DANUBE POLLUTION REDUCTION PROGRAMME

NATIONAL REVIEWS 1998
BULGARIA

TECHNICAL REPORTS

Part A: Social and Economic Analysis

Part B: Financing Mechanisms

MINISTRY OF ENVIRONMENT AND WATER

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 where submitted between May and October 1998. After revision by the international expert team, the different reports have been finalized and are now presented in the following volumes:

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

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

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

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

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

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

The **Bulgarian National Review** was prepared under the supervision of the Country Programme Coordinator, **Mr. Nikolai Kouyumdziev**. The authors of the respective parts of the report are:

- Part A : Social and Economic Analysis: **Ms. Ada Bainova**
- Part B : Financing Mechanisms: **Ms. Svoboda Tosheva**
- Part C : Water Quality: **Ms. Marieta Stoimenova**
- Part D : Water Environmental Engineering: **Mr. Ivo Popov**

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Part A

Social and Economic Analysis in Relation to Impact of Water Pollution

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1. Summary

The social and economic analysis of the health risk connected with the pollution of the Danube River basin update the "National Review of the Danube River basin - Bulgaria " published in 1993. The presented information about the years 1994-1996/1997 was collected by the following institution:

- *Ministry of Environment and Water (MEW)*
- *Ministry of Health (MH)*
- *Ministry of Transport (MT)*
- *Ministry of Agriculture, Forestry and the Agrarian Reform (MAFAR)*
- *National Institute of Statistics (NIS)*
- *15 Regional Hygiene and Epidemiology Inspectorates in the Danube River basin*
- *National Center of Hygiene, Medical Ecology and Nutrition (NCHMEN)*

The present survey examines the Danube River basin by catchment areas of its tributaries and populated regions. In the Danube River basin 7 zones on the base of their hydrographic characteristics are defined: zone A - town of Vidin region; zone B - the Ogosta River area - towns of Montana and Vratca region; zone C - the Iskar River area - town of Sofia region; zone D - the Vit River area - town of Pleven region and the Osam River area - town of Lovetch region; zone E - the Yantra River area - towns of Gabrovo and Veliko Tarnovo region; zone F - the Russenski Lom area - towns of Russe and Razgrad region; zone G - towns of Silistra and Dobritch region. By the size of the area, the biggest is zone C (22.1% of the area of the Danube River basin) where the biggest number of the hazardous industrial pollutants is located, and the smallest are zones A and F (9.4% and 8.7%, respectively, of the area of the Danube River basin).

Information about municipalities and towns with population of 10 000 and over (39 towns and villages) in the upper regions of the Danube River basin was collected with a view to identifying the so called "hot spots" regarding the health risks and priorities.

In the period 1994-1996, a steady downward trend of the size of the population of the Danube River basin, as well as of the population of the country, was observed: the number of the inhabitants of the Danube River basin decreased from 3942769 in 1994 to 3897255 in 1996. For the country the figures are as follows: 8427418 in 1994 and 8340936 in 1996. The proportion of the population of the Danube River basin to the population of the country is 46.7% and this proportion remained constant in the period observed. The distribution of the population by zones shows that the most populated is zone C (39.5% of the population in the Danube River basin) and the least populated are zones A and F (3.5% and 6.1%, respectively).

Almost no change in the proportion of the urban to the rural population of the country was registered in the surveyed period: it only declined from 67.8% in 1994 and 1995 to 67.6% in 1996. No noticeable change in that proportion was observed in the Danube River region, too; it remained at 70.6% at the average for the investigated period.

In the surveyed 39 towns with a population of 10 000 and over, the birth rate of live-born babies declined from 9.4 per 1000 in 1994 to 8.6 in 1996. At the same time, the death rate increased. In some of the towns in the region of Lovetch and Montana, the death rate was 19-20 per 1000 compared to the average for the country of 14 per 1000 in 1996.The infant mortality rate (infants who die before reaching one year of age) in the Danube River basin is about 0.1-0.2 per 1000.

The negative natural dynamics of the population of the Danube River basin is disturbing. The average rate for the country was -3.8 per 1000 in 1994 and -5.4 per 1000 in 1996. At the same time, the rate of the negative natural increase in Pavlikeni, Sevlievo, Lukovit, Troyan, Belene (Lovetch region, zone D) and Kneja, Bjala Slatina, Berkovitca (Montana region, zone B) was -10 to -11 per 1000, about two times higher than the average for the country. Not only the social and economic problems, but, to some extent, the differences in the size of the population of the towns in the regions of Montana and Lovetch, and the connected with the size differences in the age structure (in the smaller towns the population is older), account for this situation.

No tendency towards improvement of the negative demographic characteristics is observed.

As regards the social and economic status of the population of the Danube River basin, it does not differ from the national average. Because of the grave economic and financial crisis at the beginning of 1996, it is not possible to make an assessment of the status for the period 1994-1996, it can only be made for 1997. The total annual per capita income in 1997 was 900285 levs for the country and 928488 levs - for the Danube River basin. There are some differences by zones: relatively lower is the income in zones B, C, F and G and higher - in zones A, D and E. It is explained by the fact that in the latter zones some of the enterprises are relatively stable. The average salary in levs of the employee on a labour contract in the state and private sectors follows the rate of inflation. The national average monthly salary was USD 77.4 in 1997.

The towns and villages in the Danube River basin (99.4 - 99.8%) have central water supply systems. The loss of delivered raw water in the waterpipe network is from 20% to 50%. A slight increase in the water abstraction is observed and the slight decrease in 1995 is explained by the drought and the water regimen imposed in some of the towns. The total quantity of delivered domestic raw water in the Danube River basin varies from 591031 Th. m^3 in 1994 to 621707 Th. m^3 in 1996. The total quantity of water consumed varies from 320255 Th. m^3 in 1994 to 268 640 Th. m^3 in 1996. The average per capita delivered raw water was 412.5 l/h/p in 1994 and 438.99 l/h/p in 1996 and the quantities of water consumed per capita varied from 223.5 l/h/p in 1994 to 189.6 l/h/p in 1996. The decrease of the quantity of efficiently used water points to an increase in the loss of water delivered by the water main.

The wear of the water supply systems and the social and economic problems in the period observed are some of the causes leading to the increased water losses in the water main. Another reason is the lack of an effective legislative framework, ensuring a stricter control over the use of water.

The data for abstracted water for industry, agriculture, mining, irrigation and cooling demands relate to economic units, which are supplied with more than 36 thousand m^3 annually. The surface waters in the Danube River basin are the main source of water for the above mentioned purposes. The waters of the Danube River (108810 Th. m^3 in 1994) constitute 51% of the surface waters in the Danube River basin and 33.5% of all abstracted waters (including ground waters) in 1994. In 1996 the figures are, respectively 127 882 Th. m^3 or 54.6% of the surface waters and 37% of all abstracted waters in the Danube River basin, i.e., there is a tendency of slight increase in the abstracted water resources for the demands of the industry, agriculture, mining and irrigation.

Abstracted water from ground sources was 34% of the total quantity of abstracted waters in 1994 and 31.4%. - In 1996.

The economic units using over 36 th.m^3 annually are supplied with water in two ways: through independent water supply (91-94%) and supplied water (6 to 9%).

The structure of the used raw water maintained its proportion in the period of 1994-1996: about 15% for utility purposes, 77% - for manufacturing purposes and 7% - for agricultural purposes.

Some of the factories still do not have a policy for control and effective use of the water resources, such as the closing of the cycle of circulating or cooling waters.

At present, centralized pipeline systems for distribution of drinking water have been constructed for 97.2% of the urban areas. The number of water sources for central supplies is 154, of which 80.5% are underground sources and 19.5%, considerably fewer, are surface sources. Of the latter, four are drinking water reservoirs with drinking water treatment plants (DWTP). The consumption of drinking water for industrial purposes declined in 53% of the urban areas in the period 1994-1996. The average annual flow rates are relatively constant and provide the population with water quantities per capita which are higher than the adopted average limits The drinking water sources are protected against contamination by establishing sanitary protection zones "A" and "B" around them. Zone "A" is the strictly guarded site in the near proximity to the water source and its facilities. Zone "B" presents some problems as it occupies large plots of arable agricultural land, subject to restitution, which are being returned to their former owner.

More than 75% of the urban centers have no drinking water treatment plants and this is directly connected with the observed deviation of water from some of the physic-chemical and microbiological indicators (opacity, coli titre), which are not easily affected by the usual disinfection with chlorine. As a result of the regularly carried out annual monitoring, it was established that in more than 57% of the urban centers the coli titre indicator exceeds the 5% deviation allowed by the World Health Organization. In some of the cases, the deviation from the standard in coli titre has, logically, been accompanied by the absence of a disinfection factor in the network. In the period observed, there was no information of gastro-intestinal infection, subject to official registration (dysentery, enterocolitis and hepatitis A), with the drinking water being proved to be the etiological factor. In the period 1994-1997, deviations of the controlled physic-chemical indicators were observed in respect of opacity, ammonia, iron, manganese, petroleum products and 6-valent chromium. The above standard content of 6-valent chromium in the drinking water of Lom and a small region around it is endemic in nature. The specific character of the deviation of drinking water in Vratca (ammonia) and in Pleven (petroleum products) is a result of the human impact on the environment in the region (industrial pollution from carbamide production, oil production and oil processing). The significant deviations in iron and manganese, typical for the towns of Sofia and Novi Iskar, are not caused by problems related to the main water sources and the quality of the "raw" water but are introduced additionally by the amortized water distribution network. In the period 1994-1997, the introduced measures of administrative enforcement for the improvement of the quality of the drinking water were the result both of confirmed citizen complaints and of the activity of the local control activities (HEI) The analysis of the information supplied indicates a number of problems, related to the quality of the drinking water in the towns and villages in the Bulgarian part of the Danube River basin: lack of drinking water treatment plants in 75% of the urban areas; inefficient disinfection; lack of a uniform information system for the drinking water qualities; not organized sanitary protection zone "B" around the drinking water sources; amortized water distribution systems and facilities; industry originated chemical pollution (ammonia, petroleum products).

The discharged wastewater from the public sewer system and the surveyed economic units in the Danube River basin in the period 1994-1996 amount to 533444 th.m^3 - 547 666th.m^3. The quantity of discharged untreated wastewater also had minimal fluctuation: 221738 th.m^3 in 1994 and 212655 th.m^3 in 1996. These waters are discharged mainly into the river flows without being treated appropriately. A big problem is the high percentage of untreated wastewater discharged into the river flow of the Russenski Lom about 72%, compared to the average of 40% for the Danube River basin. The Plant for Antibiotics, situated in the region of Razgrad, is a big pollutant of the waters .

An upward trend of the proportion of the households connected to the sewer network in the towns with population of 10000 and over is observed. The towns of Novi Iskar and Lukovit do not have a sewer system. In the towns of Kneja and Teteven only 10 - 35% of the population is connected to the sewer system, in the towns of Lom, Kozlodui, Russe, Berkovitca, Montana, Teteven, Gabrovo, Bjala and Isperih - 50 - 85%, and in the rest of the towns with population of 10000 and over - 85 - 98%.

The problems concerning the sewer systems are the following: inadequate diameter of the sewer pipes; urgent need for repair of the systems; need for suitable equipment and for sufficient funds for maintenance of the system.

The problems relating to the municipal wastewater plants are discussed in detail in Sections B and C.

The mean quantity wastewater per capita in 1995 decreased to the amount of 171.8 l/p/d, compared to 224.6 l/p/d in 1994. The quantities of domestic wastewater, generated in the villages did not change in the period 1994-1996 as were subjected to a water regimen.

A significant part of the industrial wastewater, produced in the metallurgical, metalworking, oil processing, chemical, textile, leather and food-processing plants and factories, are not treated properly and are a great risk to the environment of the Danube River basin.

Emergency discharge of high concentrated pollutants (ammonia, organic compounds, heavy metals, petroleum products) leads to serious consequences of ecological and health nature.

One of the main sources of contamination of the waters in the Danube River basin is the uncontrolled landfills for domestic solid waste. Examined were the landfills of all 39 towns with a population of 10000 and over, from zone A to zone G, in the catchment areas of the rivers, and it was found out that they do not meet the contemporary requirements. Part of them are with exhausted capacities, others are situated very close to rivers, they lack suitable insulation, drainage systems and collectors. The municipalities face numerous problems with the control and the covering of the landfills with earth. On the landfills for domestic solid waste, industrial and hazardous solid waste is disposed and this contaminates the underground water horizons.

The investigation carried out in the period 1994 - 1997 gives reason two groups of risk solid waste landfills to be formed: sources of grave risk to environment and health and sources of potential risk. Sources of great risk are the landfills of the towns of Nikopol, Vratca, Mezdra, Cherven Brjag, Lukovit, Teteven, Lovetch and Levski.

The difficult social and economic situation of the country and the protracted process of privatization aggravate the considerable ecological and health risks that the industrial and hazardous solid waste landfills, as well as the stored unusable pesticides in most of the municipality, present. The danger becomes even greater in cases of floods and landslides, which happened in the country lately. Nowadays, it is accepted that the solid domestic, industrial and agricultural waste is one of the sources of pollution of the Danube River basin of a social and health importance.

There are no significant changes in the number and capacities of the hydro-energy plants. Their percentage in the total production of electrical energy is not big. In Bulgaria there is no legislative base for the control of pollution caused by spills of oil and other petroleum products containing polychlorinated biphenyl’s (PCBs).

In the towns, situated along the Danube River, an upward trend has been noted since 1997, in the number of permits issued for fishery from a fishing boat and with a single casting net. Relatively bigger is the catch of barbell, Silver carp and Bighead carp, Danubian bream, shad, great sturgeon and pike-pearch.

After some factories had discontinued work, the state of fishing, as a profitable occupation, improved.

Considerable problems are the limited possibilities for the natural reproduction of carp, poaching and the insufficient funds for contemporary fish farming.

In the period 1994-1997, the passenger traffic on Bulgarian ships on the Danube River has decreased sharply from 115859 in 1993 to 31660 passenger/kilometer in 1997.

The data for shipping abroad indicates an upward trend, the passenger/kilometer index increased from 32361 in 1993 to 46361 in 1997. The same applies to the cargo traffic on the Danube River. Most intensive is the cargo traffic in the ports of the towns of Vidin, Lom and Russe.

The quantities of discharged sanitary and ballast wastewater from ships into the Danube River have decreased from 251 ton in 1994 to 162 ton in 1996. The illegal discharge of sanitary waters and petroleum products and the uncontrolled dumping of refuse from ships into the river are a big problem.

The national revenue from tourism has decrease considerably in the period 1994-1997. It cannot be said that that the Danube River is a leading factor in the national and/or international tourism. The number of entertainment ships on the Danube River has drastically decreased. The same applies to the index of passenger/kilometer, too.

The insufficient number of tourist bases and the lack of tradition and investments may explain why water tourism in the towns observed, with the exception of Vidin, is not considered as a socially important, profitable occupation. The natural conditions in the regions of Belene, Russe, Silistra and Tutrakan give a reason for optimism to the people of the area in this respect.

The number of controlled beaches, swimming baths and recreation bases along the Danube has not increased, as a matter of fact, there are very few of them. The waters of the Danube do not meet the standard as regards the physic-chemical indices for organic and non organic contamination and the biological indices for Class 1 surface water which are defined as “bathing waters (Decree No. 7, State Gazette 96/1986). The indices of organic and biological contamination are higher than the norms. It is connected with the discharge into the river of domestic wastewater from the big towns, ports and some of the ships. According to the data supplied by the HEI, the waters of the Danube meet the requirements for “bathing water” only at some of the beaches in the region of the towns of Kozlodui and Tutrakan.

A survey of the ecological and health legislation related to the management of the risk of pollution of the Danube River basin shows that it is necessary to bring it in conformity with the European legislation and standards. The analysis of the existing legislation indicates that some of the legislative documents are old; there is no a contemporary legal framework for control and management of the problems. Forthcoming is the passing of the Bill of Waters, which will contribute, to the harmonization of the legislation concerned with their management. Only in the last years has the inventory of industrial and hazardous waste started. The problem of management of old hazardous waste, generated by some of the factories in the Danube River basin, has not been solved in a legal way yet.

The institutional framework for a preventive and current control over the pollution of the Danube River basin is not effective enough due to the following problems: not completed monitoring of the polluters; lack of effective information systems; financial difficulties in the implementation of the decisions on EIA. The inter-institutional contacts on the level of the regional competent bodies, involved with the prevention, reduction and management of the pollution of the Danube River basin, are not always synchronized.

The Ministry of Environment and Waters and the Ministry of Health have started the development of a National Action Plan on Environment-Health since 1996. The Plan will be part of a strategy for the protection of environment and health in Europe. It contains a number of defined activities and programs, which can be applied successfully in the Danube River basin. An example of that is the development of the Regional Action Plan on Environment-Health for the Region of Russe, which was worked out in cooperation with the Russe Municipality.

The non-governmental organizations (NGOs) that have taken an active part in the discussions on the defining of the priorities, the goals and the necessities of the development of measures for reduction of the contamination of the Danube River basin, caused by industrial and agricultural activities and by the towns and villages, suggest the following common goals and policies:

- Training, teaching programs and access to information;
- Participation in the Danube River Councils ;
- Participation in the control over the enforcement of an effective legislation;
- Public relations on all levels concerned with the above problems;
- Creating of a lobby and contacts with government institutions and local administration;
- Setting up of a center that will unite the NGOs from the regions in the Danube River basin, and will provide possibilities for regular meetings, the sharing of opinions, experiences, and data for their successful activities.

2. Description of the State of the Danube Environment

2.1. Water Resources

Bulgaria has limited water resources - a total of 19 499 x 10^6 m^3 for the country and 2320 m^3/year per capita of the population. At the end of 1997 the Ministry of Environment and Waters (MEW) prepared a "National Strategy for Development of the Use of Water Resources and Protection of Water in the Republic of Bulgaria", with the object of:

- setting up of a system of principles, regulations, priorities and restrictions to serve as a guidance on the preparation of a "State Plan for Development of the Use of Water Resources and Protection of Water";
- adoption of a conception for long-term management of the water resources and a policy for its implementation.

2.2. Biological Resources and Eco-systems

The Danube River basin includes geographic and biographic areas like Danube Plain, Ludogorie, Predbalkan, parts of the Central Balkan Range and parts of Vitosha and Rila Mountains. The variations in climate and the soil - geological conditions are a premise for the huge biological diversity. The Danube River in its Bulgarian part of 471km forms the following types of habitats with specific eco-systems:

- Danube Islands - 61(Bulgarian) with a territory of 10 624 ha. The Belene Islands Complex is the biggest along the river. Flood forests are presented by Salix alba, Salix triandra, Populus alba, Populus nigra, Querqus longipes, Ulmus effusa and others.

  Flood lowlands -270 km with total area of 450-470sq. km. The bigger lowlands are situated near the villages of Vidin, Archar-Orsoia, Kozlodui, Belene-Svishtov, Tutrakan, Vetren-Aidemir.
- Riverside lakes and marshes - these are part of the flood lowlands with constant water level. From generally 29 with a territory of about 8650 ha in the beginning of the century, today there are only about 1500 ha left.

These three types of **wetlands** play a leading role in the conservation of the biological diversity, also in providing the self-purification of the water and securing the longtime usage of the water and biological resources. **According to the Ramsar Convention (Bulgaria is member since 1976) it is necessary that great attention be paid to the wetlands which will guarantee reestablishment of the quality of the water in Danube River.**

A few projects were implemented in last years, which represent the great national and international importance of the biological diversity along Danube River:

- With the financial help of USAID a National Strategy for Conservation of the Biological Diversity was created.
- Under the Guidance of PHARE Program in the period 1996-98, a project called CORINE Biotopes was implemented which defined the 141 sites of European importance for the whole diversity of the flora and fauna.
- Under the guidance of the Bird Life International, Bulgarian Society for The Protection of Birds prepared and published the book "Important Bird Areas" in which according to the European criteria, 50 places of international importance are described.

- According to **WWF's Green Danube Program** in cooperation with the NGO Green Balkans, the National Forestry Department and the Ministry of Environment projects have been commenced for the conservation and reestablishment of the biological diversity of the islands along Danube River - Vardim, Belene islands, Lakut or the riverside marshes like Kalmok, Kaikusha.
- Thanks to **USAID** and the finances granted by the **Bulgarian Government** in 1994 the connection between the **Biosphere Reserve of Srebarna** and Danube River have been reestablished which allows the functioning of the eco-systems with the new regime programmes of Danube River basin after building new reservoirs and locks in Central Europe.

A proof for the great biological diversity in Danube River basin is presented in Table 2.1 of the chosen CORINE Biotopes. From 141 for the whole territory of the country 81 are represented in the following table. Their diversity includes wetlands, open karst landscapes, river valleys, caves - with a great significance of the bat colonies, meadows and forest eco-systems.

Table 2.1 Protected territories included in CORINE biotopes

Category	Number	Area
National Parks	5	99 389 ha
UNESCO Biosphere Reserves	7	16 215 ha
Strict Nature Reserves	9	16 091 ha
Protected Habitats	11	2 727 ha
Nature Monuments	44	3 347 ha
Historical Places	5	625 ha
Total	**81**	**138 394 ha**

The total area of CORINE Habitats in Danube River's basin including not reserved territories is 339860 ha from which 138394 ha are reserved territories.

From these as natural parks are included parts of the Central Balkan, Vrachanski Balkan, Vitosha Mountain, Rila Mountain and the whole Russenski Lom. As biosphere reserves according to UNESCO programme are included Srebarna, Chuprene, Tzaritchina, Boatin, Djendema, Steneto, Bistrishko Branishte. Srebarna is one of the five Bulgarian Ramsar Sites with international importance and World Heritage Site under UNESCO Convention. The diversity of the eco-systems included in important Bird Areas is presented in the Table 2.2.

Table 2.2 Diversity of the eco- systems included in the important bird areas in the Danube River basin

Name of The Area	Area, ha	Bird species Number	Key Species
Rayanovtci Meadows	1500		Crex crex
Tchuprene	1990	68	Alectoris graeca, Bubo bubo
Dolni Bogrov - Kazichene	1000		Crex crex, Aythya nyroca
Zimevitza Meadows	500		Buteo rufinus
Orsoya Fishponds	360	167	Phal. Pygmeus, Ayt. nyroca
Ibisha Island	70		N. nycticorax, Ard. purpurea
Island near Gorni Tzibar	60		Ph. carbo, Pel crispus
Funiyata	12		Merops apiaster
Central Balkan	36500	140	Raptors
Belene Islands Complex	1714	104	Pl. falcinelus, H. Albicilla
Vardim Island	458		Ph. carbo, Pl. Leucorodia
Mechka Fishponds	800	168	Ayt. nyroca, Ix. Minutus
Lomovete	4320	152	T. ferruginea, N. Percnopterus
Kalimok Complex	1000	183	Chl. hybridus, Ayt. nyroca
Stenata	15		Merops apiaster
Pozharevo Island	170		Ph. pygmeus, Ard. raloides
Srebarna Lake	1445	226	Pel. crispus, Egr. Alba, Br. ruficollis
Hursovska Reka (River)	2000		N. percnopterus, C. gallicus
Suha Reka(River)	1500		Bubo bubo, Acc. Brevipes, T. ferruginea

From 50 places in Bulgaria with a total area of 700 000 ha in the Danube River basin, 19 are defined (Table 2.2) with a total area of 86 914 ha according to Kostadinova (1997). There are a lot of endangered bird species (Europe & World) which live in these territories.

At the present the following projects are in progress:

- Preparation of Management Plan for Srebarna Ramsar Site - 35 000 SFr (Ramsar Bureau)
- Hydrochemical monitoring of Srebarna water - 15 000 USD (UNESCO)
- Small Scale Wetland Restoration Project in the Danube River basin - PHARE (IUCN - Slovakia).

2.3. Human Impact

The population of the Danube River basin in 1996 was 3 897 255 or 46.7% of the total population of the Republic of Bulgaria. In zone C live 39.5% of the population of the Danube River basin. A significant number of the plants of the ferrous and non-ferrous metallurgy, the chemical, textile, and food processing industries and biotechnology is located there.

The human impact, a result of the significant pollution of the Danube River basin from a combination of toxic cumulative substances with a long-term effect on health (arsenic, lead, cadmium, manganese, cobalt, chrome, nickel, phenols, halogen hydrocarbons, waste oils, oil products, biological products, etc.), is connected with the following identified sources of pollution:

- Disposal of industrial waste, a significant part of which is dangerous, at inappropriately situated and not controlled landfills;
- Remains of unusable pesticides, which were gathered but improperly stored by the municipalities in the period of 1991-1993. There has not been found a solution for their safe disposal yet;
- Disposal of industrial, agricultural and mainly dangerous waste at the municipal solid waste landfills, which are not controlled and safeguarded;
- Lack of landfills in the small settlements, where waste is disposed at risky places: in dry gullies or near small rivers;
- Ineffective control over old and dangerous industrial waste, insufficient monitoring, not well prepared reports to the EIA, lack of coordination among the state institutions in charge of the problems at regional level;
- Insufficient sewers in the towns and villages, unsuitable pipe diameters, lack of funds for the maintenance of the shafts, collectors and layouts of the sewerage system;
- Discharge of domestic wastewater, industrial wastewater from small factories, workshops, laboratories and farms directly into the sewerage system, into surface water basins /run off, flows/ and less often - in the soil;
- Lack of management and control over the rain waters on the sites of the industrial, agricultural and transport enterprises which leads to the contamination of the ground waters;
- Lack of suitable projects, faulty performance and management of the local wastewater treatment plants at the firms;
- Incorrect storage and unsuitable use of the sludge from the wastewater treatment plants containing cumulative toxic organic and non-organic compounds;
- Discharge of untreated wastewater into surface flows;
- Lack of readiness for preventing water contamination in case of natural disasters (floods, droughts, earthquakes, landslides) and accidents (explosions, fires, pipeline breakage, transport accidents);
- Inadequate sanitary control over protected areas of drinking water sources;
- Inappropriate location of sources of chemical, biological and microbiological contamination as regards risky geologic and hydrogeological sites (karsts and old mines);
- Inappropriate use of contaminated waters for watering agricultural crops;
- Location of areas of intensive agriculture and/or farms at risky sites as regards surface flows and ground waters;
- Lack of well detailed hydrogeological characteristics of risky industrial, agricultural and transport projects.

A survey of the state of drinking water revealed that in comparison with the chemical contamination, the danger of contamination of the waters with microorganisms is significantly greater.

To the biological contamination contribute the following oversights in the management of waters:

- oversights in the planning and building of, the control over, and the maintenance of the water-conduit and sewer systems;
- discharge of untreated domestic waste waters;
- insufficient and/or inappropriate disinfecting treatment of the drinking waters;
- lack of appropriate management of hospital waste;

It is necessary to mention some peculiarities, characteristic of the East European countries:

- Lack of systematized and current information at all levels of the competent state institutions;
- Insufficient access to the information systems related to the management of water contamination;
- There is no relevant enough information about failures in the management of the quality and the quantity of water (in cases of accidents, disasters, oversights);
- The municipality administration, the non-government organizations and the citizens are hindered from getting access to the available information;
- There are no information offices at regional level to communicate with and to advise the public about the ecological and health risks, connected with the water contamination in every particular case.
- The mass media cover only major failures, which affect a greater number of people.

Nothing is being done seriously or regularly at regional level for the prevention of the contamination of the waters in the Danube River basin. Lack of funds, to some extent, accounts for this situation.

2.4. Key Issues of Environmental Degradation

The key issues of environmental degradation in the Danube River basin can be systematized as follows:

1. Activities of industrial plants;

   Artificial fertilizers production (carbamide, ammonia), petrochemical industry petroleum oil refinery), leather production, metalworking workshops, pharmaceutical industry (antibiotics production), textile industry and food processing facilities (see Part C).
2. Agricultural activities;

   Animal growing (pig farms) and use of artificial ammonia based fertilizers (see Part C).
3. Urban planning;

   Lack of municipal wastewater treatment plants and inefficiency of the existed equipment for wastewater treatment (see Part B and Chapter 5). Problems with the sewage systems and urban landfills (see Chapter 5).

4. Transport infrastructure;
   Contamination of Danube River by wastes from the increasing international river traffic (see Chapter 5).
5. Mismanagement of protected areas;
   Lack of finances for protection of the wetlands.
6. Insufficient control over the river traffic;
   Lack of effective coordination at international level.

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

3.1. Present Situation

The information about the population and the water sector relates to the period after 1994 and represents an up-dating of the National Survey of the Danube River basin, which was published in 1993. The data were provided by the National Institute of Statistics (NIS), Sofia, in April; however, they do not include the demographic characteristics for 1997 as the information is at present being processed and will be ready by the end of May 1998; data base - provided by the National Geographic Information System "Health - Environment" at the National Center of Hygiene, Medical Ecology and Nutrition-Sofia, was also used.

The Danube River basin encompasses almost the entire territory of North Bulgaria (see Fig.3.1).

Annex Table 3.1 shows the towns with a population of over 10000, which are studied. The National Survey of the state of the Danube River basin includes towns with population of over 50 000.

Figure 3.1 presents the communities and the location of the settlements included in the survey for the period 1994 - 1997.

Annex Table 3.1 shows the zones and the catchment areas of the rivers that flow into the Danube River. The settlements - pollutants of the catchment areas of the rivers of the Danube River basin are towns with population of over 10 000 people. The data relating to the state of the drinking water, the domestic wastewater and municipal solid waste landfills for the period 1994 - 1997 were collected and supplied by the Ministry of Health through the Regional Hygiene and Epidemiology Inspectorates.

3.1.1. Population

The total population of the Republic of Bulgaria and its distribution by zones and catchment areas [Vidin area (zone A), Montana and Vratca area (Ogosta River, zone B), Sofia and Botevgrad area (Iskar River, zone C), Pleven area (Vit River, zone D) and Lovetch area (Osam River, zone D), Gabrovo and Veliko Tarnovo area (Yantra River, zone E), Russe and Razgrad area (Russenski Lom River, zone F) and Dobritch and Isperih area (small rivers in North-East Bulgaria, zone G)] are given in Annex Tables 3.2 and 3.3 for the years 1994, 1995 and 1996, respectively.

The data reveal that the population of Bulgaria is decreasing rapidly; it decreased from 8,427,418 in 1994 to 8,384,715 in 1995 and to 8,340,936 in 1996. The middle part of the Danube River basin is more densely populated - the bigger cities are concentrated there, and in the eastern and the western parts the density of the population is less.

No change in the proportion of the urban and rural population was registered in the surveyed period. In the period 1994 - 1996, the urban population represented 70.6% of the total population of the Danube River basin. The process of restitution of lands to their owners is not yet completed, and the economic crisis hampers the investment in the sphere of agriculture, and these may be the reasons why many of the unemployed in the cities had not moved to the country.

In the Danube River basin live more than a third of the population of the country. The catchment areas of the rivers Iskar, Yantra, Vit and Osam are more densely populated. A significant part of the enterprises, pollutants of the waters, are situated there (Annex Table 3.2).

Annex Tables 3.4-a, -b, -c show the rate of natural dynamics in the towns with population over 10 000 situated in the Danube River basin, selected for the survey for the 1994-1996 period. A disturbing trend of increasing decline in the rate of born-alive babies was found out; the birth rate in 1994 was 9.4 per 1000 and declined in 1995 and 1996 to 8.6 per 1000. The death rate in the country increased from 13.2 per 1000 in 1994 to 14.0 per 1000 in 1996. The death rate in some of the towns of Lovetch and Montana area is 19-20 per 1000.

The infant mortality rate /infants who die before reaching one year of age/ is 0.1 - 0.2 per 1000. This index, which characterizes the social and economic state of the population, has not shown a tendency towards improvement yet.

The data about the negative natural increase of the population of the Danube River basin are disturbing. The average rate for the country was -3.8 per 1000 in 1994 and -5.4 per 1000 in 1996. At the same time the rate of natural increase in Pavlikeni, Sevlievo, Lukovit, Troyan, Belene (Lovetch area, zone D) and Kneja, Bjala Slatina, Berkovitca (Montana area, zone B) was -10 to -11 per 1000, about two times higher than the average for the country. This situation can be, to some extent, explained by the age structure of the comparatively not numerous populations of some of those towns.

The preliminary data for 1997 point to a worsening demographic trend without any indications that the birth rate and the death rate will come back to normal proportion in the Danube River basin.

The 1997 data will be supplied by The National Institute of Statistics in June 1998 and supplemented to the specialized National Survey.

3.1.2. Area

Figure 3.1 shows the administrative and territorial division of North Bulgaria; the map indicates the communities and towns with population over 10,000. Figure 3.2 presents the rivers and the zones A, B, C, D, E, F and G, defined according to the catchment areas of the rivers, as they were used in the preparation of the National Survey of the Pollution of the Danube River basin in 1993. The maps were provided by the National Geographic Information System “Health-Environment” at the NCHMEN.

Bulgaria is situated on the Balkan Peninsula; the area of the country is 110 991 square kilometers. It is bounded on the east by the Black Sea, on the west by Yugoslavia and Macedonia, on the south by Turkey and Greece and on the north by the Danube River and Rumania. The length of the north boundary, delineated by the Danube River, from the Timok River to the town of Silistra, is 470.8 km.

Table 3.1 shows the area of the zones, defined according to the catchment area of the rivers, tributaries of the Danube River. The data in the Table are in accordance with the distribution by zones from Fig. 3.2.

The catchment area of zone C (Sofia) is the biggest and occupies 22.1% of the total area of the Danube River basin. The area of zones A and F (Vidin and Razgrad) are the smallest - they occupy 9.4% and 8.7% of the Danube River basin, respectively.

The Iskar River basin has the biggest part of the population surveyed.

Table 3.1 Catchment area of the rivers tributaries of the Danube River

Zone	Area/Country	Area (km^2), determined by municipalities	Proportion (%)
A	Total for zone A	2480	9.4
B	Total for zone B	6641	14.6
C	Total for zone C	10071	22.1
D	Total for zone D	6577	14.4
E	Total for zone E	8659	19.0
F	Total for zone F	3978	8.7
G	Total for zone G	8126	17.8
Danube River basin		**45532**	**100**

3.1.3. Per Capita Income

It is well known that the economy of Bulgaria, as the economies of all the countries of Central and East Europe, is not stable. In the period 1996-1997 the inflation was high as a result of the crisis in the Bank system and the wrong agricultural policy. After the change of government and the introduction of the Currency Board the economic situation has been somewhat stabilized and it can be asserted that there were no dramatic changes in the income of the population in 1997. That is the reason why the per capita income in Table 3.2 is only given for the year 1997 in accordance with the data of the National Institute of Statistics (NIS) and the Territorial Departments of Statistics (TDS), which cover the areas in the Danube River basin. The total per capita income is a sum of the money income and income in kind, which is calculated according to an internationally adopted method.

Table 3.2 Per capita income in 1997 according to the data of TDS

TDS	Zone	Total income * levs	Money income levs	Income in kind levs
Average for the country		**900285**	**639571**	**260714**
Average for the Danube River basin		**928468**	**591552**	**336915**
Vidin	**A**	1070256	584888	485368
Vratca	**B**	1183495	612058	571437
Montana	**B**	852405	483775	368630
Sofia – city	**C**	814849	743949	70900
Sofia – district	**C**	731097	534796	196301
Lovetch	**D**	1125598	722263	403335
Pleven	**D**	1084228	663136	421092
Veliko Tarnovo	**E**	1040269	648286	391983
Gabrovo	**E**	866318	638805	227513
Razgrad	**F**	832269	487838	344431
Russe	**F**	808633	584271	224362
Targovishte	**F**	786884	481047	305837
Silistra	**G**	891150	487797	403353
Dobritch	**G**	962128	610864	351264
Shumen	**G**	877437	589512	287925

** Total income = money income + income in kind*
Note: The exchange rate due to the crisis at the beginning of 1997 was about 1 $= 200 levs

The average rate of inflation for 1997, according to NIS data, is presented in Table 3.3. The per capita income in the area of zone B, zone C, zone F and zone G is comparatively low. The per capita income in zone A, zone D and zone E is higher. This can be explained by the fact that some of the enterprises in the latter zones are relatively stabilized.

Table 3.3 Average rate of inflation in Bulgaria in 1997 and 1998 according to the data of NIS, Sofia

Month	Rate of inflation %		Month	Rate of inflation %	
	1997	**1998**		**1997**	**1998**
January	43.5	2.1	July	3.7	no
February	242.7	1.7	August	5.5	
March	12.3	-0.1	September	3.6	data
April	-0.7	0.1	October	0.5	
May	5.6	0.5	November	0.5	available
June	0.8	-1.9	December	1.5	

Annex Table 3.5 shows the average salary in levs of the employed on a labor contract in the state and private sectors in the municipalities in the Danube River basin in 1996. It should be noted that by the end of 1996 a significant number of private firms, small size businesses and cattle and pig farms went bankrupt because of the grain crisis and the crisis in the Bank system. Moreover, the sharp rise of the rate of inflation at the end of 1996 and the beginning of 1997 depreciated to a great extent the incomes of the population.

The minimal salary is changed regularly by Government decrees. According to the NIS data, the average salary in 1997 was 137 583 levs. At the rate of exchange 1 dollar = 1778 levs the average salary was USD 77.38 per month.

3.1.4. Domestic Water Demand

- Total quantity of delivered raw water;
- The term "delivered raw water" includes the water consumed plus the water lost in the water-supply system; the losses are usually in the range of 20 - 50% of the raw water in the central water main.
- Average per capita consumption of water and average per capita quantity of raw water delivered;
- Proportion of the population receiving water from the central water supply system.

The data provided by the National Institute of Statistics are included in the tables attached (Table 3.4 and Table 3.5). However, the official data for 1997 are being processed and it is impossible to use them at present. It may be possible to get the processed data by the end of June 1998 and to complete the report.

In the tables attached the following terms are explained:

- *"water delivered"* is the quantity of water which is conducted by the water-supply system from the water source or the water treatment plant to the consumer;
- *"efficiently used water"* is the water conducted to the consumer and registered by the customer's water-meter or billed to the customer on the basis of legislative documents, applied in the cases where the customer /a person or an organization/ has not got a water-meter.

The "water delivered" quantity per capita was calculated for towns and villages with water supply systems, taking into account the total population, although in some places not all of the inhabitants get water from the main.

The "efficiently used water" quantity per capita per day was calculated taking into account not only the efficiently used drinking water by households, but also at public services, hotels, baths, restaurants and institutions where the customers get it free of charge.

Almost all small and bigger towns in the country (including the Danube River basin) have central water supply systems. Those of the villages that are without a central water supply system is usually sparsely populated, situated in mountainous, not easily accessible sites. Their inhabitants draw water from wells and springs because the building of a central water supply system is considered to be economically unjustified.

There is a trend of slight increase in the abstraction of water. The slight decline in the rate of raw water abstraction in 1995 was due to the heavy drought in the winter of 1994 and the spring of 1995; many towns and cities, including Sofia, were put on a water regimen at that time.

There is a marked trend towards decreasing the quantity of the efficiently used raw water which only means that the quantity of water lost in the water supply network /unproductive loss of water/ is increasing.

Table 3.4 General information about the raw water supply to the population of the Danube River basin - the Bulgarian part

Indices		1994	1995	1996
Proportion (%) of the population connected to the central water supply system:				
➢ the Danube River basin	Total	98.2	98.4	98.4
	cities	98.7	98.6	98.8
	villages	84.2	83.8	84.4
➢ Bulgaria	Total	98.7	98.7	98.7
Total quantity of the water delivered for domestic use (thousand $m^{3)}$:				
➢ Danube River basin	Total	591 031	584 689	621707
	cities	474 596	452 556	505512
	villages	116 435	131 933	116195
➢ Bulgaria	Total	1309628	1201371	1242680
	cities	1023729	954725	988317
	villages	285899	246646	254363
Average quantity of water delivered per capita (l/h/day):				
➢ Danube River basin	Total	412.5	408.2	438.9
	cities	469.0	449.6	506.9
	villages	276.1	310.0	277.0
➢ Bulgaria	Total	398.6	400.4	410.2
Total quantity of efficiently used water (thousand m^3):				
➢ Danube River basin	Total	320 255	206 645	268 640
	cities	267 262	203 493	214 072
	villages	52 993	57 152	54 568
➢ Bulgaria	Total	701043	591457	587888
	cities	562300	467616	462386
	villages	138743	123841	125502
Average efficiently used water per capita (l/h/day)				
➢ Danube River basin:	Total	223.5	144.3	189.6
	cities	264.3	202.1	214.7
	villages	125.7	134.3	130,1
➢ Bulgaria	Total	160	137	139

3.1.5. Domestic Wastewater Production

- Total quantity of domestic wastewater (wastewater generated by the population 85% of the water consumed);
- Average quantity of generated domestic wastewater;
- Proportion of the population connected to the central water supply system

Only those settlements (cities, towns and villages) that have sewerage, collector and all the facilities for the intake and discharge of the domestic and industrial wastewater into wastewater treatment plants or directly into receivers (river, gully, sea, etc.), are considered in the statistical evaluation. General information is presented in Table 3.5.

There are towns and villages in the Danube River basin without sewerage. The wastewater treatment plants are not numerous (see Part B).

Table 3.5 General information about the population, connected to the public sewerage system in the Danube River basin

Indices		**1994**	**1995**	**1996**
Total quantity of domestic wastewater, calculated as 85% of the water consumed by the population (thousand m^3):				
➢ Danube River basin	Total	272 217	175 648	228344
	cities	227 173	172 969	181961
	villages	45 044	48 579	46 383
➢ Bulgaria	Total	595886	502738	499705
	cities	477955	397474	393028
	villages	117931	105841	106677
Average quantity wastewater per capita - l/h/d (calculated as 85% of the efficiently used water):				
➢ Danube River basin	Total	190.0	122.7	188.8
	cities	224.6	171.8	182.5
	villages	106.8	114.2	110.6
➢ Bulgaria	Total	136.0	116.2	118.4
Proportion (%) of the population connected to the public sewerage network:				
➢ Danube River basin	Total	65,7	65,7	65,0
	cities	92,2	92,1	90,9
	villages	3,8	3,9	4,8
➢ Bulgaria	Total	66.5	66.5	66.5

3.2. Projection for Planning Horizons 2010 and 2020

3.2.1. Population

The official statistic data about the demographic characteristics of the population of the Danube River basin by catchment areas and by towns with population over 10 000, situated in zones A, B, C, D, E, F and G, for the period 1994 - 1996, indicate that the population of the area is definitely decreasing (Annex Tables 3.2, 3.3).

The natural dynamics are negative with a tendency towards increasing its negative rate (Annex Tables 3.4-a, -b and -c). The infant death rate in the surveyed areas has not lowered during the periods observed. The death rate is steadily increasing and in some of the areas (zones B, C and D) it is considerably higher than the average for the country.

It can be expected that these unfavorable trends will continue in Bulgaria, as well as in the rest of the East European countries, until the year 2010, and only a social and economic stability could lead to normalization of the demographic characteristics of the population of Bulgaria after the year 2010.

There are no available published data from the governmental institutions to estimate the planning horizons 2010 and 2020.

3.2.2. Domestic Water Demand

When discussing the future domestic water demand, the following considerations should be taken into account:

- A considerable decrease of the urban and rural population is expected;
- The expected average water demand in litters per day is projected according to the characteristics of the different classes of the towns. For the purpose of the prognosis the towns were divided into 6 classes for the period to the year 2000 and from 2001 to 2010 (Annex Table 5.22);
- The carried out investigation found out that the losses of the central water supply system are very great (Table 3.4). They were ascertained to be 54% in 1994, 35% in 1995 and 43% in 1996. The water supply network in the Danube River basin needs replacement of the pipes, correction of the layout, reconstruction and extension to some of the sectors of the towns, which were built without getting a proper permission issued by the municipality.

It is expected that even up to the year 2010 the losses in the central water supply system will continue to be significant and high in comparison with the standards of West Europe.

3.2.3. Domestic Wastewater Production

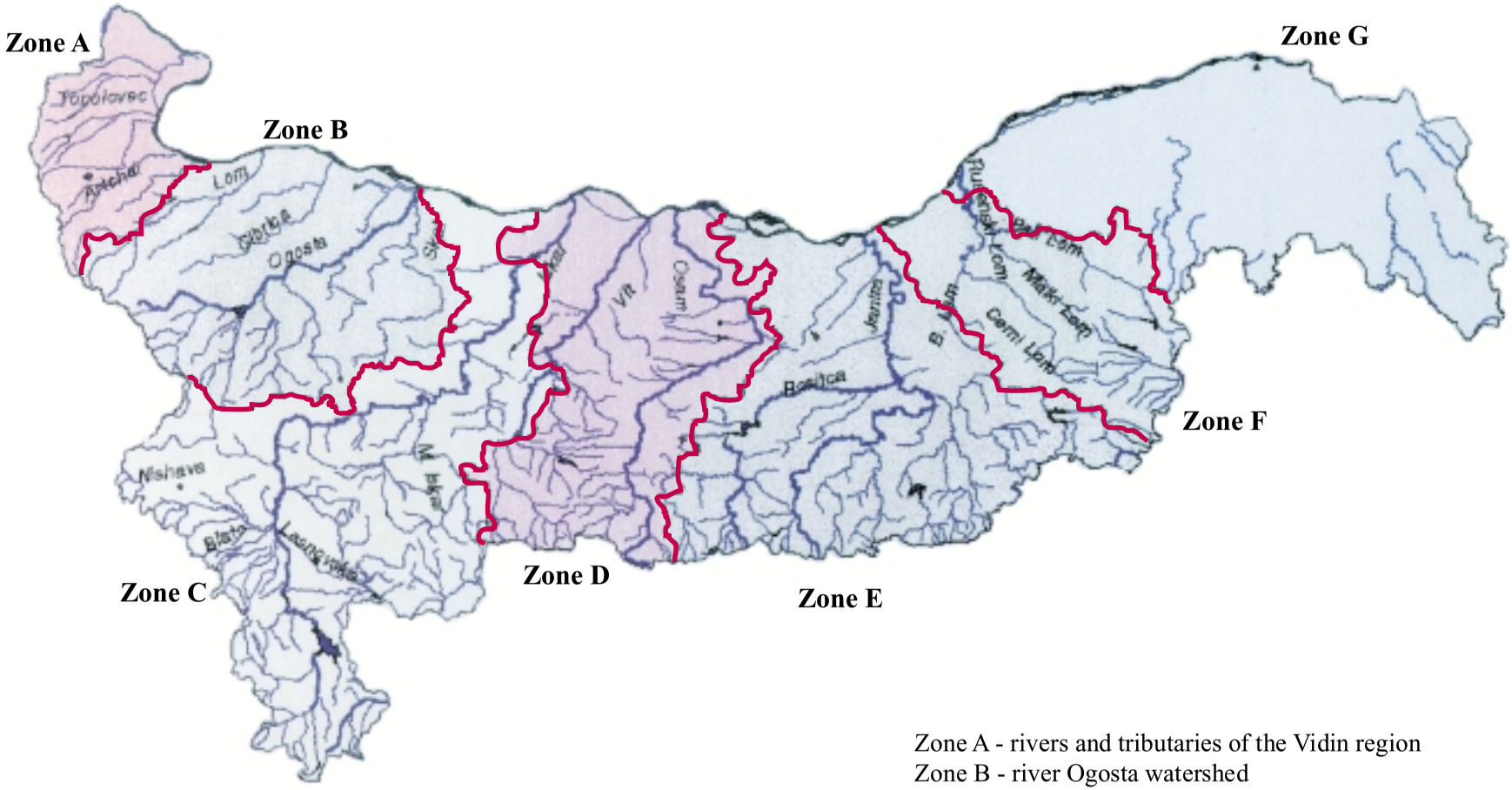
The prognosis for the domestic wastewater production (DWWP) up to the year 2010 can be discussed in the following directions:

- The expected average production of DWW per capita in litters per person per day is calculated as 90 % of the water used, depending on the characteristics of the class of the town. The prognoses in Annex Table 5.23 relate to the period up to the year 2000 and from 2001 to 2010.
- In any case, the proportion of DWWP for the urban population will be higher (over 60%) than the one for the rural population, and especially the population of the mountainous region of the Danube River basin.

- It is expected that the proportion of the population connected to the sewerage systems of the towns will increase. It is expected that illegal construction sites, new town districts and some small towns will be connected to the town sewerage systems. The realization of these projects depend on the social and economic state of the municipalities;
- It is expected that the construction of the municipal wastewater treatment plants in the towns of Troyan and Isperih will be completed (see Part B);
- It is expected that municipal wastewater treatment plants will be built in most of the towns which have urgent need of them (see Part B);
- Expansion and reconstruction of the municipal wastewater treatment plants in the towns of Sofia and Samokov is expected (see Part B).

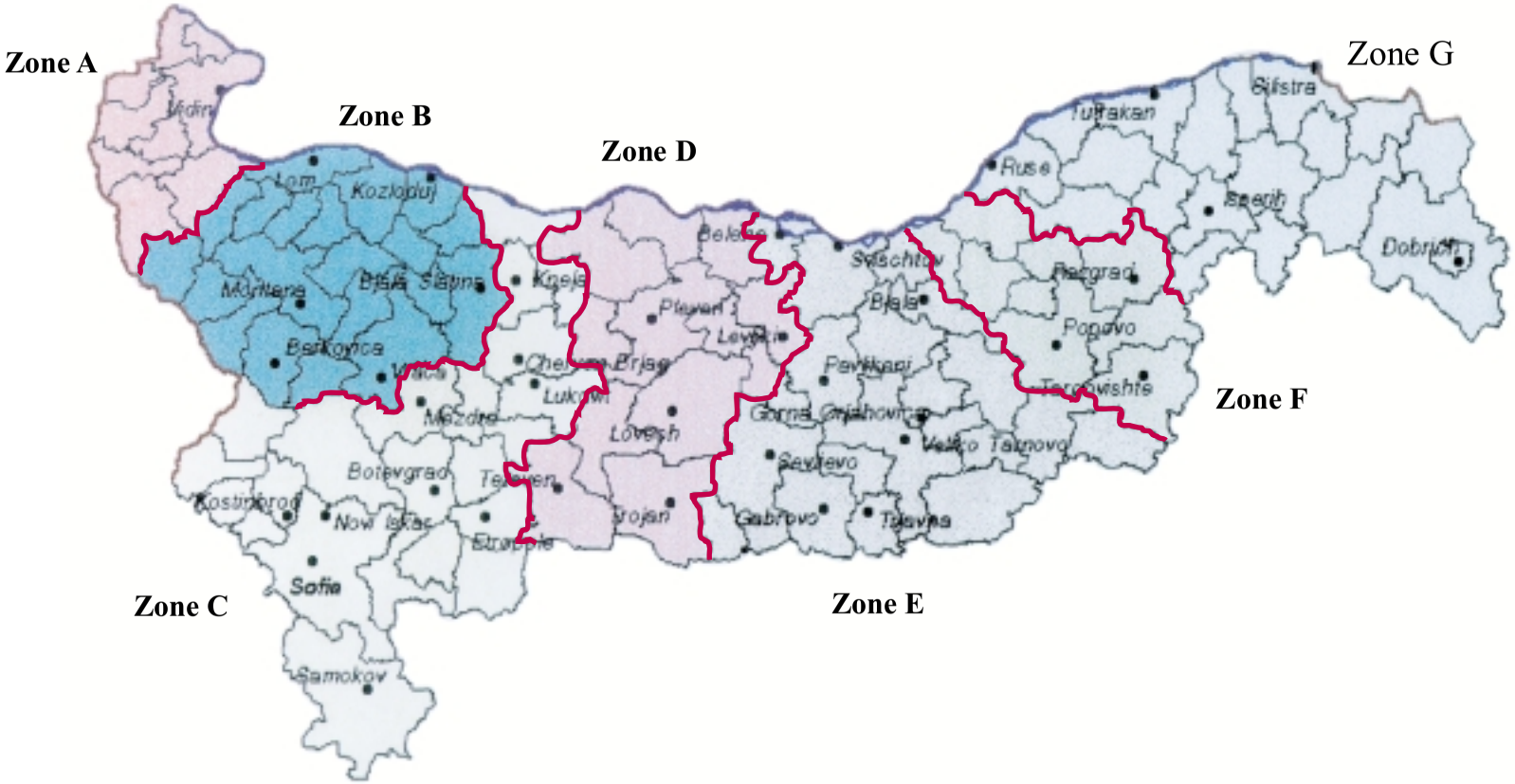
It is not possible to make real prognoses about the development of the population, the drinking water supply and the management of the domestic wastewater production for the period 2010 - 2020.

Figure 3.1. Water resources balance zones for the Danube River basin



Zone A - rivers and tributaries of the Vidin region
Zone B - river Ogosta watershed
Zone C - river Iskar watershed
Zone D - rivers Vit and Osam watershed
Zone E - basin of the Jantra River
Zone F - basin of the Rusenski Lom River
Zone G - rivers and tributaries of the Silistra and Dobritch regions

Figure 3.2. Administrative communities and settlements with population greater than 10 000 inhabitants across the Danube River basin zones



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

The urban centers with population of more than 10 000 citizens concentrate a total of 2 506 678 persons.

An analysis has been made of the available information concerning drinking water supply in the area gathered by the drinking water control institutions (the Hygiene and Epidemiology Inspectorates, Water Supply and Sewer Companies). The data are presented in the tables in Annex 4.

Annex Table 4.1. reflects the degree of completion of centralized pipeline systems for distribution of drinking water. Such systems have been constructed for 97,2% of the urban areas. Only in the town of Kneja 58% of the citizens (8 333 households) have not been provided with centrally supplied potable water. The number of water sources for central supplies is 154, with 80,5% of the cases being underground sources (124 in total) and in 19,5% (32 in total) - surface sources. Of the latter, four are water reservoirs specially constructed for that purpose – the Iskar reservoir (Sofia), the Al. Stamboliski reservoir (V. Tarnovo, G. Orjahovitsa), the Yovkovtsi reservoir (Gabrovo, Sevlievo), and the Srechenska Bara reservoir (Vratca, Montana). The town of Botevgrad receives drinking water form a non-regulated water source – the Bebresh reservoir, constructed for industrial purposes. The mean annual flow quantities are relatively constant and supply each citizen with a quantity which is several timers higher than the average limit quantities of 120-150 l/24 h/p adopted for Bulgaria and Europe and depending on the size of the urban area. Exceptions are Lom and Byala Slatina where the population has been provided with only 53 - 38 l/24 h/p, respectively, calculated on the basis of submitted actual average annual flow data.

Sanitary protection zones “A” have been established around most water sources in compliance with the regulations (Regulation No 2 on the Sanitary Protection Zones around Drinking Water Sources). The problems stated in the information about the sanitary protection zones, such as in Sofia, Razgrad and Isperih, are localized in the zone "B", although this has not been clarified. The reasons for this are of an objective nature and are related to restitution of lands and the manner of land use of those areas.

More than 75% of the urban centers have no drinking water treatment plants. The water is supplied to the population following disinfection with chlorine gas or other chlorine chemicals only, and the necessary efficiency of the process ensuring safety of the drinking water in respect of infectious diseases conveyed by water can not be ensured.

The consumption of drinking water for industrial purposes is on the decline in 53% of the urban areas. In 6 areas the same level is preserved and it increases for the remaining in proportion to the increasing number of enterprises (Table 4.2.). The data collected and available for the consumed drinking water is sporadic in nature and their informative value is relative. The increased water consumption in the indicated singular cases can be related to the opening of new sites or expansion of existing ones (Byala, Montana, Russe).

In more than half of the urban centers (57%) the deviation of waters from the standards on microbiological indicator exceeds the 5% deviation allowed by the WHO. It is visible from the data in Annex Table 4.3 that significant deviations exist in certain years for the towns of Byala,

Montana, Lukovit, Vidin, Razgrad, Popovo, Tutrakan, Novi Iskar and Sofia. The exceedance of the allowable percentage of drinking water deviation from the standard for the whole period of 4 years has remained for the towns of Lovetch, Teteven, Silistra, Russe, Berkovitca, Mezdra, Byala Slatina, Kneja and Vratca. In certain cases, the deviation from the standard in coli titre has, logically, been accompanied by the absence of a disinfection factor in the network. The infections disease rate by nosological units such as enterocolitis, disintery and hepatitis A is lower than the average for the state, which is, respectively, 197.16 $^{0}/_{0000}$, 116.73$^{0}/_{0000}$, and 74.33$^{0}/_{0000}$. According to the data submitted by the Hygiene and Epidemiology Inspectorates, there are no cases of proven gastro-intestinal infection with an etiological factor being the drinking water.

The physicochemical properties of the drinking water (Annex Tables 4.4. – 4.7.) are monitored by the laboratories of the municipal and state owned Water Supply and Sewers Companies, while the health control is carried out by the laboratories of the Hygiene and Epidemiology Inspectorates of the Ministry of Health. More frequent (4 times annually) studies are made on a limited number of infirm indicators, which can be associated with the quality, and efficiency of water treatment, which involves disinfection. Once in 3 or 5 years, depending on the water source's stability, more indicators are studied as regulated by the Bulgarian State Standard on Drinking Water. The former lack of a uniform information system for the Bulgaria's drinking waters quality, including the territory of the Danube basin, poses an objective hindrance to collection of the necessary retrospective data, the determination of exposure and the degree of the health risk for a particular pollutant.

The most frequent deviations of the controlled infirm parameters (Annex Tables 4.4. – 4.7., Part A), from the Bulgarian State Standard are observed in respect of opacity and ammonia, and, more rarely, of oxidability and nitrides. Only in Razgrad there are data on exceedance of the nitrates standard in 1996. The nitrites are a problem for the drinking waters of the Razgrad region, especially for the rural populated areas whose water is supplied from local underground sources. The deviations of the parameters stated (Part A of the Annex Tables) are caused in most cases by inadequate and inefficient treatment of water prior to its supply to consumers and not so much by the qualities of the raw water. The presence of ammonia in waters in the karst regions in the towns of Vratca, Montana and Cherven Bryag, reaching up to several scores per mg/l is determined by industrial pollution proven in a number of studies. It is visible from the tables for the drinking water physic-chemical characteristics (Annex Tables 4.4. – 4.7., part B) that the data are scarce, especially concerning toxic elements, and there are no data whatsoever on specific pollutants such as petroleum products and pesticides. These last are analyzed specifically in the event of doubt of pollution, or if provoked by industries typical for the region, such as timbering and oil processing around the town of Pleven. Concerning toxic elements, the above-standard content of 6-valent chromium is characteristic of a small region around the town of Lom and is endemic in nature. No epidemiological studies have been conducted amount the population exposed to chromium through the drinking water. Deviations in iron and manganese are typical for the town of Sofia and Novi Iskar. These are not caused by problems related to the main water sources, but are introduced additionally by the amortized water distribution network.

The emergency pollution of drinking water sources in the Danube basin, registered in the period 1994 – 1997 (Annex Table 4.8.), are related to industrial pollution with petroleum products (Pleven), chemical pollution from carbamide production (Vratca) and pollution with sanitary waters (Kneja). Citizen complaints are provoked by changes in the organoleptic properties of water, related to deviations in opacity, iron and manganese (Sofia, Vratca, and Pleven). The significant number of complaints in 1994 in the town of Samokov has probably been related to similar reasons but the lack of data for the physico-chemical and microbiological analyses of drinking waters makes it difficult to establish the relation. The measures of administrative enforcement are the result both of confirmed citizen complaints and of the activity of the local

control authorities. The specific inspections of drinking water supplies by the Hygiene and Epidemiology Inspectorates involve also the documents describing the disinfection of water. Although such documents exist in 88% of the water supply disinfection points, the data contained there are formal in nature and do not represent the actual property and efficiency of processing (Annex Tales 4.1. and 4.3.).

The main problems related to the drinking water quality in the Bulgarian section of the Danube basin are caused by:

- Lack of drinking water treatment plants – 75% of the urban centers
- Inefficient disinfection
- Lack of a uniform information system for the drinking water properties
- No organized sanitary protection zone B exist around the drinking water sources
- Amortized water distribution systems and facilities
- Industry originated chemical pollution (ammonia, petroleum products)
- Endemic region with above-standard chromium contents

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

The actual and future population potentially affected by the unsanitary conditions in the Danube River basin is discussed in chapters 3.1.1, 3.1.2 and 3.2.

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

The main health hazards related to the water pollution in the Danube River basin relate to the risks from microbiological contamination of the drinking water, the presence of 6-valent chromium, petroleum products, ammonia and nitrates in isolated regions due to the pollution of the drinking water sources with fertilizers and industrial waste.

The data collected by 15 Hygiene-Epidemiology Inspectorates on the drinking water quality in the 39 towns with more than 10000 inhabitants for the period 1994 - 1997 are presented in Tables 4.1 - 4.8. Table 4.9 gives a summary on the geographical problem area. It should be stressed that the Bulgarian state standard for drinking water includes all the requirements and standards concerning raw water quality for drinking water purposes of the EU. The main health hazards related to drinking water quality and usage (Table 4.9) might be stressed as follows:

- The ratios of the non-standard samples by total coliforms (titre) exceeds the allowable standard of 5% (World Health Organisation) in most of the towns in the Danube River basin. There is a risk of development of water born infection diseases as *Enterocolitis, Dysentery and Hepatitis A* (see Table 4.3).
- In zone A of the Danube River basin an endemic area with naturally enhanced content of chromium-6^+ has been established and monitored by the hygiene institutions. The water-soluble chromium-6^+ compounds are classified by IARC as carcinogenic to humans of Class-1 with sufficient evidence for carcinogenicity. The health promotion policy of the Ministry of Health involves a continuous tendency to reduce the number of drinking water sources in this area.

- The region of Pleven has a significant number of drinking water sources contaminated by petroleum oil products due to inappropriate industrial practices during the last 40 years. The petroleum refinery "Plama" has an old and non-effective WWTP. The poor geological research practices along the terraces of the rivers Vit and Ossam resulted in additional contamination with rock oil. The continuous monitoring of the drinking water from the region of Pleven has been supported by additional studies of the composition of petroleum oil products. No polycyclic aromatic hydrocarbons (PAH's) have been determined in the samples.
- The plant for artificial ammonia fertilizer situated near Vratsa is the source of ammonia contamination of the drinking water in the area of the town Cherven brjag. The WWTP of the enterprise is not efficient. Besides, the karst in the region contributes to the ammonia transfer in the underground waters.
- Periodically increased turbulence and enhanced nitrite levels in the drinking water of different areas of the Danube River basin (Table 4.7a) have been seasonally determined. They are not expected to impose serious health effects.

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

The quantity of the abstracted water resources is the result of the water intake by public water supply companies and of the waters abstracted with facilities owned by the inspected companies (independent water supply). Double counting in the transfer of water between the public water supply systems is also possible.

The water use and the wastewater data are the result of many years of statistical surveillance.

The following rivers, forming river valleys flow in the Bulgarian water shed of the Danube: Ogosta, Iskar, Vit, Osam, Yantra, Rousenski Lom and other rivers (included here are the rivers to the west of the Ogosta river, the rivers to the east of the Rusenski Lom river and the rivers from the western parts of the country which, crossing former Yugoslavia, are discharged into the Danube). The watersheds are presented in Figure 5.1.

5.1.1.1. Domestic Raw Water Demand

These needs are provided from territorially different Water Supply and Sewers companies – the data are presented in chapter 3.1.4.

5.1.1.2. Industrial/Mining Raw Water Demand

The data for the extracted water resources relate only to the companies observed by the National Institute of Statistics – those which are supplied with more than 36 thousand m^3 annually. The data apply mainly to the average and large industrial sites. Presently, it is not possible to assess the total water intake in the territorial, or the natural and geographical aspect, since the National Institute of Statistics does not possess the necessary data of the Irrigation Systems Ltd.

"Independent water supply" is the activity of extraction of water through owned facilities for individual use from surface, ground and other water sources.

"Surface" is the water, which is collected or which flows at the surface: rivers, streams, lakes etc., as well as the artificial water bodies.

"Ground waters" are those contained in ground formations and which can be abstracted. These are permanent or temporary stocks of water available in the ground layers. This indicator includes ground water carrying layers with a free table, as well as the deep head or headless aquifers contained in porous rocks.

Regarded as ***"supplied"*** is the water received from public water supply companies.

The used water is formed from the used fresh water and the recycled water. The water, which is considered "raw", is the water, which has not been used hitherto.

"Cooling water" is the water, which has been used for heat absorption and removal.

A main source of water in the Danube basin are the surface waters (Annex Tables 5.1-a, -b, -c, 5.2, 5.3- a, -b, -c and 5.4). The tables relate to the watersheds of the main rivers according to the zones from A to F.

For the companies these are:

- 213 481 th.m^3 - 65,7 % of the total quantity – for 1994;
- 230 986 Th. m3 - 65,3 % of the total quantity – for 1995;
- 234 308 Th. m3 - 68,1 % of the total quantity – for 1996 which is 24% of the total quantity of abstracted surface waters for Bulgaria and for the companies;

Of all surface waters abstracted in the Danube basin, the waters of the Danube are as follows:

- for 1994 – 108 810 Th. m^3, i.e. – 51 % of the surface waters and 33,5 % of all abstracted waters (including ground waters);
- for 1995 – 127 016 Th. m^3, i.e. – 55 % of the surface waters and 35,9 % of all abstracted waters;
- for 1996 – 127 882 Th. m^3 i.e. – 54,6 % of the surface waters and 37 % of all abstracted waters.

There is a remaining trend of 50-55 % of the abstracted waters to be waters from the Danube, and these amount to 33-37 % of all abstracted waters.

The water abstraction from ground sources has also remained stable:

- for 1994 these are 111 199 Th. m^3, which is 34 % of the total quantity of abstracted waters;
- for 1995 these are 122 503 Th. m^3, which is 34,6 % of the total quantity of abstracted waters;
- for 1996 these are 108 085 Th. m^3, which is 31,4 % of the total quantity of abstracted waters.

The trend is approximately 31-35% of the abstracted waters to be from ground sources.

The total water supply for the companies with more than 36000 m^3 annual water use according to the NIS was 470275 Th. m^3 for 1996 /surface waters, Danube river and ground sources/. From the watersheds of the main tributaries the data are divided as follows: Iskar river 80 664 Th m^3, Osam river 21 931 Th m^3 , Ogosta river 33 973 Th m^3 and Russenski Lom river 159 753 Th m^3. There are no data available for the watersheds of the other tributaries.

Abstraction of water for the needs of companies, is provided for in two ways: through independent water supply (91 – 94%) and supplied water (6 – 9%), according to the Annex Table 5.2.

There are no substantial changes in the raw water use structure (Annex Tables 5.3 – a, b, c and 5.4):

- for 1994 – of 83 441 Th. m^3 raw water – 15% for utility purposes in the industrial enterprises, 77% for manufacturing purposes and 8 % for agricultural purposes.
- for 1995 – of 109 189 Th. m^3 raw water – 14% for utility purposes in the industrial enterprises, 80 % for manufacturing purposes and 6 % for agricultural purposes.
- for 1996 ã. – of 93 052 Th. m^3 raw water – 15,8% for utility purposes in the industrial enterprises, 77,5% for manufacturing purposes and 6,7% for agricultural purposes.

5.1.1.3. Agricultural Raw Water Demand for Irrigation

The data concerning agricultural raw water demand for irrigation are given in chapter 5.1.1.2. No data are available for irrigation.

5.1.2. Wastewater Discharge to the Danube River System

"Wastewater" is generated as a result of a particular activity and they become not suitable for the purpose they were used for.

"Treated" are the wastewater that receive effluent treatment with the help of facilities (that work independently) or in wastewater treatment plants. There are several types of treatment: mechanical, biological and other methods. The volume of the waters that pass through several types of treatment is recorded only once - at the final stage of effluent treatment

"Other methods of treatment" include all single operations that cannot be classified as biological or mechanical, as: coagulation, flocculation, precipitation and others.

The discharged wastewater from the public sewerage and the surveyed economic units (Annex Tables 5.5 -a,-b,-c, 5.6, 5.7, and Table 5.1 relating to the catchment areas of the rivers in accordance with Fig. 5.1) were assessed as follows:

- 533 444 thousand m^3 in 1994 ;
- 547 666 thousand m^3 in 1995 ;
- 533 548 thousand m^3 in 1996 , that is, the fluctuation is minimal.

The proportion of the untreated wastewater (Table 5.1) is as follows:

- 41,6 % of the discharged waters in 1994;
- 39 % of the discharged waters in 1995 ;
- 39,8 % of the discharged waters in 1996 .

During the last years, over 70% of the wastewater, discharged into the river flow of the Rusenski Lom, were untreated:

- 74,5% in 1994;
- 72 % in 1995;
- 71 % in 1996.

The proportion of untreated wastewater discharged to the main river flows of the Danube River basin varies from 27% to 74.5%, and the proportion of the treated with biological filter waters to the total volume of the wastewater varies from 9% in 1996 (the Osam River) to 56.8% in 1996 (the Iskar River). More detailed information is given in Table 5.1.

Table 5.1 Summarized information about the wastewater in the Danube River basin - proportion (%) of untreated waters to effluents and biological filter treated waters

	Catchment areas	Year	% untreated wastewater	% of biologic filter treated waters to the total volume of wastewater
1.	**Ogosta**	**1994**	**27**	**37,3**
		1995	**35**	**27,3**
		1996	**39**	**25,1**
2.	**Iskar**	**1994**	**31,5**	**55,7**
		1995	**31**	**53,1**
		1996	**32,7**	**56,8**
3.	**Osam**	**1994**	**-**	**0,2**
		1995	**27**	**4,3**
		1996	**35,1**	**9**
4.	**Vit**	**1994**	**44,9**	**50,6**
		1995	**42**	**56,8**
		1996	**40,1**	**58,5**
5.	**Yantra**	**1994**	**45**	**48,4**
		1995	**42**	**44,6**
		1996	**41,3**	**26,9**
6.	**Rusenski Lom**	**1994**	**74,5**	**6,7**
		1995	**72**	**9,2**
		1996	**71**	**7,1**
	Total for the Danube River basin	**1994**	**41,6**	**41,4**
		1995	**38,9**	**38,7**
		1996	**39,8**	**38,9**

5.1.2.1. Domestic Wastewater Production

The information about the state of sewers, the collection and management of domestic wastewater, shown in Annex Table 5.8 is related to the towns with population over 10 000, situated in the Danube River basin. In the period 1994-1996, it indicates an upward trend of the proportion of the population connected to the sewer network in the bigger towns, more particularly at the construction of new house buildings (Lom, Belene, Kostinbrod, Pleven, Levski) and, respectively, a downward trend of the proportion of the population not connected to the sewer system. However, this is not the case with the illegal construction of houses, mainly in the villa zones and in the outskirts of towns.

About 50 - 85% of the population of the towns of Kozlodui, Russe, Berkovitca, Montana, Teteven, Gabrovo, Bjala and Isperih are connected to the municipality sewer network.

The towns of Novi Iskar and Lukovit do not have sewer systems. Septic tanks are used. In the rest of the towns 85-98% of the population are connected to the municipality sewer system. It should be noted that in almost all the cases, according to the information of the regional Hygiene and Epidemiology Inspectorates, there are problems with the collection and management of domestic wastewater.

- Insufficient sewers, especially in some districts of the cities;
- Inadequate (most often small) diameter of the sewer pipes;
- Old pipes not replaced regularly;

- Lack of, or insufficient technical equipment for maintenance and cleaning of the sewers (pump stations, cleaning and scavenge machines);
- Illegal clogging with solid fractions by people lacking a sense of responsibility;
- Illegal plugging in the sewer system;
- Old layout, not always functional in terms of urban planning;
- Irregular extermination of the rodents in the sewer system;
- Faulty maintenance of the street run off from the rain waters;
- Discharge of industrial wastewater into the municipal sewer carrying the risk of clogging, corrosion or soiling of the pipes;
- Not completed municipal collectors (Pleven, Popovo) or lack of such (Teteven, Lom).

The above mentioned serious problems were aggravated in the period 1994-1997 by the economic crisis and the lack of funds in most of the smaller municipalities. The monopoly the firms of the "Water Supply and Sewer Systems" have contributed, to a great extent, to the difficulties in collecting and management of the domestic wastewater.

Annex Table 5.9 presents the average annual output of domestic wastewater in m^3/sec., by towns, for the period 1994-1997.

Before discharge into the receiver, the municipal sewer systems most often use grids and settling tanks for large particles with a comparatively low efficiency.

The data collected indicate that in the towns with population over 10 000 on the banks of the Danube (Vidin, Lom, Svishtov, Belene, Kozloduy, Russe, Silistra and Tutrakan), as well as in all the smaller municipalities, **there are no municipal wastewater treatment plants**. The same applies to some of the towns in the rest of the catchment areas of the Danube basin: Berkovitca, Montana, Bjala Slatina, Kostinbrod, Novi Iskar, Mezdra, Etropole, Lukovit, Kneja, Teteven, Troyan, Lovetch, Levski, Trjavna, Gorna Orjahovitsa, Sevlievo, Pavlikeni, Bjala, Popovo. Some of the towns have projects or the readiness for projects of municipal wastewater treatment plants /MWWTP/.

In the towns of Troyan and Isperih the MWWTP are under construction.

The towns with population over 10 000 in the Danube River basin that have MWWTP are the following: Vratca, Samokov, Sofia, Botevgrad, Pleven, Gabrovo, Veliko Tarnovo, Razgrad and Dobritch. The insufficient capacity and the bad technical condition of the MWWTP in Sofia, Samokov, Botevgrad and Razgrad create financial problems. Additional data on the status of the MWWTP are given in Part B.

The industrial wastewater is discharged into the MWWTP (Sofia, Razgrad) and this impedes greatly the biological treatment. The control at the point of discharge into the receiver and the sanctions imposed for polluting are not big or strict enough to make the industrial plants improve the work in their own WWTP.

The data obtained from the survey of the state of the domestic wastewater in the towns with population over 10 000 agree with the data obtained for the entire surveyed territory. The total quantity of domestic wastewater, calculated as 85% of the water consumed by the population decreased in 1995 as a result of the water regime imposed in the Danube basin because of the drought.

The average quantity wastewater per capita (Table 3.5) in 1995 was lower (171.8 litters per person per day) than it was in 1994. The domestic wastewater generated in the villages was not affected by the drought in 1995 as in a number of the villages the water regime had not been imposed.

The proportion of the population in the towns of the Danube River basin connected to the municipal sewer system is about 65.0-65.7% and the proportion of the population of the country - 55.5%. The difference between the proportions of the urban population (90.0-92.2%) and the rural population (3.8-4.8%) connected to the sewer system is significant. In the villages septic tanks are still being used for the domestic wastewater, and, as it was mentioned above, some of the towns also do not have sewer systems.

Annex Tables 5.5 -a and -b show the volume of wastewater discharged by municipal sewer systems in 1994-1995 by catchment areas in the Danube River basin.

5.1.2.2. Industrial/Mining/Shipping Discharge

The data supplied by the NIS about wastewater discharged in the catchment areas of the main rivers that flow into the Danube are presented in Annex Tables 5.5 -a and -b for 1994, 1995 and 1996, respectively. Most significant is the proportion of wastewater discharged by industrial enterprises. Comparatively smaller is the proportion of the wastewater discharged by mining.

5.1.2.3. Agricultural Discharge (major point sources)

The total volume of wastewater discharged into rivers flowing into the Danube by agricultural and forestry units in 1994-1996 are presented in Annex Tables 5.5 -a and -b.

The summarized information relating to the treatment of the wastewater is given in Annex Tables 5.6, 5.7 and Table 5.1.

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

5.1.3.1. Municipal Solid Waste Disposal

One of the main sources of pollution of the soil and groundwaters in the Danube River basin is the landfills for solid waste disposal. The Law for Limiting the Damaging Impact of Waste on the Environment (State Gazette, 86/1997) treats the disposal of refuse (garbage, rubbish, ashes), industrial and construction waste and hazardous waste. The control over these activities is exercised by the Ministry of Environment and Water and the Regional Environmental Inspectorates but their regulations do not provisions requiring that different kinds of solid waste should be collected separately. There has not been developed an effective system for the recycling of polymer, paper and metal components of municipal solid waste. If there is any separate collecting of refuse, it is done by poor people trying to earn some extra money.

A great number of the small towns have uncontrolled landfills. They are located on inappropriate sites in the vicinity of the towns, and very often - near to rivers or gullies.

Annex Tables 5.10 and 5.11 present information about the state of the landfills for municipal solid waste of the towns with population over 10 000 situated in the Danube River basin. Zone A includes all the towns along the bank of the Danube from the west to the east. In the rest of the zones are included the towns along the banks of the rivers flowing into the Danube, starting from the beginning of the rivers to the point of their discharge. A great number of their landfills are not controlled and not well organized They do not meet the European requirements for control and management of landfills for municipal solid waste disposal.

For the assessment of the risk of pollution of soil and ground waters in the Danube River basin due to serious failures in the management of solid waste disposal, lack of funds and a clear understanding of the dangers to the health and the environment, the following criteria are used:

- Population;
- Period of use and capacity of the landfills for solid waste disposal;
- Use of folio or clay for protection;
- Use of drainage and collectors;
- Management of the run off of rain waters from the body of the landfills;
- Location as regards the catchment areas and the rivers discharging into the Danube;
- Hydrogeological characteristics;
- Covering with earth and recultivation.

On the basis of the criteria used the landfills are classified by the degree of hazard they pose to the zones defined in Table 3.3. The landfills of the towns of Bjala Slatina, Samokov, Kostinbrod, Suhodol project in Sofia, Etropole, Veliko Tyrnovo, Gabrovo, Trjavna and Popovo have comparatively good insulation, partly built drainage and are situated at a distance of 2-3 km from the rivers of the corresponding catchment area.

All the towns along the bank of the Danube (Lom, Svishtov, Belene, Kozloduy, Russe, Silistra, Tutrakan) do not have protective folio or clay layer, do not have drainage systems or collectors for the drained waters and they are located at a distance of 2 to 10 km from the river. The landfills of Vidin and Nikopol pose a great risk, because they are located at only 0.2 km from the bank of the river. The capacity of the landfill of Svishtov is exhausted and this creates a real danger of water pollution.

The capacity of the landfill of Vratca will be spent by the end of 1998, there is no insulation, no drainage and the landfill is located in a karst area 10-12 km from the Iskar River. The uncontrolled landfill of the town of Berkovitca is only 1 km from the Rakovitsa River. The landfill for solid waste disposal in Suhodol / Sofia/ is built in three stages. The first stage, as a matter of fact, was completed without taking into consideration the ecological requirements. The drained water from the small collector is transported in cisterns to the wastewater treatment plant in Sofia; the covering with earth is not adequate and the water in the small dam lake near Suhodol is heavily contaminated.

Due to the exhaustion of the capacity of the landfill of Dolni Bogrov, part of the industrial and hazardous waste is disposed at the landfill in Suhodol.

The landfills of the towns of Novi Iskar and Botevgrad are close to the end of their capacity. There is no clay layer and their drainage systems do not function. This creates a real danger of contamination of the water of the Iskar River. The landfills of the towns of Mezdra and Cherven Brjag, which are at a distance of 0.50 and 0.15 km from the Iskar River, also create a great risk to the water of the river as their capacities are exhausted, and there is not any protective shield to prevent the contamination of the ground waters (see Annex Tables 5.10, 5.11). The landfill of the town of Lukovit also lacks a protective shield, it is not covered with earth and directly contaminates the Zlatna Panega River, which is only 0.15 km away.

The capacities of the landfills of the towns of Lovetch and Levski are also exhausted. There are no clay layers, drainage and collectors for the drained water, the waste is not covered with earth, and the landfills are only 0.8 and 0.2 km away from the Osam River, respectively. The landfill of the town of Troyan is also located near the Osam River (1 km to the west); there is no protective insulation and the waste in not covered with earth. The above mentioned landfills for solid waste have capacities to be used until the year 2020 but they do not meet the requirements of the ecological and health legislation.

The capacity of the landfill of the town of Teteven will last until 2018, but it is built without any protective facilities. The run off of rain waters from the body of the landfill run across the terrace of the Vit River and contaminate it as the landfill is very close to the river, only 0.10 km away from it.

A great risk to the ground waters is the landfill of the town of Sevlievo. Its capacity will last until 1999, it has no insulation, no drainage system, part of the run off is collected in a collector with a volume of 300 m^3. It is located at a distance of 2 km from the Yantra River and is used for industrial solid waste disposal. The landfills of the town of Bjala have capacities till the year 2000, they do not have any insulation and drainage, and they are only 2 km and 0.7 km away from the Yantra River. They are not covered with earth because of the lack of funds.

The capacity of the landfill of the town of Dobritch is exhausted. It is situated in a karst area and the clay layer cannot make it safe as there is no an appropriate drainage system and, moreover, the recultivation project has not been up-dated yet.

The information about the Danube River basin supplied by the Hygiene and Epidemiology Inspectorates indicates that the landfills are not well organized There is no an effective control over the quality and the quantities of solid waste. The containers, the trucks and the equipment are worn out, the scales are not correct and very often out of order.

The municipalities do not have enough funds to cover with earth and recultivate the landfills. The control institutions do not levy sanctions or fines on the organizations, responsible for the maintenance of the landfills.

A great risk to the environment in the Danube River basin is the practice industrial and hazardous waste (waste machine, motor and transformer oils, dyes, petroleum products, refuse and scraps left after cleaning and repairing of installations and equipment, non-usable pesticides, hospital waste, slaughterhouse waste, etc.) to be disposed, with or without permission, at the municipal landfills. In this respect, the practice is a serious violation of the provisions of the Government Decree No.153 for the collecting, transporting, storing and inactivating hazardous waste (State Gazette, 73/1993).

The social and economical problems of the country make impossible the realization of the projects for new landfill, and, after a time, they become obsolete. Not always the selection of the sites for the landfills pass an open procedure for EIA and the public discussions of the projects are only for the form's sake.

Using the above-mentioned criteria, the landfills are classified by the degree of their potential risk to the environment and to the health, into two groups, shown below. Their spatial distribution is shown as follows:

Sources of heavy pollution	Potential sources of pollution
Nikopol	Vidin
Vratca	Svishtov
Mezdra	Berkovitca
Cherven Brjag	Sofia
Lukovit	Novi Iskar
Teteven	Botevgrad
Lovetch	Troyan
Levski	Sevlievo
	Bjala
	Dobritch

5.1.3.2. Industrial/Mining/Hazardous Solid Waste Disposal

The legislative framework of the management of hazardous waste in the Republic of Bulgaria is defined by the Government Decree No.153 (State Gazette 70/1993) and the Law for limiting the harmful impact of waste on the environment (State Gazette 86/1997) (see s. 6.1). In the Republic of Bulgaria there are no landfills for hazardous waste built in accordance with the present-day requirements and regulations. .A preliminary inquiry of the state of the landfills for hazardous waste in the ferrous and non-ferrous metallurgy, metal-working, petroleum-processing, chemical, leather, food-processing and textile industry and an inventory of the landfills of the enterprises were done by the Ministry of Environment and Water in cooperation with the Firm POVVIC-EP-Ltd, Sofia and US EPA. The data obtained for the period 1994-1997 change in a dynamic way due to the grave crisis in the bank system, the bankruptcy of a number of firms, the change of the objects of their activities and the privatization procedures which turned out to be too complicated and time-consuming.

The information contained in the reports to EIA is not complete and not always gives real quantitative and qualitative characteristics of the landfills for industrial waste located on or outside of the industrial enterprise sites. The data in Annex 7.4 to the National Survey of Bulgaria in 1993, about the landfills of the industrial enterprises in the region of the big cities in The Danube River basin (Russe, Pleven, Veliko Tarnovo, Gabrovo, Vratca, Sofia, Lom, and Lovetch) cannot be compared.

Completion of the process of privatization and stabilization of the economy of the country are needed so that a real quantitative and qualitative characteristics of the industrial, mining and hazardous waste, generated by enterprises with normal activities could be made.

It was mentioned in chapter 5.1.3.1 that a significant part of the industrial waste, especially that produced in smaller enterprises, is being dumped, legally or illegally, on the municipal unorganized and uncontrolled landfills for solid domestic waste.

The team for Part A of the present investigation suggest that a project for inventory of the industrial waste landfills on the sites of stabilized enterprises and working mines in the Danube River basin be financed, so that a more accurate assessment of the risk to the environment and to health, brought about by mismanagement of hazardous waste, can be made.

5.1.4. Hydro Power

5.1.4.1. Hydroelectric Power Stations on the Danube River and its Tributaries

Hydro-energy Potential

The facts of nature and human activities are the main determining factors of the hydro-energy potential of a river flow. In the Bulgarian stretch of the Danube River and its tributaries this potential is assessed at approximately 12.2 billion kW/hour. The assessment is presented in Table 5.2.

Table 5.2 Approximate assessment of the hydro-energy potential of the Danube River and its tributaries

River tributary	Hydro-energy potential		
	Theoretical mill. KW/h.	Technical mill. kW/h.	Developed mill. kW/h.
At the beginning of the 60's			
Bulgarian stretch of the Danube River	10375*	3300	-
Rivers to the west of the Lom River	208	-	-
Lom	293	68	20
Tcibritca	25	-	-
Ogosta	745	356	100
Iskar	3173	715	333
Vit	495	228	-
Osam	380	135	11
Yantra	1046	234	68
Russenski Lom	79	-	-
Rivers in Dobrudzha	15	-	-
TOTAL	16834	5036	532
At the beginning of the 90's			
Bulgarian stretch of the Danube	5450	3420	-
Rivers to the west of the Lom River	210	-	-
Lom	306	68	23
Tcibritca	26	-	-
Ogosta	755	220	81
Iskar	3198	972	272
Vit	492	215	18
Osam	430	145	25
Yantra	1064	265	66
Russenski Lom	74	-	-
Rivers in Dobrudzha	150	-	-
TOTAL	12155	5305	485

The "Rivers to the west of the Lom River" include: Nishava, Erma, Visochitsa, Topolovets, Voinishka, Vidbol, Archar, and Scomlja; "Rivers in Dobrudzha" include: Topchiiska, Tsaratsar, Karagjol and Suha. .

The differences in the assessment of the types of hydro-energy potential are obvious. They can be explained by the fair approach to accuracy of the methods used and some subjective criteria, as well as by the nature and quality of the available information. The value marked with an aster (*) most probably shows the theoretical hydro-energy potential of the common Bulgarian-Rumanian stretch of the Danube River. It is an accepted practice, when water energy is used jointly, each of the country to use half of the total potential.

Use of Water Energy

The used water energy as a type is potential and depends on the volume of the flow. The conversion of waterpower into electricity is achieved by means of hydroelectric power plants (HEPP and PAHEPP). In the catchment area of the Danube River, 44 hydroelectric power plants altogether were established; their expected period of normal operation varies in the range from 28 to 98 years. At present, 3 of them are closed down, and about another one (see in Table 5.3**) there is no information as to the nature of the causes due to which it is not operating. In the Bulgarian stretch of the Danube River there are no hydroelectric power plants built. The summarized data are given in Table 5.3.

Table 5.3 Hydro-electric power plants built on the tributaries of the Danube River - summarized data

River valley	Number of hydro-electric power plants			Indices	
	Tail-race water (average for the day)		Water under pressure	Q	W
	without	with		m^3/s	mill. m^3
Rivers to the west of the Lom River	-	-	-	-	-
Lom	3	1	-	12	126
Tcibritca	-	-	-	-	-
Ogosta	1	3	-	11	200
Iskar	7	2	3	166	2694
Vit	3**	-	1	14	184
Osam	3	1	-	11	231
Yantra	7	2	4	66	887
Russenski Lom	-	-	-	-	-
Rivers in Dobrudzha	-	-	-	-	-
TOTAL	23	9	8	280	4322

The future development of energy power is connected with the use of the technical hydro-energy potential of the water resources to an extent that it will not upset the ecological balance of the rivers. The possibilities of its fuller utilization in the catchment area of the Danube River are expressed in the building of over 380, mostly small, hydroelectric power plants. Most promising, in this respect, are the middle courses of the rivers Iskar, Ogosta, Lom, Osam, Vit, Yantra and the common Bulgarian-Rumanian stretch of the Danube River. Technical and economic investigations indicate that in the near future, the building of the "Sreden Iskar" Cascade will be the most effective. The construction of the big hydroelectric projects "Nikopol - Turnu Magurele" and "Silistra - Kalarash" is not economically justified and is beyond the technical possibilities of the country at present.

The sources of pollution of the ground and, partly, of the surface waters in the vicinity of hydroelectric power plants are the spent machine, motor and transformer oils.

Published data indicate that transformer oil contains polychlorinated biphenyl's (PCB's). They are stable chlorine-organic compounds with cumulative toxicity and long-term effects on the human organism.

Up to the present, there has not been carried out any inventory of the quantities of waste petroleum products containing transformer oil generated by hydroelectric power plants. There is no in Bulgaria a legislative base for the control over pollution caused by spent oils and petroleum products containing PCB's.

5.1.4.2. Electric Power Capacity and Annual Output

At the hydroelectric power plants built on rivers flowing directly into the Danube River, the installed aggregates have a total capacity of 130 MW and their annual output is nearly 334 MWh. The utilizability of the individual plants varies from 2630 to 8250 hours annually - 187560 h/y. These figures are tentative only, as they are based on old hydrological and operational data (Table 5.4).

Table 5.4 Characteristics of the established hydroelectric power plants

Rivers	HEPP	N	$E_{mean\ values}$
	Number	MW	MWh
Rivers to the west of the Lom River	-	-	-
Lom	4	7420	16.5
Tcibritca	-	-	-
Ogosta	7	3885	13.3
Iskar	12	91461	228.3
Vit	4	5230	5.6
Osam	4	4295	19.9
Yantra	13	17746	50.3
Russenski Lom	-	-	-
Rivers in Dobrudzha	-	-	-
TOTAL	44	130037	333.9

The strategy of the future development of hydro-energy accentuates the construction of cascades of, mainly, low-pressure hydroelectric power plants, situated at those stretches of the rivers that have economically efficient hydro-energy potential. The middle flow of the Iskar River is considered to be the most promising for this purpose and 14 electric-power plants had been selected as first-stage projects. Some data concerning the projects are given in Table 5.5

Table 5.5 Characteristics of the projected first-stage hydroelectric plants

River	HEPP	$N_{projected*}$	$E_{projected*}$
	Number	MW	MWh
Small hydro-electric power plants			
Lom	3	990	3.67
Ogosta	7	3885	13.3
Iskar-tributaries	6	3410	9.82
Vit	3	4047	9.05
Osam	1	924	2.11
Yantra	2	1519	2.35
Cascade “Sreden Iskar”			
Iskar	14	43560	242.38
Hydro-technical complex “Nikopol-Turnu Magurele”			
Danube	× 1	402 000	2193

** Values obtained on the base of the technical projects*

5.1.4.3. Proportion to the Total Production of Electric Power in Bulgaria

The production of electricity in the country is based on the work of different by type and capacity electric power plants, joined in the general electric power system. The hydroelectric power plants take full part in the load of the general power system. The hydroelectric power plants, working on running water without equalizer, on storage water from a reservoir or on high water are at the base of the loading diagram. The hydroelectric power plants working with stored water from reservoirs, those working with running equalized water and the pumping-accumulating hydroelectric power stations cover the peak of the load.

The percentage of the hydro-energy in the total production of electricity is steadily decreasing with slight variation in the last years: it fell from 40% in 1960 to 4.5% in 1990 and there is a slight increase to 9% after 1995. As regards the capacities installed in the energy system, the percentage of those installed in the hydro-energy is 50, 17 and 25, respectively Table 5.6).

Table 5.6 Share of the hydro-energy in the total production of energy in Bulgaria

Indices	Years				
	1960	1990	1991	1992	1993
	%	%	%	%	%
Capacity	50	17.2			16.4
Production of electric energy	40	4.4	6.3	5.8	5.1

5.1.5. River Fisheries

5.1.5.1. Canal-locks and Free Passage of Fish

The volume of the waters formed in the catchment areas of the Bulgarian rivers, which flow, directly into the Danube is not big enough to make possible the use of the rivers for shipping. On the other hand, on the common Bulgarian - Rumanian stretch of the Danube there are no hydro-technical installations with water supporting functions which could obstruct river navigation. That is why, building of locks and other installations for facilitating the free passage of ships or fish had not been necessary in this part of the Danube catchment area.

For the last 30 years, the idea of making the lower courses of the rivers Ogosta, Iskar, Vit and Yantra navigable, as well as the idea of building a navigable canal to join the Danube to the Black Sea have been repeatedly discussed, their working out has begun and the relevant technical projects have been brought to various stages of readiness. Their main flaws are the fact that their development is totally dependent on the realization of other big scale projects, the lack of motivation and the impossibility of return on investments, and more particularly, at present, under the changed economic conditions of the country. If, or when we set about their eventual realization, then will we put on the agenda the question about the types, the possibilities and the consequences of building locks for these hydro-technical complexes.

However, on the rivers flowing directly into the Danube, there have been installed many other hydro-technical equipment which stop completely the river flow or divert part of its waters without being furnished with the relevant facilities for ensuring the free passage of fish or for letting out enough water to wet the river bed. At this stage, it is very difficult, due to various objective reasons, to determine the number of these equipment, the way in which they affect the rivers, the eco systems, the passage of fish and the extent of their impact.

5.1.5.2. The State of Fishery

The fishery in the Danube River is controlled by the State Inspectorate of Fishery at the Ministry of Agriculture, Forestry and Agrarian Reform. There are Regional Inspectorates of Fishery in the towns of Lom and Russe. The rivers flowing into the Danube are mostly small, in their low courses the surface waters are contaminated, the flow is not stable and the fishery there is not subjected to the state control. The fishery there is mainly of the sport type.

Annex Tables 5.12 -a, -b and -c give information about the basic types of fish in the Danube, the average quantities in ton/m for the years 1995, 1996, and 1997. The data was supplied by the Regional Inspectorates of Fishery in Russe and Lom. The catch in 1995 was lower, which can be explained by the heavy drought in the summer of 1995. Comparatively bigger is the catch of barbell (Barbus), Silver carp and Bighead carp (Hypophthalmichthis molitrix and Aristichtys nobilis), bream (Danube) (Abramis brama), and shad (Danube herring) (Alosa pontica). Next in quantity is the catch of great sturgeon (Huso huso) and Danubian pikeperch (Lucioperca Sandra).

Annex Table 5.13 gives information about the number of permits issued for industrial fishery in the Danube (number of permits, fees in levs), by fishery gear for the years 1995, 1996 and 1997. In 1997 an upward trend is noted in the number of permits issued for fishery from a fishing boat and with a single casting net.

The data about towns with a population of over 10 000 situated along the bank of the Danube River, collected by the Hygiene and Epidemiology Inspectorates, are systematized in Annex Tables 5.14 and 5.15.

Fishing bases along the bank of the Danube are registered in the towns of Svishtov, Russe, Silistra and Tutrakan. Besides, in many of the towns there are registered individual fishermen. The data about the fish most often caught in the region agree with the information supplied by the State Inspectorate of Fishery, and that is: barbel, Silver carp and Bighead carp, Danubian pikeperch, Danubian bream, sheat-fish, etc.

In the towns of Vidin, Silistra and Tutrakan, the average number of working places, connected with river fishery increased in the period 1994-1997. As some of the factories in the region (Annex Table 5.15) had stopped operating, the state of the fishery as a means of living improved. This is connected with the decreased industrial pollution. In the region of Russe river crayfish can be found again. In the region of Tutrakan, the natural reproduction of carp (Cyprinus carpio) is hindered by limited conditions. Poaching is still widespread and is an obstacle to the normal fishery.

An inquiry, carried out in the towns with population over 10 000, situated along the bank of the Danube, reveals that fishery may be a means of livelihood under the following conditions:

- fishery to be regulated by the legislation;
- a stricter control to be exercised;
- fishery to be financed with priority;
- administrative and organizational measures to be taken in order to support suitable conditions for the natural reproduction of fish.

5.1.6. River Shipping

Annex Table 5.16 presents the data supplied by the Ministry of Transport about the passenger traffic on the Danube for the period 1993-1997. The number of passengers and the index passenger/ kilometer are given by type of ship: liners, entertainment and transport ships, and also by the type of sailing - coast navigation or navigation to foreign countries. In comparison to 1993-

1994, the passenger traffic on Bulgarian ships has decreased sharply. There haven't been ships for inter town navigation since 1995 and the index of passenger/ kilometer (p/k) fell from 115 859 in 1993 to 31 660 in 1997.

The data about navigation abroad reveal an upward trend - there were 32361 p/k in 1993 and 43316 p/k in 1997.

The total number of passenger ships fell from 104 in 1994 to 88 in 1997.

The shipping of goods on the Danube (Annex Table 5.17) increased from 10382 Mill. t/k in 1993 to 12870 Mill. t/k in 1997. The volume of cargo shipped is increasing. The number of units observed in the period is about 4702-4706.

Annex Table 5.18 gives information about the river shipping on the Danube and the main ports with population over 10 000. The cargo shipping was particularly intensive in the ports of Vidin, Lom and Russe. As it was mentioned above, passenger shipping is on the decrease.

The following information is based on data supplied by the National Institute of Statistics, about the volume of sanitary and ballast wastewater discharged from ships into the river. We suppose that the increase of the fees for managing this kind of waters last year contributed to the decrease of the volume of the registered wastewater discharged into the river. Some of the ships pollute the water of the Danube dumping into it refuse and discharging sanitary waters.

Accepted Sanitary and Ballast Wastewater from Ships Navigating the Danube is the following:

- 1994 251 tons
- 1995 355 tons
- 1996 162 tons

The proportion of export to import through the ports on the Danube (Annex Table 5.19) is not recorded on national level, but on the basis of an inquiry it can be asserted that the import is significantly bigger than the export. The import through the ports of Lom and Russe for the period 1994-1997 was 82-92% and the export - 14-18%. The port of Vidin has two petroleum terminals.

Some of the ports have administrative, economical and technical problems (Lom, Russe) and these render it difficult for them to exercise their activities in controlling and preventing the pollution of the waters of the Danube River.

The sources of pollution of the Danube River waters as a result of river shipping are as follows:

- petroleum products: waste motor oil, refuse from containers, polluted water from cleaning and washing the ships;
- sanitary waters discharged from the ships;
- refuse after cleaning, including detergents;
- contamination from goods, shipped in bulk;
- disregard of the requirement that ships regularly dispose of the sanitary water and refuse at determined places in regulated ways.

5.1.7. Recreation/Tourism

The economic and social crisis in 1996-1997, the war in former Yugoslavia, and the protracted process of privatization in the field of tourism, brought about a substantial decrease of the national income coming from this sector.

It cannot be claimed that the Danube River plays a significant role in the national and/or international tourism. The Black Sea Coast, the summer and winter resorts in the East Rodopa Mountains, and in the mountains of Pirin, Rila and Middle Stara Planina are more important now and in the future for this sector of economy.

Annex Table 5.16 presents the information of The Ministry of Transport about the number of entertainment ships navigating the Danube. In the period 1993-1997, a progressive decrease of the passenger/ kilometer index is observed. According to the official data, the number of the passengers in 1997 was 122. It may be concluded, that the Danube River is hardly used by entertainment ships.

The information collected by the Hygiene and Epidemiology Inspectorates about the towns with population of over 10 000, situated on the bank of the Danube (Annex Table 5.20) shows that the number of the existing national and international bases for water tourism did not increase in the same period although that number is small.

The insufficient number of the tourist bases and the lack of tradition in this field may explain why water tourism in the towns observed is not treated as an income resource for the population. It is the main type of tourism in the region of Vidin. A programme "TOUR" is prepared in Silistra but its success depends on the good international connections of the town in this sphere.

The reasons why the water tourism is not at present a profitable occupation for the population along the Danube, can be systematized as follows:

- lack of tradition;
- lack of private initiative;
- lack of funds and possibilities for investment by the local people;
- lack of sufficient facilities;
- lack of suitable mooring facilities for the vessels;
- lack of service activities;
- insufficient advertising, small number of tourists;
- expensive fuel.

In spite of all problems of the tourism sector mentioned above, the data about the towns of Belene, Russe, Silistra and Tutrakan indicate that water tourism can become an income earning occupation for the population.

The water of the Danube River does not meet the sanitary requirements as regards the indices of organic and non-organic contamination and the biological indices of the Class 1 surface waters (Decree No.7 about the indices and norms for determining the quality of running surface waters, State Gazette, 96/1986), so that the water does not conform to the standards of "bathing water". The indices of organic and biologic contamination are higher than the norms. It is connected with the discharge into the river of domestic wastewater from the big towns, ports and some of the ships. According to the data supplied by the Hygiene and Epidemiologic Inspectorates, the water of the Danube meets the requirements for "bathing water" only at some of the beaches in the region of the towns Kozloduy and Tutrakan.

Annex Table 5.21 shows the number of the controlled beaches, swimming baths and bases for water sport in the towns along the Danube. In the period 1994-1997 their number did not increase, although the controlled recreation bases are few in number.

There is a trend towards an improvement of the quality of the water of the Danube River, but it still does not comply with the sanitary standards, and, what is more, there are no facilities for its purification and quality control.

It has to be mentioned, that, because of the lack of suitable bases and of appropriate control and preventive measures, the number of drowned people, especially children, did not decrease significantly in the period 1994-1997.

5.2. Projection of Expected Economic Significance / Impacts

5.2.1. Projection of Abstraction of Raw Water

The survey of the demographic characteristics of the population of the Danube River basin revealed that the death rate was higher than the birth rate in the period 1994-1996. There is a definite trend towards the lowering of the natural dynamics of the population (See chapter 3.1.1).

The social and economic state of the country does not give any reason to expect some increase in the population and consequently, an increase in the use of domestic water. No change is expected in the proportion of the water delivered per capita to the population of the towns and the population of the villages. The completion of the process of restitution of land and the development of individual initiative in the villages will probably have an impact on the change of the structure of the population after the year of 2010.

Annex Table 5.22 gives an evaluation of the expected volume of drinking water calculated on the basis of the expected use per capita for satisfying the needs of the population of the Danube River basin. The evaluation is done by zones and in each zone the municipalities are presented according to their classification (class 0 to class 4).

It can be expected that with the decreasing of the size of population, the use of domestic water, probably, will not be higher (See chapter 3.1.4 for comparison).

Water supply to the observed economic units in the period 1994-1996 does not show any change (See chapter 5.1.1) with the exception of the year 1995 when the abstraction of water diminished because of the drought. It is expected that the reconstruction of the water-supply network will decrease the loss of water.

The process of privatization, stabilization and reconstruction of the industrial, agricultural enterprises and the mines is not completed yet.

In Bulgaria there is Monetary Board with international financial control.

It can be supposed that this critical social and economical period will lead to the stabilization of some of the enterprises and they will start operating with full capacity. At present, it is difficult to make real projections.

5.2.2. Projection of Wastewater Discharge

In chapter 5.1.2, the data for the wastewater discharge in the Danube River basin for the period 1994-1996 are discussed.

Annex Table 5.23 presents the projection of domestic wastewater discharge by zones and municipalities. It is expected that the building of collectors in some of the towns will be completed, the sewer systems in the municipalities will be reconstructed and extended and that sewers will be built in the smaller towns. The number of towns with population over 10 000 with municipal wastewater treatment plants will increase.

This projection implies the necessity of substantial investments from the state administration and the municipalities.

The procedures of EIA for new projects and existing industrial, agricultural and mining enterprises require the building of local wastewater treatment plants equipped with all the necessary technical devices for mechanical, physic-chemical and biological treatment of the wastewater on the sites of the enterprises. Part of the existing projects will be realized, but it will depend entirely on the financial, social and economical stability, to be achieved with the help of the Currency Board.

The introduction of the European legislation related to the environmental management of waters would improve significantly the exercise of control and the efficiency of the measures taken for limiting the pollution of the waters in the Danube River basin.

5.2.3. Projection of Other Major Impacts

A project for controlled landfills for solid waste disposal to be built in a number of towns in the Danube River basin is envisaged. The disposal of domestic and industrial solid waste at landfills located near the Danube and its tributaries will be stopped.

Annex Table 5.24 presents the projection of the quantities of municipal solid waste to be generated in the period 2000-2010, calculated on the average of 320 tons annually per capita in towns with population over 10 000.

The solid waste landfills in the Danube River basin are real sources of water pollution (See chapter 5.1.3.1). Substantial investments from the municipalities are needed so that the process of building landfill in accordance with the European requirements could be started.

River fishery could become an income earning occupation for the population of towns situated along the Danube River (See chapter 5.1.5). With the decline in the number and capacities of some of the factories, the recovery and normalization of the natural fish population is being established.

Financial and technical provision for the fisheries will open possibilities for the population to make real use of this resource.

The factors that brought about the significant decline of the river shipping on the Danube (among them the lack of contemporary vessels) will continue hindering its recovery for the time being.

A major problem is the control over sanitary and ballast wastewater from ships, including those of the international traffic, which contaminate the waters of the Danube with sanitary waters and refuse.

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

The process of harmonizing the ecological and health legislation has started in Bulgaria since 1990. In the last couple of years the state institutions succeeded in the preparation of a project of a legal base, conforming to the legislation of the countries from the European Union. Following is a list of the major legal documents related to the management of waters and waste and to the procedures for the environmental impact assessment (EIA) of projects and existing objects, where the European requirements for prevention and limitation of the contamination of surface, ground and run off waters are included.

Bulgarian legislation related to prevention of water pollution

1. Bulgarian State Standard 2823-83 Potable Water.
2. Decree No.2 for the sanitary protected zones around water-supply sources and the installations for domestic water supply.
3. Government Decree No. 24 for the order in which to determine and levy sanctions for damages and contamination of the environment above the admissible limits, State Gazette No. 15/1993, amended and supplemented in State Gazette No.101 / 1995 and No. 34 / 1997
4. Decree No. 9 for the use of water-supply systems and sewer systems, State Gazette No. 77/1994, amended and supplemented State Gazette No. 7/1996, No. 3/1997.
5. Decree No.2 for the limits of the admissible content of harmful compounds in the waste waters discharged into the sewer system of towns and villages, State Gazette No. 72/1978
6. Decree No. 7 for the indices and limits for determining the quality of the running surface waters, State Gazette No. 96/1986
7. Decree No. 1 for environmental assessment (EIA), State Gazette No. 73/1995
8. Decree No.1 for environmental impact assessment of projects, objects and activities that are not subject to the obligatory requirements of EIA, State Gazette No. 119/1997
9. Law for the amendment and supplement of the Law for protection of the environment, State Gazette No. 85/1997 with the list of the projects, subject to the requirements of EIA
10. Law for the restriction of the harmful impact of the waste waters on the environment, State Gazette No. 86/1997
11. Decree No.6 for the bottling of natural mineral waters, State Gazette No. 15/1995
12. Decree No. 4 for the sanitary requirements at the use of dam reservoirs for domestic water supply, State Gazette No. 18/1984
13. Sanitary and technical limits and rules for the building and operating the equipment for the supply of towns, villages and the industry with drinking water, State Gazette No. 41/1970
14. Decree for the removal of the reserves of raw ground waters, State Gazette No. 9/1971
15. Government Decree No. 153 for collecting, transporting, keeping and treating hazardous waste, State Gazette No. 70/1993
16. Government Decree No. 268 about the regimen for import and transit transportation of waste and hazardous substances, State Gazette No. 94/1996

17. Decree for the conditions and the order for receiving permission for import and transit transportation of waste and hazardous substances, State Gazette No. 94/1996
18. Decree No.6 for the veterinary, sanitary and hygienic requirements for the collecting, treating and utilizing kitchen refuse, State Gazette No. 7/1986

The list above shows that some of the legislative documents are old. There is no a contemporary legal framework for control and management of the problems. Forthcoming is the passing of the Bill for the water, which would greatly contribute to the concordance of the legislation concerned with its management.

6.2. Analysis of Relevant Institutional Framework

The control and management of the waters in the Danube River Basin is exercised by State Institutions and their competent bodies, state firms, municipality firms and the local administration. The main institutions are listed, as follows:

- Ministry of Environment and Waters; it has 6 Regional Environment and Waters Inspectorates in the towns of Montana, Vratca, Pleven, Veliko Tarnovo, Russe and Shumen. There is a Department of Waters in their structure. They control and manage the state of the surface and ground waters, and of the domestic, industrial and agricultural waste waters.
- National Center of Environment and Sustainable Development in Sofia deals with the scientific and practical problems, related to the management of waters.
- Ministry of Health with 15 Regional Hygiene and Epidemiology Inspectorates in the towns of: Sofia, Sofia-District, Vidin, Russe, Silistra, Vratca, Montana, Pleven, Lovetch, Veliko Tarnovo, Gabrovo, Targovishte, Dobritch, Razgrad and Shumen. The Communal Departments are responsible for the sanitary control of t the quality of the drinking water, bath water and recreation water.
- National Center of Hygiene, Medicinal Ecology and Nutrition - deals with the scientific and practical problems related to the management of drinking water, domestic solid waste, monitoring and assessment of the risk to health generated by the impact of the pollutants in the Danube River Basin.
- Ministry of Agriculture, Forestry and the Agrarian Reform with a State Inspectorate of Fishing and two Regional Inspectorates of Fishing in the towns of Lom and Russe. They control the natural and artificial reproduction of the types of fish in the flow of the Danube River and its tributaries. They are responsible for the control and management of fishing.
- National Institute of Statistics, Sofia collects and processes the data related to the demographic characteristics and the management of the water resources.
- Ministry of Transport and its competent bodies control the passenger and cargo traffic on the Danube River.
- Ministry of Regional Development and Urbanization
- Company “Water Supply and Sewerage” (wands) is responsible for the purification and supply of drinking water by the water supply system and for the sewer system and the treatment of the waste water. It is responsible for the control and the maintenance of the water supply net and the sewer net in towns and villages. Part of the Company’s firms is municipal, state or mixed with 49% municipal and 51% state share. “W and S” and are responsible for the municipal wastewater treatment plants.
- National Company of Electricity manages the hydroelectric power plants.
- Committee of Energetic
- Dam Reservoirs and Cascades

7. Description and Analysis of Actual Policies and Strategies

7.1. Actual Policies and Strategies

The Second European Conference on Environment and Health, which was held in Helsinki, Finland, in June 1994, defined as a priority of its future activities the health and the social problems, connected with the pollution of environment. At this forum the European Action Plan on Environment - Health was accepted as a base for a pilot project including Bulgaria, Great Britain, Italy, Lithuania, Hungary and Uzbekistan.

The National Environmental Health Action Plan was completed and submitted for public discussion to the Bulgarian non-governmental organizations in 1998. On the base of it, the development of the local plans has started. The National Plan set as its goal the development of inter-institutional cooperation, coordination and agreement in the implementation of the national policy and strategy for environment and health on national, regional and local levels and in the working out of programs for development in all main sectors of the economy.

In section 3.1 "Waters" of the National Action Plan on Environment and Health, it is indicated that the control over the waters is exercised by the National System for Ecological Monitoring through the sub-system "Control and Protection of the Purity of Water" and its divisions "Surface Waters" and "Ground Waters". In 1995 the National set for control had 340 watching stations, 24 of which along the bank of the Danube River. The state of the ground water is observed from 238 stations, including 43 springs.

The ground for action for preventing the pollution of the drinking water for the population is discussed in sections 4.1, 4.2 and 4.3 of the present paper.

Development of a National Geographic Information System is projected. A significant part of it will be devoted to the water pollutants in the Danube River Basin.

The methodology of health risk assessment is accepted to be a priority instrument in taking decisions on all levels concerning the prevention of pollution in the Danube River Basin.

The accepted measures for exercising control over pollution of environment provide for decentralization of control, introduction of local limits for the emission of pollutants in regions with aggravated ecological situation, and building of systems for self-control in factories-pollutants.

All components of the policy of the Ministry of Environment and Waters and of the Ministry of Health, regarding management of the risks to ecology and health, generated by the impact of pollution, relate to the Danube River Basin.

7.2. Sector Policies

The problems related to the main sectors might be discussed as follows:

- **Industry** Due to the economical crisis and the difficulties in the privatization process the main sources of water pollution (the petroleum oil refinery in Pleven, the plant for artificial ammonia in Vratsa, the plant for sugar production in Gorna Orjahovitsa, the pharmaceutical enterprises in Trojan and Razgrad, the leather and textile facilities in Sevlievo and Gabrovo, etc) have polluting technologies and no efficient WWTP.

  In general the pollution from industry sources in the Danube River Basin has a tendency to decrease because some of the enterprises are closed and other operate with reduced capacity (see Part B).

- **Agriculture** The privatization process in the agriculture sector is not finished. There are no points with intensive agriculture. The small farmers do not use a good deal of imported pesticides. There is a governmental policy of strict control on the import of banned and restricted phyto-sanitary products in Bulgaria.

  Due to the comparatively high prices, the artificial fertilizer use is limited. Most of the animal growing farms (pig farms) are reduced as a result of the cereal crisis in 1996-1997. The existing ones have no efficient local systems for wastewater treatment (see Part B).

- **Forestry** The forests are under a process of restitution and privatization. There are problems with uncontrolled clear felling and increase of the woodcutting areas. The fires during hot seasons result of severe consequences as well.

- **Transportation** The Bulgarian Danube river traffic is continuously reduced (see Chapter 5.1.6). The increased use of the Danube River for international shipping results in contamination by the ship wastes and petroleum products. The Bulgarian harbors have no the necessary vessels for control of the Danube river pollution.

- **Energy** The development of energy power in the catchment area of the Danube river does not upset the ecological balance of the rivers. The hydroelectric power plants are small. The sources of pollution are the spent machine, motor and transformer oils (see Chapter 5.1.4).

The National Environmental Health Action Plan defines the inter-sector cooperation as a priority in the implementation of the environment policy.

- It is projected conditions to be created for an effective delegation of responsibilities from the central to the local level.
- The development of inter-institutional cooperation in activities on the "Environment-Health" problem continues to be a priority.
- It is suggested that suitable instruments for establishing the connection between pollution of environment and the state of people's health should be provided.
- A system of measures, based on the principles of market economy, favorable to the protection and improvement of environment, and thence to the health of the people, is projected.
- To strengthen and expand the role of the municipalities in implementing the "environment-health" policy is a priority.
- Introduction of legal instruments and other means, ensuring the public participation in the process of taking decisions concerning environment and health, is projected.

The above mentioned priorities also apply to the policy of the Ministry of Environment and Water and the Ministry of Health regarding the reduction and restriction of water pollution in the Danube River Basin.

Annexes

1. **Annex for Chapter 2**
2. **Annex for Chapter 3**
3. **Annex for Chapter 4**
4. **Annex for Chapter 5**

Annex

for Chapter 2

Table 2.1 Protected territories of CORINE biotopes in the Danube River basin in Bulgaria

SITE'S NAME PROTECTED TERRITORIES NAME	PROTECTED TERRITORIES		YEAR OF ESTABLISHMENT	BUFFER ZONE	IUCN & Bird Life	TOTAL AREA	% OF PROTECTED AREA
	Status *	Area (ha)		year/area (ha)	Interna-tional	(ha)	(%)
1.West Balkan Usketo	 PH	 1,9	 1949			**46 800**	
1.01.Kom Gornata koriya Urutcnik	 SR PH	 160,0 51,0	 1968 1973	 1986/108,0		**1 800**	
1.02.Chuprene Chuprene Kopren-Ravno butce-Kalimanitza	 SR=BR PH	 1 439,4 536,4	 1973 1973	 1979/ 542,3	IBA	**1 440**	100%
2.Ponor Treskavetz Elata	 PH NM	 985,7 0,5	 1975 1964			**9 200**	
3.Vratcanski Balkan Vratcanski karst Ritlite Lakatnitchki skali	NP SR NM PH	30 129,9 1409,0 160,0 93,0	1989 1983 1938 1966	1983/ 477		**30 000**	
3.01.Ledenika Ledenika	 NM	 102,3	 1960			**102**	100%
3.02.Temnata dupka Temnata dupka	 NM	 1,0	 1962			**1**	100%

4.Bebresh Utcilistchna gora Vodnata pestchera Urvitc	 SR NM Hist.Pl.	 128,7 0,3 93,3	 1963 1976 1962	 1986/ 164,3		**4 200**	
5.Muhalnitsa Muhalnitza	 PH	 1,9	 1992			**370**	
6.Central Balkan - Partly	NP (incl.SR)	73 261,8 (36 500)	1991		IBA	**165 000** **(80 000)**	
6.01.Boatin	SR=BR	1 597,2	1948	1983/ 941,9		**1597**	100%
6.02.Tsarichina	SR=BR	3 418,7	1949	1983/1 061,8		**3 419**	100%
6.03.Steneto	SR=BR	3 578,8	1979	1979/ 232,6		**3 579**	100%
6.04.Djendemite Dzhendema SeverenDzhendem	 SR=BR SR	 4 220,2 1 610,0				**5 830**	100%
7.Chepun	UnP					**3 600**	0%
8.Aldomirovsko blato	PH	129,4	1989			**129**	100%
9.Vitosha -Partly	NP	26 606,6 (10 000)	1934			**23 200** **(10 000)**	100% 8%SR
9.01.Bistrishko branishte	SR=BR	1 061,6	1934			**1 062**	100%
9.02.Torfeno branishte	SR	784,1	1935			**784**	100%
10.Lozenska planina Urvitch	 Hist.Pl.	 56,4	 1971			**5 400**	
24.Rila - Partly	NP	107 924 (20 000)	1992			**135 400** **(20 000)**	80%NP 13%SR
24.01.Central Rila Reserve	SR	12 393,7	1992			**12 394**	100%
97.Ostrovche Golemiia iug	 NM	 47,3	 1972			**4 315**	

98.Ludogorie Karaкuz Toptciijsko dere Nahodistche na div bozhur IUtc pestchera	 PH NM NM NM	 75,1 72,0 5,0 2,0	 1951 1976 1976 1973			**59 600**	
99.Srebarna	SR , WH RS	902,1 600	1948	1983/ 542,8	GIBA	**902**	100%
100.Garvan Garvansko blato	 NM	 280,0	 1985			**880**	
101.Maluk Preslavets	NM	38,5	1986			**12**	100%
102.Kosuite Ostrov Pozharevo	 PH	 71,0	 1995		 GIBA	 **734**	
103.Belenska gora	UP					**2 615**	0
104.Nova Cherna Kalimoк	 PH	 683,0	 1997		GIBA	**721**	
105.Boblata	UP					**1 890**	0
106.Lomovete Beli Lom Rusenski Lom	 SR NP	 773,0 3 259,8	 1980 1986	1987/ 278,3	IBA	**16 060**	
107.Stulpishte Dикilitatch	 NM	 2,0	 1970		GIBA	**183**	
108.Batin	UP					**1 510**	0
109.Vardim Stariiat dab	 **PH**	 98,7	 1971	 proposed extension.	IBA	**1950**	

110.Turnovski vissochini Bozhur poliana Preobrazhenski manastir Dervent	 NM NM Hist.Pl.	 19,6 17,1 15,3	 1968 1974 1971			**2 000**	
111.Dryanovski monastery Pestchera Batco Kiro	Hist.Pl. NM	311,6 0,5	1973 1962			**1 250**	
112.Golyama malka rechka	UP					**400**	0
113.Emen,Emenski prolom	NM	25,5	1980			**300**	
114.Belenski islands Kitka Iztotcen Persin	SR SR NM	385,2 24,5 718,9	1981 1981 1981		IBA	**3 400**	
115.Devetashko plateau Devetatchka pestchera	 NM	 14,1	 1996			**5 300**	
116.Nanin kamuk	NM	0,3	1996			**700**	
117.Dolni Vit Nahodistche na obiknoven sladnik	 NM	 0,2	 1976			**50**	
118.Iskar Gentcov orman TCetchmata	 NM NM	 27,3 0,2	 1962 1978			**1 020**	
119.Chernelka	NM	449,2	1969			**449**	100%
120.Nikolaevski gori	Hist.Pl.	150,0	1973			**700**	
121.Mikre TCHumnatitza	 NM	 27,4	 1987			**3 500**	

122.Parnitsite						**800**	
Goren i Dolen Parnik	NM	0,2	1964				
123.Sadovets						**1 500**	
Studenetz	NM	350,0	1972				
Ginina pestchera	NM	2,5	1974				
124.Sedlarkata	NM	0,5	1972			**0**	100%
125.Uglen	UP					**620**	0
126.Haydushka cave	NM	0,3	1976			**0**	100%
127.Karlukovski karst						**11 900**	
Kaleto	NM	57,4	1961				
Skalnite kukli	NM	64,2	1972				
Kuklite	NM	10,9	1972				
Kupenite	NM	4,3	1972				
Haijdutchka dupka	NM	3,0	1962				
Bankovitza	NM	3,0	1962				
Svirtcovitza	NM	2,0	1962				
Prohodna	NM	1,5	1962				
Temnata dupka	NM	1,5	1962				
Habitat of Div bozhur	NM	1,0	1977				
128.Kalenska cave	UP					**0**	0
129.Ponora	NM	90,0	1962			**0**	100%
130.Bojite mostowe	NM	15,0	1964			**30**	50%
131.Tsibur	UP					**1 300**	0
132.Orsoya	UP				GIBA	**1 340**	0
133.Ibisha	SR	34,3	1984		IBA	**250**	
134.Belogradchik rocks	NM	598,7	1949			**1 700**	
135.Magura	NM	83,0	1960			**200**	42%
136.Vrushka chuka	NM	67,6	1986			**80**	

Note: UP – Unprotected SR - Strict Reserve PH - Protected Habitat Hist.Pl. - Historical Place WH - UNESCO World Heritage site
NP - National Park NM - Nature Monument NP - Nature Park BR - UNESCO Biosphere Reserve RS - Ramsar Convention site
IBA - Important Bird Area GIBA - Global Important Bird Area

Annex

for Chapter 3

Table 3.1 Catchment areas of the rivers that flow into the Danube River. Towns with population of over 10 000

Zone	Catchment area	Town	Number of population	Rivers flowing into the Danube River
A	Bulgarian (south) bank of *the Danube River*	Vidin Lom Svishtov Belene Kozloduj Russe Silistra Tutrakan	63493 30846 31435 10383 14231 168429 47617 11507	Danube Danube Danube Danube Danube Danube Danube Danube
B	Montana area *Catchment area of the Ogosta River*	Vratca Berkovitca Montana Bjala Slatina	76441 16328 52297 15739	Leva and Ogosta Barziya and Ogosta Barziya and Ogosta Skat and Ogosta
C	Sofia area *catchment area of the Iskar River*	Samokov Sofia Kostinbrod Novi Iskar Mezdra Etropole Botevgrad Lukovit Cherven Brjag Kneza	28415 1114199 12091 13441 13020 12079 23114 10498 17876 13594	Iskar Iskar Iskar Malak Iskar and Iskar Bebresh and Iskar Malak Iskar and Iskar Bebresh and Iskar Panega and Iskar Panega and Iskar Gostilya and Iskar
D	Pleven and Lovech area *Catchment area of the Vit and Osam Rivers*	Teteven Pleven Trojan Lovech Levski	12443 127848 24894 47545 13127	Beli Vit and Vit Tuchenitca and Vit Beli Osam and Osam Osam Osam
E	Gabrovo and Turnovo area *Catchment area of the Yantra River*	Gabrovo Trjavna Veliko Turnovo Gorna Orjahovitca Sevlievo Pavlikeni Bjala	74860 12306 67357 38621 25484 13749 11168	Jantra Drjanovska reka and Jantra Jantra Jantra Rositsa and Jantra Rositsa and Jantra Jantra
F	Razgrad area *catchment area of the Rusenski Lom River*	Popovo Razgrad	19838 41923	Popovski Lom and Russenski Lom Beli Lom and Russenski Lom
G	Dobrich area *Catchment area of small rivers*	Isperih Dobrich Targovishte	10598 103531 42083	

Table 3.2 Community population towards 31.12.1996 of Danube River basin

Zone	Community		Population	Urban		Rural	
	URCC	name	Number	Number	%	Number	%
Total for Bulgaria			**8340936**	**5634602**	**67.6**	**2706334**	**32.4**
Total for Danube River Basin			**3897255**	**2742660**	**70.4**	**1154595**	**29.6**
Total for Zone A			**135688**	**83318**	**61.4**	**52370**	**38.6**
A	96832	Belogradchik	9390	6206	66.1	3184	33.9
A	96850	Boinica	2792	0	0.0	2792	100.0
A	96880	Bregovo	8791	3350	38.1	5441	61.9
A	96918	Vidin	84800	65588	77.3	19212	22.7
A	96966	Gramada	3742	2357	63.0	1385	37.0
A	96976	Dimovo	9965	1437	14.4	8528	85.6
A	97015	Kula	8084	4380	54.2	3704	45.8
A	97032	Makresch	3300	0	0.0	3300	100.0
A	97080	Novo selo	4824	0	0.0	4824	100.0
Total for Zone B			**402130**	**230830**	**57.4**	**171300**	**42.6**
B	96846	Berkovica	24653	16221	65.8	8432	34.2
B	96863	Boichinovci	13605	2334	17.2	11271	82.8
B	96877	Borovan	7515	0	0.0	7515	100.0
B	96894	Brusarci	7675	1732	22.6	5943	77.4
B	96904	Bjala Slatina	34091	15291	44.9	18800	55.1
B	96921	Vraca	93153	75097	80.6	18056	19.4
B	96935	Valcedram	14906	5337	35.8	9569	64.2
B	96949	Varshec	10831	7570	69.9	3261	30.1
B	96952	G.Damjanovo	5288	0	0.0	5288	100.0
B	96997	Kozloduj	24493	14582	59.5	9911	40.5
B	97001	Krivodol	13548	4052	29.9	9496	70.1
B	97029	Lom	38582	30105	78.0	8477	22.0
B	97046	Medkovec	6361	0	0.0	6361	100.0
B	97063	Mizia	10851	4409	40.6	6442	59.4
B	95532	Montana	65386	51211	78.3	14175	21.7
B	97118	Rujinci	6861	0	0.0	6861	100.0
B	97121	Hajredin	7795	0	0.0	7795	100.0
B	97135	Chiprovci	6275	2889	46.0	3386	54.0
B	97149	Chuprene	3561	0	0.0	3561	100.0
B	97152	Jakimovo	6700	0	0.0	6700	100.0
Total for Zone C			**1542407**	**1322928**	**85.8**	**219479**	**14.2**
C	95100	Bojurishte	7080	0	0.0	7080	100.0
C	95114	Botevgrad	37592	22720	60.4	14872	39.6
C	95145	Gorna Malina	7052	0	0.0	7052	100.0

continued

C	95181	Elin Pelin	22465	5830	26.0	16635	74.0
C	95193	Etropole	14678	11825	80.6	2853	19.4
C	96983	Kneja	18285	13554	74.1	4731	25.9
C	95251	Kostinbrod	17491	11957	68.4	5534	31.6
C	96654	Lukovit	22740	10513	46.2	12227	53.8
C	97058	Mezdra	28141	12883	45.8	15258	54.2
C	97094	Orjahovo	16951	6779	40.0	10172	60.0
C	96699	Pelovo	9778	4291	43.9	5487	56.1
C	95323	Pravec	10274	5531	53.8	4743	46.2
C	97104	Roman	8772	3642	41.5	5130	58.5
C	95368	Samokov	48787	32614	66.8	16173	33.2
C	95409	Svoge	25424	8053	31.7	17371	68.3
C	95426	Slivnica	11167	8399	75.2	2768	24.8
C	99999	Sofia-grad	1189043	1137893	95.7	51150	4.3
C	96815	Cherven Brjag	39314	23338	59.4	15976	40.6
C	96829	Jablanica	7373	3106	42.1	4267	57.9
Total for Zone D			**416109**	**259324**	**62.3**	**156785**	**37.7**
D	96565	Guljanci	19171	4163	21.7	15008	78.3
D	96579	Dolna Mitropolija	27784	9194	33.1	18590	66.9
D	96582	Dolni Dabnik	16429	5436	33.1	10993	66.9
D	96623	Levski	27967	12959	46.3	15008	53.7
D	96637	Letnica	6571	4720	71.8	1851	28.2
D	96640	Lovech	65776	46127	70.1	19649	29.9
D	96671	Nikopol	14964	4785	32.0	10179	68.0
D	96709	Pleven	152607	128671	84.3	23936	15.7
D	96726	Pordim	9251	2636	28.5	6615	71.5
D	96774	Teteven	25522	12381	48.5	13141	51.5
D	96788	Trojan	39809	24623	61.9	15186	38.1
D	96801	Ugarchin	10258	3629	35.4	6629	64.6
Total for Zone E			**550040**	**354687**	**64.5**	**195353**	**35.5**
E	94798	Antonovo	8404	1941	23.1	6463	76.9
E	96517	Aprilci	4490	3885	86.5	605	13.5
E	96520	Belene	13300	10237	77.0	3063	23.0
E	94811	Bjala	18440	10872	59.0	7568	41.0
E	96534	Veliko Tarnovo	92149	73744	80.0	18405	20.0
E	96548	Gabrovo	81894	72785	88.9	9109	11.1
E	96551	Gorna Orjahovica	56762	41573	73.2	15189	26.8
E	96596	Drjanovo	13656	9334	68.4	4322	31.6
E	96606	Elena	13493	6992	51.8	6501	48.2
E	96610	Zlatarica	5880	3137	53.4	2743	46.6
E	96668	Liaskovec	17021	10022	58.9	6999	41.1

continued

E	94928	Omurtag	27133	8983	33.1	18150	66.9
E	96685	Pavlikeni	33027	16916	51.2	16111	48.8
E	96712	Polski Trambesh	21590	5366	24.9	16224	75.1
E	96735	Svishtov	49635	31056	62.6	18579	37.4
E	96743	Sevlievo	45855	25194	54.9	20661	45.1
E	96757	Strajica	18360	5558	30.3	12802	69.7
E	96760	Suhindol	4083	2703	66.2	1380	33.8
E	96791	Trjavna	15859	14389	90.7	1470	9.3
E	95042	Cenovo	9009	0	0.0	9009	100.0
Total for Zone F			**236775**	**120157**	**50.7**	**116618**	**49.3**
F	94808	Borovo	8354	2735	32.7	5619	67.3
F	94842	Dve mogili	13580	5039	37.1	8541	62.9
F	94873	Ivanovo	12750	0	0.0	12750	100.0
F	94914	Loznica	17012	2927	17.2	14085	82.8
F	94931	Opaka	8647	3463	40.0	5184	60.0
F	94945	Popovo	40522	19486	48.1	21036	51.9
F	94959	Razgrad	63328	41593	65.7	21735	34.3
F	95025	Targovishte	62845	40155	63.9	22690	36.1
F	95039	Car Kalojan	9737	4759	48.9	4978	51.1
Total for Zone G			**614106**	**371416**	**60.5**	**242690**	**39.5**
G	94784	Alfatar	4549	2327	51.2	2222	48.8
G	94825	Vetovo	19928	7151	35.9	12777	64.1
G	94839	Glavinica	14843	2193	14.8	12650	85.2
G	24918	Dobrich	29129	0	0.0	29129	100.0
G	96489	Dobrich-grad	101760	101760	100.0	0	0.0
G	94856	Dulovo	33378	7576	22.7	25802	77.3
G	94869	Zavet	13377	3809	28.5	9568	71.5
G	94887	Isperih	28213	10620	37.6	17593	62.4
G	94890	Kajnardja	6265	0	0.0	6265	100.0
G	96387	Kaolinovo	13433	1621	12.1	11812	87.9
G	96400	Kruschari	7030	0	0.0	7030	100.0
G	94900	Kubrat	26820	9594	35.8	17226	64.2
G	94962	Ruse	183790	167352	91.1	16438	8.9
G	94976	Samuil	9752	0	0.0	9752	100.0
G	94984	Silistra	69714	46171	66.2	23543	33.8
G	94993	Sitovo	7307	0	0.0	7307	100.0
G	95008	Slivo pole	15712	0	0.0	15712	100.0
G	95011	Tervel	21133	11242	53.2	9891	46.8
G	97077	Tutrakan	7973	0	0.0	7973	100.0

Table 3.3 Total number of the population for Bulgaria, for the Danube River basin and for the respective zones for 1994-1996

Bulgaria and studied zones	*Urban/ rural*	*Population*		
		1994	*1995*	*1996*
Total for Bulgaria	**Urban**	**5715904**	**5688362**	**5634602**
	Rural	**2711514**	**2696353**	**2706334**
Total for Danube River Basin	**Urban**	**2783383**	**2769966**	**2742660**
	Rural	**1159386**	**1152039**	**1154595**
Total for Zone A	**Urban**	**86337**	**84974**	**83318**
	Rural	**52036**	**51864**	**52370**
Total for Zone B	**Urban**	**236772**	**235360**	**230830**
	Rural	**173644**	**171213**	**171300**
Total for Zone C	**Urban**	**1328665**	**1327657**	**1322928**
	Rural	**222040**	**219197**	**219479**
Total for Zone D	**Urban**	**266643**	**262640**	**259324**
	Rural	**158000**	**156994**	**156785**
Total for Zone E	**Urban**	**362700**	**360422**	**354687**
	Rural	**194878**	**193785**	**195353**
Total for Zone F	**Urban**	**124267**	**122962**	**120157**
	Rural	**116110**	**116577**	**116618**
Total for Zone G	**Urban**	**377999**	**375951**	**371416**
	Rural	**242678**	**242409**	**242690**

Table 3.4 – a Natural dynamics of the population in communities with towns over 10 000 Inhabitants across Danube River basin in 1994

Zone	Community name	Annul average population	Live born		Death		Deceased children up to 1 year age		Population Growth	
		/number/	*/number/*	*/per 1000/*	*/number/*	*/per 1000/*	*/number/*	*/per 1000/*	*/number/*	*/per 1000/*
Total for Bulgaria		**8443590.5**	**79442**	**9.4**	**111787**	**13.2**	**1296**	**0.2**	**-32345**	**-3.8**
A	Vidin	86829	832	9.6	1165	13.4	7	0.1	-333	-3.8
B	Berkovica	24968	251	10.1	432	17.3	9	0.4	-181	-7.2
B	Bjala Slatina	35221	361	10.2	682	19.4	7	0.2	-321	-9.1
B	Vraca	95151.5	879	9.2	1031	10.8	20	0.2	-152	-1.6
B	Kozloduj	24137.5	260	10.8	366	15.2	2	0.1	-106	-4.4
B	Lom	39945	368	9.2	657	16.4	4	0.1	-289	-7.2
B	Montana	67234.5	603	9.0	823	12.2	12	0.2	-220	-3.3
C	Botevgrad	37960.5	425	11.2	472	12.4	3	0.1	-47	-1.2
C	Etropole	15035.5	122	8.1	166	11.0	2	0.1	-44	-2.9
C	Kneja	18454.5	180	9.8	324	17.6	3	0.2	-144	-7.8
C	Kostinbrod	17714.5	96	5.4	269	15.2	2	0.1	-173	-9.8
C	Lukovit	23241	262	11.3	496	21.3	4	0.2	-234	-10.1
C	Mezdra	28416.5	273	9.6	510	17.9	6	0.2	-237	-8.3
C	Samokov	50528.5	484	9.6	751	14.9	6	0.1	-267	-5.3
C	Sofia	1190152	10203	8.6	13719	11.5	123	0.1	-3516	-3.0
C	Cherven brjag	39934	406	10.2	686	17.2	6	0.2	-280	-7.0
D	Levski	28612	248	8.7	504	17.6	2	0.1	-256	-8.9
D	Lovech	68272	570	8.3	998	14.6	6	0.1	-428	-6.3
D	Pleven	158304	1617	10.2	1708	10.8	34	0.2	-91	-0.6
D	Teteven	25619	298	11.6	335	13.1	1	0.0	-37	-1.4
D	Trjavna	40427	300	7.4	684	16.9	3	0.1	-384	-9.5
E	Belene	13596.5	92	6.8	198	14.6	-	-	-106	-7.8
E	Bjala	19146.5	184	9.6	316	16.5	3	0.2	-132	-6.9

E	Veliko Tarnovo	93695	750	8.0	1173	12.5	14	0.1	-423	-4.5
E	Gabrovo	83780.5	631	7.5	1088	13.0	12	0.1	-457	-5.5
E	Gorna Orjahovica	57948	514	8.9	783	13.5	4	0.1	-269	-4.6
E	Pavlikeni	33288.5	258	7.8	646	19.4	5	0.2	-388	-11.7
E	Svishtov	51346	343	6.7	738	14.4	6	0.1	-395	-7.7
E	Sevlievo	46428	368	7.9	875	18.8	3	0.1	-507	-10.9
E	Trojan	16165.5	112	6.9	257	15.9	1	0.1	-145	-9.0
F	Popovo	40906	365	8.9	731	17.9	8	0.2	-366	-8.9
F	Razgrad	63425	647	10.2	756	11.9	12	0.2	-109	-1.7
G	Dobrich	104371	1127	10.8	963	9.2	17	0.2	164	1.6
G	Isperih	28099.5	410	14.6	388	13.8	8	0.3	22	0.8
G	Ruse	185906	1586	8.5	2093	11.3	26	0.1	-507	-2.7
G	Silistra	71804	608	8.5	918	12.8	12	0.2	-310	-4.3
G	Tutrakan	21692.5	219	10.1	324	14.9	6	0.3	-105	-4.8

Table 3.4 – b Natural dynamics of the population in communities with towns over 10 000 Inhabitants across Danube River basin in 1995

Zone	Community name	Annul average population	Live born		Death		Deceased children up to 1 year age		Population Growth	
		/number/	*/number/*	*/per 1000/*	*/number/*	*/per 1000/*	*/number/*	*/per 1000/*	*/number/*	*/per 1000/*
Total for Bulgaria		**8406067**	**71967**	**8.6**	**114670**	**13.6**	**1065**	**0.1**	**-42703**	**-5.1**
A	Vidin	86582	780	9.0	1265	14.6	13	0.2	-485	-5.6
B	Berkovica	24798	201	8.1	473	19.1	6	0.2	-272	-11.0
B	Bjala Slatina	34554	340	9.8	724	21.0	8	0.2	-384	-11.1
B	Vraca	94916	803	8.5	1049	11.1	7	0.1	-246	-2.6
B	Kozloduj	24429	214	8.8	355	14.5	3	0.1	-141	-5.8
B	Lom	39424	346	8.8	635	16.1	5	0.1	-289	-7.3
B	Montana	66938	565	8.4	841	12.6	14	0.2	-276	-4.1
C	Botevgrad	37703	357	9.5	456	12.1	3	0.1	-99	-2.6
C	Etropole	14808	156	10.5	214	14.5	1	0.1	-58	-3.9
C	Kneja	18367	141	7.7	328	17.9	2	0.1	-187	-10.2
C	Kostinbrod	17481	117	6.7	268	15.3	3	0.2	-151	-8.6
C	Lukovit	22977	224	9.7	472	20.5	2	0.1	-248	-10.8
C	Mezdra	28190	260	9.2	550	19.5	5	0.2	-290	-10.3
C	Samokov	49809	450	9.0	780	15.7	4	0.1	-330	-6.6
C	Sofia	1192239	9416	7.9	14221	11.9	121	0.1	-4805	-4.0
C	Cherven brjag	39404	316	8.0	704	17.9	4	0.1	-388	-9.8
D	Levski	28309	227	8.0	515	18.2	2	0.1	-288	-10.2
D	Lovech	67295	511	7.6	1087	16.2	9	0.1	-576	-8.6
D	Pleven	155545	1375	8.8	1783	11.5	19	0.1	-408	-2.6
D	Teteven	25513	277	10.9	338	13.2	6	0.2	-61	-2.4
D	Trjavna	39898	262	6.6	669	16.8	2	0.1	-407	-10.2
E	Belene	13420	87	6.5	197	14.7	0	0.0	-110	-8.2

E	Bjala	18854	155	8.2	331	17.6	1	0.1	-176	-9.3
E	Veliko Tarnovo	93437	687	7.4	1237	13.2	12	0.1	-550	-5.9
E	Gabrovo	83168	571	6.9	1142	13.7	6	0.1	-571	-6.9
E	Gorna Orjahovica	57736	408	7.1	819	14.2	2	0.0	-411	-7.1
E	Pavlikeni	33105	247	7.5	654	19.8	7	0.2	-407	-12.3
E	Svishtov	51306	282	5.5	716	14.0	6	0.1	-434	-8.5
E	Sevlievo	46203	343	7.4	910	19.7	4	0.1	-567	-12.3
E	Trojan	15981	92	5.8	204	12.8	0	0.0	-112	-7.0
F	Dve mogili	13731	122	8.9	274	20.0	3	0.2	-152	-11.1
F	Popovo	41069	345	8.4	746	18.2	3	0.1	-401	-9.8
F	Razgrad	64212	605	9.4	824	12.8	9	0.1	-219	-3.4
G	Dobrich	103803	1010	9.7	1066	10.3	21	0.2	-56	-0.5
G	Isperih	28133	324	11.5	363	12.9	6	0.2	-39	-1.4
G	Ruse	184723	1398	7.6	2161	11.7	21	0.1	-763	-4.1
G	Silistra	71634	575	8.0	807	11.3	12	0.2	-232	-3.2
G	Tutrakan	21551	176	8.2	295	13.7	0	0.0	-119	-5.5

Table 3.4 – c Natural dynamics of the population in communities with towns over 10 000 Inhabitants across Danube River basin in 1996

Zone	Community name	Annul average population	Live born		Death		Deceased children up to 1 year age		Population Growth	
		/number/	*/number/*	*/per 1000/*	*/number/*	*/per 1000/*	*/number/*	*/per 1000/*	*/number/*	*/per 1000/*
Total for Bulgaria		**8362826**	**72188**	**8.6**	**117056**	**14.0**	**1125**	**0.1**	**-44868**	**-5.4**
A	Vidin	85542	785	9.2	1186	13.9	16	0.2	-401	-4.7
B	Berkovica	24669	182	7.4	439	17.8	5	0.2	-257	-10.4
B	Bjala Slatina	34182	311	9.1	725	21.2	7	0.2	-414	-12.1
B	Vraca	93926	865	9.2	1031	11.0	16	0.2	-166	-1.8
B	Kozloduj	24517	251	10.2	392	16.0	4	0.2	-141	-5.8
B	Lom	38866	316	8.1	663	17.1	12	0.3	-347	-8.9
B	Montana	66052	526	8.0	879	13.3	12	0.2	-353	-5.3
C	Botevgrad	37526	390	10.4	465	12.4	6	0.2	-75	-2.0
C	Etropole	14673	141	9.6	171	11.7	0	0.0	-30	-2.0
C	Kneja	18307	160	8.7	332	18.1	2	0.1	-172	-9.4
C	Kostinbrod	17411	142	8.2	299	17.2	2	0.1	-157	-9.0
C	Lukovit	22808	246	10.8	500	21.9	5	0.2	-254	-11.1
C	Mezdra	28121	236	8.4	515	18.3	3	0.1	-279	-9.9
C	Samokov	49081	459	9.4	716	14.6	4	0.1	-257	-5.2
C	Sofia	1190888	9460	7.9	14385	12.1	117	0.1	-4925	-4.1
C	Cherven brjag	39244	297	7.6	751	19.1	4	0.1	-454	-11.6
D	Levski	28073	239	8.5	592	21.1	6	0.2	-353	-12.6
D	Lovech	66458	532	8.0	1104	16.6	5	0.1	-572	-8.6
D	Pleven	153374	1491	9.7	1980	12.9	25	0.2	-489	-3.2
D	Teteven	25535	251	9.8	347	13.6	3	0.1	-96	-3.8
D	Trjavna	39790	274	6.9	658	16.5	1	0.0	-384	-9.7
E	Belene	13312	59	4.4	222	16.7	0	0.0	-163	-12.2

E	Bjala	18558	153	8.2	329	17.7	5	0.3	-176	-9.5
E	Veliko Tarnovo	92731	750	8.1	1285	13.9	15	0.2	-535	-5.8
E	Gabrovo	82343	499	6.1	984	12.0	6	0.1	-485	-5.9
E	Gorna Orjahovica	57197	422	7.4	788	13.8	3	0.1	-366	-6.4
E	Pavlikeni	33039	259	7.8	680	20.6	2	0.1	-421	-12.7
E	Svishtov	50419	335	6.6	727	14.4	4	0.1	-392	-7.8
E	Sevlievo	45933	326	7.1	843	18.4	4	0.1	-517	-11.3
E	Trojan	15869	94	5.9	209	13.2	1	0.1	-115	-7.2
F	Popovo	40862	317	7.8	755	18.5	8	0.2	-438	-10.7
F	Razgrad	63813	560	8.8	808	12.7	12	0.2	-248	-3.9
G	Dobrich	102646	980	9.5	973	9.5	23	0.2	7	0.1
G	Isperih	28168	345	12.2	370	13.1	9	0.3	-25	-0.9
G	Ruse	184117	1495	8.1	2276	12.4	21	0.1	-781	-4.2
G	Silistra	70593	522	7.4	985	14.0	6	0.1	-463	-6.6
G	Tutrakan	21281	165	7.8	280	13.2	0	0.0	-115	-5.4

Table 3.5 Average Salary of Contracted Employees in State and Private Sectors in Communities with Towns over 10 000 Inhabitants

Communities	Total (in state and private sectors) in levs	In private companies of double accounting in levs
Total for Bulgaria	**167582**	
District Sofia grad	**191454**	**201266**
District Varna	**183509**	**131111**
Dobrich grad	137231	129641
Dobrich	169726	161979
District Lovech	**143329**	**122434**
Belene	138010	56178
Veliko Tarnovo	140115	99146
Gabrovo	127673	97018
Gorna Orjahovitca	158498	57041
Levski	141382	118499
Lovetch	149109	83563
Lukovit	115752	112795
Pavlikeni	155040	68919
Pleven	158587	162625
Svishtov	158366	139457
Sevlievo	137945	205491
Teteven	105681	55741
Trojan	165170	96010
Trjavna	134602	93992
Cherven brjag	120387	80391
District Montana	**151325**	**143931**
Bjala Slatina	116489	83404
Vidin	141059	246154
Vraca	192712	195429
Kozloduj	292655	120274
Lom	114636	65480
Mezdra	153674	110255
Montana	144176	115766
District Ruse	**145295**	**115251**
Bjala	124870	93731
Popovo	133227	58323
Razgrad	146358	181361
Ruse	169643	117274
Silistra	164137	94954
Tutrakan	115817	94534
Oblast Sofia	**165402**	**124128**
Botevgrad	165416	83618
Etropole	135366	57132
Kostinbrod	111251	139232
Samokov	120929	68940
Svoge	129686	209004

Annex

for Chapter 4

Table 4.1 General data about drinking water sources

Zone	Town	Number of citizens	Number of citizens on central water-main	Number of town's water sources **			SPZ *	Average annual capacity of water sources for the town (m^3/s)				PCDW	Disinfecting agent			
				T	S	G		94	95	96	97		Cl_2 gas	Ca hypochlorite	Na hypochlorite	O_3
A	Vidin	62972	62972	2	0	2	yes	1.05	1.05	1.05	1.05	n.d	n.d.	n.d.	n.d.	n.d.
A	Lom	36336	36336	4	0	4	yes	0.03	0.023	0.02	0.017	no	•	•	•	
A	Svishtov	32600	32600	3	0	3	yes	0.054	0.06	0.06	0.05	no	•			
A	Belene	9919	9919	1	0	1	yes	0.053	0.049	0.041	0.033	no	•			
A	Kozlodui	16000	16000	3	0	3	yes	0.26	0.26	0.26	0.26	no	n.d.	n.d.	n.d.	n.d.
A	Ruse	167352	167352	4	0	4	yes	1.10	1.10	1.10	1.10	no	•			
A	Silistra	46171	46171	5	0	5	yes	0.26	0.17	0.19	0.16	no	•	•		
A	Tutrakan	13081	13081	3	0	3	yes	0.03	0.046	0.045	0.032	no	n.d.	n.d.	n.d.	n.d.
B	Vratsa	95236	95236	6	1	5	yes	0.627	0.715	0.773	0.798	yes	n.d.	n.d.	n.d.	n.d.
B	Berkovitsa	19776	19776	3	2	1	no	n.d	n.d	n.d	0.350	yes	•			
B	Montana	51211	51211	1	1	0	yes	1.07	1.39	1.25	1.23	yes	•			
B	B.Slatina	14629	14629	14	0	14	yes	0.006	0.005	0.007	0.008	no	n.d.	n.d.	n.d.	n.d.
C	Samokov	30000	30000	2	1	1	yes	0.15	0.20	0.25	0.25	no	•			
C	Sofia	1112847	1112847	4	4	0	no	n.d	n.d	n.d	5.5-6	yes	•			
C	Kostinbrod	11507	11507	2	0	2	no	0.05	0.05	0.05	0.05	no	•			
C	Novi Iskar	13556	13556	1	1	0	n.d.	n.d	n.d	n.d	n.d	n.d	•			
C	Mezdra	14117	14117	4	1	3	yes	0.043	0.079	0.074	0.073	no	n.d.	n.d.	n.d.	n.d.
C	Etropole	14655	14655	4	3	1	yes	0.04	0.04	0.04	0.04	no	•			
C	Botevgrad	22000	22000	3	2	1	yes	0.12	0.12	0.12	0.12	yes	•			
C	Lukovit	11079	11079	4	0	4	yes	0.15	0.15	0.15	0.15	no	n.d.	n.d.	n.d.	n.d.

C	Tcherven brjag	18827	18827	1	0	1	yes	0.09	0.085	0.085	0.068	no	•			
C	Kneza	14487	6154	5	0	5	yes	0.04	0.04	0.03	0.03	no	•	•		
D	Teteven	12534	12534	4	2	2	yes	0.084	0.085	0.086	0.087	n.d	n.d.	n.d.	n.d.	n.d.
D	Pleven	136000	136000	7	1	6	yes	1.22	0.97	0.88	0.837	no	•			
D	Trojan	26000	26000	3	3	0	yes	0.16	0.17	0.17	0.18	no	n.d.	n.d.	n.d.	n.d.
D	Lovetch	48223	48223	5	2	3	yes	0.23	0.302	0.32	0.266	no	•	•		
D	Levski	13620	13620	4	0	4	yes	0.09	0.085	0.085	0.068	no	•	•		
E	Gabrovo	83771	83771	5	3	2	yes	0.73	0.84	1.04	0.98	yes	•	•		
E	Triavna	15637	15637	4	2	2	yes	0.03	0.04	0.06	0.06	no	•			
E	V.Tarnovo	74865	74865	1	1	0	yes	0.06	0.058	0.044	0.042	yes	•			
E	G.Orjahovitsa	45795	45795	1	1	0	yes	0.08	0.087	0.113	0.068	yes	•			
E	Sevlievo	27500	27500	1	1	0	yes	n.d	n.d	n.d	n.d	yes	•		•	
E	Pavlikeni	16466	16466	4	0	4	yes	0.09	0.07	0.065	0.085	no	•			
E	Bjala	10872	10872	1	0	1	yes	0.13	0.13	0.125	0.12	no	•			
F	Popovo	22925	22925	3	0	3	yes	n.d.	0.28	0.27	0.26	no			•	
F	Razgrad	40264	40264	28	0	28	no	0.25	0.23	0.19	0.21	no	•	•	•	
G	Isperih	10672	10672	3	0	3	no	0.04	0.03	0.05	0.02	no			•	
G	Dobritch	104680	104680	5	0	5	yes	0.42	0.417	0.526	0.487	no	•			

PCDW - Plant for Cleaning Drinking Water

***** Sanitary-Protection Zone - Compliance with the Ordinance for SPZ

****** ***T*** - total number of water sources; ***S*** - surface water sources; ***G*** - ground water sources

Table 4.2 Consumption of drinking water of industrial and agricultural enterprises

Zone	Town	Number of industrial enterprises				Number of agricultural enterprises			
		Capacity m^3/s				Capacity m^3/s			
		1994	1995	1996	1997	1994	1995	1996	1997
A	Vidin	n.d. n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.
A	Lom	4 0.0026	3 0.0018	3 0.0016	3 0.0012	n.d. n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.
A	Svishtov	18 0.035	18 0.032	18 0.03	18 0.03	n.d. n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.
A	Belene	4 0.0010	4 0.0006	4 0.0008	4 0.0005	1 0.0023	1 0.0016	1 0.0014	1 0.0009
A	Kozloduj	5 0.00008	5 0.00005	5 0.00005	5 0.00005	n.d. n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.
A	Russe	1600 0.189	3400 0.233	4100 0.251	4500 0.254	24 0.015	26 0.016	33 0.018	38 0.002
A	Silistra	18 0.031	18 0.014	12 0.011	9 0.008	n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.
A	Tutrakan	8 0.0023	8 0.0015	8 0.0020	8 0.0016	1 n.d.	1 n.d.	1 n.d.	1 n.d.
B	Vratsa	17 0.00005	17 0.00006	17 0.00005	16 0.000045	n.d. n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.
B	Berkovitsa	25 0.01	25 n.d.	25 0.003	25 0.0029	4 0.0001	4 n.d.	4 0.00014	4 0.0000125
B	Montana	25 0.0066	25 0.0094	25 0.0152	25 0.0153	1 0.0000007	1 0.0000119	1 0.0000317	1 0.0000537
B	Bjala Slatina	6 0.083	6 0.11	6 0.94	6 0.9	n.d. n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.

C	Samokov	16 0.015	16 0.015	16 0.015	16 0.015	n.d.	n.d. n.d.	n.d. n.d.	3 0.01
C	Sofia	2068 n.d.	2042 n.d.	2124 n.d.	2142 n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.
C	Kostinbrod	n.d.	n.d. n.d.	2 0.0003	2 0.0004	n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.
C	N.Iskar	n.d. n.d.	n.d. n.d.	83 n.d.	85 n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.
C	Mezdra	4 0.3	4 0.16	4 0.13	4 0.12	n.d. n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.
C	Etropole	15 0.01	15 0.01	15 0.005	15 0.005	n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.
C	Botevgrad	3 0.01	3 0.01	3 0.01	3 0.01	n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.
C	Lukovit	12 0.006	12 0.007	12 0.008	12 0.007	n.d. n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.
C	Tcherven brjag	8 0.011	8 0.0071	8 0.0065	8 0.006	2 0.00006	1 0.00003	1 0.00004	1 0.00003
C	Kneza	8 0.0028	8 0.0027	9 0.0026	10 0.0025	5 0.0006	6 0.0006	6 0.0006	6 0.0005
D	Teteven	9 0.002	9 0.003	9 0.003	9 0.004	n.d. n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.
D	Pleven	49 0.122	46 0.095	45 0.086	44 0.065	4 0.004	4 0.003	4 0.001	n.d. n.d.
D	Trojan	n.d. 0.07	n.d. 0.0677	n.d. 0.0654	n.d. 0.0649	n.d. n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.
D	Lovetch	38 0.017	54 0.034	54 0.036	56 0.028	n.d. n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.
D	Levski	11 0.004	11 0.004	9 0.002	9 0.001	3 0.0008	3 0.00076	2 0.00053	2 0.00052

E	Gabrovo	52 0.031	52 0.026	53 0.026	53 0.025	n.d. n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.
E	Trjavna	13 0.003	13 0.0035	13 0.0027	13 0.006	n.d. n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.
E	V.Tarnovo	n.d. n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.
E	G.Orjahovitsa	45 n.d.	44 n.d.	44 n.d.	42 n.d.	1 n.d.	2 n.d.	3 n.d.	4 n.d.
E	Sevlievo	14 0.0018	17 0.0018	19 0.0019	23 0.0017	1 0.00005	1 n.d.	1 n.d.	1 n.d.
E	Pavlikeni	26 0.015	26 0.016	25 0.013	26 0.013	1 0.0001	1 0.00006	1 0.00005	1 0.00005
E	Bjala	82 0.011	86 0.012	91 0.013	97 0.014	4 0.002	5 0.002	6 0.003	8 0.004
F	Popovo	n.d. n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.
F	Razgrad	47 0.016	52 0.02	64 0.021	68 0.024	n.d. n.d.	n.d. n.d.	n.d. n.d.	n.d. n.d.
G	Isperih	n.d. n.d.	n.d. n.d.	n.d. n.d.	6 0.008	n.d. n.d.	n.d. n.d.	n.d. n.d.	n.d. 0.007
G	Dobritch	26 n.d.	26 n.d.	26 n.d.	26 n.d.	2 n.d.	2 n.d.	2 n.d.	2 n.d.

Table 4.3 Data on microbiological qualities of drinking water and registered cases of gastro-intestinal diseases

Zone	Town	Percentage of non-standard samples by total coliforms(titre)				Percentage of samples without residual active chlorine in the water-supply system				Enterocolitis				Dysentery				Hepatitis			
		94	95	96	97	94	95	96	97	94	95	96	97	94	95	96	97	94	95	96	97
A	Vidin	5.35	6.03	6.07	2.44	6.3	3.15	10.5	5.97	186	218	144	109	135	94	72	87	155	84	214	77
A	Lom	0	0.8	2.66	4.42	7	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0
A	Svishtov	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0	0	0	0	0	0	0	0	0	0	0	0
A	Belene	n.d.	2.3	6.5	4.9	80	90.9	89	30.7	3	0	0	14	0	0	0	0	4	8	6	1
A	Kozlodui	2.8	5.3	4.5	2.6	2.3	4.2	3.8	2	2	4	3	1	17	9	3	2	12	10	10	4
A	Ruse	10.1	5.81	5.17	6.26	0	0	0	0	115	203	180	186	24	65	13	40	79	66	56	73
A	Silistra	30	23	18	18	77.4	83.2	91.3	77.2	36	43	30	19	168	53	24	29	20	24	5	5
A	Tutrakan	9.53	10.9	3.65	4.57	2.5	0.7	0.7	1.0	11	35	11	10	13	9	1	4	7	11	2	2
B	Vratsa	7.3	7.0	7.2	7.2	n.d.	n.d.	n.d.	n.d.	406	366	332	178	407	127	76	41	217	200	37	42
B	Berkovitsa	8.69	8.35	9.42	9.37	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
B	Montana	28.6	8.25	1.82	3.51	33.6	7.1	9.96	22.6	0	0	0	0	0	0	0	0	0	0	0	0
B	B.Slatina	12.0	17.9	11.7	6.8	0	3	2	1.5	25	31	38	42	11	15	6	6	46	123	21	4
C	Samokov	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
C	Sofia	5.6	10.8	8	0.2	6	13	9	5.7	671	567	531	406	1143	612	494	282	773	640	830	1031
C	Kostinbrod	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
C	N.Iskar	11	8.5	4	2	n.d.	n.d.	50	21	1	3	4	4	5	13	1	1	5	8	5	6
C	Mezdra	18.8	14.3	15.2	12.5	2.2	2.0	1.5	1.5	174	0	114	86	90	0	6	16	62	0	16	6
C	Etropole	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
C	Botevgrad	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
C	Lukovit	11.4	6.3	6.6	4.7	n.d.	n.d.	n.d.	n.d.	65	38	45	63	15	13	12	14	13	27	2	1
C	Tcherven brjag	2.5	0.8	1.6	1.9	36.8	55.9	58.3	34.6	5	4	10	1	6	3	7	1	32	39	11	5
C	Kneza	10.9	7.6	8.1	7.3	10	9	11	8	2	6	2	2	2	2	0	0	10	14	7	7
D	Teteven	14	16.8	14.3	20.5	n.d.	n.d.	n.d.	n.d.	7	12	9	8	31	16	2	9	22	8	4	4

D	Pleven	0.1	3.3	2.1	0.5	41	31	26	20.9	220	81	90	54	153	65	28	36	207	154	61	42
D	Trojan	0.31	1.37	0.3	1.8	n.d.	n.d.	n.d.	n.d.	0	0	3	0	16	8	4	4	45	60	10	6
D	Lovetch	19.8	25.8	14.5	16.6	n.d.	n.d.	n.d.	n.d.	268	123	81	119	204	83	4	45	205	103	20	29
D	Levski	n.d.	3.7	3.3	3.1	81.8	50	50	66.6	6	3	0	1	10	4	1	0	16	46	5	2
E	Gabrovo	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	339	192	177	101	443	57	21	37	45	69	17	40
E	Trjavna	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	59	12	5	4	25	6	1	3	3	6	3	11
E	V.Tarnovo	0	0	0	0	0	0	0	0	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
E	G.Orjahovitsa	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
E	Sevlievo	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0	0	0	0	0	0	0	0	0	0	0	0
E	Pavlikeni	7.6	0.39	1.7	1.72	32	10.5	12.7	14.5	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
E	Bjala	10.8	7.4	0.9	3.6	0	0	0	0	0	0	0	4	21	0	0	1	5	6	1	1
F	Popovo	6	6.92	5.6	6.89	1.8	2.1	1.8	2.0	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
F	Razgrad	8.65	5.51	5.8	5.94	2.5	2.0	4.3	7.5	294	188	117	95	139	21	5	3	19	13	3	6
G	Isperih	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	72	18	22	4	50	4	10	1	11	5	1	0
G	Dobritch	n.d.	n.d.	n.d.	n.d.	1.5	2.3	2.0	0.8	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.

Table 4.4a Physico - chemical parameters of drinking water part I - 1994 .

Zone	Town	pH value		Total hardness		Dry ersidue		Turbidity		Oxidizability		$(NH_4)^+$		$(NO_2)^-$		$(NO_3)^-$		$(PO_4)^{3-}$		$(Cl)^-$	
		T	N	T	N	T	N	T	N	T	N	T	N	T	N	T	N	T	N	T	N
A	Vidin	185	0	185	0	56	0	185	0	306	0	323	0	323	0	162	0	2	0	185	0
A	Lom	4	0	4	0	1	0	4	0	4	0	4	0	4	0	4	0	1	0	4	0
A	Svishtov	48	0	4	0	0	0	48	0	48	0	48	0	48	0	48	0	0	0	48	0
A	Belene	10	0	0	0	0	0	10	0	10	0	10	0	10	0	10	0	0	0	10	0
A	Kozlodui	12	0	1	0	1	0	1	0	12	0	12	0	12	0	12	0	1	0	12	0
A	Russe	17	0	2	0	2	0	0	0	17	0	17	0	17	0	17	0	2	0	17	0
A	Silistra	4	0	4	0	4	0	0	0	26	0	26	0	26	0	26	0	26	0	26	0
A	Tutrakan	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
B	Vratsa	600	0	0	0	0	0	600	101	600	0	600	5	600	1	600	0	0	0	600	0
B	Berkovitsa	26	0	2	0	2	0	26	0	26	0	26	0	26	0	26	0	2	0	26	0
B	Montana	362	0	0	0	0	0	362	3	362	0	362	0	362	0	362	0	0	0	362	0
B	B.Slatina	5	0	1	0	1	0	5	0	5	0	5	0	5	0	5	0	1	0	5	0
C	Samokov	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
C	Sofia	290	0	1	0	1	0	290	5	290	3	290	0	290	0	290	0	1	0	290	0
C	Kostinbrod	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
C	N.Iskar	4	0	2	0	2	0	3	0	4	1	4	0	4	0	4	0	2	0	4	0
C	Mezdra	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
C	Etropole	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
C	Botevgrad	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
C	Lukovit	5	0	0	0	0	0	5	1	5	0	5	0	5	0	5	0	0	0	5	0
C	Tcherven brjag	31	0	0	0	0	0	31	1	31	0	31	8	31	1	31	0	0	0	31	0
C	Kneza	4	0	4	0	1	0	4	2	4	0	4	1	4	7	4	0	1	0	1	0
D	Teteven	6	0	1	0	1	0	6	1	6	0	6	0	6	0	6	0	1	0	6	0
D	Pleven	307	0	6	0	6	0	307	26	307	0	307	26	307	21	307	0	6	0	326	0
D	Trojan	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
D	Lovetch	230	0	0	0	0	0	230	3	230	0	230	2	230	0	230	0	0	0	230	0
D	Levski	11	0	0	0	0	0	11	0	11	0	11	0	11	0	11	0	0	0	11	0

E	Gabrovo	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
E	Trjavna	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
E	V.Tarnovo	60	0	5	0	5	0	60	0	60	0	60	0	60	0	60	0	60	0	60	0
E	G.Orjahovitsa	22	0	5	0	5	0	22	0	22	0	22	0	22	0	22	0	0	0	22	0
E	Sevlievo	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
E	Pavlikeni	18	0	1	0	0	0	18	0	18	0	18	0	18	0	18	0	0	0	18	0
E	Bjala	2	0	2	0	0	0	0	0	2	0	2	0	2	0	2	0	2	0	2	0
F	Popovo	7	0	0	0	0	0	7	1	7	0	7	0	7	0	7	0	0	0	7	0
F	Razgrad	65	0	0	0	0	0	0	0	65	0	65	0	65	0	65	1	0	0	65	0
G	Isperih	14	0	0	0	0	0	0	0	14	2	14	0	14	0	14	0	0	0	14	0
G	Dobritch	108	0	1	0	1	0	108	0	108	0	108	0	108	0	108	0	1	0	108	0

T - Total number of samples ;

N - Number of non-standard samples

Table 4.4b Physico - chemical parameters of drinking water part II - 1994

Zone	Town	Fe^{++}		Zn^{++}		Cu^{++}		Mn^{++}		Pb^{++}		As^{++}		Cr^{6+}		Cd^{++}		Petroleum products		Pesticides	
		T	N	T	N	T	N	T	N	T	N	T	N	T	N	T	N	T	N	T	N
A	Vidin	150	0	1	0	1	0	150	0	0	0	1	0	1	0	1	0	0	0	0	0
A	Lom	1	0	1	0	1	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0
A	Svishtov	0	0	0	0	0	0	48	0	0	0	0	0	0	0	0	0	0	0	0	0
A	Belene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A	Kozlodui	1	0	1	0	1	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0
A	Russe	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
A	Silistra	4	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0
A	Tutrakan	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
B	Vratsa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B	Berkovitsa	2	0	2	0	2	0	2	0	2	0	2	0	2	0	0	0	0	0	0	0
B	Montana	0	0	0	0	0	0	0	0	32	0	109	0	0	0	0	0	0	0	0	0
B	B. Slatina	1	0	1	0	1	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0
C	Samokov	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
C	Sofia	290	119	1	0	1	0	270	91	1	0	0	0	1	0	1	0	0	0	0	0
C	Kostinbrod	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
C	N.Iskar	3	1	2	0	2	0	2	0	2	0	0	0	2	0	2	0	0	0	0	0
C	Mezdra	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
C	Etropole	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
C	Botevgrad	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
C	Lukovit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	Tcherven brjag	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	Kneza	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D	Teteven	1	0	1	0	1	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0
D	Pleven	7	0	6	0	6	0	6	0	6	0	0	0	6	0	6	0	3	3	0	0
D	Trojan	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
D	Lovetch	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0
D	Levski	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

E	Gabrovo	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
E	Trjavna	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
E	V.Tarnovo	5	0	5	0	5	0	5	0	5	0	5	0	5	0	0	0	5	0	0	0
E	G.Orjahovitsa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E	Sevlievo	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
E	Pavlikeni	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
E	Bjala	2	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0
F	Popovo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F	Razgrad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
G	Isperih	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
G	Dobritch	1	0	1	0	1	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0

T - Total number

N - Number of non-standard samples

Table 4.5a Physico - chemical parameters of drinking water part I - 1995.

Zone	Town	pH value		Total hardness		Dry ersidue		Turbidity		Oxidizability		$(NH_4)^+$		$(NO_2)^-$		$(NO_3)^-$		$(PO_4)^{3-}$		$(Cl)^-$	
		T	N	T	N	T	N	T	N	T	N	T	N	T	N	T	N	T	N	T	N
A	Vidin	166	0	166	0	40	0	166	0	292	0	301	0	301	0	160	0	5	0	160	0
A	Lom	43	0	0	0	0	0	43	0	43	0	43	0	43	0	43	0	0	0	43	0
A	Svishtov	50	0	4	0	0	0	50	0	50	0	50	0	50	0	50	0	0	0	50	0
A	Belene	11	0	0	0	0	0	11	3	11	0	11	0	11	0	11	0	0	0	11	0
A	Kozlodui	8	0	0	0	0	0	8	1	8	0	8	0	8	0	8	0	0	0	8	0
A	Russe	19	0	0	0	0	0	0	0	19	0	19	0	19	0	19	0	0	0	19	0
A	Silistra	0	0	0	0	0	0	0	0	3	0	3	0	3	0	3	0	0	0	3	0
A	Tutrakan	3	0	0	0	3	0	0	0	5	0	5	0	5	0	5	0	5	0	5	0
B	Vratsa	492	0	0	0	0	0	492	122	429	0	492	3	492	6	492	0	0	0	492	0
B	Berkovitsa	24	0	0	0	0	0	24	1	24	0	24	0	24	0	24	0	0	0	24	0
B	Montana	202	2	0	0	0	0	202	8	202	0	202	0	202	0	202	0	0	0	202	0
B	B.Slatina	2	0	0	0	0	0	2	0	2	1	2	0	2	0	2	0	0	0	2	0
C	Samokov	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
C	Sofia	860	0	1	0	1	0	860	46	860	6	860	2	860	0	810	0	1	0	860	0
C	Kostinbrod	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
C	N.Iskar	3	0	1	0	1	0	3	1	3	0	3	0	3	0	3	0	1	0	3	0
C	Mezdra	1	0	0	0	0	0	1	0	1	0	1	0	1	0	1	0	0	0	1	0
C	Etropole	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	Botevgrad	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
C	Lukovit	6	0	0	0	0	0	6	0	6	0	6	0	6	0	6	0	0	0	6	0
C	Tcherven brjag	34	0	0	0	0	0	34	0	34	0	34	7	34	2	34	0	0	0	34	0
C	Kneza	4	0	1	0	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
D	Teteven	4	0	0	0	0	0	4	0	4	0	4	0	4	0	4	0	0	0	4	0
D	Pleven	271	0	1	0	1	0	271	7	271	2	271	17	271	5	271	0	271	0	271	0
D	Trojan	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
D	Lovetch	220	0	1	0	1	0	220	2	220	0	220	0	220	1	220	0	1	0	220	0
D	Levski	16	0	0	0	0	0	16	0	16	0	16	0	16	0	16	0	0	0	16	0
E	Gabrovo	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.

E	Trjavna	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
E	V.Tarnovo	60	0	5	0	5	0	60	0	60	0	60	0	60	0	60	0	60	0	60	0
E	G.Orjahovitsa	10	0	5	0	5	0	10	0	10	0	10	0	10	0	10	0	0	0	10	0
E	Sevlievo	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
E	Pavlikeni	16	0	1	0	0	0	16	0	16	0	16	0	16	0	16	0	0	0	16	0
E	Bjala	2	0	2	0	0	0	0	0	2	0	2	0	2	0	2	0	0	0	2	0
F	Popovo	10	0	0	0	0	0	10	1	10	0	10	0	10	0	10	0	0	0	10	0
F	Razgrad	70	0	0	0	0	0	0	0	70	0	70	0	70	0	70	2	0	0	70	0
G	Isperih	4	0	0	0	0	0	0	0	4	0	4	0	4	0	12	0	0	0	15	0
G	Dobritch	163	0	2	0	0	0	163	1	163	1	163	2	163	1	163	0	0	0	163	0

T - Total number of samples ;

N - Number of non-standard samples

Table 4.5b Physico - chemical parameters of drinking water part II - 1995

Zone	Town	Fe^{++}		Zn^{++}		Cu^{++}		Mn^{++}		Pb^{++}		As^{++}		Cr^{6+}		Cd^{++}		Petroleum products		Pesticides	
		T	N	T	N	T	N	T	N	T	N	T	N	T	N	T	N	T	N	T	N
A	Vidin	170	0	1	0	1	0	70	0	0	0	1	0	1	0	1	0	0	0	0	0
A	Lom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A	Svishtov	0	0	0	0	0	0	50	0	0	0	0	0	0	0	0	0	0	0	0	0
A	Belene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A	Kozlodui	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A	Russe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A	Silistra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A	Tutrakan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B	Vratsa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B	Berkovitsa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B	Montana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B	B. Slatina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	Samokov	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
C	Sofia	646	280	1	0	1	0	623	157	1	0	0	0	1	0	1	0	0	0	0	0
C	Kostinbrod	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
C	N.Iskar	3	3	1	0	1	0	3	1	1	0	0	0	1	0	1	0	0	0	0	0
C	Mezdra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	Etropole	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	Botevgrad	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
C	Lukovit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	Tcherven brjag	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	Kneza	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D	Teteven	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D	Pleven	1	0	271	0	1	0	1	0	1	0	0	0	1	0	1	0	0	0	0	0
D	Trojan	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
D	Lovetch	1	0	1	0	1	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0
D	Levski	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

E	Gabrovo	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
E	Trjavna	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
E	V.Tarnovo	5	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0
E	G.Orjahovitsa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E	Sevlievo	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
E	Pavlikeni	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
E	Bjala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F	Popovo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F	Razgrad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
G	Isperih	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
G	Dobritch	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0

T - Total number

N - Number of non-standard samples

Table 4.6a Physico - chemical parameters of drinking water part I - 1996.

Zone	Town	pH value		Total hardness		Dry ersidue		Turbidity		Oxidizability		$(NH_4)^+$		$(NO_2)^-$		$(NO_3)^-$		$(PO_4)^{3-}$		$(Cl)^-$	
		T	N	T	N	T	N	T	N	T	N	T	N	T	N	T	N	T	N	T	N
A	Vidin	150	0	150	0	72	0	150	0	300	0	300	0	300	0	156	0	7	0	157	0
A	Lom	37	0	0	0	0	0	37	0	37	0	37	0	37	0	37	0	0	0	37	0
A	Svishtov	49	0	4	0	0	0	49	0	49	0	49	0	49	0	49	0	0	0	49	0
A	Belene	18	0	0	0	0	0	18	0	18	0	18	2	18	0	18	0	0	0	18	0
A	Kozlodui	4	0	0	0	0	0	4	0	4	0	4	0	4	0	4	0	0	0	4	0
A	Russe	23	0	0	0	0	0	0	0	23	0	23	0	23	0	23	0	0	0	23	0
A	Silistra	7	0	6	0	6	0	0	0	8	0	8	0	8	0	11	0	6	0	8	0
A	Tutrakan	0	0	0	0	0	0	0	0	11	0	11	0	11	0	11	0	11	0	0	0
B	Vratsa	396	0	2	0	2	0	396	30	396	0	396	4	396	4	396	0	2	0	396	0
B	Berkovitsa	23	0	0	0	0	0	23	0	23	0	23	0	23	0	23	0	0	0	23	0
B	Montana	224	0	0	0	0	0	224	0	224	0	224	0	224	0	224	0	0	0	224	0
B	B.Slatina	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
C	Samokov	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
C	Sofia	365	0	0	0	0	0	365	0	365	4	365	1	365	0	365	0	0	0	365	0
C	Kostinbrod	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	N.Iskar	6	0	0	0	0	0	6	0	6	0	6	0	6	0	6	0	0	0	6	0
C	Mezdra	4	0	0	0	0	0	4	0	4	0	4	0	4	0	4	0	0	0	4	0
C	Etropole	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	Botevgrad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	Lukovit	7	0	1	0	1	0	7	0	7	0	7	0	7	0	7	0	1	0	7	0
C	Tcherven brjag	36	0	1	0	1	0	36	3	36	0	36	1	36	1	36	0	1	0	36	0
C	Kneza	4	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D	Teteven	6	0	0	0	0	0	6	1	6	0	6	0	6	0	6	0	0	0	6	0
D	Pleven	239	0	2	0	2	0	239	0	239	0	239	7	239	8	239	0	2	0	239	0
D	Trojan	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
D	Lovetch	224	0	0	0	0	0	224	0	224	0	224	0	224	0	224	0	0	0	224	0
D	Levski	16	0	0	0	0	0	16	0	16	0	16	0	16	1	16	0	0	0	16	0

E	Gabrovo	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
E	Trjavna	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
E	V.Tarnovo	60	0	5	0	5	0	60	0	60	0	60	0	60	0	60	0	60	0	60	0
E	G.Orjahovitsa	8	0	1	0	1	0	8	0	8	0	8	0	8	0	8	0	0	0	8	0
E	Sevlievo	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
E	Pavlikeni	13	0	1	0	0	0	13	0	13	0	13	0	13	0	13	0	0	0	13	0
E	Bjala	2	0	0	0	0	0	0	0	2	0	2	0	2	0	2	0	0	0	2	0
F	Popovo	8	0	2	0	2	0	8	1	8	0	8	0	8	0	8	0	8	0	8	0
F	Razgrad	59	0	0	0	0	0	0	0	59	0	59	0	59	2	59	0	0	0	59	0
G	Isperih	8	0	0	0	0	0	0	0	8	0	8	0	8	0	8	0	0	0	8	0
G	Dobritch	274	0	0	0	0	0	274	0	274	0	274	2	274	2	274	0	0	0	274	0

T - Total number of samples ;

N - Number of non-standard samples

Table 4.6b Physico - chemical parameters of drinking water part II - 1996.

Zone	Town	Fe^{++}		Zn^{++}		Cu^{++}		Mn^{++}		Pb^{++}		As^{++}		Cr^{6+}		Cd^{++}		Petroleum products		Pesticides	
		T	N	T	N	T	N	T	N	T	N	T	N	T	N	T	N	T	N	T	N
A	Vidin	142	0	1	0	1	0	157	0	0	0	0	0	0	0	0	0	0	0	0	0
A	Lom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A	Svishtov	49	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0
A	Belene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A	Kozlodui	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A	Russe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A	Silistra	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
A	Tutrakan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B	Vratsa	2	0	2	0	2	0	2	0	2	0	2	0	2	0	0	0	0	0	0	0
B	Berkovitsa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B	Montana	1	0	1	0	1	0	0	0	1	0	15	0	0	0	0	0	0	0	0	0
B	B. Slatina	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
C	Samokov	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
C	Sofia	12	6	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0
C	Kostinbrod	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	N.Iskar	5	2	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0
C	Mezdra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	Etropole	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	Botevgrad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	Lukovit	1	0	1	0	1	0	1	0	1	0	1	0	0	0	1	0	0	0	0	0
C	Tcherven brjag	1	0	1	0	1	0	1	0	1	0	0	0	1	0	1	0	0	0	0	0
C	Kneza	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D	Teteven	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D	Pleven	2	0	2	0	2	0	2	0	2	0	0	0	2	0	2	0	9	9	0	0
D	Trojan	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
D	Lovetch	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D	Levski	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

E	Gabrovo	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
E	Trjavna	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
E	V.Tarnovo	5	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0
E	G.Orjahovitsa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E	Sevlievo	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
E	Pavlikeni	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
E	Bjala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F	Popovo	4	1	2	0	2	0	2	0	2	0	0	0	2	0	0	0	0	0	0	0
F	Razgrad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
G	Isperih	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
G	Dobritch	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

T - Total number

N - Number of non-standard samples

Table 4.7a Physico - chemical parameters of drinking water part I - 1997 .

Zone	Town	pH value		Total hardness		Dry ersidue		Turbidity		Oxidizability		$(NH_4)^+$		$(NO_2)^-$		$(NO_3)^-$		$(PO_4)^{3-}$		$(Cl)^-$	
		T	N	T	N	T	N	T	N	T	N	T	N	T	N	T	N	T	N	T	N
A	Vidin	174	0	174	0	47	0	174	0	293	0	301	0	301	0	178	0	5	0	180	0
A	Lom	13	0	4	0	4	0	13	0	13	0	13	0	13	0	13	0	4	0	13	0
A	Svishtov	54	0	4	0	0	0	54	0	54	0	54	0	54	0	54	0	0	0	54	0
A	Belene	13	0	0	0	0	0	13	0	13	0	13	0	13	0	13	0	0	0	13	0
A	Kozlodui	8	0	0	0	0	0	8	1	8	0	8	0	8	0	8	0	0	0	8	0
A	Russe	15	0	0	0	0	0	0	0	15	0	15	0	15	0	15	0	0	0	15	0
A	Silistra	0	0	0	0	0	0	0	0	12	0	12	0	12	0	12	0	0	0	12	0
A	Tutrakan	3	0	3	0	3	0	0	0	2	0	2	0	2	0	2	0	2	0	2	0
B	Vratsa	336	0	0	0	0	0	336	47	336	0	336	0	336	2	336	0	0	0	336	0
B	Berkovitsa	20	0	1	0	1	0	2	0	20	0	20	0	20	0	20	0	1	0	20	0
B	Montana	202	0	0	0	0	0	202	0	202	0	202	0	202	0	202	0	0	0	202	0
B	B.Slatina	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
C	Samokov	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	Sofia	59	0	2	0	2	0	59	2	59	3	59	0	59	0	59	0	2	0	59	0
C	Kostinbrod	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
C	N.Iskar	14	0	0	0	0	0	14	0	14	0	14	0	14	0	14	0	0	0	14	0
C	Mezdra	6	0	1	0	1	0	6	0	6	0	6	0	6	0	6	0	1	0	6	0
C	Etropole	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	Botevgrad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	Lukovit	5	0	0	0	0	0	5	0	5	0	5	0	5	0	5	0	0	0	5	0
C	Tcherven brjag	27	0	0	0	0	0	27	1	27	0	27	3	27	1	27	0	0	0	27	0
C	Kneza	4	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D	Teteven	6	0	0	0	0	0	6	1	6	0	6	1	6	0	6	0	0	0	6	0
D	Pleven	212	0	0	0	0	0	212	3	212	0	212	0	212	0	212	0	0	0	212	0
D	Trojan	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
D	Lovetch	218	0	0	0	0	0	218	2	218	0	218	0	218	0	218	0	0	0	218	0
D	Levski	12	0	0	0	0	0	12	0	12	0	12	0	12	0	12	0	0	0	12	0

E	Gabrovo	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
E	Trjavna	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
E	V.Tarnovo	60	0	5	0	5	0	60	0	60	0	60	0	60	0	60	0	60	0	60	0
E	G.Orjahovitsa	24	0	5	0	5	0	24	0	24	0	24	0	24	0	24	0	0	0	24	0
E	Sevlievo	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
E	Pavlikeni	13	0	1	0	1	0	13	0	13	0	13	0	13	0	13	0	0	0	13	0
E	Bjala	2	0	0	0	0	0	0	0	2	0	2	0	2	0	2	0	0	0	2	0
F	Popovo	12	0	0	0	0	0	12	1	12	0	12	0	12	0	12	0	0	0	12	0
F	Razgrad	53	0	0	0	0	0	0	0	53	0	53	0	53	1	53	0	0	0	53	0
G	Isperih	10	0	0	0	0	0	0	0	10	0	10	0	10	0	10	0	0	0	10	0
G	Dobritch	151	0	0	0	0	0	151	0	151	0	151	0	151	0	151	0	0	0	151	0

T - Total number of samples ;

N - Number of non-standard samples

Table 4.7b Physico - chemical parameters of drinking water part II - 1997

Zone	Town	Fe^{++}		Zn^{++}		Cu^{++}		Mn^{++}		Pb^{++}		As^{++}		Cr^{6+}		Cd^{++}		Petroleum products		Pesticides	
		T	N	T	N	T	N	T	N	T	N	T	N	T	N	T	N	T	N	T	N
A	Vidin	174	0	1	0	1	0	174	0	0	0	0	0	0	0	0	0	0	0	0	0
A	Lom	4	0	4	0	4	0	4	0	4	0	4	0	4	2	0	0	0	0	0	0
A	Svishtov	54	0	2	0	2	0	54	0	2	0	0	0	2	0	0	0	0	0	0	0
A	Belene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A	Kozlodui	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A	Russe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A	Silistra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A	Tutrakan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B	Vratsa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B	Berkovitsa	1	0	1	0	1	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0
B	Montana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B	B.Slatina	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
C	Samokov	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	Sofia	59	1	2	0	2	0	59	0	2	0	0	0	2	0	2	0	0	0	0	0
C	Kostinbrod	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
C	N.Iskar	14	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0
C	Mezdra	1	0	1	0	1	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0
C	Etropole	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	Botevgrad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	Lukovit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
C	Tcherven brjag	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	Kneza	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D	Teteven	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
D	Pleven	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D	Trojan	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
D	Lovetch	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	3	0	0	0
D	Levski	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

E	Gabrovo	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
E	Trjavna	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
E	V.Tarnovo	5	0	5	0	5	0	5	0	5	0	5	0	5	0	0	0	5	0	0	0
E	G.Orjahovitsa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E	Sevlievo	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
E	Pavlikeni	1	0	1	0	1	0	1	0	1	0	0	0	1	0	0	0	3	0	0	0
E	Bjala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F	Popovo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F	Razgrad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
G	Isperih	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
G	Dobritch	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

T - Total number

N - Number of non-standard samples

Table 4.8 Data on the breakdown pollution of water sources, citizens' complaints and administrative measures

Zone	Town	Number of citizens' complaints				Administrative measures /**P** - *prescriptions,* **S** - *statement,* **O** - *order for closing/*												Registration of residual active chlorine	Number of the registered breakdown pollutions			
		94	95	96	97	1994			1995			1996			1997				94	95	96	97
						P	S	O	P	S	O	P	S	O	P	S	O					
A	Vidin	0	0	0	0	3	0	0	3	0	0	3	0	0	3	0	0	yes				
A	Lom	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	yes				
A	Svishtov	0	0	0	0	0	10	0	1	16	0	1	4	0	16	1	0	yes				
A	Belene	0	0	0	0	1	11	0	3	9	0	0	5	0	1	3	0	yes				
A	Kozlodui	0	0	0	0	6	3	0	15	0	0	8	0	0	24	1	0	yes				
A	Russe	0	0	0	0	15	1	0	15	2	0	15	0	0	7	0	0	yes				
A	Silistra	n.d.	n.d.	n.d.	n.d.	12	29	1	14	20	1	32	21	8	18	13	2	yes				
A	Tutrakan	n.d.	n.d.	n.d.	n.d.	0	2	0	3	2	0	4	1	0	1	2	0	n.d.				
B	Vratsa	100	150	200	0	1	9	0	0	2	0	3	14	0	1	10	0	yes	•	•	•	
B	Berkovitsa	0	0	0	0	1	3	3	1	1	0	1	1	1	1	1	0	no				
B	Montana	0	0	0	0	2	4	3	1	3	0	2	1	0	0	0	0	yes				
B	Bjala Slatina	0	0	0	0	1	0	0	1	0	0	2	0	0	3	0	0	yes				
C	Samokov	94	1	3	2	1	0	0	2	0	0	1	0	0	2	0	0	yes				
C	Sofia	400	500	7	5	65	9	0	53	13	0	47	10	1	31	6	0	yes				
C	Kostinbrod	7	2	5	2	2	1	0	1	0	0	2	1	0	2	0	0	yes				
C	N.Iskar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	yes				

C	Mezdra	0	0	0	0	0	0	0	4	0	0	1	0	0	2	0	0	yes				
C	Etropole	0	0	0	0	16	0	0	20	0	0	18	0	0	20	0	0	yes				
C	Botevgrad	0	0	0	0	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.				
C	Lukovit	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	yes				
C	Tcherven brjag	0	0	0	0	1	3	0	4	6	0	1	4	0	1	5	0	yes				
C	Kneza	1	2	5	1	1	0	0	3	0	0	15	0	0	12	2	0	yes				•
D	Teteven	n.d.	n.d.	n.d.	n.d.	0	0	0	5	0	0	4	0	0	2	0	0	n.d.				
D	Pleven	0	0	0	0	0	3	0	0	3	1	1	1	0	1	1	0	yes	•	•	•	•
D	Trojan	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	yes				
D	Lovetch	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	yes				
D	Levski	0	0	0	0	1	3	0	1	4	0	8	1	0	2	0	0	yes				
E	Gabrovo	0	0	0	0	3	7	0	2	9	1	2	10	1	7	12	0	yes				
E	Trjavna	0	0	0	0	0	3	0	0	4	0	1	3	1	0	5	0	yes				
E	V.Tarnovo	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	yes				
E	G.Orjahovitsa	0	0	0	0	3	1	0	2	0	0	3	2	0	4	1	0	yes				
E	Sevlievo	0	0	0	0	3	2	0	2	1	0	1	2	1	2	3	0	yes				
E	Pavlikeni	0	0	0	0	2	4	0	1	1	0	1	0	0	1	1	0	yes				
E	Bjala	0	0	0	0	1	0	0	1	0	0	1	0	0	1	1	0	yes				
F	Popovo	0	0	2	4	1	1	1	1	2	0	2	2	0	1	1	1	yes				
F	Razgrad	n.d.	n.d.	n.d.	n.d.	19	0	0	36	9	0	27	5	0	31	4	0	yes				
G	Isperih	0	0	0	0	6	3	0	6	6	0	6	5	0	6	7	0	yes				
G	Dobritch	0	0	0	0	0	0	0	7	1	0	9	2	0	4	0	0	yes				

Annex

for Chapter 5

Table 5.1-a Total supply by watershed for Danube River basin - 1994 - 1996 (Thousand m^3)

Year	Branches (by NACE)	Self water supply	Surface water	Danube waters	Underground water
1994	Agriculture, forestry, fishing	34614	20697	8310	13917
	Mining, and quarrying	2782	2458	0	324
	Manufacturing	229748	140850	54027	88871
	Others industrial activities	47599	46586	46473	991
	All industrial activities	280129	189894	100500	90186
	Other activities	10216	2890	0	7096
	Total	**324959**	**213481**	**108810**	**111199**
1995	Agriculture, forestry, fishing	37657	20308	8300	17349
	Mining and quarrying	2270	2110	0	160
	Manufacturing	252240	160043	72670	92142
	Others industrial activities	47492	46066	46046	1426
	All industrial activities	302002	208219	118716	93728
	Other activities	14080	2459	0	11426
	Total	**353739**	**230986**	**127016**	**122503**
1996	Agriculture, forestry, fishing		17320	7000	13519
	Mining, and quarrying	14441	11361	1191	3080
	Manufacturing	229325	144728	60740	83139
	Others industrial activities	56777	54729	54041	2048
	All industrial activities	300543	210818	115972	88267
	Other activities	12691	6170	4910	6299
	Total	**344077**	**234308**	**127882**	**108085**

Table 5.1-b Water supply by watershed for Danube River basin – 1996 (Thousand m^3)

Watershed river	Branches (by NACE)	Self water supply	Surface water	Danube waters	Underground water
Other	Agriculture,forestry,fishing		0	0	5834
00	Mining and quarrying	1147	291	291	856
00	Manufacturing	72489	44426	44318	28063
00	Others industrial activities	692	0	0	692
00	All industrial activities	74328	44717	44609	29611
00	Other activities	5608	4910	4910	656
00	**Total**	**85770**	**49627**	**49519**	**36101**
Iskar	Agriculture,forestry,fishing		0	0	1080
01	Mining and quarrying	5798	5650	0	148
01	Manufacturing	69816	42888	0	26918
01	Others industrial activities	1558	349	0	1209
01	All industrial activities	77172	48887	0	28275
01	Other activities	2422	3	0	2419
01	**Total**	**80674**	**48890**	**0**	**31774**
Osam	Agriculture,forestry,fishing		127	0	631
04	Mining and quarrying				
04	Manufacturing	15238	12215	5174	3023
04	Others industrial activities	0	0	0	0
04	All industrial activities	15238	12215	5174	3023
04	Other activities	941	8	0	753
04	**Total**	**16937**	**12350**	**5174**	**4407**
Jantra	Agriculture,forestry,fishing		8604	0	2521
06	Mining and quarrying				
06	Manufacturing	18172	13328	0	4836
06	Others industrial activities	411	335	0	76
06	All industrial activities	18583	13663	0	4912
06	Other activities	2955	1219	0	1736
06	**Total**	**32663**	**23486**	**0**	**9169**
Rusenski Lom	Agriculture,forestry,fishing		8500	7000	891
07	Mining and quarrying	5277	3276	900	2001
07	Manufacturing	20296	8836	8638	11460
07	Others industrial activities	54104	54041	54041	63
07	All industrial activities	79677	66153	63579	13524
07	Other activities	106	0	0	106
07	**Total**	**89174**	**74653**	**70579**	**14521**
Vit	Agriculture,forestry,fishing		0	0	1037
08	Mining and quarrying	227	160	0	67
08	Manufacturing	6145	144	0	4561
08	Others industrial activities	4	4	0	0
08	All industrial activities	6376	308	0	4628
08	Other activities	79	29	0	50
08	**Total**	**7496**	**337**	**0**	**5715**
Ogosta	Agriculture,forestry,fishing		89	0	1525
09	Mining and quarrying	1992	1984	0	8
09	Manufacturing	27169	22891	2610	4278
09	Others industrial activities	8	0	0	8
09	All industrial activities	29169	24875	2610	4294
09	Other activities	580	1	0	579
09	**Total**	**31363**	**24965**	**2610**	**6398**

Total for Danube River Basin					
	Agriculture, forestry, fishing		17320	7000	13519
	Mining, and quarrying	14441	11361	1191	3080
	Manufacturing	229325	144728	60740	83139
	Others industrial activities	56777	54729	54041	2048
	All industrial activities	300543	210818	115972	88267
	Other activities	12691	6170	4910	6299
	Total	**344077**	**234308**	**127882**	**108085**

Table 5.2. Water supply (without water power stations and nuclear power station) by watershed (Thousand m^3)

Years	Total	Self water supply			Supplied water (under contracts)	
		Total	of which:		Total	from public water supply
			from surface water sources	from underground water sources		
Iskar						
1994	146247	80638	50419	30195	65609	30169
1995	139665	89204	53286	35908	50461	20902
1996	127251	80674	48890	31774	46577	22651
Osam						
1994	13322	8730	4710	3837	4592	2401
1995	42099	9974	5333	4429	32125	3755
1996	47120	16937	12350	4407	30183	29336
Jantra						
1994	50450	33299	24108	9191	17151	12290
1995	46873	31036	22285	8739	15837	12901
1996	47372	32663	23486	9169	14709	11155
Rusenski Lom						
1994	96739	84392	66888	17482	12347	11832
1995	93827	82510	63467	19042	11317	11153
1996	99062	89174	74653	14521	9888	9711
Vit						
1994	27693	10435	3167	7268	17258	4586
1995	26151	7146	355	6791	19005	5007
1996	21672	7496	337	5715	14176	4687
Ogosta						
1994	33767	30302	24519	5783	3465	2458
1995	39822	30537	24394	6143	9285	2377
1996	39467	31363	24965	6398	8104	2451

Table 5.3 – a Total water-use by watershed in the surveyed economic units for Danube River basin 1994 - 1996 (Thousand m^3)

Watershed river	Branches (by NACE)	Public purposes	Agriculture	Irrigation	Industrial purposes	Irretrievably used	Cooling water	Other industrial purposes
1994	Agriculture, forestry, fishing	1495	39248	15639	1139	664	51	424
	Mining, and quarrying	611	40	20	1347	0	0	1347
	Manufacturing	42465	1371	309	261308	49871	127279	84158
	Others industrial activities	888	0	0	59236	2225	47779	9232
	All industrial activities	43964	1411	329	321891	52096	175058	94737
	Other activities	21662	239	95	9276	2883	3099	3294
	Total	**67121**	**40898**	**16063**	**332306**	**55643**	**178208**	**98455**
1995	Agriculture, forestry, fishing	1895	37963	10864	1127	443	80	604
	Mining and quarrying	508	23	10	1328	70	30	1228
	Manufacturing	40321	1153	282	299676	48456	133859	117361
	Others industrial activities	743	0	0	56181	2080	45540	8561
	All industrial activities	41572	1176	292	357185	50606	179429	127150
	Other activities	25860	715	278	11169	3071	4379	3719
	Total	**69327**	**39854**	**11434**	**369481**	**54120**	**183888**	**131473**
1996	Agriculture, forestry, fishing		33146	10395	1132	426	120	586
	Mining, and quarrying	814	24	10	13890	463	0	13427
	Manufacturing	46858	810	195	262662	47349	121279	94034
	Others industrial activities	1664	0	0	65511	3609	53547	8355
	All industrial activities	49336	834	205	342063	51421	174286	115816
	Other activities	20162	408	237	8702	886	1249	6567
	Total	**70980**	**34388**	**10837**	**351897**	**52733**	**176195**	**122969**

Table 5.3 – b Water-use by watershed in the surveyed economic units for Danube River basin -1996 (Thousand m^3)

Watershed river	Branches (by NACE)	Public purposes	Irrigation	Irrigation	Industrial purposes	Irretrievably used	Cooling water	Other industrial purposes
Other	Agriculture,forestry,fishing		6421	922	350	3	0	347
00	Mining and quarrying	66	6	0	1137	75	0	1062
00	Manufacturing	9706	41	35	65448	2555	42834	20059
00	Others industrial activities	435	0	0	320	304	1	15
00	All industrial activities	10207	47	35	66905	2934	42835	21136
00	Other activities	4187	126	47	5147	17	2	5128
00	**Total**	**14721**	**6594**	**1004**	**72402**	**2954**	**42837**	**26611**
Iskar	Agriculture,forestry,fishing		674	108	272	122	120	30
01	Mining and quarrying	376	0	0	5781	0	0	5781
01	Manufacturing	12185	16	15	84645	22836	51770	10039
01	Others industrial activities	464	0	0	8152	2318	636	5198
01	All industrial activities	13025	16	15	98578	25154	52406	21018
01	Other activities	8049	118	74	1164	613	54	497
01	**Total**	**21309**	**808**	**197**	**100014**	**25889**	**52580**	**21545**
Osam	Agriculture,forestry,fishing		1620	853	46	0	0	46
04	Mining and quarrying							
04	Manufacturing	9347	40	20	33239	5995	2489	24755
04	Others industrial activities	1	0	0	8	0	0	8
04	All industrial activities	9348	40	20	33247	5995	2489	24763
04	Other activities	670	8	0	755	137	83	535
04	**Total**	**10134**	**1668**	**873**	**34048**	**6132**	**2572**	**25344**
Jantra	Agriculture,forestry,fishing		12094	7249	4	1	0	3
06	Mining and quarrying							
06	Manufacturing	4133	186	104	19654	4806	6152	8696
06	Others industrial activities	115	0	0	1208	765	108	335
06	All industrial activities	4248	186	104	20862	5571	6260	9031
06	Other activities	3921	53	53	1352	98	1103	151
06	**Total**	**8274**	**12333**	**7406**	**22218**	**5670**	**7363**	**9185**
Vit	Agriculture,forestry,fishing		9226	742	450	300	0	150
07	Mining and quarrying	199	0	0	5232	371	0	4861
07	Manufacturing	4631	324	6	22594	2586	7335	12673
07	Others industrial activities	339	0	0	54104	0	52594	1510
07	All industrial activities	5169	324	6	81930	2957	59929	19044
07	Other activities	1096	75	35	190	0	5	185
07	**Total**	**6625**	9625	**783**	**82570**	**3257**	**59934**	**19379**
Rusenski Lom	Agriculture, forestry, fishing		1421	371	4	0	0	4
08	Mining and quarrying	94	18	10	188	17	0	171
08	Manufacturing	3918	60	0	12768	2287	1734	8747
08	Others industrial activities	280	0	0	1479	169	200	1110
08	All industrial activities	4292	78	10	14435	2473	1934	10028
08	Other activities	912	23	23	94	21	2	71
08	**Total**	**5526**	**1522**	**404**	**14533**	**2494**	**1936**	**10103**
Ogosta	Agriculture,forestry,fishing		1690	150	6	0	0	6
09	Mining and quarrying	79	0	0	1552	0	0	1552
09	Manufacturing	2938	143	15	24314	6284	8965	9065
09	Others industrial activities	30	0	0	240	53	8	179
09	All industrial activities	3047	143	15	26106	6337	8973	10796
09	Other activities	1327	5	5	0	0	0	0
09	**Total**	**4391**	**1838**	**170**	**26112**	**6337**	**8973**	**10802**

Total for Danube River Basin								
	Agriculture, forestry, fishing		33146	10395	1132	426	120	586
	Mining, and quarrying	814	24	10	13890	463	0	13427
	Manufacturing	46858	810	195	262662	47349	121279	94034
	Others industrial activities	1664	0	0	65511	3609	53547	8355
	All industrial activities	49336	834	205	342063	51421	174286	115816
	Other activities	20162	408	237	8702	886	1249	6567
	Total	**70980**	**34388**	**10837**	**351897**	**52733**	**176195**	**122969**

Table 5.4. Water-use in the surveyed economic units (without water power stations and nuclear power station) by watershed (Thousand m^3)

Years	Water used			Fresh water used for:		
	Total	of which fresh water		Domestic purposes	Agriculture	Production
		Total	Drinking water			
Iskar						
1994	883605	141751	34387	27148	933	113670
1995	891748	133215	31585	23025	3488	106702
1996	890334	122131	26797	21309	808	100014
Osam						
1994	14908	13092	4231	2389	3214	7489
1995	43824	41804	33603	4948	1642	35214
1996	47850	45850	30645	10134	1668	34048
Jantra						
1994	53279	44953	12072	8179	17253	19521
1995	50412	41436	12981	9096	14561	17779
1996	51267	42825	11564	8274	12333	22218
Rusenski Lom						
1994	127676	96117	15956	7323	9631	79163
1995	135804	93472	15771	7765	10013	75694
1996	137954	98820	13198	6625	9625	82570
Vit						
1994	98693	27637	8402	6009	1679	19949
1995	94367	26095	8184	5817	1353	18925
1996	44636	21581	8124	5526	1522	14533
Ogosta						
1994	337427	32623	5524	3272	1378	27973
1995	332417	32449	6071	3903	1479	27067
1996	332080	32341	5648	4391	1838	26112

Table 5.5 – a Total wastewater discharged in surface and underground water sources by the surveyed economic units and public sewage for Danube River basin - 1994 - 1996 (Thousand m^3)

Watershed river	Branches (by NACE)	Discharged-total	Non treated	Treated	Mechanical	Biological	Other Methods
1994	Agriculture,forestry,fishing	19308	15339	3969	2309	1485	175
	Mining and quarrying	1680	555	1125	0	0	1125
	Manufacturing	122655	38670	83985	71689	6946	5350
	Others industrial activities	30266	22272	7994	7854	0	140
	All industrial activities	154601	61497	93104	79543	6946	6615
	Other activities	4960	4720	240	50	0	190
	MSTP	354575	140182	2E+05	1853	212540	0
	Total	**533444**	**221738**	**3E+05**	**83755**	**220971**	**6980**
1995	Agriculture,forestry,fishing	22303	14839	7464	5360	1847	257
	Mining and quarrying	1536	514	1022	0	0	1022
	Manufacturing	153788	39900	113888	52111	8158	53619
	Others industrial activities	29352	21664	7688	7611	0	77
	All industrial activities	184676	62078	122598	59722	8158	54718
	Other activities	6066	5518	548	332	6	210
	MSTP	334621	130845	203776	1850	201926	0
	Total	**547666**	**213280**	**334386**	**67264**	**211937**	**55185**
1996	Agriculture,forestry,fishing	17829	13799	4030	2039	1797	194
	Mining and quarrying	13083	7341	5742	4783	0	959
	Manufacturing	119640	24997	94643	39207	8592	46844
	Others industrial activities	33988	25607	8381	8331	0	50
	All industrial activities	166711	57945	108766	52321	8592	47853
	Other activities	8741	8653	88	88	0	0
	MSTP	340267	132258	208009	10791	197218	0
	Total	**533548**	**212655**	**320893**	**65239**	**207607**	**48047**

Table 5.5 - b. Wastewater discharged in surface and underground water sources by the surveyed economic units and public sewage for Danube River basin - 1996 (Thousand m^3)

Watershed river	Branches (by NACE)	Discharged-total	Non treated	Treated	Mechanical	Biological	Other methods
Other	Agriculture,forestry,fishing	3347	549	2798	1558	1240	0
00	Mining and quarrying	917	46	871	871	0	0
00	Manufacturing	40623	9849	30774	2520	52	28202
00	Others industrial activities	301	301	0	0	0	0
00	All industrial activities	41841	10196	31645	3391	52	28202
00	Other activities	5604	5604	0	0	0	0
00	MSTP	26072	9092	16980	0	16980	0
00	**Total**	**76864**	**25441**	**51423**	**4949**	**18272**	**28202**
Iskar	Agriculture,forestry,fishing	101	3	98	41	0	57
01	Mining and quarrying	5998	5996	2	2	0	0
01	Manufacturing	30314	1653	28661	24568	3086	1007
01	Others industrial activities	1074	839	235	185	0	50
01	All industrial activities	37386	8488	28898	24755	3086	1057
01	Other activities	519	519	0	0	0	0
01	MSTP	226288	77313	148975	1870	147105	
01	**Total**	**264294**	**86323**	**177971**	**26666**	**150191**	**1114**
Osam	Agriculture,forestry,fishing	257	121	136	0	0	136
04	Mining and quarrying						
04	Manufacturing	14923	997	13926	914	2001	11011
04	Others industrial activities	4	4	0	0	0	0
04	All industrial activities	14927	1001	13926	914	2001	11011
04	Other activities	412	392	20	20	0	0
04	MSTP	6100	6100	0	0	0	
04	**Total**	**21696**	**7614**	**14082**	**934**	**2001**	**11147**
Jantra	Agriculture,forestry,fishing	4666	4475	191	0	190	1
06	Mining and quarrying	0	0	0	0	0	0
06	Manufacturing	7832	2036	5796	5271	197	328
06	Others industrial activities	120	96	24	24	0	0
06	All industrial activities	7952	2132	5820	5295	197	328
06	Other activities	1950	1896	54	54	0	0
06	MSTP	31349	10465	20884	8921	11963	
06	**Total**	**45917**	**18968**	**26949**	**14270**	**12350**	**329**
Rusenski Lom	Agriculture,forestry,fishing	7700	7333	367	0	367	0
07	Mining and quarrying	4885	975	3910	3910	0	0
07	Manufacturing	12545	5422	7123	1148	1536	4439
07	Others industrial activities	32489	24367	8122	8122	0	0
07	All industrial activities	49919	30764	19155	13180	1536	4439
07	Other activities	0	0	0	0	0	0
07	MSTP	21897	18180	3717	0	3717	
07	**Total**	**79516**	**56277**	**23239**	**13180**	**5620**	**4439**
Vit	Agriculture,forestry,fishing	327	327	0	0	0	0
08	Mining and quarrying	176	176	0	0	0	0
08	Manufacturing	3242	1328	1914	194	1720	0
08	Others industrial activities	0	0	0	0	0	0
08	All industrial activities	3418	1504	1914	194	1720	0
08	Other activities	80	66	14	14	0	0
08	MSTP	19570	7608	11962	0	11962	
08	**Total**	**23395**	**9505**	**13890**	**208**	**13682**	**0**
Ogosta	Agriculture,forestry,fishing	1431	991	440	440	0	0
09	Mining and quarrying	1107	148	959	0	0	959

09	Manufacturing	10161	3712	6449	4592	0	1857
09	Others industrial activities	0	0	0	0	0	0
09	All industrial activities	11268	3860	7408	4592	0	2816
09	Other activities	176	176	0	0	0	0
09	MSTP	8991	3500	5491	0	5491	
09	**Total**	**21866**	**8527**	**13339**	**5032**	**5491**	**2816**
Total for Danube River Basin							
	Agriculture,forestry,fishing	17829	13799	4030	2039	1797	194
	Mining and quarrying	13083	7341	5742	4783	0	959
	Manufacturing	119640	24997	94643	39207	8592	46844
	Others industrial activities	33988	25607	8381	8331	0	50
	All industrial activities	166711	57945	108766	52321	8592	47853
	Other activities	8741	8653	88	88	0	0
	MSTP	340267	132258	208009	10791	197218	0
	Total	**533548**	**212655**	**320893**	**65239**	**207607**	**48047**

Table 5.6. Wastewater discharged from public sewerage by watershed (Thousand m^3)

Years	Total	Untreated	Treated	
			total	with biological methods
Iskar				
1994	228014	76329	151685	149832
1995	215778	73358	142420	140570
1996	226288	77313	148975	147105
Osam				
1994	5178	5178	0	0
1995	5644	5644	0	0
1996	6100	6100	0	0
Jantra				
1994	32041	11535	20506	20506
1995	31754	11003	20751	20751
1996	31349	10465	20884	11963
Rusenski Lom				
1994	25103	20593	4510	4510
1995	24387	19316	5071	5071
1996	21897	18180	3717	3717
Vit				
1994	23245	8546	14699	14699
1995	22460	7658	14802	14802
1996	19570	7608	11962	11962
Ogosta				
1994	11714	3749	7965	7965
1995	9407	3395	6012	6012
1996	8991	3500	5491	5491

Table 5.7 Wastewater in the surveyed economic units (without water power stations and nuclear power station) by watershed (Thousand m^3)

Years	Generated	OF WHICH: DISCHARGED					
		Total	of which: untreated				
			Total	Surface water areas	Under-ground levels	In public sewage	
						without MWWTP	with MWWTP
Iskar							
1994	84078	74410	30367	11375	276	8332	10384
1995	83607	73817	25706	9136	154	5907	10509
1996	74241	58715	24675	8907	103	5276	10389
Osam							
1994	5339	5332	3202	1876	145	1161	20
1995	23492	23488	3435	1522	4	1820	89
1996	22098	22095	6307	1486	28	4428	365
Jantra							
1994	22347	22347	15079	8070	198	3391	3420
1995	26245	26219	17704	10107	190	3940	3467
1996	25360	25356	15951	8189	314	4611	2837
Rusenski Lom							
1994	64674	63890	43692	37386	304	5929	73
1995	60943	60400	41565	35861	253	5363	88
1996	64842	64237	42415	37881	216	3871	447
Vit							
1994	14175	14175	8971	5215	111	69	3576
1995	14249	14249	8374	3214	86	194	4880
1996	10901	10879	6315	1798	99	151	4267
Ogosta							
1994	12657	12657	4434	2047	4	1509	874
1995	15457	15457	6665	4341	1	1524	799
1996	15483	15483	7230	4996	31	1533	670

MWWTP - Municipal Waste Water Treatment Plant

Table 5.8. Domestic wastewaters (DWW) in towns with over 10000 inhabitants in Danube River basin

Zone	Town	Population with public sewerage								Population without public sewerage				Problems concerning public sewerage
		Number				Percentage				Number				
		1994	1995	1996	1997	1994	1995	1996	1997	1994	1995	1996	1997	
A	Vidin	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	insufficient; part of sewerage obstructed
A	Lom	16850	17430	19600	21850	46.37	47.97	53.97	60.13	19486	18906	16736	14486	insufficient; unsuitable, old pipes; the main collector obstructed 90 % with inert materials
A	Svishtov	31560	31640	31980	32150	96.8	97	98	98.6	1040	960	620	450	insufficient
A	Belene	5743	6223	7677	6145	62	62	62	62	3520	3814	4706	3777	insufficient with technical deficiencies
A	Kozloduj	12000	12000	12000	12000	75	75	75	75	4000	4000	4000	4000	insufficient; obstructed collectors; insufficient surface water draining
A	Ruse	168000	171000	167000	166000	83.3	82.3	80.84	81.33	34000	32000	32000	31000	insufficient; unsuitable pipes' thickness, pumping station of insufficient capacity and inappropriate location
A	Silistra	48352	48352	48352	46171	100	100	100	100					no
A	Tutrakan	12000	12000	12000	12000	92	92	92	92	1000	1000	1000	1000	insufficient; erased concrete in cascade shafts of the collector
B	Vraca	94835	94953	95241	95256	98.3	98.5	98.7	99	1552	1450	1225	961	insufficient, old pipes, difficulties in maintaining WWPS
B	Berkovica	15684	16110	16209	16612	80	82	82	84	4092	3666	3567	3164	insufficient, old pipes of unsuitable thickness, lack of finances for maintaining the sewerage
B	Montana	38592	40217	40448	40968	75.36	78.53	78.98	80	12619	10994	10763	10243	insufficient, old pipes, lack of treatment plant for DWW
B	Bjala Slatina	n.d.	n.d.	n.d.	n.d.	60	60	60	60	n.d.	n.d.	n.d.	n.d.	insufficient, old pipes
C	Samokov	30000	30000	30000	30000	100	100	100	100	n.d.	n.d.	n.d.	n.d.	insufficient, unsuitable pipes, problems with maintaining sewerage
C	Sofia								5					insufficient, old pipes and unsuitable size;30% of DWW do not pass through WWTP "Kubratovo"; industrial plants not equipped with treating plants and direct contaminate rivers, the WWTP operation is disturbed

C	Kostinbrod	9707	11007	11207	11207	85	95	97	97	1800	1500	1300	1300	old pipes and unsuitable size
C	Novi Iskar	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	lack of sewerage system; households with septic tanks, partly built sewage system
C	Mezdra	13389	13389	13389	13389	98.7	98.7	98.7	98.7	180	180	180	180	insufficient, no WWTP
C	Etropole	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	900	900	800	600	unsuitable size, incorrect operation and maintenance of the municipal sewerage
C	Botevgrad	22000	22000	22000	22000	100	100	100	100	n.d.	n.d.	n.d.	n.d.	incorrect operation
C	Lukovit	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	11431	11497	11788	11079	lack of sewerage system
C	Cherven Brjag	16499	16434	19395	17507	92	90	92.3	93	1390	1366	1354	1320	insufficient, part of the sewerage system not convenient for maintenance, part of the districts without sewerage system
C	Kneja	n.d.	n.d.	n.d.	n.d.	3	3	3	3	n.d.	n.d.	n.d.	n.d.	insufficient, old pipes, lack of WWTP
D	Teteven	3250	3250	3250	3250	33	33	33	33	9881	9843	9512	9284	insufficient, old pipes and unsuitable size, no municipal sewerage collector
D	Pleven	124565	121680	121220	132800	97	97	98	98	3380	3350	3330	3260	insufficient, old pipes and unsuitable size, partly built collectors, problems with the maintenance by Water Supply and Sewerage Co.
D	Trojan	20800	21000	21000	21000	80	81	81	81	5200	5000	5000	5000	insufficient, lack of equipment for rehabilitation of the sewerage
D	Lovech	41712	41730	41770	42012	86	86	86	87	n.d.	n.d.	n.d.	n.d.	insufficient, problems with sewerage maintenance
D	Levski	13102	12962	12872	13535	9.92	99.2	99.3	99.4	n.d.	n.d.	n.d.	n.d.	insufficient, contamination by the private farms, clogging with solid particles, lack of respective cleaning technics
E	Gabrovo	n.d.	n.d.	n.d.	n.d.	50	50	50	50	n.d.	n.d.	n.d.	n.d.	
E	Trjavna	n.d.	n.d.	n.d.	n.d.	50	50	50	50	n.d.	n.d.	n.d.	n.d.	
E	Veliko Tarnovo	67865	67486	66268	n.d.	100	100	100	n.d.	n.d.	n.d.	n.d.	n.d.	insufficient, old pipes
E	Gorna Orjahovica	38850	38706	37925	n.d.	100	100	100	100	n.d.	n.d.	n.d.	n.d.	
E	Sevlievo	n.d.	n.d.	n.d.	27500	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	insufficient, unsuitable pipe size and old pipes, necessity for reconstruction

E	Pavlikeni	16541	16572	16514	16454	99.88	99.9	99.99	99.93	20	16	12	12	necessity for reconstruction of the control shafts
E	Bjala	9000	9000	9200	9200	60	62.12	64.14	64.14	3600	3500	3300	3300	insufficient, unsuitable size
F	Popovo	n.d.	n.d.	n.d.	21100	n.d.	n.d.	n.d.	92.03	n.d.	n.d.	n.d.	1825	insufficient, sewerage system partly obstructed
F	Razgrad	n.d.	31404	33014	34222	n.d.	78	82	85	n.d.	8857	7247	6039	insufficient, old pipes, clogging of the streets sewerage, lack of sewerage in some districts
G	Isperih	6000	6000	6000	6000	40	40	40	40	7000	7000	7000	7000	insufficient, , lack of sewerage in some districts
G	Dobrich	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	90	n.d.	n.d.	n.d.	n.d.	insufficient, necessity of deratisation in the sewerage and cleaning with respective technics

n.d. – no data

Table 5.9. Status and problems, related to the sewerage and wastewater in towns over with 10000 inhabitants

Zone	Town	Mean Capacity for Year (m^3/sec)				MWWTP	Treatment equipment before discharging	Discharging in river/dry gulch	Recommendations
		1994	1995	1996	1997				
A	Vidin	n.d.	n.d.	n.d.	n.d.	no	no	Danube	no
A	Lom	n.d.	n.d.	n.d.	n.d.	no	bars and precipitators 30% capacity power	none	construction of sewerage collector and designing of WWTP
A	Svishtov	0.076	0.083	0.079	0.081	no	no	Danube	MWWTP construction
A	Belene	0.029	0.027	0.023	0.018	no	no	Danube	construction of WWTP and completion of the sewerage system, averting illegal plug in the system
A	Kozloduj	0.029	0.023	0.022	0.019	no	no	pump station in Danube river	no
A	Ruse	0.45	0.465	0.46	0.44	no	no	Rusenski Lom and Danube	MWWTP construction
A	Silistra	0.105	0.095	0.084	0.067	no	no	Danube	construction of WWTP before the discharge in Danube river
A	Tutrakan	0.125	0.132	0.14	0.145	no	no	Danube	planned building of main collector
B	Vraca	0.13	0.168	0.156	0.156	yes	mechanical bars, biofilters, fields for WWTP sludge	Leva river	no
B	Berkovica	0.02	0.02	0.021	0.021	no	no	Berkovska reka, Barzia, Danube	construction of WWTP
B	Montana	0.10	0.09	0.09	0.07	no	no	Ogosta	construction of WWTP and sewerage system
B	Bjala Slatina	0.018	0.015	0.016	0.013	no	no	Skat tributary of Ogosta	completion of MWWTP, stopped because of lack of funds
C	Samokov	n.d.	n.d.	n.d.	n.d.	no	no	no	modernization and extension of WWTP
C	Sofia	6.1	6.1	5.8	6.2	no	bars, precipitators, tanks for biological treatment, secondary precipitators contact reservoirs	Iskar and tributaries, discharging in dry gulch in “Vitosha” district	increase of capacity and quality of treating, building of new WWTP in the industrial plants, renovation of the old sewerage in the central part of the town

C	Kostinbrod	18	17	16	13	no	no	Blato	construction of WWTP
C	Novi Iskar	n.d.	n.d.	n.d.	n.d.	no	no	Iskar	building of sewerage system and discharging the waste waters in WWTP”
C	Mezdra	0.045	0.047	0.044	0.05	no	no	Iskar	construction of WWTP
C	Etropole	n.d.	n.d.	n.d.	20	no	in stage of design	no	construction of WWTP
C	Botevgrad	150	150	150	150	no	bars, filters, precipitators of 1/3 of waste waters	overflow drain, high waters of Kalnica	WWTP of reduced capacity, necessity for building new WWTP
C	Lukovit	n.d.	n.d.	n.d.	n.d.	no	no	no	construction of sewerage system
C	Cherven Brjag	0.089	0.065	0.061	0.067	no	no	Iskar; part of sewerage system discharging in dry gulch	construction of WWTP; additional construction of sewerage system in some districts and cottage areas
C	Kneja	36000	31000	28000	25000	no	bars and precipitators	Gostilia and Iskar	construction of WWTP
D	Teteven	n.d.	n.d.	n.d.	n.d.	no	no	Vit from septic tanks	building of sewerage system with WWTP
D	Pleven	0.737	0.712	0.621	0.422	yes	mechanical bars, sand filters, tanks for biological treatment, secondary precipitator, fields for WWTP sludge	Vit, tributary of Danube	completion of collectors, necessity for monitoring of the waste waters of specific industrial facilities
D	Trojan	0.0875	0.1138	0.1134	0.1246	in building	no	Osam	completion of WWTP
D	Lovech	0.072	0.061	0.073	0.089	no	no	Osam	construction of WWTP
D	Levski	0.075	0.074	0.071	0.059	no	no	Osam	municipality control of the illegal discharge of waste waters from private farms; completion of the sewerage system and construction of WWTP
E	Gabrovo	0.1	0.09	0.09	0.09	yes	bars, precipitators, fields for WWTP sludge	no	not operating at the designed capacity, completion of the sewerage system
E	Trjavna	25	25	25	25	no	n.d.	n.d.	n.d.
E	Veliko Tarnovo	0.117	0.115	0.117	0.123	yes	bars, sand filter, precipitator, tanks for biological treatment, filter press	Jantra	completion of municipal WWTP

E	Gorna Orjahovica	0.0442	0.0444	0.0461	0.0525	no	no	Jantra	construction of MWWTP for G. Orjahovica and Ljaskovec
E	Sevlievo	230	221	212	185	no	no	Rosica	project and construction of MWWTP
E	Pavlikeni	0.13	0.134	0.144	0.109	no	local WWTP in the industrial facilities	in Pavlikeni gulch and then in Rosica	cleaning of Pavlikeni gulch
E	Bjala	0.0195	0.019	0.019	0.018	no	no	Jantra	construction of MWWTP
F	Popovo	n.d.	0.02	0.02	0.02	no	bars	Popovska, Cherni Lom	completion of the collector on both sides of river Popovska
F	Razgrad	0.0360	0.0328	0.0327	0.0029	yes	bars, filters, precipitators	in dry gulch in railway-station industrial zone	compliance with Regulation 9/14.09.94. of the MRDC; enlargement of the sewerage system, completion of MWWTP
G	Isperih	0.048	0.048	0.048	0.048	in building	yes	in dry gulch	lack of funds for completion of WWTP and construction of sewerage system
G	Dobrich	0.6814	0.652801	0.71	0.6373	yes	biological and mechanical block, oil-capture	Suha reka	project and construction of MWWTP

WWTP - Waste Water Treatment Plant

Table 5.10. Status of the solid waste (SW) landfills in towns with over 10000 inhabitants

Zone	Town	Begin/Exhaust *(years)*	Mean quantity per year *(tons)*				Insulation	Drainage	Collecting shafts for drain-off waters *(volume)*
			1994	1995	1996	1997			
A	Vidin	1991/2006	47951	26390	7576	15000	clay	no	no
A	Lom	1987/2010	8200	23256	29703	22300	no	no	no
A	Svishtov	1980/Exhausted M	46000	48000	48000	50000	no	no	no
A	Belene	1987/2007	350	195	210	215	no	no	no
A	Kozloduj	1981/2000	70000	70000	70000	70000	no	no	no
À	Ruse	1977/2006	129000	90000	66000	74000	no	no	no
A	Silistra	1986/2002	210000	194000	142876	101200	no	no	no
A	Tutrakan	1975/2003	14000	20000	15000	16000	no	no	no
B	Vraca	1978/1998 M	60000	55200	21976	38600	no	no	no
B	Berkovica	1968/2002	4320	5040	5352	6304	no	available	no
B	Montana	1979/2040 (available 100 dca, 35 dca full)	no data	26452	22157	19446	no	no	no
B	Bjala Slatina	1996/2026	8400	7100	9300	5860	clay	available	available ($48m^3$), water discharge by pumps
C	Samokov	1968/2005	1500	1500	1500	1500	clay	no	no
C	Sofia	1997/1999 M	no data	no data	no data	320000	clay layer and folio	available	available ($25m^3$) insufficient M
C	Kostinbrod	1981/2010	8000	8000	8000	3000	clay	no	no
C	Novi Iskar	1997/1999 M	67059	67059	67059	67059	clay layer and folio	available	available ($25m^3$) insufficient M
C	Mezdra	1975/1999 M	12200	15936	13000	12000	no	no	no
C	Etropole	1983/2050	no data	no data	no data	no data	clay	available	no
C	Botevgrad	1986/exhausted M	36	36	36	36	clay	no	no

C	Lukovit	1958/2000	no data	no data	no data	5165	no	no	waste water discharge in the river Zl. Panega
C	Cherven Brjag	1972/1999 M	33700	24500	17200	15500	no	no	no
C	Kneja	1974/2000	6360	7080	4200	4680	no	no	no
D	Teteven	1984/2018	6975	16710	17200	17300	no	no	through ballast infiltrated in the soil
D	Pleven	1985/2001	48300	47280	47100	57166	clay	no	no
D	Trojan	1992/2020	28	30	28	27	no	no	no
D	Lovech	1960/1990 M	30673	31075	29357	26375	no	no	no
D	Levski	1984/1998 M	52054	44000	32952	22081	no	no	no
E	Gabrovo	1984/2010	no data	no data	55202	65000	clay	available	available (500m^3)
E	Trjavna	1970/?	1830	2830	2840	2900	no	no	no
E	Veliko Tarnovo	1971/2000	32250	31433	30778	27863	clay	no	no
E	Gorna Orjahovica	1970/2005	44000	40000	31000	38000	clay	no	no
E	Sevlievo	1979/1999 M	13500	13500	13500	13500	no	no	available (300m^3)
E	Pavlikeni	1976/2001	14000	13000	12000	10000	no	no	no
E	Bjala	1981/2000	24000 5650	27000 5900	27500 6000	21500 5000	no	no	no
F	Popovo	1980/2010	35900	35100	34200	33400	clay	available	high mound for waste waters filtering
F	Razgrad	1972/2010	17300	17300	16162	16400	clay	available	no
G	Isperih	1992/2010	30900	31000	31100	31112	clay	available	available
G	Dobrich	1977/exhausted M	245000	95000	78000	78000	clay	no	no

Table 5.11. Localization, composition and problems, related to solid waste landfills (SWL) in towns with over 10000 inhabitants

Zone	Town	Localization	Category	Composition of Solid Wastes (SW) landfill	Project for New Landfill till 2010	Problems	Risk for pollution
A	Vidin	13 km from Vidin; 0.2 km south of Danube	I^{A}	SW	No	lack of funds	yes L
A	Lom	10 km from Lom; 2 km east of Danube	I^{B}	SW, industrial and construction wastes	Yes	lack of separate collection of SW; old equipment and containers; lack of incinerator for the hospital wastes	yes L
A	Svishtov	3 km from Svishtov; 8 km south of Danube	III^{B}	SW	Yes	no	yes L
A	Belene	4 km from Belene; 10 km south of Danube	I^{A}	SW, SW from private farms; hospital wastes; metal pipes from mining Eliseina	No	insufficient and old containers for waste and trucks; industrial wastes from mining Eliseina should be disposed in landfill for hazardous wastes in Botunec, Sofia region	yes
A	Kozloduj	7 km from Kozloduj; 4 km south of Danube	I^{A}	SW	No	uncontrolled	yes
A	Ruse	2 km east of Ruse; 6 km south-east of Danube	I^{A}, I^{C}	SW	Yes	lack of compliance with the regulations	yes
A	Silistra	0.5 km from Silistra; 10 km south of Danube	I^{A}, I^{C}	SW and limited quantities industrial wastes; hazardous wastes prohibited	Yes	old equipment for collecting and è landfill; limited funds for management of the landfill	no
A	Tutrakan	4 km from Tutrakan; 3 km south-east of Danube	I^{C}	SW and industrial hazardous wastes	Yes	lack of funds for construction of WS landfill	no
A	Vraca	3 km from Vraca; 12 km south of Iskar	I^{B}	SW and hospital wastes	Yes	old equipment and containers; lack of funds; lack of insulation, access of the people and animals	yes M
B	Berkovica	1.2 km from Berkovica, east of Rakovica	IV^{A}	SW; industrial and construction wastes	No	old equipment and containers, lack of separate collection; uncontrolled landfill (disposing beyond the determined ground)	yes L
B	Montana	8 km from Montana in the “Nedelishte”, 5 km east of Ogosta	I^{D}	SW; industrial and construction wastes	no	old equipment and containers, lack of separate collection, uncontrolled	no
B	Bjala Slatina	2 km from B. Slatina, south of Skat	I^{B}	SW and hospital wastes	no	lack of necessary equipment and funds	no
C	Samokov	6 km from Samokov, 7 km north-west of Iskar	I^{B}	SW and hospital wastes	no	no	no

C	Sofia	1 km west of Suhodolska, tributary of Iskar	I^{D}	SW and industrial wastes	yes	lack of separate collection; the left collector in Suhodol landfill is not constructed; no landfills for industrial wastes	yes L
C	Kostinbrod	15 km from Kostinbrod	I^{B}	SW	yes	no	no
C	Novi Iskar	1 km west of Suhodolska river	I^{B}	SW	yes	lack of separate collection; the left collector in Suhodol landfill is not constructed; no landfills for industrial wastes	yes L
C	Mezdra	2 km from vil. Brusen; 0,5 km north of Iskar	III^{B}	SW and sediments from industrial WWTP, hospital wastes	yes	old containers and equipment	yes M
C	Etropole	11 km from Etropole	II^{B}	SW and hospital wastes	no	no	no
C	Botevgrad	7 km from Botevgrad	III^{B}	SW, metal and hospital wastes	yes	insufficient containers	yes L
C	Lukovit	0.25 km from Lukovit; 0.15 km south of Zl. Panega river	III^{B}	SW	yes	no earth covering	yes M
C	Cherven Brjag	0.3 km from Cherven Brjag; 0.15 km east of Iskar	III^{B}	SW and hospital wastes	yes	insufficient and old container and trucks	yes M
C	Kneja	5 km from Kneja; 6 km west of Gostilja river	I^{C}	SW and hospital wastes	no	lack of funds	no
D	Teteven	16 km from Teteven; 0.1 km south of Vit	II^{B}	SW and construction wastes	no	no	yes M
D	Pleven	10 km from Pleven, 3 km from village Bukovlak, 3 km from v.Opanec; 3,5 km from Grivishka, tributary of Vit; 5 km east of Vit	III^{B}	SW, metal and other industrial wastes	yes	lack of project for enlargement of the landfill and wastes processing	no
D	Trojan	3 km from Trojan; 1 km west of Osam	III^{B}	SW and hospital wastes	yes	problems with earth covering	yes L
D	Lovech	2 km from Lovech; 0.8 km north-west of Osam	III^{A}	SW, industrial and hospital wastes	yes	no earth covering	yes M
D	Levski	4 km from Levski; 0.2 km east of Osam	I^{B}	SW and fertilizers, wastes of carriage-building facility, luminescent tubes, salts from the etching of aluminum pieces, sediments from the industrial WWTP	yes	lack of funds, insufficient and old containers and equipment, landfill full, hazardous wastes disposal	yes
E	Gabrovo	10 km from Gabrovo; 3 km west of Jantra	III^{B}	SW	no	lack of guard, access of people and animals	no
E	Trjavna	7 km from Trjavna; 10 km from Belichenska	III^{B}	SW, industrial and hazardous wastes	no	enclosing not possible	no
E	Veliko Tarnovo	12 km from V.Tarnovo, 5 km east of Jantra	III^{A}	SW and industrial wastes	yes	old containers and equipment, lack of funds, lack of modern landfill	no

E	Gorna Orjahovica	3 km from G.Orjahovica; 1.5 km south of Jantra	III^B	SW and industrial wastes	yes	old equipment and containers, lack of separate collection	no
E	Sevlievo	5 km from Sevlievo; 2 km west of Rosica	III^B	SW	yes	problems with funds	yes L
E	Pavlikeni	4 km from Pavlikeni; 9 km north-west of Rosica	III^B	SW	no	old equipment and insufficient number of containers	no
E	Bjala	**1.** - 3 km west of Bjala; 1 km north-west of Jantra **2.** - 1km south of Bjala; 0.7km from Jantra in south direction of Bjala	III^A	SW industrial and hazardous wastes	no	lack of compliance with the regulations	yes L
F	Popovo	14 km from Popovo;10 km north-west of Goljamata reka	III^B	SW industrial and hazardous wastes	no	old containers; no earth covering	no
F	Razgrad	2.5 km from v.Nedoklan; 8 km north of Razgrad; 8 km from Beli Lom	II^A	SW and industrial non-hazardous wastes	yes	old equipment, lack of separate collection, lack of compactor, lack of funds	yes L
G	Isperih	3 km from v.Lavino; 5 km from Isperih	I^C	SW and industrial non-hazardous wastes		old equipment, lack of separate collection, lack of compactor, lack of funds	yes
G	Dobrich	10 km from Dobrich, 1 km from v.Bogdan	II^A	SW	yes	exhausted landfill, insufficient number of containers, necessity for updating the design for exploitation and recultivation of the existing landfill	yes L

Note:
I^A, **I^B** - Real risk of pollution of the ground waters. Not recommended for landfills for hazardous wastes;
I^C - Pollution of lower water levels. Not recommended for landfills for hazardous wastes;
I^D - Potential pollution of the highest water-carrying level. The existence of waterproof clay layer slows down the diffusion of pollution. Not recommended for landfills for hazardous wastes.

II^A - Karst sediment rocks - Exceptionally hazardous for the pollution of the karst waters, particularly in the open karst zones and sudden deterioration of the drinking water quality at the sources. Not recommended for landfills for hazardous wastes
II^B - Karst sediment rocks. Excessive risk for pollution particularly at the supply zones (open karst areas). Unexpected deterioration of the drinking water quality at the sources. Not recommended for landfills for hazardous wastes.

III^A - Sediment rocks - Small risk for pollution of ground waters; Construction of hazardous wastes landfills possible after investigation on the geology of the area.
III^B - Sediment rocks - No risk for pollution of ground waters; Construction of hazardous wastes landfills possible after investigation on the geology of the area.

IV^{A} - Intrusive and methamorphological rocks.- Small risk for pollution of ground waters. Construction of hazardous wastes landfills possible after investigation on the geology of the area.

IV^{B} - Intrusive and methamorphological rocks - Excessive risk for pollution in the cases, where marble lay bare on the surface. In the areas, when covered by gneiss practically no risk for pollution; Not recommended for construction of hazardous wastes landfills; In areas with covered karst, construction of hazardous wastes landfills possible after investigation on the geology of the area.

V - Intrusive and methamorphological rocks -Small risk for pollution. However, construction of landfills prohibited when there is a potential risk for deterioration of the physical and chemical quality as result of the landfill.; construction absolutely prohibited in the supply zones (distance of 5 km from the water source).

Table 5.12–a Fish species and other invertebrates in the Danube River for 1995 (data of the State Fisheries Inspectorate, Ministry of Agriculture)

No	Species (Fish and invertebrates)	Regional Fisheries Inspectorate (RFI) Danube River		
		Lom	Ruse	Total *(tons)*
1	Alosa pontica pontica; Shad	16,2	14,4	30,8
2	Huso huso; Great sturgeon	10,8	2,8	13,6
3	Acipenser guldenstadte; Russian (Black sea) sturgeon	0,1	0,8	0,9
4	Acipenser ruthenus; Sterlet	0,1	-	0,1
5	Acipenser stellatus; Stor stergeon	0,1	-	0,1
6	Gymnocephalus; Ruffe (Pope)	0,4	-	0,4
7	Lucioperca lucioperca; Pike-perch (European)	0,5	21,8	22,3
8	Abramis sapa; Eastern bream	0,2	-	0,2
9	Barbus; Barbel	2,5	89,5	92,0
10	Leuciscus idus; Ide (Orfe)	6,8	-	6,8
11	Alburnus alburnus; Bleak	2,4	-	2,4
12	Abramis brama; Bream (Danube)	3,4	70,2	73,6
13	Aspius aspius; Asp	3,2	-	3,2
14	Chondrostoma nasus; Undermout;	1,5	-	1,5
15	Silurus glanis; Catfish (Wels; Sheat-fish; European catfish)	2,8	27,5	30,3
16	Ctenopharingodon idella; Grass carp	3,2	-	3,2
17	Hypophthalmichthis molitrix and Aristichthys nobilis; Silver carp and Bighead carp	48,8	366,6	415,4
18	Cyprinus carpio spp.; Carp (common carp)	1,3	17,4	18,7
19	Esox lucius; Pike	0,1	-	0,1
20	Others species	15,6	21,2	36,8
	Total fish - Danube River	**120,0**	**632,3**	**752,3**

Table 5.12-b Fish species and other invertebrates in the Danube River for 1996 (data of the State Fisheries Inspectorate, Ministry of Agriculture)

No	Species (Fish and invertebrates)	Regional Fisheries Inspectorate (RFI) Danube River		
		Lom	Ruse	Total *(tons)*
1	Alosa pontica pontica; Shad	28,2	95,7	123,9
2	Huso huso; Great sturgeon	18,4	3,7	26,4
3	Acipenser guldenstadte; Russian (Black sea) sturgeon	0,8		0,8
4	Acipenser ruthenus; Sterlet	0,2		0,2
5	Acipenser stellatus; Stor stergeon	0,1	-	0,1
6	Gymnocephalus; Ruffe (Pope)	0,4	0,2	0,6
7	Lucioperca lucioperca; Pike-perch (European)	7,4	18,4	25,8
8	Abramis sapa; Eastern bream	0,2		0,2
9	Barbus; Barbel	12,2	107,4	119,6
10	Leuciscus idus; Ide (Orfe)	6,5	1,2	7,7
11	Alburnus alburnus; Bleak	2,5	3,4	5,9
12	Abramis brama; Bream (Danube)	13,8	76,8	90,6
13	Aspius aspius; Asp	2,4	1,5	3,5
14	Chondrostoma nasus; Undermout;	1,00	-	11,00
15	Silurus glanis; Catfish (Wels; Sheat-fish; European catfish)	12,1	15,2	27,3
16	Ctenopharingodon idella; Grass carp	3,5	4,6	8,1
17	Hypophthalmichthis molitrix and Aristichthys nobilis; Silver carp and Bighead carp	47,9	440,0	488,3
18	Cyprinus carpio spp.; Carp (common carp)	1,1	15,2	16,3
19	Esox lucius; Pike	0,1	-	0,1
20	Others species	17,7	162,6	180,3
	Total fish - Danube River	**176,5**	**946,3**	**1122,8**

Table 5.12-c Fish species and other invertebrates in the Danube River for 1997 (data of the State Fisheries Inspectorate, Ministry of Agriculture)

No	Species (Fish and invertebrates)	Regional Fisheries Inspectorate (RFI) Danube River		
		Lom	Ruse	Total *(tons)*
1	Alosa pontica pontica; Shad	17,4	68,9	85,3
2	Huso huso; Great sturgeon	19,2	4,4	30,7
3	Acipenser guldenstadte; Russian (Black sea) sturgeon	0,4	0,2	0,6
4	Acipenser ruthenus; Sterlet	0,3	0,1	0,4
5	Acipenser stellatus; Stor stergeon	0,1	0,1	0,2
6	Gymnocephalus; Ruffe (Pope)	0,6	0,2	0,8
7	Lucioperca lucioperca; Pike-perch (European)	4,2	10,8	15,0
8	Abramis sapa; Eastern bream	0,6	0,1	0,7
9	Barbus; Barbel	11,8	100,5	112,3
10	Leuciscus idus; Ide (Orfe)	7,3	2,4	9,7
11	Alburnus alburnus; Bleak	2,5	4,5	7,0
12	Abramis brama; Bream (Danube)	14,6	75,6	90,2
13	Aspius aspius; Asp	3,6	1,2	4,8
14	Chondrostoma nasus; Undermout;	2,1	1,3	3,4
15	Silurus glanis; Catfish (Wels; Sheat-fish; European catfish)	1,6	1,8	3,4
16	Ctenopharingodon idella; Grass carp	3,5	4,2	7,7
17	Hypophthalmichthis molitrix and Aristichthys nobilis; Silver carp and Bighead carp	49,7	420,8	470,5
18	Cyprinus carpio spp.; Carp (common carp)	3,2	12,8	16,0
19	Esox lucius; Pike	0,3	1,2	1,5
20	Others species	15,8	112,1	127,9
	Total fish - Danube River	**158,8**	**823,2**	**982,0**

Table 5.13. Licenses for fishing industry for the Danube River Waters issued by the State Fisheries Inspectorate (SFI), Ministry of Agriculture

Issued licenses across fishing devices:		RFI/ **Lom** number of licenses **/cost in thousand levs/**	RFI/ **Ruse** number of licenses **/cost in thousand levs/**	**Total - SFI** number of licenses **/cost in thousand levs/**
1997				
Danube river - fishing boat (with fishing nets)	**Total**	**619/4446,0**	**1619/10573,8**	**2238/15019,8**
	fishing nets (only)	497/2982,0	1619/10573,8	2116/13555,8
	fishing nets (hooks/fishing rods)	122/1464,0	-	122/1464,0
1996				
Danube river - fishing boat (with fishing nets)	**Total**	**553/1328**	**1363/2726**	**1916/4054**
	fishing nets (only)	111/ 444	1363/2726	1474/720
	fishing nets (hooks/fishing rods)	442/ 884	-	
1995				
Danube river - fishing boat (with fishing nets)	**Total**			
	fishing nets (only)	499/1186	1257/2514	**1756/3700**
	fishing nets (hooks/fishing rods)			

Table 5.14. Danube River use for fishery across the harbors

Region/ Town	Fish-Farming Facilities on the Danube river		Fishermen yes/no	Species (Fish and Invertebrates)	Mean Annual Quantity Fish Draught *(tons)*			
					1994	1995	1996	1997
Vidin	**Registered**	0	yes	Huso huso, Great sturgeon; Acipenser ruthenus, Sterlet; Lucioperca lucioperca, Pike-perch ; Silurus glanis, Catfish; Cyprinus carpio spp., Carp; Barbus, Barbel; Hypophthalmichthis molitrix, Silver carp; Esox lucius, Pike; Chondrostoma nasus, Undermout etc	n.d.	n.d.	n.d.	í .ä.
	Nonregistered	0						
Lom	**Registered**	0	yes	Huso huso, Great sturgeon; Acipenser ruthenus, Sterlet; Lucioperca lucioperca, Pike-perch ; Silurus glanis, Catfish; Cyprinus carpio spp., Carp; Barbus, Barbel; Hypophthalmichthis molitrix, Silver carp; Esox lucius, Pike; Chondrostoma nasus, Undermout; Huso huso, Great sturgeon; ; Abramis brama, Bream; Alburnus alburnus, Bleak	n.d.	n.d.	120	n.d.
	Nonregistered	0						
Svishtov	**Registered**	2	n.d.	Silurus glanis, Catfish; Cyprinus carpio spp., Carp; Hypophthalmichthis molitrix, Silver carp;	18	24	29	35
	Nonregistered	0						
Belene	**Registered**	0	yes	Silurus glanis, Catfish; Cyprinus carpio spp., Carp; Hypophthalmichthis molitrix, Silver carp; Abramis brama, Bream	15	15	13	12
	Nonregistered	0						
Kozloduj	**Registered**	0	no	Abramis brama, Bream; Silurus glanis, Catfish; Cyprinus carpio spp., Carp; Hypophthalmichthis molitrix, Silver carp; Ctenopharingodon idella, Grass carp	0	0	0	0
	Nonregistered	0						
Ruse	**Registered**	10	yes	Silurus glanis, Catfish; Hypophthalmichthis molitrix, Silver carp; Abramis brama, Bream; Barbus Barbel; Huso huso, Great sturgeon; Alosa pontica pontica, Shad;	96	100	110	100
	Nonregistered	0						
Silistra	**Registered**	6	yes	Silurus glanis, Catfish; Hypophthalmichthis molitrix, Silver carp; Abramis brama, Bream; Barbus Barbel; Huso huso, Great sturgeon; Alosa pontica pontica, Shad; Acipenser guldenstadte, Russian sturgeon	100	98	104	103
	Nonregistered	0						
Tutrakan	**Registered**	3	yes	Cyprinus carpio spp., Carp; Hypophthalmichthis molitrix, Silver carp; Abramis brama, Bream; Barbus Barbel; Silurus glanis, Catfish; Acipenser guldenstadte, Russian sturgeon	90	100	130	79
	Nonregistered	0						

Table 5.15. Fishery in the Danube - potential source of subsistence for the population

Region/ Town	Fishery: baseline status and change: 1994 - 1997	Average number jobs, related to fishery				Potential Subsistence (yes/no)
		1994	1995	1996	1997	
Vidin	improvement after stopping of some facilities	685	474	555	616	yes, to a very little extent
Lom	improvement after ceasing the poaching and stopping of some facilities	58	67	74	120	yes, for 0.5% of the population
Svishtov	fishing ceased under water raise	18	24	29	35	yes
Belene	fishing industry - main subsistence for 100 people; trend for reduction of poaching	30	40	70	100	yes, in case of implementation of control of fish draught
Kozloduj	n.d.	0	0	0	0	no
Ruse	water quality improvement, crayfish appearance	250	236	250	270	yes
Silistra	observed clearing of the water from the industrial wastes	200	220	250	260	no
Tutrakan	fish decreasing, no favorable conditions for reproduction of carps	100	120	160	170	yes

Table 5.16. Passenger traffic 1993- 1997

			1993		1994		1995		1996		1997	
			Passengers number	Passengers / km th.	Passengers number	Passengers / km th.	Passengers number	Passengers / km th.	Passengers number	Passengers / km th.	Passengers number	Passengers / km th.
Transported passengers and performed passenger/km in thousands	Coastal voyages	Linear ships	1762	92298	1679	47147	1472	23754	1568	28224	1603	28854
		Pleasure crafts	1128	22698	120	6883	134	3053	125	3050	122	2806
		Inter-civic crafts	286	863	56	1045	89	---------	---------	--------	--------	--------
		Total	3176	115859	1894	59029	2643	46114	1693	31274	1725	31660
	Transboundary voyages		251	32361	190	30411	222	43802	216	42984	221	43316
	Total		3427	148220	2084	89440	2864	97389	1909	74258	1946	74976
Total number of passenger vessels			110		104		90		86		88	
Total number of passengers			24007		22101		13744		16340		16632	

*Transported number of passengers and passenger/ km in thousands

Table 5.17. Freight traffic 1993 – 1997

				Y E A R				
				1993	**1994**	**1995**	**1996**	**1997**
	Number of performed ton / km, in millions			10 381.9	10 264.1	12 007.2	12 605	12 870
	Number of transported cargoes ton, in thousands			20 853	18 688	22 760	23 500	24 010
	TUGBOATS	Number units		790	753	755	750	752
FREIGHTS	AND	Power	Total	549 451	542 080	538 499	540 000	539 184
	PUSHINGBOATS	in kilowatts	Mean	696	720	713	720	717
		Number units		359	316	315	310	310
	SELF	Dead weight	Total	378 679	363 854	382 189	376 030	376 030
IN	PROPELLED	in tons	Mean	1 055	1 151	1 213	1 213	1 213
	VESSELS	Power	Total	285 298	220 060	225 613	218 550	220 720
		in kilowatts	Mean	795	696	716	705	712
	NONSELF	Number units		3 926	3 607	3 636	3 642	3 640
OPERATIONS	PROPELLED	Dead weight	Total	4 362 312	4 250 420	4 131 806	4 108 176	4 204 200
	VESSELS	in tons	Mean	1 111	1 178	1 136	1 128	1 155
		Number units		**5 075**	**4 676**	**4 706**	**4 702**	**4 702**
	TOTAL	**Total dead weight, in tons**		**4 740 991**	**4 614 274**	**4 513 995**	**4 484 206**	**4 580 230**
		Total power, in kilowatts		**834 749**	**762 140**	**764 112**	**758 550**	**759 904**

Table 5.18. Traffic in the Danube River across ports (1994 - 1997)

Port/	Navigable traffic (number of vessels), (tons), (km)				Freight traffic (number of vessels), (tons), (km)					Passenger traffic (number of passengers)			
town*	1994	1995	1996	1997		1994	1995	1996	1997	1994	1995	1996	1997
Vidin	n.d	n.d.	n.d.	n.d.	**N. vessels** **freight (t)**	84 n.d.	94 136000	353 68000	454 112000	40000	40000	1333000	179000
Lom (Numb. Vessels)	475	774	871	1158	**N. vessels** **freight (t)**	475 670134	694 972628	781 1062703	1108 1561734	0	8000	9000	5000
Svishtov (Thousand tons)	535	546	625.	547	**N. vessels** **freight (t)**	761	681	794	707	2 international liners			
Ruse (Thousand km)	25	76	63	68	**N. vessels** **freight (t)**	359.5 $x10^6$	732.7 $x10^6$	627.3 $x10^6$	676.5 $x10^6$				
Silistra (Numb. vessels)	7564	9592	11864	14678	**N. vessels** **freight (t)**	0	271	277	190	0	174	151	174
Tutrakan	455	280	183	304	**N. vessels** **freight (t)**	1 barge 669	4 barges 2653	2441	428	5000	3945	835	4082

* Belene has no harbor

Table 5.19. Data on goods' exchange through the Danube vessel traffic and harbors

Harbor / Town	Data for the import / export relationship of goods				Potential risk in the harbors activities	Sources of Danube river pollution
	1994	1995	1996	1997		
Vidin	125.7 thousand tons /no export	145 thousand t /100 thousand t	68 thousand tons /no export	122 thousand t /669 thousand t	two petroleum terminals	potential pollutants: vessels and petroleum terminals
Lom	93% / 7%	95% / 5%	86% / 14%	91% / 9%	administrative, economic and technical problems in the harbor	petroleum products, sanitary waste waters, and waste from vessels' cleaning
Svishtov	102 thousand t /12 thousand t.	146 thousand t /10 thousand t.	138 thousand t /10 thousand t	102 thousand t /12 thousand t	no	sanitary waste waters, vessels' waste waters
Silisra	18590 tones /11166 tones	14586 tones /29603 tones	3333 tones /12665 tones	6616 tones /26998 tones	no	petroleum products, sanitary waste waters, and waste from vessels' cleaning
Ruse	92% / 8%	85% / 15%	80% / 20%	82% / 18%	administrative, economic and technical problems in the harbor	4000 m^3 sanitary waste waters / year
Tutrakan	0	0	1283	0	no	no

* Belene has no harbor

Table 5.20. Data for Danube River usage for tourism

Region/ Town	Tourist bases					Tendency of Use of Danube River for Tourism		Possibilities for the river tourism to become source of income	
		1994	1995	1996	1997	Yes/No	Reason	Yes/No	problems
Vidin	**Nat***	3	2	2	3	yes	main type of tourism in the region of Vidin and the watershed	no	no necessary equipment, no premises for vessels' housing expensive fuel
	Int**	1	1	1	1				
Svishtov	**Nat***	0	0	0	0	no	n.d.	no	n.d.
	Int**	0	0	0	0				
Belene	**Nat***	2	2	2	2	no	n.d.	yes	in case of enlargement of the necessary equipment and promoting services
	Int**	0	0	0	0				
Kozloduj	**Nat***	1	1	1	1	no	lack of necessary conditions	no	not enough tourists
	Int**	0	0	0	0				
Ruse	**Nat***	0	0	0	0	no	lack of private initiative	yes	because of the existing natural environmental resources
	Int**	1	1	1	1				
Silistra	**Nat***	0	0	0	0	yes	program is being prepared by Tour-Op "Iskar" Co	yes	to some extent in case of development appropriate international relations along the Danube river
	Int**	1	1	1	1				
Tutrakan	**Nat***	0	0	0	0	no	no investments	yes	n.d.
	Int**	0	0	0	0				

*Nat - National
**Int - International

Table 5.21. Use of Danube for recreation

Region / Town	Beaches, swimming baths, bases for aquatique sport					Compliance with the regulations for bathing water	Number of drowned people			
		1994	1995	1996	1997	Yes / No	1994	1995	1996	1997
Vidin	**contr.**	12	12	12	12	no	5	4	1	3
	uncontr.	12	12	12	12					
Svishtov	**contr.**	0	0	0	0	no	1	0	1	2
	uncontr.	0	0	0	0					
Belene	**contr.**	1	1	0	0	n.d.	0	0	0	0
	uncontr.	0	0	1	1					
Kozloduj	**contr.**	1	1	1	1	yes	0	0	0	0
	uncontr.	2	2	2	2					
Ruse	**contr.**	1	1	1	1	n.d.	4	3	5	4
	uncontr.	4	4	4	4					
Silistra	**contr.**	2	2	2	2	no	0	0	3	2
	uncontr.	0	0	0	0					
Tutrakan	**contr.**	0	0	0	0	yes	4	1	2	1
	uncontr.	0	0	0	0					

Table 5.22. Projection of needs of drinking water based on data per capita of the population

Zone	Class based on URCS*	Community Name	Population	Estimated water quantity in l/day	
				Year 2000	Year 2010
Total for Danube River Basin			**3897255**	**941048095**	**1011366455**
Total for Zone A			**135688**	**30226610**	**33512140**
A	**3**	Belogradchik	9390	2018850	2206650
A	**5**	Boinica	2792	362960	376920
A	**4**	Bregovo	8791	1670290	1802155
A	**2**	Vidin	84800	20776000	23320000
A	**4**	Gramada	3742	710980	767110
A	**4**	Dimovo	9965	1893350	2042825
A	**3**	Kula	8084	1738060	1899740
A	**5**	Makresch	3300	429000	445500
A	**5**	Novo_selo	4824	627120	651240
Total for Zone B			**402130**	**88079715**	**96112325**
B	**3**	Berkovica	24653	5300395	5793455
B	**4**	Boichinovci	13605	2584950	2789025
B	**5**	Borovan	7515	976950	1014525
B	**4**	Brusarci	7675	1458250	1573375
B	**3**	Bjala_Slatina	34091	7329565	8011385
B	**1**	Vraca	93153	24219780	26082840
B	**4**	Valcedram	14906	2832140	3055730
B	**4**	Varshec	10831	2057890	2220355
B	**5**	G.Damjanovo	5288	687440	713880
B	**3**	Kozloduj	24493	5265995	5755855
B	**4**	Krivodol	13548	2574120	2777340
B	**2**	Lom	38582	9452590	10610050
B	**5**	Medkovec	6361	826930	858735
B	**4**	Mizia	10851	2061690	2224455
B	**2**	Montana	65386	16019570	17981150
B	**5**	Rujinci	6861	891930	926235
B	**5**	Hajredin	7795	1013350	1052325
B	**4**	Chiprovci	6275	1192250	1286375
B	**5**	Chuprene	3561	462930	480735
B	**5**	Jakimovo	6700	871000	904500
Total for Zone C			**1542407**	**410792790**	**430644930**
C	**5**	Bojurishte	7080	920400	955800
C	**2**	Botevgrad	37592	9210040	10337800
C	**4**	Gorna_Malina	7052	1339880	1445660
C	**3**	Elin_Pelin	22465	4829975	5279275
C	**3**	Etropole	14678	3155770	3449330
C	**4**	Kneja	18285	3474150	3748425
C	**3**	Kostinbrod	17491	3760565	4110385

C	**3**	Lukovit	22740	4889100	5343900
C	**3**	Mezdra	28141	6050315	6613135
C	**3**	Orjahovo	16951	3644465	3983485
C	**4**	Pelovo	9778	1857820	2004490
C	**3**	Pravec	10274	2208910	2414390
C	**4**	Roman	8772	1666680	1798260
C	**2**	Samokov	48787	11952815	13416425
C	**3**	Svoge	25424	5466160	5974640
C	**3**	Slivnica	11167	2400905	2624245
C	**0**	Sofia-grad	1189043	332932040	344822470
C	**2**	Cherven_Brjag	39314	9631930	10811350
C	**4**	Jablanica	7373	1400870	1511465
Total for Zone D			**416109**	**95512370**	**103952480**
D	**4**	Guljanci	19171	3642490	3930055
D	**4**	Dolna_Mitropolija	27784	5278960	5695720
D	**4**	Dolni_Dabnik	16429	3121510	3367945
D	**3**	Levski	27967	6012905	6572245
D	**4**	Letnica	6571	1248490	1347055
D	**2**	Lovech	65776	16115120	18088400
D	**3**	Nikopol	14964	3217260	3516540
D	**1**	Pleven	152607	39677820	42729960
D	**5**	Pordim	9251	1202630	1248885
D	**3**	Teteven	25522	5487230	5997670
D	**3**	Trojan	39809	8558935	9355115
D	**4**	Ugarchin	10258	1949020	2102890
Total for Zone E			**550040**	**125606020**	**138029905**
E	**4**	Antonovo	8404	1596760	1722820
E	**4**	Aprilci	4490	853100	920450
E	**4**	Belene	13300	2527000	2726500
E	**3**	Bjala	18440	3964600	4333400
E	**1**	Veliko_Tarnovo	92149	23958740	25801720
E	**2**	Gabrovo	81894	20064030	22520850
E	**2**	Gorna_Orjahovica	56762	13906690	15609550
E	**3**	Drjanovo	13656	2936040	3209160
E	**3**	Elena	13493	2900995	3170855
E	**5**	Zlatarica	5880	764400	793800
E	**4**	Liaskovec	17021	3233990	3489305
E	**3**	Omurtag	27133	5833595	6376255
E	**3**	Pavlikeni	33027	7100805	7761345
E	**3**	Polski_Trambesh	21590	4641850	5073650
E	**2**	Svishtov	49635	12160575	13649625
E	**3**	Sevlievo	45855	9858825	10775925
E	**3**	Strajica	18360	3947400	4314600
E	**4**	Suhindol	4083	775770	837015
E	**3**	Trjavna	15859	3409685	3726865
E	**5**	Cenovo	9009	1171170	1216215

Total for Zone F			**236775**	**50570535**	**55822485**
F	**5**	Borovo	8354	1086020	1127790
F	**4**	Dve_mogili	13580	2580200	2783900
F	**5**	Ivanovo	12750	1657500	1721250
F	**4**	Loznica	17012	3232280	3487460
F	**5**	Opaka	8647	1124110	1167345
F	**3**	Popovo	40522	8712230	9522670
F	**2**	Razgrad	63328	15515360	17415200
F	**2**	Targovishte	62845	15397025	17282375
F	**5**	Car_Kalojan	9737	1265810	1314495
Total for Zone G			**614106**	**140260055**	**153292190**
G	**4**	Alfatar	4549	864310	932545
G	**4**	Vetovo	19928	3786320	4085240
G	**5**	Glavinica	14843	1929590	2003805
G	**3**	Dobrich	29129	6262735	6845315
G	**2**	Dobrich-grad	101760	24931200	27984000
G	**3**	Dulovo	33378	7176270	7843830
G	**4**	Zavet	13377	2541630	2742285
G	**3**	Isperih	28213	6065795	6630055
G	**5**	Kajnardja	6265	814450	845775
G	**4**	Kaolinovo	13433	2552270	2753765
G	**4**	Kruschari	7030	1335700	1441150
G	**3**	Kubrat	26820	5766300	6302700
G	**5**	Ruse	7973	1036490	1076355
G	**1**	Samuil	183790	47785400	51461200
G	**4**	Silistra	9752	1852880	1999160
G	**2**	Sitovo	69714	17079930	19171350
G	**5**	Slivo_pole	7307	949910	986445
G	**4**	Tervel	15712	2985280	3220960
G	**3**	Tutrakan	21133	4543595	4966255

* URCS - United Register Codes of Settlements

** According to the Guide for Water Supply, Ivan St. Ivanov, Tehnika Publ., Sofia, 1982 (in Bulgarian)

Table 5.23. Projection of domestic wastewater discharge based on data per capita of the population

Zone	Class based on URCS*	Community Name	Population	Estimated domestic waste water quantity in l/day	
				Year 2000	Year 2010
Total for Danube River Basin			**3897255**	**846943285.5**	**910229809.5**
Total for Zone A			**135688**	**27203949**	**30160926**
A	**3**	Belogradchik	9390	1816965	1985985
A	**5**	Boinica	2792	326664	339228
A	**4**	Bregovo	8791	1503261	1621939.5
A	**2**	Vidin	84800	18698400	20988000
A	**4**	Gramada	3742	639882	690399
A	**4**	Dimovo	9965	1704015	1838542.5
A	**3**	Kula	8084	1564254	1709766
A	**5**	Makresch	3300	386100	400950
A	**5**	Novo_selo	4824	564408	586116
Total for Zone B			**402130**	**79271743.5**	**86501092.5**
B	**3**	Berkovica	24653	4770355.5	5214109.5
B	**4**	Boichinovci	13605	2326455	2510122.5
B	**5**	Borovan	7515	879255	913072.5
B	**4**	Brusarci	7675	1312425	1416037.5
B	**3**	Bjala_Slatina	34091	6596608.5	7210246.5
B	**1**	Vraca	93153	21797802	23474556
B	**4**	Valcedram	14906	2548926	2750157
B	**4**	Varshec	10831	1852101	1998319.5
B	**5**	G.Damjanovo	5288	618696	642492
B	**3**	Kozloduj	24493	4739395.5	5180269.5
B	**4**	Krivodol	13548	2316708	2499606
B	**2**	Lom	38582	8507331	9549045
B	**5**	Medkovec	6361	744237	772861.5
B	**4**	Mizia	10851	1855521	2002009.5
B	**2**	Montana	65386	14417613	16183035
B	**5**	Rujinci	6861	802737	833611.5
B	**5**	Hajredin	7795	912015	947092.5
B	**4**	Chiprovci	6275	1073025	1157737.5
B	**5**	Chuprene	3561	416637	432661.5
B	**5**	Jakimovo	6700	783900	814050
Total for Zone C			**1542407**	**369713511**	**387580437**
C	**5**	Bojurishte	7080	828360	860220
C	**2**	Botevgrad	37592	8289036	9304020
C	**4**	Gorna_Malina	7052	1205892	1301094
C	**3**	Elin_Pelin	22465	4346977.5	4751347.5
C	**3**	Etropole	14678	2840193	3104397
C	**4**	Kneja	18285	3126735	3373582.5
C	**3**	Kostinbrod	17491	3384508.5	3699346.5
C	**3**	Lukovit	22740	4400190	4809510

C	**3**	Mezdra	28141	5445283.5	5951821.5
C	**3**	Orjahovo	16951	3280018.5	3585136.5
C	**4**	Pelovo	9778	1672038	1804041
C	**3**	Pravec	10274	1988019	2172951
C	**4**	Roman	8772	1500012	1618434
C	**2**	Samokov	48787	10757533.5	12074782.5
C	**3**	Svoge	25424	4919544	5377176
C	**3**	Slivnica	11167	2160814.5	2361820.5
C	**0**	Sofia-grad	1189043	299638836	310340223
C	**2**	Cherven_Brjag	39314	8668737	9730215
C	**4**	Jablanica	7373	1260783	1360318.5
Total for Zone D			**416109**	**85961133**	**93557232**
D	**4**	Guljanci	19171	3278241	3537049.5
D	**4**	Dolna_Mitropolija	27784	4751064	5126148
D	**4**	Dolni_Dabnik	16429	2809359	3031150.5
D	**3**	Levski	27967	5411614.5	5915020.5
D	**4**	Letnica	6571	1123641	1212349.5
D	**2**	Lovech	65776	14503608	16279560
D	**3**	Nikopol	14964	2895534	3164886
D	**1**	Pleven	152607	35710038	38456964
D	**5**	Pordim	9251	1082367	1123996.5
D	**3**	Teteven	25522	4938507	5397903
D	**3**	Trojan	39809	7703041.5	8419603.5
D	**4**	Ugarchin	10258	1754118	1892601
Total for Zone E			**550040**	**113045418**	**124226914.5**
E	**4**	Antonovo	8404	1437084	1550538
E	**4**	Aprilci	4490	767790	828405
E	**4**	Belene	13300	2274300	2453850
E	**3**	Bjala	18440	3568140	3900060
E	**1**	Veliko_Tarnovo	92149	21562866	23221548
E	**2**	Gabrovo	81894	18057627	20268765
E	**2**	Gorna_Orjahovica	56762	12516021	14048595
E	**3**	Drjanovo	13656	2642436	2888244
E	**3**	Elena	13493	2610895.5	2853769.5
E	**5**	Zlatarica	5880	687960	714420
E	**4**	Liaskovec	17021	2910591	3140374.5
E	**3**	Omurtag	27133	5250235.5	5738629.5
E	**3**	Pavlikeni	33027	6390724.5	6985210.5
E	**3**	Polski_Trambesh	21590	4177665	4566285
E	**2**	Svishtov	49635	10944517.5	12284662.5
E	**3**	Sevlievo	45855	8872942.5	9698332.5
E	**3**	Strajica	18360	3552660	3883140
E	**4**	Suhindol	4083	698193	753313.5
E	**3**	Trjavna	15859	3068716.5	3354178.5
E	**5**	Cenovo	9009	1054053	1094593.5
Total for Zone F			**236775**	**45513481.5**	**50240236.5**

F	**5**	Borovo	8354	977418	1015011
F	**4**	Dve_mogili	13580	2322180	2505510
F	**5**	Ivanovo	12750	1491750	1549125
F	**4**	Loznica	17012	2909052	3138714
F	**5**	Opaka	8647	1011699	1050610.5
F	**3**	Popovo	40522	7841007	8570403
F	**2**	Razgrad	63328	13963824	15673680
F	**2**	Targovishte	62845	13857322.5	15554137.5
F	**5**	Car_Kalojan	9737	1139229	1183045.5
Total for Zone G			**614106**	**126234049.5**	**137962971**
G	**4**	Alfatar	4549	777879	839290.5
G	**4**	Vetovo	19928	3407688	3676716
G	**5**	Glavinica	14843	1736631	1803424.5
G	**3**	Dobrich	29129	5636461.5	6160783.5
G	**2**	Dobrich-grad	101760	22438080	25185600
G	**3**	Dulovo	33378	6458643	7059447
G	**4**	Zavet	13377	2287467	2468056.5
G	**3**	Isperih	28213	5459215.5	5967049.5
G	**5**	Kajnardja	6265	733005	761197.5
G	**4**	Kaolinovo	13433	2297043	2478388.5
G	**4**	Kruschari	7030	1202130	1297035
G	**3**	Kubrat	26820	5189670	5672430
G	**5**	Ruse	7973	932841	968719.5
G	**1**	Samuil	183790	43006860	46315080
G	**4**	Silistra	9752	1667592	1799244
G	**2**	Sitovo	69714	15371937	17254215
G	**5**	Slivo_pole	7307	854919	887800.5
G	**4**	Tervel	15712	2686752	2898864
G	**3**	Tutrakan	21133	4089235.5	4469629.5

* URCS - United Register Codes of Settlements

** According to the Guide for Water Supply, Ivan St. Ivanov, Tehnika Publ., Sofia, 1982 (in Bulgarian)

Table 5.24. Projection for solid wastes (SW) based on data per capita generated by the population

Zone	Community Name	Population	Average annual quantity SW in tons
			Years 2000-2010
Total for Danube River Basin		**3897255**	**1247121.6**
Total for Zone A		**135688**	**43420.16**
A	Belogradchik	9390	3004.8
A	Boinica	2792	893.44
A	Bregovo	8791	2813.12
A	Vidin	84800	27136
A	Gramada	3742	1197.44
A	Dimovo	9965	3188.8
A	Kula	8084	2586.88
A	Makresch	3300	1056
A	Novo_selo	4824	1543.68
Total for Zone B		**402130**	**128681.6**
B	Berkovica	24653	7888.96
B	Boichinovci	13605	4353.6
B	Borovan	7515	2404.8
B	Brusarci	7675	2456
B	Bjala_Slatina	34091	10909.12
B	Vraca	93153	29808.96
B	Valcedram	14906	4769.92
B	Varshec	10831	3465.92
B	G.Damjanovo	5288	1692.16
B	Kozloduj	24493	7837.76
B	Krivodol	13548	4335.36
B	Lom	38582	12346.24
B	Medkovec	6361	2035.52
B	Mizia	10851	3472.32
B	Montana	65386	20923.52
B	Rujinci	6861	2195.52
B	Hajredin	7795	2494.4
B	Chiprovci	6275	2008
B	Chuprene	3561	1139.52
B	Jakimovo	6700	2144
Total for Zone C		**1542407**	**493570.24**
C	Bojurishte	7080	2265.6
C	Botevgrad	37592	12029.44
C	Gorna_Malina	7052	2256.64
C	Elin_Pelin	22465	7188.8
C	Etropole	14678	4696.96
C	Kneja	18285	5851.2
C	Kostinbrod	17491	5597.12
C	Lukovit	22740	7276.8

C	Mezdra	28141	9005.12
C	Orjahovo	16951	5424.32
C	Pelovo	9778	3128.96
C	Pravec	10274	3287.68
C	Roman	8772	2807.04
C	Samokov	48787	15611.84
C	Svoge	25424	8135.68
C	Slivnica	11167	3573.44
C	Sofia-grad	1189043	380493.76
C	Cherven_Brjag	39314	12580.48
C	Jablanica	7373	2359.36
Total for Zone D		**416109**	**133154.88**
D	Guljanci	19171	6134.72
D	Dolna_Mitropolija	27784	8890.88
D	Dolni_Dabnik	16429	5257.28
D	Levski	27967	8949.44
D	Letnica	6571	2102.72
D	Lovech	65776	21048.32
D	Nikopol	14964	4788.48
D	Pleven	152607	48834.24
D	Pordim	9251	2960.32
D	Teteven	25522	8167.04
D	Trojan	39809	12738.88
D	Ugarchin	10258	3282.56
Total for Zone E		**550040**	**176012.8**
E	Antonovo	8404	2689.28
E	Aprilci	4490	1436.8
E	Belene	13300	4256
E	Bjala	18440	5900.8
E	Veliko_Tarnovo	92149	29487.68
E	Gabrovo	81894	26206.08
E	Gorna_Orjahovica	56762	18163.84
E	Drjanovo	13656	4369.92
E	Elena	13493	4317.76
E	Zlatarica	5880	1881.6
E	Liaskovec	17021	5446.72
E	Omurtag	27133	8682.56
E	Pavlikeni	33027	10568.64
E	Polski_Trambesh	21590	6908.8
E	Svishtov	49635	15883.2
E	Sevlievo	45855	14673.6
E	Strajica	18360	5875.2
E	Suhindol	4083	1306.56
E	Trjavna	15859	5074.88
E	Cenovo	9009	2882.88
Total for Zone F		**236775**	**75768**

F	Borovo	8354	2673.28
F	Dve_mogili	13580	4345.6
F	Ivanovo	12750	4080
F	Loznica	17012	5443.84
F	Opaka	8647	2767.04
F	Popovo	40522	12967.04
F	Razgrad	63328	20264.96
F	Targovishte	62845	20110.4
F	Car_Kalojan	9737	3115.84
Total for Zone G		**614106**	**196513.92**
G	Alfatar	4549	1455.68
G	Vetovo	19928	6376.96
G	Glavinica	14843	4749.76
G	Dobrich	29129	9321.28
G	Dobrich-grad	101760	32563.2
G	Dulovo	33378	10680.96
G	Zavet	13377	4280.64
G	Isperih	28213	9028.16
G	Kajnardja	6265	2004.8
G	Kaolinovo	13433	4298.56
G	Kruschari	7030	2249.6
G	Kubrat	26820	8582.4
G	Ruse	7973	2551.36
G	Samuil	183790	58812.8
G	Silistra	9752	3120.64
G	Sitovo	69714	22308.48
G	Slivo_pole	7307	2338.24
G	Tervel	15712	5027.84
G	Tutrakan	21133	6762.56

* National projection is estimated to be 0.32 t/per capita/year

Part B

Financing Mechanisms

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All basic amounts are given in USD counter value as per the following average exchange rates:

1994 BGL	56,40	per 1 USD
1995 BGL	67,17	per 1 USD
1996 BGL	174,42	per 1 USD
1997 BGL	1760,00	per 1 USD

The exchange rates are calculated on the basis of the BNB base rates as published in PARI newspaper of 1.05.1998 and may be subject to adjustment.

Abbreviations

GDP	Gross Domestic Product
BGL	Bulgarian Lev
USD	United States Dollar
OECD	Organization for Economic Cooperation and Development
NEPF	Municipal Environmental Protection Fund
MEPF	National Trust Eco Fund
CBC	Cross Border Cooperation
UNDP	United Nations Development Programme
IFC	International Finance Corporation
EBRD	European Bank for Reconstruction and Development.
EIB	European Investment Bank
REC	Regional Environmental Council
EIA	Environmental Impact Assessment
Bln	Billion
Mio	Million

1. Summary

Financing mechanisms in the field of water quality and water management programmes at the present stage of the reform process are subject to the impact of numerous factors of economic, institutional social and political nature. These factors are connected with the long-term structural changes occurring in the Bulgarian economy and within society, with the implementation of the Currency Board on July 1, 1997 as well as the specific features of the participation of the country in the international division of labor, the world economy and in European integration in particular. As a very important aspect of the environmental issues, the development of the water sector is one of the top priorities in the overall environmental strategy and policies of the present government.

The future development of Bulgarian industry and agriculture, along with improved infrastructure, tourism, the hydroelectric projects, transportation, etc on the basis of market principles and mechanisms require a completely new approach to the financing of the water programmes and projects. This new approach must be based on profound analysis of the new role of water sector in regard to the transition to a market economy and its potential greatly to contribute to and to stimulate the transition. The financing of water sector projects and programmes is becoming more and more important not only for the purpose to overcome some old, to a certain extent inherited problems from the past but also to create the infrastructure backbone of the economy and to comply with the new requirements for participation in the international division of labor.

At present the financial resources for environmental protection are strictly limited due to the still very difficult economic situation of the country. Total investments for nature protection and restoration amounted to 1% of the GDP in 1995 and 0.9% in 1996. According to recent estimates the situation has not changes in 1997.

According to official information from the National Institute of Statistics in 1994 the total environmental investments amounted to BGL 5 609 780 000 (USD 99 464 184) including BGL 2 482 128 000 (USD 44 009 361) for the water sector or 44,2% of the total amount. In 1996 the total environmental investment was BGL 18 159 712 000 (USD 104 114 840). The investments in the water sector were BGL 6 751 329 000 (USD 38 707 309) or 37%. This data demonstrates that in absolute terms the level of investments has not changed significantly.

The penalties and fees which were collected amounted to BGL 75 918 000 in 1994 (USD 1 364 064) and to BGL 106 675 000 (USD 60 610) in 1996, incl. for the water sector BGL 36 696 000 (USD 650 638) in 1994 and BGL 40 177 000 (USD 230 346) in 1996.

A salient feature of Bulgaria's water sector related investments is the relatively large share of the financing for maintenance of the existing assets.

In 1995, 72% of the total investments were used for maintenance of the existing assets and only 28% were actually for acquisition of new assets and other activities. In 1996 those indicators were respectively 76 and 24%.

Another distinguishing characteristics is the particular structure of the sources of financing. According OECD estimates for 1994, 20% of the expenditures for environmental protection and restoration were provided by the state budget, 8% by the municipalities and 63% by the enterprises. About 5% of the funding came from the National and the Municipal budgets and 4% by external financial sources.

In the period after 1994 two major trends have emerged. The **first trend** is the increase of the activities and the funding of the National Fund for Nature Conservation. The expenditures of the fund amounted to BGL 192,8 Mio in 1994 (USD 3,4) and to BGL 7,261 Mio (USD 4,1) in 1997. The financing of a total of 60 investment projects - 48 investment environmental ones in municipalities and companies and 12 projects for the National Monitoring System was implemented in 1997.

The amounts invested in the water sector only were respectively BGL 59.5 Mio (USD 1,06) in 1994 and BGL 3,102 Mio (USD 1,76) in 1997.

The **second trend** is connected with the enlargement and institutional strengthening of the external financing. In 1995 the World Bank granted a loan in the amount of USD 98 Mio, of which the allocation for the water companies was 47,5 Mio in 1996. The World Bank environmental loan to Bulgaria for 1998 is USD 16 Mio.

The financing of the water sector is a priority issue. The expenditures in the water sector represent 37% of the total amount of the environmental expenditures. Nevertheless a lot of acute problems in the water sector remain unsolved, among them the pollution reduction problem.

In this context the Danube River basin deserves special attention in view to its strategic importance for the development of the region and the country as a whole. The development of the transport infrastructure and the water economy potential of the river have been of priority for many years but they have never been fully utilized. The state policy in the last decades and its mechanisms were not efficient enough in order provide maximum usage of the potential of the Danube River basin. The industries in the region and particularly the chemical industry, the tanneries, machine building, production of cardboard and paper, of construction materials and others, based on the water economy, are not supplied with sophisticated water pollution reduction equipment. On the other hand the economic crises in the region of the Danube River basin is deeper than in some other parts of the country in regard to reduction of production, income generation, unemployment. This implies an economic restructuring of the basin with the prospect to better utilization of the resources and the water economy of the Danube River. One of the strategic tasks in this context is the pollution reduction.

The completed data collection and analysis reveal that in order to increase the financial resources and to make better use of them for the purposes of water management and water pollution reduction, it will be necessary to improve the existing legal framework in this field. The adoption of adequate regulations for the establishment of a special National Fund “Water Resources” and the improvement of the exiting regulations for collection of penalties and fees would greatly contribute to the creation of more flexible financing mechanisms of the water sector and for more effective implementation of the Danube River Pollution Reduction Programme.

The sources of financing of water programmes and projects including for the Danube River Pollution Reduction Programme will need to be mostly external because of several important reasons: the limited internal financing, the nature of the pollution reduction activities and the necessity of sophisticated equipment and know how related to them.

The internal sources will continue to develop and diversify. Along with the development of the privatization, the financing from the newly privatized enterprises may substantially increase in compliance with the environmental requirements.

There are substantial possibilities for the development of the private sector financing on the part of the commercial banks, which are slowly recovering from the financial crises of 1997. This process will be stimulated under the conditions of the Currency Board. There are also substantial reserves for the development of private models of financing which will be possible with the development of the economy on market principles.

The indirect financial stimuli of taxation and customs’ duty character are also an important reserve.

2. Data Collection and Analysis

2.1. Legal Basis of the financing of the Water Management Programmes and projects.

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

The legal framework of the financing of the water management programmes and projects can only be discussed in the light of the changes and development of the Bulgarian legislation incl. the environmental one, in regard to the laws and regulations with financial relevance. At present there are adopted 153 Laws, regulations, decrees, tariffs and other legal acts which provide the framework of the Bulgarian environmental legislation. Otherwise the legal framework governing only the water sector financing issues is quite scarce and in some points non-existent.

In view to the fact that the water sector activities are not concentrated only in the Ministry of Environment and Water and also that the basic sources of financing of the water sector projects are the state budget, the municipal budgets, the National Fund for Nature Conservation, own funding of enterprises and financing from external sources, the analysis of the legal framework of the water sector financing has to be based on the existing legislation regulating the said sources. In this regard the following laws and regulations are important:

As of 1997 **New Law for the Composition and Implementation of the State Budget** is functioning and providing the composition, the acceptance, the execution of the state budget, the budget process and the relations between the state budget and the budgets of the municipalities as well as the regime of the off-budgeted financial sources. The income and expenses items of the budgets of the state institutions are determined with the annual Law for the State Budget, which is composed and executed for one budget year starting January 1, and ending on December 31. The state budget is prepared after a profound analysis of the basic needs of the state institutions and co-ordination between the respective institutions and the Ministry of Finance. The budget is voted by the Parliament and has the power of a Law. The state institutions incl. the Ministry of Environment and Water, the Ministry of Construction, the Ministry of Regional Development and Public Works (which implement various projects of environmental nature) classify their budgets as per activities and time frame. In this regard the financing of water sector projects and programmes with financing from the budget is strictly regulated by the Law for the State Budget.

The formation of the municipal budgets by state subsidies and by their own sources is also a substantial source of funding of environmental and water related projects. According to **Article 20 of The Law for the Local Self-government and Self-administration**, the Municipal council has the powers to determine and to implement municipality related projects, incl. environmental ones and in the water sector. Article 46 of the said Law explicitly formulates the functions of the mayor.

The budgets of the municipalities are independent as far as they are basically composed of financing of personal sources such as taxes, fees and charges. The latter are determined by the **Law for the Local Taxes and Charges**. The municipal budgets may be flexible as long as they are composed of other sources as well, such as from economic activities. The municipalities are authorized to apply for non-interest bearing loans and to receive financing from the state budget for the purpose of implementing projects of national importance.

The restructuring of the economy by the means of privatization of the state property also provides possibilities for financing of environmental incl. water sector projects. These possibilities are regulated by the **Law for the Restructuring and Privatization of State and Municipal**

Enterprises in Article 6, paragraph 1, item 2. According to the said Law 5 percent of each completed privatization deal have to be invested in the National Fund for Nature protection. The latter is regulated by the **Nature Protection Act (Art. 3).** Amounts of the charges and fees for pollution within the acceptable limits are distributed for the local i.e. municipal budgets - 40%, and for the National Fund for Nature Protection - 60 % and in cases when the pollution is above the acceptable limits the subdivision of the means is 30 versus 70 percent in favor of the National Fund.

Along the general regulators of environmental protection related to funding mention should be made of the **Regulation for the Collection, Expenditures and Control of the Funds for Nature Protection of** 17.08.1995. The regulation provides the legal framework for the financing, the institutional functioning and the purposes of the National Environmental Protection Fund, for the Fund for Environmental projects in mountainous regions and the Municipal funds for nature conservation.

The **Water Law** of 1960 (amendments of 1977, 1984, 1986, 1997 and currently under discussion and updating) does not provide special regulations in regard to financing of water sector programmes and projects. Part VI " Taxes " Article 33 stipulates the necessities for taxes to be paid in some specific cases of water consumption and in Part IX "Penalties" the amount of the penalties for violation of the said Law.

In relevance to cost, revenues and financing of Water Quality and Water Management Programmes and Projects the Bulgarian legislation consists of few regulations. One of them is the **Regulation for the Order of Determination and Implementation of Sanctions for Pollution or Damages of the Environment over the Accepted Norms** approved with an Act of the Council of Ministers of 4.02.1993(amended in 1995 and 1997)**.** The said Regulation stipulates that the amount of the sanction is determined according to the level of the average minimal salary for the country as of the date of the verification of the violation. The sanctions related to water pollution are stipulated in Part 1 of the Regulation and in Annex 1 are stated as per type of pollution, polluting substance and specific combination of substances.

The **Tariff for the Charges Collected by the Ministry of Environment and Waters** of March 31, 1997 stipulates the taxes for the issuance of permits for wastewater discharge. These charges are determines as a percentage of the average minimal wage. For water discharge up to 100 cubic metros per day, the charge is 30 percent and over that limit - 55 percent.

Among the regulators for providing stimulus for water sector pollution reduction measures mention should be made of the **Act N 387 of October 16, 1997** stipulating that the equipment for the water sector delivered in compliance with the Agreement between Bulgarian and the World Bank for restructuring and modernization of the water companies, is not subject to import duties and taxes.

Table 2.1 Main laws and regulations relevant to environmental financing

Title of Law or Regulation	Main Characteristics
I. Environmental Laws **I.1. Environment Protection Act** (of 1991, amendments in 1992, 1995, 1997)	**Determines the amounts of the charges and fees for pollution within the acceptable limits and their distribution among the municipal and the NEPF.**
I. 2. The Water Law (of 1996, amendments in 1977, 1984, 1986, 1997)	**Stipulates taxes for water consumption and penalties for violation of the said Law.**
I.3.Regulation for the order of determination and implementation of sanctions for pollution or damages of the environment over the accepted norms (of 4.92.1993, amended in 1995 and 1997).	**Determines the sanctions for the water pollution.**
I.4. The Tariff for the charges collected by the Ministry of Environment and Waters (of March 31, 1997 **)**	**Stipulates the taxes for the issuance of permits for wastewater discharge.**
II. General Laws. **II.1. The Law for the State Budget of 31.01.1998**	**Contains the amount of financing for specific projects.**
II.2. The Law for the Municipal Budgets of 1993	**Stipulates the execution of the municipal budgets and the order of the inter-relation with the state budget.**

Source: Database of the Council of Ministers, Legal Information Department.

2.1.2. Assessment of Main Deficiencies and Needs for Improvement

From an economic and financial point of view the legal frame work of financing of the water management projects and programmes can be considered as satisfactory in view to the current economic development of the country and the transition period in particular. Although the Bulgarian legislation does not provide a separate legal basis for all the specific issues of water sector financing, in the period of the reform it has developed rapidly towards a more flexible regulatory system. Nevertheless the main deficiencies consist in the lack of a special regulation of the water right as well as provision of a more detailed legal background for the realization of existing internal possibilities for mobilization of all the internal sources of financing of the water sector projects and programmes.

Another important issue is the lack of a legal framework, which is to provide, and co-ordinate the budgets of the ministries relevant to the different aspects of the water sector projects.

In this regard one of the deficiencies of the legal framework in general consists in the fact that water related issues are regulated by a number of laws: the Water Law, the Law for preservation the waters and the soils from pollution, the Law for the Health care, the Urban Development Act and others. Subsequently this may have a negative impact on the legal framework of the financing of the water management projects.

In order to **self-finance** some activities, related to the water management (information and monitoring, permitting regime, investment projects, scientific research, etc.) and the pollution reduction programme, there should be established the relevant bodies and mechanisms. The necessary funds may be provided through the introduction of a tax for the administrative service "issuing of permits" and the tax **"water right"**[1]**.** The latter may be determined according to the volume, depending on the quantity and quality of the used and discharged wastewater or according to other appropriate criteria, for the use of water areas or carrying out of regulated activities in the river beds, lakes, etc. In order to collect the taxes and accumulate the funds, it is necessary either to establish a National Fund "Water Resources" by means of a special legal act or by the means of the existing Regulation.

2.2. National Policy and Strategy for Funding of Water Sector Programmes and Projects. Overall Policy and Funding Strategy for Water Quality and Water Management Programmes or Projects and for the Danube Pollution Reduction Programme.

The National Policy and Strategy for funding of the water sector is based on the need to implement the basic guidelines of the Strategy for unified water management in Bulgaria on the one hand, the specific objectives for the Danube River region and the overall economic and environmental policy under the conditions of the Currency Board and the respective implications for the state budget, the municipal budgets and the international assistance, on the other. That is why it is necessary to make a brief description of the main targets of the national environmental policy, of the strategy for unified water management and of the national policy concerning the Danube river Basin.

The **Action Programme of the Ministry of Environment and Waters** projects the following activities:

- the introduction of a new environmental management systems based on a combination of control and command and financial tools, to minimize emissions from municipal, industrial, agricultural and diffuse sources;
- the establishment of an environmental monitoring network to support policy and strategy development and enforcement of legislation; the stimulation of a great public awareness and interest in environmental issues;
- the stimulation and support of rehabilitation programmes at contaminated sites;
- the establishment of conservation programmes to prevent deterioration of protected areas; the development of legislative framework for environmental management.

The **Strategy for Unified Water Management** formulates the basic principles, objectives as well as stages, which have to be taken into account in terms of financing.

The main objectives for sustainable policy in the water sector are determined as follows:

- Provision of water for drinking and community use, for recreation,-therapy, etc.;
- Provision of water for industrial purposes (irrigation, industry, energy production, etc.);
- Protection of environment and water ecosystems;
- Restricting of the impact of floods and droughts.

[1] The "Water Right" is the right to interfere with the natural condition of the water, which would be subject to charge.

The water is a dynamic resource with a wide range of applications. In the past it was a general view that it would be sufficient to monitor, control and manage the river corridor or separate point sites. Now these processes are viewed as interrelated and it is clear that the development of the catchment areas affects directly the quantity and the quality of the water resources, as well as the possibilities for their use. That is why many countries accepted the River Basin[2] as the main unit in the water management and established the relevant management structures at a basin level.

The use of the water resources usually is done through water use equipment and systems. It is carried out at a technological level and according to economic principles, and that is why the resource should be subject only to state regulation, but not to direct regulation by the state institutions.

The competition between the water users in market economy conditions could lead to damages to environment and to the socially oriented water uses (communal drinking water supply), and because of that the quality of the water and its inter-sector balance should be subject to regulation by the state.

Yet some other aspects are of great importance for the water management. These are: the calculation of the economic value of water as a natural resource and the informational provision of its management which should find their place in the structures and the mechanisms for rational management of the resource.

The main principles of the water management in Bulgaria are as follows:

- integrated management - complexity, environmental considerations, effectiveness, priorities;
- the River Basin - main unit in the water management;
- hierarchy of the management;
- alternatives and effectiveness of the management;
- legislative correspondence of the adopted principles of management;
- provision of information;
- scientific services and application of a systematic approach;
- participation of the community and the local authorities.

For the achievement of the objectives and principles of water management, it is proposed:

- At a **national level** - one institution should be responsible for the integrated natural resource "water", which would implement the state policy for its integrated and sustainable management. This would be the institution, which should be responsible for the balancing of the interests of the water users, for management of the water and the related ecosystems, as well as for the monitoring and control of their condition and the sources of pollution. This institution would co-ordinate the common policy in the area of water with the ministries and institutions, which have some competence in this area, related to their main activities.
- The most appropriate unit for integrated water management at the **regional level** is the River Basin or Groups of River Basins. The internal basin problems would be solved by the relevant management structures at a basin level with the help of the state bodies. This form is the most appropriate for co-ordination of the local and state interests and for the participation of the local authorities and the community in the water management. The disputes and the transfer of water between the river basins would be solved by the state body on a national level.

[2] The River Basin includes the catchment areas of one or a group of rivers.

- The level **"Water use system"** would be managed according to the economic laws, however within the framework, established by the basin level, when it is related to internal basin links, and by a national level, when there are concerned larger systems, extending over the territorial range of the basin level of management.

The reforms in the water management may be completed in several stages. The recommended activities for the initial stage include:

1. Preparation and adoption of a "Strategy for development of the use of water resources and protection of water";
2. Concentration of the functions related to water, including the mineral one, in one institution;
3. Harmonization of the Bulgarian legislation with the European Community. During the preparation of the Water Law, in parallel would be prepared and made the necessary changes and clarifications in the Law for the State Property, the Law for the Municipal Property, the Law for the Local self-government and Local Administration, the Law of Concessions and the Rules for its implementation, the Law for the Territorial and Urban development and others;
4. Collection and processing of information for argumentation and selection of the river basins: geographical and geological characteristics; hydrographic characteristics; demographically characteristics; possibility for use of the lands and impact of the anthropogenic activities; assessment of the water abstractions; assessment of the pollution by point sources; assessment of the pollution by non-point sources; analysis of other anthropogenic impacts on the status of the water.
5. Collection and processing of information for the status and range of the different types of water use systems and their differentiation as "Water companies", water use associations for water supply, irrigation, energy production, etc.;
6. Development and approval of the conditions and the criteria for privatization of the large water use systems and facilities (water supply, irrigation, energy production ones);
7. Transformation of the water supply and drainage companies into firms with municipal or mixed participation (in process of realization);
8. Establishing of associations of the water users for irrigation according to the technological principle and granting of the ownership of the internal canal networks;
9. Development and approval of the water use and ecological conditions for construction and operation of and facilities;
10. Development of economic argumentation for the above activities.

The main task of the second stage is the introduction of the new Water Law into force and during its implementation there should be prepared:

1. The regulation basis related to the implementation of the new Water Law;
2. Programme of measures for:
   - the application of the taxes "Water Right";
   - observation of the standards for quality of surface and ground water;
   - monitoring of the status of the surface and ground water and the abstraction from it;
   - control over the observation of the legislation in the area of water;
   - introduction of a permitting regime for activities, related to water;
   - introduction of a combined approach on the basis of emission and emission limits and others.

3. River Basin Management Plans and State Water Programme;
4. Economic analyses for the management of water and management of: the water abstraction and distribution; collecting and treating of the wastewater; assessment of the investments in the infrastructure in respect of the public and the private sector; presentation of the data according to the sectors of economic activity - community, industry and agriculture, etc.

Among the main activities following the introduction of the Water Law into force, are included also:

1. Establishing and strengthening of co-ordinating and consultative bodies for water management at national and basin levels;
2. Introduction of the Programme of Measures and the River Basin Management Plans;
3. Transformation of the large water use systems and facilities into independent market economic structures.

The third stage is related to the establishing of the structures for collection, accumulation and management of the funds (Basin Agencies and National Fund "Water Resources").

During the realization of the first two stages, it is necessary to ensure the active participation of the state institutions, which can ensure the implementation of the reforms. For this reason, it is advisable all functions related to water to be concentrated in the Ministry of Environment and Water and in its structure to differentiate a unit for implementation of the reform. It is also necessary to ensure the active participation of the Ministry of Regional Development and Public Works, the Ministry of Agriculture, Forests and Land Reforms and the Committee of Energy in respect of the privatization and the restructuring of the water use systems which at present are under their command. The implementation of the third stage would be accompanied with the gradual withdrawal of the state from the direct management of the water, combined with decentralization, deconcentration of the functions and strengthening of the basin level of management and increasing of its authorities.

The realization of the Strategy for Integrated Water Management in Bulgaria in its final form depends exclusively on the new legislation in the area of the natural resources and especially on the future Water Law. In terms of the financing of the activities for the implementation of the Strategy it would be necessary both to increase the internal sources of financing and to provide more effective external funding At present, according to our estimates, the funding for Water management and pollution reduction is about 0,3% of the Internal Domestic Product. Under the conditions of the Currency Board the financing from the state budget is limited. That is why one of the main task of the national policy in the field of financing water management and water pollution reduction programmes is to create stable and flexible mechanisms of internal financing i.e.

- **to establish a mechanism for self-financing,**
- **to improve the procedures of the permitting regime,**
- **to provide adequate structures for collection of water taxes and management of the funds.**

The **Strategy for the Danube River Basin** is based on the priorities given in terms of the usage of the water economy, the industrialization and the social development of the region. At present the region faces many acute problems of economic, social and environmental nature. All the industries in the region, the energy sector, the machine building, chemistry, paper and cardboard production, the tanneries etc. experience the impacts of the economic crises. The studies and the economic analysis reveal that the economic crises of the region is deeper if compared to some other regions

of the country. Most of the industries in the region lack financing for up to date pollution reduction equipment. Both on regional and on national level the financial resources for that purpose are very limited.

The strategy of the Danube River Basin, which is a part of the overall national strategy, has the objectives to provide additional sources of internal financing for pollution reduction from the local industrial enterprises, from the agricultural sector, from the municipalities and on national level from the existing internal sources.

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

The most recent open information about the structure of the resources for funding of environmental programmes and projects is for 1994. According to estimates done by the OECD in 1994, 20% of the environmental expenditures were done by the state budget, 8% by the municipalities and 63% by the enterprises both private and state. The remaining 11% of the expenditures were done by the National and the Municipal funds (5%) and 4% by international sources. Most unreliable is the information provided by the enterprises. Nevertheless there is sufficient evidence that the principle for the " polluter has to pay " may be applied.

The projects for pollution reduction have initially been financed mainly by the state budget but now they are also financed by the National and the Municipal Funds. The fees and the charges which have been collected are transferred ton the funds. They amount to BGL 36 696 000 (counter value in USD 650 638) in 1994 and to BGL 40 177 000 in 1996 (counter value in USD 230 346).

Although as nominal value the funding for the water management has increased, it is completely insufficient in terms of the needs of the country in this field. According to official evaluations of 1994, more than BGL 3 billion (USD 53 191 489) were necessary for the completion of the construction of 29 wastewater plants. In 1994 the financing was BGL 250 Mio (USD 443 262), and in 1995 BGL 460 Mio (USD 6 854 418). At this rate of investment has been evaluated that the completion will take about 10 years if it will not become a priority environmental issue.

2.3.1. Relevant Public Funding Sources and Instruments in Use.

National Environmental Protection Fund (NEPF)

Municipality Funds for Environmental Protection (MFEP)

The NEPF, established in 1993, is functioning within the framework of the Ministry of Environment and water. The funds' depository in BGL and currency is the Bulgarian National Bank with predominant state-owned capital. The fund is governed by a Managing Board (minimum 12 persons - representatives of different ministries), headed by the Minister of Environment and water and supported by an Executive Bureau (6 persons). The Environmental Project for Mountain Regions Fund is also a part of the NEPF.

Municipalities' Funds for Environmental Protection are similar to NEPF, although their scope is limited to the territory of the respective municipality. They are governed by a Managing Board (at least 5 people) and headed by the mayor of the municipality.

The following activities are eligible for applying for funding:

- purchase of tangible and intangible assets for environmental facilities for **wastewater treatment; water supply and sewage collector systems;** catching and neutralization of hazardous air-pollutants protection, including: gazification and other alternative energy sources; facilities and equipment for decreasing the pollution from transport and energy

production, limiting energy transfer losses and negative effects from high-frequency magnetic fields; equipment for geo-protection; facilities for ground protection, erosion prevention, and re-cultivation of polluted areas; waste management equipment; facilities for biodiversity protection; noise and radiation prevention equipment; monitoring equipment; licenses, know-how, patents; other pollution prevention or environmental recovery assets;

- events, that are not related to long-term assets: reclamation of flora, chemical melioration, biological and integrated plant protection; draining, landscape protection, incl. protected natural sites and objects; biodiversity conservation; other pollution prevention or environmental recovery events;
- payment for scientific or technical services; environmental assessments or audits, required by the Ministry of Environment;
- others (see Regulation on accumulating, using and control of the environmental protection funds - State Gazette No 75/1995, amendments State Gazette No 72/1996

The NEPF is financed by 60% of the collected pollution charges and 70% of the collected pollution fines; import duties on old automobiles; fees and duties on the production and import of liquid fuels; some cash flows from the privatization; funds from the national budget; donations from Bulgarian or international organizations and persons; indemnification to the State on environmental issues under Court rulings; interest repayments on loans provided by the Fund; etc.

The MEPF's are financed by the municipal charges; 40% of the collected pollution charges and 30% of the collected pollution fines; fines from breaches of Municipalities' Regulations on environmental pollution; some cash flow from the privatization; funds from the municipalities' budget; grants, interest-free loans and soft loans from the NEPF; donations from Bulgarian or international organizations and persons; indemnification to the municipality from another municipality under Court rulings on environmental issues; interest, etc.

At the beginning of 1995 in Bulgaria there were 170 Municipal funds for environmental protection in 251 municipalities. The Municipal funds are very small. In 1994 the total amount granted by them is about BGL 25 Mio. (USD 443 262). The biggest is the fund of the municipality of the city of Bourgas, followed by that of Sofia.

In 1994 the Fund in Bourgas lent resources for BGL 7 Mio (USD 124 113) and that of Sofia - BGL 4 Mio (USD 70 921). In general, the municipal funds are very small to be effective. One of the ways to solve this problem is to create regional funds.

The types of assistance depend on the funds available, type of the project and type of applicant. According to the Regulation on NEPF, types of assistance are as follows:

1. co-financing of mutual projects and programmes with other ministries, municipalities, NGOs and other institutions;
2. grants for establishment and maintenance of the National Monitoring System, for research and for emergency cases;
3. grants for projects in the "hot spots" regions, municipalities in critical economic situation and in the mountain or semi-mountain regions identified in an act of the Council of Ministers;
4. interest free loans to firms and municipalities for projects lasting less than one year for reducing pollution in the energy sector, in the "hot spots" regions, in municipalities in critical economic situation and in the mountain and semi-mountain regions, identified in an act of the Council of Ministers;
5. soft loans (with interest equal to 10% of the base interest rate) to firms and municipalities for projects lasting for more than one year for reducing pollution in the energy sector, in the "hot spots" regions, in municipalities in critical economic situation and in the mountain and semi-mountain regions, identified in an act of the Council of Ministers;

6. interest free loans and soft loans (with interest equal to 10% of the Bulgarian National Bank interest) to enterprises for sustainable agriculture in the mountain and semi-mountain regions for projects lasting for more than a year;
7. soft loans (with interest equal to 30% of the basic interest rate of Bulgarian National Bank) to municipalities for construction of environmental objects and purchase of environmental equipment or environmental events;
8. soft loans (half the base interest rate) to enterprises for construction of environmental sites and purchase of environmental equipment;
9. reimbursement interest on credits from commercial banks that have been used for environmental purposes.

Grants are provided only for 50% of the project amount. Grants to municipalities and regions in critical situation can be up to 70% of the project amount. Loans for sustainable agriculture can not be higher than 30% of the project value.

Only Bulgarian companies can apply for assistance (Bulgarian equity at least 51%).

Table 2.2 National Fund for Environmental Protection – income and expenditures in 1993, 1994, 1997 (in BGL, all amounts in Mio)

Income	**1993**	**1994**	**1997**
Charges of which	58,8	53,9	
for the air	16,1	25,0	
for water	40,.2	14,2	
for wastes	2.5	14,7	
Taxes for car imports	33,2	110,8	
Income from privatization	-	50,.5	
TOTAL (counter value in USD)	100,3 (3,6)	257,8 (4,6)	15704,2 (8.9)
Expenditures			
Monitoring	27,.3	57,1	
Wastewater treatment	14,5	59,5	
Control of the air pollution	16,.2	61,5	
Management of hard wastes	2,.0	4,0	
Others	3,3	10,7	
TOTAL (counter value in USD)	63,3 (2,3)	192,8 (3, 4)	7261.2 (4.1)

Source: Bulgaria. Environmental performance review. OECD.1996, p.97
Report on the activities of the NEPF for 1997

Data in Table 2-2 shows that BGL 59,5 Mio (USD 885 812) or 30,8% of total financing in 1994 was for wastewater treatment plants.

The available data for 1997 is prepared on the basis of different items which does not allow to complete all the items of Table 2 - 1. Nevertheless the information provided in the Report en the activities of the NEPF for 1997 shows that the Fund' financing and activities have greatly improved and developed.

Total revenue of the fund was BGL 15 704 257 000 in 1997 (counter value in USD amounts to 8,9). About 80 per cent were provided by taxes on liquid fuels and 14 percent by allocations of the privatization of the state enterprises.

In 1997 the expenditures amount to BGL 7 261 274 000 (USD 4,1 Mio). According to the main items the greater part of the funds was distributed for investment environmental projects of municipalities and companies - 78,2% and for establishing and maintenance of the National Monitoring System- 20,4%. This **illustration shows the investment character of the Fund.**

Because the revenue was greater than the estimated there were made corrections of the plan for 1997 for redistribution of the additionally received funds, approved on meetings of the Board of Directors. There were increased mainly the funds designed for financing of the investment environmental projects of municipalities and companies according to the general order and in mountain regions, as well as for the National Monitoring System of the Quality of Environment.

For water projects were spent BGL 3 102 558 806 (USD 1,7 Mio). The distribution of the funds according to components of environment shows that approximately half of the allocated funds by NEPF in 1997 were designed for financing of wastewater treatment plants. Most considerable amounts were allocated to financing of wastewater treatment plants in the town of Kazanluk, in the town of Shoumen, in the town of Plovdiv and the town of Pomorie.

In 1997 there were brought into operation 16 sites. Under 17 contracts the terms of execution of the tasks expire in 1998. For 15 contracts were concluded or is expected the preparation of additional agreements for prolongation of the terms for execution of the contracted types of construction assembly works.

The total value of the concluded contracts in 1997 in BGL 11 111 170 598 (USD 6 313 164) of which 81% in the form of grants and the rest 19% in the form of loans.

The policy of the Board of Directors of NEPF in relation to financing of environmental projects was directed towards the granting of funds mainly for completion and bringing into operation of investment projects with a considerable and direct environmental effect.

In 1997 there started also the mutual collaboration between NEPF and Phare Programme for Environment in regards the co-financing of projects approved by the European union. The contracts for granting of funds were concluded with the recipients through the NEPF. For the prevailing part of these environmental projects the funds under the Phare Programme were intended for purchase of equipment. The accent was laid on the granting of funds by NEPF for the construction-assembly works, necessary for the installation of this equipment, in order these sites to be brought into operation (communal waste disposal site in the town of Gotze Delchev, wastewater treatment plant for the tannery of Sevlievo and wastewater treatment plant for “Prista” Tannery in Rousse and some others).

2.3.1.1. Standardized Funding Mechanisms for Investments in Water Pollution Control

The standardized funding mechanisms for investments in water pollution control are regulated basically by the budgets of the relevant ministries, the municipal budgets and their relation with the state budget, the mechanisms of the NFEP and the requirements of the external sources.

2.3.1.2. Typical Sources of Investment Money for Industrial and Commercial Wastewater Treatment/Pretreatment

The typical sources of investment money for municipal wastewater treatment plants are the municipal budgets, subsidies from the state budgets, financing from the NFEP and external sources. The municipalities prepare economic justifications for each financial proposal. If the financing is from the external sources and it is the form of a loan, including soft, a collateral is needed or a bank guarantee.

2.3.1.3. Typical Sources of Investment Money for Industrial and Commercial Wastewater Treatment/Pretreatment

The sources for investment money for industrial and commercial wastewater treatment plants are the same as the above mentioned but they depend to a great extent on the ownership of the enterprise. State enterprises receive budget funding for the necessary production equipment and the water treatment plants if it is a part of the equipment needed. In case the enterprise applies for a loan, the economic justification must prove that the enterprise will generate sufficient income to repay the loan. It is very rare that a state enterprise will be granted a commercial loan only for the purchase of water treatment plants. Most of the state enterprises are heavily in debt and cannot provide the necessary collateral for a loan. The commercial banks usually lend short term and strictly keep to the requirements for collateral and economic justification. There are no specialized lending institutions dedicated to industrial pollution control.

Private companies may purchase water treatment plants on a commercial basis. Their access to loans is limited and faces the same problems as state enterprises.

2.3.1.4. Patterns and Procedures for Municipal and Industrial Wastewater treatment

2.3.1.5. Agricultural Pollution of Ground Water and Surface Water

Agricultural pollution deserves special attention. First it must be pointed out that production in that branch has diminished tremendously. The private farms do not dispose of means for financing and they will hardly obtain it on a commercial basis, from the commercial banks. Public sources are also limited. Some funding may be obtained from the external sources but few agricultural entities may answer the requirements for financing.

The interviews with local people (e.g. environmental expert of the Municipality of Rousse and the Director of the National Park “Russenski Lom”) have shown those possibilities for financing in that field is extremely limited and there is little concern on the part of the government institution.

2.3.2. Private Financing Models in Use

To our knowledge such models are not yet applied in Bulgaria.

2.3.3. Actual Water and Wastewater Tariffs/Charges

2.3.3.1. Actual Tariff Policies and Systems

The Ministry of environment and waters is responsible for the water quality, for the legal framework concerning the water management and the establishment of charges and fees. The Ministry of Healthcare establishes the norms for drinking water. The Ministry of regional development and public works is responsible for the water supply systems, for the municipal wastewater treatment plants and for the collection systems.

The municipalities are responsible for the public works including the structure of water resources and the infrastructure of water supply. In co-operation with the centralized institutions the municipalities control the keeping to the legal framework in the field of water management. Water supply companies (state, municipal, state-municipal) determine the prices for water supply and wastewater treatment.

Each consumer pays for the consumption of drinking water. Since 1991 the Unified system of prices has been abolished and each water company determines its own rate of consumption linked tariff with the consent of the municipality. In view to the inflation in the country the price of water has increased dramatically in nominal value. In 1991 it was 4 BGL per cubic meter for the drinking water. In the first quarter of 1997 it varied between BGL 310 and BGL 520 (USD 0.2 - 0.3) at an exchange rate of BGL 1 718 per 1 USD on (30.06.1997) between BGL 430 - BGL 620 in April 1998 (USD 0.24 - 0.34 at an exchange rate of BGL 1800 as of 30.04.1998).

Table 2.3 Price of drinking water per cubic meter in some municipalities of the Danube River basin in BGL and in USD 1997/1998

Municipality	06.1997	04.1998
1.Vidin	310	430
2.Vratza	344	430
3.Montana	162	300
4.Svishtov	370	420
5.Pleven	355	450
6.Rousse	245	340
7.Silistra	520	620

Source: Ministry of Regional Development and Public Works; May 20, 1998

The water companies in the towns of Montana and in Rouse are state owned. The water companies in the towns of Vidin, Vratza, Pleven and Silistra are owned both by the state and by the municipality. The water company in Svishtov is municipal.

2.3.3.2. Level and Structure of Cost

Data officially provided by the Ministry of Regional Development and Public works reports the following information concerning the level and structure of costs which are taken into account for the price of drinking water according to the Methodology for water price formation of 10.05.1996.

The price per cubic meter drinking water is determined on the basis of the total costs including profitability of 30%. The structure of costs is the following:

- costs for materials;
- costs for electric energy and fuels;
- costs for external services and repair works;
- costs for depreciation;
- costs for salaries;
- costs for social insurance;
- costs for organization and management;
- costs for other activities;
- financial costs.

As per consumer categories, the water companies charge prices for drinking water, for provisionally clean water, sewage water and treated wastewater.

The production costs for drinking water vary in every specific case and depend on the specific conditions.

Water meters are not used everywhere in the country. Although the municipalities determine tariffs for industrial wastewater hey do not have adequate regulations for control. There are no tariffs for treatment of everyday wastewater. There are also no tariffs for water supply from wells.

The Ministry of Environment and Water has developed a proposal to introduce tariffs for payment of the everyday water treatment in order to provide additional financing for the construction of wastewater treatment plants.

The tariffs will be calculated per cubic meter and will be linked to consumption and the quality of the discharged wastewater.

2.3.3.3. Level of Current Cost Coverage

The information provided by the Ministry of Regional Development and Public Works reports that the collected drinking water tariffs provide almost full cost coverage but having in mind that water companies cannot afford big costs.

On the basis of current analysis of all the costs, including production, transportation and distribution, the tariffs are subject to changes after which a new price is determined.

The level of collection rate for the population is 70 to 80 percent and depends on the price of drinking water. The higher is the price, the lower is the level.

The cost/ cost structure of water and wastewater for some typical utilities is not open for unofficial publications.

2.3.4. Actual System and Practice of Pollution Charges, Fees, Penalties

2.3.4.1. Charges/Fees for Water Abstraction (municipal, industrial, irrigation)

The **Water Law** of does not provide special regulation in regard to financing of water sector programmes and projects. Part VI " Taxes " Article 33 stipulates the necessities for taxes to be paid in some specific cases of water consumption and in Part IX "Penalties " the amount of the penalties for violation of the said Law.

2.3.4.2. Charges/Fees for Wastewater Discharge (exceeding defined quality standards)

The Regulation for the order of determination and implementation of sanctions for pollution or damages of the environment over the accepted norms approved with an Act of the Council of Ministers of 4.02.1993 stipulates that the amount of the sanction is determined according to the level of the average minimal salary for the country as of the date of the verification of the violation. The sanctions related to water pollution are stipulated in Part 1 of the Regulation and in Annex 1.

Sanctions are imposed on the juridical persons who pollute water streams and basins exceeding the enforced permissible norms for the country. The sanctions are specified on the basis of the sanction for every polluting substance above the norm, the wastewater flow rates and the time of discharge.

The polluting substances and indicators, the unit size of the sanction for every one of them and the formulas by which the size of the sanction is calculated in each concrete case are specified in an appendix.

The penalties and fees which were collected amounted to BGL 75 918 000 in 1994 (USD 1 34 6 064) and BGL 106 675 000 (USD 60 160) in 1996, incl. for the water sector BGL 36 696 000 (USD 650 638) in 1994 and BGL 40 177 000 (USD 230 346) in 1996.

The amounts (in thousand BGL and counter value in USD as per average exchange rate) of paid fees and sanctions for the water resources in 1994 and in 1996 in some of the basic regions of the Danube river basin is as follows:

REGION	**1994**	**1996**
Lovetech	2807 (49,77)	3014 (17,28)
Montana	1596 (28,30)	6636 (38,05)
Rousse	435 (7,71)	1903 (10,90)

The **Tariff for the Charges Collected by the Ministry of Environment and Waters** of March 31, 1997 stipulates the taxes for the issuance of permits for wastewater discharge. These charges are determines as a percentage of the average minimal wage. For water discharge up to 100 cubic metros per day, the charge is 30 percent and over that limit - 55 percent.

2.3.4.3. Other Relevant Charges, Fees, Penalties

Such cannot be specified.

2.3.4.4. Assessment of Efficiency of Actual Practice

The system of pollution charges, fees and penalties may be defined as relatively well developed. One of the basic problems is the lack of sophisticated equipment and well-trained personnel to provide the implementation of the system.

2.3.5. Economic and Financial Incentives For Pollution Reduction Measures

The economic financial incentives are composed of exemption from duties and tax relieves.

On the strength of Ordinance No 226 issued by the Council of Ministers in Regulation No 3 (25 March 1996) on the Conditions and Orders for issuing of Import and Export Certificates, of Statements on Import of Machines, Appliances and Equipment, Working with Freon (that is different from Freon 11 and 12), and of Statements for Duty Free Import, for which the competent authority is the Ministry of Environment, of 1966 - Chapter III, the Ministry of Environment specifies the necessary documentation for issuing such statements concerning the goods listed in Appendix No 8, points 1-3 and 5-8.

Exempt are the following commodities:

- Apparatus and spare parts, information products and reagents for analyses, valuation, report and control of the condition of the environment - emission control;
- Installation, equipment and assembly units for them, consumable and reagents and reagents for the purpose of reducing the total quantity of **harmful substance in the wastewater** and gases and reaching the established emission norms or the norms, stipulated by components of the environment or by international agreements, of which the Republic of Bulgaria is a party;
- Specialized installations, consumable and reagents for the purpose of recreation of soiled and damaged lands;
- Installations, equipment and assembly units for them, consumable and reagents and chlorinating apparatus for the purification and decontamination and achieving the indices in compliance with the standard requirements for drinking water and water for medical purposes;
- Substances, materials and investment equipment for replacement of technologies using ozone destroying substances;
- New and unused specialized installations and equipment and assembly units for them for recycling, neutralizing and storing of waste for which there is a positive conclusion on EIA. It regards installations and equipment constructed after January 1, 1992, recycling mainly waste of local origin or used for the completion of existing equipment and installations being exploited before 1992 under the condition that they recycle at least 50% local waste;
- Installation, equipment and assembly units for them for obtaining energy from non-traditional alternative sources (sun, wind, geothermal waters and bio-masses);
- New and unused specialized machines and equipment for collecting and transporting waste and for maintaining the purity in populated areas;
- Materials, equipment and installations for the improvement of radiation and nuclear safety;
- Nuclear fuel.

Tax Exemptions

In the Bulgarian Tax Legislation there are no special privileges or tax exemptions for activities referring to environmental projects. The Law on the Profit Tax and the Law on Economic Activity of Foreign Persons and on Protection of Foreign Investment are important here as a part of the general tax regime.

The Profit Tax Law defines as taxable any amounts and expenses unrelated to the activity of the person, as well as the expenses on improvements, modernization and reconstruction of the fixed assets more than 5% of their balance value.

Donations to the amount of 3% of the positive financial result (before tax transformation) are exempt from Profit Tax; these are donations for:

1. health institutions and organizations;
2. foundations for protection of environment, scientific and health purposes;
3. drinking water;
4. restoration and protection of natural, historical and cultural monuments;
5. the state and the municipalities (except for donations for the state and the municipalities made by bodies with state and municipal participation).

The reduction of the financial results under this provision may be allowed only in case that corporate bodies have no unpaid or advance installments for taxes, duties, excise, etc., as at the moment of donation. The donation shall not be in favor of persons who make or manage it.

The value of the donation in kind shall be determined according to its market price or according to the price in the public notary act if it is higher. The tax exemption for donations shall be acknowledged on the basis of a contract and document certifying that the subject of donation has been received.

Remise of the profit tax - 100% for the first three years and 50% for the fourth and fifth year is provided in cases of:

1. privatized companies - they invest the remised resources in amount no less than 50% in tangible fixed assets of the same company;
2. companies with foreign participation exceeding 50% (except for cases of privatization transactions) - if the registered capital of the established company is not smaller than the lev equivalence of USD 5 million and no less than 50% of the remised resources are invested in tangible fixed assets.

Another assumption for preferential treatment of environmental project is the credit granted for a period over 5 years by a foreign natural or legal person; this credit shall be considered as a foreign investment and shall have all the rights and protection provided in the Law of Economic Activity of Foreign Persons and on Protection of Foreign Investment. Most recently, as of May 26, 1998, the commodities of environmental nature are exempt from the Value Added Tax.

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

The Bulgarian Banking system is based on a two-tier system. The Central bank - the Bulgarian National Bank plays a major regulatory role and the commercial banks provide the backbone of the financial infrastructure of the economy and accumulate and operate with the available financial resources for commercial, investment and other purposes. The restructuring of the banking system was started with the adoption of the Law for the Banks and the Credit activity in 1992 when the basic regulations for the banks were adopted. Afterwards the banking legislation was developed to create the legal framework for the functioning of the banking system on market principles.

The regulations for the Banks stipulate that their major task is to contribute to the development of the Bulgarian Economy on market principles for the technological innovation of the production. According to the said existing banking regulations, banking institutions are the Bulgarian National Bank, the commercial banks, the State saving Bank, the branches of the foreign banks and banks-joint ventures with foreign capital.

The Bulgarian National Bank is a financial institution of national importance, which participates in the process of elaboration, and implementation of the state policy in the banking system for the purposes of achieving stability of the national currency - the Bulgarian Lev. It reports before the National Assembly. It has the exclusive right of issuing banknotes and coins in the country and Bank regulates the money circulation. It regulates and supervises the other banks' activities for the purpose of ensuring the stability of the banking system and protecting the depositors' interests. It preserves the minimal obligatory reserves of the commercial banks.

In connection with the performance of its functions, the Bulgarian National Bank demands from the banks to submit any documents and information. The Bulgarian National Bank may also participate organizationally and financially in international organizations aiming at the development of international co-operation in the sphere of foreign exchange, monetary and credit policy.

The commercial banks are licensed to accumulate the available financial resources of the population and the legal entities and to carry out payments and credit operations both in national and in foreign currencies. Short-term loans are granted for a period of 1 year, mid-term loans - up to 5 years and long-term loans - up to 10 years. The banks are obliged to carefully analyze the financial statements of their customers and their business-plans before granting a loan. All loans incl. for infrastructure purposes are to be collateralized.

Until the Currency Board was introduced the commercial banks operated in a highly unstable macro-economic environment. The Gross Domestic Product decreased by 16,7% in 1991, by 7,3% in 1992 and by 1,5% in 1993. After a short period of relative growth (1,8% in 1994 and 2,1% in 1995) the economy entered into a severe crises. The GDP fell by 7,9% in 1996 and by 7,5% in 1997. Inflation became a major problem reaching 577% in 1997. In terms of economic growth the 1997 was the most unfavorable since the beginning of the 90-ties.

The produced GDP (current prices) was BGL 17 000 million (USD 10 billion) respectively USD 1200 per capita, the population being 8,4 million people.

Until the introduction of the Currency Board the efforts to stabilize the economy were based on monetary instruments:

- liberalization of prices accompanied by high inflation and devaluation of the national currency
- restrictive policy of the commercial banks in terms of investment activity, high interests loans charged
- liberal currency policy
- high internal indebtedness.

By the end of 1996 and the beginning of 1997 the economy experienced high instability and hyperinflation. The banking sector was in a deep crisis due to a huge accumulation of bad loans. A great number of banks, among them some big state banks, were at first put under special supervision and afterwards declared bankrupt.

Since the introduction of the Currency Board as of July 1, 1997 the stabilization of the economy was started by the means of a strict financial discipline, fixed exchange rate of the Bulgarian lev to the German Mark and all other instruments of the currency board. The implications of the currency board for the Banking system are substantial and result in more strict banking supervisory regulators, in the increase of the requirements for a minimal base capital (up to USD 10 million), increase of the requirements for the capital adequacy, diminishing of the possibilities for refinancing of the commercial banks on the part of the Bulgarian National Bank and others. At present there are seven big state banks: Bulbank, the State saving bank, the United Bulgarian Bank, the Post Bank, Hebros Bank, Express Bank, Biochim Bank. These banks hold 73,5% of all banking assets, 81,0% of the loan portfolio of the commercial banks and 76,6% of the accumulated financial resources from the population.

The second group consists of 18 private small and medium banks among them the Central Co-operative Bank, The Bulgarian Russian Investment Bank, Credit Bank, First Investment Bank, Municipal Bank, First East International Bank, International Orthodox Bank, Unionbank, International Bank for Trade and Development, Teximbank, Eurobank, Credit Express, Bulgaria Invest, Bulgarian Universal Bank, Corporative Bank, Bulgarian Investment Bank, Bulgarian Trade and Investment Bank and Roseksim Bank. Some of these banks do not answer the requirements for capital increase and have a bad loan portfolio. As a group they ended the year 1997 with a loss of over BGL 5,2 billion (USD 29,5 Mio). The loan activity of these banks concentrates basically on private customers connected with the shareholders.

There are also 10 foreign banks operating on the Bulgarian market among them:

- ING Bank
- BNP Dresdner Bank Bulgaria,
- Reifeisen Bank
- Ionian Bank,
- Beirish Bulgarishe Handelsbank,
- Xios Bank,
- Bulgarian American Credit Bank,
- National Bank of Greece
- Societe General.

As a group these banks have a positive financial result in 1997 amounting to BGL 374,5 million (USD 212 787).

Table 2.4 Capital indicators of some Bulgarian banks as of March 31, 1998 and net profit as of December 31, 1997 in BGL Bln

in BGL Billion	Base capital	Paid in Capital	Profit
State Saving Bank	0,33	0,33	59,89
Bulbank	15,12	15,12	162,40
Post Bank	2,4	2,40	14,29
Express Bank	3,57		15,53
Hebros Bank	14,40	n.a.	4,30
Biochim	16,76	16,76	0,99
United Bulgarian bank	75,96	75.96	n.a.
Credit Bank	30,00	n.a.	n.a.
Bulgarian Russian Investment Bank	5,00	5,00	0,26
Bulgarian Tradeand Inv. Bank	1,40	1,40	0,06
Inter. Bank for Trade and Develop.	13,00	3,98	0,01
BulgariaInvest	8,00	8,00	0,00
Eurobank	10,70	10,70	-7,00
Central Coop. Bank	15,00	14,75	0,33
Municipal Bank	10,30	5,98	0,98
Corporative Bank	2,20	2,20	0,29
Teximbank	2,86	2,86	0,11
International Orthodox Bank	32,50	13,49	-1,20

Source: The Banker, weekly newspaper, April 25, 1998, Sofia
(The exchange rate of December 30, 1997 was 1776 BGL per 1 USD)

The prospects of financing of great infrastructure projects and programmes, including such for the pollution reduction in the water sector on the part of the Bulgarian banking sector are small in the short-run. The Bulgarian Banks still have enormous problems with their loan portfolio. The legal requirements for collateralization of all loans create additional problems for loans in the water sector. Pollution reduction equipment may be financed only if it is a part of a project with a strict economic justification in terms of repayment and collateralization.

The credit activity of the banks is slowly recovering. Since the 4-th quarter of 1997 until the first two months of 1998 the loans granted by the commercial banks and the State Saving Bank amount to BGL 176,4 billion (USD 100,2 million), of which 72% of which short-term, the majority of them granted to private enterprises.

At this point in time there is not a special financial institution with the special task of financing infrastructure projects of national importance. In 1996 The Law for the State Bank for Investments and development was adopted. The Bank is to finance private small and medium enterprises and projects of national importance. It is supposed to manage funding from foreign lenders. For the time being the Bank has not started its operations.

The Bulgarian Foreign Trade Bank is the considered most trustworthy and with the biggest financial potential to invest in long-term investment projects.

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

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

The existing documentation on the national policies concerning the international assistance in concentrated in the basic agreements signed with the international donors, be-lateral agreements with neighboring countries and official documents of the relevant ministries. The national policy may be considered as flexible, open for the foreign investors and in compliance with international practices and principles in that field.

The main international funds and institutions, which provide international assistance, are as follows:

(1) NATIONAL TRUST ECOFUND (NTEF)

The National Trust Ecofund (NTEF) was established on July 14, 1995 by an amendment of the Environmental Protection Act (Article 3b). On October 23, 1995 a debt-for-environment swap treaty between the governments of Bulgaria and Switzerland was signed. According to the treaty, the Swiss party agreed to cancel over 20% of Bulgarian debt provided that the Bulgarian party used these funds to finance ecological projects. The funds generated by the swap are channeled to the NTEF. The total amount of CHF 22 million is scheduled to be written off in eight portions until 1999. The first portion was already written off by the Swiss government on April 1, 1996; the second one was expected to be written off on September 1, 1996, and so on. In parallel, from the national budget allowance for foreign debt service, the levs equivalent of the corresponding sums in CHF is allocated to the NTEF through Bulbank which is the agent of the Fund.

The Fund tries to attract funds from other foreign donors as well.

The objective of the NTEF is the raising and management of funds to be used for financing projects and activities, aimed primarily at the improvement of environmental conditions in Bulgaria. The funds may be utilized for:

- environmental investment projects of domestic or international priority within the territory of Bulgaria;
- elimination of past pollution and damages to the environment;
- purchase and commissioning of ecological equipment, including equipment ensuring lowest emission levels during industrial use;
- activities aimed at preservation of biodiversity and protected territories;
- bringing economically viable businesses in compliance with the requirements of environmental legislation;
- other activities consistent with the NTEF's objective and its financing criteria and requirements.

Other activities of the NTEF may include:

- facilitation of the transfer of technology and know-how that have immediate positive effect on the environmental conditions in Bulgaria;
- assistance for the strict compliance of the Republic of Bulgaria with its international law obligations in the area of environmental protection;
- other activities directly related to the fulfillment of the NTEF's objective.

In the selection of priority projects and the determination of the respective form of financing, the NTEF's bodies are guided by the donors' requirements and the national Environmental Policy priorities. The priority criteria in the selection and evaluation of projects are as follows:

- Reduction of health risks resulting from environmental pollution and damage;
- Clean-up of pollution or redress of damage to the environment, especially when due to heavy metals and toxic or hazardous waste;
- Reduction of pollution induced by sulphur oxides and greenhouse gases in compliance with Bulgaria's obligations under international environmental agreements;
- Reduction of pollution or redress of damage to the environment in "hot bed" areas of environmental damage;
- Assistance in the implementation of fast track programmes introducing Bulgarian environmental standards in economically viable companies;
- Preservation of biodiversity in the country's preserved territories.

Pursuant to the Swiss donor's conditions, the NTEF will finance projects primarily through grants and only exceptionally through soft loans.

(2) **PHARE PROGRAMME PHARE FOR ENVIRONMENT IN BULGARIA**

PHARE programme is an European initiative which provides grant finance to support its partner countries in Central and Eastern Europe to the stage where they are ready to assume the obligations of European Union membership. PHARE programme operates in Bulgaria since 1990 (Regulation 2698/90).

PHARE provides assistance in terms of know-how to different non-trade, public and private organizations, stimulates investment and responds to countries' needs that could not be satisfied by any other financing. The Programme also makes direct investment and investment in the infrastructure. It is expected that the latter will increase during the years.

PHARE priorities are restructuring of the state-owned enterprises, (including agriculture), private sector development, public administration and institutions reform, reform in the fields of social service, employment, education and health services, development of energy industry, transport and telecommunication infrastructures, environmental protection and nuclear plants security.

Programme Management Units (PMU) are set up in national institutions, committees, ministries, etc., of the beneficiary country in order to manage the PHARE sectional programmes in situ.

Up to now PHARE has only provided technical assistance for environment - i.e. financing for consultations, research, training, public awareness, feasibility studies, monitoring and field equipment, information systems, etc. However, it intends to support more and more investment projects in the field of environment.

(3) **PHARE CROSS BORDER COOPERATION (CBC**)

In recognition of the need to reinforce co-operation and stimulate integration of the countries of Central and East Europe with the European Union (EU), in 1994 the Commission of the EU decided to finance the promotion of cross border co-operation (CBC) between regions of Central and East European countries and adjacent regions of Member States of the EU. For instance, Bulgarian government considers the improvement of the co-operation between the border regions of Bulgaria and Greece as a task of great importance.

The general objectives of the PHARE-CBC programme are:

- to promote co-operation with CEEC regions bordering the EU, and thus to help these border regions to overcome the specific development problems stemming from their relative isolation in the national economy;
- to encourage the creation and the development of co-operation networks for cross border co-operation on either side of the borders and the establishment of links between these networks and the wider EU network.

The CBC not only assists the regions concerned but also stimulates the development of the country in general and its integration with the EU.

The PHARE CBC Programme has the following priorities (in descending order):

- transport infrastructure;
- utilities: water supply, telecommunications, oil conduit, gas main, electric transmission network;
- environment: wastewater treatment system, monitoring systems of river waters, nuclear safety and waste treatment, erosion protection;
- economic development: support for small and medium business, setting up business information centers;
- agriculture: new technologies in agriculture, photo-sanitary and veterinary control;
- human resources: vocational training, social and health programmes;
- programme management through CBC-PMU.

The Cross Border Co-operation Programme is exclusively investment oriented. In its environmental part, it provides grants for projects for reduction and prevention of pollution and waste disposal, monitoring systems of the quality of river waters, nuclear safety, improvement of transport infrastructure, of utilities, especially water supply, and for agricultural development.

The Indicative Budget of the EC PHARE-CBC financing in the period 1994-1999 amounts ECU 140 million. According to the PHARE agreement, Bulgaria should contribute funds amounting to approximately 25% of the value of the total funding. PHARE-CBC assistance to Bulgaria for environment and water supply is about ECU 14 million, or about 18% of the total budget. The types of financial assistance are grants (duty and tax exempt) and co-financing (recommended).

The grants provided by the PHARE CBC programme are directed mainly to the border regions of Bulgaria - 17 municipalities situated in the immediate proximity of the Greek border and 23 municipalities in the immediate back areas, inseparable from geographical and socio-economic point of view, sharing similar problems, local development potential, common structure and communication network.

(4) **UNITED NATIONS DEVELOPMENT PROGRAMME (UNDP)**

The United Nations Development Programme (UNDP) serves as a central co-ordination mechanism for planning, organizing and providing technical assistance in the United Nations system. UNDP supports projects for the improvement of human and natural resources of the recipient country in all sectors in order to facilitate its independent development and economic growth.

UNDP has a network of more than 120 offices worldwide, which work in close co-operation with the recipient countries' governments and specialized agencies providing help in carrying out the following activities:

- drawing up programmes and plans of national importance for the recipient country;
- mobilizing resources for multilateral assistance for development purposes;
- administrative support for and co-ordination of the various UNDP funds and programmes;
- management of project implementation and evaluation of final results;
- preparing projects for follow-up capital investment.

The first UNDP project in Bulgaria dates back to 1966 although the UNDP office in Bulgaria was set up in 1993 following the intensified co-operation between Bulgaria and UNDP with a greater focus on assistance to the national authorities so that they could meet the challenges arising during the transition period.

The Bulgarian government has priorities on the basis of which it determines its own programmes. UNDP recognizes these programmes as relevant framework for its development co-operation activities.

The current mandate and framework for UNDP is to deliver effective and efficient technical assistance to support Sustainable Human Development. In this context four priority areas have been set for programme concentration:

- poverty eradication;
- jobs and sustainable livelihoods;
- advancement of women;
- environment and protection of natural resources.

The major efforts should be focused on the first one, although the other three should be considered essential too.

The total amount of UNDP funds for the period 1992-1996 was about USD 3 million. UNDP provides funding only for local or national administration and non-government organizations (NGO). Co-financing of the projects is recommended and is expected to become one of the obligatory requirements in applying for funding. Partial self-reliance is considered of great importance during the decision making process.

(5) INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT (WORLD BANK)

The Bank's environmental initiatives are guided by an increased awareness of and sensitivity to the social and ecological dimensions of development, and their relationship to economic and technical factors. These initiatives are integrated into its country assistance strategies, aimed at helping borrowers pursue sustainable development. The Bank:

- assists borrowing countries to prepare, update, and implement national environmental strategies and action plans;
- collaborates with UNDP and other UN agencies and scientific organizations in helping to improve data on water and air pollution, soil loss, deforestation, depletion of the ozone layer, and emission of greenhouse gases;
- plays a leading role in mobilizing resources for innovative agricultural research that can increase agricultural production while protecting the environment;
- helps countries institute sound management of their water resources;
- promotes innovative and participatory processes in urban management, assisting cities to formulate environmental management strategies and helping to mobilize the financial resources needed for their implementation;
- intensifies its efforts as a GEF implementing agency to help developing countries, especially low-income countries, meet the incremental costs of global environment protection.

The Bank extends loans, which generally have a five-year grace period and must be repaid during periods ranging from 15 to 20 years. By contrast to commercial banks, World Bank's lending rate is the same for all its borrowers and is based on its average cost of funds, re-priced every six months with a 0.5% spread (0.25% for timely payers). The World Bank's way of making sure that all projects receiving financial backing meet the same set of rigorous standards is the so-called "project cycle". This is a six-step process, which consists of the following stages: identification, preparation, appraisal, negotiation and board presentation, implementation and supervision, evaluation.

World Bank commitments in Bulgaria total USD 839 million as of 31 May 1996. It participates in:

- the Environmental Management and Protection of the Black Sea Programme;
- the Danube River Basin Environmental Programme;
- Phase-out of Ozone Depleting Substance; (project for Bulgaria is over);
- Water Loan;
- Agricultural Development Project;
- Private Investment and Export Finance Project.

The loan agreement on the Water Companies Restructuring and Modernization Project was signed on 29 June 1995 in Washington between Bulgaria and the International Bank for Reconstruction and Development. The objects of the project are to:

- increase the corporate autonomy and commercial orientation of Regional Water and Sewage Companies and improve their operational efficiency (institutional strengthening);
- improve health and environmental conditions in urban areas and conserve water resources;
- demonstrate the feasibility and benefits of introducing transparent procurement procedures, efficient contract management and competition for the provision of goods, work and services.

The loan is managed by a special Project Management Unit (PMU). The project is expected to be completed by 31 December 2001.

The Water Loan is directed towards the Bulgarian water sector, therefore, all projects concerning water pollution prevention or wastewater treatment come into its framework:

- projects for rehabilitation or upgrading of water and sewage facilities;
- water efficiency and reduction of water losses;
- completion of ongoing investments in this field.

Particularly, the following project costs are financed:

- procurement of goods, equipment and materials;
- civil works, installations and turnkey contracts.

Under the loan agreement USD 98 million were provided by the World Bank. The total amount is allocated as follows:

1. Projects for ongoing investments, elimination of system bottlenecks and rehabilitation or upgrading of water and sewage facilities - USD 47.5 million;
2. Reduction of water losses and improvement of operating efficiency of water and sewage companies, installation of accurate production metros, replacement of pipes, and purchase and installation of equipment - USD 21 million;
3. Technical assistance - USD 7.5 million;
4. Unallocated - USD 16.4 million;
5. Interest and other charges accrued - USD 5.6 million.

SOURCE: Guidelines to investors in environmental projects. Ministry of Environment and Water, PHARE Programme Management Unit, 1996, Sofia

The loans are denominated in levs. The interest rate is the Central Bank rediscount rate at the time of the approval of the loan plus 6 points. The interest rate is adjusted every six months to reflect the basic rate at the time.

The repayment period is 13 years, including a three-year grace period, with interest capitalization every three months. Loans are repaid at annual installments. There is no minimum or maximum of the loan amount; its average is ca. USD 2.000.000.

Grants may be provided for technical assistance for preparing tender documents for some of the projects proposed.

(6) **INTERNATIONAL FINANCE CORPORATION (IFC)**

The International Finance Corporation is a member of the World Bank Group, founded in 1956 for the purpose of promoting private enterprise in the developing world. The countries in Eastern and Central Europe and the former Soviet republics are a new focus of IFC's work. IFC has representatives in Warsaw, Prague, Budapest, and Moscow to handle its growing operations in the region.

IFC finances the creation of new private companies as well as the expansion or modernization of established companies in sectors ranging from agribusiness to manufacturing to energy to mining. It has also made the environment one of its top priorities and is encouraging the private sector to become involved in the environmental sector.

About 80% of the funds are borrowed in the international financial markets through public bond issues or private placements and 20% is borrowed from the World Bank. Each year IFC approves about USD 4 billion in financing, including syndication and underwriting.

IFC can provide loans, equity investment, and arrange quasi-equity instruments (subordinated loans, preferred stock, income notes) in whatever combination it is necessary to ensure that a project is soundly funded from the outset. IFC can provide additional support through contingent financing or full or partial guaranties of other sources of financing. Through its syndicated loans, where IFC is the lender of record and signs the loan agreement with the borrower, IFC is able to attract large amount of commercial bank lending to companies in developing countries. There is also a possibility of offering derivative products such as currency interest rate swaps made available to companies in developing countries.

IFC finances projects unable to obtain sufficient funding on reasonable terms from other sources. Normally, it does not finance more than 25% of the total project costs, so as to ensure that most of the project financing comes from private investors and lenders. While IFC may buy up to 35% of the stock of the company, it is never the largest shareholder and does not take part in the firm's management. Since IFC does not accept government guarantees, it shares all project risks with its partners.

Interest rates on IFC loans and financing reflect market rates, which vary between countries and projects. Maturity on loans is from 3 to 13 years with a grace period as long as 8 years.

(7) **EUROPEAN BANK FOR RECONSTRUCTION AND DEVELOPMENT (EBRD)**

The EBRD provides project specific direct financing for private sector activities, restructuring and privatization, or financing infrastructure that supports these activities.

Although environment is not a first priority, the EBRD seeks to promote environmentally sound and sustainable development in all of its activities through investment operations and mobilization of foreign and domestic capital.

As regards to environment EBRD's policy priorities are:

- assistance in environmental policy formulation and development of effective legal framework, creation of institutional and human resources to enforce them;
- promoting economic instruments to eliminate the cause of environmental degradation;
- encouraging the development of environmental goods and service industries, commercially viable investments in environmental technologies and pollution prevention, funding infrastructure projects;
- adoption of adequate environmental assessment;
- promoting the adoption of procedures for information to and consultation with all levels of government.

The EBRD will consider viable project proposals that have "multiplier effect" such as demonstrating additional benefits to the local economy, mobilizing co-financing, relieving infrastructure problems or encouraging foreign private investment in the form of joint ventures, reducing investment risks and facilitating the transfer of technology and management skills.

Although it is not a commercial bank, it approaches projects in a similar way and provides funding at market rates. However, an advantage is the EBRD's willingness and ability to bear risk (e.g. the Bank usually does not require guarantees from the host government or recourse to foreign sponsors).

EBRD operates in both the private and public sector. The Bank offers a wide range of financial instruments and takes a flexible approach in the structuring of its financial products: lending, syndicating loans, guarantees, underwriting, equity investment, advisory services.

(8) **EUROPEAN INVESTMENT BANK (EIB) APEX CREDIT LINE**

European Investment Bank operates in Bulgaria through an intermediary commercial bank.

The Apex Credit Line, also called the Global Loan of European Investment Bank was set up to provide companies with the opportunity of obtaining long-term project finance at a relatively low cost. The credit is intended for the purpose of financing the fixed asset components of an investment (e.g. land, plant and machinery, equipment), but it may also be used for intangibles (e.g. licenses, know-how, etc.).

Export-oriented firms and joint ventures with international contacts are preferred as borrowers.

Finance is available for projects in most sectors though priority will be given to those sectors, which are important to the economy and have export capability, for instance:

- agriculture and food processing;
- textiles and clothing;
- light engineering projects (e.g. light manufacturing, assembly);
- chemical industry (e.g. cosmetics);
- pharmaceuticals;
- tourism.

(9) **REGIONAL ENVIRONMENTAL CENTRE (REC)**

The REC is an independent, non-governmental and non-profit organization that was founded in 1990 by Hungary, the USA and the EU Commission. In October 1995 the Hungarian Government granted the organization a new status of international organization. At the present moment REC operates in 13 countries in Central and Eastern Europe (CEE). The REC mission is to encourage and support environmental problem solving in the region. REC for CEE-Budapest opened a local office in Sofia in 1992, which was registered as a Bulgarian foundation.

The financing programme focused on already popular environmental problems that were considered priorities for the country and needed urgent action for improvement.

The REC provides grants only for non-governmental organizations. At present, the Local Office of the REC manages two major programmes and assists in the implementation of a third one of the Budapest REC office.

The Local Grants Programme funds are managed at local level - i.e. in the Bulgarian Office of REC. It provides short-term financial support for:

- operational costs (e.g. office rent, salaries, equipment);
- institutional development activities;
- organization of or participation in seminars, conferences, meetings;

- local projects that increase society's awareness of environmental problems, and encourage participation and education in the field of environment;
- local events such as celebration of Earth Day or organization of children or students environmental camps.

The Local Grants Programme does not finance purely research and scientific work, religious activities, purchase of land or buildings, direct investment and civil works or facility reconstruction.

The Danube River Small Grants Programme is aimed at supporting the NGO that work in the field of environment protection in the Danube River basin. The priorities of the project are:

- Danube River Basin management improvement and ecosystem protection;
- educational programmes and transfer of know-how;
- research, data collection, information dissemination, activities that attract public interest to the problems of the Danube River Region;
- implementation of plans for local management of rivers, lakes, ground water and reservoirs;
- activities to encourage application of environment friendly methods in agriculture.

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

2.4.2.1. Completed and Ongoing Projects

Concerning the completed and on going projects official and open information reveals data for the World Bank Lending Programme. In the field of environment the project under implementation is the one for the Water companies restructuring and modernization. It is effective since October 1995. Upon agreement between the World Bank and the Government of Bulgaria, at the end of 1996 the project was restructured so that USD 12 Mio have been allocated for the District Heating Project and USD 47,5 Mio remained for the water companies restructuring and modernization loan.

2.4.2.2. Planned Projects

Available open information reports the following data:

- In 1998 the World Bank will grant a loan in the amount of USD 16 Mio for Environmental Remediation Project. Negotiations were completed on March 13, 1998.
- The future investment projects proposed for financing by Phare Programme for 1998-99 are connected mostly with reconstruction of environmental facilities. There are no special projects for pollution reduction of the Danube river basin.

The projects are the following:

- Reconstruction of Buhovo tailing pond. It is one of the potentially most dangerous facilities around the capital of Sofia. The reconstruction will ensure the stability of the dam wall of the pond.
- Reconstruction and bringing up to the environmental standards of the production facilities of the production facilities at the non-ferrous metal works Gara Iskar.
- Elimination of the harmful emissions in the central zone of the town of Vratza through the replacement of the local boiler installations with central heating.
- Center for recycling of waste.

- Incinerators for municipal hospitals.
- Reconstruction of the smelting section in the casting workshop in the plant for cast products "Stomana "- Silistra.
- Environmental plan for the Black Sea project for wastewater treatment plants for the towns of Akhtopol and Tzarevo.
- Reconstruction of the electro-filter of steam generator N 5 in Republika Power Plant - Pernik.

The project includes the building of waste treatment plants for the towns of Akhtopol and Tzarevo. The towns of Aktopol and Tzarevo are resort centers with national importance and in the adjacent to them areas are situated numerous tourist facilities - camping sites, recreation houses and hotels. The communal and industrial wastewater is discharged without any prior treatment. The objective of the project is to eliminate one of the main sources of health risk for the population and the visitors in the area, protection of the quality of the coastal water and the marine ecosystem. The implementation of the project is related to the observation of the international obligations of Bulgaria for restriction of the emissions from ground based sources - the Convention for protection of the Black Sea from Pollution.

Clean up of damaged lands by quarrying in Iskar and Lesnovska river valleys.

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

For the time being there is no Centralized National Institution such as Development or Promotion Bank for Handling International Funds. Such funds are handled either by selected commercial banks able to bear the investment risks or by the state owned BULBANK (Bulgarian Foreign trade Bank).

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

The available open and accessible information related to the investment portfolio, provided by the National Statistical Institute, makes it possible to make some general comparisons and to trace some general tendencies and specific features.

The share of total expenditures for protection and restoration of the environment is 0.9% of the Gross Domestic Product in 1995 and 1% in 1996.

For the period 1994-1996 as per their environmental purpose (as a share of total investments) the expenditures were distributed as follows:

	1994	**1996**
1. In the water sector	44 %	37 %
2. For the air	29 %	23 %
3. For making use or destroying of wastes	13 %	14 %
4. For soil protection	5 %	8 %
5. Other	9 %	18 %

Table 2.5 Expenditures for the water resources: basic items 1994, 1996 in BGL'000, counter value in USD

Item	1994	in USD	1996	in USD
Total Investments	5609078	99464	18159712	10 4 114
1.1. For the water resources	2482128	44 009	6751329	38 707
1.2. for local wastewater treatment plants	1070886	18987	4147045	23 776
1.3. for urban treatment stations	367784	6520	1469513	33 8 425
1.4. for circulating water supply	306802	5439	1702973	9 763

Source: National Statistical Institute, Sofia, 1998

As it is shown from table in 1996 the total amount of environmental investment has grown considerably in nominal value which is due to inflationary factors.

In 1994 the biggest (60 %) is the share for the expenditures for maintenance of long-term material and non-material assets in the total amount of environmental investments.

In 1995 the share of this item is 72% and in 1996 it is 76%. This is a result of the deep financial and economic crises of the economy in which it is not possible to make large amounts for new environmental expenditures.

Because of the worsening financial situation of most enterprises, the activity of which causes pollution of the environment are not in a position to give priority to the expenditures for nature protection. It is expected that with the introduction of new regulations in regard to charges and fees for nature protection there will be more possibilities in the future for the introduction and functioning of effective economic regulators.

The available information for 1996 is more detailed and allows to provide general data for the structure of the investments **as per sectors of economic activity and branches** of the economy.

In **industry in 1996** the expenditures of nature protection amounted to BGL 13 729 533 000 (USD 78715359) or 78% of total expenditures. Within the industry the structure of expenditures is as follows:

- 84% of total expenditures for protection and restoration of the environment (without apparatuses for monitoring and control) in industry are done by manufacturing;
- 7% by mining and quarrying;
- 8% by energy production;
- 1% by construction.

In **agriculture in 1996** the expenditures for protection and restoration of environment (without apparatuses for monitoring and control) amounted to BGL 1071307 000 (USD 6142110).

In terms of asset structure incl. for wastewater treatment plants the available information is the following:

Total environmental investments for acquisition of long-term tangible and intangible assets amount to BGL 4640285 000 (USD 26604087) in 1996. Of them: BGL 1687839000 (USD 9676866) for the water resources and BGL 687577000 (USD 3942 074)

In 1996 the amount of the total investments for maintenance and exploitation of long-term tangible and intangible assets and for different activities of environmental nature is BGL 13519427 000 (USD 7 751 076) of which:

- BGL 5 063 490 000 (USD 29030443) for the water resources. Of this amount or 86% for maintenance of industrial wastewater plants and municipal sewage treatment plants.
- BGL 1 256 659 000 (USD 7204787) for maintenance of equipment for circulating water supply of which: 300 650 000 (USD 172 371) for materials, 190 351 000 (USD 1 091 337) for outside services, 153 532 000 (880 243) for depreciation, 467 625 000 (USD2 681 028) for salaries and social security and 144 501 000 (USD828 465) for other purposes.

As per some of the municipalities of the Danube river Basin the expenditures for acquisition and maintenance of tangible and non tangible assets in 1994 and in 1996 allows for general comparison. Data for 1994 does not include expenses for apparatuses for monitoring and control and is available only for certain items:

I. Expenditures for acquisition of assets (all amounts in '000)

1. Region of Lovetch.

The expenditures for water resources amount to BGL 61 586 (USD 1092) in 1994 and to BGL345064 (1978,29) in 1996. The resources used for town and village wastewater treatment plants were respectively BGL24618 (USD 436) in 1994 and BGL 56499 (USD 323) in 1996.

2. Region of Montana

The expenditures for water resources amount to BGL 324160 (USD 5747) in 1994 and to BGL240700 (1380) in 1996.

3. Region of Rousse.

The expenditures for the water resources amount to BGL 106391 (USD 1886) in 1994 and to BGL 122 218 (USD 707) in 1996.

The expenditures for town and village wastewater treatment were respectively BGL32817 (USD 581) in 1994 and BGL 30480 (USD 175) in 1996.

II. Expenditures for maintenance of assets in BGL, respectively USD '000

The available statistics provide data only for certain items. For 1994 there is data concerning expenditures for maintenance for local wastewater treatment stations and for 1996 - for production wastewater treatment stations. (That is mentioned where available).

In the region of Lovetch the expenditures for maintenance of tangible assets for the water resources were BGL129446 (USD2295) in 1994 and BGL 253 980 (USD1456) in 1996.

In the region of Lovetch the expenses for local water treatment plants were BGL 6214 in 1994 and for urban water treatment plants BGL 23546 (USD 414)

In 1996 the expenditures were BGL 159447 (USD 914) for production wastewater treatment plants and BGL 56845 (USD 343) for urban wastewater treatment plants.

In the region of Montana the expenditures for maintenance were BGL 69019 (USD1224) in 1994 and BGL 398630 (USD 2275) in 1996.

In 1994 for maintenance of local wastewater treatment plants were spent BGL 61330 (USD 1087).

In 1996 the expenditures for maintenance of production wastewater treatment plants were BGL 388071 (USD 2225).

In the region of Rousse the expenditures were BGL 38522 (683) in 1994 and BGL 162206 (USD 929,9) in 1996.

The expenditures for maintenance of urban wastewater treatment plants were BGL 6821 (USD 121) in 1994 and BGL25000 (USD 413) in 1996.

2.5.2. Inventory of Actual and Planned Investment Portfolio

The amount of investment concerning water pollution reduction projects planned for 1998, the projections for 1999 and for the year 2000 are not open for unofficial publications.

Nevertheless the Law for the State Budget of January 1, 1998 provides information about the projected duration of each project. Total expenditures for environmental projects for 1997 are specified in the amount of BGL 6 263 000 000 (USD3 558 523)

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

From a purely financial point of view one of the main weaknesses of the project implementation is the insufficient financing which only partially covers the needs of the completion of the planned projects.

The general economic uncertainty, the inflationary pressure have also had a very serious impact on the projects implementation. The devaluation of he national currency in the first half of 1997 and the economic crises almost paralyzed any economic activity. Although under the conditions of the Currency Board the prospects for completion of the projects seem to be more favorable it is obvious that there will be serious budget constraints.

Annex 1

Major Projects for Municipal Wastewater Treatment Plants: Duration and Expenditures in 1997

Name of region or municipality	Duration of Project	Expenditures in BGL '000 (cv USD)
1. Region of Bourgas. 1.1. Municipality of Nessebar – Obzor	1982/99	100 000 (56 818)
1.2. Municipality of Pomorie	1983/98	500 000 (284 091)
1.3. Municipality of Sliven	1974/99	40 000 (22 727)
2. Region of Varna 2.1. Municipality of Balchic	 1992/98	 100 000 (56 818)
2.1. Municipality of Varna	1997/2000	80 000 (45 455)
2.3. Municipality of Shoumen.	1978/2000	200 000 (113 636)
3. Region of Lovetch		
3.1. Municipality of Veliko Turnovo	1973/99	45 000 (25 568)
3.2. Municipality of Strajitza	1991/00	100 000 (56 818)
4. Region of Montana	1990/99	450 000 (255 682)
5. Municipality of Plovdiv	1996/99	150 000 (85 227)
6. Region of Sofia - Municipalities 6.1. Samokov 6.2. Samokov - Borovets 6.3. Cocherinovo 6.4. Kubratovo	 1991/99 1991/98 1994/99	 1200 000 (681 818) 300 000 (170 455) 100 000 (113636)
7. Region of Haskovo 7.1. Dimitrovgrad	1993/98 1987/2000	200 000 (113636) 60 000 (34 091)

Source: The Law for the State Budget, January 1, 1998

Annex 2

Bibliography

Bibliography

1. Bulgaria. Environmental performance review. OECD. 1996
2. Economic Policy under the conditions of the Currency Board. Institute of Economics, Bulgarian Academy of Sciences.1997, Sofia
3. Environment 1996. National Statistical Institute. 1998, Sofia
4. Guidelines to investors in environmental projects. Ministry of Environment, PHARE Programme Management Unit .1996, Sofia
5. Geoecological problems on the Bulgarian Bank of the Danube river. Seminar. Foundation Rousse. 1997, Rousse
6. Information officially provided by the Ministry of Regional Development and Public Works concerning tariffs and charges paid for water supply. May 27, 1998
7. Information officially provided by the National Statistical Institute concerning the environmental expenditures as per main regions of the Danube River Basin. May 27, 1998
8. The law for the state budget as of January 1998
9. Report on the activities of the National Environmental Protection Fund in the Ministry of Environment and Water for 1997
10. Strategy for the territorial development of the Republic of Bulgaria. Structure and Development of the Danube river side. Ministry of territorial development and construction. 1996, Sofia
11. Strategy for unified management of waters in the Republic of Bulgaria. Ministry of Environment and waters.1997, Sofia
12. Seminario sobre “Perspectivas del Programa Phare y otros proyectos de inversion con financiacion multilateral en Bulgaria . 5-6 de Mayo, 1998, Sofia
13. The Banker. Weekly newspaper. April 25, May 4, 1998, Sofia
14. The economy of Bulgaria until the year 2000. Institute of economics. Bulgarian Academy of Sciences. 1998, Sofia