DANUBE POLLUTION REDUCTION PROGRAMME

NATIONAL PLANNING WORKSHOP
BULGARIA

Sofia, 30 June to 4 July 1998

MINISTRY OF ENVIRONMENT AND WATER

in cooperation with the

Programme Coordination Unit
UNDP/GEF Assistance

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Preface

The present report is based on the results of the National Planning Workshop, held in Sofia, Bulgaria from 30 June to 4 July 1998. The main goal of the workshop and was to provide comprehensive analysis of the problems and solutions for reduction and control of water pollution and its adverse effects on the environment. The result is a national contribution to the development of the Danube Pollution Reduction Programme and shall constitute to the revision of the Strategic Action Plan (SAP) of the ICPDR.

The workshop was organized by the Country Programme Coordinator Nikolai Kuyumdzhiev with the assistance of the workshop facilitators, Kamelia Georgieva and Vesselina Stoyanova. A team of national experts, who elaborated National Review Reports, was present to guide the participants in scientific and technical matters.

The National Planning Workshop was attended by participants from various sectors: Representatives of Ministries (Environment and Water, Health, Agriculture, Forest and Agrarian Reform and Regional Development). Inspectorates and Municipalities, as well as National Institutes, the Bulgarian Economy Chamber and NGOs were also represented. A list of participants is attached to this report in Annex 7.2

The present report was prepared by the national facilitators with the assistance of the national experts, Marieta Stoimenova (Agriculture), Ivo Popov (Industry) and Branimir Borisov Natov (Municipality). It is based on ideas, expert opinions and results of discussions from the workshop.

Overall conceptual guidance and technical advice was given by Mr. Joachim Bendow, UNDP/GEF Project Manager. A team of international experts from UNDP/GEF, Maxime Belot and Ulrike Meissner gave assistance and guidance in workshop organization and report writing. To reinforce national initiatives representation of the EC Phare and Tacis Programme provided further support to assure coordination of planned measures and projects.


DANUBE RIVER BASIN
Germany
Czech Republic
Slovakia
Ukraine
Moldavia
Danube
Austria
Hungary
Slovenia
Croatia
Danube
Romania
Bosnia-
Herzegovina
Danube
Black
Sea
Yugoslavia
Bulgaria
Adriatic
Sea
STATE BOUNDARY
RIVER
DANUBE RIVER BASIN
BULGARIAN PART
OF DANUBE RIVER BASIN
SEA

Bulgaria
Group discussions - Interaction in a conductive working environment far enough from the capital city and from any distractions

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Executive Summary

In the frame of the Environmental Danube Programme of the ICPDR and with the assistance of UNDP/GEF, a team of Bulgarian experts has elaborated National Reviews, providing information on water quality, analyzing financing mechanisms, describing social and economic framework conditions and developing projects and programs for pollution reduction, improvement of water quality, sustainable management of aquatic ecosystems and protection of resources. These elements, as well as the results of the National Planning Workshop shall constitute a national contribution to the development of the Danube Pollution Reduction Programme and shall provide elements for the revision of the Strategic Action Plan (SAP) of the ICPDR.

This present report shows the results of the National Planning Workshop, which took place in Sofia, Bulgaria from 30 June to 4 July 1998. It is one of 11 national workshops, which have been organized in all participating countries, signatories of the Danube River Protection Convention or adhering to its principles.

The Danube River receives water from 42.3% of the whole Bulgarian territory. This region is one of Europe's poorest areas in available water resources. There are 7 big and 9 smaller rivers in the Danube River catchment area. Improper water management and insufficient environmental protection significantly influence water quality conditions in the Bulgarian tributaries of the Danube River. Some of these rivers carry high pollution loads; however, it is noted that, practically, there is no difference between the entering and the leaving water quality in the Bulgarian sector of the Danube River. This defines the water quality problems in the Bulgarian sector rather of local nature. However, as a transboundary adverse impact on the river morphological status can be identified the intensive river bed and bank erosion.

The Bulgarian sector of the Danube River Basin (DRB) is divided into three geographic regions, covering several catchment areas of Danube tributaries: the Western region with the main rivers Ogosta, Skat and Iskar, the Central region with the main rivers Vit, Osam and Yantra, and the Eastern region with the Roussenski Lom river and the rivers eastside. It was agreed that also a fourth geographic region should be considered, because of its specific problems: the Danube River course. The report describes the physical aspects, demography and human activities in each of these regions.

Particular causes and effects of pollution from point and diffuse sources have been analyzed in a sector approach, considering activities in the agricultural, industrial and urban sectors. Based on the situation analysis and the problem analysis of the three main sectors, the core problem in the Bulgarian DRB was identified as ***"Inadequate human activities in the catchment area"***. Sector core problems were described as "negative impact of agriculture and forestry on water quality", "pollution from industrial activities" and "negative impact of settlements over water quality". A number of direct causes of the sector core problems leading to the deterioration of water quality in the DRB were identified, such as:

- Inadequate plant growing practice, weakness of irrigation, discharge of untreated waste water from animal breeding farms and environmental unfriendly forest and wetland management - from the agriculture,
- Past pollution from closed industrial sites, discharge of untreated waste water and unsustainable industrial practices - from the industry, and
- Improper waste management, weaknesses in waste water treatment plants operation and inefficient operation of sewage systems - from the settlements.

Considering the results of the objective analysis, the program objective was defined as ***"Appropriate human activities in the catchment area"***. To achieve this programme objective, sector objectives were stated, as "Negative impact of agriculture and forestry on the water quality reduced", "Pollution from industrial activities limited" and "Water pollution load from the municipalities significantly reduced".

In order to identify sector strategies, each of the sectors was thoroughly examined:

Agriculture and Forestry:

It is considered to be the sector for future prosperity of the country. Good traditions exist, but due to a lack of understanding of environmental problems, serious environmental damages were caused by it. To develop it in the future so that the population can rely on its economic benefits, serious measures need to be undertaken. To achieve the sector objective, it is required to:

- ***adopt adequate plant growing practices*** by raising skills and knowledge for applying best agricultural practices, implementing measures for finalizing the agrarian reform, updating the equipment for application of fertilizers and pesticides and ensuring funds for appropriate agricultural activities;
- ***implement appropriate irrigation practices*** by improving the regulatory framework, developing a financial policy for irrigation, rehabilitating irrigation systems for private use and ensuring qualified personnel;
- ***reduce negative impact of animal breeding*** by improving the treatment of breeding farms waste water, proper composting of farm manure and sludge, enforcing the legislation on animal breeding and making funds available in order to stimulate ecological animal breeding;
- ***introduce environmentally sound forest and wetland management methods*** by protecting and conserving natural forests, implementing pilot projects for ecological network, restricting illegal timbering and implementing projects for wetlands restoration.

Industry:

Industry practices caused in the past a lot of environmental damages. The economic restructuring and the process of privatization are of substantial importance for the activities to be undertaken for overcoming the environmental consequences of the industrial activity. To achieve the sector objective, it is necessary to:

- ***reduce the impact of past pollution on the environment*** by preparing an inventory of polluted sites, undertaking measures for improving management, ensuring funds for liquidation of past pollution and updating designs for closure of industries;
- ***implement appropriate measures to limit the discharge of industrial waste water*** by introducing of efficient treatment technologies, by constructing treatment facilities, updating manufacturing technologies and improving maintenance and operation of treatment facilities'
- ***adopt sustainable industrial practices*** through appropriate public relations strategy for stakeholders involvement, establishing programs for reduction the use of hazardous materials and prevention of the risk of accidents, introducing the environmental management in enterprises and implementation of modern manufacturing technologies.

Municipalities:

In the last decades, due to the industrialization and the concentration of the population in the towns, settlements became the main point source of water pollution. The lack of Municipal Waste Water Treatment Plants (MWWTP) for the majority of the settlements, the improper operation of the existing ones and the outdated and insufficient sewage systems led to substantial pollution of the surface and ground water with nutrients. The lack of an adequate waste management enhanced the hazard of toxic pollution and the health risk. To achieve the sector objective, it is needed to:

- ***implement environmentally sound waste management*** by developing funding mechanisms, introducing proper waste management practices, introducing appropriate legislation and monitoring system, as well as raising public awareness and commitment;
- ***eliminate weaknesses in MWWTP operation*** by optimizing technologies and sludge treatment, introducing improved technical and financial regulations, and developing human resources and managerial skills;
- ***operate sewage systems efficiently*** by expanding the existing network and developing the information system, introducing sound management of the systems and optimizing operation activities by introducing modern repair equipment.

The results of the workshop demonstrated that projects to implement the strategies for pollution reduction in the DRB are clearly needed. Some 84 projects were proposed to cover all defined results. Out of them, as **of high priority**, the following projects were retained:

In the **agricultural sector**:

- Adaptation of the EU methods for assessment the pollution load from non-point sources;
- Development of a hydrometric system for the Karaissen irrigation system;
- Restoration of the Belene Island wetland;
- Restoration of the Vardim wetland.

In the **industrial sector**:

- Inventory of past pollution upgradeable data base;
- Remediation of past environmental damages in Kremikovtzi (metallurgical plant);
- Construction of a WWTP in the sugar factory-Gorna Oriahovitza on the Yantra River;
- Completion and operating the WWTP in the pharmaceutical plant - Razgrad on the river Roussenski Lom;
- Training of managers on introducing environmental management system in enterprises.

In the **municipal sector**:

- Construction of a solid waste landfill in Pleven on the river Vit;
- Construction of MWWTP in Gorna Oriahovitza/Liaskovetz on river Yantra;
- Construction of WWTP in Popovo on river Roussenski Lom;
- Completion of the sewers in Sofia on river Iskar.

1. Introduction

1.1. Background

Bulgaria belongs to the group of former socialist countries. The economy of the country is undergoing a major transition from a centralized to a market economy. The scope and timing of environmental improvements is closely linked to the success of this transition. The context of environmental policy will be determined by the profound economic changes.

The most serious environmental problems in Bulgaria are localized in specific areas - hot spots - where point sources of pollution cause hazards to the health of the local population. Pollution in hot spot areas is mostly due to municipality and heavy industry. About 12% of Bulgarians live in hot spot areas.

The competent bodies in the field of water management in Bulgaria are the following institutions: Ministry of Environment and Water, Ministry of Regional Development and Public Works, Ministry of Agriculture Forestry and Agrarian Reform, Ministry of Health, Ministry of Industry, Ministry of Transport, Comity of Energy.

The basic law in the country is the Constitution of the Republic of Bulgaria of 1991. The updating of the legislative basis in the water sector should abide this basic law - where it is proclaimed that waters are exclusive state property. The waters have to be maintained and managed in the interest of the citizens and the society.

In reviewing the hierarchy of the existing legislative basis of investigation, use and protection of water in Bulgaria, we can distinguish two groups:

- general legislation
- legislation of institutional and inter-institutional significance

Effective water management depends, to a considerable degree, on the legislative basis and implemented management mechanisms.

Above all, Bulgaria has had a status of an associated country of the European Community for nearly five years. This determines the first priority of the country - to strictly carry out Bulgaria's obligations, arising from the Europe Agreement, which is the legal base for the development of bilateral dialogue with the EU. Bulgaria is obligated to harmonize its legislation with that of the Community. The activities through which EU environmental norms and standards will be introduced will result in supplementing the horizontal legislation, i.e. drafting the laws for the various components of the environment:

- air and water management,
- conservation of bio-diversity and sustainable management of natural resources,
- environment in the inhabited areas,
- public works activities in the regional aspect,
- reduction of the harmful impact of waste.

In 1991, the Framework Environmental Protection Law was adopted. It is based on some fundamental principles:

- "polluter-pays",
- "right of the public to have information"
- "preventive control"

A Chapter of that Law provides ”for a procedure for environmental impact assessment”.

The Water Law Act, which is the legislative basis in the field of water protection, came into force before the political and socio-economic changes in 1989. The recent changes in the governmental structure presume the unification of the management of the quality and the quantity of water, as well as the concentration of more functions in one institution, the Ministry of Environment and Water, to implement the national policy for integrated water management. Serious steps have been taken to modernize and improve water management policies through a new Water Law framed by the Ministry of Environment and Water and it is expected to be prepared and submitted to the Parliament in the second half of this year. The important point is that the draft law incorporates all the major points of EU directives related to water management (Draft Framework Water Directive in the area of water policy by the Council of European Union – 1997). It will lay down a river basin approach in water management, as well as financial mechanisms in the latter. This means full coast retrieval and the approval of taxes on the use of water as a valuable resource.

The necessity of changes in water management in the country is also provoked by some international documents. In 1991, the Bulgarian Minister for the Environment took part in the Dobris Castle Convention where a new process, “Environment for Europe”, was launched. The ministers endorsed an Environmental Action Program for Central and Eastern European countries at their second convention in Lucerne in 1993 and formally adopted an Environmental Program for Europe (EPE) at the meeting in Sofia in 1995.

The important international agreement – the Danube River Protection Convention - was signed by the Danube countries and the European Union in Sofia in June 1994. Signing the Convention is seen by the Bulgarians as one of the ways of leading the country into EU membership and it is definitely one of the instruments for achieving harmonization with European water quality standards. Beforehand, the signatories to the Convention agreed that they would start to implement activities and programs that relate to the principles and clauses of the convention. Currently the Government is going towards the ratification of the Convention. The Convention is to be reviewed and discussed in the Council of ministers and in due course submitted to the Parliament. Parliamentary support is expected, since the will of the country seems to be that Bulgaria should become a full member of the Convention. The ratification is seen as a means to become a member of the EU and, thus, the country could profit from all benefits that flow from it. Through the ratification of the Convention, Bulgaria will confirm its readiness to fulfil its commitments step by step but will also gain access to international projects and programs designed to solve the ecological problems of the Danube basin. The Danube River Protection Convention falls within the framework of the Convention on the Protection and Use of the Transboundary Water Courses and International Lakes (Helsinki, 1992) .In the same framework, Bulgaria signed the Black Sea Convention in 1992 and ratified it in 1993.

This report is a part of the activities under GEF - UNDP. Together with its predecessor, the “National Review of Bulgaria” of August 1993, it is an important step towards the establishing of a regular reporting routine on the state of the environment in the Bulgarian Danube river basin.

1.2. Planning approach

The organization of the National Planning Workshop in Bulgaria is part of the planning process to develop the Danube Pollution Reduction Programme in line with the policies of the Danube River Protection Convention. UNDP/GEF gives its technical and financial support to organize a country-driven planning process and to assure involvement of all stakeholders at national, as well as regional level.

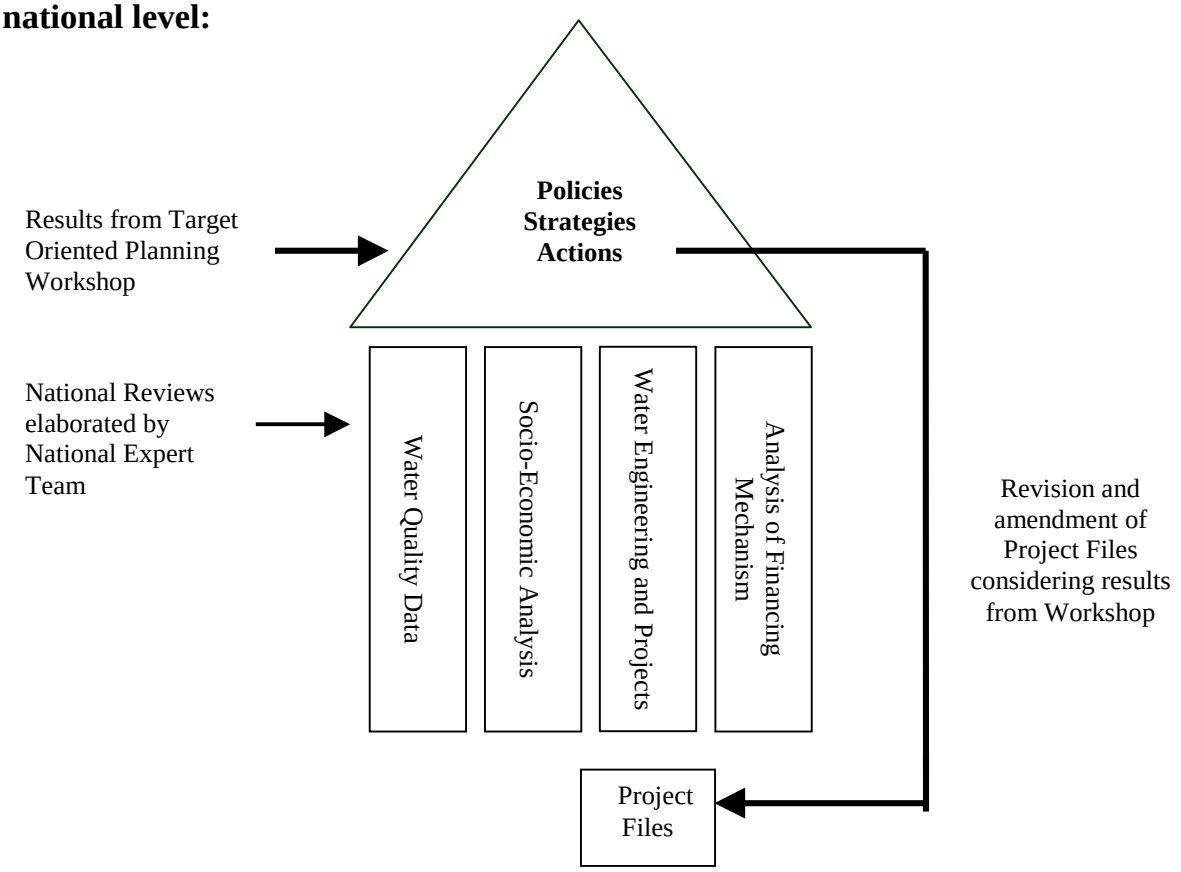
The first step of this process consisted of the elaboration of National Reviews, with particular attention to the collection of viable water quality data, the analysis of social and economic framework conditions, the definition of financing mechanisms and the identification of national priority projects for pollution reduction. For this purpose, a team of national experts for water quality data, water engineering, socio-economic analysis and financing mechanisms has been established within the Ministry of Environment and Water, and under the guidance of the Country Programme Coordinator. The results of these studies represent the baseline information for participants of the National Planning Workshop. Moreover, they constitute the national contribution, in technical, economic and financial terms, for the elaboration of the Danube Pollution Reduction Programme with particular attention to transboundary issues and the development of an investment portfolio.

To assure wider participation in the planning process, prior initiatives have been taken to organize an NGO-Consultation Meeting, which took place in Bankys from 5 to 7 June 1998**.** At this occasion, the Non-Governmental Organizations have discussed common strategies and priority measures for pollution reduction and designated their participants for the National Planning Workshop, as well as for the forthcoming regional meeting of the Danube Environmental Forum (regional NGO with the participation of all Danube countries).

Within the frame of the National Planning Workshop a multi-disciplinary team, including participants from various ministerial departments, from municipalities and regional organizations, from universities and scientific institutions and from the civil society (NGOs) has analyzed the causes and effects of water pollution and developed strategies and actions for pollution reduction and improved management of aquatic ecosystems and resources.

The workshop has been organized in utilizing target oriented planning methodology (TOPP) and applying logical framework approach. The results constitute a comprehensive and integrated presentation of policies, strategies and actions in three main sectors: Agriculture, Industry and Transport and Municipal Waste Management. The achievements of the workshop will contribute to national planning, with particular attention to the development of sector-related strategies and actions for pollution reduction and protection of aquatic ecosystems and resources. At the regional level, the results of the workshop will help to define transboundary issues and to develop regional strategies and actions for the revision of Strategic Action Plan of the ICPDR. Identified projects will be taken into account in the elaboration of the Danube Pollution Reduction Programme and in particular in the Investment Portfolio.

The following chart designs the functional links of the planning process at the national level:



The main characteristics of the methodological approach for the conduct of the workshop include:

- **Target oriented planning methodology,** which allows defining problems and objectives in a logical frame while taking constraints and limits into consideration. It promotes a systematic, step-by-step approach based on well-focused, task-oriented discussions. This facilitates the description of expected results and actions, the finding of innovative solutions, the definition of assumptions and of impact indicators to support, at later stage, monitoring of programme implementation;
- **Team approach**, which draws on the knowledge, ideas, experience, and judgments of the participants. The collective effort of decision-makers, planners, implementing agents, and beneficiaries is likely to lead to better results than unilateral decision making. The method builds on group interaction aimed at consensus building; it promotes communication and collaboration between participants in all stages of analysis;
- **Visualization of results** in form of colored cards, which are integrated into formal structures, presenting the various aspects of group discussion so that each stage of the analysis is clearly visible to all participants. Cards also serve as the basis for the documentation of the deliberations and the preparation of the final report;
- **Elaboration of Workshop Report,** presenting in written form the results of the workshop and strictly the charts and planning tables elaborated in consensus by the participants and taking into account the arguments and reasons developed during the discussions.

The Target Oriented Programme Planning (TOPP) methodology includes the following stages:

- Definition of River Basin Areas
- Situation/Stakeholders Analysis (with identification of assets, resources and favorable conditions)
- Problem Analysis (causes and effects of pollution)
- Analysis of Objectives (measures to reduce and control pollution)
- Definition of Actions and Important Elements (detailed description of actions to facilitate report writing)
- Identification of Existing, Ongoing and Proposed Projects (in relation to identified actions)
- Definition of Assumptions and of Impact Indicators (to monitor programme and project implementation)

2. General Frame of Analysis

Located on the Balkan Peninsula, Bulgaria has an area of 110 911 km^2 with a population of 8.5 mil. On average, the population density is 81 person per km^2. Bulgaria extends from the western shore of the Black Sea to former Yugoslavia in the West. In the North, the Danube River forms the greater part of Bulgaria's common boundary with Romania. Greece and Turkey lie to the south and southeast of Bulgaria. About three-quarter of the Bulgarian territory is mountainous and one quarter consists of plains. 68% of the whole population live in towns. Urban population expanded rapidly through the 1970s. Nearly 3 mil. residents live in 12 cities, each with a population of over 100 000 residents

This report is focused on the Bulgarian part of the Danube River basin with 3 897 225 inhabitants. The territory is marked with a great diversity. The central section of the basin is densely populated and the capital of Bulgaria is situated here. The western and eastern sections of the basin consist of sparsely inhabited areas, of plains and mountains, and of areas with intensive agricultural and industrial activities.

The water quality of the Danube River in the common Bulgarian-Romanian section is mainly influenced by the water management and environmental protection activities of the upstream countries. The Bulgarian tributaries to the Danube contribute a mere 3.5 % to the main river runoff.

Water quality in the river basin is monitored at 139 sampling points of which 21 are situated on the Danube. The low runoff from the territory of Bulgaria and the present state of the water quality of the tributaries do not have a significant impact over the Danube's water quality. At the points of inflow of wastewater, discharged by industrial enterprises and at the points of tributary inflows the river stream forms a mixing zone, which is in close proximity to the Bulgarian bank. The Bulgarian part of the Danube river is situated immediately after the hydro-technical complexes Iron Gates 1 and 2. Their operation has an adverse effect on the river stream and the morphology of the riverbed. The complexes influence favorably the quality of the waters and sediments downstream.

The waters of the Bulgarian tributaries of the Danube River provoke severe pollution problems in several areas, where the relatively limited flow conditions of the recipients are coupled with high pollutant loads of municipal, agricultural or industrial emissions. The sources of pollution are called "hot spots" and are shown on the map enclosed hereby.

2.1. Identification and Description of River Basin Areas Considering Physical, Demographic and Economic Situations

Physical, Geographical and Water Management Characteristics of the Danube River Basin

Layout

The Danube River, with a total length of 2 527 km, is listed immediately after the Volga River as the second biggest river in Europe. From the confluence of the Timok River (km.845) to the town of Silistra (km.375), the Danube constitutes the Bulgarian-Romanian border. The length of the common Bulgarian-Romanian section of the Danube River is 470 km. The catchment area of the section is 108 000 km^2 (13.2 %).

The Danube river receives water from 46 930 km^2 (42.3 %) of the territory of the Republic of Bulgaria. The area of the Bulgarian part of the Danube basin is 5.7 % of the total river catchment area. The southernmost point of the whole Danube basin is located on the 42^o 05' line of latitude, within the source of the Iskar River in the Rila mountains.

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Geological Structure and Geomorphologic Conditions

The catchment area of the section belongs to the Carpathian - Balkan geomorphologic region. The Bulgarian part of the catchment is situated on the Moes Platform. The Platform, projecting between the South Carpathians and the northern slopes of the Stara Planina (Mountain), is overlain with mighty sediments. The surface is covered with Quaternary loess and Alluvium.

Due to multiple Alpine folding, the Stara Planina Mountain consists chiefly of Mesozoic rocks with shists and sandstones, also granite, syenite and diorite. The highest peak is Botev (2 376 m). The mountain ranges usually show rounded forms. In the north, the mountains are generally lower and retreat in the wavy North-Bulgarian Plateau and then fall steeply to the Danube River.

With regard to the geological structure and morphology, the Stara Planina Mountain may be divided into three parts – a western, central and eastern region. The basin of the Danube tributary Iskar spreads southward and goes as far as the Rila Mountains. The highest peak is Mussala (2 925m). Eastward, the catchment extends over the western part of the Dobrudzha plateau. Cretaceous sediments and karst forms are to be met covered with quaternary loess, consequently, there is a relatively shortage of rivers and lakes.

Climatic Conditions

Due to the elongated shape of the Danube basin from the west to the east and due to the diverse relief features, the climatic conditions are variable. With respect to the climate, the Danube catchment extends from the western region where the climate is European-Continental, to the northeastern part, which is under the influence of Continental climate. The lower Danube flatland has hot summers and cold winters with relatively low precipitation. The dependence of climatic elements on land elevation is an additional condition for a diversified climate, since the basin varies from high mountain ranges, covered with snow to the middle of the summer season, to hot lowlands. In the mountainous regions the local climate, conditioned by the height and exposure of the valley, is of great importance, contributing considerably to the climatic variation within the Danube basin.

During the severe drought period from 1981 to 1995 the anomalies of the average annual air temperature reached +0.6^{o}C. The average multi-annual precipitation decreased by 12 - 16 % in the different parts of the catchment, followed by a 20 to 35 % decrease of the runoff. During the last three years precipitation has been close to the norm. Evaporation is of substantial significance for the water balance of the area. In the lower regions of the basin the estimated mean annual values of evaporation are between 450 - 550 mm. Only in the medium and higher altitudes of the Stara Planina and Rila Mountains the values are less than 300-350 mm.

Hydrographic Stream System

The density of the stream system (km of stream length/km^2) is a criterion for the evolution of the hydrographic stream system, which enables us to make conclusions about the runoff rate. The stream density varies from 0.2 in the lowlands and from 2.7 to 3.0 in the high mountains. From the western part of the basin to the eastern one, the average density of the stream system lowers from 0.7 to 0.3 and goes below 0.1 in the region of Dobrudzha.

Water Resources and Water management

The natural water resources of the basin are estimated at 6 309 M m^3 annually. They are distributed unevenly in terms of space and time. The inhabitants of the territory have at their disposal an average quantity of 1 549 m3 per capita annually. For the different catchment basins of the tributaries this evaluation varies from 80 to 100 m3/cap. annually (Dobrudzha), and from 2500 to 3000 m3/cap. annually in the central and high parts of the mountains. In low-water years (with an annual runoff probability of exceedance higher than 90%) the available water resources are from 2.2 to 2.7 times less. The region is one of Europe’s poorest areas in available water resources. The

insufficient water resources and their non-uniform distribution in the catchment area prompted the construction of 819 reservoirs with a total volume of 2 311x106 m3, which can accumulate 37.6 % of the natural river runoff. Water resource management is effected by three Regional Inspectorates and by the Ministry of the Environment and Waters. The catchment basin is divided into three regions, which correspond to the physical and geographical conditions and to the existing water economic systems.

Water Quality Control and Management

Water quality control and management is implemented by seven regional inspectorates and by the Ministry of the Environment and Waters. The data are collected on a regional level and are forwarded for processing and depositing at the national center of environment management and sustainable development. The microbiological determinants are controlled by 15 hygiene epidemiological inspectorates. The information is submitted to the national center of hygiene.

The River Basin Area Approach in Bulgaria

There are 7 big and 9 smaller rivers in the Danube river basin area. Their catchment basins are distributed in 3 water economy regions. The borders between the regions coincide with watersheds. The regions, which have been set up on the basis of geographical, and economic criteria, do not coincide with the administrative regions in the country. To some extent they overlap with different demographic regions.

With regard to the morphology of the basin and water economy distribution, it was decided at the workshop that the state of the environment should be analyzed in each water economy region and, separately, for the main river as follows (see attached map):

- ***Western region*** - covers the basins of the Ogosta, Skat and Iskar Rivers and of 7 smaller rivers west of Ogosta;
- ***Central region*** - covers the basins of the Vit, Osam and Yantra Rivers;
- ***Eastern region*** - covers the basin of Russenski Lom River and of the rivers east of it;
- ***Danube River course*** - covers the riverbed and the terrace to the dikes. This region is analyzed separately because of the specific conditions due to the river morphological processes and economic activities, associated with the main Danube River course. Some demographic parameters are computed for the main settlements, situated on the bank. These settlements are not excluded from the three above-mentioned basic regions. They are presented in addition in order to characterize the state of this riverside region.

Within these regions the pollution reduction planning problems and their interrelations with different influencing factors can be analyzed:

(i) Western Region

Physical aspects

The region encompasses Northwestern Bulgaria. It includes the catchment basins of the Ogosta, Skat and Iskar rivers and 7 smaller rivers west of Ogosta. The predominating relief is mountainous and semi-mountainous. The average water resources are 1390 m^3/per capita annually.

Demography/Social background

In terms of demography the region is divided into 3 subregions: **A** - catchment basins of rivers west of the Ogosta river, **B** - catchment basins of the Ogosta and Skat rivers and C - catchment basin of the Iskar river. The Bulgarian capital city Sofia is situated in the catchment basin of the Iskar River, which is the most urbanized region of the country.

Population growth is negative, -6 to -7% in the western and less urbanized subregions and -2 to -3% in the catchment basin of the Iskar River. The mortality rate is high, 13.2 to 21.2%.

Transboundary effects

Significant transboundary effects are not localized, except the influence of the Iron Gate system on the Bulgarian section of the Danube River. The waters that are warmed up by the cooling system of the Kozloduy Nuclear Power Plant run into the Danube River. The zone of mixing is close to the Bulgarian bank where the water temperature from 2 to 5 ^{0} C is higher than usual for the natural conditions of the streamflow.

Human activities/economy

The Kozloduy NPP is to be found close to the Danube River. In the catchment basin of the Iskar River there are industrial enterprises for the production of chemicals, machines, enterprises of the food industry and hydroelectric power stations.

Only few of the enterprises have their own wastewater treatment plants. In the towns the wastewaters are discharged to the wastewater treatment plants via the sewerage system. Most of the enterprises discard their wastewaters right into the water receivers.

The use of fertilizers and pesticides in farming is significantly reduced and so is the use of water for irrigation. Around 80% of the equipped irrigable lands are not irrigated. The stockbreeding farms are not sufficiently equipped with sewage treatment stations. In most cases the farms are to be found in close proximity to a water receiver.

(ii) Central Region

Physical aspects

The region covers the central part of Northern Bulgaria and includes the catchment basins of the Vit, Ogosta and Yantra rivers. The predominating relief is mountainous and semi-mountainous. The arable land lies in close river valleys along the lower riches of the rivers and along the Danube River. The annual water resources are 2 652 m^3 per capita of the population.

Demography/Social background

The region is strongly urbanized. Consequently population is predominantly urban. Demographically, the region is characterized by a progressive decrease of the population. The process is more strongly manifested in the mountainous and semi-mountainous regions of the districts of Lovech and Veliko Tarnovo. Population growth rate is negative, -4 to -5%. The mortality rate is high, 13.9 to 21%.

Transboundary effects

None.

Human activities/economy

There are enterprises of all branches of industry in the region. However, enterprises of the light industry prevail. Oil processing enterprises and chemical works have been built in the towns of Pleven and Svishtov. Machine building and light industries are developed in the catchment basin of the Yantra River. Only a small number of the enterprises have sewage treatment stations. In the towns the sewage waters are discharged to the wastewater treatment plants via the sewerage systems. The latter, however, is yet to be completed. In many cases is it outdated and worn out. Most of the enterprises discard the wastewater right into the water receivers.

The predominating farming activities are plant and vegetable growing. The use of fertilizers and pesticides is strongly reduced. The use of water for irrigation is equally restricted. Around 70% of the irrigable lands are not irrigated. The largest irrigation systems in Northern Bulgaria are to be found in the region. Salty and over humid soils are met. The stockbreeding farms are not equipped with waste treatment structures and are very often situated close to a water receiver.

(iii) Eastern Region

Physical Aspects

The region covers a part of northeastern Bulgaria. It includes the basins of Roussenski Lom and the rivers east of it. Plains are the prevalent terrain. Water resources are utterly insufficient and reach a mere 475 m^3/cap.annum.

Demography/Social Background

The region is highly urbanized with a prevailingly urban population. There is a negative demographic trend, more notable in the mountainous and semi-mountainous parts of the Lovech and Veliko Tarnovo municipalities. The growth rate is negative, -4 to -5 $‰$. The mortality rate is high, 13.9 to 21.1 $‰$.

Transboundary Effects

None.

Human Activities/Economy

Industry is less developed (except for Rousse) with a prevalence of light industry. An insignificant part of the enterprises have their own wastewater treatment facilities. Cities, which have a WWTP, collect their waste waters by means of the sewerage system. The urban sewerage systems are not fully constructed and are considerably worn out. Some of the enterprises discharge their wastewater straight into the rivers. Crop cultivation is the major agricultural activity in the region. Fertilizer and pesticide treatment has diminished substantially. Water used for irrigation has also diminished greatly. Around 78 % of the irrigable land are not irrigated. This region is the site of the biggest irrigation systems of eastern Bulgaria. Salinated and over-humidified soils have been registered. The stockbreeding farms are not equipped with sewage treatment facilities and are very often situated close to a water receiver.

(iv) Danube River Course Region

Physical Aspects

The length of the Bulgarian Danube River section is 470 km. The average width of the river is 940 m and the average depth is 5.8 m. The mean annual runoff of the Danube at the west state border of the Bulgaria is 5937 m^3/s. During the severe drought period, range over the last 16 years, the runoff decreased to 5089 m^3/s (Fig.1). The decreased runoff is mainly the result of the variability of the climatic factors but also of the human impacts from the Central and East European riparian

countries. The duration curves and the comparison between the hydrographs indicate the significant decreasing of the runoff and suspended sediment load spread over the whole Danube downstream. The decreasing of the sediment load of the main river started in 1970 when the complexes Iron Gate 1 and 2 come in operation.

Demography/Social Background

The riverside region is urbanized with a prevailingly urban population. There is a negative demographic trend. The growth rate is negative, -2.5 to -20.6 ‰. The mortality rate is high, 9.8 to 31.7 ‰. The rate of unemployment is from 10.6 % to 25.8 %.

Human activities

The impact of human activities on the river course can be classified into three groups:

- impacts within the catchment area (forestry, agriculture and related irrigation, water supply and draining, urbanization, open mines and so on);
- impacts directly connected with the tributaries network (dams, hydro-power plants, water supply system intakes, gravel-pits, sand-pits and so on);
- impacts directly connected with the Danube River (Iron Gate 1 and 2 reservoirs, dikes, dredging, navigation, fishing and so on).

The decrease of the runoff sediment load has a negative impact on the water regime of the reserve areas and the wetted zones. A decrease of biodiversity and biological resources is observed. The lowered water levels and the peculiarities of the morphological processes create unfavorable conditions for navigation due to the presence of numerous fords. The bank erosion intensity reaches up to 7 - 8 m/Year (Fig. 2) in some sections.

Some adverse impacts on the river morphological process in the Bulgarian section of the Danube River impel the inclusion of localization of intensive river bed and bank erosion and some reserve territories to the **hot spot lists** as follow:

- The Danube River bed from km 844 to km 347 is subject to intensive erosion processes, which necessitates a new bathymetric survey. The last one was carried out in 1967
- The Danube River bank at Long Tzibritza Section (km 710)**,** being subject to intensive erosion, needs urgent fortification.
- The Danube River Bank at km 542 to km 536 (Yantra River estuary) being subject to intensive erosion, urgently requires fortification.
- Restoration of the water regime of the wetlands Persin and Vardin.
- Restoration of the biodiversity in the Belene Island.

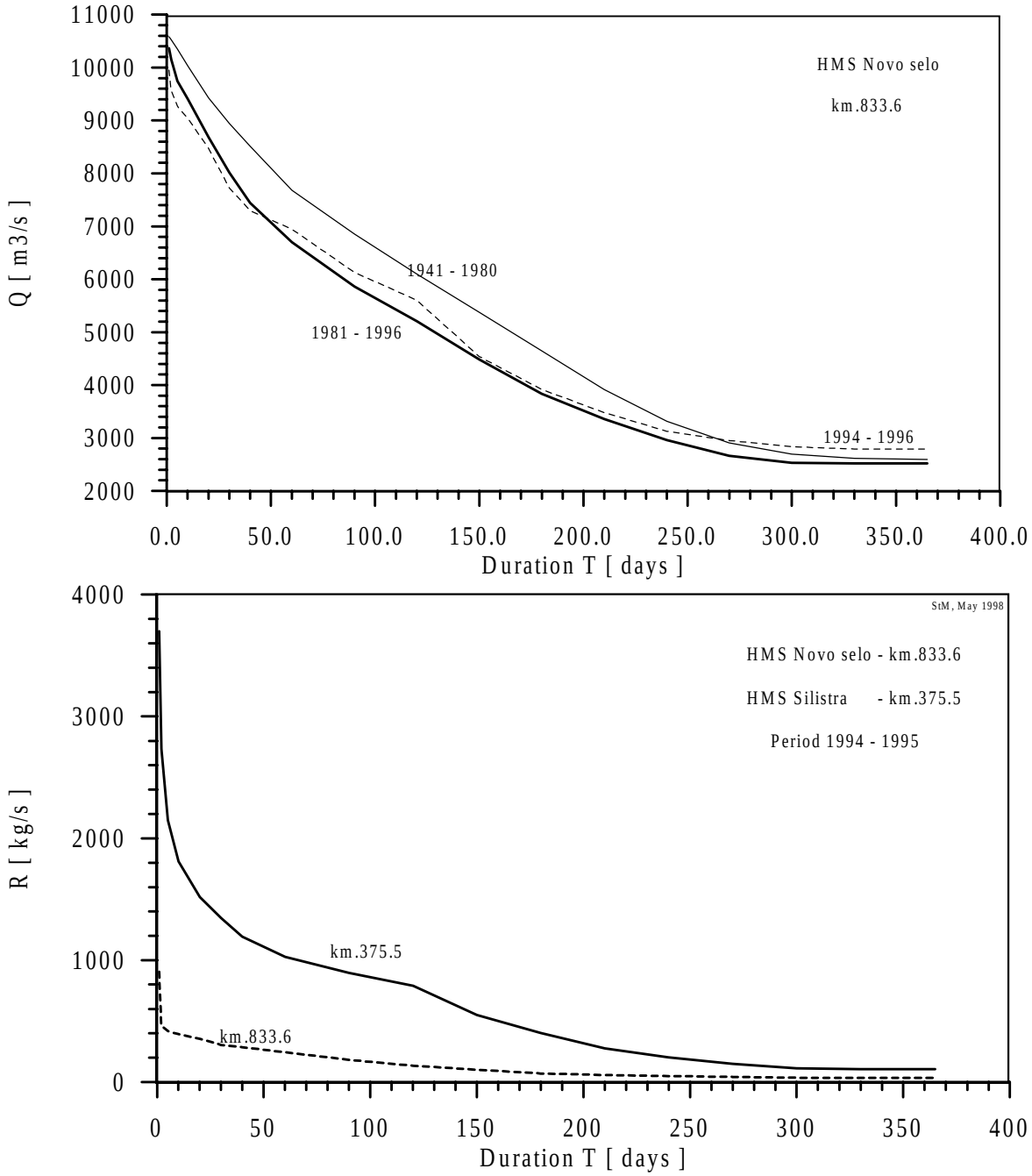


Fig.1. River Runoff and Suspended Sediment Load Duration Curves. Danube River at the town of Novo Selo (km.833.6) and Silistra (km.355.5)

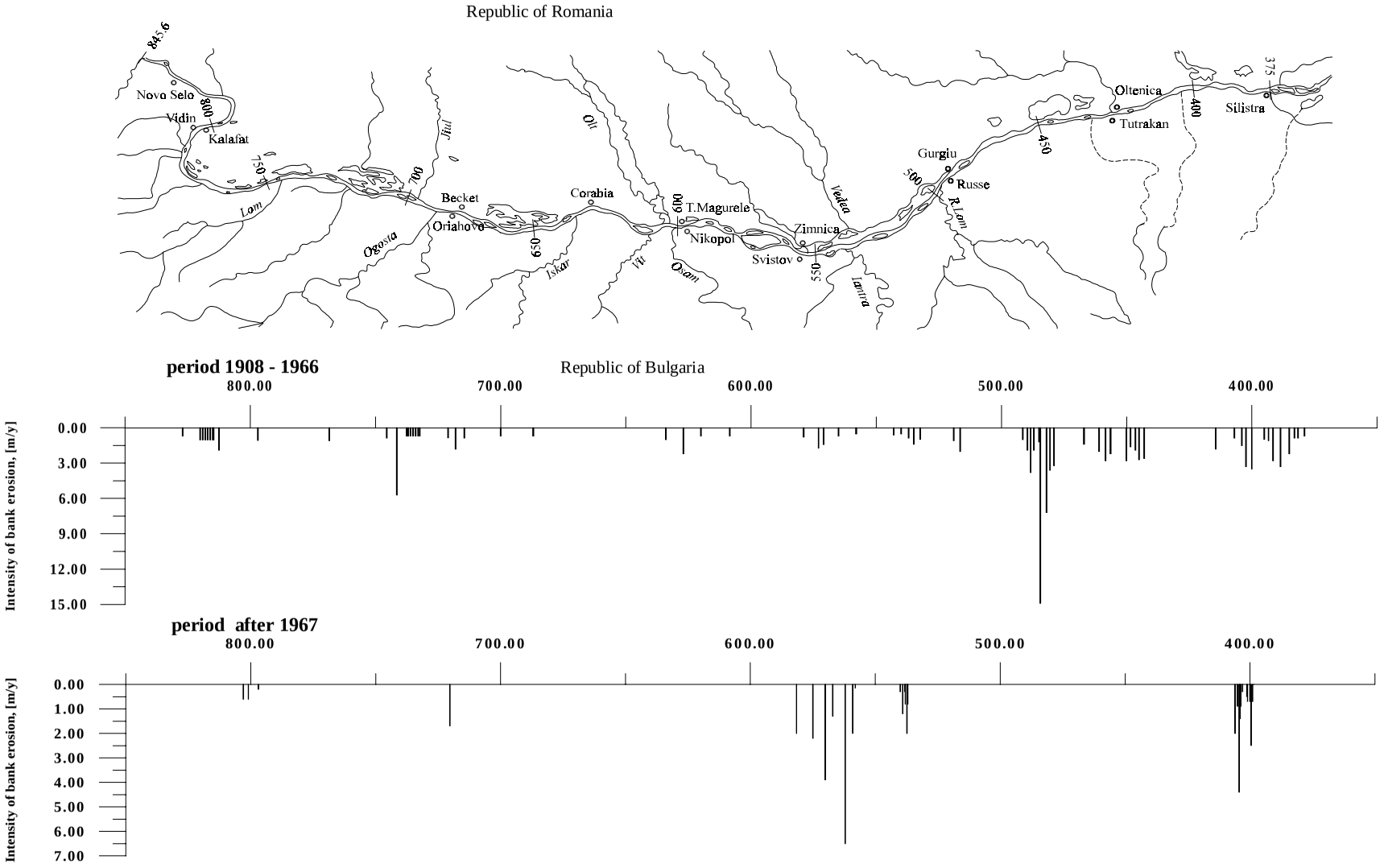
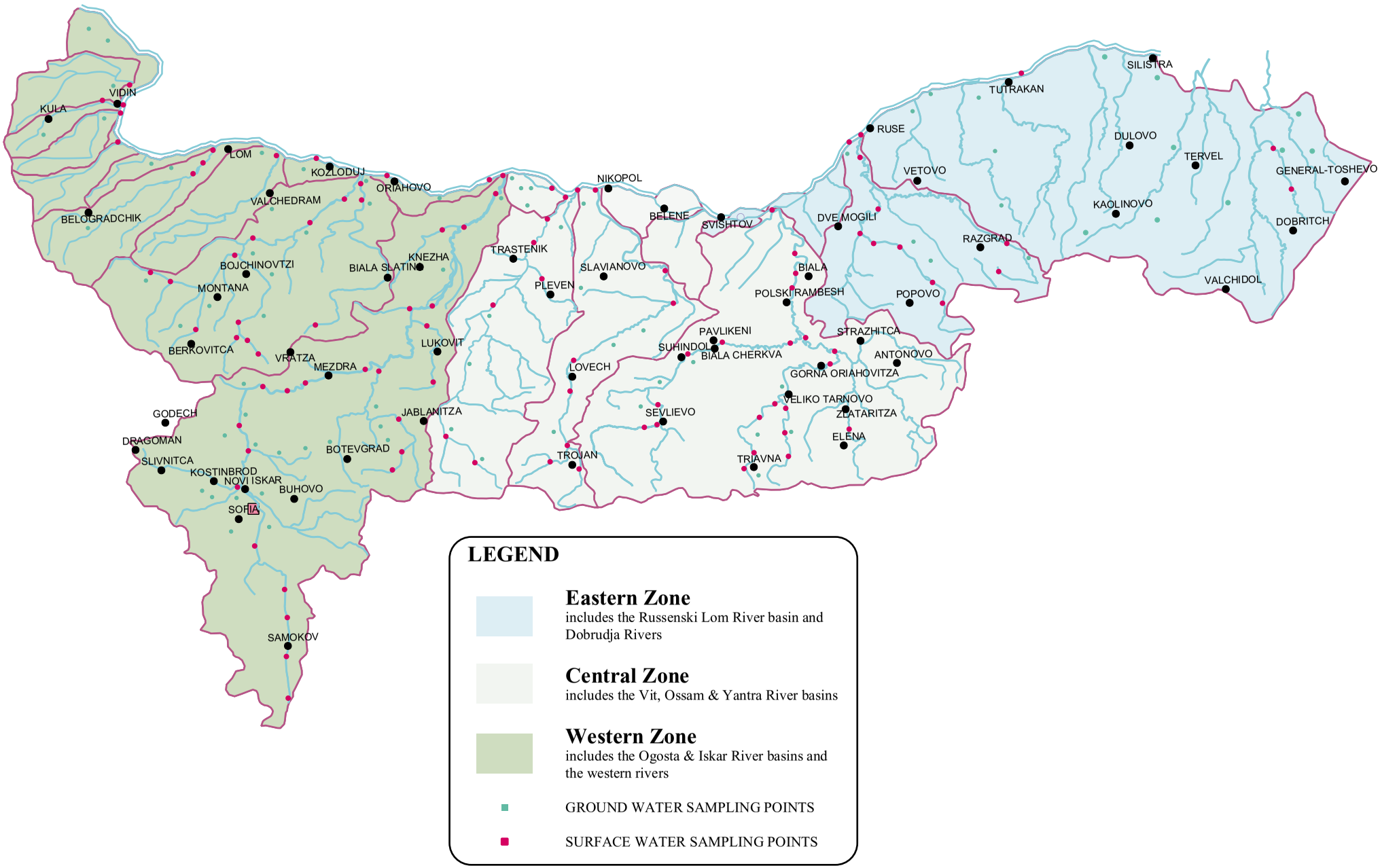


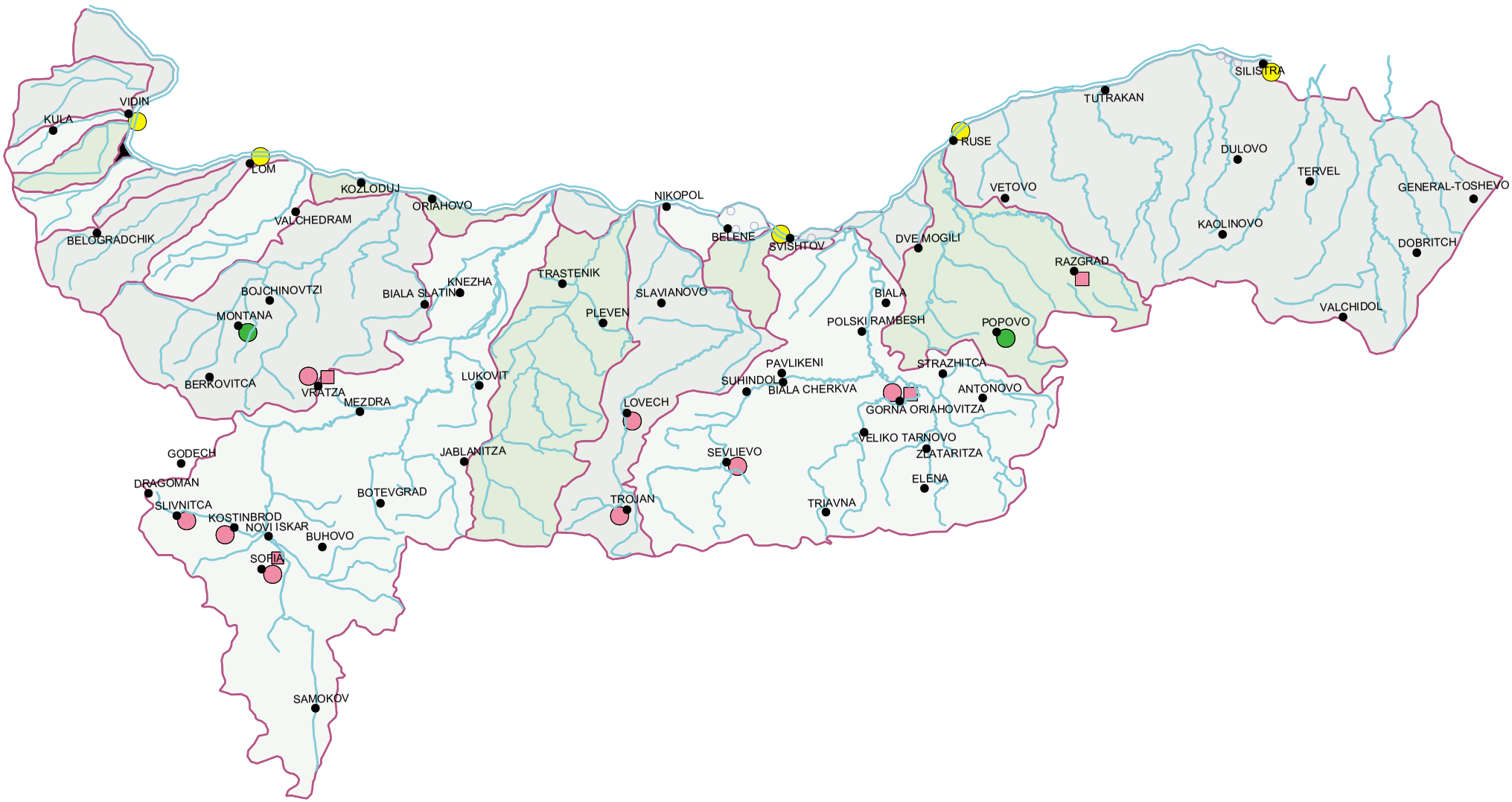
Fig. 2. Intensity of the Bulgarian bank erosion (VODPROECT-1970, Dr.St.Modev-1985)

MAP OF CATCHMENT AREA OF THE BULGARIAN STRETCH OF THE DANUBE RIVER AND ITS TRIBUTARIES

THE WATER ECONOMY REGIONS
IN THE BULGARIAN DANUBE CATCHMENT AREA



MAP OF HOT SPOTS IN THE BULGARIAN DANUBE CATCHMENT AREA



2.2. Problem Analysis

2.2.1. Core Problem

Based on the situation analysis and the problem analysis of the three main sectors the core problem for the Bulgarian Danube River catchment area was stated. It reflects the situation in the three sectors. It is stated as:

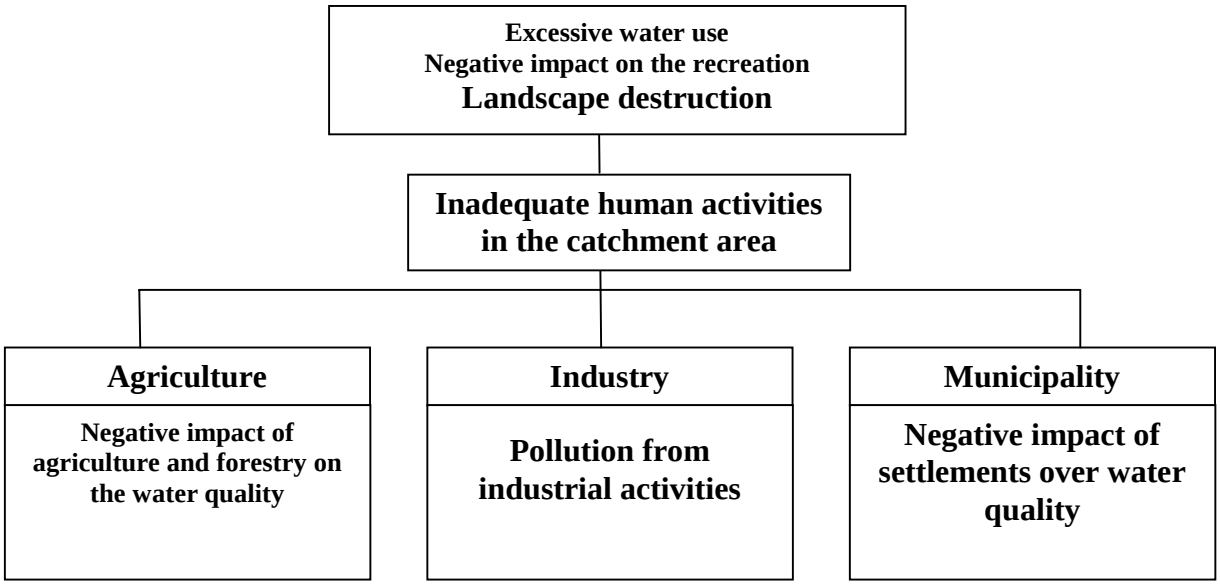
"INADEQUATE HUMAN ACTIVITIES IN THE CATCHMENT AREA"

2.2.2 Direct Causes of the Core Problem

Three direct causes, which are leading to the core problem, were identified:

- Negative impact of agriculture and forestry on the water quality, caused by the inadequate plant growing practice, by weaknesses of irrigation, discharge of animal breeding waste water and the use of environmentally unfriendly forest management methods.
- Pollution from industrial activities, caused mainly by past pollution due to the closure of industrial sites, discharge of wastewater and unsustainable industrial practices.
- Negative impact of settlements over water quality, due to improper waste management, weaknesses in WWPT operation and inefficient operation of sewage services

SCHEME OF PROBLEM



2.2.3. Effects of the Core Problem

The core problem leads to several direct effects for the environment, which were described in general on the first stage as negative consequences in the situation analysis. The cause-effect analysis led the participants to the following direct effects of the inadequate human activities in the Bulgarian Danube catchment area:

- **Ground and surface water pollution**
- **Pollutants migration in the environment**
- **Erosion**
- **Landslides sinking**

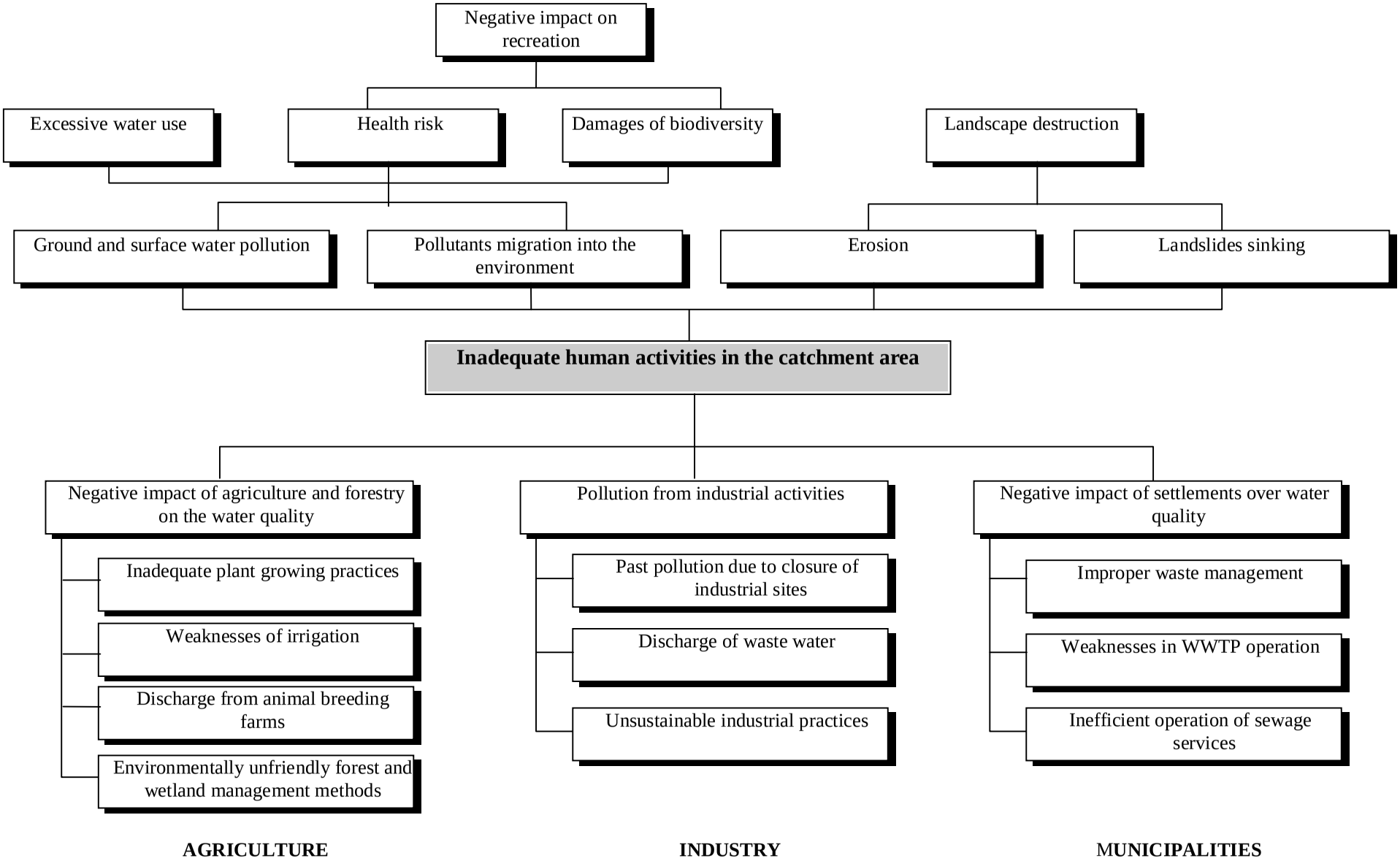
Ground and surface water pollution occurs as an effect of inadequate human activities in all three sectors. Pollution migration into the environment is an effect of the negative impact of agriculture and forestry on water quality.

Landslides sinking and activation are a result of inadequate human activities in the agrarian and municipal sectors. Surface erosion is also an effect of the municipal and agricultural activities.

Ground and surface water pollution together with the pollutant migration in the environment lead to excessive water use, health risk for the population and damages of the biodiversity.

The existing health risk and the damaged biodiversity lead to a negative impact on recreation and tourism. Erosion and the sinking of landslides have as a common effect the landscape destruction.

General Problem Hierarchy



2.3. Analysis of Objectives and Identification of Priority Sectors

2.3.1. Description of Objectives

The conducted objective analysis in the three sectors groups gave the participants the opportunity to convert their vision about the existing situation into a positive vision about the desired state. The means-ends relationships analysis between the proposed main activities (first envisaged as measures to be undertaken in the sectors situation analysis), expected results and sector objectives led the specialists who participated in the workshop to the following statement of the program objective:

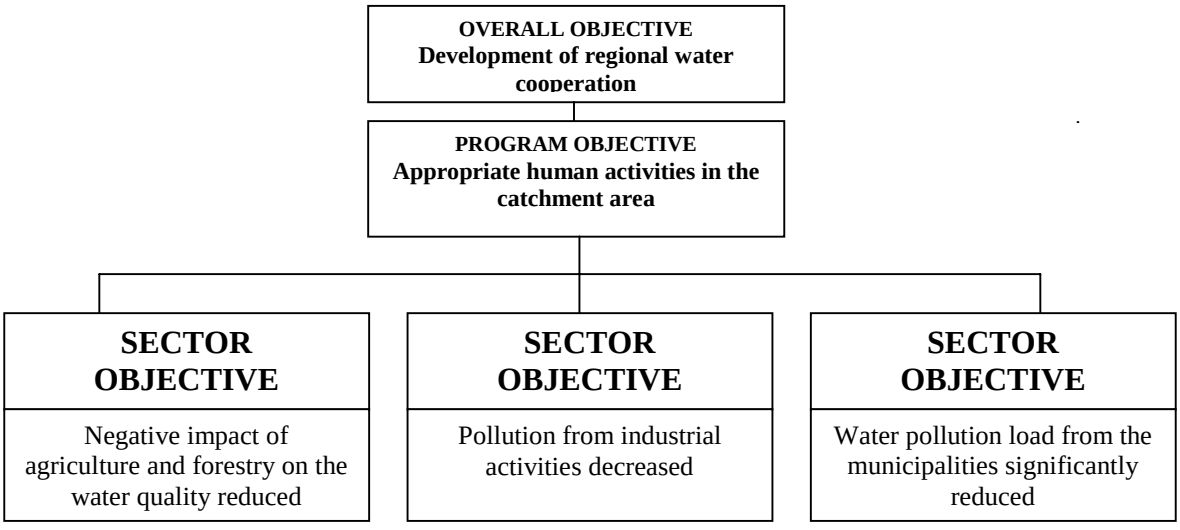
"APPROPRIATE HUMAN ACTIVITIES IN THE CATCHMENT AREA"

To assure sustainable development in this region, specific objectives for each of the sectors have been identified:

- Reduction of the negative impact of agriculture and forestry on the water quality
- Decrease in pollution from industrial activities
- Significant reduction of water pollution load from the municipalities

Through applying specific projects and activities in the three sectors the situation in the Bulgarian Danube Catchment will be significantly improved - ground and surface water pollution will be limited, pollutants migration into the environment will be reduced, erosion will be prevented and the landslides will be stabilized. This will lead to a stabilization of water use, a reduction of health risk, biodiversity conservation, landscape restoration and facilitation of recreation.

SCHEME OF OBJECTIVE



2.3.2. Identification of Priority Sectors

The main results will be obtained through the implementation of the main activities, their elements and concrete projects identified and described on the basis of the analysis of the needs of the sectors and the proposed measures. In each sector sets of main activities were developed the implementation of which will lead to the achievement of the sector results. The sector results are necessary to achieve the sector objective. Each of the sector objectives contributes to obtaining program objective.

1. Agriculture and Forestry

Agriculture is considered to be the sector for future prosperity of the country. Good traditions in this sector exist, but due to a lack of understanding of environmental problems serious environmental damages were caused by it. In order to develop it in the future and the population to be able to rely on its economic benefits, serious measures need to be undertaken.

To achieve the objective of the sector, it is required to:

- adopt adequate plant growing practices;
- implement appropriate irrigation practices;
- reduce negative impact of animal breeding farms;
- introduce environmentally sound forest and wetland management methods.

2. Industry

The practices in the industry caused in the past a lot of environmental damages. Now, the country is in a period of economic restructuring, and the most important branches of the industry are in privatization. This fact is the background for the great importance of the activities that need to be undertaken in order to overcome the environmental consequences of the industry over the water quality of the Danube river.

On the ground of the analysis of the sector problems and the set of the sector objectives, it is necessary to:

- reduce the impact of past pollution on the environment;
- implement appropriate measures for limitation of discharging of industrial waste water;
- adopt sustainable industrial practices.

3. Municipalities

The settlements in the Bulgarian Danube river basin are the third main sector causing water pollution. Several main problems were identified and adequate objectives stated. The reduction of negative impacts over water quality can be reached if the following set of main activities is undertaken:

- implement environmentally sound waste management;
- overcome weaknesses in waste water treatment plants operation;
- operate sewage services efficiently.

2.3.3. Important Assumptions for Program and Sector Objectives

The analysis and steps of planning, undertaken by the participants, led to the necessity to describe also such factors of social and economic environment of the country which are outside of the direct scope of the program but are of vital significance for the realization of the program objectives.

They are external factors and they are necessary to ensure the success of the program and sustainability of its results.

For the **agriculture and forestry sector** these assumptions are as follow:

- **Sufficient water resources exist**
  There is a negative water balance in Bulgaria in general. It can be improved only through better management. A National Programme for sustainable water use should implement this on a high governmental level.
- **Former forest areas are restored**
  During the last decades, artificial deforestation causes problems to the water balance. The Ministry of Agriculture, Forests and Agrarian Reform in cooperation with the Ministry of Environment and Water are responsible for the solution of this problem.

For the **industry sector** only one assumption was identified:

- **The transition framework conditions are favorable**
  Transition framework conditions are necessary to allow us to support current program efforts towards achieving appropriate human activities in the catchment area.

For the **municipality sector**, three assumptions are envisaged in the program:

- **Adequate legislation available**
  The legislative and regulatory framework has a decisive role to clarify the role and competencies of state and local authorities. The availability of precise regulations, norms and technical requirements make possible an efficient control during the construction and operation of the facilities related with the water quality conservation.
- **Structural reform completed**
  The completion of the structural reform is a condition, which could solve all negative impact of the unclear or mixed ownership of the waste and wastewater facilities and systems. Privatization ensures a sound management of the utilities, assures funds for the implementation of the programs for good housekeeping, reconstruction and modernization and makes clear the responsibilities of the managers.
- **Good economic and social status of the population**
  The possibility to afford the cost increase of the services rendered by the municipality or the companies managing the waste or the wastewater directly depends on the economic status of the population.

2.3.4. Impact Indicators for Program and Sector Objectives

The Target Oriented Program Planning method gives the opportunity to create a basis for project monitoring and evaluation. For this purpose during the planning phase the main impact indicators for evaluation of the progress of the program were identified. They are based on the understanding that the objectives will be agreed as reached in case the negative effects of the human activities are overcome.

For the **agricultural sector** the indicator for the sector objective "Negative impact of agriculture and forestry over water quality reduced" is:

- **Reduction of pollution loads from BOD5 by 30%, of nutrients by 10%, of suspended solids by 35% (as compared to 1997), following flowing in from the Bulgarian reach of the Danube River Basin by the year 2010.**
  This will allow the water at the estuaries of the Bulgarian tributaries to reach the quality of a 2nd category water intake

For the sector objective in the **industry sector** "Pollution from industrial activities limited" the impact indicator was defined as:

- **The concentration of the pollutants, regulated by the ordinance on the surface running water at the inflow point of the Russenski Lom river to the Danube river correspond to the 3rd category water intakes in the year 2010.**

  Correspondence of the concentration of pollutants to the III category water intakes at the inflow point of the Roussenski Lom river to the Danube river will facilitate the evaluation of the success of implemented activities towards limiting the pollution from industrial activities.

For the sector objective in the **municipality sector** "Water pollution load from the municipalities significantly reduced" the impact indicator is

- **The amount of polluted drainage water of solid waste dump sites will be reduced by 50% by the year 2010, leading to a significant reduction of ground water pollution in the municipalities from the whole Danube river basin.**

  The drainage water discharged from solid waste dumps is normally measured by the institutions responsible for the water quality monitoring. The data are analyzed by the experts of the National Center for Environmental Protection and Sustainable Development. At the end of each year the Center has to present a report for the environmental situation in the country. At the end of 2010 an assessment is planned to be made in comparison with the 1998 data of the drainage ground water quantity and quality.

Program Planning Matrix

Summary of Objectives and Activities	Impact Indicators	Important Assumptions
➢ **Overall Objective:** Sustainable development in the Danube River Basin achieved	➢	
➢ **Program Objective:** Appropriate human activities in the catchment area		
➢ **Sector Objectives:** **1. Agriculture and Forestry:** Negative impact of agriculture and forestry on the water quality reduced **2. Industry:** Pollution from industrial activities decreased **3. Municipality:** Water pollution load from the municipalities significantly reduced	➢ Reduction of pollution loads from BOD5 by 30%, of nutrients by 10%, of suspended solids by 35% (as compared to 1997), flowing in from the Bulgarian reach of the Danube river basin by the year 2010. This will allow the water at the estuaries of the Bulgarian tributaries to reach the quality of a 2nd category water intake (SO-AF) ➢ The concentration of pollutants, regulated by the ordinance on the surface running water at the inflow point of the Russenski Lom river to the Danube river correspond to the 3rd category water intakes in the year 2010 (SO-1) ➢ The amount of polluted drainage water of solid waste dump sites will be reduced by 50% by the year 2010, leading to a significant reduction of ground water pollution in the municipalities from the whole Danube river basin. (SO-M).	➢ Sufficient water resources exist (SO-AF) ➢ Former forest areas are restored (SO-AF) ➢ Transition framework conditions are favorable (SO-I) ➢ Adequate legislation available (SO-M) ➢ Structural reform completed (SO-M) ➢ Good economic and social status of the population (SO-M)
➢ **Results/Outputs:** **1. Agriculture and Forestry** 1.1 Adequate plant growing practices adopted 1.2 Appropriate irrigation practices implemented 1.3 Negative impact of animal breeding farms reduced 1.4 Environmentally sound forestry and wetland management practices introduced **2. Industry** 2.1 Impact of past pollution on the environment reduced 2.2 Appropriate measures for limitation of discharging of industrial waste water implemented 2.3 Sustainable industrial practices adopted **3. Municipality** 3.1 Environmentally sound waste management implemented 3.2 Weaknesses in WWTP operation eliminated 3.3 Sewage services efficiently operated		

PO - Program Objective SO-AF - Sector Objective Agriculture and Forestry SO-I - Sector Objective Industry SO-M - Sector Objective Municipality

3. Sector Strategies

3.1. Agriculture and Forestry

3.1.1. Situation Analysis

3.1.1.1. Importance of the Sector and Activities leading to Water Pollution and Environmental Degradation

The post-war rapid growth of industrial and agricultural production in Bulgaria, combined with urbanization and with an expansion of infrastructure and irrigation systems have caused a severe degradation of the environment. Fast economic development and inefficient consumption of energy have induced industry-related pollution, while overuse of water resources and uncontrolled utilization of fertilizers and pesticides for agricultural production have seriously affected land and water resources. This was accompanied by the degradation of water quality and by soil pollution, especially in the areas surrounding large cities and industrial centers A lack of concern for the environment within the industry and agriculture has induced environmental deterioration in the country, but mostly in the more economically developed regions. One of the regions, where environmental degradation was most evidently pronounced was the Danube River Basin.

Agriculture is one of the most important sectors of the Bulgarian economy. It is well known that in the past, Bulgaria was a well-developed agricultural country. The agricultural land in the Bulgarian part of the Danube River Basin is about 3 208 000 hectares or 54,3 % of the total agricultural lands of the country. The uncultivated land area is 24,6% and the cultivated land area is 75,4%.

There are a number of diffuse sources of agricultural pollution in the Danube catchment area. It is well known that the reasons for agricultural pollution are the excessive application of fertilizers and pesticides, the irrigation with polluted water and the surface erosion.

An indicator of the non-point pollution is the content above the set limits of nutrients, such as nitrogen, phosphorus, potassium and some toxic substances. Due to the fact that, up to now, the land reform in the country is not completed, i.e. there is still no clarity concerning the ownership of the land, no steps have been taken for the development of the control of non-point pollution. The utilization of the irrigation systems for the country as a whole has diminished to 10%, which is considered as critical.

As agricultural hot spots we can define the sites for the accumulation and composting of the manure. In the greater part of the villages the manure mass is piled in the yards of the houses or along the banks of the nearest river.

Land Reform and Land Use

Significant steps have been made in 1998 in the area of the agrarian reform. 20% of the agricultural land has been returned to its owners in 1997, amounting to almost one third of the land returned in the period from 1991 to 1997. To settle the land use issue, a Lease Act was adopted in 1996 stipulating the general conditions for the leasing of land. This Act provides for better conditions for a long-term leasing of land. Also, the Agricultural Lands Ownership and Use Act was amended and a Regulations on its implementation was adopted, representing an important prerequisite for speeding up of the agrarian reform.

Structure of Private Farms by Arable Land Size

Arable Land Size	% of Farmers	% of Land Size
up to 0.2 ha	51%	3%
up to 0.5 ha	20%	5%
from 0.5 to 1 ha	14%	7%
from 1 to 2 ha	9%	8%
from 2 to 5 ha	4%	8%
from 5 to 10 ha	1%	3%
more than 10 ha	1%	66%
	100.00%	100.00%

Fertilization

The monocrop growing of crops, especially cereals, poses a serious problem in agriculture with the significant increasing of weeds typical for cereal crops. During the last three years, regarding the cereal crops (wheat, barley and maize), the relative share of treated areas has increased. In 1994, 56% of the areas were treated, 53% in 1995 and 70% in 1996. For the same period (1994 – 1997) the amount of mineral fertilizers used has decreased fivefold as compared to 1980 – 1981. There is a relatively lower decrease of nitrous fertilizers at 3.4 times, and more than a 25 times reduction of phosphorous fertilizers. Potassium fertilizers are only used in green house production.

The extremely unfavorable ratio of fertilizers does not allow utilization of nitrogen, introduced into the soil by the plants, and leads to its entering into other elements of the ecosystem cause pollution of soil and waters.

The participants in the workshop considered, that the current level of impacts to water pollution as a result of agricultural activities marks the need to plan, as soon as possible, projects for the future in order to facilitate the completion of the reform and to achieve a normal level of agricultural production limiting the pollution potential.

Integration into the European Union

Following 1989, Bulgaria has reoriented its commercial priorities and has adopted a hard line of integration into the European economic structures on the basis of a strong political consensus. The process was started in 1993 with the signing of the European Agreement for Bulgaria's accession to the European Communities, which aims at the gradual establishment of free commercial zones. Pursuant to this Agreement, Bulgaria has obtained a significantly accelerated provision of large preferences for its exports to the European Union. During the negotiations between Bulgaria and the European Union under the Subcommittee on Agriculture in relation to the enactment of the GATT Agricultural Agreement, a generalized customs discount was adopted and applies to 80% of the MFN rates, while customs-free import has been allowed for a number of Bulgarian agricultural crops.

Despite the significantly improved access to the market for Bulgarian agricultural goods to the EU markets, the reality shows that a significant amount of possibilities provided on a preferential basis with the EU Agreement are not utilized because of the crisis in our agriculture.

The foreseen process of EU integration depends largely on the approximation and harmonization of the Bulgarian agricultural legislation with EU legislation in several main areas: veterinary medicine, plant protection, quarantine and agrochemistry, standards and metrology, and agrarian policy. One main point of reference for the ensuing Program of the Ministry of Agriculture and Food Industry is the White Paper for preparation of associated CEE states for integration into the uniform EU market developed by the European Commission during the French presidency.

The White Paper contains a list of approximately 200 main EU agricultural acts of primary significance for the harmonization process, grouped in two areas.

- Harmonization of the legislation and practices in veterinary medicine phytosanitary protection and for animal nutrition and breeding requirements
- This section alone includes more than 1 000 regulations of the EU.
- Introduction of measures in conformity with the legislation for the European agricultural market and the common market regulations

Information System Development

The Ministry of Agriculture, Forestry and Agrarian Reform can not operate efficiently and in a rational manner without establishing an efficient and functioning information system maintaining data bases of different nature and substance. A uniform information system must be established drawing from:

- all specialized structural units and branches of the Ministry of Agriculture, Forestry and Agrarian Reform in Bulgaria;
- external sources of information and organizations providing generalized and summarized information to the Ministry;
- additional specific analyses, predictions and evaluations;

The development of an adequate Information system is of great importance. Different components such as the "Uniform Land Information system" and the "National Extension Services Information System" are under preparation and have to be ready at the end of 1998. Other components like the "Agrimarket Information System" (1993) and MARS-MERA (1997) are already developed with the financial support of EU-PHARE

The restoration of private ownership of land and the protection of various types of property, both public and private, can be realized only if there is a well functioning organization supported by an efficient information system based on modern information technologies. The restitution of land is related to the processing of an enormous amount of information. The automation of this activity is realized by means of national data bases introduced in all land committees.

The inadequate process of collection, processing and targeted use of information from cooperatives and mayors' offices and from inquiries held among extremely large numbers of producers of transient nature does not allow a reliable data base to be created. A modern method will be introduced for the successful implementation of the project through which the objective assessment of land division processes will be made.

National Agricultural Advisory Service

A National Agricultural Advisory (Extension) Service (NAAS) system has been established in 1995 with the financial support of PHARE for different services extended to farmers. It is governed by the Science, Education and Development Department under the Ministry of Agriculture, Forests and Agrarian Reform. The National Extension Service is functioning at present on following levels:

- *National level* - Eight national centers have been established and are functioning.
- *Regional level* - At this level, a Regional Scientific Service and Advisory Council has been established. The head of the Council agrees all regional extension services.
- *Territorial level* - Under the PHARE programme 29 local offices have been equipped for extension services under the National Services System.

Whereas, the PHARE programme support should only be continued until the end of 1998, the NAAS needs to be expanded.

3.1.1.2. Current Strengths/Assets and Stakeholders Involved

Assets

In the agricultural Sector, several assets are available for the future to rely on when measures are to be undertaken to overcome the negative consequences. The following assets have been defined during the workshop in the frame of the Situation Analysis (Annex 2.1) for the Agriculture and Forestry sector:

- **Legislation and Policy**
  There is clear national policy on water management in the country. A National Water Management Strategy was developed recently which gives the main mandates to the local governments. A new Water Act is being developed to harmonize the norms and regulations with European standards.
- **Facilities for Irrigation and Waste Water Treatment**
  Existing equipment and facilities for irrigation are partly in operation. WWTP are in operation in some pig farms.
- **Information and Application of Modern Technologies.**
  Through the National Agricultural Advisory Service system, different companies, NGOs and international donors, the introduction and application of modern technologies are under preparation in the field of integrated plant protection, environmentally sound biological agriculture etc. Information about such technology practices from outside Bulgaria is available in the country.
- **Financial Resources**
  The Agricultural Fund at the Ministry of Agriculture, Forestry and Agrarian Reform and the National Environmental Fund at the Ministry of Environment and Waters exist to provide funding by means of grants or low interest loans for the implementation of projects with national priority. The National Trust Fund, established by the Swiss government as a Debt for Nature fund, is also available with a high priority for the Danube River Basin.
- **Human Resources**
  The country has available scientific potential providing consultancy for the type, quantity and quality of used fertilizers and pesticides (Research Institutes of the Agricultural Academy/MAFAR). Well-educated and trained personnel in many fields and new NGOs are enhancing their activities in supporting the new waste management models. A National Agricultural Advisory Service system and NGOs have capacity to introduce modern technologies for farming.

Stakeholders

Three groups of stakeholders could be identified: organizations/institutions, polluters and affected groups.

Organizations/institutions

The water management in Bulgaria went through many transformations and institutional changes. The Republic of Bulgaria has a centralized structure. Most legislative and executive powers are concentrated at the Central Government level. Under the Constitution, the supreme body responsible for approving laws is the National Assembly and the Council of Ministers.

The Ministry of Agriculture, Forestry and Agrarian Reform (MAFAR) has the leading role of the Agricultural and Forestry management. It has the responsibility to protect agricultural land and crops from pollution. A special unit inside the Ministry of Agriculture, the National Service for

Plant Protection, is responsible for a pre-market evaluation of efficacy of any pesticide, based on field trials performed in Bulgaria. The final decision for pesticide registrations is made by the Ministry of Health based on risk assessment for humans and the environment, prepared by its expert body, the Council of Toxicology. Besides the members from the Ministry of Health, this Council also includes experts from the Ministry of Agriculture, Ministry of Environment, and Ministry of Internal Affairs. This Ministry is currently implementing clean-up programs for contaminated agricultural land.

The Ministry of Agriculture, Forestry and Agrarian Reform owns almost all large irrigation facilities and some major reservoirs in the country through its Government-owned company "Irrigation Systems Inc." (subdivided into 28 regional companies in a country). It incorporates additional functions, such as fish breeding, the correction of river flows, drainage of flooded areas etc.

The National Forestry Management Board is within the MAFAR. It has the responsibilities for forestry and the protected area management.

The Ministry of Environment and Waters (MoEW) has one of the leading roles in the implementation of environmental policy**.** This is the central state administration authority coordinating all environmental issues.

Legislation:

- the legal initiative for drafting of environmental and water legislation,
- the implementation of the Law on Environmental Protection,
- preparation in joint effort with concerned institutions of environmental quality standards (air, water, and soil); biological diversity conservation and management of protected areas.

Monitoring, Control and Enforcement:

- The Ministry controls all dischargers and emitters in the environment through its **15 Regional Environmental and Water Inspectorates** (REWI) (7 of them are in a Danube River Basin)
- The MoEW controls the quality of all environmental components water, air, soil, biodiversity through its REWIs and National Center for Environment and Sustainable Development (NCESD) which operate a country wide environment monitoring network.
- MoEW is responsible for the management of ground and surface water resources, quantity, quality and abstraction.
- The MoEW ensures the environmentally sound execution of new construction and other works through an EIA, which incorporates EU environmental management principals and procedures.
- REWIs setting and permitting the effluent standards limits and amount of discharged waste water;
- Environmental Improvement Efforts
- Formulation, coordination and execution of national and regional programs and projects, aiming at improvement of the environment.
- National Policy Making and Development of Strategies
- Development and formulation of environmental and environment related policies in cooperation with other Ministries and institutions, International donors and other agencies.
- Development of national strategies and action plans for and water management, water quantity and quality conservation and the elaboration of all relevant regulations
- Participation in formulation, negotiation, implementation of international and cross-border agreements

Fund Management

- Management of the National Environmental Protection Fund and control of use of Municipal Environmental Protection Fund

The Ministry of Regional Development and Public Works (MRDPW) develops strategic and policy documents for water supply systems operation and maintenance. On behalf of the state the MRDPW owns part of the water supply and sewage companies. The MRDPW, in coordination with the Ministry of Environment and Water, develops the package of measures for effective use and protection of water. It controls central and regional land use planning and development through its "Regional Development and Housing Policy" Department.

The Ministry of Health (MoH) issues regulations for the standards of drinking water. Through its Hygienic Epidemiological Inspections (28 in country; 15 in a Danube River Basin), it controls the water quality in the water supply systems and studies its impact on human health. The Ministry of Health approves the list of registered pesticides issued every year by the Ministry of Agriculture. This Ministry is jointly responsible with the MoEW for the elaboration and implementation of the National Environmental Health Action Plan.

The **Municipalities** act on environmental issues of municipal importance. They strengthen and play a decisive role in the privatization of Water and Sewage Companies. Furthermore, they are responsible for setting and enforcing the appropriate legislative frame for the households and they small-scale farms.

Polluters

The **farmers** generate wastewater, which is used without the needed relevant treatment by residential households, commercial districts, institutional, and recreational facilities. The farmers - polluters- and the users of the polluted water are not aware about the negative impacts and danger of wastewater. The farmers are not interested in the ways of proper composting of manure and the consequences of high consumption of drinking water in the pig farms. Leacheates and untreated drainage water could contaminate both, the surface and ground water.

Affected groups

Individual users, including the population, civil associations, owners of land in the vicinity of the water courses, recreation facilities and tourism, are the most affected by the adverse effects of water pollution. The risk for endangering the health of the population arises from the discharge of untreated water, leacheates and the drainage water of waste dumps. The development of recreation and tourism are hampered by the hazard of water contamination and the possibility that toxic elements enter into the food chain.

Environmentally oriented **NGOs** are very sensitive to water pollution which deteriorate the water ecosystems and the biodiversity. They usually feel more affected and their activity could be used for public awareness raising.

The Water and Sewage Companies, as well as **the River Basin Authorities** are affected by water pollution, as they are under the pressure of the water users. The more surface and groundwater is polluted, the more resources are needed to operate and maintain the treatment facilities and the higher is the price of the supplied water. At the same time, more investment is needed for new treatment facilities.

3.1.1.3. Analysis of Transboundary Effects

The comparison of samples from the two frontier points of the Danube River (Novo Selo, km. 833.6) and Silistra (km. 375) indicates no significant differences in the examined characteristics of the Danube water. This shows that the contribution of the Bulgarian tributaries is insignificant and that the basic quality of Danube River water is determined from upstream of the Bulgarian section.

Given the geographic characteristics of the Bulgarian part of the Danube River basin, there are no transboundary effects caused by contamination of the local rivers. As pointed out above, there are three parallel streams in the section of the Danube River - one close to the Bulgarian bank, the second in the middle of the river (main course) and the third close to Romanian bank. All surveys conducted during many years have shown that these streams do not mix as a whole. Thus, there is no impact of the Bulgarian side to the Romanian one and vice versa. In the discharging points of Bulgarian rivers into Danube River some polluting effects have been observed. The pollution along the Danube River course itself has only local effects and a practically insignificant impact. Erosion problems at the Bulgarian bank of the Danube River are caused by the manifold negative impacts, of which the biggest is due to the operating of the "Iron Gate" I and II.

Only a few small rivers of the Nishava catchment area spring from the Bulgarian territory and after that leave to Yugoslavia. Timok is the opposite case - its catchment area is almost exclusively in the Yugoslavian territory and only in the end it becomes a borderline river between the two countries.

3.1.2. Sector Problem Analysis

3.1.2.1. Core Problem

The sector core problem was identified after reviewing the negative environmental consequences of agricultural activities in the four geographic areas. It was defined as:

"NEGATIVE IMPACT OF AGRICULTURE AND FORESTRY ON THE WATER QUALITY"

It is well known that agriculture and forestry have direct and indirect impact on water quality and quantity. The reason of which is the excessive application of fertilizers and pesticides in the past, the irrigation with polluted water and deforestation. The wetlands are affected negatively too.

3.1.2.2. Causes Leading to Environmental Problems

There are four direct causes leading to a significant pollution from agricultural activities and forestry:

- Inadequate plant growing practice
- Weaknesses of irrigation
- Discharge of animal breeding waste water
- Environmentally unfriendly forest and wetlands management methods

(i) Inadequate plant growing practice

This caused results in negative impact on water quality due to excessive and improper use of fertilizers and pesticides in the past, improper rotation of crops and unfavorable framework conditions.

a. Excessive use of fertilizers and pesticides in the past

The participants' understanding is that past pollution from fertilizers and pesticides affects mainly the quality of soil and ground water.

b. Improper use of fertilizers

There is an improper use of fertilizers because of the non-observance of the rules and requirements for the use of mineral fertilizers and pesticides. This is due to low environmental awareness and non-observance of agricultural technologies. Another cause for the improper use of fertilizers is the non-observance of agricultural technologies because of low skills of farmers and the lack of adequate training courses for the farmers. The lack of initial equipment is caused by insufficient financing, whereas the reason for the low skills of farmers, as for low environmental awareness is that there are no adequate training courses.

c. Improper crop rotation due to inadequate technologies

This problem is in a very closely linked to the soil and ground water contamination.

d. Unfavorable framework conditions

There are unfavorable framework conditions because of weaknesses in pollution control. The group identified as a weakness of pollution control the legislative irregularities, the insufficient information system and incomplete legislation. The incomplete agricultural reform, which is due to the still unsolved ownership of the land (and irrigation systems), is another reason for the unfavorable framework conditions.

(ii) Weaknesses of irrigation

The direct effects of the weaknesses of irrigation are unfavorable quality and quantity of water and soil. The participants explained these weaknesses with the:

a. High price for delivery of irrigation water

The high price for delivery of irrigation waters causes weaknesses of irrigation because of a lack of adequate irrigation equipment, the existence of expensive, energy intensive systems and insufficient financial resources which, again, are caused by the lack of a national policy for the Danube river basin

b. Supply of inappropriate volumes of water at an inappropriate time

The supply of inappropriate volume of water at an inappropriate time is due to the condition of the existing irrigation facilities, which are not suitable for small-scale private farmer. This is because of a lack of a national policy for the Danube river basin, which is also the reason for insufficient financial resources. Another reason for the fact that there is an inappropriate supply of water at the wrong time is the lack of qualified personnel.

c. Unclassified forms of ownership over land and irrigation systems

The unclassified forms of ownership over land and irrigation systems are because of the incomplete agrarian reform

(iii) **Discharge of animal breeding wastewater**

The discharge of animal breeding wastewater into the receiving waters is a direct cause for the decrease of surface and ground water quality with regard to the content of nutrients, BOD_5 and SS over the permissible limit. The group identified the following causes:

a. Insufficient waste water treatment

The wastewater treatment is insufficient because of uncompleted facilities or the lack of them. This is caused by the fact that only limited funds are available and the majority of animal farm wastewater technologies are outdated.

b. Improper composting of farm manure

There is improper composting of farm manure due to the lack of farming skills and insufficient control. The existing control is insufficient because of the non-compliance with the regulatory framework and the lack of coordination of control executed by the MoEW (REWI), MRDPW (Water Supply & Sewage Co.), MAFAR and MoH (HEI). The latter is due to the imperfect legislation for small-scale animal breeding farms.

(iv) **Environmentally unfriendly forest and wetlands management methods**

The group recognized that the forest and wetlands management methods are environmentally unfriendly because of:

a. Inappropriate afforestation and wetland management

There is an inappropriate afforestation and wetland management due to an afforestation with intensive (fast growing) species, the replacement of natural forests by intensive crops and the afforestation with inadequate species caused by the lack of resources for forest and wetland protection, as well as the delay of the reform.

b. Deforestation

Deforestation is caused by illegal timbering, insufficient control and the incomplete regulatory framework which, again, is due to the delayed reform.

3.1.2.3. Environmental Effects

The direct consequences of the sector core problem, which were defined by the participants during the workshop are as follow:

- **Inexpedient water use**

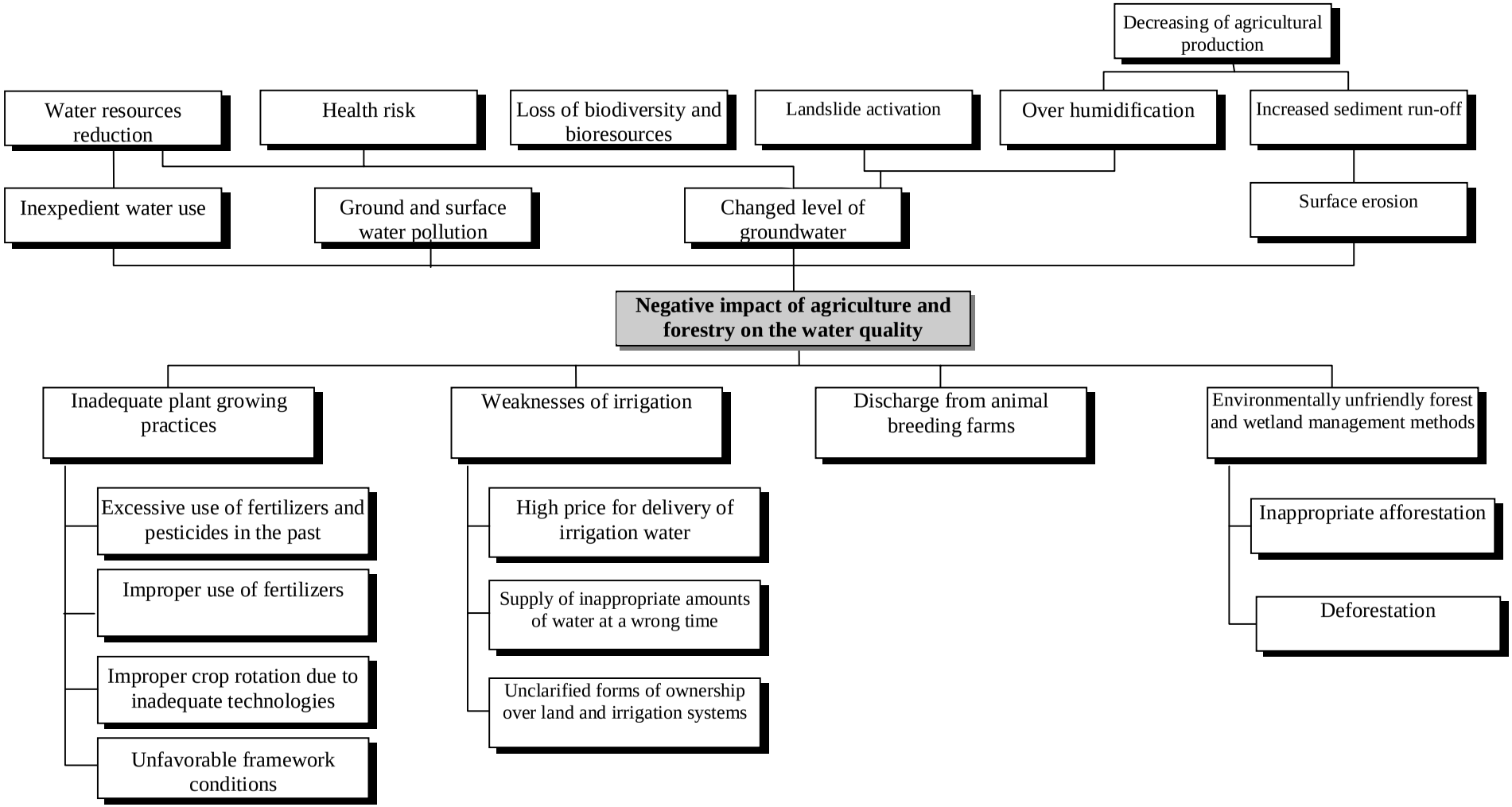
  The inexpedient water use is related to the reduction of water resources.
- **Ground and surface water pollution**

  The pollution of ground and surface water is directly related to the reduction of water resources, the health risk, the loss of biodiversity and bioresources
- **Changed level of groundwater**

  The changed level of groundwater is on the one side directly related to the reduction of water resources, the health risk, the loss of biodiversity and bioresources and on the other side it has land slide activation and over humidification as a consequence, which leads to a decrease in the agricultural production.
- **Surface erosion**

  The surface erosion has an influence on the increased sediment load and respectively on the decrease of the agricultural production.

General Problem Hierarchy: Agriculture and Forestry



3.1.3. Objectives, Expected Results, Actions and Related Projects

The sector objective, which was retained by the participants during the workshop, is:

"NEGATIVE IMPACT OF AGRICULTURE AND FORESTRY ON THE WATER QUALITY REDUCED"

The group has formulated the following four expected results in order to achieve the sector objective:

- Adoption of adequate plant growing practices
- Implementation of appropriate irrigation practices
- Reduction of the negative impact of animal breeding farms
- Introduction of environmentally sound forest and wetland management methods

Each of these results can be achieved by undertaking specific activities, which were identified by the participants. Following, existing and planned projects were marked down for each activity. The result of this exercise demonstrated that additional projects to implement strategies for pollution reduction in the Bulgarian part of the Danube River basin are clearly needed and a number of projects were proposed.

(i) Adoption of adequate plant growing practices

This result could be achieved through the implementation of activities in the following areas:

- Skills and knowledge for agricultural practices;
- Measures for the agrarian reform and protection of resources;
- Equipment for application of fertilizers and pesticides;
- Funds for appropriate agricultural activities.

It is foreseen to:

- **raise skills and knowledge in order to apply best agricultural practices**. This activity includes the development of an integrated plant protection program, the elaboration of a farmer training program, an increase of knowledge on the consequences of various agricultural practices, observation of the requirements for fertilizer & pesticide application, an expansion and establishment of the supplement agricultural advisory offices to assist farmers for application of advanced agricultural practices and the organization of a public awareness campaign.

  The ***on-going projects*** related to this main activity are:

  - *Extension services in the Ministry of Agriculture, Forestry and Agrarian Reform (MAFAR)*
  - *Pilot project for organic agriculture in the Central Balkan National Park*
  - *Information system for safe use of pesticides*

Planned Projects:

- *Harmonization and development of a document based on the Pesticides Directive*

Proposed Projects:

- *Extension services establishing program, increasing the farmers' skills*
- *Program for exchange of personnel and specializing in agriculturally developed countries*
- *Program for ecological plant growing in the region*
- *Public awareness campaign*

- **implement measures for the agrarian reform and protection of resources**. This activity implies clarification of land ownership, specification of the scope of the current legislation, improvement of the current legislation in accordance with the EU standards, assurance of the appropriate land use and organization of an adequate pollution control.

  The ***on-going projects*** related to this main activity are:

  - *Demonstration project for organic farming in the village of Apriltsi*
  - *Regional monitoring of economically significant ground waters in the towns of Vidin, Lom, Lovech, Rousse, Silistra, Varna, 1992*

  Proposed Projects:

  - *Integrated plant protection program in the region*
  - *Adaptation of methods of the EU member states for assessment of pollution loads from non-point agricultural sources*
  - *Establishment of a non-point source monitoring system for agricultural pollution of the Danube catchment area.*
  - *Establishment of an information system for the movement of pesticides along the Osam and Vit rivers*

- **facilitate the updating of equipment for application of fertilizers and pesticides.** It includes, the inventory the existing equipment, specification of the need for modern equipment, introduction of new, more efficient equipment and maintenance of the farming equipment in a good technical order
- **ensure funds for appropriate agricultural activities**, which includes, the extension of the specialized financial fund, the development of a program for use of financial exemptions, elaboration of the programs for ecologically sound crop cultivation, attraction of the external sources of financing, definition of the criteria for funding and introduction of a market policy

(ii) Implementation of appropriate irrigation practices

This result could be achieved by undertaking activities in the following areas:

- Regulatory framework for irrigation;
- Financial policy for irrigation and agriculture;
- Irrigation system for private sector of agriculture;
- Qualified personal.

It is required to:

- **facilitate the improvement of regulatory framework for irrigation.** It is needed to speed up the drafting and adoption of the new Waters Act, to clarify the ownership of hydrotechnical facilities and to create water associations (NGOs)

The following projects have been identified:

Proposed Projects:

- *Adapting of irrigation systems in northern Bulgaria to the needs of private farming*
- *Establishment of Water user associations along the Vit, Yantra & Iskar Rivers*

- **develop financial policy for irrigation and agriculture.** It is necessary to look for external sources of financing, to use moneys from the "Land Improvement Fund" for irrigation agriculture and to use funds generated by small hydropower plants.

Proposed Projects:

- *Feasibility study for the construction of small hydropower plants at the Sopot dam*
- *Feasibility study for the construction of small hydropower plants at the Ogosta dam*

- **rehabilitate the irrigation system for private agriculture** (e.g. the Srebrenska river watershed; Eastern zone). It is important to provide a modern irrigation inventory, to asses the energy consumption of the existing system, to introduce low energy consuming irrigation systems, to redesign the dumping stations along the Danube, to restore destroyed pumping station & other technical facilities, to develop a hydrometric network and to construct individual water catchments for private farmers.

Neither existing nor planned projects exist for this activity.

Proposed Projects:

- *Optimizing water use for private farming*
- *Creation of a hydrometric system for the Karaissen irrigation system*
- *Redesigning & modernization of the Brushlyan & Lyulyaka pumping stations*
- *Methods to reduce the energy consumption of the irrigation system in the Danube plain*
- *Reconstruction and upgrading of the Sofia irrigation system*
- *Project for redesigning of the irrigation pumping stations in the villages of Brushlyan and Aidemir*
- *Reconstruction of Aidenitsa drainage pumping station*

- **ensure qualified personnel**. It is necessary to develop a program for training of the irrigation personnel to train operators of small dams, to establish local extension service bureaus and to promote personnel exchange program with countries with advanced agriculture.

  Proposed Projects:

  - *Establishment of an information and advising system for irrigation in Northern Bulgaria*
  - *Program for training in operation of small water reservoirs*
  - *Irrigation personnel training program*

(iii) Reduction of the negative impact of animal breeding farms

To achieve this result it is foreseen to undertake measures in the following areas:

- animal breeding farms
- processing of manure and sludge
- legislation
- financial resources

It is necessary to:

- **improve WWT from animal breeding farms.** It is necessary to introduce new technologies for treatment of waste water discharged by animal breading farms, to optimize current technological schemes, to advisory offices to offer training courses, to draw on advanced practices in ecological animal breeding, to ensure trained staff to apply new technologies and to improve operation and maintenance of treatment facilities.

  Proposed Projects:

  - *Establishment of an information system for emission control over animal breeding*
  - *Modernization of WWTP of pig farms in Goliamo Vranovo*

- **promote proper composting of farm manure and sludge.** It is important to develop training program on composting, to construct composting facilities and to ensure modern equipment for composting.

  Proposed Projects:

  - *Small scale farmer training program*
  - *Pilot project for treatment and complete utilization of the waste manure in the Yantra river basin*

- **enforce legislation on animal breeding.** It is essential to assure control over the discharge of wastewater, to ensure co-ordination of control /enforcement exercised by MoEW, MoI, MAFAR, MoH, and LGs and to raise sanctions and penalties for polluters.
- **make funds available.** It is necessary to provide exemptions for farms which do not discharge waste water and develop small scale animal breeding funding programs and to promote financially ecological animal breeding in the mountains

(iv) Introduction of environmentally sound forest and wetland management methods

In order to reach this result activities need to be undertaken in the following fields:

- Natural forests;
- Ecological network;
- Timbering;
- Wetlands.

It is expected to:

- **ensure the protection and conservation of natural forests.** It is key to terminate the process of substitution of natural forests with intensive crops (Main river Danube), to review the current projects and activities, to implement procedures for modification of current projects, to create appropriate conditions for all natural forests, including those which are not a part of the forest fund, to train staff for forest protection and conservation, to make funds available for forest protection and conservation, to harmonize national legislation with EU directives on habitats, birds and water, to implement an adequate legislative framework, to involve NGOs in the reform process, to speed up restoration of ownership over forests and to train new owners

  Proposed Projects:

  - *Completion phase of the Green Danube Project for the Islands in the Danube: Vidin – Nikopol, Svishtov – Silistra*
  - *Project for adapting the legislation of forestry to the EU directives*
  - *Project for public support for the forestry reform*

- **implement a pilot project for ecological network** (in the Ogosta, Iskar and Vit river basins). It is needed to identify all areas for restoration, to design projects for prospective areas, to restore local forests /including flooded ones/ - central + western zone, to ensure funding for restoration through national + local funds

  Proposed Projects:

  - *Public project for development of an Econet in the basin of the Ogosta, Iskar & Vit rivers*
  - *Restoration ecological balance in the wetlands and flooded forest of Genchov Armyan*

- **restrict illegal timbering.** It is necessary to support NGOs in creating volunteer networks for combating trespasses, to step up effective control (MAFAR, MoI, MoEW, LG), to enhance the efficiency of protection through adequate programs, to raise public awareness against illegal timbering and to regulate timbering

  Proposed Projects:

  - *Project for establishment of an NGO network to combat poaching*
  - *Project for institutional assistance to the forest guards (National Department of Forests and municipalities in the Skat and Ogosta river basins*

- **implement projects for restoration of wetlands.** It is indispensable to restore the biodiversity and bioresources of wetlands, to ensure ecological water levels for the wetlands, and to declare new wet zones as protected: Klimok, Orsoya, Metka

  Proposed Projects:

  - *Project for restoration of the wetlands in the Belene and Vardim islands*
  - *Project for management and use of the reeds massif*
  - *Project for the restoration of the hydrological regime of the Nova Cherna wetland*

In order to obtain the sector objective, the proposed ***projects of high priority*** are as follows:

- Adaptation of the EU methods for assessment the pollution load from non-point sources;
- Development of a hydrometric system for the Karaissen irrigation system;
- Restoration of the Belene Island wetland;
- Restoration of the Vardim wetland.

3.1.4. Important Assumptions for the Sector

The group has analyzed the sector objective and the implementation of the planned strategy. Though a complete set of activities with their elements and particular projects are envisaged, the participants recognize the fact that external conditions exist which are of crucial importance for the achievement of the planned results and objectives. These external factors are out of the control of the planned program or are implemented under the authority of other national or international bodies and organizations.

The following assumptions at the **activity level** have been identified to achieve the sector results:

- **Conditions clarified**

  One of the most important embarrassments for the implementation of adequate plant growing practices is the unclear situation of land ownership. The land reform is under way for too long and faces many problems of political, economic, legal and cultural kind. The clarification of legal and other conditions can be initiated on high political levels but also on the level of the regional agrarian commissions.

- **Justified price for irrigation services**

  During the period of transition, the existing irrigation system "lost its owner" and because of the changing price for water and the lack of new modern water legislation, the price for irrigation services is currently not clear, neither can it be justified. This problem can be solved by the Ministry of Environment and Waters and the Ministry of Agriculture, Forests and Agrarian Reform through improvement of legislation and regulation.

- **Prices of energy resources are publicly affordable**

  Due to the transition period, the prices for energy resources increased rapidly which causes difficulties for proper irrigation practices. This problem can be solved in the process of the overall development of economic restructuring in Bulgaria and is an important condition to achieve the sector results.

- **Sanctions on illegal timbering are effectively applied**

  Legislation in the field of forest management has been updated but its enforcement is very unsuccessful. The responsibility for measures to enforce legislation lies with the Ministry of Agriculture, Forest and Agrarian Reform.

On the **result/output level** the following assumptions were identified to achieve the sector objective:

- **Adequate water quantities are supplied on time**
  Better management of water balance on the national level could be the condition for regulation of the time issue.
- **Adequate waste water treatment**
  New technologies for wastewater treatment for animal breeding farms and proper composting practices for manure can improve the conditions. Responsibility for lies with the Ministry of Agriculture, Forestry and Agrarian Reform.
- **Drying of wetlands is terminated**
  Restoration of water regimes destroyed by the digging of the Danube bank is needed. This can be achieved through the construction of hydrological facilities.

3.1.5. Impact Indicators for Sector Results

To assess progress towards achieving the targets, verifiable impact indicators need to be stated. They define the contents of the objectives and results in operationally measurable terms (quantity, quality, target groups, partner institutions, time period and place)

Impact indicators for sector objectives have already been presented in chapter 2.3.4. For the particular sector results the group identified the following indicators:

For the result 1.1 – Adoption of adequate plat growing practices:

- **Ground water quality is improved. Nutrient content has diminished by 15%. Compliance with EU potable water standards in the Roussenski Lom River basin is achieved by the year 2015. (R-1)**
  This is the most important condition for preserving thee Black Sea and it is a reachable indicator. The particular river basin was chosen because of monitoring facilities, which are existing in the area.

For the result 1.2 – Implementation of appropriate irrigation practices:

- **Salinization reduced in 20% of the saline areas through adequate farming methods by year 2005 in the region around the town of Svishtov. (R-2)**
  The salinization is caused by over-irrigation. In Svishtov the situation is worse than anywhere else is.

For the result 1.3 – Reduction of negative impact of animal breeding farms:

- **The surface water quality is improved. Suspended solids reduced by 70%; BOD5 reduced by 60%; nutrients reduced by 35% and the requirements for category II are achieved by the year 2010 in the Yantra river basin. (R-3)**
  The implementation of environmentally friendly agricultural practices and proper wastewater treatment can be monitored through this indicator. The Yantra River basin is a pilot area for most of the projects in the Bulgarian Danube River basin.

For the result 1.4 – Introduction of environmentally sound forestry and wetland management practices:

- **Preserved biodiversity on 1 500 ha of natural forests and 2 000 ha of wetlands along the Danube and restored 1 000 ha of forests with indigenous species in the Ogosta, Iskar and Vit river**

  This will lead to great improvements of the water quality in the whole Danube River Basin.

3.2. Industry

3.2.1. Situation Analysis

3.2.1.1 Importance of the Sector and Activities Leading to Water Pollution and Environmental Degradation

The Bulgarian Environmental Strategy Study, developed in 1992 by experts from the Ministry of Environment and Waters and the World Bank, includes, among the priorities in water management, a reduction of industrial contamination, especially toxic substances e.g. heavy metals. Recommendations are made on revising the standards for wastewater discharge, development of permission system, revision of the fee system and introduction of environmental audit for the main sources of contamination.

In the area of the Danube River basin there are more than 130 significant industries representing practically all the industrial branches (See Annex 1). They discharge annually about 200 million cubic meters of wastewater. These quantities vary from several hundred cubic meters per day to several hundred thousand cubic meters per day (e.g. Kremikovtzi). The range of pollutants is very wide - SS, BOD_5, COD, Nitrogen in different forms, Phosphorus, heavy metals, etc.

The participants in the workshop agreed that the basic polluters discharging heavy metals and other toxic substances are the industries, which from time to time also release polluting substances due to emergencies and accidents. The efficiency of all the existing treatment facilities is not satisfactory. Some industries do not dispose of any wastewater treatment. A significant problem caused by the industrial activities is the existence of past pollution resulted by ceased productions or abandoned sites where no proper closure has taken place.

Most organic polluting industry can be dealt with in Municipal Waste Water Treatment Plants (MWWTPs) of the towns in the catchment area. The main problem areas with industries that are not organic in origin, are the discharged heavy metals or other pollutants.

The potential projects that will be defined in the industries will be directed towards both process-oriented solutions and end-of-pipe solutions. To improve the present situation in Bulgaria with respect to the environmental performance of these industries, an assessment of each industry will be made in long term. The outcome of these assessments could be recommendation for application of cleaner technologies, or treatment of the effluent in an industrial waste water treatment plants, or discharge to a public sewer for treatment in municipal waste water treatment plant.

Since 1994, a large part of the industries have worked either with reduced production capacity or completely ceased their operation activities. Thus, water quality has improved correspondingly but not due to the application of up-to-date low water use or waste-less technologies. The general lack of sustainability of industrial practices due to the heavy economic frame caused by the transition leads also to unfavorable environmental consequences.

3.2.1.2. Current Strengths/Assets and Stakeholders Involved

Assets

During the workshop in the frame of the Situation Analysis the available resources/opportunities or better said the available assets have been defined. They are presented in Annex 2.2. of this report.

- **Legislation and Policy**

  In the field of legislation and policy there are number of assets which create a relatively favorable frame for future activities and measures that need to be implemented. Enacted in December 1991, the **Environmental Protection Act** contains general provisions, as well as specific provisions on collecting and disseminating information on the state of the environment, controlling the state of the environment, environmental impact assessment, the rights and duties of state and municipal authorities, and liabilities associated with environmental damage and pollution.

  The Act provides legal authority for the **Polluter-Pays-Principle** and provides formulae for allocating pollution fees and fines to municipal environmental protection funds and the national environmental protection fund. It calls on the Council of Ministers to prepare and submit to the National Assembly an annual report on the State of the Environment. It also establishes controls on transboundary movements of solid waste, including hazardous waste; establishes the right of individuals and public entities to access the available information concerning the state of the environment; rests responsibility for collecting information on the state of the environment with (a) the Ministry of Environment and Waters (MoEW), (b) the Ministry of Health (MoH), (c) the Ministry of Agriculture, Forestry and Agrarian Reform (MAFAR), and (d) the National Statistics Institute; confers to these authorities responsibility for controlling the state of the environment and pollution sources, in conformity with control methods endorsed by the Minister of Environment; initiates Environmental Impact Assessment procedures; and establishes the range of fines to be applied for specific damages to the environment by individuals or firms. Supplementary provisions define dangerous materials and waste as those which damage or may damage human health, the flora or the fauna and the quality of the environment when being produced, transported, stored, used or disposed.

  Regulation No. 1 on Environmental Impact Assessment (EIA), promulgated first on December 28, 1992 and revised on August 7, 1995, sets the terms and procedures for conducting an EIA pursuant to Chapter 4 of the Environmental Protection Act. It provides a broad definition of environmental impact assessment dealing with impacts on various media and resources. The investor or person initiating an activity shall bear the costs of an EIA. The stages of the EIA process are: (1) preparation of a preliminary report, (2) discussion of the program and the EIA report, (3) incorporation of comments in the final report, and (4) decision on the EIA as a condition for approving or rejecting the project.

  Regulation No. 2 on EIA was promulgated on August 7, 1995. It establishes specific requirements for experts conducting EIAs as well as licensing procedures for these experts.

  Regulation for economic sanctions for air, water and soil pollution from 1978 has been revised, updated and adopted by the government as *Decree No 24* from 04.02.1993. Fines and sanctions are imposed for pollution exceeding the admissible limits. The fine amount is determined on the basis of the mass and toxicity of the discharged pollutants.

  The sanctions are distributed according to the Environmental Protection Act in the National Environmental Protection Fund (70%) and the Municipal Environmental Protection Funds (30%) and may be used only for financial support of environment protection activities.

Privatization process based on Privatization Act and carried out by the Privatization Agency can be also considered as an asset. The Privatization Act defines the liability of the state in relation with the past pollution. Difficulties faced in the privatization had lead to development of methodology guidelines for assessment of damages caused by past pollution.

In order to improve the enforcement of the regulations, particular emphasis has been given to the development of an **efficient monitoring system** combined with improvements in the collection and dissemination of environmental data. A National System for Ecological Monitoring and Environmental Information (NSEM) has been created and funded initially from the state budget.

All main river basins are covered by the surface water monitoring web. Monitoring is being made at 331 points: 275 along the tributaries, 21 at the Danube River, 24 at the Black Sea coast and 11 at the lakes. The samples are analyzed by 33 parameters every month. The results are published every quarter and summarized in an annual report. Monitoring of the groundwater is made at 276 points. Since 1992 the responsibility for monitoring of all surface and groundwater has been undertaken by MoEW. The created background has permitted MoEW to define the so called "Hot spots" and to concentrate the relatively limited resources in order to address the most pressing needs. The "Hot spots" list is periodically updated reflecting the changes of the environmental characteristics - some problems are solved, others appear and need priority solution.

In order to carry out preventive control and to liquidate accidental consequences the competent authorities such as the Civil Defense Department, the Fire Protection Department, MoEW and their Regional Environmental and Water Inspectorates (REWI), MoH and the relevant Regional Hygiene-Epidemiological Inspectorates (HEI), municipal administrations and others combine their efforts into Regional and National Commissions for Prevention of Natural Disasters and Industrial Accidents.

- **Human Resources**

The available human resources are another important asset. In the country, significant technical expertise exists, concentrated in consulting, engineering and construction firms, as well as within the industry sector. These are well prepared and experienced specialists whose knowledge could be used very positively to solve problems of different nature and character. There are also a number of NGOs and some of them are very active and are well appreciated by the public.

- **Technical Resources**

Recently Methodology Guidelines for Assessment of Past Pollution from Industries have been adopted. Acceptable technologies for rehabilitation and water treatment are also available in the country. Construction firms and industries have relatively good equipment on hands, even though it is not yet "state-of-art". Many of the industries have their own WWTP.

- **Financial Resources**

The financial resources have an essential role in all activities mentioned above. Given the limited resources of the industries to face their problems, the participants underlined them as a very important asset. Available environmental funds are:

- National Environmental Protection Fund
- National Trust Eco-Fund
- Municipal Environmental Protection Funds

The first and the third one accumulate their income from the environmental sanctions imposed to violators, a percentage of the price of the liquid fuels, a percentage of the privatization deals and others. The second one is a result of a "Debt for Nature" swap agreement among the Swiss and the Bulgarian governments.

Foreign sources can also give a further input for pollution reduction activities in the Bulgarian part of the Danube River basin using different forms such as grants, loans, financial and technical assistance (PHARE, GEF/UNDP, UNIDO's TEST Program, World Bank, bilateral cooperation, etc.).

Stakeholders

Three groups of stakeholders could be identified as organizations/institutions, polluters and affected group.

Organizations/institutions

Ministry of Environment and Waters (MoEW) is the principal stakeholder which has the responsibility to develop and promote the national policy in the field of environment, to carry out the environmental monitoring and control through its **Regional Environmental and Water Inspectorate (REWI)** and the **National Center on Environment and Sustainable Development**. Achieving its goals and realizing its functions MoEW interacts with **Council of Ministers** on drafting of legislation and elaboration of year report on the state of environment. In the field of drinking water standards, microbiological contamination and risk assessments the main counterpart of MoEW is the **Ministry of Health (MoH)**. They both together with the **Civil Defense (CD)** cooperate in protection of the population from industrial accidents. In this field CD department has the major role.

The overall frame of activities undertaken both by the MoEW itself and in interaction with other institutions is addressed also to limit impacts on the environment and to eliminate environmental consequences originated by industrial activities considering the following measures: harmonization of the legislation, adoption of new legislation, introduction of permitting regime, implementation of strict sanctions for excessive use of conditionally clean water, introduction of chemical safety audits, introduction of environmental and health risk assessment, introduction of economic incentives and regulators system promoting environmentally sound technologies, establishment of environmental funds for elimination of past environmental damages, development of inventory and past pollution cadastre, development of programs eliminating or restoring the damages, development of waste containment governmental programs, improvement of the environmental management systems (EMAS, ISO 14001).

In privatization issues the major stakeholders are **Privatization Agency (PA)** and the other Ministries such as **Ministry of Industry (MoI)**, **Ministry of Trade (MoT)**, **Ministry of Agriculture, Forestry and Agrarian Reform (MAFAR)**, etc. PA is responsible for privatizations of the biggest industrial plants while for the smaller ones the ministries take care. The functioning of the Privatization Agency has a direct impact on the accelerated change of ownership. This is an essential condition to improve the overall economic environment in the country.

Polluters

Among stakeholders in the overall frame there is also a number of companies such as **consulting and engineering firms**, **construction enterprises** as well as **the industries themselves**. Their common efforts could promote improvement of the environment by means of the following measures: introduction of economic mechanisms promoting the implementation of environmentally sound technologies, construction of local WWTPs, development of individual site remedial programs, introduction of self monitoring, introduction of the best available waste water treatment and production technologies, development and introduction of employee training programs, discontinuation of production when necessary, estimation for the development of the industrial activities.

Affected groups

Other important stakeholders are the **non-governmental organizations (NGOs)**. They could support a set of measures which are relevant to the scope of their activities: wider involvement in specific program development, introduction of a public control system, development of information, educational and training programs for the public, participation in discussing the environmental priorities.

3.2.1.3. Analysis of Transboundary Effects

As mentioned earlier, there are no transboundary effects, according to the data available. The share of the Bulgarian tributaries in the overall river Danube water quantity and quality is insignificant.

The only exception, directly related to water pollution, is the water transport along the river. In the last years the traffic increased but the amounts of ballast, waste water and wastes submitted by the ships to the port authorities for treatment in the specialized installations decreased. Obviously, the control of the port authorities is insufficient and most probably some of the vessels pollute the Danube, discharging illegally their waste water directly into the river. This is a typical example of a negative transboundary impact caused by international navigation.

3.2.2. Sector Problem Analysis

3.2.2.1. Core Problem

Water quality in the Danube River basin is considerably affected by industrial pollution. High loads enter into the receiving water bodies and abandoned sites pose a significant risk for the human health and the environment.

The participants have retained for the industry sector the following core problem:

“POLLUTION FROM INDUSTRIAL ACTIVITIES“

3.2.2.2. Causes Leading to Environmental Problems

The causes leading to significant pollution from industrial activities are as follows:

- Past Pollution due to Closure of Industrial Sites
- Discharge of Waste Water
- Unsustainable Industrial Practices

Most of the causes are common for the different industrial branches, so they are discussed for the overall sector.

(i) Past Pollution due to Closure of Industrial Sites

Past pollution most commonly is result of improper realization of closure activities or lack of such measures. The sources of contamination originated by past pollution usually pose significant risk to the human health and the environment. Discussions resulted that past pollution is reflected in the following causes:

a. Technology Constraints

Inefficient technology, both in the production processes and the realization of closure activities is one of the technology constraints in the past pollution context. Inefficient technological processes are always the cause for higher contamination. Inappropriate closure technology originates directly from polluted site. The technology constraints also are linked to poor technological discipline and poor access to information and know-how for advanced technologies.

This set of problems is also related to the insufficient funds available for the sector due to the delayed reform and the lack of pro-active company management. In fact, managerial attitudes vary from no-action to reactive management. From this point of view, the management in the sector could be defined as poor.

b. Poor Past Projects for Site Closure Activities

It would be unfair to say that projects for closure have never been performed and implemented within the last years. However, the participants agreed that in the majority of the cases of realization of such projects, apart from the reasons mentioned above, such as lack of sufficient funding and poor company management, the cause for the poor performance of the projects were the low consideration of the problem, the lack of back line information and, as an important issue, the lack of public access to information. People simply did not know the real state of the problem and have been deliberately kept non-informed.

c. Bad Housekeeping of Enterprises

In the majority of the cases in the industry sector, the main concern, both of the state and the managers, used to be the production output of the plants. Housekeeping was considered a secondary issue that does not need big attention. The main reason for this situation is that, in the conditions of a centralized economy, state ownership does not create conditions for high commitments and, in particular, for the closure of sites in compliance with the law and in a technically proper way.

(ii) Discharge of Waste Water

The second direct cause for the pollution from industrial activities defined by the participants in the workshop was the discharge of industrial waste water. The problem has two main aspects reflected in the following causes:

d. Low Efficiency of Treatment Facilities

For the low efficiency of the existing treatment facilities three groups of problems were identified that influence in a different manner. These are inadequate treatment operation, use of hazardous but cheaper raw materials and unfavorable framework conditions.

Inadequate treatment operation is linked to inefficient treatment technologies and poor maintenance of treatment facilities. During some years the established designing and calculation methods were misconcepted. The experts were forced to use typical designs and elements in an excessive manner, which lead to over-designing of some installations and a delay in the development of new technologies. Regarding the origin of equipment (e.g. national production, socialist country production and free market production) heavy

restrictions existed and the experts frequently had to use inefficient, unreliable, energy high consuming and over estimated treatment equipment. The attention of the company management is low - usually the managers considered water treatment as an insignificant activity far from their scope of work. As a result, the waste water treatment plants were understaffed and the personnel did not have the suitable qualification.

The **use of hazardous raw materials** is cause of the low efficiency of the treatment facilities. Main reason is that these materials usually are cheaper at the market and given the condition that no financing is available for the majority of the industry and no suitable economic regulators exist to promote use of more environmentally sound raw materials.

The **framework conditions** under which the sector operates and, in particular, the treatment facilities are really unfavorable. On the one side the process technologies in the industries are outdated and antiquated, on the other side the regulatory framework, especially related to water protection, needs considerable updating.

e. No Treatment Facilities

The lack of any treatment facility was identified as the second aspect of high concern in the context of industrial waste water discharges. Unfortunately some significantly polluting industries discharge their waste waters without any even preliminary treatment.

(iii) Unsustainable Industrial Practices

Discussions about industrial practices resulted in the consensus that bad or unsustainable practices generally are the cause for pollution from industrial sector. This creates usually big problems in maintenance of environmentally sound operation. The following causes were pointed out by the working group:

a. Insufficient Control

There are several issues that influence the control exercise. Sometimes there is **no appropriate technical equipment** or, even worse, no funds to buy it or to physically carry out an efficient control (e.g. lack of transport means, fuel, etc.). Another aspect that has an important impact is the **insufficient cooperation among the institutions**, which are involved, in the controlling process. The **incompleteness of the environmental regulations** (e.g. emission standards, permitting system, etc.) and the overall **unfavorable frame conditions** due to the state of transition also create difficulties for the realization of efficient control.

b. Technical Constraints

A group of technical elements that, together, have an impact on industrial practices were defined as technical constraints by the Working Group. The first element is **outdated technologies applied in the whole sector**. The lack of up-to-date and environmentally friendly technologies has an unfavorable impact on, both the economy and the environment. The outdated technologies cause higher resource consumption (raw materials, energy and water) and a discharge of contaminated emissions containing a variety of pollutants such as toxic or persistent substances.

Another element included into the group of technical constraints is **the non-implementation of Environmental Management System** (EMS) in the industrial plants and within the sector as a whole. It restricts the possibilities for the identification of environmental impacts, risks and improvement, assessment of compliance with environmental policies and legislation. It is, thus, difficult to define basic principles on environmental responsibilities and to establish short-, medium- and long-term goals to improve environmental performance. A direct consequence of non-implementation of EMS is the lack of self monitoring which could enable the industries to make environmentally-sound decisions.

All the above mentioned reflect the poor level of management and the economic conditions of transition. Frequently industries, in order to save financial resources, buy **and use hazardous raw materials, supplies and inappropriate equipment**. These constraints represent one of the main factors to solve the problems in the industry as a sector. Many of the industries have no available, even not the basic, budget to finance the necessary upgrading of their technologies. As mentioned before, there are no economic incentives and regulators strong enough to force the industries to modernize their own production processes.

c. Industrial Accidents

Industrial accidents including process failures or breakdowns could be a source of unexpected very high pollution loads and can provoke serious water pollution emergencies. To avoid that, prevention activities are an essential factor, which cover continuous maintenance and training, existence of emergency plans and means of liquidation of the consequences caused by industrial accidents.

d. Low Involvement of Public

Public awareness is not too high regarding the problems connected with improper industrial practices. With this regard, the role of the NGOs is very important given the fact that both for the industries and the wide public it is more difficult to keep a permanent and positive contact. The NGOs are those who must serve as intermediates between the industries and the public. Unfortunately, their **access to environmental information is poor**. Usually people could keep quiet many years facing an obviously environmentally unfriendly production trying to save their working places. This is one of the reasons for **low public concern** about the unfavorable industrial practices.

The **trade unions** and the branch associations could play a very positive role in this context, but currently they **are not highly concerned about environmental issues**. Their role in establishing a system of cooperation with the state and in negations on voluntary agreements is still weak.

3.2.2.3. Environmental Effects

The direct consequences of the sector core problem, which were defined by the participants during the workshop are:

- Health risk
- Landscape degradation
- Destruction of ecosystems
- Environmental pollution
- Accidental pollution
- Excessive water use

Pollution from industrial activities reflects directly on the food chain and potable water supply, which creates **health risk** for the population as well as for the hired workforce in the industries.

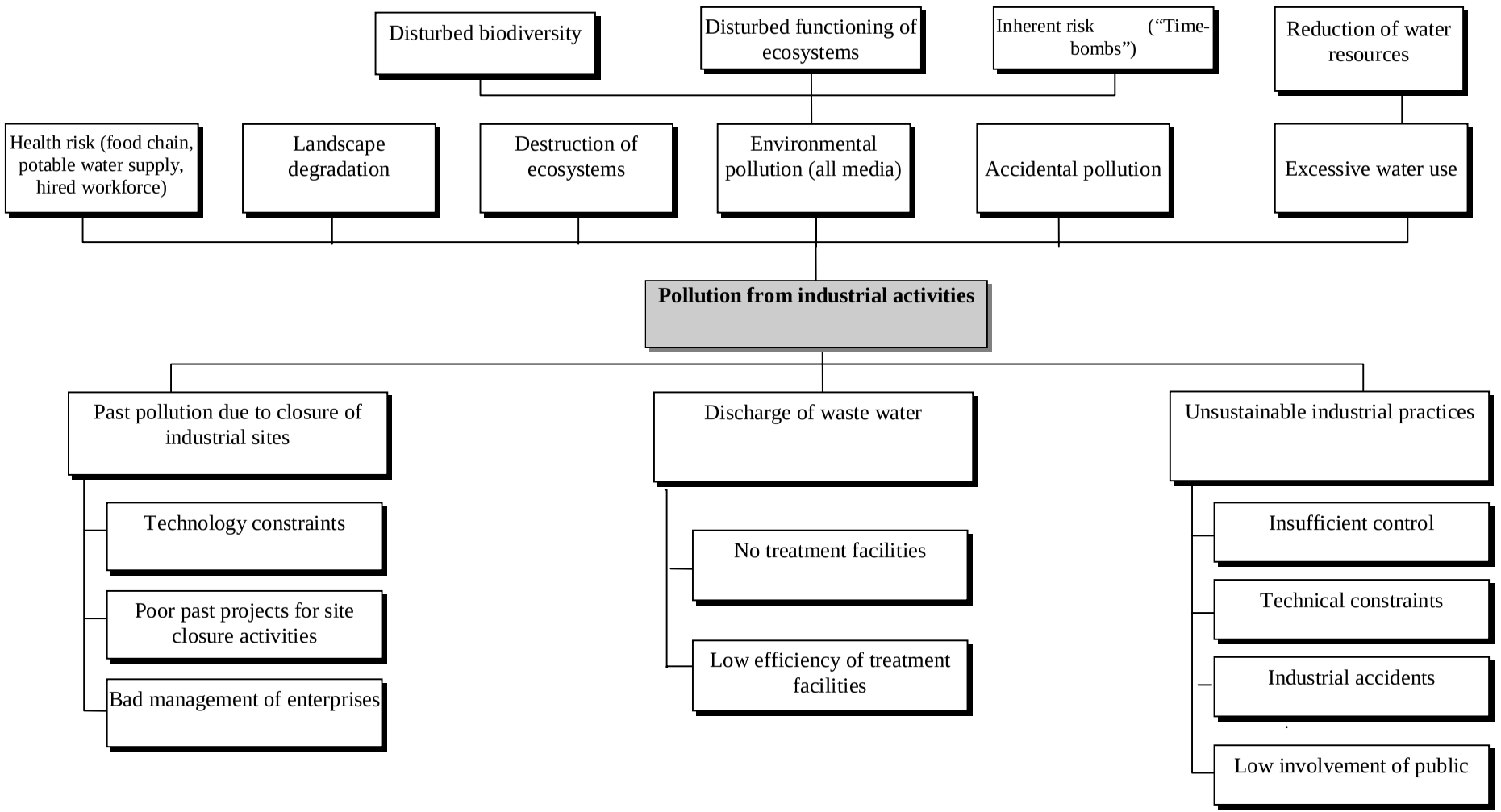
Landscape degradation and **destruction of ecosystems** are environmental effects observed as a result of both improper closures of industrial sites and unsustainable industrial practices.

The pollutants migration in the environment has consequences in all environmental media. The results of **environmental pollution** are **disturbances in the biodiversity** as well as in the overall **functioning of the ecosystems**. Also, it hides **inherent risk**, which could be defined as "time-bomb".

Accidental pollution is directly related to the unsustainable industrial practices as a whole and to the industrial accidents in particular.

Technical and technology constraints lead to **excessive water** use and the result of this is **reduction of water resources**.

General Problem Hierarchy: Industry



3.2.3. Objectives, Expected Results, Actions and Related Projects

Considering the above mentioned problem, the following sector objective has been retained:

"POLLUTION FROM INDUSTRIAL ACTIVITIES Decreased"

In order to achieve the immediate objective three results have been expected:

- Reduction of the impact of past pollution on the environment;
- Implementation of appropriate measures in order to limit the discharge of industrial waste water;
- Adoption of sustainable industrial practices.

Each of these results can be achieved by undertaking specific activities, which were identified by the participants. Following, existing and planned projects were marked down for each activity. The result of this exercise demonstrated that additional projects to implement the strategies for pollution reduction in the Bulgarian part of the Danube River basin are clearly needed and a number of projects were proposed.

(i) Reduction of the impact of past pollution on the environment

To obtain this objective, four main activities are considered. It is foreseen to:

- **prepare an inventory of pollution sites from the past.** This includes classifying the pollution sites by sectors and types of production, identifying all pollution sites from the past, prioritizing by urgency and developing specific projects.
- **undertake measures for improving management.** This activity includes introducing efficient technologies, enforcing technological compliance, involving branch associations for liaison with the government, promoting the development of human resources and introducing training programs for managers and staff.
- **ensure funds for liquidation of past pollution.** For this, it is key to secure funds for whole projects, use privatization and eco-funds as source of funding and develop state financing programs.
- **implement updated designs for closure of industries.** It is important to evaluate available technical archives, develop methods to evaluate old industrial buildings as past pollution, develop specific remedial programs and update designs and application of new technologies for closures.

The ***proposed projects*** related to a reduction of the impact of past pollution on the environment are as follows:

- *Inventorying past pollution upgradeable data base;*
- *Studying of sites for construction of radioactive waste depositories;*
- *Preparation of a long term program for resolving past pollution problems;*
- *Projects for remediation of past environmental damages in specific sites: Sviloza, Zita - Rousse, Kremikovtzi and Zvezda - Olive-oil producing factory in Dolna Mitropolia.*

(ii) Implementation of appropriate measures for limiting the discharge of industrial waste water

The expected result will be achieved by carrying out activities in the following area:

- Treatment technologies;
- Treatment facilities;
- Manufacturing technologies;
- Maintenance and operation of treatment facilities.

It is needed to:

- **introduce efficient treatment technologies.** This activity includes technical analysis of the existing treatment facilities and a feasibility study for their reconstruction, carrying out a study of the proposed treatment technologies following by a study for the proposed treatment equipment, commissioning the design, reconstructing and modernizing existing facilities and ensuring control during the construction.

  Proposed projects for the introduction of efficient treatment technologies concern WWTPs of three industrial facilities in the town of Rousse: Eco Protein Ltd., Bimas Ltd. and Zhiti Ltd. Also, there is a need of construction of a second phase of WWTP in Dolna Mitropolia Sugar Factory.

- **construct treatment facilities.** This includes ensuring a complete project design and study cycle, applying the best available technologies, ensuring continuous oversight during construction of treatment facilities as well as ensuring appropriately trained and sufficient staff as prescribed in the law.

  The ***existing/ongoing project*** for this activity is:

  - *Construction of WWTP for "Orgachim" (East industrial zone) in the town of Rousse.* "Orgachim" is a chemical plant, which consisted of two separate production facilities, located in the East and West industrial zones of the town, respectively. Similar projects are planned for industrial facilities in other towns.

  Proposed projects for the construction of treatment facilities concern:

  - *the alcohol factory within the sugar factory in the town of Gorna Oriahovitsa*
  - *the pharmaceutical plant in the town of Razgrad*
  - *the mushroom canning factory in Krassen Village*
  - *Hlebna Maya, Vinprom Rousse Winery and Zahar Bio sugar factory - all of them in the town of Rousse*
  - *Fazerles in the town of Silistra*
  - *Himko Ltd. in the town of Vratsa*
  - *Elatsite-A Mine*

- **update manufacturing technologies.** It is necessary to prepare an impact assessment of the technological changes over treatment technologies and a definition of an investment project. Further it is key to introduce appropriate economic regulators, seek funding opportunities through environmental funds and ensure them and, finally, implement the investment projects.

  Planned Project:

  UNIDO is developing a comprehensive program to accelerate the *Transfer of Environmentally Sound Technology (TEST)* as part of its mission to assist

developing countries and countries in transition in achieving sustainable industrial development. Sustainable Industrial Development (SID) is defined as a pattern of development that balances a country's concern for competitiveness, social development and environmental soundness. Either absolutely or comparatively, such development accomplishes three things:

(1) it encourages a competitive economy, with industry producing for export as well as for the domestic market;

(2) it creates productive employment, with industry bringing long-term employment and increases national prosperity and

(3) it protects the environment, with industry efficiently utilizing non-renewable resources, conserving renewable resources and remaining within functional limits of the ecosystem.

This program, which is bringing together UNIDO's experience in industrial modernization, technology acquisition and the environment, aims to build capacity in governments and to assist enterprises in addressing their environmental responsibilities within the context of becoming more competitive and responding to social concerns. The core of the program is an Environmentally Sound Technology Assessment System, which is currently being tested in the Philippines. The system is designed to assist enterprises to make informed technology choices that would allow them to have access to advanced technologies which, again, would improve their environmental performance at least cost and, at the same time, enhance their competitive position and respond to their social (employment, training and community) obligations.

There are two ***general proposals*** regarding the update of the manufacturing technologies. One of the proposals is to *develop an integrated system for hazardous materials control*, and the other to *establish a National Chemical Safety Audit Program.*

- **improve the maintenance and operation of treatment facilities.** This includes updating the facility operating instructions, ensuring permanent input-output control for the facilities, optimizing the WWTP staff number, as well as raising its qualification, and management improvement.

  There are ***on-going training programs***, focused on raising WWTPs staff qualification as well as on management improvement. A project is ***proposed*** for the improvement of WWTPs maintenance and operation in Orgatechnica, Silistra.

(iii) Adoption of sustainable industrial practices

In order to achieve this result, it is foreseen to:

- **apply an** appropriate **public relations strategy for stakeholders involvement.** This involves development of an NGO interaction mechanism. It will be also necessary to provide NGOs and the public with access to environmental and health information. Other measures have to be undertaken to involve the mass media in positive policy promotion, creating lobbies for promotion of environmental initiatives, as well as establishing a mechanism for public relations in emergency situations.

  There are ***on-going training programs***, focused on the development and implementation of public relations strategies as well as projects for NGOs TV films and programs broadcasting.

Proposed projects are the

- *Development of a system for involving the community in the decision-making process and control,*
- *Development of a system for environmental and health information dissemination.*

- **establish a program for prevention of the risk of industrial accidents.** This activity includes installing an automatic control and signaling devices, updating emergency plans, developing a plan to eliminate accident consequences, renewing instruction and training sessions and drafting safety operation instructions for small and medium size hazardous production processes.

  For this activity the following projects have been identified:

  Existing Project:

  - The *development* and implementation of the Municipal Emergency Action Plans

  A ***proposed project*** is

  - to implement the requirements of Seveso-II for industrial accident prevention.

- **reduce the use of hazardous raw materials, supplies and equipment.** This activity will be achieved by creating an environmental management system and introducing self-monitoring, defining environmental functions and responsibilities, periodically assessing the control results, evaluating the possibilities for closure of certain production processes, as well as updating measures when it is necessary.

  There is an ***on-going*** Danish ***project*** for the introduction of the IPPC Directive in Bulgaria. A ***proposed project*** is to implement environmental management i.e. EMAS and ISO 14001, which could be followed by a demonstration project in a specific enterprise.

- **implement modern manufacturing technologies.**

  This involves enforcing management capacities, creating lobbies to introduce adequate environmental legislation, searching for possibilities for financial relieves (e.g. import of environmentally sound equipment), promoting changes in the production processes, rather than treatment “at the end of the pipe” and introducing waste minimization technologies and appropriate hazardous waste treatment. Furthermore, it includes implementing disposal technologies of clean technologies with an assessment of the product life cycle and promoting training programs.

  A ***proposed project*** is to train managers in implementing clean technologies.

Concluding this chapter, according to the results of the water quality monitoring in the Danube River Basin and in order to achieve the sector objective to limit the pollution from industrial activities, the proposed ***projects of high priority*** are as follows:

- Inventorying past pollution upgradeable data base;
- Remediating past environmental damages in Kremikovtzi;
- Constructing a WWTP in the alcohol factory within the sugar factory in the town of Gorna Oriahovitsa;
- Completing and putting under operation the WWTP in the pharmaceutical plant in the town of Razgrad.
- Training of managers on introducing environmental management system in enterprises.

3.2.4. Important Assumptions for the Sector

The selected industrial sector has been analyzed in details and important assumptions have been generated. The assumptions were summarized and are listed in the Sector Planning Matrix (Annex 5.2.). These assumptions concern external factors, important for the success of the sector strategy those lie outside its scopes and are not under the direct control of the program. They may affect the implementation and long-term sustainability of the sector strategy. Also, the important assumptions are necessary conditions to obtain the objectives.

The following assumptions have been identified in order to achieve the **sector results**:

- **Environmental legislation is properly enforced**
  An effective compliance strategy and enforcement program can bring many benefits to the society. First, and most important, it is the improved environmental quality and public health that results when environmental requirements are complied with. Second, compliance with environmental requirements reinforces the credibility of environmental protection efforts and the legal systems that support them. Third, an effective enforcement provides fairness for those who willingly comply with environmental requirements. Forth, it can bring economic benefits to individual facilities and to the society.
- **Public involvement is assured**
  Raising public awareness and involving the community in the decision-making process and control are very important in order to achieve sector results.
- **The changed form of ownership has a positive influence**
  Completion of the privatization process is very important, because it will assure funds for renewing the technologies, development and implementation of certain programs, as well as it will support the current program efforts towards achieving proper housekeeping of the enterprises and sustainable industrial practices adoption.
- **Trade unions and branch associations positively cooperate**
  Trade unions and branch associations should take their specific place in the society and play the role of intermediates between the industries and the government in order to influence the decision-making process. Also they should assure that industries' comply with environmental, health and safety requirements. Another important task for the trade unions is to promote voluntary agreements.

The following assumptions have been identified to achieve the **sector objective**:

- **Facilities for treatment and disposal of hazardous waste exist**
  It is very important that facilities for treatment and disposal of hazardous waste are constructed to support program's efforts to limit the pollution from the industrial activities. These facilities are essential for the small and medium size hazardous waste generators in order to solve their hazardous waste disposal.
- **Industries are maintained and managed in line with agreed standards**
  Proper maintenance and pro-active management of the industrial facilities will support the achieving of sector objective.
- **Government authorities and other stakeholders cooperate within agreed legal frame**
  It is essential that all stakeholders establish a link for cooperation between themselves in order to unite their efforts.

3.2.5. Impact Indicators for Sector Results

Objectively verifiable indicators were developed for sector objectives and sector results in order to define the contents of the objectives and results in operationally measurable terms (quantity, quality, target group, partner institution, time period and place). They should give an adequate and precise picture of these objectives/results. Furthermore, they should be measurable in a consistent way at an acceptable cost.

The following impact indicators are to be used to assess the progress towards attaining the sector results for the industry in the Bulgarian part of the Danube river basin:

For the result 2.1 – Reduction of impact of past pollution on the environment:

- **The concentration of fatty acids in the ground water is diminished by 50% and at the same time ground water quality conforms in a higher degree to the background values for the aquifers by the year 2010 at Zvezda Olive-oil producing factory in Dolna Mitropolia.**

  Zvezda is a closed olive-oil-producing factory in the town of Dolna Mitropolia. There is a lagoon, where the retained fats had been accumulated and from where fatty acids could be released to the ground water. A reduction of the concentration of fatty acids in the ground water by 50% after completion of the remedial program will facilitate the evaluation of the success of implemented activities towards a reduction of the impact of past pollution on the environment.

For the result 2.2 – Implementation of appropriate measures for limitation of discharging industrial waste waters:

- **The concentration of heavy metals in the effluent of the Chemically Polluted Waters Treatment Plant (CPWT) of the Zhiti - Rousse plant at the point of discharge into the Roussenski Lom river is reduced in compliance with the admissible concentration for a II category receiving waters by the year 2010.**

  Reduction of the concentration of heavy metals in the effluent of the CPWT of Zhiti - Rousse at the point of discharge into the Roussenski Lom river in compliance with the admissible concentration for a II category receiving waters will facilitate the evaluation of the success of implemented activities towards limiting the discharge of industrial waste water.

For the result 2.3 – Adoption of sustainable industrial practices:

- **The concentration of organic 2 chlorine containing solvents in the waste water from the Antibiotic - Razgrad pharmaceutical factory at the point of their discharging into the sewer (at the industry end-point) is reduced to 0.03% by the year 2010 with the same production rate.**

  Reduction of concentration of organic 2 chlorine containing solvents in the waste water from the Antibiotic - Razgrad pharmaceutical factory at the industry end-point will facilitate the evaluation of the success of implemented activities towards the adoption of sustainable industrial practices.

3.3. Municipalities

3.3.1. Situation Analysis

3.3.1.1. Importance of the Sector and Activities Leading to Water Pollution and Environmental Degradation

In the last decades the untreated or partially treated waste water from municipalities have become a significant source of surface and ground water pollution due to an increased migration out of the rural areas and, consequently, a higher concentration of population in urban areas. The municipalities are ranging from big industrialized cities to small villages. 39 settlements with over 10 000 inhabitants are situated in the Bulgarian part of the Danube river basin.

The volume of water supplied for domestic needs for 1996 was 620 mil.m^3 of which about 500mil.m^3 was supplied to towns, and 120 mil.m^3 to the villages. The utilized water was 54 - 60 % out of total water supplied. In the villages it was even lower from 44% to 52%. The obsolete water supply infrastructure and the inadequate water measurement system cause this low efficiency. The total volume of municipal wastewater, generated in the Bulgarian Danube River Basin, was 547 mil.m^3. The negative impact of the settlements' waste water over the water quality in the Danube river basin is mainly due to the fact that 40% of the waste water is discharged untreated into the river network. The insufficient capacity of the existing treatment facilities and the weaknesses in their operation ensure only 39% biologically treated wastewater.

Waste Water Treatment Plants (WWTP) are in operation only in 12 settlements with over 10 000 inhabitants; in four they are under construction, in other 13 they have complete projects for WWTP. There is a need for at least 9 additional ones. Furthermore, for all plants in operation or under construction a review of their current parameters is needed along with reconstruction and modernization of the facilities or the designs.

Sewage Systems

The insufficient sewage systems create additional problems related with water pollution. The sewage systems are mixed - they collect wastewater from rainfalls, households and industry. The latter has to be locally treated in order to meet the requirements for discharging the wastewater into the municipal sewage network. For a significant part of the enterprises this is not the case. This fact hampers the effective work of the municipal WWTP in the Danube river basin. Actually, in settlements with over 10 000 inhabitants, from which 85 - 100% are connected to the municipal sewage system. In smaller towns and villages this percentage is lower and a considerable part of the households' wastewater is directly discharged into the rivers or in inappropriate underground septic tanks. Problems with ground water pollution arise from the overloading of the network, and from a lack of connecting sewers with the WWTP. A further problem is the improper maintenance of the sewage system, due to a lack of modern equipment and funding resources.

For more than 10 years a governmental strategy for the construction of sewage systems, sewers and WWTP for the whole country has been existing, but it became outdated even before it's implementation. This strategy was designed for a centralized economy and was never funded. Actually, an updated version is in preparation by the Ministry of Regional Development and Public Works.

Solid Waste Management

Another major source of contamination of surface and ground water from municipalities is the inadequate management of solid waste. The collection of solid waste is organized by the municipality but no measures are taken for separation, re-use or recycling of the waste. Currently 230 registered solid waste dumps are in operation in the Bulgarian Danube river basin of which 39 are maintained by towns of more than 10 000 inhabitants. Few of them could be considered as municipal landfills - the main part of them is open dumpsites, which do meet neither technical nor environmental requirements. The hazard of surface and ground water contamination arises from the lack of bottom insulation and leacheate treatment facility, as well as the storage of industrial and hazardous wastes.

The governmental policy on waste management is stated in the National Solid Waste Management Strategy and regulated in the new Waste Management Act, which envisages enhancing the role of local authorities.

3.3.1.2. Current Strengths/Assets and Stakeholders involved

Assets

In the municipal sector, several kinds of assets are available for the future to rely on when measures are to be undertaken to overcome the negative consequences. These can be defined as follow:

- **Legislation and Policy**
  There is clear national policy on waste and water management in the country. A National Solid Waste Management Strategy was recently developed which gives the main mandates to the local governments. The Solid Waste Management Act is already adopted and in enforcement. Municipal Waste Management Programs are currently being developed. Legislation already exists in the field of water supply and sewage. Furthermore, a new Water Act is being developed to harmonize the norms and regulations with European standards.
- **Facilities for Waste Water Treatment**
  Sewage systems and WWTP are in operation in towns over 150 000 inhabitants. In settlements with over 10 000 inhabitants, 12 WWTP are in operation and 4 are under construction.
- **Information and Application of Modern Technologies**
  Through different companies, NGOs and international donors the introduction and application of modern technologies are under preparation in the field of waste re-use, separate collection of solid waste, clean technologies, etc. Information about such technologies is available in the country.
- **Financial Resources**
  The National Environmental Fund at the Ministry of Environment and Waters and the Municipal Environmental Funds exist to provide funding by means of grants or low interest loans for the implementation of projects with national priority. The National Trust Fund, established by the Swiss government as a “Debt for Nature” fund, is also available. The World Bank provided to the country a special US$1.000.000 loan for water supply to support the reform in this field. Several other financial resources are in place, e.g. the bilateral agreement with the Danish government etc.

- **Human Resources**

  The country has well educated and trained personnel in many fields and new NGOs are enhancing their activities in supporting the new waste management models. Institutions and consultant firms have capacity to introduce modern technologies and sophisticated equipment for the solid waste management and the wastewater treatment.

Stakeholders

Three groups of stakeholders could be identified as organizations/institutions, polluters, and affected groups**.**

Organizations/institutions

The institutions of the central and local government are the policy makers and are implementing this policy through law enforcement, execution of programs and projects at different levels.

The Ministry of Environment and Waters (MoEW) has one of the leading roles in the implementation of environmental policy**.** This is the central state administration authority coordinating all environmental issues. Its competencies in the areas of municipal activities and their impact on water quality cover:

- the legal initiative for preparation of all specialized laws in the area of environmental and water management and the implementation of the Law on Environmental Protection;
- the development of national strategies and action plans for water management, water quantity and quality conservation and the elaboration of all relevant regulations;
- the development of the National Solid Waste Management Strategy and the preparation of methodological waste management programs;
- the promotion of concession deals of state-owned utilities concerning waste and waste water management.

The **15 Regional Environmental and Water Inspectorates (REWI)** implement the legislation concerning all elements of the environment - water, air, soil, biodiversity. They perform the state supervision of environmental protection, namely:

- setting and permitting the effluent standards limits and amount of discharged waste water;
- control on the permitted limits for waste water discharges from municipal facilities into the rivers;
- observation and evaluation of the level of pollution, the measures and activities for the water and soil protection from the solid waste disposal;
- charging fines when the permission requirements are not met.

The Ministry of Regional Development and Public Works (MRDPW) develops the strategic and policy documents for water **supply** and wastewater drainage in the settlements. On behalf of the state MRDPW owns part of the water supply and sewage companies, therefor takes care of the operation of the sewage systems and the municipal WWTP.

The MRDPW has the following responsibilities:

- define the order and the mechanisms for privatization of water use facilities and systems;
- participate in the process of water economic planning with the provision of necessary information and argumentation, as well as forecasts of the needs for water in the different communities;
- determine the main activities for the operation and maintenance of the water supply and sewage systems;
- finance the construction of the facilities;
- develop the package of measures for effective use and protection of water in coordination with the Ministry of Environment and Water.

The Ministry of Health (MoH) issues regulations for the standards of the drinking water and through its Regional Hygienic Epidemiological Inspectorates controls the water quality in the water supply system.

The local municipal authorities are in a process of strengthening and play a decisive role in the privatization of Water and Sewage Companies. In their competencies is the management of the municipal solid waste collection, transport and treatment or disposal. The local authorities are responsible for setting and enforcing the appropriate legislative frame and the financial mechanisms, which ensure the financing of municipal activities from different sources.

The river basins authorities are envisaged in the new Water Act as *the institution* carrying out adequate management based on democratic principles and participation of the public. In the Basin Councils, all social groups concerned with the water management, are equally represented: state institutions, regional and municipal administrations, non-governmental ecological organizations, water users and polluters. The Basin Council develops the plans for management of the river basin, organizes public discussion and coordinates with the local authorities the management and control of the implementation of the plans and the activities envisaged.

This group of stakeholders along with their functions related to the management of water quantity and quality in municipalities, the management of used water resources and the waste management, have also coordinating and consultative functions for activities in these areas.

Polluters

The **population** generates wastewaters used by residential households, commercial districts, institutional, and recreational facilities. The problems arise from the low awareness of the impacts of wastewater, the low interest of solid waste separation and the high water consumption of drinking water. Water use from public services includes fire-fighting, the street-cleaning and public parks irrigation, as well as the maintenance of water supply systems. The wastewater and solid waste generated by commercial and institutional facilities depend on their size and number and the type of their functions and activities. Commercial water-using facilities such as laundries or car washes influence the daily variation of wastewater quantity. They also let off in the wastewater special pollutants, such as oil materials and detergents.

The **local industry**, in particular the small and medium size companies, discharge their wastewaters into the municipal sewage system and dispose their solid waste on the municipal landfills. The lack of local treatment or pre-treatment facilities in enterprises causes the hazard of toxic pollution when wastewater from industry is directly discharged into the municipal sewage system. A common practice for the enterprises is to dispose hazardous solid waste on the municipal landfill mixing it with the household wastes. As the municipal landfills usually do not meet the requirements for the disposal of hazardous waste, leacheates and untreated drainage water could contaminate both the surface and ground water.

Hospitals and health facilities produce wastes and waste water polluted with special and high toxic elements. The threat of contaminated waste in the municipal sewage system and the municipal landfills could be eliminated by installing incinerators or other forms of disinfection prior to discharging the waste.

Water Supply and Sewage Companies ensure that wastewater from the population and from all water users is drained and streamlined to the sewers connected with the WWTP or directly discharged into the water course. The companies are responsible for the sound operation of the water supply network and the sewage system, as well as development of water resources, the technical and investment development of the sanitary engineering, the operation and maintenance of waterworks. Moreover they are responsible for the administration, operation, repair, upgrading and modernization of the facilities.

Municipal services have the responsibility to collect, transport and dispose the solid waste from households, commercial districts, institutional, and recreational facilities. The municipalities produce programs for the sound management of municipal landfills and take care of the sanitation and rehabilitation of old dumpsites. The financing is ensured by the municipal budget. However the budget is not sufficient to carry out these tasks, therefore the local authorities are striving to privatize all these activities in order to make the collection of solid waste more effective.

Affected groups

Individual users, including the population, civil associations, owners of land in the vicinity of the water courses, recreation facilities and tourism, are the most affected by the adverse effects of water pollution. The risk for endangering the health of the population arises from the discharge of untreated water, the leacheate and the drainage water of waste dumps. The development of recreation and tourism are hampered by the hazard of water contamination and the possibility that toxic elements enter into the food chain.

Environmentally oriented **NGOs** are very sensitive to water pollution which deteriorate the water ecosystems and the biodiversity. They usually feel more affected and their activity could be used for public awareness raising.

The Water and Sewage Companies, as well as **the River Basin Authorities** are affected by water pollution, as they are under the pressure of the water users. The more surface and groundwater is polluted, the more resources are needed to operate and maintain the treatment facilities and the higher is the price of the supplied water. At the same time, more investment is needed for new treatment facilities.

3.3.1.3. Analysis of Transboundary Effects

According to the data available, the share of the Bulgarian tributaries in the overall river Danube water quantity and quality is insignificant. In almost all tributaries' estuaries, the water quality is covering the requirements for category II (good for recreation and fisheries) i.e. it is better than the water quality of the main stream of Danube entering the Bulgarian territory. Exceptions are the estuaries of Yantra River and Roussenski Lom. But neither in those cases there is a possibility for transboundary migration of pollutants.

Surface and ground water pollution from solid waste disposal is without transboundary effect, with the exception of cases of non-compliance with the regulation for trade or illegal export, transport accidents and improper handling of hazardous solid waste, which could lead consequently to ground water pollution.

3.3.2. Sector Problem Analysis

3.3.2.1. Core Problem

The core problem was defined as the

"NEGATIVE IMPACT OF SETTLEMENTS OVER WATER QUALITY"

The data from the existing water quality monitoring for all tributaries of the Danube River show that urban areas generate a significant pollution. Municipal wastewater treatment plants (MWWTP) are missing in a significant number of settlements or the existing ones are operated improperly. The municipal waste dumps do not meet, nor the technical, neither the environmental requirements for safe waste disposal.

3.3.2.2. Causes Leading to Environmental Problems

The direct causes for this negative impact of settlements over water quality are as follows:

- Improper Waste Management
- Weaknesses in Waste Water Treatment Plants Operation
- Inefficient Operation of Sewage Systems

(i) Improper Waste Management

The improper solid waste management is considered as a direct cause of surface and groundwater pollution because of the toxic and hazardous elements, which could contaminate it. Even in low concentration, toxic and hazardous elements create a health risk when present in the ground water supplied for drinking purposes and also in surface water used for recreation, irrigation or industrial water supply. The following causes of improper waste management were pointed out in the workshop:

a. Illegal Dumping

The health risk arises when a common practice is the illegal dumping of solid waste. This illegal dumping leads to an increase of pollution with a surface runoff and with the leakage in ground water in places, which are neither regulated nor monitored. The existence of such illegal dumpsites is due to **inefficient control** from the responsible institutions. An adequate control system with a **database has not been put in place**. The database should include the type and quantity of the waste generated by each stakeholder with an indication for the site where to dump it. Some **legal regulations are still missing**, which are related with the technical requirements for household landfills, hazardous waste storage facilities, rules for the handling and operation of different types of waste, as well as measures to treat the leacheates.

b. Improper Practices

The operation of the regulated municipal solid waste landfills suffers from improper practices. The lack of specially equipped facilities to treat **hazardous waste from the local industry and the hospitals** leads to the practice of dumping them on the municipal landfills where they are mixed with solid waste from households. Almost all regulated municipal landfills have **no facilities to treat the leacheates** and it is directly discharged into the near-by watercourse contaminating it.

It is very rare that in the municipal landfills the operation technology is strictly observed, such as the requirement to cover the solid waste with soil and to rehabilitate the old dumps properly and in due time. An insulating bottom layer is also missing and the

leacheate penetrates into the soil thus contaminating the aquifers. In all these activities, modern equipment for waste separation, transport, compacting, leacheate treatment, methane burning and land rehabilitation is missing due to the low funding from the municipal budget.

c. Lack of Public Awareness

The lack of public awareness and commitment of the society to be involved in programs to minimize waste generation, to improve waste separation, to re-use household's wastes, hamper the implementation of waste management strategies on national and local level. The **population is not sufficiently informed** about the impact on water quality and on human health from improper waste management. A strong media policy is needed to create the missing public awareness on this crucial problem for water quality in the Danube river basin.

(ii) Weaknesses in WWTP Operation

Discussions on WWWTP resulted in the consensus that weaknesses in their operation are generally a cause for water pollution from the municipality sector. Direct causes for these weaknesses were considered as:

a. Poorly Operating Municipal Waste Treatment Plants

The causes for the weaknesses in WWTP operation are the poorly operating existing municipal WWTP and the insufficient number of WWTP as a whole. Some of the WWTP are build a long time ago and have no sufficient capacity. In almost all cases the problem with the **sludge treatment is not solved**: in one case the **de-watering equipment is poorly operating**, in a second one the digesters are not fully equipped, and in a third the sludge **disposal sites are not sufficient**. A large number of settlements have no WWTP and the existing WWTP have outdated equipment. Difficulties arise from the drop down of the industry and consequently the production of locally made equipment**,** which is more affordable than the imported.

Due to the lack of local treatment or pre-treatment plants in enterprises, wastewater with hazardous substances and different chemicals is discharged into the municipal sewage system and disturb the effective operation of the MWWTP. No adequate quantity and quality of reagents are used to make their operation more efficient, as the imported are expensive and the local production of reagents is not sufficient. Furthermore, in some settlements, not all sewers, which are needed, are constructed and part of the wastewater is discharged untreated into the watercourse before reaching the WWTP. The main cause for the failure of this very important activity for the protection of the water quality in the Danube river basin is the yet continuing insufficient funding.

b. Inadequate Regulations

Another cause for the weaknesses in WWTP operation is inadequate regulations, which hamper, among all, the willingness for investment. The ownership and the management of the MWWTP are three-fold - owned by the state, the municipality and mixed with a private share.

The existing regulations are tailored for the **state ownership only**, which creates problems to all managers. The obsolete equipment and the **low salaries can not motivate the maintenance staff** of the WWTP to enhance its professional skills.

(iii) Inefficient Operation of the Sewage System

The third direct cause for the negative impact of settlements over water quality defined by the participants was the inefficient operation of the sewage systems. This problem has two main aspects reflected in the following causes:

a. Untreated Domestic Waste Water

The inefficient operation of the sewage system affects the water quality by discharging untreated wastewater in the watercourses. In many settlements the **system is not sufficiently developed** and some parts, mainly the suburbs, use septic tanks, which contaminates the ground water.

Usually, the sewage systems in Bulgarian towns were constructed in the beginning of the century and their **capacity is insufficient**. The tubes have small cross-section, the joints are not tight and many times leakage is detected. The old system needs modernization and appropriate maintenance, which has not taken place. The existing special repair equipment is insufficient, obsolete or is missing. The cause of the failure in the operation of the sewage system in municipalities is the lack of financing. The burden of such a large amount of investment actually is unbearable for the municipal budget.

b. Improper Sewage System Management

Another week point is the improper sewage system management. During the years the **underground cadastre** of the tubes' positioning and the facilities' sites **is not properly conducted**.

Nowadays, the management has **neither sufficient information nor a modern information system** to lead the repair activities properly. The lack of an adequate information system and sophisticated equipment for leakage detection hamper the possibility for an efficient control of the sewage system operation. Some obstacles for good management arise from the outdated technical and managerial regulations.

3.3.2.3. Environmental Effects

The negative impact of settlements over water quality reflects directly on

- **Ground Water Pollution**

  Pollution from waste dumps leacheates and untreated drainage water is highly toxic and even with low concentrations affects negatively the ground water used for drinking water supply. Consequently, it creates a high health risk. Discharged into the surface watercourses, the untreated waste dump drainage water affects as well the aquatic ecosystems and the recreation potential and, thus, creates a health risk. Polluted surface and ground water have only limited use for either industry, irrigation or other uses.

- **Surface Water Pollution**

  The direct discharge of untreated water from municipal sewage systems into the surface watercourses creates a high load of nutrients. The result is the degradation of the aquatic ecosystems, which affects the biodiversity in the rivers. The specific pollutants have negative consequences on the species and may enter into the food chain without knowing the hazards for human health. The pollution of surface water affects the recreation potential of the rivers and the riparian areas. Furthermore, practicing water sports in polluted waters leads to a serious health risk. The polluted watercourses crossing the settlements have an unfavorable impact over the hygiene and sanitation of municipalities.

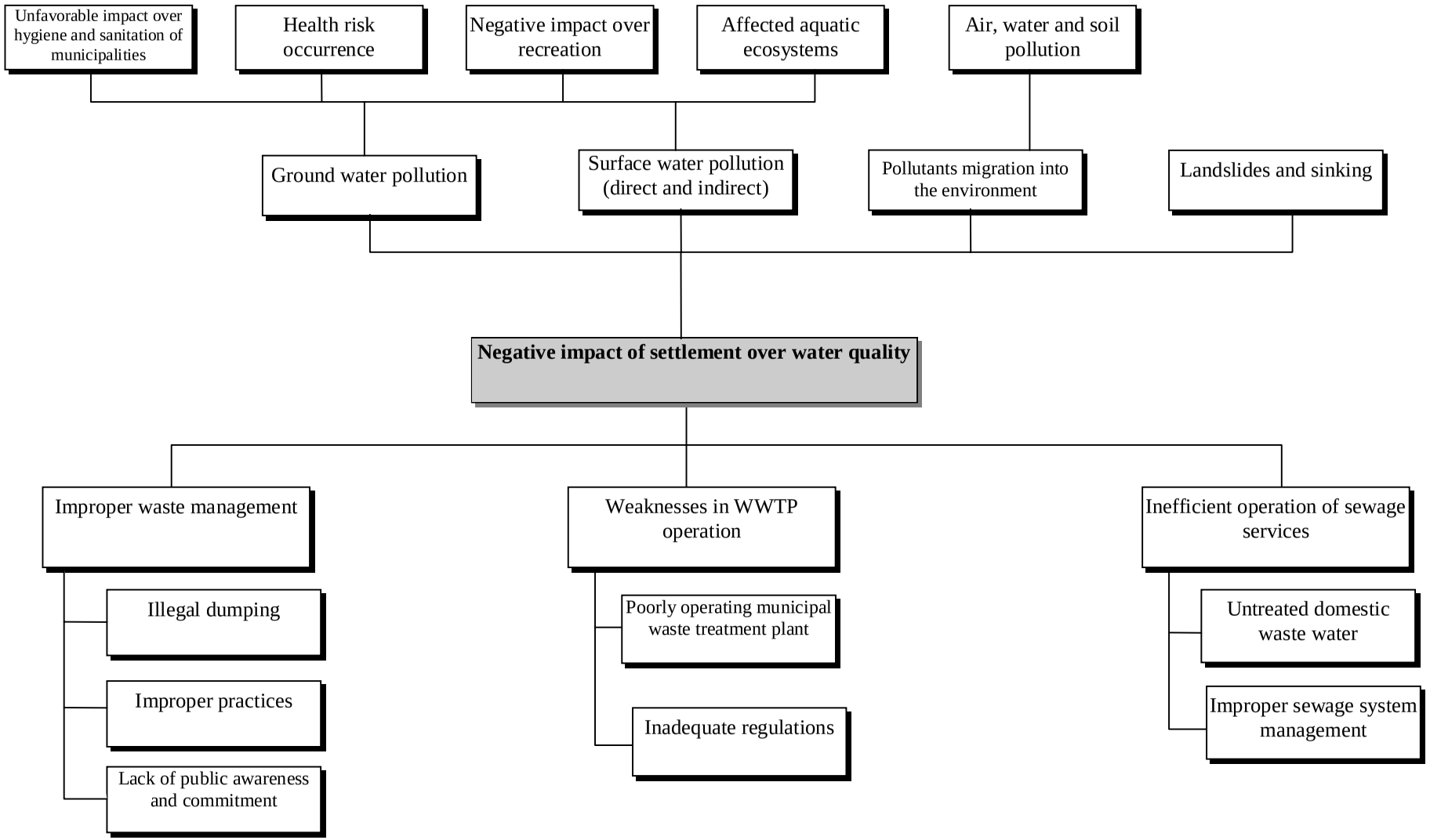
- **Pollutants Migrating into the Environment**

  The pollutant migration into the environment has consequences in the watercourses downstream, as well as in the soil, in particular when used for irrigation. The highly toxic untreated waste dump drainage water affects the air and the untreated sewage water emanates bad odors.

- **Landslides and Sinking**

  A direct consequence of the leakage from the sewage system is landslides when an underground clay layer is humidified. In other types of soil the moisture provokes a process of sinking. The two processes could only be mastered with difficulties, by very expensive technical measures.

General Problem Hierarchy: Municipalities



3.3.3. Objectives, Expected Results, Actions and Related Projects

Taking into consideration the defined core problem and the identified causes leading to environmental problems, after discussions and analysis the following municipal sector objective was retained:

"WATER POLLUTION LOAD FROM MUNICIPALITIES SIGNIFICANTLY REDUCED"

In order to achieve this objective, three results have been expected:

- Implementation of environmentally sound waste management;
- Elimination of weaknesses in MWWTP operation;
- Efficient operation of sewage systems.

Each of these results can be achieved by undertaking specific activities, which were identified by the participants. Following, existing and planned projects were marked down for each activity. The result of this exercise demonstrated that additional projects to implement the strategies for pollution reduction in the Bulgarian part of the Danube River basin are clearly needed and a number of projects were proposed.

(i) Implementation of environmentally sound waste management

To achieve this result, four activities have to be considered in the following areas:

- Funding mechanisms
- Waste management
- Legislation and monitoring
- Public awareness

It is foreseen to:

- **develop funding mechanisms.** This activity includes: ensuring changes of the municipal funding policy, establishing waste treatment associations, differentiating a waste collection fee system and providing special-purpose subsidies from local and foreign financial institutions.

  There is an ***existing project*** to ensure financing through the National and Municipal Environmental Protection Funds and the National Environmental Trust Fund.

  The ***proposed projects,*** related to this activity, are to draft a municipal regulation for differentiated solid waste fees and to establish a consortium for hazardous waste treatment.

- **introduce proper practices of waste management.** This involves developing municipal programs for solid waste management, banning illegal dumping and closing illegal dumpsites. It further involves installing facilities for treatment of hazardous waste and waste from hospitals, stopping dumping of hazardous waste on municipal landfills, limiting the discharge of untreated landfills leacheates, building regional landfills and solid waste sorting facilities and executing sanitation of old dumps.

  There are several ***on-going projects*** related with this activity, such as two pilot projects, one for regional solid waste landfills in Vratza/Mezdra and Veliko Turnovo/Gorna Oriahovitza, one for a separate solid waste collection in three districts of Sofia.

  Some ***planned projects*** are waiting to be financed, such as, in Sofia, the sanitation and capping of the solid waste landfill, the reconstruction of the hospital waste incinerator and the hazardous waste incinerator. Moreover projects are planned for the construction of solid waste landfills in the towns: Razgrad, Dobritch, Cherven Briag, Troyan, Lovetch, Lom, Svishtov, Silistra, Tutrakan, Rousse, Kostinbrod, Novi Iskar and Botevgrad.

  The ***proposed projects*** are technical projects for sanitation and recultivation, the construction of a solid waste landfill in Pleven, Nikopol, Lukovit and Levski and to study new sites for the construction of solid waste landfills in Sofia.

- **introduce appropriate legislation and monitoring system.** It is necessary to develop a waste data base, identify sites with past pollution, harmonize the Limitation of the Impact of Waste Act with EEC&WHO regulations, develop technical requirements regulations, develop instruction for hazardous waste disposal and control the illegal import or transport of hazardous waste.

  The ***ongoing projects*** related to legislation and monitoring systems are the implementation of the Basil Convention requirements and ADR, as well as the development of the National Automated Environmental Monitoring System. Introducing a public Register of Waste and elaborating a uniform monitoring and control method were ***proposed activities*** for projects.

- **raise public awareness and commitment.** This activity includes developing a media policy, as well as public awareness programs and informing the general public by appropriate means.

  An ***On-going project*** related to this activity is the National Clean Environment campaign. A ***planned*** project is the designing of a national program on environmentally appropriate waste management. The ***proposed project*** is the development of a national training program on waste management.

(ii) Elimination of weaknesses in WWTP operation

To achieve this result, the three activities have to be completed in the following areas:

- Operation of municipal WWTPs
- Legislation improvement
- Human resources

It is necessary to:

- **assure effective operation of municipal WWTP.** For this activity it is important to establish an overall management scheme, optimize the technologies, make reagents available, modernize the equipment, provide adequate sludge treatment, improve input-output control, introduce self-monitoring and make this process automatic.

  There are several ***on-going projects***, which relate to the construction or reconstruction of WWTPs or sewers in different areas (see Annex 6.3). The constructions of WWTPs for the towns of: Belogradchik, Sevlievo, Cherven Briag, Etropole, Mezdra, Levski, Berkovitza, Rousse, Silistra and Troyan are ***planned projects***, which wait to be financed. ***Proposed projects*** are for the construction of WWTPs in Gorna Oryahovitza and Lyaskovetz, Popovo, Lovetch and Montana, as well as for a self-monitoring of a WWPT and a project for automatic input-output control.

- **introduce measures for improvement of the legislation.** This involves developing new regulations on fees, tariffs and norms, developing measures for ensuring the law enforcement, reviewing the existing legislation related to this matter and harmonizing it with EU regulations.

  The ***on-going project***, related to this activity, is the harmonization of the national regulatory framework with EU regulations. ***Proposed projects*** are to review the existing legislation and regulations and to control the implementation of the laws and regulations.

- **develop human resources and managerial skills**. This activity includes developing mechanisms for self-financing, optimizing the processes and thus releasing funds for improving the management, establishing a management control system, raising the personnel skills and setting up public relation offices in each WWTP.

  The ***proposed projects*** are formulated as follows:

  - *Provision of free external financial support for improving the existing WWTP;*
  - *Project for optimization of the processes in order to release funds for improving the management;*
  - *Project for the overall framework of WWTP management;*
  - *Project for the automatisation of the management operations in WWTP;*
  - *Project for computerized control in WWTP;*
  - *Training on the management and maintenance of WWTP;*
  - *Creation of Public Relation Offices at each WWTP.*

(iii) Efficient operation of sewage services

To achieve this result, three activities have to be completed in the following areas:

- Domestic waste waters
- Management of the system
- Operation activities

It is foreseen to:

- **ensure collection and treatment of domestic wastewater.** This involves expanding the existing sewage systems, providing periodic monitoring of the elements of the sewage system, clarifying the needs for modern equipment, updating the current cadastre, developing information system and measuring the discharged water quantities.

  Projects regarding the collection and treatment of domestic waste water are ***existing*** for the pump station "Keia" in Rousse, the sewage system in a part of Vidin and the sewers in Samokov and Lom.

  Several ***planned projects*** are waiting to be financed:

  - *Sewer Gorubliane - Sofia;*
  - *Regional information system and GIS for ecozones - Sofia;*
  - *National system for underground cadastre;*
  - *Pump station "Ialta" - Rousse*

  Proposed projects are formulated as follows:

  - *Program for developing an information system on the state and functioning of the sewage network;*
  - *Program for monitoring and control of the sewage system;*
  - *Competition of the sewers in Sofia; Nikopol, Svishtov, Silistra*

- **introduce a sound management of the system.** It is necessary to develop a permitting system, to improve the interaction among enforcing authorities, to involve operational control, to maintain the existing sewage system in good technical state and to renovate the repair equipment.

  With regards to this activity, a ***project*** for inter-institutional coordination of the activities and a project for an updating of the National Program for Development of the Sewage Systems have been ***proposed*** during the workshop.

- **optimize operation activities.** This involves assessing the needs of modern equipment, introducing modern repair technologies, providing leak detection equipment, rehabilitating the compromised sewers, cleaning sand-clogged sewers and, regularly, the inspection shafts, introducing on-site training, eliminating accidents promptly and creating financial incentives for utility companies.

  Projects have been proposed for staff training and for financial incentives, as well as municipal projects for modern equipment and maintenance.

According to the results of the water quality monitoring in the Danube river basin and in order to achieve the sector objective by reducing the pollution load in the most polluted stretches of the Danube main tributaries, the projects proposed with ***high priority*** are as follows:

- River Yantra - Construction of WWTP - Gorna Oriahovitza/Liaskovetz;
- River Roussenski Lom - Construction of WWTP - Popovo;
- River Vit - Construction of solid waste landfill in Pleven
- River Iskar – Completion of the sewers in Sofia

3.3.4. Important Assumptions for the Sector

Having defined the objectives in the municipal sector, several important assumptions were identified, which have a crucial influence on the success of the program and the activities undertaken. These assumptions concern external factors that are not under the direct control of the program. The important assumptions are necessary for achievement of the results and the objectives.

The following assumptions have been identified to achieve the sector objective:

- **Sites are available**
  In the conditions of private ownership of the land, it is extremely difficult for the local authorities to find suitable sites for solid waste landfills and WWTP, where landowners are unanimously willing to sell their property. The other obstacle is the unwillingness of all citizens when a facility for solid waste or wastewater should be constructed in their neighborhood

- **Current economic conditions favorable**
  The activities and projects envisaged in the program could not restore the investment made in a short or medium term. Stable economic conditions are needed to assure the relevant funding and lower the risk for the financial institution involved in the implementation of the activities required.

- **Local WWTP in industry exist**
  The proper operation of the municipal WWTP depends on the quality of the discharged wastewater, as the technology of water purification is a biological one and could not cope with toxic elements. A pre-treatment of the waste water discharged in the municipal sewage system by the local industry is an obligatory pre-requisite for eliminating all toxic and hazardous elements in the industrial waste water.

3.3.5. Impact Indicators for Sector Results

Objectively verifiable indicators were developed for sector objectives and sector results to define them by operationally measurable terms. They should give an adequate and precise picture of the objectives and the results. They should be measurable in a consistent way at an acceptable cost.

The following impact indicators have been used to assess the progress towards attaining the sector results in municipalities.

For the result 3.1 – Implementation of environmentally sound waste management

- **Reduction of the landfill areas with 25% by the year 2010 with consequent improvement of ground water quality in all municipalities of the Danube river basin.**
  Due to the measures undertaken to separate the solid waste, to recycle or to re-use them, the quantity and consequently the volume of the solid waste will be reduced. Such a reduction could be achieved by providing facilities for compacting the solid waste on-place. To measure the reduction of the landfill areas in the whole Danube river basin an inventory of all landfills had to be in place, as envisaged in the program activities.

For the result 3.2 - Elimination of weaknesses in MWWTP operation

- **Reduction of water transfer losses and improvement of the quality of surface water, leading to an increase of usable water resources (category II) with 20 % by the year 2010 in the western region of the Bulgarian Danube river basin.**

  The evaluation of the real average improvement of water quality is difficult to be assessed in the different watercourses, as well as the evaluation of the reduction of water losses by reconstruction of water supply systems. Nevertheless, the combined effect of the two measures could be easily calculated by the water supplying companies by the quantity of water delivered to water users.

For the result 3.3 – Efficient operation of sewage systems

- **Increase ground water use by 10% and increase potable water supply in compliance with EU standard for drinking water, by 2010 for the municipalities in the Danube river basin.**

  The increase of the potable water supply could be evaluated by the increase of samples with drinking water quality. The increase of such samples with 10% shows the increase with the same percentage of the usable ground water resource.

Annexes

1. **Identification of River Basin Areas**
2. **Situation Analysis**
3. **Problem Analysis**
4. **Objective Analysis**
5. **Sector Planning Matrix**
6. **Description of Activities, Important Elements and Projects**
7. **Workshop Organization**

Annex 1 Identification of River Basin Areas

1.1. Western zone: Ogosta, Skat, Iskar and Western River basins

1.2. Central zone: Vit, Osam, Yantra River basins

1.3. Eastern zone: Russenski Lom River and Dobrudja Rivers

1.4. Danube River Course

Physical-Geographical Characteristics	Demographic Characteristics	Transboundary Impacts	Human Activities in the Basin	Negative Forces Leading to Water Pollution
Terrain ➢ Mountainous and semi-mountainous: 72% **Characteristic of the river basin** ➢ High water for the Sofia plain (RISK!) **Numerical parameters** ➢ Plains: 28% (4 880 km^2) ➢ Area: 17 425 km^2 (37.1%) ➢ Average water resources: 1 390 m^3/capita/year ➢ Prognosis for year 2010 natural water resources: 1 180 m^3/capita/year ➢ Irrecoverable water losses: 350 mil. m^3/year (167 m^3/capita/year) ➢ Outflow: 170 mm (2 960 mil. m^3/year) ➢ In low-water years: (95%) outflow – 2.2 times less ➢ Area flooded by the Danube: 227 km^2	**Population** ➢ 480 405 A+B* ➢ 1 607 793 Total C* ➢ Area by municipality: Zone A+B: 9 121 km^2 – 24% – Zone C/ Iskar: 10 071 km^2 – 22.1% ➢ Growth Rate: - 6 to -7 ‰ A+B - 2 to -3 ‰ C ➢ Mortality rate 13.2% to 21.2% ➢ Urban: 56.5 % A+B Rural: 43.3 % A+B ➢ Urban: 85.5 % C Rural: 14.5 % C ➢ Aging Population: 65% past retirement age **Economic Characteristics** ➢ Impoverisation ➢ Depopulation ➢ Lack of livelihood ➢ Migration ➢ Unemployment due to shutdown of industries (Vidin) 14.3 % **Health Status** Balkan Endemic Nephropathy Zone * A – Catchment basins of rivers west of the Ogosta River B- Catchment basins of the Ogosta and Skat River C- Catchment basin of the Iskar River	➢ Kozdoluy NPP ➢ Inflow from the territory of Yugoslavia - 26x10^6 m^3 annually ➢ Transferred water from Nestus and Struma rivers: 65x10^6 m^3 annually	**Agriculture** ➢ Vine growing ➢ Production of vegetables ➢ Grain production ➢ Orchard growing ➢ Irrigated areas - established – 65 500 ha - used – 14 400 ha ➢ Drainage ➢ Animal farms ➢ Poultry farms ➢ Fish breeding ➢ Forestry **Industry** ➢ Ferrous metallurgy and ore mining ➢ Non-ferrous metallurgy and ore mining ➢ Construction of tailings ponds ➢ Food industry (vegetable oil production, milk processing, meat production meat processing, sugar production, canning) ➢ Oil Prospecting; ➢ Chemical & rubber industries ➢ Gas extraction; coal- mining ➢ Glass & porcelain production ➢ Production of construction materials ➢ Wood processing ➢ Pulp & paper industry ➢ Electric & electronics industry ➢ Machine building & metal processing ➢ Tanning, fur coats and shoe industry ➢ Textile industry ➢ Nuclear Power Plant Kozloduy: Cooling water from 3 to 3.5 bil. m^3/year	➢ Improper composting of vegetation waste ➢ Excessive use of pesticides and herbicides; ➢ Discharge of insufficiently treated animal farm waste water ➢ Unusable plant protection chemicals; oils ➢ Excessive use of fertilizers ➢ Potential threat of accidents in unusable pesticide warehouses ➢ Outdated irrigation technologies ➢ Improper storage of pesticides /incl. those that are subject to destruction ➢ Improper composting of farm manure ➢ Discharge of untreated animal farm water ➢ Discharge of untreated animal farm waste water ➢ No waste water treatment plants (WWTP) ➢ Outdated waste water treatment technologies ➢ Discharging of untreated waste water into the receiving waters ➢ Discharge of untreated waste water from industries ➢ Industrial accidents ➢ NPP Kozloduy: discharge of the water from the cooling system into the Danube River.

Physical-Geographical Characteristics	Demographic Characteristics	Transboundary Impacts	Human Activities in the Basin	Negative Forces Leading to Water Pollution
Climate ➢ Climate elements after 1980: Precipitation: 645 mm (470-1100) Evaporation: 455 mm (380-550) ➢ Increase: Air temperature by 0.6 °C	**Water consumption** ➢ Relative share of the population using surface water sources – more than 20% Shortage of drinking water for large cities (Vidin, Montana) ➢ Water per capita: Urban areas Supplied 507 l/person/day Used 215 l/person/day Rural areas Supplied 277 l/person/day Used 130 l/person/day ➢ Population using central water supply: Urban 99.4% Rural 98% ➢ Sources of central water supply– 80.5% ground sources ➢ Population with sewage: Urban - appr.91% Rural – appr.4.8%		**Municipalities** ➢ Population – households ➢ Auto transport ➢ Loss of green areas ➢ Oil storage facilities ➢ Heat generation plants ➢ Waste landfills ➢ Hospitals	➢ No sewer systems in the small settlements ➢ Poor condition of the sewer system ➢ Incomplete sewer system – appr. 60 % A; appr 78% B; ~ 95 % C ➢ Unsatisfactory treatment of municipal WWTP sludge ➢ No municipal WWTP /Vidin, Lom, Montana, Berkovitza, Belogradchik ➢ Vehicles using leaded fuel ➢ No provisions against oil spills ➢ No waste water treatment facilities in heat generation plants ➢ Disposal of hazardous waste in municipal waste landfills ➢ Households waste dumps ➢ Discharge of untreated landfill leachates ➢ Discharge of untreated hospital waste waters/hospital waste

Physical-Geographical Characteristics	Demographic Characteristics	Transboundary Impacts	Human Activities in the Basin	Negative Forces Leading to Water Pollution
Terrain ➢ Protected areas: Kitka, Persin (Belene), Vardim. ➢ Plains: 36% ➢ Mountainous and semi-mountainous: 64% **Characteristic of the river basin** ➢ River bed correction ➢ Erosion ➢ Loss of flood plains and swamps **Numerical parameters** ➢ Area: 13 911 km^2 (29.6%) ➢ Precipitation: 640 mm (520-1060) ➢ Evaporation: 455 mm (380-550) ➢ Outflow: 184 mm (2 562 mil. m^3/year)	**Population** ➢ 966 149 ➢ Areas of Municipalities: 1 536 km^2 – 33.4% ➢ Growth Rate: - 4 to – 5 ‰ ➢ Mortality rate: 13.9% to 21% ➢ Decrease of the number of population in rural areas and change of the ethnic composition ➢ Depopulation of mountainous and semi-mountainous areas: Lovetch and V.Tarnovo municipality ➢ Global tendency of decreasing of the population ➢ Aging Population ➢ Urban: 63.4 % ➢ Rural: 36.6 %	➢ No Impacts	**Agriculture** ➢ Terracing ➢ Irrigated areas are established and used ➢ River bed corrections ➢ Salinization of the Danubian lowlands ➢ Plant growing ➢ Animal breeding ➢ Fish farming ➢ Forestry: Afforestation Timbering Field protection forest belts	➢ Destruction of landscape ➢ Outdated irrigation technologies ➢ Excessive use of fertilizers in the past ➢ Improper composting of vegetation waste ➢ Potential accident in unusable fertilizer storage ➢ Improper composting of farm manure; ➢ Outdated animal farm waste water treatment technologies ➢ Discharging of untreated animal farm waste water ➢ Discharging of untreated fish farm waste water ➢ Deforestation; ➢ Afforestation of species in inadequate areas ➢ Decreasing of floodplains ➢ Drying by intensive forest plants

Physical-Geographical Characteristics	Demographic Characteristics	Transboundary Impacts	Human Activities in the Basin	Negative Forces Leading to Water Pollution
Water resources ➢ Potential: 2 562 mil. m^3/year ➢ 2 652 m^3/capita/year ➢ Water losses: 295 mil. m^3/year (305 m^3/capita/year) ➢ Forecast for year 2010 Natural water resources: 1990 m^3/capita/year ➢ Runoff: 170 mm (2960 m^3/year) ➢ In low-water years: (95%) outflow – 2.7 times less! ➢ Decrease: Precipitation: 15.5% Outflow: 33% **Climate** ➢ Increase: air temperature by 0.6 °C	**Water consumption** ➢ Water per capita: Urban areas Supplied 507 l/person/day Used 215 l/person/day Rural areas Supplied 277 l/person/day Used 130 l/person/day ➢ Population with sewage: Urban - appr.91% Rural – appr.4.8% ➢ Waste water Urban – 182 l/pers/day Rural – 110 l/pers/day ➢ Population with centrally supplied water: Urban 99.4% Rural 98%		**Industry** ➢ Food industry (Sugar production, Spirits production, Wine producing) ➢ Wood processing ➢ Machine building, metal processing ➢ Chemical processing and oil processing ➢ Pulp and paper industry ➢ Oil and Gas extraction ➢ Production of glass and porcelain ➢ Tanning, shoe and fur coat production ➢ Textile industry ➢ Production of construction materials ➢ Construction of small hydropower plants ➢ Ore mining **Municipalities** ➢ Population – households ➢ Waste water treatment plants ➢ Services ➢ Recreation and tourism ➢ Oil storage facilities ➢ Industries discharging into the town sewer systems ➢ Heating (thermal) plants ➢ Landfills ➢ Hospitals ➢ Construction of hydro-technical facilities ➢ Bank strengthening ➢ Autotransport	➢ Insufficient industrial waste water treatment ➢ Outdated/Resource consuming industrial technologies ➢ Discharging of untreated waste water into the receiving waters ➢ Outdated waste water treatment technologies ➢ Industrial Accidents ➢ Past industrial pollution ➢ Improper closure of industrial sites ➢ Destruction of landscape for constructions ➢ Extraction of inert materials ➢ Insufficient treatment of WWTP sludge ➢ Discharge of untreated domestic waste water ➢ Inappropriate maintenance of the sewage network ➢ Improper storage of oil products ➢ Use of old waste water treatment technologies in WWTP ➢ Discharge of untreated industrial waste water ➢ Discharge of untreated landfill effluent water (leacheates) ➢ Discharge of untreated waste water from hospitals

Physical-Geographical Characteristics	Demographic Characteristics	Transboundary Impacts	Human Activities in the Basin	Negative Forces Leading to Water Pollution
Terrain ➢ Plains: 58% Mountainous and semi-mountainous: 42% **Characteristic of the river basin** ➢ Structure of Land Use ➢ Desertification ➢ Erosion of agricultural land by water and wind ➢ Acidification and salinization of soils ➢ Main sources – ground water ➢ Loss of flood plains and swamps **Numerical Parameters** ➢ Area: 15 524 km^2 (33,2%) ➢ Runoff: 24 mm (24-35 mm) ➢ Precipitation: 518 mm (380-800) ➢ Evaporation: 493 mm (430-570) ➢ Decrease: Precipitation: 12% Outflow: 21% after 1980	**Population** ➢ 8042 908 ➢ Areas of Municipalities: 12 104 km^2 – 26.5% ➢ Urban: 56.0 % Rural: 44.0 % ➢ Growth Rate: - 3 to – 4% (-3.8% for Bulgaria) ➢ Mortality Rate: 13.9% to 21.1% ➢ Central water supply sources 80.5% ground water 19.5% surface water F+G ➢ Depopulation of the mountain area ➢ Disease rate/Allergies	➢ Hypsometry of the region (Bulgaria in relation to Romania)	**Agriculture** ➢ Plant-growing Application of chemicals in agriculture ➢ Life stock breeding Fish-breeding ➢ Irrigated areas exist and are used; construction of hydrotechnical facilities ➢ Forestry **Industry:** ➢ Food processing sugar production vegetable oil production meat production and meat processing milk processing wine producing ➢ Timbering and wood processing Pulp and paper producing industry ➢ Machine building and metal processing ➢ Production of construction materials ➢ Production of glass and china ➢ Textile industry ➢ Tanneries and shoe making industry ➢ Pharmaceutical industry (“Antibiotic”-Razgrad) ➢ Electrotechnical and electronic industry	➢ Excessive use of fertilizers and pesticides in the past ➢ Potential danger of accidents in unusable pesticide storehouses ➢ Improper composting of farm manure ➢ Outdated animal farms waste water treatment technologies ➢ Discharging of untreated animal farm waste water ➢ Deforestation ➢ Negative Impacts: Desertification,Erosion of agricultural land by water and wind, Acidification and salinization of soils, over-humidification ➢ Outdated industrial technologies ➢ Industrial accidents ➢ Discharge of untreated waste water into the receiving waters ➢ Outdated treatment technologies ➢ Unsatisfactory treatment of industrial waste water ➢ Improper closure of industrial sites in the past

Physical-Geographical Characteristics	Demographic Characteristics	Transboundary Impacts	Human Activities in the Basin	Negative Forces Leading to Water Pollution
Water resources ➢ Potential: 400 mil. m^3/year ➢ 475 m^3/capita/year ➢ Runoff: 24 mm (400 mil. m3/year) (200 mil. from ground sources) ➢ In low-water years: (95%) outflow – 4.5 times less! ➢ Forecast Natural water resources: 430 m^3/capita/year ➢ Irrecoverable water losses: 20 mil. m^3/year (24 m^3/pers/year) **Climate** ➢ Increase: air temperature by 0.6 °C after 1980	**Water use** ➢ Population with centrally supplied water: Urban 99.4% Rural 98% ➢ Water per capita: Supplied 507 l/person/day Consumed 130 l/person/day ➢ Rousse, Silistra – 5% deviation from the Bulgarian drinking water standard ➢ Population with sewage system: Urban - appr.91% Rural – appr.4.8%		**Municipalities** ➢ Hospitals ➢ Autotransport ➢ Population – households ➢ Heat generation plants ➢ Energy efficiency ➢ Oil storage facilities ➢ Industries discharging into the town sewer ➢ Waste landfills ➢ Tourism	➢ No municipal waste water treatment plants (in Popovo, Rousse, Silistra) ➢ Outdated municipal WWTP ➢ Unsatisfactory treatment of WWTP sludges ➢ No sewer systems in small villages and towns ➢ Poor condition of the sewer system (interrupted connections) ➢ Low percentage of completion of the sewer system ➢ Discharging of landfill leachates ➢ Inappropriate maintenance of the sewer system ➢ Improper handling of generic waste ➢ Improper oil products storage ➢ Landfill lecheates discharging ➢ Improper disposal of hospital waste ➢ Discharge of untreated hospital waste water

Identification of River Basin Areas **Danube River Course** **Annex 1.4**

Physical-Geographical Characteristics	Demographic Characteristics	Transboundary Impacts	Human Activities in the Basin	Negative Impacts
➢ **Characteristics of the Danube river** **Numerical parameters** ➢ Length from 845th km to 375th km = 470km ➢ Average wide: 940 m ➢ Average slope: 5.8 cm/km ➢ Islands 163 km^2 ➢ Floodplains in the lowlands: 723 km^2 ➢ Danube lowlands: 1 280 km^2 ➢ River outflow: *Novo selo* until 1981 – 5 937 m^3/s after 1981 – 5 089 m^3/s Decrease – 848 m^3/s (14.3%) ***Silistra*** until 1981 – 6 492 m^3/s after 1981 – 5 478 m^3/s Decrease – 1 014 m^3/s (32 bil. m^3) (15.6 %) ➢ Suspended sediment load: until 1970 – 37.5 mil. t/year after 1984 – 9.6 mil. t/year Decrease – 28.9 mil. t/year (76%) Silistra until 1970 – 53.2 mil. t/year after 1984 – 22.5 mil. t/year Decrease – 30.7 mil. t/year (58%) ➢ Suspended sediment load from tributaries until 1970 – 18.2 mil. t/year after 1984 – 4.1 mil. t/year Decrease: 14.1 mil. t/year (77%)	**Population*** ➢ Main settlements: Novo selo,Vidin, Lom, Oriahovo, Nikopol, Svishtov, Rousse, Tutrakan, Silistra. ➢ In habitants of the main settlements: 358256 pers. ➢ Unemployment: average 14.0 % variation: from 10.6 to 25.1 % ➢ Birth rate: average 7.6, variation: from 5.7 to 10.0 % ➢ Mortality rate: average 12.1 %; variation: from 9.8 to 31.7 %. ➢ Growth rate: average - 9.1 %; variation: from -2.5 to -17.6 % * Note: All riparian settlements are included in the analysis of the water economy regions.	➢ Operation of the Iron Gate 1 & 2 complexes ➢ Lack of information from Romania ➢ Development of communications – bridges, ferry lines ➢ Destruction of natural bird and fish habitats ➢ Timok River	**River training activities:** ➢ Bank strengthening: – dikes built – 260,7 km by 1960 **Agriculture** ➢ Irrigation ➢ Livestock breeding **Industry** ➢ Water transport – ports and river navigation; – vessel repairs ➢ Fishing – in the Danube – 1942 – 1 687 335 kg 1997 - 972 000 kg – in the Danube wetland – 1942 – 864 120 kg 1997 - None. ➢ Dredging: for navigation and for sand production	➢ Marshes: reduction from 62 km^2 to 17 km^2; ➢ Flooded areas before 1930 – 853 km^2; after 1960 – 62 km^2 ➢ Water intakes for irrigation: 1995 - 17 mil. m^3 ➢ Pumping station for irrigation: 128.4 cub. m/s ➢ Discharges of untreated water from the animal farms ➢ Accidents ➢ sanitation waters - 251 m^3/year **Erosion processes** 1. Irreversible 2. Intensity of bank wearing away up to 15 m/year 3. Highly endangered areas: Vidin, Lom-Cibrica, Belene, Marten Yantra River Estatuary, Popina-Garvan 4. Decreased suspended sediment load delivered to the Black Sea coastal zone 5. Destruction of the delta 6.Negative consequences: – lowering of water level by 0.80 – 1.20 m ! – difficult navigation – increased cost of water supply – difficult supply of waters to wetlands, incl. the nature reserves Persin, Vardim, Srebarna ➢ Incomplete drainage systems in the lowlands ➢ Landslide processes on the Bulgarian banks

Annex 2 Situation Analysis

1.1. Agriculture and Forestry

2.2. Industry

2.3. Municipality

Activities leading to water pollution	**Current Strengths / Assets**	**Environmental consequences of economic activities**	**Transboundary effects**	**Causes leading to inappropriate activities**	**Measures to be undertaken**
➢ Inadequate plant growing practice	➢ Restored ownership over agricultural land (small land owners) ➢ Educational programs (HIoA) ➢ Training (NGOs) ➢ Available scientific potential providing consultancy for the manner, quantity and quality of used fertilizers and pesticides (Research Institutes of the Agricultural Academy/MAFAR) ➢ New technologies from the world practices (MAFAR - Extension Services) ➢ Integrated plant protection (MAFAR, Phare PMU)) ➢ Implementation of biological protection (MoEW, MAFAR Researchers) ➢ Traditions in agriculture/plant growing (farmers) ➢ Environmentally sound (biological) agriculture (MoEW,MAFAR, NGOs) ➢ Agribusiness (MAFAR, farmers) ➢ NGO activities (NGOs)	➢ Transfer of pollutants ➢ Microbial pollution ➢ Surface water pollution (rivers, water impoundments) ground water ➢ Nutrient and pesticide pollution ➢ Water pollution (nutrients, pesticides, herbicides) ➢ Health risk along the food chain ➢ Eutrophication ➢ Threatened ecosystems ➢ Swamping Excessive moisture ➢ Salinization and/or leaching ➢ Erosion ➢ Secondary pollution of soils ➢ Wasteful use of water resource ➢ Gaps in agriculture	➢ Changing fish species in the Danube ➢ Pollution with sustainable pesticides ➢ Reduced biodiversity by loss of habitats	➢ Insufficient financing ➢ Incomplete regulatory framework ➢ Unfinished agricultural reform ➢ Legislative discrepancies ➢ Non-observance of agricosylvicultural technologies ➢ Non-observance of the rules and requirements for work with mineral fertilizers and pesticides ➢ Use of restituted polluted land ➢ Insufficient control of pollution ➢ Low environmental awareness ➢ No public concern ➢ Low worker skills ➢ Non-observance of proper crop rotation	➢ Financing through bank loans ➢ Agricultural modernization financial policy ➢ Use of special purpose funds ➢ Water price. Water use preferences ➢ Financial relieves ➢ Introduction of market policy ➢ Involvement of NGOs in special purpose fund management ➢ Protection of the ecoproducers ➢ Improvement and enforcement of the legal framework ➢ Regulation of fertilizer, pesticide and herbicide use. ➢ Completion of the agricultural reform ➢ Banning of practices causing loss of habitats ➢ Use of proper technologies ➢ Establishment of specialized and secure pesticide storage facilities ➢ Integrated plant protection ➢ Agricultural policy (agriculture and compensations) ➢ Non-use of fresh farm manure ➢ Introduction of biological agriculture ➢ Monitoring systems (introduction) ➢ Water quality control ➢ Soil control ➢ Pesticide sale and use control ➢ Education and training ➢ Regular information to the public ➢ Establishment of extension services ➢ Exchange of experience with countries with developed agriculture ➢ Proper crop rotation

Activities leading to water pollution	**Current Strengths / Assets**	**Environmental consequences of economic activities**	**Transboundary effects**	**Causes leading to inappropriate activities**	**Measures to be undertaken**
➢ Weaknesses of irrigation practices	➢ Existing equipment and facilities (Irrigation systems Ltd.) ➢ Sufficient technical resources (Irrigation systems Ltd.) ➢ Qualified staff (Irrigation systems Ltd./) ➢ Limited financial resources (Irrigation systems)	➢ Eutrophication ➢ Biological element pollution ➢ Erosion ➢ Water and soil pollution ➢ Loss of natural wetlands ➢ Loss of biodiversity and bioresources ➢ Change of the hydrological regime on large areas ➢ Salinization ➢ Excessive moisture ➢ Excessive water use with low efficiency ➢ Positive effects	➢ Pesticide pollution ➢ Eutrophication of water impoundments ➢ Loss of biodiversity	➢ Unfinished agricultural reform ➢ Unclear land ownership ➢ Form of land ownership and system ownership ➢ No adequate irrigation equipment ➢ No trained staff ➢ No realistic water price ➢ Existing financing ➢ Expensive energy-intensive systems ➢ Supplies of inadequate water quantities at the wrong time ➢ No water in some areas ➢ No common policy for the Danube area	➢ Completion of the agrarian reform ➢ Improvement of the regulatory framework ➢ Reconstruction of existing irrigation systems taking in consideration the new land division ➢ Irrigation standards. Training in this aspect. ➢ Restoration and modernization of the existing equipment and facilities ➢ Provision of funds in dry areas with financial preferences for water supply ➢ Adoption of new water pricing method
➢ Discharge from animal breeding farms	➢ Insufficient equipment and facilities (owners, farmer, cooperatives, MAFAR) ➢ Animal farm waste water cleaning technology (owners, farmers) ➢ Different kinds of animal farms - small and medium scale (MAFAR) ➢ Limited financial resources (private small scale farmers)	➢ Ground water pollution ➢ Surface water and soil pollution ➢ Nutrient pollution ➢ Microbial pollution ➢ Health risk ➢ Reduced drinking and other water resources ➢ Damage of natural ecosystems and protected areas		➢ Limited funding ➢ Incompletely constructed facilities ➢ Insufficient treatment of waste water ➢ Insufficient control ➢ No control synchronization between the Ministry of Health, the Ministry of Environment and Waters, the Ministry of Territorial Construction and Welfare, and the Ministry of Forests, Agriculture and Agricultural Reform ➢ Non-compliance with the regulatory framework ➢ Improper composting of farm manure ➢ No knowledge among small-scale farmers ➢ Lack of knowledge concerning farming ➢ Inadequate regulatory framework for small-scale animal breeding	➢ Modernization of manure sites and animal waste settling ponds ➢ Financial relieves for WWTP construction ➢ Introduction of modern methods for waste water treatment ➢ Non-wash cleaning ➢ Waste free technologies ➢ Compost site construction ➢ Construction of local WWTP ➢ Increased fees and penalties for pollution ➢ Control authority support (institutional strengthening) ➢ Improved technology of farm manure composting ➢ Programs for work with small farms (training and support) ➢ Establishment of legislation for small-scale animal breeding ➢ Improvement of the regulatory framework for small-scale animal breeding ➢ Introduction of EIA for large animal farms

Activities leading to water pollution	**Current Strengths / Assets**	**Environmental consequences of economic activities**	**Transboundary effects**	**Causes leading to inappropriate activities**	**Measures to be undertaken**
➢ Environmentally unfriendly forest and wetlands management	➢ Qualified staff and experience (MAFAR, MoEW) ➢ New regulatory framework (MAFAR,MoEW) ➢ Adequate new afforestation financing mechanism (MAFAR) ➢ Clarification of forest ownership (MAFAR) ➢ Forest fund (MAFAR, private forest owners) ➢ Adapted species (forest units) ➢ Established control system (MoEW, MAFAR)	➢ Loss of riparian natural forests ➢ Surface erosion ➢ Landslide activation ➢ River bank break-up, flooding ➢ Extinction of animal and plant species ➢ Reduced water resources ➢ Decreased water table ➢ Nutrient pollution ➢ Increased suspended sediment load ➢ Diminishing tourism possibilities	➢ Loss of flora and fauna	➢ Deforestation ➢ Illegal tree felling ➢ Inadequate control ➢ Intensive crops in natural forests ➢ Inadequate legal framework ➢ Delayed reform ➢ Incompetence in dyke construction ➢ Incompetence in tree felling ➢ Insufficient knowledge ➢ No moneys in the forest protection funds	➢ Control of timbering ➢ Creation of new field protection shelter belts ➢ Increased enforcement against illegal felling ➢ Restoration of some natural wetlands ➢ Afforestation with proper species ➢ Restoration of ownership of forests ➢ Regulatory settlement of processes – production – restoration ➢ Educational program for new owners ➢ Limitation of species substitution ➢ Planning of necessary forest protection budget funds

Activities leading to water pollution	**Current strengths / assets**	**Environmental consequences of economic activities**	**Transboundary effects**	**Causes leading to inappropriate activities**	**Measures to be undertaken**
➢ Closure of industrial sites and facilities	➢ Legal framework (Environmental Protection Act) (MoEW) ➢ Privatization process (PA+MoEW+MI) ➢ Available method for assessment of past environmental damages (PA+MoEW) ➢ Available technical facilities (Construction firms) ➢ Available human potential (Consulting and Construction firms) ➢ Available technologies for land reclamation ➢ NGO activities (Number of NGOs) ➢ National Environmental Protection Fund and a National Trust Eco-fund with priority to finance elimination of past pollution (MoEW + Council of Ministers)	➢ Water, soil and air pollution ➢ Landscape degradation ➢ Health risk (drinking water supply) ➢ Decreased biodiversity ➢ Health risk for employees – accidents ➢ Inherent risk (“Time bombs”)		➢ Untimely updating of the projects for activities in conformity with the technological development ➢ Bad old designs for closure of industrial sites and facilities ➢ Inefficient technology ➢ No WWTP ➢ State of transition ➢ No control by competent authorities ➢ Form of ownership ➢ No regulation for elimination of damages caused by past activities ➢ No financing ➢ Poor housekeeping of industries ➢ Poor technological discipline ➢ Non-reclamation of terrains disturbed by mining ➢ Improper protection and management of tailings ponds and refuse heaps ➢ Improper storage of toxic and radioactive waste ➢ Land slides, spills from drums, unknown hazardous substances	➢ Inventory and preparation of cadastre ➢ Use of new technologies ➢ Introduction of new economic mechanisms that provide incentives for environmentally sound technologies ➢ Utilization of new technical facilities ➢ Construction of local WWTPs ➢ Establishment of financial funds for elimination of past environmental damages ➢ Change of ownership (acceleration) ➢ Development of individual site remedial programs ➢ Training program development ➢ NGO involvement in specific program development ➢ Governmental programs for waste containment

Abbreviations:
MoEW - Ministry of Environment and Water; ***PA***-Privatization Agency; ***MI***-Ministry of Industry; ***CD***-Civil Defense; ***EIA***-Environmental Impact Assessment; ***REWI***-Regional Environmental and Water Inspectorate

Activities leading to water pollution	**Current strengths / assets**	**Environmental consequences of economic activities**	**Transboundary effects**	**Causes leading to inappropriate activities**	**Measures to be undertaken**
➢ Discharge of waste water	➢ Existing WWTP in industries (Industries) ➢ Human resource (industries + MoEW) ➢ Waste water monitoring and emission control (MoEW)	➢ Surface water, ground water and soil pollution ➢ Reduced drinking water resources ➢ Disturbed functioning of ecosystems ➢ Health risk (food chain)		➢ Outdated regulatory framework ➢ No suitable economic regulators ➢ No financing ➢ Poor treatment facilities operation ➢ Insufficient WWTP staff ➢ WWTP personnel of low qualification ➢ Burst pollution ➢ Inefficient treatment technologies ➢ Outdated industrial technologies	➢ Adoption of new legislation (contemporary) ➢ Legislative harmonization ➢ Introduction of economic incentives and regulators system ➢ Development and introduction of employee training programs ➢ Decommissioning of production capacities ➢ Introduction of self monitoring ➢ Introduction of the best available waste water treatment technologies ➢ Introduction of the best available production technologies
➢ Unsustainable industrial practices	➢ Available data for hot spots (MoEW) ➢ Compulsory EIA (REWI + MoEW) ➢ System of preventive control (MoEW+CD) ➢ Accident consequence elimination system ➢ Violator sanctioning regulatory framework	➢ Excessive use of water resources ➢ Environmental pollution (all media) ➢ Health risk ➢ Destruction of the landscape ➢ Disturbed biodiversity		➢ State of transition ➢ Underdeveloped environmental protection legislation ➢ Insufficient possibilities for efficient control (financial and technical possibilities) ➢ Insufficient interaction between institutions ➢ Inadequate planning and management ➢ Outdated technologies ➢ No efficient environmental management system ➢ No self-monitoring ➢ Industrial accidents ➢ Use of hazardous but cheaper raw materials and equipment ➢ Insufficient awareness of NGOs and the public and active involvement in problem resolution	➢ Harmonization of the legislation ➢ Introduction of permitting regime ➢ Introduction of programs eliminating or restoring the damages ➢ Estimation for the development of the industrial activities ➢ Strict sanctions for excessive use of conditionally clean water ➢ Introduction of economic mechanisms promoting the implementation of environmentally sound technologies ➢ Introduction of new technologies ➢ Improvement of the environmental management systems (ISO 14001, EMAS) ➢ Discontinuation of production ➢ Introduction of chemical safety audits ➢ Maximum recirculating waters ➢ Introduction of environmental and health risk assessment ➢ Introduction of a public control system ➢ Development of information and educational programs for the public ➢ NGOs and public participation in discussing the environmental priorities

Abbreviations:
MoEW - Ministry of Environment and Water; ***PA***-Privatization Agency; ***MI***-Ministry of Industry; ***CD***-Civil Defense; ***EIA***-Environmental Impact Assessment; ***REWI***-Regional Environmental and Water Inspectorate

Activities leading to water pollution	Current Strengths / Assets	Environmental consequences of economic activities	Transboundary effects	Causes leading to inappropriate activities	Measures to be undertaken
➢ Improper waste management	➢ National solid waste management strategy (MoEW) ➢ Methodological waste management programs ➢ Available legislation for the process (prevention, transport, disposal) ➢ Municipal waste management programs (municipalities) ➢ Establishment of regional landfills ➢ Local governments ➢ Waste recovery ➢ Introduced clean technologies ➢ Bulgarian Industrial Association (Ministry of Industry) ➢ Separate waste collection projects implemented by NGOs (NGOs) ➢ National Environmental Protection Fund/ Municipal Environmental Protection Fund (MoEW) ➢ Human resources ➢ Available training programs (courses, seminars)	➢ Past pollution ➢ Ground water pollution by infiltrating hazardous leachates ➢ Surface water pollution (direct or indirect) ➢ Soil pollution ➢ Migration of pollutants into the environment ➢ Secondary pollution (air) ➢ Changes in the aquatic ecosystems ➢ Occurrence of health risks ➢ Disrupted cycle in the system of Resources - consumption - waste stream	➢ Illegal import and transportation of hazardous waste	➢ Inadequate regulatory framework ➢ Insufficient financial resources ➢ Incomplete legislation ➢ Improper practices ➢ Illegal dumping ➢ Illegal disposal of hazardous waste in municipal landfills ➢ Discharging of untreated leachates ➢ Non-regulated waste landfills ➢ No public involvement ➢ Insufficient public awareness of the impacts of waste dumping ➢ No media policy ➢ Lack of organizational skills ➢ Non-observance of the landfill operation technology ➢ Improper hospital waste disposal ➢ Unequipped municipal solid waste landfills (no systems and facilities) ➢ Insufficient control ➢ No waste reference data base	➢ Proposing improvements in the legislation ➢ Technical regulations ➢ Identification of past pollution ➢ Sanitation and reclamation of old dumps ➢ Provision of waste treatment facilities ➢ Strict enforcement of the regulations ➢ Appropriate disposal of hospital waste ➢ Adjustment of the municipal financing policy ➢ Establishment of special waste treatment companies ➢ Differentiated waste fee system ➢ Creation of public awareness to waste related impacts ➢ Creation of a waste information and monitoring system

Abbreviations:
MoEW - Ministry of Environment and Waters; ***MRDPW*** - Ministry of Regional Development and Public Works

Activities leading to water pollution	**Current strengths / assets**	**Environmental consequences of economic activities**	**Transboundary effects**	**Causes leading to inappropriate activities**	**Measures to be undertaken**
➢ Weaknesses in WWTP operation	➢ Financial resources ➢ Regulatory framework (MRDPW) ➢ Engineering and consulting organizations ➢ Available program for WWTP and sewer system construction ➢ Constructed municipal WWTP (Municipalities) ➢ Sewers	➢ Ground water pollution ➢ Surface water pollution ➢ Negative impact on recreation ➢ Reduced water resources ➢ Disturbed aquatic ecosystems ➢ Soil pollution ➢ Health risk		➢ No municipal Waste Water Treatment Plants (WWTP) ➢ Obsolete facilities ➢ No locally produced equipment ➢ No local WWTP in the industrial enterprises ➢ Insufficient capacity ➢ Unfinished sewers ➢ No sludge disposal sites, methods and standard ➢ Poorly operating WWTP equipment ➢ Inadequate treatment of sludges in the municipal WWTP ➢ Insufficient quantities of reagents used ➢ Insufficient local production of reagents	➢ Municipal WWTP construction ➢ Construction of sewers ➢ Reconstruction/modernization of the existing WWTP ➢ Updating of existing projects ➢ Increasing personnel skills ➢ Provision of suitable reagents ➢ Improvement of the regulatory framework ➢ Differentiated tax and fee system ➢ Additional financial resources from the environmental protection funds available ➢ Updating the database ➢ Systems for quantity / quality "input-output" control ➢ Public (NGO) involvement in the control
➢ Inefficient operation of sewer systems	➢ Existing legislation (MRDPW) ➢ Acting NGOs (NGOs) ➢ Staff potential ➢ Foreign investments ➢ Information about foreign technical achievements ➢ Existing projects	➢ Health risk ➢ Untreated hospital waste waters discharged in the sewage system ➢ Water and soil pollution ➢ Loss of usable water resources ➢ Conditions for land slides and sinking created		➢ Old sewage system with inadequate capacity ➢ Insufficient equipment to repairs the sewage system ➢ Poor facility management and maintenance ➢ Illegal discharging ➢ Insufficiently developed sewage network ➢ Insufficient and inefficient control of sewage system condition and operation ➢ No information system and incomplete underground cadastre ➢ Inadequate inventory of facilities	➢ Expansion of the sewage system ➢ Renewal of the repair facilities ➢ Treat and decontaminate hazardous hospital waste ➢ Sewage system maintenance ➢ Improved sewage pipe quality ➢ Proper facility maintenance and management ➢ Deratisation of the sewage system ➢ Efficient sewage system control ➢ Establishment of an information network ➢ Financing (domestic + foreign) ➢ Financial incentives for the sewage system operators ➢ Improved interaction of the enforcement authorities ➢ Raising personnel skills

Abbreviations:
MoEW - Ministry of Environment and Waters; ***MRDPW*** - Ministry of Regional Development and Public Works

Annex 3 Problem Analysis

3.0. Global

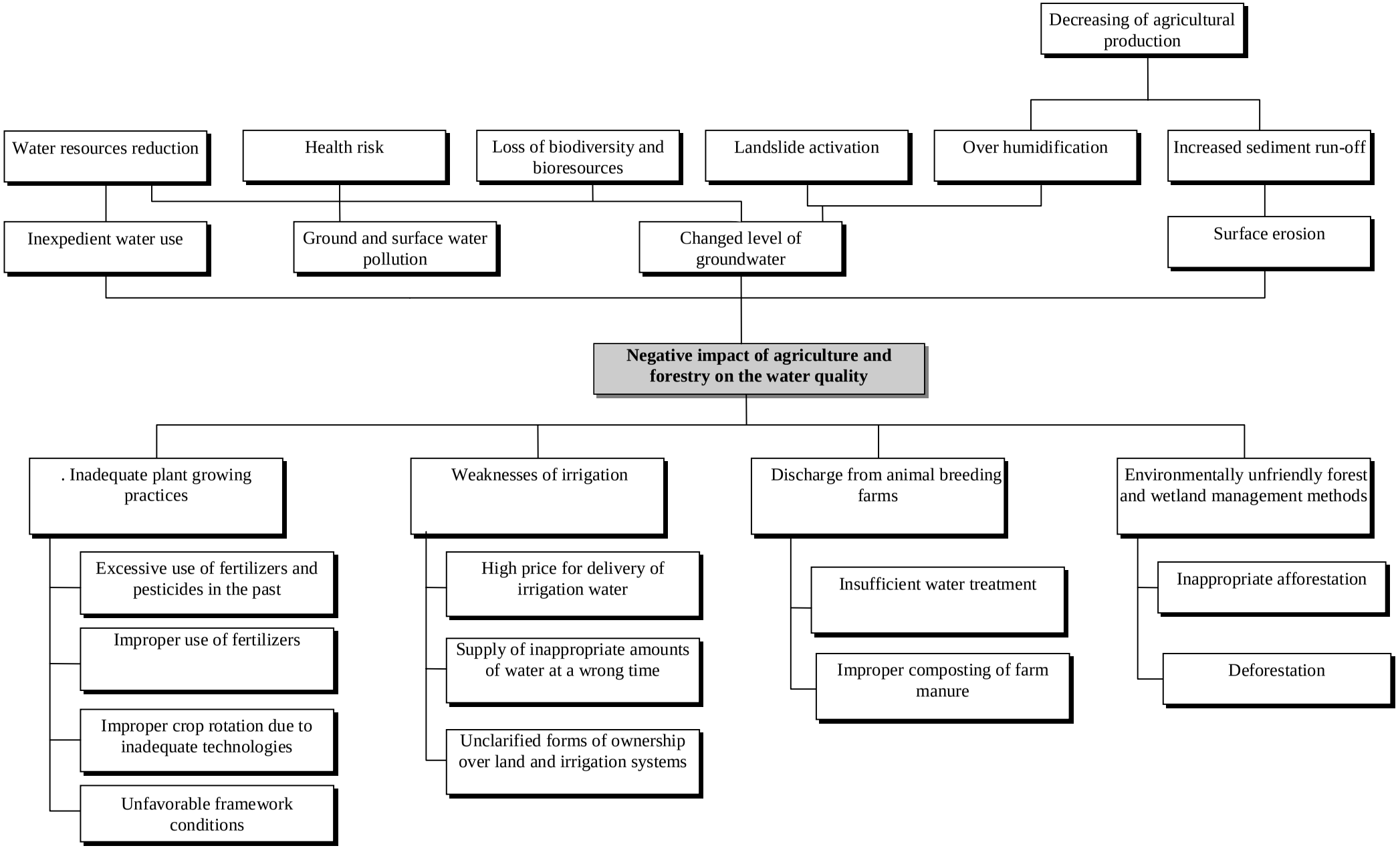
3.1. Agriculture and Forestry

3.2. Industry

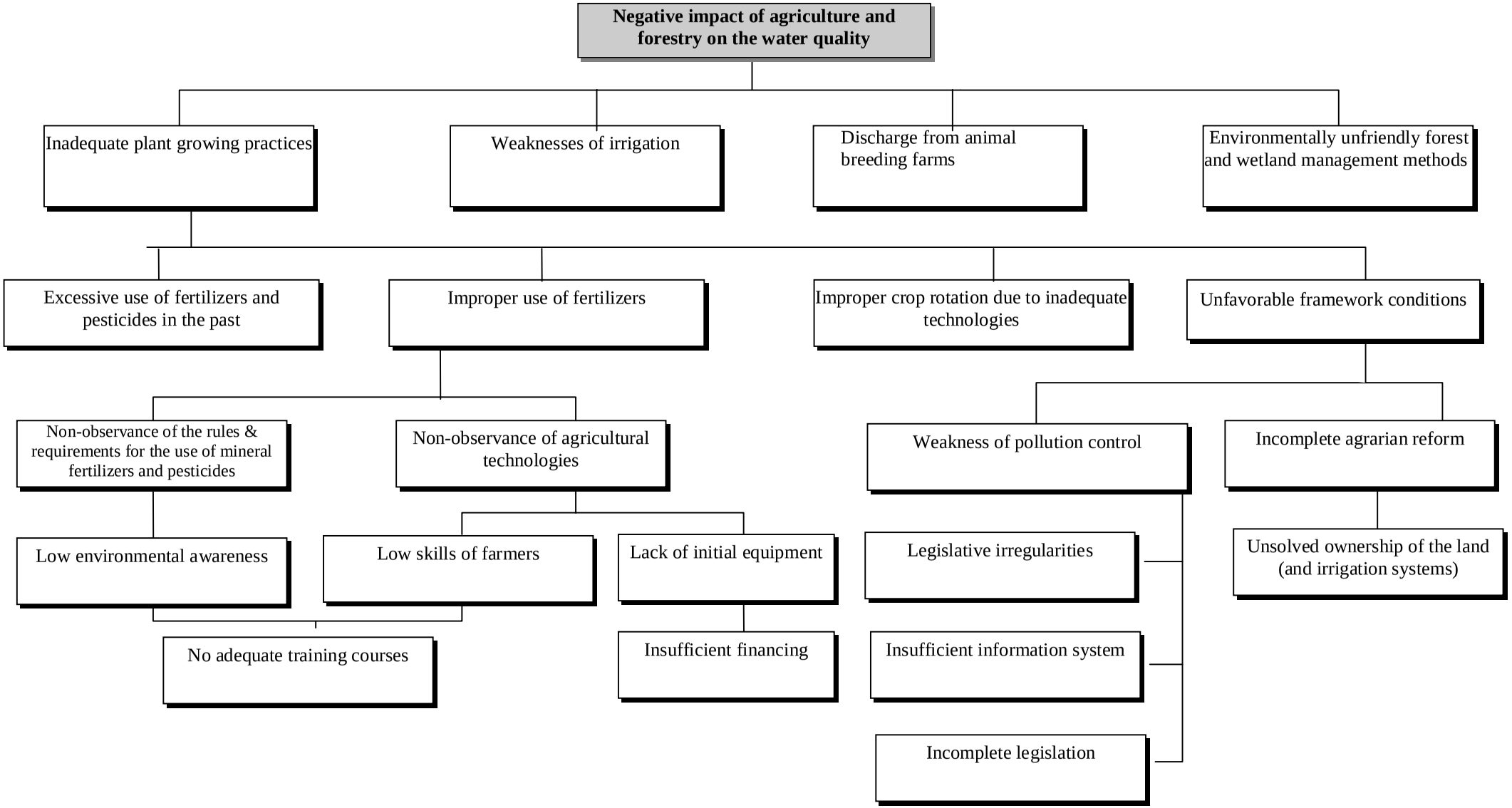
3.3. Municipalities

GLOBAL HIERARCHY OF PROBLEMS

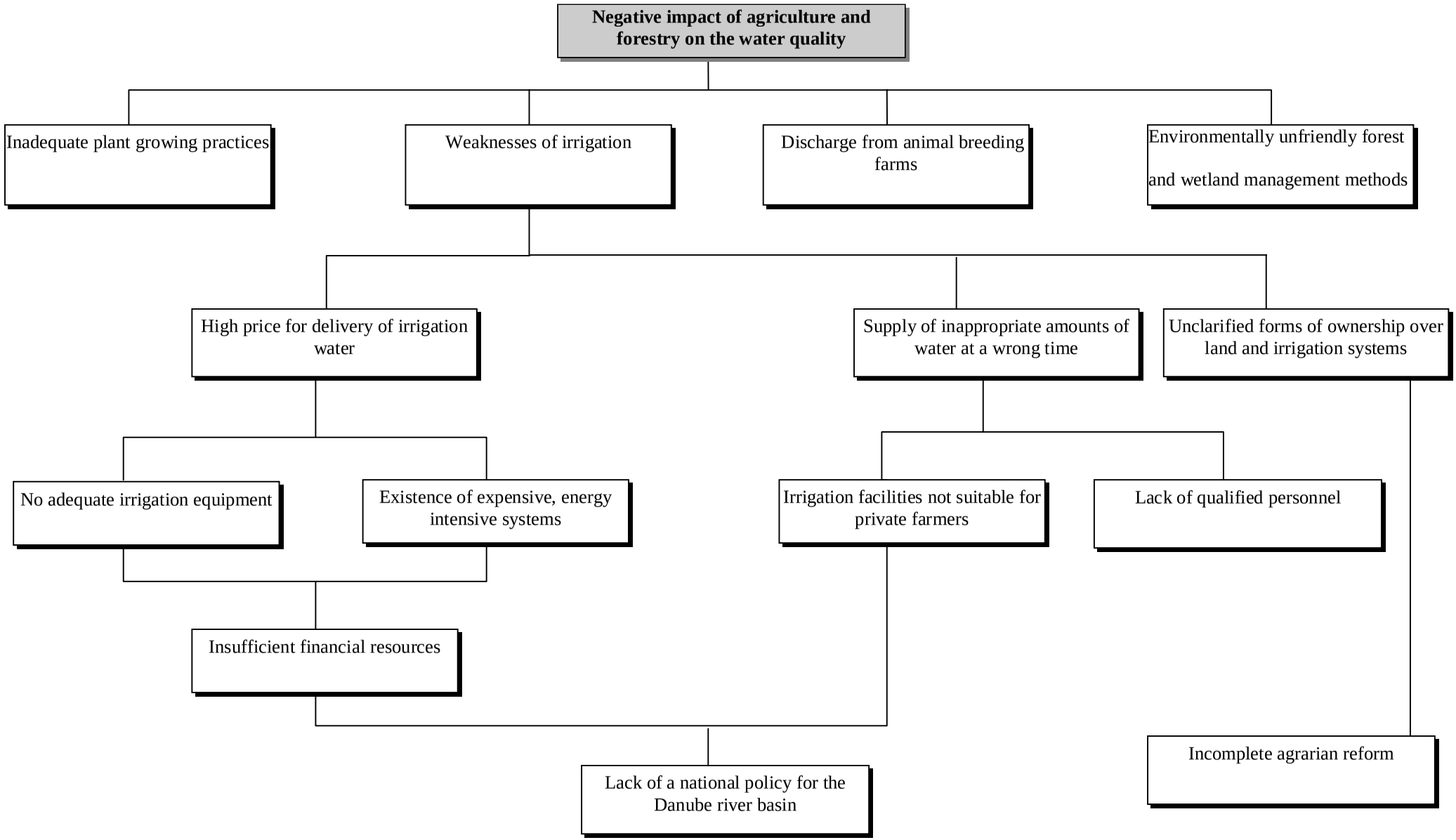
Annex 3.0



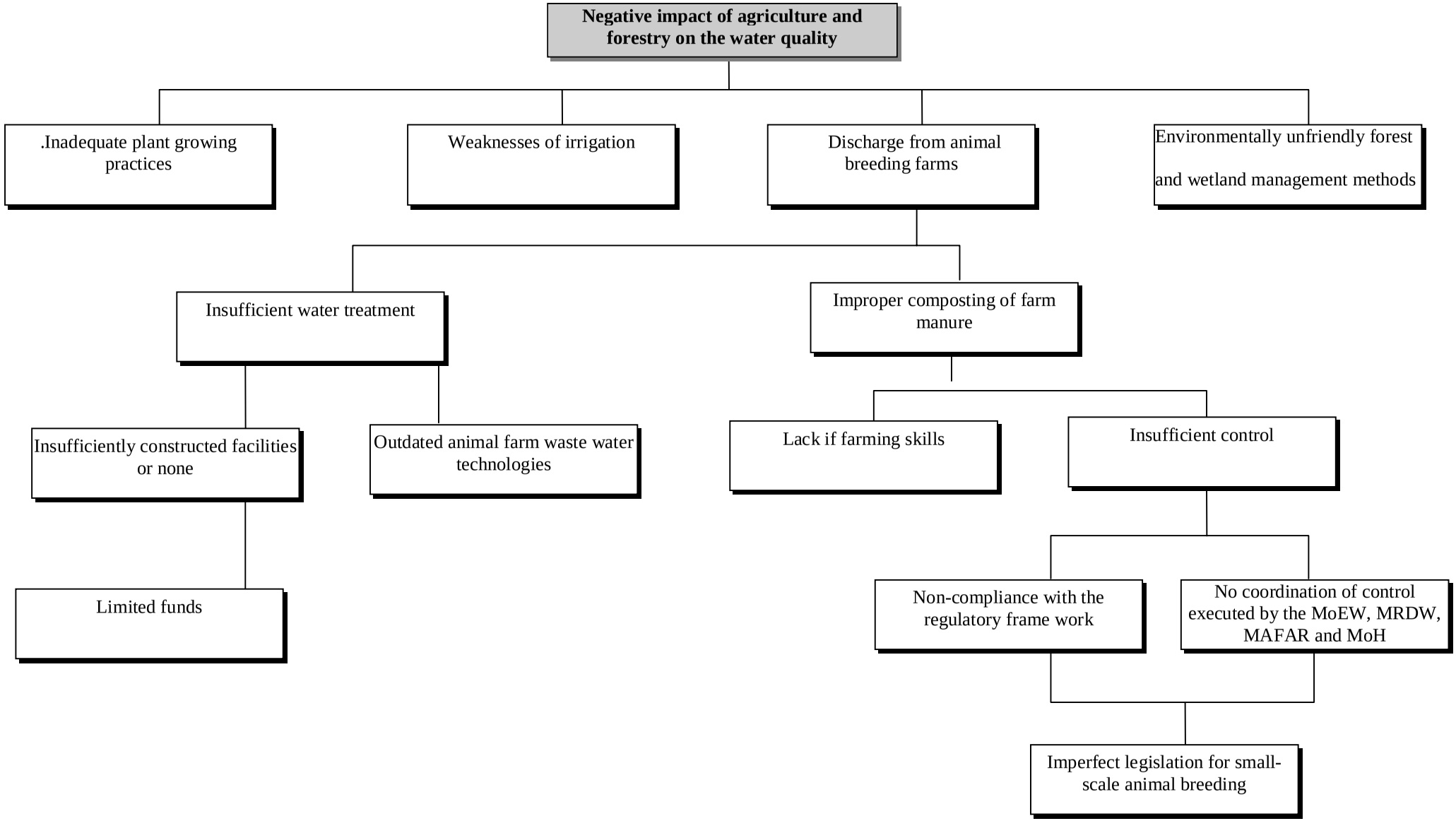
1. Plant growing



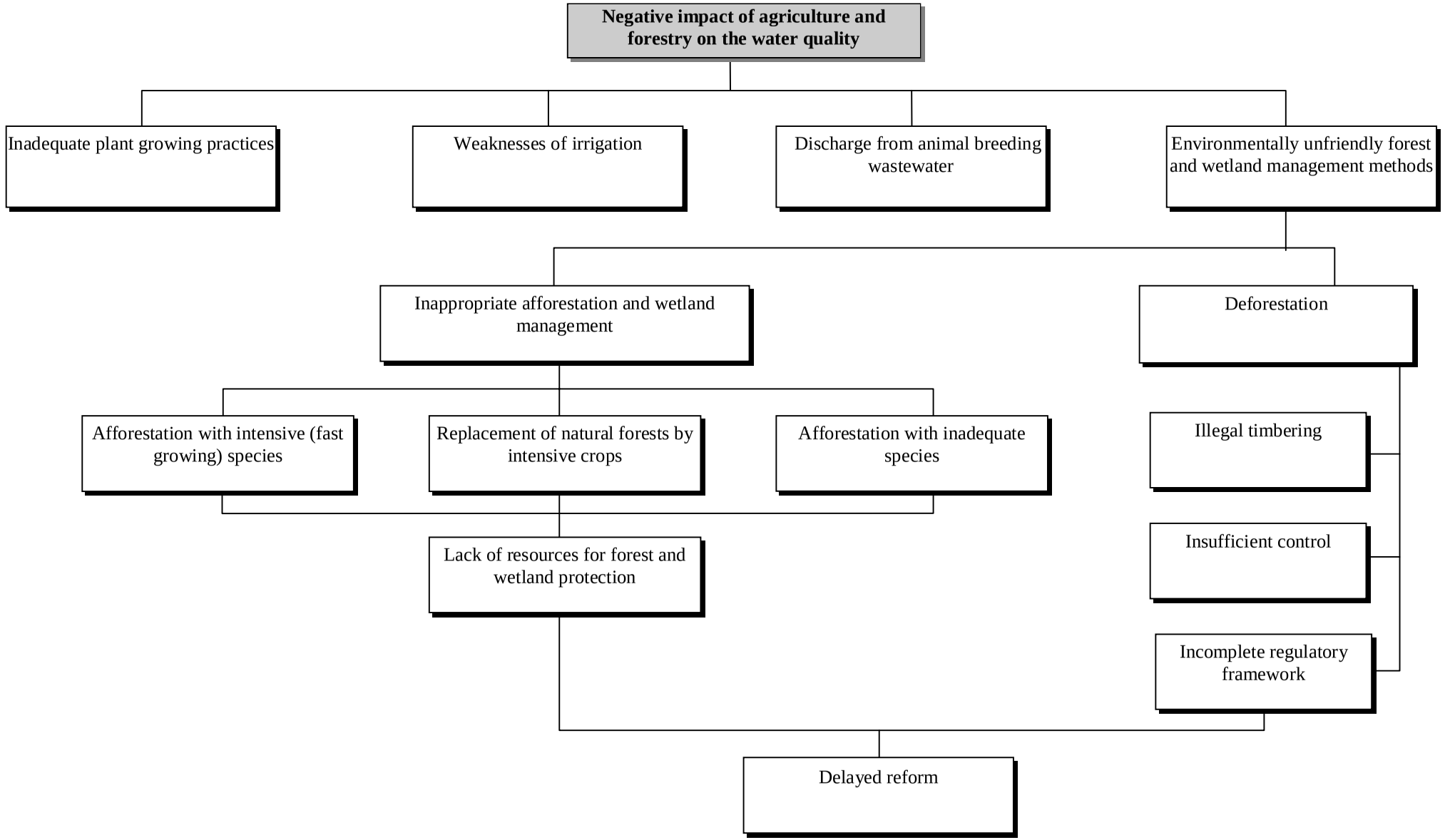
2. Irrigation



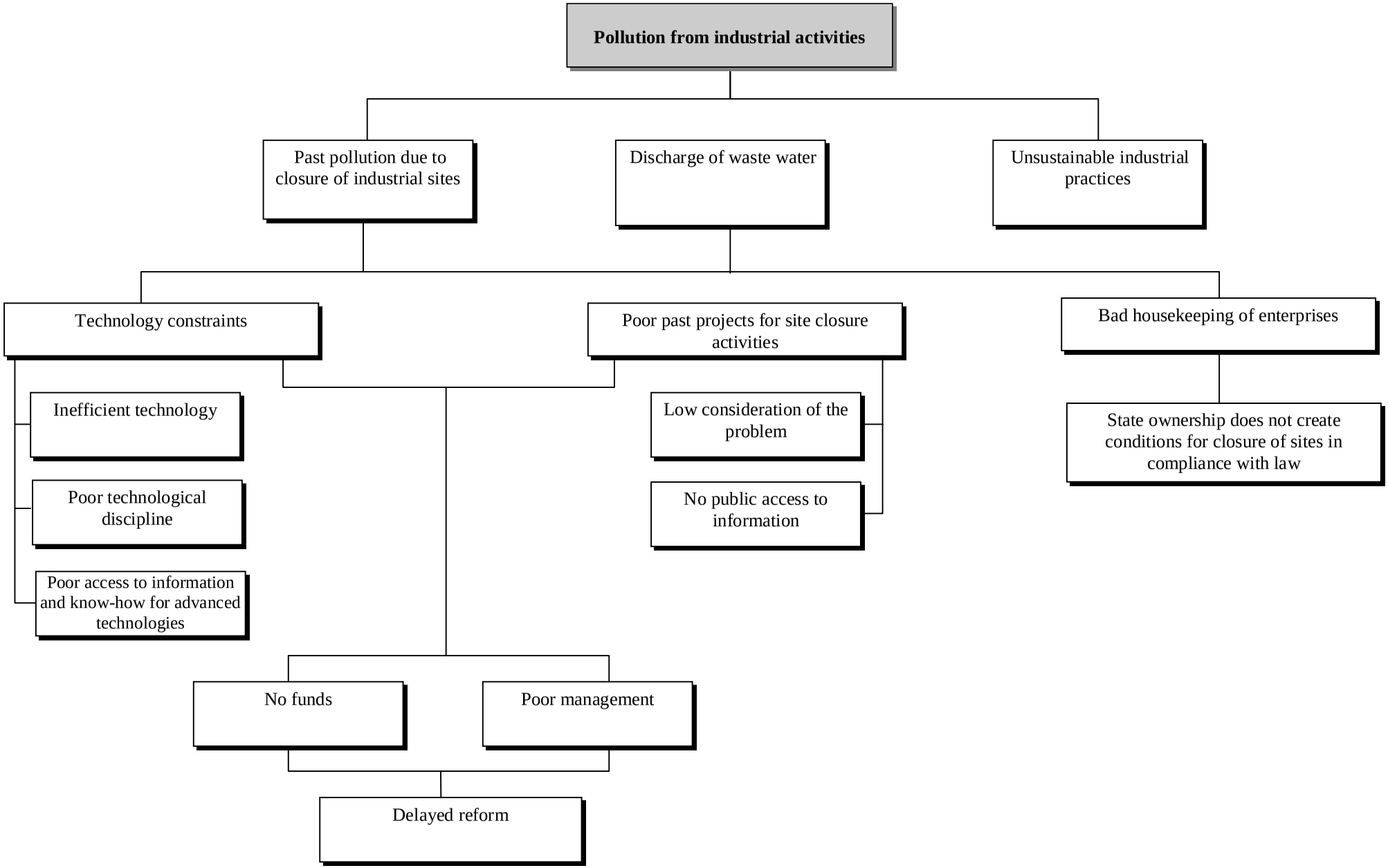
3. Discharge of animal breeding waste water



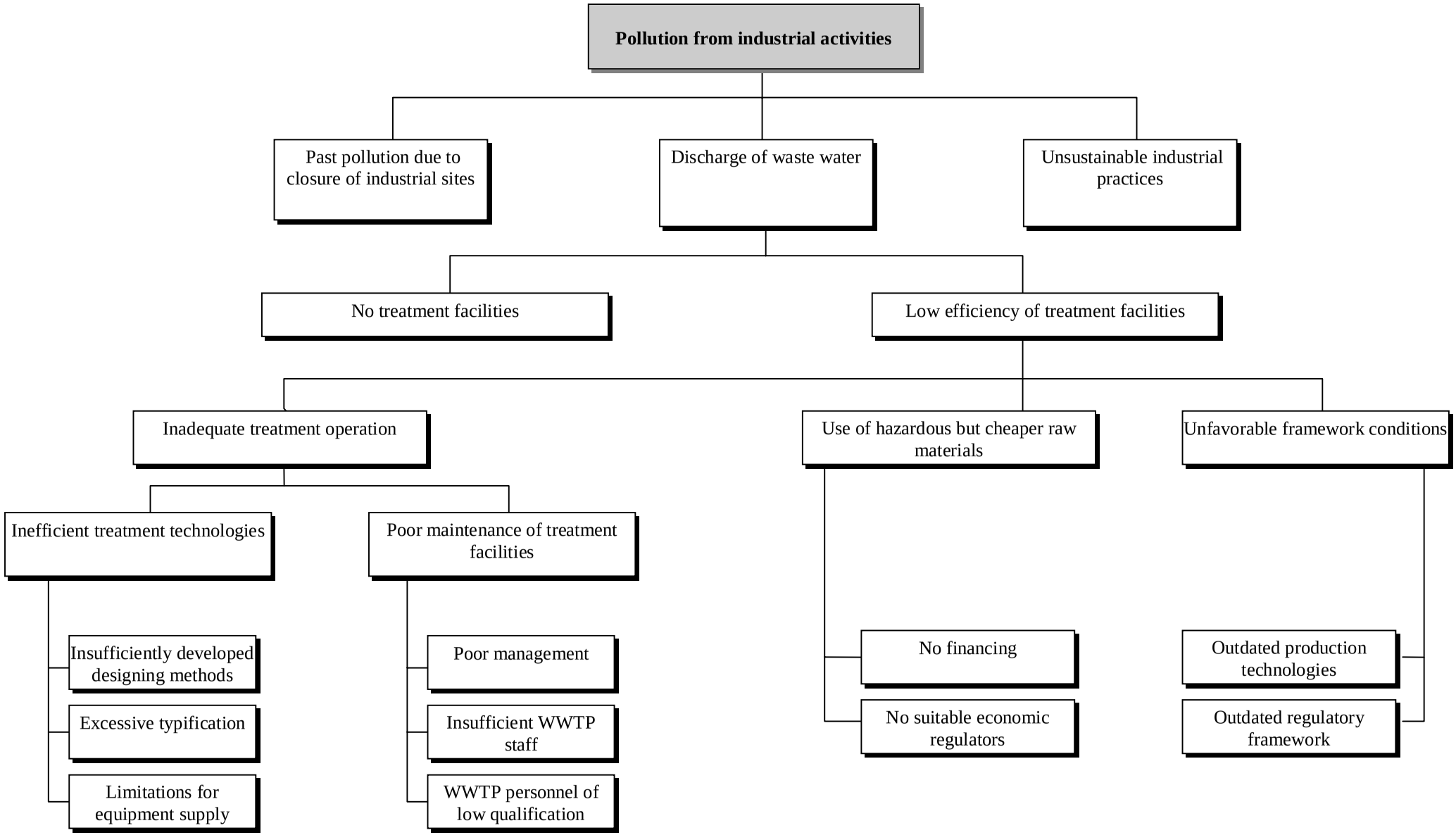
4. Forest and wetland management



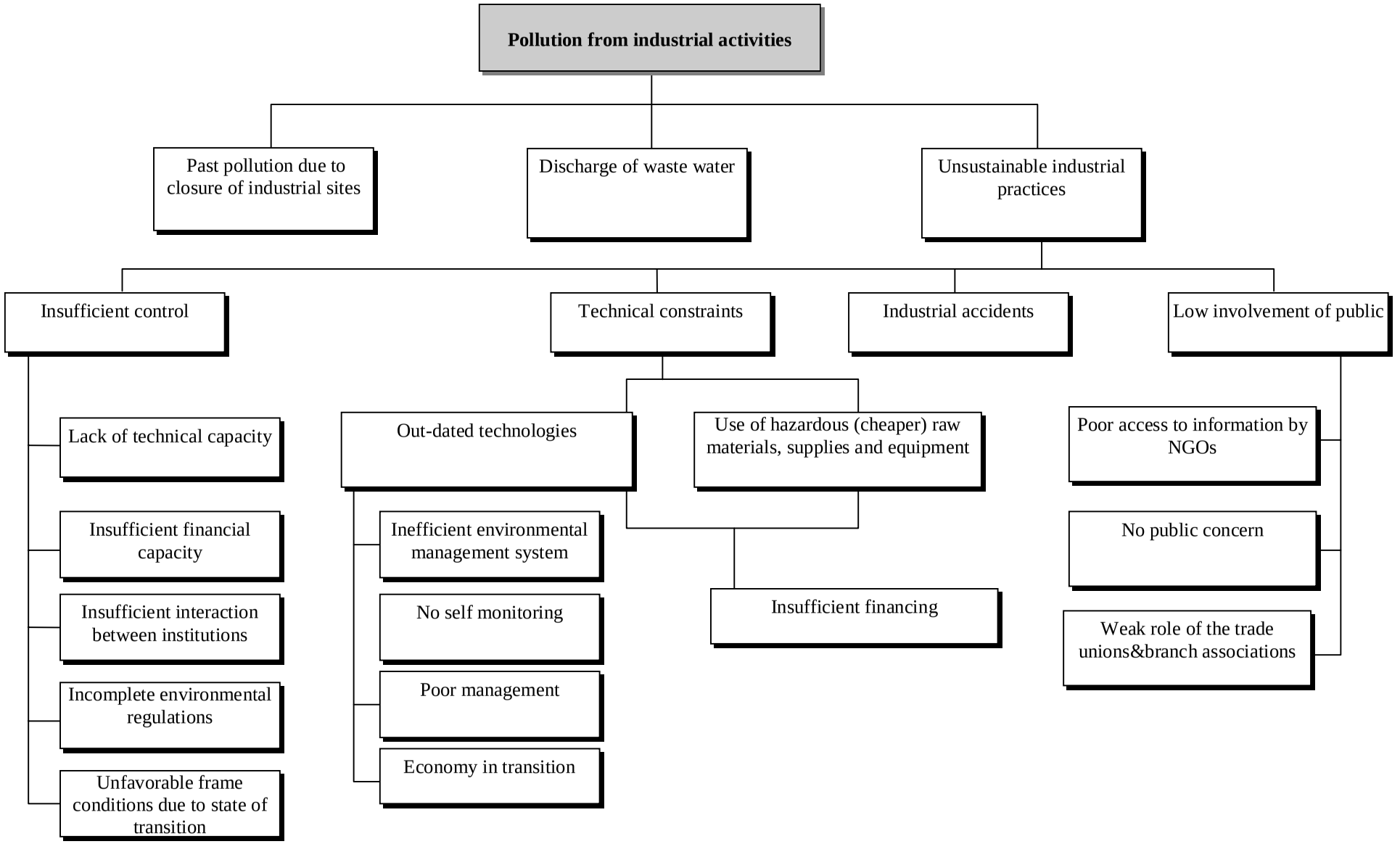
1. Past pollution



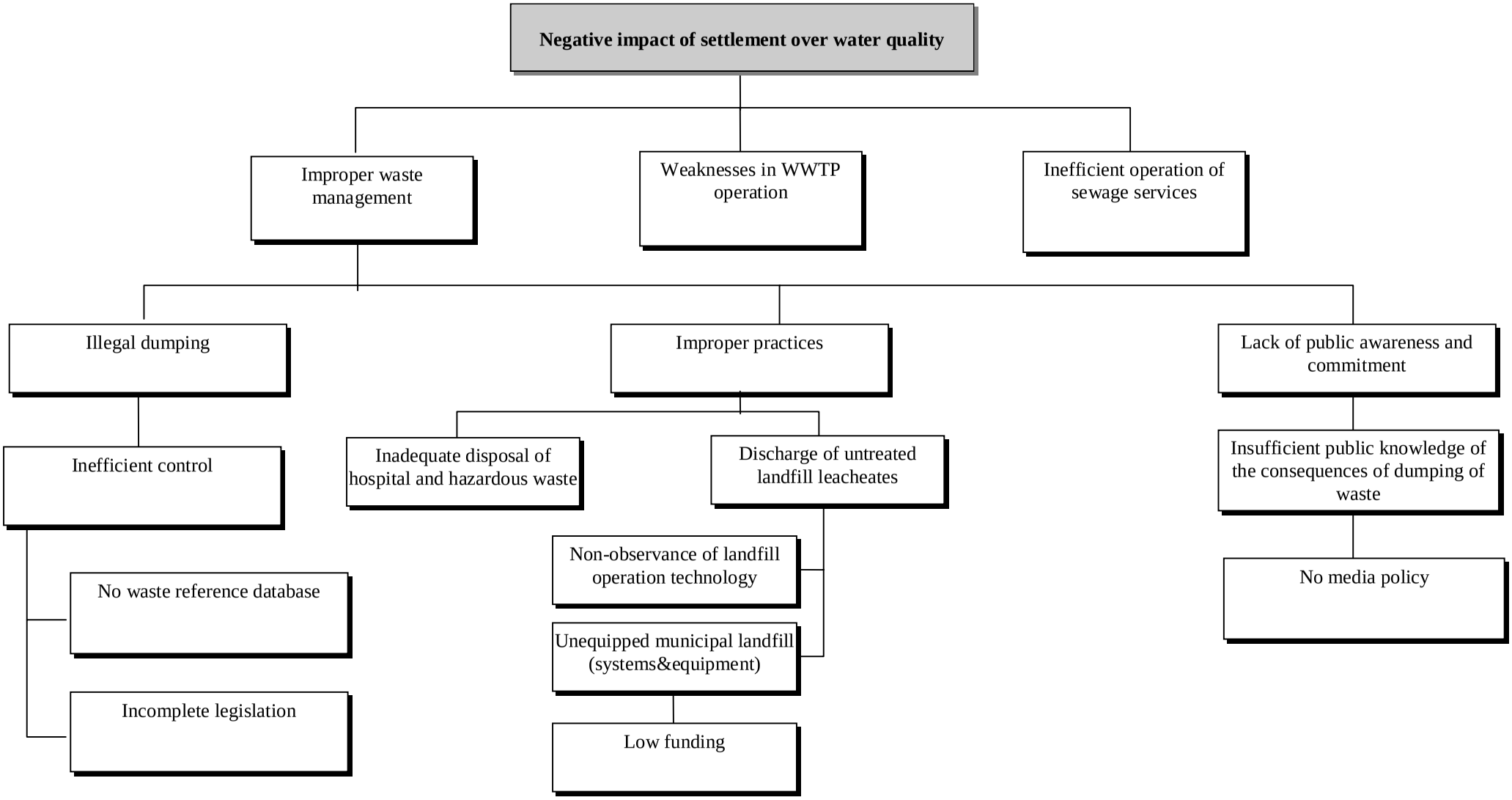
2. Industrial waste water



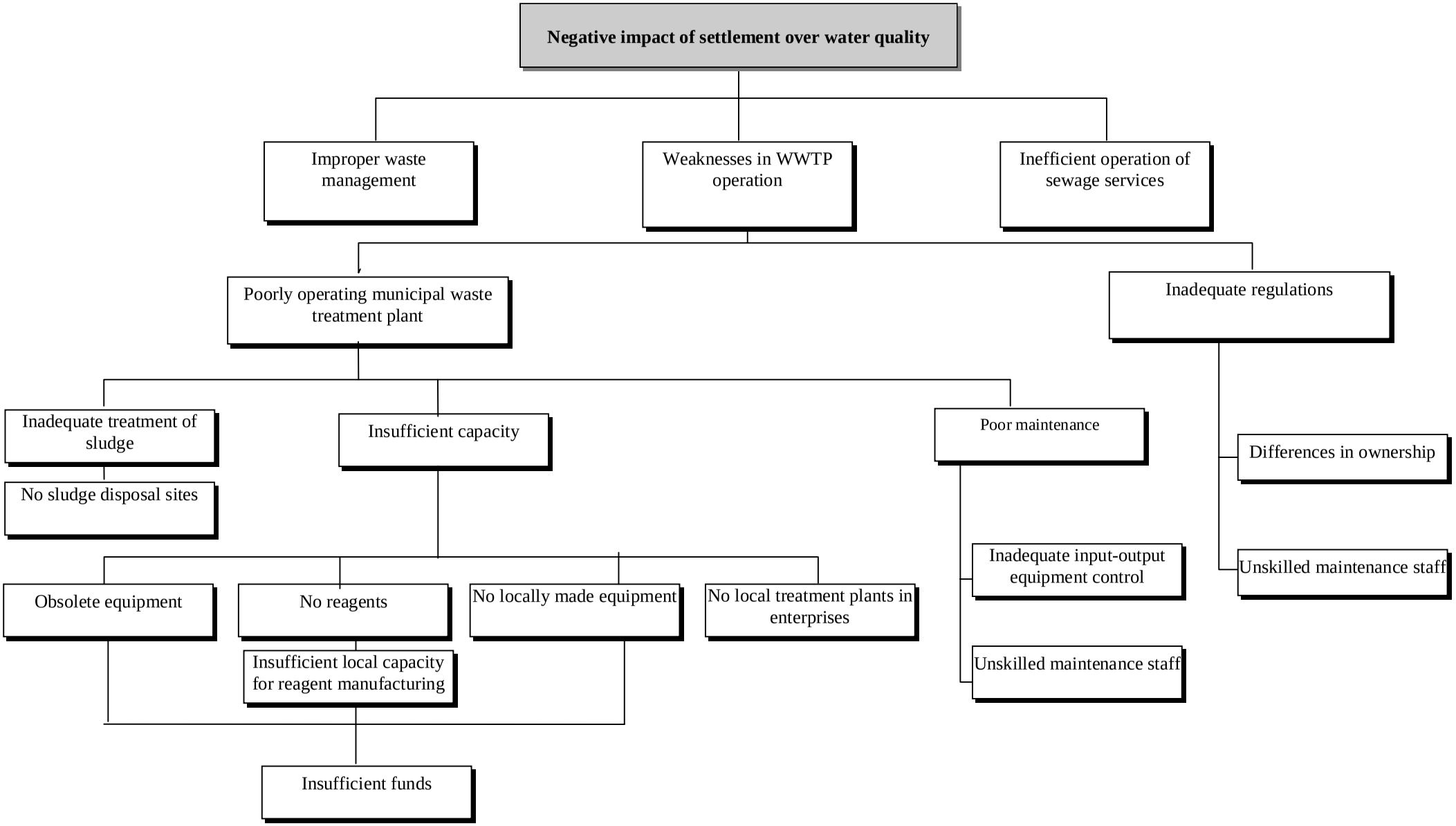
3. Industrial practices



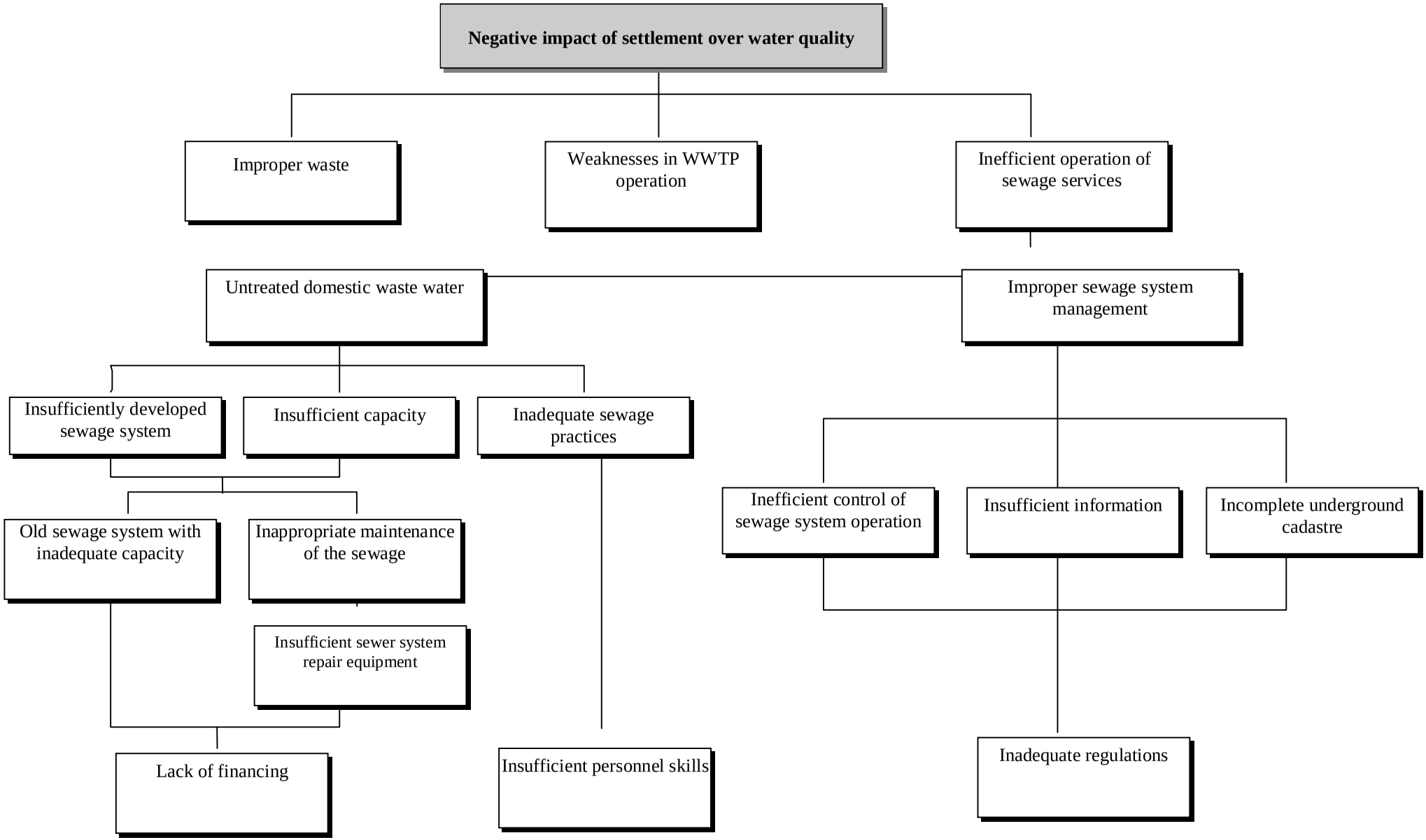
1. Waste management



2. Management of waste water treatment plants (WWTP)



3. Operation of sewage systems



Annex 4 Objective Analysis

4.0. Global

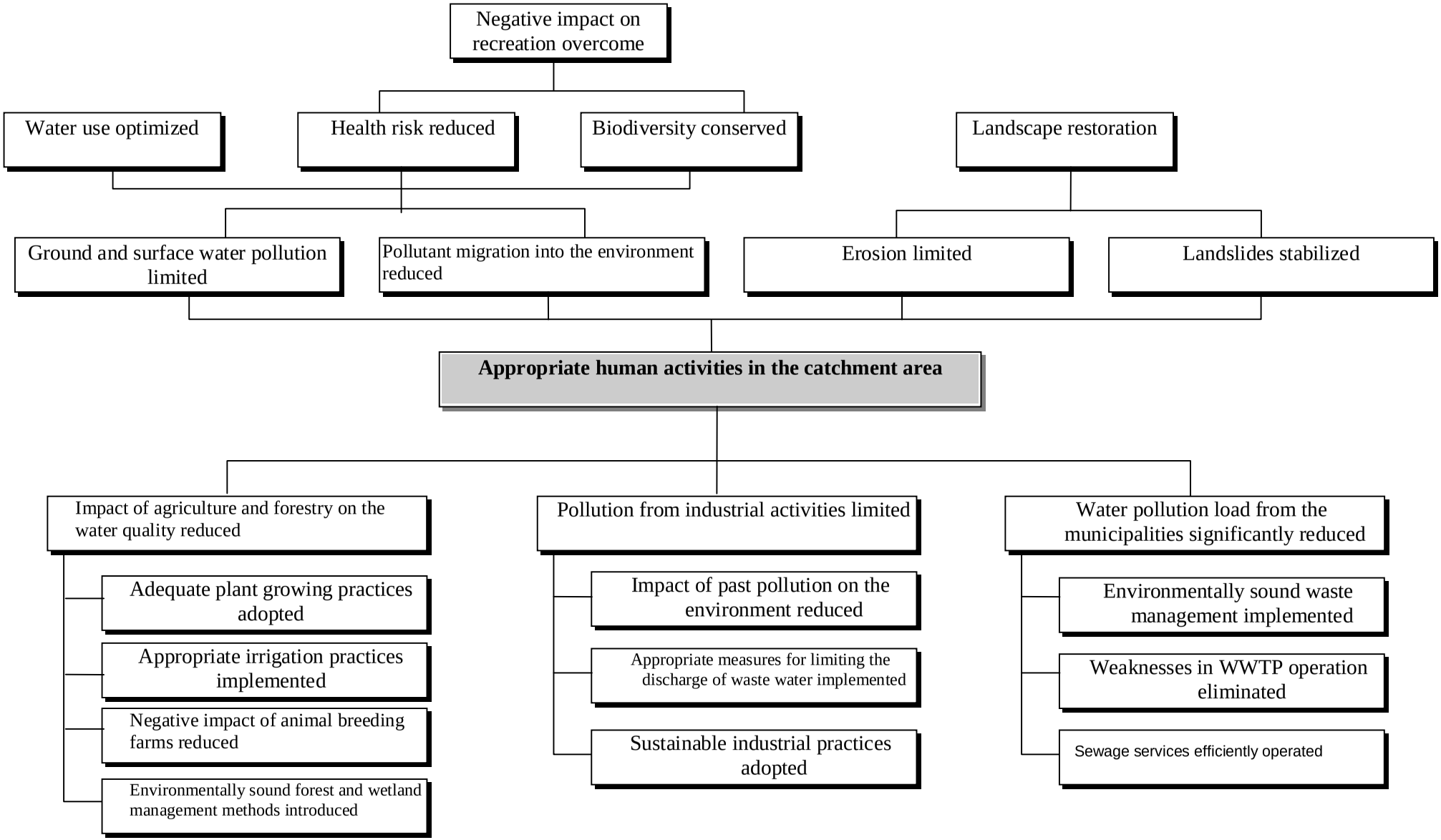
4.1. Agriculture and Forestry

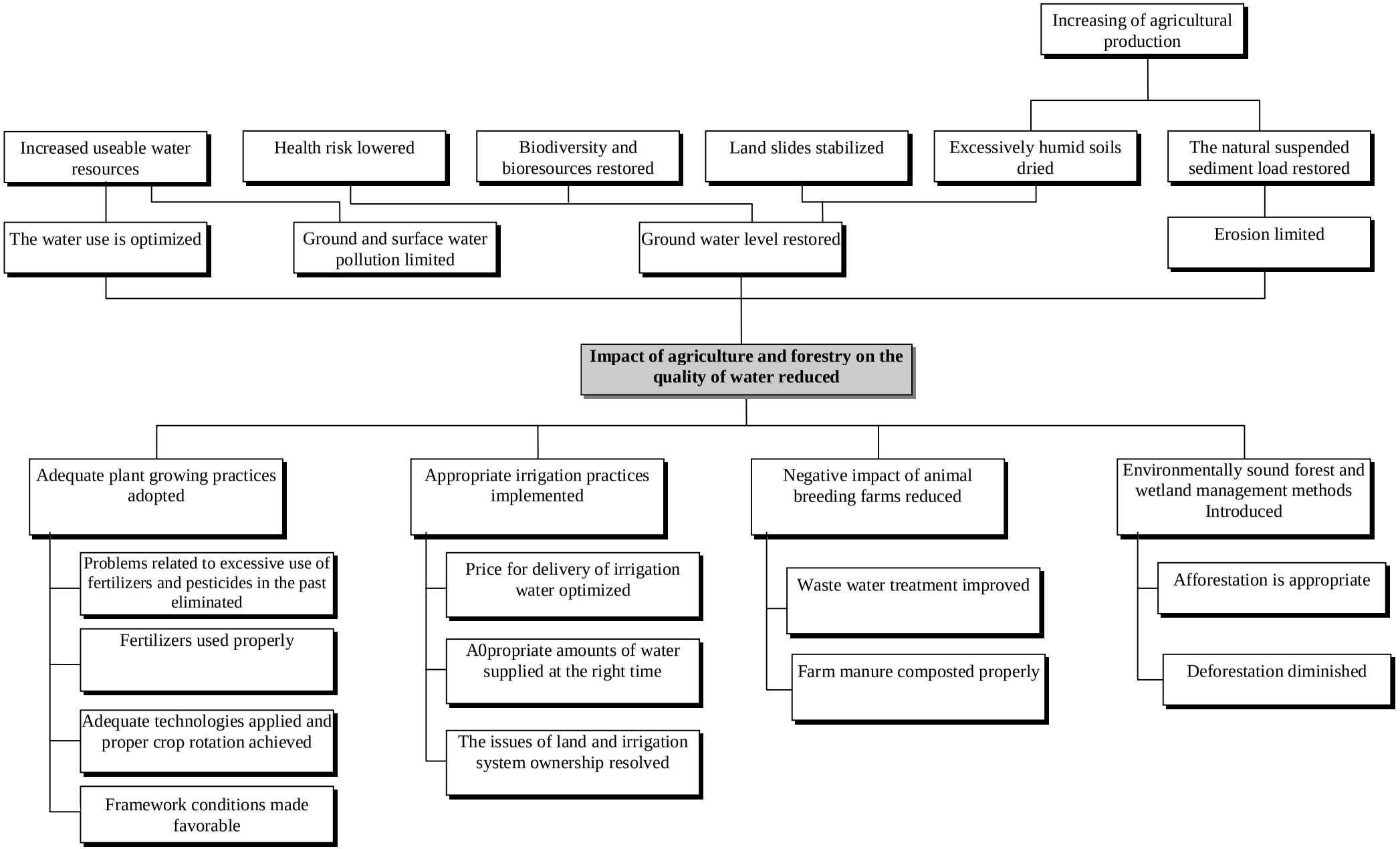
4.2. Industry

4.3. Municipalities

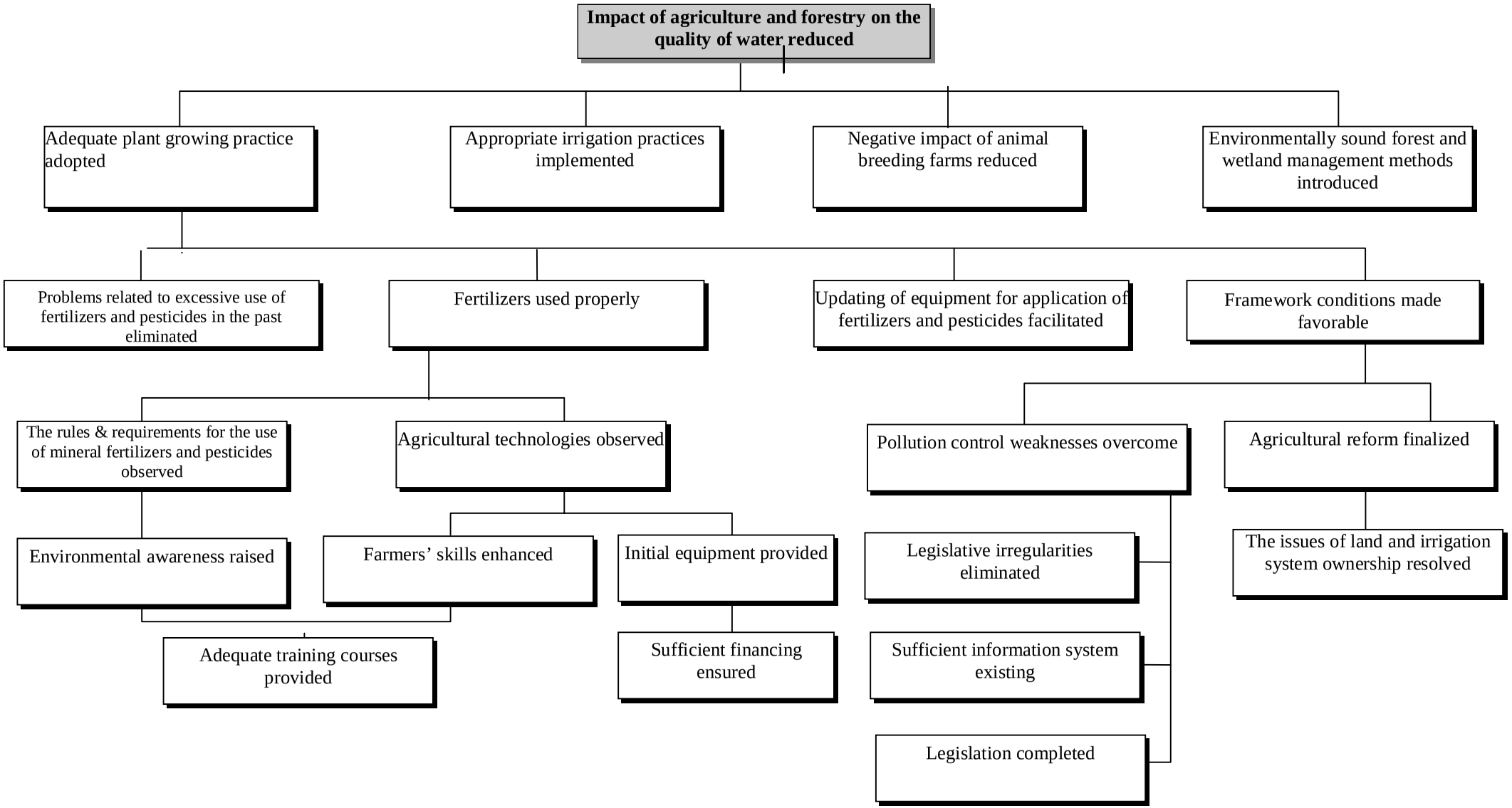
GLOBAL HIERARCHY OF OBJECTIVES

Annex 4.0

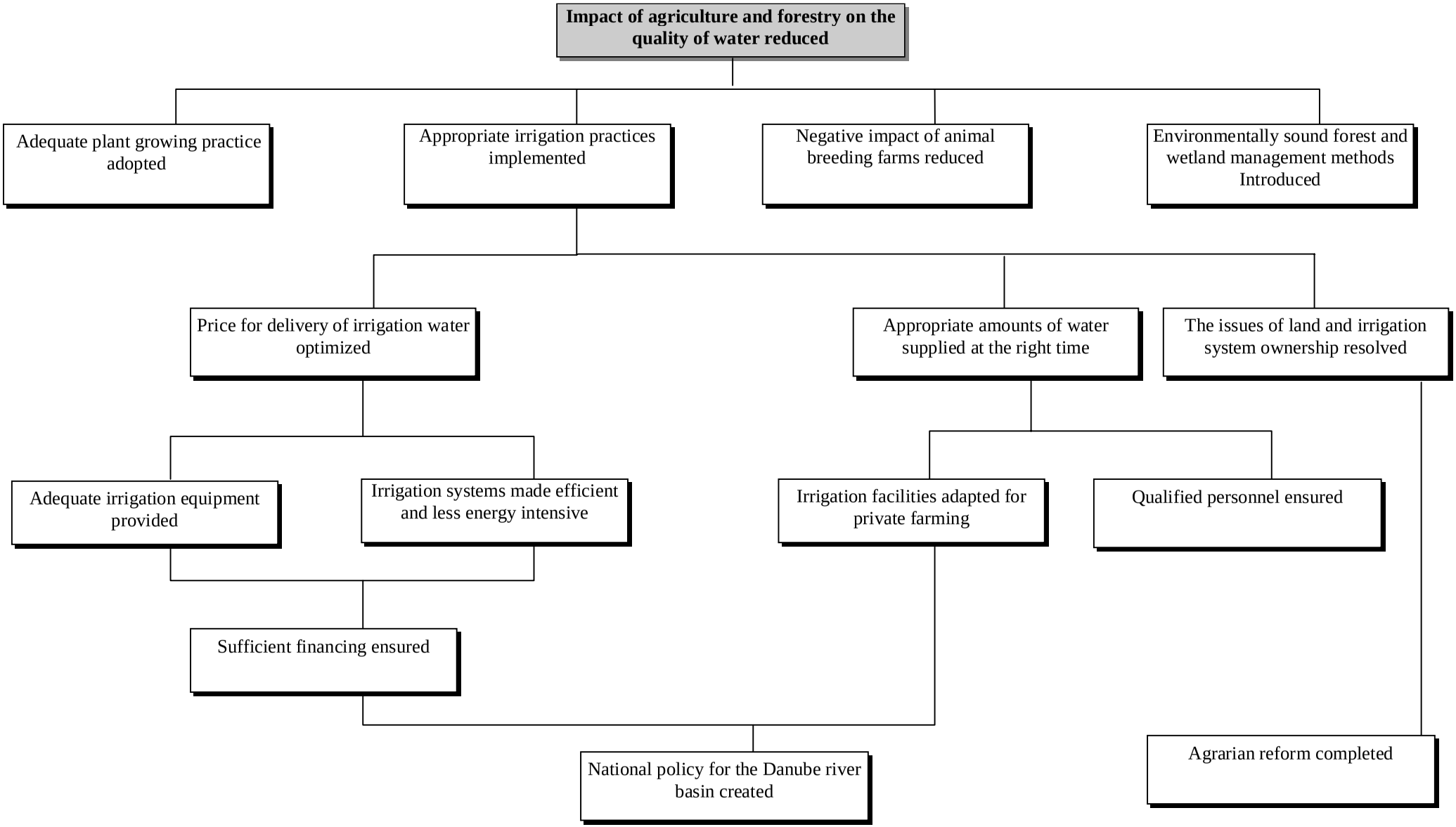



Increasing of agricultural production
Increased useable water resources
Health risk lowered
Biodiversity and bioresources restored
Land slides stabilized
Excessively humid soils dried
The natural suspended sediment load restored
The water use is optimized
Ground and surface water pollution limited
Ground water level restored
Erosion limited
Impact of agriculture and forestry on the quality of water reduced
Adequate plant growing practices adopted
Problems related to excessive use of fertilizers and pesticides in the past eliminated
Fertilizers used properly
Adequate technologies applied and proper crop rotation achieved
Framework conditions made favorable
Appropriate irrigation practices implemented
Price for delivery of irrigation water optimized
A0propriate amounts of water supplied at the right time
The issues of land and irrigation system ownership resolved
Negative impact of animal breeding farms reduced
Waste water treatment improved
Farm manure composted properly
Environmentally sound forest and wetland management methods Introduced
Afforestation is appropriate
Deforestation diminished

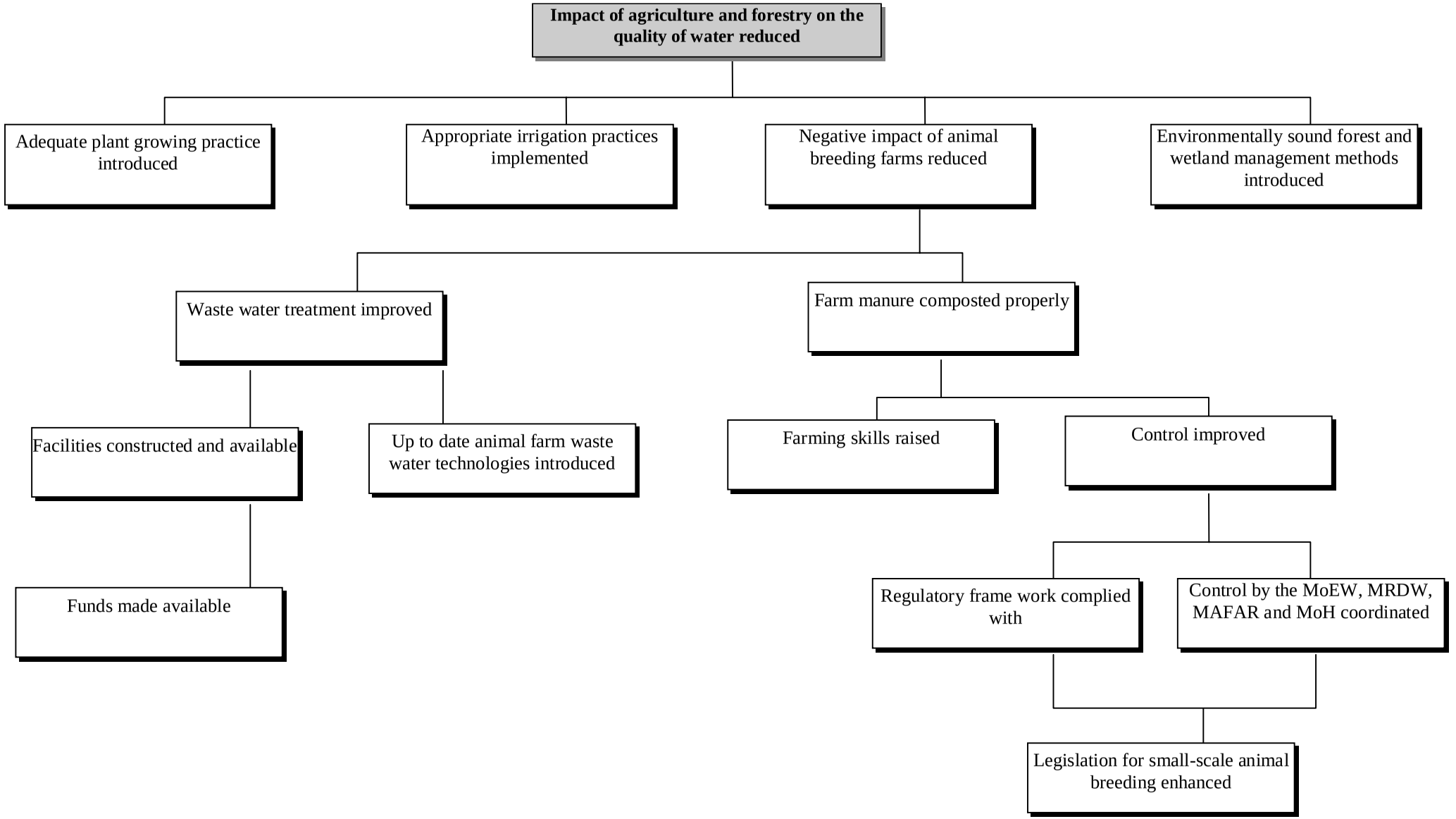
1. Plant growing



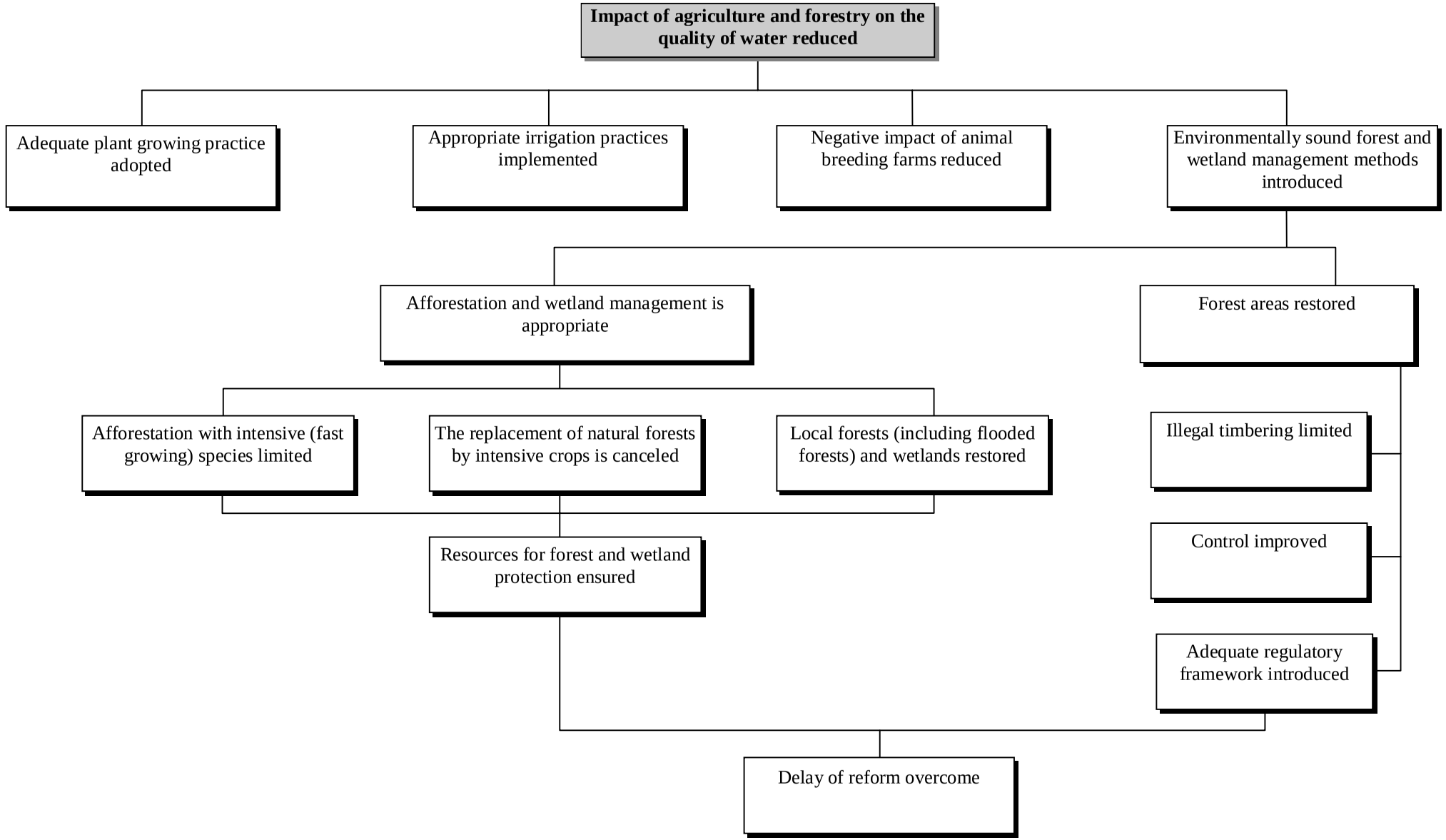
2. Irrigation

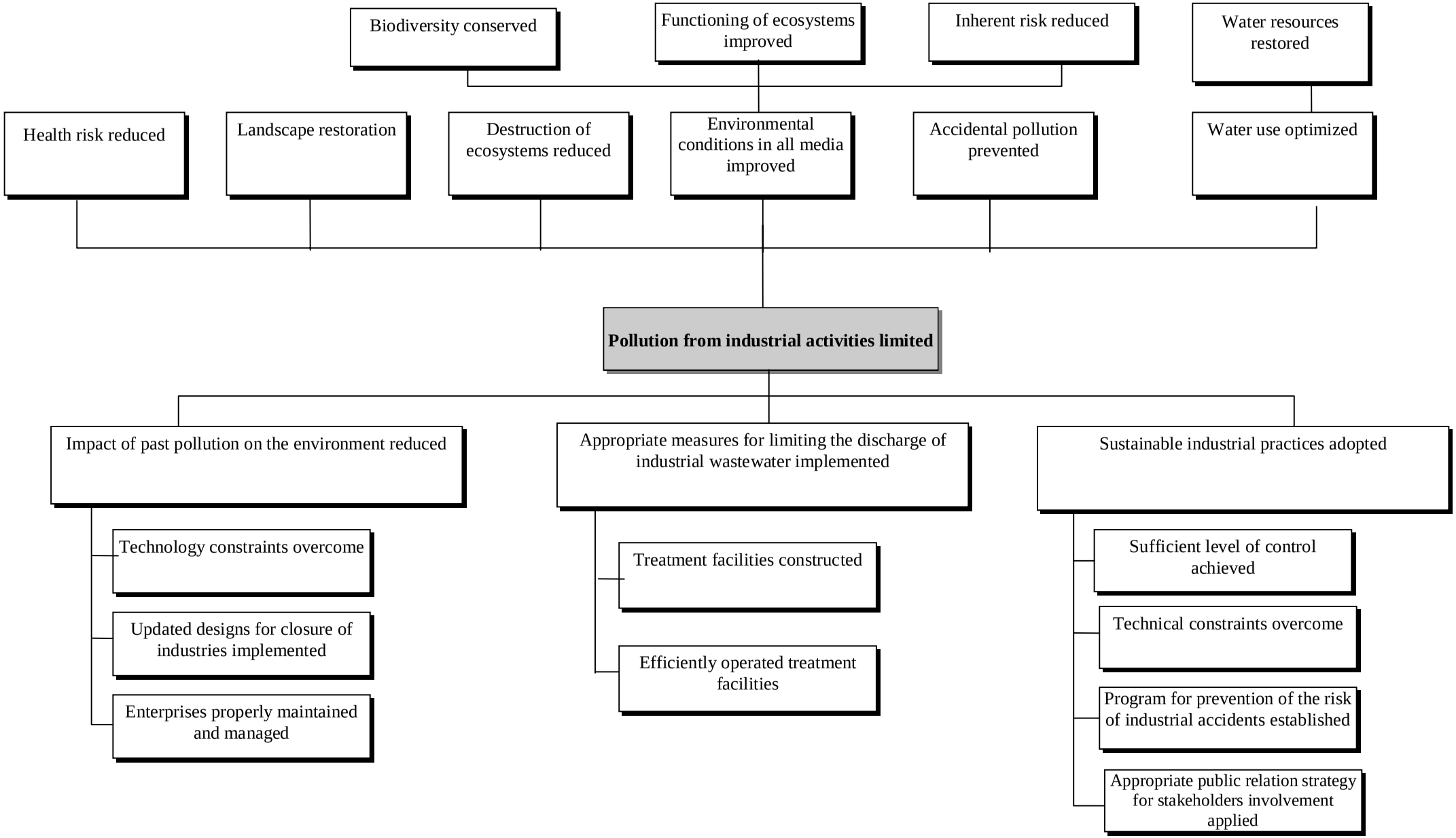


3. Discharge from animal breeding farms

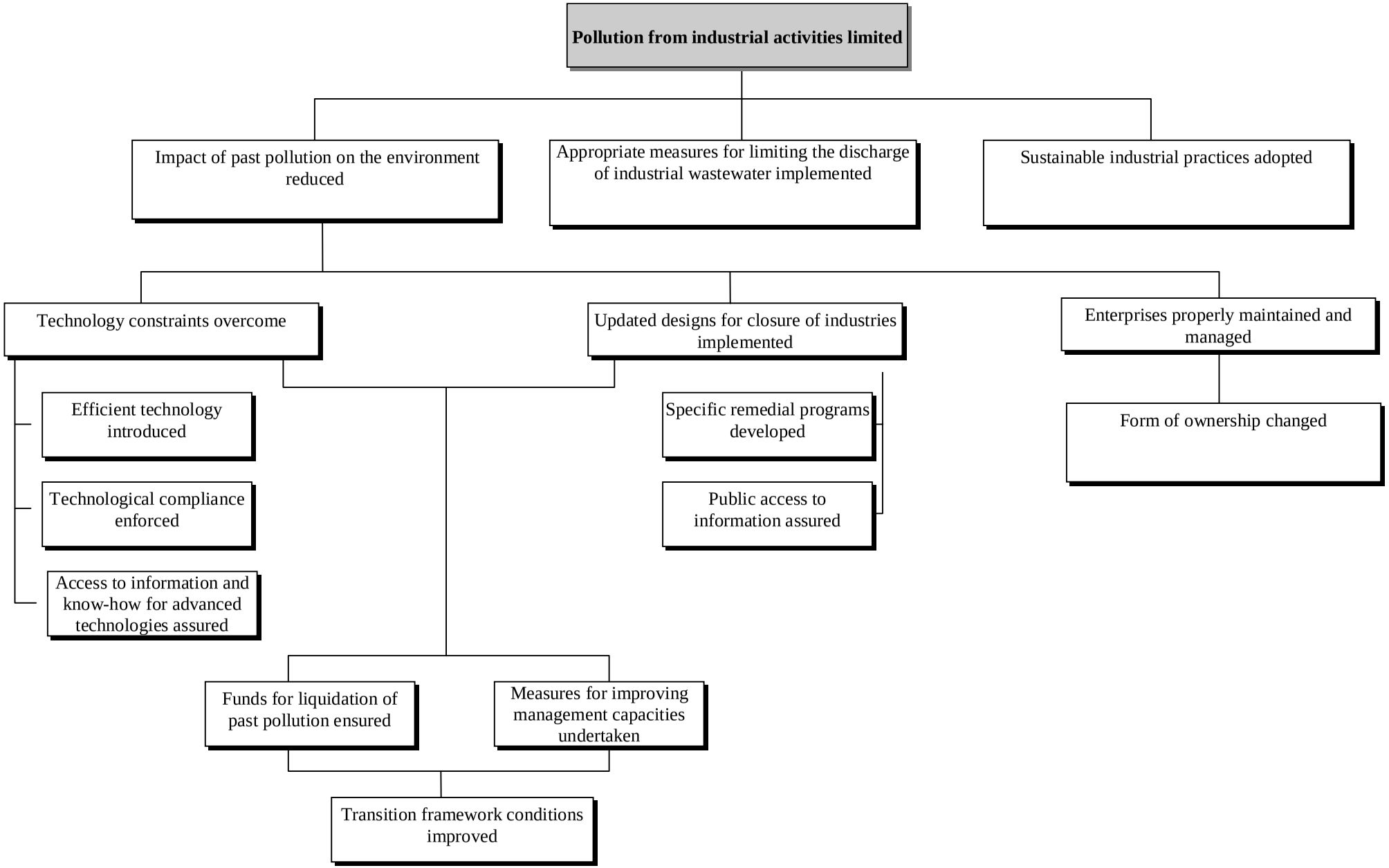


4. Forest and wetland management

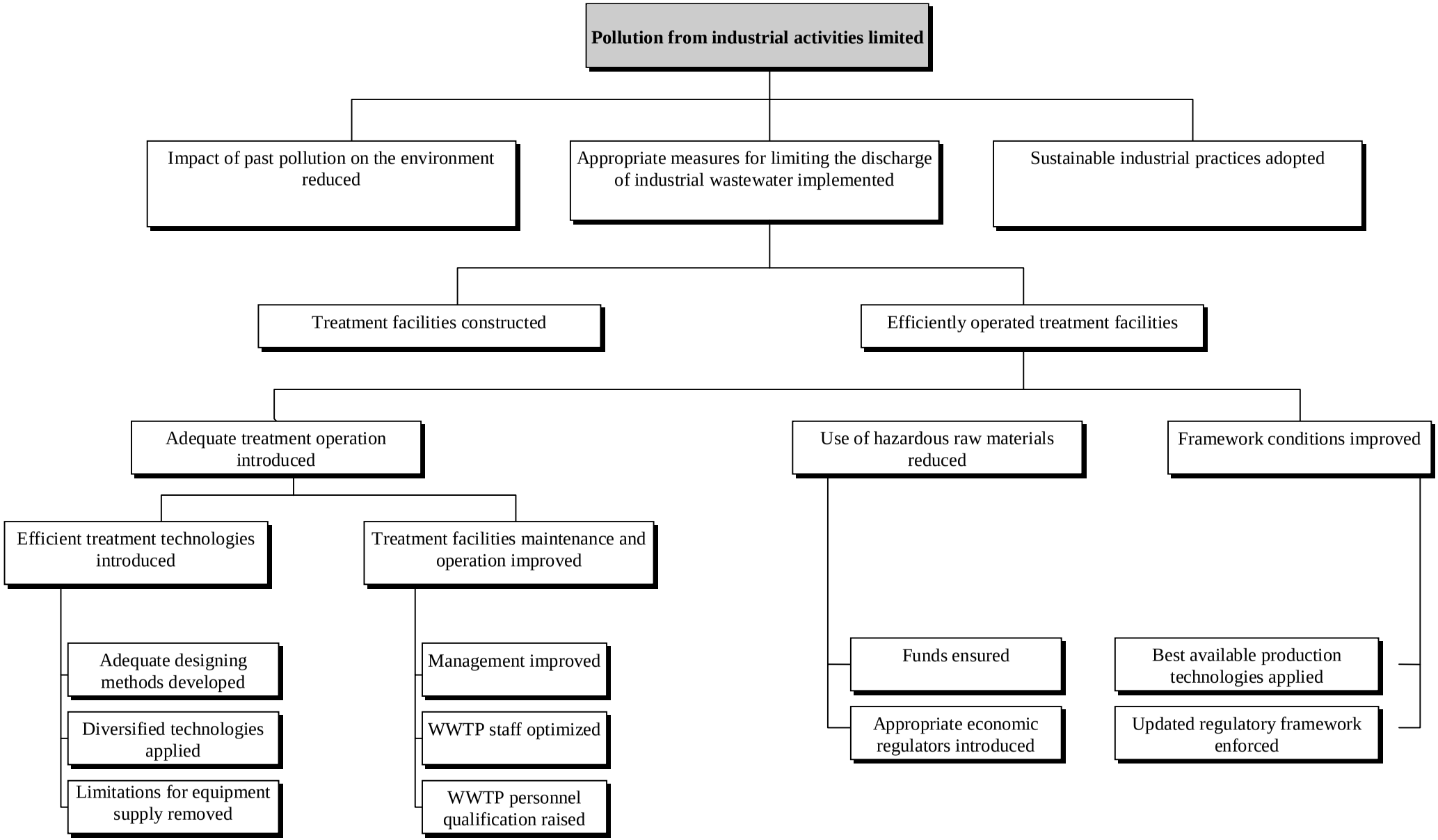



Biodiversity conserved
Functioning of ecosystems improved
Inherent risk reduced
Water resources restored
Health risk reduced
Landscape restoration
Destruction of ecosystems reduced
Environmental conditions in all media improved
Accidental pollution prevented
Water use optimized
Pollution from industrial activities limited
Impact of past pollution on the environment reduced
Technology constraints overcome
Updated designs for closure of industries implemented
Enterprises properly maintained and managed
Appropriate measures for limiting the discharge of industrial wastewater implemented
Treatment facilities constructed
Efficiently operated treatment facilities
Sustainable industrial practices adopted
Sufficient level of control achieved
Technical constraints overcome
Program for prevention of the risk of industrial accidents established
Appropriate public relation strategy for stakeholders involvement applied

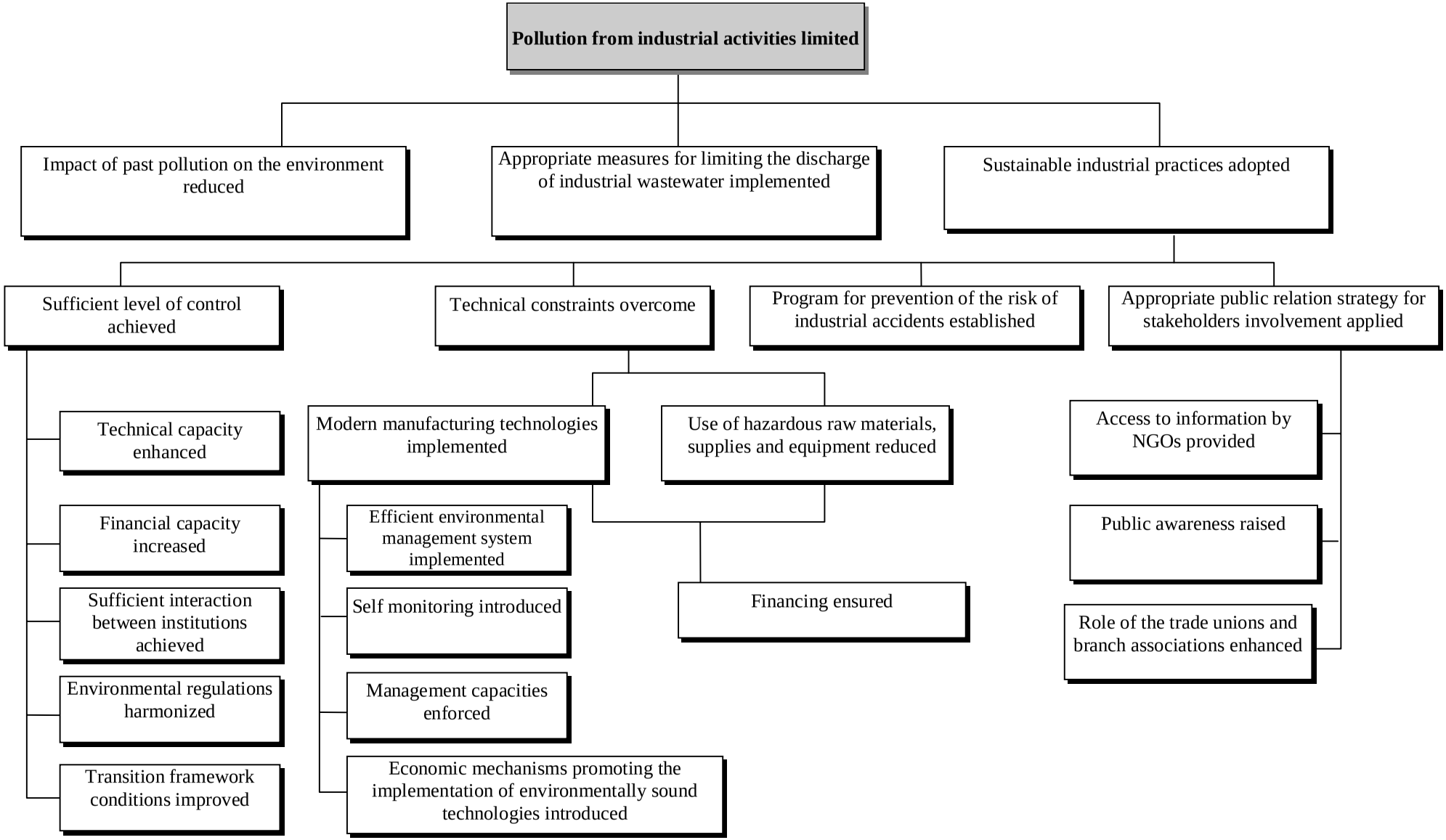
1. Past pollution

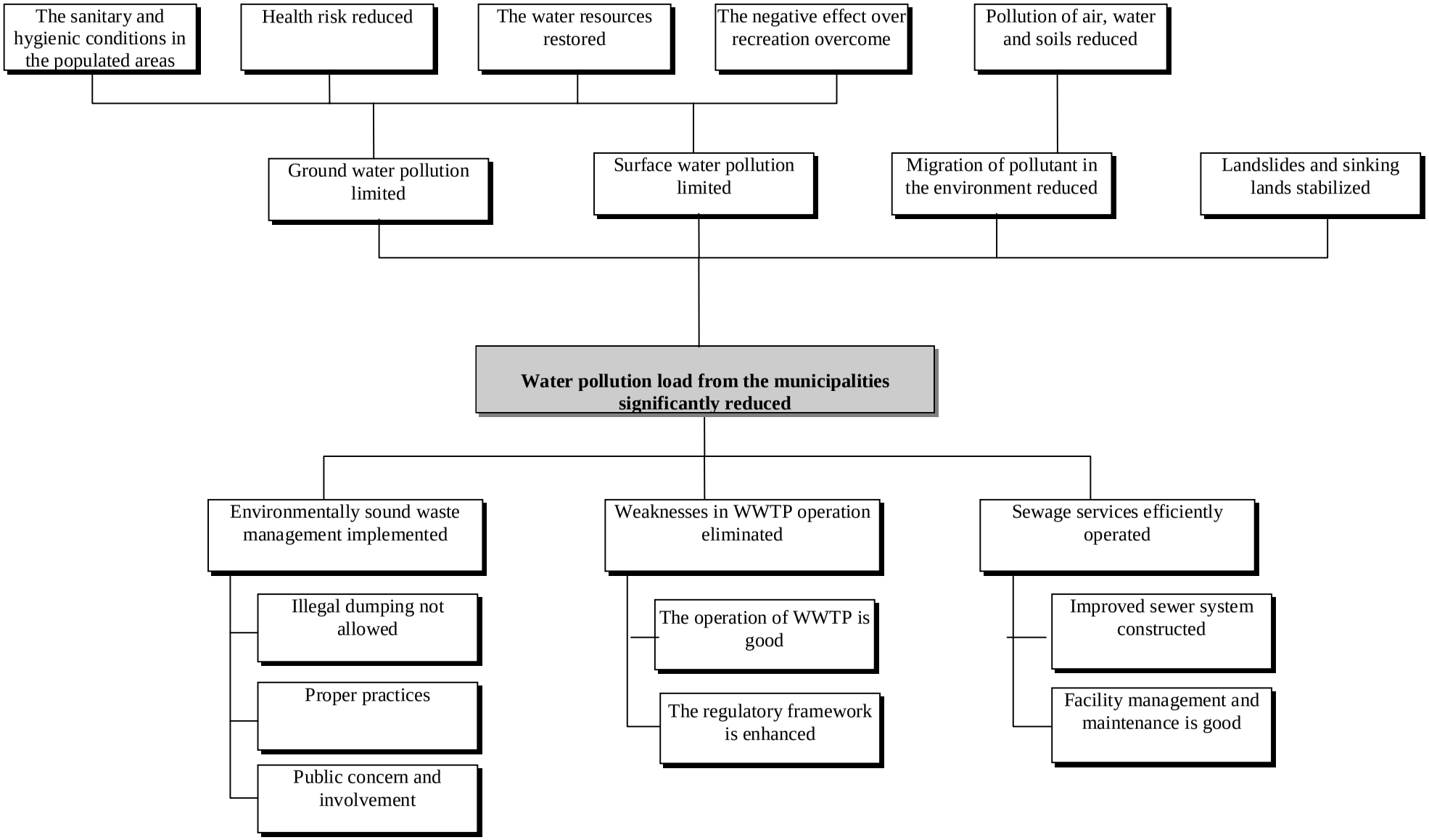


2. Industrial waste water

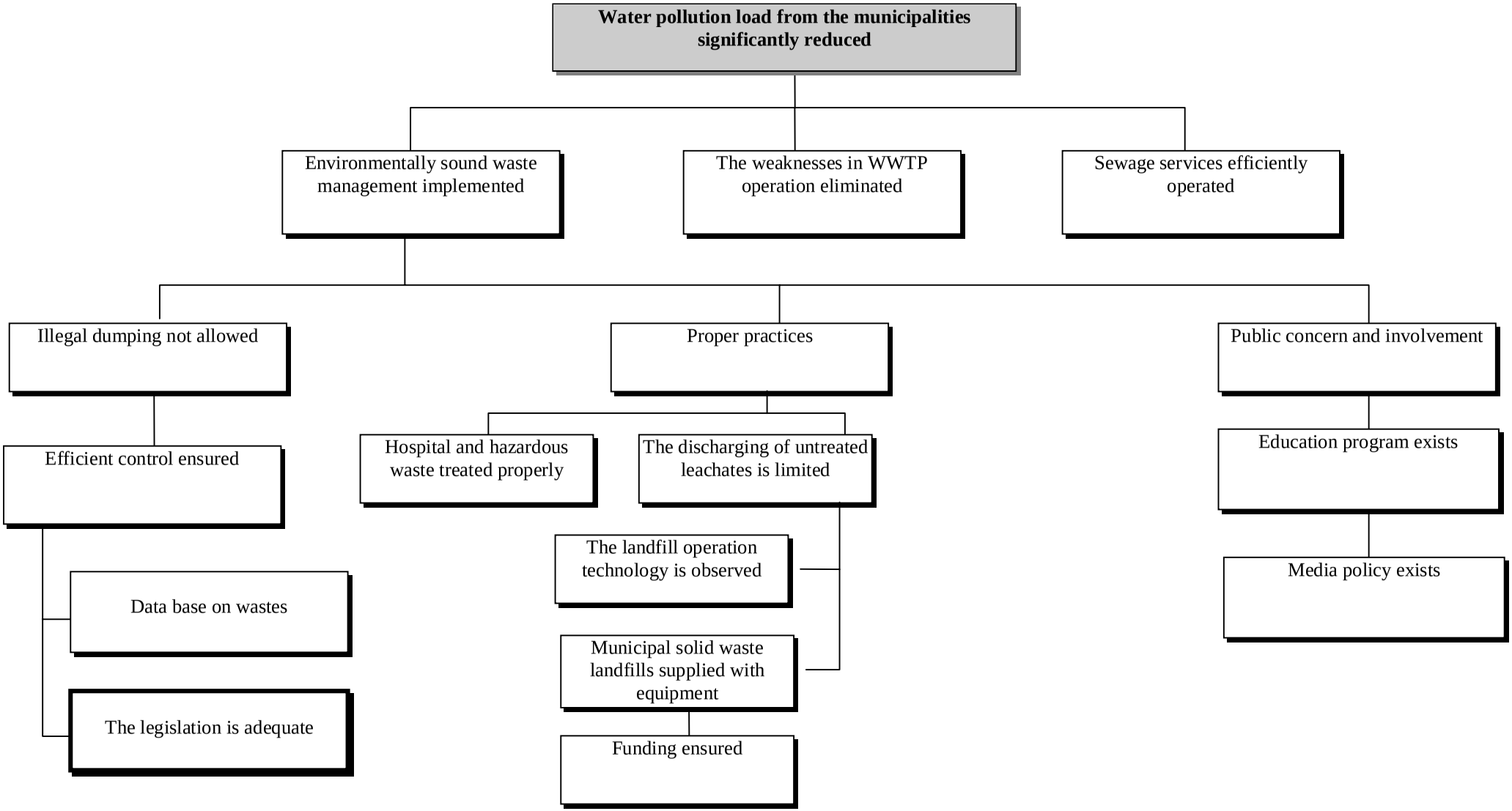


3. Industrial practices

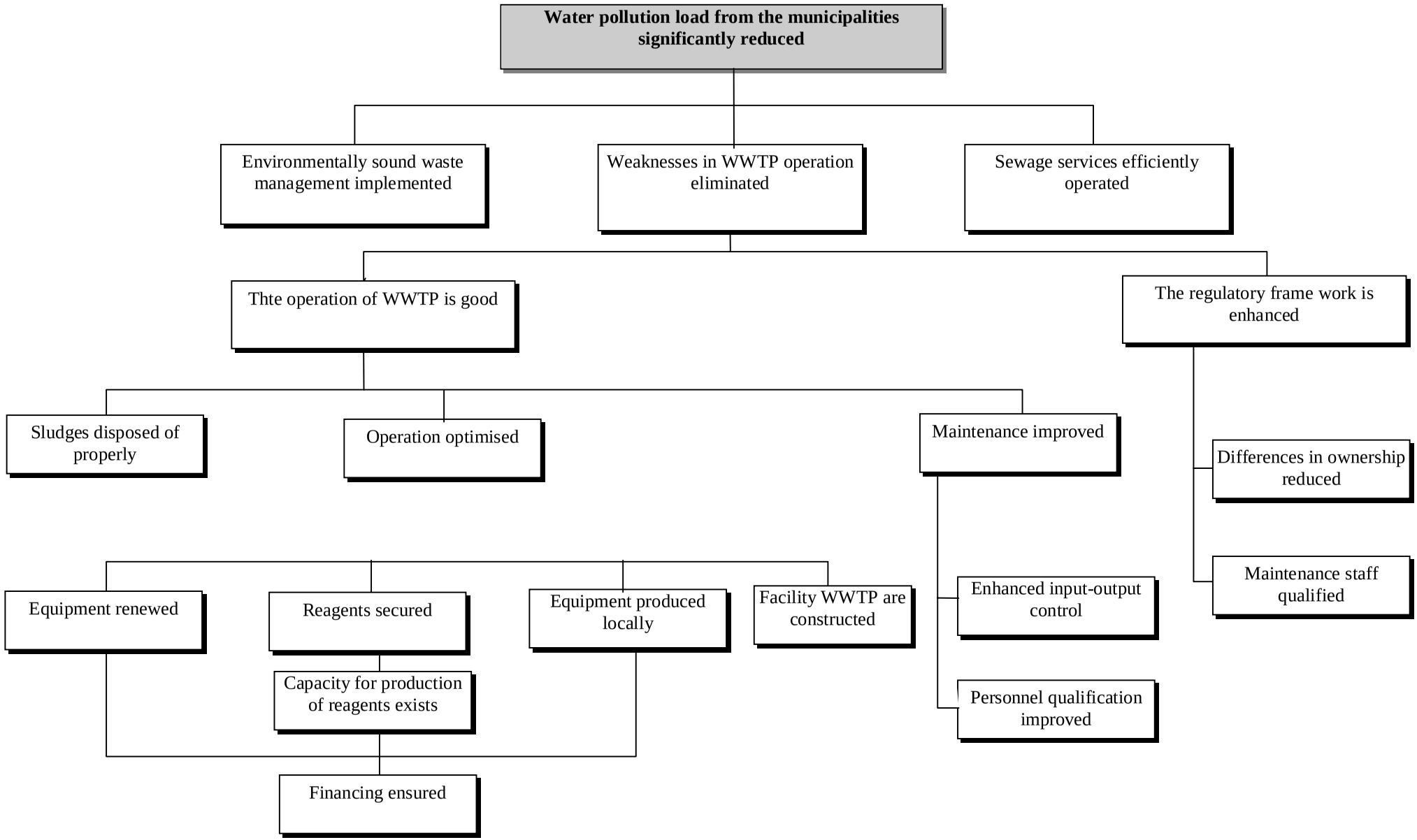



The sanitary and hygienic conditions in the populated areas
Health risk reduced
The water resources restored
The negative effect over recreation overcome
Pollution of air, water and soils reduced
Ground water pollution limited
Surface water pollution limited
Migration of pollutant in the environment reduced
Landslides and sinking lands stabilized
Water pollution load from the municipalities significantly reduced
Environmentally sound waste management implemented
Weaknesses in WWTP operation eliminated
Sewage services efficiently operated
Illegal dumping not allowed
Proper practices
Public concern and involvement
The operation of WWTP is good
The regulatory framework is enhanced
Improved sewer system constructed
Facility management and maintenance is good

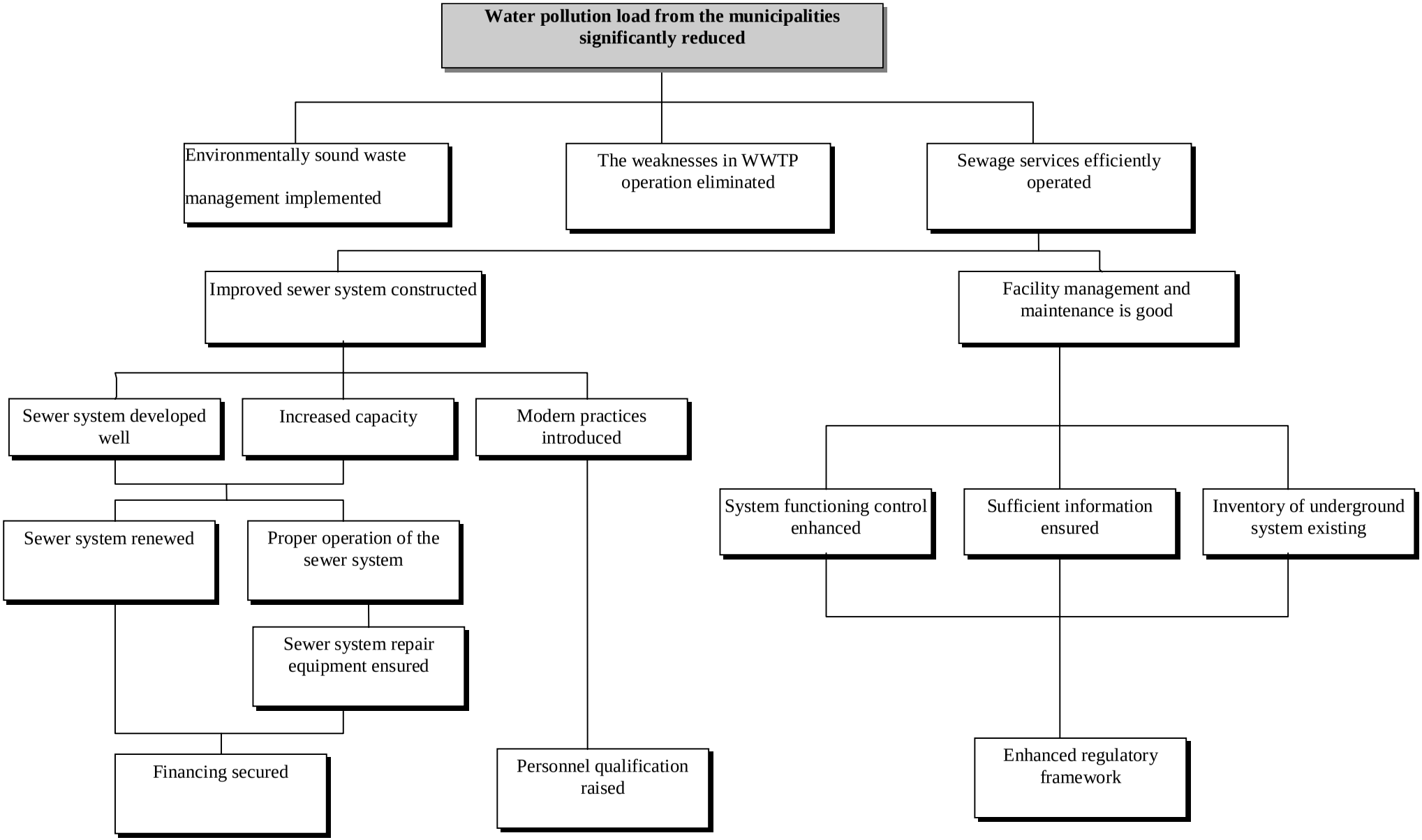
1. Waste Management



2. Management of waste water treatment plants (WWTP)



3. Operation of sewage systems



Annex 5 Sector Planning Matrix

5.1. Agriculture and Forestry

5.2. Industry

5.3. Municipalities

Sector Planning Matrix **Agriculture and Forestry** **Annex 5.1**

Summary of Objectives and Activities	Impact Indicators	Important Assumptions
➢ **Program Objective: Appropriate human activities in the catchment area**		
➢ **Sector Objective:** 1. Negative Impact of agriculture and forestry on the quality of water reduced	➢ Reduction of pollution loads of BOD5 by 30%, of nutrients by 10% , of suspended solids by 35% (as compared to 1997), flowing in from the Bulgarian reach of the Danube river basin by the year 2010. This will allow the water at the estuaries of the Bulgarian tributaries to reach the quality of a 2nd category water intake (SO-AF)	➢ Sufficient water resources exist (1.1) ➢ Former forest areas are restored (1.4)
➢ **Sector Results:** 1.1. Adequate plant growing practices adopted 1.2. Appropriate irrigation practices implemented 1.3. Negative impact of animal breeding farms reduced 1.4. Environmentally sound forest and wetland management methods introduced	➢ Ground water quality is improved. Nutrient content has diminished by 15%. Compliance with EU potable water standards in the Roussenski Lom river basin is achieved by the year 2015. (R-1) ➢ Salinization reduced in 20% of the saline areas through adequate farming methods by year 2005 in the region around the town of Svishtov. (R-2) ➢ The surface water quality is improved. Suspended solids reduced by 70%; BOD5 reduced by 60%; nutrients reduced by 35%, and the requirements for category II are achieved by the year 2010 in the Yantra river basin. (R-3) ➢ Preserved biodiversity on 1 500 ha of natural forests and 2 000 ha of wetlands along the Danube and restored 1 000 ha of forests with indigenous species in the Ogosta, Iskar and Vit river basins by the year 2015. (R-4)	➢ Adequate water quantities are supplied on time (SO-AF) ➢ Adequate waste water treatment (SO-AF) ➢ Drying of wetlands is terminated (1.4)
➢ **Activities:** 1.1.1. Raise skills and knowledge for applying best agricultural practices 1.1.2. Implement measures for agrarian reform and protection of resources 1.1.3. Facilitate updating of equipment for application of fertilizers and pesticides 1.1.4. Ensure funds for appropriate agricultural activities 1.2.1. Facilitate improvement of the regulatory framework for irrigation 1.2.2. Develop financial policy for irrigation and agriculture 1.2.3. Rehabilitate the irrigation system for private agriculture (the Srebrenska river watershed; Eastern zone) 1.2.4. Ensure qualified personnel 1.3.1. Improve WWT from animal breeding farms 1.3.2. Promote proper composting of farm manure and sludge 1.3.3. Enforce legislation on animal breeding 1.3.4. Make funds available 1.4.1. Ensure protection and conservation of natural forests 1.4.2. Implement a pilot project for ecological network (in the Ogosta, Iskar and Vit river basins) 1.4.3. Restrict illegal timbering 1.4.4. Implement projects for restoration of wetlands		➢ Conditions clarified (1.1.1. to 1.4.4) ➢ Justified price for irrigation services (1.2.3) ➢ Prices of energy resources are publicly affordable (1.4.1 to 1.4.4.) ➢ Sanctions on illegal timbering are effectively applied (1.4.1. to 1.4.4.)

PO - Program Objective SO-AF- Sector Objective Agriculture and Forestry SO-I - Sector Objective Industry SO-M - Sector Objective Municipality

Sector Planning Matrix **Industry** **Annex 5.2**

Summary of Objectives and Activities	Impact Indicators	Important Assumptions
➢ **Program Objective: Appropriate human activities in the catchment area**		
➢ **Sector Objective:** 2. Pollution from industrial activities decreased	➢ The concentration of pollutants, regulated by the ordinance on the surface running water at the inflow point of the Russenski Lom to the Danube river correspond to the 3rd category water intakes in the year 2010 (SO-I)	➢ The transition framework conditions are favorable (SO-I)
➢ **Sector Results:** 2.1. Impact of past pollution on the environment reduced 2.2. Appropriate measures for limiting the discharge of industrial waste water implemented 2.3. Sustainable industrial practices adopted	➢ The concentration of fatty acids in the ground water diminished by 50% and at the same time ground water quality conforms in a higher degree to the background values for the aquifers by the year 2010 in Dolna Mitropolia, Zvezda Factory (R-1) ➢ The concentration of heavy metals in the effluent of the chemically polluted waters treatment plant of the Zhiti-Rousse plant at the point of discharge into the Russenski Lom river are reduced in compliance with the admissible concentration for a II category receiving waters by the year 2010 (R-2) ➢ The concentration of organic 2 chlorine containing solvents in the waste water from the Antibiotic-Razgrad factory at the point of their discharging into the sewer (at the industry end-point) are reduced to 0.03% by the year 2010 with the same production rate (R-3)	➢ Facilities for treatment and disposal of hazardous waste exist (2.1. to 2.3) ➢ Industries are maintained and managed in line with agreed standards (2.1. to 2.3) ➢ Government authorities and other stakeholders cooperate within agreed legal frame (2.1. to 2.3.)
➢ **Activities:** 2.1.1. Prepare an inventory of pollution sites from the past 2.1.2. Undertake measures for improving management 2.1.3. Ensure funds for liquidation of past pollution 2.1.4. Implement updated designs for closure of industries 2.2.1. Introduce efficient treatment technologies 2.2.2. Construct treatment facilities 2.2.3. Update manufacturing technologies 2.2.4. Improve maintenance and operation of treatment facilities 2.3.1. Apply an appropriate public relations strategy for stakeholders involvement 2.3.2. Establish a program for prevention of the risk of industrial accidents 2.3.3. Reduce the use of hazardous raw materials, supplies and equipment 2.3.4. Implement modern manufacturing technologies		➢ Environmental legislation is properly enforced (2.1.1. to 2.3.4.) ➢ Public involvement is assured (2.1.1. to 2.3.4.) ➢ The changed form of ownership has a positive influence (2.1.1. to 2.1.4. and 2.3.1. to 2.3.4.) ➢ Trade unions and branch associations positively cooperate 2.3.1. to 2.3.4.)

PO - Program Objective SO-AF - Sector Objective Agriculture and Forestry SO-I - Sector Objective Industry SO-M - Sector Objective Municipality

Sector Planning Matrix **Municipality** **Annex 5.3**

Summary of Objectives and Activities	Impact Indicators	Important Assumptions
➢ **Program Objective: Appropriate human activities in the catchment area**		
➢ **Sector Objective**: 3. Water pollution load from the municipalities significantly reduced	➢ The amount of polluted drainage water of solid waste dump sites will be reduced by 50% by the year 2010, leading to a significant reduction of ground water pollution in the municipalities from the whole Danube River basin (SO-M)	
➢ **Sector Results:** 3.1. Environmentally sound waste management implemented 3.2. Weaknesses in WWTP operation eliminated 3.3. Sewage services efficiently operated	➢ Reduction of the landfill areas by 25% and improved ground water quality by year 2010 for all municipalities in the region (waste for disposal following separate collection) (R1) ➢ Increase the usable water resource by 20%, decrease water transfer losses in parallel to an improvement in the quality of surface water (category 2+3) by the year 2010 in the western zone of the Danube river basin (R2) ➢ Increase ground water use by 10% and increase potable water supply from underground sources in conformity with the EU standard in population centers with a modern sewerage system by 2010 (R3)	➢ Adequate legislation (SO-M) ➢ Rate of structural reform (SO-M) ➢ Good economic and social status of the population (SO-M)
➢ **Activities:** 3.1.1 Develop funding mechanisms 3.1.2. Introduce proper practices of waste management 3.1.3. Introduce appropriate legislation and monitoring system 3.1.4. Raise public awareness and commitment 3.2.1. Assure effective operation of MWWTP 3.2.2. Introduce measures for the improvement of legislation 3.2.3. Develop human resources and managerial skills 3.3.1. Ensure collection and treatment of domestic waste water 3.3.2. Introduce sound management of the system 3.3.3. Optimize operation activities		➢ Sites are available ➢ Current economic condition favorable ➢ Local WWTP in industry exist

PO - Program Objective SO-AF - Sector Objective Agriculture and forestry SO-I - Sector Objective Industry SO-M - Sector Objective Municipality

Annex 6 Description of Activities, Important Elements and Projects

6.1. Agriculture and Forestry

6.2. Industry

6.3. Municipalities

RESULT 1.1: ADEQUATE PLANT GROWING PRACTICES ADOPTED

Main Activities	Important Elements	Projects		
		Existing/On-going	**Planned**	**Proposed**
➢ 1.1.1 Raise skills and knowledge for applying best agricultural practices	➢ Develop an integrated plant protection program ➢ Elaborate a farmer training program ➢ Increase knowledge on the consequences of various agricultural practices ➢ Observe the requirements for fertilizer & pesticide application ➢ Expand and establish agricultural advisory offices ➢ Assist farmers for application of advanced agricultural practices ➢ Organize a public awareness campaign	➢ Extension services in the Ministry of Agriculture, Forests and Agrarian Reform (MAFAR) ➢ Pilot project for organic agriculture in the Central Balkan National Park ➢ Information system for safe use of pesticides	➢ Harmonization and development of a document based on the Pesticides Directive	➢ Extension services establishing program, increasing the farmers' skills ➢ Program for exchange of personnel and specializing in agriculturally developed countries ➢ Program for ecological plant growing in the region ➢ Public awareness campaign
➢ 1.1.2 Implement measures for agrarian reform and protection of resources	➢ Clarify land ownership ➢ Specify the scope of the current legislation ➢ Improve current legislation in accordance with the EU standards ➢ Assure appropriate land use ➢ Organize adequate pollution control	➢ Demonstration project for organic farming in the village of Apriltsi ➢ Regional monitoring of economically significant ground waters in the towns of Vidin, Lom, Lovech, Rousse, Silistra, Varna, 1992		➢ Integrated plant protection program in the region ➢ Adaptation of methods of the EU member states for assessment of pollution loads from non-point agricultural sources ➢ Establishment of a non-point source monitoring system for agricultural pollution of the water shed of the Danube ➢ Establishment of an information system for the movement of pesticides along the Osam and Vit rivers
➢ 1.1.3 Facilitate updating of equipment for application of fertilizers and pesticides	➢ Inventory the existing equipment ➢ Specify the need for modern equipment ➢ Introduce new, more efficient equipment ➢ Maintain the farming equipment in a good technical order			
➢ 1.1.4 Ensure funds for appropriate agricultural activities	➢ Extend the specialized financial fund ➢ Develop a program use of financial exemptions ➢ Elaborate programs for ecologically sound crop cultivation ➢ Attract external sources of financing ➢ Define criteria for funding ➢ Introduce a market policy			

RESULT 1.2 : APPROPRIATE IRRIGATION PRACTICES IMPLEMENTED

Main Activities	Important Elements	Projects		
		Existing/On-going	Planned	Proposed
➢ 1.2.1. Facilitate improvement of the regulatory framework for irrigation	➢ Speed up the drafting and adoption of the new Waters Act ➢ Clarify the ownership of hydrotechnical facilities ➢ Create water associations /NGO/		➢ Restoration of the Water Associations in the 'Rossitza' irrigation system – JICA	➢ Adapting of irrigation systems in northern Bulgaria to the needs of private farming ➢ Establishment of Water user associations along the Vit, Yantra & Iskar Rivers
➢ 1.2.2 Develop financial policy for irrigation and agriculture	➢ Look for external sources of financing ➢ Use moneys from the "Land Improvement Fund" for irrigation agriculture ➢ Use funds generated by small hydropower plants			➢ Feasibility study for the construction of small hydropower plants at the Sopot dam ➢ Feasibility study for the construction of small hydropower plants at the Ogosta dam
➢ 1.2.3. Rehabilitate the irrigation systems for private agriculture	➢ Provide a modern irrigation inventory ➢ Asses the energy consumption of the existing system ➢ Introduce low energy consuming irrigation systems ➢ Redesign the dumping stations along the Danube ➢ Restore destroyed pumping station & other technical facilities ➢ Develop a hydrometric network ➢ Construct individual water catchments for private farmers			➢ Optimizing water use for private farming ➢ Creation of a hydrometric system for the Karaissen irrigation system ➢ Redesigning & modernization of the Brushlyan & Lyulyaka pumping stations ➢ Methods to reduce the energy consumption of the irrigation system in the Danube plain ➢ Reconstruction and upgrading of the Sofia irrigation system ➢ Project for redesigning of the WWTP in villages of Brushlyan and Aidemir ➢ Reconstruction of Aidenitsa drainage pumping station
➢ 1.2.4. Ensure qualified personnel	➢ Develop a program for training of the irrigation personnel ➢ Train operators of small dams ➢ Establish local extension service bureaus ➢ Promote personnel exchange program with countries with advanced agriculture			➢ Establishment of an information and advising system for irrigation in Northern Bulgaria ➢ Program for training in operation of small water reservoirs ➢ Irrigation personnel training program

RESULT 1.3 : NEGATIVE IMPACT OF ANIMAL BREEDING FARM REDUCED

Main Activities	Important Elements	Projects		
		Existing/on-going	Planned	Proposed
➢ 1.3.1.Improve waste water treatment from animal breading farms	➢ Introduce new technologies for treatment of waste water discharged by animal breading farms ➢ Optimize current technological schemes ➢ Advisory offices to offer training courses ➢ Draw on advanced practices in ecological animal breeding ➢ Ensure trained staff to apply new technologies ➢ Improve operation and maintenance of treatment facilities		➢ Reconstruction and upgrading of the WWTP- pig breeding farm in Nikolovo village	➢ Establishment of an information system for emission control over animal breeding ➢ Modernization of WWTP of pig farms in Goliamo Vranovo
➢ 1.3.2.Promote proper composting of farm manure and sludge	➢ Develop training program on composting ➢ Construct composting facilities ➢ Ensure modern equipment for composting	➢ Demonstration project for organic farming in the village of Apriltsi ➢ Pilot project for organic farming - Central Balkan		➢ Small scale farmer training program ➢ Pilot project for treatment and complete utilization of the waste manure in the Yantra river basin
➢ 1.3.3.Enforce legislation on animal breeding	➢ Assure control over the discharge of waste water ➢ Ensure co-ordination of control /enforcement exercised by MoEW, MoI, MAFAR, MoH + LG's ➢ Raise sanctions and penalties for polluters			
➢ 1.3.4 Make funds available	➢ Provide exemptions for farms which do not discharge waste water ➢ Develop small scale animal breeding funding programs ➢ Promote financially ecological animal breeding in the mountains			

RESULT 1.4 : ENVIRONMENTALLY SOUND FOREST & WETLAND MANAGEMENT METHODS INTRODUCED

Main Activities	Important Elements	Projects		
		Existing/on-going	**Planned**	**Proposed**
➢ 1.4.1. Ensure protection and conservation of natural forests	➢ Terminate the process of substitution of natural forests with intensive crops (Main river Danube) ➢ Review the current projects and activities ➢ Implement procedures for modification of current projects ➢ Create appropriate conditions for all natural forests, including those which are not a part of the forest fund ➢ Train staff for forest protection and conservation ➢ Make funds available for forest protection and conservation ➢ Harmonize national legislation with EU directives on habitats, birds + water ➢ Implement an adequate legislative framework ➢ Involve NGO's in the reform process ➢ Speed up restoration of ownership over forests ➢ Train new owners	➢ Green Danube Ist phase sites: the Vardim, Milka 2, Kitka Islands; Implemented by WWF, National Forestry Department, the Green Balkan ➢ GEF Biodiversity conservation projects management planning for the Central Balkan National Park ➢ Completed project for determination of the Corine Biotopes in Bulgaria ➢ Implementation of a park management plan in the Russenski Lom National Park done by the Park's Management	➢ Green Danube IInd phase: Sites Belene islands; performed by the WWF, the Ministry of Agriculture, Forests and Agrarian Reform, Ministry of Environment and Waters ➢ Project for Restoration of the Runtava Bara in the Island of Vardim; National Department of Forests in the National Trust Eco Fund	➢ Completion phase of the Green Danube Project for the Islands in the Danube: Vidin – Nikopol, Svishtov – Silistra ➢ Project for adapting the legislation of forestry to the EU directives ➢ Project for public support for the forestry reform
➢ 1.4.2. Implement a pilot project for an ecological network, (in the Iskar, Ogosta, and Vit river basins)	➢ Identify all areas for restoration ➢ Design projects for prospective areas ➢ Restore local forests /including flooded ones/ - central + western zone ➢ Ensure funding for restoration through national + local funds	➢ Green Danube IInd phase; Site: Oak forests in the Vardim Island	➢ Project to define the boundaries $ of the western Balkan Mountain National Park funded by the REC ➢ Project for public involvement in putting pressure for making restoration activities the priority of national funds and programs	➢ Public project for development of an econet in the basin of the Ogosta, Iskar & Vit rivers ➢ Restoration ecological balance in the wetlands and flooded forest of Genchov Armyan
➢ 1.4.3. Restrict illegal timbering	➢ Support NGO's in creating volunteer networks for combating trespasses ➢ Step up effective control (MAFAR, MoI, MoEW, LG) ➢ Enhance the efficiency of protection through adequate programs ➢ Raise public awareness against illegal timbering ➢ Regulate timbering	➢ Project for public support for the reform in the nature protection legislation performed by the Green Balkans NGO	➢ GEF Project for Biodiversity Conservation; Ranger training courses for the Central Balkan National Park	➢ Project for establishment of an NGO network to combat poaching ➢ Project for institutional assistance to the forest guards (National Department of Forests and municipalities in the Skat and Ogosta river basins)
➢ 1.4.5. Implement projects for restoration of wetlands	➢ Restore the biodiversity + bioresources of wetlands ➢ Ensure ecological water levels for the wetlands ➢ Declare new wet zones as protected: Klimok, Orsoya, Metka	➢ Completed project for determining the bird areas in Bulgaria ➢ Project for protection and sustainable development of wetlands in the region of Nova Cherna village – Ist phase. Implemented by the Green Balkans NGO ➢ Project for protection of wetlands in the Iskar river basin; Ist phase. Done by the Ecoclub 2000 NGO ➢ UNESCO Project for monitoring of the Srebarna lake ➢ Management plan for the Srebarna Reserve – 18 months as of May 1, 1998; 3600 Swiss francs		➢ Project for restoration of the wetlands in the Belene island ➢ Project for management and use of the reeds massif ➢ Project for the restoration of the hydrological regime of the Nova Cherna wetland

RESULT 2.1 : IMPACT OF PAST POLLUTION ON THE ENVIRONMENT REDUCED

Main Activities	Important Elements	Projects		
		Existing/On-going	Planned	Proposed
➢ 2.1.1. Prepare an inventory of pollution sites from the past	➢ Classify them by sectors and types of production ➢ Identify all pollution sites from the past ➢ Prioritize by urgency ➢ Develop specific Projects	➢ Regional monitoring of ground water in the Lovech region, the Town of Lukovit ➢ Regional monitoring of ground water in the Lom - Pleven Depression ➢ Regional monitoring of ground water in the Vidin region ➢ Regional monitoring of ground water in Sofia region ➢ Regional monitoring of ground water in Rousse Silistra	➢ A hydro-geological information system (collection of information) ➢ Automated hydro-geological information system (data base)	➢ Inventorying past pollution upgradeable data base ➢ Studying of sites for construction of radioactive waste depositories
➢ 2.1.2. Undertake measures for improving management	➢ Introduce effective technologies ➢ Enforce technological compliance ➢ Involve branch associations for liaison with the government ➢ Promote development of human resources ➢ Introduce training programs for managers and staff			
➢ 2.1.3. Ensure funds for liquidation of past pollution	➢ Secure financing for the whole project ➢ Use privatization as source of financing ➢ Develop a state financing program ➢ Use ecofunds for financing			➢ Preparation of a long term program for resolving past pollution problems
➢ 2.1.4. Implement updated design for closure of industries	➢ Evaluate available technical archives ➢ Develop methods to evaluate old industrial buildings as past pollution ➢ Develop specific remedial programs ➢ Update designs ➢ Apply new technologies for closures	➢ Recultivation of Uranium Mines - Buhovo		➢ Past environmental damages Svioza ➢ Past environmental damages Zita - Rousse ➢ Past ecological damages Kremikovtzi ➢ Past environmental damages - Olive-oil producing factory Dolna Mitropolia

RESULT 2. 2: APPROPRIATE MEASURES FOR LIMITING THE DISCHARGE OF INDUSTRIAL WASTE WATER IMPLEMENTED

Main Activities	Important Elements	Projects		
		Existing/On-going	Planned	Proposed
➢ 2.2.1. Introduce efficient treatment technologies	➢ Technical analysis of the existing treatment facilities & feasibility study for their reconstruction ➢ Study the proposed treatment technologies ➢ Marketing study for the proposed equipment ➢ Commission the design, reconstruction and modernization of existing facilities ➢ Ensure control during construction	➢ WWTP for the Sevko Tannery in Sevlievo ➢ WWTP for Prista JSC in Rousse (along the Lom River)	➢ WWTP in Kremikovtzi Iron and Steel Works ➢ Reconstruction of the WWTP of Leso Plast -Troyan ➢ Reconstruction of the WWTP for Balkan - Lovech	➢ Eco Protein Ltd.- Rousse WWTP (Danube) ➢ WWTP Bimas Ltd.- Rousse (Danube) ➢ WWTP Zhiti Ltd. Rousse (Lom River flow) ➢ Construction of a second phase of WWTP Dolna Mitropolia Sugar Factory
➢ 2.2.2. Construct treatment facilities	➢ Ensure a complete project design + study circle ➢ Apply the best available technologies ➢ Ensure continuous oversight during construction of treatment facilities ➢ Ensure appropriately trained and sufficient staff as prescribed in the law	➢ WWTP for Orgachim-Iztok work site	➢ WWTP “Sugar Factory”, the Town of Gorna Oryahovitsa ➢ WWTP Metal Construction Factory Nikopol, the Town of Nikopol ➢ WWTP for Danube Silk Jsc.and Phasan Jsc. - Rousse (Roussenski Lom) ➢ WWTP for Antibiotic plant in Razgrad	➢ WWTP Mushroom Canning Factory - Krassen Village (Russenski Lom River flow) ➢ Hlebna Maya - Rousse (Danube) WWTP ➢ Fazerles Town of Silistra WWTP ➢ Vinprom Rousse Winery (Danube) WWTP ➢ Zahar Bio Sugar Factory, Town of Rousse (Danube river flow) WWTP ➢ WWTP Himko Ltd ➢ WWTP Elatsite-A Mine
➢ 2.2.3. Update manufacturing technologies	➢ Assess the impact of the technological changes over the treatment technologies and define an investment project ➢ Introduce appropriate economic regulators ➢ Seek out funding opportunities through environmental funds ➢ Ensure funds ➢ Implement the investment project			➢ Integrated system for control of hazardous materials ➢ National Chemical Safety Audit Program
➢ 2.2.4. Improve maintenance and operation of treatment facilities	➢ Update the facility operating instructions ➢ Ensure permanent input-output control for the facilities ➢ Optimize the WWTP staff number ➢ Raise the WWTP staff qualification ➢ Improve management	➢ Training Programs		➢ Orgtechnica - Silistra WWTP

RESULT 2. 3: SUSTAINABLE INDUSTRIAL PRACTICES ADOPTED

Main Activities	Important Elements	Projects		
		Existing/On-going	Planned	Proposed
➢ 2.3.1. Apply an appropriate public relations strategy for stakeholders involvement	➢ Develop an NGO interaction mechanism ➢ Provide NGO's and the public with access to environmental & health information ➢ Use of the mass media for a positive policy ➢ Create lobbies for promotion of environmental initiatives ➢ Establish a mechanism for public relations in emergency situations	➢ Training Programs ➢ Project for a video film by an NGO to be broadcast on national TV ➢ Program for air time for NGOs in Bulgarian TV		➢ Design a system for involving the community in the decision making process and control ➢ Design a project with NGOs on an information system
➢ 2.3.2. Establish a program for prevention of the risk of industrial accidents	➢ Install automatic control and signaling devices ➢ Update emergency plans ➢ Develop a plan to eliminate consequences of accidents ➢ Renew instructional and training sessions ➢ Draft safety operation instructions for small and medium hazardous production processes	➢ Municipal Emergency Action Plans		➢ Project for implementing the requirements of Seveso-II for prevention of industrial accidents
➢ 2.3.3. Reduce the use of hazardous raw materials, supplies and equipment	➢ Create an environmental management system ➢ Introduce self-monitoring ➢ Define environmental functions and responsibilities ➢ Asses periodically for the control results ➢ Evaluate the possibilities for closure of certain production processes ➢ Update the measures when necessary	➢ Danish project for introduction of the IPPC in Bulgaria		➢ Project for implementation of the IPPC Directive in Bulgarian industry ➢ Project for implementing environmental management - EMAS, ISO 14001 ➢ Demonstration project for implementation of environmental management in enterprises
➢ 2.3.4. Implement modern manufacturing technologies	➢ Enforce management capacities ➢ Create lobbies for introduction of adequate environmental legislation ➢ Search for possibilities for financial relief (import of environmentally sound equipment) ➢ Make funds available ➢ Promote changes in the production processes, rather than treatment "at the end of the pipe" ➢ Introduce waste minimization technologies ➢ Introduce appropriate technologies for hazardous waste treatment and disposal ➢ Implement clean technologies with an assessment of the product life-cycle ➢ Promote training programs			➢ Project for training managers in implementing clean technologies

RESULT 3.1 : ENVIRONMENTALLY SOUND WASTE MANAGEMENT IMPLEMENTED

Main Activities	Important Elements	Projects		
		Existing/On-going	Planned	Proposed
➢ 3.1.1. Develop funding mechanisms	➢ Change of the municipality funding policy ➢ Establishment of waste treatment associations ➢ Differentiated waste collection fee system ➢ Provision of special- purpose subsidies from financial institutions	➢ National environmental protection fund, Municipal environmental protection fund, National environmental trust fund		➢ Drafting a municipal regulation for differentiated fees ➢ Establishment of a consortium for hazardous waste treatment
➢ 3.1.2. Introduce proper practices of waste management	➢ Develop municipal programs for SWM ➢ Ban illegal dumping ➢ Install facilities for treatment of hazardous waste ➢ Close down illegal dump sites ➢ Stop dumping of hazardous waste on municipal landfills ➢ Build regional landfills ➢ Build SW sorting facilities ➢ Treat hospital waste in environmentally appropriate ways ➢ Limit the discharge of untreated landfill leacheates ➢ Sanitation of old dumps	➢ Pilot project for regional SW landfills (Vratsa/Mezdra, Veliko Turnovo/Gorna Oriahovitsa in conformity with the National program for SWM ➢ Separate collection of SW pilot project (Sofia-3 districts) ➢ Suhodol landfill-Sofia ➢ National program for SWM	➢ Construction of SW landfills V.Turnovo, Gorna Oriahovitsa, Razgrad and Dobrich ➢ Construction of landfills in Lukovit, Cherven Briag, Pleven, Troyan, Lovech ➢ Constructions of SW landfills Lom, Svishtov, Silistra, Tutrakan ➢ Sanitation and capping of a solid waste landfilling Dolni Bogrov ➢ Construction of a SW landfill-Rousse ➢ Construction of a landfill for municipal solid waste Kostinbrod, Mezdra, Novi Iskar, Botevgrad ➢ Reconstruction of the hospital waste incinerator-Sofia ➢ Hazardous waste incinerator-Sofia	➢ Studying of sites for construction of solid waste landfill-Sofia ➢ Technical projects for sanitation and recultivation ➢ Construction of a solid waste landfill in Pleven ➢ Construction of landfills in Nikopol, Lukovit, Levski
➢ 3.1.3. Introduce appropriate legislation and monitoring system	➢ Creation of a waste database ➢ Identification of past pollution ➢ Harmonization of the limitation of the impact of waste act with EEC & WHO ➢ Develop technical requirements regulation ➢ Develop hazardous waste disposal instruction ➢ Control of the illegal import or illegal transport of hazardous waste though Bulgaria	➢ Basel convention + ADR ➢ National automated environmental monitoring system		➢ Public register of wastes ➢ Preparation of a uniform monitoring and control method
➢ 3.1.4. Raise public awareness and commitment	➢ Develop a media policy ➢ Develop public awareness programs ➢ Inform the general public by appropriate means	➢ National clean environmental campaign	➢ Designing of a national program on environmentally appropriate waste management	➢ Development of a national training program on waste management

RESULT 3.2: WEAKNESSES IN WWTP OPERATION ELIMINATED

Main Activities	Important Elements	Projects		
		Existing/On-going	Planned	Proposed
➢ 3.2.1.Assure effective operation of MWWTP	➢ Establish overall management scheme ➢ Modernize the equipment ➢ Optimize the technologies ➢ Make reagents available ➢ Provide adequate sludge treatment ➢ Improve input-output control ➢ Introduce self monitoring ➢ Automation of the process	➢ Resort "Borovets" collector channel "The Egg" ➢ WWTP Gabrovo reconstruction ➢ WWTP Vratsa-reconstruction (partial) ➢ WWTP Sofia partial reconstruction - sludge treatment ➢ Collector pipe connecting Novi Iskar to Sofia WWTP (constructed) ➢ WWTP Samokov - modernization and rehabilitation ➢ Main collector channel in Rousse under construction ➢ WWTP "The Egg" under construction ➢ WWTP Strazhitsa under construction ➢ WWTP Pleven under reconstruction	➢ WWTP Belogradchik ➢ WWTP Sevlievo ➢ WWTP Cherven Bryag ➢ WWTP Etroplole ➢ WWTP Mezdra ➢ WWTP Levski ➢ WWTP Berkovitsa ➢ WWTP Rousse ➢ WWTP Silistra ➢ WWTP Troyan	➢ Self-monitoring projects for WWTP ➢ Automatic input – output control project ➢ Construction of WWTP Lovech ➢ Construction of WWTP Montana ➢ Construction of WWTP Popovo ➢ Construction of WWTP Gorna Oryahovtza and Lyaskovetz
➢ 3.2.2. Introduce measures for improvement of the legislation	➢ Develop secondary legislation on fees, tariffs, norms ➢ Develop control measures to ensure enforcement of the laws ➢ Harmonize legislation with EU ➢ Revise the existing legislation	➢ Project for bringing the regulatory framework in compliance with the EEC legislation		➢ Project for revision of the existing legislation ➢ Control over the implementation of the laws and regulations
➢ 3.2.3. Develop human resources and managerial skills	➢ Optimize processes and thus release of funds to improve management ➢ Develop mechanisms for self-financing ➢ Set up PR offices ➢ Establish a management control system ➢ Raise the personnel skills			➢ Creation of PR offices at the WWTP ➢ Training on the management and maintenance of WWTP ➢ Automated management of operations at WWTP's ➢ Project on the overall framework for WWTP management ➢ Project for optimization of the processes in order to release funds for improved management ➢ Provision of free external financial aid for improvement of the existing WWTP ➢ Project for computerized control in WWTP

RESULT 3.3 : SEWAGE SERVICES EFFICIENTLY OPERATED

Main Activities	Important Elements	Projects		
		Existing/On-going	Planned	Proposed
➢ 3.3.1. Ensure collection and treatment of domestic waste water	➢ Expand the sewerage system ➢ Provision of periodic monitoring of the elements of the sewer system Clarify the needs for modern equipment ➢ Update the current cadastre ➢ Develop information system ➢ Measure the discharged quantities	➢ Pumping station Keja - Rousse ➢ Sewer System in part of the town of Vidin ➢ Main collecting channels-Samokov ➢ Collector channel town of Lom	➢ Main branch- Gorubliane ➢ Regional information system and GIS for ecozones Sofia ➢ National system for underground cadastre ➢ Yalta pumping station in Rousse	➢ Development of a program for devising and info system on the state and functioning ➢ Development of a program for monitoring and control of the sewerage system ➢ Completion of the sewer in Sofia ➢ Construction of the main collectors along the Danube (Nikopol, Svishtov, Silistra
➢ 3.3.2. Introduce sound management of the system	➢ Develop a permitting system ➢ Improve interaction among enforcing authorities ➢ Operational control ➢ Maintain the existing in good technical shape ➢ Renovate the repair equipment			➢ Project for inter-institutional co-ordination of activities (designing of common policies) ➢ National program for development of a sewerage system - update
➢ 3.3.3. Optimize operation activities	➢ Assess the needs for modern equipment ➢ Introduce modern repair technologies ➢ Clean sand-clogged collector channels ➢ Regular cleaning of inspection shafts ➢ Deratization of the sewer system ➢ Introduce on-site training ➢ Provide leak detection equipment ➢ Rehabilitation of the compromised sewer ➢ Eliminate accidents promptly ➢ Create financial incentives for the utility companies			➢ Municipal projects for modern equipment and maintenance. Staff training. ➢ Project or financial incentives

Annex 7 Workshop Organization

7.1. Agenda of the Workshop

7.2. List of Participants

7.3. Evaluation of the Workshop

7.4. Opening Speech

DANUBE POLLUTION REDUCTION PROGRAM
NATIONAL PLANNING WORKSHOP
30. June- 4. July 1998, Sofia

AGENDA

TUESDAY, 30 JUNE		
14.00 -14.30	**Opening of the workshop** ➢ Introduction ➢ Program/Planning Process ➢ Presentation of Work Program	**PLENARY** Mr. Bendow Facilitators
14.30 -14.45	**METHODOLOGICAL APPROACH OF TOPP**	Facilitators
14.45 -15.45	**Presentation and discussion of River Basin Areas** River Basin Approach in Bulgaria ➢ Physical Aspects ➢ Demography ➢ Transboundary Effects as perceived ➢ Human Activities/Economy	**PLENARY**
15.45 -16.00	COFFEE BREAK	
16.00 -17.30	**PRESENTATION AND DISCUSSION OF RIVER BASIN AREAS**	**PLENARY**

WEDNESDAY, 1 JULY		
8.30 -10.00	**SITUATION ANALYSIS** ➢ *Methodology:* Actions leading to Pollution will be proposed for each sector by the Facilitators ➢ Exercise applying the method. Formation of Working Groups (by sector)	**PLENARY**
10.00-10.30	COFFEE BREAK	
10.30-12.30	**Situation Analysis**	**GROUP WORK**
12.30-14.00	LUNCH BREAK	
14.00-15.30	**Presentation of Situation Analysis** ➢ Municipal Sector	**PLENARY**
15.30-16.00	COFFEE BREAK	
16.00-18.00	**Presentation of Situation Analysis** ➢ Agriculture ➢ Industry	**PLENARY**

THURSDAY, 2 JULY		
8.30 -10.00	**Presentation of Problem Analysis (Problem Tree)** **Presentation of Objective Analysis (Objective Tree)**	**PLENARY**
10.00-10.30	COFFEE BREAK	
10.30-12.30	**PLANNING MATRIX** *a) Methodology* *b) Sector Objectives*: proposed by Facilitators out of the Situation Analysis and Objective Analysis *c) Results/Outputs*: developed by participants out of Situation Analysis and Objectives Analysis *d) Definition of Activities*: Methodology	**PLENARY**
12.30-14.00	LUNCH BREAK	
14.00-15.30	**Definition of Activities in relation to Results/Output**	**GROUP WORK**
15.30-16.00	COFFEE BREAK	
16.00-18.00	**Definition of Activities in relation to Results/Output from each Sector**	**PLENARY**

FRIDAY, 3 JULY		
8.30 -10.00	**<u>Activities, Important Elements and Projects</u>** ➢ Methodology ➢ Exercise in applying the method ➢ Definition of Important Elements ➢ Existing and planned projects in relation to proposed activities and important elements	**PLENARY** **GROUP WORK**
10.00-10.30	COFFEE BREAK	
10.30-12.30	**PRESENTATION OF ACTIVITIES, IMPORTANT ELEMENTS AND PROJECTS**	**PLENARY**
12.30-13.30	LUNCH BREAK	
13.30-15.30	**IMPORTANT ASSUMPTIONS** ➢ Methodology ➢ Definition of important elements	**PLENARY** **GROUP WORK**
15.30-16.00	COFFEE BREAK	
16.30-17.00	**IMPACT INDICATORS** ➢ Methodology ➢ Exercise applying the method ➢ Definition of Impact Indicators for Results and Outputs	**PLENARY** **GROUP WORK**

SATURDAY, 4 JULY		
8.30 -10.00	**PRESENTATION OF SECTOR PLANNING MATRIX** ➢ Summary of Objectives and Activities ➢ Important Assumptions ➢ Impact Indicators	**PLENARY**
10.00-10.30	COFFEE BREAK	
10.30-12.30	**Presentation of Program Planning Matrix** **Evaluation of the Workshop** **Closing of the Workshop**	**PLENARY**
12.30-13.30	LUNCH BREAK	
14.00	DEPARTURE	

National Planning Workshop in Bulgaria

29 June-7 July 1998

List of Participants

1. **Branimir Borisov Natov**
   Bulgarian Economy Chamber
   Env. Policy Advisor
   Sofia 1000; 16-20 Alabin Str.
   981-16-97;980-30-55
   e-mail:natov@bia-bg.com
2. **Boris Kirilov Angelov**
   RIEW
   Director
   Pleven; 1Al.Syamboliiski Str.
   80-17-68; 80-17-68
3. **Vanio Paskov Marinov**
   Hygiene-Epidemiologycal Inspectorate
   Director
   Vidin
   2-32-57
4. **Vaska Iordanova Mihailova**
   Ministry of Environment and Water
   Expert
   Sofia ; 22 Maria Luiza blvd.
5. **Georgi Kostov Tsonev**
   Russe Municipality
   Head of Environment Dept.
   Russe ; 7000 Svoboda Sq.
   23-80-21
6. **Georgi Petkov Tsenov**
   RIEW
   Director
   Vratsa ; 81 Ekzarh Iosif
   Tel/fax: 2-47-61
7. **Dimiter Dimitrov**
   Ministry of Health
   Expert
   1000 Sofia; Sveta Nedelia Sq.
   988-51-28

8. **Daniela Angelova Karailieva**
   Hygiene-Epidemiological Inspectorate
   Head of Occupational Health Dept.
   Montana
   096/2-39-83

9. **Damian Nikolov Boichev**
   National Center for Environment and Sustainable Development
   Director
   955-90-22; 955-90-15

10.Konstantin Nikiforov Tsankov
   National Institute for Hydrology and Meteorology-Bulgarian Academy of Science
   Hydroengineer
   Sofia ; 66 Tsarigradsko Shose
   975-33-45

11.**Elisaveta Borisova Sgurovska**
   Ministry of Environment and Water
   Chief Expert, Environmental Impact Assessment Dept.
   1000 Sofia ; 67 W. Gladstone
   847-22-29

12.**Ivan Borisov Vankov**
   RIEW
   Chief Expert
   Vidin
   2-74-91

13.**Iordan Georgiev Kosturkov**
   Institute for Water Problems of Bulgarian Academy of Science
   Hydroengineer
   713-24-46’ 72-25-77
   e-mail: yordan@bgctct.acad.bg

14.**Iordanka Traikova Hristozova**
   Ministry of Agriculture, Forest and Agrarian Reform
   Chief Expert
   1000 Sofia ; 55 Hristo Botev Str.
   98-08-274
   fax:981-79-55

15.**Liubomir Atanacov Profirov**
   Ministry of Environment and Water
   Expert, Biodiversity Dept.
   1000 Sofia ; 67 W. Gladstone Str.
   847-22-379
   fax: 52-16-34

16. **Maria Hristova Minovska**
RIEW
Veliko Turnovo
062/2-31-07
fax: 062/2-37-84

17. **Maria Ivanova Minkova**
NGO Ekoglasnost
Deputy Director
1000 Sofia; P.K. 548
9 Dondukov blvd.
88-15-30; 80-23-23
fax: 88 5 30

18. **Mihail Veselinov Mollov**
National Center for Environment and Sustainable Development
Expert
1618 Sofia; 136 Tsar Boris III
e-mail: ncesd@online.bg

19. **Maya Pencheva Drianovska**
Ministry of Environment and Water
Chief Expert
Sofia; 22 Maria Luiza blvd
987-08-87

20. **Plamen Ilev Ninov**
National Institute of Hydrology and Meteorology
hydroengineer
Sofia ; 66 Tsarigradsko Shose
975-39-87 ext. 260
e-mail: ninov@metro.bg

21. **Parvan Borisov Samarjiev**
Ministry of Regional Development
Chief Expert, Water Sector Dept.
Sofia; 16-18 Sveti, Sveti Kiril I Metodi Str.
88-32-60; 980-28-38

22. **Plamen Marinov Lakov**
NGO Clean nature
Director
Pleven
064/5-41-02

23. **Stefan Daskalov**
Ministry of Environment and Water
Chief Expert
Sofia ; 67 W. Gladstone Str.
8472-2383
fax: 52-16-34

24. **Stancho Nenov Stanchev**
Hygiene-Epidemiological Inspectorate
Head of Occupational Health Dept.
Razgrad; 8 Kiril I Metodi
2-73-82

25. **Ruska Petkova Kalevska**
Ministry of Environment and Water
Expert, Waste Management Dept.
1000 Sofia
84-72/22-24; 22-81;52-16-34
e-mail: moew@mb.bia-bg.com

26. **Snejana Ivanova Georgieva**
RIEW
Chief Expert
Russe; 20 Pridunavski blvd.
082/27-81-65; 27-80-28

27. **Stefan Modev**
Associate professor,Dr.
Vice president of The IHP-National Commettee of Bulgaria
University of Architecture, Civil Engineering and Geodesy
Department of Hydraulics and Hydrology
1 Chr. Smirnensky Str.
1421 Sofia
tel: 63 321 ext.672; 66 63 75
fax: 65 68 63
e-mail: Modev_fhe@UACG.ACAD.BG

28. **Toma Georgiev Belev**
NGO Green Balkans
Director
Plovdiv; 160 6-ti septemvri blvd.
032/26-45-16;22-69-78
fax: 26-45-16
e-mail: greenbal@mbax.digsys.bg

29. **Todorka Iordanova Simova**
Irrigation System JSC.
Sofia; 136 Tzar Boris blvd.
56-61-21

30. **Tsevetanka Marinova Dimitrova**
RIEW
1111 Sofia; 26 Lavele Str.
87-26-73; 88-02-25

31. **Tsetska Voinova Tsvetanova**
Hygiene-Epidemiological Inspectorate
Head of Occupational Health Dept.
Vratsa
2-22-75

32. **Hrabar Hristov Natov**
Ministry of Regional Development
Chief Expert
1000 Sofia; 17-19 Sveti, sveti Kiril I Metodi Str.
88-32-60
fax: 980-28-348

TECHNICAL EXPERTS:

Marieta Stoimenova
JICA Study Team
The Integrated Environmental Management of the Maritza River Basin Project
National Center for Environment and Sustainable Development
136 Tzar Boris III Blvd., Sofia 1618
tel/fax: 955 90 18
e-mail: marietta@mail.techno-link.com

Ivo Popov
POVVIK-EP Ltd.
Consulting and Engineering company for environmental technologies
30 Boris Angelov Str., Sofia 1138
tel: 78-13-22
tel/fax: 974-37-56
e-mail: povvik@ttm.bg

Prof. Ada Bainova
National Center of Hygiene
tel: 58-12-260

FACILITATORS:

Kamelia Georgieva
GEF Biodiversity Project
Techical Coordinator
123 Rakovski Str., floor 3, Sofia 1000
tel: 88-14-30
tel/fax: 980 13 85
e-mail: kameliag@ard.mgu.bg

Veselina Stoyanova
Executive Director
4 Parchevich Str., Sofia 1000
tel: 51-80-49
tel/fax: 954 97 11

COUNTRY PROGRAM COORDINATOR

Nikolai Kuyumdzhiev
Ministry of Environment and Water
Chief Expert, Use and protection of Surface Water Dept.
tel: 981-44-12; 981-43-93
fax: 981-11-85

DANUBE PROGRAM COORDINATION UNIT:

Joachim Bendow
GEF/UNDP Chief Technical Adviser
tel:+431 21345 5618
e-mail: jbendow@unov.un.or.at
Vienna International Center
P.O. Box 500-A
1400 Vienna
Austria

Teun Botterweg
D-PCU Team Leader
Vienna Internationale Center, room DO419
P.O. Box 500
1400 Vienna
Austria
tel:+431 2134 5615
fax: +431 213 45 5836
e-mail: tbotterweg@unov.un.or.at

Maxime Belot
dipl. sciences commerciales
Sossenheimer Weg 52
D-65824 Schwalbach/TS
tel: +49-6196-85974

Ulrike Meissner
Schleifmuhlgasse11/21
1040 Wien
Austria
tel: + 43 1 5814193

Evaluation of the workshop

The goal of the workshop was that a common understanding is to be achieved on the national level about the strategies and priorities leading to a reduction of the Bulgarian input in the Danube water pollution. As a result of the workshop, the preparation of a National report is expected, which, based on wide and in depth analysis of the situation, will suggest the implementation of concrete activities and projects.

In the Workshop the Target Oriented Program Planning (TOPP) method was used. The workshop in general applied properly the preliminary developed agenda. All steps envisaged in the method were covered and the results of them documented.

Most of the invitees participated in the workshop and, thus, more then 22 national or regional governmental institutions, NGOs and academic organizations were represented. The facility where the workshop took place was convenient enough and provided good conditions for work and rest.

The workshop finished with an evaluation by the participants, using the "questioning by cards technique". The following four questions were put on the board where everybody had to "pin" her/his opinion (The table is herewith attached):

- The organization of the workshop
- the method used
- results achieved
- personal contribution

The **organization** of the workshop was positively evaluated by most of the participants. Only three participants were not satisfied by it. Most of the participants stated that the method used is very creative and gives good results. Here are some of the statements recorded: "The method is good and allows avoidance of omissions or subjective opinion in planning and defining of the project's priority"; "I believe that the method is very interesting and that allows results through its logical thinking process".

Some suggestions are made that can be useful for the further implementation of it - to give more time for initial presentation of the **method** with simple examples, to distribute resource materials longer in advance in order participants to be prepared better. For some of the participants the method was just interesting, and for one of them arguable.

The **results** achieved were also high evaluated. Two of the participants look to the future to evaluate them if they will be applied in the program.

We asked the participants to express their feelings about their **personal contribution** in the result achieved. Most of them think that it was to the extend of their qualification and experience. Only two of them thought it was unclear or modest.

In general the workshop was evaluated positively by the participants and we can say they finished their work with satisfaction.

Organization	Method	Results achieved	Personal contribution
➢ Very good ➢ Excellent ➢ Very good ➢ Very good ➢ Perfect ➢ The organization is excellent ➢ The organization was immaculate ➢ Very good and efficient ➢ Good ➢ Good ➢ Immaculate ➢ Good ➢ Good ➢ Good ➢ Very good ➢ Very good ➢ Very good ➢ Very good in view of the so many problems for discussion ➢ Excellent ➢ Very good ➢ Superb organization ➢ Very good ➢ The organization was very good but the notification and the materials could have been submitted earlier so that everyone could read them in advance and come prepared ➢ Very good ➢ Very good ➢ Bad ➢ Poor ➢ Poor.	➢ Provides conditions for the creation of a good program ➢ Efficient ➢ The method is good and allows avoidance of omissions or subjective opinion in planning and defining of the project's priority ➢ Very good for team work ➢ Very good approaches and logistics, but more time is necessary for initial presentation of the method with a simple example ➢ Very easily applicable ➢ Productive ➢ The method is successful ➢ Very good ➢ Allows active participation and provision of information ➢ Useful ➢ Excellent ➢ Allows obtaining of the information necessary for planning ➢ The method requires too many resources and loses the connection between objective, expected results and planned activities ➢ Very good for planning of strategies at all levels ➢ Efficient and applicable in preparing other types of programs too ➢ Productive ➢ Strong planning method ➢ Good ➢ Excellent ➢ Interesting ➢ Interesting ➢ Arguable ➢ Interesting ➢ I believe that the method is very interesting and that allows results through its logical thinking process ➢ So far the result is unclear but is useful ➢ Interesting, especially if we have learned from it ➢ Interesting	➢ We'll see... ➢ The result will be clear after we see how much of the seminar will be included in the program ➢ The results are a basis for a successful completion of the project ➢ Possibly the best ➢ The results will be useful in future planning ➢ Very good ➢ More than expected ➢ Good ➢ Very good ➢ Encouraging (good) ➢ Very good ➢ Good ➢ Good ➢ Very good ➢ Good ➢ Good ➢ Very good results, in line with the expectations ➢ Good ➢ The results are good compared to the available initial data ➢ The workshop achieved the objective ➢ Good ➢ Good ➢ Very good and applicable in reality for a certain period of time ➢ Unknown ➢ Possibly the best and with more time the results could be even better ➢ I expect very good results after the materials are finalised.	➢ Big ➢ Very good ➢ Sufficient ➢ Good, because I understand the role of wetlands ➢ Very good ➢ Good ➢ Very good ➢ Excellent ➢ Good ➢ Good ➢ Average ➢ Good ➢ Within my personal capabilities ➢ Within my personal capabilities ➢ Within my competence ➢ Expert and technical ➢ My contribution was positive for some problems ➢ Substantial ➢ Could have been more active ➢ Everyone was contributing to the extent of their qualification and experience ➢ Good ➢ Partial ➢ Within my capabilities ➢ Unclear ➢ Modest ➢ Average.

Opening Speech held by Professor Emil Marinov, Deputy Minister of Environment and Water

Bistritsa, June 30 – July 4, 1998

Dear ladies and gentlemen, dear colleagues,

It is my pleasure to congratulate you on the opening of the National Consultative Meeting and Workshop within the Pollution Reduction Programme for the Danube.

Bulgaria has been an active participant in the pan-European environment protection efforts initiated at the Environmental Protection Meeting in 1989 in Sofia within the frame of the security co-operation process in Europe expressed specifically at the European Conference in Lucerne in 1993 and continued at the meeting of the Ministers of the Environment concluded several days ago in Aarhus in Denmark.

There is experience on the continent in the international co-operation and uniting of efforts in resolving the problems of water quality and the natural environment of the transboundary rivers. One example are the Rhine and the Elba rivers. This experience forms the basis for the planning and creation of a common strategy for the Danube river basin. At the same time, it is difficult to find a parallel and a matching model not only in Europe, that has the scale and depth of national, economic and ecological problems in this region. The Danube is Europe's second largest river next to the Volga but more than 80 million people reside in its basin, which includes partially or completely the territories of 14 states. Also, an extreme diversity of economic and technological possibilities of the various states is represented there.

The problems of using and conserving the water resources in the region involve a complete range of possible issues. Diverse harmful impacts exist and change the conditions of water flows and ecosystems, affecting also the environment and people's health. Especially serious are the problems of microbiological pollution, contents of organic substances causing depletion of oxygen, nutrient loads, eutrophication, and hazardous and toxic substances with all their harmful impacts over drinking water sources, river ecosystems, animal species, other water users, recreation, or, in general, on the quality of life in the polluted region.

The population in many regions of the basin suffers from an acute shortage of water, while the available water does not always meet the sanitary requirements.

The unique nature of the Danube is also related to the fact that this enormous basin drains into a practically closed volume – that of the Black Sea, – with all possible consequences from the pollution accumulated on the long stretch of the river and its tributaries. The Danube basin delivers 55% of the Black Sea's fresh water volume and also contributes significantly to the nutrient load. This threatens the unique ecosystems of the Danube's delta and the Black Sea and requires urgent strengthening measures.

The transboundary problems require partnership and co-ordinated international measures and activities for their elimination. Each country resolves the problems on its own territory. But while improving the quality of life of its own population, it becomes involved in the regional efforts and supports the downstream states in conformity with the Convention for the Protection of the

Danube, for which Bulgaria is implementing pre-ratification procedures. Upon mentioning the Convention for the Protection of the Danube, I would like to remind you that it was signed four years ago yesterday in Sofia.

The government of Bulgaria recognizes the urgent need for identification and implementation of measures for prevention, control and reduction of the harmful impacts caused by the discharging of hazardous substances and nutrients in the Bulgarian stretch of the Danube river watershed and for sustainable use and management of waters. This can not but conform to the national programmes and priorities, to the bilateral and multilateral agreements, and to the efforts made by our country to approximate its legislation that of the European Union and to accede to it. Among the steps in this direction are the adoption of a modern Environmental Protection Act, also specific laws, harmonized with the EU directives were adopted for the various components and regulatory documents. A new Waters Act is undergoing drafting, agreement and adoption.

Bulgaria is one of the countries in transition but is making serious efforts to participate in the process of environmental management at the regional level. The International Programme for the Protection of the Danube, financed by the UNDP, the Global Environmental Facility and the European Union through the PHARE Programme has entered its second phase.

As a member of the Supreme Council of the International Programme for the Protection of the Danube, I had the pleasure to support the Danube Pollution Reduction Programme. This meeting is very important for the protection of the environment the basin of the Danube and, in particular, for the protection and management of the waters in the Bulgarian watershed.

The intersectoral approach in water management is a new element in our practice.

The Ministry of Environment and Waters has become an initiator of this meeting at a moment of great importance for Bulgaria's environment protection.

On the one hand, we are among the initiators of a number of European and regional initiatives in the field of water protection and management, and on the other hand, it is both difficult and easy to undertake important steps in this area during the transition from planned to market economy. It is difficult because there are free budget resources, which should be oriented directly toward environmental projects. It is easy because at the time it is possible at the time of restructuring to apply directly the new laws and other concepts with a view to preventing the negative impacts on the environment by industry, agriculture or populated areas.

The workshop's objective is to use an in-depth analysis of the condition of the Bulgarian portion of the Danube basin area to outline the basic measures and projects aimed at improving the environment and waters focused upon by the programme.

We have invited to the workshop representatives of all central authorities and their regional branches related to environmental management in the region; representatives of the academic institutions, local authorities, non-governmental organizations etc. We expect this expert meeting to allow all participants to contribute with their knowledge, skills in preparing a serious national report to be used in planning the country's participation in the International Pollution Reduction Programme for the Danube River Basin and in the Convention on the Protection of the Danube.

We expect intensive work in the days to come. Assisted by the GEF Project Coordination Unit and the UNDP, we could prepare and propose a contemporary and efficient planning method. We have invited a team of trained independent facilitators and logistics staff to support you in your work.

Several months ago and expert team assisted by the GEF Project Coordination Unit and the UNDP drafted a detailed analysis of the Bulgarian stretch of the Danube river basin.

We expect now that you, supported by these experts and by the facilitators, will generate a good formulation of Bulgaria's needs and reach a consensus on a proposal of projects and programmes to be included in the second phase of the Environmental Programme for the Danube expected to be ratified by the Republic of Bulgaria soon.

Ladies and gentlemen,

I would like to wish you beneficial work once again and to assure you that this National Consultative Meeting on Pollution Prevention of the Danube is a part of our contribution to the pan-European efforts for sustainable development and nature conservation.