

FRESHWATER COUNTRY PROFILE GREECE

Decision-Making

Programmes and Projects

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Status

Capacity-Building, Education, Training and Awareness-Raising

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Decision-Making: Since December 2003, a new legislative and institutional framework has been put into force in the country. It consists of Law 3199/9-12-2003 (OJG 280A/2003) on “water protection and the sustainable management of the water resources” with which the EU Water Framework Directive (WFD) (2000/60/EC) is transposed into the national legislation. This new framework Law foresees a radical re-orientation of the respective administrative capacities in Greece and introduces an innovative and holistic approach concerning water management that recognizes explicitly the ecological function of water. It also lays emphasis on the management of water on the basis of river basins as well as on the water pricing so that it reflects its full costs. In more detail, the main objectives of the new Law include: the long-term protection of water resources, the prevention of deterioration and the protection and restoration/remediation of degraded water resources and wetlands, the reduction and, in cases, the phase out of harmful and polluting discharges, the reduction of groundwater pollution and the prevention of its further deterioration as well as the mitigation of the effects of floods and droughts. The 3199/03 Law also incorporates the ‘polluter pays principle’ and the objective of maintaining or reaching a ‘good ecological status’ for all water resources through the control of pollution by use of thresholds levels and standards. It also introduces innovative approaches concerning the protection of water quantity and the transnational cooperation for the protection of transboundary water courses and lakes.

The new legislation for the protection and the sustainable management of the water resources in Greece, provides a detailed identification of 13 River Basin Districts (RBDs) according to the administrative units of the country, the competent authorities and their respective responsibilities in water management in Greece. In this context, Regional Water Directorates and Councils will be established within each River Basin District / Water Region (RBDs) and they will have the responsibility for organising and coordinating water policy activities (including water pricing) and specific Water Programmes and Action Plans with specific measures for each RBD. They will be in charge for implementing the WFD in the RBDs of the country and they will be supervised by the National Water Agency, a governmental authority with the overall responsibility for establishing water policy. In the new legislation there is also consideration about the most effective options for setting up legal coordination mechanisms relating to the designation and management of the River Basins that cross the Water Region borders. The appointment of the new authorities will be legally binding once it is integrated into the new legislation.

The 3199/03 Law also integrates the public participation requirements of the WFD. The active involvement of the interested parties is ensured by their representation at the National and Regional Water Councils that will be developed as a part of the new administrative framework. In order to complete the transposition of the WFD, besides this new law, further instruments, Presidential Decrees and Joint Ministerial Decisions are under preparation, for the incorporation of the technical provisions of the Directive.

Before this new law on water was put into force, the legislative framework of the country on this issue included Law 1739/1987 on Water Resources Management, establishing the institutional framework for the management of water resources in Greece and the Environmental Protection Law 1650/1986 for the protection of surface and groundwater quality, including control of effluent discharges. The 1987 Law also provided for the design and implementation of water resources policies as a prerequisite for development that would enhance the results of production processes, balance the various competitive uses for water and contribute to the renewal-replenishment of water resources as well as to the protection of the environment through participatory processes. Despite the innovative and integrated approach introduced by this Law, its complexity made its full implementation in practice quite difficult.

The existing Legal Framework for water resources management in Greece, apart from the above mentioned new Law 3199/9-12-2003, also includes Joint Ministerial Decisions (JMD) such as JMD 46399/1352/1986 and JMD A5/288/1986 for the harmonization of the Greek legislation with EU Directives 75/440, 76/659, 76/160 and Directives 78/659, 79/869 and 80/778 respectively, as well as JMD 18186/271/1988 for measures and restrictions for the Protection of the Aquatic Environment: Determina-

tion of Limit Values for Dangerous Substances in wastewater. It also includes Council of Ministers' Decisions (CMD) such as CMD 144/1987 for the Protection of the Aquatic Environment from Pollution caused by Dangerous Substances. Moreover, concerning drinking water quality, the Sanitary Regulatory Decision A5/288/86 (Official Journal of the Government - OJG 53B, 379B) about "Drinking Water Quality" (which refers to the qualitative characteristics of drinking water, to the frequency of sampling and the obligations of the responsible persons), in harmonization with Directive 80/778/EEC, was valid until December 25th 2003, when the new JMD Y2/2600/01 (OJG 892/B/11/11-7-01), in harmonization with EU Directive 98/83 for the quality of water for human consumption, came into force.

Management of protected areas including wetlands, was defined in 1999 (Law 2742/99) through the establishment of administrative units (Management Bodies) and the competence of NATURA 2000 Committee, whereas in 2002, through Law 3044/02, 25 Management Bodies were established, additionally to the existing two ones. Management of the most important protected wetland sites in Greece, designated as Ramsar wetlands of international importance, is attained through the establishment of these Bodies (which are financially supported, for the time being, from the state), that will collaborate with the respective regional services to be established according to Law 3199/03, with the mandate to develop and implement regional water management plans.

Concerning the protection of the quality of water resources and of vulnerable zones, in years 2001 and 2002 the existing legislative framework was complemented by various JMDs determining protection measures for vulnerable water resources as well as threshold levels for polluting substances from various anthropogenic sources, according to relative EU Directives (described in detail under Chapter 'Programmes and Projects', C. Protection of Water Resources, Water Quality and Aquatic Ecosystems).

Finally, in 2003, a new Forest Act (3208/03) was adopted, concerning the protection and management of forest resources with emphasis on the protection of forests and their hydrological role.

Programmes and Projects: The targets of the National Strategy for Sustainable Development (NSSD) (2002), regarding the management of water resources, are set out in the National Strategy for Water Resources (NSWR) (2002) and aim at the sustainable use of water resources, the efficient protection of water ecosystems and the attainment of high quality standards for all surface and ground water bodies by the year 2015. The NSWR also incorporates the water targets, in line with the Johannesburg Plan of Implementation, for water supply and sanitation as well as for integrated water management and water efficiency plans.

The basic sectors of action of the NSWR are:

- Integrated approach for water management: Development of Management Plans on river basin level including transboundary water courses, based on water quality and quantity considerations and the interaction between surface and ground waters.
- Decentralization of water management authorities-bodies: Establishment of Water Managing Bodies the transposition of competencies to the regional and local levels. These Bodies will also be responsible for the elaboration of Crises Management Plans, for extreme events e.g. floods and droughts.
- Upgrading and expansion of infrastructure: This includes the promotion of specific measures and actions for meeting the demand for water supply through the expansion of existing networks as well as through the decrease of losses, the construction of new and the upgrading of existing wastewater treatment plants with emphasis on recycling, the construction of new multi-purpose reservoirs and finally, the establishment of more effective mechanisms for monitoring water quality and quantity with focus on creating an updated Data Bank.
- Incorporation of socio-economic considerations in water management: This includes measures to reinforce public participation in water management efforts as well as adaptation of pricing policies to include 'the social cost' in water services' provision.

- Protection from harmful substances: Setting of new maximum permissible levels of harmful substances' concentrations in water resources as the basis of a sound system for liabilities, water protection and promotion of remedial measures, where required.

More specifically, the NSWR contains a wide series of projects, programmes and actions, according to the requirements of the WFD that will allow meeting set targets at national, EU and international levels, by fully implementing the WFD and law 3199/03, such as:

- Participation in the process of testing the guiding and supporting documents on key aspects of the WFD (technical Guidance Documents) in several pilot river basins across Europe (integrated testing in pilot river basins). The overall objective of this integrated testing Project is to contribute to the implementation of the WFD in selected Pilot River Basins, leading in the long-term to the development of River Basin Management Plans. The specificity of the testing versus the real implementation is that the testing is a front-runner of the actual implementation. Greece is participating in this Project with Pinios Pilot River Basin (Thessaly RBD).
- Update of the National Data Bank of Hydrological and Meteorological Information and of the National Environmental Information Network.
- Identification and characterisation of the individual river basins and identification of the respective competent authorities.
- Development of a new monitoring network for inland surface, transitional, coastal and ground waters, including the development of monitoring programs for biological quality parameters and the assessment of their ecological quality.
- Intercalibration exercise in several water bodies, as a part of the intercalibration network within the European Union.
- Designation of heavily modified and artificial water bodies.
- Development of water pricing policies that enhance the sustainability of water resources.
- Continuation of construction of wastewater treatment plants.
- Analysis of the role of local authorities and citizens in securing long-term water resources conservation.
- Development of Management Plans in Water Districts for each river basin of the country.

For the implementation of Law 3199/03 and of the NSWR, in Greece, four (4) Phases have been set aiming at accomplishing the following intermediate targets (according to the WFD requirements):

- 1st Intermediate Target (December 2004): Characterization of the RBDs in terms of pressures, impacts and economics of water uses, including a register of protected areas lying within the river basin districts.
- 2nd Intermediate Target (December 2006): Operation of the monitoring network for inland surface, transitional, coastal and ground waters and evaluation of the results of the first intercalibration exercise.
- 3rd Intermediate Target (December 2009): Production and publishing of river basin management plans for each RBD, including the designation of heavily modified water bodies.
- 4th Intermediate Target (December 2015): Implementation of the programmes of measures and achievement of the environmental objectives.

A. Integrated Water Resources Development and Management: During the first phase of the WFD implementation in Greece, the main problems encountered were related to compatibility issues with current administrative bodies and lack of information and data, especially for biological quality elements. This, consequently, has created difficulties in the definition of reference conditions and the development of classification systems. However, the passing on of Law 3199/03, the establishment of new operational monitoring networks and the testing of the technical Guidance Documents in Pinios Pilot River Basin (Pinios PRB Project), will be the best way to get through such problems related to the implementation of WFD at an early stage.

The Pinios Pilot River Basin is part of a 15 Pilot River Basin Network across Europe (integrated pilot river basins testing network). The overall aim of this PRB Project is to identify the technical and management problems that may come up in real cases of the WFD implementation in the country and to develop pragmatic solutions to these problems, to test the practicability and efficiency of the technical Guidance Documents in Greece before they are widely applied, to attain a concrete example of the application of the technical Guidance Documents and to inform the interested parties on the implementation of the WFD, through real circumstances, allowing the stakeholders (including local and regional authorities) to be involved at an early stage.

Other specific actions and programmes that have been so far promoted include:

- The elaboration of an updated “Master Plan of water resources management of the country” (January 2003) by the Ministry of Development in collaboration with the Technical University of Athens and the Institute of Geological and Mineral Explorations. This study is a first approach on water supply and demand balance for each River Basin District and of their inter-dependence.
- The elaboration of River Basin Management Plans for each river basin, compatible with the WFD. These management plans are assigned to different Consortium of Companies (2nd semester of 2003), they are funded through the 3rd Community Support Framework (CSF) and will be completed by 2007, with the involvement of the Regional Water Directories and public participation.

The promotion of these programmes will enable an integrated management of all water resources, combining surface water and groundwater bodies, wetlands and coastal water resources at a river basin scale. It will also link water quality and water quantity considerations as well as competitive water uses, functions and values into a common policy framework, with water as a social good.

The 3rd Operational Fisheries Programme 2000-2006 also supports activities contributing to the sustainable development and the protection of natural environment. Other programmes and projects in place on integrated water resource development and management include: recharging ground water aquifers, restoration of wetlands, torrent control and management of their watershed, construction of dams and small water storage basins etc. Legislative and administrative measures are also adopted by local authorities as well as by central services for the protection of people, properties, agricultural areas and infrastructure, during extreme flood and drought conditions. To this end, the Operational Programme for Rural Development of the Ministry of Agriculture incorporates actions on integrated programmes for the reclamation of areas undergone natural disasters. Such projects also contribute to combating desertification.

The large multi-purpose reservoirs constructed by the Public Power Corporation (PPC S.A.) are contributing to the development and management of water resources. PPC S.A. operates seventeen large hydroelectric plants that serve a variety of purposes apart from power production, i.e. drinking water supply (to approximately 20% of the population), irrigation water supply, flood protection as well as preservation of existing ecosystems and creation of new ones. The reservoirs of these large hydroelectric projects have a useful storage capacity of 6.5 billion m³ at the end of the wet period. The effective management of these large reservoirs by PPC SA contributes highly to meeting the freshwater demands of the country without any impact to the groundwater bodies.

B. Water Resources Assessment: YPEHODE supervises the existing national monitoring network for water quality. This network that measures water quality systematically since 1995, relies on existing sampling stations, such as those set up since the 70s by the Ministry of Agriculture for monthly monitoring of irrigation water quality (90 sampling points in rivers, 30 sampling points in lakes plus seasonal sampling in 100 irrigation projects and 250 drillings). The network encompasses upgraded Laboratories of the General Chemical State Laboratory (GCSL), under the authority of the Ministry of Finance, as well as Municipal and Research Laboratories. Monitoring is based on 200 sampling points in lakes and rivers and

samples are being analyzed for around 69 parameters (physicochemical parameters, nutrients, heavy metals and microbiological) on a trimester basis.

This Monitoring Network includes sampling points where water is analyzed for toxic substances contained in Lists I and II of the EU Directive 76/464/EC. More specifically, samples are monitored for 156 substances of Lists I (7 substances) and II (116 substances) as well as 33 priority substances, at 50 sampling points through out the country. For the transboundary rivers, 5 sampling points have been established at the entry points from the upstream neighboring countries, where 5 automatic monitoring stations have been situated at Axios, Strymonas, Nestos and Evros (2 stations) rivers. Groundwater monitoring is carried out at approximately 400 sampling points covering the whole country except the Aegean islands. Sample analyses focus on nitrates of agricultural origin. The Institute of Geology and Mineral Exploration (IGME) has also established a national network for monitoring qualitative and quantitative properties of groundwater, collecting systematically hydrological, hydrochemical and other data (heavy metals, pollutants). Data are then incorporated in a GIS database for compiling adequate timeseries and determining evolutionary trends of groundwater according to the WFD. Pesticide residue monitoring is carried out in cooperation with the Benakion Phytopathological Institute.

A water quality monitoring programme of rivers, lakes and groundwater, including the determination of all heavy metals and pesticide residues has been executed and will be continued in cooperation with the Aristotle University of Thessaloniki in the Regions of Macedonia and Thrace, in Northern Greece.

Drinking water is analyzed for 66 sampling points in rivers and lakes, using the laboratory infrastructure of the GCSL. Further 14 sampling points for surface waters are located in specific areas, such as water supply areas. Therefore monitoring programmes for drinking water quality, specify, inter alia, the water sampling points. These programmes are submitted to the Directorate for Health of the corresponding Prefecture for approval, together with a graphical illustration of the points of water intake, which are also notified to the competent Regional Authorities.

PPC S.A. runs a hydrologic monitoring network, the hydrometric part of which is very advanced in its capacities and most valuable for data collection in the context of relevant studies. However this network is restricted in the mountainous part of Greece, where the PPC's interests are primarily focused.

In the frame of the obligations derived from Directive 91/676/EC, YPEHODE assigned to the University of Patras the elaboration of a study and the organization and operation of a Groundwater Quality Monitoring Network in the country (monitoring parameters: NO₃, NO₂, NH₄, Cl, SO₄, ions, conductivity and pH). From the conclusions of this study and according to the criteria of the Directive, vulnerable zones have been designated as regards nitrate pollution of agricultural origin and "Codes for a Good Agricultural Practice" along with Action Programs for the promotion and implementation of such Codes, have been developed in these zones.

A project for "Collection and evaluation of ecological data for rivers and lakes" of the country, according to the requirements of the WFD has been also assigned to the National Center of Marine Research. The aim of this project is to estimate the sufficiency and adequacy of existing data for the typology, the classification of ecological status, the definition of reference conditions and the inter-calibration. In addition, it will formulate proposals concerning the future steps on research to be accomplished and the monitoring systems.

Monitoring results from the above mentioned Networks are made available to the public and are also forwarded to EUROWATERNET, managed by the European Environment Agency (EEA).

The National Surface and Groundwater Quality Monitoring Networks are currently under revision and readjustment, according to the requirements of the WFD and Law 3199/03. In this context, the Operational Environmental Programme (OEP) 2000-2006 of Greece includes the development of a new, expanded and complemented National Monitoring Network (Priority Axis 1, Measure 1.1) for the quality of surface waters and groundwater, transboundary rivers, drinking water, and bathing waters including a central laboratory for the calibration and coordination of regional laboratories involved in the monitoring networks.

Moreover, though Measure 8.1 of Priority Axis 8 of OEP 2000-2006, monitoring parameters (biotic, abiotic) will be evaluated and selected at national level and a unique database will be compiled, together with the formulation of monitoring plans for the areas under the responsibility of the Management Bodies. Through these activities, a coherent and comprehensive overview of the chemical and ecological status within each River Basin District will be provided. This overview will enable, after assessment of the reference conditions, the classification of the surface waters into five classes, on the basis of specific quality elements and the development of national classification schemes. The establishment of this new legally binding monitoring network (under the competencies of the Regional Water Directorates and the overall supervision of the National Water Directorate) for inland surface, transitional and coastal waters is part of an overall project to be implemented in the country by 2006.

C. Protection of Water Resources, Water Quality and Aquatic Ecosystems: Measures aiming at the protection of water resources and aquatic ecosystems in Greece encompass a special ‘concessions and permitting’ system. Permits for building water infrastructure are issued by the relevant Ministry following an application accompanied by an assessment of the quantitative and qualitative situation of water resources before and after the execution of the project. Concessions (water use permits) are granted for 10 years by the Ministry of Development or the relevant prefect following a valid license. Permits for the discharge of effluents into rivers are granted to industries after the effluent discharge thresholds have been set and a discharge and water use permit have been issued. The Ministry of Health carries out sampling of discharged wastewater to control compliance with permissible levels and impose sanctions if required. Other measures for protecting environmental integration and ecosystems include Environmental Impact Assessments (EIA) as a prerequisite for any water related project or infrastructure.

According to the requirements of the EU Directive 91/676/EEC (transposed into national legislation with JMD 195652/1906/1999, OJG 1575B), four (4) “vulnerable zones” towards nitrogen pollution from agricultural run-offs have been established and respective special Action Programmes have been planned and adopted, according to art.5 of the Directive, focusing on the minimization of the adverse impacts on the environment of Greece. The implementation of these programmes is obligatory for all farmers of these vulnerable zones. These Action Programmes include:

- Action programme for Thessaly plain (JMD 25638/2905/2001, OJG 1422B)
- Action programme for Kopaida plain (JMD 20417/2520, OJG 1195B)
- Action programme for Argolida plain (JMD 20416/2519, OJG 1196B)
- Action programme for Pinios basin, Prefecture of Ilia (JMD 20418/2521, OJG 1197B)

In 2001 three more areas were identified as sensitive areas (with JMD 20419/2522, OJG 1212B), completing the list with the sensitive areas, namely: Thessaloniki plain, Strimonas basin, Preveza-Arta plain. The respective Actions Plans are under publication procedures.

Moreover, under the National Programme (OJG 1866/B/12.1.03) for the reduction of toxic substances of List II of Directive 76/464/EC, a special Action Programme for the protection of Lake Vegoritida-Petron and Soulos stream has been established through JMD 15782/1849/2001 (OJG 797B) and is already being implemented.

In the above mentioned context, national legislation has been complemented in recent years with the following enactments:

- i. Transposition of Article 7 of Directive 76/464/EU regarding the determination of National Programme for reducing the disposal of hazardous substances to waters:
 - CMD 2/2001 regarding the determination of guidelines of water quality from disposals
 - JMD 4859/726/2001 regarding the determination of measures and limits for water protection
- iii. Implementation of Article 5 of Directive 91/676/EU (pollution from nitrates)
- iv. Implementation of Article 5 of Directive 91/271/EU (disposal of urban waste water):
 - JMD 48392/939/2002 (OJG 405B/3-4-2002), regarding the completion of the list with sensitive areas for the disposal of waste water.

Under Priority Axis 8 (total budget of around 193 million €, of the OEP 2000-2006, significant amounts are being invested for the protection of natural sites and wetlands. These Programmes will support the organization of a National System of Protected Areas, which are part of the NATURA 2000 list and include, inter alia, all important Ramsar wetlands, coastal and sea areas, the integrated protection and management of ecosystems, species and landscapes and the restoration of Lake Karla.

By the national legislation, 27 Management Bodies have been established in important Greek ecosystems, which include all Ramsar wetlands and important coastal and sea areas. These administrative units are formulating respective Management Plans and Action Plans, which are in line and specify the management priorities described in their respective Specific Environmental Studies. Management Bodies are entitled with opinion giving prior to EIA procedures, assisting public authorities in the implementation of environmental legislation, elaboration of projects and specific studies, information and public awareness actions as well as implementation of eco-tourist projects. In the past, through the 2nd CSF, Programme Agreements had been signed for these areas, with the aim to put forward projects and activities that would prepare the future function of the Management Bodies. Additionally, the Greek Biotope/Wetland Centre (EKBY), founded by the Greek Government and the European Commission in 1991, constitutes an autonomous non-governmental scientific institute that assists in many cases competent authorities in the planning and implementation of conservation and sustainable development measures.

D. Drinking Water Supply and Sanitation, Water and Sustainable Urban Development: In Greece, the supply of clean and sanitarily appropriate water, from underground and surface waters, to every citizen in the country, consists one of the main responsibilities of Public Administration. The state is responsible for providing water and wastewater services to Athens and Thessaloniki and has effectively entrusted water services to two large companies: to EYDAP in Athens, which legally has private status but is supervised by YPEHODE and to DEYATH in Thessaloniki, a public sector company. In cities, over 10000 municipal companies manage water and wastewater services. In smaller towns and rural areas, communities are directly responsible. Aside from some small wastewater treatment plants installed in private properties, there is no further private sector involvement.

In 1998 more than 90% of Greek population was connected to drinking water networks and the percentage is rising. Currently, drinking water supply for the 20% of the population derives from large reservoirs managed by the PPC S.A. The most serious shortages occur in the Aegean islands, particularly during the tourist season. In some areas rain water retention works are being built. Drinking water is good for 82% of the population, satisfactory for 8% and not satisfactory for 2% due to marine water intrusion in coastal aquifers. Monitoring of drinking water quality is carried out by the Ministry of Health and its Regional Laboratories for Public Health.

Water supply prices vary considerably throughout the country and are set by municipalities, whereas in Athens are approved by YPEHODE. Water charges are based on volumetric rates and are progressive, with the price per cubic meter increasing with the level of consumption; however, a ceiling exists for

large families. The areas of Athens and Thessaloniki have a combined water billing system covering both water supply and wastewater collection & treatment charges. Volumetric rates for industry are generally higher than for households with charges including also flat rate pollution charges and wastewater charges.

Four protection areas have been designated for vulnerable drinking water sources, in the framework of a programme to protect drinking water resources. Within these areas polluting activities are restricted and environmentally friendly farming is encouraged for abating nitrate pollution.

In 1998, the percentage of settlements served by sewerage systems (with population equivalent – p.e.>15.000) was 45%, and in 2000 increased to 64%. This percentage has increased even more, during the last 3 years, after the construction of additional collecting systems. Regarding the operation of the urban wastewater treatment plants in Greece, the percentage of served population of settlements with p.e.> 10.000, with plants discharging in sensitive areas has increased from 16% in 1998 to 42% in 2000. For settlements with p.e.> 15.000 that discharge into normal areas, the percentage has increased from 27% to 43% in 2000. This percentage has further increased in 2001, with the total number of municipal wastewater treatment plants amounting to 290, whereas projections show that in 2005 the number will reach 475, covering 94,8% of Greek population, giving emphasis to secondary and tertiary treatment. The operation of a significant number of existing treatment plants is a responsibility of the Municipal Services for Water Supply and of EYDAP and DEYATH for Athens (where the secondary treatment plant of Psytalia is in operation since some years) and Thessaloniki respectively.

OEP 2000-2006 is promoting, under Measures 1.1, 1.2, 1.3 and 6.2, the development of a National Management Scheme for urban and industrial wastewater, the construction of tertiary treatment facilities in sensitive regions and the implementation of innovative and adjusted technologies for the treatment of urban and industrial wastewater in selected areas.

E. Water for Sustainable Food Production and Rural Development: The agricultural sector consumes around 75% of water withdrawals in Greece with the surface of irrigated areas rising in recent years. Farmers are not charged for irrigation water supplied by individual projects but they pay only a small fee per hectare of cultivated area served by collective irrigation projects to the Local Land Reclamation Board (TOEV). Water provided by the Public Power Corporation (PPC S.A.) to farmers from large dams to cover irrigational needs is not charged.

The programmes promoted in line with the Amended Common Agricultural Policy (CAP) since the mid 90s focus, inter alia, on streamlining economic, ecological, social and alimentary needs, increasing the ‘multi-functionality’ of the agricultural sector as well as promoting an integrated and sustainable development of rural areas. In the context of the NSSD, a Scheme for the Agricultural Development has been promoted. The Scheme includes specific programmes and actions such as: promotion of best agricultural practices and more sustainable production patterns, rational use of water aiming at resources’ conservation and desertification abatement, promotion of an integrated approach for the development of agricultural land, gradual reform of state support to the sector and of market distorting mechanisms, promotion of adequate economic instruments for internalizing external costs, promotion of programmes for biological agriculture, fallow and biodiversity protection in hot spot areas of increased ecological value, promotion of information and awareness raising campaigns among farmers, upgrade farmers’ social status and development of an integrated fisheries policy. These actions are also included in the Operational Programme of the Ministry of Agriculture ‘Operational Programme for Rural Development 2000-2006’.

In this context, the programmes promoted by the Ministry of Agriculture have resulted in the development of more sustainable irrigation systems, the promotion of ecological products (without chemicals and pesticides), the decrease in per hectare consumption of fertilizers by discontinuing subsidies as well as the decrease of total agrochemicals’ use through awareness raising. For this purpose, the Ministry of Agricul-

ture has established and published “Codes of Good Agricultural Practices” for the management of agricultural areas, of grazing lands, of water resources and of biodiversity. The Ministry of Agriculture is also promoting the implementation of a Programme for the Integrated Pest Management (IPM) that is aiming at “Application of Alternative methods of Integrated Pest Management and Disease Control” in different crops at the country level.

F. Impacts of Climate Change on Water Resources: The recent National Action Plans to Combat Climate Change (2002) and Desertification (2002) include projects, programmes and actions on water resources, as a priority area for protection. The Ministry of Agriculture has promoted the implementation of an Action Plan, of approximately 450 million € total budget, through: construction of small dams, reservoirs for rain water in threatened areas and artificial water recharging, torrents’ watershed management, control and reduction of irrational use of irrigation water and of water losses by modernizing irrigation networks, reduction of nitrogen pollution of agricultural origin in groundwater, protection of mountainous watersheds with terraces, and development of coastal and inland karstic water resources. Water recycling and re-usage is implemented through the projects promoted by the Land Reclamation Directorate of Ministry of Agriculture and by the TOEVs. Other ongoing land reclamation projects for facing drought also include promotion of new drillings where the groundwater table permits it, and harvesting of spring water. YPEHODE and the Ministry of Development have contributed to the above mentioned Action Plan by taking measures in the same direction, for protecting water systems from salinization and erosion. These activities, complemented by a reinforced component on research, exchange of information and training, as well as establishment of appropriate monitoring mechanisms, are intensified in 2000-2006. The refilling of artificially drained lakes planned under OEP 2000-2006 and the planned diversion of the Acheloos River will also contribute to address desertification problems in the threatened plains of Central Greece.

By now almost 10% of power production is coming from renewable sources, a large proportion of which, in terms of installed capacity, are large hydroelectric plants. Greece has been committed to meeting the target of 20.1% power generated by renewable sources. Hydroelectric power generation contributes substantially to meeting the target of reduction of greenhouse gas emissions and hydropower development is one of the measures included in the National Action Plan for the abatement of Climate Change.

Status: Freshwater resources- water quantity: Greece is generously endowed with freshwater resources. Mean annual precipitation in Greece is about 700 mm, nearly half of which is lost to evapotranspiration. However, freshwater resources are unevenly distributed throughout the country, due to the climatic conditions and the rugged geographic relief of Greece. Precipitation ranges from around 400 mm in the Aegean islands and Athens to more than 900 mm in the North West and the Ionian islands with the island of Kerkyra presenting maximum precipitation levels. On the contrary, parts of the southern and central mainland, the Aegean islands and Crete are in danger of desertification. Water distribution is also uneven in time. Peak periods for water demand and consumption are reported during the summer dry period when the population in certain areas (mainly coastal) is multiple due to tourist arrivals. During the dry period, water demand is also maximized for irrigational purposes. Therefore water is not always available where and when it is mostly demanded. Water redistribution, storage and saving and a sound demand side management are therefore indispensable priorities for water policy in Greece.

The mean annual surface run-off of Greece’s mainland rivers is 35 billion cubic meters. More than 80% of the surface flows originates in eight major river basins: the Acheloos (Central Greece), Axios, Strymonas and Aliakmonas (Macedonia), Evros and Nestos (Thrace) and Arachtos and Kalamas (Epirus). Nine rivers flow over 100 kilometers within Greece: the Aliakmonas, Acheloos, Pinios, Evros, Nestos, Strymonas, Kalamas, Alfios and Arachtos. Four major rivers originate in neighboring countries: Evros (Turkey), Nestos and Strymonas (Bulgaria) and Axios (FYROM); total inflow from upstream neighboring countries amounts to 12 billion cubic meters.

Some 41 natural lakes (19 with an area over five km²) occupy more than 600000 hectares or 0.5% of the country's total area. The largest are lakes Trichonida, Volvi and Vegoritida. Lake Prespa is on the borders with Albania and FYROM. The number of Greek wetlands according to the inventory of EKBY, rises to about 400 with 10 of them designated as Ramsar wetlands of international importance. The 14 artificial lakes (ten with an area over five km²) occupy 26000 hectares.

Some 80-85% of freshwater resources are in the form of surface water and the rest are groundwater. Per capita consumption of water is around 830 m³ with peaks of over 1000 m³ recorded during heat wave days and days of intensive snow fall. Around 75% of total freshwater withdrawals are for agriculture with irrigated areas representing a third of total cultivated areas. Uneven rainfall distribution results in scarcity of water resources during peak period for irrigation, a period similarly crucial for other uses such as tourism. Therefore, about half of irrigation water is pumped from aquifers. A considerable portion of irrigation water comes from large multi-purpose reservoirs owned by PPC S.A. Households account for about 10-15% of total freshwater withdrawals. Water supply to the Metropolitan area of Athens is provided mainly from surface water stored in dams several hundred kilometres away and transferred to the city. Other big coastal cities usually extract groundwater, even though salinization problems have caused other solutions to be sought such as spring and surface water collection in reservoirs.

Water quality: The national water quality standards for various uses (drinking, aquatic life etc) have been harmonized with the relevant legislation (Directives) of the European Union (EU). Human economic and industrial activity in Greece is concentrated in river basins where additional pressures occur due to agricultural activity. Surface run-offs and wastewater discharges create intense point pressures on the quality of water resources. However, the situation has been enhanced over recent years due to the massive construction of municipal wastewater treatment plants for most of the country's human settlements.

Greek rivers are generally of very good quality. They host some 78 indigenous fish species half of which are endemic. Mean annual nutrient concentration as well as the heavy metals' concentrations low and in most cases below maximum permissible limits for drinking water. Only in some cases in downstream river locations, in urban areas or in areas of intensive agricultural and industrial activity, the levels of phosphorus, nitrites, ammonium and dissolved solids might be rather higher than the standards. High nutrient concentrations, phosphorus concentrations slightly exceeding thresholds, as well as heavy metals are found in certain lakes, mainly in the northern part of the country, indicating human influence (from agricultural run-off, municipal and industrial wastewater discharges) leading, in certain cases, to eutrophication. Groundwater quality, even though generally good, is threatened by uncontrolled wastewater disposal and salinization caused from over-extraction due to seawater intrusion at coastal areas. High concentrations of nitrates, deriving from nitrogenous fertilizers and the use of livestock manure, as well as pesticide residues have been detected in northern and western parts of the country but do not always exceed maximum permissible values.

The implementation of recent Law 3199/2003 for the protection and management of water resources (see Chapter 'Decision Making') will give new impetus to sustainable and integrated water management in Greece, by giving emphasis on the ecological function of water and by introducing an integrated water resources management (IWRM) approach on river basin level as well as a pricing policy so that it reflects water's full costs.

Capacity-Building, Education, Training and Awareness-Raising: The Ministry of National Education and Religious Affairs organizes, funds and supports a big variety of environmental projects every year in all classes of primary and secondary schools. During the school period 2002-2003, around 5700 projects were executed by 11000 teachers and 157000 pupils, a considerable number of which was related to freshwater issues. Greek Schools' curricula include various programmes and projects related either to "management of natural resources" or to critical environmental issues, such as water pollution and water

management. Moreover, Greek Schools participate in many regional, national and international thematic networks such as “The River” aiming at awareness raising from an early age, the “Water fountains”, the “Lakes”, etc. The importance of freshwater in environmental education is also highlighted by the fact that 14 of the 17 official “Centres of Environmental Education” established by the Ministry of Education throughout the country execute freshwater related programs, in which hundreds of pupils and teachers participate every year.

Training on the sustainable use of soil and water resources is also provided by related University Departments. Greek Universities (e.g. the National Technical University of Athens, National and Kapodistrian University of Athens, Aristotle University of Thessaloniki, University of Thessaly, Democritus University of Thrace) participate actively in a number of initiatives related to the impacts’ assessment of climate change, floods and droughts on water resources management throughout the EU and other critical water issues, via workshops and research programmes.

On 5 June 2002, YPEHODE started an extended ‘do your bit’ campaign that covered the whole country, focusing on awareness raising of all ages, with emphasis on providing school children with practical information for protecting the environment, the natural and water resources, in everyday life, through dissemination of leaflets and educational material, questionnaires, interactive dialogues etc. This campaign is repeated on a yearly basis. Moreover, in the framework of OEP 2000-2006, funds have been bound for environmental awareness raising programmes, with a total budget of 2.8 million €

In the Athens area, information campaigns, during peak consumption periods, combined with economic incentives succeeded to curb the wasteful use of water and to severe reductions in drinking water reserves.

For the optimum operation of the existing Urban Wastewater Treatment Plants and the personnel training, the Union of Municipal Services for Water Supply and Sewerage has undertaken significant initiatives, such as the implementation of a project called ‘Equal’, promoted by the Ministry of Labour. The objective of this project is the development of educational mechanisms on environmental practises, particularly on the operation of the treatment plants.

In the agricultural sector, programmes have been promoted for the awareness raising of farmers (e.g. publication of ‘Codes of good Agricultural Practices’) to adopt well balanced agricultural and fishery practices which decrease the adverse effects on the natural environment and to support organic farming and fallow.

The WFD aspects and other general information concerning its implementation have been shared among interested parties and stakeholders. Information has been disseminated also to the general public. Activities at regional level, e.g. in the Pinios Pilot River Basin have established the basis for the public involvement. On the long-run, there will be public involvement in formulating the content of the River Basin Management Plans, whereas at present, a series of public seminars and workshops are organised, in order to raise awareness and to foster discussions on social considerations. The publication of information leaflets for activities related to the implementation of the WFD (e.g. for Pinios Pilot River Basin Project) and the use of the internet as an information platform will ensure transparency and provide the framework for an applied and fruitful public participation.

Awareness raising and education has also been the key objective of type II initiatives that are being implemented, with emphasis on water resources. MEDIES, a partnership initiative on Education for Environment and Sustainability, launched at the WSSD, for the implementation of Agenda 21 and the MDGs, has already produced an Educational Package for school children ‘Water in the Mediterranean’ in several languages. Two widely attended training seminars have also been organised in Athens (15.12.02 and 25-

26.10.03) on the methodologies and teaching methods of education for environment and sustainability, and an interactive webpage (www.medies.net) has been set up.

Information: The access to Internet, the world wide web and other websites about sustainable development and state of the environment helps Greek citizens to acquire knowledge on policies, programmes and legislation on freshwater management. Data on the quality of surface water can be found at www.thisavros.gr whereas information on the WFD and the Pinios River Basin Pilot Project can be found at www.minenv.gr/pinios_river.html. On YPEHODE's website (www.minenv.gr) the national annual report on surface water quality is also posted as well as other related national reports.

The National Data Bank of Hydrological and Meteorological Information (NDBHMI) provides the required hydrological and environmental information for the development of the Master Plan and specific regional management plans for the inland waters in Greece. The Programme is based on a major environmental network and data base consisting of hydrological and meteorological information at the national scale. The Ministry of Health and Welfare collects relevant data and cooperates with the Ministry of Internal Affairs and Decentralization for its evaluation and the measures to be taken for the protection of Public Health. The Ministry for Health and Welfare sends required data to the Commission of the European Union, by drawing up a Report, every three years. The elaboration of data under the NDBHMI contributes considerably to integrated water management and addressing adverse impacts of droughts, floods and forest fires. Currently, the update of the National Data Bank of Hydrological and Meteorological Information is underway, to include new data, and thus, adapting to the new extended National Network of Environmental Information in order to improve the information exchange and information management mechanisms on water resources in Greece.

Publication and diffusion of information material as well as information exchange through related activities, including websites' keeping, is also carried out by the National Centre for Environment and Sustainable Development (EKPA) and several NGOs and Institutes throughout the country.

Research and Technologies: In the framework of the 3rd CSF, OEP 2000-2006 encompasses several research projects that will complement activities for the implementation of WFD in Greece, inter alia:

- The EVALUWET project aiming at an harmonized approach and functional evaluation methodology, at catchment scale, amongst European environment agencies and stakeholders;
- The IT Framework-HarmoniT project for the development and implementation of a European Open Modeling Interface and Environment for strategic planning;
- The SHYLOC project for the development of adequate software for monitoring surface water storage and wet width of natural and man-made ditches; and
- The WWI project for the assessment of existing water management policies and river basin management measures, according to the WFD model and the integrated river basin management principles, aiming at measuring progress and effectiveness of their implementation.

Other related research projects such as the Harmoni-CA, a tool for sustainable management and quality of water, have been supported under the 5th Framework Programme of the Directorate-General for Research of the European Commission.

The 8th Priority of the 6th Framework Programme of the European Commission promotes activities in support of the development and implementation of EU policies. Among the main objectives of this Priority, the section 3.1.5 is dealing with "environmental assessment (soil, water, air, noise, including the effects of chemical substances)". In this frame, the proposed research intends to contribute, inter alia, to the implementation of the CIS of the WFD. One of the topics relevant to water policies deals with the identification of groundwater pollutant's threshold values for the evaluation of the chemical status of groundwater bodies. The main objective of the BRIDGE (Background criteria for the Identification of Groundwater thresholds) research programme, in which Greece is actively participating, is to set out crite-

ria for the assessment of the chemical status of groundwater, which is based on existing Community quality standards (nitrates, pesticides and biocides) and on the requirement for Member States to identify pollutants (substances that may occur from both natural and anthropogenic sources, and synthetic pollutants) and threshold values that are representative of groundwater bodies found as being at risk, in accordance with the analysis of pressures and impacts carried out under the WFD.

The Operational Programme ‘Competitiveness’ (OPCOM) 2000-2006 of the Ministry of Development has also included an applied research programme for the development of systems, tools and methodological approaches for addressing hydrological, hydrogeological and environmental issues in order to draw up Integrated Water Resources Management (IWRM) Plans for 4 major RBDs. In the same context, the implementation of various research projects through public-private partnerships has been approved by the Ministry of Development for 2000-2006, aiming at exploring innovative approaches to water management, through advanced technological methods. Such projects include the development of optimized irrigation systems, the protection of aquifers through recharge with treated industrial wastewater, the innovative use of telematics and GIS for mapping water resources etc.

Greece is an active member of the EURAQUA Forum of Governmental Institutions on water resources, an organization involved with the implementation and promotion of research programmes regarding climate change, integration of information technology in water resources and management, etc.

In addition, several University Departments together with the Department of Forest Hydrology of the Forest Research Institute of Athens carry out research on hydrological aspects of natural ecosystems and on mountainous hydromonics.

Financing: A number of economic instruments are used in Greece, among them Municipal, Industrial and Irrigation water supply charges (see also Chapter ‘Programmes and Projects’, D). The Environmental Protection Law 1650/86 includes the “polluter pays principle” (Article 29) and provides for the levying of waste and water user charges. The development of water pricing policies that enhance the sustainability of water resources is also foreseen by Law 3199/03 (see also Chapters ‘Decision Making’ and ‘Programmes and Projects’).

OEP 2000-2006 includes several Measures and respective budget lines for the promotion of integrated water management, protection of water resources and water supply and sanitation. For the implementation of the WFD and Law 3199/03 in Greece, the funds that will be disbursed by the Greek Government up to 2006 will be about 19.3 million € and additional funds will be allocated, if needed. Other Operational Programmes (e.g. Competitiveness, Rural Development, Fisheries etc) also include Measures (see Chapters ‘Programmes and Projects’ and ‘Research and Technology’) with respective budget lines related to water resources. At the Regional level, financial support for the protection and management of natural resources, with emphasis on water resources, and of significant ecosystems is provided by the Regional Operational Programmes, for each Administrative Region of Greece, under the framework of the CSF. Additional activities concerning development of infrastructure in Greece are also partially financed by the EU Cohesion Fund.

Cooperation: Major rivers (Evros, Nestos, Axios, Strimonas) in Greece originate in upstream countries. Lakes Doirani and Prespa are also transboundary. Therefore, international cooperation concerning the management of shared natural resources is an important issue for Greece.

Greece ratified the Helsinki Convention (1992) on the protection and use of transboundary watercourses and international lakes (Law 2425/1996, OJG 148/4.07.1996), the Barcelona Convention (law 855/1978, OJG 235/A/23-12-78) including its latest amendments of 1995 (law 3022/2002, OJG 144/A/19.06.2002), and the Ramsar Convention (1971) on wetlands of international importance as the waterfowl habitat (De-

cree 191/1974, OJG 350/20.11.74), among others. Furthermore, Greece has signed all – and ratified most of - the Protocols of the Barcelona Convention. In May 2003, during the 5th Ministerial Conference ‘Environment for Europe’ in Kiev, Greece signed the Protocol on ‘Civil liability and compensation for damage caused by the transboundary effects of industrial accidents on transboundary waters’ to the 1992 Helsinki Conventions on the ‘Protection and Use of Transboundary Watercourses and International Lakes’ and on the ‘Transboundary Effects of Industrial Accidents’.

Bilateral Agreements have been signed between Greece and Bulgaria, for the river Nestos in 1996, regarding issues of water sharing and for the river Ardas, regarding the amount of water used annually by the Greek side for irrigation purposes. Greece has also signed an Agreement of Understanding with Bulgaria covering, inter alia, issues of possible bilateral cooperation on integrated monitoring of water quality and application of the necessary measures for water protection. Agreements and initiatives have also been launched between Greece and FYROM for the protection of Lakes Megali Prespa and Doirani and between Greece, Albania and FYROM for the establishment of a transboundary National Park and of a Permanent Tri-lateral Committee on Transboundary Freshwater issues, aiming at protecting the Prespa Lakes shared among these three countries, following a Joint Declaration by the 3 Prime Ministers in February 2001. Greece has also signed and ratified (Law 2902/2001, OJG 77/A/2001) a MoU with Turkey that has already entered into force (30.6.01) that covers issues of possible bilateral cooperation on transboundary water resources (Evros river) and a MoU with Cyprus (Law 2424/1996, OJG 147/A/1996), covering, inter alia, issues of possible bilateral cooperation related to the protection of waters and soils, as well as to the protection of the marine environment.

Furthermore, Greece has signed (but not yet ratified) MoU’s with Georgia, FYROM and Albania, covering issues related to, inter alia, the sustainable management of transboundary waters, the monitoring of water pollution and the protection of the marine environment. Greece and Albania have also signed an agreement on the Establishment of a Permanent Greek-Albanian Commission on Transboundary Freshwater Issues. Regarding monitoring of the quality of shared waters, control stations have been established at the entry points of transboundary rivers from other countries (see Chapter ‘Programmes and Projects’, B. Water Resources Assessment).

Since 1999 and in the framework of OECD’s Development Assistance Committee (DAC), Greece has funded the implementation of several projects on water resources management and protection, in partner countries. Through the Bilateral Programme of Development Assistance and Cooperation in the field of Environment and Sustainable Development of YPEHODE, the water resources related projects funded in 1999 were 9, with a total budget of around 77164 € whereas in 2000 they were 12 of total budget of around 2.8 million €. These projects were implemented through Universities, Research Institutes and NGOs in Greece and recipient countries of South East Europe, the Mediterranean and East Europe, Caucasus and Central Asia (EECCA). Projects laid emphasis on transboundary water quality and capacity building issues as well as protection of wetlands. In 2001, the implementation of a project for the construction of a wastewater treatment plant in the city of Strumica in FYROM for the protection of water resources was initiated. In the context of the National Bilateral Programme of Development assistance and Cooperation “Hellenic Aid” for the years 2000-2001, the total budget allocated to the implementation of water related projects in partner countries was around 0.56 million USD, whereas for year 2002 the allocated budget was around 0.665 million USD. The implementation of these aid projects contribute to the MDGs/WSSD targets for sustainable development and poverty reduction. A representative example of a project to this direction is the construction of a dam as well as a water reservoir in the Damte region in Ethiopia aiming at drinking and irrigational water supply in the area. The sums already allocated are 130000 € whereas the overall estimated budget rises to 500000 €

At WSSD in 2002, the Greek Government participated together with other partners (e.g GWP-Med, Mediterranean Information Office for Environment, Culture and Sustainable Development, UNESCO,

UNEP/MAP, Governments of other Mediterranean and SE European countries, Research Institutes, Local Authorities etc) in the launching of 3 type II partnership initiatives focusing on water resources protection and management: the 'MEDIES initiative' (see also Chapter 'Capacity-Building, Education, Training and Awareness-Raising'), the 'Euro-Mediterranean Water-Poverty Facility' and the 'Sustainable water management in the Balkan and SE Mediterranean area'. Greek Government has provided a start up budget of around 160000 € in support of these partnerships.

Since WSSD, the Greek Government has also taken up the responsibility of leading the Mediterranean Component of the EU Water Initiative (MED EUWI) that was launched in Johannesburg. The MED EUWI gives particular emphasis to Mediterranean priorities, according to needs and strategies defined in partnership with governments, the European Commission and stakeholders. The Components' Secretariat is served by GWP-Med.

The MED EUWI aims to assist design of better, demand-driven and output-oriented water programmes in the region, to facilitate better coordination of water programmes and projects, targeting more effective use of existing funds, through identification of gaps and mobilization, where required, of new financial resources and to enhanced cooperation for their proper implementation, based on peer review and strategic assessment. The focus themes of MED EUWI are: (i) water supply and sanitation, with emphasis on the poorest part of the societies, (ii) integrated water resources management, with emphasis on management of transboundary water bodies, (iii) water, food and environment interaction, with emphasis on fragile ecosystems, (iv) non-conventional water resources as well as (v) horizontal issues such as transfer of technology, transfer of know how, capacity building, training and education. The Component is currently running its Preparatory Phase: its Operation Plan was produced in July 2003 and its detailed Activity Plan will be elaborated by end of March 2004.

On EU level, the Hellenic Presidency of the EU (1st semester of 2003) in its political agenda gave particular emphasis and prioritised water issues especially in the Mediterranean Region and South East Europe, in a number of international events; inter alia :

- 3rd World Water Forum (Kyoto, 16-23.3.03): The EUWI with all its Components was extensively presented, whereas EU's key positions on the water-related WSSD targets and MDGs were reflected in the adopted Ministerial Declaration.
- EU Informal Council of Environment Ministers (Lagonissi, 3-4.5.03): Effective water resources management in SE Europe and common work on transboundary waters, as a catalyst for peace and conflict prevention in the Region were some of the main issues discussed. The Meeting was attended by Ministers of Environment of the enlarged EU (25 countries) and SE European countries.
- International Conference on "Sustainable Development for Lasting Peace: Shared Water, Shared Future, Shared Knowledge" (Vouliagmeni, 6-7.5.03), organised by Greece and the World Bank (WB): Co-operation for the management of transboundary water bodies and aquifers in the SE Europe and the Mediterranean was the priority theme of the Conference, aiming to assess opportunities and constraints and formulate recommendations for regional sustainable development, peace and stability. The 'Vouliagmeni process' has been systematically pursued since the Conference by both Greece and the WB.
- Hellenic Water Week (Athens, 17-20.6.03), organised by Greece and the EU Commission: The event focused on the implementation of the WFD especially in the Mediterranean, as well as the elaboration of the different themes of the MED EUWI, through the suggestion of concrete actions (building blocks, demonstrations projects) and development of synergies by different players.