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Ministry of agriculture,
natural resources
and environment



WATER DEVELOPMENT
DEPARTMENT



REPUBLIC
OF CYPRUS

Cyprus river basin management plan

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Contents

Foreword	pg.4
Introduction	pg.6
The Water Bodies of Cyprus	pg.8
Areas of protected water bodies	pg.9
The status of water bodies in Cyprus	pg.10
The major pressures on the waters of Cyprus and their impact	pg.12
Our Environmental Objectives	pg.16
The Programme of Measures	pg.16
BASIC MEASURES	pg.17
Supplementary measures deemed necessary for satisfying the set environmental objectives	pg.22
Cost effectiveness of measures	pg.28
The view of the public	pg.29
The importance of the RBMP	pg.30

Foreword

Cyperus is one of the most arid countries in the European Union. The sustainable management of water in a country like ours, that suffers from long periods of water scarcity and drought, constitutes one of the biggest challenges we have to face. To achieve sustainable management of our water, an integrated approach and investigation of all the technical, social, economic and environmental factors associated with water are required. This new environmental approach is based on the model of development - management of our water resources, in compliance with the European Water Framework Directive – WFD (2000/60/EC).

The Directive came into force on the 22nd of December, 2000 and was incorporated in the law of the Cyprus Republic by the Act of Law of 2004 (N13 (I) / 2004). The aim of the WFD is the achievement of good status for water across Europe through the sustainable management of all surface, underground and coastal water resources.

This Directive is considered innovative because it addresses water as an ecological resource and also involves the public in decision making on water and the environment. In addition, it provides new opportunities for sustainable use, management and prevention of further degradation of water, giving guidelines for the preparation of plans and programmes aiming to achieve «good status» for all water by 2015 or, at the latest, in 2027.

During the last years, several preparatory studies have been carried out and several actions have taken place on the implementation of the WFD in Cyprus. Through the public consultation process, the most important water



management issues facing our country have been identified and prioritized and a River Basin Management Plan has now been prepared.

The Management Plan records the current state of water, sets objectives for improving it and establishes the program of measures to achieve these objectives. More specifically, the Plan contains a package of measures that are technically feasible, cost effective, efficient and necessary to gradually improve the status of degraded water resources as well as maintain the good status of the rest.

Undoubtedly the Water Framework Directive is a useful tool for alleviating many water-related problems we face. The effective implementation of the Directive, through the River Basin Management Plan, with the active participation of society and the political commitment of the Government, is expected to have positive results for our country.

I express sincere acknowledgements and congratulations to the Direction and staff of the Water Development Department, and all those who contributed in any way in this pioneering effort for the sustainable development and management of the precious water resources of our country.



Sophocles Aletraris

Minister of Agriculture, Natural Resources and Environment



Introduction

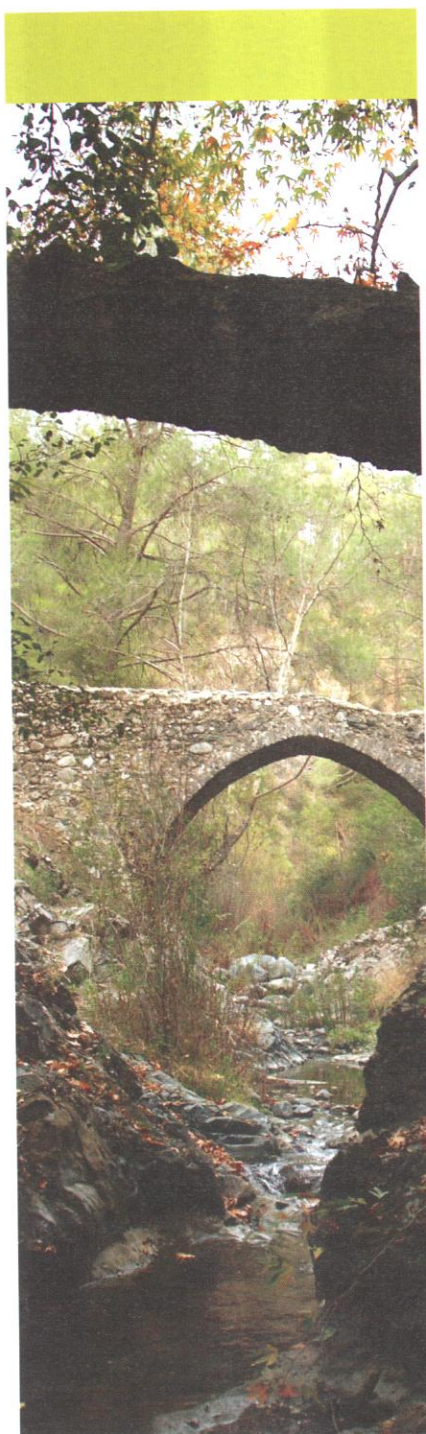
The Water Framework Directive (WFD), 2000/60/EC, was enacted in 2000 and became mandatory for all Member States in 2003. WFD aims to protect water from degradation, ensures the progressive reduction of pollution and promotes sustainability for all uses (water supply, irrigation, industry, farming, tourism) and the environment, thus protecting water resources for current and future generations.

The Cyprus Republic has fully incorporated the WFD into the National Legislation by the «The Protection and Water Management Law of 2004» (N13 (I) / 2004).

The Law is available on the WDD website. According to this Law the Competent Authority to implement the WFD provisions is the Minister of Agriculture, Natural Resources and Environment.

The Competent Authority is responsible for all obligations related to the WFD. The only exception concerns the programme of measures and the management plan for the River Basin District, which in accordance with Articles 4(3), 19 and 22 are prepared under the coordination of the Competent Authority and approved by the Cabinet of the Republic of Cyprus.





Overall, WFD aims to achieve good status for all water bodies by 2015.

In order to achieve the WFD objectives, all Member States of the EU including Cyprus must implement a series of targeted and prioritized actions with a clear and strict schedule.

The cornerstone of these actions is the **MANAGEMENT PLAN** and the associated **PROGRAMME of MEASURES**. These were completed in 2011. The Directive prescribes that by 2012 all the measures included in the programme shall be operational.

The set environmental targets should be met by 2015, through the implementation of the Programme of Measures.

In 2015, the Management Plan, the environmental objectives and the Programme of Measures will be reviewed. A new cycle of management and protection of water bodies begins in 2015 and ends in 2021. The process is repeated from 2021 until 2027.

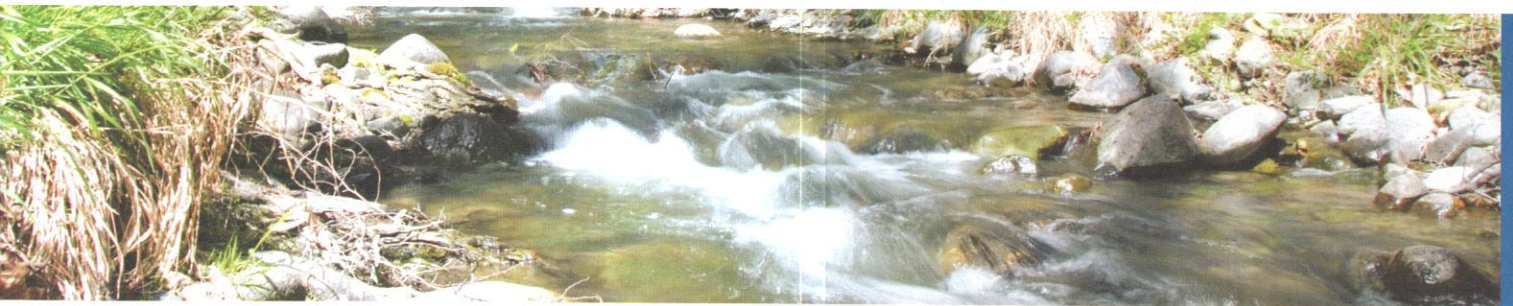
Cyprus has fulfilled all its obligations arising from the WFD. All information related to the implementation of the WFD are available at:

www.wfd.wdd.moa.gov.cy.

Cyprus has recently completed the Management Plan, the Programme of Measures, the Plan for the revision of Water Policy and the Drought Management Plan. These were officially instituted by the approval of the Cabinet in June 2011.

The Water Bodies of Cyprus

A total of 216 river water bodies were identified in Cyprus. Of these, 49 were designated as Heavily Modified ie. bodies that have lost their natural character due to human activities



Due to the dry Mediterranean climate, there are only 5 natural lakes in Cyprus, and are all salty or brackish. The rest of the lakes were created by human activity. Therefore 18 lake water bodies were identified, 12 of which were designated as Heavily Modified and 1 as Artificial. This last designation indicates a water body that is entirely manmade (Achna).



In addition, 27 coastal water bodies were identified. The Republic of Cyprus exercises effective control over 25 of them. Of these, 5 were designated as Heavily Modified.

Finally, 20 groundwater bodies were identified. One body is entirely located in an area over which the Republic of Cyprus does not exercise effective control. Of the remaining 19 groundwater bodies, 13 have been given protected status as they are used for potable water supply.



Areas of protected water bodies

A Register has been established of areas assigned protected status for the benefit of their water bodies. This register consists of the following:

areas of abstraction of water intended for human consumption

Such areas in Cyprus are 5 reservoirs (5 Lake Water Bodies) and 13 groundwater bodies.

areas designated for the protection of economically significant aquatic species

There are no such areas in Cyprus.

bodies of water designated as recreational waters, including areas designated as bathing waters.

There are 113 such areas in Cyprus.

areas designated as vulnerable zones under Directive 91/676/EEC (nitrates from agricultural sources)

In Cyprus, 5 vulnerable zones have been established in Kokkinochoria, Kitty - Pervolia, Akrotiri, Paphos and Polis. They are related to the aquifers of Kokkinochoria, Akrotiri, Paphos (Peyia), Kiti and Polis.

areas designated as sensitive under Directive 91/271/EEC (urban waste-water treatment)

In Cyprus, 2 sensitive areas have been defined:

- Polemidia dam and its watershed
- Coastal waters extending from the Municipality of Paralimni to Cape Pyla.

Habitat or species protection areas

In total, 36 areas that are part of the Cyprus Natura 2000 Network have been included in the Register (17 Sites of Community Interest/SCIs, 14 Special Protection Areas/SPAs for birds and 5 areas that are both SCI and SPA).

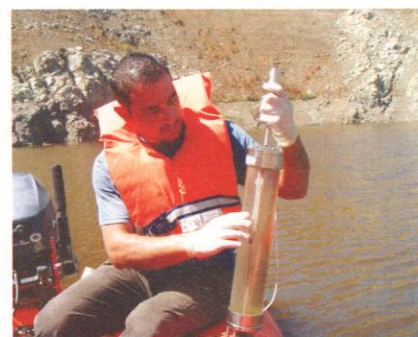
The status of water bodies in Cyprus

Cyprus has set up and operates Monitoring Programmes in order to obtain and maintain a coherent and comprehensive picture of the status of water in accordance with WFD requirements.

These programs are ongoing and constantly enhanced with new data and measurements.

The results of the monitoring programmes show that:

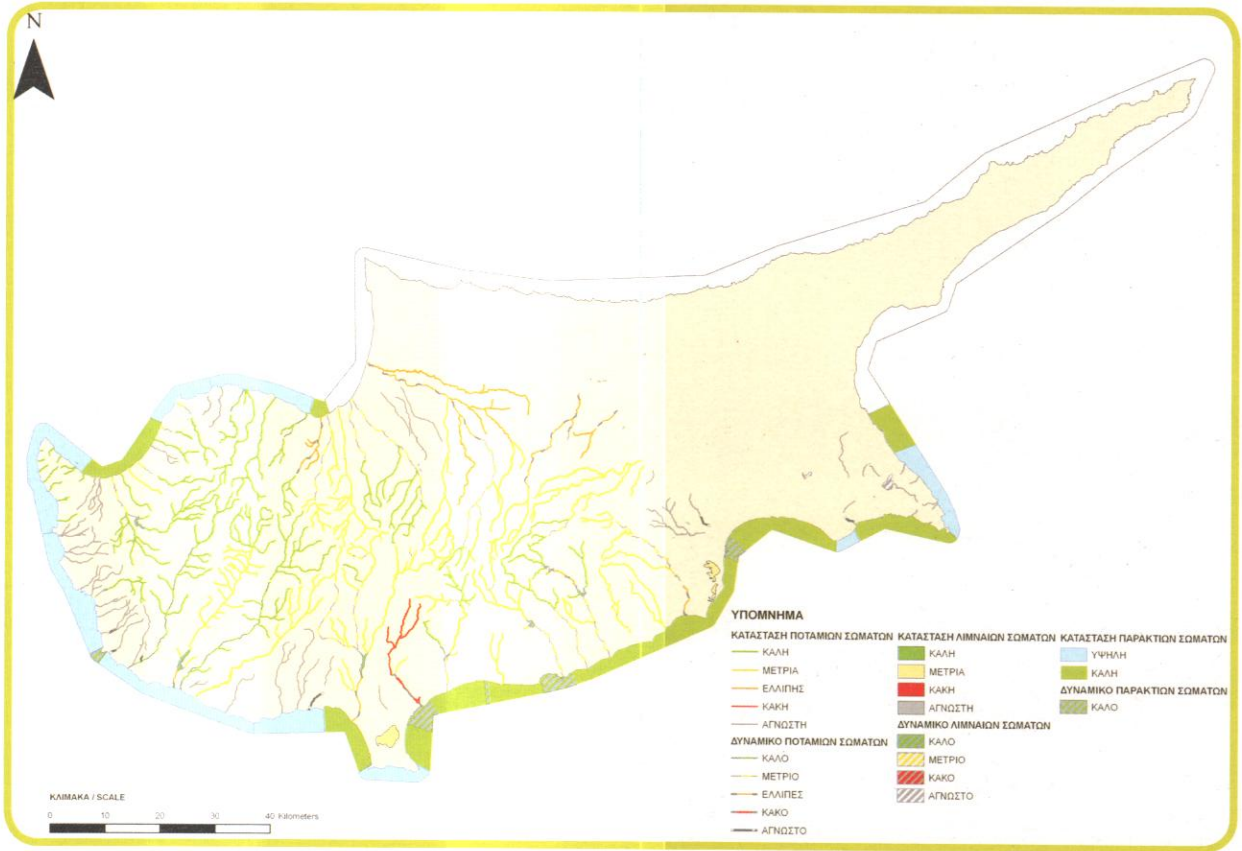
- The chemical status of the large majority of river bodies is good
- The ecological status of river bodies is not as good as the chemical due both to human intervention and to the absence of water for long periods.
- In a similar manner, while the large majority of lake water bodies have a good chemical status, their ecological status is lagging behind and measures should be taken to improve it.
- In contrast, all 25 coastal water bodies were found to have a good or high ecological status or good ecological potential. Similarly, their chemical status was good.
- Most groundwater bodies have a poor quantitative status. Chemical status of most groundwater bodies is good.



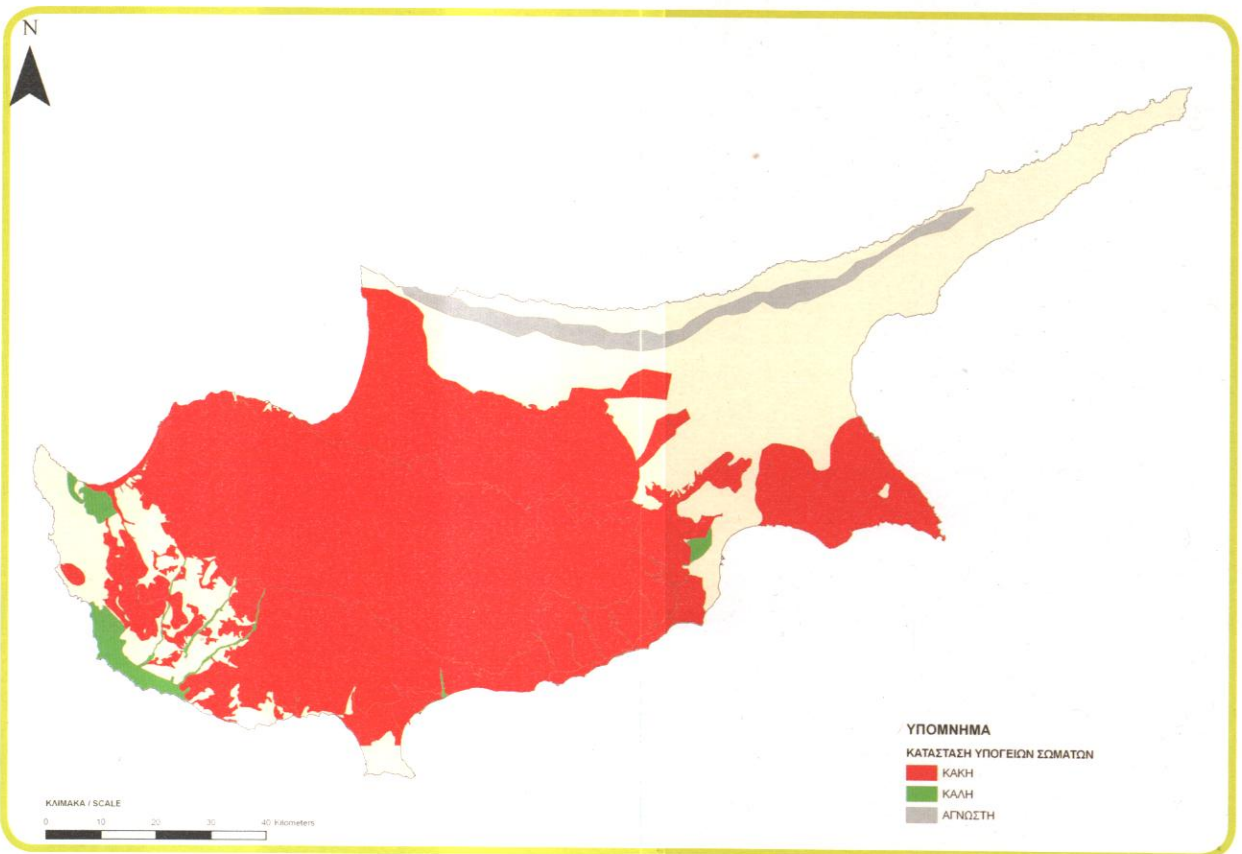
Lake water sampling



River water sampling



Current status and potential of surface water bodies



Current status of groundwater bodies

The major pressures on the waters of Cyprus and their impact

Sources of pollution that may cause the degradation of water quality in Cyprus fall into two categories: point sources that are limited spatially and may affect a limited number of water bodies, and diffuse sources that affect wider areas.

Major point pollution sources are the following:

- Urban waste water which may adversely influence the water quality in receiving water bodies

In Cyprus there is a high degree of compliance with the urban waste-water treatment Directive. By 2012 the population that will be connected to sewerage systems and treatment plants will increase from 417.990 to 860.000. Sewerage networks in 57 villages are either under construction or their construction has been planned.

- Livestock waste from large animal farms

A large number of farms for the intensive rearing of livestock operate in Cyprus. 30 poultry and 37 pig farms fall within the provisions of the Directive on Integrated Prevention and Pollution Control (IPPC).

- Industrial wastewaters and wastewaters from large installations

It is estimated that around 1.100 industrial units operate currently in Cyprus. These produce a wastewater quantity of the order of 3.000.000 cubic meters per annum. A large number of industries are based in Industrial Areas and Industrial Zones. In the whole of Cyprus, there are more than 45 industrial zones. This category of pollution source also includes the high and unregulated pollution potential of Vati.



Discharge of urban wastewater



Industrial and livestock wastewater



- **Solid waste disposal sites**

To date, solid waste disposal practice in Cyprus has included the regulated, semi-regulated disposal of municipal solids at various sites throughout the country. To address the problem of uncontrolled waste disposal a special management plan has been established and is being implemented.

- **Mines and(to a lesser degree) quarries**

The Cypriot mining industry mainly produced ores and concentrates of copper, iron, gold, chromite as well as asbestos fibers. The main mining areas of the island are Skouriotissa, Agrokippia, Kambia, Kalavastos and Limni. Isolated mines are found in Troulli, Magkaleni, Peravasa and Vretsia. The operation of mining facilities over the past 100 years has left more than 200 million tons of mining waste collected around abandoned mines on the island.

- **Aquaculture, desalination plants and (to a lesser degree) ports.**

The main aquaculture units in Cyprus consist of 7 units for fattening of euryhaline Mediterranean species, 3 units dedicated to the fattening of bluefin tuna and 7 freshwater aquacultures (6 small trout and 1 ornamental fish unit). In addition there are 3 private fish hatcheries and 1 shrimp hatchery located on land.

The Cyprus Ports Authority manages the commercial ports of Limassol and Larnaca, the industrial Port of Vasilikos, the old port of Limassol, the port of Paphos, the port of Latchi and the oil terminals at Larnaca, Moni, Vasiliko and Dhekelia. In addition, there are two marinas in operation: Marina of Larnaca (400 boat capacity) and Marina of Agios Rafael (300 capacity) as well as 12 fishing shelters.

The major diffuse pollution sources are the following:

Runoff and infiltration from agricultural activities

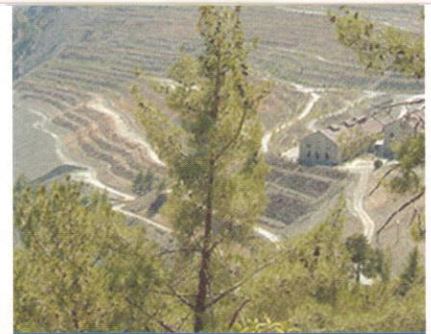
Agriculture is associated with major sources of diffuse pollution. These contribute to the loading of surface water and groundwater with nutrients. Agriculture is practiced on 30% of the total area of Cyprus. The main pollutant pressures due to agriculture are in the form of increased nutrient content (nitrogen and phosphorus), increased oxygen demand (BOD, COD), increased salinity and pesticides.

Livestock waste

The rearing of animals is a widespread rural practice in Cyprus. Farms with pigs, cattle and poultry are to be found in many parts of the island while free range sheep farming is also common. Waste such as manure and sludge from farms, pig farms excluded, is collected, stored in areas close to the farms and used as a fertilizer on surrounding land.

Urban waste water in areas where there are no collective sewage networks and treatment plants

Urban wastewaters in areas not connected to central wastewater treatment systems cause diffuse source pollution. The current practice in Cyprus is the use of individual waste disposal systems (septic tanks) which in many cases are not watertight. In cases where watertight cesspits exist, their emptying is done with the use of tanker trucks. The initiative for the emptying of the septic tanks and the transportation of sewage to plants rests with the owners of the property.



Pollution from mines and quarries



Rainfall Runoff

Runoff can be a significant source of pollution, thus placing considerable pressure on the quality of surface water and groundwater. It may take the form of point pollution but most often represents a diffuse source of pollution, particularly in urban areas. Similarly, industrial areas and transport infrastructure such as highways and airports, also produce a significant volume of rainfall runoff. This runoff may have a high pollution load (COD, nutrients (N, P), heavy metals (Cu, Pb and Zn), oils and hydrocarbons).

In addition to pollution, abstractions from water bodies, is also an important source of pressure on the waters of Cyprus.

With regard to surface water abstraction, Cyprus, has the highest number of dams per unit area in Europe with a total dam reservoir storage capacity of the order of 330 million cubic meters.

Large volumes are also abstracted from groundwater bodies. In some cases, the rates of abstraction were excessive leading to deterioration in the status of the aquifer. The highest quantities of groundwater are abstracted from the aquifers of Kokkinochoria, Mesaoria, Akrotiri and Paphos.



Our Environmental Objectives

Environmental objectives were set for all water bodies. These were based on the information and knowledge gained regarding the current status of water bodies, exerted pressures and their impacts, the use of water and the protected areas. For many water bodies, the good status or good potential cannot be achieved in the first programming period (until 2015) either for technical reasons or because of natural conditions that do not allow the recovery of water bodies in such a short time.

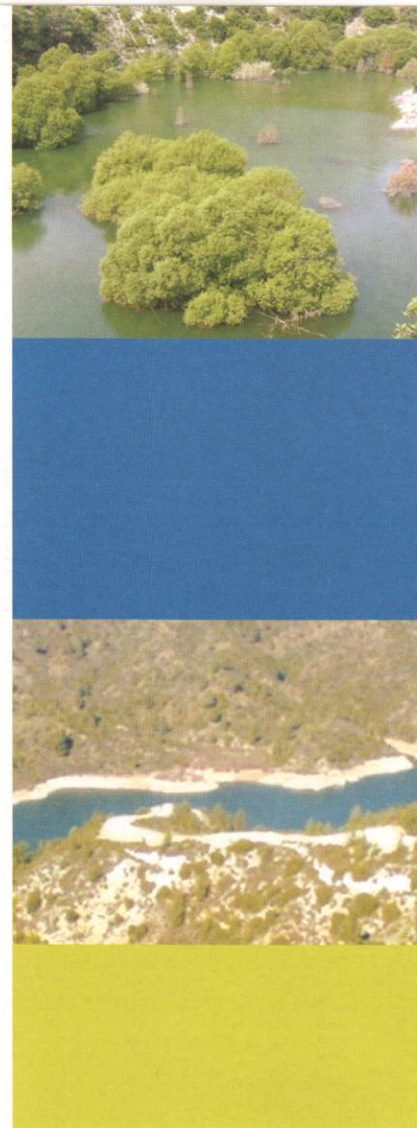
In many cases the reasons for not achieving good status by 2015, are related to the inability to identify and track the causes of deterioration in the status of the water body.

Therefore for 2015 the set target is an increase in the good status percentage for lake and river water bodies from 45% to 75%. For groundwater bodies where the recovery rate is extremely low, the good status percentage is set to rise from 21% today to a value of 26% in 2015.

The Programme of Measures

The Programme of Measures consists of the Basic Measures and the Supplementary Measures. The Basic Measures aim at the implementation of all relevant legislation and regulations with the aim of achieving the set environmental objectives. These include water pricing measures that may be regarded as incentives towards more efficient water management. The Supplementary measures are more focused measures that aim to supplement the Basic Measures towards achieving the environmental objectives.

The central policy approach in relation to water is the so-called combined approach (Article 10).



BASIC MEASURES

Measures required to implement EC legislation for the protection of water

These are the measures required for the implementation of EC legislation for the protection of waters. The measures are aimed at reinforcing the implementation of various EU Directives (such as the directives on urban waste water, birds, etc.). These Directives are related to water and are being implemented by the Republic of Cyprus. A series of specific measures, that are primarily administrative, are also included in this category.

The list of Basic Measures includes:

- Preparation of a study to strengthen the Department of the Environment, the Geological Survey, the Department of Agriculture and other departments and agencies which are responsible for the implementation and monitoring of EU directives on the environment.
- Investigation of the impact of stormwater runoff and disposal of other wastes through the drainage pipes in bathing waters and finding sustainable ways to mitigate this impact
- Investigation of the trend of macroalgae growth and / or marine phytoplankton and the determination of the appropriate management measures
- Management Studies for SPA areas of Achna Dam and Paralimni Lake.
- Banning the extraction/removal of materials from riverbeds and carrying out specialized management studies in river areas that belong to the Natura 2000 network.
- Reforming the legal framework on the drilling and operation of boreholes used for human consumption
- Preparation of guidelines on all necessary technical measures for the proper chlorination of water used for human consumption
- Measures related to safety reports of oil installations falling under provisions of the SEVESO Directive
- Amendment of the Law on the environmental licensing of projects.
- Rationalization of the treatment and disposal of the sewage sludge of the Agia Napa – Paralimni wastewater treatment plant
- A study on the Assessment of Technical and Operational Characteristics of the Existing Wastewater Treatment Facilities.
- Issuing waste discharge licenses for all installations including stringent discharge limits for certain parameters for specific installations.
- Elaboration of a monitoring programme for aquifers underlying areas irrigated with recycled water.
- Establishment of a national inventory of obsolete pesticides.
- Setting of minimum criteria for the use of equipment for the application

- of plant protection chemicals.
- Establishing a system of mandatory protection zones for all surface water bodies and setting minimum mandatory distance for application and storage of pesticides.
- Incentives for upgrading and improvement of livestock facilities within Nitrate Vulnerable Zones.
- Special measures for educating / informing / increasing awareness of people and introduction of penalties in the above areas.
- The establishment of a Monitoring Committee for the Action Plan for the reduction and prevention of nitrate pollution.
- Adopt and implement Minimum Environmental Releases from reservoirs.
- Elaboration of a special study to determine the permitted limits in treated livestock waste as well as the criteria for their application to the ground.
- Revision of the existing Development Plans, where necessary.
- Development of a methodology for the delimitation of riverstaging into account Directive 2007/60/EC as well.
- Implementation of the guidelines for the design and management of riparian zones.

Measures to implement pricing policies

The measures proposed for implementing the principle of cost recovery for water use include the following:

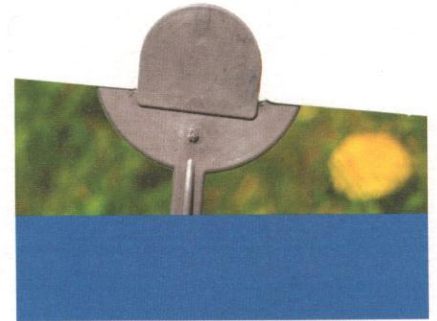
- Application of an appropriate pricing policy.
- Provision for the introduction of an overconsumption fee (Quota) in the pricing policies which will be implemented.
- Establishment of a central mechanism for the collection, management and use of the environmental and resource costs (Water Fund)

Measures taken to meet the requirements of Article 7

Cyprus must establish protection zones for all water bodies that are or will be used in future for abstraction of drinking water.

Actions in order to fulfill the above mentioned requirement have already been launched for both ground water bodies and reservoirs. Several protection zones have already been established and the on-going work will be completed with the establishment of protection zones for all relevant water bodies.

It should be noted that the complicated processes that existed until recently with regards to abstraction of surface / groundwater and surface water storage were simplified and administratively homogenized, on November 15, 2010 the date on which «the Integrated Water Management Law of 2010» (Law 79 (I) / 2010) came into force.



Measures taken for point source discharges liable to cause pollution (Article 11(3)(g))

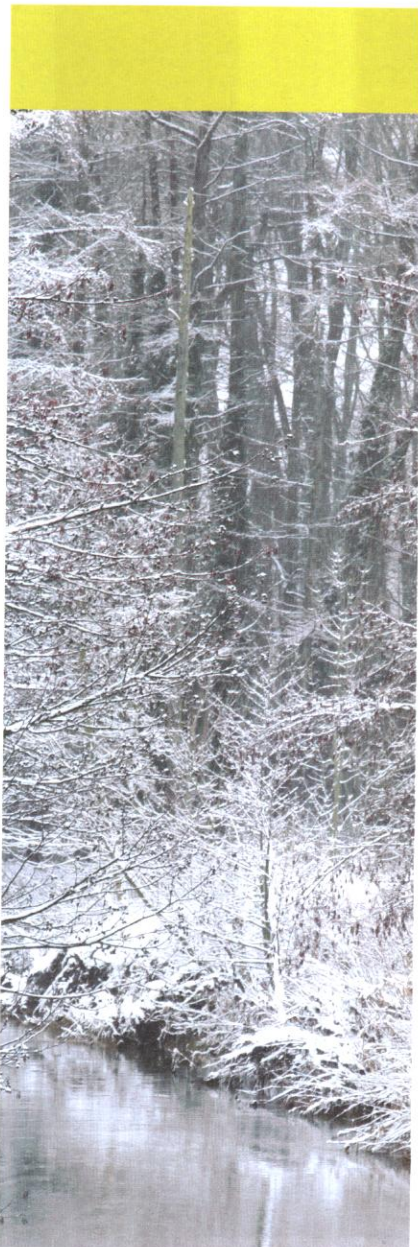
The proposed measures for point source discharges include the following:

- Set up of a registry of the mining and industrial facilities of Cyprus
- Priority measures for the rehabilitation of the mines in Limni and Kalavassos.
- Finalization of the timetable, objectives and cost for the rehabilitation of the rest of inactive mines
- Setting of a fixed timetable for the rehabilitation of unauthorized waste dumping sites
- Continuation of the monitoring program based on the existing network of wells in the burial area of ASKAREL (Polemídia area) and preparation of an Action Plan.
- Installation of the necessary infrastructure to handle waste water from sea vessels in the ports.
- Elaboration of a comprehensive techno – economic and environmental study for the remediation of the contaminated Vati area in parallel with the expansion of the Pentakomo waste treatment plant

Measures for the significant adverse impacts on the status of water (Article 11(3)(i))

To strengthen the institutional framework (Laws on Shore Protection, on Town and Country Planning etc.) concerning the protection of water bodies from human activities which could lead to morphological changes, a set of measures are proposed. A summary of these measures is presented below:

- Delineation of river water bodies within the Development Plan areas, taking into account the existing provisions of the Plans and the established development rights.
- Subsidies for actions towards the rehabilitation of the hydromorphological characteristics of river and lake water bodies.
- Hydromorphological rehabilitation of Chapotami river downstream of the existing private dam
- Actions for the hydromorphological rehabilitation of certain river WBs
- Actions for the rehabilitation of the riparian zone of certain river WBs
- Preparation of Guidance Document: «Guidelines for planning and management of river areas»
- Registry for recording small water storage works, small recharge levees and small weirs.



Identification of the cases where direct discharges to groundwater have been authorised in accordance with the provisions of Article 11(3)(j)

Measures taken for the priority substances (Article 16)

- Harmonization of the Cyprus legislation with the Directives 2008/105/EC and 2009/90/EK.
- Register of installations emitting Priority substances - Action Plan.
- Compliance with the technical requirements of Directive 2009/90/EK and with the procedures described in Part B of Annex I of Directive 2008/105/EC.

Measures to prevent or to reduce the impact of accidental pollution incidents

The proposed measures for the prevention of accidental pollution can be summarized as follows:

- The fuel storage tanks at airports should be surrounded by a watertight dyke and monitored through boreholes with samples taken 4 times a year.
- Establishment of a Committee on Accidental Pollution Risk Management
- Continuation of the removal of asbestos still at the bottom of the Limassol Port.
- A Study on the installation of an electronic fuel leak detection system in the sea area of the Larnaca oil terminal.

Measures taken under Article 11 (5) for water bodies which are unlikely to achieve environmental objectives under Article 4

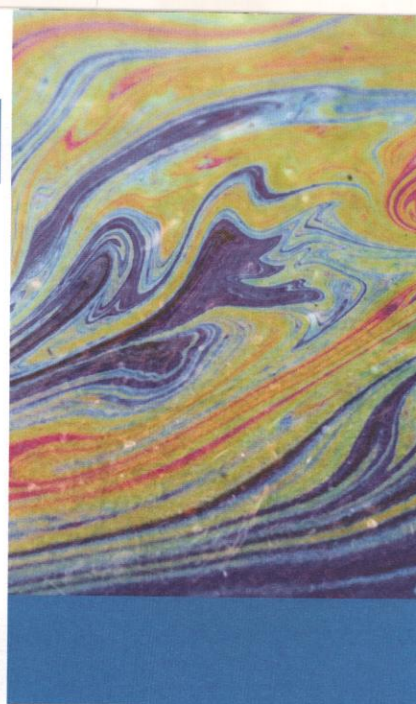
In this category, the proposed measures concern the following:

- Development of a distributed rainfall runoff model coupled with a model of nutrient/ pollutants transport at RBD level
- Completion of a special programme investigating the river basins with unidentified sources of pollutants
- Update of the monitoring programme of water bodies
- Special ad hoc monitoring programme of water bodies with high uncertainty in the classification

Measures Promoting Efficient and Sustainable Water Use

In order to achieve sustainable use of water resources, actions should be launched. These actions will aim at a high level of environmental and public health protection, ensuring the availability of water resources for future generations and the prosperity of the economic and social system. In this framework the following measures are proposed:

- An investigative study on the need for a change in the cropping pattern in the country
- Investigation of the scope and implications of the inclusion of all



residents of mountainous areas in the Register of Professional Farmers.

- Reducing water supply network leakages to 18% in urban areas and 22% in rural communities by year 2015
- Promoting water saving technologies in industry
- Strategic Study for the identification of exclusion zones for new golf courses.
- Masterplan for the management of the bulk water supply system.
- A study for the water supply of the Fasouri wetland.
- Development of an integrated policy for sustainable stormwater management and implementation of the relevant proposals of the WDD
- Implementation of the WDD planned Projects concerning the use of recycled water and its integration into the country's water balance.

Measures regarding controls and permitting of artificial aquifer recharge

- The term "artificial recharge" includes all works involving the deliberate acceleration of the recharging of aquifers from surface water sources. For cases of artificial recharge and especially those by treated wastewater the following actions should be taken:
- Review of existing artificial recharge licenses taking into account the recent threshold concentrations of specific pollutant determined by Directive 2006/118/EC.
- Provision of an alternative disposal method of recycled water in cases where chemical deterioration of the groundwater body is observed.
- Mapping out (by 2013) of conditions under which the pollutants listed in Annex VIII of the WFD should be considered hazardous or non hazardous.

Measures for Diffuse source discharges liable to cause pollution

Compliance with the provisions of Directives 91/271/EEC, 91/676/EEC, 86/278/EEC and 96/61/EC and the relevant laws of the Republic, provides the necessary framework for the protection of diffuse discharges. In addition, the following are required:

- A study to address the issue of environmentally safe disposal of the domestic sewage from small settlements. Preparation of proposals for improved management of the collection, transport and disposal of septic tank and cesspit sewage.
- Utilization and upgrade of the PIGWASTEMAN tool.
- Funding (based on priority) for relocation or demolition of livestock installations located near surface water bodies whose status has been characterized as lower than good.



Supplementary measures deemed necessary for satisfying the set environmental objectives



Administrative Measures

There is a confirmed need for the expansion of the boundaries of the Water and Sewerage Boards by incorporating and integrating the networks of neighboring municipalities. With such extensions, economy of scale is accomplished resulting in significantly reduced unit water prices and also ensuring good water quality and the systematic monitoring and control of the water distribution network. The following are proposed:

- The establishment of single Water Boards and Sewerage Boards at District level.
- Investigation of the terms and conditions for the establishment of a Water Board in Paphos and Ammochostos Districts.
- A study on the possibility of transferring the jurisdiction over the potable water supply networks of certain Communities to the Water Development Department
- Gradual banning of the supply of drinking water from private wells.

Economic and fiscal measures

The measures proposed in this category include:

- Establishment of the «Water Fund»
- Subsidies for reduced use of irrigation water
- Awareness raising campaigns for the rural population as well as the introduction of penalties and fines for offenders

Negotiated environmental agreements

The implementation of such voluntary agreement programs between government authorities and private parties is currently under discussion at European level. It is proposed that these voluntary programmes are reexamined in the next Management cycle.

Emission controls

They are part of the «combined approach» for pollution control. To achieve such a degree of control, the Competent Authorities should have adequate legal powers and resources to be able to:

- a. Identify and monitor all types of discharges in the basin
- b. Issue waste discharge licenses and enforce the terms of the agreement
- c. Take action to prevent pollution either by imposing protection areas or by regulating activities which could have adverse effects on water status.

The proposal is:

- The completion of the issuing of waste discharge licenses for those facilities that currently do not have one or whose license has expired as well as the intensification of checks on compliance with the issued license.

Codes of good practice

According to the results of the monitoring Programme, Garyllis river and Polemidia dam have high concentrations of active substances present in plant protection products (Trifluralin and Alachlor). For addressing this issue, it is proposed that a Code of Good Practice for the use of plant protection products is established in the watersheds of these areas.

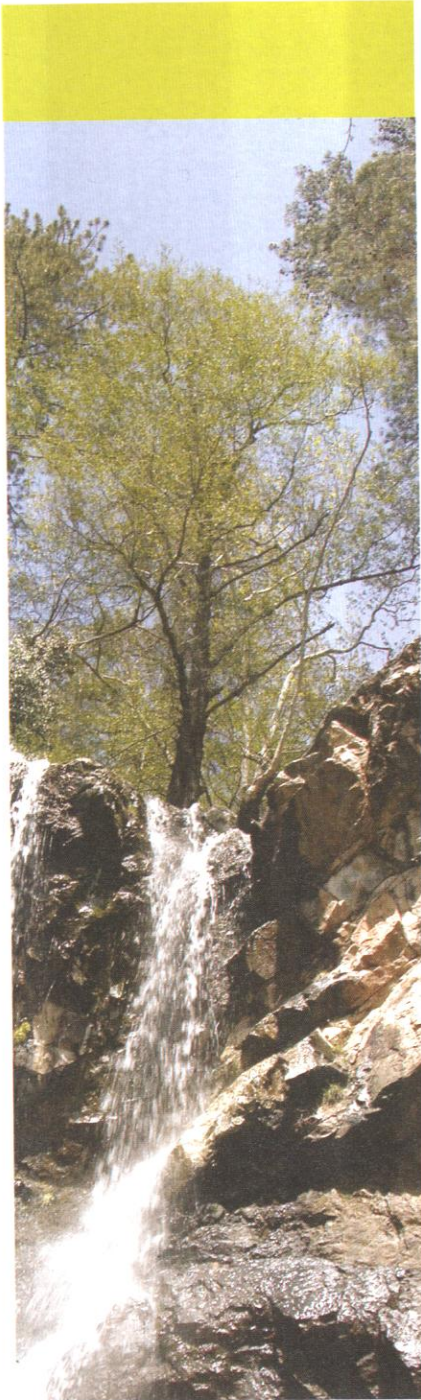
Demand management measures

In an effort to promote measures and targets to reduce water consumption in each water use, the Republic of Cyprus is implementing a policy of water demand management. This has reaped significant benefits. Measures taken fall in a wide range of categories including economic, communicative, legislative, administrative, and technological.

In this context, the WDD proposes that the current considerable effort to raise public awareness on issues of water resources management be continued.

Other proposals include:

- An investigative study on the necessity for a change in the cropping pattern in the country
- Implementation of a system for measuring, recording and reporting of the water losses in Large Government Irrigation Projects.
- Use of the K.O.A.P. database to estimate irrigation demand.
- Addressing the issue of losses in drinking water distribution networks.



Efficiency and reuse measures

The ongoing actions regarding the effective use / reuse currently implemented by the WDD should continue.

Water must remain a public resource to which everyone should have access at socially and environmentally fair prices.

It should be recognized that deforestation and uncontrolled urban and tourist development contribute significantly to increasing water scarcity. The competent authorities should take into account concerns about water resources in their planning, especially in connection with the development of economic activities in sensitive river basins, including coastal areas.

The civil protection mechanism of Cyprus should be prepared to take action in crisis situations resulting from extreme drought.

Water saving should be a top priority for the Republic of Cyprus in order to address water scarcity and drought.

The Cyprus Republic should incorporate sustainable water management in the criteria that should be met by water users before granting them funding from the budget or from the EU Structural Funds.

The Cyprus Republic should also support technology, good practices and innovation that minimize water consumption, aiming to increase efficiency in water management.

Private and public swimming pools are a significant consumer of water in Cyprus. An appropriate fee for the pools should be established.

Water losses due to leakages in public water supply networks should be minimized. For this purpose by 2015 central water meters should be installed in all Communities and a considerable number of consumers should be connected to water meters. Gradually all premises in Cyprus should be equipped with water meters.

The water performance criteria should, where possible, become part of construction standards for buildings. In this context proposals include:

- The compilation of a Guidance Document on the creation of gardens with low irrigation water requirements in developments and
- The compilation of a Guidance Document on specifications and codes regarding the installation of low water consumption appliances in new buildings. The installation of these devices should be mandatory in all government buildings.



Desalination Installations

A number of permanent and mobile desalination plants are currently operational. The Government policy is the complete independence of the water supply of the urban and tourist areas from rainfall and the guaranteed satisfaction of maximum demand during the summer period. Within this framework, the WDD has prepared a Desalination Plan which includes the eventual operation of 5 Permanent Desalination Plants, with a total production capacity of 250.000 cubic meters per day.

The following measures are proposed:

- The payment of an environmental fee for licensing private desalination plants
- The correlation of the degree of the utilization of desalination plants to the specified Drought risk as defined in the Drought Management Plan.

Infrastructure

The following measures are proposed:

- Preparation of the final design study and construction of the connection of the Germasogeia Dam to the Southern Conveyor (Southern Conveyor Project)
- A study for the interconnection of the reservoirs of Paphos with the integrated Southern Conveyor Project
- A study investigating the scope for building a water refinery near the Kouris dam to meet water supply demands of several mountainous communities
- A Study for as well as the necessary repair works for the recycled water pipeline in the region of Timi.

Artificial Recharge

The proposed measures for the artificial recharge of aquifers include:

- Expansion of the monitoring program of the recharged aquifer of Ezousa with the addition of parameters such as Hg, TCE & PCE as well as any other parameters which will be considered important. Groundwater samples should be taken on a quarterly basis
- A hydrogeological study covering the broader area of the Ezousa recharge operation, for the investigation and the prevention of adverse impacts on neighbouring areas.
- Updating of the existing three dimensional model of groundwater drainage in the area of Kiti by introducing into the simulation quality as well as movement of ground water. The aim is the development as well as the evaluation of alternative scenarios of recharge.
- Updating of the study for the use of recycled water from the Sewerage Boards of Ayia Napa – Paralimni for aquifer recharge.
- Technical and environmental investigation of the possibilities of constructing small earth dams in rivers for groundwater recharge
- A hydrogeological study for Pirgos GWB.

Educational Measures

The educational measures are aimed at creating water awareness in schools and the wider public. The following are recommended:

- Further strengthening of the measures creating water awareness in Primary Education
- Creation of a Web site promoting water consciousness
- Regular small group meetings of WDD with Mayors and Community



Councils

- Publication of an informative and awareness leaflet concerning pollution issues associated with activities in the primary sector
- Educational programs for the public and specialized educational programs for farmers and hotel personnel
- Provide specialized training for staff involved in groundwater monitoring and groundwater data management.
- Campaigns for raising awareness on the management of rainwater



Works of Research, Development and Demonstration

The establishment of a Water Development and Research Unit is recommended. Furthermore the following research programs/studies are proposed:

- The development of a distributed rainfall runoff, nutrient transport and selected contaminants model
- Determining reference conditions in LWBs
- Exploring the typology of hyporhoic rivers
- Development of Water Quality Assessment Systems (Annex V of the WFD)
- Updating of the monitoring networks
- Reinforcement of the infrastructure for monitoring meteorological parameters

Use of treated wastewater

In this category of measures the following principles apply:

- The widespread use of recycled water will be an extremely useful addition to the water balance. However the issue of salinity of the recycled water should be addressed.
- As the water treatment technology keeps improving there should be an integrated approach as regards «water treatment plants and further treatment for recycling».
- It is important to secure additional quantities of recycled water for the needs of the Southern Conveyor Project areas. Even though the Southern Conveyor Project the most significant project in the country it presents the greatest problems as regards coverage of demand.

Based on the above issues, the following are recommended:

- A technical and an environmental feasibility study regarding the construction of a long undersea pipeline for the disposal of the brine from the desalination of recycled water of Nicosia and Larnaca
- A feasibility study for the use of the increased quantities of recycled water for Paphos
- A soil study to determine the safe limits as regards the application of recycled water for irrigation, in the areas of Yermasoyia, Polemidia, Akrotiri, Aradippou, Athienou, Mesaoria, Kokkinochoria and Kiti.

WFD treats sediments as important elements for assessing the status of surface WBs.

In order to achieve measurable and significant progress in relation to the sediments by the year 2015 or 2021, as well as within the scope of Directive 2008/105/EC, the following should be done:

A. Launch programs assessing the quality of sediments

B. In cases where pollution is detected

- Mapping of the origin of substances detected in sediments (natural or human causes)
- Development of hydrodynamic and sediment transport models through which the movement of pollutants from the emission source (eg industrial unit) to the WBs is simulated
- Development of models of bioaccumulation in the living organisms that are found in aquatic ecosystems
- Action Plan for areal rehabilitation.

In the current management period, the launching of a monitoring program and analysis of the data of sediments in 9 reservoirs, 4 saline lakes and the port of Limassol is proposed.

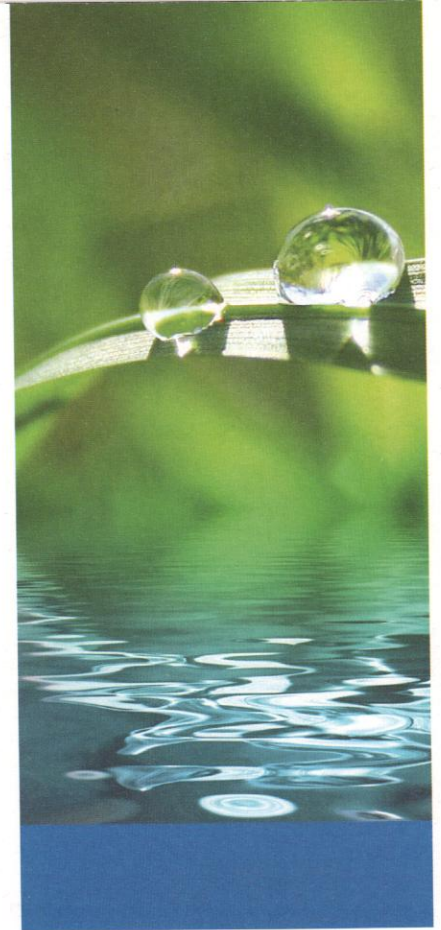


Cost effectiveness of measures

For all the proposed supplementary measures, cost effectiveness analysis was implemented in order to determine the combination of measures that will achieve the environmental objectives by 2015 at the lowest possible cost.

A total of 53 measures were examined. On the basis of their cost effectiveness these were classified as absolutely necessary, essential and neutral .

The analysis showed that the measures which are effective in all water bodies are measures that promote the ecological restoration of degraded water bodies and wetlands and measures related to the monitoring of WBs. Measures which promote research, development and better control of the quality characteristics of water bodies also appear to be effective. Finally, administrative measures and measures which increase water use efficiency and promote the acceptance of recycling treated effluent by promoting environmental responsibility, educational programmes as well as campaigns which increase awareness are very important. The implementation of these measures is expected to play a central role in achieving good qualitative and quantitative water status.



The view of the public

AA broad and comprehensive public consultation was held in three distinct stages, as prescribed by the WFD.

The 1st consultation phase was launched in April 2007 and was completed within six months. During this time, the following actions were implemented:

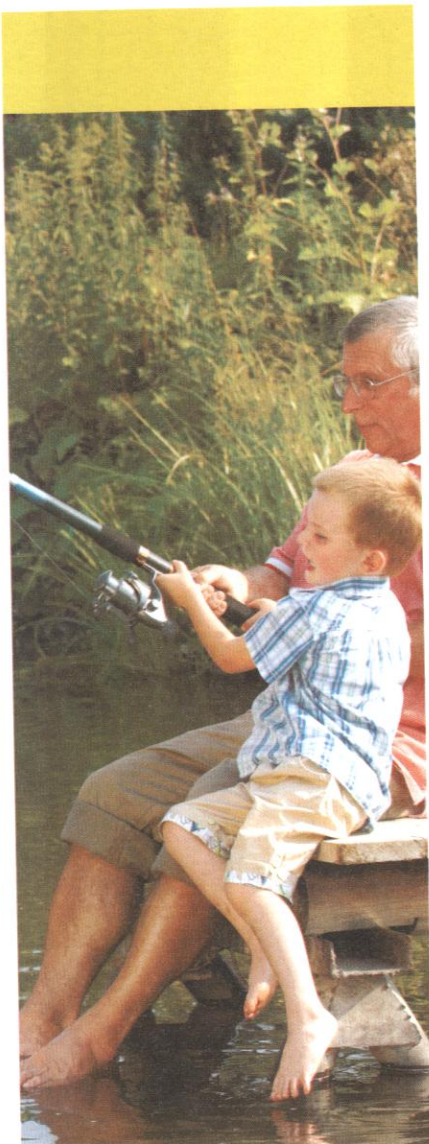
- Mapping of the stakeholders
- Design of the consultation process
- Selection of tools and methods
- Timetable for implementation

The 2nd consultation phase was launched in December 2007 and completed in over than six months. During this period the following were implemented:

- Discussion on the significant issues of water management. The Competent Authority gave wide publicity to the consultation text and organized systematic information campaigns and collected relevant opinions through a specially designed questionnaire.
- Preparation of a permanent framework of information, communication and exchange of views
- Organization of training workshops for public officers on technical issues of consultation

The 3rd consultation phase began in May 2010 and was completed within six months. Based on all significant water issues identified during the 2nd consultation phase a Draft Management Plan was drawn and was made available for comments to the public. As part of the consultation process, a series of public actions, public presentations as well as thirteen open meetings (4 district meetings, 4 stakeholder meetings, 4 meetings with Community Councils and 1 Pancyprian meeting) were organized and carried out.

The results of the consultation were announced at a wide open Pancyprian meeting held on the 1st December 2010.



The importance of the RBMP

The RBMP has several functions but its primary function is to record the current status of water bodies and to determine the actions to be taken for attaining the environmental objectives.

In addition, the RBMP coordinates the program of measures, prioritizes the different actions for the protection of waters and takes into consideration and guides other plans and projects implemented in Cyprus in order to prevent direct or indirect adverse impact on water bodies.

Finally, the Management Plan is the key planning tool of the Competent Authority i.e. the Minister of Agriculture, Natural Resources and Environment) as well as the Competent Authority's central mechanism for reporting, to the European Union (EU). In other words, the management plan is the mediator between Cyprus and the EU on water issues.

The RBMP is the means to ensure the sustainability of water for present and future generations.

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The website of the Department of Water Development (WDD) contains a range of useful information about the Water Framework Directive, the Management Plan, the environment and the water policy of Cyprus. Also, on the same site you can search the maps associated with the Management Plan, the monitoring program of Cyprus' waters and a number of other supporting documents and information.



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