“Sustainable Water Management through Common Responsibility enhancement in Mediterranean River Basins”

Overview of Water Management in Cyprus - Towards the implementation of WFD

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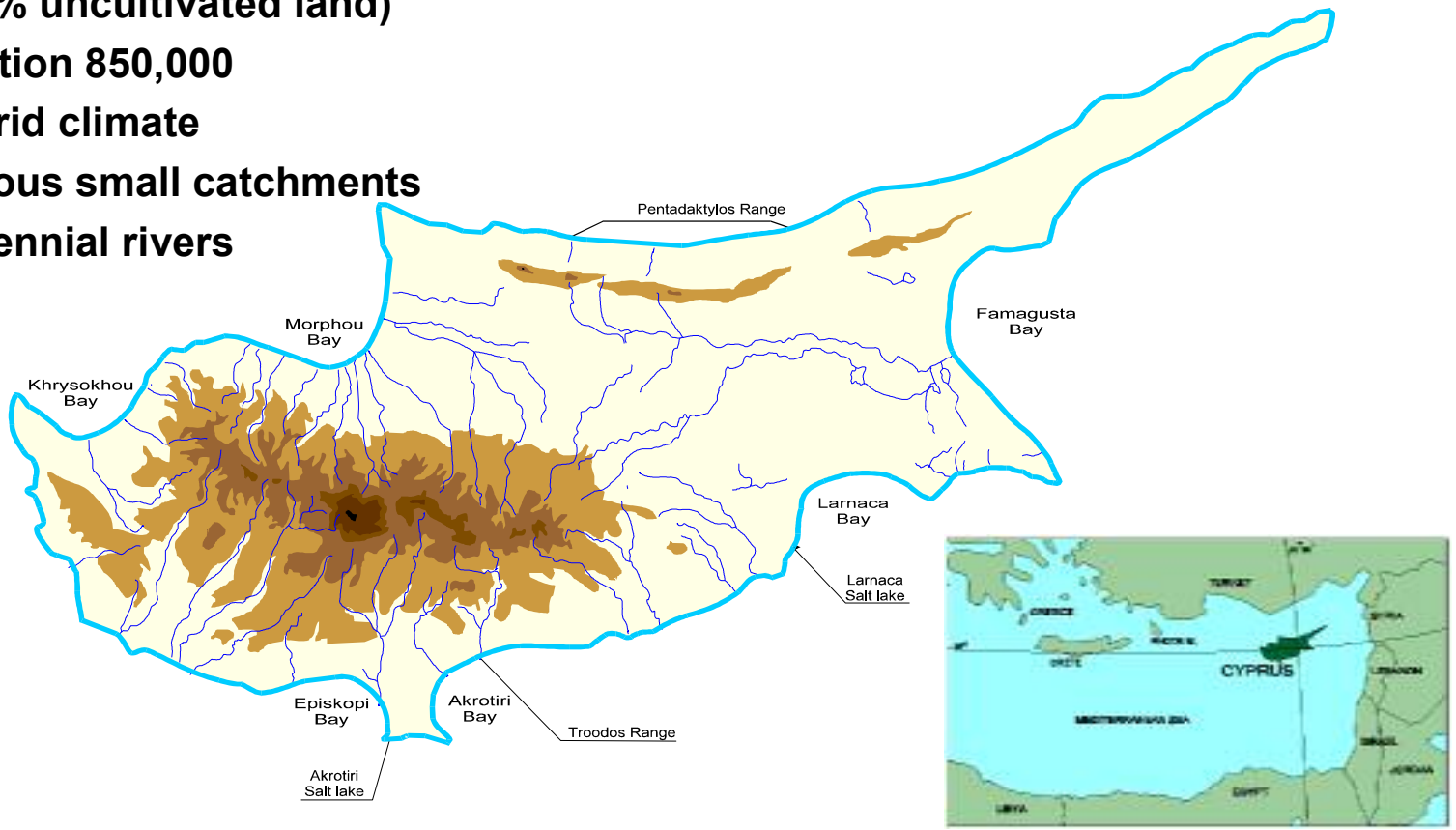
Contents

- Cyprus water at a glance
- Specific challenges
- Water management in Cyprus
- Implementation of WFD
- Conclusions

Cyprus Location and Physical Description

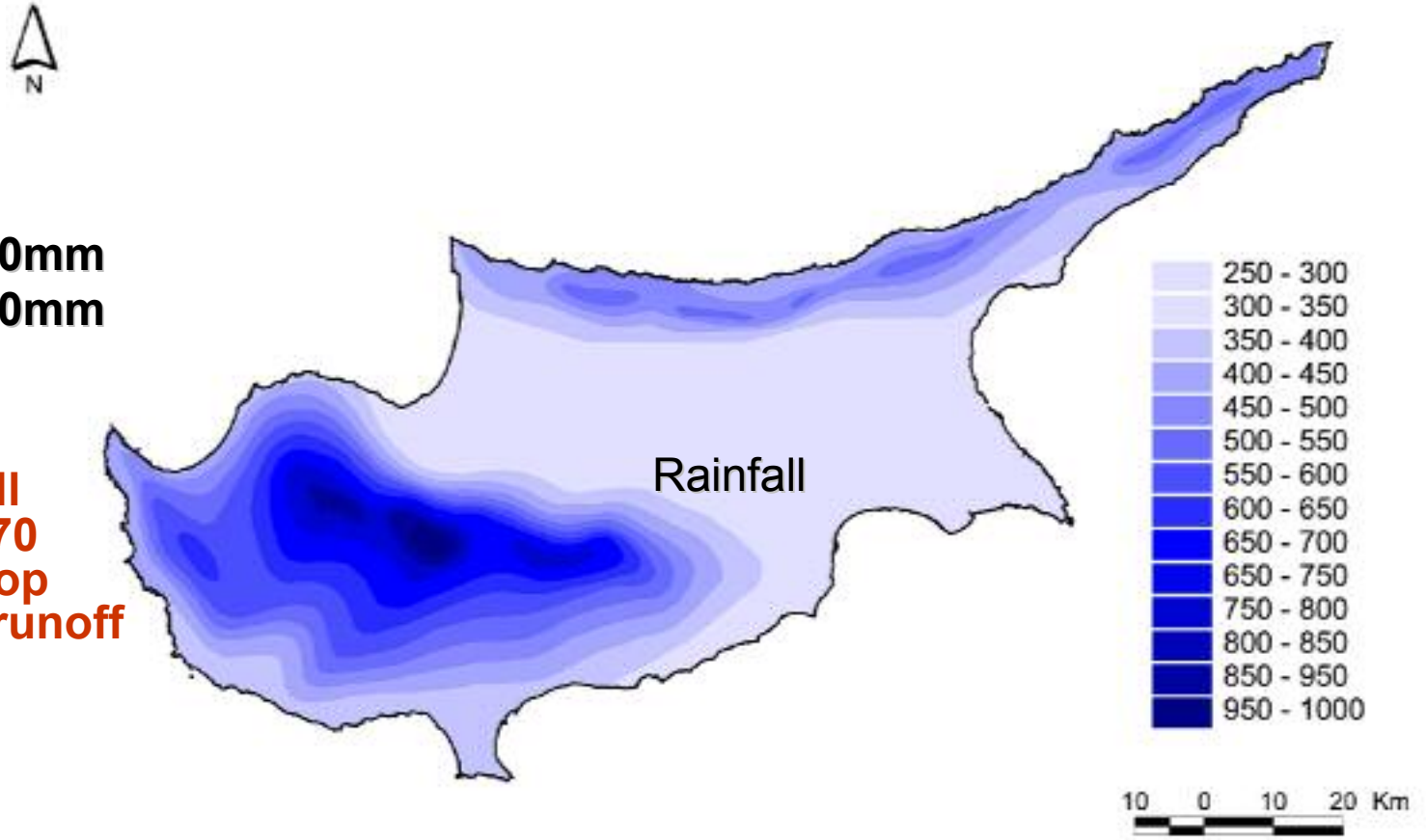
- **Area: 9250 km² (47% arable, 19% forest and 34% uncultivated land)**
- **Population 850,000**
- **Semi arid climate**
- **Numerous small catchments**
- **No perennial rivers**



Average Annual Precipitation Map of Cyprus (mm)

Rainfall
1900-1969 540mm
1970-2005 470mm

A step in rainfall of 15% after 1970 resulted in a drop of 40% in river runoff



Specific Challenges

Long, repetitive drought periods & Increasing demand for water

Serious water shortages

Climate change is expected to aggravated these problems

Quality and Quantity problems

- **Need augmentation with desalination and sewage reuse even in a desalinated form (Problems of CO2 emissions)**
- **Optimize desalination with water demand management and wider island development plan**
- **Identify adaptation measures and best practices**
- **Even though Cyprus is characterised as one river basin, the government of Cyprus can not exercise control over 40% of the area**

Cyprus at a Glance - Water Sector Organization

Policy Level

- **Ministry of Agriculture, Natural Resources and Environment (MANRE) main ministry responsible for the formulation of the government´s water policy**
- **Other important ministries involved are the Ministry of the Interior, the Ministry of Finance and the Ministry of Commerce, Industry and Tourism**
- **The ultimate responsible body is the Council of Ministers**

Executive Level

- **Responsibility mainly divided between**
  - **The District Offices, have legal powers for distribution agencies and issue of ground water abstraction permits**
  - **The Water Development Department, is responsible for the study, design, construction, operation and maintenance of water works as well as the monitoring, management and protection of water resources**

Past Water Policy

Water Supply Management (1960-1989)

- Exploitation of surface water
- Construction of 20 major Dams (327MCM)
- Conveyance Systems and
- Large Irrigation Schemes

«Not a drop of water to the sea»

Lower the impact of short-term droughts for agriculture and domestic usage BUT increasing water demand was not fully covered and decrease in rainfall combined with large dams have let to a reduction in the replenishment of aquifers and the degradation of both surface and ground waters

Water Demand Management (1990-2000)

- Water rationing, conservation measures
- Exploitation of non-conventional water resources (desalination, sewage reuse)

«Water, use it don't waste it»

Improvements in water use, advanced efficiencies, conservation, creation of water consciousness, supply main cities with water (independent from the weather), BUT increasing demand and climate change have let to water deficit – **DEMAND>SUPPLY**

Water Policy as from 2000

Despite the major water works the use and management of waters is not considered sustainable:

- **Great disparities exist between demand and supply**
- **Emphasis is placed on quantitative rather than qualitative water management**
- **Water is not considered adequately as an ecological resource of natural ecosystems**

MAJOR WATER WORKS

Integrated Water Resources Management

WFD currently in progress Articles 8, 9,11,13 and 14

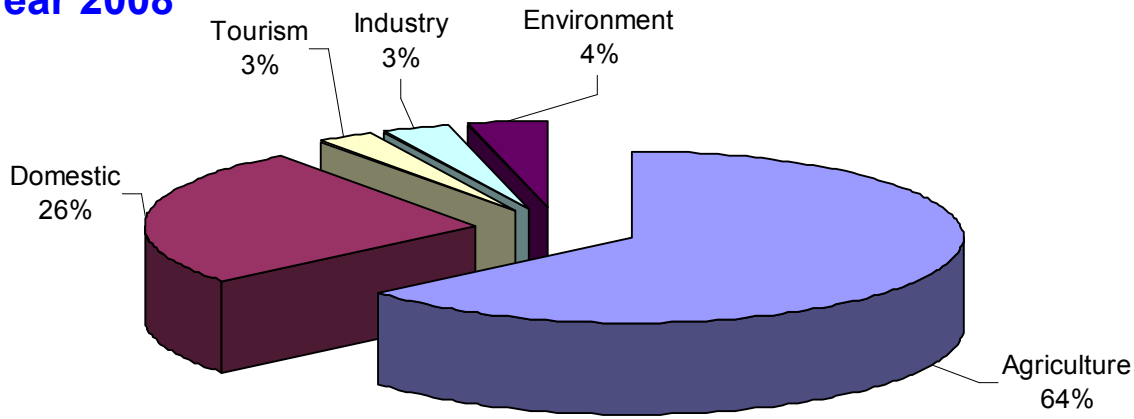
«Mind Water and the Environment»

Aim → provide sustainably to all our people sufficient, clean, healthy and reliable water for domestic and irrigation needs and for the environment

Water Demand

Total Annual Water Demand –Year 2008

Agriculture	**161 MCM**
Environment	**10**
Domestic	**66**
Tourism	**7**
Industry	**8**
TOTAL	**252 MCM**



Sources of Supply in 2008 UNDER DROUGHT CONDITIONS
Dams (78) + Aquifer (95) + Desalination (32) + Effluent (11) = 228MCM or 14% DEFICIT
Consumer's level consumption of water:140l.p.c.d.

Water Price defers according to **the use:**

- Industrial, domestic and touristic use – 0,85 € / m^3 , «full» cost recovery
- agricultural use – 0,17 € / m^3 , 53% cost recovery **Low prices lead to inefficient use**

Completed Activities in Cyprus

Legal Transposition- Identification of Competent Authorities (Article 3)

- Water and Management Law N13(I)/2004
- The Minister of Agriculture, Natural Resources and Environment
- Two main “agencies” (Water Development Department & Environment Service)

Identification of River Basin Districts (Article 5)

- The whole island is defined as one River Basin

Characterization of River Basin (Articles 5) in terms of :

- Pressures and impacts on water bodies (i.e. pollution, overuse)
- Economics of water uses to identify the most cost effective measures

Register of Protected Areas (Article 6)

- Natura 2000, bathing waters, drinking water sources

Establishment of a Monitoring Network (Article 8)

- In terms of both quality and quantity of waters

Involvement of Stakeholders (Article 14)

-Timetable and Work Programme (1st Campaign April 2007- Sep 2007)

- Significant water management issues (2nd Campaign Dec 2007- Jul 2008)

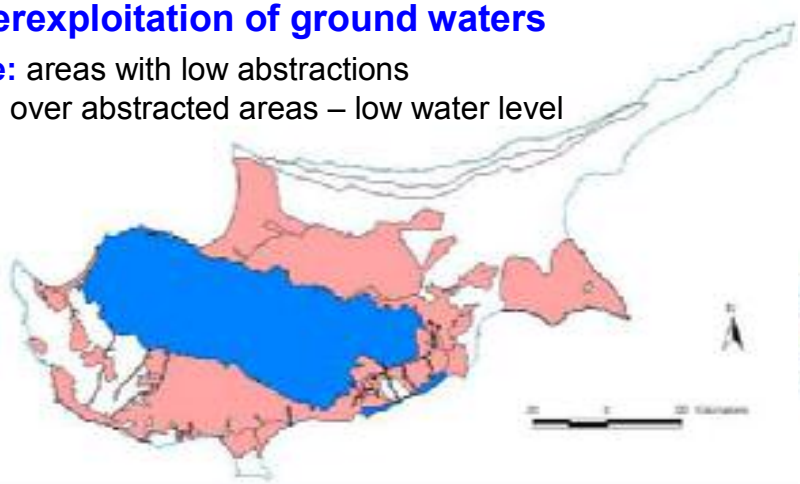
Significant Water Management Issues

- **Overexploitation of ground waters** (level decline, high salinity)
- **Hydromorphological pressures** (degradation of ecosystems downstream of dams) **and quantity-flow of surface water** (49 streams out of 216 are heavily modified)
- **Pollution**
  - **Agricultural** (Pesticides and Fertilizers - Nitrates & Phosphorous): 8% of the area susceptible to nitrate pollution
  - **Urban wastewater discharge** (2 sensitive areas)
  - **Other sources (industry, mining, rainwater run-off)**
- **Conservation of protected areas and significant hydrophilous ecosystems** (bathing waters, drinking water sources, Natura areas)
- **Water scarcity and Drought** (both for potable and irrigation water)
- **Other issues**
  - **Water pricing** (varies according to services, areas, etc and covers part of the supply services’ financial cost)
  - **Administrative issues** (Dual responsibility between two Ministries inefficient & ineffective, lack of an integrated water entity)
  - **Pressure on coastal water bodies** (tourism development)

Schematic Presentation of Our Problems

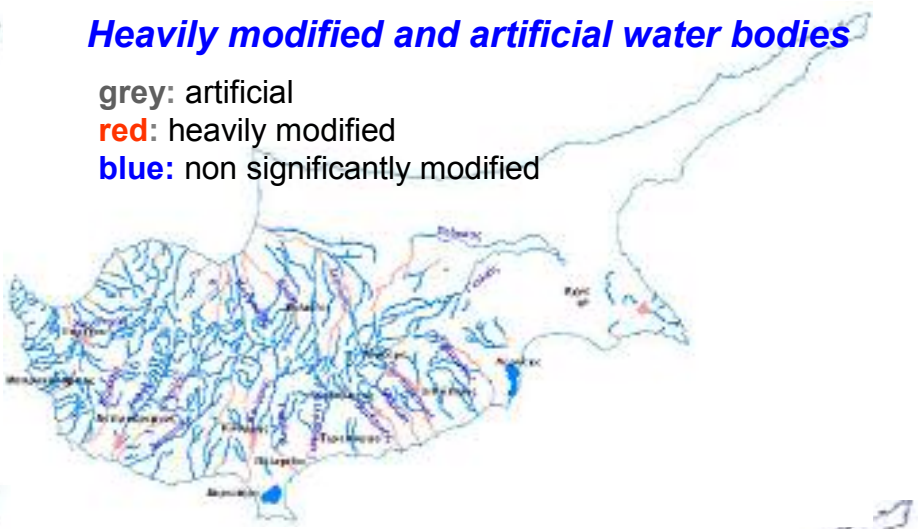
Overexploitation of ground waters

blue: areas with low abstractions
red: over abstracted areas – low water level

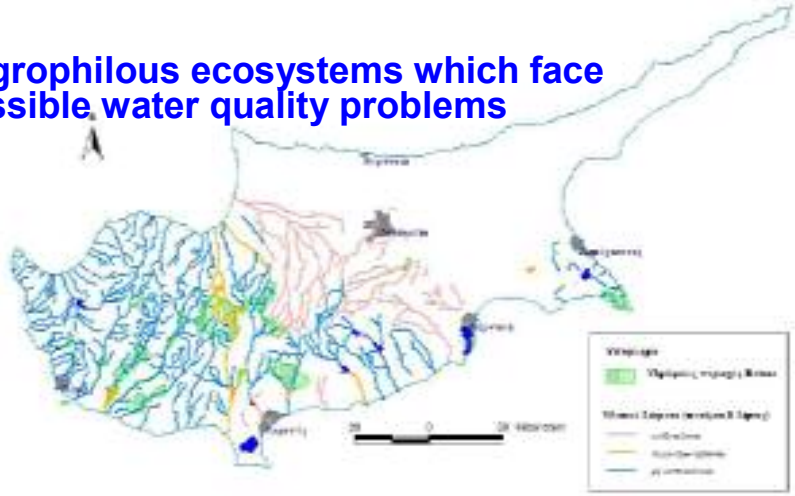


Heavily modified and artificial water bodies

grey: artificial
red: heavily modified
blue: non significantly modified



Hygrophilous ecosystems which face possible water quality problems



Nitrate Zones

Managing Stakeholders Expectations

Transparency and active involvement through:

- Announcements, TV, Radio, Leaflets
- Web page
- Publications
- Seminars / Workshops
- Questionnaire
- Working groups

www.wfd.wdd.moa.gov.cy

Main issues of concern:

- **water sufficiency**
- **assurance of good water quality for every use**
- **water pricing**
- **proper public management**

Currently in Progress Activities

Protocol of Information and Data Bank (Article 9)

setting up of water pricing policies with incentives for efficient water use in accordance to the **«polluter & user pays» principle** (polluters and users should pay for the natural resources they use and the damage they create)

sufficient cost recovery (prices should cover the operational & maintenance costs, the costs invested in infrastructure, environmental and resource costs)

Intercalibration Exercise

formally defines where “good ecological status of water bodies” lies

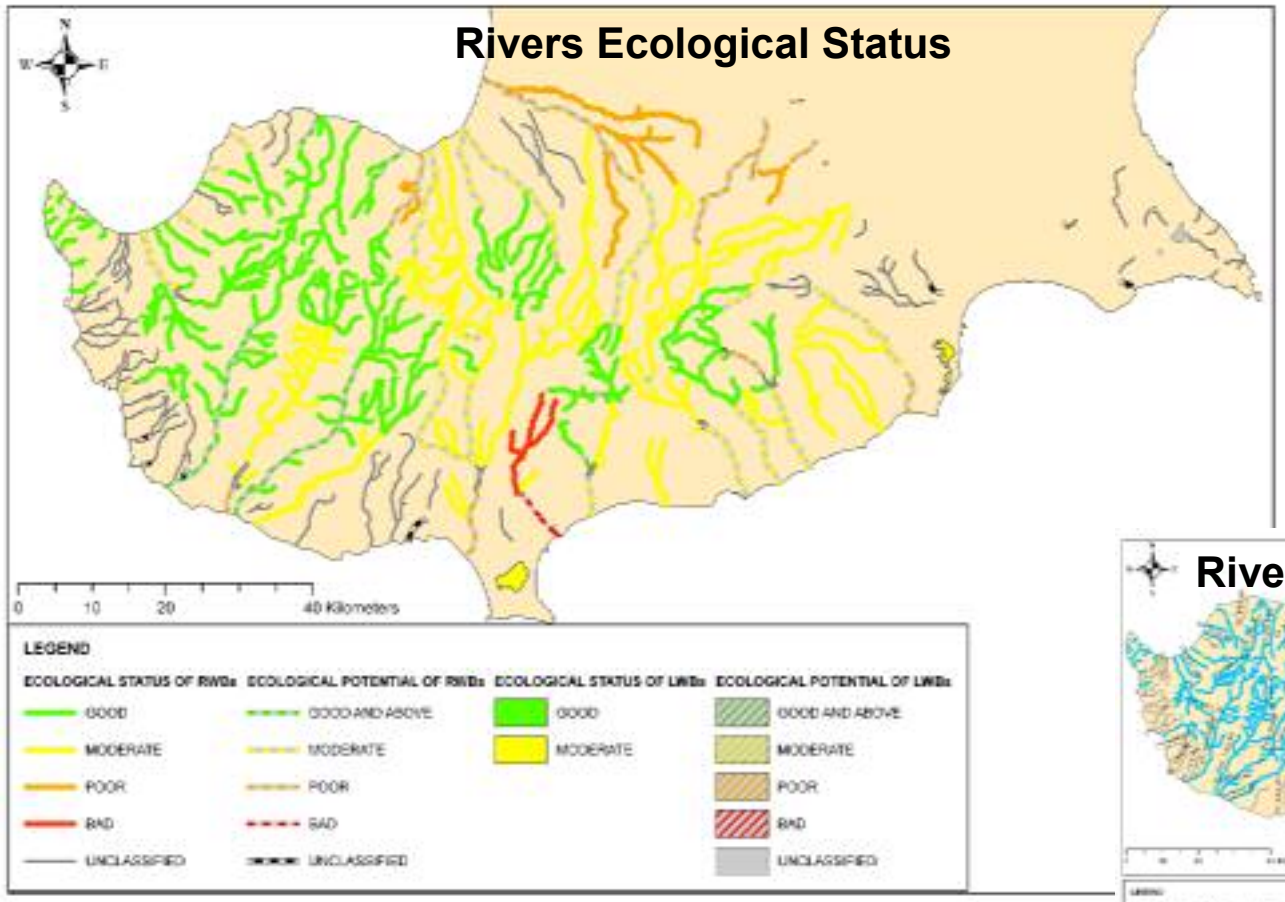
Monitoring of water bodies (Article 8)

fill data gaps and improve our knowledge of water status and the pressures

demonstrate the effectiveness of the measures

provide long term trend analysis

Ecological Status of Water Bodies

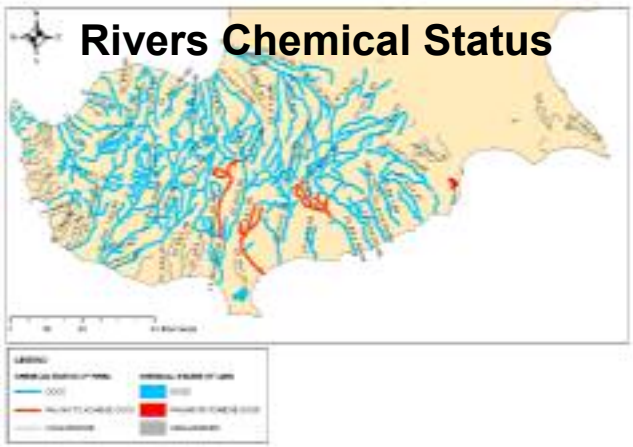


WB´s AT RISK

Rivers 67% of 216

Ground waters 84% of 19

Lakes 45% of 18



Steps Towards our first RBMP

Draft Drought Management Plan

- Drought Indicators
- % of Volume in Dams at the end of inflow period in order to:
  - Initiate curtailments in irrigation
  - Initiate downstream recharge
  - Decrease contribution from desalination plants
- proposals for less water intensive crops

Draft Water Management Policy Review

- Review of major water works effectiveness
- Water balance scenarios with regard to all conventional and non-conventional sources of water, taking into consideration increases in domestic water supply, increases in effluent reuse, maximum permitted abstraction from boreholes, volumes of acceptable water shortages, etc

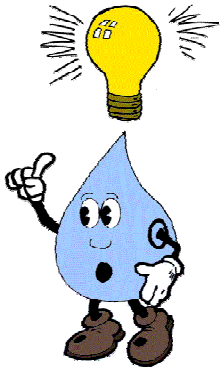
Draft River Basin Management Plan

Program of Measures (expected by the end of 2009)

Strategic Environmental Assessment

3rd Consultancy Campaign (planned to start in February 2010)

What else can we do?



Quantitative issues

- Use effluent water for irrigation and artificial recharge of aquifers
- Register and audit all private boreholes to control abstractions
- Reassess all water intensive development plans (i.e. golf courses)
- Develop incentives for changing the cropping pattern
- Harvest rain water run off
- Replace domestic water supply networks to decrease water losses

Qualitative issues

- Rehabilitate obsolete mine areas
- Implement preventive measures to safeguard potable water sources
- Allow for ecological flow downstream of major dams
- Improve and audit the implementation of agricultural code of practice

Horizontal issues

- Develop fiscal incentives to promote water efficient devices
- Apply quota for water overuse
- Optimize water management through the establishment of a Water Entity
- Intensify awareness campaign and public communication

Main Shortcomings

- Lack of sufficient quantitative and qualitative data
- Lack of a national network of data collection and storing
- Difficulties in cooperation between the various agencies dealing with water
- Lack of an overall water agency
- Shortage of expertise and manpower
- Small experience in consultation processes
- The attitude of the users towards water / environment
- The high cost of implementation
- The extremely tight and demanding timetable

Conclusions

- Water is by far the most precious resource in Cyprus
- The present water situation is not sustainable
- The WFD provides Cyprus with an opportunity for introducing and implementing water policies that enhance sustainability

It's effective implementation, presupposes:

- long term planning,
- allocation of adequate financial resources,
- active involvement of the society,
- change of attitude towards water and the environment,
- political will

- The difficult part of the implementation is ahead of us BUT we have taken the first step in order to:
  - Minimize the gap between supply and demand for water
  - Stop the deterioration of our scarce water resources

Thank you for listening

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