The environmental objectives and Programme of Measures of the River Basin Management Plan

The case of Cyprus

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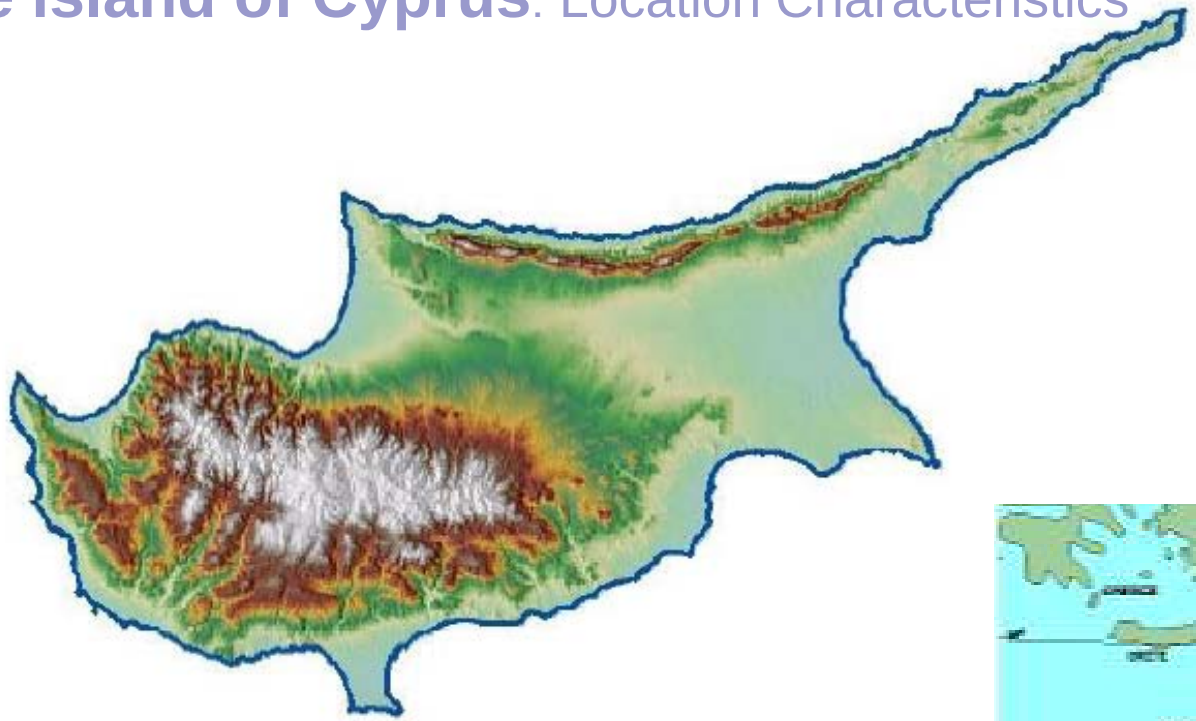
NOVIWAM Southern European Regions | Novel Integrated Water Management Systems

The island of Cyprus: Location Characteristics



Area: 11.015 km^2 (47% arable, 19% forest, 34% uncultivated land)

Population: 850.000

Semi arid climate

Numerous small catchments

No perennial rivers

The island of Cyprus: Annual Precipitation Map (mm)

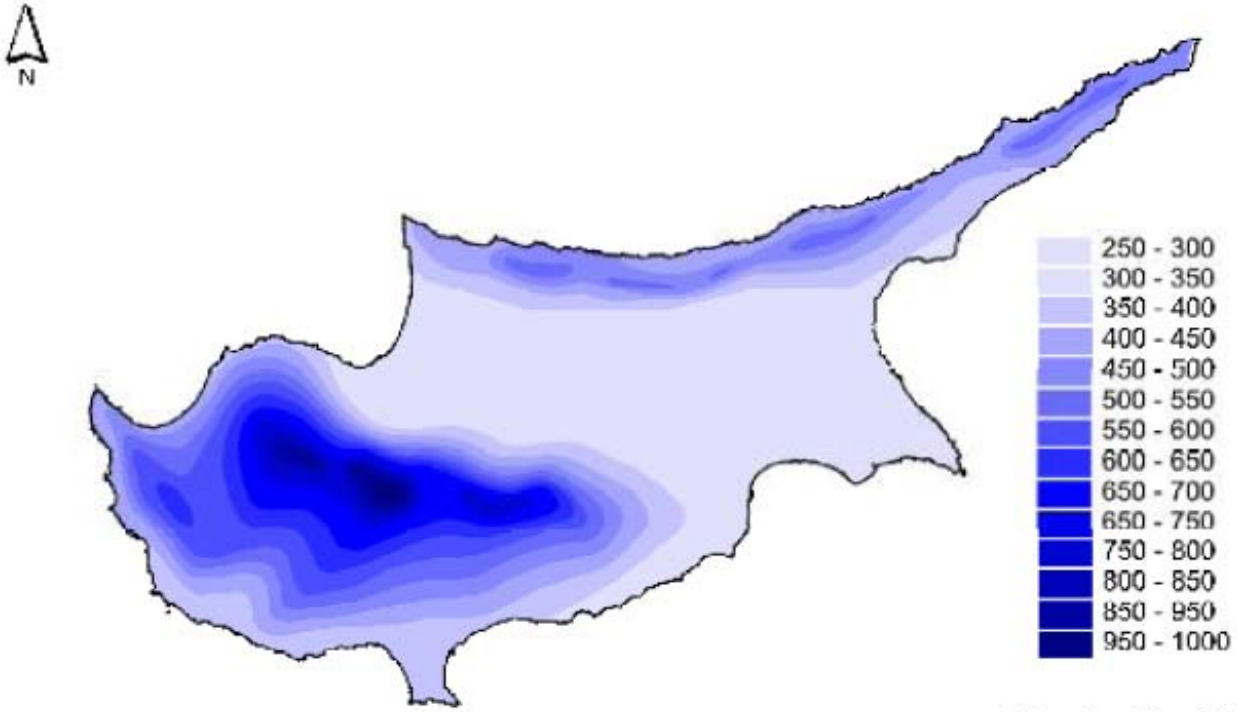
Rainfall

1900-1969 **540** mm

1970-2005 **470** mm

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

Major environmental issue: Prolonged periods of **droughts**



Sewerage Board of Limassol-Amathus

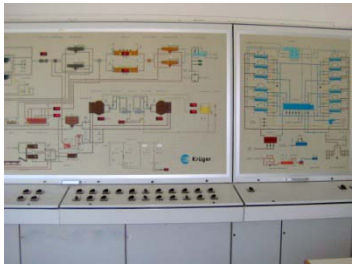
Construction, operation and maintenance of the public sewerage and storm water drainage system of the Greater Limassol Area, therefore improvement of the hygienic and environmental conditions and quality of life in the area.

*Biological Wastewater Treatment Plants

*Expansion of the Sewerage Network

*Storm Water Drainage system (application of SUDs)

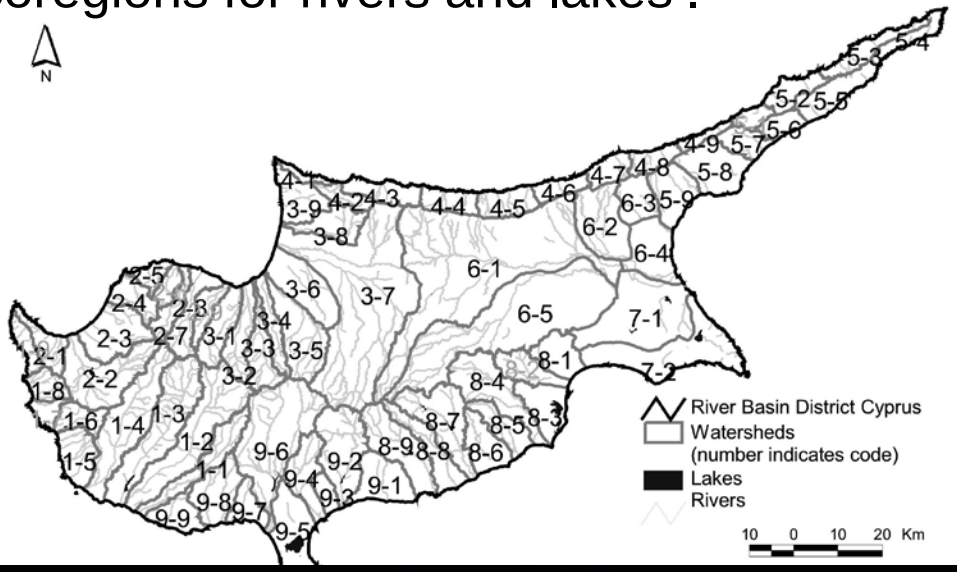



- The WFD has been transposed to National Legislation by the “Water Protection and Management Law” N.13(I)/2004 in 2004
- Competent Authority is the Minister of Agriculture, Natural Resources and Environment
  - The two main “agencies” responsible for implementing the provisions of the WFD is the Water Development Department and the Department of Environment. Other Departments are also involved.
- In 2010 the “Integrated Water Resources Management Law” N.79(I)/2010, was approved, assigning to the Water Development Department the overall management of water resources

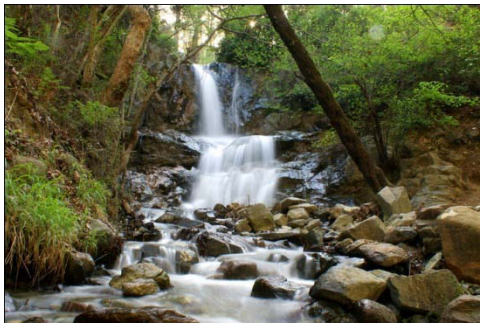
- **One River Basin District**
- 9 hydrological regions made up of 70 watersheds and 387 subwatersheds. (**47 watersheds** under which the government exercises effective control).
- Ecoregion 6: the Mediterranean Sea, on System A, ‘Ecoregions for transitional and coastal waters’

  Ecoregion 26: on System A, ‘Ecoregions for rivers and lakes’.



The WFD sets a framework for the protection of the environment which:

- Prevents further deterioration, protects and enhances the condition of water resources and the ecosystems that are directly dependent on water.
- Promotes the viable use of water based on the long-term protection of the available water resources.
- Aims for the enhancement of the protection and the improvement of the water environment by taking specific measures for the progressive reduction of the emissions, dumping and leakages of Priority Substances as well as the cessation or the gradual elimination of the emissions, dumping and leakages of Dangerous Priority Substances
- Ensures the gradual reduction of the contamination of groundwater and prevents its further contamination
- Contributes to the mitigation of the consequences of floods and drought



WFD - Cyprus implementation status at a glance

Articles 3	-Legal transposition -Assignment of a competent authority
Articles 5	- Identification of River Basin District (RBD) - Analysis of RBD in terms of pressures and human activities impact. - Financial analysis of water use
Article 6	- Creation of a Protected Areas register.
Article 2	- Intercalibration of the classification systems for the ecological status of water bodies.
Articles 8 and 15	-Establish operational monitoring networks. -Monitoring the Water Bodies
Article 14	- Involvement of stakeholders - Public participation
Article 11	- Programme of measures based on the monitoring and analysis of the characteristics of RBD.
Article 13	- Production and publishment of River Basin Management Plans
Article 9	- Protocol of information and Data Bank - Pricing policies to enhance sustainability of water resources

High	Good	Moderate	Poor	Bad

"Good Status" for all Water Bodies by 2015

How? River Basin Management Plan

Through: Programme of measures

Good	Failing to achieve good

River Basin Management Plan

- The determination of the actions required within the framework of the WFD is done at the level of a River Basin District (RBD).
- The RBMP focuses on the achievement of the protection, improvement and viable use of the water environment, i.e. surface water (lakes and rivers), groundwater, ecosystems dependent on water, river estuaries and coastal waters (up to 1 nautical mile from the coast).
- The RBMP will be reviewed every 6 years

- 3rd Public consultation period 25/5- 28/11 2010
- Draft River Basin Plan
    - Draft Programme of Measures
    - Draft Drought Management Plan
    - Draft Review of Water Strategy
    - Pricing Policies
- River Basin Management Plan presented on 1st of December
- Will be approved by the Cabinet of Ministers and sent to the European Union in the spring of 2011.
- By the 22nd of December 2012 all measures will be under implementation.

The River Basin Management Plan will:

Be a fundamental instrument of registry and documentation for information gathered in accordance with WFD including e.g.:

* environmental objectives for surface and groundwater,

* information regarding the quantity and quality of the waters,

*information regarding the main impact of human activities on the status of surface waters and groundwater bodies.

Co-ordinate the Programme of Measures with other relevant programmes implemented in Cyprus

Be used as the **main instrument of reference** of the Ministry of Agriculture, Natural Resources and Environment in the European Union

Programme of Measures

- **Basic measures** that must be implemented in accordance to community and/or national legislation

- **Supplementary measures**, when the basic measures are not sufficient to achieve environmental objectives.

Basic measures

- Combined approach for point and diffuse pollution sources
- “Polluter Pays” principle
- High quality of water intended for human consumption
- Audits on pumping and artificial recharge of groundwater

The implementation of measures is associated to a continuous procedure of assessment

Basic Measures

1. Measures required for the implementation of community legislation, for water protection
2. Measures required for the implementation of the principle of cost recovery for water use
3. Measures required for the implementation of Article 7 (quality of water intended for human consumption)
4. Measures for the control of the abstraction and impoundment of water
5. Measures for the disposal from point sources and other activities, affecting the water conditions
6. Measures taken for the Negative Impact on water condition
7. Assessment of cases of direct pollutants disposal permits
8. Measures taken for priority substances
9. Measures taken for prevention or reduction of the impacts of pollution accidents
10. Measures taken for aquatic systems that are not likely to meet the environmental objectives of WFD
11. Other basic measures

Measures required for the implementation of community legislation, for water protection

Ensure that all discharges into surface waters are controlled according to the combined approach as well as the establishment and/or implementation of:

(a) the emission controls based on best available techniques, or
(b) the relevant emission limit values, or
(c) in the case of diffuse impacts the controls including, as appropriate, best environmental practices set out in various European Directives (i.e IPPC, 91/271/EC, 86/278/EC etc)

Measures required for the implementation of community legislation, for water protection

- Directives 76/106/EC and 2006/7/EC on the Management of Bathing water quality

  - Investigation of the adverse effects storm water disposal through drainage system, has on bathing water.

  - Sustainable ways of prevention, restoration, compensation.

- Directive 86/278/EC on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture
  - Rationalization of sludge's treatment and disposal

Measures required for the implementation of EU legislation, for water protection

The contribution of SBLA

- Competent authority: Water Development Department
- In the initial stages of operation of the WWTP, small quantities of effluents ended up in the sea. No adverse effects i.e algae bloom have been observed the last 15 yrs of operation
- All Limassol's beaches are awarded with the Blue Flag

- Advanced sludge treatment and disposal system
  - Mesofilic anaerobic digestion (By-product: Biogas)
  - Digested and dewatered sludge meeting the threshold levels of European and national regulations
  - Production of guidelines for the public on the correct application methods of sludge
  - Reused mainly for agricultural purposes and soil conditioner
  - Permits for safe disposal are issued by the Department of Environment
  - Electricity generation from biogas

Measures required for the implementation of community legislation, for water protection

- Directive 91/271/EC on the Treatment of Urban Wastewater
  - Assessment of the technical and operational characteristics of the existing wastewater treatment plants. Identification of problems and ways of tackling them.
  - Issue of permits for waste disposal for all treatment plants
  - Emissions threshold

Measures required for the implementation of community legislation, for water protection

The contribution of SBLA

- SBLA's WWTP first operated in 1995 and was upgraded in 2008
- Disposal permit available for treated wastewater disposal
- Emission permit for biogas production
- Proposals for stricter threshold concentrations of specific parameters are being prepared

Measures required for the implementation of community legislation, for water protection

- Directive 2007/60/EC for the assessment and management of flood risks
  - Development and application of technologies/infrastructure, for the protection of riverine areas

Measures required for the implementation of community legislation, for water protection

The contribution of SBLA

- Long term planning since 1992, based on Master Plans, continuous updating
- SBLA is applying SUDs technologies
  - Retention ponds (1 operational, 2 under construction, 2 under study)
  - Use of permeable materials for pavements
  - Filter strips and swales
  - Use of storm water absorption pits
  - Close Co-operation with local Authorities-Building Permits
  - Storm water absorption pits in every new development
  - Conversion of 20.000 sewage absorption pits to storm water pits

Measures taken for the implementation of the principle of cost recovery for water use (Article 9)

- Implementation of good pricing policy

The contribution of SBLA

Full cost recovery

– The total cost of service for wastewater treatment is fully recovered, through imposed sewerage and service charges

Cost Category (€)	2008	2009	2010	2011	2012
Energy Cost	0,20	0,22	0,23	0,24	0,24
Total Operating Cost	0,80	0,82	0,85	0,88	0,87
Administrative Cost	0,45	0,51	0,51	0,50	0,47
Depreciation	0,74	0,71	0,64	1,10	1,58
Financing Cost	0,27	0,56	0,86	1,10	1,16
Total Cost	2,26	2,82	3,09	3,82	4,32

Measures taken for the disposal from point sources and other activities that affect the water conditions (Article 11 (3) (g))

- All ports/marinas should install wastewater receptors infrastructure
  - Competent authority: Environment Department

The contribution of SBLA

- Arrangements have been made so that all marinas under construction, will install reception facilities
- Similar facilities expecting to be installed in the 2 main ports of Cyprus

Identification of cases in which direct disposal of pollutants in aquifers, was permitted (Article 11(3)(j))

The contribution of SBLA

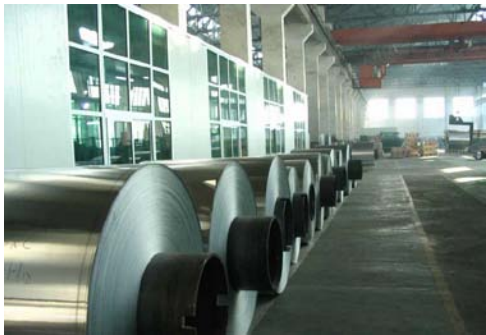
- In RBD level, the activity linked to the disposal of pollutants was the recharge of aquifers with recycled water
  - Competent authority: Water Development Department
  - Authority responsible for the quality of recycled water: SBLA (sand filters, chlorination)
    - Systematic sampling and analyses of parameters
    - Parameters concentration always bellow the acceptable levels

Other basic measures – Recharge of aquifer with tertiary treated wastewater

- Define under which conditions the pollutants referred on the Annex VIII of WFD are considered dangerous
- Reassessment of the permits
- Predict alternative use for the disposal of treated wastewater, in case some of the parameters of aquifers deteriorates

Other basic measures – Recharge of aquifer with tertiary treated wastewater
The contribution of SBLA

- In order to assist Ministry in the identification of dangerous substances, sampling and information will be provided.
- SBLA's permits expire by 2012. Permits will be provided in the light of new regulation.
- Alternative use of treated wastewater:
  - Golf courses
  - Diluting the brine of desalination plants
  - Industrial use



Other basic measures

- Address the sewerage and disposal of wastewater at district level.
- Improvement of the system for the collection, management, transport and disposal of sewage.

Other basic measures
The contribution of SBLA

- Sewerage at district level consists the long term goal of the Government. A study was conducted for the reorganization of the local districts, under which potable water, sewerage and storm water management will potentially expand to district level.
- Improvement of the system:
  - Upgrade in 2008 (40.000 m^3/d)
  - 2 new WWTP will be constructed (one in 2012)
  - Expansion of sewerage network. By 2012 the system capacity will be doubled, with about 900 km sewerage network and 50km of storm water drainage system

Supplementary Measures

1. Legislative
2. Administrative
3. Financial
4. Emissions control
5. Codes of Good Practices
6. Demand management
7. Effectiveness and Reuse
8. Assessment of Resources from preplanned projects
9. Desalination plants
10. Restoration of existing infrastructure
11. Artificial recharge of aquifers
12. Educational measures
13. Research, development, demonstration
14. Reuse of the treated wastewater of cities and municipalities
15. Sediments

Supplementary measures – Code of Good Agricultural Practice

- Provisions for the creation of a code for fertilisers and plant protection products

The contribution of SBLA

- Wastewater reuse for agricultural purposes
- Use of sludge as soil improver

Supplementary measures – Desalination Plants

- Coexistence of desalination plant and WWTP:
  - Dilution of brine with treated wastewater, to reduce the environmental impacts brine's disposal would have on marine environment
  - Reduction of brine's temperature before its disposal to the sea
  - Treatment of the by products collected from the cleaning of membranes

Contribution of SBLA

- The 3rd planned WWTP could potentially be located near the Desalination Plant of Episkopi-Limassol

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