



Water Management and Adaptation to Climate Change in Greece

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The Special Secretariat for Water (SSW)

The SSW, is responsible for:

- the development and implementation of all programs related to the protection and management of the water resources of Greece
- the coordination of all competent authorities dealing with the aquatic environment

The implementation of the Water Framework and the Marine Strategy Directives as well as of the related daughter Directives fall within the scope of the activities of the Secretariat



Actions for Climate Change Adaptation (1/2)

National Water Management Policy; adaptation to Climate Change through:

- ☑ the implementation of the WFD [2000/60/EC](#) and the elaboration of River Basin Management Plans (RBMP) for each River Basin District (<http://wfd.opengov.gr>)
- ☑ The implementation of the FD [2007/60/EC](#) and the elaboration of Flood Risk Management Plans for each River Basin District (<http://floods.opengov.gr>)



Actions for Climate Change Adaptation (2/2)

- ☑ The elaboration and the maintenance of a National Database for hydrological and meteorological data (www.hydroscope.gr).
- ☑ The update of the legal framework relating to wastewater management, the promotion of the reuse of treated wastewater and the adaptation of other regulations for water.



WFD 2000/60/EC - Adaptation to CC (1/9)

- Climate change is not explicitly included in the text of the Directive. **There are no established rules for dealing with the impact of Climate Change**
- However, under the Guidance Documents for the European policy on climate change :
 - (a) measures proposed in RBMP should be sustainable and effective in conditions of future Climate Change,
 - (b) the water monitoring programs should aim at identifying the trends in climate change.
 - (c) Directive 2000/60/ EC is a basic tool to mitigate floods and droughts



WFD 2000/60/EC - Adaptation to CC (2/9)

- The EU report (2012) on the **Blueprint for Water** emphasizes on:
 - (α) the quantitative water status (objectives and measures for efficient water use, water savings, reuse, etc.)
 - (β) the problem of Drought and Water Scarcity. It is expected that by 2030 this problem will affect 50% of the water resources in Europe



WFD 2000/60/EC - Adaptation to CC (3/9)

1st cycle of WFD implementation

Adopted River Basin Management Plans at the 1st cycle of WFD implementation include measures for:

- **Water Savings** with large-scale actions (water supply network rehabilitation, leakage detection and control) and interventions at the household level (water saving in homes and public buildings, reuse of treated wastewater)
- **exploitation of stormwater resources** in areas with water shortages (water retention and water storage measures)



WFD 2000/60/EC - Adaptation to CC (1/9)

1st cycle of WFD implementation

The SSW together with:

- other concerned Ministries (e.g. the Hellenic Ministry of Rural Development and Food)
- the Water Directorates of the Decentralised Administrations
- the technical services of Regional and Municipal Administrations

promotes the implementation of the adopted measures in RBMP and the provision of the required resources for the next programming period.



WFD 2000/60/EC - Adaptation to CC (5/9)

Water Scarcity and Droughts Management Plans

Greece is one of the first countries that developed supplementary to the RBMPs **Water Scarcity and Droughts Management Plans** for each River Basin District, consistent with the guidelines of the EE. They include:

1. Identification of relative **Drought Indexes** (SPI-Standardized Precipitation Index) and **Drought Analysis** (intensity, duration, frequency, spatial distribution)

i.e. for RBD GR11, based on rainfall data (1967-2010) of 11 gauge stations \Rightarrow monthly time series of rainfall for the RBD (values adapted to the average elevation of the basin) \Rightarrow SPI for time steps 3, 6, 12, 24 and 48 hours \Rightarrow record of drought episodes (duration, intensity, size) + station assessment as to their suitability for monitoring drought in the RBD.



WFD 2000/60/EC - Adaptation to CC (6/9)

Water Scarcity and Droughts Management Plans

2. Identification of **Water Scarcity Indexes** (WEI-Water Exploitation Index) and **Analysis of Water Scarcity**
i.e. for the RBD GR11, based on water supply and demand data for irrigation / potable water / industry / livestock / tourism + the required environmental flows \Rightarrow water scarcity risk assessment and identification of vulnerable areas

Pressures on Water Resources vary considerably from to region to region in each RBD (e.g. in the RBD GR11 between the western and eastern part)



WFD 2000/60/EC - Adaptation to CC (7/9)

Water Scarcity and Droughts Management Plans

3. Investigation of **existing relation between surface/ groundwater bodies and SPI.**

e.g. RBD GR11 ⇒ proposal of an early warning system based on index SPI-6 for surface runoff and on index SPI-24 for groundwater aquifer. **Selection of representative monitoring stations**

4. Evaluation of surface and groundwater water bodies **sensitivity to drought in the achievement of the environmental objectives of the WFD** ⇒ Sensitive surface and groundwater water bodies in each RBD



WFD 2000/60/EC - Adaptation to CC (8/9)

Water Scarcity and Droughts Management Plans

5. Measures for prevention and mitigation of the negative effects of Droughts and Water Scarcity:
- ✓ Continuous monitoring and recording of meteorological and hydrological parameters and evaluation of available Water Resources
 - ✓ Calculation and evaluation of indexes \Rightarrow prediction of future drought episodes: e.g. in the RBD GR06 it is proposed to use SPI3 and SPI6 indexes during the month of March to predict potential drought events in June and in September
 - ✓ Early warning and emergency response measures \Rightarrow drought management measures for each alert level (e.g. reduction in water use, prohibition of new abstractions etc.)



WFD 2000/60/EC - Adaptation to CC (9/9)

Water Scarcity and Droughts Management Plans

2nd cycle of WFD implementation:

- ✓ Consideration of Climate Change ⇒ projection of hydrological data
- ✓ International coordination with neighboring countries
- ✓ Adoption of a national methodology for Drought Management and Water scarcity Plans



National Database for hydrological and meteorological data (www.hydroscope.gr)

- The SSW is responsible for collecting hydrological and meteorological data at the national level \Rightarrow 400 stations throughout Greece, cooperation and exchange of information with all national institutions involved in the hydrological cycle (Ministry of Rural Development and Food, Public Power Corporation, National Meteorological Service, National Observatory of Athens)
- It has developed and maintain a National digital database with meteorological, hydrological and hydrogeological information (available data since 1940) equipped with specialized processing software
- A modern and dynamic information tool for the analysis of the hydrological cycle and the diagnosis of Climate Change in Greece.



Update of the institutional framework for the implementation of policies to tackle climate change

- **Reuse of treated wastewater:** providing guidance and support to competent authorities on the proper implementation of the Joint Ministerial Decision 145116/2011, as amended and in force (JMD 191002 / 05.09.2013).
- Promotion of **water conservation and water saving devices** in the household sector
- Promotion of **rainfall collection and exploitation** in areas with water shortages



Thank you for your attention

