



APAT

**Agenzia per la protezione dell'ambiente e per i servizi tecnici**

**Scheda proposta progettuale INTERREG III B – ARCHIMED**

**PRIORITY AXIS 3: INTEGRATED AND SUSTAINABLE MANAGEMENT OF CULTURAL AND NATURAL RESOURCES AND OF LANDSCAPES AND RISK MANAGEMENT**

**MEASURE: 3.1 Protection, planning and management of natural resources and landscapes**

**Project title: Integrated and sustainable water resources management in Mediterranean Countries with a pilot plant application.**

In the Mediterranean Countries water is limited and irregularly distributed in space and time. The remarkable demographic increase, the rising level of life style, the industrialization, the ongoing climatic change, are all together resulting in a continuous reduction in water availability often causing emergencies, nearly everywhere.

Communities must often prioritise water uses, either for agriculture, industry, tourism etc.

Water availability is a priority element for the development of socio-economic activities; the uncertainty and unsteadiness deriving from a progressive reduction of the aquifers will lead to a condition of underdevelopment and deterioration, thus affecting sustainable development.

In this project it is proposed the application of a sustainable and innovative methodology for water resources management in geographic areas selected in the participating Countries as areas where water scarcity strongly limits industry, agriculture, urban development.

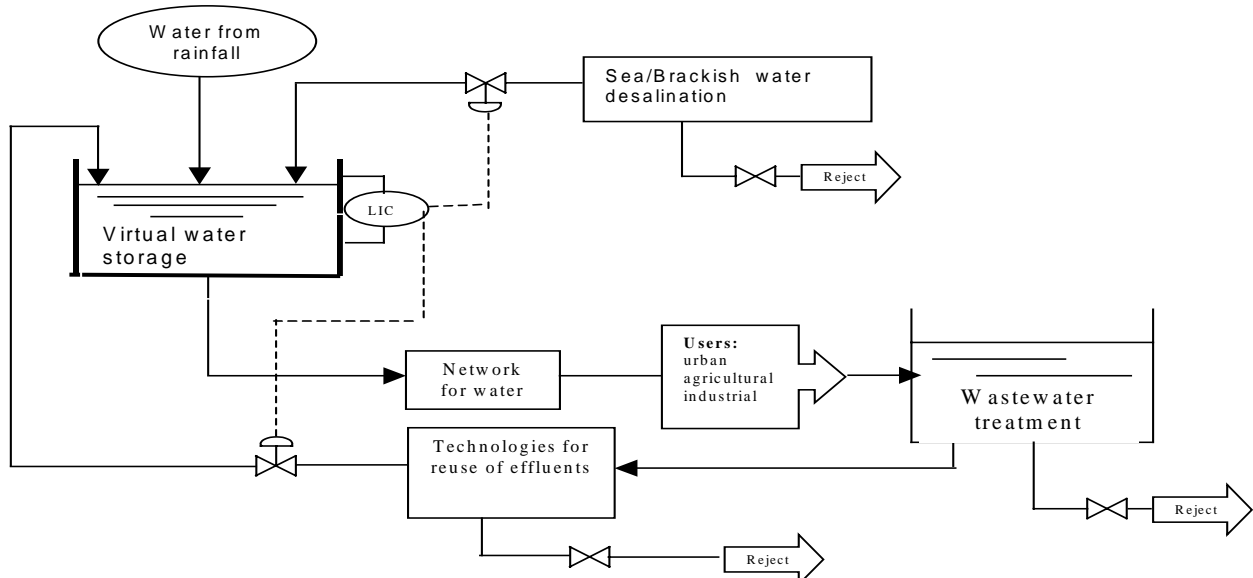
The methodology is developed in cooperation between APAT and the research group of the Department of Chemistry, Chemical Engineering and Materials of the University of L'Aquila, in the framework of master "Desalination, water reuse and water management".

Leader of the R&D group is Professor Diego Barba.

The main principle of the methodology is an effective integrated closed-cycle management to preserve and/or restore the water reserves, in terms of quantity and quality, along the years.

The steady state/restoration of reserves is guaranteed when water consumption and demand equal the amount of rainfall integrated by fresh water needs produced by waste water reuse and/or desalination of sea/brackish water.

The systematic reuse of waste waters, instead of the systematic discharging to the sea, is a basic variable in the closed-cycle approach. Use of this variable (reused water) allows to maintain and/or restore the water reserves assuring steady conditions both in case of an increased water demand or reduced rainfall.



The “reused water” is a cost parameter in the proposed water cycle management. This cost reflects the choice of reuse technology and the main part of this cost is linked to the energy consumption. Consequently, the proposed methodology allows also to assess the energy needs to achieve the required water quality for a specific use.

The energy associated to the reuse/desalination technologies constitutes the basis to define a public economic incentive. An “energy based” incentive, as a means to convince the decision makers and stakeholders of the need for a shift in water management from open to closed cycle and for its effective and efficient maintenance.

The use of such a methodology can play a crucial role to promote sustainable planning and management of water resources in Mediterranean Countries. This methodology takes into account the social, economic and environmental importance of water. The partners in this project, using the same methodological approach to water management, will constitute a Mediterranean network, so easier further international cooperations will be facilitated.

The integrated water resources management requires a political commitment, aware of the need for a sustainable management and of the available technologies and also able to make the necessary decisions. This can be one of the main difficulties in the wide implementation of the methodology: to convince the decision makers.

A further opportunity offered by the project is also to highlight the importance of this precious resource to young people: the future decision makers, who will be able to touch by their hand the possibility of a safeguard of the water.

#### Activities description

The methodology will be applied to some areas of the participating Countries typical for many coastal areas of the Mediterranean basin:

- a) areas with high grade of socio-economic development, characterized by steady or decreasing yearly rainfall, where the implementation of an industrial/agricultural/tourist development is promoted;
- b) areas with characteristics similar to the previous one, but where a strong industrial/agricultural/tourist development determines increasing disruption between water demand and renewable conventional supply; the overexploitation of the local water reserves is leading to widespread salt-water intrusion.

In these areas the preservation/restoration of quantity/quality of water reserves will be possible only if water management will be based on the closed-cycle with integration of natural water with technologies which will allow the reuse of waste water or desalination of sea/brackish water. The application of the methodology allows to define these technologies to obtain the required characteristics and the amount of water for the prevailing use in the selected areas.

Main workpackages for each implementation:

- WP1 Dataset collection.

The following data will be retrieved to assess specific features of the area:

- meteo-climatic, hydrogeological, socio-economic data,
- quality/quantity data of the water resources in the area,
- specifications of existing artificial basins;
- operating specifications of wastewater treatment/desalination plants.

- WP2: Data processing.  
Data collected will be processed to evaluate:
  - the water demand for different uses and natural water availability,
  - in cases of damaged underground water reserves, the time range necessary to restore the reserves without to draw out from it,to elaborate a total water balance and define both the characteristics and the amount of water that needs to be produced by technologies.
  
- WP3: Wastewater treatment/desalination plants defining.  
Will be defined the specifications of the wastewater treatment plant and desalination plant to produce the required characteristics and the amount of water for the prevailing use in the selected areas.
  
- WP4: Economic analysis and economic incentives defining.  
Will be formulated economic scenarios and estimated economic incentives based on the energy consumption associated to the reuse/desalination technology. An “actual energy consumption” will be connected to the specific technology by a comparative analysis between minimum and effective energy consumption. This method permits, also, to optimize the technology utilized to produce the necessary water.

#### Expected results

The application of the methodology proposed in this project allows:

- to achieve a sustainable planning and management of the water resources in the geographic areas in which the methodology is applied;
- to provide an integrated assessment of water demands, available resources and management options;
- to identify the suitable technologies to obtain the required characteristics and the amount of water for the prevailing use in the selected areas;
- to define the economic incentives as a means to convince the decision makers and stakeholders of the need for a shift in water management from open to closed cycle and for its effective and efficient maintenance.

Total budget : **3.000.000 Euro**

Partners: **Cyprus, Greece, Malta, Basilicata, Calabria, Sicily**

Contact persons:

**Patrizia Fiorletti**

tel. +39 6 50072136

e-mail: [fiorletti@apat.it](mailto:fiorletti@apat.it)

**Liliana Tomarchio**

tel. +39 6 50072873

e-mail: [tomarchio@apat.it](mailto:tomarchio@apat.it)

**APAT** - Agency for Environmental Protection and Technical Services

Department State of Environment and Environmental Metrology

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