

# The MEDAWARE Project: Development of Tools and Guidelines for the Promotion of the Sustainable Urban Wastewater Treatment and Reuse in the Agricultural Production in the Mediterranean Countries

## Introduction

The Mediterranean countries are characterized by a **severe water imbalance**, mainly in the summer months, especially those located in the North Africa and Middle East region. This imbalance in water demand versus supply is due mainly to the relatively and *uneven distribution of precipitation, high temperatures, increased demands for irrigation water and the impacts of tourism*. To alleviate water shortages serious consideration must be given to **wastewater reclamation and reuse**. MEDAWARE project funded by the Euro-Mediterranean partnership (2003-2007), seeks to develop a methodology for the safe wastewater reuse in the countries of this region. Following, the project's objectives and methodology are described.



### The consortium of the project consists of:

**Greece** (National Technical University of Athens), **Spain** (CARTIF Technology Center), **Cyprus** (Agriculture Research Institute), **Jordan** (Jordan University of Sciences and Technology), **Lebanon** (American University of Beirut), **Morocco** (Chouaib Doukkali University), **Palestinian Authority** (Ministry of Environmental Affairs), **Turkey** (Istanbul Technical University and Middle East Technical University), **Greece** (Prospect Systems).

## The problems that need solutions

The sustainable wastewater treatment and reuse is a continuous challenge. In the Med. countries, wastewater, at different level of treatment (raw, secondary or tertiary) is used alone or mixed with fresh water, mostly on forage and cereals but also sometimes on fruit trees and even vegetables, depending on national legislation and its enforcement. **Concern for human health and the environment** are the most important constraints in the reuse of wastewater. In several cases the *wastewater is not properly treated* due to the fact that the construction cost of efficient treatment systems is very high, especially for small and medium size communities. Of course many alternative solutions have been developed with the scientific and technological progress during the last years. However, the selection of the appropriate treatment technique that is tailored to the needs of each community means in several cases the involvement of qualified specialists. Moreover, in several cases the outflow of the wastewater treatment systems does not have a standard quality either because standard operating procedures are not followed, or because there is no qualified personnel able to overcome usual problems and to control/monitor the whole treatment procedure.

Concluding, the main problems that have to be dealt with are:

- The non-regulated use of treated water in agriculture
- The non-existing reuse criteria related to hygiene, public health and quality control
- The non-existing reuse criteria related to irrigation techniques, degree of wastewater treatment, and choice of areas and types of crops to be irrigated
- The lack of efficient control and monitoring of urban wastewater treatment plants
- The lack of trained personnel both in the competent authorities and the treatment plants
- The low level of awareness of the farmers and the public at large

## The strategies that may lead to solutions – The MEDAWARE Methodology

According to the opinion of the authors, the overall strategy that has to be followed in order to deal with the problems described above consist of four main sub-strategies, which also form the basis of the project:

**Sustainable and Controlled Treatment Strategy:** Technical support to the authorities for the implementation of the appropriate technologies for treatment, (including evaluation of existing situation in respect to wastewater treatment, development of specifications for innovative urban wastewater treatment technologies and systems tailored to local needs) and for the control and monitoring of the wastewater treatment plants (including guidelines, methodologies and tools)

**Sustainable Wastewater Reuse Strategy:** Technical support to the authorities for the sustainable and safe utilization of treated wastewater in the agricultural production, development of guidelines for the safe reuse (for operators and farmers), etc.

**Best Practices and Effective Policies Promotion Strategy:** Acquisition of knowledge and experience of scientifically sound and effective practices on urban wastewater treatment and reuse implemented in countries facing similar problems and having similar characteristics, through compilation of useful material in a report and also through selected site visits. In addition effective socio-economic and legislative instruments applied elsewhere will be examined and success stories will be promoted.

**Education/Awareness Strategy:** Training/Educating support of all actors involved in the wastewater treatment and reuse cycle (including training workshops, a discussion forum, conference, a guiding support software tool, brochures, leaflets, etc)

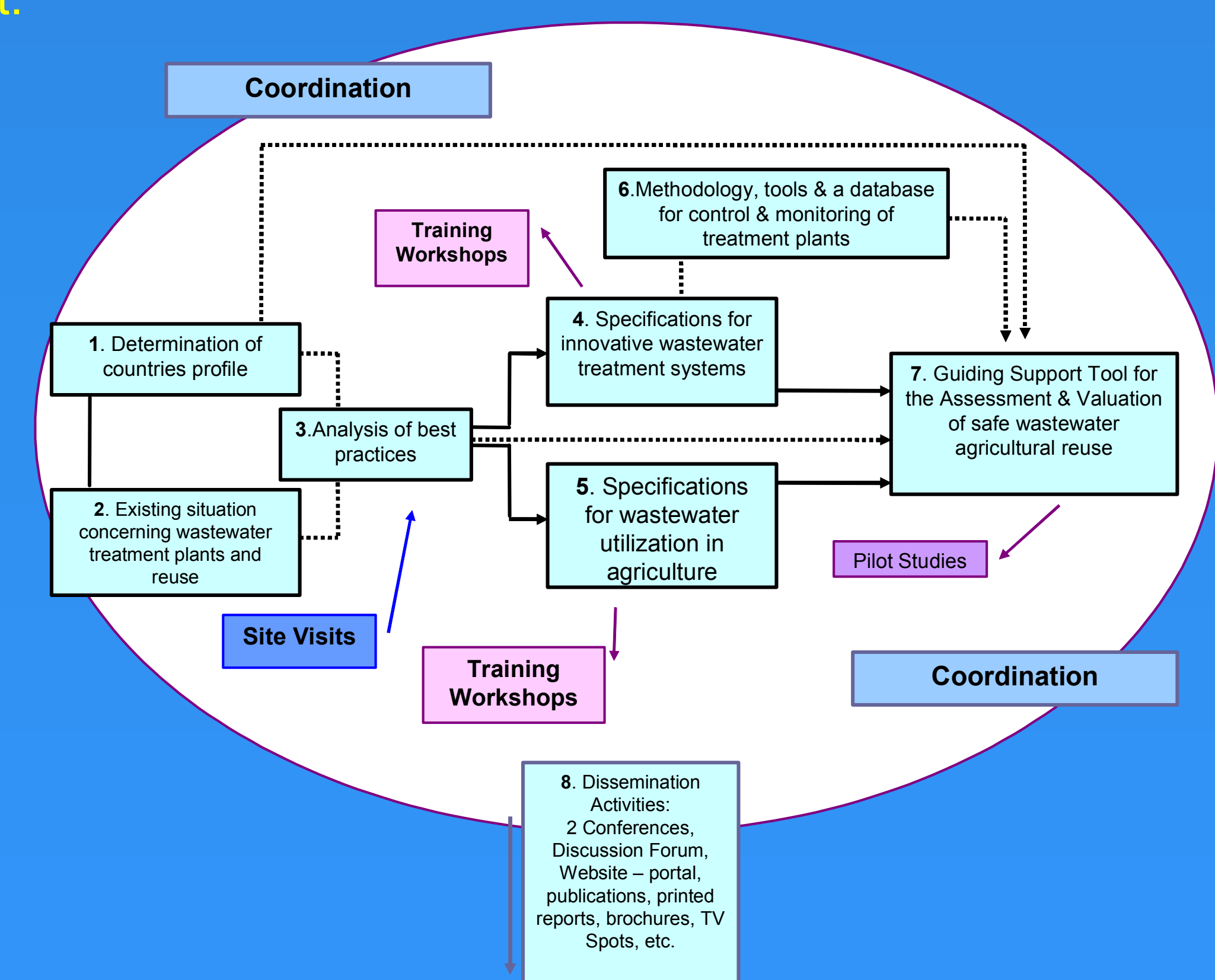


Fig 1: The Methodology of MEDAWARE

## Conclusions

Although wastewater has been used already for decades the need for adaptations of the guidelines to the specific area of concern is high and still a challenge to all involved disciplines. The adaptation to the local conditions should increase the benefits and decrease the health risk. This will result in a higher public acceptance which is crucial for the implementation of reuse projects. The highest priority in the wastewater management sector in every country has to be given to setting up an effective wastewater management system which will include: i) Maximization of collection of wastewater, ii) Upgrading the existing wastewater collection systems, iii) Rehabilitation or upgrading of existing wastewater treatment plants or the construction of new treatment plants, iv) Establishment of proper standards for influent and effluent wastewater quality, v) Education of the farmers.