

SEA EUTROPHICATION

Ευτροφισμός



BLOOMING OF ALGAE

G. I. Bernard



MEDAWARE

MAIN OBJECTIVE

DEVELOPMENT
OF TOOLS AND GUIDELINES
FOR THE PROMOTION OF THE SUSTAINABLE
URBAN WASTEWATER TREATMENT
AND REUSE
IN THE AGRICULTURAL PRODUCTION
IN THE MEDITERRANEAN COUNTRIES

MEDAWARE PROJECT

Co-ordinator contact details & Financial Information

National Technical University of Athens

School of Chemical Engineering

Unit of Environmental Science and
Technology

9, Heron Politechniou Str.

15773 Athens

Contact Persons:

Prof. Maria Loizidou

mloiz@orfeas.chemeng.ntua.gr

Tel: + 30 210 7723106

Fax: + 30 210 7723285

Dr. Despo Fatta

dfatta@ucy.ac.cy

Mr. Costas Moustakas

konmoust@central.ntua.gr

- Total Cost: 2.345.569 Euros
- Commission Funding:
1.876.455 Euros , 80% of the
total project cost

Duration of the Project: 42 Months
Starting Date: 1/5/2003

Number of Technical Tasks: 7

MEDAWARE PROJECT

List of Participants

- Greece

- National Technical University of Athens, Unit of Environmental Science and Technology
 - Project Coordinator
- Prospect Systems, Civil Non Profit Corporation

- Spain

- Cartif, Centro de Automatizacion, Robotica y Tecnologias de la Informacion y de la Fabricacion

MEDAWARE PROJECT

List of Participants

- **Cyprus**

- Agriculture Research Institute

- **Jordan**

- Jordan University of Sciences and Technology, Dept. of Applied Biological Sciences

- **Lebanon**

- American University of Beirut, Faculty of Engineering

- **Morocco**

- Chouaib Doukkali University, Laboratory of Water and Environment

- **Palestinian Authority**

- Ministry of Environmental Affairs

- **Turkey**

- Istanbul Technical University, Dept. of Environmental Engineering

MEDAWARE PROJECT

Specific Goals

↪ **To facilitate the change of the current situation in the Med countries in respect to wastewater treatment and reuse in the agricultural production and**

↪ **The enhancement of the professional capacity building in the wastewater treatment and reuse sector**



Description of Activities

- Duration: 42 months
- 7 Tasks
- Plus one task for Coordination/management

MEDAWARE PROJECT

Specific Objectives & Technical Work

Tasks 1,2

Identification of the existing situation in the participating countries regarding:

- **Water and wastewater management policy**
- **Operation of the urban wastewater plants and the effluent disposal methods/practices applied**
- **Potential negative impacts** caused by the non sustainable operation of the wastewater treatment and the disposal methods applied with emphasis given to wastewater reuse in agriculture

Key Findings - Task 1

Determination of the Countries Profile

- **Total area of Cyprus:** 9,251 km²
(18% is covered by forests)
- **Total population:** 689.565 (Census 2001)
- **Urban Population:** 70%,
Rural Population: 30%
- **Density of the population:** 114 people/km²
- **Contribution of agriculture to GDP:** 3,7% (2001)
- **Labour force employed in Agriculture:** 7,1% (2001)

Present sources and sinks of water (Annual quantities in MCM)

Source Econ. Sector	Surface Water	Groundwater	Recycled Water	Desalinated water	Total	%
Irrigation	82	97	4		183	68
Domestic	17	22		30	69	26
Industry		4			4	1
Environmental	6	7	1		14	5
TOTAL	105	130	5	30	270	100
%	39	48	2	11	100	

Irrigation: Includes Animal Husbandry 8 MCM
 Government Schemes 100 MCM
 Non-Govern. Schemes 75 MCM

Domestic Residents (Households) 54 MCM
Tourism 15 MCM

Environmental: Landscape irrig., i.e., Hotel & house gardens, playgrounds, parks, road isles
Ecological areas i.e., Lakes, marshes, flora & fauna of river beds

Key Findings - Task 1

Determination of the Countries Profile

Agricultural Land, 2001

LAND USE	Irrigable Area (*1000 hectares)	Total Area (*1000 hectares)
CROP AREA	35.2	133.6
<i><u>Temporary crops</u></i>	<i>19.2</i>	<i>92.3</i>
Cereals	4	56
Legumes	0.5	0.8
Industrial Crops	0.5	0.5
Fodder crops	4.5	25.3
Vegetables and melons	9.7	9.7
<i><u>Permanent Crops</u></i>	<i>16</i>	<i>41.3</i>
Vines	2.5	18.2
Citrus	5.4	5.4
Fresh fruit	3.6	3.6
Nuts	1.2	3.9
Olives and Carobs	3.3	10.2
FALLOW LAND	1.5	9.5
GRAZING LAND	0	1
UNCULTIVATED LAND	1.5	47.8
SCRUB AND DESERTED LAND	0	6.6
TOTAL	38.2	198.5

Key Findings - Task 2

Evaluation of the Existing situation related with WWTP and Effluent Disposal Practice

- The total number of the main WWTPs currently in operation is 25 (big cities, some municipalities, some rural communities)
- There are also some smaller WWTPs, (around 175) located in hotels, military bases and hospitals
- Centralized sewerage networks and WWTPs cover part of the broader urban areas, serving 45% of the total urban population.
- Centralized sewerage networks now serve 12% of the rural population.
- In the remaining urban and rural areas the traditional methods for sewage disposal are absorption pits and septic tanks.

Key Findings - Task 2

Evaluation of the Existing situation related with WWTP and Effluent Disposal Practice

- Recycled domestic water is presently used:
 - for irrigation of fodder crops, football fields, parks, hotel gardens, etc. (1.5 MCM/yr)
 - for irrigation of permanent crops (3.5 MCM/yr)
- It is estimated that by the year 2012 an amount of about 30 MCM/yr of treated sewage effluent will be available for agriculture and landscape irrigation.

Key Findings - Task 2

Evaluation of the Existing situation related with WWTP and Effluent Disposal Practice

Problems concerning reuse:

- ❑ The demand for water exists only during the summer, thus the Sewerage Boards face problems with the storage and or disposal of water during winter.
- ❑ There is a problem of disposal of treated water at the smaller WWTPs of villages. (The farmers in those areas refuse to irrigate their fields with recycled water, due mainly to prejudice).

MEDAWARE PROJECT

Specific Objectives

Best Practices and Success Stories

development of specifications

development of the appropriate tools and a database for the effective control and monitoring of the operation of the wastewater treatment plants

reuse safety for the agricultural