

**Sustainable Water  
Integrated Management (SWIM) -  
Support Mechanism**



Project funded by  
the European Union

*Water is too precious to waste*

**TWO DAYS TRAINING ON THE OPERATION AND MANAGEMENT OF WWTPS**

**9-10 September, Murcia**

**Introduction**

***Presented by: Dr. David Martinez Vicente***

## Contents

1. Wastewater reuse in the Mediterranean region: reality and perspectives.
2. Wastewater reclamation and reuse as part of an integrated water management system. Integration in water planning processes.
3. Managing reclaimed water issues: understanding environmental factors and diffusing public perception.
4. Case studies on reclaimed water use in agriculture. Worldwide water reuse projects.
5. Future trends on water reuse research.

# Module I : Introduction

## 1. Wastewater reuse in the Mediterranean region: reality and perspectives.

### Foreword

#### Mediterranean Cross-Continental Process

#### PRIORITY 2: Non-conventional Water Resources



TARGET MED 2.1: Fostering the inclusion of non-conventional water resources in the water planning in the Mediterranean: towards making the term “non-conventional” obsolete

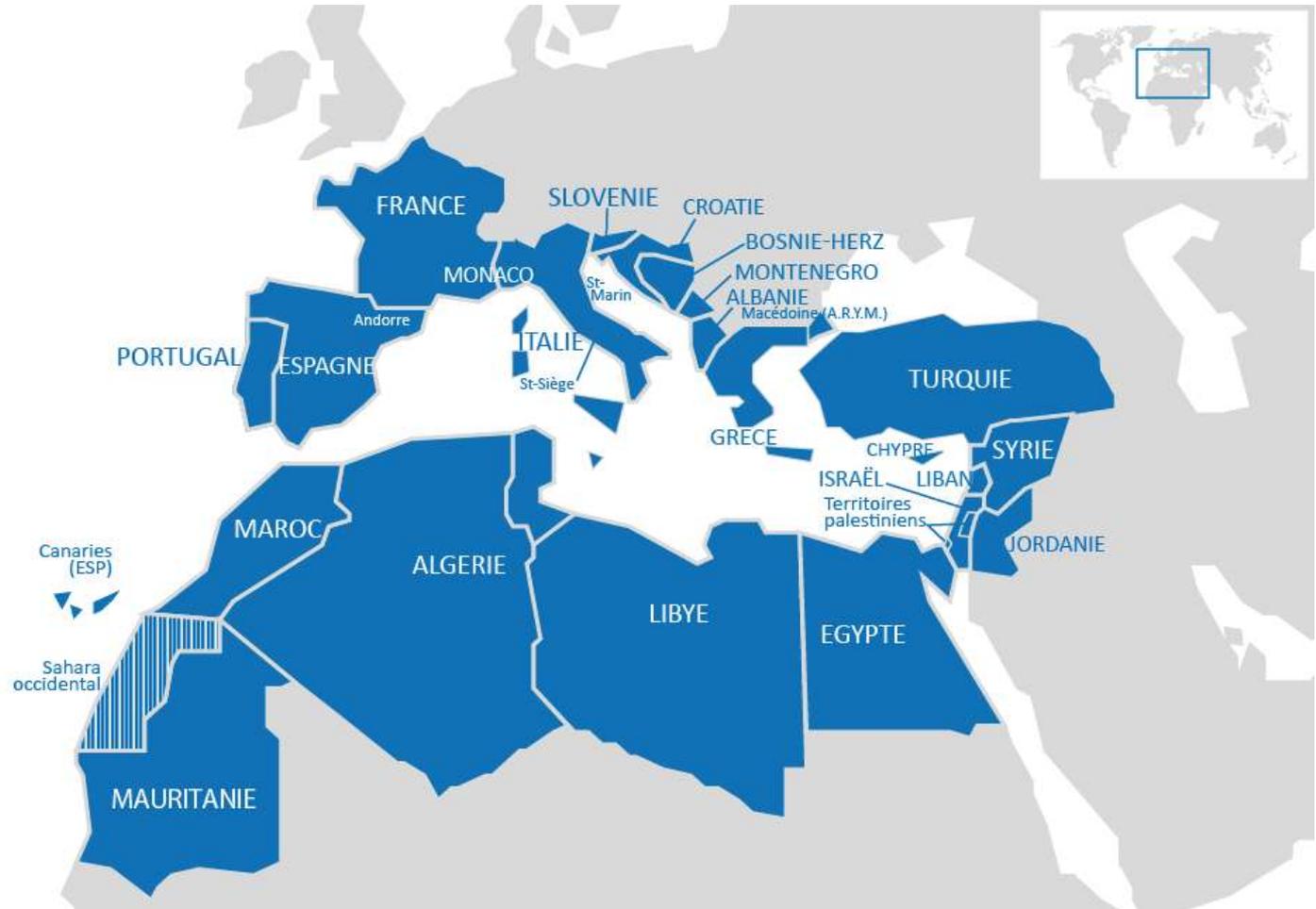
TARGET MED 2.2: Non-conventional water resources in the Mediterranean: the necessity of a Common Regulatory Framework Approach



# Module I : Introduction

## 1. Wastewater reuse in the Mediterranean region: reality and perspectives.

### Foreword



# Module I : Introduction

## 1. Wastewater reuse in the Mediterranean region: reality and perspectives.

### Background and rationale (I of II):

- NCWR are focused on desalination and reuse of regenerated wastewater
- Water scarcity is a common and severe problem in many areas of the arid and semiarid Mediterranean
- Population growth, and food production needs, increases water demand
- Natural renewable resources are usually exhausted and/or degraded

# Module I : Introduction

## 1. Wastewater reuse in the Mediterranean region: reality and perspectives.

### Background and rationale (II of II):

- Non-renewable resources like groundwater overexploitation are unsustainable. Interbasin transfers are often unfeasible due to the inexistence of adequate intake rivers
- Demand management measures and new non-conventional water resources could be the only sustainable possibility for reduce actual and future imbalance between demand and supply
- Under this perspective, NCWR becomes of strategic importance throughout the Mediterranean, which enforces and underlines the need for short-term shared perspectives and commitments between regions and countries

# Module I : Introduction

## 1. Wastewater reuse in the Mediterranean region: reality and perspectives.

### Wastewater reuse in the Mediterranean region:

- Wide casuistry but irregularly planned and/or implemented
- Uses: mainly irrigation, but growing interest in industry, urban services...
- High potential for development, but planning process is needed in most countries
- Financial cost are much lower than desalination. Competitive resource, except when very high quality standards are required
- Untreated water uses must be prevented and avoided
- Needs strong reliability and sanitary guarantees. Enforce users acceptance
- Is not really a new resource except for coastal areas
- Substantial environmental improvement (basins and Mediterranean sea)

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## 1. Wastewater reuse in the Mediterranean region: reality and perspectives.

### Regulatory framework in European countries



# Module I : Introduction

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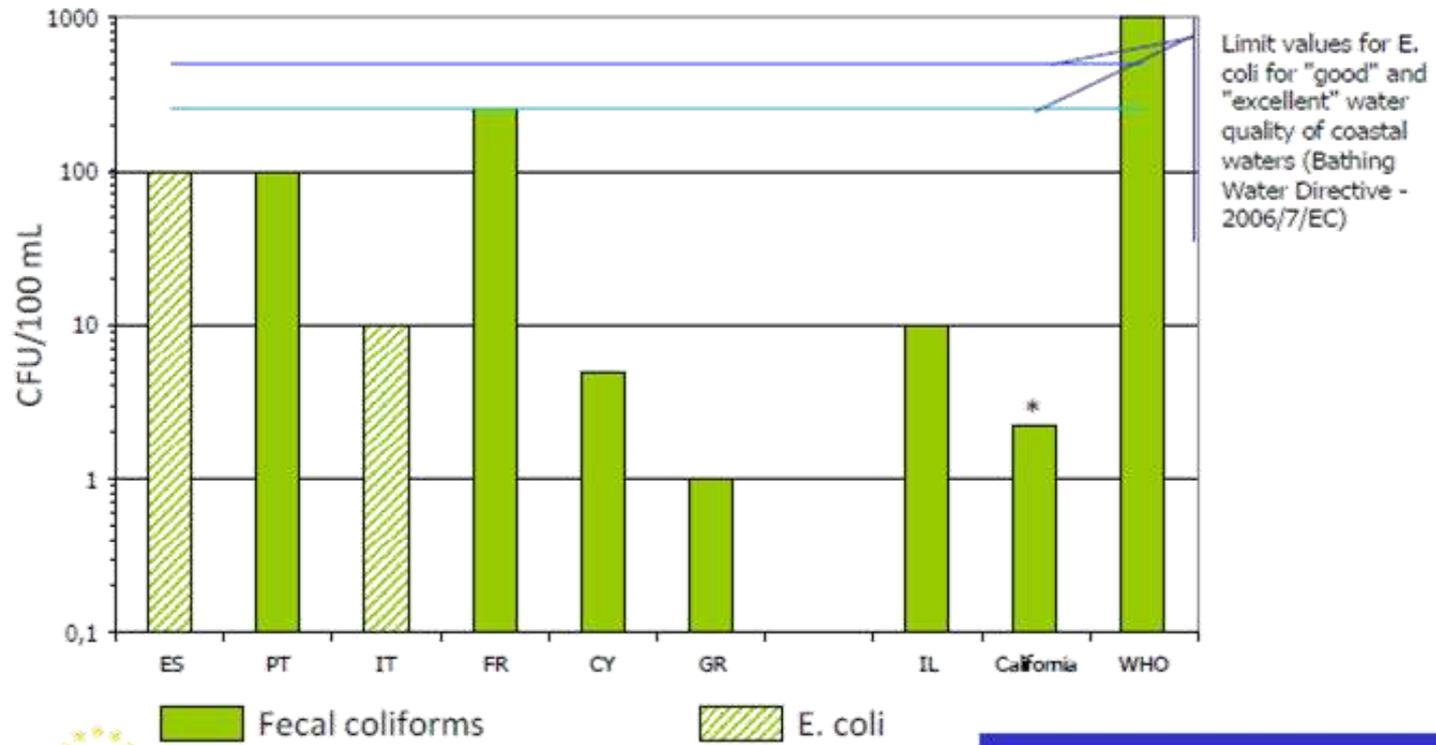
### Regulated uses and parameters

Reuse application	UK	NL	BE	FR	ES	PT	IT	GR	CY
Agricultural irrigation (AGR)				█	█	█	█	█	█
Industrial uses (IND)				█	█	█	█	█	█
Urban uses (URB)				█	█	█	█	█	█
Irrigation of public greens				█	█	█	█	█	█
Domestic uses (performed by private persons in their private homes) (DOM)				█	█	█	█	█	█
Recreational uses (REC)				█	█	█	█	█	█
golf course irrigation				█	█	█	█	█	█
Environmental / ecological uses (ECO)				█	█	█	█	█	█
Aquifer / Groundwater recharge (AQR) /GWR)				█	█	█	█	█	█
Direct potable reuse					█			█	
Product quality				█	█	█	█	█	█
Limit values for water quality for different uses				█	█	█	█	█	█
Process									
Removal rates / treatment efficienncy								█	█
Monitoring frequencies				█	█	█			█
Code of good practice				█	█	█			█

# Module I : Introduction

## 1. Wastewater reuse in the Mediterranean region: reality and perspectives.

### Unrestricted irrigation limit values



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### Status of water reuse in Mediterranean countries

Country	Wastewater reuse	
	2002 (1999-2005) MCM/year	Amounts planned to reach during next decade. MCM/year
Malta	4	9
Israel	280	380
Cyprus	25	30
Italy	45	250
Spain	300	1200
Turkey	50	no data found
Albania	negligible	no plans set
France	6-7	no plans set
Greece	> 10	> 15
Portugal	Not clear	> 20
Total	> 700	approx. 2000

# Module I : Introduction

## 1. Wastewater reuse in the Mediterranean region: reality and perspectives.

### Treated wastewater reuse in Mediterranean countries

Malta	No legislation, high water scarcity, reuse in agriculture for over 25 years
Israel	75% of WW is reused in agriculture, sewerage system collects 92% of WW
Cyprus	WW is considered part of the water resources. Government distributes directly different sources of water to farmers
Italy	Reuse standards requiring determination of 54 parameters (11 with same values than potable water)
Spain	Royal Decree 1620/2007. Increasing reuse capacity during last years: case of Murcia
Turkey	No official reuse policy. Some cases of reuse in agriculture, parks and gardens. Relevant indirect reuse from rivers
Albania	No WWT, so no planned reuse activity
France	Only located water scarcity. Legislation from 1991, discussed but not modified. Reuse by application to soils for over 100 years
Greece	Several proposals for regulation, but still no legislation. Reuse in agriculture and landscaping
Portugal	Nowadays trying to accomplish EU Directive 91/271 of WWT. Recent regulations for reuse

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### Treated wastewater reuse in Mediterranean countries

Algeria	2011: 128 WWTP, 600 Mm <sup>3</sup> /y 2014 horizon: 239 WWTP, 1200 Mm <sup>3</sup> /y for irrigation of 100,000 ha Legal framework: Executive Decree of 20 May 2007
Croatia	No reuse activity
Egypt	Severe problem of sewerage network coverage. Indirect «reuse» through rivers without previous treatment. WW produced in 1998: 3.43 billion m <sup>3</sup> /y → Horizon 2017: 4.93 billion m <sup>3</sup> /y Major cities: up to 50% of WW collected and treated – Rural areas: <3%
Jordan	Reuse 85% of TWW
Lebanon	Limited treatment, direct untreated reuse to soils of by rivers
Morocco	Increasing treatment capacity and reuse. Existence of desalination and WWT plans
Syria	WWTPs in major cities. Reuse of WW not treated for non edible crops
Tunisia	WWT is a common activity. 20-30% of effluents is reused in agriculture and golf courses. Comprehensive legal framework: 1975 Water Code, subsequent Decrees and Orders. Rate of connection in localities managed by ONAS: 88,7% (106 WWTP, development of tertiary treatments in 48)

# Module I : Introduction

2. Wastewater reclamation and reuse as part of an integrated water management system. Integration in water planning processes.

## Need for NCWR Planning:

- To provide a global rationale for the process
- To avoid project failures and misinvestments

## Water Plans main requirements:

- Common concepts and wording. Rules and standards to be applied
- A legal regulatory framework. Common basis but adapted to local conditions

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## Water Plans must include:

- Previous global design at the regional scale. Analysis of demand units, cities and industrial aggregation. Wastewater system network optimization (transport, treatment and return). Scale effects (critical for cost reduction).
- Technological issues: good projects, well designed installations, updated technology, efficiency, optimization...
- Financial issues: cost and full/partial recovery structure, tariffs, who pays, amounts to pay, regulation of payments, ...
- Institutional issues: legal framework, management organization for operating and maintaining the system, ...
- Political commitment to do that. Global perspective avoiding local effects
- Explicit links with the global water resources planning of the basin, region or country.

# Module I : Introduction

2. Wastewater reclamation and reuse as part of an integrated water management system. Integration in water planning processes.

## General steps to accomplish (I of II):

- Improve the knowledge of the actual and real state of NCWR in the Mediterranean region.
  - Establishment of permanent working groups, in order to develop specific reports on NCWR and a common Mediterranean Water Regulatory Framework, at national level, or preferably coordinated at a Mediterranean level.
  - Dissemination of the gathered knowledge, so as to foster the stakeholders awareness and commitment at all levels, by means of specific Conferences, capacity building activities, or other dissemination strategies.

# Module I : Introduction

2. Wastewater reclamation and reuse as part of an integrated water management system. Integration in water planning processes.

## General steps to accomplish (II of II):

- Ensure the widest possible participation of countries committed
  - Encourage the development of detailed studies in each country as preparatory activities for the National Water Plans (NWP).
  - Develop, approve and implement the NWP of each country, by means of transparent and participatory process, with the widest possible stakeholders participation.

مع خالص شكري  
وامتناني

Thank you  
for your attention

Merci pour  
votre attention



*For additional information please contact:*

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