Plan Bleu pour l'environnement et le développement en Méditerranée

Treated wastewater reuse strategies in the Mediterranean

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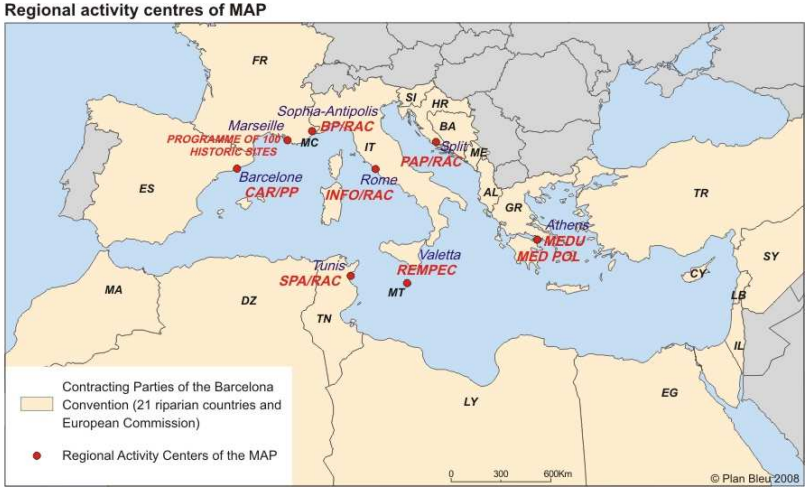
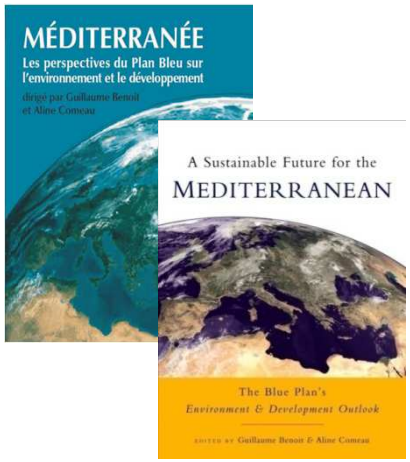
What is the Plan Bleu?

- **A Regional activity centre** attached to the Mediterranean Action Plan (MAP – 1976), first-ever UNEP Regional Seas Programme
- Created 30 years ago as a **systemic and prospective analysis centre in the Mediterranean**

Regional activity centres of MAP





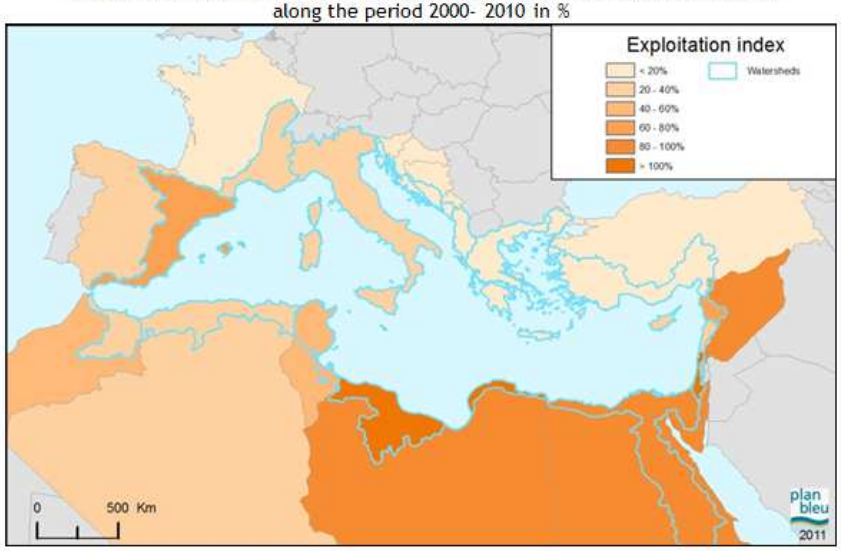
Plan Bleu's mandate:

- Producing information and knowledge in order to alert decision makers and stakeholders to the environmental challenges in the Mediterranean
- Drawing up scenarios for the future to assist in the decision making process

→ Political translation in the Mediterranean Strategy for Sustainable Development

Mediterranean context: Increasing pressures on water resources

Exploitation Index of renewable natural resources(countries and watersheds) along the period 2000- 2010 in %

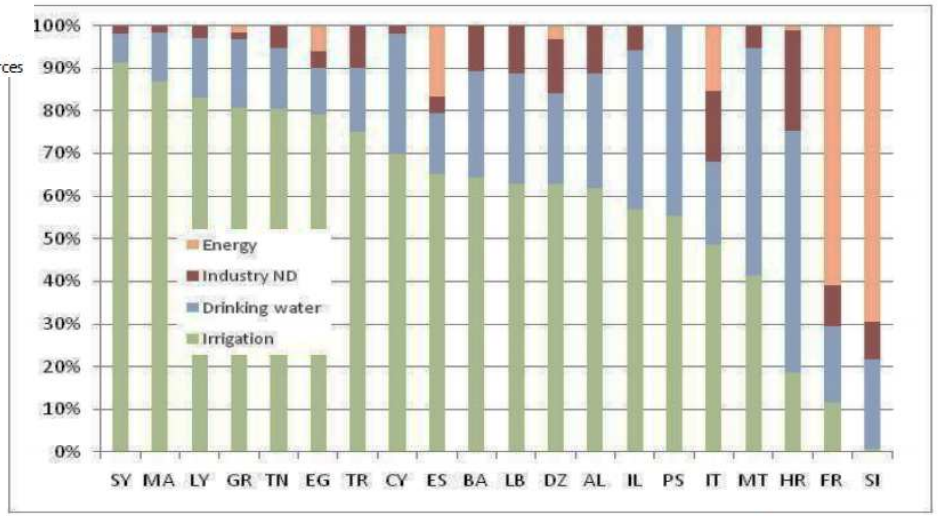


Source : Plan Bleu from national sources

Over-exploitation of renewable water

(Egypt, Israel, Jordan, Libya, Malta, Syria, Palestinian territories)

Water demand by sector (period 2005-2010)



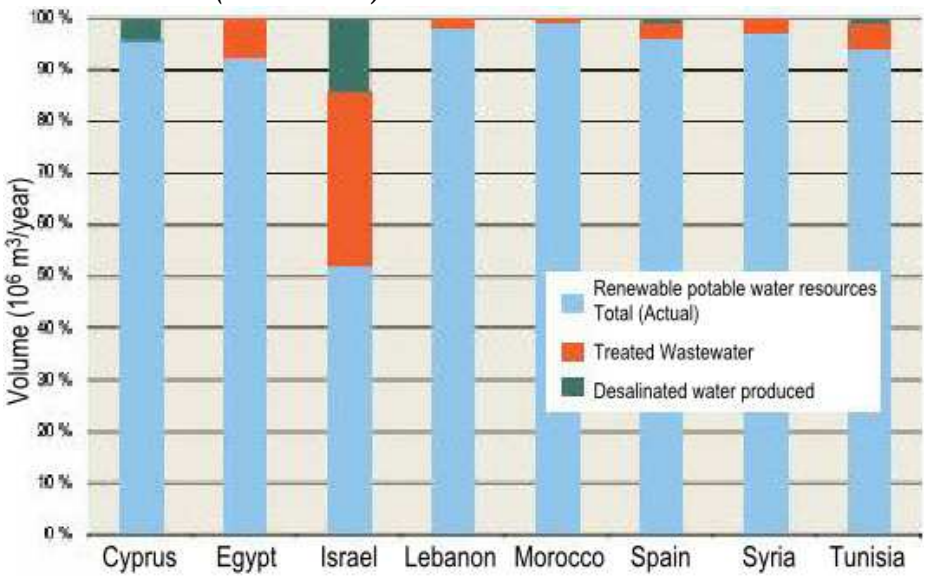
Source: Plan Bleu from national so

Agriculture higher water consumer in the Mediterranean

64% of Total water demand

Treated wastewater reuse in the Mediterranean

Relative share of conventional and non conventional water resources (2008-2010)



Source : Plan Bleu 2012

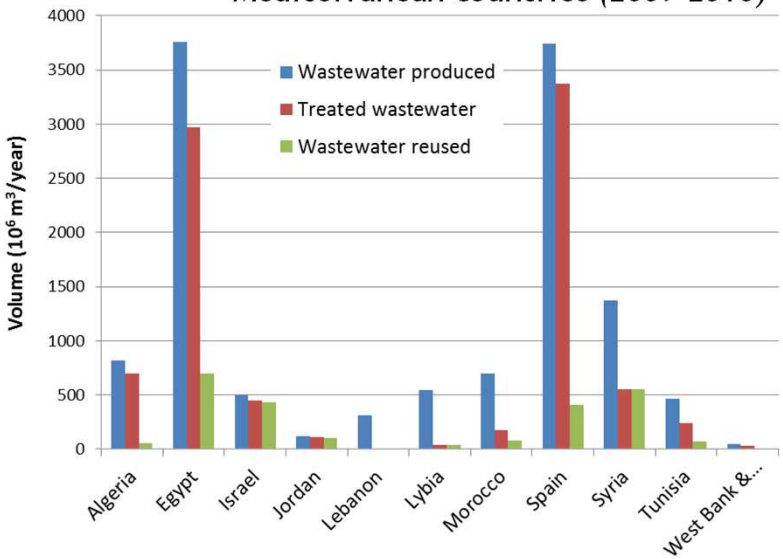
- **Proportion of TWW low / volume of potential reuse**
- **65% of conventional water resources used for agriculture irrigation in Medit.**
- **>80% in SEMCs**

➢ **Israel: among the Mediterranean leaders in TWWR**

2003, TWWR ↔ 14% water total demand

(20% in 2012; 24% in 2050)

Wastewater Treatment and Reuse in Mediterranean countries (2009-2010)



Source : GCC water statistics book, 2010, FAO-Aquastat 2009

TWWR applications and examples in the Mediterranean

Irrigation	Irrigation of food and non-food crops
	Landscape irrigation: parks, golf courses, residential areas, etc.
	Forest irrigation
	Land treatment
	Ex.: Crops and/or forest irrigation (Spain, France, Israel, Italy, Jordan)
	Ex.: Landscape irrigation of golf courses, green or urban areas (Hammamet, Tunisia)
Preservation of the Environment	Aquifer recharge
	Augmentation of surface water
	Fight against salt intrusion
	Recreational and environmental uses (lakes, etc.)
Industrial Uses	Recycling (cooling water, process water, etc.)
	Construction
	Ex.: Industrial use (Morocco, mining site of the Office Chérifien des Phosphates) (see Box 2)
Urban Uses excluding irrigation (separate distribution system)	Toilet flushing (on-site reuse)
	Cooling water for air conditioning
	Firefighting
	Ornamental use
	Street and road maintenance
	Car washing
	Ex.: Greywater recycling (Cyprus,
Drinking Water	Indirect reuse through augmentation of surface water
	Direct reuse (combined with conventional drinking water)
Other Uses	Firefighting, artificial snow, etc.

Drivers, Context and Strategic Objectives of TWWR projects

WWTP Prat del Llobregat (Cataluña) (Source: © Soliclima 2005-2009)

- **Drivers** → major structural changes

  (e.g. increased water scarcity, stronger urban development, expansion of irrigated agriculture)

- **Context** → specific to each country or local situation

  (political, economic, regulatory, health conditions, type of agriculture, available volume of water resources, sanitation coverage)

- **Objectives** → identified by policymakers, professional representatives, users, etc.

  (improving public health, conservation of drinking water resources, environmental protection, economic development of agriculture and tourism)

Example of Tunisia

- **Increasing water pressure**
  → 1980s: Program for wastewater treatment and reuse for irrigation (Medjerba Basin), and facilities installed in 11 major Tunisian cities
  → Creation of the National Sanitation Utility (ONAS)

- Irrigation with untreated wastewater forbidden in 1975, and TWWR standards formulated in 1989

Nebeur Dam in Tunisia (Source: Econostrum)

- **Programs to mobilize conventional resources** → construction of 20 dams, 220 mountain reservoirs and lakes, 50,000 wells and 20,000 bore wells
  and modernization of irrigation practices (efficient sprinklers systems)

- **1980-90s, overextraction of groundwater and deteriorated quality of coastal aquifers**
  → implementation of pilot sites for aquifer recharge by TWWR (ex. Nabeul region in 1985 & 2007)
  → development of sanitation and TWWR programs

- **Development of tourism** → consequences in terms of water quality standards and new recreational areas → development of TWWR use in golf courses and green areas. …

Obstacles and Success Factors of TWWR strategies

Obstacles related to:

- **Complexity of TWWR** *(cross-sector issues);*
- **Institutional and organizational context** *(no common authority, lack of coordination, lack of TWWR strategy)*
- **Legislative and regulatory framework** *(inexistent, not adapted to local contexts)*;
- **Competition between TWW and conventional water**
- **Difficulty to combine supply and demand planning over time and space;**
- **Inadequate storage capacity and sanitation capacity;**
- **Risks of soil salinization and water pollution;**
- **Inadequate tariff policy and limited financial capacity;**
- **Lack of a « project methodology », of training and of communication;**
- **Negative perception and unacceptability;**
- **Inadequate monitoring, controls and evaluation;**

Obstacles and Success Factors of TWWR strategies

Success factors include:

- **Operational institutions working together in a coordinated approach on TWWR;**
- **Appropriate and progressive regulations that take into account the constraints of irrigation users (balancing health and food production/soil management concerns);**
- **An integrated water resources management (IWRM) policy, a health and environmental policy;**
- **Adequate and efficient treatment systems;**
- **Public acceptance;**
- **Economic and financial viability of projects.**

5 Key recommendations

1. **Adopting a holistic, multidisciplinary and bottom-up approach**
2. **Following an adapted, phased « project approach » considering the irrigation system (water-soil-plant-people) as an integral part of the wastewater treatment and reuse process**
3. **Adopting measures to reduce and control health and environmental risks**
4. **Evaluating all externalities through private and social cost-benefit analyses**
5. **Organising specific training and awareness programs for each group of actors**

Thank you for your attention

For more information:

www.planbleu.org