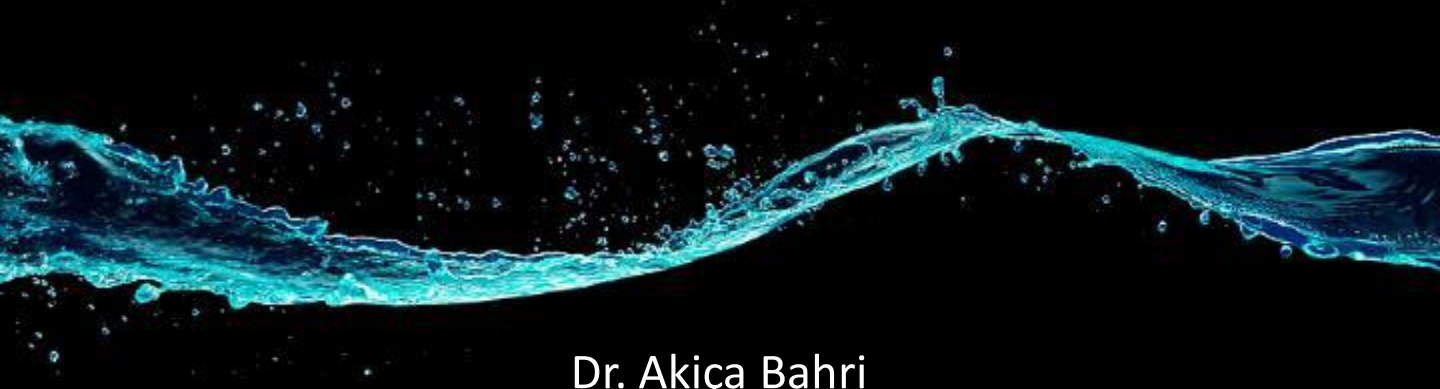
Challenges in Policy-Making Efforts on Water Reuse in Mediterranean Tourist Facilities



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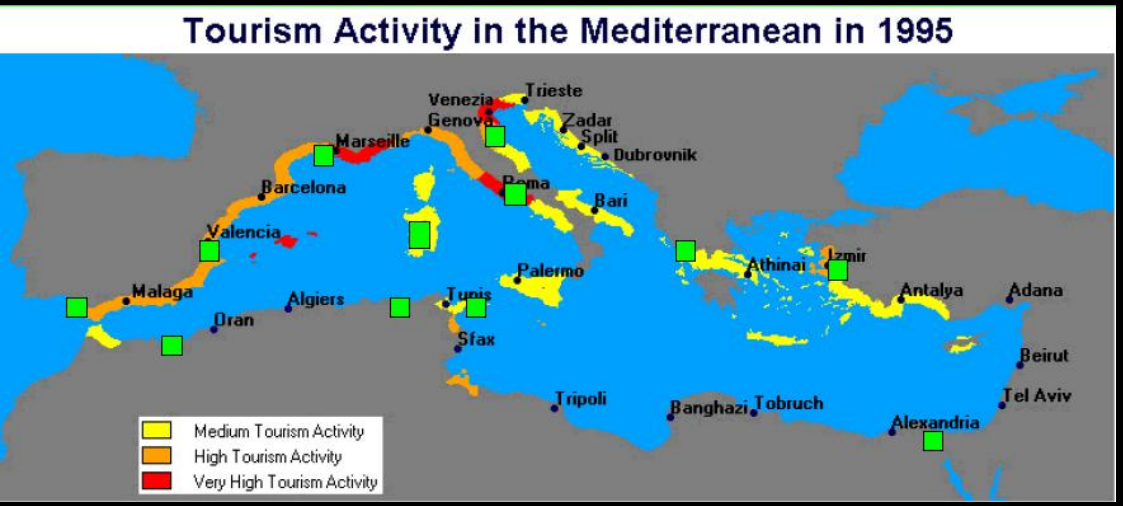
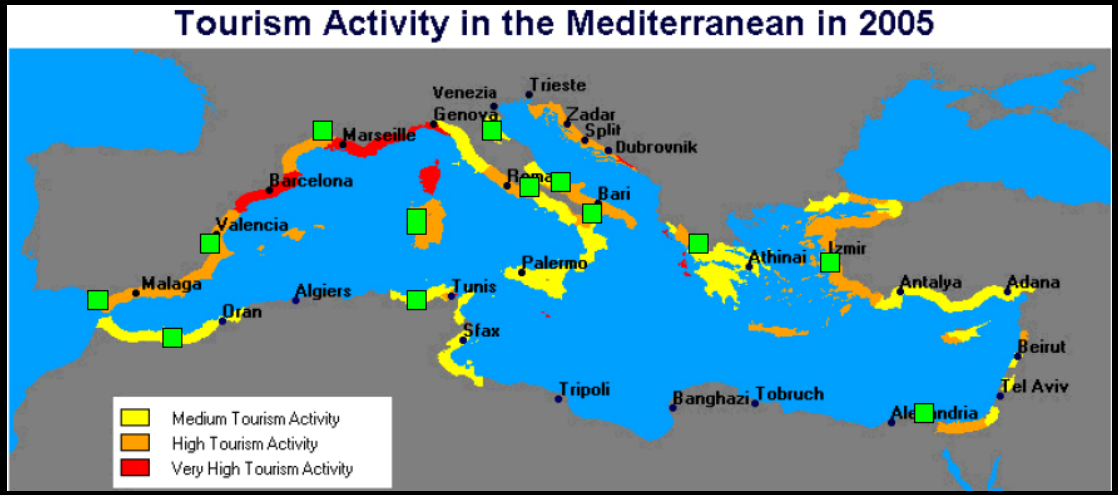
Tourism and water resources in the Mediterranean

- Main tourist destination in the world
- Depends on agriculture and tourism and, secondarily, on industry and other economic activities
- 440 and 655 million tourists in 2025 with 235 to 355 million on the coastal region
- Construction of new reservoirs, water transfer schemes, and desalination plants - at least 500 big dams, with a storage capacity of 230 km^3
- Groundwater overexploitation, saline water intrusion and overuse of non-renewable GW resources
- Increase in non-potable urban demand (golf courses, private and municipal gardens)





Source: De Stefano, 2004

Competition between tourism and other users

- One night stay by one tourist generates a demand for 0.465 m^3. Agriculture covers about 2/3 of total water usage in the region
- Value added to water by tourism can be 60x > Ag. sector
- Use conflicts between agriculture, hydro-electricity and household needs, with tourism sometimes being given priority
- Increasing competition between tourism and other users, including the water rights and the food and water security of local people raises questions about the ethics and politics of water access (Gössling et al., 2012)

Impacts of tourism on water resources in the Mediterranean

- Contributes to WR overexploitation and degradation and destruction of freshwater ecosystems
- Enormous pressures on domestic and industrial water supplies as well as WW infrastructure
- Peaks in WW volumes: 300 L/pers./day (up to 850) - 180 L/pers./day WW- could be reduced by 50%
- 80% of the effluent of residents and tourists collected. 50% of the sewage networks connected to WWTPs, the rest discharged into the sea (Scoullos, 2003)
- ➡ Pollution of surface water, groundwater and the Mediterranean Sea (7% in 2000), and declining water quality and the environmental assets (degradation of sensitive wetlands, beaches, etc.)

Distribution of WWTPs on the Mediterranean coastline

The Mediterranean region generates large volumes of wastewater, with urban water use alone accounting for about 38 x10^9 m^3 /year

Source: Medpol, Plan Bleu

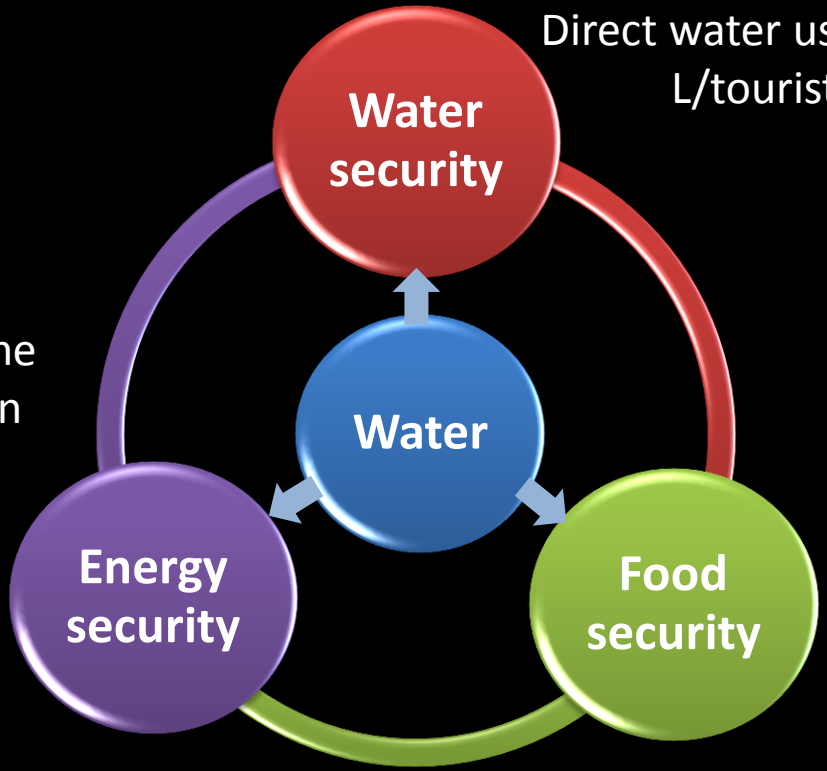
Driving forces for water reclamation and reuse

- Tourism
- Public health
- Water resources
- Economic issues
- Environmental issues (water quality discharge regulations)

Impacts of tourism on water resources in the Mediterranean

- Significant investment in WW collection and treatment. Most of the TW discharged into the sea through submarine outfalls
- Additional treatment to produce safe water to cope with non-potable demands
- ➡ Contribution of tourism to improvements in water quality (WWTP)

Tourism's water footprint



Direct water use : 80-2000 L/tourist/day

Transport to the destination can more than double direct water use

2000-5000 L/tourist/day

Food and fuel production have comparably large water footprints

Total needs: 2000-7500 L/tourist/day

Water use categories and estimated use per tourist/ day

Water use category – direct	L per tourist per day
Accommodation	84–2000
Activities	10–30
Water use category - indirect	L per tourist per day
Infrastructure	n.a.
Fossil fuels	750 (per 1000 km by air/car)
Biofuels	2500 (per 1 L)
Food	2000–5000
Total per tourist per day	Estimated range: 2000–7500

- Tourism's indirect water requirements more substantial than direct water use
- Main water-consuming factors: irrigated gardens, swimming pools, spa and wellness facilities, golf courses, guest rooms and kitchens

Source: Gössling et al., 2012

Future scenarios for water for tourism in the Mediterranean region

- CC scenarios enhance the necessity of **improving water management, water pricing and water recycling policies**
- The tourism industry, the government and individual tourists should take concrete measures:
  - ✓ installing water saving devices
  - ✓ reusing water
  - ✓ enacting water saving policies
  - ✓ adopting a land use plan that respects environmental considerations

Water reuse in tourism activities

- Contributes to the enhancement in tourism activities
- Brings significant advantages to agriculture (e.g. crop irrigation) and tourism (e.g. golf course irrigation)
- Contributes to the protection of local natural water resources and protection of the environment
- Small-scale decentralized sanitation technologies and reuse
- Water reuse regulations

Tourism and water, food and energy management

Tourism needs to **engage in water, food and energy management**, **focusing on** :

- **Policy:** compliance with national greenhouse gas reduction goals, measurement and charging of water consumption
- **Management:** reduce water use, treat WW and reuse water
- Suitable **pricing of water services** for water recycling
- **Research and development:** understanding the ethical issues of water recycling and reuse
- **Education and behavioral change** to encourage tourists and staff to engage in water-saving measures (Gössling et al., 2012)

Golf course irrigation with reclaimed water in Tunisia

- Since the beginning of the 1970s, Tunisia has enforced a policy to ensure golf course irrigation with reclaimed water
- The availability of this resource has been a major factor in the nation's ability to develop golf courses, and its corresponding tourism economy
- All the existing golf courses (which cover an area of 1030 hectares) as well as some landscaped areas (420 ha) and hotel gardens use reclaimed water

Conclusion

- Tourism in the Mediterranean Region is a pillar of economies and can be a transformative force for improving lives and protecting the environment
- Tourism policies need to limit the negative territorial and environmental impacts and to make tourism a real driver of sustainable urban, rural and coastal development

Sustainable and responsible tourism can:

- Promote resource efficiency and environmental protection
- Be carbon neutral by offsetting carbon emissions through water and waste recycling and access to renewable energy
- Be a catalyst for positive change, promoting business practices and consumer behavior that boost sustainable tourism

Thank you