# Water JPI End-Users Perspective on the SRIA RDI needs within Theme 5

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# Sustainable Water Resources Management – EU Council Conclusions (17 October 2016) 1/2

- Pressures on water caused by pollution, increased demand, landuse impacts, climate change
- Effects of drought and water scarcity notably in the Mediterranean
- Increase of heavy precipitation and intensified landuse can cause flash floods
- EU Regions have different geographical, environmental and climatic conditions; then water management must adopt flexible measures
- To secure good quality water it is important to protect water bodies and reach the GES according to the WFD
- EU water policy objectives must be integrated into other policies (food, agriculture, energy, spatial planning, urban,…) and funding mechanisms
- Green infrastructures and NWRM can enhance water storage potential
- Sustainable water resources and river basin management are a prerequisite for a circular economy

# Sustainable Water Resources Management – EU Council Conclusions (17 October 2016) 2/2

- MS need to reduce water consumption through
  - Water pricing strategy that incentives efficient water use
  - Reduction of water losses and leakages
  - Systems for water allocation and water accounts
  - Sustainable use and reuse of water
  - Improving data collection and analysis
  - Improving water governance at basin and local scale
- MS need to take measures to improve water reuse that can deliver benefits in economic savings, environmental benefit, investment in new technologies and in new green jobs
- WFD, FD and MSFD are the main water-related policy instruments
- Time to prepare for WFD revision in 2019 is short and the EC and MS need to prepare adequately well before.

# Some difficulties and obstacles in implementing the WFD

- How to go from "a good chemical status" to a "good ecological status"?
- Programs of measures usually include BMPs designed to improve the chemical status (rather indirect link to the ecological status)
- Enforcement and monitoring (mostly for not-structural measures)

# Research needs / Policy gaps in the WFD implementation

a. the ***efficiency*** of several ***management practices*** under different climates and environmental situations.

b. the ***link between hydrological, chemical and ecological status targets***

c. the ***link*** between the relevant ***EU legislations*** in the field of ***water resources management*** and use, i.e. the Water Framework, the Marine Strategy, the Nitrate, the Drinking Water, the Groundwater, the Soil, the Bathing Water Directives ***and the CAP***

***d.*** ***measures to enhance water quality and to adapt and mitigate for extreme hydrological events exist:*** how can governance help or obstruct best practices.

***e.*** ***new technology (e.g. real-time soil moisture monitoring)*** to better match irrigation with plant needs, *improved irrigation practice*, further development of *promising soil management practices.*

# Research needs / Policy gaps in Water Management (1)

a. Research is still needed regarding ***sensoring technologies***, decision support systems, irrigation techniques and communication instruments to help a rationale use of water resources of different origin in smart irrigation

b. Despite sensors and technologies already available, still innovation struggles to become real part of everyday life of EU farmers. There is a need for ***advisory systems and networks*** to be developed and adapted to different socio-economical realties in the EU regions.

c. Still the ***efficiency*** of several ***management practices*** required in the Programs of Measures remain rather unclear under different climates and environmental situations. The WFD implementation thus requires a further research effort also including ***linkages between hydrological, chemical and ecological status targets*** and ***source allocation*** of allowed nutrient and pollutant discharge.

d. Improving the water use efficiency optimizing ***water harvesting*** in rainfed systems

e. Illegal water abstraction detection

# Research needs / Policy gaps in Water Management (2)

*f.* ***Water reuse in agriculture*** can play a paramount role in EU agriculture, mostly but not only in water stressed areas. EU legislation still lacks on this issue and is really needed.

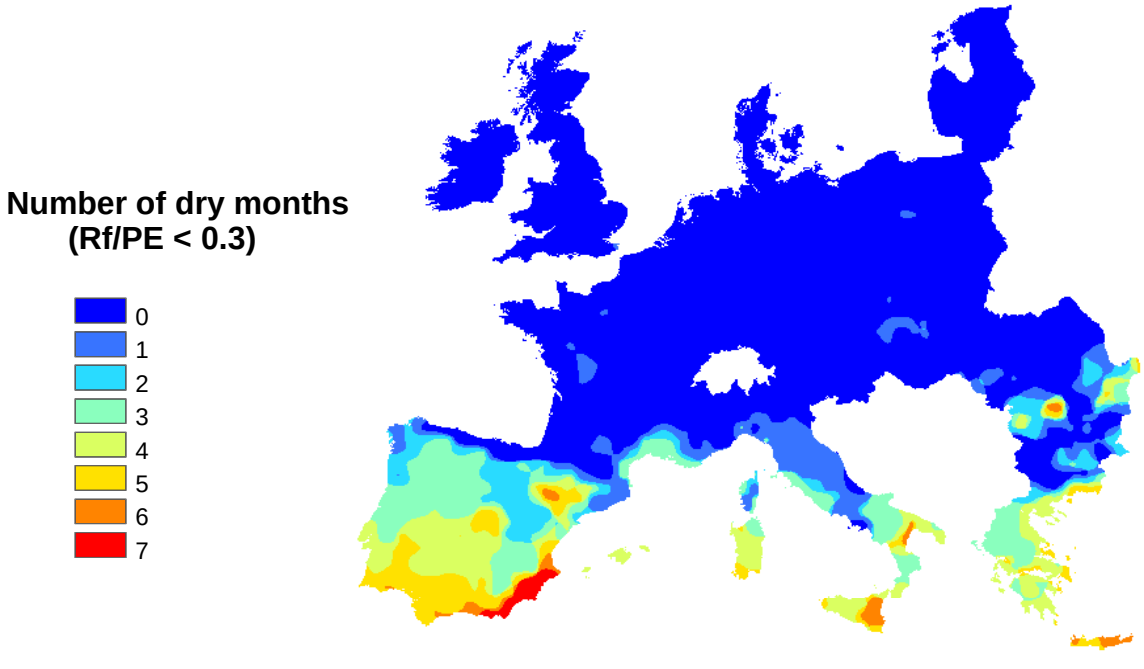
g. A clear ***linkage*** is needed between the relevant ***EU legislations*** in the field of water resources management and use, i.e. the Water Framework, the Marine Strategy, the Nitrate, the Drinking Water, the Groundwater, the Soil, the Bathing Water Directives and the CAP.

h. Various ***measures to enhance water quality and to adapt and mitigate for extreme hydrological events exist***. How can governance help or obstruct best practices.

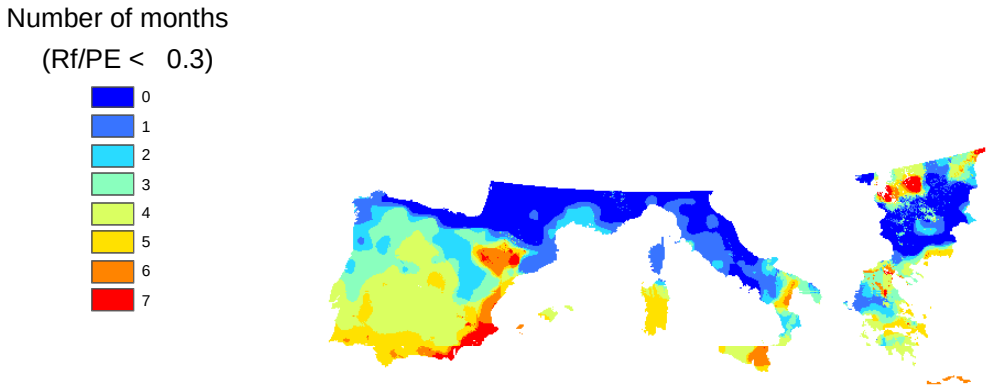
i. The *use of* ***new technology (e.g. real-time soil moisture monitoring)*** to better match irrigation with plant needs, *improved irrigation practice*, further development of *promising soil management practices* to increase irrigation efficiency and water should be promoted.

j. Coordinating, networking, streamlining and promoting tangible and intangible ***infrastructure in support of research*** for the long term perspective on land and water in Mediterranean environments

# Specificities in water management issues for arid - semiarid areas



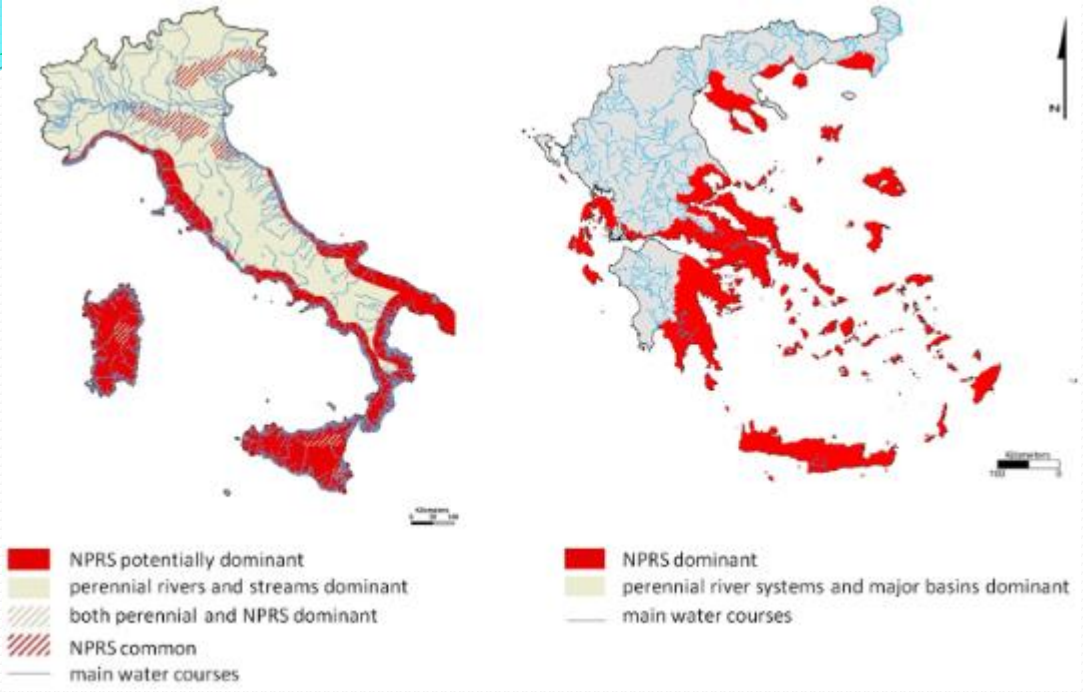

Actual climate




2030, Hadley

**Kirkby et al. 2005**

# Non perennial rivers




**Skoulikidis et al. 2016**

**International Commission on Large Dams, 2015**

**Table 1**
Number and density of large dams in the EU-Med countries (source: ICOLD - International Commission on Large Dams, 2015).

| Country | Number of large dams (>15 m) | Number of dams/1000 km²area |
|---|---|---|
| Portugal | 217 | 2.35 |
| Spain | 1082 | 2.14 |
| France | 713 | 1.30 |
| Italy | 542 | 1.80 |
| Greece | 164 | 1.24 |
| Cyprus | 57 | 6.16 |
| EU | 7000 | 1.75 |

# Flush flood in the Tagliamento River

# Considerations in Arid and Semi-Arid Watersheds

Aquatic resources and management objectives are fundamentally different.

Rainfall depths are much lower.

Evaporation rates are much higher.

Pollutant concentrations in stormwater are much greater.

Vegetative cover is sparse in the watershed.

Sediment movement is great.

Dry weather flow is rare, unless return flow is present

# Relevance of the flashy / intermittent rivers

Streamflow affects numerous processes

- sediment regime
- channel formation
- floodplain and flood processes
- groundwater and surface water interactions
- nutrient delivery
- water quality

In this region intermittent and ephemeral streams are very common fluvial systems.

These rivers show a high rate of change in streamflow, high peak discharges, and low baseflow.

A large part of their annual volume flows in a few days, delivering a great part of their sediment and nutrient loads

# First flush impacts to reservoirs

In water scarce areas temporary waters constitute the only available surface water sources. To exploit these resources dams are built.

Runoff due to flash floods can have several adverse effects on downstream lakes and reservoirs:

The longer is the time of no flow between flood events, the higher the load of pollutants available to be taken in charge (WWTP discharge).

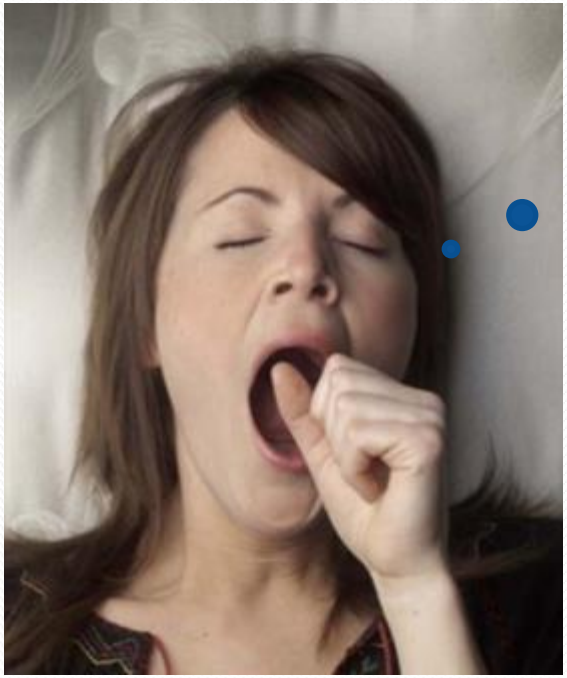
Stormwater runoff can carry high loads of nutrients that enrich the trophic state of the lake leading to algal blooms and anoxia, mostly due to phosphorus.

Lakes do not flush contaminants as quickly as streams, and act as sinks for nutrients, metals, and sediments; this has the consequence that lakes can take longer to recover contamination

# Basic research priorities for intermittent rivers

- Methods for the estimation and restoration of natural flow regimes
- Reported data on water abstraction most probably underestimate the water uses for agriculture, mainly due to a high percentage of illegal and unrecorded abstractions
- Diversity and seasonal dynamics of biotic assemblages
- Resilience of biota to increased desiccation duration
- The role of a dry river bed as a corridor for terrestrial vertebrates
- The classification and surveying mechanisms must be refined, validated and standardized
- Hydrological and ecological monitoring schemes must consider and adapt to capture short-term processes
- Specific BMPs must be evaluated to be applied in such basins

# Thank you
# for your attention

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