

Scarcity, Droughts and Urban Water Emergency Plans in Cities with over 20,000 inhabitants

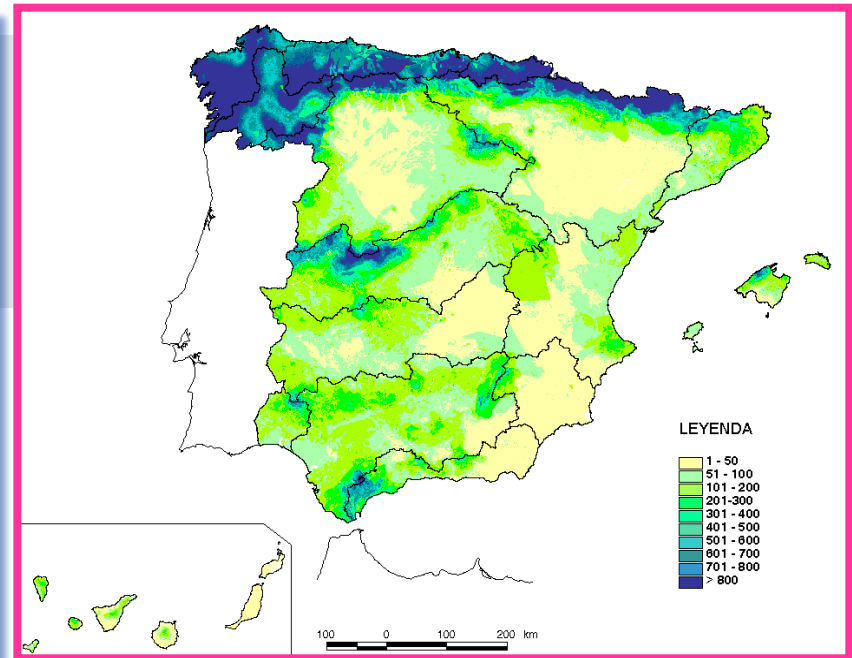
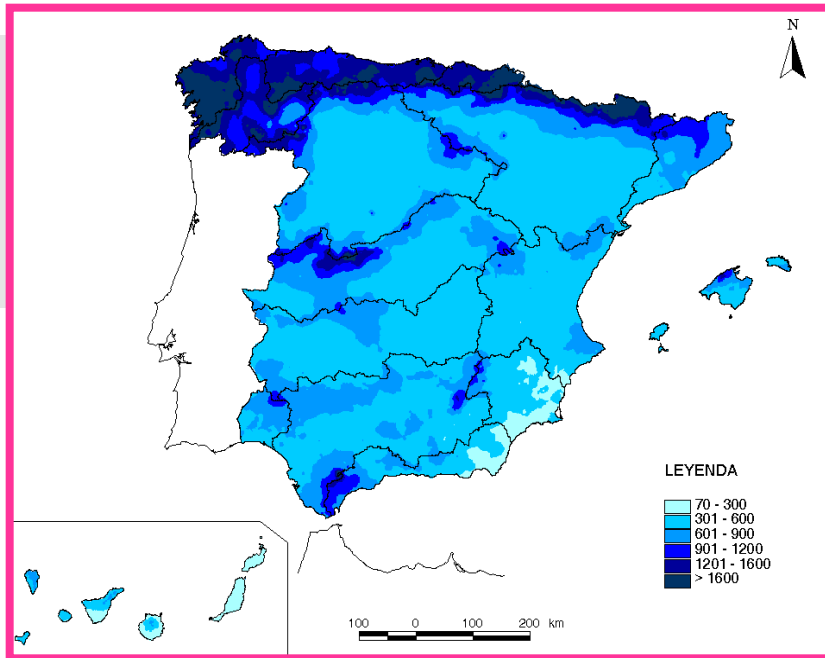
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Water scarcity and irregular runoff distribution



Rainfall: annual average: 649 mm.

- Vigo: 2.200 mm.
- Almería: 196 mm.

Runoff: annual average: 220 mm.

- North: 700 mm.
- Southeast (Segura): 50 mm.

- * Drought Mangement: main policy instruments:

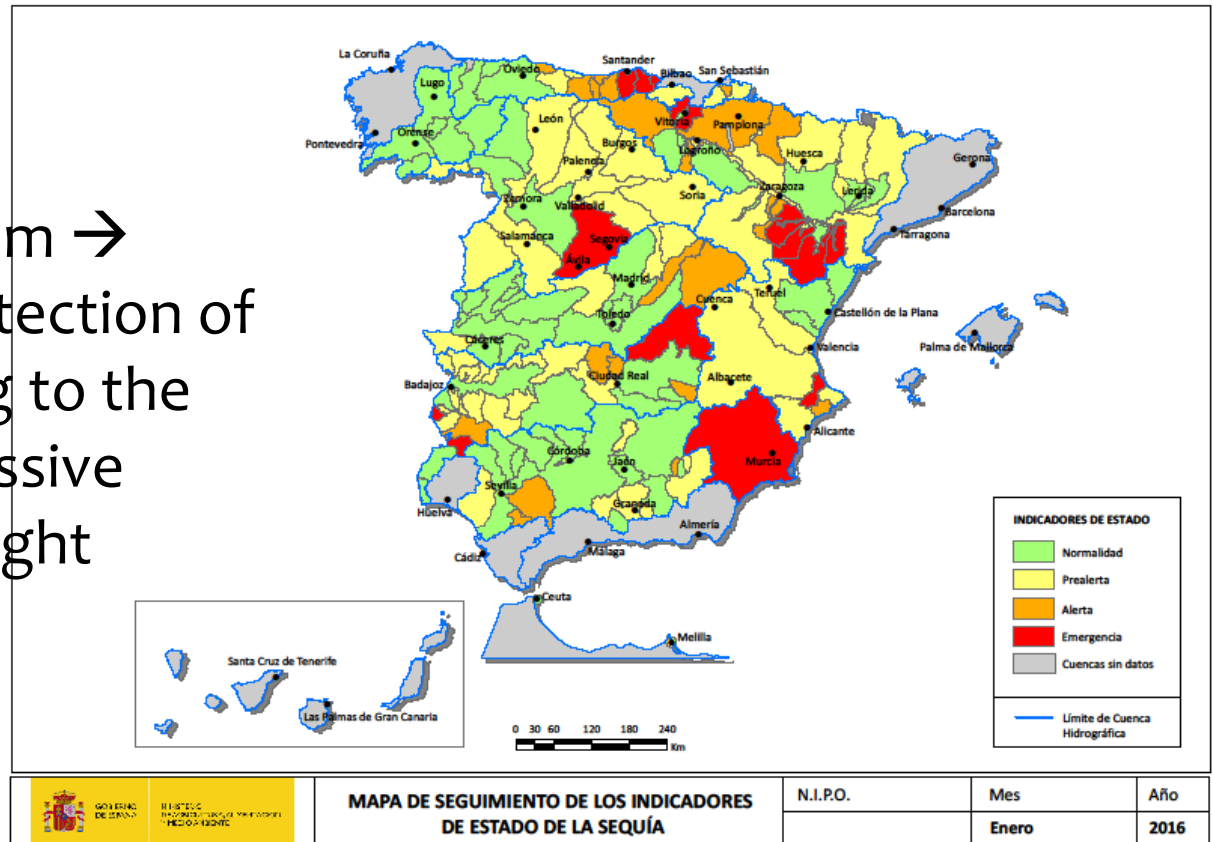
- * Drought Indicator Monitoring System: They are set to monitor the quantitative status of water bodies.

- * The Special Plans for Situations of Alert and Drought

- * The Urban Water Supply Emergency Plans in populations over 20.000 inhabitants

Monthly drought situation maps

The **Indicator** system → allows the early detection of droughts according to the established progressive thresholds on drought severity.



Special Plans for Situations of Alert and Drought

- * **The elements of the plan:**
 - * The **Indicator** system
 - * A **Programme of measures** → which defines the measures to put in place in function of the severity of the drought
 - * The **Management system** → who has the responsibility to manage the different measures.
 - * A **Follow-up system** → to insure the correct functioning of the plans.

Update on plans due in December 2017

Water Services Emergency Plans in Cities of over 20.000 inhabitants

Guidance for the Preparation of Emergency Drought Plans for Water Services in Main Cities

There are Plans in Madrid, Barcelona, Bilbao metropolitan systems, Vitoria, Pamplona, Badajoz, Merida, moos of those in Murcia, etc..



Example: The Canal de Isabel II (Madrid) Water Supply Plan, serving 7 million people

- * Establishes
 - * Limitations and prohibitions for specific water uses,
 - * Environmental standards to be protected,
 - * Procedure for managing unforeseen events
 - * How to use water infrastructures in the Madrid Region when there is a drought.

Examples of measures

- * Regular monitoring of water reservoirs
- * Inventory of alternative (including non conventional) water supply sources
- * Improve mix of water resources in the system
- * Temporary acquiring water use rights from other users
- * Limitations for water uses (garden irrigation, swimming pools, golf courses, etc)
- * Wastewater reuse (regulated by Royal Decree)
- * Improve connections among subsystems.
- * Special drought wells
- * Specific urban runoff measures

Wastewater reuse - Developments

* EU

- * EU 2012 Budapest initiative, circular economy efforts to deal with water scarcity and Climate Change.
- * 2017 EC proposal on minimum requirements for wastewater reuse (Blueprint et al).
- * Results so far: technical document on existing practices and survey.

* Spain

- * 2007 legislation including minimum requirements. Highly restrictive.
- * A reality of 500 Hm³ per year, included as part of the resource mix for non human uses (Golf courses et al) liberating high quality freshwater for human uses and as a measure for reducing overexploitation of aquifers..
- * Present work: better definition of the system to which WWRU contributes, risk analysis and multi-barrier approach as well as considering ISO 16075 for reviewing standards. The cost effectiveness analysis and cost recovery issues are being considered.

Concluding remarks..

- * The Drought plans and indicator system are now mature. They have been useful and used. There will be an update of the plans for December 2017
- * The Urban emergency plans have been unevenly applied
- * This is a legal responsibility of local authorities. Small cities /supply systems do not have the flexibility or resources to plan for contingencies. Many rely on simpler protocols of action.
- * River Basin Authorities need to inform the emergency plans and have been actively promoting them.
- * The MAPAMA is in the process of preparing guidelines - including those adapted for smaller systems.



Thank you for your attention

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