WE-NEED
WatEr NEEDs, Availability, Quality and Sustainability

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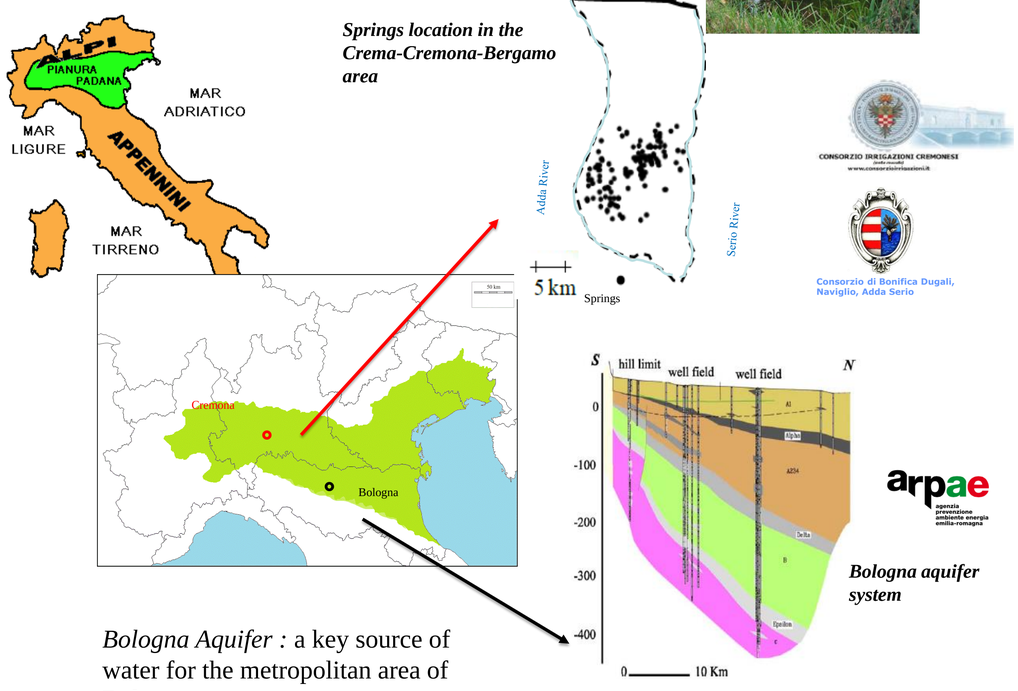
GOAL*:* Develop new management strategies to assist the sustainable use/protection of Groundwater resources (springs – wells)

KEYWORDS: Management/Protection of Groundwater Resources – Sustainability - Risk Assessment – Relevant Studied Cases (real scenarios) - Multiscale

WATER QUANTITY : Over-exploitation of Groundwater Resources
WATER QUALITY: Regulated and Emerging Contaminants

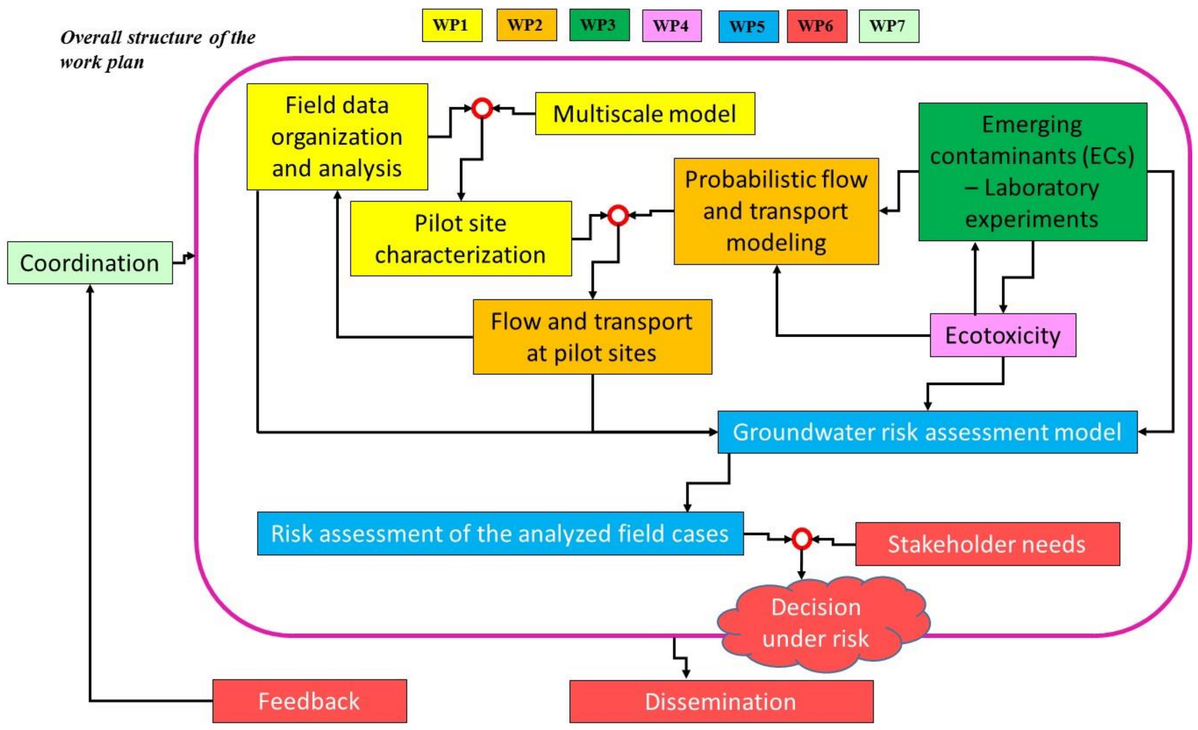
Cremona/Crema Aquifer: located within the northern part of the Padana Plain, in the so-called *Springs Belt*. Natural high-quality water springs are the main supply to agriculture and a key environmental driver.



Bologna Aquifer : a key source of water for the metropolitan area of Bologna.

Scientific/Application-oriented objectives:

- Develop methods/models that analyse/incorporate **uncertainty quantification** and **its propagation across observation scales** (as grounded on direct observations/experiments at diverse scales of interest).
- Provide quantitative understanding and **process-based models** of the hydrogeological system and geochemical behavior of reactive chemical species **in relevant scenarios**.
- Include these results within a **decision making** framework for the **sustainable use of water**, preserving historical heritage, and producing acceptable risk to existing ecosystems.
- Assessment of the contaminant-specific **vulnerability** of the aquifer systems.
- Physically-based **risk assessment** and water management protocols.



Start day: 20 April 2016 – Duration:3 years

		Lead Partner	Participating Partner
WP1	Data collection and multiscale characterization	Polimi	UPC, UAVR, Weizmann
WP2	Probabilistic flow and transport modeling	UPC	Polimi, Weizmann
WP3	Fate of ECs - laboratory experiments and modeling	Weizmann	UAVR
WP4	Ecotoxicology	UAVR	Weizmann
WP5	Multidisciplinary risk assessment and decision making	Polimi	UPC, UAVR, Weizmann
WP6	Dissemination of results, communication with stakeholders/general public	Polimi	UPC, UAVR, Weizmann
WP7	Project management	Polimi	

Innovation

(1) **Statistical Scaling**. Models to describe aquifer functioning under the influence of uncertain parameters and processes defined at diverse spatial scales.

(2) Characterization of the **fate of EC in aquifers.**

(3) Quantification of the effect of **multiple sources of uncertainty** (hydrogeological settings, aquifer architecture, abstraction rates, sources and loads of contamination,..) on sustainable management and protection of the groundwater bodies.

(4) Application of Stochastic groundwater models in **real-relevant hydrogeological studies**.

(5) Probabilistic Risk assessment (incorporating health implications). Decision making under Risk.

Expected impacts

(1) Quantification of the uncertainty linked to evaluation of environmental **impacts of groundwater extraction and contaminant dynamics** (through modeling, delimitation of data requirements, and innovative experimental analyses).

(2) Provision of an **understandable and ready-to-use platform for risk analysis and management under uncertainty** (relying on data acquired and rational use of modeling options and capabilities).

(3) Increase our level of confidence by **reducing uncertainties** regarding new substances that require regulation.

(4) Offer improved risk assessment and management practices with an overall effect of **reducing future costs** associated with over-exploitation/contamination of groundwater.