Living labs and study sites description

The SAVE water project aims to demonstrate how Living Labs can drive sustainable water management, identify key success criteria, and pinpoint areas for improvement. The innovation in this project, compared to traditional approaches, lies in the integration of geomatics and artificial intelligence technologies within the living lab concept. This promotes innovation by enhancing real-time data analysis, fostering collaborative decision-making, and enabling more effective testing and implementation of solutions that address real-world challenges. The combination of a study site's structured data collection with a living lab's collaborative and participatory approach creates a powerful platform for both understanding complex challenges and developing practical, user-centered solutions.

Besides the Mediterranean study sites, the SAVE-Water project include European case study such as the **Berlin-Brandenburg area,** which is prone to severe droughts, water scarcity, and heat waves. Berlin has been recognized as a global pioneer in sustainable urban water management and serves as a model city for improving water supply systems in other regions. Berlin also functions as a living lab for modeling urban water indicators, thanks to its advanced infrastructure for hydrological and climatological measurements, including eddy flux towers, lysimeters, sap flow sensors, soil moisture sensors, and more.

The Mediterranean regions included in this study face similar challenges :

The FSTT and UGE partners will focus on the Charf El Akab aquifer in northern coastal area of Morocco, which is overexploited due to intensified agriculture and growing water demands from local populations. This has led to a gradual decline in piezometric levels, raising the risk of saline intrusion from the Mediterranean Sea. Sustainable management strategies should be considered to address this issue. Charf El Akab functions as a living lab for water vulnerability modeling under external shocks (sea water intrusion, pollution and socio economic impacts)

The Portuguese Living Lab (LL) is located in Alentejo, a region with hot, dry summer and mild winter, where high evapotranspiration rate present significant water management challenges. This LL covers rural agricultural zones and coastal regions, offering a comprehensive perspective on water-saving needs. The LL focuses on managing diverse water sources : rainwater, groundwater, desalinated water, and treated wastewater and is testing innovative solutions for scalability. The LL also monitors water use efficiency, crop yield per drop in irrigation fields, soil water retention, runoff, biodiversity, and soil fertility.

The CIRAD and IAV Living Lab will study the Aït Bouguemaz Valley in the Tabant administrative district. This region has an arid climate, with cold winter marked by snowfall and very dry, hot summers. The valley's economy is primarily based on subsistence agriculture and livestock farming, with cereal crops such as barley, durum wheat, corn, and rye. Recent agricultural changes have introduced new species like soft wheat, corn, and apple trees, while more traditional crops like rye and millet have diminished. This LL aims to develop new tools to monitor land use changes and assess their impacts on hydrological system.

The Italian Living Lab in Agrianto, developed by ISASI-CNR and Agriant partners, focuses on extreme climate events like heat waves, droughts, and heavy rainfall. By utilizing innovative meteorological monitoring systems, including commercial microwave links (CML) for measuring rainfall, fog, dew, and humidity this project integrates classical data with advanced technology to improve our understanding of these events. The LL also adopts a citizen science approach, emphasizing environmental monitoring of key parameters such as temperature, pressure, humidity, solar radiation, and air pollution. Low-cost sensors and user-friendly instruments will engage local communities in data collection, fostering collaborative efforts in real-world conditions.

Another Living Lab, developed **by Tunisian partners FST and MSE partners**, is located in Greater Tunis and northern Tunisia (Tunis, Mornag, Manouba, Ras Jebel -Bizerte), as well as in Gabès (southern Tunisia), regions that are prone to intensive agricultural activities, water overexploitation, and urban expansion. One of the selected pilot sites is the phreatic aquifer of Manouba, lodged in the Plio-Quaternary sediments and exploited by 979 wells. Previous studies showed that water consumption for irrigation during summer has caused groundwater level drawdown and a subsequent aquifer overexploitation. The second pilot site for Tunisian living lab is the plain of Mornag located about 20 km southeast of the city of Tunis with an area of 200 km^2. The waters of the shallow aquifer of the plain are generally subject to intense exploitation which resulted in a decrease in piezometry and increased

salinity. The Tunisian living lab aims to use Low-cost sensors and participatory approach for data updates and vulnerability models validation through stakeholder feedback.
The same challenges are present in the Annaba basin, which is the focus of the **Algerian Living Lab** developed by the UBMA partner. The selected area is bordered to the north by the Mediterranean Sea and stretches from Annaba in the north to Guelma in the south. One of the immediate consequences of rapid development in this region is the pollution of the Oued's waters. The Algerian Living labs aim to develop innovative solutions to preserve water, monitor water consumption, and prevent pollution and overuse before and after the construction of Debbagh dam.
The Egyptian Living Lab will focus on the Fayoum region, specifically the Fayoum Depression, an inland, closed drainage basin located southwest of Cairo. As the largest inhabited oasis in the world, Fayoum represents a microcosm of Egypt's broader water challenges. The area is characterized by hot, dry conditions, with agriculture as the main livelihood of its population. A major challenge for effective water management in Fayoum is the shifting agricultural landscape, affected by informal urbanization and agricultural expansion. In this proposal, a selected irrigation canal catchment will be used as a case study to represent these dynamics of urbanization and agricultural growth. This Living lab will serve as a collaborative platform to address these water management challenges by integrating geospatial technologies. The Galicia region, where the **Spanish Living Lab** is focused, faces similar challenges of water scarcity under climate chnage. This Living Lab aims to promote ethical practices and responsible groundwater management, integrating environmental law, social sciences, and cultural values.