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# WATER MANAGEMENT TO SUPPORT MEDITERRANEAN AGRICULTURE

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> WADIT and Copernicus data support the optimization of the water management in agriculture
>
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**Water Digital Twin project, funded by the Ministry of Enterprises and Made in Italy, has the objective of assessing the crop water use in Apulia Region** | Own Work

Mediterranean agriculture faces increasing pressure from climate variability, water scarcity, and growing demands for sustainable production. Effective water management is therefore a critical priority across the region. An integrated framework that combines European water policy principles, basin-scale planning, and Earth Observation–based methodologies, improves water resource assessment and irrigation efficiency in Mediterranean agricultural systems.

# THE CHALLENGE

The Water Framework Directive (WFD; 2000/60EC) requires Member States to use their River Basin Management Plans and Programmes of Measures to protect and restore water bodies. At National level, the Ministry of Agricultural, Food and Forestry Policies established a database of water volumes used for irrigation. The Regions, on their end, must fulfil the (i) validation of such data, and (ii) the quantification and update of water volumes.

The WADIT – Water Digital Twin – project, funded by the Ministry of Enterprises and Made in Italy, has the objective of assessing the crop water use in Apulia Region (southern Italy) by developing a farm-scale model which uses a simplified water balance model integrated with the Earth Observation data from Sentinel-2 imageries. The main target of WADIT's outputs is the Southern District Basin River Authority.

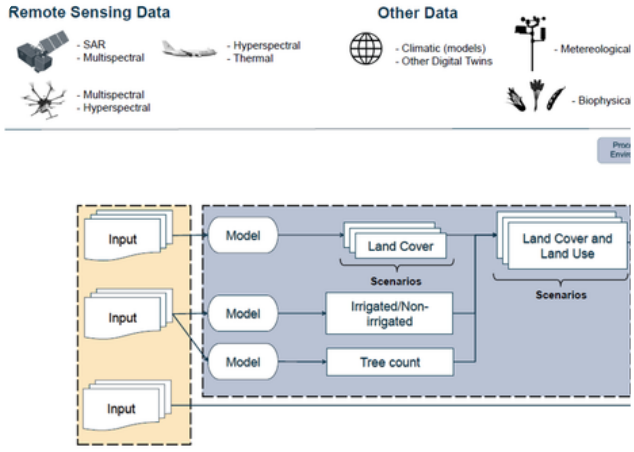
# THE SPACE SOLUTIONS

The WADIT project uses Earth Observation data, particularly from the Copernicus missions, to produce qualitative and quantitative indicators of crop water use.

Thanks to the use of remote sensing techniques, the WADIT project integrates and simplifies the information coming from different Earth Observation data, with different spatiotemporal resolutions and sensors, into the water balance model, addressing the challenge of managing crop water used with high accuracy and update frequency.

The output of the project empowers stakeholders, i.e., the River Basin Authority, to make informed decisions about drafting water management plans, optimizing water resources within the river basin district, as well as, safeguarding the use of water resources.

The solution proposed in WADIT is the integration of different satellite data sources into a water balance model. For instance, Sentinel-1 and Sentinel-2 data are used to produce irrigation maps, land use and land cover maps, and other qualitative indicators of crop water status, with high spatiotemporal resolution.




**Project Dashbord** | Screenshot

**THEMATIC AREA**

Climate, Water and Energy

**REGION OF APPLICATION**

Puglia

**SENTINEL MISSION USED**

S1, S2

**COPERNICUS SERVICE USED**

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# THE BENEFITS AND THE BENEFICIARIES

The project empowers the River Basin Authority to make informed decisions about water management in agriculture, within a complex legislative framework, including the Water Framework Directive.

In fact, the European Commission requires member States to protect, safeguard and restore community water bodies. In this context, the River Basin Authority, which can operate on a relatively wide territory, has to draft the Water Management Plans with the main focus of monitoring water resource uses and defining the water balance.

The main activities are (a) the quantification of the utilized agricultural area and (b) the quantification of the irrigation area.

In this regard, the solution proposed by WADIT project allows the Southern District River Basin Authority, not only to produce more accurate and up to date information needed to draft the water management plans, but also to pursue their actions in a more efficient and sustainable way, and at a lower cost and effort.

| | TIER 1<br>SERVICE PROVIDER | TIER 2<br>PRIMARY USER | TIER 3<br>SECONDARY USER | TIER 4<br>END USER BENEFICIARIES |
|---|---|---|---|---|
| SERVICES AND BENEFITS | Sentinel 1,<br>Sentinel 2 | Irrigation maps,<br>land use and land cover maps,<br>qualitative indicators of crop water status | Water balance model | Water management |
| BENEFICIARIES | Planetek Italia | Autorità di Bacino Distrettuale dell'Appennino Meridionale (Southern Apennine District Basin Authority) | Regional authority | Regional level |

**EU POLICY / DIRECTIVE**

EU Water Framework Directive

**TYPE OF SERVICE PROVIDER**

Commercial Service

**TYPE OF FUNDING SOURCE**

National Space Programmes

**USAGE MATURITY LEVEL**

3



## A FUTURE WITH COPERNICUS

Currently, the proposed solution developed within the WADIT project is designed for the Apulia Region. However, the advantage of using Earth Observation data, especially with Worldwide coverage, like the Copernicus missions, is the possibility of upscaling the solution to wider areas. Furthermore, with the development of ESA Digital Twin Earth Components, it will be possible to integrate the output of such digital twins into the WADIT system, and vice versa, contributing to the development of the ESA DestinE initiative.



## DID YOU KNOW?

The WADIT project is transforming the management of water resources in agriculture in the Apulia Region. Utilizing advanced satellite imagery and the products derived from their processing, it helps regional authorities coming up with more accurate and up to date water management plans.

### Acknowledgements

Copernicus Data

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