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Earth Observation data for the monitoring of irrigation water use in Italy: The case study of the INCIPIT project.

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Agriculture is the main source of pressure on water resources, so accurate estimates of irrigation demands play a key role in sustainable water management. The **INCIPIT** (INtegrated Computer modeling and monitoring for Irrigation Planning in Italy) project (funded by Italian Min. Univ. and Research) aims to address the gaps between research and practical application in monitoring irrigation water use in six Italian regions [1].

It is designed to meet the requirements of sustainable water policies, such as the Water Framework Directive and the MIPAAF Ministry Decree, by providing accurate measurements and estimations of irrigated areas and water volumes. The project uses the ESA Sentinel-2 (S2) satellites as a valuable source of information to map irrigated areas and estimate distributed irrigation water requirements.

This study presents the results of the IRRISAT methodology, the first Italian satellite-based irrigation advisory service [2], which was applied in the Campania region. The methodology uses a one-step approach, based on the Penman-Monteith equation, and is adjusted with canopy parameters from S2 data, to quantify irrigation water abstraction. Effective irrigated areas were assessed by using pre-existing maps, unsupervised clustering, and supervised machine learning algorithms applied to vegetation index data [3].

The results of the methodology for the irrigation seasons of 2019 and 2020 will be presented for seven Irrigation and Land Reclamation Consortiums, which vary in size, irrigation scheme, farm delivery, irrigation methods, and crop types.

[1] INCIPIT Project, www.principit2017.it

[2] Vuolo F., D'Urso G., De Michele C., Bianchi B., Cutting M.: Satellite-based irrigation advisory services: a common tool for different experiences from Europe to Australia". *Agricultural Water*

Management, Elsevier, vol. 147: 82-95; [dx.doi.org/10.1016/j.agwat.2014.08.004](https://doi.org/10.1016/j.agwat.2014.08.004) (2015).

[3] Falanga Bolognesi S., Pasolli E., Belfiore O. R., De Michele C., D'Urso G.: Harmonized Landsat 8 and Sentinel-2 Time Series Data to Detect Irrigated Areas: An Application in Southern Italy". Remote Sensing, MDPI, vol.12, no. 8: 1275; doi.org/10.3390/rs12081275 (2020).