

M2 Student internship

Assessment and mapping of water management practices of Mediterranean orchards at the territorial scale



The expected global changes for the coming years could lead to an increasing demand for water for different uses. Conflicts can occur for the access to this resource, which is increasingly scarce or limited, particularly in the Mediterranean areas. In fact, Mediterranean agricultural lands are increasingly suffering due to tensions over water resources, and the periods of shortages observed in recent years may worsen with expected changes in climate. In the Provence region (especially in the department of Vaucluse), irrigation is becoming necessary for some crops which were traditionally rain-fed such as vineyards (wine), truffle and cherry trees, and wheat. Some watersheds suffer from an inadequacy between the availability and demands of water. For this reason, the Vaucluse Chamber Agricultural (CA84) has led a territorial project which aims to secure the water supply of the various users of the territory to better manage shortages in periods of droughts. A first need is to have an accurate map of irrigated areas each year

and in parallel, maps of the water needs of the different crop types all along the year. In particular, the assessment of the water needs and management practices of heterogeneous crops such as vineyards or orchards at territory scale is still a challenge.

The objectives of the internship are:

- Collect and analyse data from heterogeneous sources such as remote sensing images, statistical data and direct interviews with farmers, in order to provide new insights into agricultural practices, in particular for Mediterranean orchards that show a great variability;
- Map at the territorial level the irrigated areas and the main agricultural practices for these areas;
- Estimate the water needs of orchards at the territory scale in terms of water volumes required through water-use modelling approaches.

The case study is in the north of the Vaucluse, which is an agricultural area characterized mainly by small fields (< 3 ha) of orchards and vineyards with a wide range of agricultural practices (various species, ages, tree densities, management of inter-row - with grass or bare soil, pruning, trimming of branches...).

This project will create strong links with regional agricultural partners, such as the Chamber of Agriculture, the association for irrigation (ASA Ouveze-Ventoux) and the local farmers, interested in new possible tools for irrigation management.

During the internship, the student will acquire skills in remote sensing for agriculture, field work with farmers, statistical data analysis, and

cartography applied to agricultural management. The main activities he/she will develop will be:

- Participate in the field work to acquire information from farmers about irrigation and agricultural practices;
- Process the remote sensing images at fine spatial and temporal resolution (Sentinel images) for obtaining a map of irrigated fields and irrigation practices;
- Statistically analyse quantitative and qualitative data to obtain a typology of farmer behaviour in terms of irrigation practices;
- Estimate water consumption and irrigation needs in a spatially explicit way.

The internship will be carried out under the supervision of Dominique Courault (Dominique.courault@inrae.fr) and Marta Debolini (marta.debolini@inrae.fr), from the DREAM team of the UMR EMMAH <https://www6.paca.inrae.fr/emmah/Programme-scientifique-et-Equipes/Equipe-DREAM>