

The PhD student will be supervised by both PIs that have full complementary scientific background and they are enrolled in a scientific institution (CSIC) and an academic one (UV), jointly collaborating within the CIDE. The PhD student will be enrolled within the CIDE research team, a multidisciplinary research team with experience in agronomy and water relations (Dr. D.S. Intrigliolo), micrometeorology (Dr. R. López-Urrea), remote sensing (Dr. J.M. Ramírez-Cuesta), and fruit quality (Dr. R. Ferrer-Gallego), as well as in soil degradation (Dr. Vicente Andreu), carbon sequestration (Dra. Eugenia Gimeno) and soil evaluation (Dra. Ester Carbó). The training plan for the FPI beneficiary will be conducted in the **Biodiversity** doctorate program (UV) and **Plant Production and Agroforestry Ecosystems** program (UPV), **Water and Environmental Engineering** (UPV) or similar. In addition, the training plan will include (i) specific courses to improve his/her skills in the ambit of soil management, agriculture and statistics (ii) one stay at the Agronomy department of the University of Cordoba (UCO), which has an Excellence Research recognition (Excelencia Maria Maetzu), with Dra. Campillo and Dr. Sánchez-Rodríguez to broaden the scope of his/her thesis in relation to the soils and nutrient bioavailability. Also, the training period will include the realization of one or two **pre-doctoral stays** of 3 months in an Institution of recognized international prestige, such as the lab. of Dr. Victor O. Sadras (South Australian Research and Development Institute-SARDI and The University of Adelaide, Australia) and/or Dra. Melané Vivier (South African Grape and Wine Research Institute-SAGWRI and Stellenbosch University, South Africa) to achieve the International Mention for the PhD. This could be possible due to the strong international relationship with different leader teams.

The PhD thesis will be conducted in the framework of the INTERMED project, by evaluating the **carbon balance** of the proposed intercropping practices. The beneficiary of the pre-doctoral contract will extend the current experimental design in this regard by proposing further determinations to evaluate how agronomic diversification (i.e. including legumes and herbaceous mowing) affects carbon sequestration (uptake) and carbon emissions (release) within the agroecosystem. This could be done through the evaluation of plant and soil respiration both in the row and in the alley, but also whole-plant net CO₂ exchange rate (NCER) during day and night using gas exchange chambers (Buesa et al., 2020). Carbon sequestration by the crops could be further evaluated through validating carbon balance models such as Mirás-Avalos et al. (2018) with plant growth above- and below-ground data; and by the soil carbon content tracking both in the row and in the alley and applying the methodology suggested by FAO for C soil sequestration. The scientific papers derived from his/her doctoral thesis will be published before its defense, which will be done as a compendium of publications.