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*Innovation and resource efficiency  
for a sustainable and resilient agriculture  
adapted to Climate Change.*



# 2025 Technology Offer



**Desertification Research  
Centre (CIDE)**

**Water and Crops Research Group**

# Introduction

## Who we are?

The Water and Crops Research Group at the Desertification Research Centre (CIDE), a joint research center of the Spanish National Research Council (CSIC), the University of Valencia (UV), and the Valencian Government (GVA), is dedicated to studying Mediterranean agro-ecosystems under semi-arid climate conditions. Our commitment is to improve the natural resource use efficiency, primarily water and soil, to contribute to ensuring the sustainability and resilience of agricultural activity in a context of climate change. We work closely with farmers, irrigation communities, and other agricultural sector stakeholders to provide solutions based on advanced technology.



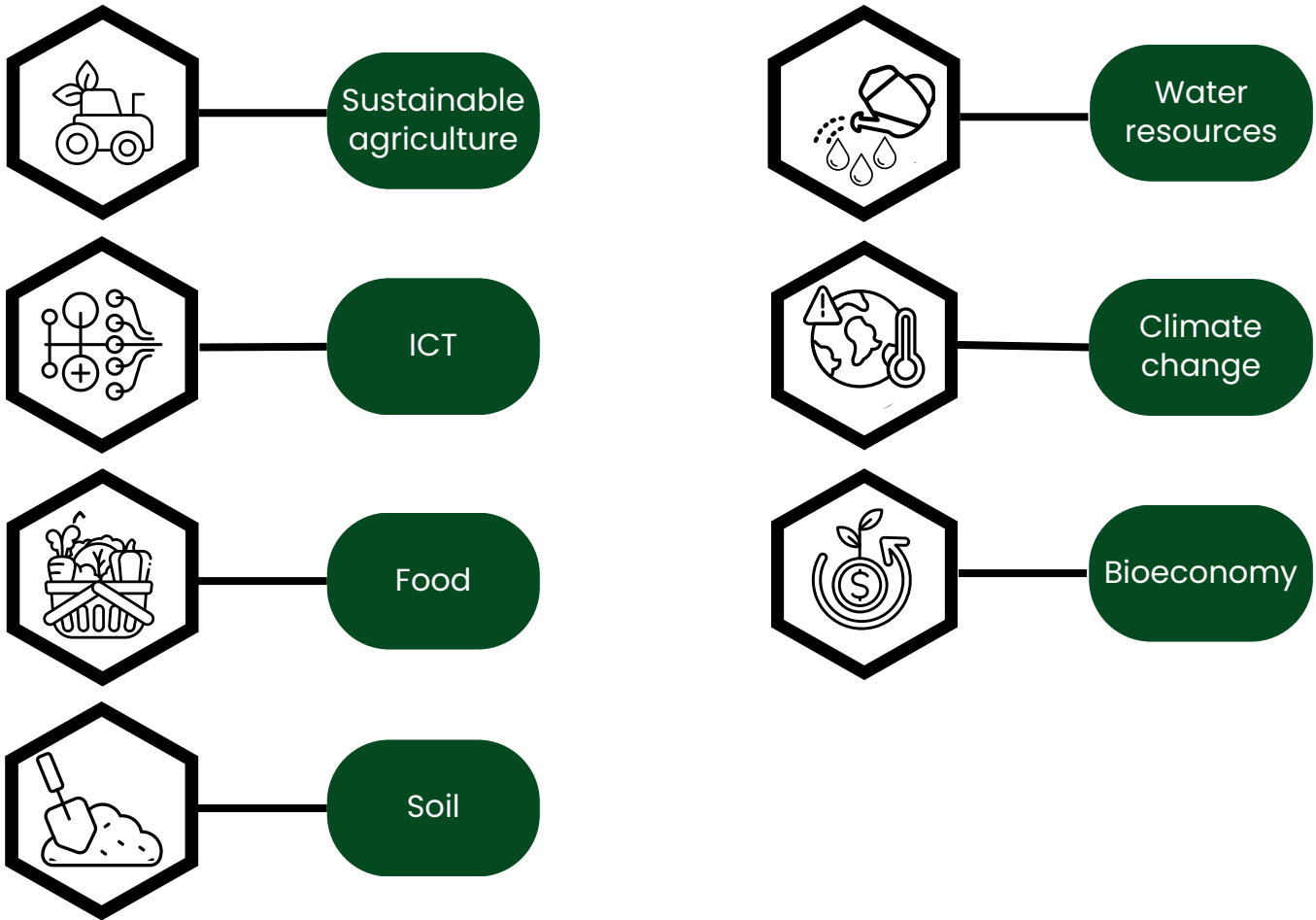
## Our mission

We conduct applied research aimed at solving real problems in agriculture by optimizing water, soil, and nutrient management through various agronomic practices.

Thanks to an innovative approach and our expertise in irrigation technologies and remote sensing, our goal is to improve crop quality in vegetable, fruit tree and vine crops while ensuring the economic and environmental sustainability of agricultural systems.



# Application sectors



## Connections with Horizon Europe



**Cluster 4 – Digitalization, Industry, and Space**



**Cluster 5 – Climate, Energy, and Mobility**



**Cluster 6 – Food, Bioeconomy, Natural Resources, Agriculture, and Environment**



# Areas of Specialisation



## Technology offer

### 1. IRRIGATION TECHNOLOGY



Cluster 6. Resource efficiency and sustainable agriculture.

We specialise in advanced irrigation technologies, such as subsurface irrigation and pulse irrigation with low-flow drippers. These technologies are designed to provide the specific needs of crops in semi-arid environments, maximising the water efficiency in every drop and improving agricultural productivity, optimising crop water status and obtaining higher quality products, such as in the case of wine production.

### 2. PRECISION IRRIGATION



Cluster 5 and 6. Resource efficiency; Water efficiency technologies for climate adaptation.

We carry out precision irrigation techniques to adjust water to the exact crop water requirements and field variability, allowing detailed and efficient control. These practices enhance crop yield and reduce environmental impact, contributing to a more sustainable agriculture.







### 3. REMOTE SENSING TECHNIQUES



Cluster 4 and 6. Digital innovation in remote sensing for environmental monitoring; IoT solutions.

Remote sensing techniques, both proximal (drones) and remote (satellites), are used to determine water and energy balances and detect crop water stress. State-of-the-art remote sensors enable real-time monitoring of soil and plant water status, providing data that allows precise adjustments in irrigation practices. These methods offer a comprehensive and detailed view of crop water requirements and agronomic conditions, optimising resource use efficiency.

### 4. SOIL AND SUBSTRATE MANAGEMENT



Cluster 6. Soil health and sustainability in agroecosystems.

Part of the group activities include the research and application of advanced soil and substrate management practices, analysing their influence on crop-water relationships. This holistic approach to soil conservation allows crops to better adapt to stress conditions.

### 5. USE OF NON-CONVENTIONAL WATER FOR IRRIGATION



Cluster 5 and 6. Sustainable and adaptive use of water resources in agriculture.

We assess the use of non-conventional water (e.g., saline water) for irrigation and its impact on the soil-crop system, analysing short- and medium-term effects. This enables to study crop tolerance to salinity while incorporating appropriate leaching fractions based on crop water requirements.

# Areas of Specialisation

## Technology offer



### 6. SUSTAINABLE NITROGEN FERTILIZATION MANAGEMENT



Cluster 6. Efficient use of nutrients and reduction of contaminants in agriculture.

In this area, sustainable nitrogen fertilisation practices are developed. These techniques minimise leaching risks and prevent nutrient loss in soil. This management approach contributes to responsible agriculture and reduces the environmental impact of agricultural production.

### 7. WATER AND CARBON FOOTPRINT QUANTIFICATION



Cluster 6. Resource efficiency and sustainable agriculture.

The Water and Crops Research Group focuses also on the quantification of water and carbon balances in agricultural ecosystems, providing data on the water and carbon footprint of crops. This approach offers key information for more sustainable management adapted to the current challenges of climate change.





## 8. AGRONOMIC PRACTICES



Cluster 6. Sustainable agricultural systems and regenerative agronomic practices.

The integration of agronomic techniques such as deficit irrigation, shading, training systems, and soil mulching (organic and inorganic) is essential to increase natural resources use efficiency, primarily water and soil. These practices not only optimize water use efficiency but also improve crop quality, contributing to the sustainability and resilience of agricultural activity in a climate change scenario.

## 9. SUSTAINABLE VITICULTURE



Cluster 6. Innovation in high-value crops and sustainability in food production.

In viticulture, we work with integrated practices that encompass not only irrigation management but also the collection and selection of specific plant material characteristics. This research line aims to improve the quality and sustainability of Mediterranean vineyards, ensuring high-quality products with local identity. Collaboration with DO Utiel-Requena is boosted for the clonal selection of the native Bobal variety.

## 10. AGROECOLOGICAL PRACTICES



Cluster 6. Sustainable agriculture, agroecological systems, and functional biodiversity.

Development and evaluation of agroecological practices that promote the sustainability and resilience of agro-ecosystems. Our approach includes water conservation, soil regeneration, increased fertility, and the enhancement of functional biodiversity. These practices seek to transform conventional agriculture into more balanced and environmentally friendly systems, contributing to food security and climate change mitigation.



# Research team



**The Water and Crops Research Group counts with a multidisciplinary research team with proven experience in crops, remote sensing technologies, water management, soils, and other cross-sector applications:**

- **Diego S. Intrigliolo.** CSIC Research Scientist. Group Leader. Agronomy, integrated water management. Contact: [diego.intrigliolo@csic.es](mailto:diego.intrigliolo@csic.es)
- **Ramón López Urra.** CSIC Research Scientist. Crop evapotranspiration, water use efficiency. Contact: [lopez-urra@csic.es](mailto:lopez-urra@csic.es)
- **Juan M. Ramírez Cuesta.** Ramón y Cajal Researcher. Remote sensing applied to water and soil management in agriculture. Contact: [jm.ramirez.cuesta@csic.es](mailto:jm.ramirez.cuesta@csic.es)
- **Raúl Ferrer Gallego.** Ramón y Cajal Researcher. Food Science and Technology, and Enology. Contact: [raul.ferrer@csic.es](mailto:raul.ferrer@csic.es)
- **Ignacio Buesa Pueyo.** CDEIGENT 2023 Researcher. Plant ecophysiology, viticulture, and agroecology. Contact: [ibuesa@csic.es](mailto:ibuesa@csic.es)

# Technology transfer & Training

## Consulting and technical advisory services

We offer expert advisory services on irrigation management, sustainable fertilisation practices, and personalised agronomic strategies to improve crop quality and sustainability.



## R&D project development

Participation in research and development projects on irrigation technologies, sensors, and agronomic management, collaborating with public and private entities to innovate in agricultural management.

H2020 SHUI ([link](#))  
Divergrape ([link](#))

Life Climatree ([link](#))  
Upgrape ([link](#))



## Specialised training

Design of training programmes tailored to the needs of the agricultural sector, including efficient irrigation techniques, soil management, and sustainable practices.



## Benefits

Collaborating with specialised research centres such as CIDE offers multiple advantages, both in terms of knowledge transfer and fostering new business opportunities, such as:

### Performance optimisation and sustainability

Our common objective is to support companies and agricultural entities in transitioning towards more efficient and sustainable practices, helping them reduce costs, optimise water and energy use, and comply with environmental regulations.

### Access to innovation and advanced technology

Collaborating with the Water and Crops Research Group provides access to the latest technologies and methodologies in precision irrigation, remote sensing, and advanced agronomic practices.





CIDE Centro de Investigaciones  
Sobre Desertificación



CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS



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