# Digital Data Farm

*Developing effective solutions for the agriculture and sustainability of the future*


www.digitaldatafarm.com

# About us

We design and create the most efficient **digital solutions** for the agriculture of the future and assist water users in **increasing the water productivity and sustainability** of their crops through a digital platform that monitors and models the water status of the **soil - plant -atmosphere** system to optimise the water and carbon footprint of agriculture.

**Alejandro Pérez Pastor**

*PhD Agricultural Engineer*

+25 years specialisation in irrigation scheduling and crop physiological and agronomic response.

**Manuel Ruiz Marín**

*PhD in Mathematics*

Expert in Data Analytics and predictive models and algorithms based on ML and AI.

**Abdelmalek Temnani Rajjaf**

*PhD Agricultural Engineer*

Expert in crop fertigation and GIS-based systems and remote sensing.

**Pablo Berríos Reyes**

*PhD Agricultural Engineer*

Expert in crop fertigation and design and analysis of experiments for agronomic research.

empresa innovadora de base tecnológica reconocida por ANCES

Universidad Politécnica de Cartagena

MEMBER OF EUT+ EUROPEAN UNIVERSITY OF TECHNOLOGY

# Our offices and facilities

We are located in the **Region of Murcia** in the southeast of **Spain** .

In the facilities of the Technological Complex of Fuente Álamo ***PTFA - A place for intelligent companies*** and in the **Agricultural Engineering Faculty of the UPCT** .


Universidad Politécnica de Cartagena

**Soil - Plant - Atmosphere Research Group**

# Our Mission and Vision

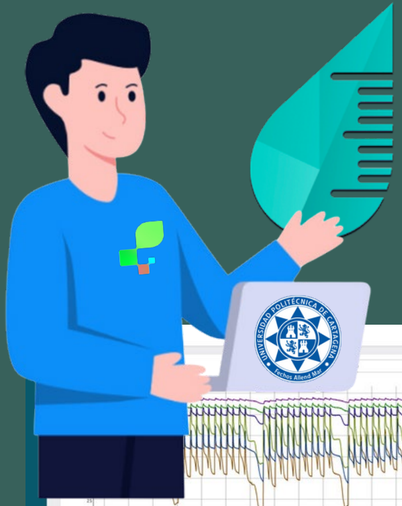
Digital Data Farm's mission is to provide water users with a **technological and decision -making support system** focused on sustainable irrigation management and increased competitiveness. Our team is highly specialised in irrigation management and **provides continuous support to farmers in the implementation and use of the technology developed.**

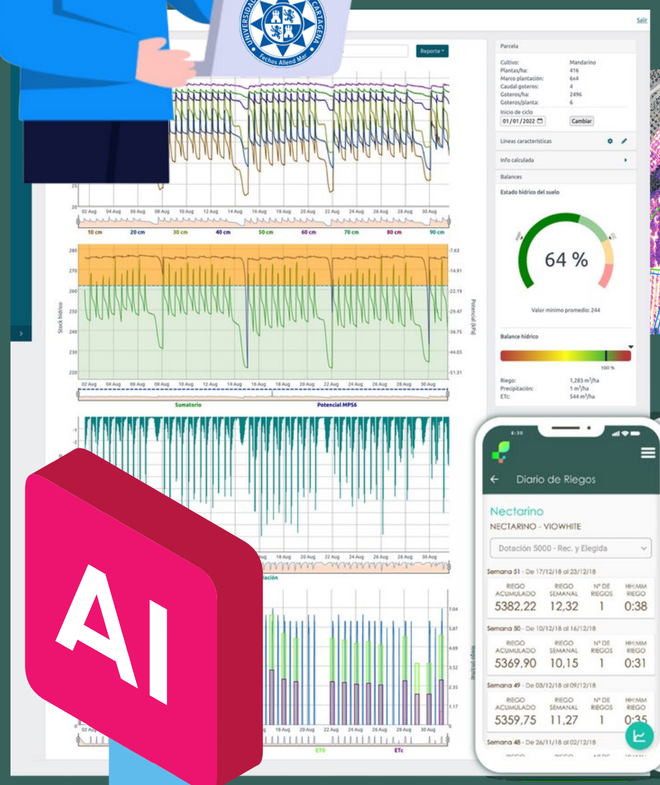
The company's vision is to significantly boost the sustainability and efficiency of irrigated agriculture globally, through **digitalisation and technological innovation**, thus aligning with the sustainable development goals of the UN Agenda 2030.

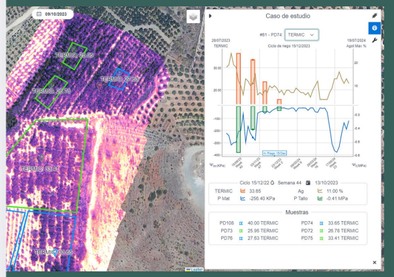

SUSTAINABLE DEVELOPMENT GOALS

# Irriman Platform

# Our Ag -Tech ecosystem







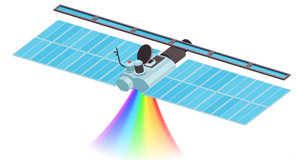








When and how much should I irrigate my crop?





Digital Data Farm

INIA CROP TECHNOLOGY

# Real -Time Data Acquisition Device

## Datalogger 4G

- Photovoltaic power supply.
- Low power consumption (supports up to 7 days without power supply).
- Supports up to 3 sensors with SDI -12 protocol, 1 I -12 weather sensor and 2 analogue inputs.
- Reading: 10 min and Upload: 60 min.
- Designs for greenhouse crops, horticultural crops and fruit trees.
- Scalable and interoperable.

Digital Data Farm

INIA CROP TECHNOLOGY

Digital Data Farm

INIA CROP TECHNOLOGY



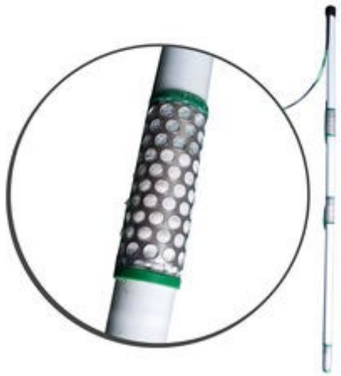
# Ag -Tech station (standard)

### Volumetric soil water content (SWC)

- Evolution of the SWC and soil temperature at several depths.
- It allows determining the time and frequency of irrigation that minimises leaching of water and nutrients.
- Non -destructive installation that does not affect root density and soil physical properties.

### Soil water matric potential (SMP)

- It determines the potential at which water is retained in the soil pores.
- It has higher sensitivity than SWC when the soil is maintained close to its field capacity.
- Soil water status indicator complementary to SWC assessment.




### Volumetric meter counter

- Determines the irrigation volume in real time (m $^3$/ha).
- Resolution of 1 L per digital electromagnetic pulse.

### Evaporative demand in -situ

- Robust thermohygrometer that measures in real time the temperature and relative humidity of the environment.
- It allows to calculate the vapor pressure deficit.

# Ag -Tech station (other conditions)

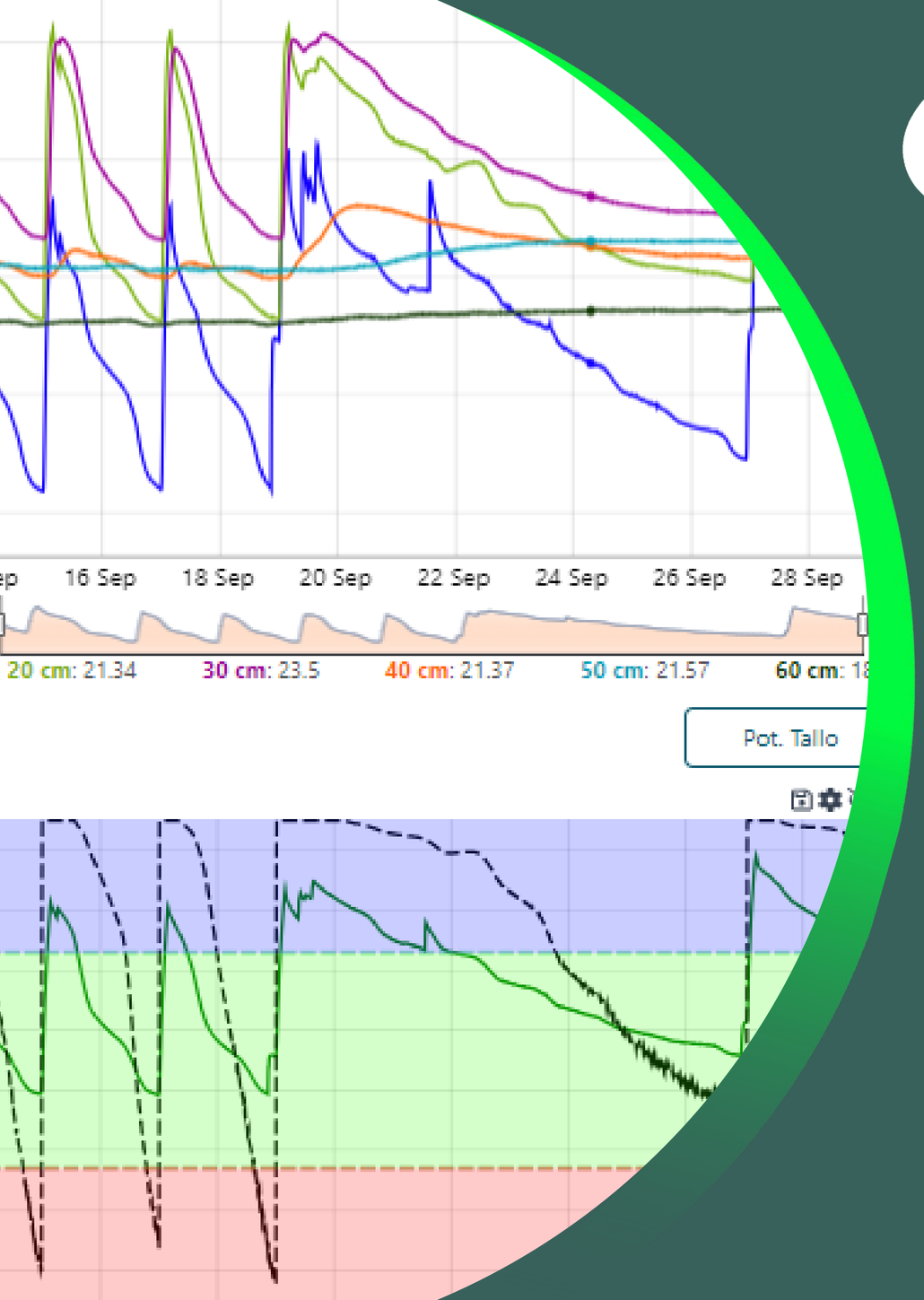
**Volumetric soil water content (SWC) & soil electrical conductivity (EC)**

- Evolution of the SWC and soil temperature.
- Determination of the soil pore water EC and bulk EC.
- It estimates SWC more accurately than FDR sensors and performs better in pots with substrate.


**Water EC at the emitter**

- Determination of the water EC and temperature in -line of emitters.

- **Total flexibility to the conditions and requirements of the farm or experimental unit.**

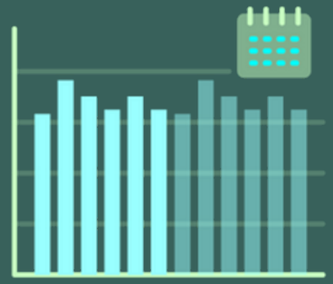



# Irriman Platform

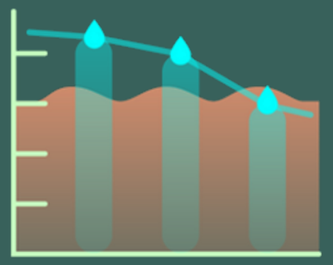
**The Smart Solution for Sustainable Agriculture.**

Real time soil water status monitoring

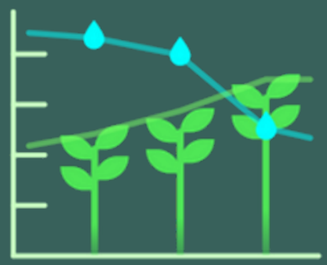
Monitoring of crop water status and growth



Applied water and irrigation scheduling



Optimisation of the ecological footprint



Prediction of soil water status and irrigation

Reducing costs and increasing profits

# Irriman Platform

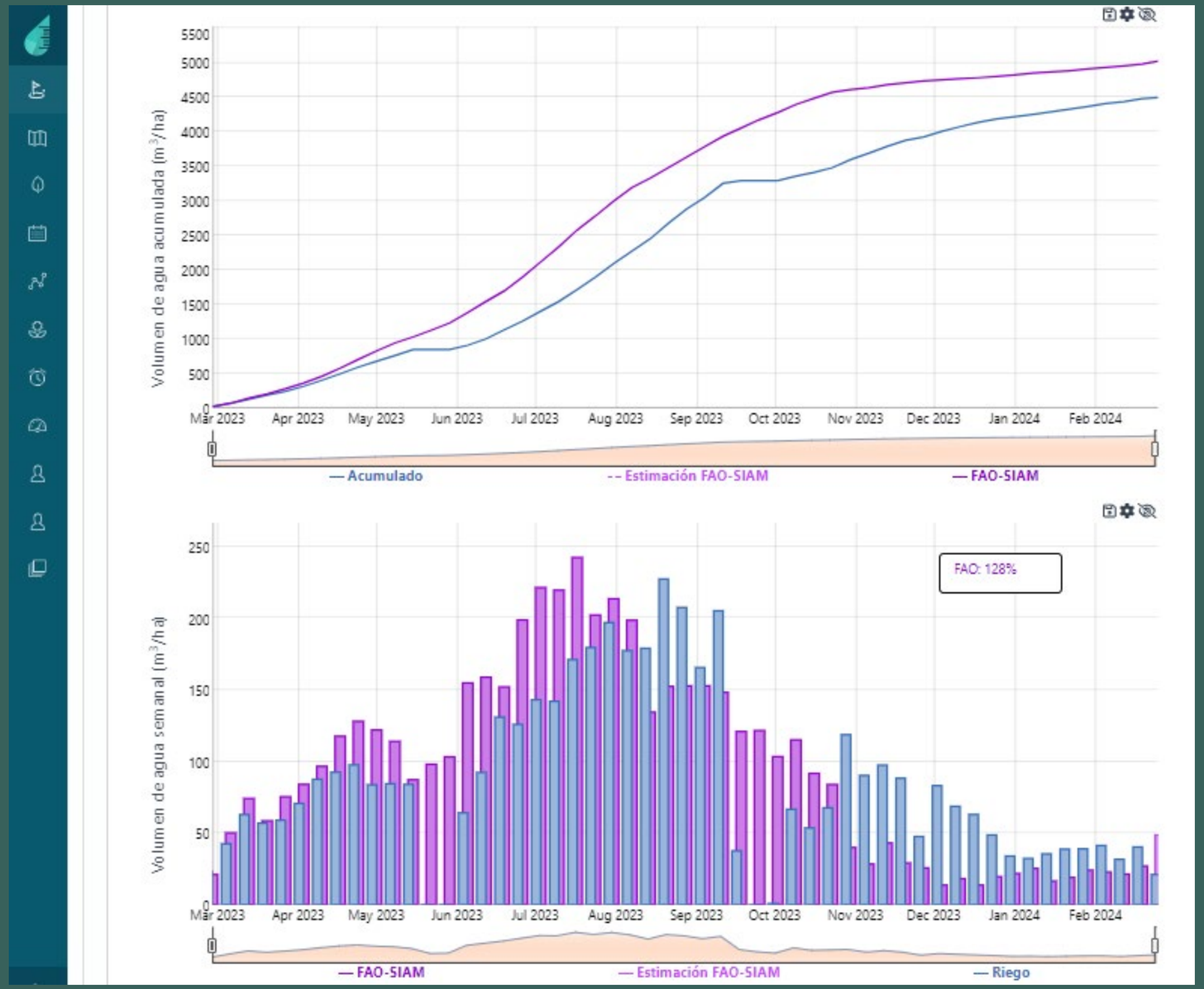
Evolution of soil volumetric water content at several depths.

Irrigation scheduling thresholds defined by expert team to maximise water productivity and crop sustainability.

Soil water content depletion (activity of the crop root system).

Daily climatic parameters: reference evapotranspiration and precipitation. Applied water volume in real time.

# Irriman Platform



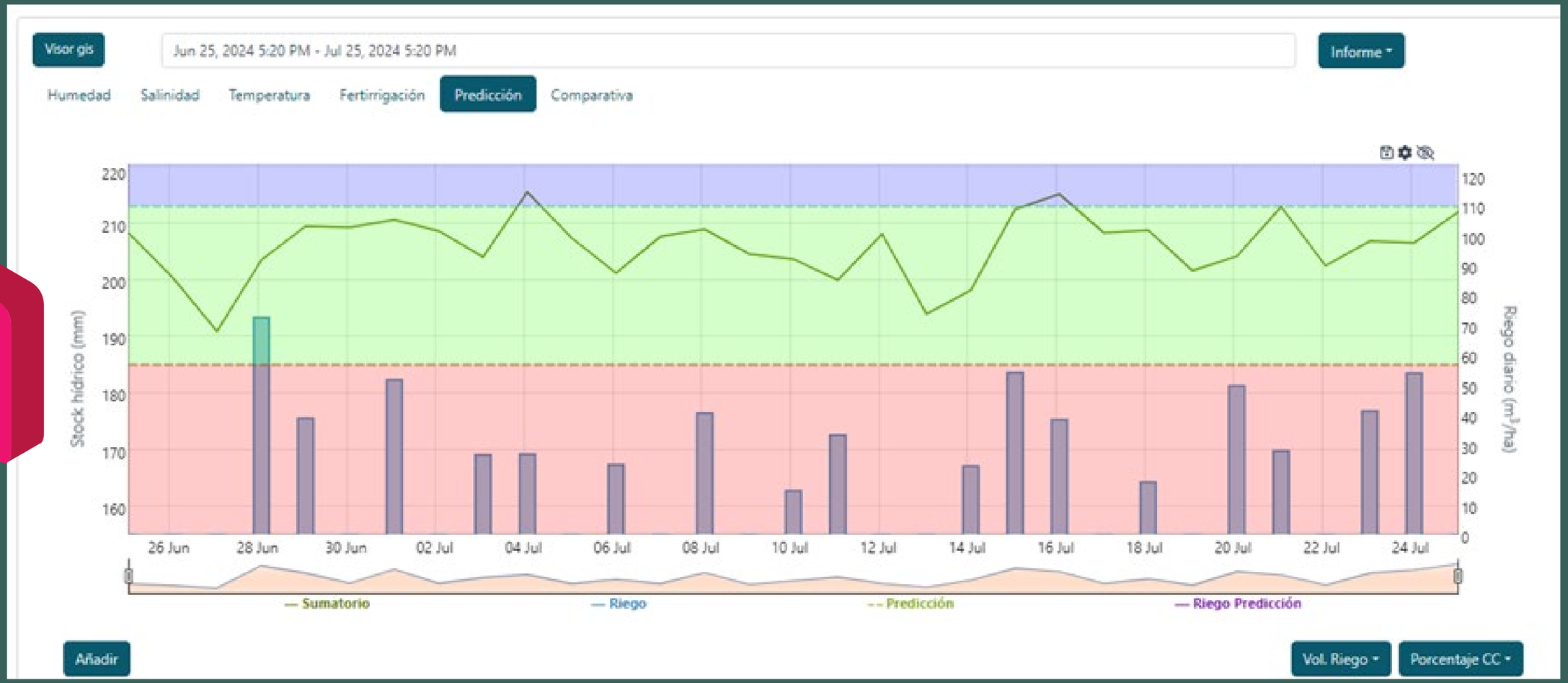

Irrigation water applied in the season and relation with respect to ET $_c$-FAO, previous season and under regulated deficit irrigation.

Accumulated and weekly.


Irrigation scheduling management indicators for specific periods.

# Irriman Platform

The Smart Solution for Sustainable Agriculture.

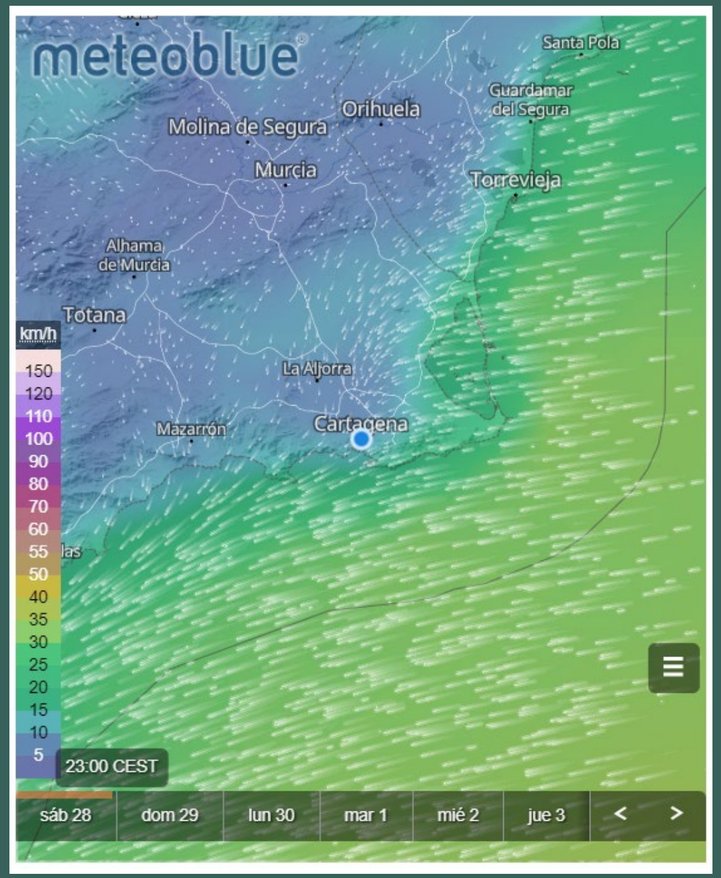


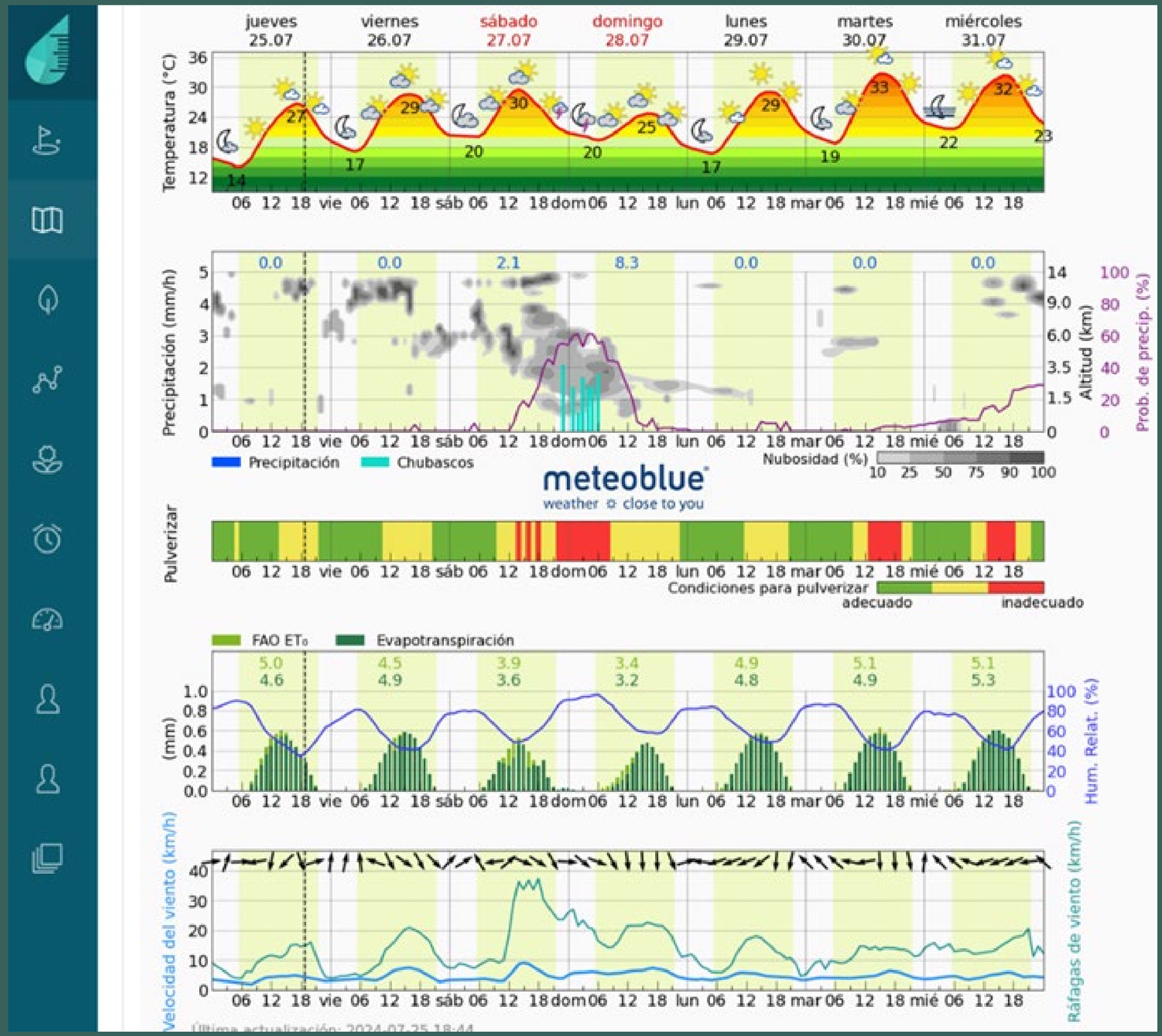

Module for the soil water status prediction as a function of maximum permissible depletion, irrigation volume and day of the year.

# Irriman Platform

## The Smart Solution for Sustainable Agriculture.

Incorporation of agro -climatic parameter prediction and visualization.



# Irriman Platform

The Smart Solution for Sustainable Agriculture.

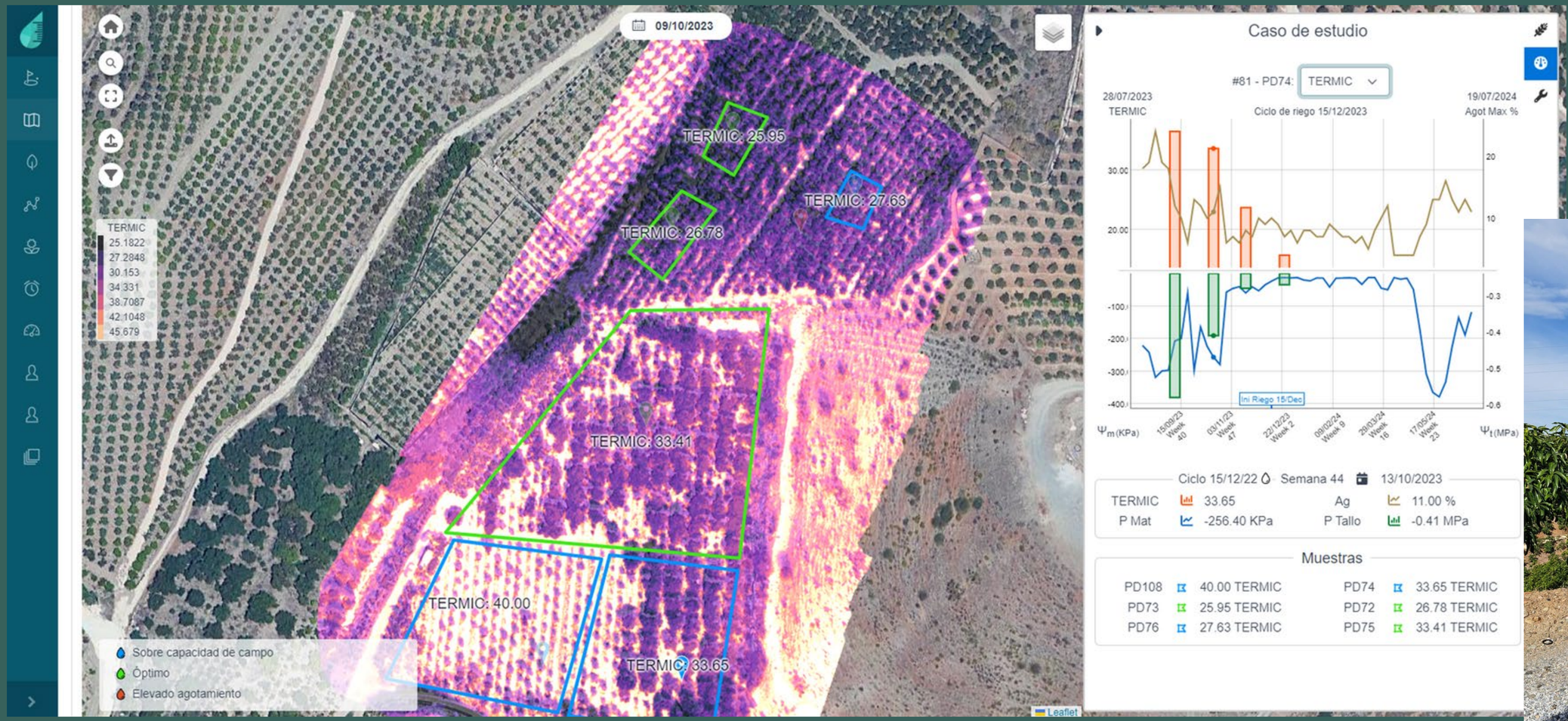

## GIS-viewer

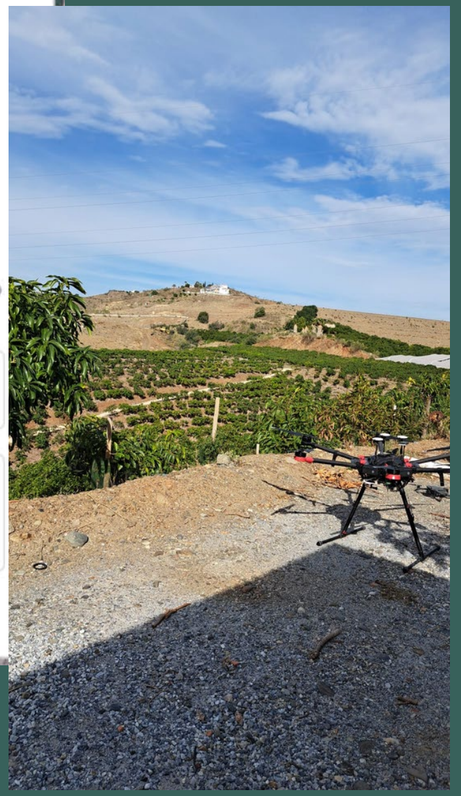
Integration of data from unmanned aerial vehicles (UAV) -mounted sensors with real -time and punctual data on soil and crop water status

# Irriman Platform

The Smart Solution for Sustainable Agriculture.

## GIS-viewer

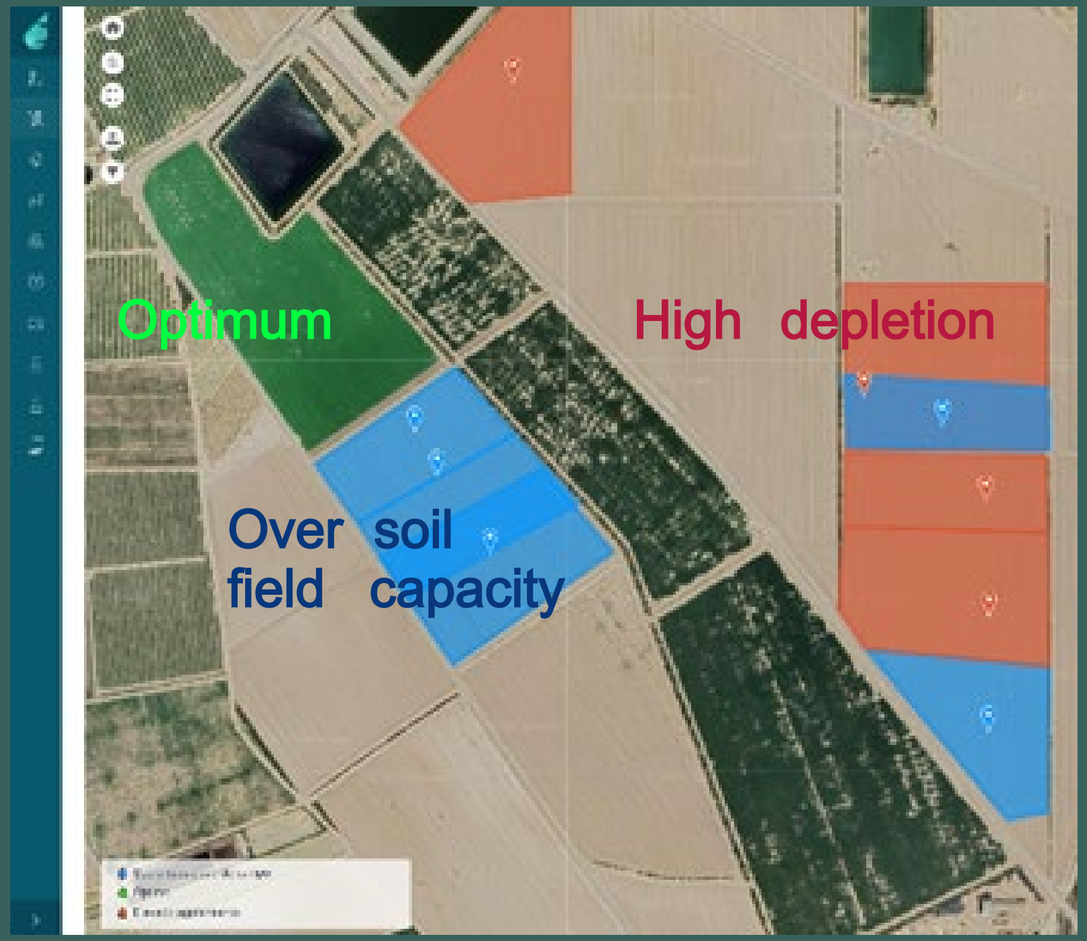


# Irriman Platform

The Smart Solution for Sustainable Agriculture.

## GIS-viewer




**Real -time visualisation of soil water status**

Over soil field capacity

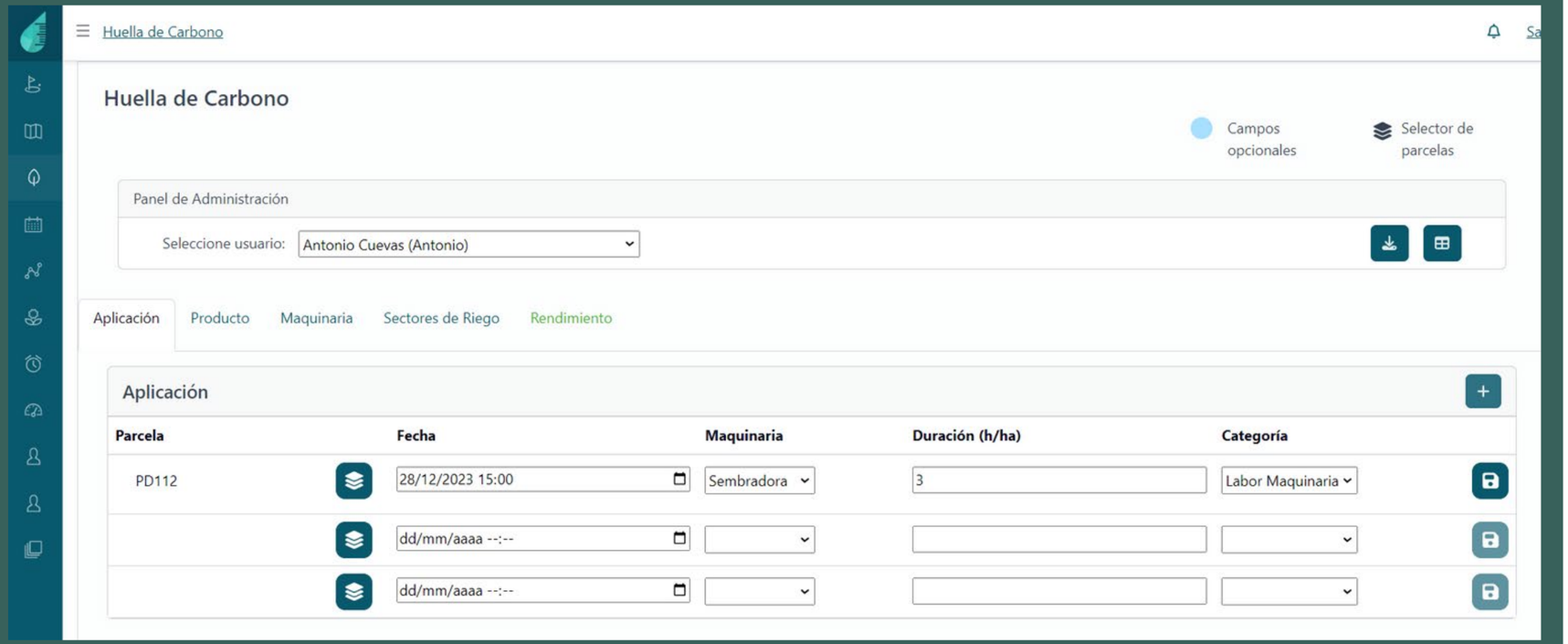
Optimum

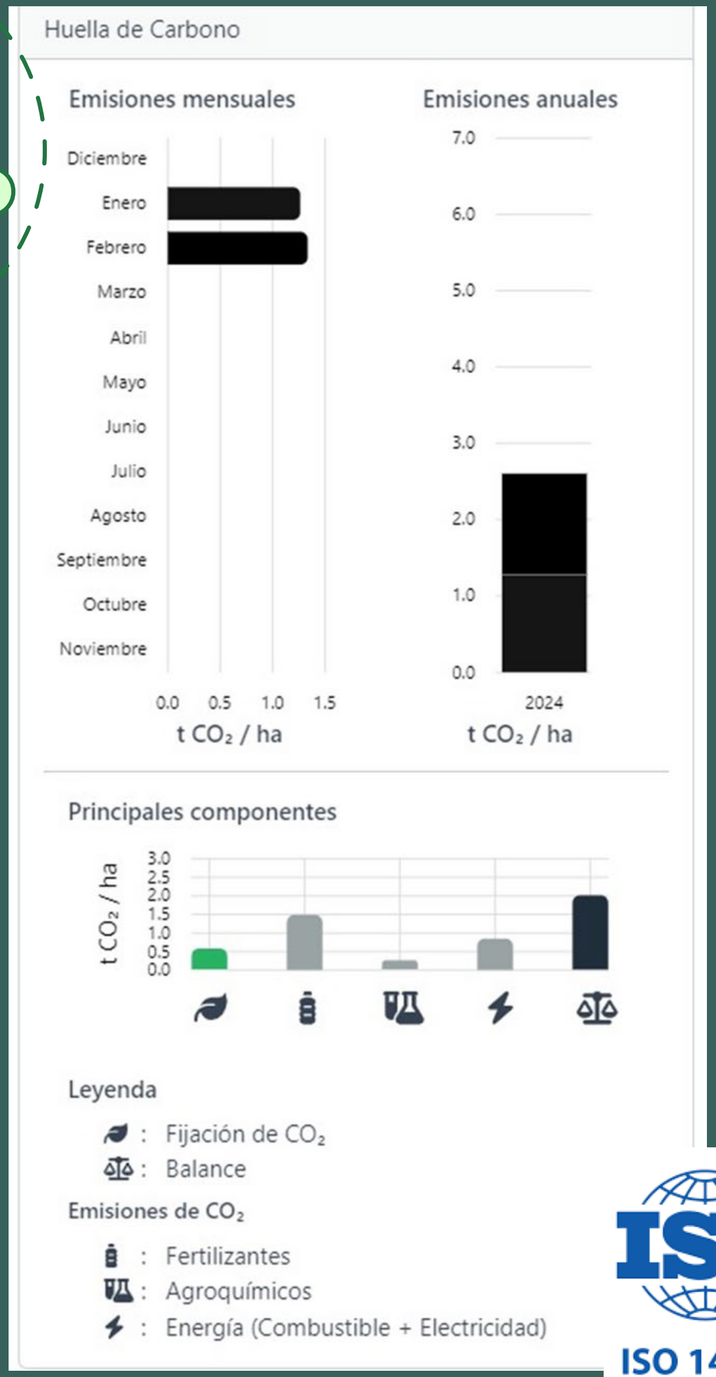
High depletion

# Irriman Platform

The Smart Solution for Sustainable Agriculture.


## Product Carbon footprint



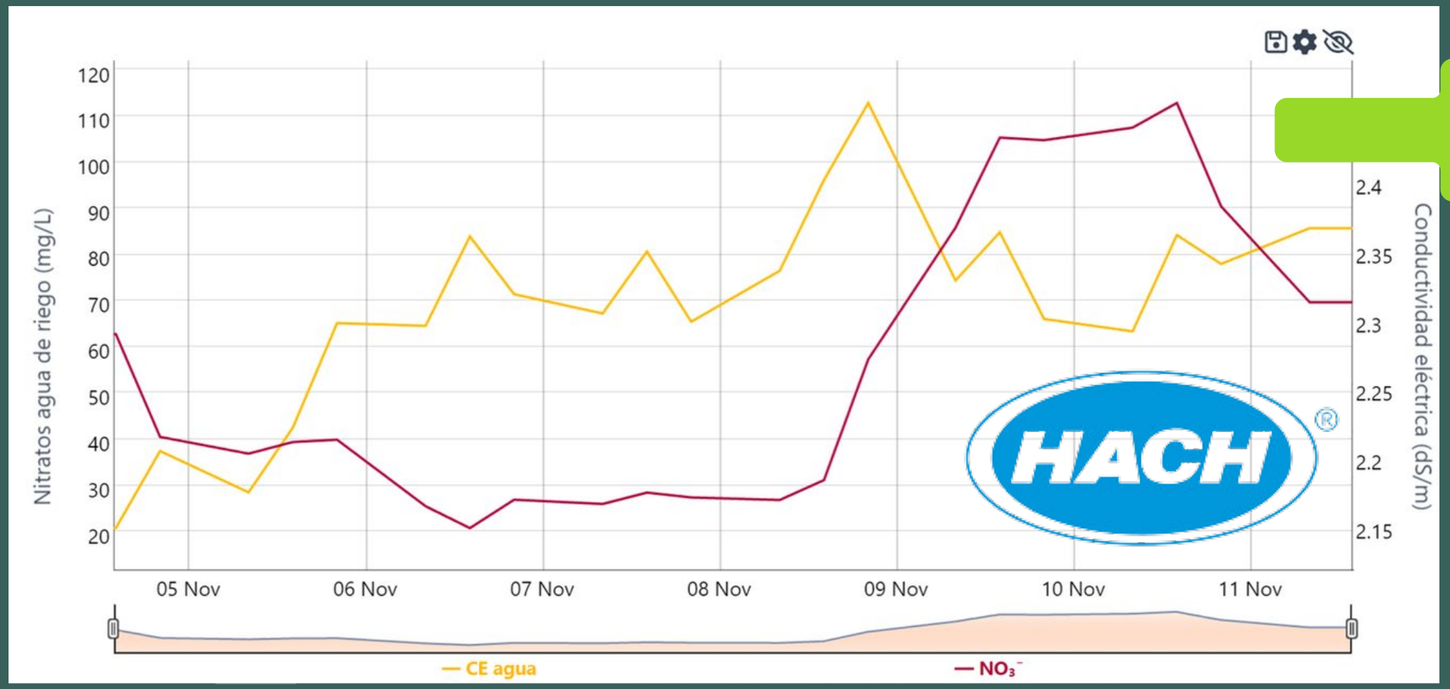




ISO 14067

# Irriman Platform

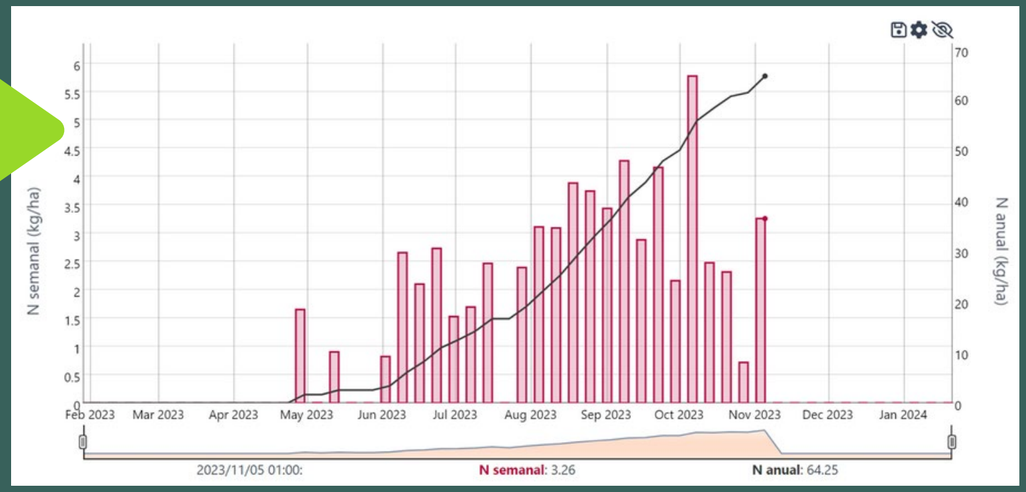
The Smart Solution for Sustainable Agriculture.

## Real -time monitoring of irrigation water quality




N supplied by irrigation water and fertilisers.

Pre - and post -fertigation injection.




Quantification of N applied to the soil on a weekly and seasonal basis.

# Irriman Platform

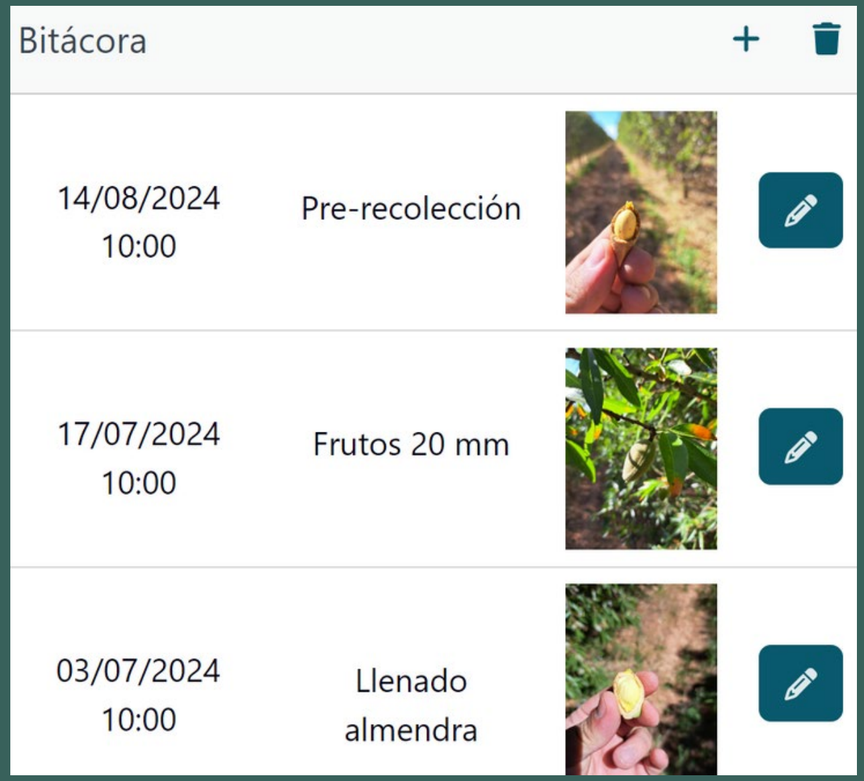
## The Smart Solution for Sustainable Agriculture.

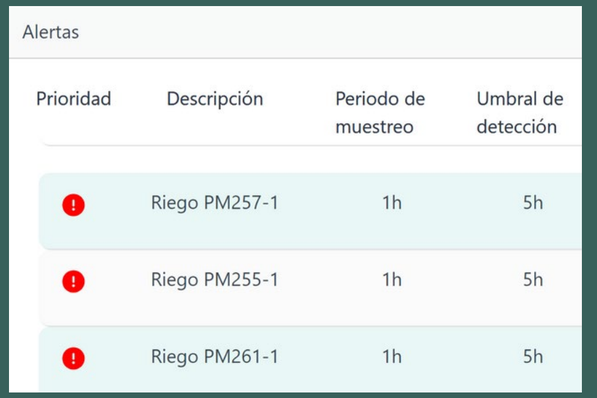
- Support service for irrigation assessment and establishment of thresholds.
- Case studies for crop clusters, zones, agronomic parameters, commercial parameters, etc.
- Alert system:

Excessive soil water depletion, long -term irrigation and weather events via email.

- Proposed expert and predicted irrigation scheduling based on forecast climate.
- Seasonal reports.
- Growing degree -day accumulation models.
- Phenological stages record.

## Additional features and services

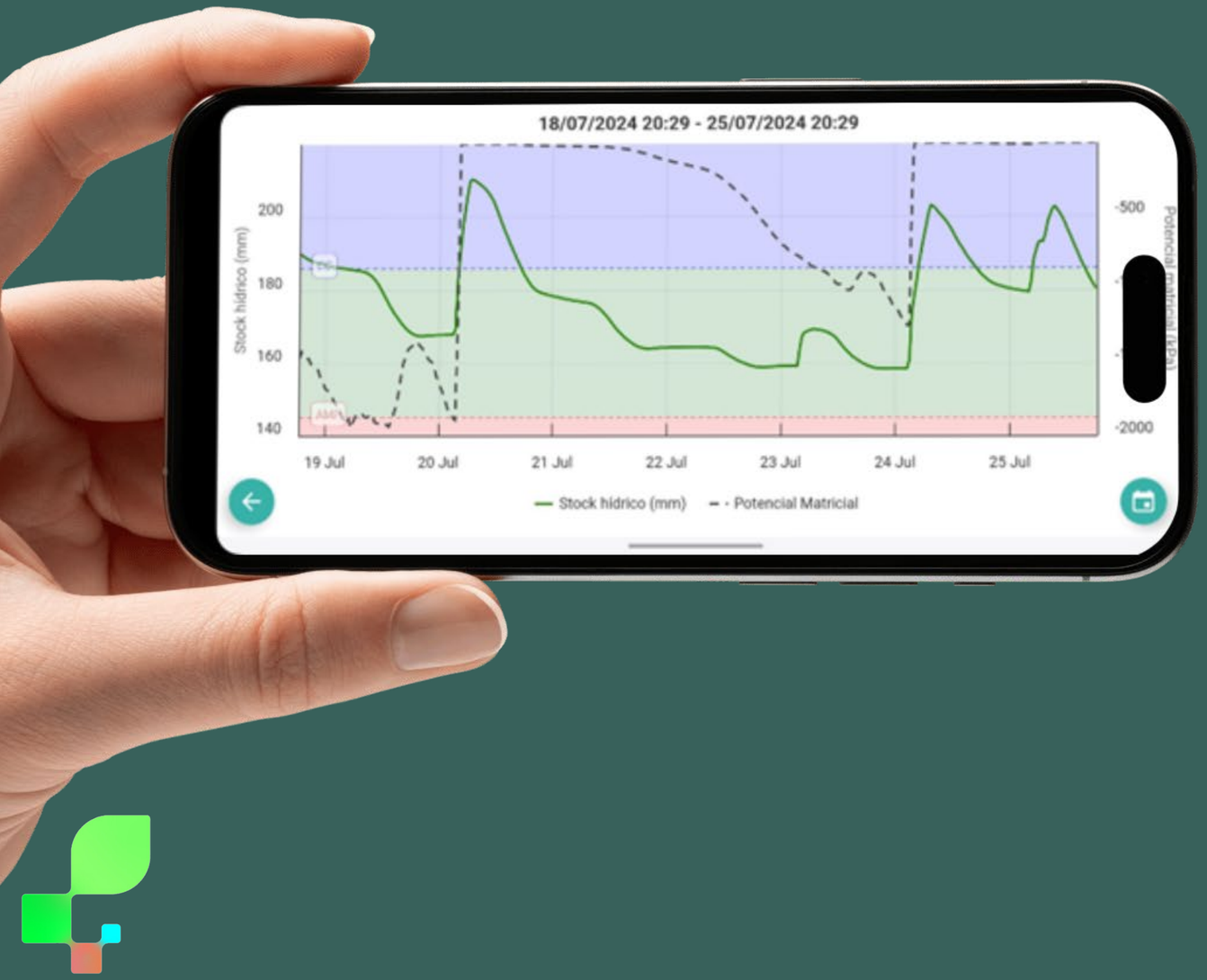


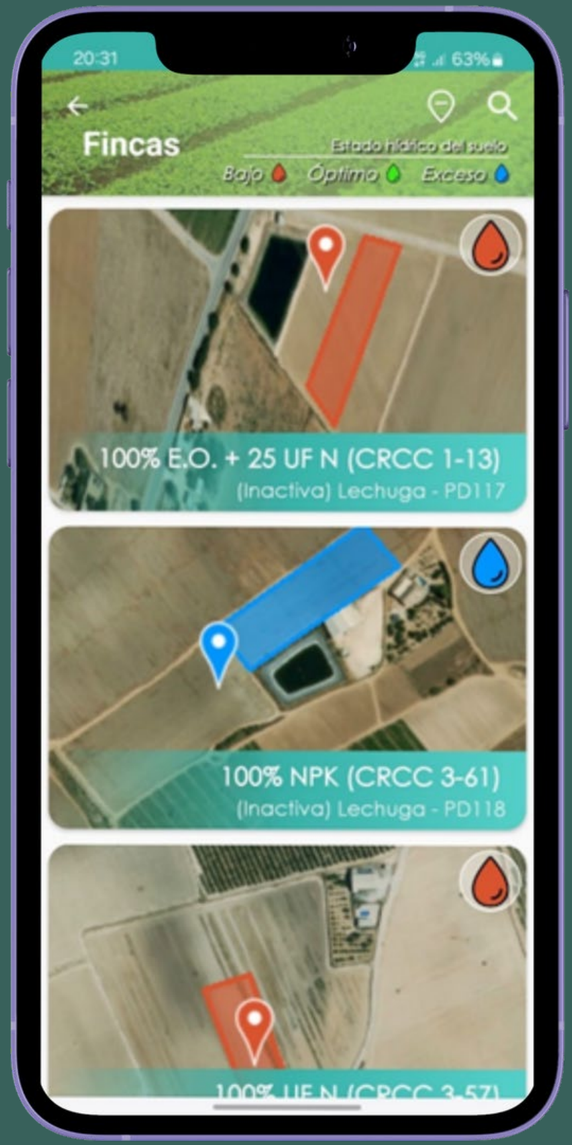



# Irriman Platform

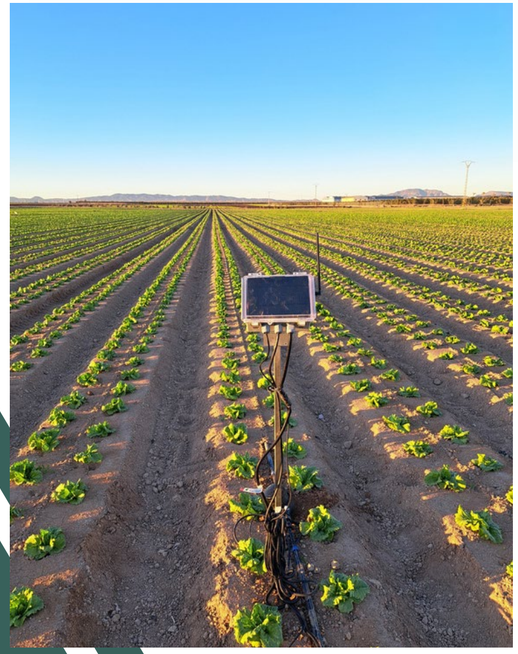
The Smart Solution for Sustainable Agriculture.

## Android APK




# Our solution has been validated in several crops






# Our philosophy and general results

Real -Time
Data Acquisition
Device

Irriman
Platform

Technology implementation

Support and monitoring

Permanent feedback

Decision-making with accurate data

25 to 40 % WPi

20 to 30 % NPK

20 to 40 % GHG

Tested on about
15,000 ha

# Our philosophy and general results

| Crop | $ET_c$-FAO ($m^3$/ha) | DDF ($m^3$/ha) | % water saved |
|---|---|---|---|
| Lemon cv. Fino 95 (in formation) | 978 | 755 | 22.8 |
| Lemon cv. Fino 95 (full production) | 4939 | 3640 | 26.3 |
| Mandarin cv. Orogros | 5796 | 4869 | 16.0 |
| Mandarin (full production) | 5248 | 3396 | 35.2 |
| Mandarin cv. Oronul | 5796 | 3897 | 32.7 |
| Mandarin cv. Nova | 5796 | 4292 | 25.9 |
| Orange cv. Valencia | 5363 | 5269 | 1.70 |
| Potato | 4205 | 2094 | 50.2 |
| Green pepper (greenhouse) | 5440 | 4145 | 23.8 |
| Lettuce (winter) | 1468 | 1132 | 22.9 |
| Lettuce (spring) | 3873 | 1379 | 64.4 |
| Melon (spring) | 3254 | 2284 | 29.8 |
| Melon (spring/summer) | 4102 | 3327 | 18.8 |

MANEJO DEL AGUA DE RIEGO EN AGRICULTURA A TRAVÉS DE UNA PLATAFORMA DIGITAL

**Pablo Berríos, Manuel Forcén, Abdelmalek Temnani, Susana Zapata, Raúl Pérez y Alejandro Pérez-Pastor***

Universidad Politécnica de Cartagena, Departamento de Ingeniería Agronómica. Paseo Alfonso XIII, 48. CP 30203 Cartagena, Región de Murcia.
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Interempresas media
www.interempresas.net
horticultura
www.horticom.com 2022/4 - 361

# Our philosophy and general results

## GHG emission measurement

## Crop water status

No reduction in yield or productivity, and even improved fruit quality.

# Our strategies and services are based on experience at field and high -quality scientific divulgation

sensors — MDPI

*Article*

## Irriman Platform: Enhancing Farming Sustainability through Cloud Computing Techniques for Irrigation Management

Manuel Forcén-Muñoz [1], Nieves Pavón-Pulido [2,*], Juan Antonio López-Riquelme [2], Abdelmalek Temnani-Rajjaf [1], Pablo Berríos [1], Raul Morais [3] and Alejandro Pérez-Pastor [1]

agronomy — MDPI

*Article*

## Optimizing Crop Water Productivity in Greenhouse Pepper

Susana Zapata-García [1], Abdelmalek Temnani [1], Pablo Berríos [1], Pedro J. Espinosa [2], Claudia Monllor [3] and Alejandro Pérez-Pastor [1,*]

ELSEVIER

Agricultural Water Management

Volume 287, 1 September 2023, 108464

## Deficit irrigation strategies of flat peach trees under semi-arid conditions

Abdelmalek Temnani, Pablo Berríos, Susana Zapata-García, Alejandro Pérez-Pastor

## Sensitivity to water deficit of the second stage of fruit growth in late mandarin trees

Pablo Berríos [1] · Abdelmalek Temnani [1] · Susana Zapata [1] · Manuel Forcén-Muñoz [1] · José Antonio Alejandro Pérez-Pastor [1]

ELSEVIER

Geoderma

Volume 263, 1 February 2016, Pages 70-77

## Efficient irrigation management can contribute to reduce soil $CO_2$ emissions in agriculture

Raúl Zornoza [a], R.M. Rosales [a], José A. Acosta [a], José María de la Rosa [b], Victoria Arcenegui [c], Ángel Faz [a], Alejandro Pérez-Pastor [b]

ELSEVIER

Agricultural Water Management

Volume 134, 1 March 2014, Pages 110-118

## Effects of timing and intensity of deficit irrigation on vegetative and fruit growth of apricot trees

A. Pérez-Pastor [a c], Mª C. Ruiz-Sánchez [b c], R. Domingo [a c]

agronomy — MDPI

*Article*

## Using Soil Water Status Sensors to Optimize Water and Nutrient Use in Melon under Semi-Arid Conditions

Susana Zapata-García [1], Abdelmalek Temnani [1], Pablo Berríos [1], Pedro J. Espinosa [2], Claudia Monllor [3] and Alejandro Pérez-Pastor [1,*]

ELSEVIER

Scientia Horticulturae

Volume 324, 15 January 2024, 112572

## Effect of deficit irrigation and mulching on the agronomic and physiological response of mandarin trees as strategies to cope with water scarcity in a semi-arid climate

Pablo Berríos, Abdelmalek Temnani, Susana Zapata-García, Virginia Sánchez-Navarro, Raúl Zornoza, Alejandro Pérez-Pastor

agronomy — MDPI

*Article*

## Modelling the Impact of Water Stress during Post-Veraison on Berry Quality of Table Grapes

Abdelmalek Temnani [1], Pablo Berríos [1], María R. Conesa [2] and Alejandro Pérez-Pastor [2,*]

Journal of the Science of Food and Agriculture — SCI where science meets business

Research Article

## Effect of deficit irrigation on apricot fruit quality at harvest and during storage

Alejandro Pérez-Pastor, Maria Carmen Ruiz-Sánchez, Juan A Martínez, Pedro A Nortes, Francisco Artés, Rafael Domingo

# They already trust our technological solutions

Comunidad de Regantes Campo de Cartagena

UNICA GROUP

el Ciruelo

Hero

ideagro an Altech company

VITACRESS

lapalma

FMC

acciona

POMA ECOLÒGICA BIOBOSCH GIRONA

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VICASOL

MOYCA

## We are part of LifeTRIPLET!

LIFE TRIPLET

Life

Coordinador

Universidad Politécnica de Cartagena

MIEMBRO DE EUT+ EUROPEAN UNIVERSITY OF TECHNOLOGY

Socios participantes

Agbar

CETAQUA CENTRO TECNOLÓGICO DEL AGUA

FMC An Agricultural Sciences Company

AZUD

AQUATEC

Comunidad de Usuarios de la Mancha Occidental II

FENACORE

imida

# Our business model

- We operate under a B2B model

We supply products and services to optimise your operations.

We are looking for long -term partnerships.

**We offer a highly specialised and customisable premium product.**

We specialize in the supply of:

- Hardware (sale and rental)
- Software as SaaS.
- Farmer decision support.
- Technological solutions.

Irriman Platform

# Our partners

CROP TECHNOLOGY

Since 1989 developing and installing advanced systems for the control of fertigation in all types of crops, as well as climate control in greenhouses, in projects carried out in more than 30 countries.


All in one for a **PERFECT CROP**

## ALL IN ONE :

**Complete control of your greenhouses**

***Climate and Fertirrigation*** integrated in one and at the same device.

# Our partners

**Be reliable in your water analysis. Hach offers you expert advice, outstanding technical support and reliable, easy -to -use solutions.**

Water quality is something we take very seriously at Hach. We know that your water analysis needs to be accurate, which is why we are committed to providing you with the complete solutions you need to be reliable in your analysis. Hach helps ensure water quality around the world by developing reliable, easy -to -use solutions and providing access to expert advice and exceptional technical support.

# Thank You!

## Contact Us

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**LinkedIn**
Digital Data Farm