WaterSENSE | REINFORM

REmote Sensing INtegration For Optimised Resource Managament

From Space to Field: Building the Earth Observation foundation for water-smart agriculture

Reliable water insights start with reliable data

In this edition of the WaterSENSE | REINFORM Newsletter, we focus on the scientific foundations of the project: the Earth Observation–based datasets that make scalable and transparent water monitoring possible.

Australia's agricultural systems operate under highly variable rainfall, strict water allocation frameworks, and large irrigated areas spread across multiple states. Reliable, consistent information on water availability and use is therefore essential for sustainable agriculture.

WaterSENSE | REINFORM is developing Copernicus-powered solutions to support water productivity assessment and sustainability reporting in agriculture. Over the past months, the consortium has completed the core development phase, transforming satellite observations and locally calibrated in-situ data into operational outputs for water use, crop yield, and crop water-use productivity.

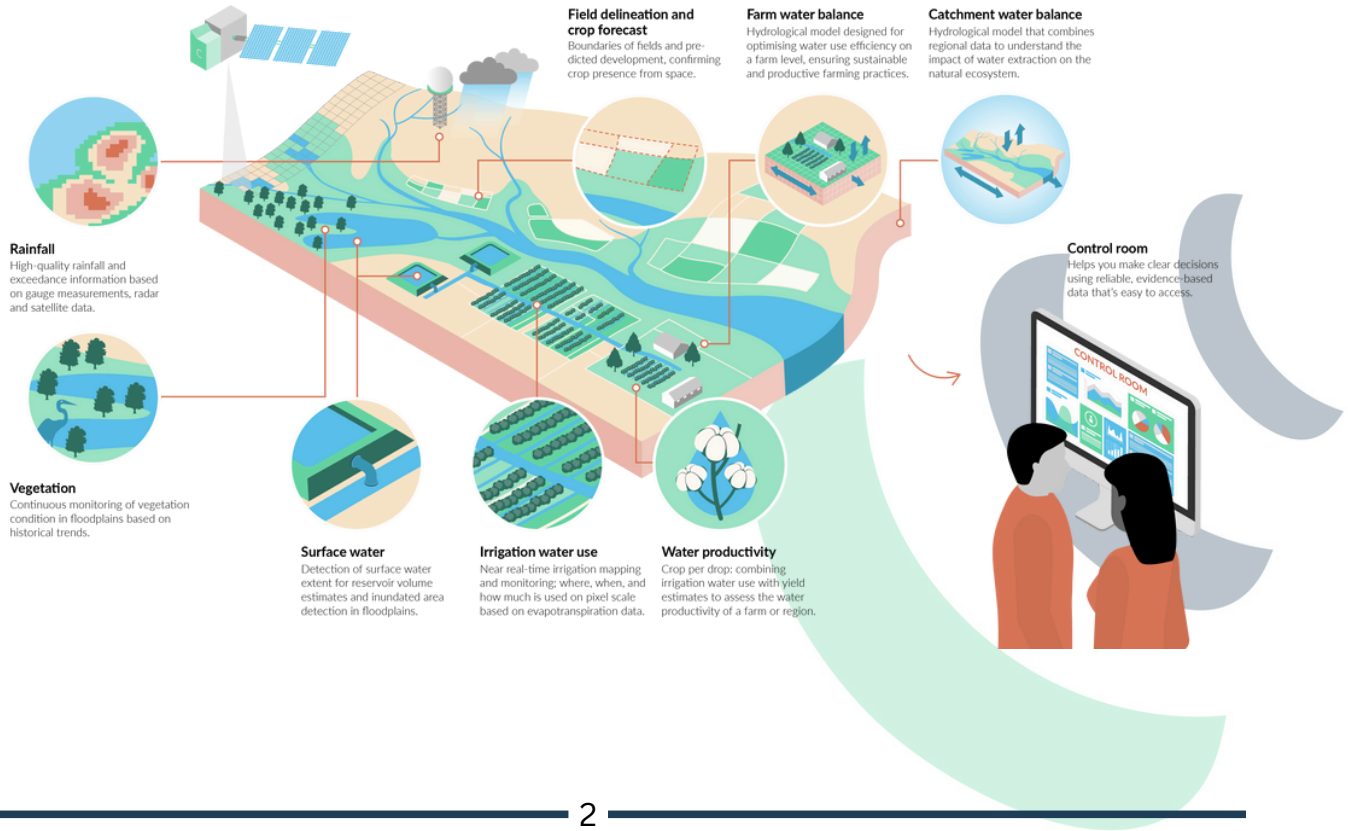
Why Earth Observation matters for sustainable water management

Sustainable agriculture requires accurate, consistent, and scalable information on how much water is available and how much is used in the field. Traditionally, this has relied heavily on local measurements and in-situ data, which, while valuable, can be costly, fragmented, and difficult to scale across large regions.

WaterSENSE | REINFORM addresses this challenge by combining Earth Observation data from the Copernicus programme with locally calibrated in-situ data. This approach enables water monitoring that is:

- Scalable, across regions, crops, and seasons
- Transparent, using reliable and open datasets
- Comparable, supporting consistent sustainability and certification assessments

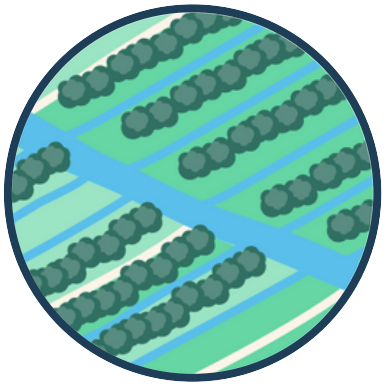
This Earth Observation foundation is particularly well suited to Australia's agricultural landscape, supporting applications from farm-level decision-making to industry reporting and regulatory frameworks.



What has been developed: the building blocks of REINFORM

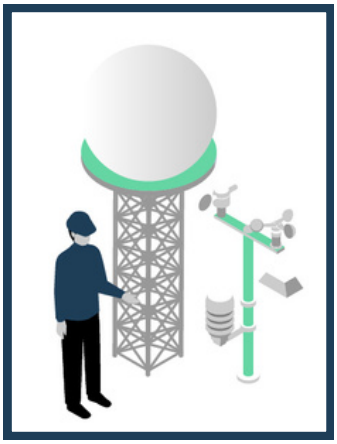
The project has developed three key Earth Observation based components that together form the backbone of WaterSENSE | REINFORM's monitoring capabilities:

Irrigation monitoring



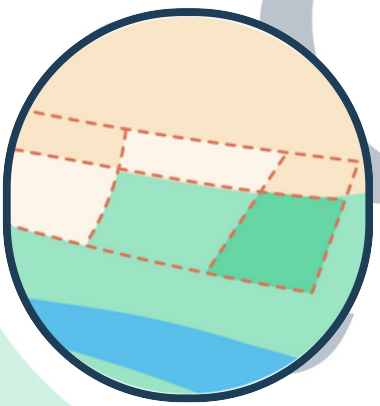
New algorithms transform satellite signals into irrigation maps, providing insight into irrigation dynamics and the extent of irrigated areas. This enables consistent monitoring of water use without relying exclusively on field - installed sensors.

Rainfall estimation



Satellite observations are combined with existing data sources to generate scalable rainfall products. These datasets support hydrological modelling and water balance calculations at regional and national scales.
At field scale, rainfall monitoring combines radar data with in-situ rain gauges, providing growers with improved insight into the high spatial variability of rainfall across Australian farms.

Crop type and field boundary mapping

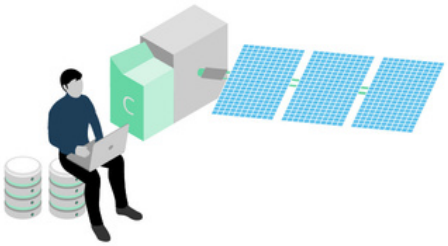


Machine-learning techniques applied to satellite imagery allow the automated detection of crop types and field boundaries. This reduces dependence on manually provided data and supports consistent monitoring across large agricultural areas.
Together, these components provide the data foundation required to assess water productivity and sustainability indicators in a transparent and repeatable way.

Copernicus Corner – The backbone of REINFORM

Copernicus is a key enabler of REINFORM's monitoring approach.

The project relies primarily on data from the Sentinel missions:



- **Sentinel-1 radar data** supports monitoring independently of cloud cover, which is essential for reliable irrigation analysis.
- **Sentinel-2 optical data** enables crop mapping, vegetation analysis, and surface water monitoring.

Thanks to Copernicus' open-access, high-quality, and long-term data policy, REINFORM solutions are not limited to a single region or pilot site. Instead, they can be scaled, transferred, and reused supporting sustainable agriculture and water management both in Australia and beyond.
REINFORM demonstrates how EU-funded Copernicus services deliver concrete public value, translating satellite data into actionable insights for farmers, industry, and policymakers.

What this means for stakeholders

The Earth Observation foundation developed within REINFORM supports a wide range of users across Australia:

- **Farmers and advisors,** by enabling consistent insights into water use and crop conditions.
- **Industry bodies and certification initiatives**, accessing transparent, data-driven indicators aligned with sustainability reporting frameworks.
- **Water managers and policymakers**, benefiting from harmonised water-use information that scales beyond individual farm boundaries

These capabilities are essential for building trust in sustainability reporting and for supporting evidence-based decision-making.

What comes next?

With the Earth Observation foundation in place, WaterSENSE | REINFORM now moves into the demonstration and co-development phase in Australia.
In the coming months, these Copernicus-powered datasets will be:

- Integrated into the WaterSENSE toolbox
- Tested and validated with Australian stakeholders
- Used to support sustainability and certification discussions

Future newsletters will showcase how satellite-based data are translated into practical tools and real-world applications, through collaboration with Australia's water-smart agriculture community.

Stay connected

If these topics resonate with you, whether you're a grower, water manager, or sustainability lead, follow us on LinkedIn and reach out. Looking for more information? We'll be sharing results from our upcoming demonstrations, practical tools, and opportunities to collaborate across Australia's water-smart agriculture community.

- Visit www.watersense.eu
- Subscribe to our newsletter
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