

# Operationalizing the increase of water use efficiency and resilience in irrigation (OPERA)

Marius Heinen, Jochen Froebrich, Claire Jacobs (ALTERRA), Willem De Clercq (SUWI), André Chanzy, Dominique Courault (INRA), Sara Muñoz Vallés (Evenor-Tech), Antonio Díaz Espejo (IRNAS-CSIC), Anna Dalla Marta (DISPAA Uni Florence), Filiberto Altobelli (CREA), Karolina Smarzyska, Wiesława Kasperska, Leszek Labedzki (ITP)



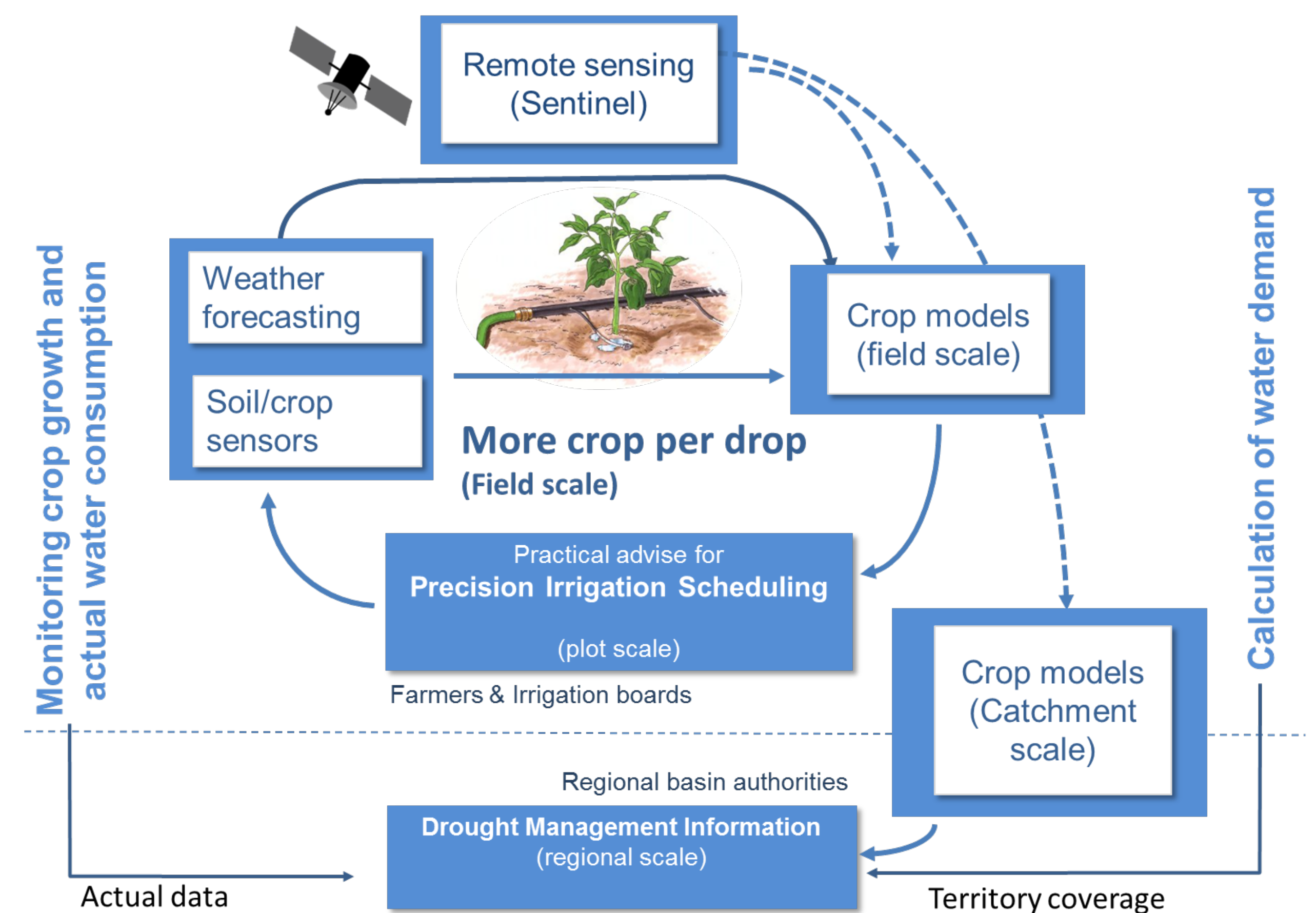
## Background

Extreme climatic events have negatively affected crop productivity in Europe and this is expected to further increase yield variability under climate change. Information is needed at when and where water shortage is to be expected. Recent decades provided large developments in sensors and models to analyse soil water dynamics. However there is a significant gap in applying the necessary combination of such techniques to predict upcoming water demands within a region over a time span of 10 to 15 days. OPERA will focus on best possible combinations of information technologies and develop innovative service models to realize a practical transition towards an increased use of precision irrigation in practice.

## Objectives

OPERA will strengthen farmers' adaptation to climate change and applies a transdisciplinary approach to identify jointly:

- How farmers and irrigation organizations can react more flexible to predicted water variability
- Adequate combinations of soil and crop sensors, remote sensing, weather forecast and simulation models for better consideration of rainfall, evapotranspiration and soil moisture in irrigation scheduling
- Integrate experience in operationalizing precision irrigation from various climatic zones in Europe and South Africa to identify the best applicable service models to realize a practical transition towards an increased use of precision irrigation in practice.



**Figure 1.** Linking weather, RS, in-situ crop and soil sensors, crop and soil models, and stakeholders to synthesize case study results in a concept for an operational support of precision irrigation at field scale and water saving at catchment scale

WP1 Identifying sector needs to increase resource use efficiency, lead IRNAS – CSIC, Spain

WP2 Forecasting water availability and critical water demand, lead INRA – EMMAH, France

WP3 Guidance for optimal irrigation water strategies (case studies), lead ITP, Poland

WP4 Conceptualization of practical service models for irrigation, lead CREA, Italy

WP5 Project management and dissemination, lead ALTERRA, The Netherlands



**Figure 2.** Case study sites in Europe and South Africa

## Case study approach

A series of case studies (France, Italy, Spain, Poland, The Netherlands and South Africa) demanding increased water use efficiency and resilience are used to test transversal research lines:

- a) The use of remote sensing data at high resolution for water demand
- b) Improving soil water content knowledge using sensors and upscaling
- c) Ensemble weather forecast and decision making under water uncertainties with farmers.

## Expected impacts

OPERA contributes to optimal watering strategies and water saving, and an increase of farm competitiveness in the agricultural market. The short term impact of OPERA will be the possibility to pick up elaborated combinations of ICT products to forecast agricultural water needs. The mid term and long term benefits will result from realizing a better advisory service in the agricultural sector under anticipation of climate variability and critical moments of water scarcity.

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