

## **SIM**

### **SMART IRRIGATION FROM SOIL MOISTURE FORECAST USING SATELLITE AND HYDRO METEOROLOGICAL MODELLING**

The work aims at developing an operational tool for real-time forecast of irrigation water requirements to support parsimonious water management in case of actual or forecasted drought period. The system will be a prototype version of a world wide web platform (smart device), that will support users in parsimonious irrigation water management from basin authority to single farm. In particular in water limited period: i) farmers to maintain soil moisture in an optimum value interval allowing water saving and reducing plant stress, ii) irrigation consortiums to manage the water among users, according to the actual and forecasted water need; iii) water authorities to manage at basin scale the water withdraw of reservoirs respect to the actual and forecasted water request, and quantitative meteorological forecast. The system combines satellite monitoring of soil moisture and of evaporative fluxes, quantitative meteorological forecast and detailed distributed hydrological modelling of soil water balance and crop water needs. It provides real-time and forecasted soil moisture behaviour at high spatial and temporal resolutions (from 10 m to 250 m, from 1 hour to daily) with forecast horizons from few up to fifteen days. This compared to water stress thresholds defined for each specific crop and its growth stage will determine the correct timing of irrigation and the amount of water. Economic impacts at basin scale of the developed technology will be evaluated starting from single farm to larger irrigation districts considering not only the role of water and energy saved in financial terms based on the local cost of the water and crop production, but also the environmental benefit due to a parsimonious use of the water .

The proposed methodology will be applied in different case studies in Italy, in the Netherlands, in China and Spain, characterised by different climatic conditions, water availability, crop types and irrigation schemes. The proposed system, for its versatility, can be easily exported for applications to the other case studies worldwide. The presence of Chinese partner will help in demonstrating this.

Water authorities, farmers consortium and single farms will be involved for the validation of the product and the analysis of its economic impacts for the demonstration area. The expected innovative tool will have impact both on the scientific community, as well as on operative farms and water authorities. These results will be guarantee from the work team, that represents a good compromise between research institutes and small enterprises which can implement advance research tools into an operative industrial product.