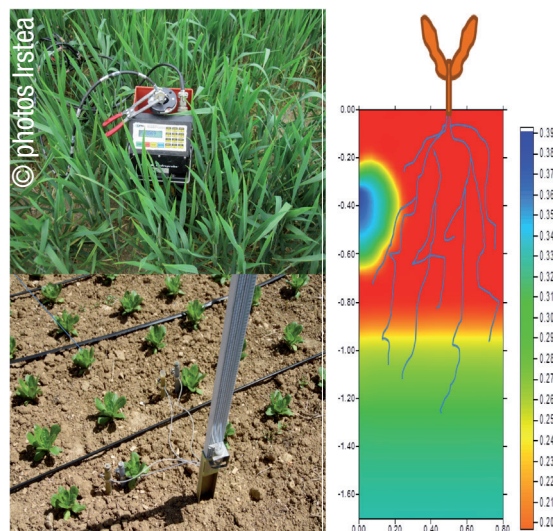


Evaluation of technical and agro-environmental performance of irrigation systems

Description

Combining experiments (in controlled and field conditions) and numerical simulation the PReSTI platform works on innovative irrigation systems. It aims at optimizing their performance at different levels of the water stream, from water uptake to its application to the plant. The valorization of treated wastewater through irrigation or application of fertilizers (fertigation) is also addressed along with the development of irrigation scheduling tools.

The platform conducts research until the final application, R&D with the industry, tests on irrigation equipment under standardized protocols and quality insurance process.



Soil water status: measurement (neutron probe, tensiometer) and numerical simulation

Equipment

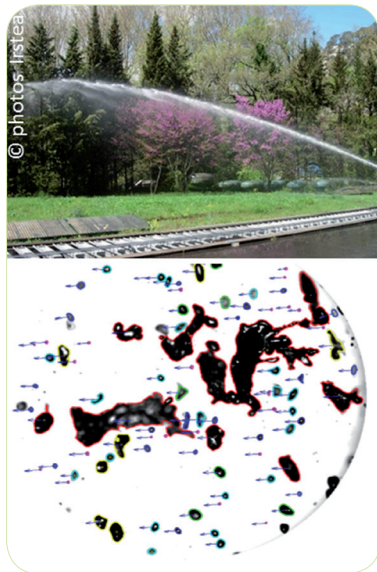
■ **Laboratory:** testing benches and high level equipment to characterize the movements of fluids in irrigation systems, in irrigation jets, when transporting particles: rheometer, IR spectrometer, particle image velocimetry facility (laser and high speed camera).

■ **Experimental plots (3,5 ha):** with different irrigation systems, different crops and farming practices, with soil and plant water transfer and status measurement facilities (neutron probe, tensiometers, gamma-densimeter...).

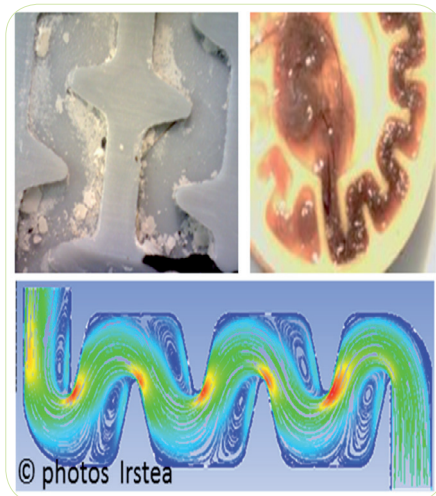
Applications

The platform studies:

- Drip irrigation emitters manufacturing variability, $Q=f(P)$ curve
- Flux of water and particles in equipments
- Uniformity in sprinkler irrigation, size and velocity of droplets, losses by evaporation and drift
- Factors of drip irrigation systems ageing (physical, biological, chemical clogging)
- Development and water status of irrigated crops
- Water balance of agricultural crops
- Energy use in irrigation systems



"Spray : jet analysis coming out of the nozzle, size and speed drops"



"Labyrinth of micro-irrigation dripper : clogging and flow visualization"

Potential development

- Observation of detailed operation of drippers in a perspective of increasing durability of performance
- Combining irrigation and fertilization (fertigation) or plant protection (biocontrol products or pesticides)
- Special constraints of irrigation in urban gardens
- Life cycle analysis, water footprint of irrigated crops
- Sprinkling: analysis of jet issuing a nozzle, size and velocity of water particles

Human skills

The team comprises 5 researchers, 3 engineers, 4 technicians, 6 under-going PHD, 3 to 5 temporary staff.

Main skills are on fluid mechanics (hydraulic, hydrodynamics), agronomy (soil science, crop growing, environment, metrology) and modelisation.

Partnerships

Private:

- Irrigation (Irrifrance, Netafim, NaanDanJain, Komet, Yzatec...)
- Environment (Ecofilae, Sun'R, SDEC, Yzatec, SAUR...)
- Water and crop management (BRL, SCP, CACG, Onema)
- Farmers and cooperatives (Terrena, Arterris, extension services...)

Scientific:

- INRA (LEPSE, EMMAH), Aix-Marseille University (M2P2, IRPHE), Montpellier SupAgro, Paris VI University, Sao Paulo University (Brazil)

Institutional:

- Agricultural chambers, CTIFL, Arvalis...