The efficient use of water is essential to sustainably increase the productivity of irrigated agriculture. Digital technologies and remote sensing products are important support tools for this purpose.

The application of theoretical concepts of the water-soil-plant-atmosphere relationships, combined with the use of remote sensing and digital technologies, facilitate decision-making for irrigation scheduling.

The implemented initiative

The general objective of the project is to generate a study to identify how to reduce the yield gap in a group of selected crops, through the use of irrigation schedules adjusted to the water requirements. The specific objectives are: 1) to make an initial diagnosis of the pilot areas and develop the infrastructure of the Irrigation Advisory System (SAR); 2) to develop a study of an information technology system that will constitute the operational bases of the SAR; 3) to carry out test studies to implement the SAR and establish the basis for its escalation. The study is being carried out in pilot areas of Argentina, Nicaragua and Uruguay and it is expected that the activities of this project will reach 1,550 farmers.

The water balance of crops in real time, using various sources and platforms, will provide answers to decision-making on irrigation scheduling. The innovations will be adapted to the particularities of family agriculture.

The technological solution

An important aspect to improve the efficient use in agriculture is the application of irrigation depths adjusted to the water needs of crops and establish an appropriate irrigation scheduling. However, not enough attention is paid on these issues. Family agriculture has limitations to access to technologies and information according to its needs. The increasing access to the Internet, mobile telephony, remote data transmission and remote sensing services, is a great opportunity to transfer information and knowledge to the family agriculture. The real-time monitoring of the climate, the water content in the soil and the state of the crops, are tools of great potential to integrate the farmers into the new digitally-driven agri-food systems and provide them with answers for decision-making on the irrigation water management.

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Main advances. Warning of irrigation alerts

The main result of the project is the development of the Irrigation Advisory Service (SAR), which answers the two basic questions of irrigation scheduling: when and how much to irrigate? The SAR shows, graphically and numerically, the availability of water in the soil. When the water content falls below a threshold (which mainly depends on the crop and the type of soil), the irrigation alert is given. The SAR has been tested in alfalfa, cotton, strawberry, tomato, pepper and beans. Other results: the diagnosis of irrigation management in the pilot areas of the project; strengthening of the meteorological information networks, through the installation of 6 automatic stations; the use of satellite images for soil moisture estimation through algorithms, using predictor variables such as bulk density and texture of soil, and spectral indices; project results communicated through reports, workshops and seminars.

Results

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