

CGUCJT

Decision-Support System for the Jucar-Turia Canal Irrigation System

The Jucar-Turia Canal Water Users Association (CGUCJT) is the **governing and coordinating body for the upstream network, acting as a liaison between canal water users and the Jucar River Basin Authority (CHJ)**. The system serves both municipal water supply and irrigation. The CGUCJT has managed the Jucar-Turia Canal since 1979. This strategic water conveyance and delivery infrastructure in eastern Spain connects the Jucar River with the Turia River Basin, crossing a total of 14 municipalities.

In terms of water supply, **the canal provides water to approximately 2.3 million residents** in the Valencia metropolitan area, the municipality of Sagunto, the Camp de Morvedre Consortium, and the Ribera region, with volumes of around 145 hm³/year. This supply is strategic for ensuring water availability during periods of drought and for supplementing the Turia River's own resources.

In terms of irrigation, the CGUCJT manages irrigation water deliveries from the Tous Reservoir to around 25,000 hectares of farmland, serving nearly 35,000 water users in 21 irrigation associations, covering a total of 30 municipalities, under a combined surface and groundwater concession. The annual irrigation water delivery—in an area where mainly perennial crops (citrus, persimmons, avocados, and kiwifruit) are grown—can reach 151 hm³, of which up to 95 hm³ comes from surface water. Therefore, coordination with other local water resources available to the irrigation associations, through an extensive network of wells, is essential. **The CGUCJT plays a key role in the joint management of the resource, water allocations, the defense of users' rights, and the adaptation of the system to current challenges** such as water scarcity, modernization, and climate resilience.

Challenges

The day-to-day operation of the infrastructure posed a challenge for the CGUCJT, given the need to **optimize the system's hydraulic performance, prioritizing municipal water supply while meeting water deliveries through 35 irrigation turnouts**, with daily regulation from the Tous Reservoir.

The service's consistent reliability and continuity had masked a number of structural challenges, which became apparent following the devastating 2024 flooding in Valencia. **Both irrigation and water supply users had taken the availability of the service for granted and were unaware of its structural fragility and complex management**, despite increasing climatic and regulatory pressures.



Project highlights

- Centralized, real-time management of the Jucar-Turia Canal irrigation system
- Integration of SCADA, GIS, and agronomic data into a single platform
- Accurate calculation of water needs using sensors and satellite imagery
- Greater water efficiency, better user coordination, and an enhanced ability to anticipate critical conditions

Following the infrastructure modernization process and the conversion of irrigation systems to technologically advanced methods, the CGUCJT faced new challenges associated with increasingly complex resource management. Changes in diversion flows, irrigation delivery schedules, and water withdrawal methods **required more precise operational control to ensure that the volumes released from the Tous Reservoir corresponded—in quantity and timing—to the actual consumption of the irrigation associations**, thereby ensuring the canal's hydraulic balance and equitable water delivery among users.

Another structural challenge was the **lack of unified digital mapping of all the member associations and the main infrastructure**. This information was essential to accurately calculate the areas eligible for irrigation, define water allocations, and improve the overall planning of the system and the distribution of available annual volumes, ensuring consistency between the CGUCJT's centralized management and the operational management of each irrigation association.

Furthermore, in a scenario marked by water scarcity and climate variability, in a highly competitive user environment, the CGUCJT faced the challenge of **optimizing the use of available water through predictive tools capable of accurately calculating crop water requirements**, and of integrating meteorological data, moisture sensors, and agronomic criteria.

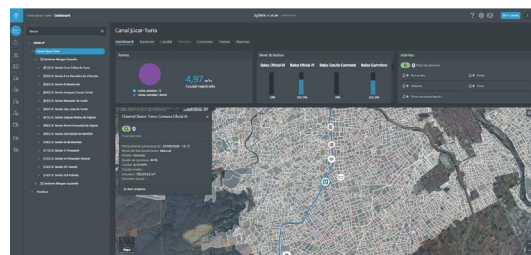
Solution

Xylem Vue's **Agrotwin solution** is a comprehensive platform designed for **monitoring, remote control, and decision support in irrigation management**. Its implementation at the CGUCJT has led to the deployment of a system that centralizes information, supervises infrastructure performance, and optimizes canal operations.

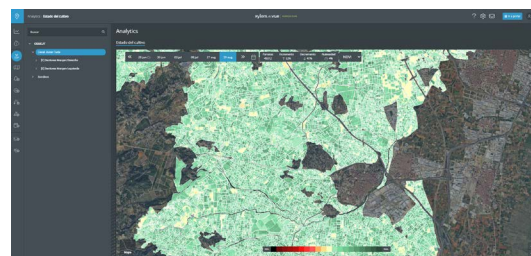
This solution was designed with the CGUCJT's specific needs in mind, given the system's operational complexity, daily regulation from the Tous Reservoir, the priority given to water supply over irrigation, and the existence of multiple distributed consumption points. In this sense, **it is not a standard solution**, but one that is tailored to the system's specific hydraulic, operational, and organizational characteristics.

The Agrotwin platform uses the **Smart Water Engine (SWE) module, which handles data acquisition and standardization** from sensors and systems with different communication protocols, centralizing them in a data lake. Additionally, **its GIS module displays the region's hydraulic and parcel data within a single environment**, as well as providing access to information on the digitized infrastructure. It also facilitates map-based queries for various public administrations. Information from soil moisture sensors and satellite imagery is integrated into the platform to **visualize changes in standardized indices**, such as crop condition, soil moisture, and soil water content.

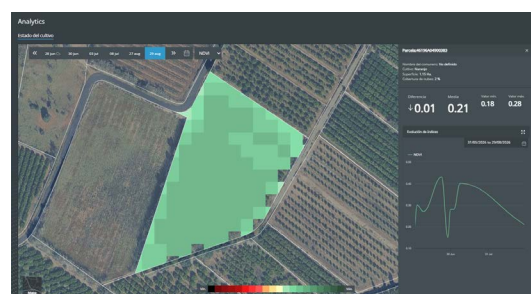
Furthermore, **the integration of the SCADA WEB VAO into the Agrotwin platform enables remote control of the infrastructure**. This means that the CGUCJT can centralize the system's operational and agronomic information, store historical data, define operating setpoints, manage alarms, and access real-time information from a single web interface.



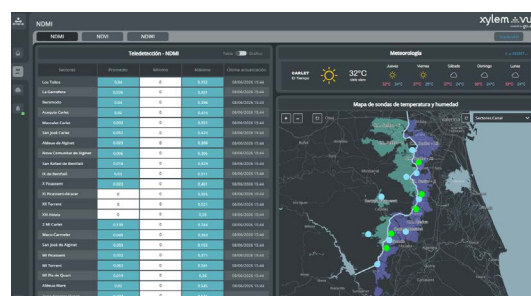
Agrotwin dashboard: KPIs and an overview of the infrastructure



Agrotwin dashboard: KPIs and an overview of the infrastructure



Remote sensing at the association and parcel levels



Report including remote sensing index levels, weather forecasts, and soil moisture sensors

Another key element of the project is the **integration of geospatial information through a GIS system that includes both the main infrastructure and the parcel database of the local associations.** This provides the CGUCJT with an accurate overview of the irrigable acreage and improves resource planning and allocation.

Additionally, the solution integrates data from weather stations, soil moisture sensors, and satellite imagery (remote sensing) to **estimate crop water requirements and contextualize water management operations.** Finally, the system features an advanced alarm module that **detects deviations, operational failures, and incidents**, sending notifications to managers and users.

Results

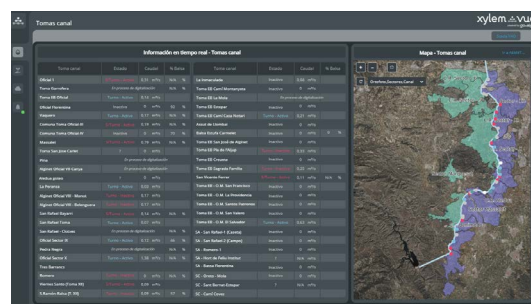
The implementation of the Agrotwin platform, together with the SCADA WEB VAO system, has enabled the CGUCJT **to transition to digital, centralized, real-time management of the Jucar-Turia Canal's main irrigation water delivery system.** The result is greater operational control over flow rates, volumes, and water delivery schedules, which reduces imbalances between the water released from the Tous Reservoir and the member associations' actual consumption. Continuous monitoring of delivery schedules and water volumes has been key to **optimizing water resource planning**, aligning actual demand with supplied volumes and efficiently regulating the canal's operating levels.

The availability of unified digital mapping and integrated operational and agronomic information has enabled the member associations to **plan irrigation more accurately and transparently, improving coordination** between the CGUCJT, the member associations, and the Jucar River Basin Authority.

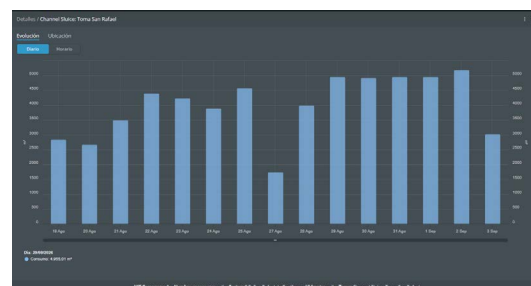
Likewise, the integration of soil moisture sensors, weather data, and satellite imagery has enabled **accurate calculation of crop water needs, reduced unnecessary consumption, and improved overall water use efficiency**, thereby reducing disputes between users, especially in the context of water scarcity and drought.

In addition, centralizing information in the Xylem Vue platform's data lake, along with the historical storage of monitored data, enables the generation of customized reports with the management indicators needed at any given time. This provides a comprehensive, up-to-date view of operations, facilitates decision-making, optimizes day-to-day management, and contributes to greater resource efficiency.

Overall, the project has provided the CGUCJT with a **more sustainable, efficient, and reliable system**, which facilitates decision-making based on objective data and strengthens its ability to anticipate critical scenarios.



Report on the current status of the canal gates



Water consumption details: canal turnout data by day



Water consumption details: canal turnout data by hour