WEAM4i Policy Brief: The Future of Smart Irrigation Management in Europe

Key messages

- The Water-Energy-Food nexus must be managed in a holistic approach in order to correctly tackle all the challenges facing these three elements.
- Energy regulation & incentives are required to align increasingly variable energy offer (renewables) with demand, optimize distribution network costs, and reward technological efforts towards a smarter energy consumption.
- Water metering: Data interoperability and standards must be adopted in order to facilitate the production of added value information from raw data.

Policy Challenges and Recommendations

1st: Energy-Efficient Irrigation

Challenges

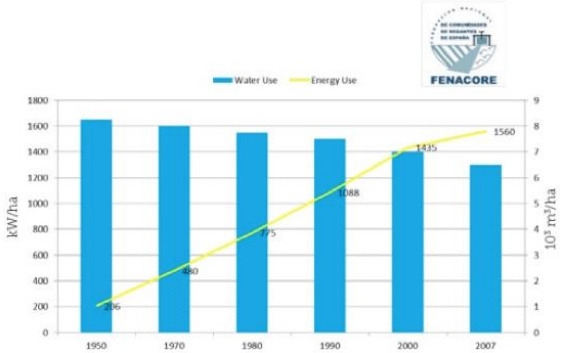
In Germany, crops water needs are mostly provided by rainfall but patterns in irrigation needs are changing due to extended dry periods during summer. Irrigation is largely handled without any smart management, and pricing signals from the electricity market are not used to support irrigation strategies.

In Spain and Portugal, with the main objective to save water, the trend of change from gravity irrigation systems to pressurized irrigation systems causes a rise in the electricity demand. Like Germany, the irrigation communities in Spain and Portugal have electricity contracts with different energy fixed prices depending on the time of the day, however the sharp increase in fixed energy costs (linked to KW contracted) and rigidity of tariff systems (not allowing seasonal contracts), are causing high costs to irrigation activities.

From the energy sector perspective, the energy utility companies are not able to reliably predict the electricity demand of irrigators in their region. Consequently, the costs of utilities for sourcing electricity increase due to deviations from their planned electricity demand.

Recommendations

- Demand-response systems should be promoted by energy regulatory frameworks, regardless of the sector or the activity where they are used (including irrigation sector).
- Distributed smart energy consumption should be positively rewarded as incentives from the market perspective, given the weaker situation of electric networks in rural/low populated areas.
- The highest the percentage of renewable energy in the electric mix, the more we need to promote smart demand systems to guarantee network stability and network infrastructure savings.
- An exchange of forecasted data related to the irrigation planning / pumping energy demand of an irrigation district with the local energy utility should be mutually beneficial, reducing electricity costs for pumping and energy and network costs for the utility.



Unitary Water consumption. Spain

Source: Corominas (2009)

2nd: Integrated management of Water-Energy-Food (WEF) nexus

Challenges

According to article 46 of European Agricultural Fund for Rural Development (EAFRD) related to investments for irrigation, water and energy are decoupled and food production/security is not considered. Furthermore, the efficiency challenge in current water plans calls for more value per drop – and more drops for less. For example, Water Scenarios for 2020 – World Business Council for Sustainable Development, 2012) encourages for:

- More value per drop increasing water economic productivity
- More drops for less – lowering water costs

However, an efficient and sustainable use of water **does not** necessary means a reduction on water use.

Recommendations

- We need to consider a holistic approach of WEF to achieve efficient irrigation. Proposal of a new WEF Key Performance Indicator is ***'crop per drop per kwh'***, which includes the kg of a given crop produced with a certain amount of water which has been pumped up using a given amount of energy.
- Increase communication with other countries and regions with similar exposure to shocks to learn from their experiences and share best practice.
- Seek to better understand the context of the policies regarding the WEF and how to evolve them over time, adopting an iterative approach open to flexible management of this process.

Lesson learnt : Environmental policy and funding incentives devoted just to save water have conducted to undesirable side effects, impacting in the sustainability of the food production/security. Therefore, the related sustainable development goals (SDGs) on irrigation must be addressed and targeted integrally.

3rd: The need of standardization

Challenges

Although water metering is mandatory for new irrigation systems (EAFRD funded), there is a poor return of this information, and often it is only used for billing purposes.

- Current system interfaces in the irrigation infrastructure lacks openness.
- In some cases, irrigation boards are captive of the metering system providers.
- Data exchange formats are not standardized

The vendors are supplying metering systems during the construction project and often the technology might be heterogeneous for different irrigation districts. This heterogeneity does not represent a major integration problem since water metering data is centralised in a SCADA system for each irrigation sector or at district level.

The major problem arises when the SCADA system is not ready for the automated extraction of the metering information to be used in other applications. Then, the vendor has to be contacted.

Recommendations

- Terms of reference for bids of water meters must include open interfaces for automatic data extraction in a standard format.
- A broad adoption of WaterML 2.0 as interoperability standard in the irrigation sector would facilitate the integration with decision support systems & reporting applications, generating added value information & enhancing the decision making.

Read the full policy brief on:

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