“From climate information to climate services in water sector”

“JUCAR RIVER’S HISTORY”

Wednesday April 5th, 2017
Fundación ADEIT (Valencia)

Juan Valero de Palma Manglano
General Secretary of Water Users Union of Jucar River
Climate Change

- △ Reduction of available water resources: droughts, etc.

- △ Increase of crop water need requirements.

- The modernization of irrigation is essential to maximize the efficiency of water use.
Irrigation concession.-

- It’s calculated using the climatic data of a period of time. Therefore it is an average demand.
- The Water Law establishes the concession volume as a maximum.
- Water demand cannot be meet in dry years
The water needed by a crop can come from rain (rain-fed crops) or from irrigation (irrigated crops).

The goal of irrigation is to complement the crops water needs that rain doesn’t meet. Usually summers are dry in the Spanish Mediterranean region, therefore in order to meet their water needs most of crops have to be irrigated. The need for irrigation in summer is very regular among years as this period is characterized by high temperatures and almost nonexistent rainfall.

However, in the rest of the seasons, autumn, winter and spring, a substantial amount of crops water requirements are naturally satisfied with rain. From a climatological perspective the months between October are April vary between years, both in terms of temperatures and especially rainfall.

According to the data analyzed, water requirements from October to April represents approximately 30% of the annual water requirements.

Therefore, rainfall reduction directly supposes an increase of irrigation requirements.
• Irrigation complements the amount of water needed by crops not satisfied by rain. Consequently, in periods of rainfall scarcity, greater water irrigation inputs are required.

• The theoretical irrigation allocations required for a crop are calculated using average statistical data, thus it should be considered as an average value. Therefore, in abnormally dry periods with scarce rainfall, allocations are not sufficient to satisfy crops water requirements.

• Given that rainfall in our irrigated area usually satisfy a large amount of crops’ winter water requirements, in years with scarce rainfall irrigation requirements increase significantly.

• The winter period 2013-14 was warm and extremely dry, having only the 30% of rainfalls compared to a regular year. Consequently, crops have been irrigated in order to satisfy most of their winter water requirements.
This chart illustrates the water requirements (ETc) of a standard orange grove using a planting pattern of 5x4m. This is data from all of the agroclimatic stations installed by IVIA in the USUJ irrigated area. Precipitation values (P) and irrigation needs have also been included (Nec. Irrigation). The data used is the average between September 2001 and September 2013. For this chart the winter period starts in October and ends in April and the summer starts in May and finish in September.
Citric water demand (%)
Droughts in Jucar river.

- 1984-86
- 1994-96
- 2004-06

- 2014-16
  - Few rain and little use by crops.
  - From April 2013 to December 2014 there were no rainfall episodes above 20 l / m².
  - 2013-14 the lowest recorded rainfall.
Hydrological year.2013-14.-

- Rainfall was 30% of the average (122 l/m²).
- Crops water requirement was 20% above average.
- Irrigation need was 40% higher than average (winter is 50%).
- With this climatology and the hydrological situation of 2005 or 2006 DISASTER
Considering that the ARJ water requirements’ would have been 214 million of m³/year.
With ARJ modernization...
Dam water volume in Jucar river basin 1st October (million of m³)

Without water savings 178 million of m³/year (Concession and Jucar RBMP).
Conclusions.-

- The modernization of Júcar’s traditional irrigation systems has been the measure that has contributed the most to minimize the drought effects in Júcar’s System.
- The current drought would have been the worst remembered if ARJ modernization would not have happened (water resources scarcity + high demand).
- Finishing the modernization of the irrigation systems is vital to avoid future restrictions due to water reductions from climate change.
- It is also imperative to avoid generating new water demands on Júcar’s Irrigation System.
Use meteorological forecasts by Irrigators Communities.

In flooding irrigation systems:

- Irrigation operation
  - Irrigation is done by turns (shifts).
  - The limited capacity of irrigation infrastructures requires a minimum of 15 days to complete irrigation in all plots.
  - In long irrigation canals doing a turn can take 25 days.
In flooding irrigation systems.-

- Use of forecasts
  - Very limited due to lack of guarantee.
  - In order to take decisions, it would be necessary to be sure that both rainfall and enough water will be guaranteed.
  - Stopping an irrigation shift for a forecast and not met can cause serious damage in crop production by an excess of delay in irrigation due to the capacity of the irrigation network.
In dripping irrigation systems:-

- **Irrigation operation**
  - In summer, daily water dose of is satisfied. In periods of lesser need, water is applied for a few days.

- **Use of forecasts**
  - They allow to be prepared before weather changes but the effective change in the irrigation does not take place until weather change is really given.
Conclussion.-

- Flooding irrigation systems could help to reduce water consumption, but certainty in the forecast is required, especially in the amount of rainfall.
- If heavy rains are predicted watering can be cut a few days in advance.
- Dripping irrigation systems help to be prepared to changes in the water demand, but the influence in water consumption is not very important.
THANK YOU VERY MUCH FOR YOUR ATTENTION

Juan Valero de Palma Manglano

General Secretary of Water Users Union of Jucar River

jvdepalma@acequiarj.es