

Outcomes of Benchmarking application in Spain

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The application of Benchmarking techniques and performance indicators to improve irrigation is a relatively recent phenomenon. The main objective of this technique is to enhance the performance of a given irrigation district by comparing its current performance with that of other districts. In this way, it is possible to determine which practices lead to a better performance in a district, adapting them to irrigation districts with lower performance.

From 2001 the research group on irrigation in the University of Cordoba (Spain) has been working in the application of the benchmarking techniques in the Spanish irrigators communities. This project is a pioneer experience in the application of the benchmarking techniques in Spain. Due to the huge amount of irrigated surface area analyzed and the variety of the irrigation districts it is one of the biggest experiences in the application of benchmarking techniques all over the world. Twelve irrigation districts with more than 140000 ha of irrigated surface were firstly characterized by means of performance indicators and then compared with each other (Table 1).

Table 1. Irrigation districts which took part in the benchmarking project

Irrigation district	Irrigated area (ha)	Water diversion		Revenue collection		Under modernisation process
		Pumped	Gravity	Per irrigated area (€/ha)	Per volume of irrigation water (€/m ³)	
Moraleda de Zafayona	1782		X		X	
Canal del Jandulilla	2091	X		X	X	
El Villar	2726	X		X	X	
Nuestra Señora de los Dolores	4500	X		X	X	
Pantano del Rumblar	5200		X		X	
Guadalcaçín	11907		X		X	X
Bembézar M.D.	11912		X		X	
El Viar	11990		X		X	X
Sector B-XII	14643	X			X	X
Genil-Cabra	15067	X		X	X	
Valle Inferior	18945		X		X	X
Bajo Guadalquivir	41214		X		X	
Total	141977					

The results show that users are normally more efficient in the use of irrigation water when they are billed per volume of irrigation water consumption which is the most common practice in pressurized irrigation networks (Figure 1). In the districts in which revenues are collected per m³ and per ha, users only have to pay for the energy costs per volume of water delivered (m³). In these districts, energy costs account for the highest expenditure of the irrigation district. With this revenue collection system, water is used more efficiently because the high cost of the resource lead the farmers to use only the minimum volume needed.

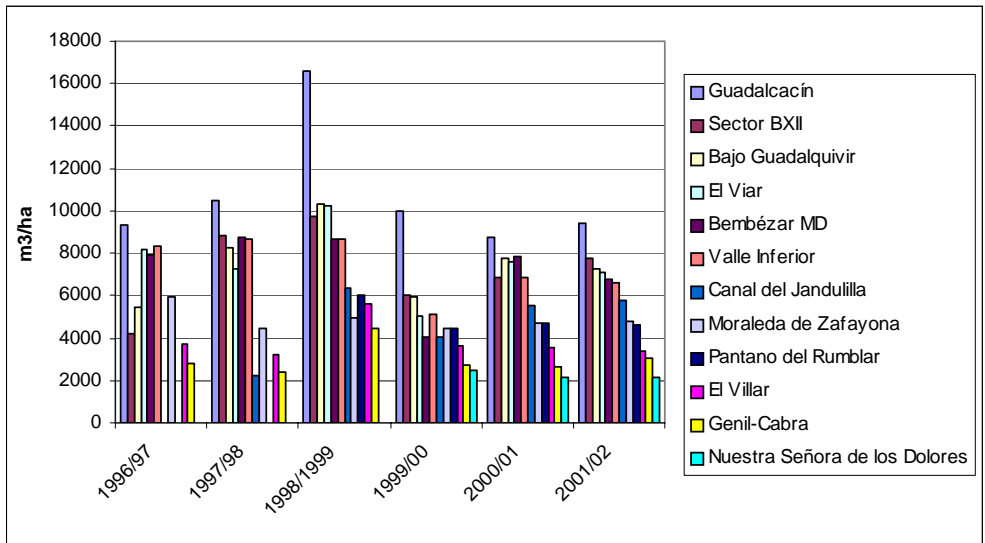


Figure 1. Irrigation water consumption per unit of irrigated surface

In terms of productivity a clear relationship cannot be seen between pumped or gravity water diversion and productivity in the other zones. As shown in Figure 2, some of the systems with old infrastructures actually achieve higher productivity than those with pumped water diversion. For instance, the Valle Inferior district, which has one of the oldest infrastructures, achieves a higher productivity per unit of irrigated area than the Genil-Cabra district (with an on-demand network and pumped water diversion).

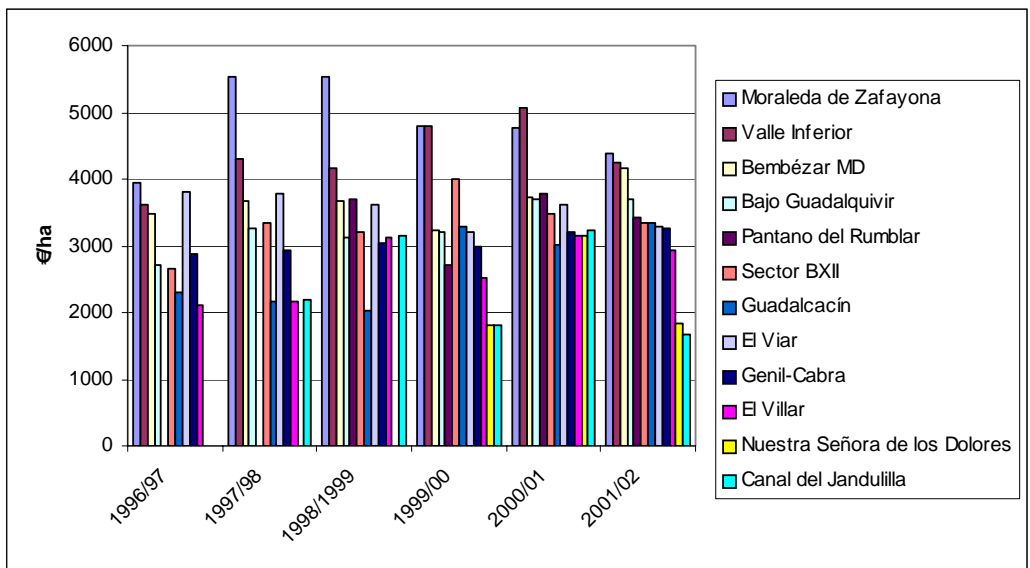


Figure 2. Output per unit of irrigated surface

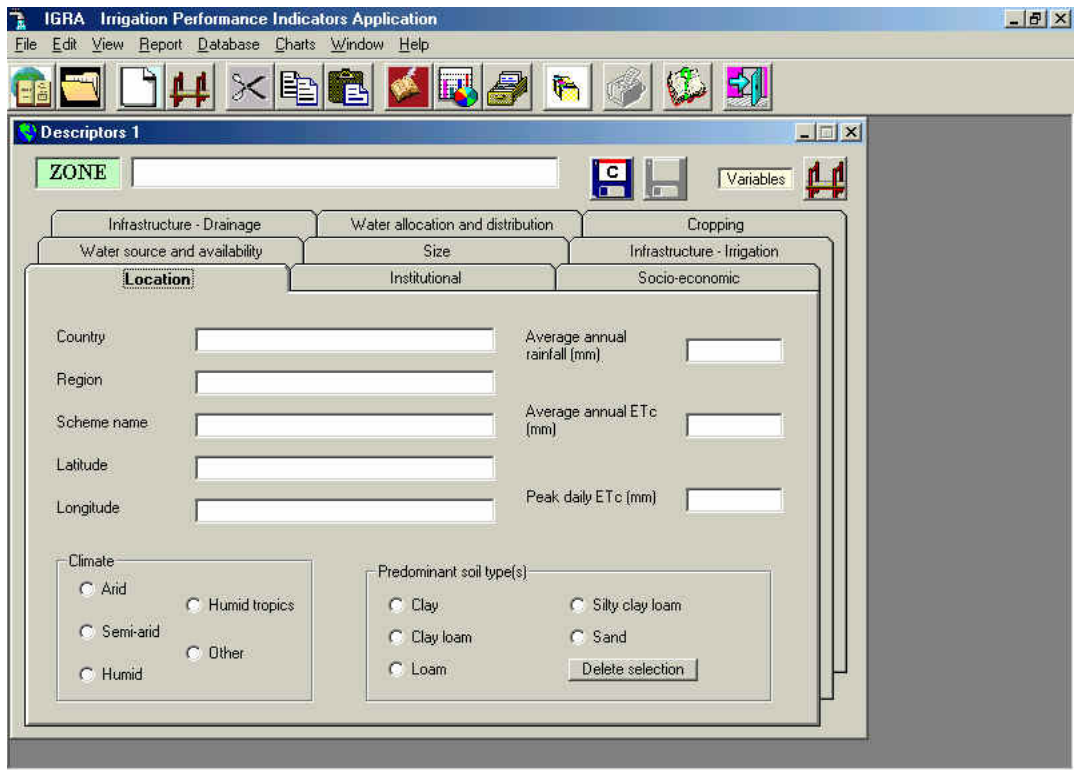
Four out of the twelve irrigation districts are now under a modernisation process. The characterisation already done to these irrigation districts will be useful to evaluate the

impact of the investments made by means of the comparison between performance indicators and to check how much they achieve the objectives pursued by the modernisation.

To this purpose, last 14th November a workshop on benchmarking was held at the University of Cordoba (Spain). In the meeting the research group on irrigation from the University of Cordoba showed to the irrigation districts managers present at the meeting the outcomes of the Research Project that has been carried out for the last years on benchmarking techniques applied to irrigation districts in Andalusia, sponsored by the Hydrographic Confederation of Guadalquivir River (River Basin Authority). FERAGUA (Federation of Irrigation Communities of Guadalquivir Basin) and FENACORE (Spanish Association of Irrigators Communities), two of the biggest Spanish Irrigators Associations, sponsored and participated in the meeting. This project is also being supported by the ICID Spanish National Committee (CERYD).

During the meeting a comparison in depth between irrigation districts was carried out and managers could know the guidelines to achieve a more efficient management of each irrigation district. Most of them should reduce the irrigation water consumption just to reduce the energy costs and to become more efficient in the use of the water. Also the districts which should improve their infrastructures because their networks are not enough to carry the water in the periods of peak demand were detected. Then the managers present made suggestions to improve other irrigation districts so as to improve the benchmarking programme in Spain, in general. One of the main proposals was just to apply the benchmarking initiative at the farm level and the need of improving the assessments of water consumption at catchments level by means of improved water metering devices.

Managers were also instructed in the use of the performance indicators and in the computer tool IGRA (Indicators Performance Indicators Application) (Figure 3). This application facilitates the calculation of performance indicators and defines them using a wide range of descriptors and irrigation year variables. Thanks to this instruction, irrigation managers will be able to work out the performance indicators on their own and analyse the temporal trends of the management and to compare with others as well.



The interest of this meeting was not only to show the results of the benchmarking experience to the Managers of the most involved Irrigators Communities of Guadalquivir Basin, but it was the first time that this technology was transferred to the irrigation water users in Spain. The meeting can be considered a first step just to achieve that Benchmarking techniques become a common tool for the improvement of irrigation districts management.