

# The new irrigation with saline groundwater and artichoke production in Lower Cheliff (Algeria).

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## Introduction

In the Lower Cheliff plain North West Algeria, an annual water deficit is observed associated with a primary salinity affecting 80% of the soils of the plains (about 50 000 ha). The groundwater was introduced by farmers a few years ago through individual and collective boreholes to supply the agriculture water demand.

However, this "new" water resource is poor with a salinity content comprised between 1.5 g / l and 5 g / l and has adverse effects on the yields of the main local cultivated crop "the artichoke".

## Objectif

The purpose of this presentation is to highlight the influence of the irrigation with groundwater on the artichokes production during six years from 2008/2009 to 2013/2014.

## Materiel and Methods

### Sampling and analysis

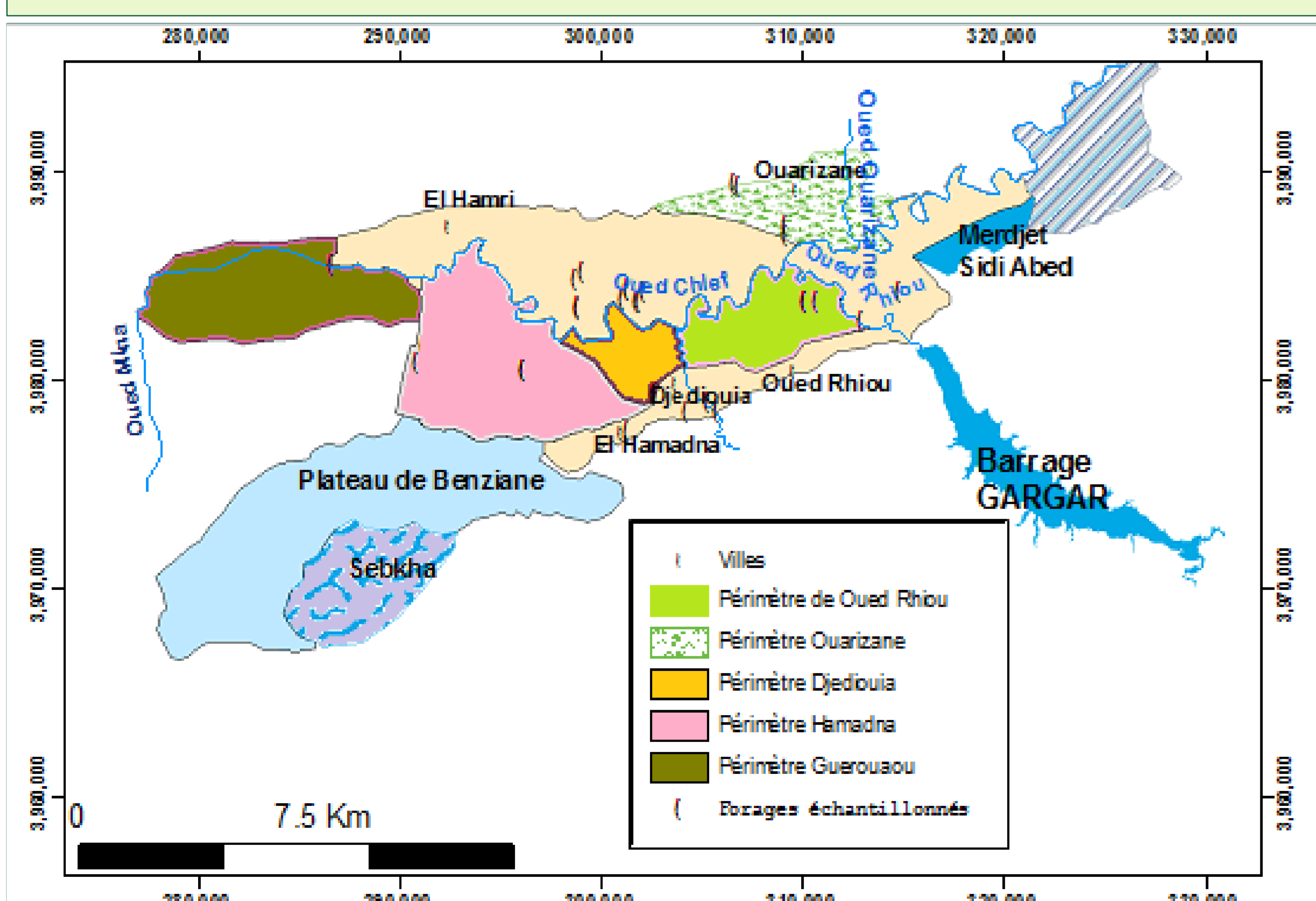
The criteria used in selecting our plots are mainly: the presence of irrigation systems, the use of groundwater for irrigation, the practice of artichoke cultivation, types of irrigation, quality irrigation water, and the presence or absence of the drainage system.

Samples of water were taken from boreholes used for irrigation of the alluvial aquifer of Lower Cheliff a depth ranging from 60 to 100 m during the period from February to May. The choice of these periods corresponds to the period of artichoke crop irrigation in the plain and above all uses of farmers to use groundwater to supplement the water requirements of crops.

Samples, the number of 26 were manually performed in flasks in plastic 1000 cm<sup>3</sup> capacity.

The electric conductivity and pH Were Measured with a Multiparameter WTW 340i (GmbH, Weilheim, Germany) measurement instrument.

Figure 01: Location of irrigated areas in Lower Cheliff and points of Sample

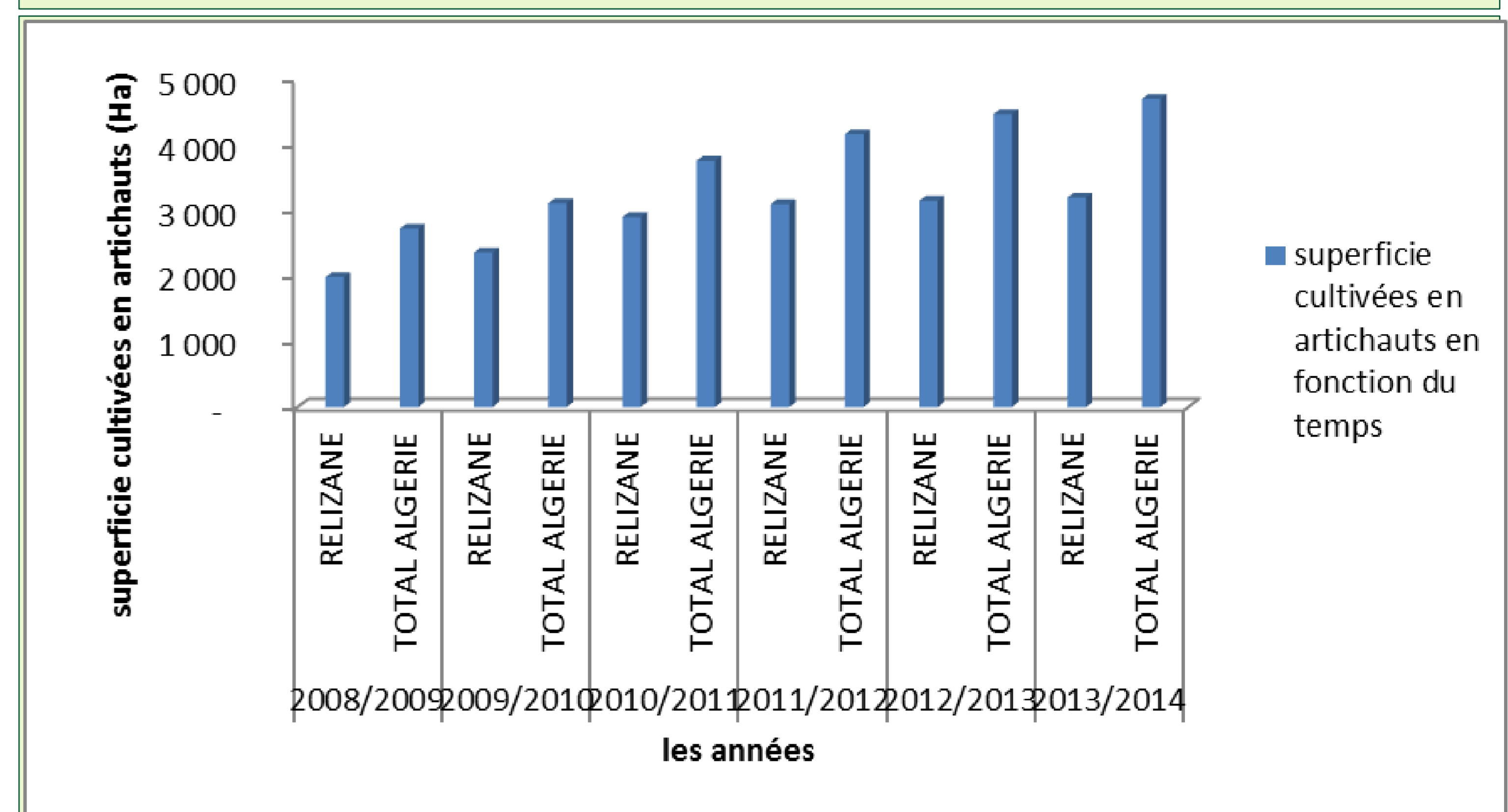


## Resultats and discussion

### Evolution of the area planted with artichoke

The following figure shows the evolution of land cultivated by the artichoke cultivation in Algeria, and the lower Cheliff since the year 2008/2009 to 2013/2014

Figure 2: Evolution of the area planted with artichokes in Lower Cheliff and Algeria.



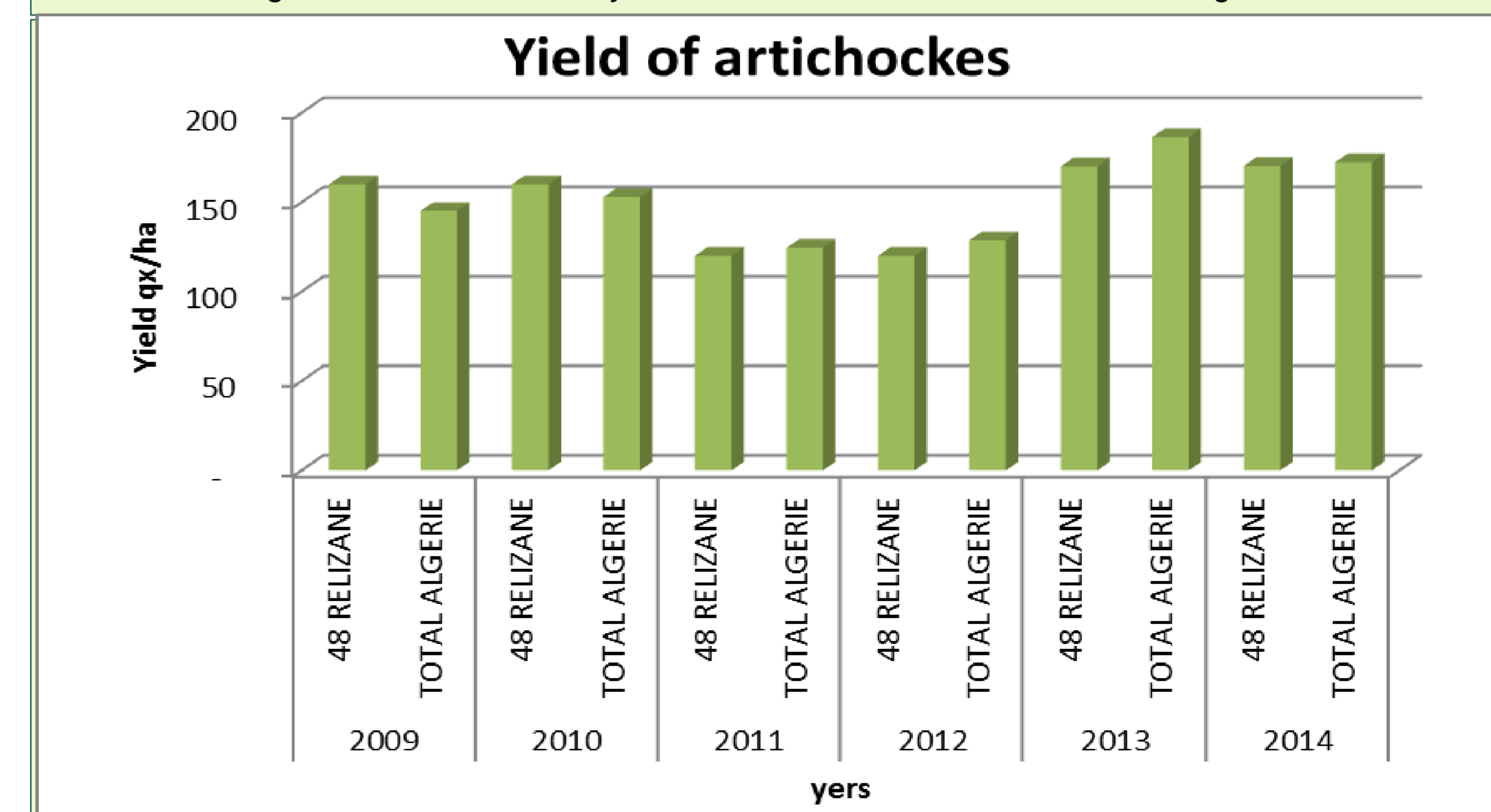
Source: Directorate of Agricultural Statistics and Information Systems (DSASI) to the Ministry of Agriculture in Algeria in 2015.

Note that the artichoke crop areas in Lower Cheliff (Relizane) are in growth since 2008/2009 with 1985ha, to 2013/2014 with 3200 ha . As we constatut that the wilaya relizane became the major wilaya for the plantation of artichoke in Algeria where the total superficies cultivated with artichokes in Algeria in 2013/2014 are 4705 Ha.

### Variation of the yield of artichoke

Figure 03 shows the change in the yield of the crop of artichoke in Algeria, and the Lower Cheliff from 2008/2009 to 2013/2014.

Figure 3: Evolution of the yield of artichokes in Lower Cheliff and Algeria.



From the figure showing a decreasing trend over time for four years and there was a reversal in the yield increase in 2012/2013 where a very high yield was marked for this year is 170 quintals / ha it is also remarkable in the 2013/2014 year.

### Distribution of yield in function of the salinity of irrigation water

Table 01 shows the variation of the yield of artichoke plots irrigate with a deferent groundwater salinity

Table 1: Evolution of the yield of artichokes in Lower Cheliff and Algeria.

Classe I	<0.45 g/l	190 - 210	15,38
Classe II	0.45- 2 g/l	80 - 170	65,38
Classe III	> 2 g/l	< 80	19,23

The results show that the quality of irrigation water influential performance where there were three deferent classes:

Plots irrigated by the waters of a non-saline quality represent 15.38% of the plots studied with yields of 170-210 Qx / Ha. (Case of water surface combined with groundwater).

Plots irrigated by the waters of a mediocre quality of salinity represent 65.38% of the plots studied with yields of 80 to 170Qx / Ha.

Plots irrigated by the waters of a severe quality higher salinity represent 19.23% of the plots studied with yields below 80 Qx / Ha.

### Conclusion

This results show that the quality of water for irrigation combined surface water has a significant effect on yield in Lower Cheliff. The height salinity of irrigation water has a negative effect on the yield of the artichoke culture.