

## EVOLUTION OF IRRIGATED AREA AND LANDSCAPED WITH SOIL EROSION CONTROL IN ROMANIA IN THE 2007-2014 PERIOD

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**Abstract:** *As a result of climate change in the last period, Romania faces a growing dependence on the production of these changes. Dry years entail poor yields and soil degradation is increasing. The present study shows that in recent years, land areas with irrigation works remained at the same level, and in many cases actually irrigated areas have even decreased over the years. The same situation is encountered at soil erosion control, where data show values almost unchanged in recent years. Without a change for the better of this situation, yields in Romania will be at the "hand" of weather conditions, with every passing year conditions getting worse.*

**Key words:** *irrigation, soil degradation, environment*

### INTRODUCTION

During the past 50 years, there have been large fluctuations in extreme temperature and precipitation, decreasing the frequency of cold days and nights or frost, and increasing the frequency of hot days, hot nights and heat waves. In northern Europe, rainfall has increased considerably, and in the south of the continent, droughts have become more frequent.

Like the rest of the world, in recent years, Romania has registered a significant increase in mean annual temperature observed. In the last century, this growth was about 0.5°C, emphasizing it in recent decades, from the second half of the twentieth century, extensive regions of Romania peaking at values between 0.8 – 1°C. As a result positive thermal extremes have increased both in frequency and intensity, heat waves being found increasingly more frequent and persistent.

In the case of the rainfall, although not as clear, there was observed a slight decrease in annual country-wide.

Recent studies show that for the 2021-2050 period will be an increase in the annual average temperature for the country with a most likely value close to 1.4°C, compared to the reference 1961-1990 period. Regarding precipitation, as noted, the estimated projections are not very clear, but most studies show a decrease in the number and quantity of rainfall, especially in the summer months, on average by up to 20% at the end of this century.

These factors have and will have a growing influence on agriculture, on the yields obtained without improvement works, irrigation and erosion prevention, yields results will getting lower.

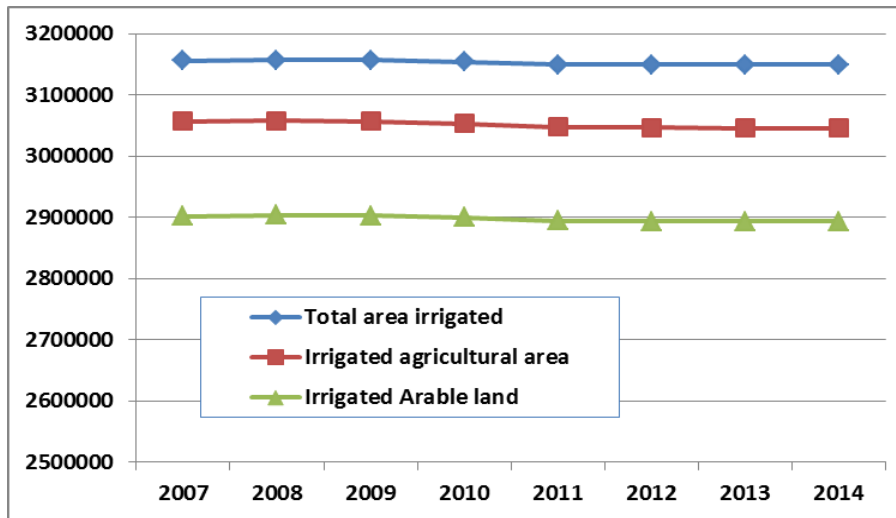
### MATERIALS AND METHODS

In the study they were taken and processing statistical data on the evolution of the irrigated area and erosion prevention, since 2007. Also, based on data and calculations was made a correlation between the productions obtained and of rainfall quantity beginning from year 2000. Most of the data were taken from the Romanian statistical yearbooks or from the national statistics institute site.

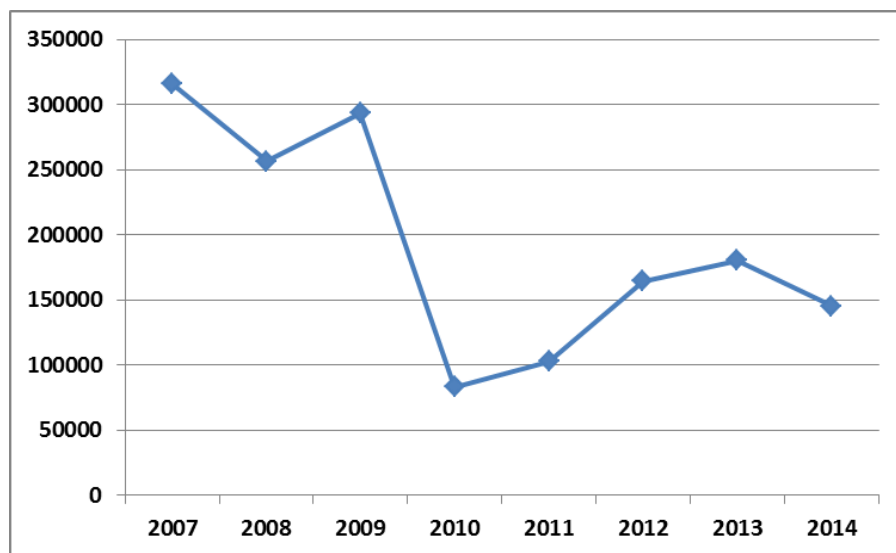
**RESEARCH RESULTS**

For starters we wanted to see what the situation is irrigated in Romania. Based on data collected it has been an evolution of the irrigated area nearly constant and even a slight decrease in land used in agriculture or arable land. Basically, since 2007, it has not found any improvement, any enlargement of the irrigated area.

Moreover, if we refer to irrigated area at least once, after a major drop in 2010, it was found a relative increase until 2013, 2014 showing a further decline. With all this growth, in 2013, the growing tip, the irrigated area was just over half of the 2007 level.



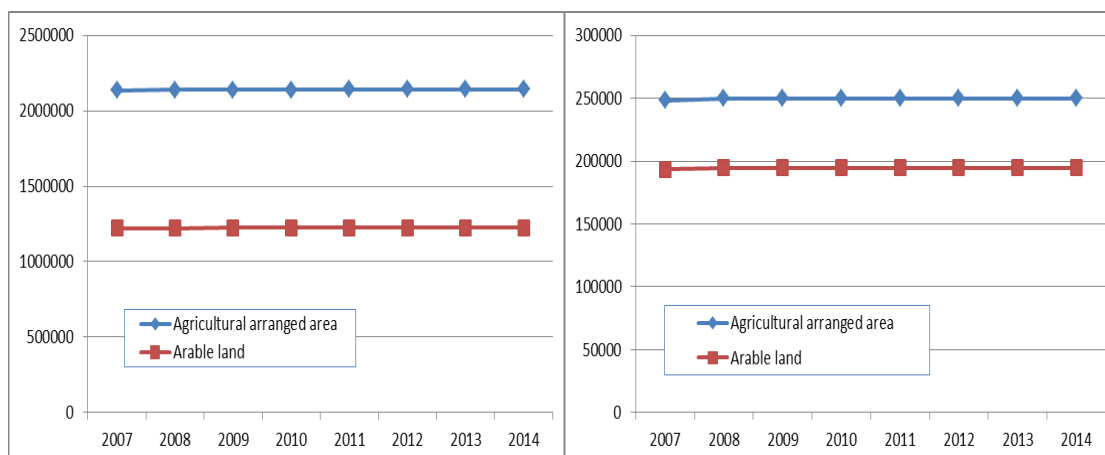
**Figure 1. Evolution of irrigation facilities, 2007-2014** (processing after <http://statistici.insse.ro/shop/index.jsp?page=tempo2&lang=ro&context=67>)



**Figure 2. Evolution of actually irrigated arable land with at least one watering, 2007-2014** (processing after <http://statistici.insse.ro/shop/index.jsp?page=tempo2&lang=ro&context=67>)

The same situation is found in the case of erosion control works and land improvement. Surfaces that have done such work remained the same in the last 7-8 years, almost did not do anything extra. Nor the drainage stays better, where values from year 2007 were preserved in the years ahead. In both cases presented, irrigated or improved

areas are the same, the remaining land is on hand of atmospheric conditions.



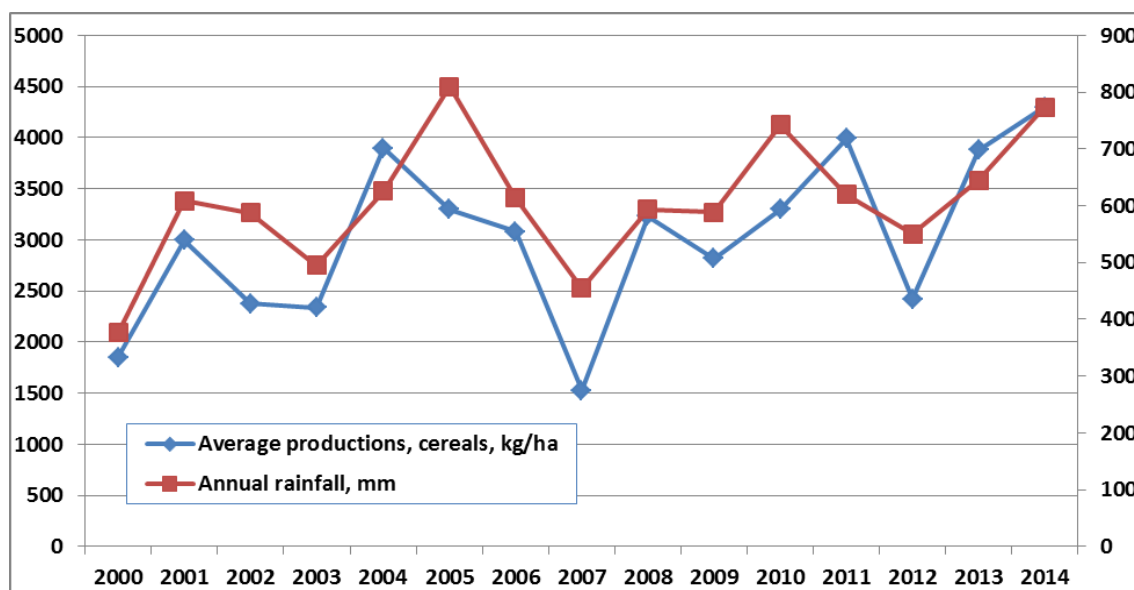
**Figure 3. Evolution of erosion control works, land improvement and drainage works, 2007-2014** (processing after

<http://statistici.insse.ro/shop/index.jsp?page=tempo2&lang=ro&context=67>)

The above results clearly, placing on the same graph the evolution of annual cereal production and annual quantity of rainfall. It can be seen that dry years have attracted low production, and in the years with more rain, production followed the same trend of growth.

There are very small differences between the two evolutions, one in 2005 and one in 2010, otherwise the two curves having the same trend over the years.

The graph shows that absence of irrigation deeply affected cereal production. Most of the irrigation system built in Romania during the communist period, covering three million hectares of arable land, disappeared after 1990 through theft or degradation.



**Figure 5. Evolution of annual rainfall and average cereals production, 2000-2014** (processing after

<http://statistici.insse.ro/shop/index.jsp?page=tempo2&lang=ro&context=67>)

## CONCLUSIONS

Making efficient irrigation systems should be a maximum priority under current trend of desertification of large areas of Romania's area. If we go by what farmers say, the data submitted by the Ministry of Agriculture and those statistics are not real, the total irrigated area in Romania is just over 100000 hectares, or almost four times lower than that announced. The unanimous view is that farmers should be supported to build individual irrigation systems, in place to carry out large and inefficient projects. The main concern should be small irrigation stations, for each farmer's needs in terms of water and electricity consumption.

Although Romania has the potential to exceed other countries in terms of production, without irrigation, Romanian farmers achieved average yields of 2-4 tons of grain / ha, far below the others. In addition, although Romania has irrigation infrastructure for about 700000 hectares, more than double that current reported, because of the high costs, there are fewer farmers who can afford these expenses.

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