WEATHER FACTORS AND THE NEED OF IRRIGATION. CASE STUDY – BRĂILA COUNTY

FACTORII CLIMATICI ŞI NECESITATEA IRIGAȚIILOR. STUDIU DE CAZ – JUDEȚUL BRĂILA

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Abstract: *Climate modification by the progressive warming of the atmosphere resulting from the concerted action of several factors, both natural and anthropic (emission of increasingly large amounts of greenhouse gases), favour the diminution of precipitations at soil level, corroborated with the increase of temperatures.*

The climate became a constraining factor in the growth and development of crops, its influence being pregnant both in the allocation and use of water resources in agriculture.

The present study refers to the influence of weather factors and the need of irrigation in the county Brăila.

Key words: *weather factors, soil, irrigations*

JEL Classification: Q54, Q24, Q15

INTRODUCTION

Irrigation is one of the important agro-technical measures that contribute to crop production prosperity, to higher yields and maximum profits.

The performant, competitive agriculture cannot be practiced in the absence of this production factor.

Among the factors that influence the need of crop irrigation an essential role is played by the weather factors (temperature, rainfall, solar radiation, wind intensity) and soil.

MATERIALS AND METHODS

The study was based on methods specific to selective research: identification of problem under research, delimitation of research framework, information collection, data processing, analysis and interpretation and drawing up the conclusions.

The information sources that have been used are the official data and the data obtained from field surveys conducted under a research project. [1]

RESULTS AND DISCUSSIONS

1. GEOGRAPHICAL AND CLIMATE DATA

The county Brăila is located in the plain, in the south-eastern part of Romania, occupying a part of the lower Siret river plain, a part of the Bărăganului Plain and small parts from the plain Sălcioara and Buzăului Plain.

The county Brăila has a continental temperate climate, at contact with the specific climate of the Danube river plain. Summers are hot and dry, and winters are cold with little snow. The rainfall features high variability in time and space, reflecting the continental climate type.

Moisture deficit mainly depends on air temperature, solar radiation and wind intensity.

The county Brăila has average temperatures higher by 1.5^0C compared to the rest of the Romanian Plain; the absolute maximum temperature, i.e. 44.5^0C was in the year 1951, while the absolute minimum temperature, -30^0C, was in 1942.

Table 1.

Average annual air temperature (ºC) in the period 2006-2010 and average multi-annual temperature (ºC) in the period 1975 – 2000

County	1975-2000 average	2006	2007	2008	2009	2010
Brăila	10.7	11.2	12.5	12.1	12.0	11.6

Source: *Raport privind calitatea factorilor de mediu în județul Brăila, 2010,* Agenția pentru Protecția Mediului Brăila

[1] FP-7 Project - Sustainable Irrigation Water Management and River - Basin Governance: Implementing User-Driven Services, (SIRIUS), 2010-2013

The average annual air temperature in the period 2006-2010 had values over the annual average of the period 1975-2000, the highest values being found in the year 2007.

Table 2.

Maximum annual air temperature (ºC) in the period 2006–2010, absolute maximum temperature (ºC) and their dates

County	Absolute maximum	2006	2007	2008	2009	2010
Brăila	41.1 (23.VII.2007)	36.6 (20.VIII)	41.1 (23.VII)	38.5 (16.VIII)	38.0 (24.VII)	37.2 (15.VIII)

Source: *Raport privind calitatea factorilor de mediu în judeţul Brăila, 2010,* Agenţia pentru Protecţia Mediului Brăila

The maximum annual air temperature (41.1^0C) was in the year 2007 in the month of August.

Table 3.

Minimum annual air temperature (ºC) in the period 2006–2010, minimum absolute temperature (ºC) and their dates

County	Absolute minimum	2006	2007	2008	2009	2010
Brăila	-25.5 (13.I.1985)	-20.3 (23.I)	-12.0 (24.II)	-15.1 (5.I)	-16.9 (22.XII)	-22.6 (26.I)

Source: *Raport privind calitatea factorilor de mediu în judeţul Brăila, 2010,* Agenţia pentru Protecţia Mediului Brăila

In the year 2010, the minimum air temperature was in January, its value (-22.6^0C) being the closest to the absolute minimum (-25.5^0C) in the year 1985.

The solar radiation at the weather station Brăila has high values, averaging 125 kcal/cm^2/year.

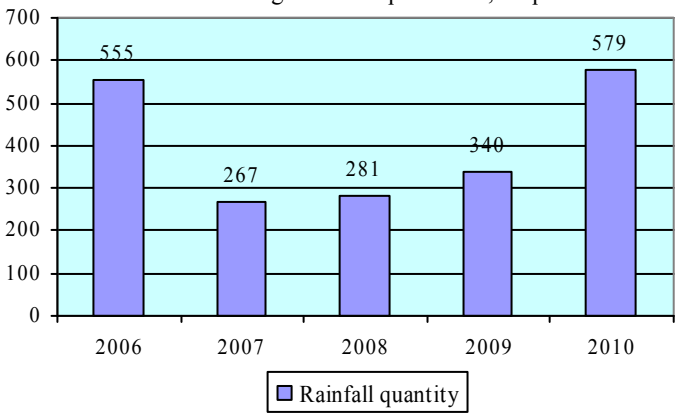
The wind blows in the period autumn – spring from the direction north and north-east, its intensity being 1.5-3.1 m/s.

The average annual rainfall is low, with torrential rain in summer time. In summer time there are long periods of drought (60-90 days).

The data on the rainfall level reveal that in the year 2010, rainfall was higher in quantity compared to previous years.

In the year 2010, July was the richest month in rainfall (624 l/sq.m), while August was the driest month of the year (18 l/sq.m), the normal rainfall being 441.8 l/sq.m.

Figure 1.



Source: *Raport privind calitatea factorilor de mediu în județul Brăila, 2010,* Agenția pentru Protecția Mediului Brăila

The annual rainfall amount does not cover the needs for obtaining high yields, and the water deficit must be covered by irrigations.

The annual relative humidity of air can reach over 72%, it exceeds 80% in winter, while in summer it reaches only 65%.

The moisture deficit in soil, in the period April – September, calculated as difference between evapotranspiration and rainfall is 300-350 mm/season. This deficit reveals the need of complementary irrigation of crops.

2. Land use

The soil is the main support to all the socio-economic activities and represents the environmental factor that is the most exposed to pollution.

Soil quality is determined by natural factors such as relief, climate, vegetation, time, as well as by anthropic factors. Thus, the agricultural practices that are not adapted to the environmental conditions, the treatments and fertilizer applications that did not respect the agro-pedological and agro-technical norms, the discharges of hazardous chemical

substances, the storage of waste of all categories, represent anthropic factors that significantly and fast modify the quality of soils.

The soil and weather conditions from the county Brăila determined the emergence and evolution of a various soil cover, where the chernozem soils prevail.

Table 4.

Soil types characteristic to the county Brăila, in the year 2010

Soil types	Area (ha)	Percentage (%)
Protisols	131991	34.1
Cernisols	203552	52.5
Hydrisols	36077	9.3
Salsodisols	15743	4.1
Total	**387363**	**100.00**

Source: *Raport privind calitatea factorilor de mediu în judeţul Brăila, 2010,* Agenţia pentru Protecţia Mediului Brăila

In the county Brăila, the agricultural land areas have the largest share in total land area, accounting for 81.43% in the year 2006 and 81.28% in the year 2010 of the total area of the county.

Table 5.

Distribution by land use categories in the period 2005-2010

Land use category	Area (ha)				
	2006	2007	2008	2009	2010
Arable	349401	349830	353087	349089	350447
Pastures	33144	33274	28905	33171	31743
Vineyards	4825	4686	4840	4492	4519
Orchards	730	636	640	640	654
Agricultural total	388100	388428	387470	387392	387363
County total	476576				

Source: DARD Brăila, 2010

In total agricultural land, arable land had the highest share (over 90%) throughout the investigated period.

3. Situation of land equipped with irrigation facilities

Irrigation is absolutely necessary in the conditions of the dry weather specific to the county Brăila. Dryness was also favoured by the increase of the demographic pressure and the climate changes.

The deviations from the optimum irrigation regime may have negative effects upon soil. Significant modifications may be produced due to the irrigation water quality, with the possible emergence of salinization and alkalization phenomena (in the situation of water containing salts), or texture modification (in case water contains alluvia).

Table 6.

Irrigated area and volume of water consumed in the county Brăila, in the period 2006-2010

Item	Year				
	2006	2007	2008	2009	2010
Irrigated area (ha)	78761	111776	90307	166342	113795
Volume of water consumed (thousand cubic meters)	72959	341396	188833	227281	159143

Source: *Raport privind calitatea factorilor de mediu în județul Brăila, 2010,* Agenția pentru Protecția Mediului Brăila

The irrigated area in the year 2010 was larger than the irrigated area in previous years, except for the year 2009.

The volume of water consumed had the highest values in the period 2007-2009, when the rainfall was much under the average, the high water deficit in soil being covered by irrigations.

CONCLUSIONS

The annual rainfall is not sufficient for obtaining high yields, so the water deficit has to be covered by irrigations.

Irrigations became absolutely necessary in the conditions of dry and droughty weather specific to the county Brăila.

REFERENCES

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