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THE FARMERS VS. THE IRRIGATION SYSTEM USAGE IN BRAILA - AN ECONOMIC POINT OF VIEW -

FERMIERII VERSUS UTILIZAREA SISTEMULUI DE IRIGAȚII ÎN BRĂILA – UN PUNCT DE VEDERE ECONOMIC –

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Abstract: *Although the farmers in Brăila county are aware with the need for water through the irrigations systems, their capacity for access to this system is strongly conditioned by: the land size of the farm; the financial capacity to support the costs of access to the irrigation system; the technical capacity of the farmers themselves to use water from the irrigation system; affiliation and actively involvement in an IWUA; membership to a IWUA with a good technical and financial capacity and which brings together viable and solvable users of water for irrigations.*

Key words: *agriculture, irrigation, Braila*

INTRODUCTION

Braila County is located in an area with continental climate, with higher temperatures and lower rainfall in recent years, multi-year averages[1]. Under the conditions of climatologically aridity tendency, in which the soil moisture deficit during the growing season reaches approx. 350 mm/season[2], irrigation is absolutely necessary.

The soils from Braila county are predominantly chernozem (class I and II of suitability for agriculture). There are soils with naturally high fertility in which the percentage of humus is 3.0 - 4.5% (MARD, 2007: 12). According to the MARD data - Department of Agriculture Brăila, the average production in the main field crops (cereals, oilseeds) increased by 40 to 70% for irrigated crops compared to the non-irrigated crops (Table 1).

[1] Symposium „***Seceta în România***", 31.05.2007, organised by de MEDD, INH and Academy of Agricultural and Forestry Sciences "Gheorghe Ionescu-Sisesti"
[2] idem

Table 1. Average annual yields for the main crops in irrigated and non irrigated systems - North Terrace – Brăila

Crop / Production system		2008		2009		2010	
		average production		average production		average production	
		t/ha	irrigated/ non-irrigated (%)	t/ha	irrigated/ non-irrigated (%)	t/ha	irrigated/ non-irrigated (%)
Wheat	Irrigated	4.65	152.6	3.31	144.6	3.92	137.0
	Non-irrigated	3.05		2.29		2.86	
Maize	Irrigated	2.72	152.4	5.13	126.1	8.52	178.1
	Non-irrigated	1.79		4.07		4.79	
Sun flower	Irrigated	2.35	159.5	2.64	147.8	2.67	147.3
	Non-irrigated	1.47		1.79		1.81	

Source: own calculation after the data of the Department of Agriculture Brăila, for irrigation area North Terrace Braila (Cazasu, Siliştea, Vădeni, Tudor Vladimirescu and Brăila municipality).

Over 90% of the agricultural and arable lands of the county Brăila (92.6% and respectively 93.3%) have available, according to NIS data for 2010, the facilities for irrigation. According to MARD, Braila is the county in which, by far, the irrigations represent an important component of farming, having the largest area covered by Organizations of Irrigation Water Users - OUAI - (200,028 ha) (MARD 2011: 24), the largest irrigated area (65% of the actual irrigated area at national level in 2010 – NIS 2012 data base) and the largest quantity of water pumped (46% of water used for irrigation in 2009 at national level – MARD, 2011). However, in the same year - 2010 -, the use of irrigation system in Braila was very low. Effectively irrigated areas with at least one watering represented only 15% of the total agricultural area equipped for irrigation at the county level, respectively, 16.4% of arable land provided with such facilities (NIS 2012).

Ministry of Agriculture has developed, after extensive studies on the irrigation system, a national investment strategy in this sector. through this strategy the 56 hydro-technical viable arrangements have been ranked in order of the priority for the investment for the rehabilitation and modernization of the irrigation systems that they will benefit; in the top three, in priority order, are placed three arrangements from Braila county that cover 31% of the county area provided with reliable irrigation systems, the rest of the hydro-technical viable areas from Braila county falling within the category of secondary priorities (MARD, 2011).

MATERIALS AND METHODS

Given the records of the irrigation system in the county with the largest area of operation and its use - Braila -:

- Irrigation system is still functional in much of the area with such type of facilities (in 2009 for 62.4% of the county area with hydrotechnical facilities, irrigation system was classified as "viable", capable of use and recipient of the investment in system rehabilitation – MARD, 2011-),
- The acute need for irrigation given the agro-pedo-climatic conditions,
- Substantial increase of the yield per unit area due to use irrigation water,
- Investment efforts of the public authorities in rehabilitation of the irrigation system in the county,

the question arises is whether and to what extent the strategic, financial and institutional efforts for increasing viability of the irrigation system respond to the triad: *needs* - *resources* - *efficiency* at farmers level in Braila county.

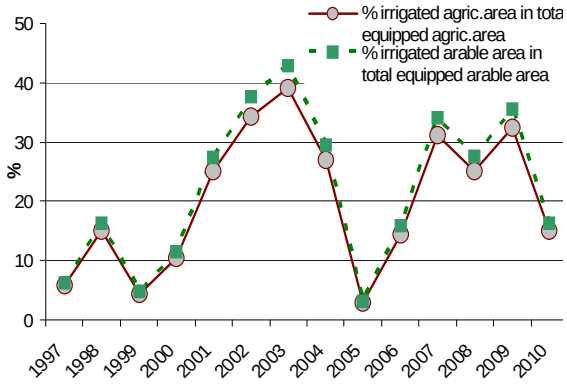
The finding of this analytical approach was based on the research undertaken within the project: *Sustainable Irrigation water management and River-basin governance: Implementing User-driven Services – SIRIUS* – (2010 – 2013) funded through 7 Framework Programme of the EU. Quantitative analysis of available from NIS secondary statistical data sources and territorial agricultural departments was used to elaborate a picture of the current situation and of the recent developments in access and use of the water for irrigation in the county Braila. This overview is supplemented with quantitative analysis and, especially, qualitative analysis of the interviews that was conducted with farmers from the North Terrace - Braila (the interviews were made by a team of researchers from the Institute of Agricultural Economics, Bucharest in the period June 2011 - March 2012). By this method we tried to query the opinions of the farmers with access to irrigation system on:

i) awareness of the *need* to access and use water for irrigation,
ii) economic and technical capacity to access the irrigation system, in other words, the *resources* available at the farm level that enhances/restrict the access to the water for irrigation,
iii) the perception of economic *efficiency* of water use for irrigation in the investigated area.

RESULTS AND DISCUSSIONS

The secondary statistical information available at the level of National Institute of Statistics for the period 1997-2010 shows that in Braila county there are significant variations of irrigated farmland from one year to another. These fluctuations are partly explained due to environmental conditions but, at the same time, these are motivated, as confirmed to us the farmers themselves, by providing subsidies and the access to the irrigation system. Thus, setting up of the Irrigation Water Users Associations - IWUA (since 1999) that associations of farmers with access to irrigation facilities, has enabled: i) the transfer of ownership of the tertiary irrigation infrastructure to the IWUA associations; farmers become responsible in maintaining and repairing of the irrigation infrastructure that belongs to the IWUA; ii) the access to subsidized electricity needed to run the irrigation system (which is mostly in the price paid for access to irrigation system in Braila). This new institutional construction with private foundation, slowing down the degradation of irrigation system infrastructure and the subsidies allocated from the state budget for irrigation increased the access to water for irrigation (the irrigated area increased exponentially after 1999 so that, in 2003, thy are nine times extended compared to the onset of reorganization of irrigation) (Figure 1). 2004-2005, excessively rainy year, according to the information of National Administration of Meteorology (Sandu, 2009), reducing demand of water for irrigation, but, soon as the climate regime reversed, the need for irrigation in the agricultural sector increased appetite of farmers to use alternative water sources. 2010 is the year that shows the reverse existing relationship between the use of irrigation water system and subsidies received from the state for this. Basically, in a dry year (2010), the area of irrigated agricultural and arable land almost halved compared to previous

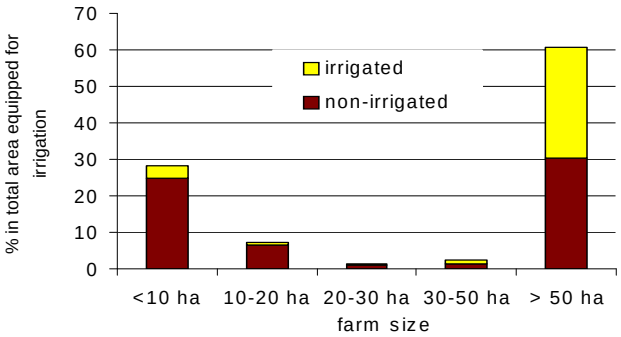
Figure 1. The use of irrigation system, Brăila county



Source: NIS (2012)

year, the interviewed farmers accused the high cost of the access to the water through irrigation system once after the subsidies were eliminated.

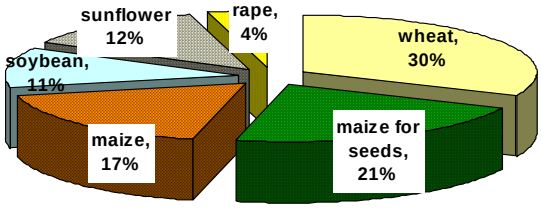
Figure 2. Utilization of irrigation facilities by size of farms, 2007, Brăila county



The NIS statistics also show a direct correlation between the agricultural farm land size and the utilization of irrigation facilities (Figure 2). Small farms with access to irrigation systems, water a small part of agricultural land on which they operates, compared with the large and commercial farms. Although 28.4% of irrigation facilities in the county of Braila are located in the area of the small farms (less than 10 ha), in 2007 these farmers applied watering only for 1/10 of these areas. In the same year, at the level of the commercial farms (over 50 ha), at least one watering have been applied for a half of the area equipped for irrigation.

It seems that, even in the period where the irrigation system was subsidized (2007), the inclination of the small farms to use water for irrigation was relatively low, mainly because of their poor technical capacity to access the farm irrigation system. Their low economic power and the focus on the semi-subsistence agriculture of these small farms, have limited their chances to increase their agricultural areas and to acquire advanced agricultural equipment necessary to facilitate access to irrigation now when subsidies were removed. Therefore, their technical

Figure 3. The structure of irrigated crops Viziru Terrace, Brăila (2009)



Source: MARD (2010)

and economic capacity to using water from the irrigation system has been further reduced, after 2010.

The fact that the large farmers are those who used mostly the water from the irrigation system in Braila County has influence on the structure of irrigated crops. Thus, the production structure of this type of farm is more directed to field crops and agricultural seeds production (Figure 3), suitable to be grown on large areas and less for vegetables that involve a lot of work force and a greater consumption of water. More than that, for vegetable a better coordination between the members of the same IWUA structure is needed in order to correlate their structures of production for a better correlation of water demand for irrigation of all farms and, through this, to optimize the cost for the access to the irrigation system.

CONCLUSIONS

The agricultural size structure of the farms that use water for irrigation and the irrigated crop structure are largely the result of the organization and operating mechanism of the irrigation system in general and are dependent of the IWUA functionality, in particular. Thus, IWUA are associations of farmers, owners of tertiary irrigation infrastructure on their territory which have yearly contracts with the irrigation water suppliers, contracts stipulating the projected periods and quantities of water required for irrigation. Under this contract, the water supply to IWUA is made at his request, demand that represents the cumulative water needs of all farmers, IWUA members. If the price of water to IWUA is established by the annual contract, the water pumping costs, requested for the distribution of water between farmers, are depending on the amount of water delivered. According to the principle of decreasing marginal costs, the greater are the simultaneously irrigated areas the smaller are the costs of water pumping per irrigated unit area. This fact: i) favours the large farms that simultaneously irrigate large areas and/or have the capacity to optimize the irrigation costs through an good management of the production structure and of water consumption, ii) determines the farmers to correlate the periods when they ask for the water to irrigate obliging them to uniform their structure of crops .

The big size commercial farms seem to be favoured in this organizational – institutional framework and, in the context of eliminating

the subsidies for irrigations; they are in the best position for optimization of the economic ratio effect/effort, relying on the following arguments:

- The high productive capacity of the soil in the area.

Soils in classes I and II of suitability for agriculture, cover 48% of the agricultural area of the county) which permit high potential yields per area unit and substantial profits even from the big culture

"....this land is good. At wheat I make 2000 kg/ha without doing it anything. If I give it an herbicide it grows by 1000 more. If I water, it grows by 1000 kg". (farmer Brăila, 52 years old, agronomist engineer)

- Technical-financial capacity for the access to the irrigation system

40% of the interviewed representatives of the commercial farms evaluate as 'good' or 'very good' the technical capacity of the own farms in order to access the irrigation system.

"Very good! We have irrigation equipments taken on credit! (farmer Brăila, 42 years old, economic education)

"Weak! They do not have enough devices and equipments (n.b. for applying waterings at farm level)" (farmer Siliştea - Brăila, 52 years old president of IWUA)

- Bigger chances to minimize production costs per area unit and to maximize profitability

Because of the physical depreciation of the irrigation system on terrace of Braila, the present output of the flowing in and distribution network is estimated at around 60% (MARD, 2007). The losses are then transferred upon the costs of access and utilization of the water for irrigations.

"The present price (of the water) is high enough ... it is not real with what is consumed….. ....The engines are very big, the consumption (n.b. electric power) is big. We pay more on water and because of this it must be replaced the engine used for water re pumping)"(farmer, 42 years old, economic education, head of IWUA)

A great part of the areas irrigated in 2010 at the level of the farms surveyed was destined to the seeding lots contracted before with the seed producers– Pioneer, Monsanto etc. who support a great part of the production costs, including a significant part of the expenses with irrigations.

"*It cannot be without irrigations! We work with maize for seed!*" (Farmer Brăila, 42 years old, economic education)

„ *…it's the crop (n.b. maize for seeds) which brings the best profit. 6 million/ha (n.b. in lei, old currency). .... If the seed producer did not give the 200 euro/ha (n.b. for irrigations), I would not have irrigated"* (farmer Brăila, 52 years old, agronomist engineer, vice-president of an IWUA).

The supply channels have a huge 'reserve' of weeds seeds brought in by the water or coming from the vegetation not taken off the canals, which is leading to the infestation of the irrigated areas; with big expenses for herbicides used in diseases and pests control from the vegetation in the canals.

"*…open canals where the grass grows ... In spring they come (through the water for irrigation in the canals) weeds seeds– bottle grass, cane– 30- 40% of the irrigated lands are infested"* (farmer Brăila, 52 years old engineer agronomist, vice-president IWUA).

Farmers are reducing the future risk to increase expenses with crop herbicides application by limiting the water consumption for irrigation.

- The securing of chances to sell the production and avoiding losses by perish character.

Farmers in area of Brăila relate the negative experiences in selling the vegetables, which, in most cases are connected to non-respect of the clauses in contracts by the firms for overtake and processing of vegetables: not overtaking the products at terms established, delayed payments, invoking of some clauses for products refuse not foreseen in the initial contract.

- Avoiding the risks of not having access to irrigation water in due time

The answer of a farmer who farmed in 2011 over 200 ha of which more than 1/2 was irrigated at the question: How do you make the decision to irrigate a crop area?
"It is difficult! You are conditioned by the others who are on the same canal (n.b. of irrigations). The decision is commonly agreement taken!"

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