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THE IRRIGATION WATER USERS' ASSOCIATIONS – CASE STUDY: NORTH BRĂILA TERRACE

ABSTRACT

In Romania, the Irrigation Water Users' Associations (IWUA) concept was set up in order to diminish competition, which generates conflicts in relation to the access to and utilization of irrigation water, as well as to facilitate the transfer to end users (farmers) of the administration and utilization mode of the existing intermediary and final land improvement infrastructure, the public utility facilities (water accumulations, main canals, pumping stations) being managed by the National Land Improvement Agency (NLIA).

The purpose of the present paper is to investigate the institutional and legal framework under which the IWUAs from Brăila county carry out their activity; in this area, the largest part of the irrigation system built up in the communist period is still working, unlike the situation in other counties from Romania, where both the water pumping stations and the water delivery canals have been almost completely destroyed.

Key words: water, irrigations, associations, competitiveness.

JEL Classification: Q15, Q56.

1. INTRODUCTION

Agricultural crops irrigation represents one of the most efficient measures for production increase. In our days, on world plan, crops irrigation is applied not only in the arid or semiarid zones of the globe, with rainfalls of 300-500 mm annually but also in the subhumid regions with rain falls of 700-800 mm annually. Irrigation is a great efficiency measure, by the help of which it can influence the level, the constance and quality of the crops. Known and practiced since the antiquity, irrigation has become in the last decades a basic component of the cropping technology .

In Romania, the more and more frequent drought, is affecting almost half of the agricultural area of the country, mainly in the Câmpia Română, Dobrogea and Moldova, areas where we can find the most extended irrigation systems, built in the period 1960-1990, though not functional or unsused for about 20 years.

The great irrigation systems were placed, alongside Danube, in a number of 10 counties, starting with Dolj county and up to county Galați and in Dobrogea.

These systems have areas larger than 140 thousand ha, amounting around 80% of the whole area managed. The water source for 75% of the hydro-meliorative settlements is ensured by the Danube River (Lup, 2010). The investments in the irigation infrastructure, have a favourable impact upon the environment not only by reduction of the risk to drought and fight with the aridization, but also by reduction of water losses due to infiltrations, with negative consequences upon the freatic water and soil.

In the field of the agricultural life, the forms of association and/or cooperation have existed and even dominated over the oldest times. The diversity of the association and/or cooperation relationships is given by the variety of the links established inside agriculture, as well as between agriculture and other branches of the national economy.

In the Romanian agriculture there is, according to the present lesgislation, the following association forms:

– Agricultural companies and other associaton forms in agriculture (Law 36/1991);

– Associations (The Government Ordinance 26/2000 with regard to associations and foundations, approved with alterings and completions by Law 246/2005);

– Agricultural cooperatives (Law of agricultural cooperation 566/2004).

In the field of land meliorations, the physical or juridical persons who own in the basis of a viable ownership or usage title, land areas equipped with irrigation systems or drainage, or works for fight against floods or fight against soil errosion, can constitute (according to Law of land meliorations 138/2004, as well as The Government Emergency Ordinance 147/1999, altered and completed by Law 573/ 2001):

– *organizations of land meliorations* (the the water for irigation users organizations, the organizations for fight with the drought and drainage, the organizations for fight against floods, the organizations for fight with the soil errosion), as well as – *federations of land melioration organizations*.

After the reformation process in agriculture and forestry the administration and utilization of the intermediary and final infrastructure of present land meliorations has passed by transfer into the ownership and administration of the *final users (the farmers),* organized into associative structures in order to develop one or more of the public interest activities, connected to the delivery of irrigation water, the exploitation, maintenance and repair works of an irrigation system which is serving more landowners.

Also, by the use of the collective power some local, zonal, or regional advantages are attracted in the goal of putting into value the production resources they have and of maximization of the effects the farmers wish to obtain: viable and profitable agricultural farms, resistence to the sales market, the successful accessing of the financial funds .

2. STATE OF KNOWLEDGE

In Romania, irrigation development started to the end of the year 1945, having a boost in the period 1970–1989, when the big irrigation systems were built by pumping. The motivation for this innitiative was mainly of political nature. Until the end of the year 1989, it was settled a total area with irrigations infrastructure of almost 3.1 million hectares, the equivalent of 20% of the agricultural area existing on national plan and which comprised 375 big systems of irrigations. These systems were developed mainly in the goal of maize irrigation, of the wheat's, sunflower's and of sugar beet's, as well as vegetables' and rice's. The majority of systems (2,7 million ha) were endowed with equipments of watering with manual movement, the way of watering being by aspersion (MAFRD and World Bank, 2009).

A great part of the lands irrigated were situated on high terraces, above the water source. In some cases, there were built irrigation systems for the irrigation of some lands situated at more than 200m above that water source, including up to 10 repumping stations. In total, approximately 60% of the areas settled for irrigations, included pumping heights of up to 75 m. The specific costs of irrigations by underpresure networks were high, until 1989 the State hiding the real amplitude of the subsidies (mainly for the energy comsumed for water pumping), in order to maintain the services of irrigations delivery. At that moment, the State found itself in the situation in which it could not deliver anymore the funds necessary for the essential maintenance and exploitation works of the irrigation infrastructure, as a consequence the irrigation systems degrading step by step.

The settlements for irrigations are comprising, as it is the case:

a) water caption: plugs with pumping and/or gravitational, forage pits, pipes, aspiration and suppressing basins, defence and consolidation of (water) banks, works for conducting the water currents, with the assembly of the afferent installations;

b) water adduction and distribution: cannals, pipes, hydrotechnical nods, dams, constructions of passage and subpassage, pumping stations, aspiration and suppressing basins, consolidations, stuffs, with the assembly of the afferent installations;

c) the internal settlement: cannals and underground pipes, which are feeding with water the irrigation installations and as it is the case, the assembly of the mobile pumping aggregates and of the afferent installations, works of land levelling;

d) the assembly of the irrigation installations and of the pumping mobile aggregates, for the watering application;

e) the water evacuation in case of damages: cannals, pipes,evacuators, dams, with the assembly of the afferent installations;

f) pedoameliorative works and measures foreseen at art. 2 paragraph (2) letter e) from Law of Land Settlements no.138/2004, republished;

g) manufacture of irrigation installations.

At present, in our country, the water for irrigation management is complying with the requirements of the European Union, which regulates the action , cooperation, coordination and implementation frame of the common norms regarding the sustainable water and soil utilization. Among these, *The Frame Directive for Water – 2000/60EEC* constitutes a new approach in the field of water management, basing itself on the basin principle and imposing strict terms for the measure programme realization. It establishes more integrative principles in the field of water management, including among others the public participation in the water management and integraton of the economic aspects. According to this Directive, The Member States in the European Union must ensure the attaining of the welfare' of all the surface waters until the year 2015.

The administration and use of the irrigation infrastructure is developing on two stages in the basis of a legislation in continuous dynamics(E. Sima, 2012). Thus:

1. *The administration of irrigation settlements in the public or private state domain, declared as of public utility* (water accumulations, magistral cannal, pumping stations, irrigation settlements; the drainage settlements with pumping and/or gravitational evacuation; settlements for fight with the soil errosion; the production and administrative buildings etc.) is ensured by the National Land Improvement Agency (NLIA), *a*ccording to the Law of land meliorations no. 138/2004 – a fundamental legislative instrument of the irrigation water sustainable management.

LINA is a public institution, legal entity, funded through its own revenues and subsidies from the state budget, under the subordination of the Ministry of Agriculture and Rural Development, which was established by the reorganization of the Land Improvement National Administration and took over part of the patrimonial assets of the National Company "Land Improvement" – S.A.

In the year 2012, the 296 complex irrigation facilities administered by 12 county branches covered a total land area of 2,991,943 ha in the year 2011 (Table 1).

Table 1

Land equipped with irrigation facilities in the year 2012

Total irrigated area	2,991,943 ha
out of which:	
- sprinkler irrigation	2,665,594 ha
- furrow irrigation	276,624 ha
- submersion irrigation	49,725 ha

Source: http://www.anif.ro/.

The land areas equipped with irrigation facilities in Romania are endowed with constructions (buried channels and pipelines, pumping stations, sluiceways, automatic hydraulic valves, culverts, mini waterfalls, chutes) ensuring irrigation water supply, transport and distribution, with an installed power of the pumping stations of 4,134 MW (Table 2).

Table 2
Irrigation sector infrastructure in Romania

Main constructions on the land equipped with irrigation facilities:	
- water supply and distribution channels	10,630 km
- buried pipeline networks	26,700 km
- floating and fixed pumping stations	2,710 pieces
* basic floating stations	53 pieces
* basic fixed stations	171 pieces
* boosting stations	349 pieces
* pressure stations	2,137 pieces
- hydrotechnical constructions	
* sluiceways	4,856 pieces
* automatic hydraulic valves	480 pieces
* culverts	4,801 pieces
* chutes	2,781 pieces
* lateral spillways	466 pieces

Source: http://www.anif.ro/.

2. *Administration and utilization of existent intermediary and final irrigation infrastructure* passed, by transfer, into the ownership and administration of the final users *(the farmers)* organized, according to the G**overnment Emergency Ordinance rdonanței de Urgență a Guvernului no. 147/1999,** approved with alterations and completions **Law no. 573/2001,** into *associative structures called* Organizations of the Irrigation Water Users (OUAI) and Federations of Irrigation Water Users Organizations (FOUAI), which: own and administrate: water plugs, pumping stations (including the electric power network for feeding them with energy),water transport and distribution cannals, the network of subterranean pipes as well as the drainage infrastructure, the fight with the soil errosion and defence against floods and are developing one or more of the following activities of public interest:

a) irrigation water delivery, operation, maintenance and repair of an irrigation, drainage and desiccation system that serves several land owners;

b) maintenance and repair of facilities for flooding and soil erosion control and development of other land reclamation activities that protect the soil on the land area of several land owners.

These organizations and federations are legal entities of public utility, without patrimonial purpose, which take over, for the land users' interest, both the ownership right and the right of use of the water users' association on the irrigation infrastructure into state ownership or of the administrative-territorial units, consisting of pumping stations, pressure stations, hydro-technical constructions, together with the related facilities and land, underground pipe lines, as well as other goods on the organization's territory and the correlative obligations.

3. MATERIAL AND METHOD

From methodological point of view, the analysis of the irrigation water management in the 6 Irrigation Water Users' Organizations, situated on the Terrace of North Braila was based on information from: The National Land Improvement Agency (NLIA), The Office for Regulation of the Organizations of Land Meliorations within the Ministry of Agriculture, Forestry and Rural Development, the Ministry of Environment etc, as well as a series of statistical data on counties and concludent governmental reports for the subject approached. As methodological instruments there are used the analysis, comparisons and synthesis of available information.

4. RESULTS AND DISCUSSIONS

In Braila county, over 80% of the total area is agricultural land. Situated in the South-East of Romania, the plain is the predominant relief form, the landscape of Braila being monotonous and without natural barriers. The climate is temperate – continental, with an average temperature of $11,1^0$C, with dry summers and cold winters. The flora and fauna are specific to the plain region. The steppe was transformed into agricultural land, Braila county being one of the most developped counties in Romania, from agriculture point of view. Although the lands of the county enjoy a high fertility degree, the frequency of drought situations leads to the productions' diminution, much under the profitability limit, which makes the activity in agriculture be noncompetitive.

The county Brăila is one of the *large agricultural counties of Romania.* With an agricultural land area of 388435 hectares and an arable area of 345911 hectares, this county represents one of the zones with the greatest possibilities of participation to the establishment of Romania's food fund and to the creation of certain availabilities for export. This potential is doubled by a *good quality of soils*, as about 48.5% of the area is represented by chernozems, very fertile soils, and almost 30% of alluvia and alluvial soils, which through hydro-melioration measures and irrigation provide good conditions for the development of crops.

Thus, owing to the hydro-melioration measures applied on a net area of 334,047 ha (representing about 86% of the county's agricultural area, and about 97% of the county's arable area and more than 20% of the total net area equipped with hydro-melioration facilities in our country of 1559876.1 ha), the county Brăila is a leading county in the application of these measures, under the conditions in which the extreme weather phenomena (drought and flooding) have been increasingly frequent in recent years.

On the territory of Brăila county there are 13 hydro-melioration systems, and the existence of certain ***large irrigation systems*** with small water pumping height

(only 13% of the areas equipped with irrigation facilities have pumping heights over 75 m) that exceed 10000 ha, compensate to a large extent the water deficit in the hot season of the year, specific to the steppe zone (Table 3).

Table 3
Land area equipped with hydro-melioration facilities in Brăila county, in 2012

Crt. no.	Name of hydro-melioration system	Area			
		Gross		Net	
		ha	%	ha	%
1.	Insula Mare a Brăilei	211200	60.09	199451	59.71
2.	Terasa Brăilei	34332	9.77	33208	9.94
3.	Terasa Viziru	19482	5.54	18920	5.66
4.	Terasa Ialomiței	18905	5.38	18102	5.42
5.	Ianca Surdila Greci	13600	3.87	12615	3.78
6.	Nămoloasa-Maxineni	13224	3.76	12979	3.88
7.	Călmățui-Gropeni	11533	3.28	11273	3.37
8.	Incinta BH Călmățui	9608	2.73	9004	2.70
9.	Grădiştea-Făurei-Jirlău	8877	2.53	8255	2.47
10.	Terasa Latinu Vădeni	4075	1.16	3741	1.12
11.	Incinta Brăila-Dunăre	3784	1.08	3646	1.09
12.	Incinta Lunca Rau Buzău	2070	0.59	2066	0.62
13.	Incinta Noianu Chişcani	787	0.22	787	0.23
	TOTAL	351482	100	334047	100

Source: National Registry of the Land Reclamation Organizations, Land Reclamation Directorate, MAFRD, September 4, 2012.

From the thermal conditions point of view, the county Brăila, located in the south-eastern part of Romania and crossed by the parallel 45^0 (near the locality Viziru), has favourable conditions for the growth and development of a wide range of cereals, industrial crops, vegetables, fruit-trees and vine, and even varieties and hybrids with a long vegetation period can be cultivated with good results. The obtained production mainly in cereals and fodder crops favours the raising of bovines, sheep, pigs and poultry.

There are available human resources both in number and as regards the professional training. The large shares of the population working in agriculture describe mainly a mono-occupational profile, and the low demographic pressure on the financial resources favours the potential of agriculture development.

The irrigation system "Terasa Brăilei" is located in the North Bărăgan Plain, in the eastern part of Romania, and it is administered by NLIA branch: Argeş-Ialomița-Siret, Brăila Nord administration unit**.** The total area of the system designed and executed in the period 1969-1972 is 67500 ha, out of which agricultural land area with public utility recognition totals 40990 ha (TCE Ltd., 2007).

The micro-relief and soil, hydrological and geological conditions in the system "Terasa Brăilei" (Brăila Terrace) imposed the execution on 17% of the

agricultural land area of a *discharge-desiccation network* and of certain *closed drainage* works in certain hollow areas in order to increase the natural drainage and discharge the water accumulated in the depressed areas, in order to counteract the ground water layer rise.

The water is fed to the system "Terasa Brăilei" from the Danube River, which is the water source, with a water flow of 53.24 cubic meters/s; the catchment of water is in the points with the most favourable conditions in the area, through 2 water inlets and floating pumping stations *SPA km. 166* and *SPA GROPENI km. 196* and from the discharge gallery of Chişcani thermo-power station, through *SRPD4* re-pumping station.

The discharge-desiccation network consists of four gravity discharge systems in the Buzău River (the discharged water flow is 3.30 cubic meters/s) and in the Danube (the discharged water flow is 8.1 cubic meters/s). The closed drainage fields sum up 1844 ha. The main channels and discharge-desiccation are operating, but they need vegetation clearing and desilting in certain areas.

The watering methods are *sprinkler irrigation* (on 96.80% of the total area equipped with irrigation facilities) and *furrow irrigation* (on 3.2% of total area equipped with irrigation facilities) and the types are the following: sprinkling through pressure pipes served by electric pumping stations on 22880 ha; sprinkling through pressure pipes served by thermal aggregates on 24740 ha; sprinkling with waterproof open channels and ditches that feed the thermal aggregates on 21,580 ha; "bivalent" type of works (furrows and sprinkling on 2.300 ha).

The irrigation system Terasa Brăilei is located in an area with continental climate, with higher temperatures and lower rainfall in the recent years than the multi-annual averages. The main winds blow from the North and North-East in the conditions of climate aridization tendency, when the moisture deficit in soil reaches about 350 mm/season in the vegetation period, and the irrigation of crops is an imperious need.

The soils from the perimeter of the irrigation system Terasa Brăilei are mainly of Chernozem type, with I and II suitability classes for agriculture. These are soils with high natural fertility, with 3.0 – 4.5% humus content, and they are suitable to irrigation application accompanied by the related desiccation system, requiring the application of agricultural technologies adapted to crops, ensuring a sustainable soil use and sub-soil protection. In the period of maximum operation of the irrigation system, due to the rise of the phreatic water layer, phreatic-humid and medium salty soils appeared mainly in the highly depressed areas. The share of these soils increased from 4-5% to about 10%.

Chemical fertilizers application is low, which leads to a low impact upon the environmental factors, yet there is a danger nutrient depletion in soils. Pesticide application represents a high pollution risk for soil, surface and ground waters. In the area of the irrigation system Terasa Brăilei, a low amount of pesticides was applied, i.e. about 50% of the necessary volume, and the substances used were from toxicity groups III and IV, hence with lower toxicity.

Sprinkler irrigation applied on 96.80% of the total area equipped with irrigation facilities brings a lower amount of water to soil than the infiltration rate, which prevents the soil erosion risk. Wind erosion is also low in the vegetation period, as sprinkler irrigation increase particles cohesion to soil.

The water from the Danube complies with STAS 9450/88 standards for the quality of water used for the irrigation of crops. The higher mineralization of water in the desiccation system reveals the impact of agro-chemicals on the water collected in the area of the irrigation system Terasa Brăilei; yet, due to the quality of the Danube water that has the salinity class C2/C3, soils may be subject to a low salinization process.

At present, the steppe-specific flora and fauna, which used to prevail in Bărăgan Plain, are much modified, their place being taken by the agricultural crops and domestic animals. The irrigation system has a non-significant impact upon the terrestrial habitats, but it is estimated that water discharge from the desiccation system impacts the water habitats. There are no protected areas and no rare species in danger of extinction in the perimeter of the irrigation system. At present, the spontaneous vegetation consisting of remains of primary steppe meadows (Festuca Vallsiaca, Stipa lessingiana, S. capillata and other xelofilous grassses) is found only in small patches, on the natural meadows, as well as by the road side, along the dikes, irrigation channels and on the idle agricultural land. Trees are found in isolated groups, consisting of poplars, willows and acacias, oak trees and different other species. The flora is completed by halofilous vegetation as well as by aquatic vegetation. Most plants develop their evolution cycle before the dry periods at the end of summer.

The administration and use of the intermediary and final irrigation infrastructure located on the area of the irrigation system Terasa Brăilei from the county Brăila is at present ensured by a total number of 26 Irrigation Water Users' Organizations (IWUOs), according to the data from the National Registry of the Land Reclamation Organizations, kept by the Office regulating the land reclamation organizations under MAFRD (Table 4).

These organizations are legal entities of public utility, with no patrimonial purpose, established in conformity with the provisions of the Land Reclamation Law no. 138/2004, as well as of Government's Emergency ordinance no. 147/1999, modified and completed by Law no. 573/2001. Their establishment was encouraged by the world context of the last years, determined by the concentration or development strategies. Thus, farmers have to face a fundamental strategic decision, namely to choose how to act better under uncertainty conditions in order to have viable, profitable holdings, to face competition on the market and to be efficient in accessing the financial funds.

The analysis of these aspects is supported by the existing situation on the territory of 4 communes located in the area Terasa Brăilei: Cazasu, Siliştea, Tudor Vladimirescu and Vădeni, located near the Danube River (Figure 1).

Table 4
Organization forms and total gross area of hydro-melioration systems in the county Brăila, in the year 2012

Crt no	Hydro-melioration system	Total gross area ha	Land Reclamation Organizations					
			IWUO		DDO		FLRO	
			no	ha	no	ha	no	ha
1.	Terasa Brăilei	34332	26	34332				
2.	Terasa Ialomiței	18905	19	18905				
3.	Terasa Viziru	19482	16	19482				
4.	Nămoloasa-Maxineni	13224	12	13224				
5.	Ianca Surdila Greci	13600	5	13600				
6.	Incinta BH Călmățui	9608	4	9608				
7.	Insula Mare a Brăilei	211200	1	68934	1	69241	2	73025
8.	Terasa Latinu Vădeni	4075	6	4075				
9.	Grădiştea-Făurei-Jirlău	8877	3	8877				
10.	Călmățui-Gropeni	11533	4	11533				
11.	Incinta Lunca Rau Buzău	2070	2	2070				
12.	Incinta Brăila-Dunăre	3784	3	3784				
13.	Incinta Noianu Chişcani	787	1	787				
	TOTAL	351482	104	355266	1	69241	2	73025

Note: IWUO – Irrigation Water Users' Organizations; DDO – Drainage and Desiccation Organizations; FLRO –Federations of Land Reclamation Organizations.
Source: National Registry of the Land Reclamation Organizations, Land Reclamation Directorate, MAFRD, September 4, 2012.

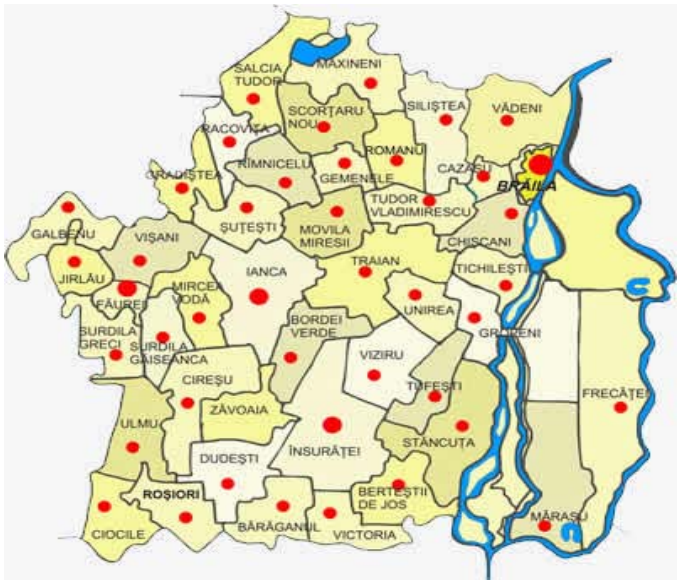

Figure 1. Location of communes Cazasu, Siliştea, Tudor Vladimirescu and Vădeni in Brăila county.

The investigated Irrigation Water Users' Organizations are: Pietroiu, Tevesil, Petrosu, Agro Dunărea, Danova Leg and Nova Prod Terra, served by 6 pressure release stations: PRS Pietroiu, PRS SV1 Silistea, PRS 24, PRS 25 and 27, PRS 26. The total area of these organizations, as registered in the Ministry Register, is 4780 ha (Table 5).

These associations were established on the basis of the Land Reclamation Law no. 138/2004, as well as of the Government's Emergency Ordinance no. 147/ 1999, approved with modifications and completions by Law 573/2001. Their statute contains provisions referring to: name, headquarters, patrimony, object and purpose of activity, management and control bodies, conditions of entry and withdrawal from association, rights and obligations of the association members.

Table 5
Irrigated area of the IWUOs from the pilot zone

Crt. no.	IWUO name	Area		Establishment order	
		Gross ha	Net Ha	Number	date
1.	Pietroiu	1 152,00	1 152,00	485	6/17/2005
2.	Tevesil	2 166,00	2 166,00	485	6/17/2005
3.	Petrosu	120,00	120,00	560	6/30/2005
4.	Agrodunărea Tractor Service	1 067,00	1 067,00	560	6/30/2005
5.	Danova Leg	170,00	170,00	1224	11/16/2005
6.	Nova-Prod-Terra	105,00	105,00	100	01/10/2006
		4 780,00	4 780,00		

Source: The National Registry of the Land Reclamation Organizations, MAFRD, 2012.

In view of facilitating the irrigation services performance, the members of the association should allow it to use any pipeline, channel, hydrants or other hydro-technical equipment located on the land owned or used by them, as well as to have access on the land administered by the association, for the operation and maintenance of the irrigation networks or their repair in case of damage.

The association can be liquidated in the conditions in which its objectives cannot be fulfilled or if, out of other reasons, its existence is not necessary any more and this is registered in the Associations' Register from the court in the area where the association is located. The way of distributing the social patrimony of the association, at the end of the liquidation process, is decided by the general meeting, by the vote of the majority of members, on the condition these own or use over more than half of the area of the association's territory. The decision of the general meeting for the association liquidation must also include the appointing of one or more liquidators .

The court makes public the decision to liquidate the respective association, at its own expense, in order to permit the creditors to register their outstanding debts

upon the assets in the association's ownership. After the association liquidation, the Ministry of Agriculture, Food and Forestry will approve the transfer of the infrastructure into the administration of NLIA.

According to the legislation into effect, *the irrigation water is delivered to the associations by NLIA,* on farmers' demand, on the basis of contracts for services with successive execution concluded on long term, named *multi-annual contracts*, as well on basis of irrigation water delivery contracts with immediate execution, named *seasonal contracts*.

The multi-annual contracts are signed for a period ranging from 3 to 5 years. The payment is made on the basis of an annual fee for irrigation water delivery, calculated by NLIA for each point of irrigation water delivery to beneficiaries. This fee covers the estimated costs for repair and maintenance of the irrigation infrastructure in the public and private domain of the state, under NLIA administration, and its value is established for each irrigation water delivery point, previously to signing the multi-annual contract.

The structure of the irrigation water delivery fees, their periodical adjustment modality, the date when the beneficiaries will be informed about the value of these fees, the date of signing the multi-annual contracts and the deadline for payment of the annual fee by the beneficiaries are established by the methodological norms regarding the calculation and payment of the fees for the land reclamation services, which is approved by Minister's Order, with the acknowledgement of the Public Finance Ministry. The ANIF fee established for each agricultural year is published in the Official Journal. This parameter value can show the extent to which the delivery to IWUO can variate.

The great number of IWUO users imposed the application of some ***specific procedures for the performance and control of the irrigation activity***. In order to be able to irrigate at a multi-annual fee, the user must be IWUO member, statute that is obtained by paying the annual membership fee.

When making this payment, the member receives *personalized tickets* on the basis of which he can go to the Pressure Release Station (PRS) and ask for water at a multi-annual tariff. When the farmer (IWUO member) wants to irrigate, he must make sure that the PRS fulfills the minimum starting condition, and then he goes to the station, where on the basis of irrigation ticket can install his irrigation equipment. At the end of the day, week or month, depending on the IWUO, the electrical mechanic from each station makes a summary with the members who irrigated on the basis of tickets received from these and cuts the receipt with the amount to pay. At the end of each month, an invoice is also issued by each PRS. This system has been applied in order to control the level of the subsidies that can be obtained per each PRS, and the subsidized irrigations of farmers, and it will be applied in the next period as well, with some modifications. Maintaining this procedure makes farmers be motivated to pay their membership fee, as this is the only modality by which they can irrigate at multi-annual tariffs, otherwise they will

have to pay the seasonal tariff, which is much higher. Another reason for maintaining this procedure is the need to monitoring and control the activity of those who irrigate.

Another procedure is to sign *some irrigation contracts on credit* between the farmers who are members in the association and the IWUO they are affiliated to. The contract provides for the application of a certain number of irrigations on credit, with the date due in September, when the farmers sell their production. After signing the contract, the IWUO sends a copy to the electrical mechanic from the station and gives the farmer the personalized tickets for the number of irrigations established by contract. On the basis of tickets, the farmer goes to the station and applies the respective irrigations. After finishing the tickets, he can no longer irrigate on credit, but only by immediate cash payment. This irrigation modality contributes to the increase of returns and of the volume of water used.

The most irrigated crop on the land with IWUO irrigable potential from the pilot zone is maize, closely followed by wheat, industrial crops, vegetables and seed crops.

Seed crops bring considerable profits for the farmers who cultivate them, if the irrigation subsidies are taken into consideration. The small grains and maize are crops that incurred losses due to the need for certain agro-technical measures. Sunflower is profitable to a certain limit. Although there are farms where the irrigation of these crops led to profit, without the irrigation cost diminution, their cultivation on most farms will suffer significant diminution.

The crop structure cannot vary very much from one year to another, even though certain agro-technical measures are imposed (crop rotation, in the first place). As a result, the way in which the farmers adjusted their cropping plans according to the profit obtained by each crop represents the most important indicator of the payment capacity.

In the investigated area, the irrigation practice is determined by the farmers' experience in agriculture. The long experience indicates that the farmers do not consider agriculture a conjunctural activity, but on the contrary, a long-lasting one. The eventual decision to give up irrigating with the cessation of subsidies is possible to be made in a broader knowledgeable context, compared to the case when certain farmers who have just began their activity without knowing all the rigours of developing such an activity. Moreover, most farmers in the pilot zone have continuously irrigated since the IWUO establishment on their territory, and in this way they may prove that they learnt the value of irrigations regardless the weather conditions and they do not apply irrigations on a sporadic basis.

Most farmers who use irrigation equipment are commercial farmers, who practice large-scale agriculture, who got associated with the small subsistence farmers on the IWUOs. These commercial farmers afford to purchase irrigation equipment and to apply irrigations for crops with high economic value.

The IWUO revenues are grouped into two categories: own revenues, consisting of the water delivery tariff to users, membership fees and contribution to the annual water delivery tariff, and revenues from subsidies, consisting of the subsidy for security ensurance, as well the NLIA delivery tariff, the annual NLIA tariff, for energy payment at the delivery point level and for the payment of maintenance and repair costs.

As regards expenditures, the main categories are: wages/administrative department, which represent 18.6% of total expenditures; NLIA delivery tariff, accounting for 30.4% in total expenditures; NLIA maintenance and repair with 7.5%, energy at the delivery point with 20.42% and maintenance and repair at IWUO level, accounting for 23.06% in total expenditures.

In the opinion of all farmers and IWUO representatives, at the organization level, energy represents the cost with the highest share in total expenditures. Yet the reality proves that this cost is only on the third place in total expenditures, with only 20.42%, and, in fact, the highest value expenditure is represented by maintenance and repairs.

The average cost of electric power represents an important factor in the irrigation cost structure. In 2009, it represented 18% at national level and 25% in the most performant IWUOs. The energy price is different by each IWUO. As long as this cost was entirely borne by the state, IWUOs were not at all interested in diminishing this cost. After the removal of subsidies, the IWUO representatives will pay an increased attention on this parameter.

The average electric power consumption is a complementary parameter to the previously mentioned one. The more the irrigation system and its aggregates at the delivery points are in a good operation condition, the lower the pumped energy consumption per 1000 m^3.

The main problems the farmers are facing in their farming activity in the investigated irrigated area are the delay in receiving the subsidies, the current situation of the irrigation infrastructure and the payment delay penalties applied to the energy supplier and ANIF.

5. CONCLUSIONS

The reform process of the Romanian agricultural sector also included measures for restructuring the modality of administration and utilization of the intermediary and final land reclamation infrastructure, by transfer into the ownership and administration of final users (farmers). These got organized into associative structures named organizations and federations of organizations in land reclamation in order to develop one or more of the following activities: irrigation water supply, exploitation, maintenance and repair of flood and soil erosion control works.

The organizations and federations can become a platform to continue the reform of the Romanian agricultural sector by the opportunity these organizations represent in view of structuring the process of collaboration among farmers.

The obsolete character of the association and cooperation concept is due not only to the communist period, but also to the post-1990 period to a larger extent, when association and cooperation meant in reality some leaders of such "associations" getting rich to the detriment of the other members and on the basis of the production factors that belonged to all the "associated" members. These negative experiences considerably contributed to the absence of this method in the farming activity development in Romania.

Maybe the terms "association" and "cooperation" should be replaced by the term "collaboration". The enlargement of the activities that the irrigation organizations and federations can carry out would lead to the consolidation of the organizations through the takeover of input acquisition for all the members and mainly by ensuring the selling of products in common. If this solution is put into practice by the Ministry of Agriculture, the concentration of power should be avoided and the non-profit status must be maintained, which will immediately affect such collaborations by the current habits by which "someone" on the top position within the organization figures out methods to trick the others. On the other hand, the necessary incentives should be identified, so that the farmers get used to the idea of collaboration.

The development and maintenance of a high payment capacity in the systems where large-sized commercial farms (over 100 ha) prevail are not due only to the profit orientation of these users but also to the fact that the irrigation systems were designed before 1990 to serve the large-sized farms, not the small ones.

Under the conditions of the individualist mentality that has prevailed in the Romanian agricultural society for more than 20 years and that may continue for other 20 years, any intervention of institutional nature needs a good strategy for the development of collaboration among farmers, otherwise, any other measure will not make anything but prolong the agony of irrigation operation.

In the case of an agriculture with policulture on small farms and with the limitation of the water and energy resources, an increased focus will be imposed, as in other countries (France, Italy, Spain, etc.), on *irrigation with water distribution on "demand"*, with highly diversified and differentiated techniques, with sprinkler irrigation prevailing. At the same time, the surface *irrigation with water distribution by "rotation"* can be adopted prioritarily in the arid areas, where the large-sized monoculture farms prevail and where large areas of homogeneous soils exist. All these have in view the creation of the specific conditions for private agriculture development, with the use of water dispersed in space and across the community.

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