Management of the Economic Efficiency of Irrigation

Cristian Vanghele
"Andrei Saguna" University of Constanta, Romania
cvanghele.flg@gmail.com

Abstract

The management of the economic efficiency of the irrigation implies the implementation at the level of the management board of the irrigation systems of a managerial decision-making system whose main objective is the technical-productive together with the effective management. efficient of the post-crisis needs regarding the reproduction in the agricultural circuit of some parameters of the efficient irrigation systems, by elaborating and using viable management strategies and adapted to the post-crisis period, concomitantly with the imple-mentation of efficient economic models through the internal and external post-crisis factors.

The implementation of these economic models must follow a managerial decision system appropriate to the existing crisis situations.

The purpose of this paper is, by elaborating scientific conclusions using modern instruments of research, to analyse the economic-financial and technical-productive indicators of irrigation that determine the management performance at the microeconomic and macroeconomic level.

Key words: management, efficiency, indicators, agriculture, irrigation
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1. Introduction

Economic efficiency is made by concrete conditions under which the production activity is carried out. evaluation of specific indicators but also specific ways of determining the indicators.

Transformation of agricultural products into foods, presents a series of particularities related to the specific activity of these branches or to the characteristic features of the means in which these expenses materialize.

The knowledge and understanding of these particularities is necessary and useful for the analysis of the indicators of investments specific of the agriculture.

2. Theoretical background. Economic efficiency - general problem

Methodologically, in terms of specialty, economic efficiency is a complex category that expresses synthetically the results obtained in economic and social activity, thereby understanding the relationship between effect and effort present under the formula:

Eec = V / C where: V = annual production volume obtained, and C = the annual volume of the expenses incurred. Regarding the economic efficiency of investments

Economic efficiency of investments, it expresses the relation between the obtained material value results and the efforts made to achieve the respective objectives.

The determination of this report is made by establishing the results obtained on an investment unit, taking into account the opportunity generated by the investment and time factor. Economic efficiency in agriculture has a broader meaning, including the degree of satisfaction of the product requirements of a certain assortment imposed by the needs of the population and the economy, the increase of the productivity of social work of the net profit.

Efficiency economic of investments cannot be expressed merely as a simple relationship between the effects achieved in a given period and the value efforts, due to the fact that some economic and social effects occur later are difficult to commensurate economically or even not yet.

an adequate evaluation.

In the case of land improvement works, the problem is even more complex from several points of view determined by specific characteristics of this type of activity, such as (Mandache, 2003):

- the social and political character of investments - taking into account their contribution to the food security of the population, as well as to maintaining the economic independence in this field, elements that are hardly quantifiable in value;
- the impact on the economic efficiency of other economic activities upstream and downstream or collateral to agriculture;
- aspects regarding the conservation and maintenance of the ecological balance, the arrangement of the hydrographic basins, combating soil erosion.etc;

Regarding the influence of the volume of activity of other branches of the economy such as the creation of new activities which in turn produce a positive economic effect, can be considered as a contribution of investments in land improvement works to the economic efficiency of these branches, first of all through the mass effect of the realized profit. Thus, the development of land improvement works on areas of 7-8 million ha, it required a strong development of the construction materials industry, of pumping equipment, of automation. The agricultural production of development in the arranged perimeters required related and collateral investments in the tractors and agricultural machinery, fertilizer and chemical industry. and various other imputations specific to agricultural technologies.

The additional agricultural and vegetable production obtained on the landscaped land, in turn, contributes to the expansion of animal production. Finally, all the activities listed above, including the design activity and technological engineering, are job creators, an element whose weight in the social efficiency of hydro-ameliorative arrangements investments.

3. Irrigations' efficiency in agriculture

The hydro-improvement works occupy a special place in the strategy of the economic policy of the Romanian agriculture, being the determinant factor of increasing the production capacities, of rendering in the productive circuit of some unferred land surfaces, or with deficient biological features deficits contributing at the same time to the development of sectors of provision of collateral services and implicitly to the involvement in the development of the activities of the socio-human segment and not lastly it is the determining factor in the conservation and the increase of the capacity of agricultural lands with good biological potential for the development of the agricultural agri-food productive activities.

The main destinations of investments in agriculture of irrigation systems are (Bohateret, 2003):

- mechanization of agricultural works
- hydro improvements
- realization of constructions
- establishment of plantations
- buying anilmale

The main characteristics of the hydro-improvement works that influence the way of investments are the following:

- investments in hydro-ameliorations have a direct influence on production agricultural. These types of works, the desiccation and induction work require investments, which result in the introduction in the agricultural circuit of productive potential of the lands already put in culture.
- A part of the land is removed from agricultural use being occupied by dams, irrigation channels and desiccation, it is necessary that in efficiency economic these losses
- the hydro-ameliorations work has a long period of use fact which determines an increase of the risk of moral wear. In addition, in the accomplishment of these works generally non-recoverable materials are used, the consumption being completely integrated in the new value created by investments
- most of the times, the hydro-ameliorations are carried out within complexes of works that follow the directing of the normal water circuit, as for example the embankment works involve the association with the desiccation works, in order to remove the excess surface or groundwater from the enclosure. dams in the embanked enclosures, desiccations and irrigations follow one another to

remove the salt. In these conditions, it is difficult to separate the contribution of the different categories of hydro-improvement works, on the production being difficult to delimit the effect of these works by the influence of the other productive factors (fertilizers, fertilizers) plants, mechanization)

- making hydro-ameliorative investments usually involves a re-profiling of the agricultural units. For example, the embankments demand a change of the technical-economic orientation of the production from fish farming to livestock, where the need to grow maize, alfalfa, etc. The introduction of irrigation conditions changes the structure of soils, regarding the extending the species of plants that make the best use of irrigation water in close connection and with the phyto-thnico biological materials used

- sometimes, the works of hydro-ameliorations, involve the making of related investments (accumulation basins), for the conservation of the surplus water. Their utility is multiple (avoiding flooding, irrigation, water supply, energy, fish farming) so that the economic effect of basic and related investments.

The efficiency in hydro-ameliorations of investments are:

- irrigation volume of investments

- the specific investment, which no longer represents only the irrigation, but an entire complex of agro-pedestrian improvement works meant to enhance the land resource from a certain landscaped perimeter. Moreover, some of these components aim at environmental protection, spatial planning objectives, with socio-economic and urban functions, flood protection, structure by ownership of the irrigation arrangements, according to which the ownership right over the irrigation arrangements as well as other categories of land improvements derives in particular from the source of financing the investments in such works. Within the economy planned all the sources of financing of the big investment objectives were based on the development fund whose share in the gross national income was maintained at over 30%.

In an irrigation arrangement, the state and the private structure of property derives from the way of organizing and exploiting the respective investments. Thus, the water outlet points, the pumping and repacking stations, the adduction and most of the transport and distribution network including the pressure stations are state owned, operated by it through its specialized units existing in each county.

A less important part of the investment represented by mobile watering equipment, was supported by investment by the state agricultural units or cooperative being between 30-40% of the specific investment and structure of the watering equipment. At the beginning the massive arrangement for the irrigation by thermal units of pumping increased the part of investment that came back from the units of agricultural.

The arrangements for land improvements as defined in Law no. 138/2004, under the management of the National Company for Land Improvements, SA are composed of:

- works from irrigation arrangements consisting of water outlets, basic pumping stations, including reversible ones, pumping stations, channels and pipelines for the supply and distribution to the pressure pumping stations

- works from irrigation arrangements and from rice fields - formed from pressure pumping stations, internal irrigation networks consisting of pipes and channels, mobile watering equipment

- works from pumping and gravitational drying arrangements consisting of main collecting channels with the corresponding pumping stations, lower order drying channels, drains and drainage collectors

-works in the arrangements for combating soil erosion

- dams and dams against floods from the Danube and inland rivers

- production and administrative buildings

The methodology of evaluating the economic efficiency of irrigation consists of analyzing the efficiency of investments and the efficiency of agricultural production under irrigated regime

In fact, the indicators of economic foundation of the projects of investments in irrigation, are conclusive from this point of view

Also, the two phases of project and investment exploitation, are not different methods of the efficiency of agricultural production in the perimeters given in use

At the same time, the analysis aimed at assessing the economic efficiency at the project level, can be done both for checking the substantiation of economic indicators, and especially for comparing different project variants.

Starting from the particularities presented above, the efficiency of the hydro-improvement works is established in two essential phases, namely:

- the design phase, when it is determined the economic opportunity of making the investments and choosing the optimal investment variant,
- the exploitation phase, when the main objective is to establish the efficiency of the use of fixed capital, achieved through investments. Ultimately, this objective is reduced to determining the economic efficiency of the production obtained by exploiting the fixed capital realized. The indicators used to analyze the economic efficiency of the investments can be grouped in:

4. Efficiency indicators of production and efficiency of investment costs

Within the indicators of the production efficiency group, we find:

- Average production per hectare. Because of the hydro-improvement works, usually several crops benefit, it is necessary that the average production level be expressed in value. The indicator must be determined for both the previous situation and the situation after the hydro-improvement works are performed, so that the possibility of comparison can be.

As hydro-amelioration works usually benefit from more cultures, it is necessary for the average production level to be expressed in value. The indicator must be determined for both the previous and the post-hydro-amelioration situations so that the possibility comparison can be made.

- The production hectare increase. It expresses the increase of the production realized from the investment in relation to the production obtained before the works are carried out. following the constructions and the hydrotechnical arrangements, installations, etc., to determine the actual production increase per hectare, the formula is used:

$Aq = Q1 / S1 - Qo / So,$

where: Aq - represents the average production increase per hectare; Qo and Q1 - the total production, expressed physically or value, obtained from the entire surface before and after the arrangement; So and S1-the surface cultivated before and after the arrangement.In this context, the production obtained before the arrangement of the hydro-amelioration works (Qo) represents the average of several years of the realized production, and the production after the arrangement (Q1) is estimated by forecast calculations.

- The cost per unit of product. It is an indicator that is calculated on the physical unit of main product. If the hydro-amelioration works serve large territories with a variety of cultures, the cost is calculated at 1 lei / value of production, thus including all the cultures in the system given from this indicator, another 2 collateral indicators can be calculated, namely:

- cost savings at 1 leu production (Ec), with the formula: $Ec = Cho / Qo - Ch1 / Q1$
- production increase at 1 leu expense (Aq), with the formula: $Aq = Q1 / Ch1 - Qo / Cho$

In all these formulas, Cho and Ch1 represent the total production costs before and after the arrangement.

- The profit rate per unit area (Ap), with the formula -$Ap = B1 / S1 - Bo / So$

where, Bo and B1 - represent the total profit (gross operating surplus) before and after the arrangement, specifying that if before the execution of the respective works is registered losses due to the natural calamities, these will be added to the increase of profit per unit area to better express the effect of hydro-ameliorative works.

Within the efficiency indicators of investment expenses, we have the following indicators:

- The (value) volume of the investment
- The execution duration of the investment
- Duration of the investment
- Specific investment
- The recovery duration of investments
- Equivalent or recalculated expenses
- Economic return on investments

Also, in the analyzing process of the efficiency of irrigation investments, certain additional indicators are also calculated which intervene in characterizing the efficiency of investments in hydro-improvement works and which differ from one category to another of works.

For example, for irrigation arrangements indicators such as:

- the system performance of the irrigation
-the efficiency of using water for irrigation on the cultivated area;
-the uniformity degree of the water distribution on the irrigated surface;
-the consumption of specific materials

The efficiency indicators of analysis the irrigation investments, must be done considering the investments interdependence with the time. In a correct analysis of the investments efficiency economic it appears necessary to take into account the durations time in which investments are made or operated.If this factor would not be important for avoiding complications it would be ignored by him.But as in the other economic fields, in the correct choice of the functioning of the economic processes in the correct choice of the functioning of the processes economics generated by making investments, as well as determining how they can be more efficient.

5. Conclusions

Efficiency economic of the irrigation, the opinions expressed by the specialists, refer to the fact that the use of several technical-economic indicators is appropriate in order to rigorously characterize the investments efficiency economic. These indicators make up a system of value indicators such as: the investments volume , the investment specific, the duration of the recovery of investments, etc., as well as a system of natural indicators such as: production capacity in physical expression, specific consumption of materials and materials, duration of execution of investments, etc. lately it is found that more and more authors restrict this system of indicators, to indicators that characterize only the profitability of investment.

Also, these basic indicators can take both static and dynamic forms of presentation. In generally, this static form is related to the traditional approach being of accounting essence, and the dynamic form is related to the analysis on flows being of financial essence.

This form also involves taking into account the time factor based on the updating techniques.

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