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THE DESIGN OF AN INFORMATIC MODEL TO ESTIMATE THE EFFICIENCY OF AGRICULTURAL VEGETAL PRODUCTION

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Abstract

In the present exists a concern over the inability of the small and medium farms managers to accurately estimate and evaluate production systems efficiency in Romanian agriculture. This general concern has become even more pressing as market prices associated with agricultural activities continue to increase. As a result, considerable research attention is now orientated to the development of economical models integrated in software interfaces that can improve the technical and financial management. Therefore, the objective of this paper is to present an estimation and evaluation model designed to increase the farmer's ability to measure production activities costs by utilizing informatic systems.

Key words**:** *agriculture, efficiency, informatic systems, profitability, vegetal*

INTRODUCTION

Any modern agricultural unit, regardless of size, shape, profile property and socio-economic space in which operate, requires a management style based on flexibility, dynamism and foresight, which is inconceivable without an operative information, complex and quality to provide the basis to take decisions [2]. The continuous development of informatic technologies designed for agriculture can have a real impact on improvement of productive activities and agriculture efficiency.

MATERIALS AND METHODS

Improving competitiveness requires that any farm to develop a particular project for production management, which will include both the flow of production factors and the flow of information relating to the scope [1]. In this context, informational systems have a great contribution to the purposes of the informatization management issues of complex problems and in particular for the apriori analysis of data elements of managerial problems, particularly for the analysis of profitability and production factors [4].

RESULTS AND DISCUSSIONS

In fact, the informatic model was materialized in the form of logical scheme and it's the depart point for the multiple data and variable correlated trough various economical functions in the software application.
The main purpose of the model is to make viable estimation and evaluation of production systems for different crop structure. The estimation part of the model is based on tree component forms: crop technologies, crop budget and crop indicators. The evaluation part is structured also on tree component forms: data collection form, administration form, output report form. The components of the model are illustrated in figure 1.
Each form requires data and variables in concordance with the particularities that each agricultural product presents. However, we can identify tree general types:
I.*The variables* - are external data that are depending on the objective fallowed, such as: characteristic of agricultural farm, type of culture, animal category, production area (plain, hill, mountain)/ production system (irrigate, not irrigate), used agricultural area, costs for the mechanized tilling, costs for the

manual work, costs for raw materials and materials, price for selling the first production and the second one, subvention on hectare, the afferent rate for types of costs (provisioning, general and management ensuring, with loan interest), value for other types of costs (sinking fund, taxes), the initial balance [10];

II.*The constants* - represents the classified lists and intern tables like: crop table, manual working table, mechanized working table, the table of contents and materials, the table of annual necessaries (monthly allowance on fodder), the table of fito-sanitary actions for every crop, the table of pesticides (fungicides, herbicide) etc. [10]

III.*The outputs* - are those data witch the system generates after the loading of the outgoing variables and constants, defined former, having on the base the algorithms calculus specific for every project module; examples: the technology of crop/ha, the technology of crop/agricultural farm, crop budget/ha, crop budget/agricultural farm, other reports comparative estimate/achieved.

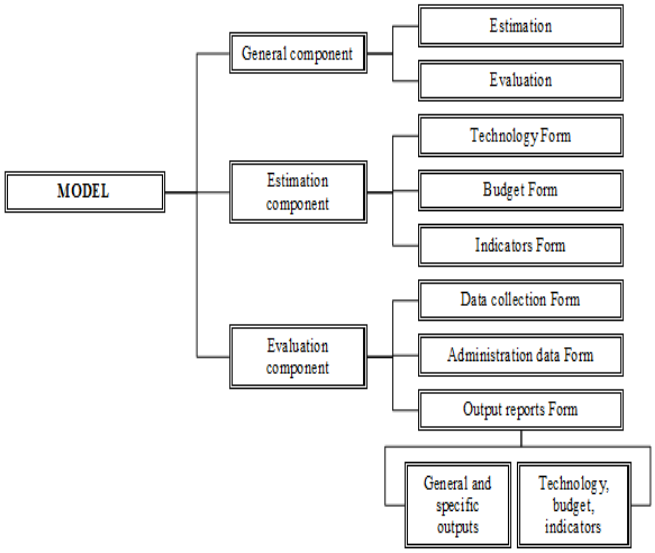

Fig. 1. General model components

The role of processing data, which together with the organization and communication system constitute the computer system is to cover mainly the following requirements [5]:

-to satisfy most needs of farm processing, the existence of as many applications;

-to provide information required for the system object, synthetic or analytic, if is applicable;

-be technically efficient, reliable and quality required by standards;

-be cheap;

-contain the necessary equipment, properly sized processing requirements;

-to ensure operation in "real time" and secure ordering process, where applicable;

-provide necessary data storage and archiving;

-to work in the specific agricultural environment;

-the ability to work on subsystems

-be developed both in terms of hardware and software;

-to ensure data integrity and security;

-provide the processing needed to transmit the necessary information communication systems;

-be easily implemented and exploited;

-be close to the user;

-lead to increased farm efficiency and overall management of all processes in particular.

Analysis of the agricultural units is subject to the range and depth of system indicators used and capacity information of each indicator is a numerical expression of an economic process or phenomenon, defined in time and space and can be characterized by absolute size, relative sizes, size average indices and coefficients [6].

In agriculture, the specific activity is given the role of land in production. In examining economic efficiency is emphasized that the degree of capitalization of the productive potential of the land, the resources available in the soil, using a set of specific indicators such as average yield per hectare by type of crop production expressed in units natural (tones) per per unit of cultivated area, production value or net income per unit area, intensive land use coefficient obtained by dividing the total area (national) aggregate surface by category of land converted into arable land conventionally [9].

Any plant-growing system comprising a series of elements embodied in various crops and biological resources, technical, material and labor combined depending on the

climatic, economic and social, for the purposes of increasing amounts of crops with greater economic efficiency [7].

In determining the efficiency of crop production systems we need economic information such as the following:

-*Production costs (operation)* – this compares the totality of inputs and services consumed in agricultural production, distinguished two categories: variable costs (operational) and fixed costs (the structure).

-*Standardized variable costs* - these are direct costs related to production activity. They depend on the nature of the activity (culture), and is proportionate to the volume of the respective culture (seed, fertilizer) or output (packaging etc.). At the level of farms specialized in crop production, variable costs include:

- Seeds and planting material,
- Chemical fertilizers and manure,
- Plant protection products,
- Fuel for drying, heating etc.,
- Temporary labor (salary + salary costs),
- Water irrigation project expenditures,
- Crop insurance,
- Marketing costs: packing, sorting, cleaning.

-*Fixed expenses* - these are expenses related to holding structure are independent of the nature, scale and intensity of the activities (cultural) within a year agricultural holdings. They should be supported even when land is cultivated and mainly include [8]:

- Lease,
- Permanent labor costs (salary + salary costs),
- Maintenance of equipment and buildings,
- Fuels and lubricants,
- Repairs to buildings and equipment,
- Interest on production loans,
- Depreciation of equipment, buildings, land improvements,
- Land tax,
- Expenditure etc.

The estimation component of the model contains technical data concerning the optimal use of inputs elaborated by research institutes which constitute the specific constants of the system (fig.2). The equations of the system model use these constants along with and the input data. These last types of data are in majority variable, but they contain also a list of values that the operator can select the databases that were previously populated.

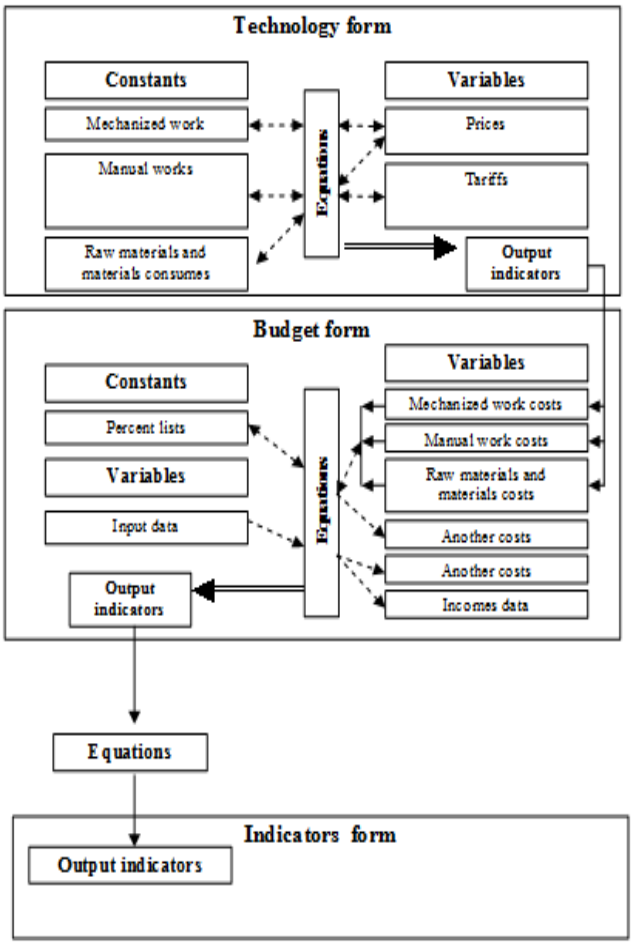

Fig. 2. Model data correlations/estimation component-vegetal production

The evaluation component of the model is based on different input data requirements which are integrated in economical correlations that permits the calculation of crop/animal technologies, crop/animal budget and crop/animal indicators (as shown in Fig.3).

CONCLUSIONS

Total economic effects that are found in one form or another in financial results of a farm as a result of their system contribution to

increasing physical production, reducing direct production costs and general running of the unit are a direct result of the quantitative and qualitative effects of system components through which it provides necessary and sufficient information for management and operation of the technical work, production, financial and economic, social and administrative.

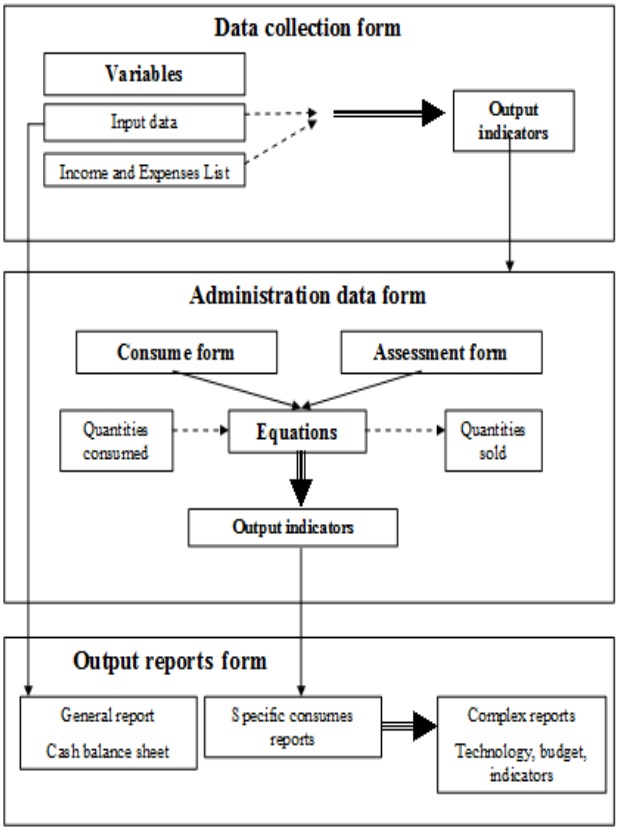

Fig. 3. Model data correlations/evaluation component

In the present, agricultural practices is influenced by the knowledge of the farmer regarding both the economical and technological aspects of production. It is important for him to know how to estimate and evaluate production costs under various prices and operating conditions. However, like we mentioned before, many farmers have difficulties trying to estimate and evaluate production costs or do not have the proper tools available to economically evaluate input use strategies [3].

Use of information technology in support of specific activities on the agricultural sector is a matter of great topical interest, under the terms of a society increasingly based on informatization, where markets are becoming more competitive, with consumers.

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