

## THE NEED TO IMPROVE PRACTICAL INFORMATION SYSTEM IN AGRICULTURE AND SPECIALIZED INDUSTRY

Romeo Cătălin CREȚU<sup>1</sup>, Petrică ȘTEFAN<sup>1</sup>, Adrian NICOLAU<sup>2</sup>, Dinu NICOLESCU<sup>2</sup>

<sup>1,2</sup> University of Agricultural Sciences and Veterinary Medicine Bucharest, 59 Marasti, District 1, 11464, Bucharest, Romania, Phone: 00 40 74 36 44 744,

E-mails: creturomeocatalin@yahoo.com, stefanmarian2004@yahoo.com

<sup>3,4</sup> Valahia University, 2, Carol I Boulevard, Târgoviște City, Dambovita County, Romania,

**Corresponding author:** stefanmarian2004@yahoo.com

### Abstract

*In Romania, the establishment of the market economy has required the elaboration and implementation of agricultural, alimentary and nutritional policies, based on scientific criteria, to ensure that the structure of Romanian agriculture would come close to that of the European Union agriculture. Agricultural policy needs to be coherent, flexible and directed towards the economic, social and environmental protection performance. Worldwide practice shows that empiric experience of economic agents does not suffice, but requires plenty of scientific knowledge. The hereby study undertakes to carry out a radiography of the production potential of agricultural operations in Romania and to demonstrate the need for improving practical information systems in agriculture and specialized industry.*

**Key words:** agritourism, innovation, management, strategy, sustainable development

### INTRODUCTION

Romanian agriculture is characterized by reduced efficiency and multiple issues of economic and social nature.

There are numerous Romanian agricultural holdings but their size does not allow the use of appropriate technologies that is the consistent use of material, human and financial resources.

According to the information released by "Structural survey in agriculture" in June 2011, as a result of the General Agricultural Census in 2010, Romania had 15,866 thousand hectares of land for agriculture in 2010, of which only 13,298 thousand hectares were effectively in operation. [19]

Out of the agricultural land in operation, 7,445 hectares were individual agricultural operations and 5,853 were agricultural operation established as agricultural entities. This means that 55.99% of the land used for agriculture in Romania is under individual ownership, which does not allow the implementation of appropriate technologies. (Lungu, 2011), [www.ins.ro 2015] [16]

### MATERIALS AND METHODS

Of the agricultural area in use in Romania, 62.45% is used as fields, 33.79% as grazing and meadow lands, 2.39% for permanent cultures and 1.37% for home gardens.

Table.1. Agricultural area in use divided by possession categories in Romania, 2010 (Thousand hectares)

Agricultural area in use	2010	
	Value	%
Fields	8,305	62.45
Home gardens	182	1.37
Grazing land and meadow-land	4,494	33.79
Permanent cultures	317	2.39
Total	13,298	100

Source: Structural survey in agriculture, 2007, General Agricultural Census, 2010 [19]

According to the same source, the average agricultural surface per agricultural holding is 3.4 hectares. An individual agricultural holding has an average surface of 1.9 hectares, while an established agricultural entity has 190 hectares on the average (Table 2).

Table 2. Agricultural exploitations in numbers and average surface in Romania in 2010

Indicators	2010		
	Number	Thousand hectares	Average size (ha)
Agricultural holdings, of which:	3,856,245	13,298	3.4
Individual agricultural holdings	3,820,393	7,445	1.9
Agriculture established entities	30,669	5,852	190

Source: Structural survey in agriculture, 2007, General Agricultural Census, 2010 [19]

In agriculture, an important structural issue is the estimation of the economic size of an agricultural holding. This depends on the optimum level of combining production factors per holding. Among the production factors, territorial dimension and exploitation intensity are determination factors or factors with major impact with regard to the economic dimension.

The most commonly used indicator in the structural analysis of agriculture exploitations in European Union is the standard gross margin (MBS). This is used in order to estimate the technical and economic potential of cultures and animal species by country and characteristic areas, in order to evaluate the economic dimension of agricultural exploitations.

Table 3. Economic dimension categories

Category	UDE
I	Less than 2
II	From 2 to 4
III	From 4 to 6
IV	From 6 to 8
V	From 8 to 12
VI	From 12 to 16
VII	From 16 to 40
VIII	From 40 to 100
IX	From 100 to 250
X	>250

Source: Decision 94/376/CE [17]

The determining unit of the economic dimension (UDE) established by Decision 94/376/CE is of 1,200 Euro. The economic

dimension categories in UDE are presented in Table 3.

## RESULTS AND DISCUSSIONS

From a technical and economic perspective, the Romanian agriculture has three different categories of development as shown in Fig.1.

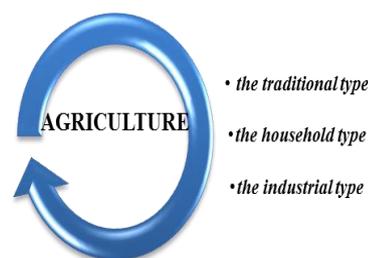


Fig.1. The main development patterns of agriculture

(i) *The traditional type*: individual exploitations where the owner earns his living from other economic fields and round it up with the agricultural income.

(ii) *The household type*: family associations with average technical level, having their area organized in specialized farms;

(iii) *The industrial type*: limited liability agriculture companies, specialized (vegetables, cattle, mixed holdings).

Although they might seem efficient and productive in time, many of these agriculture exploitations do not last long.

Agriculture work has turned into a low qualified job. It has specialized in growing mainly three cultures that is wheat, corn and sunflower or raising exclusively an animal species. (www.madr.ro 2015) [17]

Depending on the UDE number, agricultural exploitations can be divided into three different types:

(a) Small size (up to 8 UDE) - economic size categories I, II, III, IV;

(b) Middle size (8 to 40 UDE) – economic size categories V, VI, VII;

(c) Large size (over 40 UDE) – economic size categories VIII, IX, X.

*In the small exploitations* in Romania, the entire agricultural surface is represented by fields. The characteristic organization pattern consists of individual households.

The cultivated area is owned as property by

the head of the household and it is generally used for growing cereals, oleaginous plants and nutriment.

Many of these exploitations have a mixed profile: both vegetal and animal.

As far as equipment are concerned, these exploitations have the minimum required so they use mechanical works. From an equipment standpoint, these households have tractors, ploughs, harrows, seeding machines, trailers, hoes.

Labour consists of the family members or people hired on a temporary basis in order to carry out works at the right moment.

This type of agriculture exploitations have a low average efficiency per hectare that changes from one year to another due to weather conditions, lack of an irrigation system and other technological links. Production is mainly designed for internal consumption and capitalization through direct sales on the market.

The cost of production factors, as well as the average level of production result into a considerably increased amount of the total costs.

These households benefit of the state subsidy per hectare which allows making some profit per hectare. In many cases, they do not benefit of subsidies due to failing to provide in due time the required documents. (Popescu, 2010) [10]

Many of these family type exploitations are organized to generate profit, some of them achieving impressive results in this direction.

These farms specialize on cultures with low costs and a marketing bay pretty similar to that of big agricultural exploitations.

In order to stay profitable, these farms need to protect the agricultural area from the industrializing effect and focus on high quality works. (Zahiu, 2001). [13]

*As far as middle size agriculture holdings* are concerned, the entire land consists of fields. The characteristic organization pattern consists of the family agriculture association and of limited liability entities.

As far as family agriculture associations are concerned, part of the land is owned as property by the members of the association and another part of the land is rental.

As far as limited liability entities are concerned, the entire area of land is rented. The production structure is heterogeneous for this type of operations in terms of growing cereals, oleaginous plants and nutriment. From an equipment standpoint, they are very well equipped but during optimal harvesting periods they equally use third parties service providers.

For family agriculture associations, labour consists mainly of the family members, while for limited liability entities labour is made up of the companies' administrators and field specialist members.

For both organization patterns, during high peak agricultural season they also use temporary labour. This exploitation type uses equally the subsidy per hectare which leads to increasing the profit per hectare [Luca 2012]. [6]

*The large agriculture exploitations* are mainly organized as limited liability entities. The main production profile consists of growing cereals and oleaginous plants, but it can equally be vegetal or mixed.

They are very well equipped with machinery and equipment and ensure on their own the technological works.

Labour consists of the companies' administrators, field specialists and temporarily hired workers during high peak periods of the agricultural works.

These entities benefit of the subsidy per hectare which leads to increasing the profit per hectare. (Luca et al., 2012)[6]

Along with the economic development, the size of the agricultural exploitation tends to increase, theoretical reasons being described in Table 4.

Since the 1970s, the agriculture of European countries<sup>1</sup> has registered a downward trend. (Luca et al., 2012)[6]

In 1975 there were 5.8 million exploitations over the 5 member states, while in 2007 their number has considerably diminished, down to 2.6 million, with pronounced decreasing rates over the last few years. (Ionescu et al., 2007). [5]

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<sup>1</sup>Luca, L.- coordinator, Ciongă, C., Giurcă, D., (2012), *Reinforcement of the agricultural exploitation*, Economic Publishing House, Bucharest, pages. 66-67

Table 4. Reasons for the increase in size of the agricultural exploitations

	Who and what generates the reason	Results
A set of material and economic elements	Types of soil, agricultural and weather conditions, relative prices of the production factors, intermediary inputs, prices at the farm's gate, technology used	Balance size of the operation; choosing cultures; the use of production factors
Land / labour ratio	The number of grownups that can do work	Balance size of the exploitation
The characteristics of the agricultural input	Input acquisition, specialized labour	Size of the agricultural households
Management abilities	Development requires developing new competencies	Impact on the size of the agriculture exploitation
Scale economy lined to processing and selling	Contract associated costs depend on the scale of developing the activity	Potential impact on the efficient size of the farm
Accumulation and implementation of technological progress	Changing household size, agricultural and ecologic conditions, transport costs	Variations of the balance size of the agricultural exploitation

Source: Luca, L.- coordinator, Ciongă, C., Giurcă, D., (2012), Reinforcement of the agricultural exploitation, Economic Publishing House, Bucharest, pages. 66-67 – adapted [6]

### Industrialization of the agricultural products

Francois Perroux was saying that "industrialization is a cumulative process that structures social assembly by intensive use of the machinery systems and allows the accumulation of goods that human community benefits of at decreasing costs". (Francois Perroux, 1975, Politique du développement et lacunes du calcul économique », *Mondes en développement*, (10), 191-202.). [9]

This needs to be considered from a double perspective:

-From a wide perspective, it admits the idea of increasing productivity, decreasing physical effort and the drive effect generated by aggregates;

-From a narrow perspective, industrialization = substitution of imports, that is ensuring the agriculture products needed for consumption, of vegetal or animal nature, from own resources;

The industrialization of agriculture products has an impact on society changes, mainly on the labour market, due to the increased level of specialization, increasing the processing level of agricultural products, but it can also ensure industrial durability by means of enforcing environmental friendly measures. (Gagiu, 2010) [4]

The positive aspects of the products industrialization are summarized in Fig.2.



Source: personal opinion

Fig.2. Positive aspects of products' industrialization

In order to capitalize these opportunities it is necessary to combine macro-economic, micro-economic and institutional factors.

Out of the macro-economic factors having an impact on the product's industrialization, we can list the following:

-Existing or created competitive advantage (abundance of labour, low level of salaries, duration of the working day etc):

-State's intervention policies that need to be: promoting, prospecting, scheduling, protecting, forecasting, reducing uncertainty;

-Companies' strategies on medium and long term.

Micro-economic factors aim at the innovation process both of the system as well as of the products, so that they become competitive on any market, as it is well known that industrial

thinking differs from marketing thinking. (Stoica, 2012) [11]

Institutional factors have a decisive impact on the development of the product industrialization, with the mission of creating appropriate institutions that are capable of stimulating this complex and complete process [Bodea 2010] [2]

## CONCLUSIONS

„The implementation of optic fibre in the desert does not make it any greener, but the absence of modern communications cuts off the economic development in any oasis" Parker said.

A green and efficient agriculture is a difficult to accomplish challenge given the circumstances of the rapid growth of innovation in the production technique.

All it requires is as the enterprise should be familiarized both with the constantly changing frame conditions and possessing a great deal of knowledge<sup>2</sup>. [2]

On one hand, this knowledge must consider the specific conditions of the agricultural exploitation and on the other hand to equally include eternal information, in order to carry out the schedule, but especially for the decision making process.

In time, it has been observed that agricultural work becomes more efficient if it is done on big areas of land through producers' associations.

Such is the case of the Netherlands, the most efficient country in the whole world in using their agriculture potential, which despite the fact that it has a six times smaller surface of land compared to Romania, is the second exporter of agriculture products in the world, after USA.

Although the field area of the Netherlands is ten times smaller compared to Romania, this country keeps its leading position due to the agriculture activities performed by holding companies, based on cooperation contracts concluded between producers, collectors of primary agriculture products, transporters,

consulting (technical, economic, legislative). (Ghita, 2014)[3]

In Romania, the association between producers in the vegetal field (growing cereals) with producers in the cattle field (animal breeding) and product industrialization has proved its efficiency (e.g. the Agro-industrial plant in Curtici), but the number of such entities is very low.

The use of computerized systems in agriculture exploitations of a holding type has a series of advantages and disadvantages that are summarized in Table 5.

Table 5. Advantages and disadvantages of using IT technology in agriculture exploitations

Advantages	Disadvantages
Quality/accuracy of the information	The cost of hardware and software equipments
Making calculations in a fast way	Incompatibility of the equipments with the profile of the agriculture exploitation
Internal and external communication	Need for specialized personnel
Well defined and organized working tools	Data collecting efficient system
Increasing the potential of the farm	Cost for personnel training

Source: Technical and scientific report, CEEX Contract, Module I, Stage II, Manager: Pătărgăeanu S., R., ASE, Bucharest 2007, page 8. [8]

At an agriculture exploitation level, one must manage both scheduling as well as the output of the main economic indicators, on a long period of time, as well as the quality of the data inflow and generating summarizing reports... [Tudor 2013]. [11]

Therefore a series of requirements for a modern program for keeping track of the crop's technological record can be drafted for agriculture exploitations with vegetal profile, a record regarding animal's displacement for the cattle breeding sector, a record of the finished products for the products' industrialization, etc. [Aldea 2011]. [1]

<sup>2</sup> Ghiță, I., **Agriculture IT**, Master's degree notes : European agriculture economy, page 50

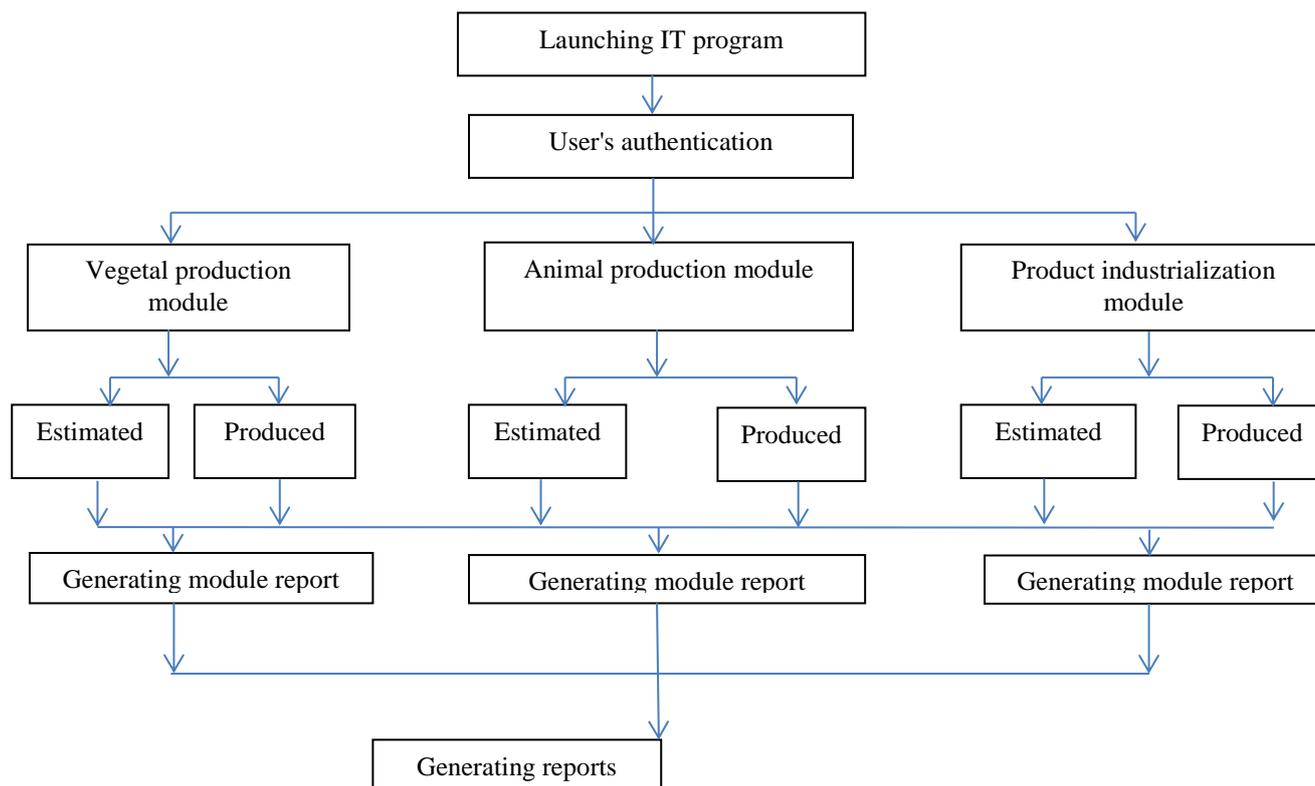


Fig.3.IT and accounting program of a complex agriculture exploitation - summarized version  
 Source: personal contribution

Software requirements<sup>3</sup> for the vegetal sector: summarizing document regarding nutriments, nutriments' management and optimization as well as their nature; cooperation between various economic entities; labour record and the production capacity of the equipment; integrated monitoring system; tractor's dashboard computers; mini-weather radios to warn on weather conditions; subsidies' record; rental follow-up, etc.

Software requirements for the animal breeding field: record per each animal, planning function monitoring; feeding schedule, weight gain; nutriments stock record, etc.

Software requirements for the agriculture product industrialization sector: raw materials management from the vegetal and animal breeding sectors; record of the product input from other economic entities; record of the value added indicators; revenue and costs; activity performance indicators, etc.

The software can be summarized as shown in Fig.3.

It is obvious that information sources and the existence of a computer in the agriculture exploitation have a major importance towards the future IT development in the rural area, in terms of the importance of opening for what's new and understanding the need for such software in the future.

<sup>3</sup> *Knowledge Based Approach in Research Projects and Programs Evaluation* authors: Bodea C., Ciobotar N., Bodea, V., in Lztras, M.D., Ordonez De Pablos, P.; Ziderman, A., Rouldtone, A.; Maurer, H.; Imber, J.B.;(Eds) *Organizational Business and Technological Aspects of the Knowledge Society, 3rd World Summit on the Knowledge Society*, WSKS 2010, Corfu, Greece, September 22-24, 2010, Proceedings Part II, Series: Communication in Computer and information Science, Vol. 112, Springer-Verlag Berlin Heidelberg 2010, pp.326-335  
[http://link.springer.com/chapter/10.1007%2F978-3-642-16324-1\\_35?LI=true](http://link.springer.com/chapter/10.1007%2F978-3-642-16324-1_35?LI=true); [http://link.springer.com/chapter/10.1007%2F978-3-642-16324-1\\_35](http://link.springer.com/chapter/10.1007%2F978-3-642-16324-1_35)

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