The Knowledge Implications on Performant Management of Agricultural Production Structure[1]

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Abstract

For to answer of Romanian agriculture development and to achieve a close level to that of the European Union is need to knowledge and to the results dispersion to users, them being managers or entrepreneurs of agricultural exploitations. Knowledge, as a production neofactor, has an important relevance in new condition regarding the knowledge society, being need the introduction of modern elements and their application.

Resorting to knowledge is created, for various types of agricultural exploitations, the support for elaboration of structures to meet current conditions. Becomes, again, necessary the professional and managerial level training of makers, they will go beyond the content knowledge, by taking decisions and implementing solutions, considered useful in the production process.

This paper contain the considerations on the importance of the knowledge in managerial process regarding production structure, the aim being to increase the economic and ecological performance of its.

Keywords: *knowledge, management, performance, structure of production*.

JEL classification: Q01, Q12, Q15.

Introduction

For create the paper work was used the analyze of the agricultural production structures whose changes are more pronounced in the current period, based on the influences of various kinds (changes in household consumption and natural), the aim being the interference with the new needs. Were used statistical data of whose processing has led to information necessary, as support for real decisions in elaboration some viable production structure.

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1. Material and method of working

Knowledge is a valuable resource in the agricultural economy that based the decisions of managers / heads of farms, being the way through they put in value their actions to achieve the best production and economic results. Knowledge takes different forms: a new production technology, improve the organizational structure or its components, advances in the use of inputs (varieties with great ecological plasticity to reduce risk), its application (knowledge) increasing the performance exploitations by introducing modernization of elements. In a such context, it creates significant starting points for exploitations management, especially of the commercial exploitations, whose activity (production structure) is intended exclusively market (Ion, 2011).

The implications perception on which this knowledge phenomenon has on the introduction of modernization of production structures and their management, in term to increase performance, make it necessary a number of issues regarding the agricultural exploitations, with reference to: structure of agricultural exploitations, dimensional structures, production structure, structure of technologies.

Structure of agricultural exploitations

Romanian agriculture has many exploitations, compared with what's happening in EU countries, after this criterion, Romania have, by some calculations, 29% of all exploitations existing in European Union EU-27). Although, over time (after application of Law 18), number of exploitations is low (a raid on them showing decrease from 4,485,000 in 2002 to 3,931,350 in 2007 and 3,856,000 in 2010), these are, anyway, to much. The source shows increasing of exploitations with legal status (agricultural societies, commercial societies, cooperative units, with duties in the agricultural input supply and marketing), in 2010, which is of 31,000, more than 8000 to 2007. However, prevailing the exploitations without legal status, most being family exploitations (99.2% in 2010).

Dimensional structure

In actual period, the dimension of agricultural exploitations are, after the agricultural statistical data (2010): 3,45 hectares, the average dimension on exploatation, 1,95 hectares on exploitation without legal statut and 190,84 hectares in case of exploitations with legal statut.

Structure of production

Production structure starts from simple to complex, which in literature is found in the two forms of structure: diversification and specialization. Decisions on a production structure or the other (the structure cannot ensure requirements simultaneously) will consider the items contained in factors, theirs intertwining, by selectively choosing of the branches that correspond quantitatively and structurally those preconditions. With reference to agricultural exploitations, to how they functioning, exist a strong correlation between the type and the level to diversifying of production (Bran, M., Bran, S., D., 2011). The exploitations by

society type are specific a narrow diversifying with a tendency towards specialization. The process is possible and positive from economic point of view, due to the existence of necessary resources, especially those concerning to the area and size, but also, due the character of productions, that determines through the level of their, high income and, consequently, a profitable activity.

Starting from these, the relation between information, types of exploitations and forms of structure of production is presented in next scheme (Figure 1).

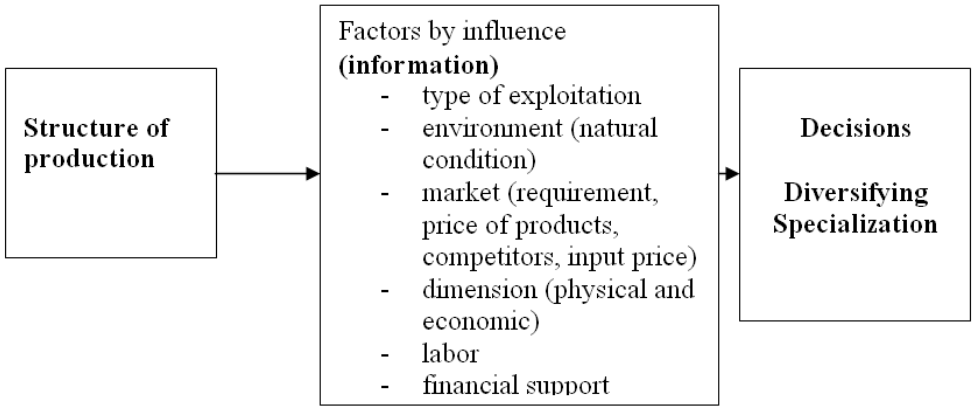

Figure 1. Implications of information in choice of production structure

Structure of technologies

Technological structures include their forms, from the conventional to the alternative (Bran, 2011). *Conventional technologies* ensure a high production per unit area, constant annual. This type of technology has a wide applicability, being, in comparison with others, the most used. This is natural; if we consider that it takes to ensure consumption of foods for the population.

Alternative technologies. Ecological technologies have a small dimension and are characterized to the high level of technical. With this is obtains unpolluted products. Environmental technology is based on application of a series of actions:

- protecting the integrity of soil and plants;
- reducing waste and harmful residues;
- fertilization with predominance of organic matter as fertilizer;
- use the integrated fight against diseases and pests using biological methods especially;
- cultivate productive varieties and hybrids, genetically resistant to diseases and pests.

Despite the good results in agricultural production in certain areas of different countries, ecological technology has come a long way in introducing and then generalize them in agriculture.

Introduction of elements to modernization of production technologies at level exploitation requires insertion of proper management, these will highlight the financial, material and human resources.

Anyway, the objectives of these must to be economic and ecological, their impact being important for what we obtain from agriculture (Figure 2).

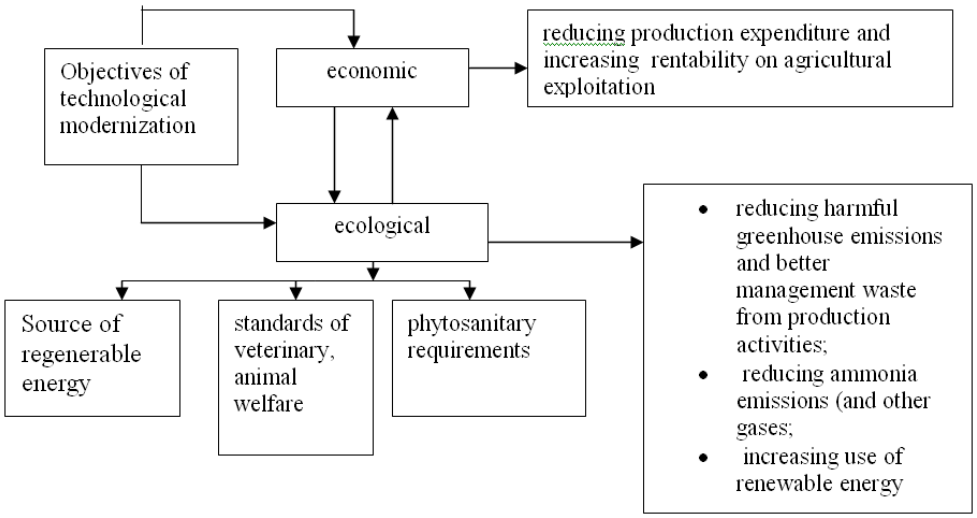

Figure 2. Objectives for technological modernization in structure of production

2. Results and discussion

The case study considers an introduction to triticale production, with crops of wheat, maize and sunflower.

Technical and economic characteristics of triticale:

- high resistance to drought;
- genetic resistance to a wide range of diseases;
- nutritional value of triticale grain is high as wheat grains, barley, and those of rye;
- high capacity to absorb water; species, the biological characteristics,
- increases the spread of agro-environmental area grain grains (sub-mountainous regions, hilly and plateau);
- is used in bakery; important forage resource (feed, green mass storage can be used with good results in feeding cattle and sheep, and the grain in feeding poultry and pigs, due to their high content in lysine;
- the average 4000 - 6000 kg / ha, 25-35 t / ha green mass.

To optimize the structure of production, was used the linear programming, which required the use of a data series of "entry" in relation to: how cultures, the estimated production costs per unit area and crop consumption labor per hectare per crop, estimated profit (tables 1 and 2).

The linear programming method, using an appropriate mathematical model, allows obtaining, from the multitude of possible variants, the optimum solution. The objective function of the model will be the maximize profits, and the variables will be possibilities to practice different branches, in the conditions and according to various requirements mentioned.

Linear programming model has the following general form:

$$\max. f(x) = \sum p_j x_j$$

General restrictions are the following:

1. $\sum_{j=1}^{n} a_{ij} x_j \leq b_i$ I=1, 2, . . . ,n

2. $x_j \geq 0$

The meanings of symbols are:

x_j = the area that will hold the branch j

p_j = the j profits branch:

a_{ij} = the resource consumption per unit area of branch j;

bi = the volume of resources;

j = set of branches;

b_i = volume of resources i

Before proceeding to build economic and mathematical model of linear programming to ensure the necessary information. Grounding in real terms of the model is based on the following information:

a) general information;
b) specifical information.

General information:

- ecological conditions;
- economic conditions of exploitations and of market;
- production and economic results from previous period.

Specifical information:

- average production per hectare and crops;
- need for seed per unit area and per crops;
- labor consumption per unit area and by product;
- consumption of fertilizer per hectare and crops;
- consumption of water per hectare;
- he necessary technical means;
- total production expenditure per hectare;
- profit per hectare;
- other indicators.

For the model structure optimization cultures must have practical application, following the computer running a large number of variants, the best solution to reflect natural conditions and economic exploitations or area and as much information as possible on the ratio of interrelations culture and production of these resources available.

Model:

Table 1. Model of linear programming

Indicators Variants (crops)	A	B	C	….. N
V1	Solution 1A	Solution 1B	Solution 1C	Solution 1N
V2	Solution 2A	Solution 2B	Solution 2C	Solution 2N
….. Vn	Solution nA	Solution nB	Solution nC	Solution nN

Model variables:

x1, surface occupied by wheat ;
x2, surface occupied by triticale;
x3, surface occupied by sunflower;
x4, surface occupied by maize.

Objective fonction:

Max f(x)) =180x1+210x2+270x3+250x4

Model restrictions are: (V0):

1 x1+x2+x3+x4 =500
2.2000x1+2170x2+2200x3+2250x4≤1200000
3.2x1+2x2+5x3+5x4≤ 3000
4. x1, x2, x3, x4 ≥0

Solving the model was made using the software package QM Module A - linear programming. There have been changes to the original version (the original model, V0), the introduction of crop rotation restrictions that respect, equally, the basic restrictions. Thus, the set M =V1, V2, V3, V4 run the computer, only one version was accepted as optimal, that which is most practical applications.

Table 2. Structure of production

No. crt.	**Crop**	**Surface**	
		ha	**%**
1	Wheat	177	35,4
2	Triticale	130	26,0
3	Sunflower	93	18,6
4	Maize	100	20,0
Total		**500,0**	**100,0**

The economic efficiency of variant is next (table 3).

In terms of resources, especially those related to available financial, in conditions of the new structure of production are respected the maximum of limits in the volume of its (88.8%).

Also, are create premises for:

- full cultivation of 500 hectares;
- compliance with the availability of labor;

- achieving a balanced production structure under existing natural conditions and the market.

Conclusions

Knowledge is a fundamental resource in the production structure that based the decisions of managers, being the way through they put in value their actions to achieve the best production and economic results;

Knowledge takes different forms: a new production technology, improve the organizational structure or its components, advances in the use of inputs (varieties with great ecological plasticity to reduce risk);

Knowledge increasing the performance exploitations by introducing modernization of technologies;

For to practice an agriculture according with the European requirements are necessary the actions to promote improved management, in term of increase its performance;

Is necessary the orientation of exploitations to produce what is need for population, in accordance with the environment, the knowledge being the support for these decisions.

The case study put in value the performance of technologies and the role of information in agricultural management.

Table 1 Input data

No. crt.	Specification	U.M	Wheat (x1)	Triticale (x2)	Sunflower (x3)	Maize (x4)	Availability of resources
1	Surface	ha	-	-	-		500
2	Expenditure	lei/ha	2000	2170	2200	2250	1200000
3	Human consumption days	z.o/ha	2	2	5	5	3000
4	Profit	lei/ha	180	210	270	250	Max.

Table 3. Economic efficiency of production structure

No. crt.	Crop xi	Surface, ha	Total incomes, lei	Total expenditure, lei	Profit, lei	Profit rate, %
1	Wheat	177	385860	354000	31860	9,0
2	Triticale	130	309400	282100	27300	9,6
3	Sunflower	93	229710	204600	25110	12,2
4	Maize	100	250000	225000	25000	11,1
Total		**500**	**1174970**	**1065700**	**109270**	**10,2**

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