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PECULIARITIES OF HUMAN RESOURCES MANAGEMENT IN SUSTAINABLE AND ECOLOGICAL FARMS

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ABSTRACT. Human resources management in agricultural farms is of particular importance in the context of the particularities of labor in agriculture, which is different from other economic sectors. Since labor is the most important production factor of any economic activity, labor productivity is the most used in the evaluation of economic efficiency. Accelerating the productivity growth is related to understanding content and its meaning, major factors of influence and way of exploitation. To emphasize human resource management and to illustrate the way of calculation of labor productivity, the study was conducted in an ecological farm with a vegetable profile of Iaşi County, Romania. The labor productivity has been used in the evaluation of economic efficiency, for three major crops: wheat, maize and potatoes. We used three indicators: average efficiency factor of production land use, W_{Pm}; the average productivity of labor in physical units, W_{Lm}; labor productivity, W_H; labor productivity in monetary value, W_V. To increase the labor productivity and efficiency of human resources there were organised training courses and programs both of managers and directly involved productive staff, but also there were introduced new production technologies that lead to ease and make efficient the staff work.

Key words: Human resources management; Labor productivity; Agricultural farms.

REZUMAT. Managementul resurselor umane în fermele agricole are o importanţă deosebită în contextul caracteristicilor muncii în agricultură, care se deosebeşte de celelalte sectoare economice. Având în vedere că munca este factorul de producţie cel mai important al oricărei activităţi economice, productivitatea muncii este cel mai mult utilizată în procesul de evaluare a eficienţei economice. Accelerarea ritmului de creştere a productivităţii muncii este legată de înţelegerea conţinutului şi semnificaţiei sale, a factorilor prioritari de influenţă şi a modului de valorificare.

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Pentru a evidenţia managementul resurselor umane şi pentru a ilustra modul de calcul al productivităţii muncii, studiul a fost efectuat într-o exploataţie agricolă cu profil vegetal din judeţul Iaşi. Având în vedere că munca este factorul de producţie cel mai important al societăţii agricole, productivitatea muncii a fost utilizată în procesul de evaluare a eficienţei economice la trei culturi mai importante şi anume: grâu, porumb şi cartof. S-a urmărit creşterea productivităţii muncii şi a eficienţei utilizării resurselor umane prin organizarea unor cursuri şi programe de instruire, atât a managerilor, cât şi a personalului direct productiv, dar şi prin introducerea unor noi tehnologii de producţie, care duc la uşurarea şi eficientizarea muncii personalului.

Cuvinte cheie: managementul resurselor umane; productivitatea muncii; ferme agricole.

INTRODUCTION

During the last decades, the agricultural practices shifted toward a sustainable development, combining the traditional-ecological tools with modern management approaches. Achieving a more sustainable agriculture engages the application of certain well established principles by scientists farmers, policy-makers, together with new solutions for specific situations (Conway and Barbier, 2013; Pretty, 2008). Apart from the development of eco-efficient strategies for organic and high quality agricultural products, adequate management of labor resources could bring a relevant contribution to a diversified agricultural structure, in an eco-efficient and sustainable manner (Serra *et al.,* 2005; Shrek *et al.,* 2006).

The increasing requirement for labor-intensive agricultural products continues to generate new sources of employment, but depending on differences in geology, topography, climate and natural resources. However the EUROSTAT statistics shows that in the last decades there is a trend for diminishing the number of agricultural holdings in UE. Romania had the largest number of holdings in the EU27 in 2011 (3.8 million holdings or 32.0% of the EU27 total), but the average area per holding is small (3.4 ha) (*Table 1*).

Table 1 - Number of holdings and utilised agricultural area

	Number of holdings[1], 2011			Utilised agricultural area (UAA)[2], 2011			Average area per holding hectares, 2011
	In thousands	% EU 27 total	% change 2011/2000	In 1000 hectares	% of EU 27 total	% change 2011/2000	
EU-28	**12053,8**	**100.0**	**-19.8**	**170027.3**	**100.0**	**-1.6**	**14.1**
Belgium	42.9	0.4	-21.9	1 358.0	0.8	-2.6	31.7
Bulgaria	371.1	3.1	-44.2	3 483.5	2.1	24.7	9.8
Czech Republic	22.9	0.2	:	3 621.0	2.0	-4.1	152.4
Denmark	41.0	0.3	-15.7	2 648.4	1.6	-0.4	64.6

	Number of holdings[1], 2011			Utilised agricultural area (UAA)[2], 2011			Average area per holding hectares, 2011
	In thousands	% EU 27 total	% change 2011/2000	In 1000 hectares	% of EU 27 total	% change 2011/2000	
EU-28	**12053,8**	**100.0**	**-19.8**	**170027.3**	**100.0**	**-1.6**	**14.1**
Germany	299.1	2.5	:	16 704.0	9.8	-1.6	55.8
Estonia	19.7	0.2	-46.6	938.8	0.6	18.0	47.7
Ireland	128.2	1.1	-5.4	4 139.2	2.4	-3.7	32.3
Greece	706.4	5.9	-14.3	4 076.2	2.4	2.7	5.8
Spain	989.8	8.2	-13.2	23 752.8	14.0	-5.7	24.0
France	514.8	4.3	-16.2	27 090.0	15.9	-2.5	52.6
Italy	1 630.0	13.5	-17.0	12 885.3	7.6	-1.8	7.9
Cyprus	38.8	0.3	-14.2	118.4	0.1	-24.3	3.1
Latvia	83.0	0.7	-34.4	1 786.4	1.1	19.9	21.5
Lithuania	199.9	1.7	-26.5	2 742.6	1.6	10.1	13.7
Luxembourg	2.2	0.0	-9.8	131.1	0.1	2.3	59.3
Hungary	577.0	4.8	-25.4	4 610.9	2.7	5.9	8.0
Malta	12.9	0.1	17.4	11.5	0.0	6.4	0.9
Netherlands	72.0	0.6	-15.8	1 873.0	1.1	-6.7	26.0
Austria	154.0	1.3	-11.4	2 997.1	1.8	-8.0	19.5
Poland	1 505.7	12.5	-30.7	14.384.1	8.5	-0.3	9.6
Portugal	305.3	2.5	-15.0	3 668.1	2.2	-1.5	12.0
Romania	3 856.3	32.0	-14.0	13 298.2	7.8	-4.5	3.4
Slovenia	74.7	0.6	-3.2	476.6	0.3	-2.0	6.4
Slovakia	69.0	0.6	-3.8	1 936.6	1.1	-9.4	28.1
Finland	63.9	0.5	-14.8	2 292.2	1.3	2.1	35.9
Sweden	70.9	0.6	4.4	3 085.3	1.8	-1.3	43.5
United Kingdom	202.4	1.7	:	15 918.0	9.4	-.12	78.6
Norway	46.6	-	-19.9	1005.8	-	-3.3	21.6

According to EUROSTAT, the total workforce in the EU-28 was about 9.9 million workers/year (as annual work units, AWUs) in 2009, accounting for 4.7% in 2008 (based on active population 2008) compared to 6.7% in 2000 (*Fig. 1*) (EUROSTAT, 2008, 2009, 2010).

The labor productivity in agriculture is usually influenced by various factors: average farm size, mechanization level, share of production for on-farm consumption (EUROSTAT, 2009). In this context, the paper elaborated an analysis of labor productivity used in the evaluation of economic efficiency, based on a case study developed in Iaşi County, Romania, for three major crops: wheat, maize and potatoes. Some indicators were calculated to measure and compare levels and rates of growth in productivity: average efficiency factor of production land use, W_{Pm}; the average productivity of labor in physical units, W_{Lm}; labor

productivity, W_H; labor productivity in monetary value, W_V. These indicators and the analysis developed based on their evolution can be used as a basis for human resources management in sustainable and ecological farms.

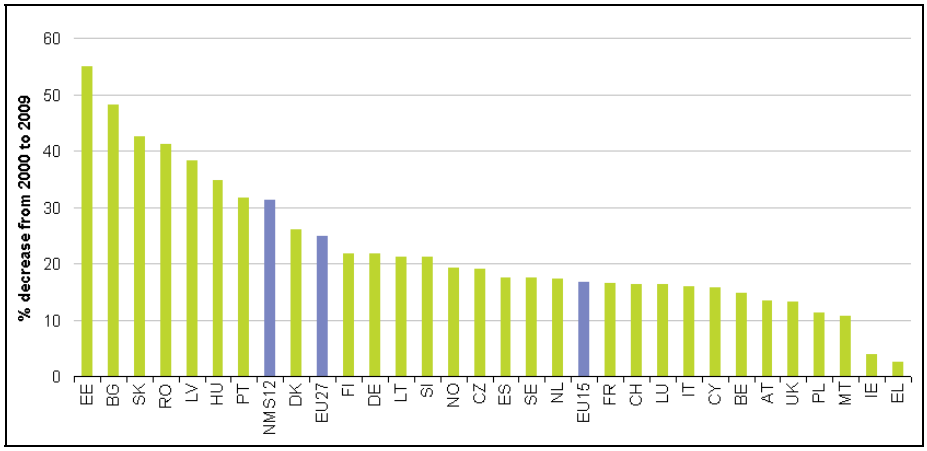

Figure 1 - Agricultural labor input, AWU, decrease from 2000 to 2009 (EUROSTAT, 2009)

Peculiarities of agricultural activities

Due to current profound social, technical, economic and social changes taking place in the entire Romanian economy and specifically in agriculture, human resources and their management is of particular importance. Romania has a high weight of labor force in agriculture which sets it apart from the countries with developed agriculture, where people working in this field are below 10% of the total workforce (Brezuleanu S., 2013)

The attempt to introduce modern systems makes the task of agricultural worker to increase, this turning from a simple executing element into a decisional one, based on an information system (Brezuleanu C.O., 2013). The workforce with limited skills and opportunities that is present especially in family farms must be trained so that they can use as effectively as possible, with rural economic sociology, the minimum expenditure of physical and mental effort the machinery and technical equipment that they use.

The human resource management shows the characteristics of particular importance in the context of labor in agriculture, which is different from other economic sectors. Thus, technically, work in agriculture has more features, as follows (Brezuleanu, 2009): *it has a diversified character*, being necessary for a worker to have knowledge in various fields, *has a high degree of difficulty* in that it takes place

outdoors, under the direct influence of climate, heavy duty, which requires measures of work organization and protection of agricultural workers to streamline their work, *is variable in time* depending on certain calendar periods, *is objectively subjected to the needs of human beings* (Mathis, 1999)

At the same time, the economic and social peculiarities of labor in agriculture are different from those of industrial employment or other economic sectors (Redman and Wilkinson, 2006). From this perspective, the employment in agriculture is characterized in that: *it is little specialized*, a single farm worker must do a series of works (different harvesting treatments, cuts in dry or green etc.), resulting in a extremely low division of labour, almost impossible, *is a work of family type, is unsafe for employees, it is difficult to control and appreciate* the work is extremely complicated to quantify because the final result is determined by both natural factors and how plants and animals react to the same man effort.

Like any other resources, human resources require a specific management, adapted to its peculiarities (Beardwell and Claydon, 2001). It summarizes the characteristics specific to agricultural activities. Of these, the most important are: work processes are interwoven with biological processes and condition each other, work in agriculture requires a large variety of professional knowledge, there is a much broader range of works and intensity of physical and intellectual effort that change over time; the seasonal character of activities, determined by the dependence of work to the biological factor, also particularizes the work in agriculture, influencing the order and period of performance of work, due to a lower degree of mechanization of agriculture, labors consumption and thus cost with it, have a large share in the structure of consumption and total production costs; in the Romanian agriculture due to specific socio-economic factors, the processes of feminization and aging of workforce have deepened, with effect on yield and quality of work, the work processes are carried out mostly by moving workers, resulting in higher energy consumption than for static work, the safety requirements are more complex than in other sectors having regard to the factors that can affect personnel, machinery and installations (low or high temperatures, chemicals, various sources of energy, greenhouse gases etc.) (Cherecheş, 2004). The motivations of working for staff in agriculture has specific elements since some products are intended for self-consumption and income have an oscillating character and are obtained by varying periods of time, physical effort for agricultural works varies depending on the characteristics of the work items (texture, structure and soil moisture, animal breeds etc.).

Human resources management in agriculture

In agriculture, from the systemic point of view, management is a part of the system represented by a particular organizational structure consisting of a set of elements. It is aimed at combining the best of all subsystems to achieve objectives. Cole (2000) consideres that the management activity is structured in three areas: **activities with people** aimed at their influencing to achieve the tasks scheduled by cooperation between manager and subordinate, **the management side of things** aimed at organizational management, designed to ensure the efficient coordination of actions and objectives, with the rational use of resources and **activities designed to forecast** with further developing the events and processes through the prediction and design techniques (Pretty, 2008).

There are features on the calculation of the necessary of human resources in the vegetal production, the branches of animal husbandry and other tangent farming activities. The necessary of personnel for other activities than agricultural production, is determined under rules of a specific nature (personal standards), given the specifics of each activity and workload to be performed. In order to appreciate ensuring farm labor resources, from time to time (usually at the beginning of the year) may be used as indicator ***the level of insurance on specialization***, determined as the percentage ratio between existing and needs arising from the calculations (Oancea, 1995).

The way in which, along the year, they managed to provide the necessary personnel, we appreciate them for having taken into consideration the ***movement of workers***, as determined by objective causes, a phenomenon known as the ***labour force movement*** and subjective reasons, process that is called ***fluctuation of labor force***. For agricultural production activities to take place under normal conditions, it is necessary that labor **be divided in organizational subdivisions and jobs**. This distribution is reflected in the organization of working groups, whose size and structure ensures that all the works are performed in accordance with the established technologies, aimed at achieving a high level of productivity. Depending on their size and the specific activities of these working groups, they have different names: ***team, working group, brigade*** etc.

There are many **factors that influence the size** and structure of the working groups. They include: the mechanization of agricultural work, the skills of the workforce, the volume of the works to be carried out, the management system adopted etc. Therefore, the methodology of establishing the working groups, their size and composition, vary from one farm to another, not existing uniform methodological standards.

In farms of field crops with a relatively high degree of technical equipment, work place, workers,

working groups, with an adequate technical equipment which allows the entire complex of agricultural work: seedbed preparation, sowing, maintenance, harvest. The size of these working groups (or teams) is dependent on area farms, the productivity of aggregates, and the technologies adopted. It aims at the complex work to be carried out in continuous flow without disruption or interruption of work processes.

Livestock holdings, with a greater concentration of livestock. The organization of the work is the team whose members run the entire volume of work in a shelter or a production hall.

Analysis of labor productivity in a Romanian agricultural farms

Procedure and methodology

To emphasize human resource management and to illustrate the calculation of labor productivity, the study was conducted in a farm with vegetal profile of Iaşi County. The total area of the agricultural company is 300 ha where only a small portion of land which is in the operation of the company is owned by shareholders (20 ha), the rest is rented where wheat, maize, soybeans, vegetables, root vegetables, strawberries and watermelons are grown.

The total number of permanent employees of the farm is 16 people in 2014. During campaigns when the necessary agricultural work is higher, agricultural farm take seasonal workers, of up to 20 people. The agricultural company has employees with different specialties, agricultural engineers, machine operators, drivers, economists, which ensure smooth and efficient operation of the specific activities of agricultural society.

Since labor is the most important production factor of any economic activity, labor productivity is the most used in the evaluation of economic efficiency. Labor productivity expresses the efficiency with which labor is consumed. It can be understood as productive labor force, i.e. under the form of labor capacity to create, within a period of time, a certain volume of goods and to provide certain services. The level and evolution of productivity depends on many economic and extra-economic circumstances: the quality of inputs used, quality of organization and business management, economic motivation of owners of production factors and the extent to which this is achieved, natural conditions, social and psychological climate. Labor productivity is a basic synthetic indicator showing labor efficiency. Accelerating the productivity growth is related to understanding the content and its meaning, the overriding factors of influence and way of exploitation. Increasing productivity of labor, systematic reduction of manpower costs contribute directly to lower costs and increase work efficiency carried (Gannon and Nejes, 1991).

Usually, work efficiency is identified with labor productivity. If we consider that labor productivity is the efficiency with which labor is

spent and that all charges have at their origin the work, then this is nothing but labor efficiency and the equivalent overlap between the two notions seems to be correct. There are situations, however, when the effect is much more comprehensive than the work product, he gave not only the production. As you move from micro to meso and macro economy, the greater becomes the aim of employment effects for the purposes of coverage of both elements can be measured and of the immeasurable. In assessing productivity of labor are taken into account only those effects which can be measured (García Sánchez *et al.,* 2014).

Also, regarding this efficiency not only in terms of useful measurable effects, but also in terms of environmental implications, it is possible that a farm labor productivity increase, but by environmental pollution and generally ignoring the problems of environmental efficiency and not answering a basic criterion, that of quality.

Calculation of labour productivity in physical units

The calculation of labour productivity will target the main crops of the farm, represented by wheat, maize and potatoes. To calculate labour productivity in physical farms we use data reported by the agricultural company for 2012 - 2014 in *Table 2*.

Table 2 - Total production of major crops (kg)

Crop	Structure of crops P (ha)			Total production Q (kg)		
	2012	2013	2014	2012	2013	2014
Wheat	70	45	96	217000	153000	278400
Maize	50	47	40	180000	192700	144000
Potato	72	57	34	1656000	1375000	748000

Using the data from *Table 2*, we can calculate the average productivity of land which is determined as the ratio between total production, Q and total area of land used for growing P, and expresses the average efficiency factor of production land use, W_{Pm} (Eq. 1, *Table 3*).

$$W_{Pm} = \frac{\sum Q}{\sum P} \quad (1)$$

Table 3 - Average productivity of land for three categories of crops (2012)

Crop	Q (kg)	P (ha)	W_{Pm} (kg/ha)
Wheat	217000	70	3100
Maize	18000	50	3600
Potato	1656000	72	23000

The average productivity of labour in physical units is considered as the ratio between total production, Q and the amount of labour used, L (number of employees) (Eq. 2, *Table 4*).

$$W_{Lm} = \frac{\sum Q}{\sum L} \quad (2)$$

We calculate labour productivity in physical units by the same formula and for other years we get the data in *Table 5*.

Table 4 - Average productivity of labour for three categories of crops (2012)

Crop	Q (kg)	L (No. employees)	W_{Lm} (kg/employee)
Wheat	217000	20	10850
Maize	18000	20	9000
Potato	1656000	20	82800

Table 5 - Evolution of labour productivity in physical units during three years

Crop	Labour productivity (kg/employee)		
	2012	2013	2014
Wheat	10850	6375	17400
Maize	9000	8029	9000
Potato	82800	57291	85938

In 2013 it was recorded the lowest yield of wheat crop of all the years analyzed, but the negative aspect was examined and successfully recovered the following year, significantly increasing the value of up to 17400 kg/employee. In maize, productivity remained relatively constant during the years 2012 - 2014 with a small decrease in 2013.

Labour productivity, W_H can also be calculated based on total output, Q divided by the number of working hours, H (Eq. 3). According to legal provisions, the number of days on the farm analyzed is 257, the 8-hour daily program which indicates that an employee works on average 32124 hours annually (Eq. 3, *Table 6*).

$$W_H = \frac{\sum Q}{\sum H} \quad (3)$$

Table 6 - Average productivity of labour for three categories of crops (2014)

Crop	Q (kg)	H (hours)	W_H (kg/hour)
Wheat	278400	32124	8.7
Maize	144000	32124	4.5
Potato	748000	32124	23.2

To calculate labour productivity in monetary value (RON) we present in *Table 7* the three cultures, wich have an important weight on the revenue of the employees. To determine the income of the agricultural company, the total production of each culture is multiplied with its average selling price (1 leu ~ 0.227 Euro).

Table 7 - The evolution of income according to different crop categories

Crop	Income receivable (lei)*		
	2012	2013	2014
Wheat	86800	122400	222720
Maize	90000	134890	144000
Potato	1324800	1375000	1425000
Total revenues	1501600	1632290	1791720

*1 leu ~ 0.227 Euro

Wheat 2014: 278400* 0.8 lei /kg = 222720 lei; Maize 2014: 144000* 1 leu /kg = 144000 lei;

Potato 2014: 748000* 1.5 lei /kg = 1425000 lei.

Based on the data from *Table 7* we calculated the labour productivity, W_V in monetary value (Eq. 4, *Table 8*).

$$W_V = \frac{\sum V}{\sum L} \qquad (4),$$

where V is the total value of the production (lei) (*Table 8*), L is the number of workers.

Table 8 - Labour productivity in monetary value

Year	V (lei)	L (No. of workers)	W_V (lei/worker)
2012	1501600	20	75080
2013	1632290	24	68012
2014	1791720	16	111982

We should notice that labour productivity per unit value decreased in 2013, then increasing up to 111982 lei/employee in 2014. This is a positive thing for the agricultural company and shows a clear increase in employee productivity due to the technical and organizational measures taken by the management company.

CONCLUSIONS

Labour productivity is one of the most important indicators, which express the efficiency level of the work in sustainable and ecological farms. This is due to the fact that labour productivity is an important characteristic for the real working activities, with normal-intensity of work. Since the productivity in agriculture has some specific features,

in the sense that the results depend not only on human labour qualification, skills of workers, the degree of technique endowment, but also a series of natural and biological factors. Climatic and soil conditions, biological potential of plants etc., can influence labour productivity, in parallel with social and technical factors.

Although the agricultural company taken in our study is small and the number of employees is low, the management is successfully carried out by some effective methods related to human resource management. The agricultural company does not follow a very exact strategy regarding its staff, but the managers of the farm do not ignore the issues connected to the successful application of human resource management, as unfortunately happens in many agricultural companies. The perspective aims to increase labour productivity and efficiency of human resources by organizing training courses and programs for both managers and staff included directly in the production, but also by introducing new production technologies so as to increase the working efficiency. Also the agricultural company would like to diversify and increase its activity area, to become an important source of new jobs. However, a continuous evaluation of potential of the staff is necessary by periodic testing of knowledge, qualities and skills.

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