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FACTOR ANALYSIS OF LABOR PRODUCTIVITY IN AGRICULTURE IN TERMS OF SUSTAINABLE DEVELOPMENT

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Abstract

This paper represents an analysis of the level of labor productivity in agriculture for each development region of Romania. Labor productivity in agriculture was analyzed by two parameters, namely: the value of agricultural production and the number of employees in agriculture for the period 2011 – 2012. The level of labor productivity is influenced by the quality of biological and bio-capacity of plants and animals as well, as well as the equipment and quality of work performed. From the factorial analysis it can be noticed a decrease of labor productivity caused by a decrease in the value of agricultural production.

Key words**:** *European found, financing, productivity.*

INTRODUCTION

In Romanian economy, agriculture contributes with a significant share to GDP and GVA, but the use of agricultural production in industry is still low. Thus, the objectives of specialized organizations should focus on developing agriculture while achieving investment in processing capacity. Local farms should receive European funds to enable the development of processing and marketing activities in an integrated farming system. Thus the newly created full amount will remain in the same unit and would create the conditions for competitive competitions able to stimulate the development sector and provide products at reasonable prices, thereby stimulating consumption and at the same time offer.

MATERIALS AND METHODS

In this paper, have been used data from National Institute of Statistics regarding value of the agricultural production and number of occupied persons in agriculture for a time series of 2 years. It has been calculated the labor productivity in agriculture for each of the 8 development regions and it has been used the factor analysis in order to calculate the evolution of each factor (labor productivity and number of occupied persons) upon the variation of the value of agricultural production.

RESULTS AND DISCUSSIONS

Factor analysis of labor productivity in agriculture

Work is the most important factor of production as condition of human development and wellbeing of any society. Unlike other factors of production, land and capital work involves a number of traits of human nature: motivations, satisfactions derived from the fact that the work is done by people, and any activity that initiates or generates no need to labor in society.

Regarding work in agriculture, finds its importance by the high share of labor costs in total production costs, a percentage that varies depending on: the system of production, type of holding, etc.

A special situation it is found in agriculture because of the high number of subsistence farms and of the seasonal character of the agricultural activities that led to a partial utilization of the working time [2]. The agricultural productions are significantly influenced by the work factor because through it combine and put in capital value of land and the exploitation [4].

Table 1. Value of the agricultural production

-thousands lei-

Regions	2011	2012
TOTAL	**76,508,656**	**64,259,474**
NORD-WEST	9,695,484	8,101,213
CENTER	8,793,035	7,124,789
NORD-EAST	12,639,425	10,646,133
SOUTH-EAST	13,170,545	10,301,573
SOUTH-MUNTENIA	14,604,812	12,534,763
BUCHAREST-ILFOV	723,148	662,698
SOUTH-WEST OLTENIA	8,740,835	7260647
WEST	8,141,372	7,627,658

Source: data processing, INS, TEMPO ONLINE

From the analysis of the value of agricultural production, it is found that it decreased by 16% in 2012 compared to 2011. The regions North-East, South-East and South-Muntenia are the regions with the greatest agricultural potential, especially for crop production, they totaled 52% of the agricultural production. The highest value of agricultural production is found in the South-Muntenia (19% of total) because the region is largely agricultural (2.449 hectares, representing 71.1% of the total area of the region), as demonstrated by the size of the agricultural area of 2449 hectares, and its share of 71.1% of the total area of the region; The remaining area is occupied by forests (19.3%) and wetlands (3.4%).

The structure of agricultural land dominates arable land 80.2%, followed by 15.7% pastures and meadows, and the last are vineyards and orchards (4.1%).

Regarding employment, Romania has almost 30% of total employment in agriculture, hunting and forestry, which ranks our country first in the European Union. Predominantly agrarian character of the South region and North East is supported by the large number of people working in agriculture. Compared to all other branches of the national economy, agriculture is the most employed people between 55-65 and older.

Romanian agriculture is facing a lot of problems regarding the productivity due to several factors.

Table 2. Number of occupied persons in agriculture (Ns)

-thousands pers-

Regions	2011	2012
TOTAL	**2,442**	**2,510**
NORD-WEST	367.5	377.3
CENTER	244	251.5
NORD-EAST	495.5	508.4
SOUTH-EAST	332.7	340.9
SOUTH-MUNTENIA	429.6	442.8
BUCHAREST-ILFOV	37	38
SOUTH-WEST OLTENIA	332.3	341.5
WEST	203.4	209.6

Source: data processing, INS, TEMPO ONLINE

Table 3.Labor productivity in agriculture (W)

- lei/employee-

Regions	2011	2012
TOTAL	31,330.33	25,601.38
NORD-WEST	26,382.27	21,471.54
CENTER	36,037.03	28,329.18
NORD-EAST	25,508.43	20,940.47
SOUTH-EAST	39,586.85	30,218.75
SOUTH-MUNTENIA	33,996.30	28,307.96
BUCHAREST-ILFOV	19,544.54	17,439.42
SOUTH-WEST OLTENIA	26,304.05	21,261.05
WEST	40,026.41	36,391.50

Source: data processing, INS, TEMPO ONLINE

One of the most important factor concerns lack of mechanization and the big share of people occupied in agriculture, most of them aged over 55 years [3]. Agriculture has the most employed people over 65, about 16% of the industry, which means that these people, although reached retirement age are forced to work due to the low level of pensions (the lowest of all social categories professional). The lowest share of population employed in agriculture is found in the age groups between 15-24 years of only 9.4%, so if we consider that in the next 10 years, the age group between 55 - 64 years will reach retirement age, means that a large part of the workforce cannot be replaced because this category has the highest percentage 20.1%. In these conditions, labor productivity growth by successive allocations technologies could lead

to positive considerations manifestation of this phenomenon.

Table 4. Indices of the value of agriculture production, number of occupied persons in agriculture and labor productivity in agriculture

Regions	Value	Ns	W
TOTAL	83.99	102.78	81.71
NORD-WEST	83.56	102.67	81.39
CENTER	81.03	103.07	78.61
NORD-EAST	84.23	102.60	82.09
SOUTH-EAST	78.22	102.46	76.34
SOUTH-MUNTENIA	85.83	103.07	83.27
BUCHAREST – ILFOV	91.64	102.70	89.23
SOUTH-WEST OLTENIA	83.07	102.77	80.83
WEST	93.69	103.05	90.92

Source: data processing, INS, TEMPO ONLINE

The influence of both factors was calculated using variable structure index shows a decrease of 18.29% in labor productivity due to variations in labor productivity in each development region, and the number of employees. Although it has a high agricultural potential, we find that the region recorded the largest decrease in labor productivity (23.66%) and the Western region of the smallest decrease (9.8%), due to the availability of equipment labor.

Table 5. Decreasing of the labor productivity in agriculture in the period 2011 – 2012

Regions	Lei
TOTAL	-5728.94
NORD-WEST	-4910.73
CENTER	-7707.85
NORD-EAST	-4567.96
SOUTH-EAST	-9368.10
SOUTH-MUNTENIA	-5688.35
BUCHAREST-ILFOV	-2105.12
SOUTH-WEST OLTENIA	-5043.00
WEST	-3634.91

Source: data processing, INS, TEMPO ONLINE

$\Delta W = \frac{\sum_i Wi1ti1}{\sum_i Ti1} - \frac{\sum_i Wi0Ti0}{\sum_i Ti0}$ = 24601,24 lei – 31330,32 lei = -5728,94 lei

Average labor productivity fell by 5728,94 lei due to the influence of both factors. In the context of accessing European funds for rural development is an increase in the number of employees in agriculture because the beneficiaries have established businesses and are required to hire according to each measure of the National Rural Development Programme. In this respect, European funds have positive effects on employment in rural areas by reducing hidden unemployment. In 2012, Romania's unemployment rate was 7%, compared to 10.5% in the EU and rural employment rate was much higher representing actually a hidden unemployment (the unemployment rate in urban areas is 8.6 % compared to 5.1% in rural areas). By age, we find that the most affected is the category 15-24 years, reaching a level of 15.9% in 2012.

In countries from Central and East Europe like Czech Republic, Hungary, Letonia, Poland and Romania, in average the rural population occupies almost 38% in comparison of UE15 where it covers 22,9% [5].

In order to ensure sustainable development in the Romanian countryside, it requires financial support of this group experiencing significant decreases in the number of persons and an increase in unemployment. Encouraging young people to remain in rural areas and their financial support for the installation and management of a farm affects labor productivity in this sector.

Factor analysis of the value of agricultural production

Decomposition of output growth based on value chain substitution process [1]:

- Based on the variation in labor productivity:

$\Delta = \sum Wi1Ti1 - \sum Wi0Ti1$ = 64259474 – 76508656 = - 14379644,17 lei

- Based on the variation in the number of employees:

$\Delta = \sum_i Wi0Ti1 - \sum_i WioTio = 78639118.17 - 76508656 = 2130462$ lei

Table 6. Decomposition of output growth based on value chain substitution process

Regions	Decrese of the value of production
TOTAL	-12249182
NORD-WEST	-1594271
CENTER	-1668246
NORD-EAST	-1993292
SOUTH-EAST	-2868972
SOUTH-MUNTENIA	-2070049
BUCURESTI – ILFOV	-60450
SOUTH-WEST OLTENIA	-1480188
WEST	-513714

Source: data processing, INS, TEMPO ONLINE

Table 7. Based on the labor productivity variation

Regions	Based on productivity variation
TOTAL	-14379644.17
NORD-WEST	-1852817.24
CENTER	-1938523.715
NORD-EAST	-2322350.693
SOUTH-EAST	-3193584.17
SOUTH-MUNTENIA	-2518800.207
BUCURESTI – ILFOV	-79994.54054
SOUTH-WEST OLTENIA	-1722185.237
WEST	-761877.7483

Source: data processing, INS, TEMPO ONLINE

Table 8. Based on the variation of the occupied persons agriculture

Regions	Based on number of occupied pers
TOTAL	2130462
NORD-WEST	258546
CENTER	270278
NORD-EAST	329059
SOUTH-EAST	324612
SOUTH-MUNTENIA	448751
BUCURESTI – ILFOV	19545
SOUTH-WEST OLTENIA	241997
WEST	248164

Source: data processing, INS, TEMPO ONLINE

CONCLUSIONS

Labor productivity in agriculture depends not only on the quality of biological and bio-capacity of plants and animals but, and the availability of equipment and quality of work performed. The European funds for rural development represent an opportunity for both the purchase and renewal of farm machinery, as well as to increase the quality of work done by involving and encouraging young people who have knowledge in the field. In the study conducted, labor productivity is calculated based on the value of agricultural production
Although labor productivity in agriculture has decreased during the analyzed period, this was influenced by the increase in the number of employees. Accessing of European funds for rural development involves hiring a number of individuals and organization of semi-subsistence exploitations. In this respect, European funds in the agricultural sector contribute to reduction of unemployment. Also, labor productivity declined in the period under review as agricultural production in Romania is still dependent on climatic factors. Most affected age group in rural areas is between 18 to 24 years which decreases the number of people increases in the unemployment rate. Thus, for the period 2014 - 2020 should be undertaken to stabilize and installing these young people in rural areas to change the management of the farm and rural diversification activities.

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REFERENCES

[1]Harja Eugenia, 2009, Statistică şi econometrie, Bacau, Editura Alma Mater a Universitatii din Bacau, 2009.

[2]Istudor Nicolae, 2006, Dezvoltarea rurală și regională a României în condițiile integrării în Uniunea Europeană, ASE Publishing, Bucharest 2006.
[3]Istudor N, Petrescu I.E, Lucov B., 2012, The opportunity of applying the measures that support young farmers and early retirement for the next period 2014 – 2020, international conference Competitiveness of agro-food and ENVIRONMENTAL economy, 8 – 11 noiembrie 2012.
[4]Petrescu Irina Elena, Lucov Bogdan, Accessing the European Funds for rural development - opportunity for rural labour, Paper Calitatea – Acces la succes.
[5]Segre Andrea, Hanjalka Petrics, 2005, EU Enlargement and its Influence on Agriculture and Mechanisation, Agricultural Engineering International: the CIGR Journal of Scientific Research and Development, vol. VII, 2005.