AGRICULTURAL LABOUR PRODUCTIVITY AND ITS IMPACT IN FARMING SYSTEM

Elena BULARCA (OLARU), Elena TOMA

University of Agricultural Sciences and Veterinary Medicine Bucharest, 59 Marasti, District 1, 11464, Bucharest, Romania, Phone/Fax: 00 40 762 2733 53; Email: bularca_elena@yahoo.com, elenatoma2001@yahoo.com

Corresponding author: bularca_elena@yahoo.com

Abstract

The aim of the article is to demonstrate the differences between labour productivity in the Romanian agriculture and the European Union countries, determining the impact on the farming system. The article is made with the help of the data from the Eurostat and the National Institute of Statistics. It use three different modalities to estimate agricultural labour productivity in European Union and in Romania. Labour productivity in agriculture, forestry and fishery sector is still very low in Romania compared to EU-28 member countries. Labour productivity in Romanian agriculture sector is lower than in other members' countries of European Union, where it is very significant (Dutch, Danish, Belgian or French productivity is 10-15 times higher). Analysing labour productivity in Romania's agriculture sector by economic activities, it is noted that agriculture has the smallest labour productivity. In view of the existence of a large number of employed persons in Romania agriculture (10.45% of the total population), it is very important to increase labour productivity in Romania because it has a major impact on economic growth and the standard of living.

Key words: *labour productivity, agriculture, Romania, EU, impact*

INTRODUCTION

The agricultural productivity has been defined by several researchers with reference to their own opinions and disciplines. So the term agricultural productivity was interpreted in different ways by agronomists, farmers, economists and geographers. In agricultural geography as well as in the economy, agricultural productivity is defined both as "input production" and "production per unit area". Improving agricultural productivity takes place when production factors are used in a much more efficient way [2].

Agricultural productivity can be defined as a measure of efficiency in an agricultural production system which employs land, labour, capital and other related resources [1].

Labour productivity is one of the most important synthetic indicators of the economic activity of agriculture, which reflects the efficiency or fruitfulness of the work spent in the production process [6].

Labour productivity means the income of the population engaged in agriculture and can be measured in terms of output per worker. It takes into account all the labour which contributes to agriculture production, the labour that is used directly on the farm as well as that used indirectly off the farming producing the materials and services used on agricultural production" [3].

Agriculture is one of the most important sector in Romanian economy and it is necessary to analyze the evolution of labour productivity and identify the causes which could influence and contribute to the development of agriculture sector [7]. The knowledge of the real level of labor productivity in Romanian agriculture and especially the cases of this level is an essential requirement for defining a coherent agricultural policy meant to reduce the recession of this sector of activity [10]. Labour productivity estimates from agriculture can support the structure of labour market policies and supervisor their effects. Productivity measures can contribute to the comprehension of how labour market performance affects living standards because „when the intensity of labour utilization (the average number of

annual working hours per head of the population) is low, the creation of employment opportunities is an important means of raising per capita income in addition to productivity growth" [5].

In this context, the principal purpose of the paper is to analyze one of the fundamental and greatest problem facing Romanian agriculture, namely low labour productivity and implicitly the relatively low yield of agricultural production [8].

MATERIALS AND METHODS

Agricultural labour productivity is an important economic indicator that is permanently in relation to economic terms as growth, competitiveness, and living standards within an economy.

Labour productivity (W) was calculated using the following formulas [7]:

$$W = \frac{TP}{EPaff} \qquad (1)$$

where:
TP= Total population, measured in number of persons;
EPaff= the employed persons in agriculture, forestry and fishery, measured in number or hours worked;
W= labour productivity represents the efficiency of one persons employed in agriculture in producing goods for the population of the country.

$$W = \frac{OAI}{EPaff} \qquad (2)$$

where:
OAI= Output of the agricultural industry, measured in Euro;
EPaff= the employed persons in agriculture, forestry and fishery, measured in number or hours worked
"W= represents the value of output (at basic prices) per unit of labour during a given time reference period. Output of the agricultural industry is made up of the sum of the output of agricultural products, agricultural services and of the goods and services produced in inseparable non-agricultural secondary activities", as defined by EU Commission.

$$W = \frac{GVAai}{EPaff} \qquad (3)$$

where:
GVAa= Gross Value Added of the agricultural industry, measured in Euro;
EPaff= the employed persons in agriculture, forestry and fishery, measured in number or hours worked;
W= represents the value of output (at basic prices) less the value of intermediate consumption produced per unit of labour during a given time reference period.

Agricultural labour productivity is calculated by using the three formulas indicated above both in Romania and European Union.

The period analysed in this study was 2007-2017.

The data for the period 2007-2017 were collected from both Eurostat Database and the National Institute of Statistics and have been statistically processed and interpreted.

RESULTS AND DISCUSSIONS

The number of persons employed in agriculture, forestry and fishery was been observed in evolution both in Romania and European Union. In 2017 compared with there has been a decrease in the number of persons that are employed in agriculture, forestry and fishery with -18.4 % in EU and - 28.4 % in Romania.
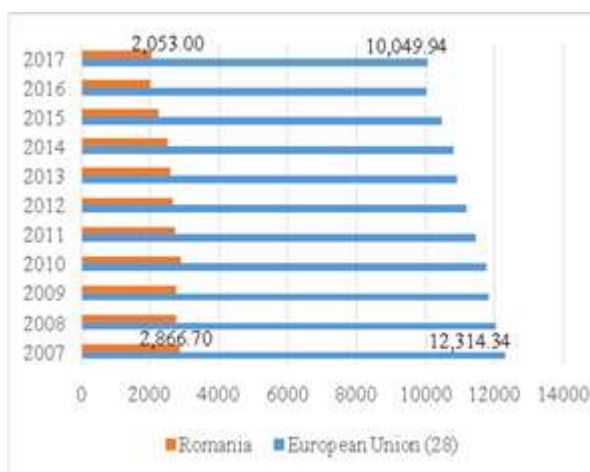

Fig. 1.Evolution of persons employed in agriculture, forestry and fishery in EU and Romania in 2007-2017
Source: Own design based on the data provided by Eurostat Data Base, https://ec.europa.eu/eurostat/data/database [4].

The above figure illustrates that Romania has an important and big impact in the share of persons that are employed in agriculture, forestry and fishery in EU, between 20 and 25% in 2007- 2017 period.
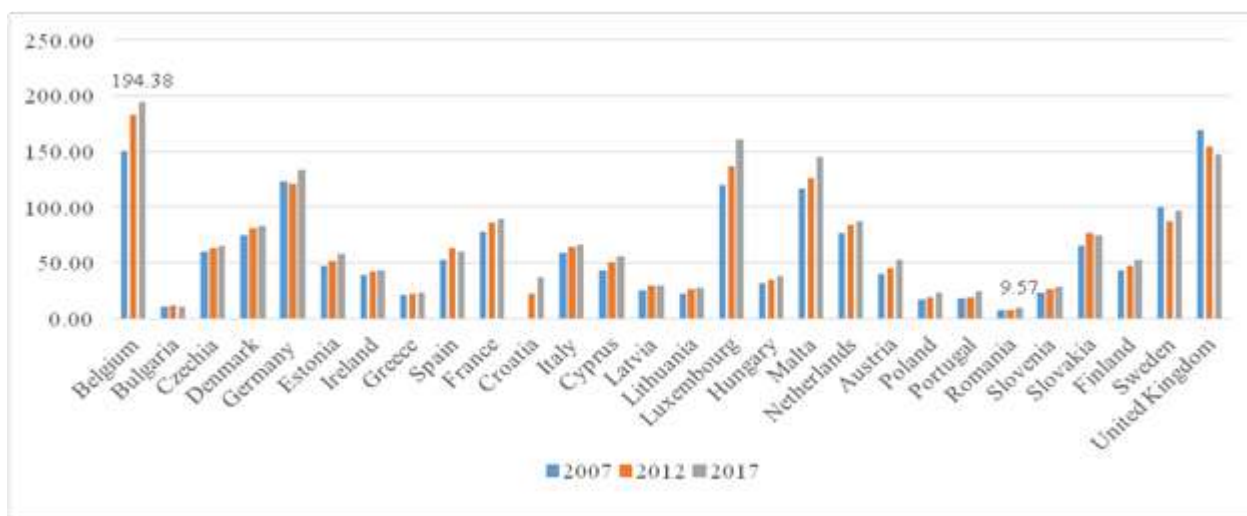

Fig. 2. Labour productivity measured in the number of persons per employed person in agriculture, forestry and fishery
Source: Own design and calculations based on the data provided by Eurostat Data Base, https://ec.europa.eu/eurostat/data/database, [4]

Analysing the labour productivity measured in the number of persons per employed person in agriculture, forestry and fishery, we observe that Romania has the smallest labour productivity from European Union. In 2017, in Romania an employed person in agriculture industry worked to feed another 10 persons, while in European Union that person fed approximately 49 persons. Romania has the biggest share from European Union of the employed person in agriculture, forestry and fishery (10.45%), while from example, Belgium is to the opposite part, with 0.51 % of the total population of the country which work in agriculture industry, this explains why in Belgium, 194 persons was fed in 2017 by one person that working in agriculture industry.

Table 1. Labour productivity calculated by dividing the total agricultural output by the number of employed workers / worked hours in agriculture, forestry and fishery in 2007-2017 period

Specification	Unit	2007	2009	2011	2013	2015	2017	2017/2007
EU (28)	Euro/ person	28,884.48	28,204.29	34,132.19	37,850.07	38,363.90	41,042.10	142.09%
Romania		2,180.13	2,238.08	2,358.97	2,623.05	3,160.89	3,629.17	166.47%
EU (28)	Euro/ worked Hour	14.62	14.38	17.50	19.84	20.01	21.47	146.82%
Romania		1.25	1.29	1.36	1.69	2.10	2.42	193.09%

Source: Own calculations based on the data provided by Eurostat Data Base, https://ec.europa.eu/eurostat/data/database, [4].

Calculating the agricultural labour productivity by dividing the total output by the number of workers/ worked hours, it was found that both in Romania and European Union there is an increase of agricultural labour productivity. Romania has a low labour productivity level: 8.8% of the EU-28 average in 2017, which it means that in Romania a person employed in agriculture, forestry and fishery helps to achieve 3,629.17 Euro output of the agricultural industry. It is important to note that in 2007- 2017 the labour productivity of Romania measured as the output of the agricultural industry/ worked hours almost doubled or an increase of some 93%.

Table 2. Labour productivity calculated by dividing the total agricultural output by the number of workers employed/ worked hours in agriculture, forestry and fishery in 2007-2017 period*

Country	GVAa per person employed EU (28) = 100			GVAa per hour worked EU (28) = 100			2017/ 2007 (%)	
	2007	2012	2017	2007	2012	2017	GVAa/ person employed	GVAa/ hour worked
Austria	105.94	113.37	107.48	78.86	88.01	84.68	143.55	156.99
Belgium	290.13	310.24	228.05	238.22	260.87	179.27	111.22	110.03
Bulgaria	13.40	17.90	16.15	17.67	22.83	20.77	170.57	171.86
Croatia	....	42.68	48.03	....	47.57	51.42	...	...
Cyprus	134.51	135.92	123.81	81.00	83.02	78.80	130.24	142.24
Czechia	56.14	57.06	57.70	56.85	55.93	56.09	145.42	144.25
Denmark	282.46	380.07	256.61	320.08	464.47	335.35	128.54	153.18
Estonia	84.12	97.48	68.79	79.29	90.95	66.04	115.71	121.77
Finland	90.73	81.50	57.56	74.34	67.42	50.96	89.77	100.23
France	280.61	277.55	219.88	221.84	218.45	186.55	110.87	122.95
Germany	189.94	188.36	189.33	213.72	213.41	225.21	141.04	154.07
Greece	90.21	75.08	70.11	88.11	71.51	62.96	109.97	104.48
Hungary	57.14	63.08	76.07	0.00	65.12	77.59	188.37	...
Ireland	124.28	114.83	160.78	111.16	93.40	124.10	183.04	163.23
Italy	225.25	228.71	195.14	161.77	172.28	142.87	122.58	129.13
Latvia	32.12	33.14	33.36	30.74	30.76	30.85	146.95	146.75
Lithuania	41.47	72.85	65.90	47.84	71.67	67.06	224.87	204.97
Luxembourg	248.21	204.04	185.36	716.62	528.32	469.83	105.67	95.86
Malta	126.19	114.87	105.40	50.73	...	...	118.18	0.00
Netherlands	352.07	318.75	335.38	375.59	321.97	332.05	134.79	129.26
Poland	29.28	32.77	36.02	29.68	31.37	33.86	174.03	166.78
Portugal	34.65	28.13	37.33	43.32	37.64	48.41	152.47	163.38
Romania	17.21	16.37	20.98	19.56	20.11	26.76	172.44	200.02
Slovakia	50.20	57.23	50.34	53.18	57.29	51.92	141.90	142.75
Slovenia	38.95	35.06	33.37	37.82	33.68	32.55	121.22	125.84
Spain	232.96	201.93	206.92	234.66	193.78	204.93	125.67	127.68
Sweden	144.85	115.99	104.08	125.90	105.23	93.09	101.66	108.11
United Kingdom	167.74	177.39	143.06	150.64	149.37	118.28	120.68	114.80

Note: (...) not available; * GVAa is measured in Euro.
Source: Own calculations based on the data provided by Eurostat Data Base, https://ec.europa.eu/eurostat/data/database, [4]

Table 2 shows the evolution of labour productivity levels in EU member countries with respect to EU average (EU-28=100). In this case, the labour productivity was obtained by dividing gross value added of the agricultural industry by workers employed in agriculture, forestry and fishery, measured in number or hours worked. Bulgaria, together with Romania have the lowest labour productivity levels: 16.15 %, respectively 20.98 % of the EU-28 average in 2017, when talking about labour productivity expressed in euro per workers and 20.77 %, respectively 26.76 % of the EU-28 average, when considering labour productivity expressed in euro/ worked hour. In 2017, among EU countries, the agricultural labour productivity

record level belongs to Netherlands (335.38%), followed by Denmark (256.61%) and Belgium (228.05%). In Romania, the agricultural labour productivity is situated on an upward trend in 2007-2017 period. It is noted that the indicator increased by 72.44 % from 2,178.12 Euro/ person in 2007 to 3,755.88 Euro/ person in 2017. This growth was mostly influenced by the increase of Gross Value in agriculture, forestry and fishery by 23.49 %, despite the fact that the employed workers in agricultural sector decreased by 38.26%.

Labour productivity in agriculture, forestry and fishery measured as Euro per employed persons in the agricultural sector as determined by the National Institute of

Statistics (transformed into Euro, at an exchange rate: Euro 1 = Lei 4.70), increased by 120.7 % from 1,738.19 euro/ worked hour in 2007 to 3,836.49 euro/ worked hour in 2017. It is noted that the average of labour productivity in the national economy is much higher than the labour productivity in the agriculture, forestry and fishery, for example in 2017, it was 4.96 times bigger.
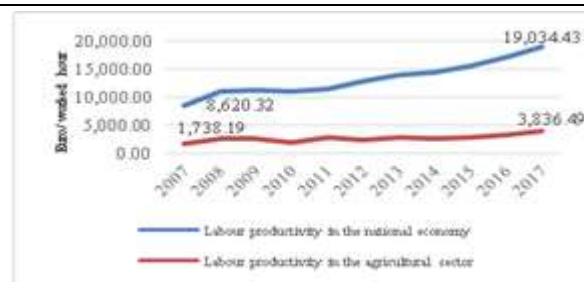

Fig. 3. Labour productivity in the national economy and in agriculture, forestry and fishery, Romania, 2007-2017
Source: Own design based on the data provided by NIS, 2007- 2017. [9]

Table 3. Labour productivity in the national economy and in agriculture, forestry and fishery in Romania,

2007- 2017 Years/ Labour productivity	2007		2010		2013		2017	
	Euro/ hour	%	Euro/ hour	%	Euro/ hour	%	Euro/ hour	%
In the national economy	4.60	100	5.89	128.24	7.70	167.59	10.60	230.56
In the agricultural sector	1.00	100	1.11	110.64	1.81	180.85	2.55	255.32
Share of agriculture (%)	21.76		18.77		23.48		24.10	

Source: Own calculation based on the data provided by NIS, 2007- 2017. [9]

Labour productivity in agriculture, forestry and fishery measured as Euro per worked hour in the agricultural sector as determined by the National Institute of Statistics (transformed into Euro, at an exchange rate: Euro 1 = Lei 4.70) increased highly significant from 1 Euro/ worked hour in 2007 to 2.55 lei/ worked hour in 2017, meaning an increase by 2.55 times. However, in agriculture, industry and fishery, the labour productivity is very small compared with the average of the national economy which increases from 4.60 Euro/ worked hour in 2007 to 10.60 Euro/ worked hour in 2017.

Figure 4. Labour productivity by economic activities in Romania, 2007-2017 (Lei/ employed person)
Source: Own design based on the data provided by NIS, 2007- 2017. [9]

Taking into account four activities of Romanian national economic, it observe that

agricultural labour productivity has the lowest level. In 2007, Romania has an excellent labour productivity in construction activity which is brought forward from 2007 to 2017 by industry sector. It is very important to mention that in Romania, the real estate transactions have the biggest level of labour productivity which increase from 123 thousands Euro/ employed person in 2007 to 650 thousands Euro/ employed person in 2017.

CONCLUSIONS

Analysing the labour productivity in the agricultural sector, there is an increase of this indicator both in Romania and in the European Union. However, labour productivity in Romania is still very low compared to the European Union average.
Firstly, the share of the population working in agriculture sector is declining. It is observed an important and big productivity increase that makes this reduction in labour possible. Romania is the only country of European Union where the persons employed in agriculture sector occupy more than 10% of total population.
Secondly, although Romania has a big share of the population working in agriculture sector, the agricultural labour productivity of

Romania is still very low compared to EU-28 member countries and represents only approximately 21% from the average of EU-28 in 2017. It is though encouraging that it had been on an upward trend in 2007- 2017 period. In European Union, Romania occupy the penultimate position, being followed only by Bulgaria, regarding the agricultural labour productivity.

Finally, it is very important to increase the labour productivity in agriculture, forestry and fishery because an economy can grow only when the number of employed persons increases (meaning employment increases) or when each employed person produces more and more. The latter effect is measured by the labour productivity.

Labour productivity in Romanian agriculture is one of the most important indicator of economic efficiency. For this reason, it is appropriate to increase this indicator because the ways of increasing labour productivity are means of intensifying the positive action of the various factors that influence it. Thus, the promotion of technical progress in trade, the scientific organization of the work in the whole commercial circuit, the raising of the personnel qualification and the improvement of the forms of cointegration of the commercial workers are domains comprising a wide range of measures that act on the direct factors.

ACKNOWLEDGEMENTS

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