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## Study on global economic efficiency in Romanian agriculture

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# STUDY ON GLOBAL ECONOMIC EFFICIENCY IN ROMANIAN AGRICULTURE

IONUȚ LAURENȚIU PETRE<sup>1</sup>

**Summary:** *This paper aims to analyze the economic efficiency at the macroeconomic level of the agricultural sector in Romania, in order to determine the level of profitability or feasibility regarding this economic sector, respectively agriculture. In order to be able to determine the global economic efficiency in the agriculture of Romania, first of all, indicators of the Economic Accounts from Agriculture will be analyzed, found in the national data bases, respectively the National Institute of Statistics; and, secondly, with the help of these indicators, a calculation system will be developed to determine the overall economic efficiency of the Romanian agricultural sector. Determining the level of profitability of agriculture is very important considering the context of globalization and the development of competitive markets, in order to have access to the market, the level of competitiveness can be measured by this analysis, mentioned above.*

**Keywords:** *agriculture, competitiveness, economic efficiency, performance, profitability.*

**JEL Classification:** *Q10, Q11*

## INTRODUCTION

The main objective of each economic agent is to ensure the efficiency of the activity carried out. The concrete form of manifestation of this principle is characterized by the determining element of the economic efficiency - the profitability. In this context, increasing profitability should be a permanent concern of the managers of the production units from all branches and, first of all, from agriculture.

Profitability, in general, consists in the ability of a farm to make a profit from its activity by judiciously using the factors of production and capital, which have different origins.

Profitability is a synthetic form of evaluating the efficiency of the economic-financial activity of a farm with reference to the means of production and labor used, taking into account the three stages of an economic circuit, namely: supply, production and sale.

In terms of quantifying profitability, two categories of indicators are used, namely profitability and profitability rates. The level of absolute profitability is represented by the profit, and the way in which the use of the resources of the farm brings profit constitutes the rate of profitability.

According to European Commission data, which issued a report in 2016, on the overall vision of the cereal sector from an economic point of view, most cereal prices have decreased by one third in the last period, and at the same time, the yield per hectare has not increased so much. A lot, and the cost of inputs increased by 5%. All these aspects presented by the European Commission negatively affect the rate of return of the respective culture, given that each of the 3 elements presented above is constituted as a factor of the rate of return.

## MATERIALS AND METHODS

In order to analyze the global economic efficiency at the agricultural sector level, a system of resulting value indicators will be used, which can be determined using the statistical data provided by the National Institute of Statistics, which refer to the economic accounts in agriculture. This set of indicators, which will determine the overall economic efficiency of agriculture, includes: gross added value (GVA), net added value (NVA), value of intermediate consumption, weight of intermediate consumption in production value, evolution and structure of GVA, NVA weight in the value of production, gross formation of fixed capital, net formation of fixed capital.

In order to calculate this set of indicators, we propose the presentation of the indicators from the national statistics, with the help of which the global economic efficiency will be determined, thus, we propose the definition of terms, according to the National Institute of Statistics.

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„The Economic Accounts for Agriculture (CEA) is a system of interconnected accounts that provides a systematic, comparable and as complete a picture as possible of the economic activity of agriculture in order to analyze the production process and the primary income generated by it within the branch of agricultural activity.

The CEA comprises the following accounts:

- the production account (the production of the agricultural branch is recorded as resources, the intermediate consumption as uses, and the account balance is the added value);

- the operating account (income generation account) records as net added value and other subsidies on production, for use the remuneration of employees, other taxes on production, and the balance of the account is the net operating surplus (mixed income);

- enterprise income account (net operating surplus / mixed income and receivables recorded as resources, leases and interest payable as utilities, account balance is the net income of the enterprise);

- the capital account includes the gross and net formation of fixed capital, the variation of product stocks and capital transfers.”

## RESULTS AND DISCUSSIONS

Analyzing the evolution of the indicators taken from the economic accounts in agriculture, for the reference period 2007-2018, the following can be observed, according to table 1.

Table 1 Evolution of the Economic Accounts in Agriculture

No. Crt.	INDICATORS	Millions (RON)											
		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
1	VEGETABLE PRODUCTION	28723	45742	35735	43488	54180	40169	53844	49058	43574	45155	53217	63390
2	ANIMAL PRODUCTION	14591	15695	17933	15314	16487	17804	17268	17629	17872	16973	18468	19490
3	<b>AGRICULTURAL PRODUCTION OF GOODS (r.1+2)</b>	<b>43314</b>	<b>61437</b>	<b>53669</b>	<b>58803</b>	<b>70667</b>	<b>57974</b>	<b>71112</b>	<b>66688</b>	<b>61446</b>	<b>62128</b>	<b>71685</b>	<b>82880</b>
4	Production of agricultural services	685	716	751	557	545	535	744	984	860	900	946	1246
5	<b>AGRICULTURAL PRODUCTION (r.3+4)</b>	<b>43999</b>	<b>62153</b>	<b>54420</b>	<b>59360</b>	<b>71211</b>	<b>58509</b>	<b>71856</b>	<b>67672</b>	<b>62305</b>	<b>63028</b>	<b>72630</b>	<b>84126</b>
6	Processing of agricultural products	3701	4841	5508	5093	5297	5751	6609	6852	6444	6321	5864	6080
7	<b>PRODUCTION OF AGRICULTURAL BRANCH (r.5+6)</b>	<b>47700</b>	<b>66994</b>	<b>59928</b>	<b>64453</b>	<b>76509</b>	<b>64259</b>	<b>78464</b>	<b>74524</b>	<b>68750</b>	<b>69349</b>	<b>78494</b>	<b>90206</b>
8	<b>TOTAL INTERMEDIATE CONSUMPTION (sum.(8.1,8.11))</b>	<b>26874</b>	<b>36201</b>	<b>32827</b>	<b>36688</b>	<b>42133</b>	<b>36571</b>	<b>44786</b>	<b>42929</b>	<b>39849</b>	<b>39991</b>	<b>43265</b>	<b>52175</b>
9	Seeds and planting material	2409	3416	2604	3501	4068	3117	4353	3921	3147	3520	3158	5716
10	Energy; lubricants	3189	5128	4612	6136	7748	6766	8510	8771	7977	8433	8558	10691
11	Fertilizers and amendments	1045	2479	1963	2525	3209	2891	3341	2887	2647	2937	3088	2767

12	Products for the protection of crops and pesticides	528	905	747	1065	1284	1089	1428	1283	1135	1367	1499	2043
13	Veterinary expenditure	674	1102	1280	1275	1290	1349	1430	1473	1463	1263	1119	1491
14	Feed	11880	13030	11313	12456	12549	12251	12993	11970	11225	11144	12184	13365
15	Maintenance of materials	1791	2560	2445	2307	2944	2312	2668	2379	2019	2164	3679	4141
16	Maintenance of buildings	338	325	316	251	445	420	444	456	497	547	471	603
17	Agricultural services	685	716	751	557	545	535	744	984	860	900	946	1246
18	Indirectly financed financial services (sifim)	272	293	221	128	117	81	243	192	134	148	148	148
19	Other goods and services	4064	6246	6575	6486	7934	5761	8631	8613	8745	7568	8416	9965
20	<b>Gross added value in base prices (r.7-8)</b>	<b>20826</b>	<b>30793</b>	<b>27101</b>	<b>27765</b>	<b>34375</b>	<b>27688</b>	<b>33679</b>	<b>31595</b>	<b>28901</b>	<b>29358</b>	<b>35229</b>	<b>38030</b>
21	<b>CONSUMUL DE CAPITAL FIX (sum.(10.1,10.4))</b>	<b>7535</b>	<b>7401</b>	<b>8172</b>	<b>9799</b>	<b>11649</b>	<b>11659</b>	<b>13334</b>	<b>12494</b>	<b>10888</b>	<b>10386</b>	<b>11927</b>	<b>13003</b>
22	Equipment	4270	3792	4581	6172	7742	7602	9089	8179	6603	6118	7517	x
23	Construction	1560	1695	1760	1751	1837	1888	2048	2105	2127	2131	2263	x
24	Plantations	618	741	592	562	670	736	707	703	656	662	650	x
25	Others	1087	1173	1239	1313	1400	1434	1491	1507	1502	1474	1498	x
26	<b>NET ADDED VALUE IN BASIC PRICES (r.9-10)</b>	<b>13290</b>	<b>23392</b>	<b>18930</b>	<b>17966</b>	<b>22726</b>	<b>16029</b>	<b>20344</b>	<b>19101</b>	<b>18013</b>	<b>18972</b>	<b>23302</b>	<b>25027</b>
27	Remuneration of employees	5860	7691	8974	11545	1490	1665	1730	1919	2217	2564	2782	3882
28	Other taxes on production	191	166	93	98	93	93	93	93	99	99	99	99
29	Other grants on production	1638	1467	3015	4264	5071	6050	6452	8173	7010	11802	11411	11133
30	<b>FACTOR INCOME (r.11-13+14)</b>	<b>14737</b>	<b>24693</b>	<b>21852</b>	<b>22132</b>	<b>27704</b>	<b>21986</b>	<b>26703</b>	<b>27181</b>	<b>24923</b>	<b>30675</b>	<b>34614</b>	<b>36061</b>
31	<b>NET EXPLOITATION OF OPERATING / MIXED INCOME (r.15-12)</b>	<b>8878</b>	<b>17002</b>	<b>12878</b>	<b>10588</b>	<b>26214</b>	<b>20322</b>	<b>24973</b>	<b>25262</b>	<b>22706</b>	<b>28111</b>	<b>31832</b>	<b>32179</b>
32	Payment lease	174	249	256	332	487	634	648	631	758	726	853	853
33	Interest to pay	23,05,2019	218	380	410	472	584	416	429	414	350	349	349
34	Interest to be received	14	37	50	57	35	51	51	43	42	39	21	21
35	<b>THE NET INCOME OF THE COMPANY (r.16-17-18+19)</b>	<b>8694</b>	<b>16572</b>	<b>12292</b>	<b>9903</b>	<b>25290</b>	<b>19155</b>	<b>23960</b>	<b>24245</b>	<b>21576</b>	<b>27074</b>	<b>30652</b>	<b>30999</b>
36	Brief formation of fixed capital - FBCF (without deductible VAT)	4342	3595	3849	4699	6357	4616	5787	4803	4155	4330	4894	x

37	Net fixed capital formation (without deductible VAT)	-3193	-3806	-4323	-5100	-5292	-7043	-7547	-7691	-6733	-6056	-7034	x
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Source: National Institute of Statistics (Agriculture Economic Accounts)

The *vegetal production* registers an increase of the value, at the current prices, during the analyzed period, thus, if in 2007 the vegetal production stood at the value of 28.7 billion lei, in the year 2018, it registered the highest level (taking into account also record productions) of about 63.4 billion lei, 2.2 times higher than in the first year. Analyzing on average, each year, there was an average growth rate of about 7.5%.

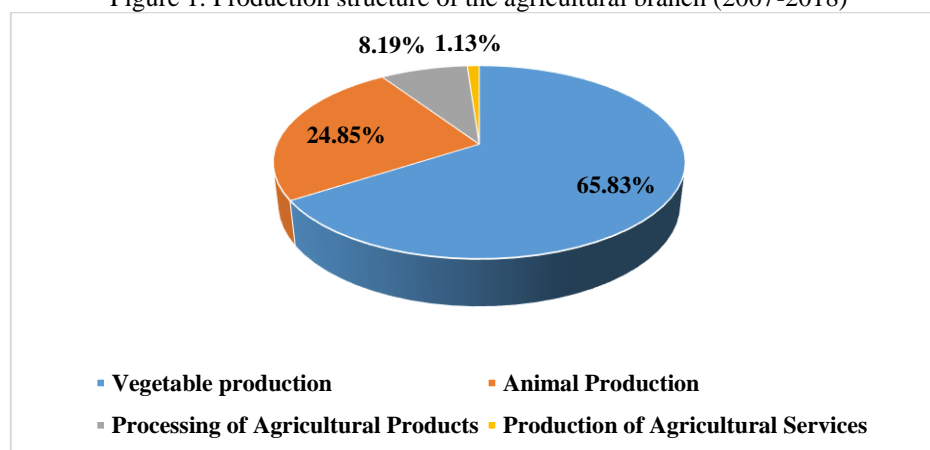
*Animal production* also registered increases during the reference period, in the year of accession to the European Union there was registered a value of this indicator of about 14.6 billion lei, and in the last analyzed year, 2018, the value of the animal production was of almost 19.5 billion lei, respectively 33.6% more. The average annual growth rate of 2.7% was recorded over the whole period analyzed

Regarding the *production of agricultural services*, it has also registered an increasing evolution, overall, registering a value of it, in the last year, of 1.25 billion lei, with about 82% more than in the first year, then when the value of agricultural services on the market was 685 million lei. The average annual rate of growth of the value of agricultural services is approaching the rate of increase of the value of vegetable production, being 5.6% per year.

From the *branch of agricultural production*, the processing of agricultural products is also included, the value of which has increased during the analyzed period, but not with the same frequency. Thus, if the value of agricultural production and services registered a somewhat constant increase from year to year, this increase in the value of processing of products is different, registering the highest value in 2014, of 6.85 billion lei, with 85 , 15% higher than in the first year, and 12.7% higher than the value processed in the last year (of 6.08 billion lei). The average annual growth rate was 4.6%.

Therefore, the evolution of the *value of the production of the agricultural branch*, obviously maintains the trend recorded in the previous indicators, respectively one of growth. In 2007, the value of the production of this branch was about 47.7 billion lei, and in 2018, there was an 89% higher value, respectively of 90.2 billion lei. Annually, an average growth rate of about 6% was recorded.

Figure 1. Production structure of the agricultural branch (2007-2018)

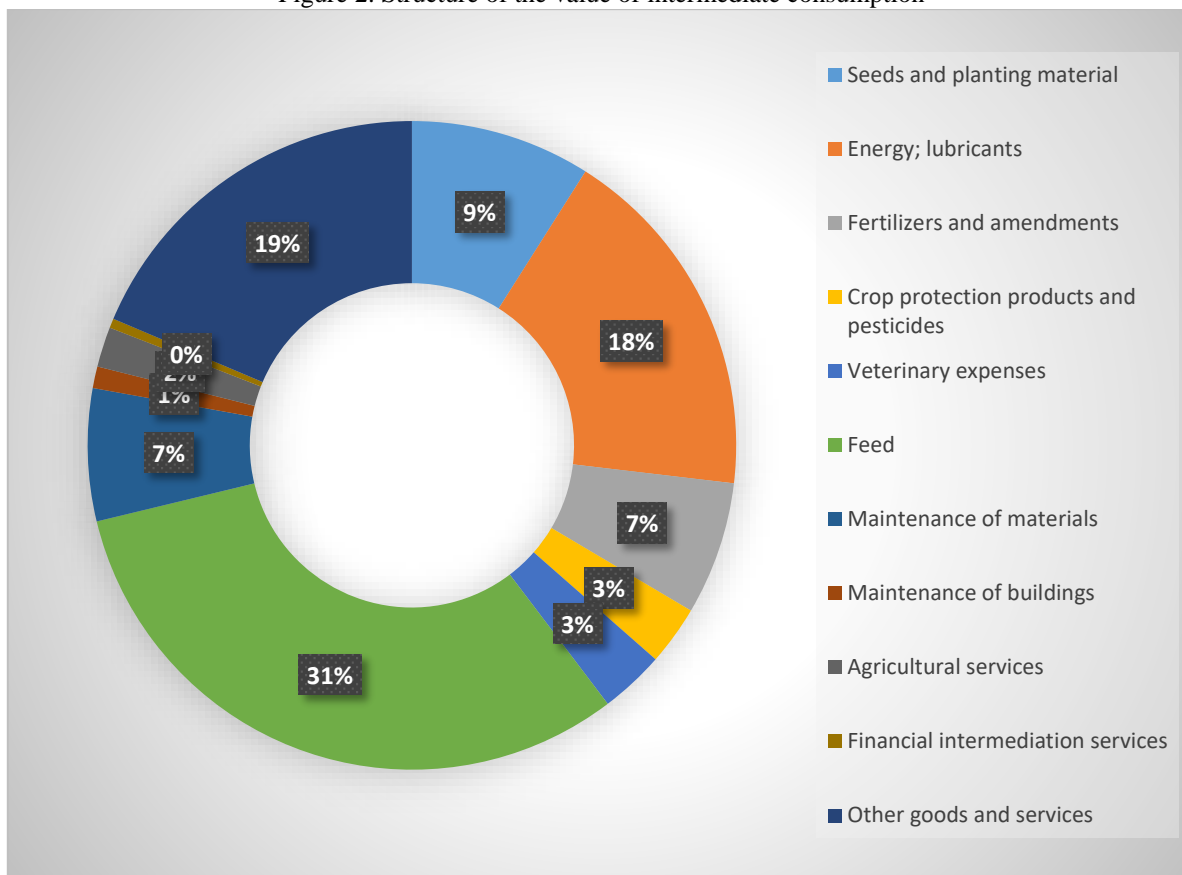


Source: own processing based on INS data

As can be seen from figure 1, in which the structure of the value of the agricultural production branch is presented, about 66% is represented by the plant production, and about 25% is represented by the animal production. Thus, summing the two components of the agricultural branch, it turns out that the value of the production of agricultural goods represents about 91%, on average (in the period 2007-2018), of the total branch. The production of agricultural services has a contribution in the value of the production of the agricultural branch of 1% (in the period 2007-2018),

thus, the total agricultural production is about 92% of the total agricultural branch. The processing value of the production is also part of this total, whose value represents 8% of the total value of the branch.

Figure 2. Structure of the value of intermediate consumption



Source: own processing based on INS data

Figure 2, shows the components that make up the value of *intermediate consumption*, being presented as an average weight in the analysis period 2007-2018. Thus, the most significant weight in the total of intermediate consumption is represented by the value of feed, which holds about 31.5% of the total. In the second position, depending on the weight in the value of intermediate consumption, the category of other goods and services, with a share of 18.6%, is located. Next, at a small difference, by weight, we find the category of energy, lubricants, which has a share in intermediate consumption of 17.9%. The following categories are positioned below; seeds and planting material, with a weight of 9%, fertilizers and amendments with 6.7%, maintenance of materials with 6.6%, veterinary expenses with 3.2%, plant protection products and pesticides with 3%, agricultural services by 2%, the maintenance of buildings by 1% and financial intermediation services by 0.5%.

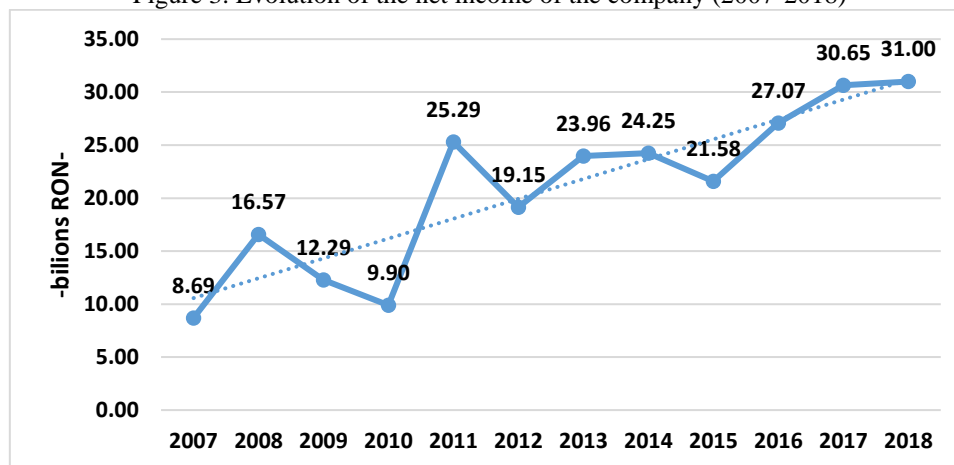
Realizing the difference between the production of the agricultural branch and the intermediate consumption, resulted, according to the National Institute of Statistics, *the gross added value* of agriculture. It registered an increase during the analyzed period, following the trend of the indicators with which it is calculated. Thus, in 2018 a gross added value of 38 billion lei was registered, 82.6% higher than in 2007 (when 20.8 billion lei was registered), being the smallest value in the analyzed period. On average, the annual growth rate did not deviate from those of the factor indicators, respectively the value of branch production and intermediate consumption, registering an average annual rate of 5.6%.

Eliminating from the value of the *income of the factors* and the remuneration of the employees (registering an average annual decreasing rate of -3.7%, taking into account the decreasing labor force in agriculture, and the migration of the population from the rural areas, even though the level of the wages has increased in this period) results in the *net operating surplus* (or mixed income).

This represents an average annual growth of 12.4%, reaching the level of 2018 to be worth 32.18 billion lei, 3.6 times higher than in 2007.

From this net operating surplus decreasing the leases (which record an average annual growth of 15.5%) and adding the interest balance (those to be paid with a growth rate of 28%, and those to be received only by 4%), the *net income of the enterprise* is obtained.

Figure 3. Evolution of the net income of the company (2007-2018)



Source: own processing based on INS data

The net income of the company registered increases, on average, during the analyzed period, thus, in the year of Romania's accession to the European Union, there was a net income of the enterprise of about 8.7 billion lei, but it registered growth fluctuations, reaching in 2018 it will be almost 31 billion lei, being 3.5 times higher than in the first year. Analyzing the average annual growth, a rate of 12.25% is recorded.

This significant increase comes on the one hand due to the reduction of the remuneration of wages (given the difficulty in the labor market in the rural area), but also through the reduction of taxes, and on the other hand a direct and significant influence has the value of subsidies. granted representing about 36% (in 2018) of the valuation of the net income of the company.

With the help of these indicators it was possible to determine the overall economic efficiency in agriculture, summarized in the following model.

Table 2. The overall economic efficiency in the agriculture of Romania in the period 2007-2018

Economic Efficiency Indicators	U.M	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Share of intermediate consumption in the value of prod. Agriculture	%	56,3	54,0	54,8	56,9	55,1	56,9	57,1	57,6	58,0	57,7	55,1	57,8
The share of VAB in the value of prod. Agriculture	%	43,7	46,0	45,2	43,1	44,9	43,1	42,9	42,4	42,0	42,3	44,9	42,2
VAB at a leu intermediate consumption	Coef.	0,8	0,9	0,8	0,8	0,8	0,8	0,8	0,7	0,7	0,7	0,8	0,7
VAN dynamics	%	100,0	176,0	142,4	135,2	171,0	120,6	153,1	143,7	135,5	142,8	175,3	188,3
Dynamics of producers' incomes	%	100,0	190,6	141,4	113,9	290,9	220,3	275,6	278,9	248,2	311,4	352,6	356,6
Producers' incomes in the value of agricultural production	%	18,2	24,7	20,5	15,4	33,1	29,8	30,5	32,5	31,4	39,0	39,1	34,4
Labor productivity in agriculture calculated at the value of agricultural production	Thousands. lei / person employed full time	19,4	27,8	24,9	26,4	31,3	25,6	33,0	32,4	34,3	40,2	45,1	x

Source: calculations based on INS data series

The share of intermediate consumption in the value of the production of the agricultural branch has ranged from 54% to 58% in the period 2007-2018, with an average of 56.44%. Thus, given the rather small oscillations, it can be appreciated that the evolutions of these two main indicators (intermediate consumption and the value of the agricultural branch production) analyzed previously were similar.

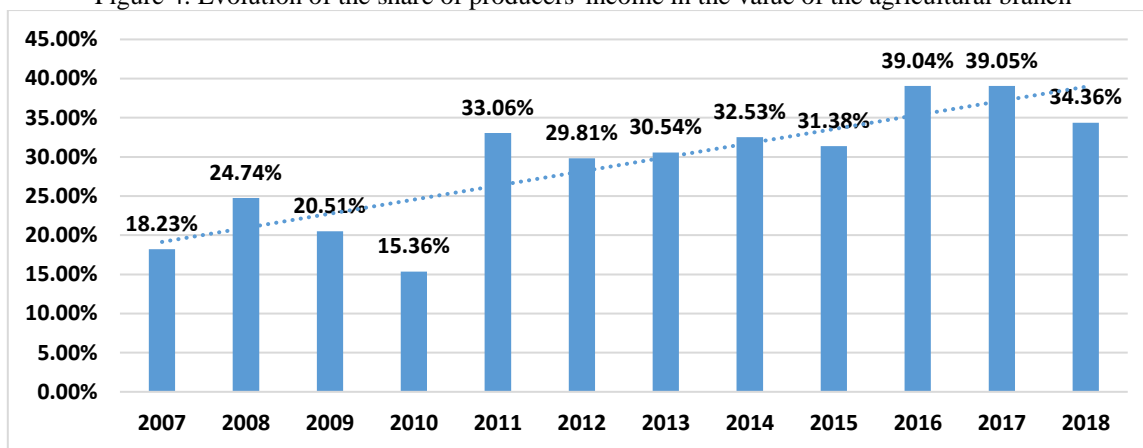
The share of the gross value added (GVA) in the value of the production of the agricultural branch registers, on average for the whole analyzed period, 43.56%, oscillating, as absolute difference between years with the previous weight, because this weight is part of the difference until the whole of the value of the production farm. The lowest share was registered in 2015, being 42%, and the highest was registered in 2008, being close to 46%, so it can be appreciated that the share of GVA in the value of the production of the agricultural branch is somewhat constant.

Analyzing the gross added value, calculated as a ratio of intermediate consumption (GVA to a leu intermediate consumption), it can be appreciated that, on average, following a consumed leu it is estimated that a GVA of 0.77 lei is recorded (2007-2018 average), registering in 2008 the highest value of 0.85 lei for a leu intermediate consumption, and the lowest value registering itself in the last year (2018), when for a leu intermediate consumption was obtained a GVA of 0.73 lei. Even if this amount may seem high, other depreciation expenses should be taken into account and not only has what affected this amount.

Analyzing also the dynamics of the incomes of agricultural producers, it can be observed that it registered a significant increase, registering relative differences, between 13.9% and 256.5%, compared to the reference year 2007. The main factor that intervened in this considerable growth of the income of the producers is related to the granting of subsidies, which represent, on average, 30% of this income, but among the causes can be mentioned: the decrease of the remuneration of wages, considering the decrease of the labor force, but also the decrease of the value of the taxes.

Next, the share of the producers' incomes was determined in the value of the productions of the agricultural branch, this weight being similar to the rate of commercial profitability. On average, over the entire period analyzed, this rate was 29%, with oscillations between 15% (in 2010) and 39% (in 2017). Thus, the value of the branch of agricultural production (respectively what share of the producers' incomes in the sale of agricultural goods and services) is around 30%, a threshold recommended in the economic literature.

Figure 4. Evolution of the share of producers' income in the value of the agricultural branch



Source: calculations based on INS data series

As can be seen, the profitability of the agricultural branch, depending on the production obtained (capitalized), fluctuated between 15.36% (2010) and 39.05% (2017) between 2007 and 2007, and these fluctuations can be attributed to both the factors climates that can significantly influence the level of production, but, given that this indicator measures the efficiency of the whole branch, we can consider that the production structure can also influence this indicator. It can be observed that the general tendency of the profitability is one of increase, reaching in the last years to surpass 35% reaching almost 40 percent.



## CONCLUSIONS

In order to have an overview of the current situation in agriculture regarding the profitability of this economic branch, at the beginning of this interim report, an analysis of the global economic efficiency of the Romanian agriculture was performed. For this, indicators of the Economic Accounts for Agriculture (CEA) were presented and analyzed. As a result of their evaluation, it can be appreciated that both the value of the plant production and the one of the animal production have increased during the analyzed period, the first of these recorded a more rapid growth rate than the last one. These increases can come, on the one hand, by increasing the obtained production (of the yield per hectare or per head of animal, which have registered increases in the last years), and on the other hand it can be stated that inflation has also contributed to this growth. of the value of agricultural production.

The services and processing sectors were also analyzed in order to determine the structure of the agricultural branch, on average, 66% of which is represented by plant production, 25% by animal production, 8% representing the processing sector and 1% that of services.

The intermediate consumption registered significant increases during the analyzed period, with a higher rate than the value of the agricultural branch, but the level of consumption still remains below that of the value of production. Therefore, it can be appreciated that, if the current trend is maintained, at a global level, in agriculture, the level of intermediate consumption will be above that of the value of agricultural production, thus a loss in this sector is expected, but granting subsidies can balance this ratio.

Realizing the difference between the value of the production of the agricultural branch and of the intermediate consumption resulted the gross added value (GVA), this also registering increases in the reference period, following the tendency of the indicators by means of which it is calculated.

Following the depreciation of the GVA, the taxation and by adding the balance of interest and subsidies, the net income of the company is finally determined, it records a fairly high average annual growth rate. This significant increase comes on the one hand due to the reduction of the remuneration of wages (given the difficulty in the labor market in the rural area), but also through the reduction of taxes, and on the other hand a direct and significant influence has the value of subsidies. granted representing about 36% (in 2018) of the valuation of the net income of the company.

Analyzing the weight of intermediate consumption in the value of the production of the agricultural branch, it was found that it ranged between 54% and 58% between 2007 and 58%, with an average of 56.44%. Thus, given the rather small oscillations it can be seen that the evolutions of these two main indicators (intermediate consumption and the value of the agricultural branch production) analyzed previously were similar.

The main factor that has intervened in the considerable increase of the producers' incomes is related to the granting of subsidies, which represent, on average, 30% of this income, but among the causes can be mentioned: the decrease of the remuneration of wages, taking into account the decrease of the labor force, but also lowering the value of taxes.

Analyzing the share of producers' incomes in the value of the production of the agricultural branch, which can be similar to the rate of commercial profitability of the agricultural branch, it is found that it fluctuated during the analyzed period between 15.36-39.05%, these oscillations can be put on account of the climatic factors that can significantly influence the level of production, but, given that this indicator measures the efficiency of the whole agricultural branch, it can be considered that the production structure can influence this rate as well.

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