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# REQUIREMENTS CONCERNING THE EVOLUTION OF THE UTILAJE PARK IN ROMANIA IN PERIOD 2012-2018

STERIE MARIA CRISTINA<sup>1</sup>

**Summary:** *The machinery fleet is of particular importance for Romania's agriculture because it helps to preserve comfort, sustainability of agricultural production and the replacement of human energy. In Romania the machines illustrate a positive growth rate, the mechanization being favoured by non-refundable funding. Submeasure 4.1. Investments in agricultural holdings stimulate the purchase of agricultural machinery, the results can be observed in the long term, based on the environmental benefits, yields and quality of agricultural products.*

**Keywords:** *agriculture, machinery park, non-refundable financing*

**JEL classification:** Q10

## INTRODUCTION

Agriculture is the art, science, industry of producing food, raising animals and other human needs.

In recent years agriculture has evolved considerably, resulting in the need to improve agricultural methods and equipment in order to obtain high quality products.

Mechanisation presents as factors of the occurrence of climate change, economic problems, the growth and efficiency of production, but also the lack of access to the workforce.

The mechanisation of agriculture is important because it boosts productivity and work efficiency, speed and speed of work. Mechanisation also helps to improve the agricultural technique by improving the irrigation system, preventing soil erosion, expanding agricultural land and costs can be adjusted accordingly.

In addition to the many benefits to agriculture, mechanisation improves the sustainability of the agricultural system, having an impact on the supply and demand of labour, agricultural profitability.

As regards the innovation and modernisation of agriculture in Romania, the financing methods are of particular importance. Thus, the Agency for Rural Investment Financing manages the European funds for agricultural innovation and modernisation.

By sub-measure 4.1 - Investments in agricultural holdings contribute to the areas of intervention, providing private beneficiaries with non-refundable funding for the modernisation of the agricultural machinery fleet through the purchase of efficient and efficient machinery and equipment.

The non-refundable support of this sub-measure for vegetable farms and livestock farms will be 50 % of the total ineligible expenditure. For projects providing for simple purchases, the maximum eligible expenditure will be EUR 500,000 and for vegetable farms the non-refundable public support will be 30% of eligible expenditure and public procurement will not exceed EUR 500,000.

## MATERIAL AND METHOD

The research is based on statistical data provided by the National Statistical Institute and Eurostat. Statistical indicators were calculated in the work, namely:

- standard deviation  $\sigma = \sqrt{\frac{\sum(x - \bar{x})^2}{(n-1)}}$ , where:

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- $\bar{x}$  = sample average;
- $n$  = sample size;
- coefficient of variation  $v = \frac{\sigma}{\bar{x}}100$ , where:
  - $\sigma$  = average deviation;
  - $\bar{x}$  = the average level of a variable;
- the pace of growth  $\bar{R} = (\bar{I} \times 100) - 100$ , where:
  - $\bar{I}$  = average general growth index.

## RESULTS AND DISCUSSIONS

The number of agricultural tractors shows variations between 184,446 in 2012 and 215,980 in 2018, showing an upward trend with an annual growth rate of 2.67% and an average of 200,682 tractors in the period considered (Table No. 1., Table No. 2.).

With regard to tractor ploughs, an upward trend is observed, with the number oscillating between 147,471 in 2012 and 169,964 in 2018 and an average period of 160,575 ploughs with a growth rate of 2.39% (Table No. 1., Table No. 2.).

Table 1 - The evolution of the fleet of tractors and agricultural machines in Romania during 2012-2018

Categories of tractors and agricultural machinery	Years						
	2012	2013	2014	2015	2016	2017	2018
Physical farm tractors	184446	191301	193120	199284	207901	212730	215980
Tractor plows	147471	152031	156964	159334	168617	169647	169964
Mechanical cultivators	29173	29565	29562	30355	30632	29648	29337
Mechanical seed drills	73519	74805	76301	77560	81255	80038	78612
Mechanical traction spraying and dusting machines	5459	5293	5315	5607	5327	5494	5709
Self-propelled grain harvesters	25626	26454	25694	27485	26923	26690	27464
Self-propelled forage harvesters	752	826	868	891	985	1069	1104
Combine harvesters and potato harvesters	5165	5348	5122	5403	5629	5924	6108
Straw and hay balers	9087	10225	10871	11966	13840	14166	14697
Feed vindrovers	1817	1221	1217	1254	1327	1375	1399

Source: [www.insse.ro](http://www.insse.ro) (accessed on 08.01.2020), own calculations

The number of mechanical growers ranged from 29,173 in 2012 to 30,632 in 2016. The average period is 29,753 mechanical growers, and in the period under review oscillates, increasing until 2016, with a positive growth rate of 0.09% (Table No. 1., Table No. 2.).

In the period 2012 to 2016, in terms of the number of sowers, the average was 77,441, where the lowest number was recorded in 2012 (73,519 sowers), and the highest number was recorded in 2016 (81,255 sowers). Also the growth rate was 1.12 (Table No. 1., Table No. 2.).

Sprinklers and dusting machines with mechanical traction show variations during the period under review. The most sprinklers were registered in 2018, i.e. 5,709, and the fewest in number, 5,293 in 2013, with an average of 5,457 sprinklers and dusting machines with traction, showing a growth rate of 0.75% (Table No. 1., Table No. 2.).

Self-propelled grain harvesters also have small oscillations. They were between 25,625 and 27,485, resulting in an average period of 26,619 self-propelled grain harvesters and a growth rate of 1.16% (Table No. 1., Table No. 2.).

Self-propelled feed harvesters have the lowest average in the categories of tractors and agricultural machinery, i.e. 927 combinations with oscillations between 752 and 1,104, with the growth rate being the highest 6.61%.

As regards combinations and potato harvesters, it oscillates between 5,122 and 6,108, the average period is 5,528 and was characterized by a growth rate of 2.83%.

Table 2- The main indicators on the number of tractors and agricultural machines in the period 2012-2018

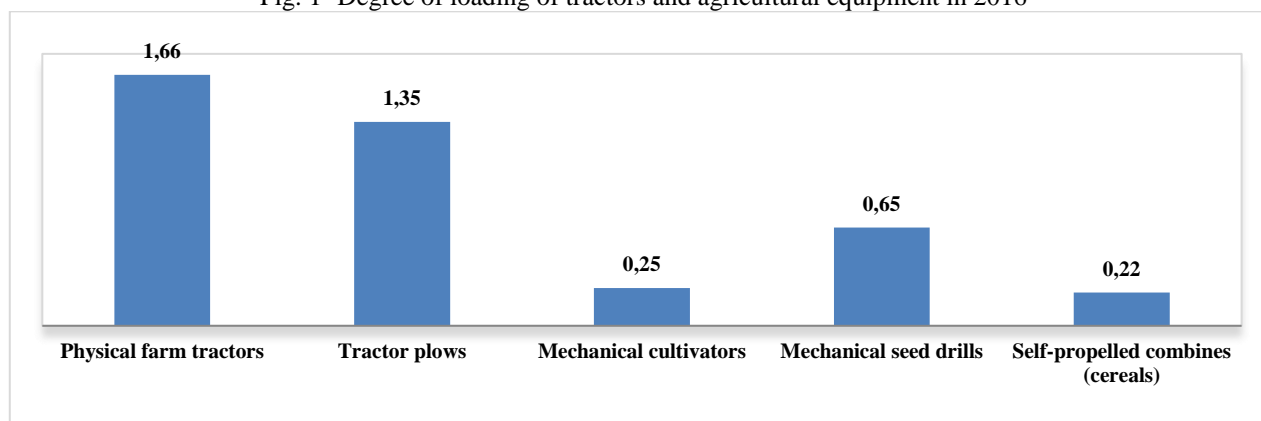
Categories of tractors and agricultural machinery	Min (no)	Max (no)	Aver. (no)	Stand. Dev. (no)	*Coef. of var. %	Growth rate %
Physical farm tractors	184446	215980	200680,29	11846,56	0,06	2,67
Tractor plows	147471	169964	160575,43	9077,65	0,06	2,39
Mechanical cultivators	29173	30632	29753,14	536,56	0,02	0,09
Mechanical seed drills	73519	81255	77441,43	2778,09	0,04	1,12
Mechanical traction spraying and dusting machines	5293	5709	5457,71	158,82	0,03	0,75
Self-propelled grain harvesters	25626	27485	26619,43	756,12	0,03	1,16
Self-propelled forage harvesters	752	1104	927,86	129,39	0,14	6,61
Combine harvesters and potato harvesters	5122	6108	5528,43	375,95	0,07	2,83
Straw and hay balers	9087	14697	12121,71	2166,38	0,18	8,34
Feed vindrovers	1217	1817	1372,86	208,78	0,15	-4,26

Source: www.insse.ro (accessed on 08.01.2020), coefficient of variation (<10 - small ;10-20- medium; >20-high).

Straw and hay balers have limits between 9,087 in 2012 and 14,697 in 2017. It has a positive growth rate of 3.84% with a period average of 1,810 (Table No. 1., Table No. 2.).

As regards the number of vindrovere for feedingstuffs, it was between 1,217 in 2014 and 1,817 in 2012, resulting in an average period of 1,372 and a negative growth rate is highlighted, i.e. -4,26% (Table No. 1., Table No. 2.).

Fig. 1- Degree of loading of tractors and agricultural equipment in 2016



Source: processed data EUROSTAT

As regards the load level, 1.66 tractors return to 100 ha, followed by tractor ploughs returning 1.35 to 100 ha and mechanical sowers by 0.65 to 100 ha.

The lowest numbers in the Romanian machinery fleet are shown by straw and fan balers, vindrovere for feed and self-propelled feed harvesters returning to 100 ha maximum 0.1.

Table 3- Evolution of the number of projects financed through sub-measure 4.1. – Investments in agricultural holdings (vegetable sector)

Specification	2015	2016	2017	2018
Number of projects funded	35	149	43	36
Number of projects excluding equipment purchases from total funded projects	33	144	26	1
Share of projects financed exclusively for equipment purchases from total financed projects (%)	94,3	96,6	60,5	2,8

Source: R.S\_Final\_sM4.1\_selected\_vegetal\_2015, R.S.FINAL\_sM4.1\_vegetal\_selected\_S01\_2016, R.S\_sM4.1\_selected\_vegetal\_stage2\_S01\_2017, R.S\_sM4.1\_selected\_vegetal\_stage1\_S01\_2017, R.S\_sM4.1\_vegetal\_et1\_2018\_selected.

The main financing measure for farmers who contributed to the acquisition and renewal of the farm machinery fleet was submeasure 4.1. – Investments in agricultural holdings. During the

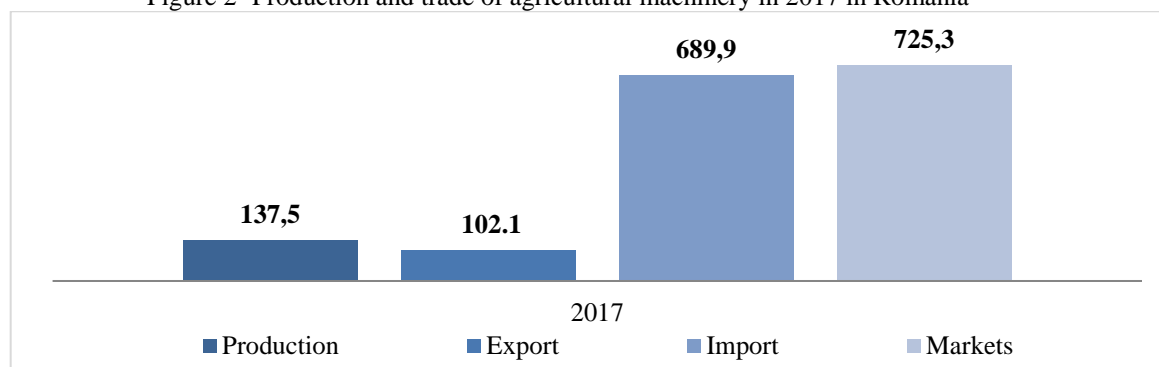
period under review, it is noted that the most numerous projects financed were registered in 2016, with 149 projects of which 96.6% were projects financed exclusively for the purchase of agricultural machinery (Table No. 3.).

By the fact that most projects were submitted in 2016 on this sub-measure, it was due to the fact that farmers became aware of the opportunity to finance their holdings as a result of the possibility of an eligible investment of up to EUR 500,000, with non-refundable support of 50% of the total investment.

In 2016, most projects were contracted through sub-measure 4.1. – Investments in agricultural holdings accounting for 96.6% projects financed exclusively for machinery procurement from total funded projects.

Lately, farmers have started to be increasingly concerned about the brand, the manufacturers of the machinery, but also the technical characteristics having a special importance in the choice of model.

Figure 2- Production and trade of agricultural machinery in 2017 in Romania



Source: processed data CEMA

According to THE CEMA data, at the level of 2017 in Romania, the market for tractors and agricultural machinery amounted to more than 725 million euros, determined also against the background of the possibility of access to European funds by Romanian farmers. Also the import of agricultural machinery accounted for about 95% of the market for agricultural machinery in Romania.

It should be noted that Romania produced agricultural machinery worth more than 137 million euros through the two Romanian-owned producers Irum and Mechanica Ceahlau.

As regards the production of agricultural machinery at European Union level in 2017, Germany is ranked 12.7 billion euros, followed by Italy 7.1 billion euros and France with 4.6 billion euros.

## CONCLUSIONS AND RECOMMENDATIONS

Agricultural machinery is an indispensable good on the farm. Their high prices make it difficult for the Romanian farmer to purchase them, so financing through European funds was a solution for them. By means of measure 4.1. - Investments in agricultural holdings, simple purchases, represented by the purchase of machinery with a financing of up to EUR 500,000 of the eligible value of the project, as well as a non-refundable support of 50% of the total investment.

The purchase of machinery in recent years has been carried out by large farms, small farms relying on the purchase of second-hand machinery and being less aware of the advantages brought by the modernisation of the tractor fleet and agricultural machinery. Also an influential factor in machine purchases is the climatic conditions of recent years that have led to good productions.

In 2016 most projects were contracted under submeasure 4.1. - Investments in agricultural holdings i.e. 144 projects exclusively for the purchase of machinery from total projects. This is due to the mechanisation of agriculture and the awareness of the benefits to both the environment and

the production of high-quality agricultural products. Projects financed in 2016 stand out for mechanical growers and mechanical sowers with the most in number in the period considered 2012-2018, but in terms of load to 100 ha of agricultural land in 2016, are insufficient.

We note that in 2017 and 2018 the number of single procurement projects decreased considerably, due to the fact that construction/assembly projects received a higher selection score, as the applicant's guide favoured investments in greenhouses/ solars (vegetables) taking the face of projects aimed at simple purchases.

Romania shows a positive growth rate in terms of the number of agricultural equipment in the period 2012-2018, effectively illustrating in agricultural activities and guidance for sustainable agriculture and quality.

The future National Strategic Program will have to continue pursuing the financing of the renewal of the fleet of tractors and agricultural equipment, in a context in which the labor force is insufficient in agriculture, and the new models of use make the labor productivity to be high.

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