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COORDINATES OF MECHANICAL PARK AT DOLJ COUNTY LEVEL

Dragoş Mihai MEDELETE, Radu Lucian PÂNZARU

University of Craiova, Faculty of Agriculture and Horticulture, 19 Libertăţii, 200421, Craiova, Romania, Phone: +40 251 416 595/146, Fax: + 40 251 418 475, E-mail: medelete @yahoo.com, rlp1967craiova@yahoo.com

Corresponding author: medelete @yahoo.com

Abstract

Dolj County is an administrative territorial unit representative for the South-West, at least in terms of agricultural production, given its potential (agricultural land and arable land - 585,363 and 488, 715 ha). In this context, it is interesting to realize an overview of what it means agricultural equipment of Dolj with major mechanical components of the park (tractors, tractor plows, seeders and combine aerial) over the period 2011-2013. Unfortunately the work could not also capture the qualitative aspects of the mechanical park side, given that many of the machines are outdated. In this situation there is a need to modernize the mechanical park, operation down menus difficult to de-capitalization conditions of the greater part of farmers. Attracting European funds constitutes a viable alternative for only a part of manufacturers, unfortunately, those with favorable financial conditions. This paper seeks to anchor Dolj County, in terms of endowment with mechanical, in regional and national context.

Keywords**:** *combine, field load per machine, plow, seeder, tractor*

INTRODUCTION

The substantiation of the economic optimization solutions obtained in agriculture must take account of objective existing situations, paying a special attention to the technological structure.

Technological structure of agriculture is expressed by farmers' access to the intensification factors referring to: the means of mechanization (tractors, machinery, equipment, facilities and equipment for mechanization of various work processes), biological means also chemical means.

The means of mechanization have a direct and indirect labor productivity growth through working on the optimal time and quality (compared with simple manual means) and represent a production factor of economic growth.

Quantifying the endowment level of a territory or an enterprise is achieved by analyzing the following indicators:

a. structure of the tractors and agricultural machinery. Direct factors influencing the level and structure of the tractors and agricultural machines are: crop structure and the area occupied by each crop; each crop technology (optimal period of works, the possible mechanization of agricultural operations etc.); production and distance to be transported; types of existing manufacturing equipment; mechanization cost per hectare with different types of aggregates.

b. degree of equipping with agriculture machinery needed for the works at the right time has the following values: tractors 58%; combine harvesting crops 94%, plows 49%, seeders 80%.

This poor endowment determines the failure of operations at the optimum level and consequently reducing agricultural production with values ranging from 15% and 80% depending on the work and culture.

c. the useful agricultural area per tractor. From this point of view the Romanian agriculture comes on the last position in the hierarchy of the European countries. [3]

For the farms, mechanically fixed capital has the highest share of total fixed capital, having a decisive role in the economic transfer of technologies in crop production and animal husbandry.

The general indicators, influencing factors and economic efficiency of the Tractors Park and agricultural machinery, are: total production value units for a conventional tractor and physically; average annual yield

per the tractor, plowing hectares, normal hours of actual use.

The factors affecting the economic efficiency of mechanization are: construction and operating skills for tractors, agricultural machinery, facilities and parts; framing the optimal operating limits for the mechanical means; professionalism of exploitation; price of mechanical means - tractors, agricultural machinery, installations; the price of fuel, lubricants and spare parts.

The efficiency of the tractors and agricultural machinery depends on the following factors: provision of effective technical means; rational use of technical means. [1]

Tractors and machinery for agriculture are elements of fixed capital used in seasonal agricultural production, which leads to a higher aspect for the investments recovery period and accelerating obsolescence of these fixed capital items compared to the situation recorded in other sectors.

Physical wear of tractors and agricultural machinery is determined by their use in production, their contact with the chemical and atmospheric factors, this phenomenon being accentuated in some situations, and deviations that may occur to the sequence of periodic repairs included in the technical books. Technical obsolescence occurs as a result of the development of technical progress, as highlighted by the appearance of tractors and agricultural machinery with high throughput with lower specific consumption but with superior functional and technical characteristics. [2]

MATERIALS AND METHODS

The work was based online documentation, using information provided by Department of Statistics, Dolj County. The collected data were processed using the comparison method (in time and space) and dynamical range of the analyzed indicators: number of tractors, plows, seeders, combines, charge per equipment.

RESULTS AND DISCUSSIONS

Table 1 shows the details of Dolj County Mechanical Park, indicating the share at regional level.

The tractor Park ranged from 7,409 pieces in 2009 and 2011 to 7,491 pieces in 2010, the average in the analyzed period was 7,436 pieces as shown in Fig. 1. At regional level, the county share was 31.36% in 2011, 32.14% in 2010, 32.77% in 2009 and 32.08% for average period.

Table 1. Dolj County, Mechanical Park - regional positioning

Nr.	Specification	2009		2010		2011		Average	
		Buc.*	% from regional level**	Buc.*	% from regional level**	Buc.*	% from regional level**	Buc. **	% from regional level**
1	Physical Tractors	7,409	32.77	7,491	32.14	7,409	31.36	7,436	32.08
2	Plows	6,288	33.55	6,247	32.75	6,288	31.38	6,274	32.53
3	Mechanical seeders	4,332	38.58	4,305	37.76	4,332	37.22	4,323	37.84
4	Combine harvesters	1,777	40.65	1,770	40.86	1,777	39.97	1,775	40.50

*http://www.dolj.insse.ro/cmsdolj/rw/pages/j51_ParcTract.ro.do
** own calculations

The number of plows varied between 6,247 in 2010 and 6,288 pieces in 2009 and 2011, and the average for the whole period was 6,274 pieces (Fig.1). At the regional level, the Dolj County had variable weights (from 31.38% in 2011 to 33.55% in 2009), while for average period share was 32.53%.

The total number of mechanical seeders ranged between 4,305 pieces in 2010 to 4,332 pieces in the years 2009 and 2011, the average for the whole period being 4,323 pieces (Fig. 1).

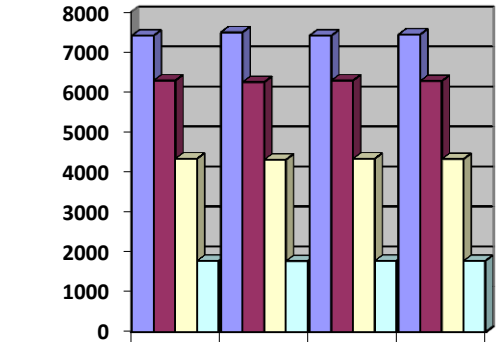
The county has contributed to the regional park of mechanical seeders with weights

varying between 37.22 % and 38.58% respectively in the years 2011 and 2009, the average weight being 37.84%.

When referring to the combine park, it was found a regional average of 1,775 pieces, the annual average values ranging between 1,770 in the year 2010 and 1,777 in 2009 and 2011 (Fig. 1). Based on the levels of this indicator, the Dolj County registered at regional level the following weights 39.97 %, 40.50 %, 40.65 % and, respectively, 40.86% for the average period 2009 and 2010.

The evolution of the components of the mecahnical park belonging to Dolj County in the period 2009-2011 is presented in Table 1.

Also, this table reflects the regional positioning of the Dolj County in terms of the share of its mechanical component.



	2009	2010	2011	Aver.
Tractors	7409	7491	7409	7436
Plows	6288	6247	6288	6274
Seeders	4332	4305	4332	4323
Harvesters	1777	1770	1777	1775

Fig.1. Dolj County - Mechanical Park means - pcs.

Aspects concerning the dynamic components of Mechanical Park are presented in Table 2.

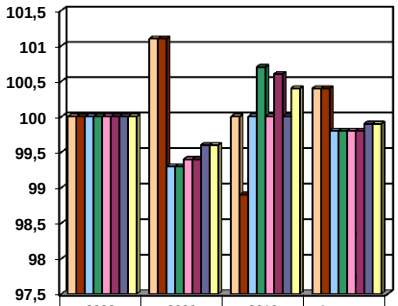
The Park of tractors is characterized by a fluctuating dynamics, regarding all the types of components - subunitary values (98.9% in 2011 compared to 2010), equi-unitary for 2009 and 2011 (indices with fixed base) above for 2010 (+ 1.1% compared to the first term of the series dynamic) as shown in Fig. 2.

The dynamics of the total number of plows is one uneven reporting bases being exceeded only by mobile base indicators for 2011 (+ 0.7% compared with the previous term of dynamic series), equi-unitary values is specific for the same year, besides the first term of the dynamical series, otherwise there are subunit levels indices (99.3% in 2010 and 99.8% respectively for the period average) as shown in Fig.2.

Regarding the way of evolution for the total number of mechanical seeders, we find lowering pointer with 0.6% in 2010 compared to 2009, then in 2011 the values are the same as in 2009 and higher than in 2010 (100.0 and 100.6% respectively for the indices with fixed and mobile bases). The dynamics of the indices is dominated by supra-unitary values for components, except for those with mobile base for the period average, 98.7%. The average of the period is characterized by subunit indices, decreasing by 0.2% compared to bases, as mentioned in Fig. 2.

The combine harvesters are characterized by a sinuous evolution, in terms of numbers.

The indicator decreased by 0.4% in 2010 compared to the first term of the dynamical series, and in 2011 it was a recovery (+ 0.4% over the previous term of the dynamic series), and the average was 0.1% lower than the terms of reference (2009 and 2011), Fig. 2.



	2008	2009	2010	Average
Tractors Ibf	100	101,1	100	100,4
Tractors Ibm	100	101,1	98,9	100,4
Plows Ibf	100	99,3	100	99,8
Plows Ibm	100	99,3	100,7	99,8
Seeders Ibf	100	99,4	100	99,8
Seeders Ibm	100	99,4	100,6	99,8
Harvesters Ibf	100	99,6	100	99,9
Harvesters Ibm	100	99,6	100,4	99,9

Fig.2. Dolj County Mechanical Park – dynamic indices

The load per machine (Table 3) has taken into account the components of county mechanical park and areas of arable farmland specific to Dolj County as follows: agricultural land: 585,469 ha, 585,451 ha and 585,169 ha in 2009, 2010 and 2011; arable land: 488,820 ha, 488,805 ha and 488,520 ha respectively in the years 2009, 2010 and 2011.

The load per tractor, in terms of agricultural land, ranged from 78.2 ha in 2010 to 79.0 ha in case of the years 2009 and 2011.

Table 2. Dolj County, mechanical park - dynamicl indices with fixed and variable base * -

Nr.	Specification	2009		2010		2011		Average	
		I_{bf}	I_{bm}	I_{bf}	I_{bm}	I_{bf}	I_{bm}	I_{bf}	I_{bm}
1	Physical Tractors	100	100	101.1	101.1	100.0	98.9	100.4	100.4
2	Plows	100	100	99.3	99.3	100.0	100.7	99.8	99.8
3	Mechanical seeders	100	100	99.4	99.4	100.0	100.6	99.8	99.8
4	Combine harvesters	100	100	99.6	99.6	100.0	100.4	99.9	99.9

* own calculations

Table 3. Dolj County, the charge per mechanical mean *

Nr.	Specification	2009		2010		2011		Average	
		Buc.	Ha./ Pcs. **	Buc.	Ha./ Pcs. **	Buc.	Ha./ Pcs. **	Buc.	Ha./ Pcs. **
1	Physical Tractors	7,409	79.0/ 66.0	7,491	78.2/ 65.3	7,409	79.0/ 65.9	7,436	78.7/ 65.7
2	Plows	6,288	93.1	6,247	93.7	6,288	93.1	6,274	93.3
3	Mechanical seeders	4,332	135.1	4,305	136.0	4,332	135.1	4,323	135.4
4	Combine harvesters	1,777	275.1	1,770	276.2	1,777	274.9	1,775	275.3

* own calculations
** The first value shows the load of farmland, the second value shows the load of arable land per tractor

Under these conditions, the average indicator was 78.7 ha/ machine (Fig. 3).
In terms of agricultural area per the tractor, there is an average of 65.7 ha, a situation which is based on sequential levels of 65.3, 65.9 and 66.0 ha for the years 2010, 2011 and 2009 (Fig . 3).
The load per plow ranged between 93.1 ha in 2009 and 2011 to 93.7 ha - 2010.
Under these circumstances, the average indicator was 93.3 ha / machine (Fig. 4).
The load per seed drill ranged from 135.1 ha for the years 2009 and 2011 to 136 ha in 2010. Under these circumstances, the average indicator was 135.4 ha / machine (Fig. 5).

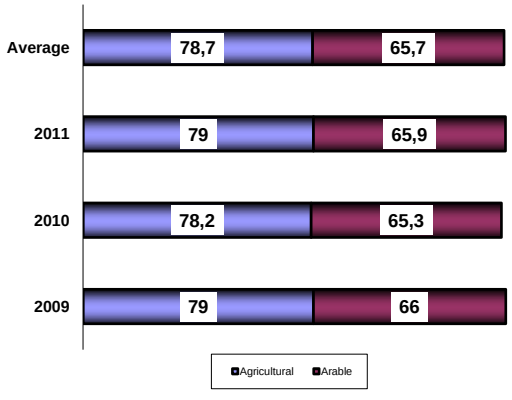


Fig.3. Dolj County, the average load per tractor (ha)

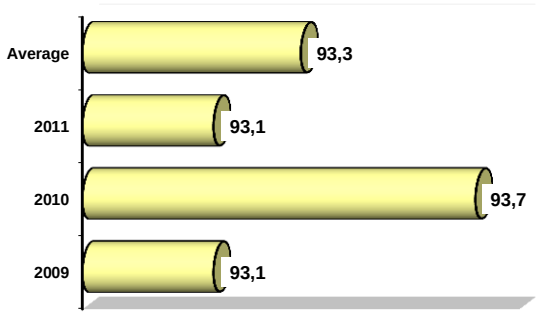


Fig.4. Dolj County, average load per plow (ha)

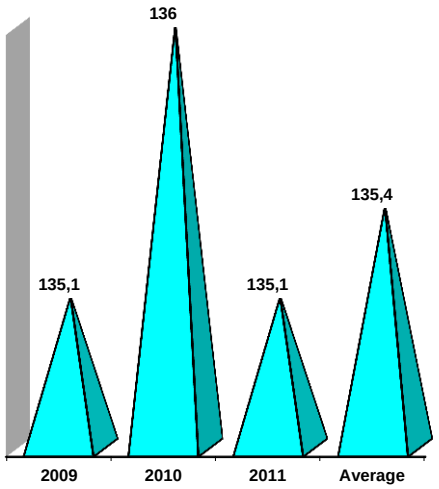


Fig.5. Dolj County, average load per seed drill (ha)

The load per combine harvester ranged from 274.9 to 276.2 ha in 2011 - 2010. Under these conditions (275.1 ha / machine in 2009), the average of the indicator was 275.3 ha / machine as shown in Fig. 6.

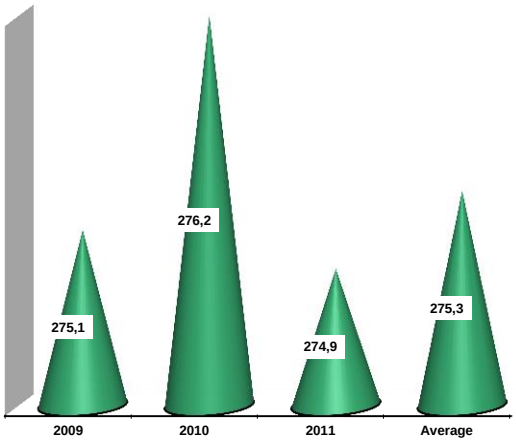


Fig.6. Dolj County, the average load per harvester combine (ha)

CONCLUSIONS

The research work based on the empirical data regarding the dynamics of the Mechanical Park of the Doj County allowed to draw several conclusions

The mechanically park of the Dolj County represented in average - 32.08%, 32.53%, 37.84 %, and 40.50% of the total number of tractors, plows, seeders and combine existing at regional level, a benefic aspect for a representative county.

However, it is noteworthy the declining share of the county, at regional level, from a year to another (from 2009 to 2011), except the combines harvesting where in 2010 it was noticed an increased share of 0.21%. Successive annual declines were found as follows: 0.63 % and 0.78% for tractors, 0.80 and 1.37% for plows, 0.82 and 0.54% for the planters, 0.89% in 2011 for combines.

The dynamics of mechanical park is one uneven the year 2010 being characterized by decreases in machinery (except tractors - + 1.1%), while in 2011 it reached the same level as in 2009, no exception.

The farmland load per tractor reached 78.7 ha, by 1.1 ha more than at regional level (0.8 and 0.8 ha in 2010 and 2011).

The arable land per tractor was 65.7 ha, by 12.2 ha more than at the regional level (0.7 and 0.6 ha in 2010 and 2011).

The load of land per plow averaged 93.3 ha, being an identical figure with the one recorded at the regional level (0.6 and 0.6 ha for the years 2010 and 2011).

Regarding the land per seed drill, it was found an average of 135.4 ha, by 22.2 ha less compared with the regional figure (+0.9 and -0.9 ha in 2010 and 2011).

For harvesters, the average load was 275.3 ha, which represented a decrease of 7.8 ha of the indicator compared to the regional level (+1.1 and -1.3 ha for 2011 compared to previous terms of dynamic series as well as for other cases).

From this perspective, it is worth to note the need to develop the mechanical park, especially regarding tractors, and eliminate, if possible, the obsolete machinery.

In this regard, it is worth to mention the efforts made by a number of manufacturers to access EU funds by various support measures in order to modernize the mechanical park.

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