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EFFICIENCY OF AGRICULTURAL MECHANISM MANAGEMENT WITH ADDITIONAL ENGAGEMENT IN AGRICULTURAL FARMS IN THE REPUBLIC OF SERBIA

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Abstract: Increasing the effectiveness of agricultural machinery management can be done in several ways.

In this paper, author highlight the importance of using agricultural mechanization through additional engagement, and that in the largest and most numerous forms of agricultural production organization in the Republic of Serbia, more precisely within agricultural holdings. In the work, five types of agricultural mechanization were observed, in such a way that they were additionally engaged within the scope of the expansion of the basic activity of agricultural farms, within the framework of the development of rural tourism. The main conclusion reached by the authors of the study is that there is a strong influence of the effectiveness of the use of agricultural machinery, which is additionally used to perform work on agricultural farms. This was confirmed after the analysis carried out on the basis of the obtained samples of N=132, where a comparison was made of two forms of use of agricultural mechanization, i.e. standard use in 52 farms with a new form of use, in 80 agricultural farms, i.e. in agricultural farms that used the same agricultural mechanization for business needs, so-called rural tourism.

The views were strengthened based on the obtained results of the comparison of the mentioned two forms of use of agricultural mechanization ($p<.05$) and indicate the importance of additional use of agricultural mechanization in the overall operation of agricultural farms.

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Key words: *Agricultural economy, business efficiency, agricultural mechanization.*

INTRODUCTION

Business decision-making is the focus of numerous researches, which emphasize the importance of making valid management decisions in entities that operate on a realistic basis [1-3].

Management and decision-making processes are characteristic at all levels of economic management, and some specificities are also present in the organization of farms [4].

In any case, business decision-making should be aligned with internal control factors in business [5-9]. This harmonization was supported by the application of new software solutions, as well as the application of IAS [10-11].

The soil factor is linked to the organization of agricultural production [12]. In addition, correct and realistic reporting to decision-makers is of particular importance [13-15], which can be seen from the overall changes in socio-economic activities in an economy [16].

MATERIAL AND METHODS

In order to prepare this study, the authors collected data from 132 agricultural farms in the Republic of Serbia. This was done in the period August-September 2023.

The observation was done in such a way that data were processed for 52 agricultural farms that use agricultural machinery on their farms in the classic way, as well as for 80 farms that also used agricultural machinery in other supplementary jobs, especially in areas of application of tourism, i.e. within the framework of rural tourism, in order to increase the income of their agricultural holdings.

Within the framework of the research, five forms of agricultural mechanization were analyzed: motor cultivators, chainsaws, small trailers, agricultural tools, other agricultural mechanization.

After that, classical statistical processing of the obtained data was done. Statistical data processing and analysis were done using the software IBM SPSS (Statistical Package of Social Science) version 25. In the work, the t test of independent samples was applied to examine the difference between groups and regression analysis to predict the total income that is achieved by applying agricultural mechanization.

A level of 0.05 was used for the threshold value of significance.

RESULTS AND DISCUSSIONS

The aim of the research was to determine whether there is a significant difference in the efficiency of using two forms of agricultural mechanization within agricultural farms. This was done using a t test.

The t-test of independent samples was used to examine possible differences in the form of agricultural technology engagement.

The presentation of the obtained results is given in Table 1.

Table 1. Presentation of the differences in relation to the value of individual and total value of individual agricultural machinery in two forms of use, as well as the total income realized in agricultural holdings in the Republic of Serbia

Analyzed factors	Agricultural machinery		t	p
	Classic form of use (N=52)	A new form of use within additional jobs (N=80)		
	Middle value			
Motocultivator	19.97 ± 0.60	24.90 ± 0.90	-36.022	<0.0005*
Chainsaw	30.20 ± 0.73	39.91 ± 0.86	-64.231	<0.0005*
Small trailers	11.52 ± 0.46	14.86 ± 0.81	-28.600	0.089*
Agricultural tools	1.52 ± 0.44	4.30 ± 0.47	-30.371	<0.0005*
Other small agricultural machinery	1.40 ± 0.45	2.31 ± 0.44	-10.589	<0.0005*
Total value of agricultural machinery	59.06 ± 0.60	89.00 ± 3.91	-52.249	<0.0005*
Total income	98.00 ± 1.70	139.95 ± 0.90	-156.728	<0.0005*

Note: Statistical significance at the level of 0.05.

Based on the presentation in Table 1, it can be seen that there is a statistically significant difference in 4 types of agricultural machinery, and that the connection is weak in the application of small trailers. The new form of using agricultural mechanization, i.e. when it is also used to perform additional work on the farm, has a higher value among all the analyzed forms of using agricultural mechanization, but also with their use it is possible to achieve higher total incomes.

In the presentation of the second part of the obtained results, the authors applied multiple linear regression. This was done to examine the formation of total income for the agricultural economy, that is, whether it is possible to predict the ratio of the total value of agricultural machinery in relation to the form of use of agricultural machinery. The regression analysis yielded a coefficient of determination of 0.956, on the basis of which it can be seen that the obtained model describes 95.6% of the total variance.

The total value of agricultural mechanization can be predicted on the basis of total income as a statistically significant model was obtained ($F=1376.95$, $p<0.0005$). Based on the results shown in Table 2, it can be seen that income has a significant impact in relation to the total value of agricultural machinery used on agricultural farms.

Table 2. Individual contribution of independent variables to the prediction of the total value of agricultural machinery for use in agricultural holdings

	Beta	t	p
A constant	-	-3.974	<0.0005*
Total income	-2.980	-4.023	<0.0005*

Note: Statistical significance at the level of 0.05.

CONCLUSION

The results obtained in the study indicate that there is a general conclusion that there is a strong connection between the use of agricultural mechanization and the efficiency of its use in agricultural farms in Republic Serbia.

As a further conclusion, the existence of a strong connection between all analyzed types of agricultural mechanization could be drawn, except for the use of small trailers in use on agricultural farms.

Finally, it should be emphasized the existence of a connection with each of the analyzed types of agricultural machinery in terms of the formation of individual contributions of independent variables in relation to the establishment of a connection between the total value of the engagement of agricultural machinery in agricultural farms and the formation of total income.

Better results were achieved by agricultural farms that used additional agricultural machinery in business because we discovered that there is a statistically significant behavior according to the resulting model where we obtained values ($F=1376.95$, $p<0.0005$).

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EFEKTIVNOST UPRAVLJANJA POLJOPRIVREDNOM MEHANIZACIJOM DODATNIM ANGAŽOVANJEM U POLJOPRIVREDNIM GAZDINSTVIMA U REPUBLICI SRBIJI

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Abstract: Povećanje efektivnosti upravljanja poljoprivrednom mehanizacijom može se ostvariti na više načina. U ovom radu Autor ističe važnost korišćenja poljoprivredne mehanizacije, putem dodatnog angažovanja i to u najvećem i najbrojnijem obliku organizacije poljoprivredne proizvodnje u Republici Srbiji, tačnije u okviru poljoprivrednih gazdinstava. U radu je izvršeno posmatranje pet (5) tipov poljoprivredne mehanizacije i to na način da se ista dodatno angažovala u okviru proširenja osnovne delatnosti poljoprivrednih gazdinstava u okviru razvoja seoskog turizma.

Osnovni zaključak studije do koga je došao Autor je da postoji snažan uticaj efektivnosti korišćenja poljoprivredne mehanizacije koja se dodatno koristi za obavljanje poslova na poljoprivrednim gazdinstvima. To je potvrđeno nakon sprovedene analize na osnovu dobijenih uzoraka od N=132, gde je izvršeno poređenje dva oblika upotrebe poljoprivredne mehanizacije, odnosno standardnog korišćenja kod 52 gazdinstva, sa novim oblikom korišćenja, kod 80 poljoprivrednih gazdinstava, odnosno kod

poljoprivrednih gazdinstava koja su koristila istu poljoprivrednu mehanizaciju za potrebe poslovanja tzv. seoskog turizma.

Stavovi su dobijeni na osnovu dobijenih rezultata poređenja pomenuta dva oblika upotrebe poljoprivredne mehanizacije ($p < .05$) i ukazuju na važnost dodatnog korišćenja poljoprivredne mehanizacije u ukupnom poslovanju poljoprivrednih gazdinstava.

Ključne reči: *Poljoprivredno gazdinstvo, efikasnost poslovanja, poljoprivredna mehanizacija.*

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