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On Some Quantitative Characteristics of Human Resources in Agricultural Enterprises in Slovakia

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Abstract: *Agriculture is one of the important sectors of the Slovak economy, the main goal of which is to provide food and food products for people. Business activities in the agricultural sector are linked to factors such as national culture, relationship to the soil, geographical conditions for growing crops, animal husbandry, and currently also reflect business ambitions. Human resources are a key component of any business, which is also valid for business in the agricultural sector. The main goal of the paper is to find out how selected characteristics of human resources in Slovak agriculture enterprises developed. The focus of the research was on the number of employees and their financial evaluation in conditions of the Slovak Republic in the period 2009-2022. Research data were taken from the database of the Statistical Office of the Slovak Republic. Analysis and synthesis methods were used, while the development of the variable was quantitatively evaluated using trend function modelling.*

1. INTRODUCTION

The structure of business entities changed significantly after 1990 because of privatization. Before 1990, cooperatives and state-owned properties existed in Slovakia within agriculture, but after 1990, new business entities were added, including trading companies, and independent farmers (Bandlerová, 2005). As Rumanovská et al. (2018) stated, in the period 2004-2013 the number of individual farmers decreased in Slovakia. Subsequently, after the economic crisis, the number of individual farmers was increasing in the Slovak regions with optimal conditions for agriculture.

Recruitment is one of the most important human resource management tools in the field of agriculture with reference to the current state of the labour market (Drahotová et al., 2020). Janecka et al. (2019) state that employees and the cost of employees have affected the performance of farms. The primary sector, especially agricultural companies, has long been struggling with labour shortages and demographic trends as well as with the negative age structure of employees (Urbancová & Vrabcová, 2020). The lack of workforce could be solved by immigrants or by automation, robotics, and digitization, which represent massive investments for farmers.

Gulyaeva et al. (2023) focused on research on human resource development in the agricultural economy sector in the digital transformation of agriculture, as changing business conditions lead to human capital becoming a leading and intensive factor in the development of the digital economy. Sadjadi and Fernández (2023) focus on the challenges and opportunities of the digitalization of

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agriculture in Spain. They identify the opportunities that digitalization can bring that will allow professionals in the sector to adapt to this intense change.

Age management is potentially another way of utilising human potential to maintain and enhance the organisation's performance with respect to future demographic trends (Chand & Markova, 2019). Slovak agricultural and forestry organizations are affected by a gender imbalance in the workplace. Women are usually in the positions of white-collar workers; however, it is only 17% of the total number of employees in this job position (Green Report, 2021).

The age of employees in agriculture increases; this also applies to the upper management of farms (Iorga & Dobre, 2018) and the younger generation of farmers is not sufficiently interested in working in the primary sector. Based on the results of Machova et al. (2022), the most popular motivational tools proved to be financial incentives in the form of salary increases or bonuses. The motivation of employees is an essential influence on employee performance. It is not only a psychological aspect, but also an economic one, while both are equal from the point of view of importance (Hitka et al., 2022). Employee motivation affects job performance (from an economic point of view as well as a mental point of view), overall success, and economic development of the entire enterprise (Uka & Prendi, 2021).

2. MATERIAL AND METHODS

The presented article examines the issue of the development of selected quantitative characteristics of human resources in agricultural enterprises in the Slovak Republic, namely:

- Development of the number of employees in the Slovak agriculture,
- Percentage share of employees in the Agriculture, Forestry, and Fishing sectors in the total number of employees in the Slovak Republic,
- Development of the number of employees working under the contract in agriculture,
- Development of wages of employees in agriculture.

The main goal of this paper is to find out how observed characteristics of human resources in the Slovak agriculture sector have developed. The underlying data were drawn from official statistical information of the Slovak Republic for the period 2009-2022 (DATAcube, 2024). The methods of comparison, analysis and synthesis, regression analysis, and estimation using trend functions were used in the study of selected indicators.

3. RESULTS

The primary part of the food vertical is agriculture, which has a crucial link to the food industry. Until 1990, agriculture, in addition to its production function, also fulfilled a significant social function, especially in employment in the Slovak countryside. The situation changed after 1990 when there was a significant decrease in the workforce (employees) in the first years of the transformation of agriculture and later due to mechanization within the framework of subsidy aid. The impact of globalization can be seen in the example of agriculture in Slovakia. The introduction of new technological procedures and the interconnection of processes between countries are leading to changes in the workforce (Širá & Dúbravská, 2020).

As Chrastinová et al. (2019) stated the development of agricultural employment is characterized not only by a significant decrease in employment but also by a proportional change in the professional categories of the workforce. With a general decrease in manual and managerial workers,

the dynamics of the reduction of manual workers was higher than the dynamics of the decrease of managerial and administrative workers. The reduction of the workforce in agriculture is a concomitant phenomenon of the continuous restructuring of the agrarian sector (Buchta, 2013).

The analysed data are from 2009-2022, with the end of the period under review marked by the COVID-19 pandemic. At the beginning of 2022, a pandemic situation persisted in Slovakia, and a state of emergency with limited freedom of movement of residents was in effect until February 23, 2022. By the end of the first half of the year, the situation gradually improved and the transmission of the disease was suppressed. The assumption that the Slovak economy would restart was threatened due to the war in Ukraine. Food prices grew rapidly, contributing significantly to inflation.

The development of employment in agriculture has had a decreasing trend since 2009, from 35,023 people in 2009 to 1,874 in 2022 (Figure 1). The linear trend has a negative slope (k = -1061.5) and coefficient of determination R^2 = 0.97.

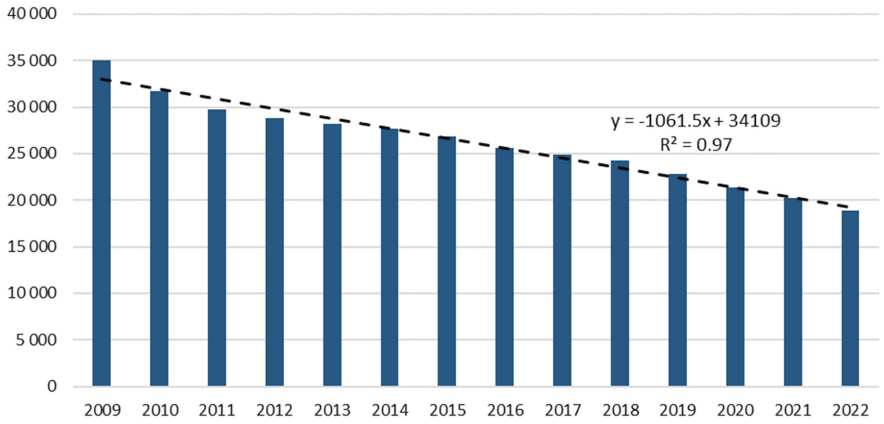

Figure 1. Development of the number of permanent employees in agriculture (total)

Source: DATAcube (2024), Own processing

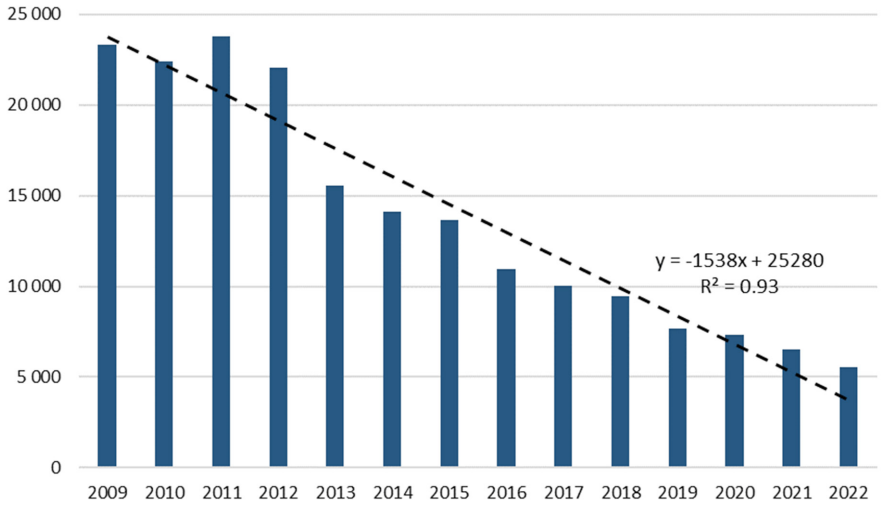

Figure 2. Development of the number of persons working under the contract in agro-enterprises

Source: DATAcube (2024), Own processing

Similar development is presented for persons working under the contract in agro-enterprises (Figure 2). The estimation model is linear with a negative slope (k = -1538) and coefficient of

determination $R^2 = 0.93$. These employees are in the agricultural sector mainly during seasonal work, e.g. during harvest. Some enterprises offer self-harvest when there is a large harvest and a lack of workers, so residents collect products themselves in the fields for minimal prices, e.g. various kinds of fruit.

In Table 1 there are summarized descriptive statistics data about employees in the agro-sector.

Table 1. Descriptive statistics of employees in agriculture

Total permanent employees		*Persons working under contract*	
Mean	26147.64	Mean	13744.71
Standard Error	1204.85	Standard Error	1780.15
Median	26228	Median	12321.5
Standard Deviation	4508.15	Standard Deviation	6660.69
Sample Variance	20323439.02	Sample Variance	44364875.45
Kurtosis	-0.26	Kurtosis	-1.37
Skewness	0.19	Skewness	0.47
Range	16149	Range	18226
Minimum	18874	Minimum	5546
Maximum	35023	Maximum	23772
Sum	366067	Sum	192426
Count	14	Count	14
Confidence Level (95.0%)	2602.93	Confidence Level (95.0%)	3845.77

Source: Own calculations

The development of the number of employees in animal and plant production is displayed in Figure 3. There is an obvious decline in both sectors, but the decline in animal production is much faster. Enterprises with animal breeding gradually stopped production in Slovakia, which was caused by intense competition in prices within the EU and world production.

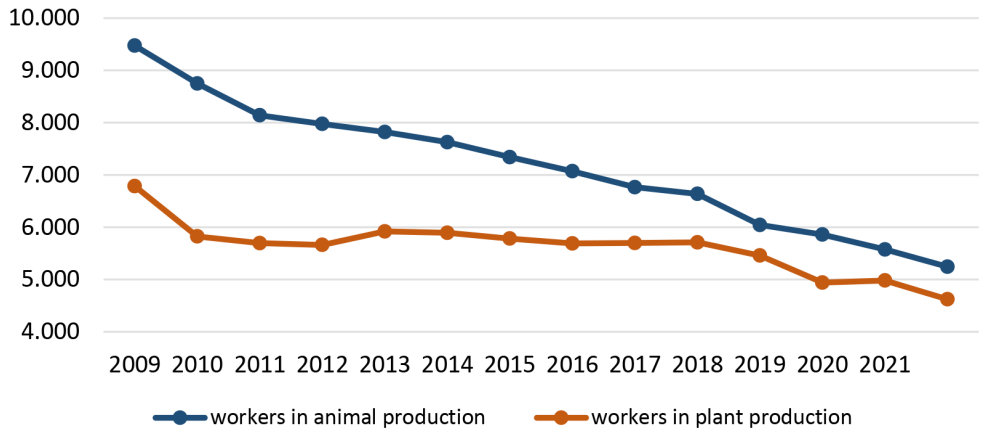

Figure 3. Development of the number of employees in the animal and plant production
Source: DATAcube (2024), Own processing

Changes in the share of employees in the Slovak agricultural sector in the total number of employees (in percentage) are presented in Figure 4. The decrease in the share of employees in the period 2019-2022 was replaced by an increase in the years 2023-2024. The situation reflects the restart of the economy after the global pandemic crisis in 2020-2022.

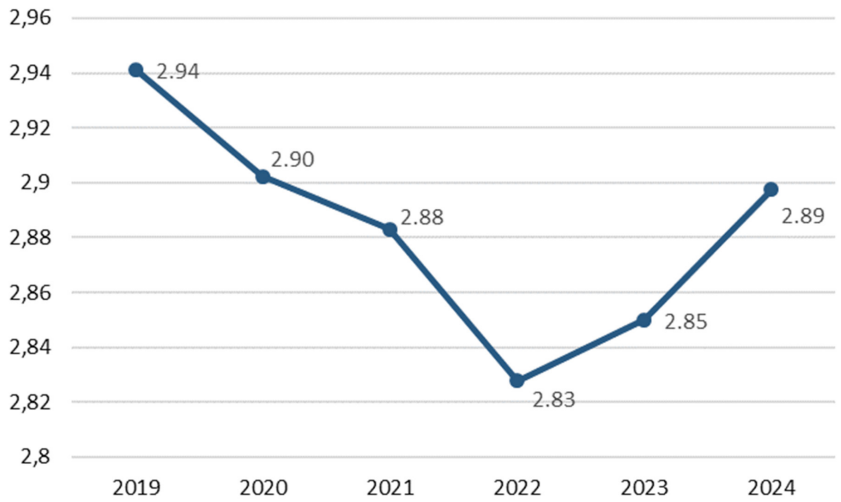

Figure 4. Share of employees in the Slovak agricultural sector in the total number of employees (%)

Source: DATAcube (2024), Own processing

Compared to other sectors of the national economy, the appreciation of the work of employees in agriculture is still lower. Employees in agriculture belong, according to the average monthly wage, to a socially weaker group of employees. Average wages in agriculture have been at the level of 74% of the average wages in the national economy.

The development of the average annual wage in the Slovak agro-sector is presented in Figure 5. Data are approximated by a linear model, which has an increasing trend with a positive slope (k = 549.44) and coefficient of determination $R^2 = 0.96$.). The robotization of agriculture will require educated employees with an adequate financial evaluation of their work.

Faskhutdinova et al. (2020) identified the main problems that hinder the rapid digitalization of agriculture, namely the lack of highly qualified IT specialists in the industry; weak development of digital infrastructure in rural areas; insufficient financial resources for the implementation of modern information and communication technologies in rural areas; high percentage of digital illiteracy in rural areas; etc.

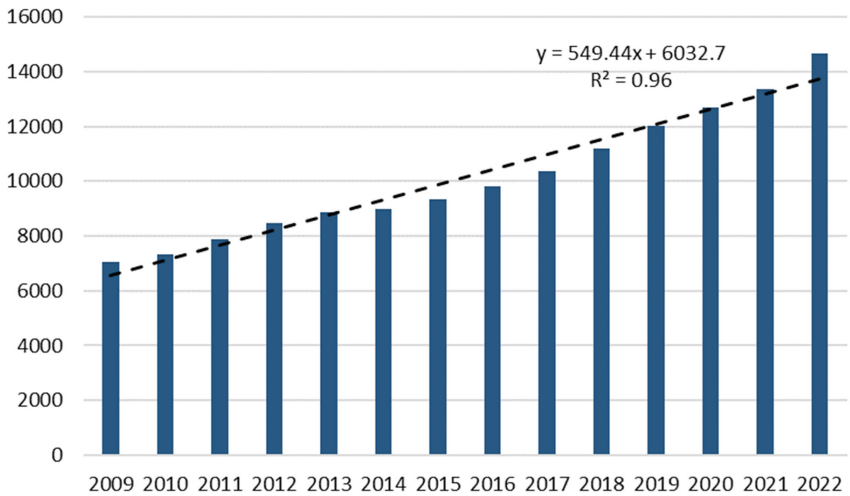

Figure 5. The development of the average annual wage in the Slovak agro-sector

Source: DATAcube (2024), Own processing

Urbancová and Vrabcová (2020) were concerned with identifying the benefits and strategies of human resource management that will help ensure generational change in agricultural enterprises. Vávra et al. (2021) found seven basic motivational factors, i.e. safety at work, fair remuneration, social security, and benefits, work climate, basic rights and freedoms, corporate image, and equal opportunity.

Agriculture and rural development are among the decisive factors in the quality, diversity and environment of Slovakia. The Green Report (2022) contains recommendations aimed at increasing the food security of the Slovak Republic. In the context of the issue addressed, the following recommendations are important:

- stabilize or expand agricultural and food production, thereby supporting employment by expanding local or regional sales of products, local and regional markets,
- increase the volume of support for livestock production and create better conditions for stabilizing livestock populations,
- intensify support for cultivation and processing in the fruit and vegetable sector to expand domestic production and processing to increase employment, and consumption and reduce imports.

4. FUTURE RESEARCH DIRECTIONS

The potential of human resources is also constantly changing and developing, which is the result of various economic effects, common agricultural policy, and globalization tendencies after Slovakia acceded to the EU. Human capital has a direct impact on agricultural productivity, as it influences and determines the procedures and efficient use of inputs to agricultural production.

Agriculture is also affected by changes in the global environment, which must respond (among other things) to climate change. The adverse impact of climate is subsequently reflected in the economic outputs of agriculture. In the agricultural sector, there are current challenges in the areas of management, innovation, and the application of innovative technologies, which will reflect the requirements for low-cost and efficient methods. Technological innovations require educated employees who will be able to implement new methods and use their potential in agriculture.

5. CONCLUSION

In the context of global population growth and climate change, the role of the agricultural sector is becoming even more important. The paper aimed to investigate how selected human resource characteristics in Slovak agriculture enterprises have developed in the period 2009-2022. The development of selected indicators confirmed that the agricultural sector responds sensitively to overall changes in the national economy. The analysis confirmed a long-term decline in the number of workers in the agro-sector, whether in permanent positions or during seasonal work. The share of workers in agriculture fluctuates depending on the overall economic situation in individual sectors of the economy. Manual work requires modern technical equipment for farmers to resolve the lack of interest of the younger generation in this type of work. The financial evaluation of employees in the agro-sector is improving, but it has not yet reached the level of average wages in the national economy.

Analyses and research studies show that the average age of farmers is gradually increasing. Generational change in the agricultural sector can slow down rural depopulation and start the modernization of the agricultural sector. Various forms of support for young farmers and financial

subsidies at the state or EU level are among the factors that can improve the situation in Slovak agriculture. The starting point for the decrease in the number of employees in agriculture is the modernization of farmers' technical equipment, where robots will perform manual work. Qualified employees in the field of robotization and automation will be needed to operate the software in agricultural machines. The above changes would contribute to reducing prices for end consumers.

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