

## ANALYSIS OF THE LABOUR RESOURCES USAGE IN AGRICULTURAL ENTERPRISES OF UKRAINE: A CASE STUDY OF THE VOLYN REGION

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### Abstract

*The article examines the specifics of the use of labor resources in the agricultural sector of Ukraine. The problems associated with ensuring the proper level of efficiency in the use of labor resources at agricultural enterprises of Ukraine have been identified, the demographic aging of the rural population is particularly important. The state of use of labor resources at agricultural enterprises was analyzed using the example of the Volyn region. The dynamics of the specific weight of employees of agricultural enterprises and the dynamics of personnel turnover indicators were determined. An econometric model of the dependence of personnel wages on the efficiency of agricultural production has been developed. The problems of ensuring proper working conditions for the personnel of agricultural enterprises of the Volyn region and the dynamics of compensation payments were considered.*

**Key words:** labor resources, agricultural enterprises, wages, personnel qualifications, working conditions

### INTRODUCTION

The specificity of the current state of economic relations in Ukraine shows that the sphere of agriculture is one of the key branches of the economy and an important source of work for the rural population. At the same time, ensuring the appropriate level of productivity of the labour in the field of agricultural production is an important element of ensuring the effective operation of enterprises in this field. This is due to the fact that labour productivity helps to increase productivity, reduce costs, and generally increase the competitiveness of enterprises. Accordingly, the analysis of the use of labour resources makes it possible to identify problematic aspects that prevent the achievement of optimal efficiency and to form ways of solving them. In addition, in recent years, a dynamic trend towards an increase in the level of competition in the market of agricultural products has been constantly observed. This also puts agrarian enterprises in front of the task of ensuring quality work with employees and requires clarification of

problematic aspects of personnel management, such as insufficient training, low level of work motivation irrational distribution of working time, etc. It is on the basis of such studies that enterprises can develop strategies for solving problems with labour resources.

It should also be noted that currently, in the sphere of agriculture of Ukraine, there is a significant demographic aging of workers. Many agricultural enterprises face the problem of dependence on older workers because the younger generation prefers moving to cities or emigrating. That is why assessment of the effectiveness of the use of the company's employees makes it possible to form approaches regarding the key principles of the personnel turnover management strategy, including the quality of working conditions and the innovative orientation of the business entity. Accordingly, the relevance of the study of the principles of the use of personnel in the sphere of agricultural production in Ukraine is predetermined by the need to identify problematic aspects of staffing in the agricultural sector, which

prevent the achievement of optimal efficiency of economic entities.

Studies of the use of labour resources in agricultural enterprises are disclosed in many works by modern scientists and practitioners. This problem concerns many aspects related to the efficiency of the use of labor resources, including their key importance in the formation of the effectiveness and profitability of agricultural enterprises. The main research is aimed at studying the role of human capital in agricultural enterprises. Scientists have analyzed the impact of education, skills, and professional training of employees on the work efficiency and competitiveness of agricultural enterprises. Issues of effective labour organization and rationalization of the work process in agricultural enterprises are also considered.

The works of such scientists as I. Britchenko [1], M. Dziamulych [2-10], N. Khomiuk [11], A. Marcuta [13], A. Popescu [14-23], M. Rudenko [24], T. Shmatkovska [25-29], R. Sodoma [31-32], I. Tofan [33], I. Tsymbaliuk [34] and many others, who studied the influence of certain factors on labour productivity at agricultural enterprises, including the study of the motivation of workers in the agricultural sector, should be especially noted. Research data shows which factors have the greatest impact on job satisfaction, motivation, and involvement of employees in achieving organizational goals.

## MATERIALS AND METHODS

In the process of carrying out the research, methods of economic and mathematical modelling were used. After the linear regression model  $y = b_0 + b_1x$  was constructed, it was checked for adequacy, that is, whether the constructed model corresponds to the available statistical data.

First, consider the variation (scatter) of the dependent indicator  $y$  with respect to its average value. The deviation is equal to  $y_i - \bar{y}$ . It is possible to write:  $y_i - \hat{y}_i + \hat{y}_i - \bar{y}$ , where  $y_i = b_0 + b_1x$  are calculated values. That is, the variation of the dependent indicator  $Y$  around its average value can be divided into two terms:  $\hat{y}_i - \bar{y}$  – a variation of

the estimated values around the average;  $y_i - \hat{y}_i$  – a variation of calculated values around the actual ones.

We denote:

$\sigma_p^2 = \sum_{i=1}^n (\hat{y}_i - \bar{y})^2$  – the variation explained by the regression with the number of degrees of freedom  $k_1 = 1$ ;

$\sigma_e^2 = \sum_{i=1}^n (\hat{y}_i - y_i)^2$  – residuals, unexplained variance, with the number of degrees of freedom  $k_2 = n - 2$ ;

$\sigma_y^2 = \sum_{i=1}^n (y_i - \bar{y})^2$  – total variation with the number of degrees of freedom  $k_3 = n - 1$  [35].

The coefficient of determination is usually used to analyze the overall quality of the estimated linear regression:

$$R^2 = 1 - \frac{\sigma_e^2}{\sigma_y^2}, \quad 0 \leq R^2 \leq 1$$

The numerator is the sum of squares of deviations of the regression line from the actual values and the denominator – is from the average value. The smaller the deviation of the calculated values from the actual values, the smaller the fraction, and the closer the coefficient of determination value is to 1.

Based on the coefficient of determination, the value of the Fisher's test can be given in the form of the following formula:

$$F_{observ} = \frac{R^2}{1 - R^2} (n - 2)$$

If  $F_{observ} > F_{kr}$ , then the  $H_0$  hypothesis is rejected, which means  $b_1 \neq 0$ ,  $y$  depends on  $x$ , therefore, the model  $y = b_0 + b_1x$  is adequate (with reliability  $(1 - \alpha) \times 100\%$ ).

The method of least squares (LSM) guarantees that the parameters found using it are:

- Not displaced. This means that  $b_0$  and  $b_1$  are random because they are found in the sample, but on average they are as if they were found in the population;
- Effective. MNC ensures rapid convergence of model parameters to exact values that could be calculated from the general population;
- Reasonable. As the sample volume increases, the accuracy of the calculated parameters increases.

Since  $b_0$  and  $b_1$  are random variables, it is necessary to check their statistical significance. This can be done using specially constructed statistics distributed according to the Student's law [35].

## RESULTS AND DISCUSSIONS

The modern problems of providing agricultural enterprises with labour resources require in-depth research related to the aging of the workforce, the problems of attracting young workers to enterprises, and the development of the socio-economic infrastructure of rural areas in order to achieve sustainable development of agriculture in Ukraine. In particular, according to the results of the analysis of Fig. 1, it was established that during the analyzed period there were qualitative changes in the educational and qualification structure of the personnel of agricultural enterprises of the Volyn region.

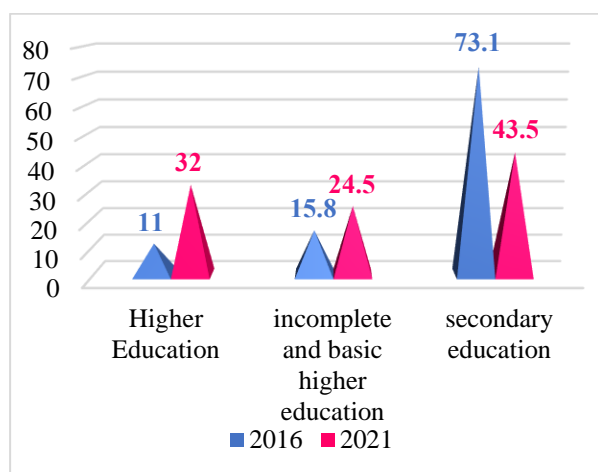


Fig. 1. Comparison of the specific weight of employees of agricultural enterprises of the Volyn region of Ukraine by education in 2016 and 2021

Source: own development based on statistical reports of the [12].

In particular, the specific weight of specialists with higher education has increased significantly, which in 2021 was 32%. This is caused by the general complication of working conditions associated with the introduction of new technologies and new equipment into the activities of agricultural enterprises. As a result, there is a growing need for qualified specialists who are able to service this equipment and practically use the

latest technological solutions. In addition, the development of processing production, which is more technologically complex than the primary processing of agricultural raw materials, because it includes technological processes that require the use of specialized equipment and technologies. In addition, during the same period, a change in the share of personnel with incomplete and primary higher education was recorded. In general, its specific weight increased to 24.5%. The specific weight of employees with secondary education, which dominated among the personnel of agricultural enterprises of the Volyn region, decreased from 73.1% to only 43.5% at the end of the period. Such a trend means that in the agrarian sphere of the region there is a gradual increase in the complexity of work, as a result of which the prerequisites for the use of the latest, more productive technologies are being formed. The future consequence of such changes is an increase in the share of finished products with a higher level of added value, the basis of which is currently the processing enterprises of large agricultural holdings.

Analyzing the change in the dynamics of professional development by employees of agricultural enterprises of the Volyn region of Ukraine (Fig. 2), it can be argued that the growth of the share of personnel who carried out this development directly in production is becoming important.

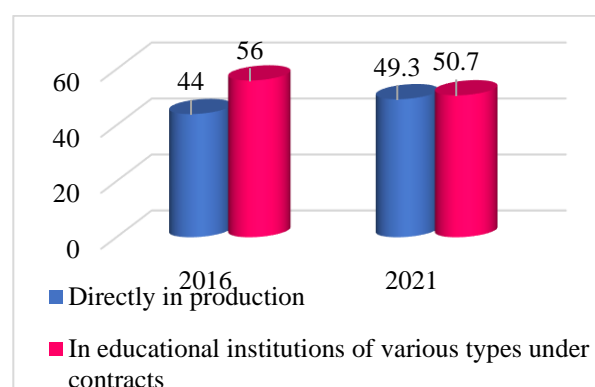


Fig. 2. Comparison of the specific weight of employees of agricultural enterprises of the Volyn region of Ukraine who increased their qualifications in 2016 and 2021

Source: own development based on statistical reports of the [12].

This is due to the need to master new technologies, which during the analyzed period were intensively implemented at agricultural enterprises of the Volyn region, in particular, such as “Volyn-Zerno-Produkt”, “Rat”, POSP named after Shevchenko, “Zakhidnyi Bug” and others. Taking into account the trends regarding the complication of the system of industrial relations at the agricultural enterprises of the region, we come to the conclusion that in the future the share of employees who will be involved in the processes of professional development on the basis of existing productions will increase, as the volume of new equipment that will be put into operation in the agricultural sector of the Volyn region will increase.

Analyzing labor turnover indicators for the analyzed period (Table 1), it can be stated that the general trend in the field of employment in the Volyn region of Ukraine is positive.

Table 1. Dynamics of labor turnover indicators in agricultural enterprises of the Volyn region of Ukraine, 2016-2021.

| Indicators  | For the period since the beginning of the year, persons |        |
|---|---|--------|
|   | 2016  | 2021   |
| The average registered number of full-time employees, persons   | 39,673  | 36,482 |
| Employees, persons are accepted   | 19,888  | 10,201 |
| of them to newly created jobs   | 735   | 3,494  |
| Employees, persons left   | 21,864  | 10,974 |
| among them for the following reasons:<br>changes in the organization of production and work (reorganization, reduction in the number of staff of employees) | 929   | 853    |
| personnel turnover (at one's own will, by agreement of the parties, violation of labor discipline, etc.)  | 20,478  | 9,302  |
| dropped out for other reasons   | 457   | 819    |
| Number of full-time employees at the end of the reporting period, persons   | 35,603  | 35,709 |
| Reception turnover rate   | 0.5   | 0.3    |
| Turnover rate from dismissal  | 0.6   | 0.3    |
| Total turnover ratio  | 1.1   | 0.6    |
| Staff turnover rate   | 0.5   | 0.3    |

Source: systematized, analyzed, and summarized by the authors based on the materials of statistical reports of the [12].

This is due to a significant increase in the number of new jobs - from 735 in 2016 to 3,494 in 2021. A decrease in staff turnover rates at agricultural enterprises was also recorded. In particular, from the table 1 we can see that in 2021 the overall staff turnover rate was 0.3, while in 2016 its value was 0.5.

at the same time, reducing the number of personnel at agricultural enterprises of the Volyn region during this period amounted to only 3.2 thousand people, or 8.1%.

It is important to note that during the analyzed period there was a slight reduction in the number of dismissed employees due to reorganization of production or downsizing. If in 2016 the number of such dismissed employees was 929, then in 2021 – 853. This indicates the stabilization of the employment situation in agricultural enterprises of the Volyn region of Ukraine, which does not require them to make drastic decisions on changing the number of personnel.

The efficiency of agricultural production largely depends on the motivation of employees of agricultural enterprises. This type of dependence was investigated by the method of correlation regression analysis. The result of the action is given as a function of the factors affecting it. Such factors include profit per hectare ( $X_1$ ), production costs per 1 ha ( $X_2$ ), sales revenue per employee ( $X_3$ ), and profitability of agricultural activity ( $X_4$ ). We chose the wage indicator ( $Y$ ) as the effective factor. The model of interdependence of factors was built on the database of agricultural enterprises of the Volyn region for 2021 (Table 2).

Table 2. Parameters of the econometric model of the dependence of wages on the efficiency of agricultural production

| Variable   | Regression equation     | R <sup>2</sup> | F     |      | t     |      |
|--|-------------------------|----------------|-------|------|-------|------|
|  |                         |                | calc. | tab. | calc. | tab. |
| Profitability, %   | $Y_1 = 974.2x + 13,233$ | 0.55           | 27.7  | 4.3  | 5.3   | 1.7  |
| Profit per 1 ha, UAH.                                    | $Y_2 = 0.2x + 18,862$   | 0.51           | 24.2  | 4.3  | 4.9   | 1.7  |
| The volume of gross production per 1 employee, hryvnias. | $Y_3 = 107.6x - 14,325$ | 0.53           | 25.6  | 4.3  | 5     | 1.7  |
| Production costs per 1 ha, UAH.                          | $Y_4 = 0.03x + 18,070$  | 0.52           | 25.2  | 4.3  | 5     | 1.7  |

where:  $R_2$  – coefficient of determination;  $F_{calc.}$  – calculated Fisher's criterion;  $F_{tab.}$  – tabular Fisher criterion;  $t_{calc.}$  – Student's calculation test;  $t_{tab.}$  – Student's tabular test;  $Y$  is salary

Source: calculated based on the materials of statistical reports of the [12].

From the regression equations (Table 2), it was established that with an increase in production costs per 1 hectare, labour wages

increase. When wages are increased, the amount of profit increases, and the profitability of agricultural enterprises increases. A particularly close, directly proportional relationship between wages and gross output per person (labour productivity) was revealed. All calculations of the parameters of the econometric model of the dependence of the efficiency of agricultural production on wages were carried out for agricultural enterprises of the region.

The existence of a dependence between the dynamics of economic efficiency indicators of the enterprise and the motivation of personnel in the field of agricultural production was determined. The wages of this industry in the Volyn region have a tendency to increase with the increase of the main economic indicators. According to the results of our research, the factor that has the greatest impact on labour remuneration has been determined – profit per 1 hectare.

At agricultural enterprises, in addition to the basic salary, bonuses, allowances, and other rewards are paid in accordance with the current legislation. Paying for work is not the only goal of work.

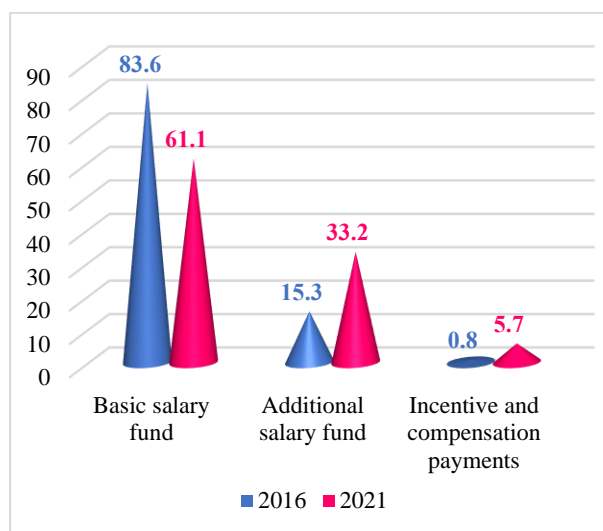


Fig. 3. Composition of the wage fund in agriculture of the Volyn region, 2016-2021, %  
Source: [12].

So, we can see that for the years 2016–2021, as part of the wage fund of the agrarian sector of the Volyn region, the specific weight of the basic salary decreased significantly – by 22.5% (Fig. 3). This is due, on the one hand,

to the aspiration of agricultural producers to transfer production to a higher-quality system of labour payment by introducing progressive forms of it, which is reflected in the growth of the specific weight of the fund of additional labour by 17.9% over the corresponding period. On the other hand, such a change involves the orientation of employees of agricultural enterprises to higher quality work results, which are paid precisely at the expense of the additional salary fund. It is also necessary to note a significant increase in the share of payments for work in harmful conditions, which in 2021 amounted to 5.7%, which is 4.9% more than in 2016. Such a change is caused by an increase in the specific weight of processing industries in the agricultural sector of Ukraine, which is associated with the intensification of the activities of large agricultural companies after the conclusion of the association agreement with the EU and the opening of the European market for Ukrainian agricultural producers. In general, the change in the structure of the wage fund in the agricultural sector indicates qualitative changes in production and the reorientation of Ukrainian enterprises to their own processing of agricultural products, which brings them a significantly higher income compared to the simple export of raw materials.

Estimating the number of personnel of agricultural enterprises of the Volyn region of Ukraine, who worked in improper working conditions in 2021 (Fig. 4), it can be stated that their total number was 14.8 thousand people or 37.4% of all personnel of agrarian enterprises. Such a value is quite critical, as it implies the need for business entities to incur additional costs for payment of labour for work in difficult conditions. At the same time, objectively certain production processes related to agricultural production and processing of raw materials require the presence of such jobs. However, as the practice of developed agricultural production in the countries of Western and Central Europe shows, it should not exceed 10-12% of the total number of employees.

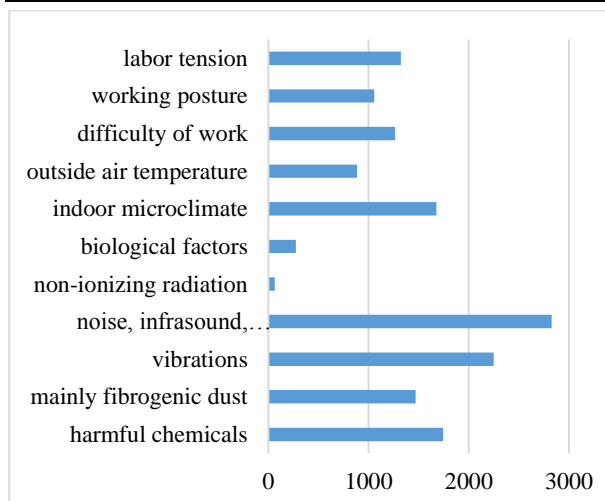


Fig. 4. The number of farm workers in the Volyn region of Ukraine who worked in improper working conditions in 2021

Source: systematized by the authors.

If we evaluate the specific working conditions that are defined as difficult, then in 2016, the largest number of employees worked in negative conditions of noise, infrared, and ultrasound – 2,828 people, as well as in conditions of increased vibration – 2,249 people (Fig. 4).

It is assumed that in the process of updating the production base of agricultural enterprises of the studied region, which is currently being carried out, there will be a general reduction in the number of employees working in harmful working conditions. That is, the quality of the work of the personnel directly depends on the quality of the applied technologies and specific production equipment. On the other hand, the speed of such renewal of production is determined solely by the investment opportunities of enterprises.

In addition, it should be noted that in the existing programs of state support for the agricultural sector in Ukraine, insufficient attention is paid to the analyzed parameter of working conditions, and the main emphasis is on stimulating enterprises to increase the level of wages.

This requires adjustment and selection of the principle of ensuring the appropriate level of labour quality among the priorities in support programs for agricultural producers of Ukraine.

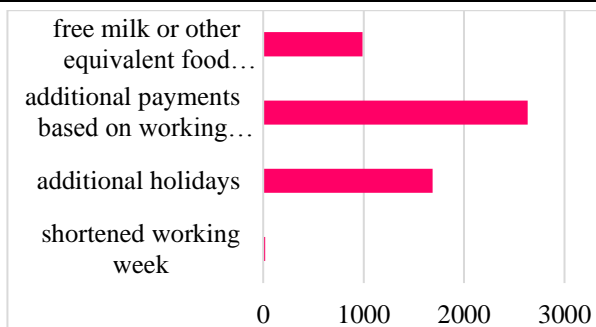


Fig. 5. The number of employees who received benefits and compensation for work with harmful working conditions in agricultural enterprises of the Volyn region of Ukraine in 2021.

Source: systematized by the authors.

If we evaluate the number of personnel of agricultural enterprises of the Volyn region of Ukraine, who received material and monetary compensation for working in harmful conditions (Fig. 5), then it is lower than the total number of people employed in such working conditions and amounted to 5,326 people or 35.9%.

At the same time, the most common form of compensation for working in harmful conditions was additional payments for working in harmful conditions - it was received by 2,633 persons or 49.4%.

Other 1,686 people or 31.7% were entitled to additional leave as compensation. 988 people received milk or other equivalent food products as material compensation.

Only 19 people (0.36%) of the total number of those who received benefits for working in harmful conditions had the right to a reduced working week.

Improving the system of compensation for work in difficult working conditions is a problematic aspect, since, on the one hand, it is determined by legislation, and on the other hand, few enterprises agree to voluntary additional payment for work in harmful conditions [30].

However, in the context of the need to adapt the labour legislation of Ukraine to the EU norms in connection with the acquisition of the status of a candidate country for joining the European Union, the future necessity of changes in this area is foreseen.

## CONCLUSIONS

According to the results of the study, it was found that the level of remuneration of employees of agricultural enterprises in the Volyn region of Ukraine is low compared to other branches of production and service. This leads to high labour mobility, a decrease in employment in the industry, insufficient motivation, and a decrease in the effective use of labour resources. Thanks to regulated labour mobility, the personnel composition of employees of the Volyn region of Ukraine is being updated: hiring more qualified and dismissing violators of labour discipline, etc. However, several negative factors affect the economic development of the agricultural enterprises of the region: an increase in costs, a slowdown in the work process, a decrease in the efficiency of the use of labour resources, and basic economic indicators.

With the help of a questionnaire survey, a score assessment of the importance of intangible labour motives in agricultural enterprises of the Volyn region was carried out. At the same time, respondents gave the greatest importance to such specific elements of work motivation as continuous seniority, interest in work results, availability of responsibility for work results, and the possibility of professional training.

In addition, in the process of research of the study of the state of working conditions, it was established that a large number of employees of agricultural enterprises in the studied region of Ukraine work in inappropriate working conditions. Noise, vibrations, harmful chemicals, microclimate in the room, etc. interfere with the work the most, which requires the development of a whole system of special measures at the legislative level and their successful practical implementation.

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