LABOUR COST IN RELATION TO FARM SIZE, MOTIVATION AND EMPLOYEE PROFILE

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Abstract

Current and future demographic, geopolitical and environmental challenges have led to research focused on analysing the cost of labour in agriculture in relation to farm size, motivation and employee profile. TwoStep Cluster analysis formed: Cluster 1 - average emotional motivation of 1.1 points and financial motivation of 3.6 points formed by employees with work experience between 0 – 20 years (frq. – frequency 69.8%), farms under 500,000 SO (frq. 72.3%). Cluster 2 (24.4%) average emotional motivation of 2.8 points and financial motivation of 2.1 points: employees with experience over 40 years (frq. 97.2%), women (frq. 44.2%) and SE Development Region (frq. 58.1%). Cluster 3 (33.9%) average emotional motivation of 3.6 points and financial motivation of 1.2 points: with experience between 3 – 40 years (frq. 63.2%), financial benefits 2 – 4 euro/hour (frq. 94.3%), farms over 750,000 SO (frq. 43.4%), male (frq. 51.1). The average level of net financial benefits is 4.8 euro/hour from 2.0 euro/hour for unqualified employees to 10.3 euro/hour for highly qualified employees; from 4.7euro/hour in farms of sizes between 100,000 SO – 250,000 SO to 6.5 euro/hour in farms under 100,000 SO. Gender shows a difference of 9.1%. The average level of emotional motivation is 1.9 points and increases from 1.5 points for 0 – 10 years of experience to 2.7 points for experience over 40 years; from 1.9 points in farms between 100,000 SO – 250,000 SO to 2.4 points in farms over 750,000 SO. Gender differentiates women from men by 7.0%. Pearson analysis of motivations – employee characteristics indicates a strong and significant inverse correlation between emotional motivations and financial benefits. The inflection point is at 28 years of experience and 4.9 euro/hour. The results suggest the need for managers to recognize employees emotional motivations and manage them dynamically and individually.

Key words: labour cost, employee motivations, financial motivations, emotional motivations, employee profile

INTRODUCTION

With unprecedented climate change, meeting future food demand will have to be achieved through sustainable intensification of agriculture: improved resistance to pathogens and reduced use of water, fertilisers, labour and fuels [10]. Shiferaw B. and other contributors consider that the size of the labour cost resulting in many of the research studies suggests a low level of technology, especially on small farms, which reduces the possibility of applying science-based management. As farm size increases, labour costs decrease and the incidence of science-based management increases [6]. Research among rural households in China shows that a 1% increase in farm size is associated with an almost 1% increase in agricultural labour productivity [13]. In response to rising labour costs, some farmers outsource some energy-intensive farm work such as harvesting. These are taken over by specialised agricultural service providers who travel around the country. Through such measures, small farmers can remain viable in agricultural production [15]. Labour productivity is one of the partial indicators of agricultural productivity, but it is still at the forefront in theory and practice. Labour output seems to be the most important driver of economic performance growth in agriculture even

though information, technology and scientific research are the current economic trends [2].
Work productivity can be improved by introducing a reliable system for evaluating and motivating employees [14]. According to the value of production and gross value added of agriculture in Romania in the period 2011 – 2020 was lower than in other EU member states. The key factors of its growth are: farm structure and size, labour force, technical equipment and investments [9]. Emotionally and intellectually motivated employees feel a strong commitment to the employing organization. The problem of motivation is today a challenge for modern managers as a continuous and variable process that requires an individualized approach [4]. Practices to improve employee motivation and opportunities are linked to financial results both directly and indirectly by influencing human capital [5]. The results of research conducted by Ouakuak, M.L. shows that motivations with ethical and emotional character affect performance at the workplace and intentions to quit [7].

The aim of the research presented in this article was to analyse the cost of labour in agriculture in relation to farm size, motivation and employee profile.

MATERIALS AND METHODS

The research objectives involved conducting an online survey using a questionnaire with 9 questions. The questions in the questionnaire are targeted at: age, work experience, gender, region of development, skill level, name of employing farm, financial benefits, financial motivations and emotional motivations. The questions had fill-in-the-blank item responses, one-item text response selection items, and multiple responses. Likert scales with 1 - 5 points (1 - min., 5 - max.) were used to determine the intensity with which motivations are perceived. The order of the questions was determined according to progressive difficulty. The platform used to develop and distribute the questionnaires was Google Forms (https://www.google.com). The collection of responses was conducted in the last quarter of 2021, online, from subjects in

the North-East Development Region of Romania. 254 questionnaires were obtained at a response rate of 72%. Sampling of the population in the NE and SE development regions was carried out using the Neyman method, 5% deviation criterion and 95% confidence level. Computer applications such as Microsoft Office, IBM SPSS Statistics 23 (Kolmogorov-Smirnov test, t-test) were used to process the data. Validation of the questionnaire results was carried out with Exploratory Factor Analysis (EFA) in SPSS to explain the covariation in the set of measured variables and to identify common factors that determine the structure and order of these variables [11, 12]. TwoStep Cluster Analysis in SPSS was used for preliminary data analysis. It performs natural clustering from a data set that is not otherwise highlighted. This clustering was based on categorical variables: age, work experience, gender, region of development, size of employing farm, skill level and financial benefits and continuous variables: financial motivations and emotional motivations. The size of the employing farm was determined by correlating the response on the name of the employing farm with the values in the sample farm dataset by size. In order to make it possible to analyse these employee characteristics, the variables age (0 - 20 years; 21 - 40 years; 41 - 60 years; over 60 years), work experience (0 - 10 years; 11 - 20 years; 21 - 30 years; 31 - 40 years; over 40 years), size of employing farm (under 100,000 SO; 100,000 SO - 250,000 SO; 250,000 SO - 500,000 SO; 500,000 SO - 750,000 SO; over 750,000 SO) and financial benefits (0 - 2.0 euro/hour; 2.1 - 4.0 euro/hour; 4.1 - 6.0 euro/hour; 6.1 - 8.0 euro/hour; over 8.0 euro/hour). The number of clusters was determined automatically and the database produced from the questionnaire was analysed. The application used a probability distance measure which is based on the assumption that the variables in the modelled clusters are independent [1]. The results obtained made it possible to establish criteria according to which the statistical analysis of the initial variables could be carried out.

RESULTS AND DISCUSSIONS

In the preliminary phase of the research, the use of TwoStep Cluster analysis tools on the characteristics resulting from the questionnaire (Fig. 1) led to the construction of three clusters with good form quality (0.62) and with the main predictors of importance: work experience, financial benefits, size of employing farms, gender and region of development.

Cluster 1 (41.7%) had an average emotional motivation of 1.1 points and financial motivation of 3.6 points. It consisted of employees with work experience between 0 - 20 years (frq. - frequency 69.8%), financial benefits 0 - 2.0 euro/hour (frq. 13.9%), size of employing farms below 500,000 SO (frq. 72.3%), gender male (frq. 45.3%) and development region South-East (frq. 69.7%).

Cluster 2 (24.4%) had an average emotional motivation of 2.8 points and financial motivation of 2.1 points. It consisted of employees with work experience over 40 years (frq. 97.2%), financial benefits 4 - 6 euro/hour (frq. 19.3%), size of employing farms 500,000 – 750,000 SO (frq. 38.7%), gender female (frq. 44.2%) and development region SE (frq. 58.1%).

Fig.1. Clustering of employees by main characteristics - results Cluster
Source Analysis: Own calculation.

Cluster 3 (33.9%) had an average emotional motivation of 3.6 points and financial motivation of 1.2 points. It consisted of employees with 3 - 40 years of work experience (frq. 63.2%), financial benefits 2 - 4 euro/hour (frq. 94.3%), size of employing farms over 750,000 SO (frq. 43.4%), gender

male (frq. 51.1) and development region SE (frq. 60.4%).

The average level of net financial benefits by agricultural work experience (Fig. 2) is 4.8 euro/hour and increases from 4.3 euro/hour for employees with 0 - 10 years experience to 11.7 euro/hour for employees with more than 40 years experience.
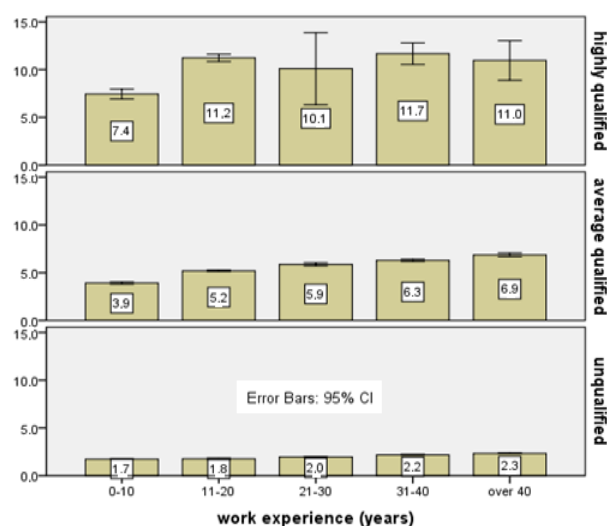

Fig. 2. Level of net financial benefits - average values (euro/hour) according to agricultural professional experience (years) and qualification level
Source: Own calculation.

Employees with experience of 0 - 10 years earn financial benefits that are 9.7% lower than the sample average and employees with experience over 31 years earn financial benefits that are 40.3% higher than the sample average. The average level of net financial benefits by skill level ranges from 2.0 euro/hour for unqualified employees to 10.3 euro/hour for highly qualified employees. In practice, highly qualified employees earn 114.2% more than the sample average and unqualified employees 58.3% less than the sample average. It is notable that there is some capping of financial benefits in two stages, from 11 - 20 years experience to 21 - 30 years experience and from 31 - 40 years experience to over 40 years experience. This phenomenon can also be put down to the decreasing marginal utility perceived by employees in the evolution of benefits but also to the insufficient capacity of management to capitalise on the marginal competence and experience of employees.

Employees can offer productivity gains that are not sufficiently used by farm management unless they are very obvious: the two thresholds of 11 and 31 years of experience.
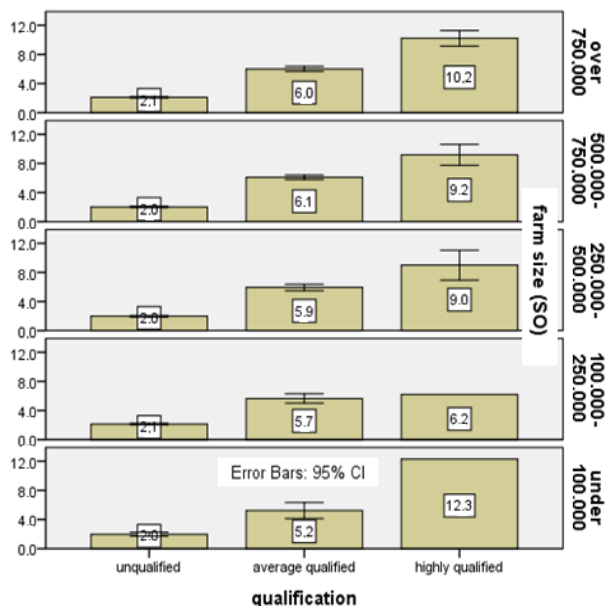

Fig. 3. Level of net financial benefits - average values (euro/hour) by economic size of the employing farm (SO) and skill level
Source: Own calculation.

All this against the background that labour migration is stimulated by the level of agricultural wages in Romania which are the lowest in the EU. The labour market is unbalanced, emigration to Western and Central Europe continues to be very high and poverty is a widespread phenomenon in many parts of the country [8].

Net financial benefits by economic size of the employing farm (Fig. 3) range from 4.7 euro/hour recorded in farms between 100,000 SO - 250,000 SO to 6.5 euro/hour benefit obtained in farms under 100,000 SO. These results are surprising as small farms are found to provide higher financial benefits than all other size categories. This phenomenon can be attributed to the additional benefits provided to highly qualified employees who also play an important role in farm management. Basically, employees with higher qualifications can perform several fractions of functions and receive cumulative benefits. Net financial benefits by skill level range from 2.0 euro/hour for unqualified employees to 9.4 euro/hour for highly

qualified employees. Unqualified employees obtain significantly similar financial benefits regardless of farm size. In contrast, in the other categories financial benefits increase with farm size with the exception shown above: medium qualified employees on farms over 750,000 SO receive benefits with 15.4% higher than those on farms under 100,000 SO and highly qualified employees on farms over 750,000 SO receive 64.5% higher net benefits than on farms between 100,000 SO - 250,000 SO.

The development region has an average impact on financial benefits of 9.2% in favour of the SE development region (Fig. 4).
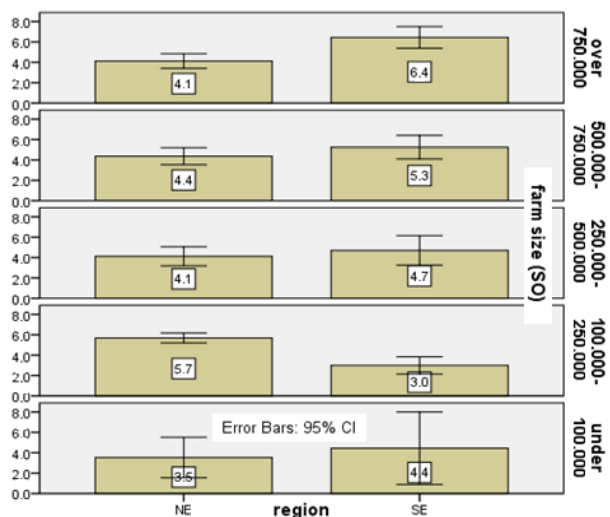

Fig. 4. Level of net financial benefits - average values (euro/hour) by economic size of the employing farm (SO) and development region
Source: Own calculation.

However, the lowest values are recorded by employees on farms in the same region with a size of 100,000 SO - 250,000 SO (31.0% lower than the average for farms in this size category).

There is also a significant gap in the financial benefits obtained by employees on farms over 750,000 SO in the SE, which are 56.1% higher than in the NE region. We believe that these are influenced by the labour pressure in the area which has higher incomes than in the northern half of the country.

The gender of employees shows a 9.1% difference between women and men (Fig. 5). Females on farms over 750,000 SO obtain benefits of 29.2% higher than the sample average and males on farms between 100,000

SO - 250,000 SO obtain financial benefits of 33.3% lower than the sample average. We believe that these differences are due to the fact that men reach the financial motivation plateau at lower values.

The intensity with which emotional motivations are perceived was determined in correlation with financial motivations. The average level of emotional motivations by work experience in agriculture (Fig. 6) is 1.9 points and increases from 1.5 points for employees with 0 - 10 years experience to 2.7 points for employees with more than 40 years experience. Employees with more than 40 years of experience perceive emotional motivations 43.9% more acutely than the sample average and employees with less than 10 years of experience are determined by emotional motivations 22.8% less than the sample average.
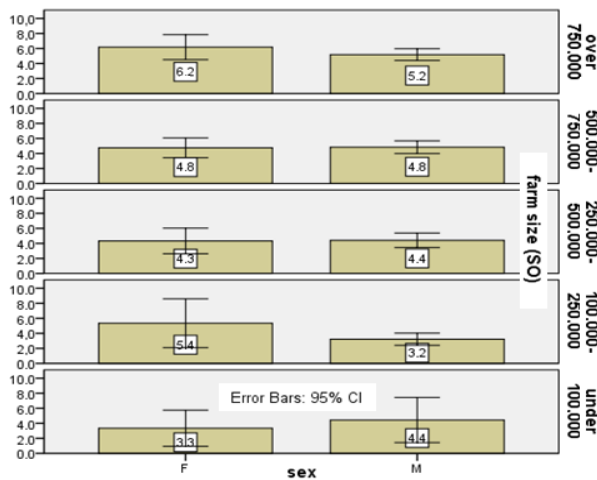

Fig. 5. Level of net financial benefits - average values (euro/hour) by gender of subjects and economic size of employing farm (SO)
Source: Own calculation.

The weakest emotional motivations are found in unqualified employees with less than 10 years of experience (68.4% more) and the strongest emotional motivations are found in highly qualified employees with more than 31 years of experience (105.3% more). The high variability in the perception of this type of motivation is justified by the complementarity with financial motivations. Emotional motivations are more intense the more financial motivations are attenuated by the satisfaction given by financial benefits.

The average level of emotional motivation by skill level ranges from 0.9 points for unqualified employees to 3.4 points for highly qualified employees. Basically, highly qualified employees perceive emotional motivation 78.9% more strongly than the sample average and unqualified employees 50.5% less than the sample average.
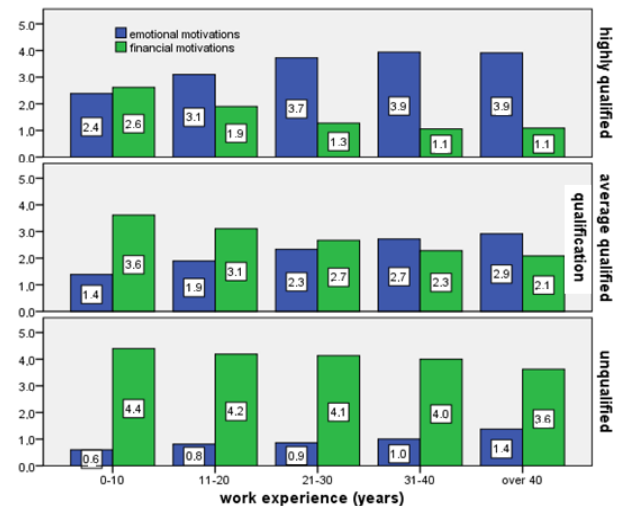

Fig. 6. Level of motivation - average values (points: 1-min., 5 max.) according to professional experience and qualification level
Source: Own calculation.

The level of emotional motivations according to the economic size of the employing farm (Fig. 7) varies from 1.9 points recorded in farms of 100,000 SO - 250,000 SO to 2.4 points value obtained in farms of over 750,000 SO.

The intensity of emotional motivation by qualification level ranges from 0.9 points for unqualified employees to 3.4 points for highly qualified employees.

A maximum level of 136.8% higher than the sample average is observed for highly qualified employees in farms under 100,000 SO, which can be attributed to the more personal relationships in small economic entities. Also, the lowest values of emotional motivations are found for unqualified employees in farms between 100,000 SO - 250,000 SO and 250,000 SO - 500,000 SO where the intensity with which these motivations are felt is 57.9% respectively 52.6% lower than the sample average. We justify these values by the dissatisfaction offered by financial benefits.
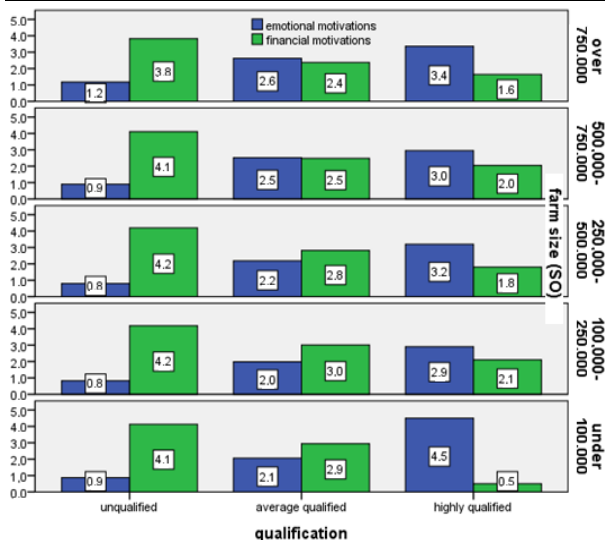
Fig. 7. Level of motivation - average values (points: 1-min., 5 max.) by size of employing farm (SO) and level of qualification
Source: Own calculation.

It shows a maximum level of 136.8% higher than the sample average for highly qualified employees in farms under 100,000 SO due to more personal relationships in small economic entities. Also, the lowest values of emotional motivations are found for unqualified employees in farms between 100,000 SO - 250,000 SO and 250,000 SO - 500,000 SO where the intensity with which these motivations are felt is 57.9% respectively 52.6% lower than the sample average. We justify these values by the dissatisfaction offered by financial benefits.

This segment of the population provides low productivity, inconsistent financial rewards and no room for other motivations. These considerations are also reflected in the results of other research which shows that the population employed in agriculture is ageing and has a low level of education. Also, 96.4% of people employed in agriculture have only practical experience [3].

The development region has a medium impact on emotional motivation with 7.5% in favour of the NE development region (Fig. 8). The lowest values are recorded by employees in farms of size 100,000 SO - 250,000 SO in the SE region.

There is also a significant gap in the perceived emotional motivations of employees in farms of size 100,000 SO - 250,000 SO in the NE,

which are 140.0% higher than those in the SE region.

We consider that some of these farms are family businesses employing relatives and their attachment to the farm is higher than others.

Medium and large farms in the NE region have mostly been consolidated through joint ventures, with performance-based hiring and financial motivations taking precedence over emotional ones.
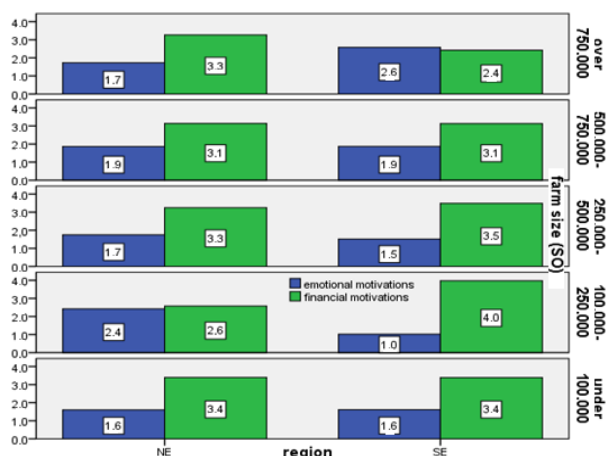

Fig. 8. Level of motivation - average values (points: 1-min., 5 max.) by size of employing farm (SO) and development region
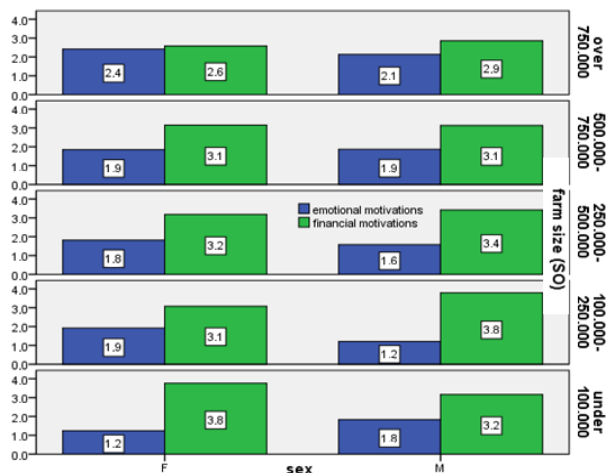Source: Own calculation.

Fig. 9. Level of motivation - mean values (points: 1-min., 5 max.) by size of the employing farm (SO) and gender of the subjects
Source: Own calculation.

Gender of employees shows a 7.0% gender gap in favour of women.

Women on farms over 750,000 SO feel emotional motivations 26.3% more strongly than the sample average and men on farms

between 100,000 SO - 250,000 SO feel these motivations 36.8% less than the sample average.

The same lower level is recorded for women in farms under 100,000 SO justified by the lower level of financial benefits they obtain in these farms.

Pearson correlation analysis between motivations and employee characteristics (Table 1) indicates a weak non-significant relationship between employee age and financial motivations but a statistically significant one for emotional motivations.

Table 1. Employee motivations and characteristics - mean values, standard deviations and multiple correlations

	Mean	Std Dev	Financial motivations	Emotional motivations
1. Age (years)	45.1	0.94	-0.16	.34**
2. work experience (years)	27.1	0.94	0.42	.82**
3. Net benefits (euro / hour)	4.8	0.92	-.78**	.64**
4. Firm size (SO)	228,451	0.96	0.27	0.31
5. Financial motivations	3.1	0.97	-.68**	-
6. Emotional motivations	1.9	0.92	-	-.68**

Financial motivations and emotional motivations 1-5, **Correlation is significant at the .01 level (2-tailed). N=254,
Source: Own calculation.

In contrast, work experience shows strong and significant correlations for emotional motivations but not statistically significant for financial benefits. The increase in net financial benefits leads to a strong reduction in financial motivations and, to a lesser extent, an increase in emotional motivations (by 21.9%). The inflection point at which the significant reduction in average financial motivations occurs is at 34 years of experience and 5.3 euro/hour (2.4 euro/hour for unqualified employees, 3.4 euro/hour for medium qualified employees and 5.8 euro/hour for highly qualified employees). For emotional motivations, the inflection point is at 28 years of experience and 4.9 euro/hour (2.8 euro/hour for unqualified employees, 3.7 euro/hour for medium qualified employees and 5.2 euro/hour for highly qualified employees).

Farm size does not provide statistically assured information on the relationship with the two types of motivation. The relationship between financial and emotional motivations are perceived by the subjects as strongly complementary, are statistically assured but also suggest the presence of other types of motivations that they did not find in the questionnaires. Consequently, the limitations of the research lie in the too cumulative nature of the two types of motivations which does not ensure a complete relevance of the employees motivation system. Future research could use a more detailed motivation system that would allow subjects to quantify their own perceptions more rigorously.

However, the results obtained are useful for farm management in agriculture because they provide benchmarks of importance and content of motivations. Managers can use these benchmarks to increase work productivity and employee quality of life.

CONCLUSIONS

The capping of financial benefits is probably driven by the phenomenon of diminishing marginal utility perceived by employees and the insufficient ability of management to leverage the marginal competence and experience of employees. In practice, productivity gains are missed and not sufficiently used by farm management. The gap in financial benefits obtained by employees in the SE and NE Development Regions is driven by labour pressure and higher average income levels in the South than in the North. The high variability in the perception of emotional motivations is partly explained by the complementarity with financial motivations. Unskilled employees on small and inexperienced farms perceive the dominance of financial motivations and are less sensitive to emotional motivations due to dissatisfaction induced by financial benefits.

The gap in the intensity of emotional motivations perceived by employees in the NE Development Region compared to those in the SE Region is due to the type of entrepreneurship, employees attachment to the farm, the mode of capital formation and the

priority recruitment criteria for employers. Employees with above-average work experience, qualifications and net financial benefits perceive emotional motivations more acutely due to higher levels of satisfaction with other motivations and different perspectives on the relationship between personal fulfilment and professional fulfilment.

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REFERENCES

[1]Bacher, J., 2000, A Probabilistic Clustering Model for Variables of Mixed Type. Quality & Quantity, 34, 223–235.
[2]Bohackova, I., Mach, J., Smutka, L., Rezbova, H., 2015, Labour productivity in agriculture - value known or unknown? Agrarian perspectives XXIV: Global agribusiness and the rural economy, Book Series Agrarian Perspectives Series, Pp. 4-72.
[3]Caratus Stanciu, M., 2020, The main characteristics of agriculture and rural development in the central region of Romania. Scientific Papers-Series Management Economic Engineering in Agriculture and Rural Development, Vol. 20(4), 131-138.
[4]Gavric, G., Cukanovic Karavidic, M., Pesic, D., 2020, Employee motivation and cultural influence. International Review, Issue 1-2, Pp. 82-87.
[5]Jiang, K.F., Lepak, D.P., Hu, J., Baer, JC., 2012, How does human resource management influence organizational outcomes? A meta-analytic investigation of mediating mechanisms. Academy of management journal, Vol. 55(6), 1264-1294.
[6]Ju, X.T., Gu, B.J., Wu, Y.Y., Galloway, J.N., 2016, Reducing China's fertilizer use by increasing farm. Global environmental change-human and policy dimensions, Vol. 41, Pp. 26-32.
[7]Ouakouak, M.L., Zaitouni, M.G., Arya, B., 2020, Ethical leadership, emotional leadership, and quitting intentions in public organizations Does employee motivation play a role? Leadership & Organization Development Journal, Vol. 41(2), 257-279.
[8]Petre, I.D., 2019, The dynamics of the number of employees, average monthly salary, income per household and pensions in Romania and the South Muntenia Region. Scientific Papers-Series Management Economic Engineering in Agriculture and Rural Development, Vol. 19(2), 335-343.
[9]Popescu, A., Tindeche, C., Marcuta, A., Marcuta, L., Hontus, A., 2021, Labor productivity in Romania's agriculture in the period 2011-2020 and its forecast for 2021-2025 horizon. Scientific Papers-Series Management Economic Engineering in Agriculture and Rural Development, Vol. 21(3), 673-678.
[10]Shiferaw, B., Smale, M., Braun, H.J., Duveiller, E., Reynolds, M., Muricho, G., 2013, Crops that feed the world 10. Past successes and future challenges to the role played by wheat in global food security. Food Security, Vol. 5(3), 291-317.
[11]Tucker, L. R., MacCallum, R. C., 1997, Exploratory factor analysis. https://labs.dgsom.ucla.edu/hays/files/view/docs/factor.pdf, Accessed on Feb. 5, 2022.
[12]Watkins, M.W., 2018, Exploratory Factor Analysis: A Guide to Best Practice. Journal Of Black Psychology, 44, 3, 219-246.
[13]Wu, Y.Y., Xi, X.C., Tang, X., Luo, D.M., Gu, B.J., Lam, S.K., Vitousek, P.M., Chen, D.L., 2018, Policy distortions, farm size, and the overuse of agricultural chemicals in China. Proceedings of the National Academy of Sciences of the United States of America, Vol. 115(27), 7010-7015.
[14]Yakubiv, V., Poliuk, M., 2019, Innovative methodologies for estimating the personnel of agricultural enterprises in Ukraine. Scientific Papers-Series Management Economic Engineering in Agriculture and Rural Development, Vol. 19(1), 617-624.
[15]Zhang, X.B., Yang, J., Thomas, R., 2017, Mechanization outsourcing clusters and division of labor in Chinese agriculture. China Economic Review, Vol. 43, Pp. 184-195.