

STRESS AND THE FARMER'S PROFILE: DEMOGRAPHIC AND STRUCTURAL DIVIDES

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Abstract: This study aimed to examine how stressors experienced by farmers varied depending on demographic and structural factors to identify the most vulnerable farmer groups. Such data are essential for developing agricultural policy proposals aimed at strengthening the psychosocial well-being of farmers. The study was conducted in Lithuania, a region in Central and Eastern Europe with a specific historical, social and economic context. The data were collected in 2024 from 288 farmers using the Farmers' Stressors Inventory and processed employing descriptive statistical methods. Uncertainty about the future, financial worries and pressure from agricultural legislation were found to be the greatest stressors for farmers. Depending on groups, factors causing stress (hereafter referred to as stressors) differed significantly: older farmers were more likely to experience physical isolation, younger farmers were more likely to experience financial pressure, longer farming seniority was associated with greater stress related to legislation, and medium-sized farms distinguished themselves by higher stress related to labor intensity, administrative burden, and social conflicts. The results show how stressors can vary even in the context of one country, depending on the social portraits of farmers, and highlight the need to differentiate psychosocial support strategies. The results can be integrated into comparative international studies and enable the development of empirically-based locally sensitive agricultural policies.

Keywords: Agricultural Policy, Agricultural Health, Central and Eastern Europe, Farm Size, Farmers, Stress, Farmers' Stressors Inventory

Highlights

- The most significant stressors were uncertainty about the future, financial worries, and regulatory pressure.
 - Stressors' intensity varied by age, farming experience, and farm size, revealing vulnerable subgroups.
 - Medium-sized farms experienced higher stress related to workload, bureaucracy, and social tensions.
 - Results highlight the need for tailored psychosocial support and locally sensitive agricultural policy.
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1. Introduction

Across the world, economic and environmental factors are a major source of stress experienced by farmers (Jahangiri et al., 2020; Proctor & Hopkins, 2023; Singh et al., 2020). In addition to these unavoidable factors, farmers experience work-life balance problems (Proctor & Hopkins, 2023), fatigue and sleep deprivation (Olowogbon et al., 2019), the feeling of social exclusion and societal misunderstanding (Garrett-Wright et al., 2023; Proctor & Hopkins, 2023). Various studies show that stress is a significant problem for farmers, which has a strong negative effect on their mental and physical well-being, agricultural productivity, overall quality of life, and can contribute to suicide (Booth & Lloyd, 2000; Liang et al., 2021). Although interest in the problem is growing and various methods to reduce stress are proposed, detailed studies are still lacking (Adam et al., 2024; Díaz Llobet et al., 2023; Jones-Bitton et al., 2019).

Research into the factors related to farmers' stress helps to develop targeted and long-term policy measures that contribute to farmers' well-being and help maintain farm stability and viability. However, a number of methodological and applicability challenges to achieve this goal are encountered. For example, Arora et al. (2020) have found that most surveys emphasize financial and workload stressors but underestimate social isolation or conflicts with family members. This may result in an insufficiently accurate picture of stress experienced by farmers.

In addition to the limitations related to stressor lists in questionnaires, in different countries, stress among farmers manifests itself differently. For example, in Ireland, occupational stressors have been found to depend on farm type and farmer demographics, with older farmers experiencing higher levels of stress (Brennan et al., 2022). Meanwhile, studies in the US have shown that younger farmers are most stressed, especially due to financial problems, time pressure and relationships with employees (Rudolphi et al., 2020). The conflicting results increasingly emphasize the necessity to conduct in-depth analysis of farmers' well-being, taking into account demographic factors (Knook et al., 2024). In this context, more clarity is also needed when examining structural (e.g., farm size) variables, since research results differ; e.g., Henning-Smith et al. (2022) and Kureshi & Somsundaram (2018).

On the other hand, a relevant problem of limited possibilities to apply research results to different countries or regions emerges. Truchot and Andela (2018) highlighted that although stress among farmers was an important public health issue, commonly used measurement instruments were developed long ago and in a different context. For example, stressor scales developed in Western countries allow comparisons of farmer stress across countries but may not be sufficiently adapted to specific farming conditions.

Specific historically determined socio-economic conditions are characteristic to the agricultural context of Central and Eastern European countries. For example, Czekaj et al. (2020) found that farmers in Poland and Latvia are characterized by greater distrust and unwillingness to collaborate. In addition, farmers in these regions face specific stressors, including aging, limited farm succession prospects, and the decline of family farms (Kurlavičius et al., 2024). It is also necessary to take into account that although Central and Eastern European countries have similar agrarian structures, their farming challenges differ depending on political reforms, the scale of the economy and the current situation (Borychowski et al., 2020). All this shows that the explored region is not homogeneous; therefore, knowledge of the situation in every country is a prerequisite in order to understand how different structural and social factors shape farmers' daily experiences and experienced stress.

Therefore, this study conducted in the context of Lithuanian agriculture aims to explore how demographic and structural agricultural factors are related to stressors experienced by farmers in order to identify the most vulnerable groups of farmers. With this aim in mind, the study will seek to answer the following questions:

- Q1. What are the most significant stressors experienced by Lithuanian farmers?
- Q2. How do Lithuanian farmers' demographic characteristics (age, farming seniority) pertain to the stressors they experience?
- Q3. How are Lithuanian farmers' structural factors (farm size, farm land area) related to the stressors they experience?
- Q4. How do stressors vary across farmer groups?

This study is based on a conceptual framework that links farmers' demographic (age, experience) and structural (farm size, farm land area) characteristics with the stressors they experience (Fig. 1).

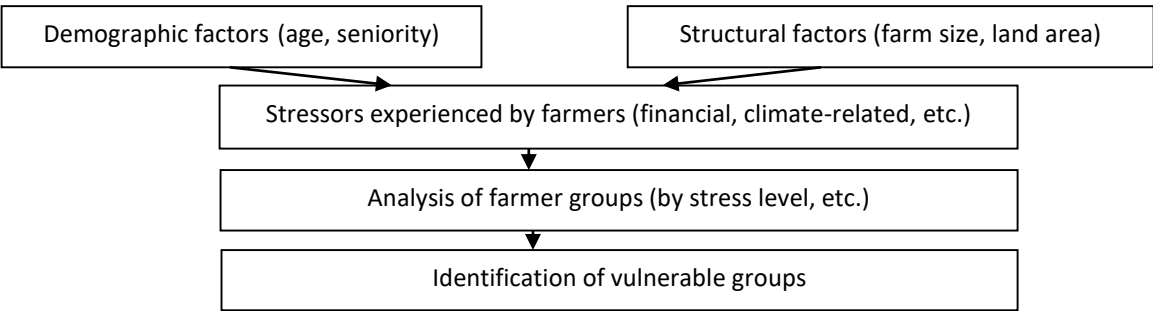


Fig 1. Conceptual framework of the study. Source: own research

The analysis of different stress-related factors and their relationships is aimed at identifying specific groups of farmers with higher levels of stress. This approach allows to systematically study the sources of stress and provides insights into the most vulnerable participants in the sector. The insights arising from the research findings can contribute to the development of more efficient support strategies and policy measures to enhance farmers' resilience and well-being.

2. Conceptual Framework

Stressors. According to Schuler (1980), stress is a dynamic condition in which an individual is: (a) confronted with an opportunity for being, having, or doing what (s)he desires, and/or (b) confronted with a constraint on being, having, or doing what (s)he desires, and/or (c) confronted with a demand on being, having, or doing what (s)he desires, the resolution of which is perceived as uncertain but will lead to important outcomes. Stressors are understood as certain inconveniences or "hassles" that people experience in their daily lives, such as work deadlines, disagreements with others, financial difficulties, etc. (Koffer et al., 2016). Based on previous research (Lunner Kolstrup et al., 2013), farmers encounter multifaceted stressors, among which high workload, lack of time, bureaucratic requirements, economic uncertainty, and social difficulties in family or work relationships stand out. Over time, these factors contribute to psychological distress, depression and even suicide risk, although for some farmers, work also provides a sense of meaningfulness and control, which may act as a protective factor.

Although reactions to stressors depend on the person's individual qualities, which interact with each other and with situational factors (Ha & Diehl, 2010), the nature and variety of stressors also depend on the field of professional activity (O'Shaughnessy et al., 2022). For example, compared to other activities, farming is associated with higher levels of general burnout, exhaustion, and cynicism (O'Shaughnessy et al., 2022). In addition, it is highly important that professional activities are usually associated with specific stressors. Koffer et al. (2016) have pointed out that a low variety of stressors, when the same stressors are repeated over a long period of time, may mean chronic stressors that cause long-term psychological discomfort.

Stressors experienced by farmers. Farmers' stressors can be divided into episodic and chronic (or permanent). Thompson et al. (2023) indicated that episodic stressors are related to technical failures, adverse weather and diseases. These are stressors that have a clear beginning and end. Accordingly, Arora et al. (2020) accentuated that some stressors such as market fluctuations and high healthcare costs cause long-term anxiety and psychological discomfort for farmers (Arora et al., 2020). In other words, these are uncertainty-related (difficult to predict) or long-lasting negative factors causing prolonged stress. Some of these (e.g., socio-economic stressors, climate change, etc.) may form a complex network of stressors that affect farmers differently (Berry et al., 2011; Hagen et al., 2019; Rose et al., 2023).

Although episodic stressors may be easier to identify, Thompson et al. (2023) maintained that when caring for farmers' health, it is necessary to pay more attention to chronic stressors. Research shows that prolonged negative factors with signs of permanence can cause stress, which contributes to depression and other mental health problems (Fletcher et al., 2023). Furthermore, Srung (2021) found that long-lasting stress negatively affects not only farmers' individual well-being but also the dynamics of family relationships.

Demographic stress-causing factors. Farmers may respond differently to stressors depending on their age or farming experience (Grocke-Dewey et al., 2023; Rudolphi et al., 2024). For example, a study by Rudolphi et al. (2024) demonstrated that men experienced more stress related to environmental and economic conditions while women tended to experience slightly more stress due to geographic isolation. Another study found that younger farmers, unlike older ones, experienced greater stress related to workload and lack of time, situation in the market or government actions (Nichols & Davis, 2024). In general, it is assumed that older people more positively accept various situations (Grocke-Dewey et al., 2023).

Structural stress-causing factors. Stress experienced by farmers is often related to structural factors such as farm size and the land area that farmers manage. Henning-Smith et al. (2022) argued that large farms may be more vulnerable to climate phenomena, especially if they do not have diversified crops. In addition, a larger number of employees increases responsibility and can cause additional stress.

Meanwhile, Kureshi & Somsundaram (2018) found that persons managing smaller farms are more likely to experience stress due to climate change and financial challenges, especially if they lack resources to adapt.

A study by Liang et al. (2023) shows that farmers managing large areas (>1000 acres; i.e., 400 hectares) experienced less perceived stress because they have better financial and organisational means to cope with challenges. Larger farms are more likely to participate in educational programmes, they collaborate with cooperatives and use technical assistance. Furthermore, Etwire et al. (2022) noted that such farms are more prepared to respond to climate change due to the possibility to apply advanced technologies. This suggests that farm size can act both as a risk factor for stress and as a protective factor, depending on contextual conditions.

Social ecological theory can explain interrelations of different stressors experienced by farmers. The theory is based on the view that human behavior and well-being are determined by factors at several interacting levels: individual, interpersonal, organizational, community factors and factors of a broader socio-political environment. This approach therefore allows us to examine interrelated structural and cultural contexts, which shape the person's responses, behaviors, and coping strategies (Cumming, 2014; Golden & Earp, 2012; Hashemi et al., 2021; Stokols, 1996). As Hashemi et al. (2021) highlighted, farmers' responses are strongly influenced by systemic circumstances, such as agricultural policy, environmental, economic, and other factors.

Features of Lithuanian agriculture. According to the Ministry of Agriculture of the Republic of Lithuania (2024), the average farm size by agricultural land area was 31.5 hectares. The largest number of farms were from 5 to 10 ha in size (about 27%); the smallest, from 30 to 50 ha (about 6%). Meanwhile, about 72% of all agricultural land was managed by farms larger than 50 ha.

Lithuania, which has been a member of the European Union since 2004, has a mid-latitude continental climate. The prevailing soils are fertile loamy and clay soils, the most important crops grown are cereals (wheat, barley, rye), potatoes, rapeseed, sugar beet, vegetables and fruits). Legumes and fodder crops are also popular; dairy and beef cattle, pigs, sheep and poultry are raised (Kurlavičius et al., 2024).

3. Research Data and Methods

Questionnaires were distributed to farmers through the Chamber of Agriculture of the Republic of Lithuania and its regional branches, which cover the entire country. A total of 600 questionnaires were sent out, which corresponds to the number of contacts in the Chamber of Agriculture database. A total of 288 completed questionnaires were returned; thus, the response rate reached 48%. The characteristics of the study sample are presented in Table 1.

"Farm size" was measured in Economic Size Units (ESU), which reflect the economic capacity of the farm based on the EU Standard Output methodology, while "farm land area" reflects the size of managed land in hectares. Thus, although these indicators are related, they reflect different structural aspects of farming (e.g., a large area of managed land does not necessarily reflect high economic capacity). This study should be considered a pilot investigation. The survey does not claim to be statistically representative of the entire Lithuanian farmer population; rather, it provides insights into how stressors vary by demographic and structural profiles. This approach allows to identify important patterns and potential directions for further, more exhaustive large-scale research.

Tab 1. Characteristics of the study sample. Source: own research and calculations

Variable	Category	N	%
Age	21–30 years	11	3.8
	31–40 years	65	22.6
	41–50 years	65	22.6
	51–60 years	95	32.9
	Over 60 years	52	18.1
Farming seniority	1–10 years	88	30.6
	11–20 years	82	28.4
	21–30 years	80	27.8
	31–40 years or more	38	13.2
Farm size	Up to 8 ESU* (small farm)	132	45.8
	8–20 ESU (medium farm)	94	32.7
	Over 20 ESU (large farm)	62	21.5
Farm land area (ha)	Up to 10	68	23.6
	11–25	61	21.2
	26–100	77	26.7
	101–500	69	24.0
	Over 500	13	4.5

To conduct the survey, the Farmers Stressors Inventory developed by Truchot and Andela (2018) was used. This instrument was specifically designed to evaluate stressors experienced during farming and has shown good validity and reliability. The instrument consists of 37 items, divided into eight aspects of farmers' occupational stressors: workload and lack of time, uncertainty about the future and the financial market, pressure from agricultural legislation, physical isolation, financial anxiety, conflicts with co-workers or family members, farm succession in the family, and unpredictable interference with farm work. These aspects were identified by performing exploratory and confirmatory factor analyses and showed sufficient internal consistency. Therefore, the instrument is considered appropriate for capturing multifaceted psychosocial stressors related to the farming context. The questionnaire also included key sociodemographic factors (e.g., age, gender, farming seniority, farm size, agricultural land area), but only those that were directly related to the purpose of the research were analyzed in this study.

The inventory was adapted into Lithuanian. Participants were asked to indicate how frequently they experienced situations described in each of the 37 items, using a Likert scale ranging from 1 (Very rarely) to 5 (Very often). The collected data were analyzed using a range of statistical methods, selected based on their relevance to the specific research questions (Q1–Q4).

In this study, descriptive statistical methods were used to identify which stressors were most relevant to farmers. This approach allows us to describe the distribution of data, to identify mean values and deviations, and to see the main trends in the research sample. According to Murphy (2021), although descriptive statistics are often disregarded, they can play a crucial role; therefore, the interpretation of results should begin with a review of the simplest data: means, standard deviations and correlations. In addition, descriptive statistics methods are commonly used in exploratory research, as they allow researchers to understand the structure of data, identify patterns and notice possible anomalies without prior assumptions (Jacobucci, 2022).

Stressors were classified by mean values based on a 5-point Likert scale, where scores above 4 meant that stressors were experienced “often” or “very often”, scores from 3.5 to 4 meant moderately frequent stressors, and scores below 3.5 meant less frequently experienced stressors.

Correlation analysis (Pearson) was used to assess the relationships between quantitative variables such as age, farming seniority, and stressor severity. This method allows identification the direction (positive or negative) and strength of the relationship without attempting to draw causal conclusions.

In the context of psychological research, Pearson correlation is used as a benchmark test, which distinguishes itself by the highest statistical power for linear relationships and allows a reliable evaluation of associations between quantitative variables when the data are consistent with classical assumptions (Karch et al., 2024). Although Pearson correlation is sometimes criticized for its sensitivity to non-normal data distribution, research shows that it remains a sufficiently reliable and effective tool even in the presence of a certain deviation from normality (Bishara & Hittner, 2012).

Analysis of variance (ANOVA) was used to compare means between several groups (e.g., age or seniority categories). This method allows us to determine whether differences in means, observed across groups, are statistically significant and, in this way, help to reveal potential social or structural factors related to stress intensity.

According to Liu and Wang (2020), ANOVA is particularly suitable for social and behavioral science research because it provides a possibility to evaluate group differences even when the data are characterized by “ceiling or floor” effects – situations where values accumulate at the limit of the scale. In studies such as the analysis of stressors experienced by farmers, a share of respondents may rate the intensity of stressors with extreme values (e.g., “very important” or “not at all important”), and ANOVA can help to evaluate differences between these groups more accurately. Meanwhile, the Tukey HSD test helped to evaluate which specific groups of farmers (e.g., by age or seniority) differed from each other most, this way complementing the ANOVA analysis.

4. Results

4.1 Sources of experienced stress

When exploring the most significant stressors for Lithuanian farmers (Q1), it was found that the greatest stress ($M \geq 4.0$) for farmers was caused by uncertainty about the future and the farm’s economic situation ($M = 4.03$, $SD = 0.75$) and the regulatory pressure ($M = 4.01$, $SD = 0.72$). These factors are significant for more than 79% of respondents and reveal farmers’ main sources of anxiety, related to economic instability and administrative burden.

Medium stressors ($M = 3.5\text{--}3.9$) include unpredictable obstacles to farm work ($M = 3.94$, $SD = 0.68$) and workload and lack of time ($M = 3.63$, $SD = 0.91$). They are relevant to more than half of farmers.

The least significant stressors ($M < 3.5$) could include succession ($M = 3.48$, $SD = 1.03$), physical isolation ($M = 3.16$, $SD = 0.96$), financial worries ($M = 3.09$, $SD = 1.02$), and conflicts with co-workers or family members ($M = 2.62$, $SD = 0.89$). However, large standard deviations of these stressors indicated that stressors are experienced very differently: for some farmers, they are major problems, while for others they are almost insignificant (Table 2).

Tab 2. Groups of Stressors by Significance. Source: own research and calculations

Group	Stressors	M	SD	Per cent
The most significant	Uncertainty about the future and the farm’s economic situation	4.03	0.75	81.2
	“Pressure” from agricultural legislation	4.01	0.72	79.9
Of medium significance	Unpredictable interruptions to farm work	3.94	0.68	72.6
	Workload and lack of time	3.63	0.91	59.4
The least significant	Farm succession	3.48	1.03	51.4
	Physical isolation	3.16	0.96	38.5
	Financial worries about the current situation	3.09	1.02	34.7
	Conflicts with co-workers or family members	2.62	0.89	17.7

Note: The stressors were categorized according to their mean scores and response percentages as follows: highly significant ($M > 4.0$), moderately significant ($M = 3.5\text{--}4.0$), and least significant ($M < 3.5$).

4.2 Connections of demographic characteristics with stressors

Several statistically significant connections were found between farmers' demographic characteristics (age and farming seniority) and stressors experienced by farmers (Q2). Age was related to physical isolation ($r = 0.16$, $p < 0.01$) and financial concerns ($r = -0.13$, $p < 0.05$). These results indicate that older farmers are more likely to feel physically isolated but experience less financial stress, compared to younger farmers.

Farming seniority was also related to several stressors. Longer farming experience was related to greater uncertainty about the future and the farm's economic situation ($r = 0.18$, $p < 0.01$), pressure from agricultural legislation ($r = 0.14$, $p < 0.05$), and physical isolation ($r = 0.15$, $p < 0.05$). Although the relationships are not strong, they can indicate a certain trend that increasing farmer seniority may cause a more sensitive response to challenges related to future uncertainty, administrative burden and social isolation (Table 3).

Tab 3. Correlation analysis results. Source: own research and calculations

	Workload and lack of time	Uncertainty about the future and the farm's economic situation	Pressure from agricultural legislation	Physical isolation	Financial worries about the current situation	Conflicts with co-workers or family members	Farm succession	Unpredictable interruptions to farm work
Farm size	0.216***	0.190***	0.316***	0	0.277***	0.192***	0.121*	0.185**
Farm land area	0.173**	0.209***	0.314***	0	0.310***	0.163**	0.136*	0.159**
Age	0	0	0	0.156**	-0.126*	0	0	0
Farming seniority	0	0.181**	0.139*	0.147*	0	0	0	0

Note: Significance levels: $p < 0.05$ (*), $p < 0.01$ (**), $p < 0.001$ (***).

4.3 Connections of structural factors (farm size, farm land area) with stressors

Farm size and farm land area were found to be significantly related to several stressors experienced by farmers (Q3). The strongest relationships were found between larger farms and greater pressure from agricultural legislation ($r = 0.31$, $p < 0.001$). Farm size was also related to financial concerns about the current situation ($r = 0.28$, $p < 0.001$).

By weaker but statistically significant relationships, farm size was also related to workload and lack of time ($r = 0.22$, $p < 0.001$), uncertainty about the future and the farm's economic situation ($r = 0.19$, $p < 0.01$), and conflicts with co-workers or family members ($r = 0.19$, $p < 0.01$). Similar trends were also observed when assessing the relationships between the farm land area and variables such as uncertainty about the future and the farm's economic situation and conflicts with co-workers or family members. Meanwhile, physical isolation was not related to either the farm size or the farm land area ($p > 0.05$), indicating that the feeling of isolation is associated with demographic but not structural variables (Table 2).

4.4 Stressors experienced by different groups of farmers

ANOVA and Tukey HSD test results showed that different groups with regard to age, experience and farm structure faced unique challenges (Q4).

Age. Firstly, the assumptions for the applicability of ANOVA were tested. According to the Kolmogorov–Smirnov test ($p = 0.057–0.239$), data distribution met the normality assumption ($p > 0.05$). The Levene's test confirmed the homogeneity of variances ($p = 0.335–0.767$), and the results of the Chi-square test ($p = 0.436–0.811$) showed that variables were independent. Thus, all assumptions for the application of ANOVA were met.

When comparing by age, significant differences were found in the dimensions of physical isolation ($F = 2.728$, $p = 0.030$) and financial worries ($F = 2.746$, $p = 0.029$) (Table 4). Meanwhile, the results of the Tukey HSD test showed that farmers over 60 years old ($M = 0.36$) were significantly more likely to experience physical isolation than farmers in the 21–30 age group ($p < 0.05$). In addition, farmers aged 31–40 ($M = 0.25$) were most likely to encounter financial difficulties ($p < 0.01$), compared to younger (21–30) and older (60+) farmers.

Tab 4. Experienced stressors by farmers' age. Source: own research and calculations

Stressors	21–30 years old, N = 11	31–40 years old, N = 65	41–50 years old, N = 65	51–60 years old, N = 95	Over 60, N = 52	ANOVA test results		Contrast (-1, -1, 0, 0, 2) ₄ (-1, 2, 0, 0, -1) ₅		Tukey HSD Homogeneous subgroups, $p \leq 0,05$	
						F	p	Contrast value	Contrast value, p	1 group Smaller	2 group Larger
Workload and lack of time	0.02	0.10	0.10	-0.02	-0.22	0.966	0.426	0.972	0.332		
Uncertainty about the future and the farm's economic situation	-0.50	0.00	-0.07	0.12	-0.02	1.112	0.351	1.270	0.205		
Pressure from agricultural legislation	0.15	0.14	-0.06	0.01	-0.15	0.729	0.573	0.665	0.507		
Physical isolation	-0.51	-0.06	-0.09	-0.04	0.36	2.728	0.030	1.304	0.002	1, 3, 2, 4	3, 2, 4, 5
Financial worries about the current situation	-0.42	0.25	0.14	-0.10	-0.22	2.746	0.029	2.562	0.006	1, 5, 4, 3	4, 3, 2
Conflicts with co-workers or family members	-0.08	0.22	0.00	-0.13	-0.02	1.188	0.316	1.312	0.190		
Farm succession	-0.25	0.12	0.10	-0.05	-0.13	0.846	0.497	1.496	0.136		
Unpredictable interruptions to farm work	-0.01	0.10	-0.05	-0.01	-0.05	0.248	0.911	0.636	0.525		

Farming seniority. The assumption of normality was confirmed by the Kolmogorov–Smirnov test ($p = 0.056$ – 0.289); the homogeneity of variances, by the Levene's test ($p = 0.093$ – 0.765); and independence of variables, by the Chi-square test ($p = 0.179$ – 0.952). All values exceeded the selected significance level ($p > 0.05$); therefore, all necessary ANOVA assumptions were met.

It was found that longer farming seniority was related to greater uncertainty about the future and the farm's economic situation ($F = 3.189$, $p = 0.024$), pressure from agricultural legislation ($F = 2.728$, $p = 0.047$) and physical isolation ($F = 2.640$, $p = 0.050$) (Table 5). The Tukey HSD test showed that farmers with 21–30 years of farming seniority significantly more often experienced uncertainty about the future ($p < 0.01$) than farmers with 1–10 years of seniority. Similarly, physical isolation is most felt among farmers with more than 30 years of farming experience, compared to those with shorter farming experience ($p < 0.05$).

Tab 5. Stressors by farming seniority. Source: own research and calculations

Stressors	Years of seniority				ANOVA test results		Contrast (-1, -1, 1, 1)		Tukey HSD Homogeneous subgroups, $p \leq 0,05$	
	1–10, N = 88	11–20, N = 82	21–30, N = 80	31–40, and over, N = 38						
					F	p	Contrast value	Contrast value, p	1 group Smaller	2 group Larger
Workload and lack of time	-0.07	-0.06	0.14	-0.01	0.757	0.519	0.232	0.310		
Uncertainty about the future and the farm's economic situation	-0.23	-0.04	0.20	0.20	3.189	0.024	0.503	0.007	1, 2	4, 3
Pressure from agricultural legislation	-0.15	-0.08	0.20	0.12	2.728	0.047	0.397	0.030	1, 2	3, 4
Physical isolation	-0.12	-0.12	0.09	0.35	2.640	0.050	0.654	0.006	2, 1, 3	3, 4
Financial worries about the current situation	0.03	0.00	-0.06	0.05	0.146	0.932	-0.028	0.913		
Conflicts with co-workers or family members	0.05	0.01	-0.06	-0.01	0.165	0.920	-0.106	0.633		
Farm succession	0.01	-0.15	0.15	-0.02	1.275	0.283	0.284	0.272		
Unpredictable interruptions to farm work	0.04	-0.17	0.19	-0.13	2.063	0.105	0.128	0.447		

Farm size. Examining whether farmers' attitudes and farming behaviour differ depending on farm size (small farm, medium farm and large farm), a one-factor analysis of variance (ANOVA) was used. Before performing it, the main assumptions were checked. The normality assumption was assessed using the Kolmogorov–Smirnov test. The obtained values ($p = 0.072$ – 0.216) exceeded the significance level ($p > 0.05$); therefore, it can be stated that the examined variables are normally distributed. Homogeneity of variances was assessed using Levene's test. The values in various subscales ranged from $p = 0.100$ to $p = 0.997$ and also exceeded the 0.05 threshold, allowing us to state that the variances in the groups were homogeneous.

The independence assumption was tested using the Chi-square test. In all subscales, p -values (according to the Pearson formula: $p = 0.129$ – 0.332 ; according to the formula for a likelihood ratio: $p = 0.051$ – 0.290) were also greater than 0.05; therefore, the assumption of independence of variables was confirmed.

The ANOVA results showed that most stress dimensions differed significantly depending on farm size. Particularly significant differences were found in the dimensions of workload and lack of time ($F = 7.185$, $p = 0.001$), pressure from legislation ($F = 12.171$, $p < 0.001$), financial worries ($F = 11.348$, $p < 0.001$), and uncertainty about the future and the farm's economic situation ($F = 4.349$, $p = 0.014$). Physical isolation was the only dimension where no statistically significant differences were found between farm size groups.

The Tukey HSD test, which was further applied, showed that significant differences were more common between small and medium-sized farms, and the z -scores indicated that small farm owners experienced less stress in most of the fields studied. Similar trends were also confirmed by the contrasts test, which showed that the assessments of small farm owners differed significantly from those of medium-sized farms, while large farms usually occupied an intermediate position (Table 6).

Tab 6. Stressors by farm size. Source: own research and calculations

Stressors	Up to 8 ESU (small farm), N = 132	From 8 ESU to 20 EDV (medium farm), N = 94	From 20 ESU (large farm), N = 62	ANOVA test results		Contrast (-1, 1, 0)		Tukey HSD Homogeneous subgroups, p ≤ 0,05	
				F	p	Contrast value	Contrast value, p	1 group Smaller	2 group Larger
Workload and lack of time	-0.24	0.21	0.19	7.185	0.001	0.4064	0.001	1	3, 2
Uncertainty about the future and the farm's economic situation	-0.18	0.19	0.11	4.349	0.014	0.2801	0.006	1, 3	3, 2
Pressure from agricultural legislation	-0.28	0.11	0.43	12.171	0.0001	0.2771	0.003	1	2, 3
Physical isolation	-0.01	0.14	-0.19	2.102	0.124	0.1484	0.252		
Financial worries about the current situation	-0.29	0.17	0.35	11.348	0.0001	0.4629	0.001	1	2, 3
Conflicts with co-workers or family members	-0.18	0.05	0.30	5.190	0.006	0.2066	0.081	1, 2	2, 3
Farm inheritance	-0.15	0.18	0.04	3.023	0.050	0.3363	0.016		
Unpredictable interruptions to farm work	-0.15	0.05	0.24	3.551	0.030	0.1401	0.124	1, 2	2, 3

Farm land area. It was further tested how farmers' reactions to stressors differed depending on the area of managed agricultural land. First, the normality of data was confirmed by the Kolmogorov–Smirnov test ($p > 0.05$); the homogeneity of variances, by the Levene's test ($p > 0.05$); and the independence assumption, by the Chi-square test ($p > 0.05$). All results allowed a reasonable application of the analysis of variance, the results of which are presented in Table 7.

Tab 7. Stressors by farm land area. Source: own research and calculations

Stressors	Up to 10 ha, N = 68	11–25 ha, N = 61	26–100 ha, N = 77	101–500 ha, N = 69	More than 501 ha, N = 13	ANOVA test results		Contrast (-1, -1, 1, 1, 0)		Tukey HSD Homogeneous subgroups, p ≤ 0,05	
						F	p	Contrast value	Contrast value, p	1 group Smaller	2 group Larger
Workload and lack of time	-0.25	-0.11	0.08	0.30	-0.22	3.140	0.015	0.7393	0.001	1, 5, 2, 3	3, 4
Uncertainty about the future and the farm's economic situation	-0.31	-0.12	0.22	0.22	-0.23	3.935	0.004	0.8714	0.0001	1, 5, 2	3, 4
Pressure from agricultural legislation	-0.40	-0.19	0.05	0.47	0.19	7.922	0.0001	1.1065	0.0001	1, 2, 3, 5	3, 5, 4
Physical isolation	-0.13	0.10	0.22	-0.15	-0.35	2.235	0.065	0.0962	0.689		
Financial worries about the current situation	-0.31	-0.31	0.06	0.42	0.49	7.669	0.0001	1.1037	0.0001	2, 1, 3	3, 4, 5
Conflicts with co-workers or family members	-0.22	-0.10	0.04	0.14	0.58	2.457	0.046	0.4919	0.034	1, 2, 3, 4	3, 4, 5
Farm succession	-0.33	0.02	0.20	0.11	-0.11	2.958	0.020*	0.6183	0.010	1, 5, 2, 4	5, 2, 4, 3
Unpredictable interruptions to farm work	-0.17	-0.16	0.08	0.24	-0.08	2.341	0.049*	0.6496	0.007	1, 2, 5, 3	5, 3, 4

Respondents' assessments in most subscales differed statistically significantly between farms classified by farm land area. The strongest differences were recorded in the subscales of workload, pressure from legislation, financial worries and uncertainty about the future ($p < 0.001$), while the only dimension of physical isolation did not show significant differences ($p = 0.065$). The Tukey HSD test and contrasts analysis distinguished two main groups of farms: up to 25 ha and over 501 ha, and 26–100 ha and 101–500 ha, with significant differences in means between them in most of the studied subscales.

The analysis of z-scores showed that owners of smaller and larger farms (up to 25 ha and more than 501 ha) were less likely to experience high workload, uncertainty about the future, pressure from legislation or financial concerns. Managers of medium and large farms are more likely to encounter increased stress due to administrative, economic and organizational challenges. It was also found that farm succession problems were significantly more relevant for medium and large farms than for small farms. In summary, it should be noted that farmers' stress experiences varied statistically significantly depending on the farm land area, with the greatest challenges usually experienced by medium and large farms (26–500 ha).

5. Discussion

This study aimed to evaluate how demographic and structural agricultural factors were associated with stressors experienced by farmers, seeking to identify the most vulnerable farmer groups. It examined how manifestation of stress varied depending on age, farming seniority, farm size and farm land area. The answers are particularly important given that the study was conducted in the region with peculiar economic, social and cultural characteristics that differed from other old European Union countries (Czekaj et al., 2020; Kurlavičius et al., 2024). Since sources of stress can manifest themselves differently than in Western countries, all this requires a separate, sensitive, locality-specific approach.

Uncertainty about the future and the farm's economic situation, as well as pressure from legislation, were found to be the greatest stressors for farmers (Q1). This stressor was important for around four out of five respondents. Similar trends were found in a study conducted in France by Truchot & Andela (2018). However, when comparing mean values, Lithuanian farmers experience these stressors more intensely: for example, economic uncertainty in Lithuania is rated higher than other factors, and pressure from legislation is singled out as particularly strong ($M > 4.0$). In addition, as in the study conducted by Nichols and Davis (2024) in the USA, lack of time and workload are among the main stressors. However, in Lithuania, the mean of this stressor is higher ($M = 3.63$ vs. 2.6 in the USA), similar to economic stressors. This shows that the intensity of stressors experienced by farmers can be significantly influenced by contextual factors (e.g., social, economic, and institutional environment).

Although the proportion of older farmers in the sample aligns with international trends (Borda et al., 2023), farmers aged 21–40 accounted for 26.4% of the sample, which is significantly higher than the European Union average. According to Eurostat (2022), only 11.9% of farmers in the EU were under the age of 40. However, as noted by Sutherland (2023), official EU statistics may underestimate the presence of young farmers, as in many countries, younger generations are actively involved in farming activities, while farms remain formally registered under older family members' names. Therefore, the somewhat higher representation of younger farmers in the sample may partially reflect an actual generational shift in Lithuanian agriculture.

It has been found that older farmers are more likely to feel physically isolated but less financially stressed, compared to younger farmers (Q2). This is consistent with trends observed in other countries, which show that younger farmers experience more stress due to financial problems (Daghagh Yazd et al., 2019). Similarly, Wheeler et al. (2022), who conducted a study in the United Kingdom, have found that older farmers may find it difficult to establish and maintain social relationships, especially when they live in remote areas where social services and infrastructure may be lacking. Meanwhile, younger farmers are at greater risk of experiencing loneliness due to social pressure and competition. In contexts where group norms prevail over individual morality (Vveinhardt & Deikus, 2025), bystanders may become participants in immediate "trials" and executions of judgment, thus failing to provide support to the isolated individual

(cf. Truchot & Andela, 2018; Hsiao, 2022). From this standpoint, tailored interventions should not only address external stressors but also promote ethical awareness and moral agency within farming communities.

However, the relationships between age and other stressors may differ in different contexts. For example, in Germany, factors related to work intensity were more important among older farmers, as were problems related to legislation (Knoop & Theuvsen, 2020). Meanwhile, in the Lithuanian sample, no significant relationships were found between work intensity, legislative pressure and age. However, the research findings suggest that the increasing duration of farming may also increase sensitivity to challenges related to uncertainty about the future, administrative burden and social isolation, which may also indicate some cumulative effect of stressors. As previous studies have shown, farmers' occupational stressors are not isolated from other areas of their lives, which means that even if some stress (e.g., financial) decreases, another stress (e.g., emotional, social, relational) may accumulate or intensify over time (Thompson et al, 2023).

In addition to demographic characteristics, farmers' reactions to stressors are most strongly associated with structural factors such as farm size, legislative pressure, and financial concerns (stress increases with farm size). In addition, a larger land area managed by the farmer was associated with greater uncertainty about the future and the farm's economic situation, and with conflicts with co-workers or family members (Q3). This is in contrast to the results of studies conducted in the USA (Nichols & Davis, 2024; Liang et al., 2023), where smaller farm size is related to higher stress, and larger holdings often mean more resources, a better technical base, the ability to delegate work and greater resilience to market fluctuations. Similarly, in Lithuania, a small group of farmers (N=13), managing more than 500 hectares (which is related to larger resources and fundraising opportunities), had lower stress indicators. Such results suggest that the effect of farm size on farmers' stress is not universal, but may also depend on the broader economic or institutional context. For example, a study conducted in Germany (Knoop & Theuvsen, 2020) showed no significant relationship between farm size and stress.

The results of the analysis of variance showed that the nature of stress significantly differed between farmer groups (Q4). That is, farmers over 60 years of age are more likely to experience physical isolation, and the 31–40 age group is more likely to experience financial difficulties. In addition, farmers managing medium-sized farms (in terms of ESU and farm land area) commonly experienced higher levels of stress, particularly related to workload, financial challenges, and administrative burden. Meanwhile, physical isolation was related only to demographic characteristics, which allows a more accurate identification of risk groups. Although Kurlavičius et al. (2024) identified limited farm succession opportunities as one of the region-specific stressors, in our research sample, this stressor was attributed to the group of the least significant stressors. However, in the two groups that manage larger assets (medium and large farms), succession was more relevant. This shows how the context can change the importance of the stressor within the same population.

Considering the identified stressors, an important issue is opportunities for practical assistance to farmers. The findings of the study suggest that interventions should be multi-layered, addressing both psychological well-being and structural constraints. Although there is a need for specialized mental health services, the geographical imbalance in the distribution of primary mental health care workers, especially in rural areas, poses a significant challenge (Wijker et al., 2022). Therefore, methods such as tele-mental health services, mobile teams and flexible consultation formats could improve farmers' access to services. Remote healthcare services in rural areas could be developed by making use of a network of libraries, equipped with broadband Internet connection. As a model presented by Keesler et al. (2025) suggests, libraries show great potential as community resource centers intended for solving problems of broadband connection, digital literacy and access to mental health services. In addition, community and peer support initiatives can be very efficient, since they are based on trust and shared experiences of farmers.

Structural initiatives, such as reducing workload by streamlining administrative procedures, strengthening financial consulting services and local community centers, are equally important. All of these could reduce some of the contextual stressors identified in this study. Thus, there is a need for strategies integrating mental health services at the individual level with broader social and structural programs that would be

adapted to regional specificities. Locally sensitive policy could be implemented by adapting mental health support and counselling services, taking into account farmers' geographical distribution; by ensuring flexible access to healthcare in rural areas; and by integrating stress management programs into existing agricultural advisory systems.

Study limitations and further research. This study provides important insights into the stressors experienced by farmers, but it has several limiting factors. First, the research sample, although representative, was unevenly distributed across certain groups; for example, there were relatively few respondents managing very large farms (e.g., > 500 ha, N = 13), which may limit the generalizability of results.

Secondly, although the stressors in this study were not formally classified as chronic and episodic, based on their content and manifestation, some of them have signs of chronicity. For example, factors such as uncertainty about the future and the farm's economic situation, workload and lack of time, pressure from agricultural legislation or financial worries about the current situation, may be experienced continuously and over time, they may have a cumulative effect on psychological self-feeling. This is consistent with the literature on characteristics of chronic stressors, related to long-term pressure, to which farmers have to continuously adapt (Willis et al., 2019; Henning-Smith et al., 2022). Meanwhile, stressors such as unpredictable interruptions on the farm or conflicts with family members can be considered more episodic; i.e., they occur at specific moments or circumstances, and their intensity and frequency can vary greatly. This is also reflected in the larger standard deviations seen in the results in these subscales. Although this difference was not analyzed as an independent aspect of the study, its validity could be further explored by differentiating between long-term and short-term stressors, which would allow a deeper understanding of the impact of different types of stressors on the farmers' psychological state.

Thirdly, the study was limited to a single period and therefore did not examine how stressor manifestation can change over time (e.g., considering different seasonal or crisis contexts). Therefore, future comparisons with the findings of longitudinal studies could be useful. In addition, it would be useful to expand the study to include factors such as gender, family structures, debt levels, or farming sector (e.g., livestock farming vs. crop farming). Finally, comparative studies between countries could help to better understand how economic, institutional, and cultural factors change the structure of stress in agriculture.

6. Conclusions

This study allowed us to answer three fundamental questions. First, it was revealed that stress experienced by farmers was a multifaceted phenomenon, manifesting itself in different stressors, the intensity of which depended on demographic and structural factors. Second, it was found that the most important differentiation sections were age, farming seniority, farm size and land area, which confirmed that social and economic aspects were closely related to psychological well-being. Third, it was demonstrated that these factors determined unequal sensitivity of farmers to stressors; therefore, stress management measures should be applied in a differentiated manner.

The established significant differentiation of stressors, depending on demographic and structural factors, opens up opportunities for a deeper understanding of a complex stressor field in which Lithuanian farmers live and work. This study not only expanded the analysis of farmers' stressors but also contributed to revealing the specific features of the Central and Eastern European region, confirming relevance of some stressors (e.g., farm succession, financial issues, or physical isolation) only in certain groups. The findings highlighted that even within a single country, the significance of stressors could vary depending on farmer demographics or farm structure. For instance, older farmers with more extensive farming experience were more likely to experience physical isolation and regulatory pressure, whereas younger farmers more frequently reported financial insecurity. Moreover, the highest levels of stress were observed among managers of medium-sized farms, who faced greater workloads and administrative burdens compared to other groups. This enables practitioners to be more sensitive and targeted when developing policy measures and encourages theorists to avoid homogeneous treatment of the region in analytical constructs.

Based on the research findings, measures aimed at enhancing social inclusion are particularly relevant for older farmers with longer farming experience, such as local community support networks or emotional assistance services that can help reduce physical isolation. When designing financial planning and stress management programs, the specific needs of younger farmers should be taken into account. Furthermore, when developing organizational support measures, special consideration should be given to the challenges faced by managers of medium-sized farms. In other words, differentiated interventions targeting specific risk factors and the unique needs of distinct groups could provide a foundation for strengthening the psychosocial well-being of farmers.

Although the employed research instrument distinguishes itself by a broad coverage of stressors and a tested psychometric structure, it has so far been applied almost exclusively in the French context. Therefore, the study not only enabled a systematic evaluation of stressors experienced by farmers but also contributed to the accumulation of comparative data on an international scale. Since the instrument is based on the structure of eight stressor dimensions, this provides an opportunity to collect comprehensive data in a standardized manner across national contexts, which is particularly important both in developing cross-cultural research programs on farmers' psycho-social well-being and in differentiating attention according to different local contexts.

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