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THE ROLE OF INDIVIDUAL CHARACTERISTICS IN RISK PERCEPTION IN FRUIT-GROWING

Rosen Plamenov Ivanov

Agricultural University – Plovdiv, Bulgaria
E-mail: rosenivanov10@yahoo.com

Abstract

Given the increasing exposure to risks in agriculture, it was important to analyse the range of determinants affecting the risk management process. The presented study of risk management in fruit growing focused on the potential role of farmers' individual demographic factors – gender, age, years of experience and educational status – as potentially influential determinants in decision-making process. A survey with 86 representatives from the Plovdiv region took place in 2024 to collect contemporary data and analyse in detail individual perceptions and possible directions in managing various types of risks. The accessed information suggested significant differences in the perceptions of risk depending on the individual characteristics of every participant. More specifically, female fruit growers were considerably more sensitive to risk than their male counterparts. Research findings also showed that the improvement of the educational status of farmers coincided with an increasing interest in risk management. The role of education was quite significant since it enhanced one's awareness regarding the existing threats, as well as the pro-active application of difference managerial solutions in practice. Moreover, findings suggested that individual age could also foster risk management, but the effect was limited to the middle-aged participants only. In contrast, the duration of individual experience in fruit growing failed to demonstrate statistical significance. Overall, the Bulgarian case largely aligned with the main trends, as identified in the literature, but also demonstrated unique local specifics worth exploring in more detail to improve risk management in fruit growing.

Keywords: demographic factors, fruit growing, individual characteristics, risk management, risk perception

INTRODUCTION

Risk management in agriculture is a field of growing relevance considering farmers' increased exposure and losses caused by a variety of environmental, market, financial and other risks (Ivanov, 2025). Risk management is complex by requiring a systematic performance of several stages, as well as committing time and resources in the process (Wolke, 2007). In general, effective risk management

is largely dependent on resource and information availability, timely actions and application of appropriate risks mitigating strategies (OECD, 2009). While theory views risk management as a structured and objective process, practice shows that it may also be affected by a set of subjective factors which tend to interfere in the process (Wolke, 2007; Harizanova-Bartos, 2021).

This study explores the role of individual personality as a potential factor influencing risk perceptions and management. Individual demographic characteristics largely shape a personality. In literature, the role of personality in risk management appears to be underexplored topic, as argued by Duong et al. (2019). In a similar manner, there is an existing knowledge gap regarding the role of personality in managing various risks in the specific fruit-growing segment in Bulgaria. Therefore, the current study is one of the initial attempts to analyse in detail the personal background of fruit-growers as a variable in the decision-making process.

In literature, Hillson & Murray-Webster (2007) argue that individual demographic characteristics of farmers may determine risk tolerance level. An empirical study by Schaper et al. (2012), shows that farmers do not equally perceive the threat of various risks and the need for their management. Instead, there is a wide spectrum of individual attitudes, ranging from full risk acceptance and no proactive risk management to a complete avoidance of risks (Schaper et al., 2012). In addition to the observed risk tolerance differences among individual farmers, there are also cross-country variations explained by the cultural specifics of each location which allow for different risk acceptance levels (Hofstede, 2001).

Previous findings suggest that some demographic factors may influence the perceived importance and actual management of risks in agriculture. Dohmen et al. (2011) and Roe (2013) investigate the relationship between the individual age of farmers and the respective level of commitment to the risk management process. The evidence suggests that age and risk tolerance are negatively correlated; thereby explaining the relatively more risk averse nature of older farmers (Dohmen et al., 2011; Roe, 2013). Agila et al. (2025) clarify that older farmers accumulate more extensive experience and exposure to past market and environmental shocks – a main factor for greater risk awareness. Similarly, Bergfjord (2013) suggests that farmers usually become more responsible in risk management only after experiencing a major financial loss and reconsidering the important role of risk management. Thus, younger farmers are typically more risk tolerant due to limited individual experience and previous exposure to adverse events (Agila et al., 2025). Given the evidence, a positive correlation between age and experience should be expected. Nevertheless, Diyyala et al. (2025) argue that the role of age is not uniform since younger farmers tend to be more open to innovation and have access to new information channels – a key difference boosting their awareness to specific types of risks, especially technology-driven ones.

Gender is another demographic factor worth exploring in the analysis. According to World Bank (2017), men and women experience considerable differences in accessing information, productive resources and even institutional support – important background factors affecting one's capacity to cope with agriculture-related risks. As a result, women tend to be more exposed to the

adverse impacts of risks in comparison to their male counterparts (World Bank, 2017). From an empirical perspective, Osiemo et al. (2021) show that women prioritise risk management, especially in terms of risks which can be prevented or controlled to avoid financial losses. Moreover, Cullen et al. (2018) demonstrate that female farmers are more concerned across most risk domains in comparison to men, reflecting increased sensitivity to uncertainty and vulnerability. Taken together, the studies discussed suggest that gender influences risk perceptions and management.

Educational status is another determinant of risk management in agriculture (Weinstein, 1989). Rahayu et al. (2021) suggest that highly educated farmers also tend to be more proactive in risk management. The main argument suggests that educated farmers tend to have a wide information access; thereby demonstrating high risk perception level (Farhan et al., 2022). Moreover, education is associated with better knowledge and skills which support the effective conduct of risk management in practice (Diyala et al., 2025). Nevertheless, it is also argued that possessing higher education and conducting effective risk management in practice may reduce risk perception levels of farmers over time (Iqbal et al., 2016). Hence, high locus of control can be a factor for overlooking some known forms of risk which in turn worsens risk management performance.

Considering literature findings, the Bulgarian case explores the impact of four potentially relevant individual factors – gender, age, experience and education – since they are also likely to influence risk management in fruit-growing.

MATERIALS AND METHODS

A sample of 86 individual fruit-growers from the Plovdiv region, Bulgaria, is analysed in the current study. An online survey took place between March and September 2024 to collect primary data from a diverse sample of respondents. The application of a snowball sampling technique facilitated the access to initially unknown respondents – a key factor for expanding the size and diversity of the sample (Saunders et al., 2009). Thus, it was also possible to recruit fruit-growers with a different type of specialisation, as shown below.

Since the article explores the demographic characteristics of individuals as a determinant of the risk management process, it is quite important to present the characteristics of the sample. In terms of gender, male respondents have a dominant position; however, the unequal representation of male and female fruit-growers is not necessarily a negative development given the fact that the overall population of farmers in Bulgaria is dominated by males with a share of approximately 78% (Shishkova & Beluhova-Uzunova, 2019). Age and experience are specific demographic factors with a relatively more equal distribution, whereas the representatives with higher education have a dominant share in the sample. Considering the findings from table 1, the sample is relatively diverse and allows for a comparison of responses across groups to explore the role of demographic factors in the process of risk management.

The formulation of a zero hypothesis assumes no relationship between individual demographic factors and the importance of risk management for respondents. Hence, to reject the zero hypothesis, it is necessary to show statistically significant variations in the opinions of respondents about the

importance of risk management across four demographic factors – gender, age, years of experience and level of education. For this purpose, analysis employs descriptive statistics measures, as well as methods for measuring the degree of statistical significance of responses across multiple groups, such as analysis of variance (ANOVA). A conventional confidence level of 0.05 is applied to manifest the existence of statistically significant responses across participants.

Statistical analysis is facilitated by the use of quantitative interval measurements. More specifically, respondents are to evaluate the importance of risk management process by considering a 5-step Likert scale, ranging from one to five. Respectively, maximum importance to risk management is manifested by the value of five, whereas the least attention is quantified by the minimum value of one.

Given the sample, the following main hypothesis is analysed in the study:

H₀: The individual demographic characteristics of farmers do not affect risk management in fruit farming.

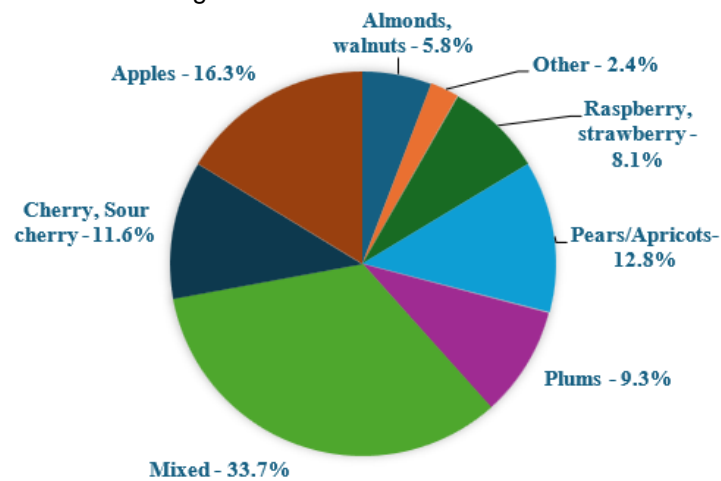


Figure 1. Distribution of orchard types in the survey (%)

Source: Own analysis

Table 1. Demographic characteristics of survey participants

Gender	Male – 77.9%		Female – 22.1%		
Age (years)	20-30 – 23.3%	31-40 – 22.1%	41-50 – 18.6%	51-60 – 24.4%	60+ 11.6%
Level of education	Basic – 4.7%	Secondary – 24.4%	Secondary vocational – 18.6%	Higher – 52.3%	-
Experience (years)	< 10 – 38.3%	11-20 – 25.6%	21-30 – 18.6%	30+ 17.5%	-

Source: Own analysis

RESULTS AND DISCUSSION

The importance of risk management process for respondents with different demographic background is analysed hereafter. The information from fig. 2 presents in detail the average assessment score across each sub-group of

respondents. In terms of gender, the results indicated that female fruit-growers perceived risk management as more important in comparison to men. This is evident from the differences in the scores, which reach an average value of 4.53 for women and 3.64 for men, respectively.

Regarding age, all groups of survey participants also demonstrated high scores – above the defined average value of three. It should be noted that young fruit-growers under 30 years of age, as well as the oldest group over 65 years, reported relatively lower scores of 3.25 and 3.20, respectively. Risk management process was considered as quite important by the middle-aged cohorts with the peak value observed among those of age 41–50 years by reaching 4.31 (fig. 2).

With respect to the duration of experience, differences in the importance of risk management were again observed. More specifically, participants with the least and the most experience reported relatively lower importance of risk management (fig. 2). Those findings were not surprising given the strong presumed correlation between the participants' age and their years of experience in fruit-growing, as also suggested by the literature. Overall, risk management seems to be quite important, despite the variations in scores with respect to years of experience in fruit-growing.

The level of education was also considered as a potential individual factor affecting the importance of risk management. Survey findings indicated that risk management importance progressively increased together with the improvement of participants' educational status. Given this linear relationship, fruit-growers with secondary education provided the lowest score – a value of just two – while university graduates reported the highest score of 4.56. Those contrasting results could be explained by the assumption that a higher level of education could contribute to a higher level of awareness regarding various potential and actual risks in fruit-growing, as well as their effective management in practice.

The descriptive findings discussed indicate that risk management is not perceived as equally important by all groups of fruit-growers. The observed variations in mean scores tend to fluctuate depending on the demographic factor under consideration and especially in respect to education. From a scientific perspective, it is important to analyse the magnitude of the observed differences and evaluate whether they are statistically significant. For this purpose, ANOVA test is applied for each of the four main demographic groups – gender, age, experience and education – to identify any statistical significance which can be of value in assessing the research hypothesis.

The next factor – duration of experience – is statistically insignificant given the high p-value of 0.087, exceeding the confidence interval of 0.05. These results indicate that the observed variations in the assessment scores from fig. 2 are marginal. Respectively, the duration of the individual experience as a fruit-grower does not influence the perceived importance of risk management. The result is largely unexpected given the initial assumption that the increased individual experience in the field of fruit-growing facilitates the understanding of risks and the need for their effective management in practice.

Table 2 presents the observed variations or the range of the assessment scores, as well as the respective p-values when the variations are tested for

statistical significance. Results indicate that gender is a statistically significant demographic factor, as suggested by the p-value of 0.009. This is considerably lower than the applied confidence interval of 0.05; thereby validating the initially suggested idea that female fruit-growers perceive the process of risk management as more important than their male colleagues. This can be explained by the assumption that men have a better access to resources and a generally higher individual tolerance to risk, rather than being exposed to fewer risks than female fruit-growers.

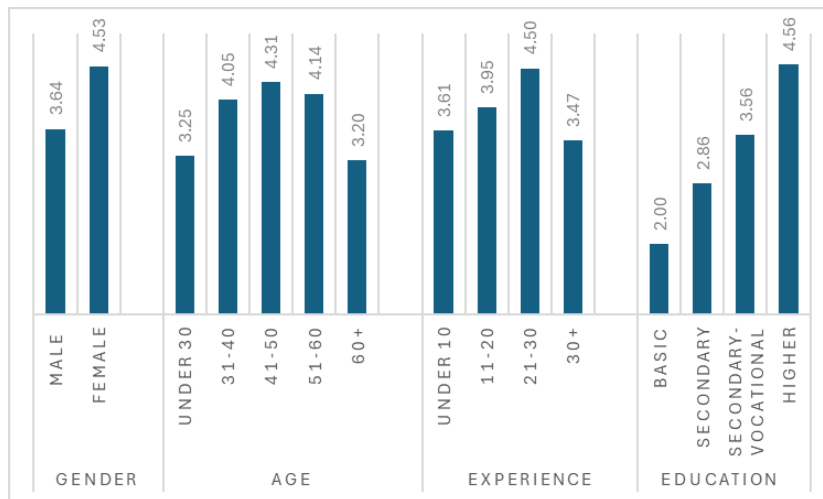


Figure 2. Mean scores of risk management importance across demographic groups (1-5 scale)
Source: Own analysis

The analysis continues with the evaluation of the role of individual age. In this case, the p-value is 0.034 which also indicates the existence of statistically significant differences in the evaluation of the importance of risk management across the various age cohorts of participants. While the observed differences are statistically significant, they are not linear, as indicated by the mean scores in fig. 2. Hence, it cannot be suggested that changes in individual age directly cause a specific effect. Initially, the increase in respondents' age is associated with a perceived higher importance of risk management. Nevertheless, this initial positive relationship between both variables is reversed after surpassing the age of 50 years (fig. 2). Any increase in one's age after that point is reversely related with the score of risk management importance.

Considering all, it is suggested that the youngest and oldest fruit-growers demonstrate considerably lower importance of risk management in comparison to the middle-age groups of respondents. Given the survey data, it is assumed that the youngest fruit-growers have high risk tolerance and lack sufficient knowledge to acknowledge the role of risk management. However, the low assessment score of the senior group of fruit-growers is quite unexpected and deserves further research analysis to better understand their reasoning.

Table 2. Variations in the importance of risk management across several demographic groups (ANOVA analysis)

Demographic factor	Range of the score (1-5)	P-value
Gender	3.64-4.53	0.009
Age	3.20-4.31	0.034
Experience	3.47-4.50	0.087
Level of education	2.00-4.56	0.000

Source: Own analysis

The last demographic factor under consideration refers to level of education. The descriptive findings indicate a considerable range of responses which in turn produces a factor with a solid level of statistical significance. Education is a main factor since its p-value is quite low and equal to 0.000. Moreover, the observed relationship between education and perceived risk management seems to be quite linear (fig. 2). Hence, an improvement in one's educational status is associated with a considerable increase of risk management importance. Based on these findings, it can be suggested that highly educated fruit-growers are also more focused on risk management since the former are aware of existing risks and the importance of effective risk management in fruit-growing.

The ANOVA findings show that three out of four demographic factors considerably influence the individual evaluation of risk management importance. Depending on the p-value levels, the statistically significant factors from the list can be ranked in a descending order. More specifically, education is shown to be the most important demographic variable, followed by age and gender. Given the descriptive results from fig.2, individual characteristics, such as high education, middle age and female gender are associated with the highest prioritisation of risk management (see fig. 2). The duration of individual experience does not affect risk management process.

Considering all, the analysis of findings also provides sufficient evidence to reject the initially formulated null hypothesis. Thus, most of the studied individual demographic characteristics indeed influence risk management in fruit-growing. This main conclusion clearly shows that the personality of a farmer interferes with the perceived importance and consecutive actions in risk management.

The evidence from the Bulgarian case largely confirms the initially suggested impact of age on risk perceptions (Dohmen et al., 2011; Roe, 2013; Agila et al., 2025). As discussed, increased age typically leads to a more risk-averse type of behaviour – a factor for enhanced risk management by farmers. In the Bulgarian case, however, this relationship holds valid up to a certain age threshold since the group of the oldest farmers (60+ years) does not prioritise risk management similarly to the youngest fruit-growers (see fig. 2).

The findings from the current study also support the initial propositions regarding the role of gender (Cullen et al., 2018; Osiemo et al., 2021). More specifically, results clearly suggest that women are more concerned with risks and dedicated to risk management. Next, a strong positive relationship between educational status and risk management perceptions and practices is also observed in the current case, thereby confirming the initial propositions by Rahayu et al. (2021) and Farhan et al. (2022).

Nevertheless, duration of experience, which is a marginal factor in the Bulgarian case, contradicts with the suggestions from the literature (Bergfjord, 2013). This observed discrepancy between general empirical findings and the current situation in Bulgaria poses an interesting direction for future exploration.

CONCLUSIONS

Research findings expanded the understanding of the role of individual characteristics in determining risk management perceptions in the Bulgarian fruit-growing sector. It is worth noting that Bulgarian fruit-growers, except for those with basic education, consider risk management as important. Moreover, the evidence largely confirms the initially-discussed literature findings suggesting that personal characteristics influence risk management. More specifically, the current case demonstrates the key role of gender, age and educational status as statistically significant determinants. The only exclusion is related to the duration of experience – a factor with marginal importance. Thus, it can be concluded that most of the analysed individual demographic characteristics interfere in one's determination of risk importance and management.

These findings identify the current situation and context of the Bulgarian case. While informative, current results are simply based on a cross-sectional study with a regional scope. Future large-scale research may further explore the role of demographic factors by collecting periodic data as a part of longitudinal research. Additional research is also of need to better understand the potentially inhibiting factors, as well as the range of appropriate policy interventions to enhance risk management in agriculture.

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