Financial Risk Analysis - Case study Guri I Zi in the Municipality of Shkodër in Albania

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Abstract: - Vegetable farmers operating in Guri I Zi, located in the Shkodra district, meet 42% of the vegetable market demand in the region. To identify the most important financing risks faced by these farmers when searching for financial resources, a study was conducted to analyze the financing risks related to their activity. The study used descriptive analysis and multiple regression analysis techniques to determine the main factors influencing the financing risks of these farmers. The study found that farmers perceived low profits, excessive debt, and high-interest rates as critical financing risks. However, the multifactorial analysis revealed that low earnings were statistically insignificant, while excessive debt and high interest rates were statistically significant. Regression analysis showed a strong correlation between financial risk, excessive debt, and high interest rates at 86%. The main objective of the study was to make farmers aware of the importance of financial risks.

Key-Words: - Financial risk, identification, analysis, entrepreneurship, agriculture, multifactorial regression.

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1   Introduction

Farmers are exposed to risks in production, market, financing, legality, and human resources *(See Figure 1)*. The study focuses on financial risk. Farmer enterprises face the inability to secure loans from banks, especially in the case of female and small-scale entrepreneurs, [1], [2], [3]. The lack of bank credit is associated with unpredictable changes in adverse climate conditions, [4], [5], [6], damaging their production through CO_2 emissions, rainfall variations, droughts, frosts, etc., [4]. Such a situation is also found in Albania. Albanian farmers, unable to access bank loans, are forced to seek financial resources from alternative institutions with high interest rates. Therefore, an analysis of financial risk in farmer entrepreneurship is necessary to identify and address financing challenges.

In developing countries, agriculture plays a significant role in economic development, [4], [5]. In Albania, agriculture constitutes approximately 1/5 of the Gross Domestic Product (GDP), [7], [8]. However, as a developing country, Albanian agriculture faces numerous challenges that require attention from the central government and local authorities, [8]. Financial risks for farmers include a lack of financial resources, low-profit margins, high production costs, and high levels of debt. This study focuses on the administrative unit of Guri I Zi in the Shkodër district, where climatic conditions are favorable for vegetable production, [8].

This research is unique because there is a scarcity of studies on vegetable production. The study aims to identify financial risks and assess the most significant risks for farmers in the study area. This investigation could help farmers address financial difficulties and provide valuable information for researchers and other interest groups, such as customers, suppliers, and public institutions.

The findings of this study could encourage local and central authorities to provide financial support to farmers. Informed institutions can develop appropriate policies and programs that favor entrepreneurial farmers. As such, this study has several beneficiaries. Entrepreneurs will have a valuable guide for managing financial risks, while researchers and academics will have new data sources for their research. Meanwhile, responsible state institutions will have valuable information to undertake supportive policies in the agricultural sector.

Research in Albania, as a developing country, adds value to the agricultural economy, [9]. Another objective of the study is to understand the financial risks associated with increasing investments in vegetable farms in the Shkodër area. The growth of farm entrepreneurship in this region will have positive effects on improving product quality at low costs, thus satisfying one of the most important consumer demands.

2 Literature Review

Agricultural production is threatened by numerous risk events. The trend of today's studies in agricultural businesses is the research of five main risks or, five general risks or five big risks, [8], [9], [10]. These risks are production risk, market risk, financial risk, legal risk, and human resources risk (*See Figure 1*).
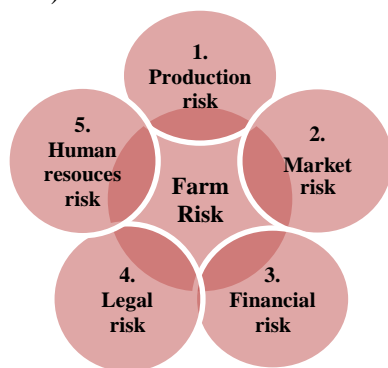

Fig. 1: Five major farm risks
Source: [8]

Theoretically, these risks have been explained by several authors, [10], [11], [12], [13], [14], [15], [16], [17], [18], [19], [20], [21], [22], [23], [24]. International studies have analyzed the challenges and risks faced by farmers in various contexts of the agricultural industry. In premodern Iceland, primary concerns were related to weather variability and human diseases, [25]. In the Netherlands, the focus has been on livestock farming, with conclusions identifying price volatility as the primary risk, followed by epidemic animal diseases and farmer deaths, [26]. In the Caribbean and Pacific Islands, fruit and vegetable farmers primarily face marketing and production risks, [27].

In Lithuania, studies have shown a high level of production risk, particularly due to non-productive inputs and plant diseases, [28]. In Slovakia, marketing risk emerged as a priority, followed by natural disasters and contract non-compliance, [15]. In India, major challenges include marketing risks, unfavourable weather, and delays in veterinary services, [29]. In Chile, climate phenomena, price fluctuations, and currency exchange rates are significant concerns, [30].

In the United States, production risks, market risks, and financial risks outweigh personal or legal risks, [21]. Other studies in the United States have concluded that non-climatic resources pose more concerns than climatic ones, [31]. In Norway, uncertainty about expected earnings, fear of inability to continue payments to the state, and debt repayment are considered the primary sources of risk, [32]. In Pakistan, the main concern is frequent changes in agricultural policies, followed by agricultural equipment prices and the absence of agricultural cooperatives, [33].

In Turkey, low-income risk, diseases, and professional inadequacies are significant concerns, [31], [34]. In Kosovo, studies have shown a wide range of risk factors, including legal, financial, market, human resources, and production risks, [35], [36], [37].

Different risk factors are found in different fields of production. Different factors are also found at different times. Therefore, risk events must be studied for each enterprise and at any time.

Two more studies were done in Guri I Zi in 2023. The first study analyzes the regressive relationship of production risk with the events that affect this process and it was concluded that vegetable farms were threatened by flooding and drought, [8].

This study focuses on financing risk. Farmers face financial risk, which is related to the way of financing and the financial condition of the farm.

Farm activity needs liquid funds to finance operations, pay suppliers, loans, and other financial obligations, [23], [26], [38], [39], [40]. Financial risk occurs when money is borrowed to finance the farm business. This risk can be caused by uncertainty about future interest rates, a lender's willingness and ability to continue to provide funds when needed, and the farmer's ability to generate the income needed to repay the loan, [41], [42], [43], [44].

Thereby, we want to prove the hypothesis:

H_1: The financial events of low profits, excessive debts, and rising loan interest rates have serious impacts on financial risk.

The financial risk factors perceived by farmers, in studies in the intensive poultry production industry in Kosovo, follow the trend of damages, which means the perception is consistent with the value of damages. Financial risk events have a large standard deviation (€46,900), but a small dispersion of 33%, [35].

3 Materials and Methods

3.1 Definition of Statistical Concepts
The main variables of our study are "Financial risk" as a dependent variable and "Financial risk sources" as independent variables (Table 1).

Table 1. Concepts of the model

Financial risk(Y)	1) Low profits (X_1)
	2) Excessive debts (X_2)
	3) Increase in loan interest (X_3)
Dependent variable	**Independent variables**

Source: Authors' elaboration

3.2 Qualitative Evaluation of Variables
In this study, a risk assessment method was applied, based on a rating scale from 1 to 5, known as the Likert scale. This method is widely known and used in numerous studies, especially in risk analysis within the agricultural context, [45], [46], [47], [48]. Assessments were done to identify and evaluate the three most significant financial risk events in vegetable farms. The assessment technique and outcomes are reported in Table 2 of the study. This assessment approach assists in identifying and analyzing the financial risk in the context of agricultural enterprise, providing a basis for taking further steps to manage and reduce this risk for farmers.

Table 2. Turning concepts into variables

Method of measurement	Assessment
1-Very low risk	1-260
2-Low risk	261-520
3-Average risk	521-780
4-High risk	781-1,040
5-Very high risk	1,041-1,300

Source: [8]

3.3 Preliminary Survey Preparation
Based on the literature, [8], [18], [26], [49], [50], and the specific situation of vegetable farms in the administrative unit "Guri I Zi," a questionnaire with three open-ended questions was developed. The study included 3,500 farmers from the area. The inability to survey all farmers led to the selection of a sample as follows, [51], [52], [53].

$$n_0 = \frac{Z^2 pq}{e^2} \qquad (1)$$

Where Z = 1.96; p =0.5; q = 0.5 and e = 0.05, n_0 is calculated:

$$n_0 = \frac{1.96^2 * 0.5 * 0.5}{0.05^2} = 385 \, farmers \qquad (2)$$

In our case, the population consists of 3,500 farmers and we can slightly reduce it, [51], [53].

$$n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}} \qquad (3)$$

Where n is the sample size and N is the population size equal to 3,500.

The sample size of the study is:

$$n = \frac{385}{1 + \frac{(385 - 1)}{3500}} = 260 \, farmers \qquad (4)$$

3.4 Survey, Data Collection and Analysis
To assess how farmers perceive the impact of three financial risk factors, 260 farmers were individually interviewed. The interviews were conducted randomly, ensuring that each farmer had an equal chance of representation. Their responses were initially recorded in Excel and then elaborated in Table 4 for reference and further analysis.

The study aimed to better understand farmers' varied perceptions of financial risks in the agriculture industry, with an emphasis on how they understand and handle these risks. We sought to get in-depth information directly from farmers through

one-on-one interviews so that we were able to understand their challenges and points of view.

Randomly selecting interviewees aimed to minimize bias and ensure a diverse representation of farmers from various backgrounds and farm sizes. This approach aimed to get an in-depth understanding of the financial risk environment in the study area's agricultural community.

Farmers' perceptions of financial risk indicators were documented in Excel, which made data administration and analysis easier. This allowed us to find patterns, trends, and correlations in the data. The data tabulation that followed in Table 3 offered an organized structure for referring to and carefully analyzing the gathered data.

Table 3. Farmers' Responses on the perceptions of Financial Risk events

Financial risk events	Likert rating				
	1	*2*	*3*	*4*	*5*
Earnings lower than expected	0	0	0	100	160
Excessive debts	15	25	70	90	60
Increase in loan interest	0	40	70	140	10
Financial risk	15	25	30	110	80

Source: Authors' elaboration

The survey data were collected and processed in the Excel program. Then they were analyzed in the Gretl program. The theoretical multiple linear regression model specification is:

$$Y = a + bX_1 + cX_2 + dX_3 + e \qquad (5)$$

3.5 Statistical Model Estimation

Multifactorial regression analysis is a widely used method in social and economic sciences to understand complex relationships among different variables, [54], [55], [56], [57], [58], [59]. This method is important in socio-demographic research and financial risk analysis due to its ability to identify relationships and effects among various factors.

In the case of studies on financial risk, multifactorial regression analysis can be used to understand how other factors, such as financial events, impact the financial risk of a subject. Through the use of the coefficient of determination (R^2) and the Pearson correlation coefficient, this method can show how much of the changes in independent variables (such as financial events) are explained by changes in dependent variables (such as financial risk).

In our research, Fisher's F-test and critical values of Fisher's were used to assess the statistical significance of the model. Furthermore, the statistical significance of variables was determined through the p-value (P-value), allowing us to understand which factors have a significant impact on the financial risk of farmers in the context of our study.

Overall, multifactorial regression analysis provides a consistent tool for assessing and analyzing the influence of different factors, helping us better understand the dynamics and complexity of market risk in the context of our scientific research.

4 Problem Solution

In another study, the perception of vegetable farmers in this area about the five main risks was measured and evaluated according to the Likert scale, [8]. The data are shown in Table 4 and Figure 2.

Table 4. Farmers' perception of the five main risks on the farm

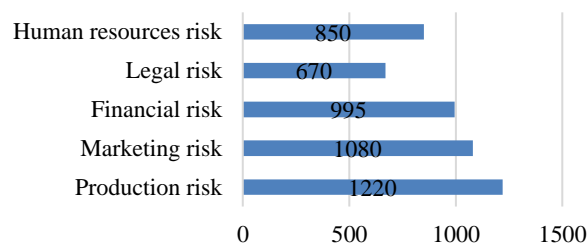| Segment	The five main risks	Perceptions	
1,041-1,300	Production risk	1,220	(i) Very high
1,041-1,300	Marketing risk	1,080	(ii) Very high
781-1040	Financial risk	995	(iii) High
781-1040	Human resources risk	850	(v) High
521-780	Legal risk	670	(iv) Average

Source: [8]

Fig. 2: Farmers' perception of the five main risks
Source: [8]

According to Table 4 and Figure 2, the financial risk is rated the third in terms of importance, after the production risk and marketing risk, followed by the human resources risk, and finally the legal risk.

4.1 Descriptive Analysis of Financial Risk

The perception of suggested sources of financial risk is presented in Table 5 and Figure 3.

Table 5. The importance of the market risk variables

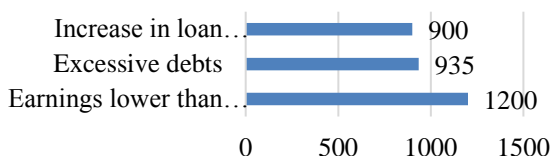| Seg ment	Source of financial risk	Perception	
[1041-1300]	Earnings lower than expected	1 200	(i) Very important
[781-1040]	Excessive debts	935	(ii) Important
[781-1040]	Increase in loan interest	900	(iii) Important

Source: Authors' elaboration

Fig. 3: The importance of financial risk variables
Source: Authors' elaboration

As we see from Table 5 and Figure 3, low profits are perceived as very important, followed by excessive debts and high loan interest rates.

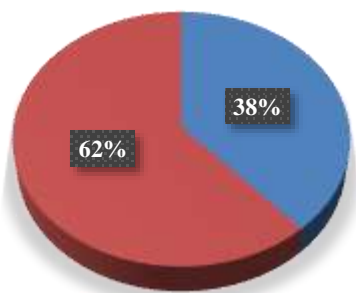The perception of 260 farmers in percent for lower profits is presented in Figure 4.

Fig. 4: Perception of low profits
Source: Authors' elaboration

Regarding the perception of risk for low profits among 260 surveyed farmers, 38% or 100 farmers evaluate it with a high impact, and 62% or 160 farmers evaluate it with a very high impact.

The perception of 260 farmers in percent about excessive debts is presented in Figure 5.
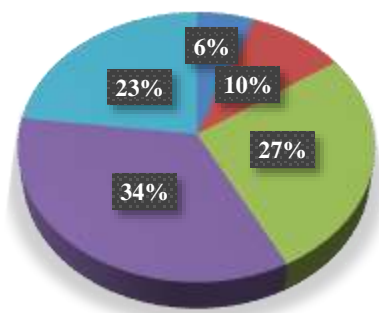

Fig. 5: Perception of excessive debts
Source: Authors' elaboration

Regarding the perception of excessive debts by 260 surveyed farmers, 6% or 15 farmers evaluate it with very low impact, 10% or 25 farmers evaluate it with low impact, 27% or 70 farmers evaluate it with medium impact, 34% or 90 farmers rate it as high impact, and 23% or 60 farmers rate it as very high impact.

The perception of 260 farmers in percent for the increase in loan interest rates is presented in Figure 6.
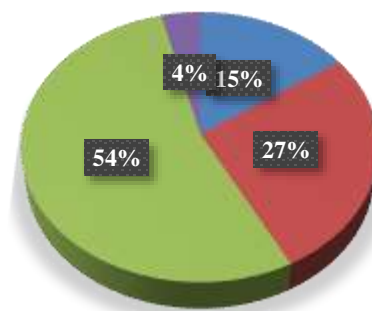

Fig. 6: Perceptions of the increase in loan interest rates
Source: Authors' elaboration

Regarding the perception of risk in the increase in loan interest rates, among 260 farmers surveyed, 15% or 40 farmers evaluate it with low impact, 27% or 70 farmers evaluate it with medium impact, 54% or 140 farmers evaluate it with high impact, and 4% or 10 farmers rate it with very high impact.

According to the data in Table 3 and the statistical descriptions in Figures 4, 5, and 6, the individual perceptions of 260 farmers regarding the four financial risk events are considerably different. They have a higher perception of low profits. Diverse is the perception of excessive debts and high loan interest rates.

4.2 Analysis of Statistical Results

The reliability of the questionnaire was assessed according to Cronbach's alpha, [60].

$$a = \left(\frac{k}{k-1}\right)\left(\frac{S_y^2 - \sum S_i^2}{S_i^2}\right) \qquad (6)$$

For our study:

$$a = \left(\frac{3}{3-1}\right)\left(\frac{5,317 - 2,11}{5,317}\right) = 0,9 \qquad (7)$$

Alfa Cronbach is 90%, meaning that the questionnaire results are reliable.

4.2.1 Multivariate Regression Analysis

The analysis of the results from Table 6 indicates a statistically significant relationship between variables X_2 and X_3 and the variable Y. Variables X_2, representing excessive debt, and X_3, determining the increase in credit interest rates, are significant at the level of statistical significance with a p-value <0.01 and p-value <0.05 respectively. This suggests that changes in excessive debts and credit interest rates have a considerable impact on variable Y.

On the other hand, the variable X_1, which represents low profits, does not show a statistically significant relationship with variable Y, having a p-value >0.05. This means that changes in low profits do not have a significant or obvious impact on variable Y in this analysis.

These findings contribute to a better understanding of the relationships and impacts between the studied variables, enhancing the understanding of the dynamics of their changes in the context of variable Y.

Table 6. P-Value of variables

	Coefficient	Std. Error	t-ratio	p-value	
const	0.690025	0.324703	2.125	0.0345	**
X_1	−0.148118	0.104201	−1.421	0.1564	
X_2	0.876412	0.0624497	14.03	<0.0001	***
X_3	0.194322	0.0983481	1.976	0.0492	**

Table 7. Fisher's Critical value and correlation

Mean dependent var	3.830769	S.D. dependent var	1.143310
Sum squared resid	45.21117	S.E. of regression	0.420245
R-squared	0.866458	Adjusted R-squared	0.864893
F (3, 256)	553.6665	P-value(F)	1.4e-111

In addition to the significance of the variables, we also assess the overall significance of the model, where the current value of the Fisher statistic exceeds the critical value of the Fisher statistic, thus accepting hypothesis H_1. The adjusted R-squared coefficient indicates that 86% of the financial risk is determined by variables X_2 and X_3 (Excessive debt and High credit interest rate) *(See Table 7)*. After excluding the insignificant variable,

The regression equation takes the form:

$$Y = 0.690025 + 0.876412X_2 + 0.194322X_3 \tag{8}$$

From the regression equation, we observe that the relationship between financial risk and the independent variables X_2 (Excessive debt) and X_3 (High credit interest rate) is positively correlated.

5 Conclusions and Recommendations

Albania enjoys very suitable climatic conditions for agricultural development. In the two previous studies, the main production risks have been identified, which include floods, drought, and market risks, where high competition was found to be the most important, [8]. This is an important step in understanding the challenges faced in this area. But the financial risk is also one of the five main risks of the farm (production risk, market risk, legal risk, and human resources risk). Therefore, in this study, we have analyzed the financial risk. We suggest to researchers in the future to analyze the legal risk and the risk of human resources. This will enable farmers to be aware of all risk events in this venture.

In our statistical analysis, it was found that the perception of financial risk consists of excessive debts and high interest rates of loans. Only two variables (X_2 and X_3) are statistically significant. Hypothesis H_1 is partially accepted. To be more objective, statistical analysis has shown that excessive debts have a high impact, while interest rates have a small impact. The percentage of high debts and interest together is 86%.

To cope with these risks, one suggestion is to focus on subsidy schemes, seeking support from local authorities and even from larger institutions such as the European Union, [61]. It is important to emphasize that the identified risks, especially in the financial aspect, have a significant impact on the field of production and can have significant consequences on the sustainability of the farm.

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