Vegetable Farmers' Perception of Production Risk Sources and Environmental Aspects – Descriptive Statistical Analysis and Multifactorial Linear Regression

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Abstract: - Farmers make decisions with incomplete information. Industrial producers can determine the number of products they produce using different inputs. Farmers find it impossible. The paper aims to measure farmers' perception of sources of production risk. For this purpose, a questionnaire was designed based on the researched literature and the reality of the farms. We conducted face-to-face interviews with 260 farmers to assess how they assess sources of production risk. We measured perception using a 1-to-5 Likert scale psychometric rating.

From the descriptive statistical analysis, the perception of the farmers for the production risk is very high. Also, the perception of the five sources of risk (drought, flooding, low temperature, non-quality factors of production, and damage) varies from high to very high. While from the regression analysis, the statistically significant variables are drought and flood. Their impact is 86% on production risk.

Key-Words: - Risk, source, event, perception, production, technical, management.

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1 Introduction

Agricultural risks are a constant challenge for farmers, with various types of risks to manage, [1], [2], [3], [4], [5], [6], [7], [8], [9], [10], [11]. Researchers have categorized these risks into five main categories, including production, market, financial, legal, and human resource risks, [7], [8], [9], [10], [11], [12], [13], [14], [15], [16], [17], [18], [19], [20], [21]. When making decisions, farmers must consider these different threats.

Farmers should be aware of five critical risks in agriculture, [21]. These are the most significant risks that can affect their farms. Our research focuses on identifying sources of production risk in agriculture. A critical threat to the production process is the presence of pests that can reduce crop yield and result in product loss. Production risks stem from unsafe planting, growing, and producing crops. The primary sources of production are bad weather, pests, and diseases, [8], [9], [10], [14], [22], [23], [24], [25], [26], [27], [28], the biological cycle, [19], equipment breakdowns, globalization, and free trade agreement, [19], [29], [30].

In agriculture, the products are diverse. According to the direction of production, the farms are: for the production of arable plants; vegetable production; for production of fruit trees; fodder production; zootechnical products; cattle products; small products; and poultry products; the production of fish and seafood, for the production of ornamental plants; for the production of medicinal plants, etc.

Our research investigates how farmers in the Gur I Zi administrative unit in Shkodër municipality, Albania, perceive production risk sources. We have developed and tested a model that links farm risks to resources and provides ways to manage risks. The administrative unit has an area of about 81.7 km2 and 11,800 inhabitants. About 3,000 to 3,100 families in this organizational unit deal with agriculture and livestock. Agriculture is the main activity. Farmers realize 42% of vegetable production in this region, [31], [32], [33].

Currently, there are no existing studies conducted in the region of Shkodra. We have reviewed the latest research about vegetables in

Albania. They are qualitative and few. Our study used a combination of qualitative and quantitative analyses. Specifically, in issue 4.1, we presented a descriptive qualitative based on farmers' perceptions, followed in issue 4.2 by a quantitative multifactorial regression analysis.

The search is unique in terms of the method used. The research results will serve farmers, field researchers, and local government, [8], [9], [10]. The research concludes by providing recommendations for managing production risk events. In conclusion, our research is innovative. The paper will inspire the authors and other researchers to research in the Guri I Zi administrative unit, market risk, financial risk, legal risk, and human resource risk in vegetable farms.

2 Literature Review

When conducting research, two primary concepts are utilized risk and production risk. However, the meaning of risk is often difficult to comprehend due to its complexity and widespread usage.

One of the meanings is that risk is uncertainty, [15], [21], [34]. Risk is favorable for someone and unfavorable for someone else. Misfortune is often associated with risk, [15], [21]. Risk is usually measured by considering both its consequences and probability, [21]. Investing in the market from an entrepreneurial perspective is about entrepreneurship, [15], [21].

Production risk arises from the unpredictable natural growth processes of crops and livestock. Many factors can affect the quantity and quality of goods, including weather, disease, pests, technology, free trade agreements, and globalization, [8], [9], [10], [19], [29], [30].

There are numerous studies on risk in agriculture, but the need for other studies continues for geographical, economic, and time reasons, [8], [9], [10]. Unforeseen events with significant impacts continue to occur to farmers, suggesting that risk has changed over time, [35], [36]. The challenges to the agricultural sector are many. These challenges make risk management in agriculture more critical than ever, [37], [38], [39], [40]. However, whether farmers' exposure to risks has increased over time remains an open question, [41].

From what we presented above, our research hypothesis is as follows:

The hypothesis: Risk events, such as drought, floods, temperatures, non-quality production factors, and diseases/pests, severely affect production risk.

There is a risk of decreased production or yield due to factors outside the farmer's control, such as weather and technology, which may result in losses, [42].

Studies show that farmers' perspectives are greatly affected by their gender, age, family situation, farm size, and desire to make a living, [43]. In Albania, vegetable farmers in the district of Korça have rated financial risk high, followed by marketing, political/legal, human resources, and production risks. Farmers in Albania face production risks such as low yield and poor quality due to such problems as soil salinity, pests, diseases, and unsuitable seeds and seedlings. During the last few years, Albania's lack of human resources has become a critical risk for agriculture, [44]. The reasons for the lack of human resources in the agriculture sector in Albania are migration and emigration in the last three decades. In the 90s of political upheaval (transition from the centralized socialist system to the market economy system), the Albanian society emigrated mainly to Greece and Italy. Meanwhile, there was a massive displacement of the agricultural population in the urban regions, specifically in Tirana (the capital) and Durrës (the economically important region), [45], [46]. Even today, in the Western Balkans, Albania is among the countries with the greatest emigration needs in the countries of the European Union, the United States of America, Canada, and Australia. Therefore, human resources in the agricultural sector are in a critical situation, [47], [48].

The country's challenging climate further exacerbates these concerns, [49], [50], [51], [52], [53]. Climate change has a more significant negative impact on smallholder farmers in Albania, [52], highlighting the need for management to understand the consequences of climate change and for government-led interventions to help farmers, [52], [54], [55].

Figure 1 presents a visual view of the research problem, the formulation of the proposed hypothesis, the selection of data, the methodology to verify the hypothesis, conclusions, and recommendations. The arrow shows the role of the government in the development of agriculture. Without the care of the government, there is no development of agriculture.

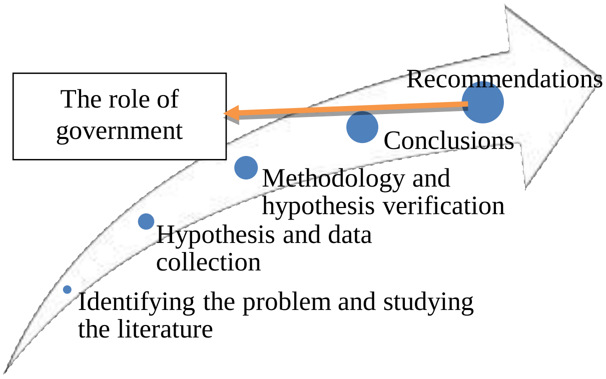

Fig. 1: Conceptual framework of the study
Source: Authors' elaboration

3 Materials and Methods

3.1 Turning Concepts Into Statistical Variables

As we have emphasized above, the concepts of our model are two: (i) Risk; and (ii) Sources of risk. These concepts are more divided explicitly as follows (Table 1):

Table 1. Concepts of the model

I) Risk	**II. Sources**
Production risk (Y)	1) Drought (X_1)
	2) Flood (X_2)
	3) Very high/low temperatures (X_3)
	4) Non-quality factors of production (X_4)
	5) Disease/pest (X_5)
Dependent variable	Independent variables

Source: Authors' elaboration

Table 2 shows how we have translated abstract ideas into quantifiable variables for the study.

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: Authors' elaboration

3.2 Data Collection

We conducted a study that surveyed 260 farmers and collected primary statistical data. We evaluated their perceptions using the Likert scale, which ranged from 1 to 5, and the results are presented in Table 3, and Table 4. Table 3 presents the farmer's perceptions of the five main risks, and Table 4 presents the farmers' perceptions of the five production risk events taken in the study.

Table 3. Farmers' perception of the five main risks in agriculture

Farm risks	**Likert rating**				
	1	2	3	4	5
Production risk	0	0	0	320	900
Marketing risk	5	30	60	460	525
Financial risk	15	50	90	440	400
Legal risk	35	200	195	240	0
Human resources risk	15	60	330	320	125

Source: Authors' elaboration

Table 4. Farmers' responses on the perceptions of production risk events

Production risk events	Likert rating				
	1	***2***	***3***	***4***	***5***
Drought	0	100	270	440	50
Flood	0	0	0	360	850
Very high/low temperatures	0	0	90	460	575
Non-quality factors of production	10	180	30	440	200
Disease/pest	0	0	75	360	725

Source: Authors' elaboration

3.3 The Methodology Used

In this research, we have combined descriptive statistical analysis (qualitative perceptual analysis) with multifactorial regression statistical analysis (quantitative analysis). These data are been from direct meetings with farmers. These data are first entered in Excel. Then their processing was done in the SPSS program.

The variables were connected through the multiple linear regression model. Here's how the model is presented:

$$\mathbf{Y_i=a+bX_1+cX_2+\dots X_n+e}$$

We compared the actual Fisher (F_f) with the critical Fisher (F_k) to determine whether the model was statistically significant. Sig./(P-value) determines the statistical significance of the dependent variable. R^2 is the coefficient of determination, which indicates how much of the dependent variable is determined by the independent variable. Pearson's Correlation Coefficient shows the relationship between variables.

4 Problem Solution

To address the issue, we analyzed the farmers' perceptions through descriptive analysis and conducted a multifactorial regression analysis for quantitative analysis.

4.1 Descriptive Analysis

First, we present the farmers' perception of the five main risks in agriculture and then the perception of production risk events.

4.1.1 Descriptive Analysis of the Five Main Risks

Table 5 and Figure 2 present the farmers' responses to the five main risks. In the first column of Table 5 are the assessment segments according to Table 2, in the second column are the five main risks, and in the third column are the farmers' perceptions of each risk. These perceptions are the summaries of the perceptions according to the Likert scale in Table 3. In column four are the evaluations in question according to the evaluation method in Table 2.

Table 5. 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: Authors' elaboration

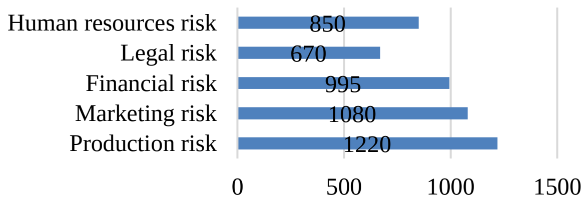

Fig. 2: Farmers' perception of the five main risks
Source: Authors' elaboration

From the above, we find that farmers have a very high perception of production risk, followed by marketing risk. They have a high perception of financial risk, followed by human resources risk. They have an average perception of legal risk.

4.1.2 Descriptive Analysis of Five Production Risks

Table 6 and Figure 3 present the farmers' responses to the five production risk events taken in the study. In the first column of Table 6 are the assessment segments according to Table 2, in the second column are the five main risks, and in the third column are the farmers' perceptions of each risk. These perceptions are the summaries of the perceptions according to the Likert scale in Table 3. In column four are the evaluations in question according to the evaluation method in Table 2.

Table 6. Importance of production risk variables

Segment	The source of production risk	Perceptions	
1,041-1,300	Flood	1,210	(i) Very high
	Disease/pest	1,160	(ii) Very high
	Very high/low temperatures	1,125	(iii) Very high
781-1,040	Non-quality factors of production	860	(v) High
	Drought	860	(iv) High

Source: Authors' elaboration

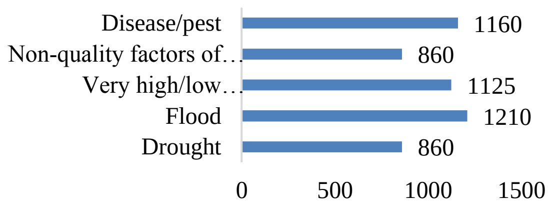

Fig. 3: Importance of production risk variables
Source: Authors' elaboration

From the above, we conclude that farmers highly perceive floods, followed by diseases/pests and temperature fluctuations. They have a high perception of non-quality factors and droughts.

4.2 Analysis of Statistical Results

Initially, all independent variables underwent testing. As found in Table 7 (Appendix), especially in columns 5 and 6, the variables low temperatures, non-quality production factors, and diseases and pests are statistically insignificant (Sig. or P-value/statistical significance is above 0.05). Specifically, in Table 7 (Appendix), we read Sig. or P-value is greater than 0.05. For low/high temperatures, it is 0.968. For non-quality production factors, it is 0.152. For diseases/pests, it is 0.813.

In conclusion, H_1 will be accepted for the variables "drought" and "flooding" and rejected for "non-quality inputs", "high/low temperatures", and "diseases/pests".

The regression model continues with the drought and flood variables, which are statistically very significant (almost 100% significance). Their statistical significance is for droughts Sig., or the P-value is 0.001, and for floods Sig., or the P-value is 0.00. (Table 8, Appendix).

The regression equation is $\mathbf{Y=X_1+X_2}$, where X_1 is drought and X_2 is flood.

Table 9 (Appendix) summarizes the model taken in the study for production risk. The correlation coefficient R indicates a strong relationship between the dependent and independent variables. The coefficient of determination R^2 shows that 86% of the variance caused by production risk is explained by drought and flooding (Table 10, Appendix).

The independent variables, drought, and flooding, are not related to each other. Pearson's Correlation Coefficient is equal to 1. It indicates the positive relationship of Y with X_1 and X_2. (Table 11, Appendix).

5 Conclusions and Recommendations

Based on our descriptive statistical analysis, it turns out that farmers perceive the five main risks from medium to very high (Table 5). They exhibit a very high perception of production risk, which was the focus of our research. For five production risk events, their perception is very high for three sources such as flood, disease/pest, and high/low temperature. For the other two events (non-quality factors and drought), the perception is the same and is rated high (Table 6).

But, the regression analysis results present us with a different situation. Droughts and floods are statistically significant factors. Their impact on the risk of vegetable production is 86%. The other three independent variables, such as low temperature, non-quality factors of production, and pest control, are not statistically significant. So we conclude that the perception of farmers does not match the results of the regression analysis.

A 2002 study recommended that farmers promote integrated pest management strategies because of growing concerns about the harmful effects of pesticides on the environment, human health, and plant and wildlife life, [44]. Another 2022 study recommends farmers do soil and water analysis before they invest, use chemicals to reduce salinity (but at a high cost), increase funding to protect plants, and buy certified seedlings, [56]. The economy depends on the environment as it uses natural resources for production and generates waste in various forms. Research indicates that continuing this trend could result in significant climate change, the depletion of natural resources, and harm to the ecosystem, [57].

Production risk is one of the most critical risks for vegetable farmers. The five production risk events show that the perception does not match the regression analysis. Even because the risk perception for low temperatures, substandard production factors and defects, and pests vary from high to very high, they are statistically insignificant. Farmers should focus on drought and floods. These two events are statistically significant. The negative impact of these two events cannot be managed and prevented by farmers. Government intervention is necessary to reduce damage from floods and drought. These two sources of vegetable production risk require strategic investments.

Institutional support and transparency are necessary to guarantee the advanced development of agriculture. The countries of the European Union provide this support through the Common Agricultural Policies, [58].

References:

[1] Huirne, R. B. M. (2003). Strategy and risk in farming. Pages 249-259. https://doi.org/10.1016/S1573-5214(03)80010-6

[2] Shannon, H., & Motha, R.P. (2015) Managing weather and climate risks to agriculture in North America, Central America and the Caribbean. Weather Clim. Extrem, 10, 50–56. https://doi.org/10.1016/j.wace.2015.10.006

[3] Ullah, R., Shivakoti, G. P., & Ali, G. H. (2015). Factors affecting farmers' risk attitude and risk perceptions: The case of Khyber Pakhtunkhwa, Pakistan. Int. J. Disaster Risk Reduct. https://doi.org/10.1016/j.ijdrr.2015.05.005

[4] Gunduz, O., Ceyhan, V., Aslan, A., Bayramoglu, Z. (2016). Determinants of farmers' risk aversion in apricot production in Turkey. Int. J. Manag. Appl. Sci. 2016, 2, 149–155.

[5] Riwthong, S., Schreinemachers, P., Grovermann, C., & Berger, T. (2017). Agricultural commercialization: Risk perceptions, risk management and the role of pesticides in Thailand. Kasetsart Journal of

Social Sciences, 38(3), 264-272. https://doi.org/10.1016/j.kjss.2016.11.001

[6] Saqib, S. E., Ahmad, M.M., Panezai, S., & Ali, U.(2016). Factors influencing farmers' adoption of agricultural credit as a risk management strategy: The case of Pakistan. Int. J. Disaster Risk Reduct. 2016, 17, 67–76. doi 10.1016/j.ijdrr.2016.03.008

[7] Jankelova. N., Masar, D., Moricova, S. (2017). Risk factors in the agriculture sector. Agric. Econ. – Czech, 63, 2017 (6): 247–258. doi: 10.17221/212/2016-AGRICECON

[8] Ndregjoni, A., Murrja, A., Prendi, L. (2023). Analysis of Legal Risk in Farms of Intensive Chicken Production - The Case of Kosovo. WSEAS Transactions on Environment and Development, vol. 19, pp. 655-667. DOI: 10.37394/232015.2023.19.64

[9] Murrja, A., Ndregjoni, N., Maloku, S., & Prendi, Ll. (2022). Aggressiveness of market risk events and their management in intensive chicken breeding farms in Kosovo. Spesialusis Ugdymas 2(43):386-402

[10] Murrja, A., Ndregjoni, A., Kapaj, I., Maloku, S., Kapaj, A. (2022). Financial Risk Analysis inthe Intensive Poultry Growth in The Republic of Kosovo. International Journal of Economics and Finance Studies, 14 (03), 366-387. doi:10.34111/ijefs. 20220078

[11] Murrja, A. (2023). *Risk analysis of human resources in the farms of intensive rearing of chickens in Kosovo*. Conference: International Balkan and Near Eastern Social Sciences Congress Series on Economics, Business and Management-Plovdiv, Bulgaria. Proceedings of XIX. ISBN: 978-619-203-339-2.

[12] Harwood, J., Heifer, R., Coble, K., Perri, J., & Somwaru, A. (1999). Management Risk in Farm. No 34081, Agricultural Economic Reports from United States Department of Agriculture Economic Research Service. doi: 10.22004/ag.econ.34081

[13] Schaffnit-Chatterjee, C. (2010). Risk management in agriculture. Towards market solutions in the EU, pp. 3-4; 17-19

[14] Girdžiūtė L. (2012). Risks in Agriculture and Opportunities of their Integrated Evaluation.Procedia: Social and Behavioral Sciences. Volume 62. Pages 783–790. doi: 10.1016/j.sbspro.2012.09.132

[15] Murrja, A., Troka, P., Ndregjoni, A. Shehu, E. (2019). Explanatory and argumentative essay on the risk of entrepreneurship definition of business risk. Business and Economics, Nuremberg, Germany 2019. International Conference II. ISBN 978-3-9819288-3-2, p.89-98.

[16] Komarek, A. M., De Pinto, A., & Smith, V. H. (2020). A review of types of risks in agriculture: What we know and what we need to know. Agricultural Systems, 178, 102738. https://doi.org/10.1016/j.agsy.2019.102738

[17] Jankelová, N,. Joniaková, Z., Romanová A., Remeňová K. (2020). "Motivational factors and job satisfaction of employees in agriculture in the context of performance of agricultural companies in Slovakia". Agricultural Economics–Czech. Pages 402–412. https://doi.org/10.17221/220/2020-AGRICECON. P. 410-411

[18] Bencová, T., & Boháčiková, A. (2021). How to deal with the global concept of Risk in Agriculture? Comparative overview of the literature. SHS Web of Conferences 92. https://doi.org/10.1051/shsconf/20219203001

[19] Murrja A., Maloku S., & Meço, M. (2021). "Turtle Diagram" as a Tool of Forecasting in the Management of Production Risk in Agriculture - Literature Review. Albanian j. agric. sci. 2021;20 (1): pp. 36-40.

[20] Ranjbar, Z., Chizari, M., Sadighi, H., Farhadian, H., Lebailly, P., Dogot, T., & Azadi, H. (2021). Risk Factors in Various Climates of Wheat Production in Western Iran: Experts' Opinions. Agriculture, 11(12), 1227. DOI: https://doi.org/10.3390/agriculture11121227

[21] Murrja, A., & Ndregjoni, A. (2022). The context of enterprise risk management in agriculture- A literature review. Conference: Business and Management -Ohrid / Republic of North Macedonia XVIII. IBANESS İktisat, İşletme ve Yönetim Bilimleri Kongreler Serisi -Ohrid/Kuzey Makedonya Cumhuriyeti

[22] Aimin, H. (2010). Uncertainty, Risk Aversion and Risk Management in Agriculture. Agriculture and Agricultural Science Procedia. Volume 1. Pages 152–156. https://doi.org/10.1016/j.aaspro.2010.09.018

[23] Antón, J. et al. (2012). A Comparative Study of Risk Management in Agriculture under Climate Change. OECD Food, Agriculture and Fisheries. http://dx.doi.org/10.1787/5k94d6fx5bd8-en

[24] Reynolds-Allie, K., Fields, D., & Rainey R. (2013). Risk Management Issues for Small Farms within Local Food Systems.

[25] Janowicz-Lomott, M.; Łyskawa, K. (2014). The new instruments of risk management in agriculture in the European Union. Proc. Econ. Finance. Volume 9. Pages 321–330. doi: 10.1016/S2212-5671(14)00033-1

[26] Hamdan, R., Othman, A., & Kari, F. (2017). Climate change effects on aquaculture production performance in Malaysia: An environmental performance analysis. *International Journal of Business and Society*, *16*(3). https://doi.org/10.33736/ijbs.573.2015

[27] Rosa, F., Taverna, M., Nassivera, F., & Iseppi, L. (2019). Farm/crop portfolio simulations under variable risk: a case study from Italy. Agricultural and Food Economics. DOI: 10.1186/s40100-019-0127-7

[28] Oliveira, M.F. L., Oliveira, S., Russo, A. T., Bahcevandziev, K., Lopes, A.B.M., Jordão, A. J., Gonçalves, J.M., Nunes, M., & Reis, P.A. (2022). Sustainability of Rice Production at Baixo Mondego, Portugal: Drivers, Risks, and System Improvements Sustainability of Rice Production at Baixo Mondego, Portugal: Drivers, Risks, and System Improvements. doi: 10.4018/978-1-7998-9557-2.ch014

[29] Sulewski, P., & Kłoczko-Gajewska, A. (2014). Farmers' risk perception, risk aversion and strategies to cope with production risk: an empirical study from Poland. Studies in Agricultural Economics 116 (2014) 140-147, http://dx.doi.org/10.7896/j.1414. P.140-147

[30] Duong, T. T., Brewer, T., Luck, J., & Zande K. (2019). A Global Review of Farmers' Perceptions of Agricultural Risks and Risk Management Strategies. Agricultur *9*(1). https://doi.org/10.3390/agriculture9010010

[31] Plani për Menaxhimin e Rrezikut nga Përmbytjet Rajoni Shkodër Pjesa II-5: Plani Vendor Gur i Zi. (2015). https://www.bashkiashkoder.gov.al/web/plani_lokal_mrp_gur_i_zi_4299.pdf

[32] Plani Strategjik i Zhvillimit të Komunës Guri i Zi. (2008). http://www.km.dldp.al/wp-multimedia/pfm/Elaborated_documents_for_LGUs/SDP%202008/Shqip/-Plani%20strategjik%20i%20zhvillimit%20t%C3%AB%20komunes%20GURI%20I%20ZI%20Permbledhje.pdf

[33] Profili i Bashkisë Shkodër. https://www.bashkiashkoder.gov.al/web/profili_i_bashkise_2703.pdf

[34] Hardaker, J. B. (2000). Some Issues in Dealing with Risk in Agriculture. No. 2000-3 – March 2000. ISSN 1442 1909

[35] Bard, S. K., & Barry, P. J. (2001). Assessing Farmers' Attitudes Toward Risk Using the "Closing-in" Method. *Journal of Agricultural and Resource Economics*, *26*(1), 248–260. http://www.jstor.org/stable/40987106

[36] Just, R. E., & Rulon, P. D. (2001). The agricultural producer: Theory and statistical measurement. Handbook of Agricultural Economics. Volume 1, Part A. Pages 629-741. https://doi.org/10.1016/S1574-0072(01)10015-0

[37] Nacinovic, M.G.G.; Mahler, C.F.; de Avelar, A.S. (2014). Soil erosion as a function of different agricultural land use in Rio de Janeiro. Soil Tillage Res. Volume 144. Pages 164–173. https://doi.org/10.1016/j.still.2014.07.002

[38] Chen, Y. H., Wen, X. W., Wang, B., Nie, P. Y. (2017). Agricultural pollution and regulation: How to subsidize agriculture? J. Clean. Prod. Volume 164, 258–264. http://dx.doi.org/10.1016/j.jclepro.2017.06.216

[39] Arif, M.S., Riaz, M., Shahzad, S.M., Yasmeen, T., Ashraf, M., Siddique, M., Mubarik, M.S., Bragazza, L., Buttler, A. (2018). Fresh and composted industrial sludge restore soil functions in surface soil of degraded agricultural land. Sci. Total Environ. Pages 517–527. https://doi.org/10.1016/j.scitotenv.2017.11.143

[40] Ferreira, C.S.S., Keizer, J.J., Santos, L.M.B., Serpa, D., Silva, V., Cerqueira, M., Ferreira, A.J.D., & Abrantes, N. (2018). Runoff, sediment and nutrient exports from a Mediterranean vineyard under integrated production: An experiment at plot scale. Agriculture, Ecosystems & Environment. Volume 256, Pages 184-193. https://doi.org/10.1016/j.agee.2018.01.015

[41] Gilbert, C. L., & Morgan, C. W. (2010). Food price volatility. hil. Trans. R. Soc. B (365), 3023–3034, doi:10.1098/rstb.2010.0139

[42] Hassan, A., A. Farooq, M. Ishaq, G. Sadiq andA. Nawaz. 2023. Risk and coping strategies of vegetable smallholder farmers in Khyber Pakhtunkhwa of Pakistan. Sarhad Journal of Agriculture, 39(2): 440-451. DOI | https://dx.doi.org/10.17582/journal.sja/2023/39.2.440.451

[43] Hayran, S. (2023). Farmers' Flood Risk Perception in Turkey: The Case of Mersin Province. Emirates Journal of Food and

Agriculture, vol. 35, no. 5. Pages 481-487. doi: 10.9755/ejfa.2023.v35.i5.3101

[44] Imami, D., & Skreli, E. (2022). Agricultural Risk A rapid assessment and recommended mitigation mechanisms.

[45] King, R., & Vullnetari, J. (2003). Migration and Development in Albania. Working Paper C5. https://eprints.soton.ac.uk/377327/1/WP-C5.pdf

[46] King, R., & Vullnetari, J. (2006). Ageing & Society, Volume 26, Issue 5, pp 783-816 DIO: https://doi.org/10.1017/S0144686X06005125

[47] King, R., Mai, N., Schwandner-Sievers, S. (2013). New Albanian Migration. https://books.google.com/books?hl=en&lr=&id=W3LEEAAAQBAJ&oi=fnd&pg=PP1&dq=Migration+and+emigration+in+Albania&ots=gwivC9_6wW&sig=7lkzF-gBFSV2gfSeH-H3ugbhzCQ

[48] Dhëmbo, E., Çaro, E., & Julia Hoxha, J. (2021). "Our migrant" and "the other migrant": migration discourse in the Albanian media, 2015–2018. Humanities and Social Sciences Communications 8:317 |https://doi.org/10.1057/s41599-021-00981-w

[49] Baettig, M. B., Wild, M. & Imboden, D. M. (2007). A climate change index: Where climate change may be most prominent in the 21st century. Geophysical Research Letters, 34(1). DOI: 10.1029/2006GL028159.

[50] REC (2011). The Impacts of Climate Change on Food Production in the Western Balkan Region. Z. Ivanyi (Ed), Regional Environmental Center for Central and Eastern Europe. [Online] Available at: http://documents.rec.org/topic-areas/Impacts-climage-change-food-production.pdf [Accessed 22 March 2020].

[51] Sutton, W. R., Srivastava, J. P. & Neumann, J. E. (2013). Looking beyond the horizon: How climate change impacts and adaptation responses will reshape agriculture in Eastern Europe and Central Asia. World Bank Publications.

[52] Zhllima, E., Imami, D., Nam, J., Shoshi, P., & Gjika, I. (2019). awareness of climate change impact and adaptation in agriculture – The case of Albania. European Countryside, Volume 14, no. 4, p. 604-622. doi: 10.2478/euco-2022-0030

[53] Županić et al. (2021). Climate change and agriculture management: Western Balkan region analysis. Energy, Sustainability, and Society 11:51. https://doi.org/10.1186/s13705-021-00327-z

[54] Roco, L., Engler, A., Bravo-Ureta, B. E. & Jara-Rojas, R. (2015). Farmers' perception of climate change in Mediterranean Chile. Regional Environmental Change, 15(5), 867–879. DOI: 10.1007/s10113-014- 0669-x.

[55] Lasco, R. D., Espaldon, M. L. O. & Habito, C. M. D. (2016). Smallholder farmers' perceptions of climate change and the roles of trees and agroforestry in climate risk adaptation: evidence from Bohol, Philippines. Agroforestry Systems, 90(3), 521–540. DOI: 10.1007/s10457-015-9874-y.

[56] Daku, S. L. (2002). Assessing Farm-level and Aggregate Economic Impacts of Olive Integrated Pest Management Programs in Albania: An Ex-Ante Analysis.

[57] Prendi L., & Murrja, A (2023). How Are the Balkan Countries Progressing Toward Green Economy? Review of Economics and Finance (21), p. 212-220. DOI: 10.55365/1923.x2023.21.20

[58] Brazhnyk, L., Ivanyuta, V., Kravchenko, T., Kozak, O., Los, O., & Pavliuk, S. (2023). Harmonization of Agricultural Policy and Economic Security of the EU States. WSEAS Transactions on Environment and Development, vol. 19, pp. 1-10. DOI: 10.37394/232015.2023.19.1.

Appendix

Table 7. Coefficients

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Correlations Zero-order	Correlations Partial	Correlations Part
1	(Constant)	.574	.181		3.168	.002			
	Drought	.099	.034	.176	2.883	.004	.757	.178	.067
	Flood	.850	.044	.873	19.258	.000	.924	.770	.449
	Very Low temperatures	-.002	.051	-.003	-.040	.968	.697	-.003	-.001
	Non quality factors of production	-.031	.021	-.080	-1.437	.152	.795	-.090	-.034
	Diseases/pest	-.012	.052	-.017	-.237	.813	.710	-.015	-.006

a. Dependent Variable: Production Risk

Table 8. Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.703	.121		5.811	.000
	Drought	.069	.020	.123	3.408	.001
	Flood	.807	.035	.830	22.977	.000

a. Dependent Variable: Production Risk

Table 9. ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	47.645	2	23.822	790.991	.000[b]
	Residual	7.740	257	.030		
	Total	55.385	259			

a. Dependent Variable: Production Risk
b. Predictors: (Constant), Flood, Drought

Table 10 -Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.927[a]	.860	.859	.174	.215

a. Predictors: (Constant), Flood, Drought
b. Dependent Variable: Production Risk

Table 11. Correlations

		Production Risk	Drought	Flood
Pearson Correlation	Production Risk	1.000	.757	.924
	Drought	.757	1.000	.764
	Flood	.924	.764	1.000

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