

FINANCIAL KNOWLEDGE, CLIMATE, AND DEMOGRAPHIC RESILIENCE AS KEY FACTORS TO FINANCIAL INCLUSION AND SUSTAINABLE DEVELOPMENT

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Abstract

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The main objective of the research study was to assess the important factors that influence the sustainable development of agriculture, the financial inclusion of farmers, as well as their perceptions regarding financial resources in Albania. Financial inclusion is key to obtaining sustainability (Arner et al., 2020). In the context of factors such as climate and demographic changes that make sustainable agricultural production difficult, it is important to assess the factors that positively and negatively affect the performance of Albanian farmers as well as their readiness to develop sustainable and environmentally friendly agricultural products. A questionnaire was created for the study purpose and shared with 207 farmers in Albania. The results of the study indicate the existence of barriers that prevent Albanian farmers from accessing financial resources and markets, relatively low financial inclusion, and low awareness of the benefits of developing sustainable agriculture. In conclusion, it is very important to increase the financial inclusion of farmers in Albania and to improve their attitude towards sustainable development to achieve sustainable agricultural products and sustainable financial performance.

Keywords: Financial Knowledge, Climate Change, Demographic Change, Financial Inclusion, Sustainable Agriculture

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1. INTRODUCTION

The sustainable development of the agriculture sector in Albania is very important for economic development, economic growth, and promoting sustainable well-being, as agriculture in Albania has a significant contribution to the country's gross domestic product (GDP), with over 18% (Muça et al., 2022). The contribution of the agricultural sector in Albania has been greater in the previous ten years and has been reduced due to many factors, such as demographic and climatic factors, lack of financial inclusion, and lack of appropriate incentive policies to promote sustainable development in this sector, and a country's growth. The development of agriculture remains a key priority for Albania due to geographical and climatic factors, weak industrial development, connection with rural, historical, and cultural tourism, as well as with the territorial and economic development strategy (Gjoni et al., 2024). There are several limitations, barriers to the sustainable development of agriculture, like a lack of ability to obtain financial resources, manage the resources effectively, plan, budget, cost, and analyze, make proper decisions, and use sustainable techniques of producing their products (Eswaran et al., 1993). In the past agriculture policies neglected slow and sustainable techniques and methods of producing agricultural products (Parikh, 2013). Sustainable development refers to the evolution of our planet by respecting nature, the environment, and life of all living (Batie, 1988). The recent climate change events have caused many negative effects to agriculture products in Albania. Greenhouse gas (GHG) emissions and deforestation have caused damage to the environment and to crops. Food insecurity is becoming a problem as farmers tend to use unfriendly environmental agricultural practices (Raza et al., 2023). For developing countries like Albania, implementing innovative techniques of environmental friendliness seems difficult (Šarić et al., 2023). Some factors influencing the sustainable development of the agriculture sector are crucial, such as financial knowledge and financial inclusion (Mabula & Ping, 2018). Financial knowledge is achieved with education and training and helps improve financial behavior, financial decision-making, and adopt innovative practices (Kodoya & Khan, 2020). In the first studies, financial literacy and financial knowledge have been considered the same concept, but the U.S. Financial Literacy and Education Commission and Jump\$tart Coalition for Personal Financial Literacy used both financial knowledge and ability in their definition (U.S. Financial Literacy & Education Commission, 2006; Jump\$tart Coalition for Personal Financial Literacy, 2007). Financial literacy is defined as the ability to use financial and general knowledge, as well as personal skills, to manage financial resources effectively and achieve sustainable, successful performance. Individuals, and in this case, farmers, should convert financial knowledge into sustainable, environmentally friendly practices to achieve sustainable agriculture products and performance (Ye & Kulathunga, 2019). To improve the financial well-being of individuals and society and to facilitate participation in economic life, financial literacy is defined by the Organisation for Economic Co-operation and

Development (OECD, 2017) as the knowledge and understanding of financial concepts and risks, and the skills, motivation, and confidence to apply this knowledge and understanding to make effective decisions across a range of financial contexts. Financial knowledge, if used properly in making financing and investment decisions, leads to financial ability (Ribaj et al., 2020). Financial knowledge is obtained by the education system, the trainings and the information shared through government channels or programs and projects (Gjoni & Muça, 2022). In the case of farmers, they should take advantage of the knowledge provided through the vet education system in Albania, or through trainings offered in the framework of European Union (EU) Projects, national projects, projects from the ministry of agriculture and rural development, or program trainings offered from ministry of finance and the tax office (Shehi et al., 2025). Financial ability of farmers represents their skills to find proper resources for their farming activities, use them efficiently, and make it possible to be repaid in time and achieve sustainable performance (Mexhuani & Ribaj, 2018). Farmers' access to financial resources is impacted by different factors such as their age, gender, education, farm size, place of residence, experience, and other factors (Pejkovski & Ribaj, 2019). Other factors are related to the distance from the financial institutions in Albania, the attention from government programs through trainings, and the terms of credit offered by financial institutions (Gjoni et al., 2022). Other important factors can be the perception of farmers of the financial institution, their trust in it, and their basic relationship with it through having an account or debit/credit card (Gjoni-Karameta et al., 2021). Another very important factor is the willingness of financial institutions to design financial products that are tailored to farmers' needs. Other factors that may have influenced the financial inclusion of farmers in Albania can be related to demographic and climate changes (Amari & Anis, 2021). The agricultural sector in Albania has been very impacted by climate change effects in the last decade (Zhlhima et al., 2022). Improving farmers' understanding and resilience would be crucial to obtaining sustainable agriculture production and performance. This study is very important because it explores the main factors influencing sustainable agriculture in Albania, financial inclusion, and financial performance. The existing studies do not explore the relationship between financial knowledge, climate, demographic changes, and sustainable agriculture performance. There are only a few studies in Albania that indicate the low levels of financial literacy of farmers in Albania, but do not indicate the relationship between the low financial literacy and financial inclusion, sustainable agriculture, and financial performance. This study aims to evaluate the key factors influencing sustainable agriculture performance in Albania through farmers' financial inclusion. This study could be a starting point to design government policy that can improve the factors influencing financial inclusion, sustainable agriculture, and the financial performance of farmers in Albania to make it possible for this sector become a motor of the Albanian economy, the main

contributor to GDP. The main research questions of our study are:

RQ1: What is the level of financial knowledge of farmers in Albania?

RQ2: What is the impact of climate change effects in agriculture production of farmers in Albania?

RQ3: What is the impact of demographic change effects in agriculture production of farmers in Albania?

RQ4: Are farmers in Albania aware of sustainable agriculture practices?

RQ5: What is the impact of financial knowledge to financial inclusion of farmers in Albania?

The structure of the paper is as follows. Section 1 indicates all the factors that are influencing the sustainable development of the agricultural sector in Albania. Section 2 reviews the relevant literature. Section 3 shows the methodology that has been used and the potential research methods. Section 4 analyzes all the results of the study. Section 5 discusses the results. Section 6 present main conclusions.

2. LITERATURE REVIEW

The term financial inclusion refers to practices, initiatives, and programs that make it possible for financial products and services to be available for all categories of individuals and enterprises (Dev, 2006). The main objective of financial inclusion of farmers in Albania should be to eliminate barriers that prevent farmers from accessing financial services and products, financial institutions, and financial markets. In developing countries, factors influencing financial inclusion vary a lot, from socio-economic, socio-demographic, political factors, technological factors, etc. (Sharma & Singh, 2024). Financial inclusion of farmers is closely related to the extent to which disadvantaged groups have access to financial resources (Ndibalema & Philip, 2023). A recent study relates access to financial services and products to productivity, meaning that if an enterprise has easy access to credit and financial products, that enterprise has a higher probability of achieving higher productivity (Danso-Abbeam et al., 2018). Financial inclusion (Aduda & Kalunda, 2012) is the process of creating financial products and services with a fair price, in the proper place and time to be accessed by all without any discrimination. It also refers to the financial institutions' initiatives to issue financial products with affordable costs and at the proper place to be accessed easily by disadvantaged categories (Lagarde, 2014). Financial inclusion can be considered as a strategy created by those institutions that intend to reduce inequality and poverty (Adesina & Ayo, 2010). Despite the efforts to improve financial inclusion, reduce inequality and poverty, in developing countries, there is still a large proportion of the population not having access to the financial services and products, information, grants, and any other supporting policy (Chaia et al., 2009; Allen et al., 2014). The low level of financial inclusion explains why even developing countries benefit from investments from developed countries; their main indicators are not satisfactory, such as low growth rates, high inequality, and poverty rates (Wabwire, 2020). If the study should consider the socio-economic factors influencing financial

inclusion, other factors should be considered important, such as education, occupation, age, distance to financial services, and income (Seluhinga, 2023). Other studies focus on the relation between financial inclusion and ecosystem development in developing economies (Kabakova & Plaksenkov, 2018). Factors to be considered from this point of view should be social, political, economic, and technological. There is a significant relationship between the ecosystem, the environment, and financial inclusion. Financial inclusion is strongly connected to financial services, and all the features of these services should be accessible and usable for farmers to reduce financial exclusion (Kumar & Gupta, 2019). These features should include the savings account services, credit payments, affordable credit facilities, internet banking facilities, mobile banking facilities, electronic transfers, etc. (Hoxha et al., 2023). According to recent studies, farmers in Albania represent one of the most financially excluded categories of the population (Zhillima et al., 2024). The fragmentation of farms in Albania makes it very difficult for them to expand their activities, get proper credit, and increase their productivity (Shoshi et al., 2017). In Albania, the structure of farms is dominated by smallholders with an average farm size of 1.2 ha/farm. These small farms suffer a lot to find proper financial services and resources; they experience low levels of financial inclusion because of poor infrastructure, the absence of storage facilities, and imposed low prices (Tomorri et al., 2022). Another important difficulty encountered by farmers in Albania lately is the ability to adapt to climate variability (Topalli et al., 2025). The agriculture sector in Albania is facing increasing climate-related risks in the form of droughts and heatwaves during summer and intense storms and floods during winter and autumn. These extreme weather events are often associated with higher costs of agricultural production and higher prices of insurance policies. These higher costs are mostly not recorded by farmers. And farmers find it more difficult to invest in climate-resilient practices. This tendency increases the farmers' financial exclusion. There is also a problem of a lack of policies to promote sustainable agriculture practices (Muça et al., 2018). Since the pandemic, COVID-19, there is an increasing emigration of farmers from Albania and countries of the Western Balkans to EU countries because of inappropriate supporting policies for the agriculture sector (Paraušić et al., 2023; Paraušić et al., 2024). Other demographic factors are very important to developing sustainable agriculture, such as women's fertility, family size, growth of population, mortality index, the proportion of people working in the agriculture sector compared to the total population, etc. (Bhandari & Mishra, 2018). The average age of farmers in developing countries that experience high rates of emigration is increasing rapidly, and the elderly tend to have more difficulties in developing financial knowledge, skills, and abilities (Anand et al., 1990). These rapid transformations of the population, associated with other important factors such as climate change, can strongly agriculture sustainable development (Bhargava, 2019). Albania, as a country that has made significant progress in integrating to EU, is really committed to any EU approach, such as that of

the sustainability strategic goals. The goal of reducing CO₂ emissions seeks modernization in the agriculture sector, and with modernization comes innovation and sustainable development (Liu et al., 2023). Sustainable development asks for fulfilling the needs of the current generations without compromising the future of the upcoming generations (Michael & Oluseye, 2014). Agriculture production is made through using natural resources such as soil, water, wind, and biodiversity, and these natural resources must be protected to achieve sustainability (Michael, 2016). Despite agriculture's importance, it receives less than 2% of total bank credit in Albania. This is due to many factors, such as land high fragmentation, high bureaucracy in procedures for recognition of property rights, lack of information, collateral problems, and problems of sales of agricultural products with profit (Mančka, 2012). On the other hand, financial institutions perceive agriculture as a high-risk sector because of problems with climate change, demographic changes, and price volatility (Maurer, 2014). Many factors make it difficult for financial institutions to support the agriculture sector properly. Some of them are the distance from them to the agriculture enterprises, poor infrastructure, higher costs, and lower benefits because of government schemes and policies to support the agriculture sector (Jankelova et al., 2017). The agriculture sector in the perception of banks and financial institutions has become riskier because of increasing climate change dramatic events that worsen the agricultural production unexpectedly (D'Alessandro et al., 2015). Recent studies are trying to prove a strong correlation between financial inclusion and the Sustainable Development Goals (SDGs), such as reducing poverty, ending hunger, improving gender equality, reducing inequality, supporting innovation and infrastructure, fostering economic growth, improving health and well-being, etc. (Ahluwalia & Khurana, 2025). Other researchers are exploring a correlation between artificial intelligence and financial inclusion to achieve SDGs, as financial inclusion is an enabler of eight elements of the SDGs (Fazal et al., 2025). Other research is focused on finding a relationship between education, financial inclusion, and natural resources in achieving environmental sustainability (Qamruzzaman, 2025). Researchers are also studying the relationship between fintech and financial inclusion to achieve sustainable development (Kishor et al., 2025). Other recent research proves the impact of financial inclusion and financial development on poverty reduction in developing economies (Mbodj & Laye, 2025). Another recent study examined the link between financial inclusion and sustainable development, considering the role of population growth and energy intensity (Iorember et al., 2025).

Based on the research objectives and literature review, the following hypotheses were developed for this study:

H1: There is a positive relationship between the level of financial knowledge of farmers in Albania and the level of financial inclusion.

H2: There is a negative relationship between the effects of climate change and the financial performance of farms in Albania.

H3: There is a negative relationship between the level of emigration and the financial performance of farms in Albania.

H4: There is a positive relationship between the financial inclusion of farmers in Albania and the sustainable agriculture practices used by them.

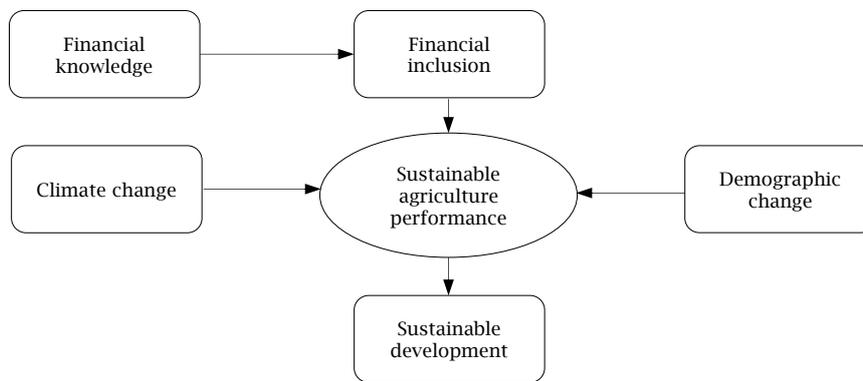
3. RESEARCH METHODOLOGY

This study is based on primary data taken through a questionnaire directed to farmers of the two main agricultural areas in Albania. We used a questionnaire as the main instrument for this study because it is more efficient in data collection, and farmers in Albania want to stay anonymous to provide honest data about their activities. The formulation of the questionnaire items was grounded in existing theoretical frameworks and prior empirical studies. Items were adapted from validated instruments used in similar research contexts, ensuring that the constructions are measured consistently with established academic standards. The questions were chosen to ensure content validity by covering all dimensions of the key variables under investigation. Items were written clearly and unambiguously to increase reliability and minimize respondent misinterpretation. We structured the questionnaire in three main categories: socio-demographic questions, quantitative and qualitative questions, and closed-ended and open questions. Socio-demographic questions offered data about the gender, age, residence, size of the farm, agriculture experience of farmers, distance of the farm from financial institutions, agriculture products cultivated, and other important data that allowed us to develop independent variables. The second part of the questionnaire included questions about the level of financial knowledge of farmers in Albania. Financial knowledge was measured through their knowledge regarding financial resources, loans, interest, risk, insurance, amortization, financial planning, investment, banking skills, revenues and expenditures, profit and loss, taxes, etc. The third part of the questionnaire included questions regarding climate change effects to agriculture production, demographic changes' impact to agriculture financial performance, sustainable agriculture practices applied, sustainability knowledge, innovative agriculture practices applied, etc. We used more closed-ended questions to achieve quantitative data for our study. The questionnaire used Likert-scale questions to estimate the extent of the factors included in the research model. Likert-scale items were selected because they allow quantifiable measurement of attitudes and perceptions, making them appropriate for the statistical analyses planned in the study. Closed-ended questions were preferred as they provide consistent response categories, facilitating comparability and reducing ambiguity. First, a pilot study with 20 farmers was done to test the variables, the quality of the questions, and whether they met the expected results. The data was gathered in the first half of 2025. The two agricultural areas were selected based on official data from Instat (Institute of Statistics of Albania) that rate them as two of the main three areas of agricultural production in Albania reported in 2024, which is why they were chosen for our study to be more significant and important (Instat, 2024). The districts of Korça and Fier are among the biggest in Albania, benefiting from a mid-climate very suitable for agricultural products such as vegetables and fruits.

Korça is in the southeast of Albania, and Fier is in the southwestern part of Albania. We will refer to these areas as area 1 and area 2 for this study. The sample data of the study are the data collected from farmers of these two areas that represent the biggest agricultural areas in Albania according to Instat in 2024. According to Instat (2024) report, in Albania, 432,000 people were engaged in the agriculture sector, making 34.9% of the total labor force in Albania. There are almost 359,000 farms in Albania with an average size of one hectare per farm. The data were processed using statistical methods, and the statistical indicators were interpreted and analyzed to draw the main conclusions of this study. We used descriptive analyses to provide a better overview of the study data, because it allows complex data to be

condensed in graphs and tables for easier communication. This method allows us to make comparisons across variables and identify areas that need deeper investigation. The questions were validated through the pilot study. The questionnaire included questions suggested by the literature, but the authors added more variables and questions in accordance with the Albanian agricultural reality. They were tested using face validity, content validity, and construct validity, and they were reviewed in collaboration with experts in agriculture, sustainability, finance, and statistics, as well as by examining response patterns for logical consistency with theoretical expectations. The questionnaire was refined accordingly to enhance both its accuracy and stability before the final data collection.

Figure 1. Theoretical framework of the study



Other methods that can be used to examine the link between financial knowledge, climate change, demographic changes, and financial institutions to achieve sustainable development of the agriculture sector are by testing correlations between factors through developing statistical

methods such as correlational and predictive modelling, multiple regression, or logistic regression.

4. RESULTS

The results of this study showed that the demographic indicators are as follows:

Table 1. Socio-demographic indicators

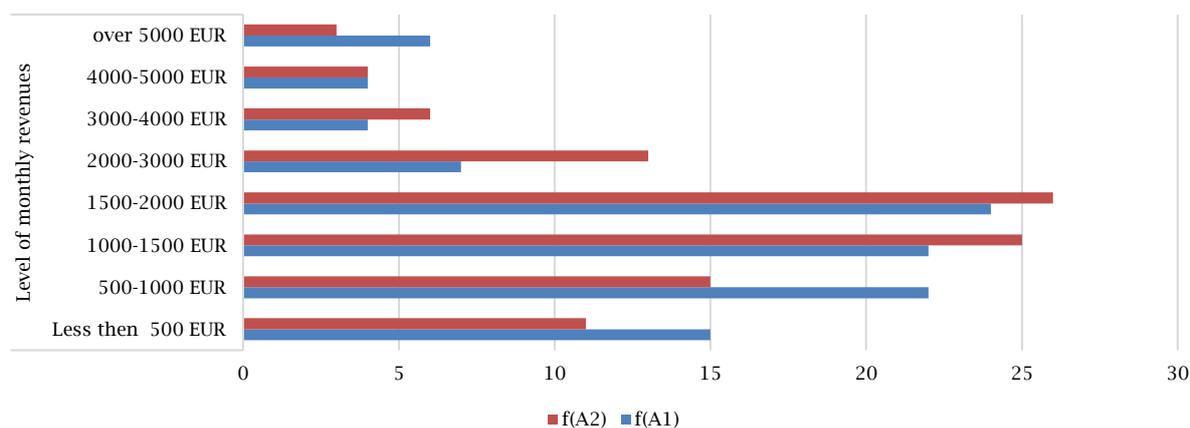
Variable	Categories	f(A1)	f(A2)	Total	%
Age	Under 18 years old	0	0	0	
	1 to 30 years old	6	4	10	5%
	31 to 40 years old	11	12	23	11%
	41 to 50 years old	39	39	78	38%
	Over 50 years old	48	48	96	46%
				207	
Gender	Female	25	16	41	20%
	Male	79	87	166	80%
				207	
Level of education	Primary	6	1	7	3%
	Secondary	54	40	94	45%
	Middle school	16	19	35	17%
	Professional education	23	35	58	28%
	University degree	5	8	13	6%
				207	
Experience on agriculture	Less than 5 years	4	2	6	3%
	5-10 years	11	13	24	12%
	11-20 years	32	30	62	30%
	Over 20 years	57	58	115	56%
		104	103	207	
Farm size	No land	2	3	5	2%
	0-0.5 ha	7	8	15	7%
	0.5-1 ha	16	5	21	10%
	1-2 ha	58	53	111	54%
	3-4 ha	13	29	42	20%
	5-10 ha	1	3	4	2%
	Over 10 ha	7	2	9	4%
		104	103	207	

Source: Authors' elaboration.

Table 1 shows that the farmers' dominant age category is more than 50 years old (46%) and between 41-50 years old (38%). This shows the tendency of aging of farmers in Albania. This is explained by the very high number of young people emigrating in the last decade; over 14% of the population was lost from 2011 to 2023 (Balla, 2021). The majority of farmers managing an agricultural business are men (80%), and only a minority are women (only 20%). This is explained by the conservative tradition of Albanian families, where the man was always the head of the family and of the family's business; the woman was left behind. This shows a low level of gender equality in Albania and a low level of women's entrepreneurship. Literature shows similarly low levels of gender equality in developing countries (Eurostat, 2023). The level of education of farmers was very low (45% of them had secondary school and 3% of them had primary school), and low (17% of them had middle school and 28% of them had middle professional education), and only 6% of them had university education. This shows that the level of education of farmers in Albania is low. Literature shows similarly low levels of education among farmers in developing countries (Rapsomanikis, 2015). The experience of farmers in the agriculture sector was long, 56% of them have more than 20 years of experience, 30% of them have 11-20 years of experience. This complies with the age of farmers that was more than 40 years old. This means that farmers who are managing farms in these two areas are getting old, and there is little tendency for young people to manage a farm. The farm size, as suggested in the research literature, dominates the size 1-2 ha per farm. This

is explained by the Law No. 7501 of 1991 called "Law on land" that redistributed the agricultural land formerly held by the state and the cooperatives to individuals and families in rural areas according to the number of family members part of the household (Law No. 7501 of 1991 concerning the land, 1991). The land distributed per family member varied approximately from 0.2 ha to 0.3 ha per family member, and for families with an average number of family members 5-7, the land per household varied from 1 to 2 ha. This very high rate of land fragmentation is a cause of many problems in developing farms in Albania, because it is very difficult to manage the variety of cultivated products, the selling terms of agricultural products, and many other problems arising from this situation created with the agricultural land reform of 1991. It is also a problem for these small farms to get financing resources, as they can use low levels of collateral. Literature shows similar problems of fragmentation in post-communist countries, widely recognized in the existing literature as a major structural problem affecting agricultural productivity, efficiency, and rural development (Lerman, 2001). Results of the study showed that both areas cultivate vegetables, fruits, grains, and livestock. Eighty-four percent of farmers responded that they have a unique identification number as farmers, meaning that they are registered in the official database of the Albanian state and are registered as taxpayers. This is positive because it means that they can benefit from grants and supporting initiatives from the government and the EU funds, and they can benefit from resources generated by financial institutions.

Figure 2. The level of monthly revenues of farmers in the two areas of study



Source: Authors' elaboration.

Figure 2 shows the level of monthly revenues of farmers in the two areas of study. The dominant category (24%) is the farmers with 1500-2000 euros per farm for both areas, and the second category with 1000-1500 euros per farm (23%). This shows the low levels of revenues for farmers in Albania and their low level of financial resources, and it follows the low farm size, the level of education, and the growing age category of farmers managing

the farms. Farmers managing small farms with low financial resources are translated into lower levels of production and financial performance, and lower readiness to adopt modern, innovative, and sustainable agriculture practices. Literature suggests that the size of the farms has a positive relationship to financial performance, meaning that the smaller the smaller the financial performance and the opposite (Barrett et al., 2010).

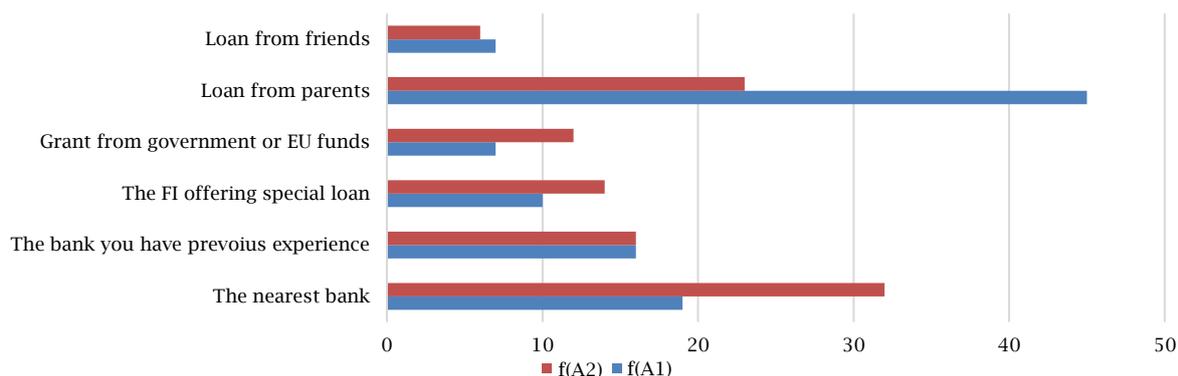
Table 2. Interest in financial products and services

Variable	Answers	f(A1)	f(A2)	Total	%
Do you have a loan from a bank or financial institution?	Yes	31	45	76	37%
	No	73	58	131	63%
		104	103	207	
Standard deviation	17.9				
Do you have a bank account?	Yes	85	97	182	88%
	No	19	6	25	12%
		104	103	207	
Standard deviation	52.8				
Are you interested in a loan?	Yes	32	47	79	38%
	No	54	45	99	48%
	Maybe	18	11	29	14%
		104	103	207	
Standard deviation	17.19				

Source: Authors' elaboration.

In Table 2, we can see that 88% of farmers have a bank account and are officially banked, and this is positive because it is the starting point for financial inclusion. In 2017, this figure was much lower, with less than 40% of transactions being categorized as cashless in Albania for individuals and 66% for businesses. Regarding the farmers' interest loan, we can notice that farmers in the second area are more interested (47% of them positively interested) in comparison with farmers of the first area (54% of them negatively interested). In total, farmers show

a low interest in loans, being highly sceptical of their future cash inflows. Farmers are very afraid of the price volatility of agricultural products and, of course, are insecure because of the negative effects and demographic changes that affect negatively the workforce in the agriculture sector. Literature suggests that the banking ability of individuals has a positive relationship to financial inclusion (Okello Candiya Bongomin et al., 2020), meaning that individuals who have higher banking skills are more financially included, and the opposite.

Figure 3. Where do farmers ask for a loan?

Source: Authors' elaboration.

Figure 3 shows the main categories of financial products that farmers ask for when they need to finance their activities. As shown in Figure 3, the main source of financial resources is loans from parents (33% of them), and the other part is divided between the nearest bank (25%), the bank that they have previous experience with (15%), and the bank that offers a special loan for farmers (12%). Only a very small percentage are asking for grants from the EU funds (9%), in contrast with other farmers in

EU countries and in the country's candidates to the EU. These results reinforce the findings of low interest and access of farmers to financial services and products offered by financial institutions, the Government, and EU funds. Literature suggests that the higher the knowledge of individuals for financial resources, the higher the access to them, and as a result, the higher their performance (Lusardi & Mitchell, 2014).

Table 3. Factors of financial knowledge of farmers

Factor interest	Categories	f(A1)	f(A2)	Total	%
Regarding the factor interest, how do you rate your own knowledge?	Very low	25	12	37	18%
	Low	15	17	32	15%
	Normal	21	19	40	19%
	Good	33	30	63	30%
	Very good	10	25	35	17%
Standard deviation	7.56		103	207	
Factor risk	Categories	f(A1)	f(A2)	Total	%
Regarding the factor risk, how do you rate your own knowledge?	Very low	41	21	62	30%
	Low	9	6	15	7%
	Normal	11	21	32	15%
	Good	34	30	64	31%
	Very good	9	25	34	16%
Standard deviation	11.92		103	207	
Factor-recording financial transactions	Categories	f(A1)	f(A2)	Total	%
Regarding the recording of daily financial transactions, how do you rate your own knowledge?	Very low	22	9	31	15%
	Low	21	14	35	17%
	Normal	19	13	32	15%
	Good	28	39	67	32%
	Very good	14	28	42	20%
Standard deviation	9.02		103	207	
Financial planning	Categories	f(A1)	f(A2)	Total	%
Regarding financial planning, how do you rate your own knowledge?	Very low	34	19	53	26%
	Low	16	11	27	13%
	Normal	21	7	28	14%
	Good	19	42	61	29%
	Very good	14	24	38	18%
Standard deviation	10.52		103	207	
Amortization	Categories	f(A1)	f(A2)	Total	%
Regarding the amortization, do you calculate and record it?	Very low	51	30	81	39%
	Low	15	5	20	10%
	Normal	20	17	37	18%
	Good	8	35	43	21%
	Very good	10	16	26	13%
Standard deviation	14.14		103	207	

Source: Authors' elaboration.

Table 3 shows the levels of financial knowledge of farmers in terms of interest, risk, recording of financial transactions, and amortization. Findings show different results for each factor. Farmers have the lowest financial knowledge regarding risk and amortization, and the highest for interest, although the answers for all factors rate the knowledge low to average. In terms of knowledge about the concept of profit, almost 61% of farmers know the true meaning, and 39% of farmers confuse it with revenues. When asked if they need training regarding financial knowledge and skills, 82.5% of farmers accept that they have missing financial knowledge and skills, and that they need training to improve them. When asked regarding the inclusion of the insurance system, 78% of farmers confirm they are covered by insurance, and 22% of them are uninsured. 64% of farmers declare to have appropriate knowledge of the insurance concept. Farmers were asked if they wanted to invest in their farm to expand their activity, and 53% were positive about future investments, and 47% of them were negative or sceptical regarding their capacity to invest. Farmers need more investments in machinery, greenhouse farming, and livestock. Farmers were asked about their knowledge of

managing their financial obligations or liabilities, and the majority of them (85%) declared that they have difficulties in understanding financial obligations and need future training to improve that knowledge. Farmers were asked about their knowledge regarding the labor cost and the seasonal labor cost, and 65% of farmers declared that they calculate it approximately and that they need future training to better how to calculate it. Farmers find it difficult to understand the effects of changing taxes and tariffs, and they need advice about fiscal issues related to their business activity.

These data prove the first hypothesis of this study, the same that literature suggests, that financial knowledge of farmers in Albania has a positive relationship with financial inclusion, meaning that farmers showing low levels of financial knowledge (interest, risk, costs, revenues, amortization, investment, financial planning, insurance) have less interest in financial services offered by financial institutions, EU funds and national subsidies. Literature suggests that the higher the financial knowledge of individuals and businesses, the higher their financial inclusion and performance (Grohmann et al., 2018).

Table 4. Climate and demographic changes, sustainability knowledge and skills impact on farmers' performance

<i>Factor climate change</i>	<i>Categories</i>	<i>f(A1)</i>	<i>f(A2)</i>	<i>Total</i>	<i>%</i>
Have you experienced negative effects on your performance because of climate change?	Hardly	5	6	11	5%
	Little	12	9	21	10%
	Normal	9	10	19	9%
	Much	5	6	11	5%
	Very much	73	72	145	70%
Standard deviation	27.40		103	207	
<i>Factor demographic change</i>	<i>Categories</i>	<i>f(A1)</i>	<i>f(A2)</i>	<i>Total</i>	<i>%</i>
Have you experienced negative effects on your performance because of demographic change?	Hardly	6	2	8	4%
	Little	3	1	4	2%
	Normal	5	12	17	8%
	Much	14	18	32	15%
	Very much	76	70	146	71%
Standard deviation	28.15		103	207	
<i>Sustainable agriculture practices</i>	<i>Categories</i>	<i>f(A1)</i>	<i>f(A2)</i>	<i>Total</i>	<i>%</i>
How familiar are you with the concept of sustainable agriculture? Do you adopt sustainable practices?	Hardly	40	31	71	34%
	Little	25	13	38	18%
	Normal	17	24	41	20%
	Much	10	18	28	14%
	Very much	12	17	29	14%
Standard deviation	9.38		103	207	

Source: Authors' elaboration.

Table 4 shows the impact of climate change's negative effects on farms' performance, the impact of demographic changes on the costs of agricultural products, and the impact of sustainable agriculture practices on farms' performance. Asked about the impact of climate change effects, farmers declare that their crops are very much affected by the recent dramatic weather events. They are faced with floods, droughts, heatwaves, and cold waves that have damaged their crops, reducing them by more than 50%. More than half of farmers (51%) declare that they have calculated their losses due to climate change effects and that 50% of their expected revenues were lost because of these events.

These data prove the second hypothesis of the study, that there is a negative relationship between climate change effects and the financial performance of farmers in Albania. This means that the more climate change negative effects farmers experienced, the more negatively their financial performance was impacted because of increasing costs and losses. Literature suggests that climate change effects have a negative effect on financial inclusion and sustainable performance (Lenton et al., 2008).

When asked if the demographic changes have affected their labor costs, farmers answered that this factor has doubled their labor costs by doubling them. This means that if a worker was paid 20 euros per day in the past 10 years, after the rising trend of emigration from agricultural areas, the cost per day for workers in agriculture sector is now 40–50 euros. This is translated into double costs from salaries, social security, and health insurance costs.

These data prove the third hypothesis of the study, that there is a negative relationship between demographic change effects and the financial performance of farmers in Albania. This means that the higher the emigration rate of workers in the agriculture sector from agricultural areas, the more negatively their financial performance was impacted because of increasing costs of labor, social security, and health insurance. Literature suggests that demographic changes have

a negative effect on financial inclusion and sustainable performance (Amari & Anis, 2021).

Farmers were asked about their familiarity with the concept of sustainable agriculture and sustainable agriculture practices, and they have mainly stated that they hardly have information regarding sustainable agriculture and sustainable agriculture practices (more than half of farmers). The other part of farmers declaring that they have partial knowledge about sustainable agriculture practices, they were asked what sustainable practices they have adopted, and farmers declared that they use organic fertilizers. They have not invested in modern, sustainable technology for their agricultural production.

These data prove the fourth hypothesis of the study, that there is a positive relationship between the financial inclusion of farmers in Albania and the sustainable agriculture practices used by them. This means that the lower the financial inclusion of farmers in the agriculture sector, the lower their readiness to adopt modern, innovative, sustainable practices in agriculture production, because to support innovation, modernization, and new production technology, you need to have higher levels of financial resources and to be stimulated by funding criteria. Literature suggests that the higher the sustainability of knowledge and skills, the higher sustainable development and performance (Lozano, 2015).

The last question was related to whether they have benefited from grants from the government. Farmers responded differently, 49% of them declared to have never benefited, and the other part declared that they had benefited only from the subsidy scheme for fuel costs.

The two areas of study showed basically similar data, with little difference regarding interest and access of farmers to financial products and services, with a slight difference for farmers of the second area, which shows a more positive attitude toward financial institutions and financial products and services. This can be due to the bigger presence of financial institutions in that area, and to

the distance to the capital, Tirana, which is the metropole of economic development in Albania. Literature suggests that the higher the financial inclusion, the higher the sustainable development of the sector and the entire economy of the country (Beck et al., 2007).

5. DISCUSSION

Our findings follow research literature for other developing countries. Albania, as a developing country, has difficulties in improving the financial inclusion of farmers because of low levels of funds that the government could engage in supporting the agriculture sector. The work to improve it began in 2017 with the Bank of Albania, in collaboration with the government agencies and the international financial institutions monitoring the Albanian economy, by increasing the number of transactions being performed cashless. From 2017-2023, cashless transactions increased from 40% in 2017 to 78% in 2023 (Bregu, 2024). Digital financial services evolution can help significantly in increasing financial inclusion of disadvantaged groups, because it removes barriers such as distance to financial institutions, lack of information, financial costs, etc. The government must implement more effective policies regarding the agriculture sector to improve the financial knowledge and skills of farmers, help them build resilience to climate change and demographic shifts, modernize agricultural technologies of production, and approach sustainable practices. It is crucial to develop new strategies to engage farmers in creating projects that boost their production in harmony with sustainable agriculture practices by improving their access to financial resources. This can be possible by increasing farmers' communities' organization in developing strategies for getting new financial resources and by introducing innovative agriculture practices that support SDGs as key pillars of increasing economic growth, reducing poverty, and inequality.

6. CONCLUSION

This study investigated the impact of important factors such as financial knowledge, climate change, and demographic change on financial inclusion and sustainable agriculture performance of farmers in Albania. The main instrument of the research was a questionnaire shared with 207 farmers in two main areas of Albania. The two main areas were selected in terms of agricultural production, crops, and total income. Results of the study confirm what research literature for developing countries suggests. Albanian farmers show low levels of financial knowledge. We investigated their knowledge regarding factors such as interest, risk, recording of financial transactions, amortization, insurance, loans, financial planning, investments, income, and labor cost. In terms of all these factors influencing significant financial knowledge, farmers showed low understanding and skills, and low ability to manage financial obligations and other important aspects of their financial performance. Farmers in Albania have no obligation to report periodically financial statements and financial information, and this contributes to their weak readiness to gain

future financial knowledge. We tested farmers regarding their interest in financial products offered by financial institutions in Albania and how they approach the financial system. Farmers have little interest in financial resources offered by financial institutions in Albania due to the limited specialization of financial institutions for the agriculture sector, high financial costs, insecurity regarding future payments, and the lack of periodic, proper information for these products and services. Farmers still use financial resources provided outside the financial system, and this approach negatively impacts their financial inclusion and performance. Results of this study showed that farmers are aware of the negative effects on their agricultural performance; they calculate losses only by the reduction in their seasonal crops, but they do not develop any resilience practice and have no support yet in terms of resilience to climate change approach. They acknowledge the reduction of their profits because of losses deriving from climate change effects, but they do not know how to prevent future losses by engaging innovative sustainable technologies, because there is still a low approach from government policies in terms of climate change resilience techniques and strategies to be implemented. Regarding demographic changes' effects on labor cost, farmers acknowledge the doubling effect on their labor costs because of high rates of emigration, and they are very afraid of the high trend of emigration from agricultural areas in the country. Farmers calculated the increased costs because of emigration trends, the reduction in their profits because of increased labor costs, but they still do not know how to address this issue for future improvement to government agencies. Results of the study showed that farmers in Albania have hardly any knowledge of the sustainability concept, sustainable agriculture practices, and investments. They adopt only organic fertilizers as a sustainable practice, but have no information on other possible sustainable practices and investments in this sector, such as solar panels, electric machinery that reduces CO₂ emissions, and other contemporary investments and practices. Findings of this study showed that farmers have not benefited from grant schemes financed by the EU programs such as IPARD 1 and IPARD 2; they have only benefited from national subsidy schemes of reimbursement of fuel costs for agricultural machinery. Farmers identified climate change, demographic changes, price volatility, unregulated rural primary markets, etc., as key determinants of their agricultural performance. We concluded that low financial knowledge of farmers has contributed significantly to the low level of financial inclusion of farmers in Albania, and we suggest that future policies and programs should focus on improving financial knowledge of farmers, building resilience mechanisms for climate change negative effects, developing immediate policies to reduce emigration from agricultural areas, and implementing sustainable agriculture practices. We recommend that urgent government policy be developed to engage farmers in Albania to be integrated into groups to develop their own strategy to benefit from EU and national funds, and any other financial products and services offered by the financial institutions for projects that support sustainability and innovation. Currently, there are

only three local groups of farmers in Albania legally registered (not in the areas that are subject to this study), and they are still not active in accessing EU funds or national funds, but compared to other developing countries in the Balkan region, this remains a very low number. Every agricultural area in Albania should be creating their local group of farmers and register it legally to have the opportunity to develop its strategy and apply for financing of its projects to improve the sustainable performance and financial inclusion. In this context, there is much to be done by all actors, first government agencies, non-governmental organization (NGOs), academics, municipalities and financial institutions focused in supporting agriculture, to develop the right strategy and measures to design immediate action plan to foster agriculture sector and areas, reduce emigration and improve financial inclusion to achieve sustainable development of agriculture sector in Albania. We also see the high level of fragmentation of farm sizes in Albania as a barrier to getting financing, as it is very difficult for such small farms to expand their production and engage in modern, innovative, sustainable production practices and techniques. National policy should encourage cooperation between small farms in creating larger groups of farmers to apply together for financing and to be trained for better financial knowledge to achieve higher performance and development goals. In conclusion, closer attention should be paid to farmers' needs in Albania as one of the greatest categories that

contribute to the labor force in Albania and to the GDP, in terms of boosting their production, improving their performance, increasing their financial inclusion to achieve sustainable development of the agriculture sector, as one of the two main pillars of the Albanian economy. This study contributes to an emerging body of literature by integrating financial knowledge, climate dynamics, and demographic factors into one framework for understanding sustainable agricultural performance. As these dimensions have rarely been examined together, the findings offer a foundation for future empirical and theoretical research. Given the escalating challenges of climate variability, rural demographic shifts, and the need for improved financial literacy among farmers, this study provides timely insights that future researchers can build upon. Understanding how these factors interact is essential for developing more resilient agricultural systems. By identifying interconnected mechanisms between financial knowledge, climate pressures, and demographic changes, this research establishes a conceptual basis that future studies can expand, refine, or empirically test in different geographical or economic contexts. The results highlight several pathways through which financial capacity and climate exposure shape sustainable performance, suggesting promising directions for further exploration. Future research can investigate additional moderating or mediating variables, long-term impacts, or cross-country comparisons.

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