The impact of natural disaster on agriculture. Case of Albania.

Grisejda Myslimi[1], Dori Risilia[2], Kamela Hasko[3]

[1]European University of Tirana, erisejda.myslimi@uet.edu.al

[2]European University of Tirana, drisilia@ubt.edu.al

[3]European University of Tirana, kamela.hasko@uet.edu.al

Abstract: Albania has been continuously affected by natural disasters such as floods, droughts, earthquakes with devastating consequences not only in the the economy and development of the country but also in people's lives. Therefore, the implementation of financial strategies for the minimization of risks in case of natural disasters is necessary. In this research paper we will identify the strategies that Albanian farmers use to reduce the consequences of natural disaster on agricultural sector. Finding the main factors that influence the selection of the risk minimization strategy by farmers in another objective of this study. The mythology we will use to prove the hypothesis is qualitative one. The research instrument is a questionnaire. The questionnaire will be distributed to farmers who live in areas that are more affected by natural disasters. Some strategies that farmers use to cope with risk are credit extensions, selling assets, use of personal food stocks, support of relatives and off farm employment. The use of agricultural insurance as a strategy for risk mitigation is at a low level in Albania. Farmers' risk controlling strategies in Albania are influenced by socio-economic variables such as age, gender, income etc.

Keywords: Natural disaster, risk management, strategies, mitigation, agricultural sector

1 Introduction

A natural disaster is an unfavorable outcome resulting from the natural activities of the earth, which has the power of destroying the environment, infrastructure, and/or population (Kousky, 2017). According to the Oxford dictionary a natural disaster is described as a sudden and violent natural event such as an earthquake, hurricane or flood that kills or injures many people or causes considerable damage. Klomp & Hoogezand (2017) defines a natural disaster as a natural occurrence that causes disorder of the performance of the economic system with a major negative impact on assets, production factors, production, employment or consumption.

Natural disasters adversely affect the financial indicators of the country, the devastation of physical capital and the loss of human lives. Albania is exposed to natural disasters such as earthquakes, floods, climate changes, droughts, fires, etc. Although natural disasters cannot be predicted or prevented, their economic effect can be reduced. Due to climate change, natural disasters are expected to increase. Faced with such situation, the need to act in finding effective strategies for managing risks and unexpected shocks caused by nature has increased. Insurance is an alternative method for managing the risk of natural disasters which directly affects the reduction of damage and consequences caused by the disaster. They reduce socio-economic cost to natural disasters and influence productivity growth and poverty reduction. Societies that are most vulnerable to weather hazards are those located in coastal areas and river deltas.

Albania is mainly subjected to natural disasters of hydro-meteorological and geological origin such as quakes, tidal wave, lacks, bonfires and mudslides. In Albania, the management of risks from natural disasters is generally made by local government entities. At the regional level the regions and cities assess and plan the risk. On the other hand, in Albania the General Directorate of Civil Emergencies is in charge for national risk assessment. What has been noticed over the years is that the local government faces a lack of sufficient knowledge and appropriate tools for disaster risk reduction. Natural disasters have a big influence, especially on the financial operation of developing countries, including Albania, since developed countries can usually manage the impacts of natural risks. The increase of the risk of extreme weather events increases the need to take measures to reduce the impact of these disasters. The governments have to follow a comprehensive disaster risk management strategy to prevent long-term macroeconomic consequences (Hochrainer, 2007). According to Gjokutaj (2019), the destructive effect of natural disasters on economic indicators is short-term, because in long-term the consequences are insignificant for the economy and the state budget. The destruction of assets reduces the productivity of businesses, production efficiency, disrupts the supply chain, increases inflation as a result of the decrease in supply and causes an increase in demand (Gjokutaj, 2019). According to him, disasters affect public finances, tax base, increase the expenditures of state budget and increase revenues and internal or external borrowing. Replacing destroyed assets with new and technologically advanced assets will increase post-disaster productivity. According to the World Bank (2020), disasters are associated with immediate increases in reconstruction costs, damaged infrastructure, destroyed businesses, reduced tax revenues, and increased levels of poverty.

The main objectives of the paper are:

a. The identification of the strategies that Albanian farmers use to reduce the consequences of natural disaster on agricultural sector.
b. To find the main factors that influence farmers decision to choose the strategy of agricultural risk minimization

Research question:

a. Which are the strategies that Albanian farmers use to reduce the consequences of natural disaster on agricultural sector?
b. Which are the factors that impact farmers determination to choose the strategy of agricultural risk minimization?

Hypothesis:

H_0: Baying of agricultural insurance products is the main strategy that Albanian farmers use to protect against natural disaster.

H_1: Baying of agricultural insurance products is not the main strategy that Albanian farmers use to protect against natural disaster.

2 Literature review

2.1 Natural disaster management in agricultural

The management of natural disasters in our country according to the Civil Emergencies Plan (Malaj, 2019) is carried out in cooperation with a number of institutions such as the Council of Ministers, the Sub-Ministerial Committee of Civil Emergencies, the Ministry of the Interior, the Department of Management and Response to Civil Emergencies, Line Ministries, Operational Forces, Head of Operations at the Central Level and the National Operational Center for Civil Emergencies. Law no. 8756, dated 26.03.2001 "For Civil Emergency" Climate change negatively affects the Albanian agricultural sector as agriculture is sensitive to natural risks. Weather events and temperature changes negatively affect crop production, infrastructure, irrigation system, etc. For this reason, following special strategies for preventing or reducing the consequences of climate risks is crucial since the consequences of climate risks directly affect people whose livelihood depends on agriculture. Thus, the presence of disaster risk decrease measures in the authorized context should be the focus of the Albanian government. The application of agricultural insurance as a means of risk transfer should be a necessary condition for farmers. The use of assurance as an method to mitigate production losses in the agricultural sector in our country is insignificant since Albanian producers are educated on the principle that damages caused by disasters will be compensated by the government. Also, the lack of insurance culture prevents disaster risk reduction. Developed countries use hazard maps and geographic information system technology to identify and reduce agricultural sector risks. The use of these measures, especially in disaster-prone areas, should be a priority for Albania as well. Assessment and planning of agricultural risks at the local, regional and national level by line ministries, civil emergency structures, academic institutions, municipalities and interested parties to reduce the risk in agriculture is another way

to reduce the consequences of natural disasters. Education programs to increase the awareness of farmers and agribusinesses on the importance and operation of agricultural insurance by defining the roles and responsibilities of each actor that is part of the insurance scheme would also affect the reduction of the severity of the consequences of the disaster. Agricultural insurance in Albanian society should be perceived by farmers as a means of reducing personal risk. The growth of investments in agriculture and the weather conditions will be accompanied not only by the increase in the demand for insurance but also by the increase in the cost of insurance. Being a country affected by natural disasters, taking measures to prevent the negative impact of disasters is necessary. In recent years, interest of financial instruments of natural disasters has increased. International financial markets, through various instruments, allow governments to transfer disaster risk in order to manage budget instabilities. The availability of financial instruments followed by appropriate government policies for dealing with disasters is a necessary strategy for dealing with catastrophic risks.

2.2 Risk managing schemes in farming

Risk management is a necessary process for farmers to reduce uncertainty (Toro, 2011). It is identified as the permanent implementation of administration strategies, techniques and procedures in the identification, analysis, evaluation, treatment and monitoring of risk (Huirne et.al 2000). According to Chantarat et al. (2016), risk management includes a set of agricultural risk assessment activities and the creation of systems for managing and reducing the assessed risk. It is a process which must be accomplished continuously. As agricultural risks threaten income and price stability, risk management has become a challenge for the governments of many countries. For the management of these risks, farmers have used different strategies depending on their personal preferences. Schaper et al. (2010) classified risk managing schemes into four groups, which included risk mitigation, risk transfer, risk avoidance and risk retention.

Risk prevention schemes include measures that decrease the farm's disclosure to risks. According to this method of risk management, businesses in agriculture eliminate activities with a higher level of risk. Reduction is related to reducing or mitigating risks and negative consequences that affect the business. Expansion and diversification of agricultural activities is the strategy most used by farmers to reduce risks. As a result, farmers can change or diversify the means or method of production, use different crops or use better techniques in addition to the existing ones for the prevention of diseases that affect agriculture. Farmers accept risk with the idea that increased risk will increase the benefits of the economic entity. In some cases, due to high costs or the inability to identify risks, it is difficult to use other risk management strategies and accepting it is the only option for farmers. After the risk occurs, cultivators use a series of methods to manage it. The measures include taking a loan, selling assets, livestock, using savings to cope with disasters, etc. Risk transfer approach is related to transmitting the costs of unfavorable events to others.

Risk is reduced by being transferred from one group to another against payment. Farmers can choose to share the risk by insuring agricultural production, livestock, property, etc.

According to Barry & Fraser (1976), production strategy, marketing strategy and financial strategy are the methods used by farmers to manage risks in agriculture. According to them, production strategies are related to the use of new technologies, product protection, plant protection, etc. The marketing strategy refers to the management of sales, including international markets, while the financial strategy is related to practices such as borrowing, extracting income from outside the farm in order to increase investment in the farm, increase cash flows, etc. The chosen strategy for risk management is influenced by the attitude that farmers have towards risk. According to Winsen et al. (2014) risk-averse cultivators use passive risk management strategies by allowing these risks to happen and managing their consequences after the event has occurred. On the other hand, farmers who take a proactive attitude try to reduce the impact relying on external risk management strategies. Some recommended risk mitigation practices are crop diversification, intercropping, soil moisture management, irrigation, integrated pest management and savings. Risk reduction strategies are very effective in risk management (Redmond, 2005) but while affecting income stabilization, they reduce average income because they require farmers to give up the most profitable alternative (Hazell, 1992). For example, specialization in a certain agricultural product would give more income to the farmer than diversification of agricultural products. Some other practices such as fragmentation of the plot, economization of purchased inputs, use of inputs with low yield but resistant to drowning cause loss of production efficiency (Rosenëig and Binsëanger, 1993). On the other hand, inhabitants of developing countries use traditional mechanisms to cope with natural disasters, such as the diversification of agricultural products, different sources of income from families or remittances, etc. (Hochrainer, 2006).

The strategies of keeping or coping with the risk are applied by the farmers after the event occurs. Some strategies that farmers use to cope with risk are credit extensions, selling assets, using personal food stocks, support of relatives and off farm employment (Hazell, 1992). These strategies are costly as the sale of assets may affect the reduction of production or decrease the value of assets while additional credit has high interest rates. Sharing and transferring the risk is another method of risk management. Traditional ways of risk management often fail. Natural disasters and loss of assets keep farmers in poverty (Chantarat et al., 2007). Farmers, businesses and governments can avoid risk by transferring it to insurance companies. The implementation of this strategy in Albania faces many difficulties. Private insurance market in Albania is undeveloped mainly due to the low income of the population, which makes it impossible to afford the insurance payment. People continue to think that government should pay the costs of natural disasters . Additionally, the law does not oblige farmers to be insured. In many cases, insurance companies cannot sell their products because property rights, especially in areas affected by natural disasters, are missing.

2.3 Determinations of risk management strategies

Age, education, income, farm size, ownership of agricultural land and the behavior of farmers towards risk are the most important factors that influence the determination of risk management strategy (Long, 2020). Richard Kofi Asravor (2019) after his study in Northern Ghana concluded that farmers' risk controlling plans are influenced by socio-economic variables such as cultivated area, age and gender. According to him in Ghana farmers use internal strategies of risk management such as the diversification of grains, the use of better farm varieties, the use of mineral fertilizers, etc. Winsen et al. (2014) after a study of 614 farms in the Flemish region of Belgium concluded that farmers preferred to use internal risk management strategies compared to insurance or futures contracts. This result was more influenced by cultural factors. Strategies such as insurance are not very popular in Belgium.

Farmers who are ready to afford the risk are predisposed to manage it by delegating, while farmers who refuse the risk face the consequences and try to reduce their effects after the risk has occurred (Wisten et.al 2014). In a study that Huirne et. al (2000) did on 731 farms in western Germany concluded that low-cost production and agricultural insurance are the most effective risk management strategies. According to Harrington & Niehaus (2004) farmers use several strategies for risk management such as avoiding credit dependence, diversification of income, futures contracts, insurance of agricultural products, diversification of agricultural products and saving on private expenses. Farmers can use more than one risk management strategy. Bardsley et al. al (1984), as a result of a mathematical simulation of demand and supply, evaluated the efficiency of insurance as a instrument for risk management. According to them, the success of the insurance contracts was related to the spatial link of the risk, to the link of the production risk against the income from the assurance strategy and from the organizational costs. After studying the Austrian wheat industry they concluded that insurance makes little influence to risk administration in the wheat industry.

2.4 The impact of agricultural insurance in mitigation losses caused by natural disasters

Natural disasters have serious negative consequences, especially in developing countries, since developed countries cope with the consequences more easily, for example by replacing lost production with increased production in a different place (Botzen, 2019). The agricultural sector is the most affected sector by natural disasters and the protection of agricultural from natural disasters is urgent (Ykhlef & Algawiaz, 2014). Well-designed insurance instruments are recognized as basic instruments for protection against the influences of natural disasters in exposed territories. They influence the mitigation of the costs of natural disasters, reduce poverty, contribute to sustainable deveapment and life quality (Harrington & Niehaus, 2004). Disasters slow economic growth, reduce government revenues,

damage private assets, destroy businesses, disrupt supply chains (World Bank, 2020) and cause human suffering, general destruction and loss of production (Bayoumi, Quayyum , & Das, 2021). According to (Bayoumi, Quayyum , & Das, 2021) natural disasters reduce growth by 0.65% to 1% and decrease production by 1.7% to 2.6%. According to their findings, uninsured losses are the ones that cause macroeconomic costs, while insured catastrophes can be insignificant or even positive for economic activity since insurance helps in reconstruction, contributes to GDP and neutralizes the negative effects of catastrophes. Thus, insurance is important in mitigating agricultural costs resulting from natural disasters. Insurance companies in cooperation with governments should provide genuine insurance policies to mitigate the risk faced by agricultural sector.

The lack of development of the insurance market in Albania is a consequence of the lack of trust that families have in insurance companies and low incomes. So, for the sale of insurance products, the government must provide the necessary physical and legal infrastructure, while insurance companies must meet the conditions of the insurance contract (Sharku & Gjata, 2018). Although disasters cannot be prevented, the process of managing their risk reduces the consequences of the disaster. Families with high incomes are more predisposed to avoid the risk of natural disasters by taking measures such as improving housing conditions to protect against floods, willingness to pay flood tax, willingness to leave the risk area, willingness to save for emergency situations, etc. (Pojani & Hudhra, 2018). According to the result of their model, individuals in the southern and central areas of Albania, as a result of the economic inability to take measures against floods and the desire to stay in their properties, are more tolerant to the risk of disasters.

3 Damages caused by natural disaster in Albania

The natural disasters that have caused the largest number of victims over the years in Albania are earthquakes and floods. From 1851 to 2020, 850 people lost their lives as a result of earthquakes and 270 others died as a result of floods. 101 deaths were caused as a result of other disasters such as storms, fires, landslides, high temperatures, etc. Below we will make a presentation of the natural disasters that have happened and the economic damage they have caused.

Table 1.

Viti	No of deaths	Humbjet ($)	Dëmi në të kora	Bagëti të humbura
2000	20	36661038	1840	22
2001	44	84646398	3350	1
2002	18	3190134817	23029	160
2003	15	65330866	3814	117
2004	5	73410925	8988	
2005	7	917899011	18894	331
2006	2	34412589	721	
2007	2	33322638	1937	
2008	16	118461423	1476	
2009	6	372951192	2869	
2010	13	4554910620	45535	31956
2011	13	39864943	4243	82
2012	7	114828328	4612	1993
2013	9	8480000	10475	84
2014	9	2143018814	1	18
2015	10	16670000	407	66
2016	20		0	
2017	6		0	
2018	21		9	193
2019	55			1120
2020	10		753	

Source: EM-DAT, International Disaster Database OFDA / CRED,

4 Methodological Framework

4.1 Method

This paper is based in a quantitative empirical research. The research instrument is questionnaire. The questionnaire is distributed to 87 farmers who have their farms in Novosel. The questionnaire contains questions about the methods used by farmers to minimize the consequences of natural disasters. The questionnaire analyzes which are the factors that stimulate farmers in risk management method selection. The questionnaire involved scale items and used a variation of a five-point Likert-type scale in which the items included "very high" to "high" and "low" to “none.”

4.2 Research instrument

In this paper, we have decided for a closed structured questionnaire. The questionnaire was organized into two sections. The initial part collects demographic factors like gender, age, education, number of family member, number of family member that work outside the farm and monthly income (Table 1). In the second section we have asked farmers on the methods they use to minimize the negative effects of natural disasters (Table 2).

4.3 Sampling and Data Collection

Information were gathered from 5 September to 20 November 2022 in Albania, Novosela. The questionnaire was distributed online and in physically. Of participants, 56.7% are male, and 43.3% are female. Of 120 participants, 35% are graduates, 24.2% have master's degrees, and 40.8% have high school qualifications. The sample characteristics are presented in Table 1.

Table 2:Demographic Profiles of the Respondents

Demographics and socio-economics	Value	Frequency	Frequency
Gender	Male	68	56.7%
	Female	52	43.3%
Age	18-25	8	6.7%
	26-34	26	21.6%
	35-44	35	29.2%
	45-54	24	20%
	55-64	20	16.7%
	Over 64	7	5.8%
Educational	High School	49	40.8%
	Graduate	42	35%
	Postgraduate	29	24.2%
Monthly income	10 000 – 30 000	11	9.2%
	30 000 – 60 000	27	22.5%
	60 000 – 90 000	41	34.1%
	90 000 -120 000	23	19.2%

	120 000 – 150 000	8	6.7%
	Over 150 000	10	8.3%
Number of family members	1	13	10.8%
	2-3	29	24.2%
	4-6	61	50.8%
	Over 6	17	14.2%
No of family members that work in farm	1	19	15.8%
	2-3	56	46.7%
	4-6	40	33.3%
	Over 6	5	4.2%
No of family members that work outside the farm	1	47	39.2%
	2-3	63	52.5%
	4-6	10	8.3%
	Over 6	0	0%

Source: Authors'construction

A descriptive analysis is presented in the table number 2. The results show that the methods most used by farmers in Novosele to protect from natural disasters are personal savings, sale of assets, livestock ect, diversifition of production and loans, use of different sources of off-farm income or remittances Buying of agricultural insurance products is the least used method by farmers to protect from natural disasters. 95.8% of farmers do not buy insurance products. The farmers in Novosele are not informed about the existence of agricultural insurance schemes. Through this descriptive analysis we verify the first hypothesis (H_1).

Table 2: Descriptive analysis

Methods used	Very high	High	Medium	Low	None
Purchase of agricultural insurance			2.5	1.7	95.8
Taking loans	16.7	22.5	20	26.7	14.1
Diversification of production	19.2	20.8	28.3	17.5	14.2
Use of different sources of off-farm income or remittances	15.8	26.7	21.7	25	10.8

Sale of assets, livestock, etc	30	19.2	26.7	14.1	10
Using savings to cope with disasters	35.8	25.8	18.4	9.2	10.8
Use of flood and rain resistant inputs	21.7	31.6	20	16.7	10
Participate in professional training		5.8	10.8	7.5	75.9
Use of modern technologies	5	14.2	15.8	36.7	28.3
Own (or collaborate with others) investment in building infrastructur	6.7	5	19.2	22.5	46.6

Source: Authors'construction

Conclusions

The main factor that caused the loss of production in Albania is the heavy rain. Lack of production sales markets, fires and plant diseases are other sources of agricultural risk in ours country. Use of different sources of off-farm income or remittances, use of personal savings and the use of flood and rain resistant inputs are the most used strategies by farmers in Novosele for minimizing the consequences of natural disasters. Age, level of education and monthly income are the factors that influence farmers decision to choose the strategy of agricultural risk minimization. The use of insurance as an instrument to mitigate production losses in the agricultural sector in our country is insignificant since Albanian producers are educated on the principle that damages caused by disasters will be compensated by the government. The lack of insurance culture prevents disaster risk reduction. Farmers in Novosele use traditional methods for managing risks from natural disasters. The presence of disaster risk reduction measures in the legal framework should be the focus of the Albanian government. The application of agricultural insurance as a means of risk transfer should be a necessary condition for farmers. Education programs to increase the awareness of farmers on the importance of agricultural insurance would affect the reduction of the severity of the consequences of the disaster.

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