



RESEARCH ARTICLE

THE CAPACITY OF ALBANIAN SMALLHOLDERS TO ADAPT TO CLIMATE CHANGE

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This paper is intended to provide an overview of the importance of adaptation to climate change and to present the adaptive capacities of Albania smallholders. Extreme weather events for example floods in winter and droughts in summer are occurring more frequently and inducing big losses in rural areas of Albania. Climate change poses the risk of much greater impacts in Albanian farms due to its demonstrated conditions and low level of adaptive capacities. Overall the questionnaires resulted that smallholders in Albania besides; poor irrigation system; insufficient use of water resources; high production cost, are now suffering from an increase of extreme weather events throughout the year. From the interviews of 185 smallholders in the Shkodra region and discussion with 15 experts, we concluded that smallholders had faced many challenges as result of changes of climate patterns and showed low level of adapting capacities. As a consequence, according to questionnaires and experts, minimal adaptation measures were taken by both farmers and government hence more governmental intervention was needed.

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INTRODUCTION

The struggle that agriculture faces nowadays from the results of climate change has raised the concern that adaptation towards such changes require proactive actions from both farmers and government. Albania is part of the Mediterranean area, located in southeast Europe and according to a lot of scientific research, the crops of these regions will suffer as direct result of climate change. According to (EEA, 2012) the increase of extreme weather events like droughts in summer and floods in winter have affected water availability and crop yields in Mediterranean region. The Shkodra region have experienced many floods throughout history which have been caused not only by flashfloods but also by human intervention on the environment such as floods hazards caused by dams and at the same time the risk of dams from floods as well as destroying riverbeds as result of excavation works for extraction of building materials. The unexpected changes of weather patterns thought-out the year have made the Shkodra region more vulnerable. According to (Medjon Hysenaj, 2012) updated data collection should be part of adaptation in order to better manage hydropower plants by avoiding unexpected floods in the near lands. Besides, the study carried out by World Bank in Albania (Sutton William et, al., 2009) as well as Third National Communication of Albania under UNFCCC, (2016), imply that temperature is expected to increase and

precipitation is expected to decrease under all climate scenarios for Albania. To reduce the negative impacts of climate change or benefit from positive impacts, adaptation can be seen as a necessary action to be taken. According to (IPCC, 2001), adaptation is the adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities (IPCC, 2001). Moreover (FAO, 2008) describe adaptation as a process which involves managing risk by improving the quality of information and its use, providing insurance against climate change risk, adopting good practices to strengthen the resilience of vulnerable livelihood systems, and finding new institutional and technological solutions. Even though the scenarios of Albania according to Second National Communication of Albania under UNFCCC, (2009) show increases of extreme weather events, only a few actions have been taken by farmers and government in adapting to climate change impacts. Adaptation is important in the climate change issue in two ways, one relating to the assessment of impacts and vulnerabilities, the other to the development and evaluation of response options (Smit and Pilifosova, 2001, p. 881). Ignoring climate change, according to (Chambwera and Stage., 2010) by not building adaptive measures will eventually damage economic growth and other aspects of human and natural wellbeing. Moreover (FAO, 2010) imply that agriculture in developing countries must undergo a significant transformation in order to meet the related challenges of food security and climate change. (Nicholas Stern, 2010) in his book the Economics of Climate Change,

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implies that adaptation policy is crucial for dealing with the unavoidable impacts of climate change, but it has been under-emphasized in many countries. Adaptation depends on adaptive capacities a country or a region shows. "Adaptive capacity is the potential or ability of a system, region, or community to adapt to the effects or impacts of climate change. (Smit and Pilifosova, 2001, p. 879). Similarly, (Adger2003, p. 29) argues, that the capacity to adapt to climate change is a function of the access to resources. According to our study smallholders showed low level of adaptive capacities, and lack of water resources, where the necessity of governmental intervention showed an important role in building adaptive capacities.

Moreover, based on (Sutton et, al., 2009, p.3), farmers in Albania are inadequately adapted to current conditions of climate. Schwarzer emphasizes that a minimum level of threat should exist before people start thinking about the potential benefits of the reactions." (Schwarzer, 1992, p. 235).In accordance with, (Jasper Stage, 2010, p. 152) if there is no planned adaptation, autonomous adaptation will be limited and that the welfare losses associated with climate change will therefore be larger, because the only autonomous adaptation actually taking place will be in the form of minor changes in farming practices.

METHODOLOGY

Our research was focused in a case study, the Shkodra region. It is located in the north west of Albania and is characterized by four geographical landforms (coast, plains, hills, mountain). The Shkodra region has a Mediterranean climate with a cool and mild winter and hot dry summer. Shkodra is one of the regions which have a considerable high amount of precipitation throughout the year, with most of the precipitation fall occurring during the period November-January.



Figure 1 Physiographic regions of Albania and locations of climate stations

In addition to, there are three hydroelectric power plants in Shkodra that supply energy for the country but historically they have displayed a negative impact for the area especially during the winter season when the precipitation level is higher

and have caused severe damage to agriculture through flooding. Farms in most of Albania including Shkodra are characterized by smallholding where the average size goes up to 1.1 ha/farm, with poor irrigation system, low incomes and low level of mechanization. The analysis for our research relies on qualitative data gathered from the questionnaires in 14 rural areas of Shkodra. Initially, we identified farms characteristics for all selected areas of the region. Our main focus was to identify smallholder's perceptions about climate change and their experiences with extreme weather events, as well as, actions taken by them and government in building resilience. Additionally, we managed to identify other necessary actions needed in increasing adaptive capacities. We interviewed 185 farmers and 15 climate experts and agriculture specialists. The data from questionnaires was analyzed using SPSS program. Statistical methods involved in carrying out our goal were mostly based on descriptive analysis by using tabular and graphical presentations and a multivariate regression analysis.

RESULTS

The average age of the farmers who participated in the questionnaires was 45, with 150 of them being men and 50 women. From academic point of view, the majority of smallholding farmers have completed high school, only 20% have finished college, while 10% of them had a bachelor degree. Regarding to farm specialization, farms located in flat and hilly area (Oblike, Obot, Ana Malit, Muriqan, Dajç, Bushat, Kosmaç, Hajmel) cultivate mostly field crops, livestock fodder, and it was mainly in rural area that utilized greenhouse farming. These areas are located around the Buna river and Shkodra lake but suffer from a deficiency of water resources where most of the water for irrigation come from wells. In recent decades, these areas have been affected by extreme weather events mainly floods and droughts. Farmers in Velipoja which is located in the coastal area of Shkodra cultivate mostly fodder, field crops and livestock. Moreover, farms in Gurizi, and Koplík, are established in medicinal and aromatic plant cultivation as well as Tabaco which is now where most of the farmers in the area are shifting to grow. Kelmendiis located in the mountain part of Shkodra, and farmers are involved with pastures and livestock. According to historical data and farmers perceptions, the region has experienced many difficulties with land salinization in the coastal area, floods and storms in flat areas, and erosions in the hilly and mountain zones.

From the interviews, farmers showed a big concern about their crops due to of the increase in frequency of extreme weather events. Even though climate conditions have brought more negative impacts in their crops some of them have stated that climate conditions in their region have affected positively their crops especially in medicinal plants and tobacco, but they could not benefit from such impacts because of poor farming systems and because of market domination by big farmers. The first measures in adapting to climate change are expected to come from farmers themselves. When asked about any action taken, the majority of farmers replied with no actions, while few of them have changed their planting structure, time of planting and harvesting as well as shifting to new crops. Figure 2. Shows the percentage of the number of farmers interviewed who have taken actions in adapting to climate change. Another aspect we tried to identify was related association memberships among smallholders, and it resulted that from the 185 farmers only 42 of them were member of farmers 'associations.

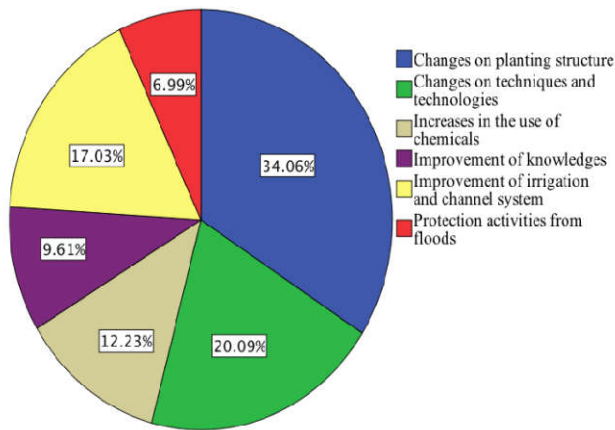


Figure 2. Action taken by smallholders

We detected a link of farmers association membership and members of associations have taken more adaptation measures than those who were not members. The results are shown in the Figure 3.

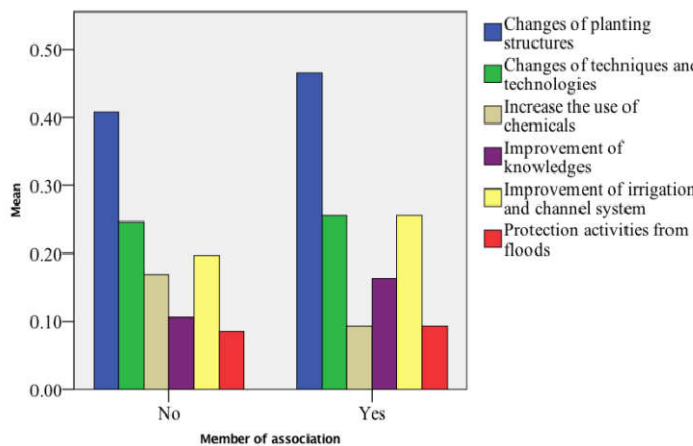


Figure 3. Comparison of actions according to membership in farm association

From the questionnaires, we learned that some farmers have increased the use of chemicals as a way to reduce negative impacts of climate change, which can be classified as a maladaptation. From multinomial regression analysis, changes of precipitation in winter was one of the outcomes observed by farmers and showed a significant impact on the changes in planting structures (0.008), but the model was not very strong ($R^2 = 0.38$). Another factor which determined the changes of planting structures was related to education level ($R^2, 0.28$). Table 1. shows the results from regression analysis of actions on changes in planting structure as a function of education level.

Table 1. Coefficients from regression analysis for changes of planting structure and education level

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-22.549	9.963		-2.263	.025
Education	11.989	5.200	.168	2.306	.022

a. Dependent Variable: Changes of planting structure

Therefore, we can say the more educated the farmers the more actions expected to be taken in changes of planting structure in order to adapt to climate change. From multinomial regression analysis of the data gathered from questionnaires, it also

resulted in a significant relationship between the level of improvement in irrigation and channel systems as an action taken by farmers and flood impacts which consisted in the fact that, the inability of improving irrigation and channel systems by farmers have affected negatively the impacts from floods but the model of these variables was poor. The results are shown in the Table 2. and 3.

Table 2. Model summary of improvement of irrigation and channel system

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.170 ^a	.029	.024	.72477

a. Predictors: (Constant), Improvement of irrigation and channel systems

Table 3. Coefficients from regression analysis for flood impacts and improvement of irrigation system

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.266	.061		20.597	.000
	Improvement of irrigation and channel systems	-.288	.123	-.170	-2.335	.021

a. Dependent Variable: Floods impacts

When asked about any actions concerning to shifting to more adaptable crops as result of climate change and economic aspects, only a few farmers in Koplik, GuriZi, Bushat and Hajmel areas had taken such actions. Furthermore, from the questionnaires and discussions with experts concerning to the increase in public awareness, it resulted that government initiatives were very poor. Furthermore, some climate experts stated that the importance in rising awareness on the adaptation to climate change is not only essential toward farmers but also towards policy makers. Experts confirmed the fact that; in spite of the increases of frequency on extreme weather events, farmers and government actions have been insufficient in adapting to the consequences of climate change. Both experts and farmers implied that actions taken by the government have been mostly reactive actions. Figure 4. shows the answers of smallholders regarding to some actions taken by government in the region of Shkodra.

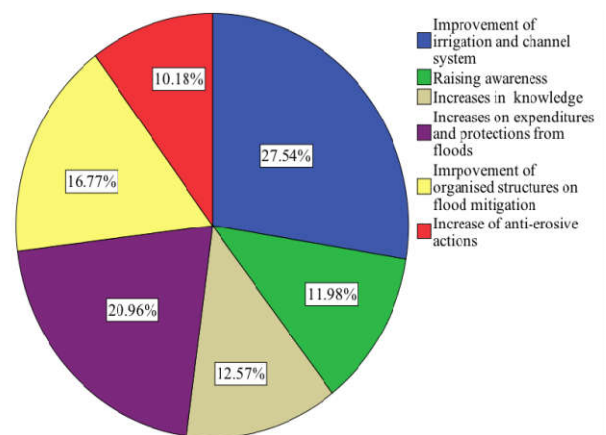


Figure 4. Answers of farmers regarding to action taken by government in adapting to climate change

From farmers' responses, the results showed a significant relationship between the low capacities of farmers in improving knowledge about climate change, and the necessity of governmental intervention in assisting to such action.

Experts argued that more support is needed, meantime government should take the impacts of climate change more seriously in building long term adaptation. From experts' opinions it is necessary to improve protection structures for floods as well as increasing governmental expenditure in irrigation and channel systems. As well as increasing public and private investment and improving public surveys there are other measures to be taken by governmental initiatives.

Conclusion

Historically farms in Shkodra have been exposed to threats of extreme weather events. The expected changes of climate indicate such events especially floods are going to occur more frequency and more severely. The purpose of adaptation has to do with personal goals, or the initial decisions of the individual to adapt. Most of the farmers interviewed have admitted that the consequences of climate change have affected their crops but they were not able to adapt because many factors relating to the farms characteristics and access to resources. Changing the planting structures, changes to time of sowing and harvesting, shifting to new crops and increasing the use of chemicals, were some actions taken by farmers but they revealed low adaptive capacities in building protection structures from flood risk, improving irrigation and channel systems in their farms and improving the knowledge. The lack of being able to access water resources was one of the most problematic issues intensifying the consequences of climate change therefore it can be seen as a proactive public action for the region. Farmers and experts state that, the government should raise awareness in taking precautionary measures to adapt to the effects of climate change. From the interviews farmers intend to adapt to climate conditions but at the same time seek financial support, farmers' awareness of the consequences, as well as, new knowledge about climate change and its effects on agriculture is also required.

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Conflict of Interest

There is no conflict of interest.

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