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Conceptual Framework of Risk Perception of Natural Disasters in Agriculture

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Abstract:

Agriculture is the sector most exposed to hazards from natural disasters.

Albanian farmers have often faced the last few years with the adverse effects of natural disasters. These damages have often been devastating to agricultural and livestock farms. As we can mention the cases of floods, landslides, hail and frosts.

Although Albanian agriculture is often faced with natural disasters, there is no scientific study regarding the risk assessment in agriculture and the perception of risk by Albanian farmers.

The purpose of this study is to build a conceptual framework for assessing the perception of risk by farmers and their awareness of the risk of natural disasters.

Based on the literature review we will build the conceptual framework of risk perception of natural disasters in agriculture. The study will bring about a review of theories on perception, the evolution of theories, and how these theories have been applied in similar studies.

In the end the paper will conclude with the conclusions and suggestions that will be considered in the study of factors analysis that affect the perception of risk in Albanian farms.

Key words: Perception theory, natural disaster, agriculture, perception of risk

INTRODUCTION

The risk of natural disasters in agriculture is a permanent challenge for farmers. Farmers' behavior is important for proper risk management in agriculture. Effective risk management in this area is strongly dependent on behavioral factors, including perception. Thus, farmer risk perception studies are important in farm risk management and from policymakers' point of view.

The perception of the risk to farmers, in particular the appropriate risk perception, can be seen as a prerequisite for choosing an effective strategy to deal with it, because a farmer who is not aware of the dangers he faces will not be in able to manage them effectively.

Farmers from different countries live in different climatic and institutional conditions, making differences in risk perception that may be the result of different factors or different mentality of farmers, and awareness, or a blend of both.

The European Union has long been aware of the importance of risk in agriculture and has investigated creating an EU level risk management system.

They have done a lot of research in this area, as can be mentioned and the research project "Design and Economic Impact of Risk Management Tools for European Agriculture" that was implemented under the spirit of the Sixth Framework Program. An important part of the project has been the observation of farmers' perceptions of perceptions of different member states regarding risk (crisis) and risk management (crisis).

In other research, like (Szekely, C. and Palinkas, 2009)[1] it is clearly stated that the European Union cannot yet be treated as a uniform economic formation due to major differences in the economic state of New States and cultural agriculture.

Even Albania, which aspires to enter the EU, has an unconsolidated agricultural sector and agricultural policies that need to be improved significantly for the protection of agriculture.

PURPOSE OF THE STUDY

The study aims to make a summary of theories on risk perception and to build a conceptual framework based on a literature review on the perception of risk in agriculture. Literature review will help us build a conceptual framework for continuing the risk perception study on Albanian farms and factors affecting them (*Thesis of Dissertation for Doctorate Ph.D.*).

SOME THEORIES ABOUT RISK PERCEPTION

The phrase "risk perception" is most often used in relation to natural hazards and threats to the environment or health.

The perception of risk perception has begun in the mid-1960s[2], and rose after experts and lay people often disagreed about how dangerous the various technologies and natural hazards were. The problem, from the experts' perspective, was a distinction between scientific facts and an exaggerated perception of the public on the dangers.

[1] Szekely, C. and Palinkas, (2009) "Agricultural Risk Management in the European Union and in the USA", Studies in Agricultural Economics No. 109. p. 55-72.

[2] Douglas, Mary. Risk Acceptability According to the Social Sciences. Russell Sage Foundation, 1985.

An early study was written in 1969 by Chauncey Starr[3]. Starr has used a preferential approach to find out which risks are considered acceptable by society.

Perception of risk is subjective judgment that people make about the characteristics and severity of a risk.

Three main families of theory have been developed: approaches of psychology (orientation and cognition), anthropological / sociological approaches (cultural theory) and interdisciplinary approaches (social amplification of the risk framework).

Approaches of psychology

Psychological approach began with research in trying to understand how people process information. This approach identifies many responsible factors to influence individual perceptions of risk, including fear, innovation, stigma, and other factors.

Orientation and Prejudice

The earliest psychometric study was conducted by psychologists Daniel Kahneman and Amos Tversky (1974)[4] who conducted a series of gambling experiments to see how people appreciated probabilities. Their main finding was that people use a deductive number to evaluate the information. These orientations are usually useful to think, but they can lead to inaccurate judgments in some situations - in this case they become cognitive bias.

Cognitive Psychology

Most people in public express a greater concern about problems that seem to have an immediate impact on everyday life, such

[3] Starr, C. (1969), "Social benefit versus technological risk", Science 165 (3899), pp. 1232-1238

[4] Tversky, Amos; Kahneman, Daniel (1974). "Judgment under Uncertainty: Heuristics and Biases". Science. 185 (4157): 1124–1131

as hazardous waste or pesticide use rather than long-term problems that may affect future generations, such as climate change or population growth. However, along with the attitude of the people's expectations and visibility, people do not understand the importance of changing environmental destructive behaviors even when experts provide detailed and clear risks caused by climate change.

The psychometric paradigm

Studies within the psychometric paradigm turned to focus on the roles of influence, emotions and stigmas in the perception of risk perception. Melissa Finucane and Paul Slovic (1982)[5] have been among the top scholars here. These researchers initially challenged Starrit's article by examining the expressed preference - how much people are threatening to say they are willing to accept. They found that, contrary to Starr's basic assumption, people in general saw the greatest dangers in society as unacceptable. They also found that the gap between voluntary and involuntary risks was not nearly as large as Starr claimed.

The psychometric study identified a wide range of characteristics that can be condensed into three high-order factors: 1) the extent to which a risk is understood; 2) the extent to which a sense of fear is aroused and 3) the number of people exposed to danger. The more a person intimidates an activity, the higher the perceived risk, and the more the person wants the risk to diminish.

Anthropological / sociological approach

The anthropological / sociological approach represents perceptions of the danger produced and supported by social institutions. From this point of view, perceptions are socially constructed by institutions, cultural values and lifestyles.

[5] Slovic, Paul; Fischhoff, Baruch; Lichtenstein, Sarah (1982). "Why Study Risk Perception?". Risk Analysis. 2 (2): 83–93

Cultural Theory

A line of Cultural Risk Theory is based on the work of anthropologist Mary Douglas and political scientist Aaron Wildavsky [6] first published in 1982. In cultural theory, Douglas and Wildavsky describe four "ways of life" in a network / group. Every way of life corresponds to a particular social structure and a special view on risk. The grid categorizes the extent to which people are limited and conditioned in their social role. The closer link between social restrictions limits individual negotiations. The group refers to the extent to which individuals are constrained by feelings of belonging or solidarity. The larger the links, the less individual choices are subject to personal control. Four ways of life include: Hierarchical, Individualist, Equal and Fatalist (subject to fate). Risk perception seekers have not widely accepted this version of cultural theory. Douglas also says the theory is controversial; it poses a risk to the movement from the preferred paradigm of rational individual choice, for which many scholars are satisfied.

Interdisciplinary theories

Social Amplification of the Risk Framework

The Social Reinforcement of the Risk Framework (SARF) combines research in psychology, sociology, and anthropology and communication theory. SARF's main thesis states that risk events relate to individual psychological, social, and other cultural factors in ways that either raise or lower public perceptions of risk. The behaviors of individuals and groups then create secondary social or economic impacts by increasing or decreasing their own physical risk. (Kasperson, Roger E.

[6] Douglas, Mary and Aaron Wildavsky. Risk and Culture. University of California Press, 1982.

1988)[7].These effects caused by risk reinforcement include perpetual mental perceptions, business sales impacts and changes in residential property values, changes in training and education, or social disorder.

The public distortion of the risk signals provides a correctional mechanism by which society assesses a more complete definition of risk and its impacts on things that are not traditionally included in a risk analysis.

Environmental Psychology

To better address and understand the risk of complex environmental problems such as climate change, new interdisciplinary risk perception models have been developed in recent years. For example, Helgeson, van der Linden and Chabay (2012)[8] and Sander van der Linden (2015)[9] present a five-factor model where public perceptions of climate change are considered to be multidimensional, resulting from a combination of factors:) cognitive, (2) emotional, (3) subconscious, (4) socio-cultural and (5) individual factors.

The model integrates knowledge from behavioral economics, cognitive psychology, cultural anthropology, psychometric paradigm, as well as heuristic approaches and prejudices.

Demographic Characteristics and Perception of Risk

Large-scale household studies confirm that factors such as gender, age, and wealth influence risk taking.

[7] Kasperson, Roger E.; et al; (1988). "The Social Amplification of Risk: A Conceptual Framework" (PDF). Risk Analysis. 8 (2): 177–187

[8] Helgeson, J., van der Linden, S., and Chabay, I. (2012)."The Role of Knowledge, Learning and Mental Models in Perceptions of Climate Change Related risks." In A. Wals & P.B. Corcoran (Eds.), Learning for sustainability in times of accelerating change (pp. 329-346).

[9] Van der Linden, S. (2015). The Social-Psychological Determinants of Climate Change Risk Perceptions: Towards a Comprehensive Model. Journal of Environmental Psychology, 41, 112-124.

Our study will focus on the use of interdisciplinary theory based on the literature review for similar studies in the field of analysis of factors influencing risk perception and risk transfer opportunities from natural disasters in farms.

PERCEPTION OF RISK IN AGRICULTURE

Literature Review

OECD (2000)[10] differentiates between the dangers common to all businesses (family situation, health, personal accidents, macroeconomic risks) and the risks that affect farming more: the risk of production (weather conditions, pests, diseases and changes technological change) (climate change, management of natural resources such as water), market risks (product and input price variability, food chain relationships with regard to quality, safety, new products, etc.) and at the end risk regulatory or institutional (agricultural policies, safety and environmental regulations).

Musser and Patrick (2001)[11] follow Baquet et al. (1997)[12] and define five major sources of risk in agriculture. The production risk relates to variations in the production of agricultural crops and livestock production due to weather conditions, diseases and pests. Market risk relates to changes in commodity prices and quantities that can be traded. The financial risk relates to the ability to pay the bills when needed, to have the money to continue farming and to avoid bankruptcy. The legal and environmental risk has to do with the possibility of lawsuits initiated by businesses or other individuals and changes in government regulation regarding the environment and agricultural practices. Finally, the risk of human resources has to do with the possibility that the family

[10] OECD (2000), Income Risk Management in Agriculture, OECD Paris

[11] Musser, W.N. and G.F. Patrick (2001), ―How much does risk really matter to farmers?‖ Chapter 24 in Just & Pope (2002).

[12] Baquet,A., R. Hambleton and D. Jose (1997), ―Introduction to Risk Management‖, USDA Risk Management Agency.

or employees will not be available to provide work or management.

The most general risk management literature, especially when it comes to developing countries, usually involves specific non-agricultural risks in the classification. World Bank (2000)[13] and Holzmann and Jorgensen (2001)[14] classify risks in six different types: natural, health, social, economic, political and environmental. They also pass this typology with an additional dimension of the systemic characteristics of the various risks: the micro or idiosyncratic risk that affects the individual, Meso's risk that affects a whole community and the macro or systemic risk that affects a whole region or country. All the risks they cite affect farmers in some way, especially natural (rain, landslides, floods, droughts ...), health (animals and plants) and environmental hazards. Moreover, most of these risks ultimately take the form of economic risk that affects the flow of income, consumption and wealth.

Any risk classification underlines the fact that an individual farmer may face many different risks at the same time. Under these conditions, the optimal choice of a strategy to deal with them requires correlations between risks to be counted.

Some authors dealing with the issue of risk perception (Borges and Machado 2012)[15] are focused on determining factors that make changes in the level of perception of risk. They concluded that these differences are determined by the socio-economic characteristics of the farmers and the characteristics of their farms.

[13] World Bank (2000), ―Helping poor People Manage Risk‖. Chapter 8 in World Bank (2000).

[14] Holzman and Jorgensen (2001), ―Social Risk management: A New conceptual framework for social protection, and beyond,‖ International Tax and public Finance, N°8, 529-556.

[15] Borges, J.A.R. and Machado, J.A.D. (2012): Risks And Risk Management Mechanisms: An Analysis of the Perceptions of Producers Of Agricultural Commodities. Interdisciplinary Journal of Research in Business 2 (5), 27-39

Compared to perception of risk, attitudes towards risk have been dealt with more often in recent decades. The risk problem is one of the main research questions in the contemporary agricultural economy (Cao et al., 2011)[16] and proper risk measurement is crucial to understanding farmers' attitude in implementing risk transfer schemes.

Risk prone affects the choice of appropriate agricultural policies tailored to the needs of the sector and the national economy. Bard and Barry (2001)[17] point out that understanding how farmers react to risk factors is important not only for farmers themselves but also for extension services, agri-food industry and authorities.

Farmer risk perception studies and risk awareness are very rare in Central and Eastern European countries. Moreover, most of the available documents regarding farmers, perception of risk and behavior toward it, do not discuss risk management strategies in this context by farmers (see Kouamé, 2010)[18].

According to the predominant economic risk theory of Von Neumann and Morgenstern (1953)[19], risk warnings determine the microeconomic choice of individuals according to risk and uncertainty. This leads us to the conclusion that, in the practical aspect, risk perception determines farmers' decisions in strategies to mitigate risk at the farm level.

[16] Cao, R., Carpentier, A. and Gohin, A. (2011): Measuring farmers 'risk aversion: the unknown properties of the value function. Paper presented at the EAAE 2011 Congress: Change and Uncertainty, Challenges for Agriculture, Food and Natural Resources, ETH Zurich, Zurich, Switzerland, 30 August - 2 September 2011.

[17] Bard, S.K. and Barry, P.J. (2001): Assessing Farmers' Attitudes toward Risk Using "Closing-in" Method. Journal of Agricultural and Resource Economics 26 (1), 248-260

[18] Kouamé, E.B-h. (2010): Risk, risk aversion and choice of risk management strategies by cocoa farmers in western Côte d'Ivoire. Paper presented at the CSAE Conference 2010: Economic Development in Africa, St Catherine's College, Oxford, 21-23.

[19] Von Neumann, J. and Morgenstern, O. (1953) Theory of Games and Economic Behavior. 3rd Edition, Princeton University Press, Princeton.

Veronique Le Bihan, Sophie Pardo and Patrice Guillotreau in 2013[20], analyzed risk perception in shellfish farming and the farmers' willingness to rely on hedging mechanisms using Logit and ordered multinomial Logit models. The results show that the degree of risk perception and reliance on risk management tools can be partly defined through a number of socioeconomic factors specific to the sector. Beyond the conventional self-protective mechanisms, the study focuses on farmers' willingness to rely on risk-transfer mechanisms that the market has so far failed to provide.

Meraner M., Finger R. (in 2015)[21] have analyzed the extent to which people are willing to take on risk, i.e. their risk preferences as well as subjective risk perception plays a major role in explaining their behavior. This is of particular relevance in agricultural production, which is inherently risky. The data presented there was collected amongst a total of 64 German farmers in 2015. It includes results of three different risk preference elicitation methods (multiple price lists, business statements in four relevant domains and general self-assessment) as well as risk perception. Additionally, farm business characteristics (e.g. size, farm-level workforce, succession) and personal farmer characteristics (e.g. age, gender, and risk literacy) are included.

Cristian R. Foguesatto and Joao A.D. Machado (2017)[22] made a study for risk perception and risk management in family farms in the state of Rio Grande do Sul, Brazil. The analysis involves 72 family farms in 43 counties, and the

[20] Véronique Le Bihan, Sophie Pardo and Patrice Guillotreau "Risk Perception and Risk Management Strategies of Oyster Farmers" The University of Chicago Press, Marine Resource Economics, Vol. 28, No. 3 (January 2013), pp. 285-304

[21] Meraner M., Finger R. Risk perceptions, preferences and management strategies: evidence from a case study using German livestock farmers. J. Risk Res. 2017:1–26

[22] Cristian R. Foguesatto and Joao A.D. Machado (2017)" Perceptions of risk and risk management strategies in family agroindustries" African Journal of Agricultural Research, Vol. 12(22), pp. 1881-1888

respondents were the individual decision makers of those organizational units.

The results suggested that the country's current economic situation, inflation/deflation, changes in product prices and the elimination/reduction of government support are the most important sources of risk. The main types of risk management included updating to new technologies, the use of technical support, maintaining/increasing market liquidity for products, and the commercialization of products without mediators. Two sources of risk (low-qualified staff and lack of motivation) and four risk management strategies (commercialization of products without mediators, acquiring certification, improving production practices and maintaining relationships with customers) were identified in the present study, but not found in the literature that reviewed.

O. Flaten, et al., (2003)[23] conducted a survey in 525 dairy farmers in Norway, for to explore dairy farmers' perceptions of risk and risk management, and to examine relationships between farm and farmer characteristics, risk perceptions, and strategies. Financial measures such as liquidity and costs of production, disease prevention, and insurance were perceived as important ways to handle risk. Even though perceptions were highly farmer-specific, a number of socio-economic variables were found to be related to risk and risk management. The primary role of institutional risks implies that policy makers should be cautious about changing policy and they should consider the scope for strategic policy initiatives that give farmers some greater confidence about the longer term. They use multiple linear regressions to relate the information on socio-economic characteristics and risk perceptions to management responses. The regression coefficients and the goodness-of-fit measures of the multiple

[23] O. Flaten, et al., (2006) "Comparing Risk Perceptions and Risk Management in Organic and Conventional Dairy Farming: Empirical Results From Norway", Napoli in 2006

(ordinary least square and logistic) regressions were used to study associations between farm and farmer characteristics, risk perceptions and risk management.

Parameswaranaik J.et al., (2003)[24] made a study to assess the risk perception of dairy farmers towards climate variability in northern dry zone of Karnataka, Indi. This was done with 120 samples which were purposively selected from the study area. They used Exploratory Factor Analysis. Perception is affected by factors such as culture, knowledge and access to information.

A few studies have found that geographic location, farm type, institutional structures and other factors affecting the operating environment of farmers influenced farmers' perceptions of risk and risk management (Boggess et al., 1985[25]; Wilson et al., 1993[26]; Patrick and Musser, 1997[27]; Meuwissen et al. 2001[28]). The studies also pointed to "the highly complex and individualistic nature of risk perceptions and selection of management tools" (Wilson et al., 1993[29]).

During the 1990s, several other studies were carried out in the USA illustrating farmers' risk perception but mostly focusing on different regions and/or different farming activities.

Szekely, C. and Palinkas, P. in 2009[1], surveyed agricultural producers in five EU Member States about their

[24] Parameswaranaik J.et al., (2006) "Exploratory factor analysis in perceptual understanding of livestock rears towards climate variability in Karnataka", International Journal of Agriculture Sciences, 2015, pp.-871-874.

[25] Boggess, W.G., Anaman, K.A. and Hanson, G.D. (1985): Importance causes and management responses to farm risk: evidence from Florida and Alabama. Southern Journal of Agricultural Economics 17, 105-116

[26] Wilson, P.N., et al. (1993),' Perceptions as reality "on large-scale dairy farms.' Rev. Agric. Econ. 15, 89-101.

[27] Patrick, G. F. and Musser, W. N. (1997): Sources and Responses to Risk: Factor Analyses of Large-Scale US Corn belt Farmers. In OECD (2000): Income risk management in agriculture. France: OECD, p. 51

[28] Meuwissen, M.P.M., et al. (2001): Sharing risk in agriculture; principles and empirical results. Netherlands Journal of Agricultural Science 49, 343-356

[29] Wilson, P.N. et al. (1993). "Perceptions as reality" on large-scale dairy farms. Review of Agricultural Economics 15: 89-101.

risk perceptions and risk management; Germany, Hungary, Poland, Spain and the Netherlands. In their paper, they compared the US agricultural risk perception and risk management profile and practices with the European Union. Great differences between the USA and the EU were evident in terms of agricultural risk perception and risk management. These differences derive from the different farming cultures, differences in historical evolution, and economic philosophy. Beside these differences it has to be clearly stated that the European Union cannot to be treated yet as a uniform economic formation due to the great differences in the new Member States' economic situation and farming culture.

CONCLUSIONS AND RECOMMENDATIONS

The sources of risk in agriculture are numerous and diverse. The markets for agricultural inputs and outputs have a direct incidence on farming risk, particularly through prices. A diversity of hazards related to weather, pests and diseases or personal circumstances determine production in ways that are outside the control of the farmer.

Unexpected changes may occur in access to credit or other sources of income that affect the financial viability of the farm. The legal framework or changes in it may lead to liability and policy risks.

The growing importance of risk factors affecting agricultural production is accentuated both directly and indirectly by local, regional, and global economic and natural phenomena which can be traced back to previous decades. Agricultural producers' conventional approach is to restrict their risk management strategies to offset and alleviate problems caused by climatic and natural phenomena.

Moreover, it is vital to determine how farmers perceive the importance of risk factors surrounding their activities as this strongly influences their risk management strategies.

Risk perception is a subjective judgment process that people make for the characteristics and the severity of a risk. The perception of the risk of natural disasters in the agricultural sector is a sensitive problem which is directly related to the reduction and management measures of this risk.

The review of risk perception theory and related studies helped us to create a clear conceptual framework for risk perception study at Albanian farms, which we will carry out in further research. According to the literature review, we conclude that the analysis of factors and group factors that influence the perception of risk in farms will be of interest to farms in Albania, politicians and stakeholders.

The future study will be based on empirical analysis by applying interdisciplinary theory to analyze the factors that influence the perception of risk in farms in Albania.

ADDITIONAL REFERENCES

1. Boehlje, M. D. and Trede, L. D. (1977): "Risk management in agriculture". Journal of the American Society of Farm Managers and Rural Appraisers, 41.1. pp. 20-29.
2. Bishu K.G., O'Reilly S., Lahiff E., Steiner B. Cattle farmers' perceptions of risk and risk management strategies: evidence from Northern Ethiopia. J. Risk Res. 2016:1–20.
3. Sjöberg L. (2000): The methodology of risk perception research. Quality and Quantity, 34: 407–418.
4. https://cordis.europa.eu/project/rcn/81226_en.html