

An Empirical Analysis on the Social Vulnerability of Agricultural Natural Disasters in China

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Abstract

Reducing social vulnerability of agricultural natural disasters is an effective way to improve agricultural risk response capacity and reduce agricultural losses. In this paper, the author integrates the social vulnerability and agricultural natural risk response into the research results of various fields, and puts forward China's agricultural natural disaster social vulnerability "medium" evaluation system. On the basis of the survey data, and the unconditional quantile regression method is used. It is concluded that there are some differences and cross characteristics in the corresponding index system. This discovery will provide an effective basis for the relevant policy formulation.

Key words: UQR; Social vulnerability; Risk; Agricultural nature disaster

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INTRODUCTION

In recent years, Chinese agricultural production has been experiencing more natural disasters risks. Various abnormal losses increase year by year, such as drought, heavy rain, floods, earthquakes, freezing, etc.. Disaster loss is multidimensional, such as population casualties

and economic losses, affected crops, houses collapsed and etc.. As in 2010, 743 million hectares of crops were affected; in 2012 the drought and flood disasters resulted in economic losses of over 320 billion yuan, which due to the loss of flood were 2,675 billion yuan. In 2013, all kinds of natural disasters have caused a total of 313.5 million hectares of crops were affected, of which 384.4 million hectares cause economic losses 5,808.4 billion yuan, only 2016 flood disaster has caused 60 million people affected. Adger (1999) pointed out that natural resources and environmental dependence, in part, determine the extent of the disaster affected by natural disasters. In theory, agricultural dependence on natural resources and environment is more important, which is more likely to be affected by natural disasters.

Therefore, the natural disaster theories, internal structure, mechanism of action and disaster response, and other theoretical researches are of great significance. It will be more beneficial to prevent, resist and reconstruct disaster reconstruction of agricultural natural disasters in the "short board" by introducing the concept of "social vulnerability concept" to the study of agricultural natural disasters.

The research on the integration of social vulnerability and risk of agricultural natural disasters is an open stage (Wu, 2014; Qu, 2015). In practice, the practical application of the academic and the comparative value also tends to be fuzzy. Research on the risk of agricultural natural disasters and related tools has become increasingly mature (Zhang, 2014), including financial insurance (Xie, 2008). Focus on the risk of natural disasters and social vulnerability will be more conducive to the integration of disaster response, disaster response capacity comparison and disaster-risk relevant policies given.

1. LITERATURE REVIEW

The research on the concept of social vulnerability in disaster science is relatively mature. Vulnerability is of

source in natural discipline, that mainly by the study of biological, physical and chemical properties of decision research paradigm: in disaster risk situation, disastrous results by disaster object on the threat of exposure and bearing disaster types of biochemical vulnerability decided to jointly, which is reflected in the scene in the interpretation of the idea of analog form (white, 1975; Burton, 1978). The vulnerability is gradually introduced to various disciplines. Such as geographical vulnerability (Smith, 1996), computer science vulnerability (Andre, 2010), engineering technology vulnerability (Cutter, 2013), etc.. With the continuous expansion of vulnerability research field and method, the field of Humanities and social sciences have gradually emerged research on vulnerability, such as financial vulnerability, food vulnerability, economic vulnerability. Social vulnerability was presented by O'Keefe (1976) for the first time. At the beginning of this century, it gradually appeared the introduction of research methods to the agricultural natural disaster risk prevention and control project (Zheng, 2009).

Traditional agricultural risk research has tended to focus on: disaster treatment, agricultural insurance and financial derivative tools, system construction, emergency management, social capital, economic, demographic and micro behavior, etc.. (Xie, 2008). The above-mentioned research fields have developed more mature, reflecting the strong research results in their respective fields.

2. THEORY CONSTRUCTION

There are some limitations in those researches. This paper, the author emphasizes the synthetic agricultural natural disaster risk research as a basis to enhance the agricultural natural disasters social vulnerability research, the establishment of a compatible with individual organization, capital, the behavior of the microscopic mechanism and macroscopic comprehensive study of "medium" research methods.

2.1 Social Vulnerability of Agricultural Natural Disasters

As for the definition of vulnerability (IPCC, 2013), the agricultural natural disaster social vulnerability is defined as follows: under certain geographical conditions, natural disasters have certain objective pressure on agricultural systems. Agriculture is related to hazard bearing object according to its social dimension of content and structure characteristics indicated a comprehensive disaster response and control ability to reduce disasters caused by the systematic losses, which are mainly reflected in: firstly, the social vulnerability of geographical conditions; second, the social vulnerability of disaster bodies attached to agriculture, agricultural disaster in different scenarios of social vulnerability; third, the social vulnerability is a negative expression, namely social vulnerability is high,

comprehensive response capability to natural disaster is low; fourth, the comprehensive response force and control force mainly to resistance, adaptability and resilience for the performance of the disaster cycle ability, its role throughout the process of the disaster; fifth, the system not only has a direct loss of disaster, but also including loss of secondary disasters, and disaster response and disaster recovery of all the opportunity period cost. Social vulnerability of agricultural natural disasters include economic vulnerability, organizational vulnerability, cultural vulnerability, population vulnerability, technology vulnerability etc..

2.2 "Medium" Agricultural Natural Disaster Social Vulnerability System

The author is trying to set up the index system of disaster response capability based on the micro individual and organizational social attribute, the establishment of the "medium" agricultural natural disaster social vulnerability system, it can provide effective policies based on practice; on the other hand, it can integrate the independent nature of agricultural natural disaster risk subject. In the process of research, the importance of the relevant factors and the differences of mechanism of the index could be found. The proposed method mainly focuses on the issue of agricultural disaster risk response and the integration of the structural connotation of the social vulnerability of disaster.

In this way, it is good to combine the advantages of two kinds of macro and micro processing mode.

3. EMPIRICAL DESIGN

For Henan, Shandong, Anhui, Jiangsu, Zhejiang, Liaoning, Heilongjiang and other 7 regional typical agricultural production areas of the design, distribution, recycling related research questionnaire. A total of 900 questionnaires were distributed and 880 valid questionnaires were recovered, with an efficiency of 97.8%.

As far as the current research results are concerned, the research paradigm of agricultural natural disaster risk prevention and control mainly focuses on social capital, social organizations, rural social environment, risk perception of demographic information and other related categories.

Unconditional quantile regression is an extension and supplement of conditional quantile regression (CQR), which is of great significance in the empirical study (Basu & Borah, 2013). At present, the research on the unconditional quantile regression (UQR) is still in the initial stage, and the theory and method research is still in development (Ndoye & Lubrano, 2014). In view of the demand of the research subject, this paper mainly refers to the unconditional quantile regression proposed by Powell (2011).

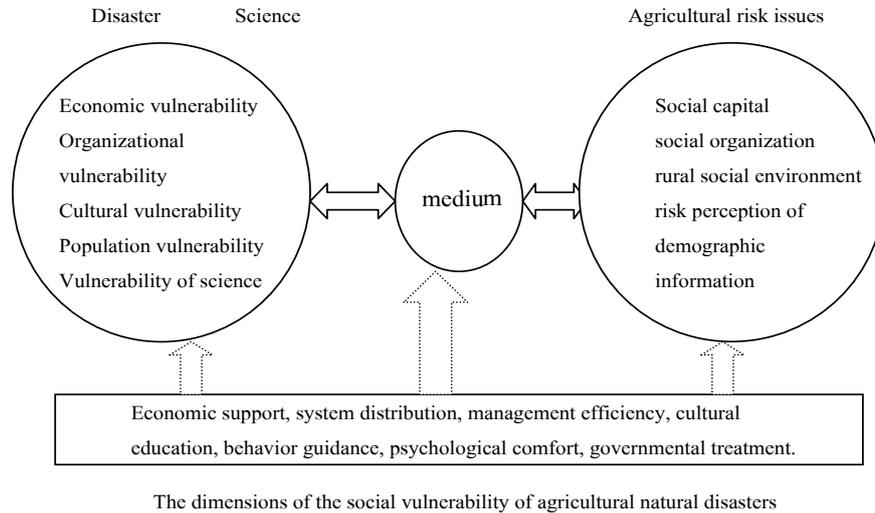


Figure 1
Social Vulnerability System of the Medium Agriculture Natural Disaster

4. EMPIRICAL RESULTS AND ANALYSIS

To the above indexes and data use weighted least squares method, the corresponding overall regression analysis: The results and the conclusions showed high consistency

with previous studies.

In this case, the corresponding results are obtained by using the unconditional quantile regression of the relevant indicators and the data of the above. Presented as follows:

Table 1
Results of Unconditional Quantile Treatment

Variable	Model(1)	Model (2)	Model (3)	Model (4)	Model (5)
	Q=0.10	Q=0.25	Q=0.50	Q=0.75	Q=0.90
Education	-0.2592 (-5.88) ^{***}	-0.2361 (-3.98) ^{***}	-0.2221 (-2.02) ^{**}	-0.2156 (-1.10)	-0.1009 (-0.88)
Government intervention	-0.1120 (-0.80)	-0.2690 (-1.83) [*]	-0.3199 (-2.12) ^{**}	-0.3306 (-4.77) ^{***}	-0.3334 (-5.88) ^{***}
Non farm employment	-0.4285 (-7.60) ^{***}	-0.2560 (-3.55) ^{***}	-0.2267 (-1.88) [*]	-0.1998 (-1.10)	-0.1209 (-0.30)
Insurance	-0.3272 (-4.00) ^{***}	-0.2290 (-2.25) ^{**}	-0.1073 (-2.09) ^{**}	-0.1001 (-0.90)	-0.0999 (-0.10)

Note. T test value: *, **, *** have passed the significant levels of 10%, 5%, and 1%.

The result shows that the degree of education, government intervention, market intervention and other factors had different characteristics. The characteristics and degree of education have a significant explanatory effect in the low vulnerable farmers' social groups, while government's intervention has a more significant explanatory effect in the high social vulnerable groups of farmers.

Under this condition, using the weighted least squares method to draw the corresponding results, and presented

as follows:

Showing an intersection of level of education, government intervention, the degree of market factors and risk perception, the improvement of the market and the government's effective involvement, education level, non-agricultural employment, will promote people the correct view of agricultural natural disaster and risk, thereby reducing agricultural natural disasters social vulnerability.

Table 2
Regression Analysis Results

Variable	Model (6)	Model (7)	Model (8)	Model (9)
Education* Risk perception	-0.1158 (-4.25)***			
Government intervention* Risk perception		-0.2002 (-3.50)***		
Non farm employment * Risk perception			-0.1963 (-3.88)***	
Insurance * Risk perception				-0.1752 (-3.09)***

Note. T test value: * * * has passed the significant level of 1%.

CONCLUSION

On the basis of summarizing the previous research results of the social vulnerability of agricultural natural disasters, the paper puts forward the construction system of the “medium” agricultural natural disaster social vulnerability index. And using the more advanced unconditional quantile regression, the following conclusions are drawn: Educational level, disaster, government intervention, market and other factors intervene showing different characteristics of economic income in social vulnerability; In addition, the degree of education, government intervention, the degree of marketization, the proportion of non farm employment and risk perception show the effect of cross. All of these findings provide a strategic focus and foothold for the policy to improve the agricultural natural disaster risk response capacity and reduce the social vulnerability of agricultural natural disasters.

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