

Socio-economic Influences on Farming Practices in the Face of Climate Change in Inje County – a Critical Evaluation

Trabert, Susann (1); Müller-Mahn, Detlef (2)

(1) Department of Population and Social Geography, University of Bayreuth, 95440 Bayreuth, Germany, susann.trabert@uni-bayreuth.de

(2) Department of Population and Social Geography, University of Bayreuth, 95440 Bayreuth, Germany, muellermahn@uni-bayreuth.de

Abstract: Farmers are increasingly confronted with extremely variable climate conditions, especially regarding precipitation and temperature, that affect agricultural production and their livelihood. The solution for dealing with a range of climate uncertainties, according to scientists and practitioners working in this field, is for the impacted social groups to adapt their behavior as quickly and effectively as possible. To assess whether and what forms of adaptation may be occurring in behaviour of farmers, we examined adaptation to climate change in Inje County of Gangwon Province both from bottom-up (through a survey among farmers) as well as from top-down perspectives (reviewing programs implemented by the regional government). Our conclusion is that a critical attitude towards the concept of adaptive capacity is still needed in order to prevent the adoption of simplistic solutions.

Keywords: *climate change, adaptation, farming, perception, adaptive capacity, Inje County*

1. Introduction

As a reaction to current and future environmental impacts, scholars and policy makers consider both mitigation and adaptation strategies to be effective in minimizing the negative effects of changing climate. Since the agricultural sector contributes only 2% of the total amount of greenhouse gases emitted in South Korea (KREI 2008), the issue of mitigation can be neglected. In contrast, adaptation is an important step for the climate sensitive business of agriculture (Burton/Lim 2005). In this context, adaptation is the adjustment of natural or human systems in response to actual or expected climatic stimuli or their effects, which moderate harm or exploit beneficial opportunities (IPCC TAR, 2001). The underlying assumption of this definition, which is exemplary for the general discourse on adaptation and implementation practices, is a normative statement that adaptation policies and programs are beneficial for all stakeholders at the same time. Secondly, the concept of adaptation currently is widely applied and has become a significant part of many countries' national and regional environmental policies. This process of implementation, that is the adoption of an 'adaptation concept', can serve as a 'magnifying glass' (Hulme 2009) and offers the researcher insight into the perception of climate change (Grothmann/Patt 2005, Weber 2010) and its consequences, into the values placed on human beings, nature and technology, and other related cultural and political aspects of society.

Thus, the underlying tenet of this abstract is that the concept of 'adaptation' is not a positivistic solution to the problems related to climate change. In order to offer long-term solutions with respect to sustainable resource use, we first need to understand how farmers perceive climatic change, and moreover, how and why they make particular decisions (Olsson/Jerneck 2010).

2. Research Scope and Survey Procedure

The survey conducted for this study addressed issues of climate change perception, general farming practices and latent attitudes concerning adaptation to a changing climate. The questionnaire contained 24 questions on 5 pages which took ca. 25 minutes to answer.

The survey sample size was based on the percentage of farming households (determined from the Agricultural Census 2005) in each of the six administrative districts in Inje County as shown in Table 1. Although interviews

were planned in the Nam-Myeon District, the 13 surveys could not be completed during the initial survey period. The surveys were not completed at a later date in order to avoid biasing the results.

Table 1. Sample composition

Administrative District	Farm Households	Percentage	Sample Size
Inje-Eup	691	24.1%	24
Nam-Myeon	391	13.6%	0
Buk-Myeon	596	20.8%	21
Girin-Myeon	596	20.8%	21
Seohwa-Myeon	274	9.5%	10
Sangnam-Myeon	324	11.3%	11
Inje-Gun	2,872	100.0%	87

The interviews were conducted between June and November 2010 in the respective villages.

3. Results

The survey cataloged social-economic factors and revealed opinions and attitudes. The age of the farmers ranged from 28-80 years with an average of 53 years. Most were male (73), and were born and raised in Inje County (56). The majority of the farmers interviewed were married (88%) and more than two-thirds of the households had more than 2 children. Other aspects of the survey addressed the questions of crop cultivation, area of cultivated land, land status, education, farm succession, distribution of agricultural products, income, and number of employees. This information had a value in itself (demonstrating the time-based development of various factors) and also serves to reveal correlations of factors with the expressed opinions and attitudes in relation to climate change and climate change adaptation.

3.1 Perception of Climate Change

In order to examine how farmers adapt to a changing climate, the perception of climate change itself is a precedent condition. The survey showed that the majority of farmers had heard of climate change (97%) from sources which included the media (TV, newspapers, internet), extension agents from ATC or public district offices, or neighbours and colleagues. Further questions focused on the year or time when they first believed to have observed changes in climate (2005-2007, 2010) and which climate phenomena they relate to climate change (increased rainfall, floods, or temperature changes). Their explanations for the consequences of climate change strongly depended on the crops cultivated and their farming experiences, which signify a personal description of their livelihoods. Even though the farmers are aware of the impact of climate change on agricultural production in the region, the farmers do not yet seem to actively pursue what scientists would call 'adaptive behavior'. One reason for this conclusion is that the survey question regarding the definition and meaning of adaptation in the questionnaire was seldom answered. Secondly, when asked to prioritize a list of factors influencing the farmer's decisions of what and how to cultivate, 'climate factors' was not ranked 1st (highest). According the survey, the factors ranked as follows:

1. Market price 시장가격 (37 nominations)
2. Required investments 투자비(종자, 농약 등) (32)
3. Climate factors 기상요인 (24)
4. Available subsidies 보조금(직불금) (29)
5. Neighbor's decisions 이웃들의 의사결정 (52)

Therefore, the notion of farmers adapting to climate change must be used very cautiously, given that other (economic, political, social) factors are also important in the decision-making process, and adaptation only to climate factors can hardly be isolated from these other influences (see Berrang-Ford et al. 2011).

3.2 Political Efforts to Enhance Adaptation

The government of Kangwon has recently acknowledged the potential for adaption to climate change in various sectors within the province. In terms of sensitivity to climate change impacts, Kangwon is ranked as 10th out of the 16 provinces of Korea but placed 2nd highest regarding exposure to climate change and strongest (16th) in terms of adaptive capacity (KEI, 2008).

More detailed insight is provided in Figure 1 which shows the assessment of potential adaptation in various sectors in Inje County. The assessment is very positive regarding ‘adaptive capacity’ (AC) from the perspectives of governance, education, environmental capacity and industrial structure due to the low exposure to floods, drought, and high temperatures during summer.

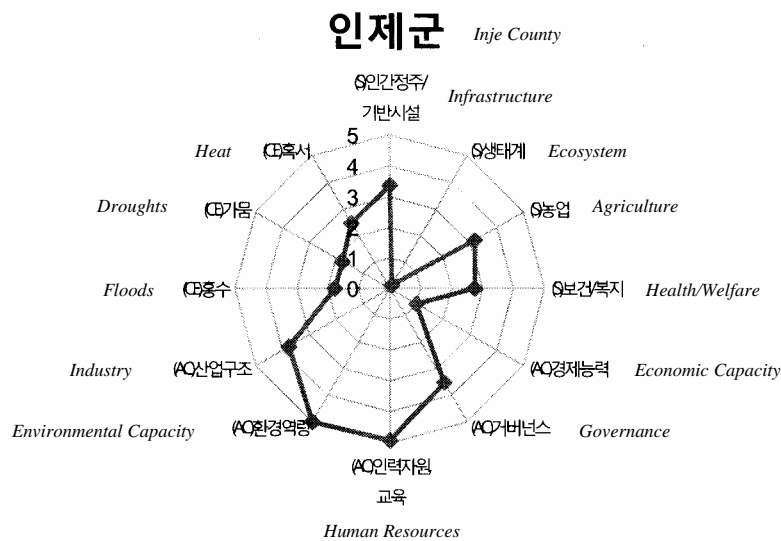


Figure 1. Assessment of adaptation potential in Inje County

The Climate Change Research Institute of Korea (CRIK) in Chuncheon developed an adaptation plan which was published in February 2010. The plan includes a SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis for the agricultural sector.

Table 2. Climate Change Adaptation Action Plan: Agriculture SWOT Analysis, Kangwon Province (from CRIK, 2010, p.69)

Strengths	Weaknesses
Clean region with a low pollution level Environmental capacity which enables environment-friendly agriculture Optimal site for highland agriculture Diverse agricultural locations	Unsuitable topographic condition for mechanized agriculture Dominance of uncompetitive, traditional farm products Lack of high-income, technology-intensive agriculture Lack of human resources due to the aging society and migration to the urban areas
Opportunities	Threats
Cultivation of early-maturing crops due to climate change Quality improvements and longer harvest period for rice Fruit and vegetable cultivation area is moving northward	Food crisis, disease and insects due to climate change Weakening competitiveness of agricultural products due to climate change

The detailed plans cover multiple components, including monitoring and development of new crop varieties and technologies. In some cases, the Agricultural Technology Center closely cooperates with farmers to experiment with new crop types and farming practices. In our survey, the farmers indicated which responses to potential climate change they would be willing to take. Those in italics were the most accepted:

1. *Change in crops cultivated/Change to crop which will be appropriate for climate*
2. *Adjustment of sowing and harvesting time*
3. *Controlled use of agrichemicals and pesticides*
4. *Improvement of farmland*
5. Diversify various crops to increase income sources
6. *Avoid excessive cultivation*
7. Vegetation management for shading
8. Change from crop production to animal husbandry
9. Employment for income other than agriculture
10. Rent the land
11. Migration to city

But as the following quotation shows, the technical aspects alone do not seem sufficient to sustainably establish new ways of farming in the face of climate change: *'It is not easy to change the type of crops since this requires changes in experience and techniques as well as machines and tools.'* (Changes in Punch bowl: Will Haeon agricultural infrastructure is to be collapsed?, p. 4) Based on a range of social factors such as age distribution or farm succession, the future of agriculture in Kangwon Province will not only depend on technical efforts. This is why the survey asked the farmers in Inje the following question: 'Imagine this place in 20 years: How will agriculture have developed?' (Q2.14 in the questionnaire). In response to this open question, we received various answers, including the very negative ('agriculture will disappear), emphasizing the status-quo ('it will never change'), or uncertainty ('we don't know ourselves').

Currently, we can clearly state that the political efforts on the regional scale have very limited influence, given that the major activities are still in the planning process. Farmers feel that they can recognize changes in the climate system, but do not significantly adjust their decisions to it. An interesting aspect of research would be to observe conflicting areas in top-down adaptation efforts; however, this will only be possible in approximately 5 years.

4. Conclusion

Agriculture in Kangwon Province will in the future be influenced by climate change. Whereas today the impacts seem to be few, the expected changes in response to shifts in temperature, precipitation, extreme winds and relative humidity are expected to increase. Although climate models offer predictions of potential change, there is large uncertainty with respect to actual future climate conditions. A comparison of the top-down and bottom-up perspectives with respect to climate change adaptation in the agricultural sector demonstrated that these two approaches are dominated by different rationality of thinking. Policy makers often times consider the long-term future, whereas farmers tend to plan only one or a few seasons ahead. Thus, from scientists as well as policy makers, there is little guidance currently to help farmers in their planning for the future. Adaptive capacity may exist and adaptation may be possible, but implementation of adaptation is not realistic at the present time. Thus, a critical attitude with respect to these concepts should be maintained in order to prevent the adoption of overly simplistic solutions.

Scenarios as a synopsis of a projected course of action, events or situations that not only include ecosystem factors but social, economic or even political aspects might help to provide to a holistic picture of what agriculture could potentially look like in 25, 50 or 100 years. Nevertheless, much work remains to be done in order to support such scenarios and to relate them to realistic farming conditions within counties of the Soyang Lake Watershed.

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