



Gaps in provincial decision-maker's perception and knowledge of climate change adaptation in China



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ABSTRACT

The perspectives and knowledge of decision makers, especially those at the provincial level, have great impact on the progress of climate change adaptation in China. Therefore, identifying knowledge gaps and enhancing climate adaptation awareness of decision makers at that level is very important. Based on this aim, we conducted a survey of climate change adaptation awareness among 85 administrative and management personnel from governmental departments responsible for climate change adaptation planning in five provinces. Study findings revealed that over half of respondents have knowledge of climate change adaptation measures, but the extent of understanding varied across different adaptation aspects and regions. Among the different aspects, understanding of measures related to human health protection was the lowest. A large majority of respondents indicated an eagerness to obtain knowledge and information about climate change adaptation, but the main barrier is a lack of training and learning material. When making adaptation plans or policies, the greatest obstacle expressed was a funding shortage. Information generated from this study can provide direction and guidance for training and educating provincial decision makers in order to improve the levels of adaptation planning and policy making.

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1. Introduction

Climate change has caused extensive concern around the world (Schneider et al., 2009; Smith et al., 2014; Jankó et al., 2014; Alló and Loureiro, 2014), and consequences of climate change are appearing at regional and local scales (Intergovernmental Panel on Climate Change [IPCC], 2007). At present, there are two approaches in the international response to climate change; mitigation and adaptation (VenkataRaman et al., 2012; Duguma et al., 2014; Felgenhauer and Webster, 2014; Shaw et al., 2014). Mitigation relates to initiatives designed to reduce the causes of climate change, while adaptation relates to human interventions to address the effects of climate change (IPCC, 2001; Bhaktikol, 2012). Under the principle of “Common but differentiated responsibility” of the United Nations Framework Convention on Climate Change (UNFCCC), negotiations have concluded that

developed countries should reduce emissions on a compulsory basis, while developing countries should do so voluntarily (Sewell, 1996; Rajamani, 2000; Tompkins and Amundsen, 2008). As a voluntary mitigation approach, China has adopted policies and taken actions to implement energy efficiency, develop renewable energy sources, develop a recycling economy, improve agricultural land management practices and promote afforestation. China has also recognized the need for adaptation to climate change and has instituted a wide variety of legislation, policies, programs and infrastructure initiatives related to climate change adaptation in agriculture, forestry, water resources and coastal zones (UNFCCC, 2007; Information Office, 2008; Mertz et al., 2009). It is important to enhance the understanding of climate change adaptation initiatives among government decision makers in China and to step up capacity building, especially in order to incorporate adaptation into national and regional socio-economic development planning (NDRC, 2012; Deng et al., 2012). A number of scholars have conducted research on stakeholders' perceptions of climate change adaptation, but most have focused on the perceptions of the public or climate change experts, rather than decision

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makers. Smith et al. (2014) studied climate and risk perceptions, assumptions, knowledge and policy preferences in relation to climate change among Native Americans, non-native ranchers and farmers and “mainstream America”. Taylor et al. (2014) reviewed the effects of emotion, agency, perceived responsibility, place attachment, personal values and uncertainty on the willingness of UK residents to support and engage with climate change adaptation. Wei et al. (2014) conducted a survey to assess the perception of health professionals in the Center for Disease Control and Prevention (CDC) in Shanxi province, China toward climate change, behavior change, and mitigation and adaptation measures issued by the central government. Although these noted studies were not designed to investigate the perception of decision makers directly, the methods and results provide good background for our research.

The Adapting to Climate Change in China (ACCC) project, led by the UK Department for International Development (DFID), the Swiss Agency for Development and Co-operation (SDC), China’s National Development and Reform Commission (NDRC) and the UK Department of Energy and Climate Change (DECC), aims to improve national and international knowledge on the assessment of climate change risks and to develop practical approaches to climate change adaptation by helping China integrate climate change adaptation into its development process. The overall aim of the project is to reduce China’s vulnerability to climate change, and to share this experience with other countries (ACCC, 2013). As an integral component of Phase II of the ACCC project, we conducted a questionnaire-based survey of government decision-makers’ understanding of climate change adaptation planning. This survey aimed at identifying the needs of decision makers and obstacles to the implementation of climate change adaptation measures, as well as providing evidence and suggestions for the development of a training manual for climate change adaptation planning. More specifically, the survey sought to assess the awareness of climate change and its impacts among decision makers; to gauge decision makers’ knowledge of adaptation measures; to analyze the knowledge needs and gaps of decision makers related to adaptation planning; and to understand how decision makers perceive and associate with the development and implementation of adaptation planning. As a corollary, our research enhances our understanding of climate change perception among a critical component of government personnel.

2. Methods

The study involved a sample survey of government departments engaged in climate change adaptation from five provinces/autonomous regions of China. Governmental decision makers working in the area of climate change adaptation were invited to participate in face-to-face interviews, with the results entered into and analyzed with Microsoft Excel software. The survey was conducted from 12 May to 15 June 2013.

2.1. Questionnaire design

2.1.1. Questionnaire design principles

The questionnaire was prepared by the survey team following the general principles of questionnaire design (Gendall, 1998; Willis, 2005) as follows:

Relevance: questions were designed to be directly related to the subject of the survey.

Logic: questions were logically relevant and consistent, and independent questions were free from logical fallacies, making the questionnaire a robust logic loop.

Clarity: both statement and questions were clear, concise and scientifically robust, and able to facilitate clear answers from the respondents without ambiguity, confusion, or vagueness.

Non-induction: questions were presented in a neutral way, without any clues to ‘induce the right’ answer, to ensure the independence and objectivity of respondents.

2.1.2. Questionnaire structure

The questionnaire included 34 questions grouped into 5 sections, with an introduction to explain the aim of the survey, provide the basic concept of adaptation and to outline our commitment to confidentiality. The five sections in the questionnaire included: (1) background and characteristics of the decision makers (section I; 9 questions), (2) knowledge of climate change and impacts (section II; 4 questions), (3) knowledge on climate change adaptation measures (section III; 9 questions), (4) knowledge needs and obstacles to climate change adaptation planning (section IV; 3 questions), and (5) climate change adaptation planning and progress (section V; 9 questions).

In section I, 2 questions related to the respondents’ title and working department, while the other 7 were multiple-choice questions related to the basic information of respondents.

In section II, there were two multiple-choice questions and a third that required the respondents to rank the answers in order of the importance, while the fourth question was a “table question”. The table question was “in your opinion, what is the impact level of climate change on different sectors in your region? Please mark the appropriate box in table (0 represents no impact, 1 represents little impact, 2 represents moderate impact, 3 represents high impact)”. The table listed each of the 8 sectors, as shown below in Table 1.

In order to provide a basis for subjective ratings such as “little impact”, “moderate impact”, “some understanding” or “full understanding”, during the interview process we explained the difference between these ratings and provided standards and examples of what each category meant. For example, in the case of a climate change-induced rise in temperature which then causes a decline in food production, if the decline in food production was minor and occasional, then that would constitute little impact. If the decline in food production was significant, such as reaching 10% and recurrent, but did not cause widespread hardship, then that is a moderate impact. If the decline in food production caused social problems such as community hunger, then the impact is high. Similarly, “no understanding” means that the respondent has not heard of or does not recognize the measure. “little understanding” indicates that they have heard of the measure but could not explain it to someone else and “some understanding” means that they could recognize whether or not it applies to their region. “full understanding” means that they would be comfortable to make a decision based on their knowledge.

In section III, questions were designed to determine the respondents’ level of knowledge on how to adapt to climate change in all aspects of agriculture, livestock, water resources,

Table 1

An example of a “table” question, as found in section II of the questionnaire.

Major impacts	0	1	2	3
Agriculture (falling food production, agricultural disasters etc.)				
Livestock (decreased grass production etc.)				
Water resources (drought, flood etc.)				
Forestry (fire, pests etc.)				
Ecosystem (soil erosion, desertification, biodiversity loss etc.)				
Coastline (sea level rise, storm surges etc.)				
Human health (safety, health, disease, diet etc.)				
Urban construction (water, electricity, heat, transportation etc.)				

If any other impacts are not listed, please elaborate.

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