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ADAPTATION TO CLIMATE CHANGE

How do Beijing Residents Value Environmental Improvements in Remote Parts of China

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Abstract

The benefits of climate adaptation policy are sometimes underestimated because its nonuse values perceived by people indirectly affected are usually ignored. Using data from a representative sample of Beijing's urban population, it is shown that people living at a distance perceive nonuse values of climate change adaptation measures aimed at improving the environmental conditions in the Tarim River Basin in Northwest China. Using the contingent valuation method the monetized benefit of a particular set of climate adaptation measures experienced by a Beijing household is approximated. It is concluded that not only the preferences of local people, but also of people living in other parts of China should be considered when deciding if a climate adaptation policy is worthwhile implementing from a social welfare point of view.

Keywords: climate policy; Tarim River Basin; cost-benefit analysis; nonuse values; contingent valuation method

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1 Introduction

Climate policy measures can be roughly subdivided into mitigation measures and adaptation measures. Mitigation policy aims at a reduction of greenhouse gas emissions with the overall goal of slowing down climate change and global warming. Since greenhouse gases like CO_2, CH_4, etc., are global pollutants which have the same effect on world climate irrespective of where they are emitted, mitigation policy creates benefits for people all over the world. Adaptation policy on the other hand does not seek to influence the global climate but, instead, is meant to reduce the negative consequences of climate change for a specific region. The benefits created by adaptation policy are only of local importance while mitigation policy yields global benefits.

Mitigation and adaptation measures are usually financed out of public funds. Before implementing a particular project or policy, decision makers should make sure that this makes sense from a social point of view, i.e., that the social benefits accruing from such a project outweigh its costs. Comprehensive environmental cost-benefit analysis requires that all benefits accruing from a project are included [*Mitchell and Carson*, 1989]. The fact that more people directly ben-

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efit from mitigation policy as compared to adaptation policy has consequences for the welfare economic appraisal of the former as compared to the latter. In practice, social benefits generated by a climate policy are calculated as the sum of changes in the utility of all households affected by this policy. As a consequence, social benefits depend both on the increase of well-being of individual households and on the number of households considered. Consequently, since the well-being of many more people worldwide is affected by mitigation measures than by adaptation measures, the former will always appear more attractive in a cost-benefit analysis than the latter, at least from a global perspective [*Hanley et al.*, 1993].

There is a growing interest in assessing public views on climate change and of adaptation policies. Quantitative surveys on this topic have been carried out in many countries [*Ebi and Semenza*, 2008; *Lowe et al.*, 2006; *Luo et al.*, 2009; *Rebetez*, 1996; *Semenza et al.*, 2008]. *Deng et al.* [2011; 2012], for instance, assessed public perceptions of climate change and adaptation measures in the Urumqi River Basin and the Aksu River Basin in Northwest China. The latter two studies focus on the preferences of the local population towards different adaptation measures. However, until now no attention has been paid to the quantification of benefits accruing from these measures also in other parts of China or even for China as a whole.

In this paper we want to show that adaption policy measures are often undervalued in cost-benefit analysis because only their so-called use values are considered, while the nonuse values they create are neglected. If it can be shown that some adaptation policy measures in the context of climate policy create also nonuse values in addition to the use values, this might lead to a new assessment of such measures and it might increase their chances of being approved in the political decision process [*Carson and Hanemann*, 2005]. It is obvious that the systematic undervaluation of adaptation policy measures resulting from the neglect of nonuse values they create might have the consequence that they are declined because they do not pass the cost-benefit test, though they create high nonuse values which are not considered in this test [*Ahlheim*, 2002]. Of course, the existence of nonuse values depends on the cultural background of the people affected by these measures and of the society they live in. Especially in an emerging country like China many people might still underestimate the importance of climate adaptation measures in comparison with economic policy measures triggering economic growth of the country, especially if the adaptation measures are conducted in faraway regions of the country [*Harris*, 2006].

In this study we test empirically the hypothesis that also in a growth-oriented economy like China non-materialistic values like the nonuse values of climate policy are perceived and respected by the population. Since environmental awareness usually increases with education level [*Dunlap et al.*, 2000], we suppose that nonuse values of climate policy are more likely to be perceived by the people living in big cities as compared to people living in remote areas. Therefore, we conduct a survey in Beijing where we ask people to assess a climate change adaptation project to be implemented in a faraway region, in this case in the Tarim River Basin in Xinjiang autonomous region. Of course, the population of Beijing is not representative for the Chinese population, but in the context of this study it serves as a suitable example for the people potentially benefiting from the nonuse value of climate adaptation policy in the Tarim River Basin. This approach can then be extended to other regions of China.

The rest of the paper is organized as follows: the next section provides information concerning the impact of climate change on the Tarim area; section 3 introduces the theoretical concept of nonuse values, the contingent valuation method and the survey; in section 4, survey results are presented and analyzed, followed by some concluding remarks.

2 Research areas

The Tarim River, located in an arid desert region in Northwest China, is the longest river in Central Asia. Figure 1 shows the location of the Tarim River and its basin. The natural environment as well as most economic activities and settlements in the Tarim River Basin directly depend on water from the Tarim River