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Prioritising ecosystem services in Chinese rural and urban communities

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ABSTRACT

Identifying ecosystem services that are important to society can help decision-makers to prioritize specific services for protection. However, ecosystem services may be valued differently by different sections of society. This study sets out an approach for assessing the use and prioritization of freshwater ecosystem services by people in rural and urban areas in China. Face-to-face interviews were conducted with 30 rural and 30 urban respondents in the same region of Shandong province. Respondents were asked about how they used their local river and to prioritize ecosystem services provided by the river. In addition, respondents were asked to state whether they would be prepared to pay to protect their local river. The rural community used more ecosystem services and prioritized them more highly than the urban community; probably because they interacted with them more frequently. The results of this study raise the question of whether there should be different ecosystem services protection goals for rural and urban regions, as well as highlighting potential trade-offs between ecosystem services prioritized by different sections of society.

1. Introduction

The ecosystem services framework combines ecology, economics and sociology into one unified idea and its central goal is to benefit human society (Costanza et al., 2014). It has the potential to bridge the gap between scientific research and policy by promoting increased public participation in environmental decision-making (Diaz et al., 2015). Interactions and trade-offs between ecological processes and functions mean that not all ecosystem services benefits can be delivered simultaneously at the same location and at the same time (Martin-Lopez et al., 2014). Furthermore, managing ecosystems for the delivery of some ecosystem services may alter the provision of other services (Spash, 2015). Such trade-offs require decisions to be made regarding which ecosystem services are prioritized and protected where. However, how should ecosystem services be prioritized and whose prioritization should be used?

Ecosystem valuation can identify ecosystem services that are appreciated by the public and evaluate the cost of ecosystem services loss to current and future generations (Kenter et al., 2015). Valuation helps decision-makers prioritize ecosystem services for protection and encourages them to consider the sustainable use of ecosystem services (Geijzendorffer et al., 2015). Ecosystem valuation should consider both use and non-use values (Corbera, 2015). Market prices can provide measures of use values but other approaches, such as the contingent valuation method, are needed to measure non-use values (Laurila-Pant et al., 2015). The contingent valuation method, which asks respondents for their willingness to pay for ecosystem services, has been widely used in developed countries but less frequently used in developing countries (Donfouet et al., 2015). For instance, the rapid economic development and urbanisation in China poses a major risk to ecosystems and the ecosystem services that they provide and there is an urgent need to identify ecosystem services for protection (Deng et al., 2015). Using contingent valuation to analyse the perspectives of different stakeholders on ecosystem services could provide important information for setting environmental protection goals and help to link scientific research and policy (Liu and Costanza, 2010). However, few ecological studies have used contingent valuation in China because incorporating public opinions into environmental decision making has only been promoted recently (Li et al., 2015).

The perceived value placed on specific ecosystem services is linked to the opinions of stakeholders, defined as “groups or individuals that affect or are affected by ecosystem services” (Suwarno et al., 2016). Stakeholders include different sections of society whose perceived value of ecosystem services can vary. For example, ecosystem values can be affected by an individual's

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disposable income or by their previous encounters with nature (Soga et al., 2015). One important factor that may affect ecosystem interactions is whether an individual lives in a rural or urban community. In general, urban populations live further away from green spaces compared to rural populations and as a result they have fewer interactions with nature (Skandrani et al., 2015). Therefore, urban populations may be less emotionally attached to ecosystems and may consider ecosystem services to be of relatively low value. Although previous studies have explored the values of some urban and rural ecosystem services in China, few studies specifically compare the differences between rural and urban communities (Wang et al., 2013; Zhao et al., 2013; He et al., 2015).

This analysis compares the perceived value of freshwater ecosystem services in rural and urban communities in China. We investigated freshwater ecosystem services because they provide irreplaceable services to benefit human well-being but also suffer from severe anthropogenic threats (Strayer and Dudgeon, 2010). To investigate whether different sections of society differ in their perceived values of freshwater ecosystem services, a questionnaire survey was conducted in a Chinese village and a city situated within the same region. Although the study uses contingent valuation methodology to estimate respondents' perception of ecosystem services, the purpose is to prioritize ecosystem services and not to assign a monetary value to them (Damschroder et al., 2007).

The objectives of this study were to address the following questions:

(1) Do rural and urban communities use and prioritize different freshwater ecosystem services?
(2) Is there a rural and urban divide between whether respondents are prepared to pay or not to save protect local river, and thus a difference between the perceived value of freshwater ecosystem services?

2. Methods

2.1. Study area

The study areas consisted of Dukou village and Fushan district of Yantai city in the northeast of Shandong province, China. Dukou village is 30 km away from Yantai City. There are approximately 250 households in the village (information from the village head) and most inhabitants are farmers. The River Baiyang runs through the village and is connected to the Menlou Reservoir nearby, which supplies drinking water to Yantai. Fushan is one of the four

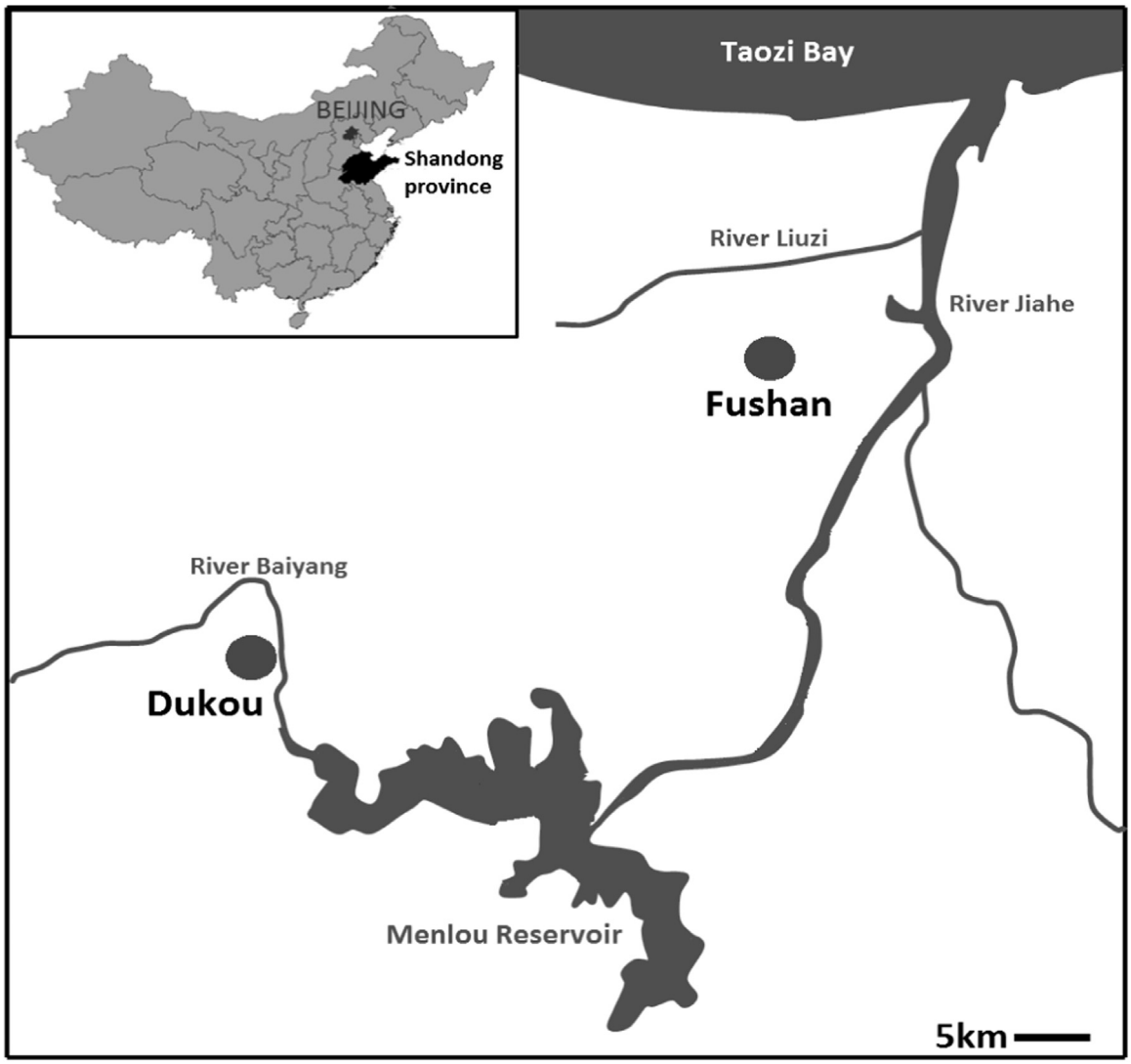

Fig. 1. The position of Shandong province within China (top left) and the position of the study areas.