



Perceptions of human well-being across diverse respondents and landscapes in a mountain-basin system, China

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ABSTRACT

Human well-being is an important concept for human-nature interactions and affected by social, ecologic, and personal factors. There is increasing consensus about the importance of public perceptions of human well-being, but studies on this are still scarce. Here, we conducted 445 face-to-face interviews to assess subjective well-being across diverse respondents and landscapes in the Huailai mountain-basin system, China. The results suggest the actualization process of human well-being is similar to Maslow's hierarchy of needs. We found that mental health was disregarded by most respondents, while basic material for a good life was most valued. Moreover, our results show differences of well-being across different socio-demographic and landscapes characteristics. Apart from good social relations, elderly respondents had highest levels of human well-being in all other four dimensions; respondents from mountainous land with a high level of ecological conservation had the lowest level of well-being. We discuss the factors contribution to well-being and its implications for local management and policies. Understanding the implications of respondents and landscapes characteristics on human well-being can help managers to develop efficient and specific policies.

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1. Introduction

Human well-being, as an endpoint and central yardstick for sustainability, is widely recognized as an important issue, but is difficult to be studied empirically (Kazana & Kazaklis, 2009; Summers & Smith, 2014). One approach is to consider the needs of local residents, and subjective measures have been proven meaningful to assess human well-being (Iniesta-Arandia, García-Llorente, Aguilera, Montes, & Martín-López, 2014; Oswald & Wu, 2010; Smith, Case, Smith, Harwell, & Summers, 2013). Management to promote human well-being across diverse landscapes while achieving sustainability is increasingly demanded by researchers and land managers (Bieling, Plieninger, Pirker, & Vogl, 2014; Quintas-Soriano, Castro, Castro, & García-Llorente, 2016; Villamagna & Giesecke, 2014). The Millennium Ecosystem Assessment (MA) provides a new insight into the linkages between human well-being and ecosystem services (MA, 2005). Hereby,

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human well-being presents a powerful bridge between humans and the natural environment. In this context, assessing human well-being and its dependency on the state of the natural environment has made substantial progress (Abunge, Coulthard, & Daw, 2013; Balmford & Bond, 2005; Xu, Tang, Wang, & Chen, 2016). However, it is still difficult to understand the linkages between natural landscapes and human well-being. Perceptions of human well-being from stakeholders are still lacking, particularly at the local level (Iniesta-Arandia et al., 2014; MA, 2005). Moreover, studies involving linkages between human well-being and natural capital and provisioning services have been documented at the local level (Abunge et al., 2013; Pereira, Queiroz, Pereira, & Vicente, 2005; Zorondo-Rodríguez et al., 2016). While few studies have sought to stress the spatial differences of human well-being across diverse landscapes (Fagerholm et al., 2016; Villamagna & Giesecke, 2014), although such an approach is important in terms of landscape management and policy-making.

Human well-being is a complex concept based on five dimensions: basic material for a good life, health, security, good social relations, and freedom of choice and action (MA, 2005). Ecosystem services provide human well-being; however, other factors are of equal importance, such as socio-demographic condition, personal factors, life experience, and other contextual factors (Butler &

Oluoch-Kosura, 2006; Carpenter et al., 2009; Dong et al., 2015; Yang, Dietz, Kramer, Chen, & Liu, 2013). For instance, recent studies proposed gender gaps should be taken into account in the measurement of well-being (Klasen, 2007), while income and education levels also have implications for human well-being (Dai et al., 2014; Kapuria, 2016; Scopelliti et al., 2016). Human well-being across diverse socio-demographic characteristics of respondents should be taken into account in order to balance well-being of different social groups and enable targeted promotion.

Previous studies have used ecological units or administrative boundaries as areas for evaluation of human well-being (Pereira et al., 2005; Summers et al., 2014; Villamagna & Giesecke, 2014; Yang et al., 2013). Hereby, ecological units are more suitable to link the status of the natural environment and human well-being, while administrative boundaries are subject to policies, management, and social factors. Assessment of human well-being combined of both ecological units and administrative boundaries is a more comprehensive and effective approach. In this study, we combined the two factors administrative boundary (towns) and natural boundary (mountain-basin system) to assess local human well-being, using interviews and questionnaires.

A mountain-basin system is a unique landscape in the farming-pastoral region, which is a transitional zone between arid and semi-arid pastoral grassland and an ecologically fragile region. Human activities, including resource exploitation, are vital for environment and human well-being, but also significantly impact this region. The mountain-basin system (MBS), defined by Zhang (2001), features mountains and basins alternations. Tang and Zhang (2003) proposed a paradigm for the Huailai mountain-basin system, which includes three layers and five function regions: mountain land (mountain region for ecological conservation), low hills (hilly region for pastures and raising livestock), and the intermountain basin (reservoir and efficient economic region in the valley plain). This paradigm is an empirical study combining ecological management with local landscape characteristics. There is a spatial distribution of well-being (Pierewan & Tampubolon, 2014; Smith, 1977), this diverse landscape contributes to the spatial differences of ecosystem function and socio-economic characteristics, and further effect the level of human well-being (Su, Xiao, Jiang, & Zhang, 2012; Xu et al., 2016).

Currently, the studies on mountain basins are still scarce, esp. in the context of human-wellbeing. We therefore extended the previous work and combined this approach with empirical investigation on human well-being. Hereby, we investigated the perceptions of human well-being to (i) assess subjective human well-being at the local level, (ii) analyze differences related to socio-demographic variables, and (iii) integrate human well-being into landscape characteristics and ecological management systems.

2. Study sites

Our study focused on the Huailai mountain-basin system in the southeast of the farming-pastoral area in northern China (Fig. 1). The region has a complex topography and is located between 394 and 1978 m above sea level, covering a total area of 1083 km². The climate is temperate semi-arid continental monsoonal climate with a mean annual precipitation of 383 mm and a mean annual temperature of 9.2 °C. Huailai county is a rural area and a major agricultural production base with corn cultivation being the most traditional and widely used agricultural practice, followed by the special cultivation of grapes. In recent years, emigration, particularly male and young emigration increased because of land shortage and farm products sales decline.

Different ecosystem and landscape types, including geomorphology, land uses, ecosystem function, industry, and

demographics may generate different nature-human relationships. In order to comprehensively analyze human-wellbeing in the Mountain-basin system, we selected typical townships which have representative landscape characteristics of the three ecological management zones, respectively. The main characteristics of the townships are summarized in Table 1.

2.1. Sunzhuangzi

Sunzhuangzi is a typical township in the south mountain land. Urbanization is restricted by the geography of the mountain, and the livelihoods of local residents are based on agro-pastoralism and outside employment. Millet and potato are the main crops and sheep is the most important livestock. Forest and small villages are characteristics for the landscape. The main function of the region is ecological conservation, with water and soil conservation having been carried out since the 1950s.

2.2. Dahuangzhuang

Dahuangzhuang is a highly efficient agricultural region with fertile soils, a large variety of crops, and a dense population, representing the main characteristics of the valley plain. Besides the water reservoir, farmland, orchards, and large villages are typical landscape characteristics.

2.3. Wangjialou

Wangjialou is a representative site of the north mountain land; the main activity in this region is ecological conservation, esp. afforestation of barren mountains and forestry farms. Besides mountainous vegetation, cultivated land and small villages are typical landscape characteristics. Urbanization is restricted by geography, similar to the south mountain region, but precipitation levels are higher.

2.4. Sangyuan

Sangyuan has the typical landscape characteristics of the low hills, with its high crop production, mainly grapes, and livestock raising. The fruit picking activities attract a large number of tourists. Soil desertification and landscape fragmentation are prominent issues in this region.

2.5. Shacheng

Shacheng is a special township of the valley plain; it is highly urbanized and densely populated. It is also a highly efficient economic region, and livestock raising has a higher significance than agricultural production. The main landscape characteristic is construction land.

3. Methods

3.1. Human well-being index

We explored human well-being through a set of 19 indicators related to five dimensions defined in the Millennium Ecosystem Assessment (MA, 2005), namely basic material for a good life, health, security, good social relations, and freedom of choice. The 19 indicators were selected based on the MA framework and characteristics of our study area. For instance, the indicator natural disaster was selected for its close relation with agricultural production, since most respondents in our study site were farmers and herdsmen. The indicator convenience of traffic was selected

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