Potential Use of Willingness to Accept (WTA) to Compensate Herders in Maqu County, China, for Reduced Stocking

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Potential Use of Willingness to Accept (WTA) to Compensate Herders in Maqu County, China, for Reduced Stocking

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Abstract

In grassland areas subject to degradation caused by overgrazing such as the Maqu grasslands, excess livestock could be removed in order to balance available forage and animal numbers. As the number of animals owned by a herder family represents wealth, income, lifestyle, and culture, reducing livestock numbers is problematic and some form of compensation is required to encourage change. Willingness to accept compensation (WTA) was assessed with the use of contingent valuation (CV) methodology to estimate the value that herder families place on the livestock numbers that lead to overgrazing. The minimum acceptable compensation was estimated as 3 717 RMB (~ $555) per head of cattle and 503 RMB (~ $75) per head of sheep at 2005 prices. The total compensation required for herder families in Maqu was estimated to be between 2.5×10^8 RMB and 3.7×10^8 RMB at 2005 prices to reduce stocking to levels considered sustainable based on an estimate of 5×10^5 sheep overgrazing equivalents in 2006.

Resumen

Las aéreas de pastizal están sujetas a degradación por el pastoreo como en los pastizales de Maqu, el exceso de ganado podría ser removido con el fin de balancear la disponibilidad de forraje y el número de animales. Cómo el número de animales en posesión de una familia representa riqueza, ingreso, estilo de vida y cultura, la reducción del número de animales es un problema y una forma de compensación se requiere para llevar a cabo es cambio. La Disposición a Aceptar una Compensación (DAC) fue evaluada usando la metodología de Valuación Contingente (VC) para estimar el valor que el hato familiar tiene en el número de animales que provocan el sobrepastoreo. La compensación mínima aceptada fue estimada en 3 717 RMB (~ $555) por cabeza de bovino y de 503 RMB (~ $75) por cabeza de oveja a precios de 2005. La compensacion total requerida por hato familiar en Maqu fue estimada entre 2.5×10^8 RMB y 3.7×10^8 RMB a precios de 2005 para reducir la carga animal a niveles considerados sostenibles basados en una estimación de 5×10^5 sobrepastoreo de ovejas equivalente en 2006.

Key Words: carrying capacity, contingent valuation, ecological compensation, grassland degradation, overgrazing

INTRODUCTION

There is around 4 billion ha of natural grassland in China, accounting for 42% of the land area. Considering grassland as a proportion of total land area, China ranks second in the world after Australia (Ren et al. 2007). Grasslands are found mainly in the arid north and northwest, in the semiarid mountain plateaus, on the Qinghai-Tibet plateau, and integrated into many other agricultural landscapes. Grasslands play an important role in livestock farming and environmental conservation (Akiyama and Kawamura 2007), but in China degradation is now a major problem; 90% of grassland is degraded in some way, with 1.3 billion ha severely degraded and about 2 million ha per year (Ren et al. 2007) becoming severely degraded. Usually, grassland degradation is reflected in biodiversity decline, reduced biomass production, increased soil erosion, and soil nutrient loss. For the purposes of this article we use *degradation* to refer to a decline in rangeland productivity, specifically plant biomass and vegetation cover, and subsequent increases in erosion and soil loss. In China average aboveground biomass of grasslands was estimated to have decreased from $> 2\,000$ kg · ha^{-1} in the 1950s to $< 1\,000$ kg · ha^{-1} in the 1990s (Akiyama and Kawamura 2007), resulting in a decline in available grass/forage and less output per animal (Zhang 2007). This has caused some herder families to increase animal numbers to maintain income, which in turn has caused further overgrazing. Long-term overgrazing (Ma et al. 2010) and climate change are believed to be combining to drive the reduction in vegetation cover of Chinese grasslands (Akiyama and Kawamura 2007). Reducing livestock numbers has been recommended as a way to alleviate this problem. (Clements 1916; Ellis and Swift 1988). However, for those who rely on livestock, reducing numbers results in reduced development opportunities, and may affect social and cultural status (referred to as *passive values* by Carson et al. 2001). Therefore, a compensation scenario must be considered if such a policy were to be implemented. *Compensation* in environmental management terms refers to the cost of balancing any negative impacts of development and resource utilization (e.g., overgrazing due to an individual herder having too many animals, which impacts on the public as a whole) against societal functions (e.g., supporting a community with an appropriate standard of living; reasonable equality across society) and is becoming increasingly accepted as a tool in environmental

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