Qilian Mountain National Park Study on Residents' Willingness to Pay Ecological Compensation and its Influencing Factors

-- A Case Study of Menyuan Area

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Abstract: The research on residents' willingness to pay ecological compensation in national parks and its influencing factors is an important basis for establishing the ecological compensation mechanism in national parks. Based on the conditional value method and Logistics model, this paper takes Menyuan area of Qilian Mountain National Park as a case study to study the residents' willingness to pay ecological compensation and its influencing factors. The results show that: (1) The total willingness of residents to pay ecological compensation in Menyuan County will reach 2.01×106~3.02×106 yuan in 2020. (2) The individual characteristics of residents' willingness to pay ecological compensation are as follows: monthly income and education level are positively correlated with residents' willingness to pay. Male's willingness to pay is higher than females, and age and willingness to pay are "n" type distribution; The psychological perception factors are: humanistic environment perception, ecological environment perception and recreation function perception in order from the largest to the smallest. Finally, the paper puts forward some suggestions and measures to improve residents' willingness to pay and promote the protection and development of Qilian Mountain National Park.

Keywords: Qilian Mountain National Park; Residents; CVM; Ecological Compensation Payment Intention; Influencing Factors; Menyuan Area.

1. Introduction

1.1. Research Background

In 2016, the General Office of the CPC Central Committee and The General Office of the State Council put forward a guideline to establish a system of protected natural areas with national parks as the main body, which refers to specific areas [1]. That achieve scientific protection and rational use of natural resources with the main purpose of protecting nationally representative natural ecosystems. The 19th CPC National Congress clearly pointed out that "a market-based and diversified ecological compensation mechanism should be established." The willingness to pay ecological compensation refers to the amount of fees (or compensation) that residents are willing to pay for behaviors that damage (or protect) resources and environment according to subjective evaluation components such as personal attributes, so as to increase the cost (or benefit) of the behavior. So as to encourage the subject of damaging (or protecting) behavior to reduce (or increase) the external diseconomy (or external economy) brought by its behavior, so as to achieve the purpose [2] Of protecting resources. Residents are the relevant beneficiaries of the ecological compensation mechanism, and play an important role [3]. In maintaining the dynamic balance of ecological compensation interests of various industries. Therefore, the research on the willingness of national park residents to pay ecological compensation and its influencing factors is conducive to improving the ecological compensation mechanism of national parks, enhancing residents' understanding and support for the ecological compensation system of national parks, coordinating the interest conflicts of ecological compensation among relevant stakeholders such as national park residents, and exploring diversified ecological compensation systems. In order to provide scientific basis and reference [4]. For the promotion of the ecological compensation mechanism of national parks.

The Contingent Valuation Method (CVM) was formally proposed by Davis in 1963 and first applied to the assessment of recreational values such as forest camping in [5]. CVM is the most important and widely used method [6]. In the study of the willingness to pay ecological compensation. In the 1970s, foreign countries began to apply CVM to carry out theoretical studies on willingness to pay ecological compensation. Studies on willingness to pay and its influencing factors [10-12]. Were conducted in national parks [7], forest recreation areas, and Marine protected areas [9]. China began to study the issue of ecological compensation from the 1990s. In the early stage, the theoretical exploratory research was mainly carried out, and the related issues of ecological compensation are also deepening [13]. In terms of research objects, a wide range of researches have been carried out from the perspective [14-16] of relevant stakeholders in terms of the willingness to pay ecological compensation and its influencing factors [17-19]. In terms of influencing factors, most of the research is carried out from the individual attributes such as age, monthly income and educational level [20-22].

To sum up, previous researches on the theory and practice of ecological compensation have made some progress. Qilian Mountain National Park is one of the ten pilot park systems...
in China, which has an important ecological strategic position, and Menyuan area is an important part of it. However, there are few researches on ecological compensation in Menyuan area of Qilian Mountain National Park. Previous studies on national parks mainly focus on the influencing factors of residents' individual attributes on the willingness to pay, but lack of studies on various influencing factors; Therefore, this paper takes the residents of Menyuan area of Qilian Mountain National Park as the research object to study the willingness and influencing factors of ecological compensation payment, in order to provide a certain theoretical and practical reference for improving the ecological compensation mechanism of Qilian Mountain National Park.

1.2. Overview of the Study Area

The park is located in the northeast of the Qinghai-Tibet Plateau, spanning Gansu and Qinghai provinces, with a total area of 50,200 km², of which Qinghai Province covers a total area of 15,800 km², accounting for 31.5% of the total area of the park. The administrative areas include Menyuan County and Qilian County of Haibei Tibetan Autonomous Prefecture, Tianjun County of Haixi Autonomous Prefecture and Delingha City, with a total of 41,000 people in 19 townships, 57 villages. It includes a provincial-level nature reserve, a national-level forest park and a national-level wetland park.

Menyuan County is located in the eastern part of Haibei Tibetan Autonomous Prefecture, with a total area of 6896km², 12 townships (8 townships and 4 towns) and 109 villages with a total area of 6902.26km² and a population of 150,000. The geographical coordinates are between 100°25 '28"~102°41'26"E, 37°03'11"~37°59' 28"N, the altitude is between 2388~5254m, and the annual sunshine hours are 2264.8~2739.8hours. The daily temperature range is 11.6~17.5℃, the average annual temperature is 0.8℃, the average annual precipitation is 520mm, and the annual evaporation is 100mm. Menyuan area covers a total area of 2100km², accounting for 30.45% of Menyuan County. There are Xianmi National Forest Park and Gangshika Snow Peak Scenic spot.
2.2. Research Methods

2.2.1. Conditional Value Method (CVM)

The core of the method of conditional value assessment (CVM) is to obtain the respondents’ willingness to pay (receive compensation) for public environmental goods through the setting of an imaginary market and questionnaires, and quantitatively express [23] the non-market value of public goods based on the respondents’ willingness to pay (receive compensation). The WTP calculation formula is as follows:

\[ T(WTP) = WTP_m \cdot M \cdot r \]  

(1)

Where: \( T(WTP) \) is the total value of willingness to pay, \( WTP_m \) is the WTP per capita of respondents, \( M \) is the total payer group of respondents, and \( r \) is the ratio of willing to pay.

2.2.2. Binary Logistic Model

In this paper, Pearson correlation values were calculated by SPSS23.0. There was a strong correlation between residents' individual attributes and their willingness to pay ecological compensation. In order to extract the factors that meet the requirements of residents and psychological perception factors, according to the standard that the factor load is greater than 0.5 and meets the requirements, the remaining 9 factors are purified.
environment perception”. The second public factor reflects residents’ perception of the friendliness of park employees, tourists and government managers, so it is named “humanistic environment perception”; The third public factor reflects the residents’ perception of the park’s service function, facility function, landscape attraction and other leisure measures, so it is named “recreation function perception”.

Therefore, in this paper, with the help of SPSS23.0, binary Logistic model was adopted to conduct regression analysis of individual attribute characteristics, psychological perception factors and ecological compensation payment intention of residents in Menyuan County. The results are shown in Table 2.

3. Results and Discussion

3.1. Ecological Compensation Payment Intention

At the beginning of 2020, the registered population of Menyuan County is 162,271, and the rate of residents’ willingness to pay is 62.90%. The calculation method of willingness to pay adopts the median value calculation method, that is, the payment amount with a cumulative frequency of 50% is selected as the WTP value. Through the statistical table of residents’ willingness to pay (WTP) value of Menyuan County, it can be concluded that the closest to the cumulative frequency of 50% are 37.41% and 53.96% respectively, and the corresponding payment amount is 20 yuan and 30 yuan. Through the calculation of the median value, the WTP is 27.61 yuan. The WTP values of ecological compensation for residents of Menyuan County in 2020 are between 2.01×106 and 3.02×106 yuan.

3.2. Influencing Factors of Residents’ Willingness to Pay Ecological Compensation

3.2.1. The Influence of Individual Characteristics on the Willingness to Pay

(1) The willingness of male residents to pay is higher than that of female residents. In terms of gender, men's willingness to pay is higher than that of women, mainly because men are generally higher than women [24] in terms of their attention to and mastery of social information, personal work income and social status.

(2) The monthly income and education level of residents are positively correlated with the willingness to pay. The survey results show that the occupations of Menyuan residents are mainly students and farmers, and the rates of willing to pay are 78.43% and 54.05% respectively. Students have a higher willingness to pay, mainly because this group can take the initiative to obtain social information, pay more attention to the ecological environment, have an open mind, and easily accept new things. They have a higher degree of support for the protection and development of resources in Menyuan area. The willingness rates of residents with incomes below 1000 yuan, 1001~2000 yuan, 2001~3000 yuan, 3001~4000 yuan, 4001~5000 yuan and >=5000 yuan were 8.63%, 13.67%, 15.11%, 16.55%, 22.30% and 23.74%, respectively; In addition, the rates of willingness to pay in middle school and below, high school, secondary school, university and graduate students were 8.63%, 10.07%, 11.51%, 25.18% and 44.60%, respectively. It shows that residents’ willingness to pay is positively correlated with their economic level and educational level.

On the one hand, residents’ income is the root cause of their willingness to pay ecological compensation. Residents with lower income are willing and able to invest less money in ecological compensation for national parks; On the contrary, on the basis of ensuring their own living expenses, the higher the income of residents, the stronger their willingness to pay. On the other hand, the more educated residents are, the more aware they are of environmental protection and the more willing they are to accept the new rules and regulations on ecological compensation.

(3) There is an N-type relationship between residents’ age and their willingness to pay. Among the survey results, 20.67%, 31.67%, 31.73%, 16.67% and 4% of residents aged 18 to 25, 26 to 35, 36 to 45, 46 to 60 and over 60 are willing to pay, respectively. The results indicate that the willingness to pay increases with age at the beginning, but decreases with age after 45 years old, showing an N-type relationship.

The main reason is that with the increase of residents’ age, the willingness to pay is lower. This is mainly because the elderly has weaker cognition and acceptance of ecological compensation, do not understand the ecological compensation mechanism of national parks, and have poor cognition of environmental protection. Therefore, they will be more cautious in choosing ecological compensation payment.

3.2.2. Influence of Psychological Perception on Willingness to Pay

The mean regression coefficients of residents' perception of ecological environment, perception of humanistic function and perception of recreational environment are 0.043, 0.272 and 0.025 respectively (Table 2). The regression analysis results show that the influence of each psychological perception factor on residents’ willingness to pay is ranked in the order of humanistic function perception > ecological environment perception > recreational environment perception.

(1) Humanistic function perception is the first factor affecting residents’ willingness to pay. The mean regression coefficient of Menyuan County residents' humanistic environment perception is 0.272, which is the first factor affecting residents’ willingness to pay. The factors of residents’ humanistic function perception are the relationship between residents and tourists, the relationship between residents and park employees, and the relationship between residents and government managers in order from strong to weak.

Surveys show that tourists’ ecotourism behavior makes residents feel that tourists have strong environmental awareness, and tourists’ arrival also promotes the development of local tourism, so residents are satisfied with the relationship between them and tourists (satisfaction=4.27). According to the survey, 38.10% of the residents are not willing to pay, among which 46.99% of the residents think that the payment may not be used for the protection of national parks, and 21.69% of the residents think that the government or tourism enterprises should bear the compensation cost (FIG. 2). Mainly due to the lack of trust in the government's executive power and public financial management system due to information asymmetry and unreasonable profit distribution between the residents and the government or tourism enterprises, they are generally satisfied with the relationship between park practitioners (satisfaction=3.26) and government managers (satisfaction = 3.36). Therefore, the perception of humanistic function became the first factor affecting their willingness to pay.
4. Conclusion and Suggestions

4.1. Conclusion

(1) The residents' willingness to pay ecological compensation in Menyuan area of Qilian Mountain National Park will reach 2.01×106–3.02×106 yuan in 2020.

(2) The difference of the residents' willingness to pay ecological compensation mainly lies in individual characteristics. Occupation and willingness to pay are positively correlated; Age and willingness to pay showed an "n" type distribution; Monthly income and education level were positively correlated with the willingness to pay.

(3) In terms of psychological perception, the perception of human environment is the first factor of residents' willingness to pay, the perception of ecological environment is the second factor affecting residents' willingness to pay, and the perception of recreational function is the third factor affecting residents' willingness to pay.

4.2. Suggestions

The study of residents' willingness to pay ecological compensation in Menyuan District is an important means to improve the ecological compensation mechanism of national parks. The following will put forward corresponding suggestions for the problems existing in Menyuan District.

First of all, it is necessary to improve the public’s positive attitude towards national parks.

(1) Through strengthening publicity and education, public opinion guidance, etc., to improve residents' environmental awareness, enhance residents' awareness of the importance of ecological compensation in national parks, strengthen residents' awareness of ecological compensation payment, and reduce residents' idea of "free riding" on ecological compensation payment. Secondly, residents' income should be increased by actively developing eco-tourism and reducing residents' idea of "free riding" on ecological compensation payment. Secondly, residents' income should be increased by actively developing eco-tourism and protecting the ecological environment. Finally, through the construction of various infrastructure and service facilities to meet the residents' recreation needs, so as to enhance the residents’ willingness to participate in ecological compensation.

(2) To establish the positive interaction between residents, government and practitioners. Establish the positive interaction between residents, government and employees. For the government, the compensation standard and amount of compensation should be disclosed in a timely manner to improve the transparency of the national park ecological compensation policy; For residents, they should take the initiative to participate in the national park ecological compensation, and actively understand the latest information of the national park ecological compensation; For employees, they should regularly participate in job training in national parks to improve service level, service skills and service.
awareness.

(3) Visitors are the main body of ecological compensation in national parks. In the future, we should actively carry out comparative studies on the driving force and spatio-temporal evolution of the willingness of multiple visitors such as residents and tourists to pay ecological compensation and the influencing factors; In terms of data collection, the combination of big data, questionnaire survey and in-depth interview can be used to compensate for the limitations of sample bias; To sum up, by further improving the scientific, comprehensive and comparable research results, more reference can be provided for the ecological compensation construction of national parks.

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