

A Study on Residents' Willingness for Tourism Ecological Compensation and Its Influencing Factors: A Case Study of Zhujiawan Village in the Qinba Mountain Region

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ABSTRACT

Ecological compensation plays a crucial role in balancing stakeholder interests, aligning with the principles of ecological civilization and sustainable development. However, research on tourism ecological compensation, especially concerning community residents' perspectives, remains limited. This study addresses this gap by examining the case of Zhujiawan Village in China's Qinba Mountain region. Through surveys and analysis, the study investigates community residents' perceptions, preferences, and factors influencing their willingness to accept tourism ecological compensation. The findings reveal that while residents acknowledge the positive economic impacts of rural tourism development, they also express concerns about environmental pollution, particularly waste and noise. They largely attribute responsibility for ecological compensation to the government and tourism developers. Cash compensation emerges as the preferred method, with employment opportunities also valued. Additionally, residents expect an annual compensation standard of 1,033 RMB, influenced by their satisfaction with the local ecological environment and awareness of ecological compensation policies. The study highlights the importance of balancing economic development with environmental protection in rural tourism destinations. It underscores the need for diversified compensation mechanisms and emphasizes the significance of community involvement in decision-making processes for sustainable tourism development.

KEYWORDS

Willingness to accept; Tourism ecology compensation; Contingent valuation method; Rural tourism

1. INTRODUCTION

Ecological compensation can effectively balance the distribution of interests among stakeholders, aligning with the core principles of ecological civilization, which advocate for harmonious coexistence, positive cycles, and comprehensive development [1]. As a significant economic, ecological, and social issue in China, ecological compensation frequently appears in national strategic decisions. For instance, the report of the 18th National Congress further proposed the establishment of a system for the paid use of resources that reflects market supply and demand, resource scarcity, and embodies ecological value and intergenerational compensation. The report of the 19th National Congress clearly stated the need to "strengthen ecosystem protection" and "establish market-oriented and diversified ecological compensation mechanisms." The report of the 20th National Congress emphasized the importance of creating mechanisms to realize the value of ecological products and improving the ecological protection compensation system.

Zhujiawan Village, located in Zhashui County of Shangluo City, sits in the heart of the Qinba Mountain region. It is not only an important ecological protection area but also one of the country's

contiguous poverty-stricken regions. With the rapid development of local rural tourism, conflicts between ecological environment protection and economic development have become increasingly prominent. Therefore, it is necessary to establish a scientific tourism ecological compensation mechanism to promote the sustainable development of tourism. As an important means to mediate the conflict between tourism development and ecological protection, tourism ecological compensation can, on one hand, impose penalties to curb ecological pollution and destructive behaviors in tourism activities, and on the other hand, enhance people's ecological protection awareness through incentives. This serves as a strong support for the sustainable development of rural tourism destinations [2].

Currently, research on tourism ecological compensation is still in its early stages. Most studies focus on the willingness of tourists, utilizing various theoretical perspectives and research methods to gradually refine the field. For instance, some scholars have employed questionnaire surveys and contingent valuation methods, along with binary logistic regression analysis, to investigate the factors influencing tourists' willingness to pay for tourism ecological compensation in Huangshan Scenic Area [3]. Others have utilized an extended theory of planned behavior framework and structural equation modeling to explore tourists' willingness to pay for tourism ecological compensation in Tianchi World Natural Heritage Site in Tianshan Mountains [4]. However, there is a lack of research on the willingness of community residents in tourism destinations regarding ecological compensation. While studies on residents' compensation willingness are relatively abundant in the field of ecological compensation, they are sparse in the context of tourism ecological compensation. Most relevant research focuses on residents' cognition and attitudes. For example, scholars have studied residents' cognition and attitudes towards tourism ecological compensation in Yangshuo County, Guangxi, to reflect the local residents' preferences for the compensation subject, method, and amount during the implementation of compensation systems [5]. Moreover, research areas mainly concentrate on natural reserves and forest parks, such as studies conducted by Chen Haiying, Li Xinglai, and Adhikari RK on the tourism ecological compensation mechanisms in Qilian Scenic Area in Qinghai, Yulong Snow Mountain Scenic Area in Yunnan, and Ba Be National Park in Vietnam, respectively [6, 7, 8]. However, research on ecological compensation in rural tourism destinations is relatively limited. Based on this, this paper takes Zhujiawan Village as an example and utilizes contingent valuation method and regression analysis to analyze residents' willingness for tourism ecological compensation and its influencing factors, ultimately drawing conclusions.

2. RESEARCH AREA AND METHODS

2.1. Overview of Zhujiawan Village

Zhujiawan Village is located in Yingpan Town, Zhashui County, at the upper reaches of the Qianyou River, nestled at the foot of Niubeiliang on the southern slope of the Qinling Mountains [9]. The village covers an area of 126 square kilometers and consists of four residential groups with a total of 468 households and 1,750 residents. The terrain slopes from north to south, with Niubeiliang at the back reaching an elevation of 2,812 meters, making it the highest peak in the eastern segment of the Qinling Mountains and the ridge of the mountains in Shangluo. Zhujiawan Village adheres to the development concept of "lucid waters and lush mountains are invaluable assets," vigorously promoting the cultural tourism and wellness industry. It has established the 4A-rated Niubeiliang National Forest Park and the 3A-rated Zhongnanshan Village Scenic Area. The village boasts three star-rated hotels and has cultivated high-end homestay clusters such as Yangpo Yard and Huajin Garden. It has also developed premium agritainment options like Yuyang Farmhouse and Hongmiao River, along with activities such as agricultural picking experiences and outdoor camping. Over 80% of the village's households are involved in the cultural tourism and wellness industry. Currently, Zhujiawan Village receives over 1.5 million tourists annually, creating more than 5,000 jobs and

generating a comprehensive tourism income of 220 million RMB. The village has been honored with titles such as "China's Most Beautiful Leisure Village" and "National Key Village for Rural Tourism."

2.2. Research Methods

This study utilizes a comprehensive literature analysis method, collecting relevant domestic and international books, academic papers, and research reports through various channels. This approach helps understand the current state of research on tourism ecological compensation, previous research methods, and accumulate relevant information, knowledge, and achievements from government documents. Based on this analysis, we construct our research framework, determine the indicators and basic structure of the survey questionnaire, and lay a foundation for subsequent project development.

Building on theoretical research, this study conducts field investigations into the tourism ecological compensation status in Zhujiawan Village. Through site visits, we gather background information, tourism development data, and details on tourism ecological compensation in Zhujiawan Village. On-site observations, field notes, and informal interviews are used to assess community residents' attitudes towards local tourism activities, their perceptions of tourism ecological compensation, and their willingness to accept compensation. This process helps obtain the necessary images, texts, and data for the study.

The questionnaire content is divided into three sections: social attributes of the sample, cognition of tourism environmental impacts, and perceptions and willingness to accept tourism ecological compensation. Given that rural tourism residents generally have lower education levels and may find the questionnaire content difficult to understand, which could affect its validity and reliability, we primarily employ a combination of face-to-face interviews and surveys. We distributed 220 resident questionnaires and, after eliminating 10 invalid ones, recovered 210 valid questionnaires, achieving a response rate of 95.45%, meeting the required standards. After completing the distribution of questionnaires and face-to-face interviews with tourists and community residents, project team members collate and analyze the questionnaire data and interview audio materials.

Using SPSS 25.0 software, we conduct reliability and validity analyses of the community residents' survey questionnaire. The Cronbach's Alpha for the questionnaire is 0.769, indicating a high level of reliability based on the Cronbach's Alpha test interval table (ranging from 0.700 to 0.799). We use Bartlett's Test of Sphericity and the Kaiser-Meyer-Olkin (KMO) measure to assess the suitability of the data for factor analysis. The chi-square value of Bartlett's Test is significant at 0.000, indicating a high level of significance, and the KMO measure of the questionnaire is 0.821, suggesting good sample adequacy.

This study employs relevant statistical tools to perform correlation and regression analyses on the factors influencing community residents' levels of ecological compensation. These analyses identify the factors affecting tourists' willingness to pay and community residents' willingness to accept compensation, providing support and reference for implementing tourism ecological compensation in Zhujiawan Village.

3. RESEARCH RESULTS

3.1. Descriptive Statistics

The study collected a total of 210 valid survey questionnaires from community residents. According to Table 1, the gender composition reveals a slight majority of males, accounting for 51.16%, while females represent 48.84%. Regarding age distribution, residents predominantly fall within the age brackets of 51-60 years and over 60 years, with a minority under 20 years old. In terms of educational background, the majority of residents possess a junior high school education or lower, comprising

79.07%, followed by those with a high school/vocational school education at 17.44%, and those with a college degree or above at 3.49%. Regarding income levels, the majority of residents belong to the middle-to-lower income bracket, with 38.37% earning below 2000 yuan, 33.72% earning between 2001-4000 yuan, and 27.91% earning above 4000 yuan. Family structure analysis indicates that households with 3-5 members constitute the majority at 70.93%, while single-person households are less common, representing 3.49%. In terms of occupation, the service industry and individual business owners comprise the largest group at 34.88%, followed by freelancers, workers, agricultural and forestry workers, and others, retirees, and professionals/teachers, accounting for 17.44%, 12.79%, 12.79%, 11.63%, 9.30%, and 1.16%, respectively. Concerning sources of income, individual businesses are the primary source at 40.70%, followed by other (migrant workers) at 27.91%, wages at 22.09%, animal husbandry at 4.65%, agriculture at 3.49%, and government subsidies at 1.16%. In terms of length of residency, the majority of residents have lived in the surveyed area for over 50 years, indicating that 31.40% of the residents are non-migrants. Those residing for 11-20 years are relatively fewer, accounting for 9.30%.

Table 1. Social demographic characteristics of community residents

Attribute	Category	Frequency	Proportion
Gender Composition	Male	108	51.16%
	Female	102	48.84%
Age Distribution	<20	0	0.00%
	21-30	14	6.98%
	31-40	42	19.77%
	41-50	34	16.28%
	51-60	64	30.23%
	>60	56	26.74%
Educational Background	Junior high school education or below	166	79.07%
	High school/Vocational school education	36	17.44%
	College degree or above	8	3.49%
Income Levels	<2000	80	38.37%
	2001-4000	70	33.72%
	4001-6000	34	16.28%
	6001-8000	14	6.98%
	>8000	10	4.65%
Family Structure	1	8	3.49%
	2	22	10.47%
	3-5	168	80.23%
	>5	12	5.81%
Occupation Distribution	Worker	32	12.79%
	Professional/Technical Personnel/Teachers	2	1.16%
	Agricultural, Forestry, Animal Husbandry, and Fishery Workers	32	12.79%
	Service Industry and Individual Business Owners	90	34.88%
	Freelancers	44	17.44%
	Retirees	24	9.30%
	Others	30	11.63%
Sources of Income	Individual Business	86	40.70%
	Salary Income	46	22.09%
	Animal Husbandry	10	4.65%
	Government Subsidies	2	1.16%
	Crop Cultivation	8	3.49%
	Others	58	27.91%
Length of Residency	1-10	32	15.12%
	11-20	20	9.30%
	21-30	22	10.47%
	31-40	46	22.09%
	41-50	24	11.63%
	>50	66	31.40%

3.2. Evaluation of the Impact of Tourism Activities by Community Residents

Based on the empirical results, it is evident that 91.86% of residents believe that engaging in tourism activities will bring more income to the local area and promote local economic development. Additionally, 67.44% of community residents perceive that the development of tourism activities has provided them with more opportunities to participate in rural tourism activities. Furthermore, 44.19% of residents believe that tourism activities have changed the local natural and cultural landscape, rejuvenating the countryside. Another 31.40% of residents believe that tourism activities promote the construction of local infrastructure. In addition, residents believe that tourism activities will also increase local visibility, improve residents' quality of life, and preserve the unique rural landscapes, with proportions of 26.74%, 23.26%, and 6.98%, respectively. It is evident that rural tourism activities bring a series of positive impacts to rural tourism destinations, with the greatest impact on rural economic development. In addition to providing more job opportunities for local residents, tourism activities also promote the construction of local infrastructure, rejuvenating the countryside.

According to the research findings, 59.30% of residents believe that engaging in tourism activities will bring more garbage to the local area. Additionally, 32.56% of community residents feel that tourism activities have little impact on them. Furthermore, 24.42% of residents think that tourism activities will cause some pollution to the local water resources. In addition to these concerns, residents also perceive a series of problems associated with tourism activities, including noise pollution, traffic congestion, and damage to vegetation and soil, with proportions of 20.93%, 19.77%, 12.79%, and 11.63%, respectively. It is evident that tourism activities bring a series of negative impacts, with the garbage problem being the most serious, followed by pollution of local water resources. However, a considerable number of residents also believe that the development of tourism activities has not had any adverse effects on their production and life.

3.3. Community Residents' Preferences for Compensation Responsibility

According to the survey results, 65.81% of residents believe that the local government should bear the responsibility for tourism ecological compensation. Additionally, 56.05% of residents consider tourism developers to be the main entity responsible for tourism ecological compensation. Furthermore, 32.56% of residents believe that visiting tourists should be the main entity responsible for tourism ecological compensation. Only 13.95% of residents think that local residents should be the main entity responsible, while 8.16% of residents believe that social groups should be the main entity responsible for tourism ecological compensation. Therefore, from the perspective of community residents, the primary entities responsible for rural tourism ecological compensation are, in descending order: the local government, tourism developers, and visiting tourists. Only a small proportion of residents believe that they themselves should bear some responsibility for the ecological compensation in rural tourism.

3.4. Community Residents' Preferences for Compensation Methods

The research team analyzed the preferred methods of tourism ecological compensation among rural tourism destination community residents. The results indicate that 62.79% of residents prefer compensation in the form of cash. This preference is attributed to the straightforward nature of cash compensation, which alleviates concerns and uncertainties. Additionally, 52.33% of residents hope for government-arranged employment opportunities or employment guidance. For instance, during the development of rural ecological tourism, local residents could be provided with jobs or technical guidance for self-employment, such as managing bed-and-breakfasts or operating pick-your-own orchards. Furthermore, 40.70% of residents are willing to accept ecological compensation in the form of preferential policies. Examples include providing housing for relocated residents or increasing investment in the scenic area. Additionally, 36.05% of residents prefer receiving compensation

through opportunities to engage in tourism business activities. This method allows residents to participate in tourism activities, thereby increasing their economic income.

3.5. Community Residents' Preferences for Compensation Standards

As shown in Figure 1, the majority of community residents prefer higher amounts of ecological compensation. Specifically, 38.37% of residents hope to receive compensation exceeding 1,400 yuan. The next most desired compensation range is 1,000-1,200 yuan, with 22.09% of residents favoring this amount. Following these, 15.12% of residents prefer a compensation range of 200-400 yuan, 6.98% prefer 800-1,000 yuan, 5.81% prefer 400-600 yuan, and 4.65% prefer 600-800 yuan. The smallest proportions of residents, each constituting 3.49% of the total sample, prefer compensation below 200 yuan and between 1,200-1,400 yuan. Using the formula (1) to calculate residents' willingness to accept (WTA), where WTA represents the annual compensation amount per household in Zhujiawan Village, A_i is the compensation amount, P_i is the probability of respondents choosing that amount, and i represents the index for the distribution of compensation preferences (with i ranging from 0 to 210 in this study), the calculated average annual compensation standard per household in Zhujiawan Village is 1,033 yuan.

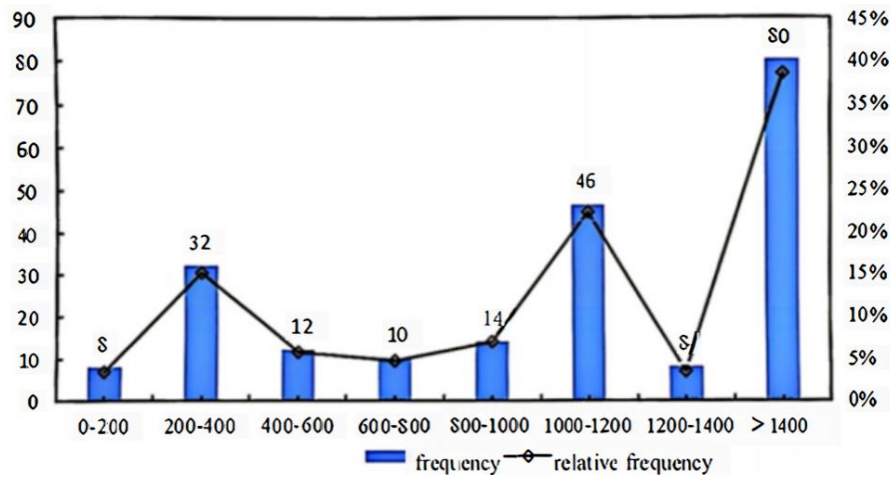


Figure 1. Compensation Amount and Frequency Distribution

$$WTA = \sum_{i=0}^{210} A_i P_i \quad [10] \quad (1)$$

3.6. Analysis of Factors Influencing Community Residents' Compensation Willingness

Generally, respondents' willingness to accept compensation (WTA) varies based on their specific circumstances. The correlation analysis of various variables primarily aims to balance the influence of personal attributes and other factors on WTA. This study analyzes the correlation between these variables and the desired compensation amount through regression and correlation analyses to determine the correlation coefficients. Based on these coefficients, the relationships are further examined.

In the survey design, the compensation amounts desired by Zhujiawan Village residents were categorized into seven intervals: less than 200 yuan, 201-400 yuan, 401-600 yuan, 601-800 yuan, 801-1000 yuan, 1001-1200 yuan, 1201-1400 yuan, and more than 1400 yuan. Twelve variables, including gender, age, occupation, income, and the level of understanding of ecological compensation, were used as independent variables, while the compensation amount was used as the dependent variable. The meanings of these variables were coded as shown in Table 2.

According to the analysis results in Table 3, variables X3, X6, X11, and X12 have passed the significance test. This indicates a significant correlation between community residents' compensation amount and occupation, family structure, satisfaction with the ecological environment, and awareness of tourism ecological compensation policies.

After eliminating eight irrelevant variables—gender, age, education level, income level, economic source, length of residence, willingness to engage in tourism activities, and necessity of ecological protection—we conducted multiple linear regression analysis again on the remaining four correlated variables. From Table 4, we observe that the VIF values for all four variables are less than 10, indicating the absence of multicollinearity.

Among these variables, X11 and X12 passed the significance test, with Sig. significance levels of 0.039 and 0.042, respectively. Additionally, all regression coefficients are negative. According to the standardized Beta coefficients, the variable X11 (satisfaction with ecological environment) has the most significant impact on the compensation amount, followed by X12 (awareness of tourism ecological compensation policies). Factors influencing the compensation amount among community residents include: Satisfaction with the ecological environment: Satisfaction with the ecological environment has a significant negative effect on the compensation amount at a significance level of 5% (Sig. = 0.039, B = -2.118). This indicates a significant negative correlation between satisfaction with the local ecological environment and the desired compensation amount, suggesting that community residents who are more satisfied with the local ecological environment prefer lower ecological compensation amounts. Awareness of tourism ecological compensation policies: Awareness of tourism ecological compensation policies has a significant positive effect on the compensation amount at a significance level of 5% (Sig. = 0.042, B = 0.215). This positive correlation suggests that community residents who have a better understanding of tourism ecological compensation policies prefer higher compensation amounts.

Table 2. Explanation of Variable Coding

Independent Variable	Independent Variable Value
Gender(X₁)	1 = Male, 2 = Female
Age(X₂)	1 = Under 20 years, 2 = 21-30 years, 3 = 31-40 years, 4 = 41-50 years, 5 = 51-60 years, 6 = Over 60 years
Occupation(X₃)	1 = Worker, 2 = Professional/Teacher, 3 = Agricultural/Fishery Worker, 4 = Service/Self-employed, 5 = Freelancer, 6 = Retired, 7 = Other
Education Level(X₄)	1 = Middle school or below, 2 = High school/Technical school, 3 = Associate/Bachelor's degree
Income Level(X₅)	1 = Below 2000 yuan, 2 = 2001-4000 yuan, 3 = 4001-6000 yuan, 4 = 6001-8000 yuan, 5 = Above 8000 yuan
Family Structure(X₆)	1 = Single, 2 = Couple, 3 = 3-5 members, 4 = More than 5 members
Economic Source(X₇)	1 = Self-employed, 2 = Salary, 3 = Breeding industry, 4 = Government subsidy, 5 = Planting industry, 6 = Other
Length of Residence(X₈)	1 = 1-10 years, 2 = 11-20 years, 3 = 21-30 years, 4 = 31-40 years, 5 = 41-50 years, 6 = Over 50 years
Willingness to Engage in Tourism Activities(X₉)	1 = Not supportive, 2 = Neutral, 3 = Supportive, 4 = Very supportive
Necessity of Ecological Protection(X₁₀)	1 = Not necessary, 2 = Slightly necessary, 3 = Necessary, 4 = Satisfactory, 5 = Very necessary
Satisfaction with Ecological Environment(X₁₁)	1 = Unsatisfied, 2 = Neutral, 3 = Satisfied, 4 = Very satisfied
Awareness of Tourism Ecological Compensation Policy(X₁₂)	1 = Completely unaware, 2 = Unaware, 3 = Somewhat aware, 4 = Fairly aware

Table 3. Pearson Correlation Analysis Results

Variable	X ₁	X ₂	X ₃	X ₄	X ₅	X ₆
Pearson Coefficient	-.087	.490	.188*	.163	.060	-.186*
Sig	.425	.655	.083	.135	.582	.087
Variable	X ₇	X ₈	X ₉	X ₁₀	X ₁₁	X ₁₂
Pearson Coefficient	.146	-.006	-.004	.002	-.274**	-.223**
Sig	.179	.960	.971	.986	.011	.035
"Note: Superscripts ***, **, and * represent significance levels of 1%, 5%, and 10% for independent variables, respectively."						

Table 4. Results of Multiple Linear Regression Analysis

Model	B	Beta	T	Sig.	VIF
Constant	7.591		2.424	0.018	
X₃	1.357	.192	1.239	.219	2.205
X₆	1.271	.128	-0.943	.349	1.698
X₁₁	-2.118**	-.265	-2.188	.039	1.350
X₁₂	2.042**	.215	0.128	.042	1.261
"Note: Superscripts ***, **, and * represent significance levels of 1%, 5%, and 10% for independent variables, respectively."					

4. CONCLUSION AND DISCUSSION

This study reveals that community residents generally believe that the development of rural tourism has significant positive impacts on the local economy and infrastructure. However, it also brings negative environmental effects such as pollution from waste and noise. Regarding the responsible parties for ecological compensation, residents commonly believe that both the government and developers should bear the main responsibility. As the primary beneficiaries of tourism development, the government and tourism developers should take the lead in ecological compensation. However, relying solely on them may have limitations. Therefore, exploring diversified mechanisms for tourism ecological compensation is essential to achieve optimal results in the future. In terms of compensation methods, residents tend to prefer cash compensation and employment opportunities, considering them more direct. Additionally, age significantly influences these preferences. Elderly residents often opt for cash compensation due to declining health, while younger residents prioritize long-term development and choose employment and skills training. Regarding compensation standards, the calculated Willingness to Pay (WTP) value indicates that residents in Zhujiawan Village expect an annual compensation standard of 1,033 RMB. Furthermore, residents' satisfaction with the ecological environment and their awareness of tourism ecological compensation policies are crucial factors affecting their compensation expectations. Based on these findings, This study suggest that future tourism development and ecological compensation policies in Zhujiawan Village should balance economic interests and environmental protection. It is essential to fully consider the needs and expectations of community residents to achieve sustainable rural tourism development.

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