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Research on Ecological Compensation of National Parks Based on Tourism Concession Mechanism

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Abstract: The Chinese government has already proposed to build a nature protected area system composed mainly of national parks and encourages the development of concession operations in national parks. The establishment of a long-term ecological compensation mechanism under the concession mode is of great significance to promoting the harmonious development of man and nature in national parks. This paper selects the Pilot Programs for Shennongjia National Park System (PPSNPS) as the research area and constructs a long-term ecological compensation mechanism under the concession model of tourism back-feeding communities in PPSNPS. Through the questionnaire survey (516 valid questionnaires in 2018), based on the Travel Cost Interval Analysis (TCIA) and Contingent Valuation Method (CVM), the landscape value of the study area is monetized. Combined with the investment cost of concession enterprises, we construct the quantitative distribution ratio of the ecological compensation standard and get the amount of ecological compensation. On this basis, a long-term ecological compensation scheme is constructed. This specific scheme content is as below: on the one hand, Shennongjia National Park Administration (SNPA) is the beneficiary of ecological compensation, and the Shennong Tourism Investment Group Co, Ltd. (STIC) is the provider of ecological compensation; on the other hand, the travel tickets income is the only source of ecological compensation funds (back-feeding funds). Specifically, the landscape value of PPSNPS in 2018 was 604,230.3 $\times$ 10^4 yuan, the input cost of STIC was 140,696 $\times$ 10^4 yuan, the income after deducting tax from tourism tickets was 15,200 $\times$ 10^4 yuan, and the distribution ratio of back-feeding funds is 1:4.29 with the back-feeding funds provided to SNPA from STIC of 12,326.65 $\times$ 10^4 yuan. Through this paper, we know that landscape value monetization can provide ideas for quantitative accounting of the ecological compensation standard for national park tourism concession. In the future, this subject needs more theoretical and practical research on multiple long-term ecological compensation mechanisms.

Keywords: protected natural areas; ecological compensation; concession; Pilot Programs for Shennongjia National Park System

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1. Introduction

On the basis of integrating the input cost of ecological protection, the opportunity cost of development, and the ecosystem services value, the long-term ecological compensation policy adopts different compensation methods, such as policy support, infrastructure construction, technical support, and concession, to provide reasonable returns to ecological protectors and natural resource investors, ensuring fairness between producers and users of natural resources. This is an institutional arrangement that clearly defines the rights and obligations of ecological protectors and beneficiaries and enables long-term and reasonable internalization of the economic externalities of ecological protection [1]. It is also of great significance for protecting the ecology, alleviating poverty, and promoting the coordinated development of ecology and the economy [2–4].

As an area rich in natural resources but relatively backward in terms of the economy, nature protected areas have become the main regions for the implementation of ecological compensation policies [5]. At present, governments around the world have implemented a large number of ecological compensation projects in nature protected areas, and positive progress has been made in forests, grasslands, wetlands, watersheds, and other types of nature protected areas. The theories and systems of these ecological compensation policies have been widely valued and studied by scholars and government decision-makers [6–8], which can be summarized as compensation methods, the main body of compensation, financing channels, and compensation standards. In recent years, relevant literature studies have shown that, in some countries, the ecological compensation policy with the joint participation of the government and the market is relatively mature [9]. Specifically, as for the main body of compensation, the government, tourism management enterprises, and tourists of nature protected areas constitute the main body of ecological compensation [10]. In terms of financing channels, compensation funds are extracted from government grants, tourism ticket revenue, and concession revenue, which are used for ecological protection and community development in nature protected areas [11]. As for compensation methods, a combination of direct compensation (blood transfusion) and indirect compensation (hematopoietic) is adopted [12], which tends to protect the interests of communities and residents in protected areas [13]. In contrast, in some countries and regions, the long-term mechanism of ecological compensation is still in the initial stage [14]. Due to the relatively lagging economic development, the ecological destruction of nature protected areas is mainly caused by the development needs of the population and economy, and the market-oriented mechanism of ecological compensation is not perfect enough. The main body of ecological compensation is relatively singular, and the compensation funds mainly come from the central or local government financial transfer payments [15]. Affected by the pressure of the government's financial burden, the compensation standard is low, and the continuity of the policy is not strong, which cannot fundamentally solve the poverty problem of residents in the nature protected areas. When the term of the compensation policy expires, more serious ecological damage is likely to occur. Therefore, in the face of ecological deterioration caused by unreasonable utilization of nature protected areas, it is necessary to reasonably establish a long-term ecological compensation mechanism [12,16].

Meanwhile, in recent years, many scholars have explored a lot of long-term ecological compensation mechanisms in nature protected areas [15,17–19], but there are few research studies on compensation policies under the concession model of tourism back-feeding communities, and the current related research lacks a combination of theory and practice. In particular, the current ecological compensation mechanism for tourism concession mostly stays in qualitative theoretical research on the definition of the connotation and concept of compensation, the construction of compensation framework, the expansion of compensation main body and financing channels, etc. However, there is a lack of in-depth research on the quantitative evaluation of compensation standards. Especially, the amount of funds allocated for tourism back-feeding communities is still determined by game and negotiation [20], which lacks scientific basis and cannot tell policy makers what compensation standards to implement. Thus, we propose a long-term ecological compensation model for tourism back-feeding communities.

Based on the tourist questionnaire data and the input cost of tourism concession enterprises in the Pilot Programs for Shennongjia National Park System (PPSNPS) in 2018, this paper uses Travel Cost Interval Analysis (TCIA) [21] and Contingent Valuation Method (CVM) [22,23] to calculate the landscape value of the study area. By establishing the ratio relationship between the input cost of tourism concession and the landscape value of the study area, we can quantitatively evaluate the compensation standard, so as to provide technical support for the construction of a long-term ecological compensation mechanism for tourism back-feeding communities.

2. Study Area

PPSNPS was established in 2016. It is one of five national park system pilots in China [24]. PPSNPS is located in the southwest of the Shennongjia Forest District in Hubei Province. Its geographical coordinates are 109°56′ E–110°36′ E, 31°21′ N–31°36′ N. The east–west width is 63.9 km, the north–south length is 27.8 km, and the total area is 116,988 ha, accounting for 35.97% of the total area of the Shennongjia Forest District (Figure 1). PPSNPS is rich in flora and fauna; it is the habitat for many rare animals such as the Chinese newt, chuan golden monkey, clouded leopard, and the Asian black bear. There are 3684 species of vascular plants spanning 210 families and 1186 genera. Among them, ferns account for 27 families, 75 genera, and 309 species; seed plants can be demarcated into 183 families, 1111 genera, and 3375 species; and deciduous woody plants span 77 families, 245 genera, and 838 species. In addition, PPSNPS is the most abundant area of deciduous woody plants in the world and is also a veritable "green treasure house", "species gene bank", and "natural zoo" [25]. As early as 2009, Hubei Provincial Government vigorously implemented ecological compensation with respect to returning farmland to forest in PPSNPS. The basic awareness and functional system of local ecological compensation was formed. As a nature protected area, PPSNPS is under strict environmental protection, and this has concomitant impacts on the wellbeing and livelihoods of local residents. In 2017, PPSNPS began to develop tourism concession and implement an ecological compensation policy at the same time. As an enterprise for tourism concession, Shennong Tourism Investment Group Co., Ltd. (Hubei, China) (STIC) has the concession for tourism development in the PPSNPS. The Shennongjia National Park Administration (SNPA) is responsible for the management and protection of natural resources in PPSNPS and also supervises the operation of the company.

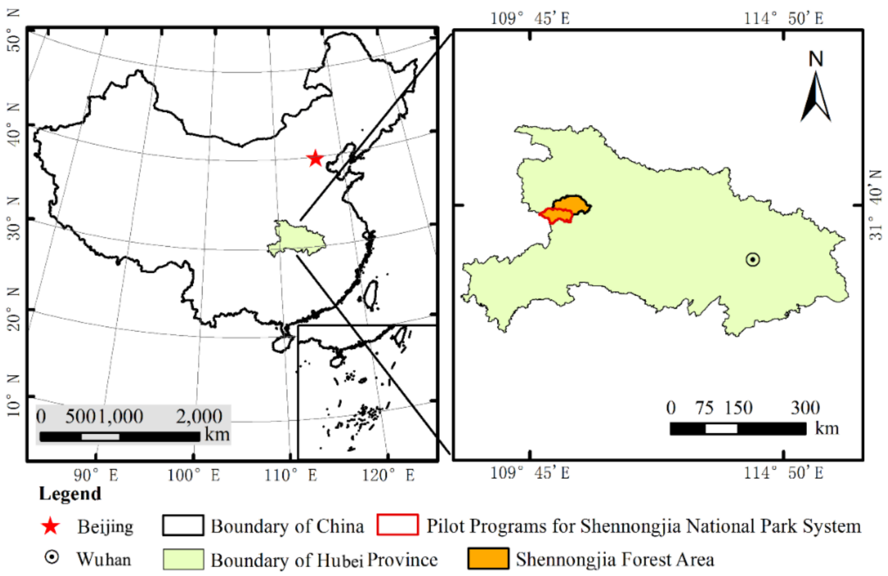

Figure 1. Location of the study area.

3. Materials and Methods

3.1. Data Sources

The data used in this research span questionnaire data, the annual financial report of STIC, and interviews with STIC personnel. The questionnaire data were collected between 15 May and 30 May 2018. Questionnaires were issued to tourists by a random survey sampling method in the tourist area of PPSNPS. In total, we got 516 valid questionnaires.

The survey data include (1) basic information concerning tourists (age, education, place of origin, monthly income, occupation, and number of trips); (2) tour time and travel costs (transportation costs, catering and accommodation costs, shopping costs, and use of recreational facilities); and (3) tourists' willingness to pay.

The operating costs and revenue of STIC span (1) the initial investment and brand valuation of STIC, including investments in scenic area construction; (2) product pricing and marketing promotion investment; and (3) the number of tourists received, ticket income, comprehensive income, poverty alleviation investment, and tax payments.

3.2. Research Logic

Firstly, based on following the "Provider Gets Principle, PGP" and "Beneficiary Pays Principle, BPP" [26], the main bodies of compensation are STIC and SNPA. STIC is the provider of the compensation funds and SNPA is the beneficiary of it. Secondly, since the tourism income of STIC is relatively single, mainly from ticket income, this study uses tourism ticket income as the only source of ecological compensation funds. Thirdly, the distribution ratio of tourism ticket income (excluding tax payments) is calculated from the cost of STIC and landscape value in PPSNPS. Thus, the compensation standard can be established.

As an environmental asset, the economic value of landscape resources has been quantified by environmental economists, especially in the development of landscape tourism. From it, the landscape value includes use and non-use values [27]. Use value refers to the value embodied when the natural landscape is developed as a tourist site providing services for people to enjoy leisure and recreation. Non-use value refers to the value of the natural landscape that has not yet been exploited but can be used by future generations. Therefore, the landscape value in this study is divided into landscape use value and landscape non-use values for the study area. Since the landscape use value of PPSNPS is mainly reflected in tourism returns, it is substantially affected by tourists' travel costs and more intuitively reflects market demand. Consequently, tourists' consumption expenditure and willingness to pay are taken as the evaluation source of landscape use and non-use value in the study area. Thus, the distribution ratio can be calculated as per Equation (1).

$$\mathrm{DR} = \mathrm{COST}/\mathrm{TEV} \tag{1}$$

where DR is the distribution ratio of tourism concession ticket income, COST is the fixed input of STIC, and TEV is the travel entertainment value that represents the landscape value in PPSNPS. The landscape value can be calculated as per Equation (2)

$$\mathrm{TEV} = \mathrm{UV} + \mathrm{NUV} \tag{2}$$

where UV is the use value of the landscape in PPSNPS. Since the research is aimed at the concession of tourism companies, the use value is replaced by the travel recreation value (TRV). NUV is the non-use value of the landscape.

3.2.1. Calculating Landscape Use Value by TCIA

The landscape use value of scenic spots is the sum of consumer cost (CC) and consumer surplus (CS) from the tourists [28]. CC is the sum of travel cost (TC) and travel time value (TV). TC include transportation, accommodation, meals, and shopping. TV is the opportunity cost of time spent by tourists traveling, calculated at 40% of the salary level [27,29–31]. CS refers to the difference between the cost that consumers are willing to pay and the actual payment for each product or service [32,33], which is often used to measure consumer net income [34]. TCIA is commonly used to calculated CS. It uses travel costs as a criterion for segmenting the source market. Travel costs in different intervals are divided into several sub-categories, and the characteristics of traveler costs in the sub-categories are the same. Taking travel costs as the core variable for calculating landscape use value is more in line with relevant economic principles [21] and the needs underlying tourists' multiple choices [35]. TCIA is widely used in monetization accounting of the tourist value of tourist attractions [26]. This method effectively avoids the defects of the Zone Travel Cost Method (ZTCM), which cannot reasonably simulate actual consumer spending and is prone to large errors [36,37]. Therefore, based on the survey data, this study uses TCIA to calculate the CS and combines the travel costs of tourists in each interval to calculate the TRV (equal to landscape use value) of the study area.

The TCIA is implemented as follows. First, tourists are divided into different sections according to their travel costs, i.e., $[C_0, C_1]$, $[C_1, C_2]$, . . . , $[C_i, C_{i+1}]$, . . . , $[C_{n-1}, C_n]$, $[C_n, \infty]$. The number of visitors per section is recorded as N_0, N_1, . . . N_i, . . . N_n, $N = \sum_{i=0}^{n} N_i$. If every tourist in the i-th section is willing to make a trip when the travel cost is C_i, then the number of tourists who are willing to travel is N_i and the tourists who are willing to pay a higher cost for travel can be calculated. When the travel cost is C_i, the travel demand is $M_i = \sum_{i=0}^{n} N_j$ and the travel probability is $P_i = M_i/N$. Assume that the tourist demand of N tourists is the same. When the travel cost is C_i, the probability of a tourist traveling is P_i; $Q_i = P_i$, Q_i is the willing travel demand of each tourist when the price is C_i. Second, Q_i is the dependent variable and C_i is the independent variable. Regression fitting is performed to obtain the tourist willingness and the demand curve of tourists, expressed as Q = Q (C). Third, the consumer surplus of each tourist is calculated as per Equation (3).

$$CS_i = \int_{C_i}^{\infty} Q(C)dC \tag{3}$$

where CS_i is the consumer surplus of each tourist in the i-th interval and C_i is the lower limit of the travel cost of the i-th interval.

Then, the total consumer surplus (TCS) of tourists in each segment is calculated as per Equation (4).

$$TCS = \sum_{i=0}^{n} N_i \times CS_i \tag{4}$$

Finally, the use value of PPSNPS is calculated as per Equation (5).

$$UV = TRV = TCS + CC \tag{5}$$

where UV is the use value of the landscape in the study area, TRV is the recreation value of the study area, and CC is the total travel cost of tourists in each section.

3.2.2. Calculating Landscape Non-Use Value by CVM

CVM is the most commonly stated preference method and an important means of evaluating non-market resources [38]. CVM usually uses individuals or households as a sample and asks them how to price a non-market product or service. The landscape non-use value based on CVM is calculated from willingness to pay for enjoying landscape resources or willing to accept compensation for environmental pollution, which impede their enjoyment of landscape resources. Generally, a non-parametric estimation model is used to calculate the willingness of the sample to pay for the landscape resources so as to obtain its non-use value. Considering the long-term effectiveness of tourism development in PPSNPS, CVM is convenient for gauging tourists' willingness to pay [22,23], so as to better distinguish and understand tourists' preferences. It is an effective assessment method for the potential value of landscapes.

Non-parametric estimation is a common arithmetic mean calculation method. Specifically, the willingness payment amount can be calculated from the product of the payment value and its probability as per Equation (6).

$$P = \sum_i P_i V_i \tag{6}$$

where P_i represents the probability of the i-th payment value selected by the respondent and V_i represents the i-th payment value selected by the respondent.

$$NUV = P \times R \times N \tag{7}$$

where NUV is the non-use value of the landscape, P is the willingness payment amount, R is the payment rate, and N is the total number of people in the target market [29].

3.2.3. Calculating the Input Value of the Enterprise from Statistical Data

The value input of the concession enterprise includes the company's initial fixed investment, brand valuation, operating costs, and poverty alleviation investment as per Equation (8).

$$COST = CGS + OC + PA \tag{8}$$

where COST is the fixed input of the enterprise; CGS is the cost of goods sold, including investment in infrastructure construction and expansion of production; OC is the operating cost, including maintenance, management, marketing, and labor costs; and PA is investment in poverty alleviation.

4. Results

4.1. Landscape Use Value

Based on the sample data statistics of the questionnaire, according to characteristics of the sample travel cost, excluding ticket revenue, transportation costs, and time costs, the sample is divided into a total of 23 partitions (Table 1). The corresponding travel demands (M_i) are divided into 23 levels from 516 to 2, travel probabilities (P_i) are divided into 23 levels from 100 to 0.39, and the corresponding Q_i (for each tourist's willingness to travel when the travel cost is C_i) are from 1 to 0.0039.

Table 1. Shennongjia travel cost partitions.

Serial Number	$[C_i, C_{i+1}]$	N_i	M_i	P_i/%	Q_i
1	0–50	6	516	100	1
2	50–100	9	510	98.84	0.9884
3	100–200	15	501	97.09	0.9709
4	200–300	22	486	94.19	0.9419
5	300–400	31	464	89.92	0.8992
6	400–500	34	433	83.91	0.8391
7	500–600	27	399	77.33	0.7733
8	600–700	29	372	72.09	0.7209
9	700–800	33	343	66.47	0.6647
10	800–900	51	310	60.08	0.6008
11	900–1000	42	259	50.19	0.5019
12	1000–1200	43	217	42.05	0.4205
13	1200–1400	34	174	33.72	0.3372
14	1400–1600	28	140	27.13	0.2713
15	1600–1800	23	112	21.71	0.2171
16	1800–2000	26	89	17.25	0.1725
17	2000–2500	29	63	12.21	0.1221
18	2500–3000	17	34	6.59	0.0659
19	3000–3500	9	17	3.29	0.0329
20	3500–4000	2	8	1.55	0.0155
21	4000–4500	3	6	1.16	0.0116
22	4500–5000	1	3	0.58	0.0058
23	5000~	2	2	0.39	0.0039

A scatter plot of travel cost (C_i) and willingness to travel (Q_i) is shown in Figure 2. It can be discerned from the figure that the higher the tourist's travel cost, the lower their willingness to travel, which is consistent with theoretical expectations.

Through preprocessing, outliers in the data are removed, using linear regression to analysis the relationship of C_i and Qi, with C_i as the independent variable and Q_i as the dependent variable. The results show that the coefficient of determination (R^2) is 0.78, $p < 0.001$. Furthermore, a logarithmic regression model is established: $\ln Q_i = -0.0012C_i + 0.2639$

(Equation (9)). The coefficient of determination (R^2) of the logarithmic regression model is 0.99, $p < 0.001$ indicating that the model fits well.

$$Q(C) = e^{(-0.0012c+0.2639)} \tag{9}$$

$$CS_i = \int_{C_i}^{\infty} e^{-0.0012c+0.2639} dC \tag{10}$$

Then, substituting Equation (8) into Equations (3) and (10), the consumer surplus of tourists is obtained and 23 sets of travel costs from the survey are recorded as 6510, 9196.29, 14,434.65, 18,776.78, 23,466.38, 22,826.92, 16,077.42, 15,315.77, 15,457.53, 21,186.42, 15,475.32, 14,052.4, 8740.38, 5662.16, 3658.61, 3253.38, 2854.47, 918.34, 266.85, 32.54, 26.79, 4.9, and 5.38. Through the summation, the total consumer surplus (TCS) is 218,199.68 yuan. Ignoring the value of time, the sum of the total travel costs is 391,052.62 yuan. In addition, Shennongjia National Park Scenic Area received a total of 4.98 million tourists in 2018. Using Equation (5), the landscape use value (travel recreation value) of PPSNPS is calculated (Equation (11)).

$$UV = [(218,199.68 + 391,052.62)/516] \times 498 = 587,999.31 \times 10^4 \text{ yuan} \tag{11}$$

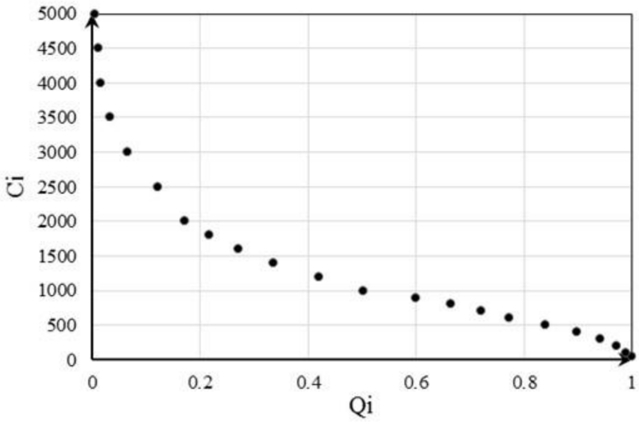

Figure 2. Scatter plot of travel cost (C_i) and travel demand (Q_i) for Shennongjia.

4.2. Landscape Non-Use Value

Among the 516 survey respondents, a total of 268 people expressed a willingness to pay a certain amount for scenic spot protection and construction. These individuals can be divided into 17 sub-areas (0–5, 5–10, 10–20, 20–30, 30–40, 40–50, 50–60, 60–70, 70–80, 80–90, 90–100, 100–120, 120–140, 140–160, 160–180, 180–200, and greater than or equal to 200). According to the rationality of statistics, the payment amount of the 17 sub-areas is expressed by the median of each interval, when the payment amount exceeds 200 yuan, 250 yuan is used as the payment amount for the absolute frequency of 250 yuan in this range is the highest (Table 2). After analyzing and arranging the payment willingness values of the surveyed individuals, the cumulative frequency distribution of the two groups of surveyed objects is obtained. The result show that among the 268 respondents who are willing to accept payment of compensation for the protection and construction of scenic spots, 48 people are willing to pay 15 yuan, 37 people are willing to pay 95 yuan as the payment amount for compensation payment, the relative frequency of choosing 15 yuan is the most, and the relative frequency of choosing 95 yuan is the second. Meanwhile, the least people are willing to pay 150 yuan and 170 yuan

Substituting the cumulative frequency distribution data of the payment amount directly into Equation (6), it can be concluded that the average person is willing to pay 62.57 yuan per year. According to census data, PPSNPS received a total of 4.98 million tourists in 2018. The proportion of respondents willing to pay compensation to protect the natural resources and ecological environment of PPSNPS is 51.94%. Therefore, from Equation (7), the landscape non-use value of PPSNPS in 2018 are calculated to be 16,230.99 × 10^4 yuan.

Table 2. Distribution of visitors' willingness to pay in Shennongjia.

Serial Number	Payment Amount (Yuan)	Absolute Frequency (Person-Time)	Relative Frequency (%)
1	2.5	9	3.36
2	7.5	27	10.07
3	15	48	17.91
4	25	34	12.69
5	35	10	3.73
6	45	25	9.33
7	55	12	4.48
8	65	5	1.87
9	75	9	3.36
10	85	7	2.61
11	95	37	13.81
12	110	11	4.10
13	130	6	2.24
14	150	4	1.49
15	170	4	1.49
16	190	9	3.36
17	250	11	4.10

4.3. The Input Value of Concession Business, Travel Ticket Income Distribution Ratio, and Back-Feeding Fund Amount

Based on the annual corporate financial report and official website data of the STIC, the input value of the STIC was 140,696 × 10^4 yuan in 2018. According to Equation (2), the landscape use value and non-use value of the PPSNPS are summed, and the landscape value is 604,230.3 × 10^4 yuan. Thus, the ratio of enterprise input value and landscape value is 1:4.29. According to statistics, the scenic spot of PPSNPS in 2018 realized a total of 29,500 × 10^4 yuan in tourist tickets and paid a total of 14,300 × 10^4 yuan in taxes, so the profit was therefore 15,200 × 10^4 yuan. In accordance with the investment ratio of STIC and SNPA, in 2018, STIC can receive 2873.35 × 10^4 yuan and SNPA can receive 12,326.65 × 10^4 yuan. Then, the back-feeding funds in 2018 should total 12,326.65 × 10^4 yuan (Figure 3).

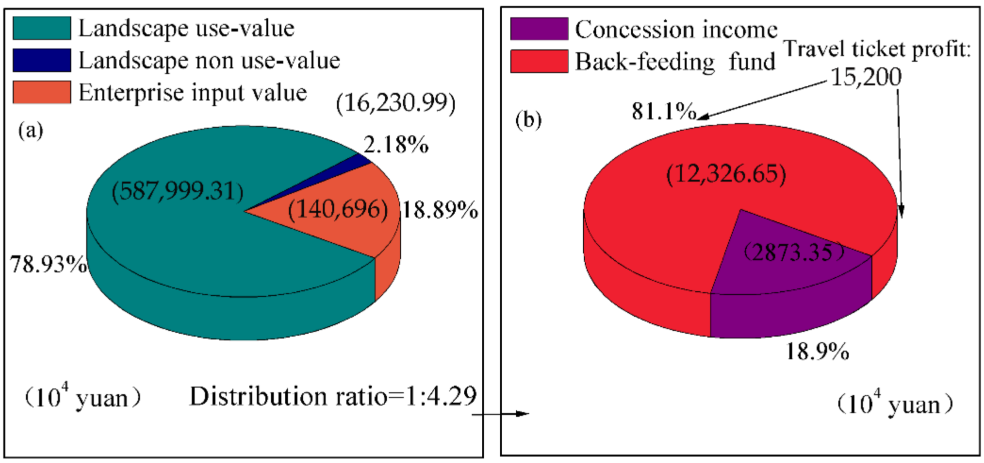

Figure 3. Travel ticket distribution ratio and back-feeding fund amount in PPSNPS. (**a**) the orange color represents the landscape use-value, the blue sector represents the landscape non use-value, the green color represents enterprise input cost and the distribution ratio represents the ratio of enterprise input value and landscape value, which is 1:4.29. (**b**) the purple one represents the concession income and the red sector represents the back-feeding fund, both of them are calculated from the distribution ratio for the travel ticket profit.

5. Discussion and Conclusions

5.1. Discussion

In this study, a long-term ecological compensation mechanism under the concession model of tourism back-feeding communities is constructed. Judging from the research results, as the concession operator, STIC provides compensation funds, which are derived from tourism ticket income, and SNPA receives compensation funds. In addition, the allocation ratio of ecological compensation funds is determined by the investment cost of tourism concession and the landscape value. Then, the amount of back-feeding funds, which is also the compensation standard, is obtained; it makes up for the inadequacy of previous back-feeding funds determined by the game negotiation between the government and enterprises, which is an important contribution of this research. Moreover, enterprises' participation in ecological compensation also makes up for the weakness of low efficiency of financial transfer payments [39]. However, the current long-term compensation model is not sound enough and lacks compensation methods, such as policy compensation and technical training, which is only franchised by one company of STIC and lacks financing channels. In the future, more compensation methods should be selected, the main body of ecological compensation and financing channels should be expanded, and the supporting measures need strengthening too [40].

From the perspective of research methods and results, it is reasonable to use the consumer surplus of tourists in the actual survey as one of use value of landscape, which is in line with the reality of eco-tourism concession in the study area and it is of practical significance. In addition, the non-use value of landscape was derived from CVM based on tourists' willingness to pay for protecting and constructing the study area, and the calculation results show that on average each person is willing to pay 62.57 yuan per year to protect the natural resources and ecological environment of the PPSNPS. Interestingly, this result is far from the results of previous research [23], which also calculated the tourists' willingness to pay for protecting ecological resources in Shennongjia by CVM based on a tourist questionnaire survey in 2017, and the willingness to pay from their result was only 13.40 yuan per year. This difference may be caused by factors such as tourists' subjective wishes and travel seasons [41,42]. Therefore, in the future, when applying CVM to estimate the non-use value of landscape, tourists in different seasons, ages, and income levels should be fully selected, and various factors that affect tourists' willingness to pay should be fully considered [43–45].

Compared with other existing ecological compensation methods in PPSNPS, ecological compensation under tourism concession is a kind of intellectual compensation [46], which not only provides back-feeding funds based on tourism ticket income, but also provides a large number of jobs. The other ecological compensation methods in the study area, such as returning farmland to forest, natural forest protection compensation, ecological relocation, etc., belong to the category of financial compensation. The establishment of ecological management posts and the renovation of fences belong to the compensation in kind. It seems that multiple ecological compensation methods can more efficient protect the local ecological environment. In the future, it needs to further explore a diversified long-term ecological compensation mechanism [47], thereby promoting the ecological and economic coordinated development in natural protected areas.

5.2. Conclusions

The purpose of this paper is to construct a long-term ecological compensation mechanism based on tourism concession in PPSNPS. By evaluating the landscape value of the study area and the investment cost of concession enterprises, the allocation ratio of ecological compensation funds was quantitatively calculated, and then the amount of ecological compensation standard was obtained.

The main findings are as follows:

(1) This study constructed a long-term ecological compensation mechanism under the concession model of tourism back-feeding communities in PPSNPS. It is an effective

technology to quantitatively evaluate the ecological compensation standard using the ecological compensation fund allocation ratio based on the input cost of the national park tourism concession enterprise and landscape value. The long-term ecological compensation scheme constructed in this paper clarifies that the SNPA and the STIC are the main bodies of ecological compensation. The calculation results show that the landscape value of PPSNPS in 2018 was 604,230.3 $\times$ 10^4 yuan, the input cost of STIC was 140,696 $\times$ 10^4 yuan, and the income after deducting tax from tourism tickets was 15,200 $\times$ 10^4 yuan. Thus, the allocation ratio of ecological compensation funds is 1:4.29, and the ecological compensation fund provided to SNPA from STIC is 12,326.65 $\times$ 10^4 yuan. This study provides an idea for the construction of a long-term ecological compensation mechanism for national park tourism concession.

(2) TCIA and CVM are effective tools for the monetization and accounting of the national park tourism landscape value, and they can provide effective technologies for the distribution of the ecological compensation funds for the national park tourism concession.

(3) Concession is an effective form for market participation in ecological compensation in national parks. The long-term ecological compensation mechanism in national parks cannot be limited to a single method and a single source. Multiple compensation methods should be encouraged, and multiple market entities and communities should participate. In the future, the construction of multiple long-term ecological compensation mechanisms for nature reserves should be further explored.

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References

1. Shang, W.X.; Gong, Y.C.; Wang, Z.J.; Stewardson, M.J. Eco-compensation in China: Theory, practices and suggestions for the future. *J. Environ. Manag.* **2018**, *210*, 162–170. [CrossRef] [PubMed]
2. Buchanan, M.J.; Stubblebine, W.C. Externality. *Economica* **1962**, *29*, 371–381. [CrossRef]
3. Kosoy, N.; Martinez-Tuna, M.; Muradian, R.; Martinez-Alier, J. Payments for environmental services in watersheds: Insights from a comparative study of three cases in Central America. *Ecol. Econ.* **2007**, *61*, 446–455. [CrossRef]
4. Liu, M.C.; Min, Q.W.; Yang, L. Rice Pricing during Organic Conversion of the Honghe Hani Rice Terrace System in China. *Sustainability* **2018**, *10*, 183. [CrossRef]
5. Wang, W.; Xin, L.J.; Du, J.H.; Chen, B.; Liu, F.Z.; Zhang, L.B.; Li, J.S. Evaluating conservation effectiveness of protected areas: Advances and new perspectives. *Biodivers. Sci.* **2016**, *24*, 1177–1188. [CrossRef]
6. Nelson, E.; Mendoza, G.; Regetz, J.; Polasky, S.; Tallis, H.; Cameron, D.R.; Chan, K.M.A.; Daily, G.C.; Goldstein, J.; Kareiva, P.M.; et al. Modeling multiple ecosystem services, biodiversity conservation, commodity production, and tradeoffs at landscape scales. *Front. Ecol. Environ.* **2009**, *7*, 4–11. [CrossRef]
7. Norton, D.A. Biodiversity Offsets: Two New Zealand Case Studies and an Assessment Framework. *Environ. Manag.* **2009**, *43*, 698–706. [CrossRef]
8. Persson, J. Perceptions of environmental compensation in different scientific fields. *Int. J. Environ. Stud.* **2013**, *70*, 611–628. [CrossRef]
9. Lindberg, K.; Hawkins, D.E. *Ecotourism: A Guide for Planners and Managers*; The Ecotourism Society: Bennington, VT, USA, 1993.

10. Zhang, J.P. Ecotourism and the Benefit of Local Residents—An Analysis of Successful Experience of Ecotourism in Kenya. *Tour. Trib.* **2003**, *18*, 60–63.
11. Archabald, K.; Naughton-Treves, L. Tourism revenue-sharing around national parks in Western Uganda: Early efforts to identify and reward local communities. *Environ. Conserv.* **2001**, *28*, 135–149. [CrossRef]
12. Liu, M.C.; Bai, Y.X.; Ma, N.; Rao, D.D.; Yang, L.; Min, Q.W. Blood transfusion or hematopoiesis? How to select between the subsidy mode and the long-term mode of eco-compensation. *Environ. Res. Lett.* **2020**, *15*, 9. [CrossRef]
13. Huang, Y.; Yang, Y.; Yang, G. Comparative Study on Practice of Payment for Ecosystem Service (PES) in Tourism between China and Foreign Countries. *Ecol. Econ.* **2014**, *30*, 280–283.
14. Li, W.H.; Zhang, B.; Xie, G.D. Research on Ecosystem Services in China:Progress and Perspectives. *J. Nat. Resour.* **2009**, *24*, 1–10. [CrossRef]
15. Liu, M.C.; Wang, J.R.; Liu, W.W.; Yang, L.; Sang, W.G. Policy framework and key technologies of ecological protection compensation to national park. *Acta Ecol. Sin.* **2019**, *39*, 1330–1337. [CrossRef]
16. Du, J.F.; Liu, X.L. Study on Long-Efficiency Mechanism of Eco-Compensation. *Ecol. Econ.* **2010**, 303–305. Available online: https://kns.cnki.net/kcms/detail/detail.aspx?dbcode=CJFD&dbname=CJFD2010&filename=STJX201001077&uniplatform=NZKPT&v=1W_wLFu9PpF-7maAAKGUvQp8AE4HHdh-XuH4bcrrWXmgPj2iky1C0u2mF1dbZ8uK (accessed on 8 March 2022).
17. Ouyang, Z.Y.; Zheng, H.; Yue, P. Establishment of ecological compensation mechanisms in China: Perspectives and strategies. *Acta Ecol. Sin.* **2013**, *33*, 686–692. [CrossRef]
18. Sellars, R.W. *Preserving Nature in the National Parks: A History*; Yale University Press: New Haven, CT, USA, 2008.
19. Zhang, Y.Q.; Yang, G.H. On the connotation of tourism eco-compensation. *Chin. J. Ecol.* **2012**, *31*, 477–482. [CrossRef]
20. Task Force for Eco-Compensation Mechanisms and Policies. In *Eco-Compensation Mechanisms and Policies in China*; Science Press: Beijing, China, 2007.
21. Li, W.; Li, W.J. Using a Modified Travel Cost Method to Evaluate the Recreational Benefits of Jiuzhaigou Nature Reserve. *Acta Scicentiarum Nat. Univ. Pekinesis* **2003**, *39*, 548–555. [CrossRef]
22. Xu, S.; He, X. Estimating the recreational value of a coastal wetland park: Application of the choice experiment method and travel cost interval analysis. *J. Environ. Manag.* **2022**, *304*, 114225. [CrossRef]
23. Yu, C.Y.; Liu, J. Research on the Willingness of Tourism Ecological Compensation in Shennongjia. *Tour. Overv.* **2017**, *2*, 1–43.
24. Tang, X.P.; Luan, X.F. Developing a Nature Protected Area System Composed Mainly of National Parks. *For. Resour. Manag.* **2017**, *6*, 1–8. [CrossRef]
25. Shennongjia National Park Protection Regulations. Available online: http://http://www.hubei.gov.cn/zwgk/hbyw/hbywqb/201711/t20171130_1487824.shtml (accessed on 30 November 2017).
26. Li, W.H.; Liu, M.C. Several Strategic Thoughts on China's Eco-compensation Mechanism. *Resour. Sci.* **2010**, *32*, 791–796.
27. Chen, F.; Zhang, J. Analysis on Capialization Accounting of Travel Value—A Case Study of Jiuzhaigou Scenic Spot. *J. Naijing Univ.* **2001**, *37*, 296–303.
28. Chen, Y.F. Travel cost method—The most popular method for assessing forest recreation value in foreign countries. *Ecol. Econ.* **1996**, 35–38. Available online: https://kns.cnki.net/kcms/detail/detail.aspx?dbcode=CJFD&dbname=CJFD9697&filename=STJJ199604006&uniplatform=NZKPT&v=AgQPm6UE1bA7di4E8HxhMwLYD9832sLs3SGV8-29VIRdXaOeBtcoM11mCOCVvF-x (accessed on 8 March 2022).
29. Cheng, C.; Xiao, Y.; Ouyang, Z.Y.; Rao, E.M. Natural landscape valuation of Wulingyuan Scenic Area in Zhangjiajie City. *Acta Ecol. Sin.* **2013**, *33*, 771–779. [CrossRef]
30. Mou, Z.; Yang, G. Forest Landscape Valuation of Libo World Natural Heritage Site. *Ecol. Econ.* **2014**, *30*, 135–140. [CrossRef]
31. Randall, A.; Hoehn, J.P.; Brookshire, D.S. Contingent Valuation Surveys for Evaluating Environmental Assets. *Nat. Resour. J* **1983**, *23*, 635–648. [CrossRef]
32. He, S.P.; Liu, J. The Study on Consumer Surplus In Western Economics. *J. Harbin Univ. Commer.* **2008**, *2*, 111–114. [CrossRef]
33. Willis, K.G.; Benson, J.F. Recreational Values of Forests. *Forestry* **1989**, *62*, 93–110. [CrossRef]
34. Blaine, T.W.; Lichtkoppler, F.R.; Bader, T.J.; Hartman, T.J.; Lucente, J.E. An examination of sources of sensitivity of consumer surplus estimates in travel cost models. *J. Environ. Manag.* **2015**, *151*, 427–436. [CrossRef] [PubMed]
35. Bestard, A.B. Substitution patterns across alternatives as a source of preference heterogeneity in recreation demand models. *J. Environ. Manag.* **2014**, *144*, 212–217. [CrossRef] [PubMed]
36. Hanley, N.; Koop, G.; Alvarez-Farizo, B.; Wright, R.E.; Nevin, C. Go climb a mountain: An application of recreation demand modelling to rock climbing in Scotland. *J. Agric. Econ.* **2001**, *52*, 36–52. [CrossRef]
37. Tourkolias, C.; Skiada, T.; Mirasgedis, S.; Diakoulaki, D. Application of the travel cost method for the valuation of the Poseidon temple in Sounio, Greece. *J. Cult. Herit.* **2015**, *16*, 567–574. [CrossRef]
38. Herath, G.; Kennedy, J. Estimating the economic value of Mount Buffalo National Park with the travel cost and contingent valuation models. *Tour. Econ.* **2004**, *10*, 63–78. [CrossRef]
39. Li, X.G.; Miao, H.; Zheng, H.; Ouyang, Z.Y. Main methods for setting ecological compensation standard and their application. *Acta Ecol. Sin.* **2009**, *29*, 4431–4440. [CrossRef]
40. Lai, L.; Huang, X.J.; Liu, W.L. Advances in theory and methodology of ecological compensation. *Acta Ecol. Sin.* **2008**, *28*, 2870–2877. [CrossRef]

41. Bostan, Y.; Fatahi Ardakani, A.; Fehresti Sani, M.; Sadeghinia, M. A comparison of stated preferences methods for the valuation of natural resources: The case of contingent valuation and choice experiment. *Int. J. Environ. Sci. Technol.* **2020**, *17*, 4031–4046. [CrossRef]
42. Liu, J.; Liu, N.; Zhang, Y.M.; Qu, Z.; Yu, J. Evaluation of the non-use value of beach tourism resources: A cas e study of Qingdao coastal scenic area, China. *Ocean Coast. Manag.* **2019**, *168*, 63–71. [CrossRef]
43. Jiang, Y.Y.; Song, Z.Q.; Zhang, M. Tourism Ecological Compensation:Progress and Prospects. *Resour. Sci.* **2013**, *35*, 2194–2201.
44. Xie, X.Z.; Ma, Z. Evaluating Recreation Value of Mount. Huang Using Travel Cost Method. *Resour. Sci.* **2006**, *28*, 128–136. [CrossRef]
45. Lee, M.T.; Liu, J.M.; Borazon, E.Q. Evaluating the Effect of Perceived Value of Ecosystem Services on Tourists' Behavioral Intentions for Aogu Coastal Wetland. *Sustainability* **2020**, *12*, 6214. [CrossRef]
46. Ma, Y.; Hu, X.P. Tourism Ecological Compensation Mplementation System Construction of Shennongjia. *Hum. Geogr.* **2010**, *5*, 120–124. [CrossRef]
47. Master Plan for the Establishment of National Parks. Available online: http://www.gov.cn/zhengce/2017-09/26/content_5227713.htm (accessed on 26 September 2017).