

Research Article

Research on the Evaluation of Ecotourism Resources: Based on the AHP Model

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The comprehensive evaluation of ecotourism resources in the Qinling Mountains scenic spot using the AHP method can provide a reference for the sustainable construction and development of ecotourism resources, as well as the development of other tourism areas. Based on the analytic hierarchy process, the evaluation system of Qinling Mountain Ecotourism Resources is constructed, and the construction system is used to evaluate tourism ecological resources. The results show that, among the subtarget levels, the highest score is the interaction of tourism areas in the same region and the second is the applicability of regulations. These two indicators have a high impact on the score of Qinling Mountain Ecotourism Resources. In the project layer, the source of passenger flow has the largest weight, which is 0.1717, and the distribution of resource types has a smaller weight. At the index level, participation needs to be considered for tourism participation design. The Qinling scenic area has high historical and cultural value, diverse resource types, good tourist source market conditions, and great tourism development potential. However, problems exist, such as low resource aggregation and imperfect tourism supporting facilities development. It is necessary to develop ecotourism resources on the premise of ensuring environmental quality while taking into account the in-depth excavation of the experience and ornamental values of tourism resources, establishing the tourism characteristics of scenic spots from many aspects, such as improving tourism participation.

1. Introduction

Ecotourism refers to tourism based on ecology. Attention is mainly focused on natural and cultural resources, such as scenic spots, fossil-producing areas, archaeological or historical sites, and wild animals and plants, especially rare and endangered species [1–4]. The development of ecotourism in the Qinling Mountains is mainly divided into mountain tourism and forest tourism resource development [5, 6]. Among them, mountain tourism resources refer to the ecotourism areas built mainly in the mountain environment, which are suitable for mountaineering, exploration, rock climbing, sightseeing, and other activities. Forest tourism resources refer to the ecotourism areas built mainly on forest vegetation and its habitat, which are suitable for camping, vacation, recuperation, and other activities [7–9].

The construction of ecological civilization is the cornerstone of the development of ecotourism and the sum of the material and spiritual achievements made by the managers of tourism areas to follow the law of harmonious development between man and nature and promote the development of society, economy, and culture [10–12]. It is an ecotourism cultural ethics form with the basic purpose of harmonious coexistence, all-round development, and sustainable prosperity between man and nature and between man and man. It will play an important role in the long-term development of ecotourism areas in the future [13–15]. Ecotourism in scenic spots is not only to meet the growing needs of the public for high-quality ecological recreation, but also an important way to enhance the scenic spot's own capacity-building, expand the source of protection funds, promote sustainable development, increase community

economic income, and drive economic development [16, 17]. In order to carry out ecotourism in scenic spots, the primary task is to evaluate the ecotourism resources in scenic spots. From the perspective of reasonable development, utilization, and protection of ecotourism resources in scenic spots, we can comprehensively evaluate and identify the value of ecotourism resources and their external development conditions in a certain area. The evaluation of ecotourism resources in scenic spots is a more in-depth research work based on resource investigation [18, 19]. It is also the premise of the development of ecotourism resources.

Due to the diversity, regionality, seasonality, and other characteristics of tourism resources, in order to better tap the characteristics of various tourism resources, further enhance the attraction of tourism resources, and protect them while reusing them, it is necessary to make scientific and reasonable planning of tourism resources to realize the sustainable utilization of tourism resources, the effective development of tourism destinations, and the three benefits of tourism industry [20–22]. Tourism planning refers to the full excavation and protection of tourism resources and the rational planning and layout of tourism destinations based on the scientific evaluation of tourism resources; the characteristics of tourism resources and the natural, social, and economic environment of tourism destinations; and the use of planning ideas [23–25]. The basis of ecological activities is the development of ecotourism resources, and the premise of development is the planning of ecotourism resources. As a subordinate classification of tourism resources, ecotourism resources belong to natural ecological environment tourism resources. In addition to the characteristics of the above tourism resources, ecotourism resources are vulnerable and nonrenewable [26, 27]. In addition to traditional tourism planning, the planning of ecotourism resources should be guided by the principles and methods of ecology.

In recent years, with the rapid development of tourism and the arrival of the era of global tourism, more small towns have joined the tourism industry [28]. A series of problems such as environmental pollution, resource destruction, and chaotic development of small towns in the development of tourism have become increasingly prominent, which has led to the decline of economic benefits, the downturn of social benefits, the degradation of the ecological environment, and other adverse consequences of tourism destinations and even forced the closure of tourism destinations. The reason is that, in addition to effective planning and management of tourism destinations, it is more important to take the path of sustainable development. At the same time, many scholars are focusing more on ecotourism. From the existing research direction of ecotourism, most of the research focuses on the development mode of ecotourism, existing problems, and countermeasures. Many studies classify the characteristics of ecotourism resources, but most of them integrate and reorganize the existing materials and resources, mostly focusing on the introduction of ecotourism-related situations [29, 30]. There is relatively little literature evaluating ecotourism from the perspective of practical statistical data. The analytic hierarchy process (AHP) is one of the most commonly used methods for tourism resource evaluation at

present, through comprehensively considering the factors affecting the evaluation results in the early stage and constructing the evaluation model of the interaction of indicators at all levels in the medium term to structure and organize complex problems and then put forward the optimal scheme.

Therefore, based on the research results of domestic and foreign scholars on ecotourism, this paper creatively uses AHP to build a comprehensive evaluation model and evaluation index system of ecotourism. Taking the Lishan scenic spot in Xi'an, Shaanxi province, as an example, this paper investigates and evaluates the ecotourism and historical and cultural resource elements, environmental characteristics, and development conditions in this area; finds out their improvements through weight analysis; provides scientific improvement suggestions for them; and provides a scientific basis for the development, construction, and management of scenic spots.

2. Problems in the Development of Ecotourism Resources

2.1. Lack of Scientific Planning. Ecotourism is different from traditional tourism and has strict requirements for environmental protection. The development of ecotourism in the nature reserve is carried out without destroying the natural environment. In the development process, we should not destroy the natural development law of the reserve and the local social order and should maintain ecological, sustainable development. During the ecotourism development of the Minjiang source reserve, there was no in-depth study on the ecosystem of the reserve, the development of scientific research and monitoring level was slow, the possible environmental impact and environmental carrying capacity were not evaluated enough, and there was a lack of scientific basis and technical means. In many areas, the development of ecotourism is in a disorderly state, and there are no detailed investigation and planning of scenic spot routes, resource assessment, and environmental monitoring and protection, which hinders the development of ecotourism.

2.2. Inconvenient Transportation. Qinling nature reserve is located in the Qinling Mountains, and the road is long and difficult to travel. The traffic construction of many reserves is insufficient. There are only a few forest roads and pedestrian trails, and vehicles cannot pass through. As a result, much beautiful scenery is seriously affected by the poor traffic, and even some places cannot be reached by manpower, wasting tourism resources. The original scenic spot is shown in Figure 1.

2.3. Imperfect Service Facilities and Institutions. After years of development, although some nature reserves have established professional ecotourism organizations, they are only limited to famous scenic spots, and there are no special service institutions in most nature reserves. The number of service facilities and places in Minjiangyuan nature reserve is small, which cannot meet the needs of tourists, causing great inconvenience to them and affecting the visit to the scenic spot. At the same time, the shortage of service facilities has



FIGURE 1: Natural scenery of Qinling Mountains.



FIGURE 2: Geographical location of Qinling Mountains.

also affected the economic income of the scenic spot. The maintenance of the scenic spot lacks funds, which is not conducive to the sustainable development of the ecology.

2.4. The Investment Mechanism Is Not Smooth. The financial budget has not been included by the government in the development funds of ecotourism development in the nature reserve. The nature reserve lacks a stable source of funds and operation management, the management personnel are unreasonable, and the management personnel of the nature reserve are too few to manage and maintain the nature reserve in an all-round way. At the same time, the reserve has a lack of operating capacity, poor economic benefits, and a lack of start-up funds for the construction of scenic spots and transportation and communication.

3. Overview of the Study Area

Qinling Mountains are east-west mountains across central China, starting from southern Gansu in the west, passing through southern Shaanxi to western Henan. The main body is located at the junction of Southern Shaanxi province and Northern Sichuan province. They are east-west, about 1,500 km long, 150 km wide from north to south, and mostly

1,500–2,500 m above sea level. It is the watershed between the tributaries of the Yellow River and the Yangtze River, Jialing River, and Han River. Qinling Mountain–Huaihe River is an important north-south dividing line in China's geography, and Qinling Mountains are also honored as the dragon vein of the Chinese civilization. Qinling Mountains are rich in mountain and forest tourism resources, determined by the unique geographical location and distinctive characteristics of the Qinling Mountains. In the middle of China's territory, Qinling Mountains is the highest mountain in the East since then, and it is also the only mountain in the east-west direction. In the eyes of geographers, Qinling Mountains are the dividing line between the south and the north and the watershed of the Yangtze River and the Yellow River. In the eyes of zoologists, the Qinling Mountains are divided into the Palaearctic and the Oriental realms, where two distinct animals meet and merge. In the eyes of climatologists, the Qinling Mountains are the transitional zone between the northern subtropical zone and the warm temperate zone. In the eyes of writers, the Qinling Mountains and the Yellow River have become the father mountain and mother river of the Chinese nation. The geographical location of the Qinling Mountains is shown in Figure 2.

There has been a saying of seventy-two valleys in the Qinling Mountains since ancient times. Seventy-two valleys in

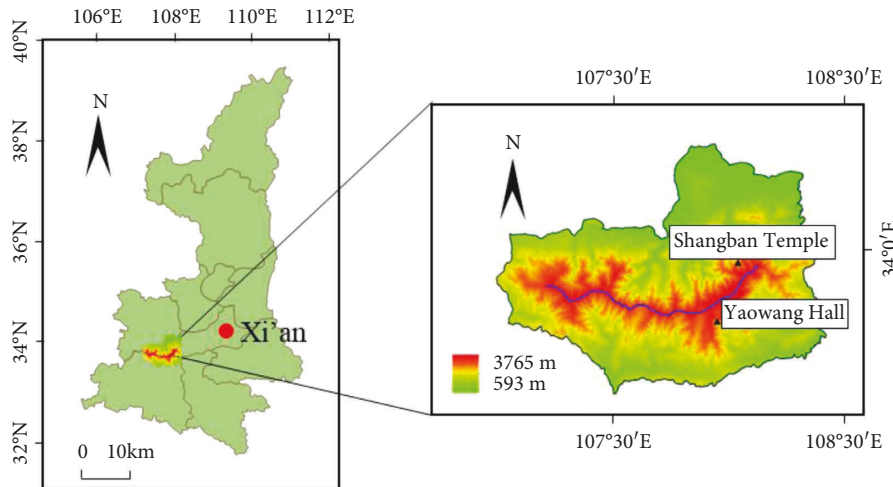


FIGURE 3: Taibai Mountain.

the Qinling Mountains refer to the north slope of the Qinling Mountains, starting from Tongguan in the East and ending at the larger Valley in Baoji in the West. Most of the rivers originate from the watershed, and there have been relatively long Sichuan roads and small roads since ancient times. The most famous ones are LAN Guan Road, Ziwu Road, Luotang Road, and Chencang Road. As for the smaller valleys and gullies, there are as many as hundreds, not counting this. The highest peak of the Qinling Mountains is mount Taibai, with a height of 3,763.2 m. It is the first peak in the eastern half of the Chinese Mainland (known as the top of the peaks). Currently, the second peak of the Qinling Mountains in Shaanxi is known as “Aoshan” or “West Taibai” for short, with a height of 3,740 m, as shown in Figure 3.

There are obvious differences in the natural landscape between the north and south slopes of the Qinling Mountains. The northern slope of the Yellow River Basin is a warm temperate coniferous and broad-leaved mixed forest and deciduous broad-leaved forest zone. Due to long-term agricultural development, most of them are secondary forests. The floristic elements and animal species in Qinling Mountains have obvious transitional, hybrid, and complex diversity. Among the wild animals, there are precious species such as giant panda, golden monkey, antelope, and birds such as Crested Ibis and black stork, which are national first-class protected objects. Among them, giant panda, golden monkey, antelope, and Crested Ibis are collectively known as the “four treasures of the Qinling Mountains,” as shown in Figure 4.

Developing ecotourism and ecological civilization construction in Qinling Mountains is a new task. It benefits from the early construction and development of tourism areas. In turn, it can better protect and improve the existing ecological landscape and further promote the development of scenic spots and the harmonious coexistence of man and nature.

4. Evaluation of Ecotourism Resources

4.1. Selection of Evaluation Methods. AHP is a practical decision-making method proposed by Sati, a famous mathematician, in the 20th century. It can evaluate the

expanded influence factors, is multilevel and multiobjective, and can overcome the deviation caused by the inability to quantify the relevant influence factors in the previous decision-making process. Based on the principles of simplicity, science, systematicness, and operability, the evaluation system of ecotourism resources is established. Through the AHP, the evaluation index system structure of the subtarget, project, and index levels is constructed (Figure 5), the index weight is determined in combination with field investigation and expert scoring, and a multi-index comprehensive evaluation model of ecotourism resources is established to analyze and evaluate ecotourism resources. Finally, the empirical application analysis of the established evaluation model is carried out to realize the evaluation and analysis of ecotourism resources.

4.2. Evaluation Index Selection and Weight Calculation.

According to the characteristics of ecotourism areas, an evaluation model system is established to evaluate ecotourism resource. Based on consulting numerous documents, consulting relevant ecoenvironmental experts, and conducting on-the-spot investigation and evidence collection of ecotourism areas, including Qinling Mountains, the agricultural ecotourism resource evaluation (a) is taken as the overall target level. According to the content of the system, it is divided into three subtarget layers: resources (B_1), ecological environment (B_2), and development conditions (B_3), further dividing the tourism resource subsystem into three project layers and dividing the ecological environment system into two project layers. Moreover, the development condition system was divided into three project layers. Finally, the project level is subdivided into 22 indicator levels, as shown in Table 1.

According to the selected evaluation indicators of Qinling Mountain tourism resources, the evaluation index system is shown in Figure 6. AHP is used to evaluate the ecotourism resources in Qinling Mountains. According to the objective reality and subjective judgment, combined with expert opinions and objective judgment results, the hierarchical elements are compared and quantified, the weight value of

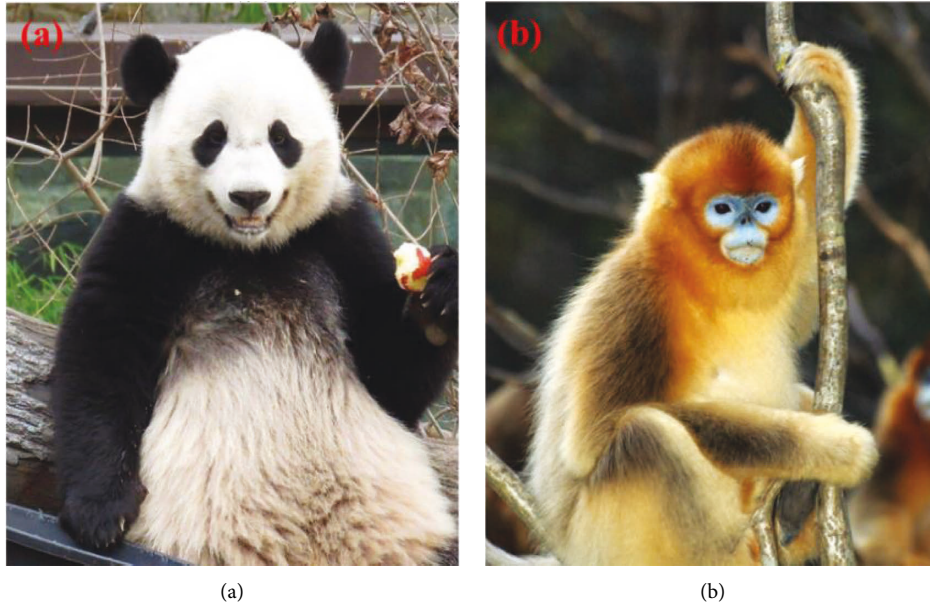


FIGURE 4: Rare animals in Qinling Mountains: (a) panda and (b) golden monkey.

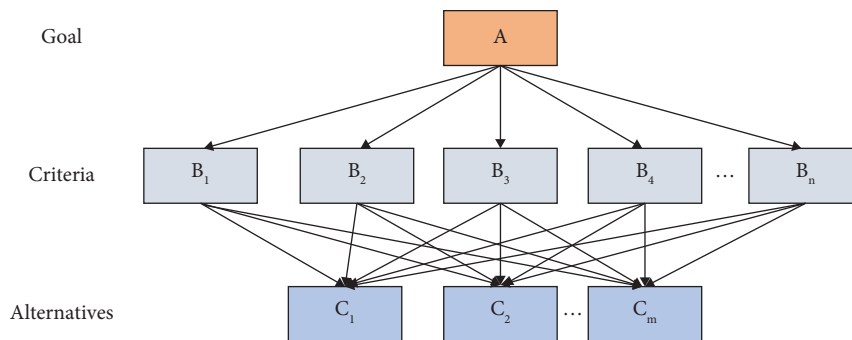


FIGURE 5: Structure of the analytic hierarchy process.

the importance of each level element is calculated, and the weight of all elements is sorted.

The importance scale of index a_i compared with index a_j : $A_{ij} = 1$ is equally important, $A_{ij} = 3$ is slightly important, $A_{ij} = 5$ is more important, $A_{ij} = 7$ is significantly important, $A_{ij} = 9$ is extremely important, $A_{ij} = 2, 4, 6, 8$ are the intermediate values of adjacent judgments, and $A_{ji} = 1/A_{ij}$ is the importance of index a_j compared with index a_i . The importance of each factor in the same layer is compared in two pairs according to the important scale value. The comprehensive weight value of each indicator is equal to the weight of an indicator at the indicator level relative to the indicator at the project level multiplied by the indicator weight at the project level. Take the average of the two feedback results from the questionnaire consultation scores of experts related to agricultural tourism, ecotourism, and tourism planning, and establish a judgment matrix as follows:

$$A = \begin{bmatrix} a_{11} & a_{12} & \dots & a_{1j} \\ a_{21} & a_{22} & \dots & a_{2j} \\ \vdots & \vdots & \dots & \vdots \\ a_{i1} & a_{i2} & \dots & a_{ij} \end{bmatrix} \quad (1)$$

Based on the constructed evaluation model, the influence degree of the factors listed at all levels in the evaluation model on the ecotourism area is determined. Through consulting relevant literature, it is found that there is a lack of research on the systematic evaluation of ecotourism resources with AHP as the main method. Considering that the quantitative assignment of various factors directly through human perception leads to analysis errors and does not have objective authenticity. The author tries to quantify by comparing two methods and constructing a judgment matrix to compare the importance of various levels of factors on the production of ecotourism areas.

Combined with the Delphi method, five experts in the field of tourism development and five experts in the field of ecology were invited to compare and score by face-to-face consultation and e-mail. The consistency of the results of the judgment matrix was tested by the following formula:

$$\lambda_{\max} = \frac{1}{n} \sum_{i=1}^n \frac{(AW)_i}{W_i}, \quad (2)$$

$$CI = \frac{\lambda_{\max} - n}{n - 1}.$$

TABLE 1: Ecotourism evaluation index.

Target layer (A)	Subtarget layer (B)	Item layer (C)	Index layer (D)	
Comprehensive evaluation of ecotourism resources (A)	Ecotourism and elements of historical and cultural resources (B ₁)	Humanistic characteristics (C ₁)	Historical and cultural values (D ₁)	
			Scientific research potential value (D ₂)	
		Tourism function and value (C ₂)	Popularity (D ₃)	
			Entertainment and leisure (D ₄)	
			Visual viewing (D ₅)	
			Diversity of ecological elements (D ₆)	
			Uniqueness of ecological resources (D ₇)	
			Scale degree (D ₈)	
		Distribution of resource types (C ₃)	Combination condition (D ₉)	
			Aggregation degree (D ₁₀)	
	Environmental characteristics (B ₂)	Ecological environment (C ₄)	Environmental suitability (D ₁₁)	
			Ecological security guarantee level (D ₁₂)	
		Social and economic conditions (C ₅)	Applicability of regulations (D ₁₃)	
			Safety guarantee level of tourist area (D ₁₄)	
			Level of supporting facilities (D ₁₅)	
			Basic tourism facilities (D ₁₆)	
		Development conditions (B ₃)	Regional location conditions (C ₆)	Position (D ₁₇)
				Traffic conditions (D ₁₈)
	Source of passenger flow (C ₇)		Interaction of tourism areas in the same region (D ₁₉)	
			Scale degree (D ₂₀)	
			Source of passenger flow (D ₂₁)	
			Tourist consumption capacity (D ₂₂)	

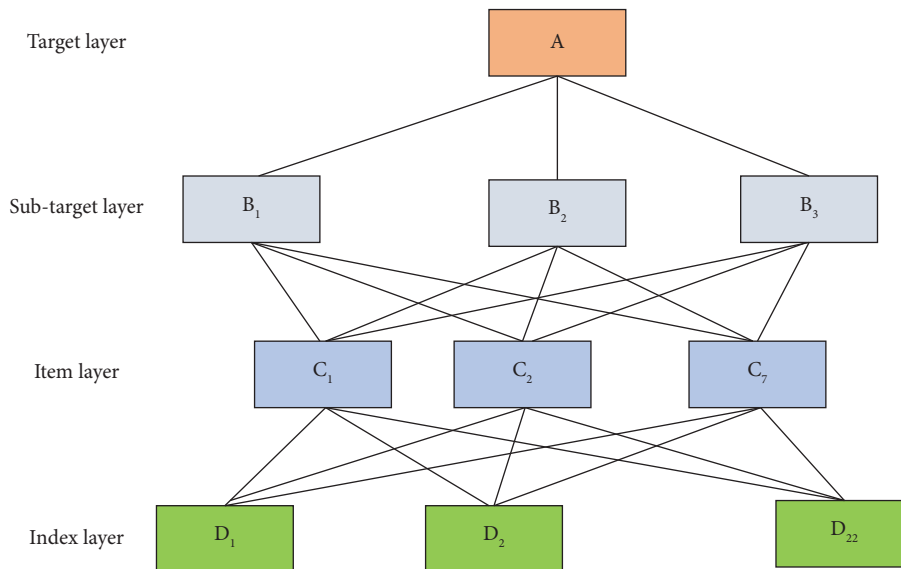


FIGURE 6: Evaluation index system of tourism resources in the Qinling Mountains.

Calculate the CI result, and check the average random consistency index RI value according to

$$CR = \frac{CI}{RI} \tag{3}$$

CR is calculated. If $CR < 0.1$, the consistency is passed. If $CR > 0.1$, conduct multiple rounds of evaluation until the CR value is less than 0.1.

4.3. Evaluation Criterion. The constructed evaluation model is used to evaluate the tourism resource points in Qinling Mountains. The scale standard of the Likert scale is used to quantify each index. First, each factor is divided into five scales: good, good, general, poor, and poor, and each scale is assigned. Among them, “good” is 90–100 points, greater than or equal to 80 and less than 90 points is “good,” greater than or equal to 70 and less than 80 points is “general,” greater than or equal to 60 and less than 70 points is “poor,” and less than 60 points is the difference. After the weight of each index is calculated by AHP, the comprehensive score is calculated:

$$S = \sum_{i=1}^n d_i C_i, \tag{4}$$

where S is the comprehensive score, d_i is the evaluation factor score, and C_i is the index weight. S is divided into five grades, as shown in Table 2.

4.4. Evaluation Index Weight Calculation Results. According to the evaluation method in this paper, the weight of each evaluation index of Qinling ecotourism resource evaluation is obtained. After the consistency test, the evaluation results meet the requirements, and then the weight of each evaluation factor is obtained, as shown in Table 3.

4.5. Analysis of Evaluation Results. In the index layer, the weights of the interaction of tourism areas in the same region (D_{19}), the applicability of regulations (D_{13}), and entertainment and leisure (D_{18}) are 0.0691, 0.0672, and 0.0660, respectively. The index accounts for the top three, which has a high impact on the score of Qinling Mountain Ecotourism Resources to a certain extent. It shows that the problems related to these two factors greatly impact the ecotourism resources of the Qinling Mountains. Compared with other factors, we need to pay special attention to these two aspects when managing tourism resources.

In order to comprehensively evaluate the ecotourism resources of Qinling ecotourism scenic spot, through sorting out the data obtained from the questionnaire survey and field survey, the corresponding impact factors of each level in the evaluation model are valued and scored, and the weight of each index is calculated. Finally, the total comprehensive evaluation score of the Qinling ecotourism scenic spot is 92. Further explore the reasons for the high and low scores of various indicators, which are mainly reflected in the following aspects:

TABLE 2: Comprehensive scoring table.

Grade	Range of comprehensive scores
I	≥ 90
II	$89 \geq S \geq 80$
III	$79 \geq S \geq 70$
IV	$69 \geq S \geq 60$
V	$S \leq 59$

TABLE 3: Weight of various indexes in the evaluation mode.

Subtarget layer	Item layer	Index layer
0.4276	C_1	D_1 0.0542
		D_2 0.0421
		D_3 0.0300
	C_2	D_4 0.0660
		D_5 0.0331
		D_6 0.0452
		D_7 0.0089
0.2853	C_3	D_8 0.0321
		D_9 0.0152
		D_{10} 0.0020
0.2871	C_4	D_{11} 0.0523
		D_{12} 0.0364
		D_{13} 0.0672
	C_5	D_{14} 0.0442
		D_{15} 0.0246
		D_{16} 0.0306
		D_{17} 0.030
C_6	D_{18} 0.0463	
	D_{19} 0.0691	
	D_{20} 0.0542	
	D_{21} 0.0611	
	C_7	D_{22} 0.0564

- (1) The natural ecological environment of Qinling Mountain Ecotourism Scenic Spot is good, but there are few elements of ecotourism and historical and cultural resources, indicating that although some scenic spots in Qinling Mountain have high historical and cultural value, other buildings in the scenic spot have been built in recent years, so their popularity is not high, and their influence is not enough.
- (2) Qinling Mountain Ecotourism Scenic Area has various plant species with scientific research value and the ability to carry out field teaching. At the same time, the diversity of species in the tourism area also brings better visual appreciation value and residents' leisure and entertainment value. However, there are still low species specificity and low aggregation in tourist areas.
- (3) Qinling ecotourism scenic spot is under the jurisdiction of the Xi'an Municipal Party committee and government. The municipal government attaches great importance to the development of service tourism. The social security situation of the city is good, and the transportation planning and construction are also gradually improving. Therefore,

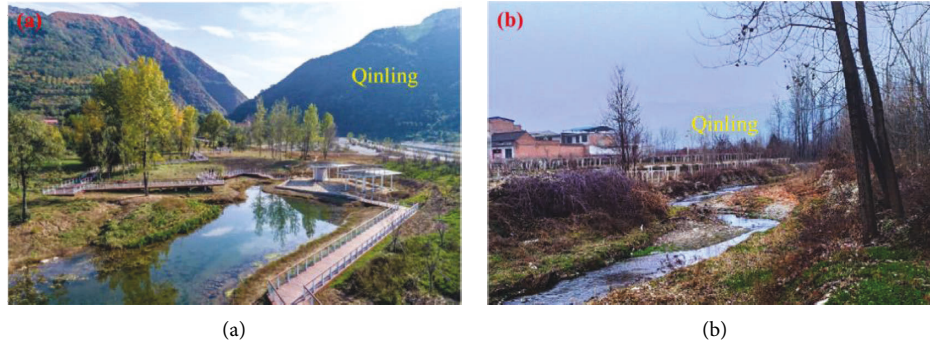


FIGURE 7: Scenic spots after development and investment: (a) Gengyu and (b) Tianyu.

the comprehensive evaluation of its tourism development conditions scores high. It shows that transportation has little impact on the tourism resources of the Qinling Mountains.

- (4) The tourist flow in the tourist area comes from a wide range of sources, but mainly from coastal provinces. Their consumption ability is very high, and their education level is also very high.

5. Suggestions for the Development of Tourism Resources in the Qinling Mountains

5.1. Strengthening the Construction of Infrastructure Services. The protection of ecotourism resources in each Yukou spot should be arranged as a whole, and scientific and reasonable ecological function areas should be defined. In particular, the protection of Yukou scenic spots that are restricted or prohibited by the government should be strengthened, such as the Heihe River and Jiuyu, and measures should be taken to regulate and restore the ecology as soon as possible. For scenic spots that the government encourages and focusing on development, we should increase investment in development, such as Gengyu and Tianyu (as shown in Figure 7). We should improve infrastructure services as soon as possible through reasonable layout planning. By strengthening and improving the hardware, we can improve the cultural connotation of Yukou scenic spots and improve the grade of scenic spots. The premise is not to destroy the ecology, give priority to nature, and never engage in predatory development and blind construction.

5.2. Landscape Restoration. Protective development requires the protection of the landscape of each valley to make it have natural integrity. First, according to the needs of the main valley landscape along the northern foot of the Qinling Mountains in Zhouzhi County, representative temples along the way and on the top of the mountain should be built, which can be used as both tourist landscapes and rest facilities. Secondly, according to the landscape needs and visual experience, the renovation of the environmental facilities of the existing villages should be strengthened. In addition to providing buildings for tourists to rest and lodge, campsites should also be opened. When developing these

valleys, the volume, form, color, style, and materials of the buildings should be strictly controlled to make them coordinate with the natural environment.

5.3. Ecological Construction. In areas where conditions permit engaging in agricultural production, we should fully introduce and use high and new technology to develop efficient agriculture. In areas with poor farming and living conditions, we should return farmland to forests and develop economic forests, specialty fruits, and ecological agriculture. In areas without farming conditions and with extremely poor living conditions, we should give full play to the catalytic role of the tourism economy, let some residents move out, and encourage some qualified mountain people to participate in the tourism service industry of the scenic spot to form a unique economic structure of the scenic spot.

In the process of protective development of scenic spots, human existence destroys the natural environment. However, human existence and the accumulation of human activities have become an integral part of the cultural environment of scenic spots. They are people in the environment. At the same time, due to human existence, the environment will increase “popularity” and sense of security. A certain number of residents should be retained to change the traditional way of production and life and better integrate into the environment. This kind of on-site relocation based on cultural and environmental protection is called ecological migration. The goal of ecological migration is to staff residents, service production, scenic spots of folk houses, enterprise management, and ecological scenic spots.

5.4. Brand Publicity and Construction. In the process of protective development of major Yukou, we should make full use of various media (traditional and new media) for advertising, use the Internet e-commerce platform to strengthen the publicity from multiple perspectives, and cooperate with tourism intermediaries and tourism channels to attract more attention from the society by designing various seasonal tourism projects to establish scenic spot brands and boutique brands, as shown in Figure 8. For example, various tourism activities can be used to drive the popularity of tourist spots, and activities such as “Zhouzhi special snack Festival,” “Rape Flower Festival,” “Lavender Flower Festival,” “New Year blessing,” and “China Kiwi theme park” can be carried out. We



FIGURE 8: Qinling featured products: (a) kiwifruit and (b) cole flowers.

can also make use of Yukou's unique landscape characteristics, strange and beautiful natural scenery, long history and culture, and other tourism resources to create brand slogans and advertising language for tourist spots; attract tourists' interest in sightseeing and play; and then drive tourism growth to form a unique tourism competitive advantage.

6. Conclusions

This paper constructs the evaluation index system of ecotourism resources based on the AHP method. Through the case analysis of the Qinling ecotourism scenic spot, the results are consistent with the actual situation, which shows that this method has high reliability and can be applied to the comprehensive evaluation of ecotourism resources. The research results can provide a reference for the follow-up in-depth development of this tourist area, as well as the development of other tourist areas. In addition, the research method adopted in this paper can also provide a reference for other tourism resource evaluation cases. The main conclusions are as follows:

- (1) The top three evaluation index weights are the interaction of tourism areas in the same region (D_{19}), the applicability of regulations (D_{13}), and entertainment and leisure (D_{18}). The weight values of the three indicators are 0.0691, 0.0672, and 0.0660, respectively.
- (2) In the process of developing ecotourism, we need to pay special attention to the local history and culture and deeply tap into the local historical and cultural values. We take the functions of history and culture, scientific research and education, and tourism value as the characteristics of ecotourism areas into the subjective evaluation system.
- (3) We focus on the role of traffic conditions and other factors in the overall development of ecotourism because it is the basic condition to ensure that consumers choose to travel. Therefore, the local government needs to further improve the construction of infrastructure and supporting facilities in the tourist area, improve traffic conditions, such as increasing the number of parking spaces and rest stations in the tourist area, strengthen the management of merchants in the scenic area, and deal with the problem of high consumption in the scenic area raised by consumers in a timely manner.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

References

- [1] X. Chen, X. Jiang, and Y. Lu, "Study on the rural ecotourism resource evaluation system," *Environmental Technology & Innovation*, vol. 20, no. 2, Article ID 101131, 2020.
- [2] Y. Q. Wang, S. B. Zhang, L. L. Chen, Y. L. Xie, and Z. F. Wang, "Field monitoring on deformation of high rock slope during highway construction: a case study in Wenzhou, China," *International Journal of Distributed Sensor Networks*, vol. 15, no. 12, Article ID 155014771989595, 2019.
- [3] B. Sun, C. Ao, J. Wang, B. Mao, and L. Xu, "Listen to the voices from tourists: evaluation of wetland ecotourism satisfaction using an online reviews mining approach," *Wetlands*, vol. 40, no. 5, pp. 1379–1393, 2020.
- [4] L. E. Wang, L. Zhong, Y. Zhang, and B. Zhou, "Ecotourism environmental protection measures and their effects on protected areas in China," *Sustainability*, vol. 6, no. 10, pp. 6781–6798, 2014.
- [5] W. Zhang, B. Li, Z. Liu, and B. Zhang, "Application of improved fuzzy comprehensive evaluation method in karst groundwater quality evaluation: a case study of Cengong county," *Earth Science Informatics*, vol. 14, no. 2, pp. 1101–1109, 2021.
- [6] A. Smriti, M. D. Behera, and H. R. Tewari, "Evaluating the applicability of ESM (Ecotourism Sustainability Maximization) model to assess, monitor, and manage the ecotourism sustainability in mountain ecosystem (Mt. Kangchendzonga Base Camp Trek, India)," *Environmental Monitoring and Assessment*, vol. 191, no. 3, pp. 1–21, 2019.
- [7] J. S. Brandt and R. C. Buckley, "A global systematic review of empirical evidence of ecotourism impacts on forests in biodiversity hotspots," *Current Opinion in Environmental Sustainability*, vol. 32, pp. 112–118, 2018.
- [8] A. Kelkit, S. Celik, and H. Eşbah, "Ecotourism potential of gallipoli peninsula historical national park," *Journal of Coastal Research*, vol. 263, no. 3, pp. 562–568, 2010.
- [9] W. Wu, X. Zhang, and Z. Yang, "Comprehensive evaluation of cloud manufacturing service based on fuzzy theory ecotourism suitability and zoning from the tourist perspective: a

- nature reserve case study," *Polish Journal of Environmental Studies*, vol. 24, no. 6, pp. 2683–2697, 2015.
- [10] Y. Hu, L. Wu, X. Pan, Z. Wang, and X. Xu, "Comprehensive evaluation of cloud manufacturing service based on fuzzy theory," *International Journal of Fuzzy Systems*, vol. 23, no. 6, pp. 1755–1764, 2021.
- [11] J. Sun, "Study on evaluation of leisure diving tourism based on fuzzy comprehensive method optimized bat algorithm," *Life Science Journal*, vol. 2022, Article ID 9047644, 7 pages, 2022.
- [12] S. Chaudhary, A. Kumar, M. Pramanik, and M. S. Negi, "Land evaluation and sustainable development of ecotourism in the Garhwal Himalayan region using geospatial technology and analytical hierarchy process," *Environment, Development and Sustainability*, vol. 24, no. 2, pp. 2225–2266, 2021.
- [13] S. A. Jozi, S. Ali, P. Aghapour, K. P. Maryam, and Z. Narges, "Presentation of strategic management plan in ecotourism development through SWOT: case study of Qeshm Island," *Journal of Food Agriculture and Environment*, vol. 8, no. 2, pp. 1123–1132, 2010.
- [14] M. Talebi, B. Majnounian, M. Makhdoum, A. Ehsan, and M. Omid, "Predicting areas with ecotourism capability using artificial neural networks and linear discriminant analysis (case study: Arasbaran Protected Area, Iran)," *Environment, Development and Sustainability: A Multidisciplinary Approach to the Theory and Practice of Sustainable Development*, vol. 23, 2021.
- [15] S. Gass, "Model world: the great debate - MAUT versus AHP journal," *Interfaces*, vol. 35, no. 4, pp. 308–312, 2005.
- [16] J. Mirarabrazi, I. N. Hassanzad, I. Ghajar, and M. Salahi, "Identifying optimal location of ecotourism sites by analytic network process and genetic algorithm (GA): (Kheyroud Forest)," *International journal of Environmental Science and Technology*, vol. 17, no. 5, pp. 2583–2592, 2020.
- [17] A. Ambecha, G. Melka, and D. Gameda, "Ecotourism site suitability evaluation using geospatial technologies: a case of Andiracha district, Ethiopia," *Spatial Information Research*, vol. 28, 2020.
- [18] M. Salemi, S. Jozi, S. Malmasi, and R. Sahar, "Conceptual framework for evaluation of ecotourism carrying capacity for sustainable development of Karkheh protected area, Iran," *The International Journal of Sustainable Development and World Ecology*, vol. 26, pp. 1–13, 2019.
- [19] M. Canteiro, F. Córdova-Tapia, and A. Brazeiro, "Tourism impact assessment: a tool to evaluate the environmental impacts of touristic activities in Natural Protected Areas," *Tourism Management Perspectives*, vol. 28, pp. 220–227, 2018.
- [20] M. B. Mulder, T. Caro, and O. A. Msago, "The role of research in evaluating conservation strategies in Tanzania: the case of the katavi-rukwa ecosystem," *Conservation Biology*, vol. 21, no. 3, pp. 647–658, 2007.
- [21] T. Wang, "Research on fuzzy comprehensive evaluation index system of mental health education for college students," *Journal of Healthcare Engineering*, vol. 2022, Article ID 7106926, 5 pages, 2022.
- [22] M. Kolahi, T. Sakai, K. Moriya, Y. Masatoshi, and R. Esmaili, "From paper parks to real conservations: case study of social capital in Iran's biodiversity conservation," *International Journal of Environmental Research*, vol. 8, no. 1, pp. 101–114, 2014.
- [23] H. S. Chen, "The establishment and application of environment sustainability evaluation indicators for ecotourism environments," *Sustainability*, vol. 7, no. 4, pp. 4727–4746, 2015.
- [24] L. L. Chen, Z. F. Wang, and Y. Q. Wang, "Failure analysis and treatments of tunnel entrance collapse due to sustained rainfall: a case study," *Water*, vol. 14, no. 16, p. 2486, 2022.
- [25] S. Wearing, M. McDonald, S. Schweinsberg, C. Paul, and B. Tahnee, "Exploring tripartite praxis for the REDD + forest climate change initiative through community based ecotourism," *Journal of Sustainable Tourism*, vol. 28, no. 1, pp. 1–17, 2019.
- [26] F. Monti, O. Duriez, J. Dominici, and S. Andrea, A. Robert, L. Fusani, G. David, The price of success: integrative long-term study reveals ecotourism impacts on a flagship species at a UNESCO site," *Animal Conservation*, vol. 21, no. 6, 2018.
- [27] P. Lonn, N. Mizoue, T. Ota, T. Kajisa, and S. Yoshida, "Evaluating the contribution of community-based ecotourism (cbet) to household income and livelihood changes: a case study of the chambok cbet program in Cambodia," *Ecological Economics*, vol. 151, no. SEP, pp. 62–69, 2018.
- [28] M. Erfani, A. Shahram, T. Ardakani, and S. Asiyeh, "Tourism positioning using decision support system (case study: chahnime-Zabol, Iran)," *Environmental Earth Sciences*, vol. 74, no. 4, pp. 3135–3144, 2015.
- [29] S. Kaffashi and M. Yavari, "Land-use planning of Minoo Island, Iran, towards sustainable land-use management," *The International Journal of Sustainable Development and World Ecology*, vol. 18, no. 4, pp. 304–315, 2011.
- [30] T. P. L. Nguyen, L. H. Huong, and B. L. Thuy, "Promoting participation in local natural resource management through ecological cultural tourism: case study in vam nao reservoir area, an giang province, vietnam," *Journal of Asian and African Studies*, vol. 55, no. 6, pp. 863–879, 2020.