

## The Comprehensive Evaluation of Rural Landscape Based on "2A"-Taking Zhiyang Village as an Example

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**Abstract:** The landscapes of many villages have been improved in the new era of rural construction, but the applicable comprehensive evaluation is none. This paper establishes a comprehensive evaluation index system of rural landscape of Zhiyang village, Hancheng city based on 2A that is AVC theory and AHP. The AVC is used to build the applicable index of comprehensive evaluation of Zhiyang village. The AHP is used to calculate the weights of evaluation index and the consistency test was carried out. The model of landscape evaluation is built by the multi-objective linear weighting function and is used to evaluate the rural landscape of Zhiyang. The results show that the rural landscape of Zhiyang is in good condition. Its capacity has advantages, the attraction and validity is not better than the capacity and they can be improved. The research results can provide scientific basis and reference for the development of rural tourism planning and the evaluation of rural landscape in this region and similar regions.

### 1. Introduction

All manuscripts must be in English, also the table and figure texts, otherwise we cannot publish your paper. Please keep a second copy of your manuscript in your office. When receiving the paper, we assume that the corresponding authors grant us the copyright to use the paper for the book or journal in question. Should authors use tables or figures from other Publications, they must ask the corresponding publishers to grant them the right to publish this material in their paper. With the vigorous development of rural construction and the implementation of rural revitalization initiatives in the new period, meanwhile, people's demand for domestic tourism has increased in recent years caused great changes of the rural landscape. However, due to the lack of guidance of rural landscape design theory, the landscape of many villages is designed blindly in the light of the theories and methods of urban landscape design. Therefore, in order to find out the advantages and problems in the current rural landscape design, it is necessary to evaluate the quality of the rural landscape comprehensively.

The AVC theory provides an effective method for landscape evaluation. Based on this theory, Wang Qiuniao [1] et al. established the comprehensive evaluation index of landscape for Sancha village in Beijing to comprehensive evaluation of the landscape and provide basis and reference for rural tourism in this region. Xie Zhijing [2] et al. constructed a comprehensive evaluation index of rural landscape, and applied it to the core area of Shuyang modern agricultural industrial park in Jiangsu province. In addition, some scholars have studied the rural landscape from the evolution of landscape pattern [3-4] and rural tourism [5-6].

As above, there are research findings on the rural landscape evaluation. However, the comprehensive evaluation target focused on the agricultural park and part of the city and most of the research is conducted from the viewpoint of rural tourism and landscape pattern evolution, it does not involve the comprehensive evaluation of rural landscape in Guanzhong area. In order to

research and evaluate the rural landscape, this paper takes Zhiyang, a vigorous village with great change in the new era of rural construction, in Guanzhong area as the research object establishes a comprehensive evaluation, based on 2A that is AVC (Attraction Vitality Capacity) theory and AHP (Analytic Hierarchy Process). Among them, the comprehensive evaluation index were constructed by AVC theory and combines with the AHP (Analytic Hierarchy Process ) to determine the weights of indexes, the multi-objective linear weighting function is used in the comprehensive evaluation model of rural landscape to calculate the comprehensive score of each layer, and compare it with rural landscape comprehensive evaluation standard.

## **2. Regional overview and data sources**

### **2.1 Regional overview**

Zhiyang village is located in the southwest of the Hancheng city in Shaanxi province (Longitude 110.43, Latitude 35.48), it is 14 km away from the city. The railway from Xi'an to Houma passes through the area and the traffic is very convenient. The area of Zhiyang village is 4.52km<sup>2</sup> with a permanent population of about 3,500. It consists of 1.27km<sup>2</sup> residential area, 0.12 km<sup>2</sup> immigrant community for villagers, 0.80km<sup>2</sup> trading area for zanthoxylum and relative agricultural products, 2.20km<sup>2</sup> agricultural area and 0.13km<sup>2</sup> woodland area. The economic sources of the villagers mainly depend on cash crops. Zanthoxylum, apple and peach are the most important cash crops in the area. Zhiyang village are surrounded by gullies from the east, south and north, the west of village connects by loess plateau. The average altitude of Zhiyang village is 526m. There are various types of landscape in the region. The most important cash crop landscape includes 1.20km<sup>2</sup> zanthoxylum growing area and 0.87km<sup>2</sup> apple growing area. The traditional folk houses (Before the 1960s) keep intact in the village, but most of them are vacant. Since the 21st century, the new dwellings, by contrast, were built along the street, and their horizontal and vertical space expansion have formed the village landscape with local characteristics.

In the past few years, Zhiyang village has built a zanthoxylum industrial park, a number of zanthoxylum trading market and zanthoxylum picking garden, specially, Zhiyang village was awarded as the national zanthoxylum industry demonstration base in 2016. In additional, the renovation of the old street and the oblique temple has gradually formed a unique landscape resource in Zhiyang village. The peach festival and the zanthoxylum picking festival attract tourists from all over the country in every April and July respectively, and gradually became folk tourism.

### **2.2 Data Sources**

The data of natural resources for the study area in this paper were collected from July to August, 2017. Our study team deeply understand and explore the unique landscape resources of Zhiyang village by means of the field experience, questionnaire survey and interviews with villagers. The cash crop landscape data get according to the results of the regional survey in 2017, and the data of annual income growth rate is obtained by the ratio of cash crop income between 2017 and 2016.

## **3. Research method**

### **3.1 Rural landscape evaluation index system**

The rationality of the evaluation index system is closely related to the accuracy of the evaluation results. In order to ensure the rationality of the evaluation index system in this study, the local landscape evaluation index was selected by expert consultation. In this study, 16 experts were invited to discuss, and the landscape evaluation index system of Zhiyang village was finally determined.

#### **3.1.1 The principle of evaluation index selection**

Evaluation index system is one important part of rural landscape evaluation, the suitability of the index selection has a great influence on the evaluation results. Therefore, the selection of evaluation

index in this study strictly satisfies the following principles: characteristic, integrity, independence, representativeness, feasibility and completeness. The characteristic principle ensures that the selected index can reflect effectively the characteristics of the evaluation object. The integrity principle ensures that the evaluation index adopted is from macroscopic to microscopic and from abstract to specific. It can reflect comprehensively the evaluation object and it could involve content of the rural landscape. The independence principle ensures that each of the indexes has no influence on others and is independent each other at each layer. The representativeness principle ensures that the selected evaluation index can clearly show the main characteristics of the hierarchy and type. The feasibility principle ensures that the data can be easily obtained and quantifiable when the evaluation indicators are selected. The completeness principle ensures that the evaluation do not omit any important aspects of the evaluation object. The implementation of the above principles ensures the rationality of the evaluation index system constructed in this study.

### 3.1.2 The construction of evaluation index system

Different topography and landform have formed a variety of landscape types, so the construction of evaluation system and the selection of evaluation index should combine with the landscape characteristics of special evaluation object. The study object in this paper lies in the special type of area where one half of area consists of mountain and the other consists of tableland. Its main landscape features are as follows: 1) there are many gullies, the terrain is complex and the natural landscape is unique. 2) There are high farmland coverage and abundant cash crops, which forms the obviously seasonal and characteristic agricultural landscape. 3) The local features of rural residents and customs are strong, and they contribute to the unique village landscape.

Combining with the features of this study object and according to the item layer involved in the evaluation index system of AVC theory, the definition and content of the item layer are obtained through consulting experts and discussion. Meanwhile, the specific and detail contents of each aspect at each layer are classified and combined, and a scientific and rigorous evaluation index system forms in the light of the selection principle. The evaluation indexes is shows (Tab.1).

Table 1. The comprehensive evaluation index system of rural landscape

Target layer	Item layer		Factor layer		Index layer		Evaluation Value
	Index	Weight value	Index	Weight value	Index	Weight value	
The comprehensive evaluation of rural landscape (A)	The attraction of rural society ( $B_1$ )	0.5936	Natural landscape( $C_{11}$ )	0.3952	Percentage of agricultural landscape area and total area ( $D_1$ )	0.2950	0.605
					Plant resource diversity ( $D_2$ )	0.1954	0.370
					The character of topography ( $D_3$ )	0.1666	0.128
					Landscape seasonal features ( $D_4$ )	0.1954	0.257
					Seasonal climate characteristics ( $D_5$ )	0.1475	0.103
			Human landscape( $C_{12}$ )	0.1976	Dwellings and historic site ( $D_6$ )	0.7049	0.440
					Custom features ( $D_7$ )	0.2109	0.248

					Farming Culture ( $D_8$ )	0.084 1	0.570
			Settlement environment( $C_{13}$ )	0.239 0	General layout of residential areas ( $D_9$ )	0.669 4	0.610
					Building density ( $D_{10}$ )	0.242 6	1.000
					The improvement degree of infrastructure ( $D_{11}$ )	0.087 9	0.420
					Geographic location ( $D_{12}$ )	0.166 7	0.810
			Regional landscape ( $C_{14}$ )	0.168 2	The convenience of transportation ( $D_{13}$ )	0.833 3	0.890
The vitality of rural economy ( $B_2$ )	0.249 3	Social economy ( $C_{21}$ )	0.192 9	Per capita net income of residents ( $D_{14}$ )	0.648 3	0.627	
				Annual growth rate ( $D_{15}$ )	0.229 7	0.597	
				The proportion of added value of secondary industry and tertiary industry in total output value ( $D_{16}$ )	0.122 0	0.571	
		Agricultural production ( $C_{22}$ )	0.106 1	The range of changes in commonly used arable land ( $D_{17}$ )	0.109 5	0.511	
				The commodity rate of agricultural product ( $D_{18}$ )	0.309 0	0.627	
				The proportion of agricultural cooperation organizations and leading enterprises drive the proportion of farmers( $D_{19}$ )	0.581 6	0.307	
		People's living ( $C_{23}$ )	0.701 0	Participation rate of new rural cooperative medical treatment ( $D_{20}$ )	0.558 4	0.727	
				Internet	0.122	0.616	

					occupancy rate ( $D_{21}$ )	0	
					The average number of years that the Labour force receives education ( $D_{22}$ )	0.319 6	0.370
					Forest-cover rate ( $D_{23}$ )	0.333 2	0.600
					Natural ecological capacity ( $C_{31}$ )	0.387 4	
					Frequency of natural disasters ( $D_{24}$ )	0.075 1	0.090
					Ecological stability ( $D_{25}$ )	0.591 7	0.680
					Social ecological capacity ( $C_{32}$ )	0.443 4	
					Air quality ( $D_{26}$ )	0.425 4	0.750
					Water environment quality ( $D_{27}$ )	0.425 4	1.000
					Domestic waste disposal rate ( $D_{28}$ )	0.093 4	0.690
					Comprehensive utilization rate of crop straw ( $D_{29}$ )	0.005 8	0.700
					Mental capacity ( $C_{33}$ )	0.169 2	
					Resident satisfaction ( $D_{30}$ )	0.666 7	0.680
					Tourist satisfaction ( $D_{31}$ )	0.333 3	0.760
					The capacity of the rural environment ( $B_3$ )	0.157 1	

### 3.2 Evaluation index data acquisition

In the comprehensive evaluation system of Zhiyang village's landscape, the comprehensive evaluation of landscape is regarded as the target layer (A) of hierarchical analysis, and the attraction of rural society ( $B_1$ ), the vitality of rural economy ( $B_2$ ) and the capacity of the rural environment ( $B_3$ ) are set as the item layer of evaluation index respectively. Each item is subdivided respectively into several factors which make up factor layer. The factor layer corresponding to the attraction of rural society ( $B_1$ ) includes natural landscape ( $C_{11}$ ), human landscape ( $C_{12}$ ), settlement environment ( $C_{13}$ ) and regional landscape ( $C_{14}$ ). The factor layer corresponding to the vitality of rural economy ( $B_2$ ) includes social economy ( $C_{21}$ ), agricultural production ( $C_{22}$ ) and people's living ( $C_{23}$ ). The factor layer corresponding to the capacity of rural environment ( $B_3$ ) includes natural ecological capacity ( $C_{31}$ ), social ecological capacity ( $C_{32}$ ) and mental capacity ( $C_{33}$ ). Under the factor layer, 31 index were set to form the index layer and satisfy the factor layer according to the characteristics of the rural landscape in the region. All the weight values were calculated with the AHP [7-8]. In the comprehensive evaluation of Zhiyang village, part of the data involved in the evaluation index can be directly measured, and part of the data can be calculated by the corresponding formula. Among the data, the detail air quality parameter is obtained by measurement on the spot, the percentage of agricultural landscape area and total area is obtained according to the practice ratio of the agricultural land area to the total area of the region, the abundance of animal and plant resources is obtained according to the field research and statistics, the net income and the growth rate of annual income are obtained from the statistical yearbook of 2017, the life garbage treatment rate and the utilization rate of crop straw are obtained according to the ratio of the number of households reaching the standard to

the total number of households, the distribution of residential areas is available according to the overall planning map of the village, the building density is calculated by the ratio of residential area to total area, the commodity rate of agricultural product is calculated with the statistical data of local agricultural products income.

The evaluation score are determined by the expert scoring method. First, each index is divided into five grades: excellent, good, medium, low and poor, and the score range of each grade is (1, 0.8), (0.8, 0.6), (0.6, 0.4), (0.4, 0.2) and (0.2, 0), respectively. Then, professional investigators score in the field survey. At last, the average score is taken as the final evaluation score.

### 3.3 Calculating the evaluation index weight values

In order to obtain the corresponding weights of different elements of item layer, factor layer and index layer, and to test the consistency of evaluation index, the calculation process is divided into three stages: building the judgment matrix, calculating the weights of each elements in different layers and testing test the consistency of evaluation index. The index system and weight value are shown in Table 1.

#### (1) Building the judgment matrix

In the comprehensive evaluation system of rural landscape, the evaluation target, the evaluation index set and the judgment matrix are denoted as A, F{F1, F2, F3....., Fn} and A-F, respectively. The judgment matrix is built by experts based on a nine-point scale. The different values represent different importance in nine-point scale and they are shown in Table 2. In this table,  $f_{ij}$  is the rank scale of relative importance of  $f_i$  comparing to  $f_j$  ( $i=1, 2, \dots, n; j=1, 2, \dots, n$ ), and all the relationships between  $f_i$  and  $f_j$  are explain. In this study, all the invited experts and relative people are very familiar with the overall situation of the region. They accord to the comprehensive evaluation system of rural landscape established in Table 1, compare the factors at each item level in pairs and judge its importance, combine with Table 2 and establish the judgment matrix.

Table 2. A-F judgment matrix and its meaning

The rank scale of $f_i$ and $f_j$	The relationship between the two index
1	$f_i$ is as important as $f_j$
3	$f_i$ is a little more important than $f_j$
5	$f_i$ is much more important than $f_j$
7	$f_i$ is highly important than $f_j$
9	$f_i$ is extremely important than $f_j$
2, 4, 6, 8 $f_{ij}=1/f_{ji}$	The situation is respectively between 1-3, 3-5, 5-7, 7-9 (The inverse comparison between the two index)

#### (2) Calculating the weight value of each element

In the comprehensive evaluation system of rural landscape, the calculation of weight value in each index is divided into the following two steps.

Step1: Calculating the sum,  $V_i$ , of each row of elements by formula (1) in the judgment matrix.

$$V_i = \sum_{j=1}^n f_{ij} \quad (i=1, 2, \dots, n) \quad (1)$$

Step2: After normalizing the  $V_i$ , the relative weight of each factor can be calculated under a single criterion as formula (2).

$$W_i = V_i / \sum_{i=1}^n V_i \quad (i=1, 2, \dots, n) \quad (2)$$

#### (3) Testing consistency of evaluation index

Due to the diversity of knowledge of experts and personnel involved in the establishment of the judgment matrix in this study, the judgment matrix presented may be inconsistent. Therefore, the above data should also be tested for consistency (CI) in order to control the error within the allowable range. The consistency test of evaluation index needs to calculate the maximum eigenvalue  $\lambda_{\max}$  of judgment matrix, consistency index and consistency ratio. The maximum eigenvalue can be calculated with formula (3).

$$\lambda_{\max} = 1/n \sum_{i=1}^n (FW)_{ij} / W_i \quad (i=1, 2, \dots, n) \quad (3)$$

The calculation of the consistency index can be calculated with formula (4)

$$CI = (\lambda_{\max} - n) / (n - 1) \quad (4)$$

Where, n represents the order of judgment matrix, if the CI (consistency index) is smaller, that means it has a good consistency.

The consistency ratio is calculated with formula (5),

$$CR = CI/RI \quad (5)$$

Where, RI is the average random consistency index and is shown in Table 3. It is generally believed that it is acceptable of the consistency of judgment matrix when  $CR < 0.1$ .

Table 3. Average random consistency index

Order	1	2	3	4	5	6	7	8	9	10
RI	0.00	0.00	0.58	0.90	1.12	1.24	1.32	1.44	1.45	1.49

The calculation results of the maximum eigenvalue, CI, RI and CR are listed in Table 4. It is obvious that the consistency ratio  $CR < 0.05$  in this judgment matrix. It shows that the consistency of judgment matrix is more satisfying.

Table 4. The random consistency index calculation table

Designation	The weight value of the $i_{th}$ index ( $w_i$ )	$\lambda_{\max}$	CI	RI	CR
Judgment matrix $C_{11-D}$	0.2950	5.1168	0.0292	1.12	0.0216
	0.1954				
	0.1666				
	0.1954				
	0.1475				
Judgment matrix $C_{12-D}$	0.7049	3.0324	0.0162	0.58	0.0279
	0.2109				
	0.0841				
Judgment matrix $C_{13-D}$	0.6694	3.0070	0.0035	0.58	0.0061
	0.2426				
	0.0879				
Judgment matrix $C_{14-D}$	0.1667	-	-	-	-
	0.8333				
Judgment matrix $C_{21-D}$	0.6483	3.0037	0.0018	0.58	0.0032
	0.2297				
	0.1220				
Judgment matrix $C_{22-D}$	0.1095	3.0037	0.0018	0.58	0.0032
	0.3090				
	0.5816				
Judgment matrix $C_{23-D}$	0.5584	3.0183	0.0091	0.58	0.0158
	0.1220				
	0.3196				
Judgment matrix $C_{31-D}$	0.3332	3.0142	0.0071	0.58	0.0122
	0.0751				
	0.5917				
Judgment matrix $C_{32-D}$	0.4254	4.0159	0.0053	0.90	0.0059
	0.4254				
	0.0934				
	0.0058				

Judgment matrix C <sub>33</sub> -D	0.6667	-	-	-	-
	0.3333				
Judgment matrix B <sub>1</sub> -C	0.3952	4.0606	0.0202	0.90	0.0225
	0.1976				
	0.2390				
	0.1682				
Judgment matrix B <sub>2</sub> -C	0.1929	3.0092	0.0046	0.58	0.0079
	0.1061				
	0.7010				
Judgment matrix B <sub>3</sub> -C	0.3874	3.0183	0.0091	0.58	0.0158
	0.4434				
	0.1692				
Judgment matrix A-B	0.5936	3.0536	0.0268	0.58	0.0462
	0.2493				
	0.1571				

### 3.4 The comprehensive evaluation model and standard

The weighted summation of the index should be done comprehensive evaluation. Therefore, a multi-objective linear weighting function is used in the comprehensive evaluation model of rural landscape in this paper. The equations of linear weighting function in different layer are shown as the following.

Factor layer:

$$E_j = \sum_{i=1}^n (W_{ij} * D_{ij}) \quad (6)$$

Item layer:

$$F_k = \sum_{j=1}^m (W_{jk} * E_{jK}) \quad (7)$$

Target layer:

$$G = \sum_{k=1}^l (W_k * F_k) \quad (8)$$

where,  $E_j$  is the comprehensive score of  $j$  factor layer,  $W_{ij}$  and  $D_{ij}$  represent, respectively, the weight value and score values of the  $i$  th factor that consists of  $n$  index,  $F_k$  is the comprehensive score of the  $k$  th item,  $W_{jk}$  and  $E_{jK}$  represent the weight value and comprehensive score of the  $j$  th item respectively,  $m$  represents the number of factors,  $G$  represents the comprehensive score of the target layer,  $W_k$  and  $F_k$  represent the weight value and comprehensive scores of  $k$  items respectively,  $L$  is the number of item. After the comprehensive evaluation values are obtained according to the above calculation method [9-10]. Meanwhile, the comprehensive evaluation results can also be got by comparing with the evaluation standard. The evaluation standard is shown in Table 5. The comprehensive evaluation results of Zhiyang village landscape are shown in table 6.

Table 5. Comprehensive evaluation standard of rural landscape

Comprehensive evaluation value	>0.75	0.75-0.5	0.5-0.35	0.35-0.25	<0.25
Evaluation standard	Excellent	Good	Common	Worse	Bad

Table 6. The comprehensive evaluation results of Zhiyang village landscape

Target layer	Comprehensive score	Item layer	Comprehensive score	Factor layer	Comprehensive score
Comprehensive evaluation of Zhiyang village	0.57	The attraction of rural society ( $B_1$ )	0.53	Natural landscape( $C_{11}$ )	0.34
				Human landscape( $C_{12}$ )	0.41



<i>landscape</i>				Settlement environment( $C_{13}$ )	0.69		
				Locational conditions ( $C_{14}$ )	0.87		
		The vitality of rural economy ( $B_2$ )	0.58			Social economy ( $C_{21}$ )	0.43
						Agricultural production ( $C_{22}$ )	0.33
						People's living ( $C_{23}$ )	0.45
		The capacity of the rural environment ( $B_3$ )	0.70			Natural ecological capacity ( $C_{31}$ )	0.61
						Social ecological capacity ( $C_{32}$ )	0.81
						Mental capacity ( $C_{33}$ )	0.71

#### 4. The comprehensive evaluation of landscape in Zhiyang village

It can be seen from the table 6 that the comprehensive score of the target layer is 0.57, which indicates that the overall landscape of Zhiyang village is good. The result of the three elements, arranged by the score, shows as the following: Capacity>Vitality>Attraction. This result shows that the environmental capacity of Zhiyang village is superior to other item layers, and there still is a large space in the economic vitality and social attraction of the village. This evaluation result is consistent with the actual situation of Zhiyang village.

##### 4.1 The analysis of rural social attraction

The comprehensive score of rural social attraction is 0.53 in Zhiyang village, by referring to the comprehensive evaluation standard of rural landscape, it can be known that the score belongs to a good grade and it can be further improved. Among its factor layer, the weight of the location condition is the highest, followed by settlement environment, cultural landscape and natural landscape.

It can be known from the index layer, the "Zanthoxylum Road" from downtown to Zhiyang village and the No.108 national road pass through the village, and it greatly improves the convenience for villagers and tourists, and increase the attraction of Zhiyang village. The comprehensive score of natural landscape is only 0.34 in zhiyang village, which is mainly affected by the climate and topography of the village. The local agricultural landscape such as Zanthoxylum woodland, apple orchard and persimmon orchard contributed greatly to the natural landscape. The settlement environment of Zhiyang village is good, and the old folk dwellings are clustered in relatively flat areas, which satisfy the layout characteristics of traditional villages. The new folk dwellings are built along the county roads, village roads and main village streets, which satisfy the development of rural economy and tourism development. The building density is appropriate in Zhiyang village, and the upcoming project of "natural gas to household" will improve the scope of infrastructure services in Zhiyang village. In addition, various historical sites and farming cultural activities have attracted many tourists for the village

##### 4.2 The analysis of rural economy vitality

The vitality of rural economy mainly reflects the level and potential of rural economic development. The comprehensive score of rural economic vitality is 0.58 in Zhiyang village, which shows that the vitality of rural economy is at a good level. Among its factor layer, the weight of

people's life is equivalent to the social economy, and the weight of agricultural production is slightly weaker.

Based on the field research, it is well known that the increasing proportion of the agricultural cooperation organization and leading enterprises, such as zanthoxylum food processing industry, breeding industry, zanthoxylum trading market, driving farmers has greatly driven the local economic development. The commodity rate of agricultural products and the per capita net income of local residents have increased significantly, however, the proportion of added value of secondary industry and tertiary industry in total output value and annual growth rate are relatively low. The comprehensive coverage of new rural cooperative medical treatment and the popularity of the internet have greatly improved the people's living quality in Zhiyang village. In order to improve the rural economy vitality, the villagers' education level needs to be improved, the secondary industry and the tertiary industry need to be strengthened in Zhiyang village, change the marketing mode of agricultural products, the local folk tourism vigorously keep developing, and the Peach Flower Stanza and Zanthoxylum Cultural Festival sustain to enhance the economic vitality of the village by the way of combining agriculture with tourism.

### **4.3 The analysis of rural environment capacity**

Rural environmental capacity is an important foundation to solve the contradiction between resource and environment and realize regional sustainable development. The comprehensive score of rural environment capacity in Zhiyang village is 0.7, it is in the good level and very close to the excellent level, which indicates that the village has a good ecological environment. Among its factor layer, the comprehensive score of the social ecological capacity is the highest, followed by psychological carrying capacity and natural ecological capacity.

From the index layer, it can be known that the water environment quality is good, the forest coverage rate is high, and it has a good ecological environment of Zhiyang village. Based on the field research, it is well known that there have been few serious natural disasters in Zhiyang village, so the impact of natural disasters on village ecological environment is not great. In addition, the high acceptance of tourists by local residents reflects that the overall development of Zhiyang village has been widely recognized by the villagers, meanwhile, tourists have a high evaluation on the Zhiyang village. All of these indicate that the environment capacity is good in Zhiyang village.

## **5. Conclusion**

Through the comprehensive evaluation of the landscape in Zhiyang village, it is found that the overall layout of the village is reasonable and has the unique local natural landscape. In addition, the local settlement environment and the ecological environment is good, it also has the well-preserved local residential and historical sites, combine with the unique human landscape, therefore, the village has the potential to develop the local tourism and conditions. However, in the process of developing the village tourism, it is necessary to strengthen the infrastructure construction and improve the local economic level to improve the overall quality of landscape in Zhiyang village.

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