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EXTRACTING THE PLANNING ELEMENTS OF MINORITY TOURISM DESTINATIONS IN SOUTHWEST CHINA BASED ON AVC THEORY

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Abstract: In the process of rural modernization, great changes have taken place in rural landscapes throughout the world, but there is a lack of a universal comprehensive evaluation index system for landscapes. AVC theory is the ternary theory of tourism destination landscapes proposed by Professor Binyi Liu. “A” represents attractiveness, “V” represents vitality, and “C” represents ability. Undeveloped minority villages have good tourism destination potential. Therefore, AVC theory can be used to extract the elements of rural sustainable development planning. Taking Nongying Village, a Buyi village in southwest China, as an example, AVC theory is combined with AHP and a comprehensive evaluation model of the rural environment in Nongying Village is constructed using a multiobjective linear weighting function. A comprehensive assessment and extraction of its unique rural environmental conditions is undertaken. The results show that the rural economy has obvious vitality advantages, and Camellia oleifera can be used as a key planning element for sustainable development. The advantages of environmental carrying capacity are obvious, and the overall ecological environment is at a good level. The social attraction is relatively weak. The innovation of this paper is to study the planning and development elements of ethnic minority villages in Southwest China from the perspective of tourism AVC and to conduct an in-depth investigation on the revitalization of oil-tea agricultural resources and Buyi culture in local villages. This study can provide a certain planning reference for the development of tourism destinations and villages with similar agricultural resources and ethnic minority characteristics in the region.

Keywords: AVC; Evaluation index system; Minority village planning; Exploitable tourist destinations; Sustainable development

1. Introduction

Mr. Xiaotong Fei once said, "from the grassroots level, Chinese society is local" (Fei, 2020). As a country based on "agriculture", China's rural settlements have a history of thousands of years, as they carry thousands of years of rural civilization (Wei et al., 2019). In the past 40 years of reform and opening up, against the background of prioritizing economic development, more attention has been given to urban development and rural construction has been neglected. The status and destiny of rural areas have changed dramatically. According to the statistical

yearbook of China's urban and rural construction, the number of natural villages in China in 2020 was 2.36 million, a decrease of 360,000 compared with the number in 2010 (“China Urban and Rural Construction Statistical Yearbook” n.d.), and these existing villages also have a large number of trends to imitate the construction of urbanization, which has led some original local villages with different characteristics to be replaced by homogeneous urbanization. The "one side of a thousand villages" phenomenon has emerged, and the countryside has lost its original attraction. China has reached a crossroad in rural planning, rural revitalization and sustainable development. Therefore, it is necessary to carry out a comprehensive evaluation of different rural environments to determine the advantages and disadvantages of the current rural environment and appropriately extract planning elements according to location.

Implementing the rural revitalization strategy is a major decision that has been deployed by the 19th National Congress of China (China Government Website,2018). Rural tourism has become an integral part of rural revitalization. Returning to rural life has seen an upwards trend, people are more inclined towards natural scenery, and urban scenery is no longer the best choice for people when traveling. At the same time, rural areas are no longer the exclusive choice of retirees, and an increasing number of young people are also returning to rural areas to pursue a better quality of life (Tsutsui et al., 2015) (Li and Nakatsuka, 2021).

Since the beginning of this century, China has issued many policies to support rural construction. In the 2013 number 1 central document of the central committee, the government first proposed the development goal of beautiful rural construction, and the construction of new rural areas became a boom (Wan, 2015). In the 2016 number 1 central document of the central government, the government adopted corresponding incentive and compensation policies to support the development of rural agriculture and tourism. In 2017, the party proposed the Rural Revitalization Strategy at the 19th National University and proposed that rural construction should achieve the comprehensive revitalization of rural ecology, culture, and talent. The strategic plan for Rural Revitalization (2018-2022) proposed the requirements for promoting the integrated development of urban and rural areas. The focus of academic circles on rural planning and construction includes the following. 1) Research on rural planning and design, rural environmental characteristics, landscape evaluation systems, and historical features should be based on traditional pastoral ecology, landscape aesthetics, urban and rural planning, etc. (Tao and Jin, 2013). 2) A study should be undertaken of the coupling relationships between rural land use and economic construction, the discovery of rural economic development, agriculture and land remediation, and the temporal and spatial evolution of rural transformation and development from the perspective of economic geography. Some scholars believe that optimizing the allocation of land resources, attracting population return and local urbanization

are important ways to achieve rural revitalization and build a beautiful China (Ma et al., 2016). 3) Integrated development of agriculture and tourism and an increase the economic income of farmers in the secondary and tertiary industries should be encouraged by developing rural historical and cultural relics, national customs and characteristics, high-quality agricultural products and other resources as tourist attractions (Liu, 2018). 4) In the study of urban–rural relations, it is advocated that rural development should be linked with urbanization, and the consumption convenience of internet big data should be used to find new ways of rural economic development (Wu et al., 2016). Previous studies have gradually shifted from the improvement of rural infrastructure and the integration of development factors to the study of rural sustainable development. Under the premise that most of China's land space is dominated by rural areas, it is necessary to promote the development direction differentially based on the different development situations in rural areas (“Rural revitalization and sustainable development: Typical case analysis and its enlightenments.n.d.), build beautiful villages according to local conditions, and realize rural revitalization.

In practice, many problems in the development of rural tourism are related to the extraction of rural planning elements (Cunha et al., 2020). The rural tourism experience can be divided into three types: pre-experience, on-site experience and post-experience, according to the relationship between people and the destination before, during or after the visit (Tynan and McKechnie, 2009). The current research mainly focuses on leisure agriculture, rural complexes, agricultural sightseeing parks and other agricultural development carriers, and less attention is given to the human landscape of rural environments in remote mountainous areas. In some studies, (Porto et al., 2012) formulated strategies to protect and promote traditional rural buildings, agricultural land and cultural heritage in rural areas to attract tourists.

At present, AVC theory provides a reasonable and effective method for landscape evaluation. In 2002, Binyi Liu first proposed the ternary theory of tourism and landscape planning in the project "international consultation on the development concept planning of Gulangyu in Xiamen" (Liu 2003). That is, attraction and vitality capacity. The theory, basis, and evaluation system of landscape tourism planning aimed at the promotion of AVC have been successfully expanded in practice. The core of this theory is "three forces". The planning and design of the surface area should include production, life, and ecology. Its ultimate goal is to achieve economic growth, social stability, and environmental protection (Wang and Zhi, 2018). It expresses the mutual attraction and mutual benefit between urban and rural areas. In the research process of the past 20 years, the AVC evaluation method has been well applied in rural tourism, rural landscape design, rural resource evaluation, etc. (Mu and Su, 2021). However, its comprehensive evaluation index factors cannot be applied to the evaluation of rural resources

and the environment in all regions, and its evaluation index and weight selection have obvious characteristics of suitability to the place. Therefore, to study and evaluate the changes that have taken place in the villages of Southwest Guizhou, which have high-quality oil-tea camellia resources and have been under rural construction during the new era, this paper selects a Nongying village in Ceheng County, Guizhou Province, as the research object and carries out a comprehensive evaluation of its rural environment based on AVC theory. The comprehensive evaluation index system of the rural environment suitable for Nongying villages is established by using AVC theory, the weight values of each layer in the comprehensive system of a rural environment of Nongying villages are determined by using AHP, and their consistency is tested. The comprehensive evaluation model of the rural environment of Nongying village is constructed by using a multiobjective linear weighting function. By calculating the comprehensive score of each level and comparing it with the comprehensive evaluation standard of the rural environment, the existing resource and environmental characteristics of Nongying villages are comprehensively evaluated. According to the research results, the environmental elements with the advantage of a comprehensive score are extracted as the key planning elements for future rural sustainable development.

2. Overview and data source of Nongying village in Ceheng County

2.1 Current situation of Nongying village

Nongying village is located in Yanjia Town, Ceheng County, Qianxinan Buyei, and Miao Autonomous Prefecture, Guizhou Province (Figure 1). It is one of the important oil tea production areas in Guizhou Province. The cultivation and operation of oil-tea camellia have a long history of more than 300 years. This area is known as “the first township of oil tea in Southwest Guizhou” and “China’s famous oil-tea camellia county” (Han et al., 2021). The mountains, beautiful environment, unique microclimate conditions, and typical red soil structure here have cultivated the “Ceheng oil-tea” product, which is famous in Southwest Guizhou. The village is located at the bottom of the two mountains and valleys. The Zhelou River runs through the village from south to north. It is dominated by low mountains and hills. The overall terrain is surrounded by mountains on all sides, with a maximum elevation of 765 m and a minimum height of 367 m. The elevation in the design area is 398 m. The terrain is undulating and has excellent natural landscape effects. At the end of October every year, 9000 hm^2 of Camellia forest in Ceheng County enter the harvesting season, and the flowering period of Camellia oleifera can last from early winter to approximately December. Nongying village fully relies on this traditional industry as a cash cow for the local Buyi ethnic minority people. From selling fruits to selling oil to developing three-dimensional cultivation under the forest,

Nongying villages further extend the industrial chain around the oil tea and then drive the synchronous development of secondary and tertiary industries. “A drop of oil” has gradually connected an industrial chain for poverty alleviation and prosperity, and oil tea planting has gradually formed rural resources with local characteristics. In addition, Ceheng is known as “the first county of the Buyi ethnic minority in China”. The population of Buyi ethnic minority people accounts for 76% of the total population of the county. Buyi ethnic minority culture is an important local cultural aspect of the current situation of the village, Figure 2.

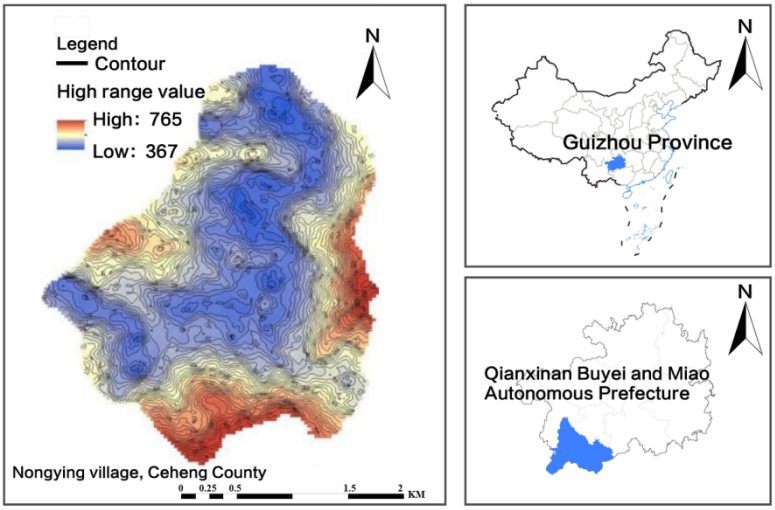

Figure 1. Location of Nongying Village.

Figure 2. Current situation of Nongying village (a: Yu'an expressway; b: Current buildings; c&d: Buyi ethnic minority characteristic buildings; e: Oil-tea camellia fields).

2.2 Data source

The natural resource data for the study area were collected in November 2019 and July August 2020 through field research, questionnaire distribution, and villager interviews (Sakurai and Teraoka, 2020). These methods provided the researchers with an in-depth understanding of

the characteristic agricultural resources of oil-tea camellia in Nongying villages and explained the current situation of the Buyi ethnic minority culture. In addition, by sorting out academic papers, conference papers, county chronicles, and other literature materials, the researchers were able to summarize the main research methods and theories of rural planning and design at home and abroad in recent years, combs the development history, existing problems, and future trends of rural planning, and provide theoretical sources for rural planning and design of the project site.

3. Comprehensive assessment process of the rural environment in Nongying villages based on AVC theory

To extract planning elements with local characteristics, it is necessary to establish a comprehensive evaluation index system for the rural environment to ensure the accuracy of the evaluation results of resources in the study area to the greatest extent. First, in the process of construction, reasonable evaluation indices should be selected through literature reading and expert consultation. Therefore, a total of 28 relevant experts were invited to analyse and discuss the local topography, Camellia resources, and Buyi ethnic minority culture, select the evaluation indicators suitable for local rural planning, and finally determine the comprehensive evaluation system of the "target layer factor layer indicator layer". See Figure 3 for the specific flow chart.

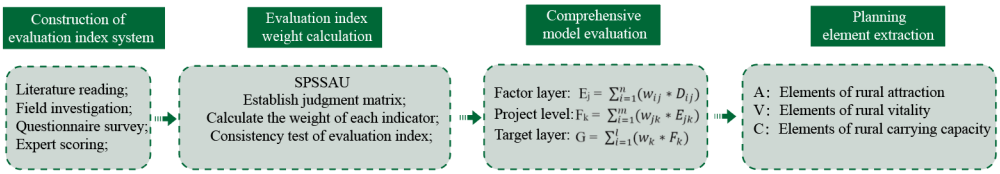

Figure 3. Comprehensive assessment process of rural environment.

3.1 Selection principles of evaluation indicators

To ensure the rationality of the index factors in the evaluation index system, the study follows the principles of comprehensiveness, independence, regionality, and feasibility to determine the evaluation index. The principle of comprehensiveness ensures that its evaluation indicators can cover the planning content of Camellia agricultural villages and reflect the evaluation objects comprehensively and objectively. The principle of independence is to ensure that all evaluation levels should be independent and not interfere with each other. The principle of regionality is to express the typical characteristics of the region, and the main characteristics are clearly expressed. The principle of feasibility is that the selection of the evaluation system

should be operational, that is, the data and methods obtained should be applied within a reasonable range, not seriously deviate from the actual situation of the research project and enhance the accuracy of index selection.

3.2 Construction of the evaluation index system

Different natural and geographical environments create a variety of environmental characteristics, so the construction of the evaluation system and the selection of indicators should be combined with the evaluation of the local environment, resources, and cultural status. The research area is the well-known oil tea village of the Buyi ethnic minority nationality. The oil tea resources in the county are 14000 hm^2, accounting for 6.6% of the forestland area (Han et al., 2021). Its environmental characteristics include the following: 1) the area is located in the mainstream area of the Nanpan River in the Pearl River system, belonging to the Southwest Guizhou Plateau mountain extended by the Wumeng mountains. It is dominated by low mountains and hills. The overall terrain is surrounded by mountains on all sides, and the terrain is undulating and changeable, which has excellent natural landscape effects. At the same time, the whole terrain is surrounded by high, middle, low, and gentle slopes, which are conducive to drainage and suitable for the planting and cultivation of Camellia. The buildings of the two residential communities in the village are constructed according to the undulation of the terrain, and the range of each direction is roughly uniform. 2) There are nearly 120 families and more than 600 forest species in Nongying villages, the most famous of which are Chinese fir, beech, Chinese Toona, wild jujube and Yunnan pine with fine leaves. The forest coverage rate is 50%, and the vegetation resources are rich. Camellia resources are widely distributed in the area, and Camellia is planted between 400 and 1350 m above sea level. The annual frost-free period is more than 300 days, which is suitable for the growth and development of Camellia oleifera. 3) The local area is a concentrated village of the Buyi ethnic minority ethnic minority. Its architectural features are generally built near mountains and rivers using local materials. The materials are mainly stone and wood. The roofs are occasionally covered with thatch or straw, but most often with stone slabs, forming a unique rural landscape. Based on the project level required to evaluate the index system of AVC theory, this study consulted 15 landscape planning and design experts, 6 tourism planning and management experts, 3 public industry economic planning experts, and 4 vegetation research experts. Experts judged and scored the listed indicators layer by layer according to their importance, established a judgement matrix, and determined the contribution of the lower-level indicators to the upper-level indicators layer by layer by using the eigenvectors of the judgement matrix to rank the importance of the basic-level indicators for the comprehensive evaluation indicators (Sowińska-Świerkosz and

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Soszyński, 2019) (Dong et al., 2022), thus forming a scientific planning index evaluation system applicable to Nongying villages (Table 1).

Table 1:Comprehensive evaluation index system of rural environment in Nongying Village.

Target layer	Project layer	Weight value	Factor layer	Weight value	Index layer	Weight value	Score
Rural environment comprehensive evaluation system A	Rural social attractionB1	0.5278	C1Geographic conditions	0.1682	D1 Geographical position	0.0025	0.0007
					D2 Traffic convenience	0.0075	0.0023
			C2 Natural landscape	0.3952	D3 Farmland landscape area ratio	0.0690	0.0291
					D4 Vegetation resource coverage	0.1131	0.0368
					D5 Unusual features of topography and geomorphology	0.1423	0.0740
					D6 Seasonal characteristics of Camellia oleifera landscape	0.1748	0.1475
					D7 Excellent rate of soil	0.5008	0.2624
					D8 Residential buildings and historic sites	0.1976	0.0816
			C3 cultural landscape	0.1976	D9 Characteristics of Buyi ethnic minority Ethnic Customs	0.3119	0.2338
					D10 Oil-tea camellia culture	0.4905	0.4131
			C4 Settlement environment	0.2390	D11 Regionality of residential pattern	0.0974	0.0525
					D12 Regionality of residential buildings	0.1653	0.0408
					D13 Historical and cultural exhibition of residential streets	0.3387	0.1251
					D14 Infrastructure perfection	0.3986	0.1701
	Vitality of rural economyB2	0.1396	C5 social economy	0.1928	D15 Per capita net income of residents	0.5076	0.1811
					D16 Annual revenue growth rate	0.3895	0.1269
					D17 Service platform system construction	0.2262	0.0933
			C6Agricultural production	0.1060	D18 Development structure of oil-tea camellia industry	0.4768	0.2496
					D19 Change range of common cultivated land	0.1199	0.0745
					D20 Brand rate of oil-tea camellia products	0.2721	0.1389
					D21 Proportion of farmers driven by agricultural cooperation organizations and leading enterprises	0.6080	0.1898
			C7 People's life	0.7010	D22 New rural cooperative medical care participation rate	0.5584	0.4125
					D23 Internet entry rate	0.1220	0.3210
					D24 Education years of labor force	0.3196	0.1631
	Rural environmental carrying capacityB3	0.3325	C8 Natural bearing capacity	0.2300	D25 Vegetation coverage of oil-tea camellia	0.3332	0.6328
					D26 Frequency of natural disasters	0.0751	0.0469
					D27 Ecological stability	0.5917	0.4987
			C9 Social carrying capacity	0.5331	D28 Atmospheric quality	0.4252	0.2754
					D29 Water environment quality	0.4252	0.1814
					D30 Domestic waste treatment rate	0.0934	0.0529
					D31 Comprehensive utilization rate of oil-tea camellia	0.0058	0.0018
			C10 Psychological carrying capacity	0.1389	D32 Residents' satisfaction	0.1667	0.0855
					D33 Visitor satisfaction	0.8333	0.5616
			C11 Industrial carrying capacity	0.0980	D34 Proportion of oil-tea camellia industry in GDP	0.6694	0.4184
					D35 Standardization of market management	0.2461	0.1287
					D36 Product added value bearing capacity	0.0879	0.0295

3.3 Acquisition of relevant data of evaluation indicators

According to AVC theory, research that determines the existing comprehensive evaluation index system of rural resources in Nongying villages can be divided into four levels: target level, project level, factor level, and index level. The project level comprises the comprehensive evaluation of rural resources in Nongying Village (a); the three project layers are rural social environmental attraction (B1), rural economic vitality (B2), and rural environmental carrying capacity (B3); the factor level includes 10 layers comprising location condition (C1), natural landscape (C2), cultural landscape (C3) and residential environment (C4) under the attraction of rural social environment; social economy (C5), agricultural production (C6) and people's life (C7) under the vitality of rural economy; natural ecological bearing capacity (C8), social-ecological bearing capacity (C9), psychological environmental bearing capacity (C10) and industrial development capacity (C11). In the index layer, following the factor layer, 36 indicators are set according to the characteristics of the rural environment in the study area. Finally, each weight value is calculated according to the AHP. The objective data in the index level of Nongying villages can be officially obtained from relevant departments or calculated and measured by formulas, such as the agricultural land landscape area ratio, which refers to the percentage of the area of agricultural land landscape (cultivated land landscape, garden landscape and grassland landscape) in the region to the total area of the region; vegetation resource coverage, which refers to the ratio of local plant vegetation and water area to the total area and reflects the objective index of rural naturalness; and the commodity rate of agricultural products, which is the percentage of agricultural products in the total agricultural products. Subjective data mainly depend on personal experience to understand subjective scoring, so the questionnaire for residents and tourists is designed for the subjective indicators in the indicator factor layer. The indicators in each indicator layer are divided into five levels: excellent, good, medium, low, and poor. The corresponding score range of each level is (1, 0.8), (0.8, 0.6), (0.6, 0.4), (0.4, 0.2), and (0.2, 0). Finally, calculate the arithmetic mean, and the calculated result is the final score.

3.4 Calculation of evaluation index weight

In the process of extracting planning elements for the sustainable development of nongying village, the weight of each level is calculated as follows:

3.4.1 Establishment of judgment matrix

The construction evaluation adopts the weight weighting method to decompose the problem into several levels (Kong and Lu, 2019). The evaluation target layer is designed as an

evaluation index set F (F1, F2, F3... FN), and the judgement matrix P (A ~ F) is constructed: the relative importance index value of F_i to F_j (I = 1, 2, 3, 4, 5... N; J = 1, 2, 3, 4, 5... N) and the value of F_{ij}. According to experts and relevant personnel regarding the comprehensive evaluation system of the rural environment in Nongying villages, the scores of the comparison items are weighted, and the comprehensive index of evaluation is finally obtained. Finally, the AHP analytic hierarchy process is used to determine the specific weight value of each index, as shown in Table 2.

Table 2: A-F judgment matrix and its meaning.

F_{ij}Value	Meaning
1	i is as important as j
3	i is slightly more important than j
5	i is more important than j
7	i and j are very important
9	i and j are absolutely important
2,4,6,8	Between 1-3, 3-5, 5-7 and 7-9 respectively
$F_{ij}=1/f_{ji}$	The unimportance of J over i

3.4.2 Calculate the weight of each indicator

Calculate the weight of each indicator with the help of spssau software:

1) : calculate the sum Vi of each row element in the judgment matrix

$$Vi = \sum_{i-1}^{n} f_{ij(i=1,2,\ldots\ldots,n)} \quad (1)$$

2) : normalized Vi can obtain the weight wi of each element.

$$Wi = Vi / \sum_{i=1}^{n} Vi_{(i=1,2,\ldots\ldots,n)} \quad (2)$$

3.4.3 Consistency inspection of evaluation indicators

Considering that the scoring of the judgement matrix may be affected by people's subjective consciousness, it is necessary to conduct a consistency test (CI) on the above data to control the error within a reasonable allowable error range. The consistency test needs to calculate three parameters of the judgement matrix: the maximum characteristic root is λ Max, consistency index is CI and consistency proportion is CR. The calculation of the maximum characteristic root is shown in Formula (3):

$$\lambda max = 1/n \sum_{i=1}^{n} (FW)ij/Wi_{(i=1,2,\ldots\ldots,n)} \quad (3)$$

The consistency index is calculated as shown in formula (4):

$$CI = (\lambda max - n) / (n - 1) \quad (4)$$

In formula (4), n is the order of the judgment matrix.

The consistency ratio is calculated as shown in formula (5):

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

RI (random index) is the average random consistency index, as shown in Table 3. It is generally believed that if the consistency of the judgement matrix is acceptable, Cr < 0.1 is needed.

The CR calculated in Table 3 is < 0.1, so the consistency of the judgement matrix established in this study meets the research requirements.

Table 3: Average random consistency index value.

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

Table 4: Calculation of random consistency index.

ID	Weight of the ith indicator Wi	Max	Consistency index CI	Average random consistency index RI	Consistency ratio CR
C1-D	0.0025 0.0075	—	—	—	—
C2-D	0.0690 0.1131 0.1423 0.1748 0.5008	5.2200	0.0550	1.1200	0.0490
C3-D	0.1976 0.3119 0.4905	3.0540	0.0270	0.5200	0.0570
C4-D	0.0974 0.1653 0.3387 0.3986	4.1530	0.0510	0.8900	0.0530
C5-D	0.1076 0.1895	4.2190	0.0730	0.8900	0.0820

	0.2262 0.4768				
C6-D	0.1199 0.2721 0.6080	3.0740	0.0370	0.5200	0.0710
C7-D	0.5584 0.1220 0.3196	3.0183	0.0091	0.5800	0.0158
C8-D	0.3332 0.0751 0.5917	3.0142	0.0071	0.5800	0.0122
C9-D	0.4252 0.4252 0.0934 0.0058	4.0159	0.0053	0.9000	0.0059
C10-D	0.1667 0.8333	—	—	—	—
C11-D	0.6694 0.2461 0.0879	3.0070	0.0035	0.5800	0.0061
B1-C	0.1682 0.3952 0.1976 0.2390	4.0606	0.0202	0.9	0.0225
B2-C	0.1928 0.1060 0.7010	3.0092	0.0046	0.58	0.0079
B3-C	0.2300 0.5331 0.1389 0.0980	3.0183	0.0091	0.58	0.0158
A-B	0.5278	3.0536	0.0268	0.58	0.0462

3.5 Comprehensive evaluation model and standard

To achieve comprehensive evaluation, it is necessary to realize weighted summation of all indicators. The calculation formula of multi-objective linear weighting function in this study is as follows:

Factor layer: $E_j = \sum_{i=1}^{n}(w_{ij} * D_{ij})$ (6)

Project level: $F_k = \sum_{i=1}^{m}(w_{jk} * E_{jk})$ (7)

Target layer: $G = \sum_{i=1}^{l}(w_k * F_k)$ (8)

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where E_j is the comprehensive score of Factor j, W_{ij} and D_{ij} represent the weight and score of the i indicators contained in Factor j, respectively, and N represents the number of indicators under Factor J; F_k represents the comprehensive score of project k, W_{jk} and E_{jk} represent the weight and comprehensive score of j factors in project k, respectively, and m represents the number of factors under project k; G represents the comprehensive score of the target layer, W_k and F_k represent the weight and comprehensive score of k projects, respectively, and l represents the number of projects.

Referring to the evaluation grouping method of the relevant literature, the evaluation criteria of each level determined in this study are shown in Table 5. The comprehensive evaluation results of the rural environment of Nongying village are calculated by using Equations (6), (7), and (8), as 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
Criteria	Excellent	Good	Commonly	Poor	Difference

Table 6: Comprehensive assessment results of rural environment in nongying Village.

Target layer	Comprehensive score of target layer	Project level	Comprehensive score of project level	Factor layer	Comprehensive score of indicator layer
Comprehensive evaluation system of rural environment A	0.5806	Rural social attractionB1	0.4546	C1Geographic conditions	0.003
				C2 Natural landscape	0.5499
				C3Cultural landscape	0.7285
				C4 Settlement environment	0.3886
		Vitality of rural economyB2	0.7967	C5 Social economy	0.6509

		C6 Agricultural production	0.4033
		C7 People's life	0.8966
Rural environmental carrying capacityB3	0.6902	C8 Natural bearing capacity	1.1784
		C9 Social carrying capacity	0.5116
		C10 Psychological carrying capacity	0.6471
		C11 Industrial carrying capacity	0.5767

3.6 Analysis of comprehensive evaluation results

According to the calculation results in Table 6, the comprehensive score of the target level is 0.5806, which is in the interval of "0.75-0.5", indicating that the rural environment of Nongying villages is generally good. The comprehensive score of AVC is in the order of vitality > bearing capacity > attraction, which indicates that Nongying village has obvious vitality advantages and has high economic development value, but its bearing capacity and attraction are relatively weak, and there is large room for improvement. The evaluation results are consistent with the actual situation in Nongying village (Figure 5).

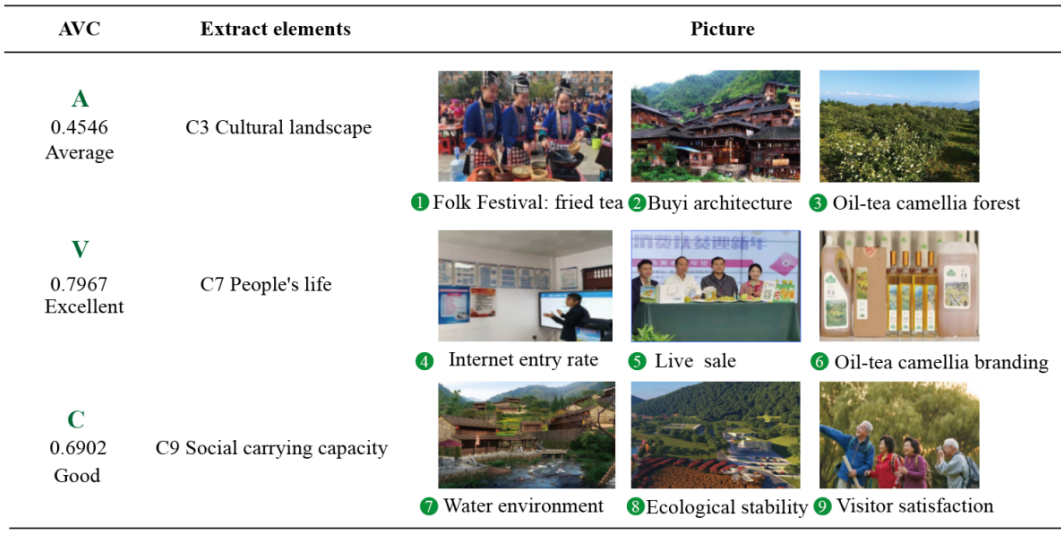

Figure 5. Extraction of planning elements of Buyi Minority Village sustainable development based on AVC theory.

3.6.1 Analysis of rural social attractiveness

The comprehensive score of social attractiveness of Nongying villages is 0.4546, which belongs to the general level within the range of "0.5-0.35" according to the comprehensive evaluation standard of a rural environment. However, according to the field survey, the research area is rich in Buyi ethnic minority culture, festivals with national customs and characteristics, and natural landscape resources of Camellia fields. Considering that the local transportation convenience may be low, the external attractiveness advantage is not obvious. In the factor layer, the cultural landscape has the highest score, followed by the natural landscape, residential environment and location conditions.

It can be seen from the index layer that the traffic advantages of the location conditions are not obvious. Through investigation, it is found that the Yu'an Expressway crosses the base on the north side of the country, and 312 provincial highways are connected on the south side (Figure 6). The provincial highway is a two-way four-lane highway with a width of 15 m. The internal village road connects all blocks of the base. The village road is basically hardened and 4 m wide. The original bridge in the north of the Zhelou River was washed away by a flood, impeding traffic on both sides of the riverbank. The construction of the highway basically conforms to the terrain and presents a zigzag shape. The highway construction is not perfect, as shown in Figure. The evaluation value of the cultural landscape is 0.7285, which mainly benefits from the unique Buyi ethnic minority ethnic customs, Buyi ethnic minority architectural layout, oil-tea camellia culture, etc., which can bring a certain number of tourist

resources to Nongying villages. The local geography and landform show a relatively obvious zonal distribution. The soil parent rocks are mainly sand shale and carbonate rock. The soil is slightly acidic and suitable for the growth of oil tea trees. It is an ideal place for high-quality oil tea planting. The current vegetation of the village is mainly Camellia oleifera and forestland, and the residential areas are distributed in the two mountain valleys. The unique microclimate and soil conditions of Nongying village have brought good natural and cultural landscapes to Nongying village and cultivated the oil-tea camellia brand of "Nongying oil tea, Ceheng's famous brand".

Figure 6. Current traffic situation of Nongying Village

3.6.2 Vitality analysis of rural economy

The level of rural economic development and its development potential are mainly reflected in the vitality of the rural economy. The comprehensive score of the economic vitality of Nongying village is 0.7967, which is in the excellent range of "> 0.75". In its factor layer, the scores of social economy and agricultural production are equivalent, and the score of people's living is the highest.

In recent years, with the increase in the internet household rate, new forms such as webcasts and internet goods delivery have promoted the branding of oil-tea camellia products and the construction of oil-tea camellia service platform systems, which have greatly brought vitality to local economic development. The per capita income and annual growth rate of residents have increased, but the proportion of farmers driven by agricultural cooperation organizations and leading enterprises is low. The increase in the new rural cooperative medical care participation rate and the internet household rate have greatly improved the quality of life of the people in Nongying villages, which is consistent with the investigation results of actual visits. To further improve the economic vitality of Nongying villages, it is also necessary to

improve the education level of residents, establish influential leading enterprises, give play to the leading role of rural cooperatives, and improve the development of oil tea products in the direction of high-quality branding. The commercial market should be combined with agricultural tourism and activities such as the "oil-tea camellia culture festival" and "Bouyei custom exhibition" should continue to be promoted.

3.6.3 Analysis of rural environmental carrying capacity

The sustainable development of a region is inseparable from a good ecological environment. The comprehensive score of the environmental carrying capacity of Nongying village is 0.6902, which is in the good range of "0.75-0.5". In its factor layer, the highest score is the social-ecological bearing capacity and the others are as follows: the natural ecological bearing capacity, psychological bearing capacity, and industrial bearing capacity.

It can be seen from the index layer that Nongying villages have good water environment quality, few natural disasters, and a good ecological environment. The acceptance of tourists by local residents is generally high, and the psychological satisfaction of tourists is also high, which reflects the good overall development trend of Nongying villages and a high level of happiness in the residents. In general, Nongying village has a good environmental carrying capacity, which is consistent with the field survey results.

4. Conclusion

Through the comprehensive evaluation of the resources of Nongying Village, the planning elements of exploitable tourism destinations that can be further optimized in the future are extracted. The innovation of the research lies in the use of an interdisciplinary perspective and the application of the tourism AVC method in the extraction of rural planning elements, which can comprehensively consider the agricultural and cultural background of the research area. Second, in the comprehensive evaluation system of rural landscapes, the AHP quantitative analysis method is adopted to study its applicability in the tourism planning of ethnic minorities in southwestern Guizhou, and the corresponding relationship between the three forces and the connotation and value characteristics of tourism resources in ethnic villages is analysed. Based on this process, the selection and analysis of influencing factors are carried out, quantitative indicators are obtained, and a quantitative evaluation method of the value of tourism resources in ethnic villages based on AVC theory is obtained. Finally, by selecting Nongying Village, a Buyi village, as an example, this study demonstrated the advantages and disadvantages of the value of tourism resources in ethnic minority villages and make a scientific and reasonable evaluation. This assessment clarified the current situation of rural resources in Nongying

Village and provided a reference for further planning of ethnic minority villages with similar backgrounds. At the same time, this study has certain limitations. For example, the AHP expert scoring method may have personal subjectivity, which may lead to a certain degree of randomness in the evaluation of various indicators.

The results show that the overall environment of Nongying Village is good, the layout of residential areas is reasonable, the Buyi culture is highly exploitable, and the potential and conditions exist to develop rural tourism. In addition, the region is rich in camellia resources. As a characteristic agricultural resource, Camellia oleifera has good economic value and landscape viewing effects and is an important source of improving economic vitality in the future. However, due to terrain limitations and other reasons, infrastructure construction in rural areas still needs to be improved, which to some extent restricts the development of rural areas, resulting in a low degree of openness in rural areas and incomplete landscape development. Most tourism resources are designed for basic services such as farmhouses built by the villagers themselves. These farmhouses are of low grade and have poor sanitary environments, which can no longer meet the needs of most tourists. Therefore, it is necessary for future research to reform and design basic rural public service facilities and comprehensively evaluate and plan existing rural landscape resources to improve transportation and open tourism routes thus meeting the development needs of rural tourism.

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