

PRA-Based Evaluation of Villagers' Adaptive Capacity to Tourism Redevelopment in National Key Rural Tourism Villages of Shaanxi Province: A Case Study of Caijiapo Village, Xi'an

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ABSTRACT

Within the context of China's rural revitalization strategy, National Key Rural Tourism Villages represent critical intersections of cultural heritage preservation and local economic development. These villages encounter multifaceted challenges during their mature development and subsequent redevelopment phases. This study investigates Caijiapo Village in Xi'an City as a case study. Employing a Participatory Rural Appraisal (PRA) approach integrated with factor analysis and in-depth interviews, we constructed a comprehensive adaptive capacity evaluation index system. This system assessed villager adaptability across six key dimensions: policy, social, ecological, economic, cultural, and psychological. Our findings identify policy support, economic incentives, and cultural identity as the principal drivers of adaptive capacity. However, significant shortcomings were observed in community participation mechanisms and cultural safeguarding practices. Consequently, this study proposes strategic recommendations focused on optimizing policy guidance, enhancing community governance capacity, and fostering deeper integration between cultural assets and economic development. This research offers a novel perspective and a practical foundation for formulating sustainable development pathways for National Key Rural Tourism Villages.

KEYWORDS

Rural Revitalization; Tourism Redevelopment; Adaptive Capacity Evaluation; National Key Rural Tourism Villages; Caijiapo Village

1. INTRODUCTION

The implementation of China's rural revitalization strategy has garnered significant governmental emphasis in recent years. The designation of National Key Rural Tourism Villages has emerged as a pivotal policy instrument aimed at fostering high-quality development within the rural tourism sector and stimulating broader rural economic regeneration. The selection criteria for these villages encompass multiple dimensions, including natural resource endowment, cultural protection, product development, infrastructure, and community participation, intending to promote sustainable rural tourism through the establishment of exemplary models. These standards underscore the importance of resource uniqueness, cultural continuity, and developmental sustainability, reflecting evolving priorities for tourism development under the rural revitalization framework. However, as many of these villages transition into the redevelopment stage, they grapple with issues such as resource overexploitation, inadequate cultural protection, and limited genuine villager involvement, necessitating a critical reassessment of their adaptive capacities and development trajectories.

Caijiapo Village, a representative case from the third batch of National Key Rural Tourism Villages, achieved notable socioeconomic benefits during its initial development phase, leveraging its rich historical-cultural resources and strategic location. Within the redevelopment context, key challenges involve balancing resource conservation with utilization and enhancing villager adaptability to realize community co-construction and shared benefits, which are crucial for its long-term sustainability. Adaptive capacity evaluation serves as a comprehensive methodology for gauging behavioral adjustments, psychological cognition, and cultural identity among villagers at various tourism development stages. This approach not only identifies deficiencies during redevelopment but also provides a vital evidence base for optimizing rural tourism models.

Existing scholarship frequently addresses rural tourism suitability assessment, villager adaptive behaviors, and cultural resource conservation. Studies indicate that policy support, economic incentives, and cultural identity are fundamental drivers of adaptation (Wu Jilin et al., 2017; Zhang Chunyou et al., 2019). Theoretical frameworks such as the Tourism Area Life Cycle and Social Capital theory offer valuable lenses for examining adaptation mechanisms during redevelopment (Zhang Chunyou et al., 2019). Nevertheless, research specifically targeting the dynamic adaptability of National Key Rural Tourism Villages during redevelopment remains limited, particularly concerning the multidimensional characteristics of villager adaptive behaviors and their underlying mechanisms, warranting further investigation.

Addressing this gap, this study takes Caijiapo Village, Xi'an, as its case study. Aligning with the national evaluation standards, it assesses villager adaptability within the redevelopment context across six dimensions: policy, social, ecological, economic, cultural, and psychological. Utilizing a mixed-methods approach combining Participatory Rural Appraisal (PRA) and factor analysis, this research aims to elucidate the core factors influencing villager adaptability and propose targeted strategies for optimizing rural tourism development. The study seeks to provide a scientific basis for adaptive capacity evaluation in tourism redevelopment and contribute theoretical and practical insights toward the sustainable development of National Key Rural Tourism Villages.

2. LITERATURE REVIEW

Rural tourism suitability evaluation constitutes a fundamental component of tourism development planning, primarily concerned with the congruence between resource conditions and development requirements, thereby informing rational development pathways (He Feng et al., 2010). Suitability theory provides an evaluative framework employing multidimensional indices (natural, social, economic, cultural) to assess development potential and risks, offering scientific support for resource allocation optimization (Kang Liting et al., 2024). Recent scholarly focus has shifted from static suitability analysis towards dynamic re-evaluation, particularly as destinations reach maturity or redevelopment stages. This research emphasizes re-examining resource distribution, developmental benefits, and environmental impacts to devise optimization strategies and long-term development paths (Zhang Chunyou et al., 2019; Cai Jingjing & Wu Xi, 2018). Dynamic analysis during re-evaluation prioritizes the integrated effects of resource use efficiency, villager participation behaviors, and market fluctuations, providing critical support for sustainable rural tourism (Cui Xiaoming et al., 2017).

The adaptive behavior of villagers is a decisive factor in the success of rural tourism initiatives. Empirical studies consistently identify policy support, economic incentives, and cultural identity as primary factors influencing adaptive capacity (Wu Jilin et al., 2017). Social capital and community cooperation play significant roles in this process; for instance, trust relationships and mutual aid among villagers can markedly enhance community self-governance capacity and participatory engagement (Zhang Chunyou et al., 2019; He Ailin et al., 2014). Research on villager adaptation has evolved from examining static characteristics to analyzing dynamic mechanisms, focusing on role transitions and behavioral adjustments across different development phases. For example, initial

stages are often driven by policy guidance and economic benefits, whereas redevelopment stages see increased influence from cultural identity and social capital (Yu Zhonglei et al., 2013; Chen Zhijun & Xu Feixiong, 2022). This dynamic perspective provides a crucial foundation for 深入研究 (in-depth study) of adaptive behaviors during redevelopment.

National Key Rural Tourism Villages, as significant sites for implementing rural revitalization, have become a focus of research due to their rich natural/cultural resources and policy backing. Nonetheless, these locales face challenges including inefficient resource utilization, insufficient cultural heritage protection, and low levels of villager participation (Zhu Hanyu, 2016). Predominant development models identified include government-led, community cooperative, and market-driven types, with the synergy between policy support and community participation being particularly critical (He Yangming, 2019). Caijiapo Village, a typical case, initially focused on policy guidance and infrastructure. As it enters re-evaluation, villager adaptive behaviors and the need for optimized resource allocation have become pertinent research foci (Sun Jiuxia et al., 2023).

Theoretically, suitability theory offers a foundational framework for re-evaluation, emphasizing resource-demand matching and comprehensive potential assessment (Butler, 1980). The Tourism Area Life Cycle theory provides a temporal basis for adaptability assessment by delineating the dynamic evolution of destinations from exploration to potential decline (Zhang Chunyou et al., 2019). Social capital theory elucidates the internal drivers of adaptation through the lenses of social networks, trust mechanisms, and community cooperation (Linnekam, 2011; He Ailin et al., 2014). The integration of these theories not only underpins re-adaptability research but also inspires innovative dynamic evaluation methods. However, extant research exhibits shortcomings in dynamic re-evaluation methodologies, understanding the synergy between social capital and cultural identity, and comparative analyses of development models across key villages. Future research should deepen the theory-practice nexus, enhance multifactor analysis within dynamic adaptation processes, and provide robust scientific guidance for the sustainable development of key rural tourism villages.

3. STUDY AREA

Caijiapo Village is situated in Huyi District, Xi'an City, China, constituting a typical historical and cultural settlement (Figure 1). Located within the heart of the Guanzhong Plain, the village boasts a scenic environment and a long history, characterized by rich traditional culture and distinctive vernacular architecture, making it a representative traditional village in Northwest China. The village layout and architectural style retain relatively intact traditional features. Dwellings are primarily brick-wood structures incorporating the unique architectural styles of the Guanzhong region, forming a landscape of significant local character. Furthermore, the village contains numerous historical building relics and cultural landscapes, providing a substantial material foundation for tourism development and cultural preservation. Socioeconomically, Caijiapo has historically been agrarian. However, recent years, propelled by the rural revitalization strategy and Xi'an's urbanization, have seen its gradual transformation into a key area for cultural tourism development. Tourism activities centered on the village have attracted considerable visitor numbers, prompting a shift in the local economic structure. Some villagers now participate in tourism-related sectors like homestay operations and agricultural product sales, injecting new vitality into the local economy. As a representative historical and cultural village in Xi'an, the challenges Caijiapo faces regarding cultural preservation and economic development are emblematic of broader issues.

4. RESEARCH DESIGN

4.1. Data Sources

Data for this study were primarily acquired through field investigations and questionnaire surveys. To gather data on household adaptability in Caijiapo Village, 170 questionnaires were distributed during the survey period, resulting in 156 valid returns, yielding an effective rate of 91.76% (Table 1). The survey encompassed diverse respondents including general farmers, tourism-related workers, and village cadres, ensuring representativeness and diversity. The valid sample included 20 general farmer households, 3 tourism-participating households, and 8 village cadre households. This selection reflects the demographic composition of Caijiapo Village and facilitates a comprehensive understanding of different groups' attitudes, adaptive behaviors, and influencing factors concerning rural tourism development. The questionnaire was designed around the six dimensions of the adaptability model (political, social, ecological, economic, cultural, psychological), covering aspects such as household economic status, attitudes towards cultural preservation, perceptions of tourism development, and participation levels.

Table 1. Basic Characteristics of Survey Sample on Tourism Development Adaptability in Caijiapo Village (N=156)

Variable	Category	Frequency	Percentage (%)	Variable	Category	Frequency	Percentage (%)
Gender	Male	102	65.38%	Ethnicity	Han	118	75.64%
	Female	54	34.62%		Ethnic Minority	38	24.36%
Age	≤ 18 years	6	3.85%	Education	Below Primary School	41	26.28%
	19–25 years	20	12.82%		Primary School	42	26.92%
	26–40 years	33	21.15%		Junior High School	42	26.92%
	41–60 years	64	41.03%		Senior High/Vocational	26	16.67%
	> 60 years	33	21.15%		College and Above	5	3.21%

4.2. Research Methods

4.2.1. Participatory Observation

As a core method in case study and qualitative research, participatory observation involves researchers immersing themselves in the subjects' lived environment to gather rich primary data through direct observation and experiential engagement. For this study, the researcher conducted two field visits to Caijiapo Village in October 2024, striving to integrate into the daily lives of local residents. This immersive approach enabled a genuine perception of socio-spatial change within Caijiapo and facilitated a deeper understanding of resident experiences and cognitions throughout this process.

The field investigation commenced with a comprehensive assessment of the village's socio-cultural context and overall spatial structure. Data pertaining to the village environment, landscape, and architectural 风貌 (style/features) were systematically collected. Particular attention was paid to historically and culturally significant memory spaces within the village, focusing on their planning layout, decorative design, and usage patterns, thereby documenting specific details of cultural expression. This method captured not only material environmental characteristics but also intangible cultural elements embedded in daily life.

The strength of participatory observation lies in the researcher's ability to establish interactive relationships within authentic contexts, enabling a more holistic understanding of social behaviors and cultural practices. This approach established a robust, multidimensional data foundation centered on Caijiapo Village, providing substantial support for empirical analysis. It ensured data authenticity and richness while offering a reliable practical basis for exploring the complex relationship between tourism development and villager adaptability.

4.2.2. In-depth Interviews

To investigate the adaptability of Caijiapo's farmers within the tourism development context, a systematic questionnaire was designed based on a constructed adaptability model. Data on the mechanisms underlying adaptive behaviors were obtained through interview protocols. The questionnaire aimed to quantitatively analyze proxy indicators for adaptability, while the interviews delved deeper into the underlying mechanisms, achieving an integrated quantitative-qualitative analysis.

Data collection employed a combined approach of "questionnaire distribution + household survey + interview," covering diverse groups including general farmers, tourism-participating farmers, and village cadres to ensure data breadth and representativeness. During household surveys and questionnaire administration, researchers ensured question clarity and response accuracy through direct face-to-face communication. Supplemented by interview guides, researchers engaged respondents in detailed discussions about specific adaptive behaviors, motivational sources, and primary challenges encountered within the tourism development context.

This mixed-methods approach provided ample empirical data, allowing for validation and refinement of the farmer adaptability model through practical application. Through systematic data collection and analysis, this study aims to comprehensively reveal the adaptability characteristics and behavioral mechanisms of Caijiapo's farmers, thereby offering scientific support and policy recommendations for enhancing farmer adaptability in tourism development.

4.2.3. Factor Analysis

This study employed factor analysis using SPSS 26.0 for statistical analysis to explore the key factors influencing farmer adaptability in Caijiapo Village and their operational mechanisms. Based on the six adaptability dimensions (policy, social, ecological, economic, cultural, psychological), 35 indicator variables were constructed, an original data matrix was established, and multivariate statistical techniques were applied.

Initially, the KMO test and Bartlett's test of sphericity were conducted to assess factor analysis suitability. Results indicated a KMO statistic of 0.665 (>0.5) and a Bartlett's test significance (Sig.) of 0.000 (<0.05), suggesting strong inter-variable correlations and appropriateness for factor analysis. Furthermore, reliability testing yielded a Cronbach's Alpha coefficient of 0.789 (>0.7), confirming good internal consistency and reliability of the questionnaire data.

Subsequently, principal component analysis (PCA) was used to extract key factors, analyzing adaptability factors for farmers in traditional villages within the rural tourism context. Seven principal factors were extracted, corresponding to the policy, social, ecological, economic, cultural, and psychological dimensions. These were categorized into high, medium, and low levels of influence based on their impact on overall adaptability. Specifically, high-influence factors included policy support and economic benefit; medium-influence factors involved social networks and cultural adaptation capacity; while low-influence factors were more associated with psychological perception and ecological adaptation.

4.3. Research Framework

4.3.1. Construction of the Adaptive Capacity Evaluation Index System

Drawing on literature review and field research, and incorporating characteristics of villager adaptability in rural tourism development, this study constructed an evaluation index system spanning six dimensions: cultural assets, ecological assets, economic assets, adaptive assets, policy assets, and psychological location (Li Weijian, 2020). The construction process involved collecting data on villagers' subjective perceptions and objective behaviors related to these issues via questionnaires. Factor analysis was then used to extract key indicators and determine their weighting, ensuring the system's scientific rigor and rationality.

Indicator selection was initially theory-driven, based on literature review, and subsequently refined using survey data to comprehensively reflect villager adaptive performance. Thirty-five candidate indicators were initially identified, later refined to 23 specific indicators through screening (referenced conceptually in Figure 3, not provided). These included policy system, livelihood capital, farmer cognition, folk culture, social participation, social ecology, and interpersonal relationships. These factors collectively enable a comprehensive analysis of rural tourism suitability influencers.

For weight assignment, a data-driven factor analysis approach was adopted. First, KMO and Bartlett's tests confirmed data suitability (KMO=0.665, Bartlett's sig.<0.01). Second, PCA extracted seven principal factors, cumulatively explaining over 85% of the total variance. Factor loadings were used to gauge indicator importance within the adaptability evaluation. Finally, comprehensive weights for each indicator were calculated based on factor loadings and variance contribution rates, forming a composite adaptability evaluation model.

To ensure index system reliability, reliability and validity tests were conducted. Reliability analysis indicated a Cronbach's Alpha of 0.789, demonstrating high internal consistency. Validity was established through factor analysis, confirming the rational structure of dimensional indicators and ensuring the scientificity and objectivity of evaluation outcomes. The final adaptability evaluation model clearly illustrates the specific impact of each indicator on villager adaptability and provides a solid data foundation for subsequent analysis and policy recommendations.

Table 2. Tourism Adaptability Index System for Caijiapo Village

Factor Layer	Indicator Layer	Variable Description and Assignment	Mean	Variable Type
Policy Adaptability A ₁	Awareness of rural tourism policies B ₁	1=Unaware; 2=1 type; 3=2 types; 4=3 types or more	1.61	Continuous
	Participation level in rural tourism decision-making B ₂	1=None; 2=1 type; 3=2 types; 4=3 types; 5=More than 3 types	1.18	Continuous
	Utilization level of rural tourism policies B ₃	1=None; 2=1 time; 3=2 times; 4=3 times; 5=More than 3 times	1.28	Continuous
Social Adaptability A ₂	Neighborhood relations B ₄	1=Very disharmonious; 2=Disharmonious; 3=Average; 4=Fairly harmonious; 5=Very harmonious	4.42	Continuous
	Types of information channels B ₅	1=None; 2=1 type; 3=23 types; 4=45 types; 5=More than 5 types	3.33	Continuous
	Number of vocational skill trainings attended B ₆	1=None; 2=1 type; 3=23 types; 4=45 types; 5=More than 5 types	1.47	Continuous
	Number of migrant work experiences B ₇	1=None; 2=1 time; 3=23 times; 4=45 times; 5=More than 5 times	1.74	Continuous
	Household location condition B ₈	1=Both far (>100m); 2=Near main road OR tourist route (50-100m); 3=Near main road AND tourist route (50-100m); 4=Very near village main road OR tourist route (<50m); 5=Very near village main road AND tourist route (<50m)	2.71	Continuous
	Number of relatives and friends B ₉	1=<50 people; 2=50-100 people; 3=100-150 people; 4=150-200 people; 5=>200 people	1.13	Continuous
	Occupational types of relatives and friends B ₁₀	1=None; 2=1 type; 3=2-3 types; 4=4-5 types; 5=More than 5 types	1.29	Continuous
Ecological Adaptability A ₃	Awareness of protecting wildlife resources B ₁₁	1=Frequently hunt AND illegally log; 2=Frequently hunt OR illegally log; 3=Occasionally hunt AND illegally log; 4=Occasionally hunt OR illegally log; 5=Never hunt OR illegally log	4.94	Ordinal*
	Awareness of maintaining living environment hygiene B ₁₂	1=Poor sanitation around house; 2=Bad sanitation around house; 3=Average sanitation around house; 4=Fairly clean and tidy around house; 5=Very clean and tidy around house	3.22	Ordinal*
Economic Adaptability A ₄	Total value of major fixed assets B ₁₃	1=<¥50k? (Interpreted); 2=¥50k-100k; 3=¥100k-200k; 4=¥200k-500k; 5=>¥500k	1.97	Continuous
	Annual household food expenditure B ₁₄	1=<¥5k? (Interpreted); 2=¥5k-10k; 3=¥10k-20k; 4=¥20k-30k; 5=>¥30k	2.05	Continuous
	Annual migrant work income B ₁₅	1=<¥10k; 2=¥10k-20k; 3=¥20k-40k; 4=¥40k-60k; 5=>¥60k	2.33	Continuous
	Total household income previous year B ₁₆	1=<¥10k; 2=¥10k-30k; 3=¥30k-50k; 4=¥50k-100k; 5=>¥100k	2.47	Continuous
	Capital invested in rural tourism B ₁₇	1=<¥5k; 2=¥5k-10k; 3=¥10k-20k; 4=¥20k-30k; 5=>¥30k	1.53	Continuous
	Annual tourism income B ₁₈	1=<¥5k; 2=¥5k-10k; 3=¥10k-20k; 4=¥20k-30k; 5=>¥30k	1.81	Continuous
	Number of household members participating in tourism B ₁₉	1=None; 2=1 person; 3=2-3 people; 4=4-5 people; 5=>5 people	1.81	Continuous
	Wearing of ethnic clothing B ₂₀	1=Never wear; 2=Rarely wear; 3=Wear during festivals; 4=Often wear; 5=Always wear	2.57	Ordinal*
Cultural Adaptability A ₅	Preservation degree of traditional dietary customs B ₂₁	1=Not preserved; 2=Incomplete; 3=Average; 4=Fairly complete; 5=Completely preserved	2.93	Ordinal*
	Types of traditional farming tools preserved B ₂₂	1=Not farming; 2=None; 3=13 types; 4=35 types; 5=>5 types	3.06	Continuous
	Proficiency in ethnic language/literature B ₂₃	1=Don't understand; 2=Rusty; 3=Basic understanding; 4=Proficient; 5=Fluent	2.67	Ordinal*
	Preservation status of traditional architectural elements B ₂₄	1=Not preserved; 2=Poor; 3=Average; 4=Good; 5=Very good	3.12	Ordinal*
	Proficiency in ethnic music/dance B ₂₅	1=Cannot perform; 2=Not proficient; 3=Average; 4=Fairly proficient; 5=Proficient	2.65	Ordinal*
	Proficiency in traditional handicrafts B ₂₆	1=Master none; 2=Average; 3=Proficient; 4=Skilled; 5=Inheritor (Master)	2.55	Ordinal*
	Participation level in folk cultural performances B ₂₇	1=Do not participate; 2=Rarely; 3=Participate in major festivals; 4=Often; 5=Participate every time	3.24	Ordinal*
	Participation level in traditional festival activities B ₂₈	1=Do not participate; 2=Rarely; 3=Participate in major festivals; 4=Often; 5=Participate every time	3.13	Ordinal*
	Confidence in tourism resource development B ₂₉	1=Very unconfident; 2=Unconfident; 3=Average; 4=Fairly confident; 5=Very confident	3.57	Ordinal*
	Willingness of family members to engage in tourism reception B ₃₀	1=Very unwilling; 2=Unwilling; 3=Willing; 4=Fairly willing; 5=Very willing	3.80	Ordinal*
Psychological Adaptability A ₆	Confidence in participating in rural tourism B ₃₁	1=Very unconfident; 2=Unconfident; 3=Average; 4=Fairly confident; 5=Very confident	3.89	Ordinal*
	Welcoming attitude towards tourists B ₃₂	1=Very unwelcoming; 2=Unwelcoming; 3=Welcoming; 4=Fairly welcoming; 5=Very welcoming	4.57	Ordinal*
	Trust level in village elites/able persons B ₃₃	1=Very distrustful; 2=Distrustful; 3=Trustful; 4=Fairly trustful; 5=Very trustful	3.29	Ordinal*
	Trust level in government (village cadres) B ₃₄	1=Very distrustful; 2=Distrustful; 3=Trustful; 4=Fairly trustful; 5=Very trustful	3.01	Ordinal*
	Awareness of tourism crisis handling B ₃₅	1=Very weak; 2=Weak; 3=Average; 4=Fairly strong; 5=Very strong	2.37	Ordinal*
	Note: "Ordinal" replaces "Virtual" for Likert-scale type categorical data treated as continuous for analysis. Specific value ranges for some continuous variables (B ₁₃ , B ₁₄) were interpreted from ambiguous original text.			

4.3.2. Technical Roadmap

This study established its foundation through literature review and theoretical analysis. By synthesizing research progress related to historical and cultural ancient towns/villages and rural tourism adaptability, the research direction and theoretical framework were clarified (Figure 2). Combined with the Participatory Rural Appraisal (PRA) methodology, an investigation into the tourism development adaptability of Caijiapo villagers was conducted. Specific methods included questionnaire surveys, literature analysis, principal component analysis (PCA), and in-depth interviews to acquire key data. Analysis focused on the six adaptability dimensions (policy, social, ecological, economic, cultural, psychological – note: text mentioned seven previously, but six are consistent throughout) to extract primary influencing factors. Integrating quantitative and qualitative analysis facilitated an in-depth exploration of the mechanisms and drivers behind villager adaptive behaviors. Finally, development strategies were proposed concerning policy support, cultural protection, community participation, and ecological conservation, providing a theoretical basis and practical reference for the sustainable development of rural tourism and the revitalization of historical and cultural villages.

5. EMPIRICAL ANALYSIS

5.1. Factor Extraction

Principal Factor 1 exhibited significant positive correlation with B₁, B₂, B₃, B₄, B₅, B₆ (coefficients: 0.849, 0.812, 0.805, 0.729, 0.563, 0.511) and negative correlation with B₁₅, B₁₇, B₁₈, B₃₀ (coefficients: -0.19, -0.109, -0.162, -0.402). This factor primarily reflects villagers' participation level in tourism development and is termed the Policy System Factor, highlighting the role of policy in fostering participation.

Principal Factor 2 showed significant positive correlation with B₈, B₉, B₁₀, B₁₁, B₁₂ (coefficients: 0.909, 0.890, 0.794, 0.639, 0.556) and negative correlation with B₂₃, B₂₄ (coefficients: -0.055, -0.103). This factor describes villagers' engagement in terms of material, financial, and human capital, reflecting tourism's impact on livelihood assets, hence named Livelihood Capital Factor.

Principal Factor 3 demonstrated significant positive correlation with B₁₃, B₁₄, B₁₅ (coefficients: 0.820, 0.680, 0.673) and negative correlation with B₁, B₃ (coefficients: -0.118, -0.104), primarily capturing villagers' cognitive understanding of tourism development. This is named the Farmer Cognition Factor.

Principal Factor 4 displayed significant positive correlation with B₁₈, B₁₉, B₂₀, B₂₁, B₂₂ (coefficients: 0.716, 0.709, 0.646, 0.618) and negative correlation with B₇, B₂₇, B₃₄ (coefficients: -0.224, -0.232, -0.121). This factor reflects the preservation and transmission of traditional folk culture, termed the Folk Culture Factor.

Principal Factor 5 showed significant positive correlation with B₂₃, B₂₄ (coefficients: 0.773, 0.683) and negative correlation with B₁₂, B₃₂ (coefficients: -0.407, -0.517), mainly describing social engagement within tourism development, emphasizing community interaction, named Social Participation Factor.

Principal Factor 6 indicated significant positive correlation with B₂₅, B₂₆ (coefficients: 0.760, 0.633) and negative correlation with B₂₇ (coefficient: -0.598; Note: B₂₇ listed twice in original, likely typo), primarily reflecting awareness of wildlife resource protection, named Ecological Environment Factor.

Principal Factor 7 demonstrated significant positive correlation with B₂₈, B₂₉ (coefficients: 0.725, 0.664) and negative correlation with B₃₃, B₃₄ (coefficients: -0.215, -0.195), mainly capturing trust in village 'able persons', reflecting reliance on interpersonal networks, named Interpersonal Relationship Factor.

5.2. Analysis of Influencing Factors on Rural Tourism Adaptability

Factor analysis results (Figure 3) indicate a generally moderate level of rural tourism adaptability in Caijiapo Village (mean score ~ 2.65), though the welcoming attitude towards tourists (B_{32}) scored highly (mean=4.57). Nearly all surveyed farmers expressed support for rural tourism development and willingness to participate given basic conditions. Indicators with means >4.0 : Neighborhood relations B_4 (4.42), Awareness of protecting wildlife resources B_{11} (4.94), Welcoming attitude towards tourists B_{32} (4.57). Indicators with means <2.0 : Awareness of rural tourism policies B_1 (1.61), Participation level in decision-making B_2 (1.18), Utilization level of policies B_3 (1.28), Number of vocational trainings attended B_6 (1.47), Capital invested in tourism B_{17} (1.53), Number of household participants in tourism B_{19} (1.81). Ecological, cultural, and psychological adaptability appear relatively stronger; policy and economic adaptability are weaker.

5.2.1. Policy System Factor

Tourism policy awareness (B_1 , $r=0.849$, High Influence): Increased awareness stems from government promotion via publicity boards and modern IT dissemination.

Policy utilization (B_3 , $r=0.812$, High Influence): Subsidy policies during relocation addressed concerns, fostering participation and benefit-sharing.

Participation in decision-making (B_2 , $r=0.805$, High Influence): Policies significantly shape farmers' confidence and resolve to participate; government implementation is crucial.

Vocational training attendance (B_6 , $r=0.729$, High Influence): Integrated poverty alleviation and tourism development initiatives, like guide training, addressed employment and enhanced skills, diversifying income sources.

5.2.2. Livelihood Capital Factor

Capital invested in tourism (B_{17} , $r=0.909$, Very High Influence): Livelihood capital is a key determinant of behavior. National funding for traditional village protection (e.g., Tuzhang house repair) reduced villager burden and promoted development.

Annual tourism income (B_{18} , $r=0.890$, Very High Influence): Income increase is a primary goal of rural tourism. Villagers transitioning to guides, management, 保洁 (cleaning), homestays, and agritainment experienced raised incomes. This is a vital economic adaptability indicator.

Household members in tourism (B_{19} , $r=0.794$, High Influence): Household labor quantity/quality influences attitudes; higher capital households participate more actively. Most participation is individual-based in reception/services, affecting capacity and quality. Satisfaction with income and adaptation effects encourages participation.

Value of fixed assets (B_{13} , $r=0.639$, Medium Influence): As a mountainous Yi village, most engage in farming/migrant work. Living standards improved significantly post-poverty alleviation.

5.2.3. Farmer Cognition Factor

Confidence in participating (B_{31} , $r=0.820$, High Influence): Motivation aligns with rationality [11]. Unique Tuzhang houses demonstrate human-land harmony and Yi intelligence.

Confidence in resource development (B_{29} , $r=0.680$, Medium Influence): Remote location, backward infrastructure, and low popularity hinder confidence, constrained by transport/communication.

Willingness for household reception work (B_{30} , $r=0.673$, Medium Influence): Diversified participation enhances adaptation and income diversity. More household members involved correlates with higher income and living standards. Farmer adaptation to tourism-induced disturbances is crucial for social-ecological system adaptability.

5.2.4. Folk Culture Factor

Proficiency in ethnic music/dance (B_{25} , $r=0.716$, High Influence): The Yi are skilled performers. Gatherings during festivals (e.g., Torch Festival) and school ethnic courses promote inheritance.

Proficiency in handicrafts (B_{26} , $r=0.709$, High Influence): Intangible cultural heritage inheritor lists exist. Handicrafts are characteristic souvenirs, engaging many villagers.

Preservation of architectural elements (B_{24} , $r=0.646$, Medium Influence): Government protection has generally preserved village architecture, though modernization poses challenges. Tourism-driven restoration for experience meets conservation needs.

Wearing ethnic clothing (B_{20} , $r=0.618$, Medium Influence): Impractical for work/farming, but strong emotional attachment exists. Clothing is a cultural symbol, often worn for events.

5.2.5. Social Participation Factor

Participation in traditional festivals (B_{28} , $r=0.773$, High Influence): Festivals are concentrated expressions of ethnic sentiment, providing joy and leisure.

Participation in cultural performances (B_{27} , $r=0.683$, Medium Influence): Psychological inertia limits enthusiasm; participants are mainly cultural teams and enthusiasts.

5.2.6. Social Ecology Factor (Note: Previously Ecological Environment Factor)

Neighborhood relations (B_4 , $r=0.760$, High Influence): Significantly influence adaptive behavior. Chinese culture and Yi values emphasize unity and mutual aid ('sharing' Tuzhang houses exemplifies this).

Awareness of wildlife protection (B_{11} , $r=0.663$, Medium Influence): Post-pandemic laws strengthened protection awareness. Villagers recognize habitat importance. Tourism impacts ecosystems [14]; farmers, as residents, make related adjustments.

5.2.7. Interpersonal Relationship Factor

Trust in government/cadres (B_{34} , $r=0.725$, High Influence): Active cadres effectively promoting and implementing policies significantly enhance adaptability.

Trust in village elites/able persons (B_{33} , $r=0.664$, Medium Influence): Elites possess prestige and set examples. Leveraging their initiative can drive broader development.

6. CONCLUSION AND DISCUSSION

This study, utilizing Caijiapo Village as a case study, explored the influencing mechanisms and optimization pathways for rural tourism development from the perspective of villager adaptability, yielding several key conclusions. Firstly, policy support and cultural identity emerged as core drivers for enhancing adaptive capacity. Policy incentives (subsidies, training) significantly boosted participation enthusiasm. Stronger cultural identity correlated with more prominent adaptation, underscoring its role as a bridge between cultural preservation and tourism development. Secondly, economic benefits and ecological protection presented a dual effect. Tourism generated income but also revealed weak ecological awareness, necessitating enhanced ecological education and resource management mechanisms for balance. Furthermore, low policy awareness and limited community participation hampered governance capacity and constrained synergy between cultural protection and economic development.

Theoretically, this study enriches the rural tourism adaptability framework by revealing multifactorial influence mechanisms across five core dimensions (Note: text stated five, but six were analyzed; standardizing to the six actually studied is recommended). It emphasizes the critical role of cultural identity, offering a fresh perspective on the coupling between cultural preservation and economic

development. Practically, it proposes optimization pathways: enhancing policy transparency and communication to raise awareness and participation; deepening culture-tourism integration through local resource excavation and regional branding to bolster identity and enthusiasm; and establishing eco-friendly tourism models via resource management and conservation incentives to achieve economic-ecological synergy.

Despite providing a systematic analysis of villager adaptability in Caijiapo, this study has limitations regarding data coverage and model construction. The single-case focus limits generalizability, requiring cross-regional validation. Factor analysis might have omitted potential influencing variables. Future research should expand to comparative cross-regional analyses and incorporate dynamic adaptation models to elucidate the evolution of villager adaptive behaviors across different development stages. This would offer more comprehensive theoretical reference and practical guidance for sustainable rural tourism and the implementation of rural revitalization strategies.

REFERENCES

- [1] Cao, Q. Y. (2016). Strategies for Transforming Human Landscape Resources of Ancient Villages into Rural Tourism Capital—A Case Study of Shitang Hakka Ancient Village in Northern Guangdong. *Journal of Shaoguan University (Social Science Edition)*, 37(5), 91–94.
- [2] Wang, Y. H., & Jiao, J. (2020). Paths and Management of Rural Tourism Development in Traditional Villages. *Chinese Journal of Agricultural Resources and Regional Planning*, 41(6), 56+109.
- [3] Bao, J. G., & Chu, Y. F. (1999). *Tourism Geography* (2nd ed.). Higher Education Press.
- [4] Sun, J. X. (2009). *Community Tourism and Community Participation in Tourism Anthropology*. The Commercial Press.
- [5] Sun, J. X., & Zhang, S. Q. (2015). Research on the Production of Living Space in Ethnic Tourism Communities—A Case Study of the Hui Tourism Community in Sanya, Hainan. *Ethno-National Studies*, (2), 68–77.
- [6] Sun, J. X., & Wu, T. (2015). The Impact of Cultural Commodification on Cultural Inheritance in Ethnic Tourism Destinations: A Case Study of Xiaohuang Dong Grand Song. *Journal of South China Normal University (Social Science Edition)*, (2), 73–82.
- [7] Liao, J. L., & Sun, J. X. (2015). Tourism Development and Changes in Ethnic Minority Families: From Simplicity to Complexity. *Guizhou Social Sciences*, (5), 119.
- [8] Wang, X. J., & Sun, J. X. (2015). Cultural Display and "Tourism Field" Construction in Ethnic Tourism Destinations. *Tourism Forum*, (2).
- [9] Zhang, C. Y., Chen, Q. H., & Liu, S. M. (2019). Research on the Evaluation Index System of Farmers' Adaptability to Participating in Rural Tourism Poverty Alleviation. *Issues of Forestry Economics*, 39(6), 607–614.
- [10] Yu, Z. L., Yang, X. J., & Yang, T. (2013). Patterns and Impact Mechanisms of Rural Household Adaptation to Tourism Development—A Case Study of the Jinsixia Scenic Area in Qinling Mountains. *Acta Geographica Sinica*, 68(8), 1143–1156.
- [11] Zhuo, F. Y. (2016). *Research on the Adaptability of Social-Ecological Systems in Huizhou Ancient Villages under Tourism Development* [Doctoral dissertation, East China Normal University].
- [12] Deng, C. X., & Liu, C. C. (2019). Research on Farmers' Ecological Adaptability under the Background of Rural Tourism Development—A Case Study of Guangming Village in Changsha City. *Journal of Natural Science of Hunan Normal University*, 42(1), 18–26.
- [13] Xiong, J. Z., & Su, Z. Q. (2016). Review of Research on Tourism Poverty Alleviation in China from 1996 to 2016. *Journal of Anhui Agricultural Sciences*, 44(18), 225–228.
- [14] Linnekam, F. (2011). Examining perceptions of households of flood risks in Georgetown and Paramaribo. *Habitat International*, 35(3), 447–456.
- [15] Siror, H. (2024). Lessons learned from the past: Tracing sustainable strategies in the architecture of Al-Ula heritage village. *Sustainability*, 16([issue number if available]), [page range if available]. [DOI if available]
- [16] Kang, N., & Liu, C. (2024). Assessment of visual quality and social perception of cultural landscapes: Application to Anyi traditional villages, China. *Heritage Science*, 12([issue number]), [page range]. [DOI]
- [17] Fedele, G., Manco, I., Verri, G., & Mercogliano, P. (2024). Evaluation of atmospheric and local climate change adaptation plans for Adriatic rural villages. *Frontiers in Climate*, 6, [article number]. [DOI]
- [18] Zhang, S., Li, Z., & Liu, S. (2024). Understanding perceptions of tourism impact on quality of life in traditional earthen-wooden villages. *Buildings*, 14([issue]), [page range]. [DOI]

- [19] Wang, J. P. (2024). Construction of an Evaluation System and Enhancement Strategies for the Effect of Rural Tourism Driving Rural Revitalization in Henan Province. *Rural Science and Technology*, 15(10), 30–36.
- [20] Kang, L. T., Luo, Z. W., Hu, X. J., Wei, B. J., & Zhou, D. M. (2024). GIS-based Suitability Evaluation and GAP Analysis for Rural Tourism in Songling Village, Zhangzhou City. *Ecological Science*, 43(2), 123–131.
- [21] Xu, Y. S., & Qiao, L. (2024). Suitability Evaluation of Village Development from the Perspective of Rural Revitalization—A Case Study of Liuliqu Village in Mentougou. *Urbanism and Architecture*, 21(1), 84–86.
- [22] Liu, N., Wei, Y. J., Zheng, Y. M., & Shi, J. L. (2023). Spatial Suitability Evaluation of Forest Wellness Tourism in Beijing. *Progress in Geography*, 42(8), 1573–1586.
- [23] Sun, H., & Zhou, C. (2022). Tourism Development Suitability Evaluation of Traditional Villages in Yixian County under the Background of Rural Revitalization. *Journal of Xi'an Shiyou University (Social Science Edition)*, 31(6), 22–30.
- [24] Su, J. B., Yang, J. J., & Li, R. J. (2021). Study on the Suitability Evaluation of Rural Ecotourism in Harbin. *China Economist*, 12, 169–170.
- [25] Yin, Z. X., Xia, Z. C., Tang, Y. L., & Liu, H. N. (2021). Spatial Pattern Evolution and Optimization Regulation of Rural Tourism Sites in Urban Agglomerations—A Case Study of Chang-Zhu-Tan Urban Agglomeration. *Economic Geography*, 41(9), 214–224.
- [26] Li, W. J., Li, B. Y., & Li, Z. H. (2020). Discussion on the Suitability of Tourism Development in Traditional Villages—A Case Study of Sanjiadian. *Rural Economy and Science-Technology*, 31(3), 89–92.
- [27] Fei, W., Yu, G. F., & Li, D. F. (2020). TOPSIS Method for Suitability Grade Evaluation of Rural Tourism Development. *Control and Decision*, 35(11), 2619–2625.
- [28] Wang, Z., Pang, Z., & Zhang, J. G. (2018). Research on Suitability Evaluation of Rural Ecological Wellness Tourism Scenic Area Development. *Chinese Journal of Agricultural Resources and Regional Planning*, 39(11), 225–233.
- [29] Li, T., Liu, J. M., Liu, R., & Ju, S. L. (2016). Leisure Agriculture Tourism Development Based on "Production-Living-Ecology" Suitability. *Economic Geography*, 36(12), 169–176.
- [30] Li, T., Cai, B. F., & Tao, Z. M. (2016). Research on Environmental Health Evaluation for Leisure Agriculture Tourism Development in Urban Agglomerations—A Case Study of Six Coastal Urban Agglomerations in China. *Geographical Research*, 35(11), 2125–2138.