

**DEVELOPMENT OF FRAMEWORK FOR
VISUAL LANDSCAPE QUALITY
EVALUATION OF CHINESE
TRADITIONAL VILLAGES FOR
LANDSCAPE PROTECTION AND
PRESERVATION IN GUIZHOU, CHINA**

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PRESERVATION IN GUIZHOU, CHINA**

by

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LIST OF ABBREVIATIONS

SBE	Scenic Beauty Estimation
SD	Semantic Differential
AHP	Analytic Hierarchy Process
GIS	Geographic Information System
ELC	European Landscape Convention
VMS	Visual Management System
SMS	Scenery Management System
EDA	Electrodermal Activity
LCJ	Law of Comparative Judgement
UNESCO	United Nations Educational, Scientific and Cultural Organization
ANOVA	Analysis of Variance
SPSS	Statistical Package for the Social Sciences
VIF	Variance Inflation Factor

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**PEMBANGUNAN KERANGKA PENILAIAN KUALITI LANDSKAP
VISUAL KAMPUNG TRADISIONAL CINA UNTUK PERLINDUNGAN DAN
PEMELIHARAAN LANDSKAP DI GUIZHOU, CHINA**

ABSTRAK

Sebagai sebahagian penting daripada warisan budaya global, kampung tradisional mengandungi sumber landskap semula jadi dan budaya yang kaya, serta menawarkan pengalaman estetik yang menarik secara visual. Ciri-ciri landskap visual ini secara mendalam mencerminkan tahap integrasi yang tinggi antara budaya serantau dan persekitaran semula jadi. Namun begitu, dengan pemodenan yang semakin pesat di China dan kebangkitan pelancongan luar bandar, landskap visual asal di sesetengah kampung tradisional telah mengalami kerosakan. Oleh itu, kajian ini bertujuan untuk membangunkan strategi dan rangka kerja bagi perlindungan serta pemeliharaan kualiti landskap visual melalui penilaian saintifik. Kampung Dong Zhaoxing dan Kampung Miao Basha telah dipilih sebagai kajian kes. Dengan menggunakan teknologi panorama 360 darjah, kajian ini mengaplikasikan rangka kerja kaedah campuran yang menggabungkan pendekatan kuantitatif (kaedah Anggaran Keindahan Pemandangan dan kaedah Pembezaan Semantik) dan pendekatan kualitatif (perbincangan kumpulan fokus pakar) untuk: (1) mengenal pasti ciri-ciri landskap utama yang memberi kesan signifikan terhadap kualiti landskap visual kampung tradisional; (2) menganalisis mekanisme di sebalik faktor-faktor yang mempengaruhi tersebut; dan; (3) membangunkan strategi serta rangka kerja yang boleh dilaksanakan untuk perlindungan dan pemeliharaan. Hasil kajian menunjukkan bahawa: (1) terdapat konsistensi yang signifikan antara kumpulan awam dan kumpulan pakar dalam anggaran keindahan pemandangan; (2) lapan indikator ciri landskap memberi kesan

signifikan terhadap kualiti landskap visual, iaitu kepelbagaian bentuk muka bumi, kepelbagaian tumbuhan, landskap air, keseragaman gaya seni bina, rasa sejarah jalan berturap, kekayaan warna, landskap aktiviti tradisional, dan kebersihan alam sekitar. Dalam kalangan indikator ini, kepelbagaian tumbuhan dan kekayaan warna dikenal pasti oleh pakar sebagai mempunyai kesan dua hala yang kompleks—baik positif mahupun negatif—manakala enam ciri lain menunjukkan kesan positif yang jelas; (3) kumpulan pakar akademik menghuraikan mekanisme di sebalik lapan faktor utama ini; dan (4) tiga kumpulan pakar telah membangunkan satu rangka kerja yang terdiri daripada sembilan bidang strategik untuk membimbing perlindungan dan pemeliharaan kualiti landskap visual di kampung tradisional, termasuk: memperkukuh aspek ekologi, melindungi bangunan dan jalan bersejarah, memulihara warisan budaya, menambah baik infrastruktur dan perlindungan alam sekitar, merangka dasar dan peraturan yang berkaitan, menyediakan sokongan kewangan dan teknikal, menggalakkan penglibatan komuniti, memajukan pembangunan pelancongan lestari, dan memperkukuh kerjasama antara sektor untuk menjamin pembangunan mampan. Kajian ini menyumbang kepada pembangunan lestari landskap kampung tradisional dengan menyediakan panduan saintifik bagi perancangan landskap visual dan pengurusan pelancongan, menyokong perumusan dasar, serta meningkatkan perlindungan dan pemeliharaan jangka panjang terhadap kualiti landskap visual. Hasil kajian ini boleh dimanfaatkan oleh perancang, penggubal dasar, kerajaan tempatan, pemaju pelancongan, serta komuniti yang terlibat dalam pemuliharaan dan pembangunan kampung tradisional.

**DEVELOPMENT OF FRAMEWORK FOR VISUAL LANDSCAPE
QUALITY EVALUATION OF CHINESE TRADITIONAL VILLAGES FOR
LANDSCAPE PROTECTION AND PRESERVATION IN GUIZHOU, CHINA**

ABSTRACT

As an integral part of global cultural heritage, traditional villages encompass rich natural and cultural landscape resources, offering visually appealing aesthetic experiences. These visual landscape features profoundly reflect the high degree of integration between regional culture and the natural environment. However, with the accelerating process of urbanization in China and the rapid rise of rural tourism, the original visual landscapes of some traditional villages have been damaged. Therefore, this study aims to develop strategies and framework for the protection and preservation of visual landscape quality through scientific evaluation. Zhaoxing Dong Village and Basha Miao Village were selected as case studies. Using 360-degree panoramic technology, the study adopts a mixed-methods framework that combines quantitative approaches (Scenic Beauty Estimation and Semantic Differential methods) and qualitative approach (expert focus group discussion) to (1) explore key landscape features that significantly affect the visual landscape quality of traditional villages; (2) analyze the mechanisms underlying these influencing factors; and (3) develop feasible strategies and framework for protection and preservation. The results show that (1) there is a significant consistency between the public and expert groups in the scenic beauty estimation; (2) eight landscape feature indicators significantly influence visual landscape quality, namely, landform diversity, plant diversity, waterscape, architectural style uniformity, historical sense of paved roads, color richness, folk activity landscape, and environmental cleanliness. Among them, plant diversity and

color richness were identified by experts as having complex two-way effects—both positive and negative—while the remaining six features have clear positive effects; (3) academic expert group elaborated on the mechanisms behind these eight influencing factors; and (4) The three groups of experts developed a framework consisting of nine strategic areas to guide the protection and preservation of visual landscape quality in traditional villages, including enhancing ecological aspects, protecting historical buildings and roads, transmitting cultural heritage, improving infrastructure and environmental protection, formulating relevant policies and regulations, providing funding and technical support, encouraging community participation, promoting sustainable tourism development, and fostering cross-sector cooperation to ensure sustainable development. This study contributes to the sustainable development of traditional village landscapes by providing scientific guidance for visual landscape planning and tourism management, supporting policy formulation, and enhancing the protection and long-term preservation of visual landscape quality. The outcomes of this research can benefit planners, policymakers, local governments, tourism developers, and communities involved in the conservation and development of traditional villages.

CHAPTER 1

INTRODUCTION

1.1 Background

Traditional villages are an integral part of the world's cultural heritage (L. Liu et al., 2023), embodying irreplaceable historical, cultural, aesthetic, scenic, and ecological values (J. Gao et al., 2020; C. Tang et al., 2021). They reflect historical memory, production methods, living wisdom, artistic essence, and a strong sense of regional identity (J. Ren et al., 2022). These villages not only record the diversity of human civilization but also showcase the unique features of different regions (Y. Wu et al., 2021). Furthermore, they are rich in natural and cultural landscape resources (C. Tang et al., 2021; X. Zheng et al., 2021), providing people with visually appealing experiences, such as distinctive architectural styles, harmonious natural environments, and profound cultural connotations (H. Shen, Aziz, Omar, et al., 2024). At the same time, traditional villages serve as vital resources for the sustainable development of local economies, societies, and cultures (Y. Liu, 2011). They hold significant historical, cultural, aesthetic, and tourism value at both national and international levels (C. Wu et al., 2020). Protecting these villages is crucial for maintaining cultural continuity, enhancing national cultural influence, and preserving local identity (H. Ma & Tong, 2022).

In China, traditional villages are one of the defining features of rural areas and an integral part of the country's traditional culture (Kong et al., 2021). However, since the 1990s, with the continuous advancement of urbanization in China, the urban industrial structure has been optimized, and the production capacity of public goods and services has been continuously enhanced (J. Xu & Zhang, 2020). In contrast, most villages have faced limitations due to their remote locations and poor accessibility,

severely constraining their economic development (Y. Liu, 2021). Many young and middle-aged rural residents have migrated to cities in pursuit of higher economic incomes and to access better education, healthcare, and cultural facilities (X. Kang et al., 2014). This migration has led to phenomena such as the ‘hollowing out’ of villages, or even their ‘disappearance’ or ‘disintegration’ (R. J. Qin & Leung, 2021; J. Xu & Zhang, 2020). According to surveys, between 2000 and 2010, the number of natural villages in China plummeted from 3.63 million to 2.71 million, with nearly 920,000 villages disappearing over a decade, including many traditional villages (J. Feng, 2013). The hollowing out or disappearance of traditional villages has led to the destruction of their natural environment, cultural landscapes, vernacular architecture, and tangible evidence of the agrarian era (J. Feng, 2012). These damaged landscapes and environmental issues initially manifest as visual impacts (K. Zhang, 2018). Among all human senses, vision is dominant, accounting for 87% of sensory perception (Z. Tang & Liu, 2015), strongly supporting the findings of Bulut & Yilmaz's research that visual quality is the most important landscape feature directly influencing people's perception (Bulut & Yilmaz, 2009).

Additionally, In recent years, an increasing number of people have sought to escape the fast-paced and high-pressure urban lifestyle (H. Cheng, 2021). Their needs have gradually shifted from material pursuits to a focus on mental and spiritual well-being, prompting them to seek experiences different from the urban hustle and bustle in rural areas (Ding & Kong, 2019; Y. Li et al., 2019). Traditional villages, as rural settlements rich in natural and cultural landscapes (J. Cao, 2023; B. Xue & Fan, 2012), have greatly satisfied this psychological demand with their scenic natural landscapes, distinctive vernacular architecture, ancient folk culture, and simple local customs (Y. Li et al., 2022). Supported by a series of national rural revitalization policies,

traditional villages have gradually become significant destinations for rural tourism (Demirović et al., 2019; Long & Tu, 2018; Y. Xu & Lu, 2024). According to data, In 2019, the total number of rural tourism visits in China reached 3.09 billion, with a total revenue of 1.81 trillion yuan (C. Han, 2020). Rural tourism not only provides an alternative source of income beyond traditional agriculture but also exerts a positive impact on the national economy and local livelihoods (Buijs et al., 2006; Job & Paesler, 2013; Nocito et al., 2023; Wong et al., 2024). Studies have shown that high-quality landscapes can promote tourism development, which in turn stimulates economic activities (Joye et al., 2010; Kothencz et al., 2017; Wolf, 2005). Therefore, creating a pleasant visual landscape environment not only fosters tourism development and stimulates the local economy but also provides a necessary financial foundation for the landscape protection of traditional villages (Agoes et al., 2021; Chi et al., 2020).

However, while tourism has played a positive role in addressing the decline of traditional village industries and fostering economic growth, it has also posed significant challenges to landscape preservation. These challenges include environmental changes in villages, the gradual loss of cultural heritage, increasing commercialization, and the erosion of regional identity. Such changes not only alter the visual landscapes of these areas but also diminish their natural and cultural values. Therefore, Striking a balance between enhancing economic benefits and maintaining the integrity of the visual landscape in traditional villages has thus become a critical issue that urgently needs to be addressed.

In response to these challenges, the Chinese government and relevant authorities established the Expert Committee for the Protection and Development of Traditional Villages in 2012. Subsequently, a series of regulations and policy documents were issued in 2013, 2014, 2017, 2018, 2020, and 2021 to guide the

conservation efforts for traditional villages (Leonella et al., 2018; X. Zhao & Du, 2018; G. Zhou & Zeng, 2021). Fundamentally, these protective measures aim to safeguard the visual landscapes of traditional villages (W. Li, 2015), underscoring the critical importance of visual landscape conservation for the preservation of cultural heritage (D. Xu et al., 2022). Thus, research on the protection and sustainability of the visual landscapes of traditional villages has become an urgent priority.

1.2 Problem Statement

1.2.1 Challenges in the Protection and Development of Traditional Villages and the Importance of Visual Landscape Quality

As an important carrier of rural cultural heritage in China, traditional villages play a crucial role in rural revitalization and urbanization (X. Huang et al., 2020). Since the establishment of the Chinese Traditional Village Directory in 2012, along with the subsequent promulgation and implementation of relevant protection laws and regulations, efforts to protect and develop traditional villages have been widely promoted across China, contributing to the conservation and restoration of the physical environment to some extent (M. Zhou et al., 2019). However, current protection and development plans face challenges when dealing with agrarian settlements characterized by diverse regional historical contexts, particularly those with declining living environments. The lack of theoretical support has led to the disarray of social structures and spatial layouts, further accelerating village decay (He & Sun, 2017). For instance, urbanization has resulted in the outflow of rural labor, leading to the ‘hollowing out’ of traditional villages (X. Liu et al., 2023; Robinson, 2024; F. Wang et al., 2021; Y. Yang, 2023). Additionally, with rapid economic development,

significant changes in the productive conditions of traditional villages have led to shifts in production methods, lifestyles, and beliefs, resulting in changes to the internal spatial structure of villages (J. Du, 2021). Furthermore, in economically underdeveloped regions of China, a lack of awareness regarding the protection of traditional villages and their landscapes has led to widespread destruction of traditional village landscapes. (Tong & Chu, 2016). These changes in the landscape not only create visual issues but also damage the reputation of these villages, diminishing their natural and cultural value (Coşkun & Kaplan, 2001).

Keleş et al. (2018) emphasizes that assessing changes in visual landscapes can help identify and prioritize areas that need protection within the framework of cultural heritage conservation planning. Hepcan (2003) argues that assessment studies of visual landscape quality, which address the lost natural and cultural characteristics, the physical development, and the social life of settlements in the present context, are gaining importance. Furthermore, according to the European Landscape Convention, each country has an obligation to identify, plan, protect, and restore the landscape elements within its borders (Déjeant-Pons, 2006). Therefore, it is necessary to evaluate the visual quality of landscape elements in the study area in order to inform priorities for their preservation, restoration, and enhancement, and, where appropriate, concealment (Kane, 1981; Palmer & Hoffman, 2001).

1.2.2 Impacts of Tourism Development in Traditional Villages and the Necessity of Visual Landscape Protection

With the advancement of tourism development in traditional villages, financial support for the conservation of these villages has been provided to some extent, contributing to the stimulation of endogenous development potential and

supplementing the deficiencies of non-agricultural village industries (D. Guo, 2017). However, several challenges have also emerged during the tourism development process. Unregulated and excessive development has altered the original rural landscape elements, industrial structures, and cultural characteristics of traditional villages, leading to changes in villagers' livelihoods and sense of place. For instance, the natural environment of villages has deteriorated during the development process, cultural elements have weakened, commercial factors have increased, and regional characteristics have diminished (D. Huang et al., 2022; H. Shen, Aziz, Huang, et al., 2024; H. Shen, Aziz, Omar, et al., 2024; L. Zhang & Zhang, 2017). Traditional architectural styles and spatial patterns have also been modified to cater to tourist preferences, resulting in a gradual erosion of the village's overall cultural authenticity (Abidin et al., 2024). Meanwhile, intangible cultural heritage—such as traditional festivals, rituals, and community-based practices—has been marginalized, and in some cases replaced by commercialized performances tailored for tourists (Ranwa, 2022; Zou, 2024).

Moreover, the tourism industry in traditional villages has generally experienced product homogeneity, similar service styles, and uniform development models (X. Chen et al., 2023; Y. Jiang et al., 2022; G. Li et al., 2024), which have led to visual aesthetic fatigue among tourists. (X. Wang & Fang, 2020). As pointed out by Zhou (2004), the development forms of rural tourism projects in China are relatively monotonous, with limited exploration of regional culture and a primary focus on sightseeing. Li (2016) also argued that the development model of rural tourism excessively relies on agricultural resources and involves simple replication of economically profitable tourism models, resulting in a lack of regional distinctiveness.

These issues have led to changes in the landscape of traditional villages, with the visual quality of the landscape reflecting these changes and their impact on the environment (Gobster et al., 2007; Keleş et al., 2018). The evaluation of visual landscape quality helps reinforce regional characteristics, maintain landscape diversity, and promote conservation, improvement, and continuity (KİPER, 2013). Therefore, it is necessary to assess the visual landscape quality of traditional villages after tourism development to understand their changing characteristics and provide theoretical support for future village tourism development.

Therefore, in the face of the above challenges, there is a need to develop a more comprehensive, scientific and effective evaluation of the visual landscape quality of traditional villages that can provide theoretical guidance for the rational planning, effective development and scientific protection of traditional village landscape resources.

1.3 Research Gap

By reviewing the literature related to visual landscape quality evaluation, several research gaps have been identified in this study.

Contextual gap, although the subjects of landscape evaluation have become increasingly diverse (Table 2.2), research focusing on the unique entities within rural landscapes—traditional villages—remains insufficient (H. Shen, Aziz, Huang, et al., 2024; H. Shen, Aziz, Liu, et al., 2024). Traditional villages, as significant cultural and natural resources (L. Wang & Wen, 2021), possess ecological value, aesthetic appeal, philosophical meaning, and distinctive landscape and architectural characteristics, making the study of their landscape quality of great theoretical and practical importance (W. Li, 2015; B. Xue & Fan, 2012). Therefore, systematically evaluating

the visual landscape quality of traditional villages not only aids in understanding their multifaceted value but also provides crucial scientific support for their conservation and sustainable development.

Methodology gap, the current assessment of visual landscape quality primarily relies on quantitative analysis. Although quantitative analysis can provide valuable data, it often lacks in-depth insights in specific contexts, particularly when cultural-specific factors are involved (Gu & Ryan, 2014). For traditional village landscapes with unique cultural and historical backgrounds, solely relying on quantitative analysis makes it challenging to comprehensively capture the complexity and diversity of their visual landscape quality. The literature reveals that only Tabatabaie et al. (2023)'s research has incorporated qualitative analysis, wherein it is argued that qualitative analysis can provide a richer contextual backdrop for quantitative results, thereby enhancing the overall understanding of landscape evaluation outcomes. Qualitative analysis offers valuable information regarding stakeholders' perspectives and experiences, playing a crucial role in providing timely feedback and in-depth understanding (Terkenli et al., 2021). Additionally, Kang (2022) contends that different theoretical approaches and research methods are not mutually exclusive but rather complementary. Therefore, further optimization and integration of qualitative and quantitative methods in future research will contribute to a more comprehensive evaluation of the visual landscape quality of traditional villages.

Tool and technology gap, current studies on landscape evaluation predominantly employ traditional two-dimensional photographs as visual materials (Table 2.7). While their validity has been partially verified, related studies have also highlighted their limitations in evaluating visual landscape quality. For instance, two-dimensional photographs often fail to accurately capture the true scenic beauty of

landscapes (Brush, 1979; L. Cao & Xu, 2021), and are unable to fully represent the multidimensional spatial characteristics of the landscape (S. Dong et al., 2023; Dramstad et al., 2006; N. Kang & Liu, 2022; Tveit et al., 2006). With the continuous advancement of modern technology, a growing number of innovative research methods and technologies have begun to be applied to landscape visual evaluation, such as Virtual Reality (VR), Augmented Reality (AR), 360-degree panoramic interactive technology, and fisheye lenses (Z. Chen et al., 2021; Netek et al., 2020). These new technologies offer greater convenience in capturing and reproducing scenes, and panoramic presentation techniques, by creating a more realistic “sense of presence,” significantly enhance the accuracy of visual landscape quality evaluation. They effectively overcome the spatial information transmission limitations inherent in traditional methods and increase public engagement in landscape planning (G. Li & Yang, 2008). Thus, integrating these new technological approaches is expected to provide more comprehensive and multidimensional support for research on visual landscape quality.

Content gap, current research has yet to thoroughly investigate the specific mechanisms through which influencing factors affect visual landscape quality, particularly regarding how these factors operate across different dimensions, such as cultural attributes and natural characteristics. While some existing studies have identified key variables that shape visual landscape quality, in-depth analyses of their underlying mechanisms remain limited. Furthermore, a comprehensive strategic framework for the protection and preservation of visual landscape quality in traditional villages has not yet been developed. In response, this study represents the first systematic attempt to analyze the operative mechanisms of these influencing factors and to propose an integrated strategic framework for safeguarding visual landscape

quality from theoretical, practical, and policy perspectives. This effort seeks to address a significant gap in the literature and contribute to a more holistic understanding of visual landscape quality in both academic inquiry and applied practice.

1.4 Research Aim

This study aims to evaluate the visual landscape quality of traditional villages and develop strategies and framework for the protection and preservation of their visual landscapes. Furthermore, the findings of this study will offer theoretical guidance for the scientific planning, effective development, and sustainable development of traditional village landscapes.

1.5 Research Objectives

Based on the challenges discussed above, the objectives of this study are as follows:

RO1. To identify the key landscape feature indicators that influence the visual landscape quality of Chinese traditional villages.

RO2. To investigate the mechanisms through which landscape feature indicators influence visual landscape quality.

RO3. To develop strategies and framework for the protection and preservation of visual landscape quality in Chinese traditional villages.

1.6 Research Questions

This study aims to address the following research questions:

RQ1. What are the key landscape feature indicators that significantly affect the visual landscape quality of Chinese traditional villages?

RQ2. How do the identified key landscape feature indicators influence the visual landscape quality of Chinese traditional villages?

RQ3. What strategies and framework can be developed to protect and preserve the visual landscape quality of Chinese traditional villages?

1.7 Scope of the Study

This study focuses on the evaluation of visual landscape quality in Chinese traditional villages. China, with its vast territory and cultural diversity, regards traditional villages as a significant component of its historical and cultural heritage, carrying rich regional culture and unique landscape value (H. Shen, Aziz, Huang, et al., 2024). Since 2012, the Ministry of Housing and Urban-Rural Development of China, along with other relevant authorities, has initiated systematic selection and conservation efforts for traditional villages. As of June 2024, a total of six batches of traditional village directories have been published, with 8,155 villages included in the national protection list (www.gov.cn/xinwen). Against this backdrop, this study further explores the evaluation of visual landscape quality based on the typical characteristics and diverse cultural landscapes of Chinese traditional villages.

To this end, this study selects Zhaoxing Dong Village and Basha Miao Village in Guizhou as case studies. The selection of these two villages is based on four reasons: **Representativeness.** Both villages are representative of the traditional villages in Guizhou Province (J. Yang et al., 2023), and were included in the first batch of the “Chinese Traditional Villages List” in 2012 (The data were sourced from the Traditional Villages Network: <http://www.chuantongcunluo.com>). Zhaoxing Dong Village is one of the best-preserved Dong villages, fully reflecting the architectural, cultural, and spatial characteristics of Dong communities (S. Jiang et al., 2023).

Similarly, Basha Miao Village exemplifies the typical lifestyle, cultural heritage, and settlement patterns of the Miao people (J. Su & Sun, 2020). **Historical Integrity.** Both villages have a long history and have preserved their traditional layouts, architectural styles, and regional culture (S. Jiang et al., 2023). **Uniqueness.** The villages possess distinctive cultural and natural landscape features. Zhaoxing Dong Village is renowned for its “Five Drum Towers,” symbolizing Dong culture, and has been listed among the “33 Most Attractive Travel Destinations Worldwide” (X. Chen, 2018). Basha Miao Village, known as the “Last Gunman Tribe,” is famous for its unique cultural rituals and natural landscapes (Xiong & Li, 2024). These characteristics highlight the diversity of traditional village landscapes. **Developing commonalities.** The selected village experienced a “hollowing out” phenomenon due to population migration (L. Cai et al., 2011; X. Jiang, 2015). However, their rich natural and cultural landscapes, combined with external investments, have revitalized them through tourism development (Shao & Zhang, 2018). They also serve as successful examples of rural development in China (X. Chen, 2018).

This study adopts a mixed-methods approach, combining both quantitative and qualitative analyses. Although quantitative analysis provides valuable data, it often lacks depth in specific contexts, particularly when cultural-specific factors are involved (Gu & Ryan, 2014). For traditional villages with diverse cultural characteristics, these limitations may constrain the applicability and generalizability of the research findings. In contrast, qualitative analysis provides rich information regarding stakeholder perspectives and experiences, playing an important role in providing timely feedback and a deeper understanding of landscape evaluation (Terkenli et al., 2021). Therefore, this study combines quantitative and qualitative

methods to better capture the understanding of visual landscapes across different cultural contexts and integrate local knowledge systems.

Furthermore, this study employs 360-degree panoramic technology as a medium for evaluating the visual landscape quality of traditional villages. Compared to traditional photographs, 360-degree panoramic technology provides a more immersive and comprehensive visual representation, allowing evaluators to better capture and analyze the spatial characteristics and overall perception of the landscape (Netek et al., 2020). This capability is crucial for understanding how different landscape features influence overall visual quality, identifying community perceptions, and determining key visual elements that need protection.

In this study, different types of respondents were selected based on the requirements of various research stages to ensure the comprehensiveness and scientific rigor of the data.

During the quantitative analysis phase, the Scenic Beauty Estimation (SBE) involved two groups of respondents: a public group (including local residents and tourists) and an expert group (comprising teachers and students with a professional background in landscape architecture). Furthermore, for the landscape feature assessment, which required more specific evaluation of landscape feature indicators, only the expert group (teachers and students with a landscape architecture background) was involved to ensure the professionalism and consistency of the evaluation process.

In the qualitative analysis phase, three groups of experts from different backgrounds were invited: an academic expert group, a practitioner/NGO group, and a government group. The academic expert group reviewed the key landscape feature indicators identified from the quantitative analysis, assessing whether the identified key indicators aligned with expectations and whether any key indicators had been

overlooked. This process resulted in the final confirmation of the key landscape feature indicators significantly influencing visual landscape quality and further explored the underlying mechanisms behind these key indicators. Finally, the three expert groups developed strategies and framework for the protection and preservation of the visual landscape quality of Chinese traditional villages from theoretical, practical, and policy perspectives, aiming to provide multidimensional guidance for the sustainable management of traditional village landscapes.

1.8 Significance of the Study

(1) Theoretical significances

Enrichment of visual landscape quality evaluation theory: This study integrates both quantitative and qualitative methods, employing 360-degree panoramic technology to develop an evaluation approach for the visual landscape quality of traditional villages. It identifies key landscape feature indicators influencing visual landscape quality and analyzes their underlying mechanisms, thereby deepening the understanding of these key indicators. Moreover, this research supplements and enriches the field of landscape evaluation with new theoretical perspectives.

Innovation in evaluation methods: Current research predominantly employs quantitative methods to evaluate visual landscape quality. However, quantitative methods often lack in-depth insights in specific contexts, particularly when cultural-specific factors are involved. Qualitative analysis can effectively address this limitation. Therefore, this study utilized 360-degree panoramic technology as a medium for visual landscape evaluation, combining both quantitative and qualitative analyses to enhance the comprehensiveness and accuracy of the evaluation. This approach addresses the shortcomings of traditional research methods and provides a

theoretical basis for the innovation of visual landscape evaluation methods, contributing to the advancement of research in the field of landscape evaluation.

Filling the knowledge gap: Existing research has not sufficiently explored the underlying mechanisms of key landscape feature indicators in traditional villages, nor has it developed comprehensive strategies and framework for their protection and preservation. This study addresses these gaps by employing expert focus group discussions to analyze the mechanisms behind the identified key indicators. Furthermore, it develops protection and preservation strategies and framework from theoretical, practical, and policy perspectives, thereby filling the current research gap.

(2) Practical significances

Providing scientific evidence for the protection and management of visual landscape quality in traditional villages: The findings of this study provide scientific support for the protection, preservation, and sustainable management of the visual landscape quality in traditional villages. They assist traditional village managers in developing more targeted and effective protection measures while also offering solid evidence for government policy-making.

Enhancing the quality of life for local residents: This study, through the development of strategies and framework for the protection and preservation of visual landscape quality in traditional villages, effectively improves the overall visual landscape quality. This enhancement not only creates a more aesthetically pleasing and comfortable living environment but also reinforces regional cultural characteristics, contributing to greater resident well-being, a stronger sense of community belonging, and cultural identity, thereby comprehensively improving the overall quality of life for local residents.

Supporting the planning and development of cultural tourism: By comprehensively evaluating the visual landscape quality of traditional villages, this study provides data and theoretical support for protecting and preserving landscape quality, attracting tourists, and optimizing tourism experiences. This contributes to the development of the cultural tourism industry in traditional villages, promotes local economic prosperity, and provides financial support for cultural heritage conservation.

Promoting the sustainable development of traditional villages: This study provides a scientific basis for the landscape planning and development of traditional villages, helping to prevent unregulated and excessive development. By identifying key landscape feature indicators and analyzing their underlying mechanisms, it supports rational planning and optimization measures to achieve efficient resource use and continuous enhancement of landscape quality, ultimately promoting the sustainable development of traditional villages.

1.9 Brief Methodology

This study employed a mixed-methods approach to explore the evaluation of visual landscape quality in traditional villages.

Stage 1: Quantitative research

(1) A 360-degree panoramic camera was used to capture photographs of the villages, which served as the research samples. After screening, 40 photographs were selected for the study, including 20 images each from Zhaoxing Dong Village and Basha Miao Village.

(2) The Scenic Beauty Estimation (SBE) method was employed to evaluate the visual landscape quality of the traditional villages. First, a 5-point evaluation scale was used, ranging from 1 ('very unattractive') to 5 ('very attractive') (Arthur, 1975; Y.

Chen et al., 2023; Ha & Yang, 2019; Othman, 2011; Tveit et al., 2006). Subsequently, the required sample size was calculated as 351 or more, based on the village population and the sample size calculation formula. Respondents were divided into public and expert groups in a 1:1 ratio. From November 15th to 20th, 2023, survey questionnaires were administered to collect respondents' ratings of the 40 panoramic photographs, resulting in 353 valid responses. Finally, Z-score normalization was applied to the scores, yielding an SBE value for each photograph.

(3) This study employed the Semantic Differential (SD) method to evaluate the landscape features of traditional villages. Initially, 16 landscape feature indicators were identified based on previous research. To quantify respondents' evaluations of these landscape features, a 5-point Likert scale was used, with scores ranging from 1 to 5. Subsequently, the sample size for the SD method was determined with reference to other studies, and the respondents were selected from experts in the field of landscape architecture (including 15 teachers and 50 students). On December 5th, 2023, a questionnaire survey was conducted, collecting 62 valid responses regarding the 16 landscape feature indicators for 40 panoramic photographs, ultimately obtaining the SD values for each indicator for each photograph.

(4) To identify the key landscape feature indicators significantly affecting visual landscape quality, this study used SBE values as the dependent variable and SD values as the independent variables, and conducted multiple linear regression analysis using SPSS 26.0 software. This analysis preliminarily identified the key landscape feature indicators of visual landscape quality of traditional villages.

Stage 2: Qualitative research

To verify whether these key indicators identified through quantitative analysis align with expectations, to determine if any significant indicators were overlooked,

and to explore the underlying mechanisms of these key indicators, this study conducted expert focus group discussions. Additionally, these discussions aimed to develop strategies and framework for the protection and preservation of visual landscape quality in traditional villages. The focus group consisted of three sets of experts: an academic expert group (5 members), a practitioner/NGO group (5 members), and a government officials group (5 members).

The online focus group discussions were conducted on April 1st, April 7th, and April 9th, 2024. The discussions were held using Tencent Meeting software, with the platform's recording feature enabled to preserve the content of the sessions. To ensure data completeness, the meetings were transcribed verbatim using the Feishu application. Furthermore, all transcribed texts were manually reviewed to verify their accuracy. First, the academic expert group discussed whether the identified key indicators met expectations, whether any indicators were overlooked, and the mechanisms behind these key indicators. Subsequently, all three groups provided strategies for the protection and preservation of visual landscape quality in traditional villages from theoretical, practical, and policy perspectives. Finally, the discussion results were manually coded to present the outcomes of the qualitative analysis.

1.10 Definition of Terms

1.10.1 Traditional Village

(1) Definition of traditional villages

Traditional village, formerly known as the ancient village. In 2012, the first meeting of the Expert Committee on the Protection and Development of Traditional Villages discussed and decided to change the previous name, “ancient village” to

“traditional village” to highlight its civilization value and inheritance significance (Q. Zhou, 2015). In the same year, the Ministry of Housing and Urban-Rural Development, the Ministry of Finance and the Ministry of Culture established the concept and connotation of traditional villages for the first time in the “Guiding Opinions on Strengthening the Protection and Development of Traditional Villages” : “refers to the village formed earlier, has rich cultural and natural resources, has a certain historical, cultural, scientific, artistic, economic and social value, should be protected villages”, and only after the national accreditation review, included in the list of Chinese traditional villages can be called traditional villages (Y. Hu et al., 2014).

Since 2012, and up until June 2024, through the selection process conducted by the Ministry of Housing and Urban-Rural Development of China and other relevant authorities, six batches of the Chinese Traditional Village Directory have been released, totaling 8,155 villages, which have been included in the national protection list (source: www.gov.cn/xinwen).

(2) Differences between traditional villages and rural areas

A. Historical and cultural background

Traditional villages are a specific unit within rural areas (W. Zheng et al., 2021), and only those that pass rigorous evaluations and are recognized by relevant national authorities can be classified as traditional villages (Y. Hu et al., 2014). Traditional villages possess a long historical background and preserve rich cultural heritage, including traditional architecture, customs, folk activities, and craftsmanship (J. Fu et al., 2021; Q. Xu & Wang, 2021). Additionally, they often have unique historical contexts and stories that reflect the social structures and lifestyles of specific historical periods (Y. J. Li et al., 2013; C. Wang & Chai, 2018).

On the other hand, rural areas refer to the comprehensive regions outside urban areas, encompassing both built and undeveloped zones (Bednaříková et al., 2006). Rural areas are broader in scope, including both modern rural areas and traditional villages. Modern rural areas do not have a deep historical background or cultural heritage and are more representative of the influences of modern agriculture, industrial development, or urbanization (K. Ren, 2021).

B. Architectural and landscape characteristics

The architecture of traditional villages largely retains traditional styles, using local materials and traditional construction techniques (J. Cao, 2023; Düzgüneş & Demirel, 2015; W. Li, 2015). Village layouts typically adhere to traditional concepts, such as those rooted in Feng Shui (Z. Zhou et al., 2022). Furthermore, due to national protection efforts and policy constraints, traditional villages have maintained their original forms and landscape structures, avoiding the impact of foreign cultures and modern architecture on their traditional landscape appearance (R. J. Qin & Leung, 2021; H. Shen, Aziz, Huang, et al., 2024).

In rural areas, influenced by modernization and urbanization processes, and due to the lack of strict government or local policy constraints, architectural styles and landscape characteristics show a trend of diversification (Torreggiani et al., 2012; H. Xie et al., 2022), often incorporating modern styles (Jin, 2023).

C. Protection and development

The development of traditional villages focuses primarily on cultural preservation and sustainable tourism. By protecting traditional architecture and cultural landscapes, they attract tourism resources to achieve economic growth (Bian et al., 2022). Traditional villages are often the subject of cultural heritage protection

policies and have specific protection and restoration measures in place (Pola, 2019; M. Zhou et al., 2019).

In contrast, the development policies for rural areas are more flexible, and modernization and development activities are relatively easier to implement. Chowdhury et al. (2023) pointed out that the development of rural areas relies more on modern technologies and policy support, such as digital agriculture and infrastructure development, to achieve comprehensive growth. However, there tends to be weaker awareness and fewer measures for the preservation of traditional culture and ecological environments.

Therefore, this study specifically focuses on Chinese traditional villages rather than general rural areas.

1.10.2 Landscape

In Steven Bourassa's *Landscape Aesthetics*, 'landscape' is considered a more appropriate term than 'environment' because it emphasizes the process of perception, which 'environment' lacks. He notes that landscape encompasses both natural and cultural landscapes and is a term with general applicability (Bourassa, 1991). Appleton (1975) further suggests that landscape is 'the perceived environment,' particularly in terms of visual perception. Zube et al. (1982) argue that landscape is the product of human-environment interaction, inseparable, and includes both natural and man-made landscapes. The European Landscape Convention (ELC) defines landscape as a human-perceived area, emphasizing the perceptual relationship between the observer and the landscape—primarily a comprehensive sensory experience (Déjeant-Pons, 2006), with visual perception accounting for 87% (Z. Tang & Liu, 2015).

1.10.3 Visual Landscape Quality

Currently, the majority of landscape architects comprehend landscape primarily in terms of its visual aesthetics, i.e. landscape (K. Yu, 1987). Beginning in the mid-1960s, ‘landscape evaluation’ research in the United States focused predominantly on the visual aesthetics of landscape. Landscape assessment (landscape evaluation) is, in an objective sense, the evaluation of the visual character of a landscape (Daniel & Meitner, 2001). In landscape assessment studies, landscape beauty is frequently considered synonymous with the visual landscape quality, with Daniel and Boster (1976) referring to the visual landscape quality as “scenic beauty”. The US Bureau of Land Management equates “visual landscape quality” and “scenic quality”, defining landscape visual quality as ‘the relative value of a landscape based on visual perception’ (K. Yu, 1987). The assessment of visual quality of a landscape is the result of the interaction between the mental activity of the evaluator and the visual quality of the landscape; it is the evaluator’s value judgment on the external and functional aspects of the landscape using visual perception (Daniel, 2001).

1.10.4 Landscape Protection and Preservation

The European Landscape Convention defines landscape protection as ‘actions to conserve and maintain the significant or characteristic features of a landscape, justified by its heritage value derived from its natural configuration and/or from human activity (Déjeant-Pons, 2006).’ According to Sun et al. (2012) and Calleja-Perucho et al. (2015), landscape protection is a systematic practice that relies on human interventions—through policies, legislation, and technological measures—to prevent natural or cultural landscapes from being damaged. It aims to preserve their ecological,

functional, and cultural values. This approach not only emphasizes the restoration of environmental degradation and the improvement of natural conditions, but also focuses on ecological sustainability, economic feasibility, and the coordinated development of landscape functions.

In contrast, Landscape preservation is the practice of safeguarding landscapes of significant historical or cultural value by maintaining their original physical form and intangible meanings. Its core principle is to prevent alterations that may compromise the authenticity, collective symbolism, and cultural continuity of the place. Preservation strategies prioritize landscapes with strong cultural memory and place attachment, aiming to protect them from degradation or loss due to development or change (Avrami et al., 2019; Wells, 2015).

1.11 Organization of Chapters

Chapter 1: Introduces an overview of the study, including the research background, problem statement, research gaps, research aim, research objectives, research questions, research scope, significance of the study, and definitions of key terms.

Chapter 2: Provides a literature review on visual landscape quality evaluation, covering commonly used theories, evaluation methods, tools, and techniques. Based on this review, the research variables adopted in this study are identified, and the conceptual framework of the study is developed.

Chapter 3: Describes the research methodology and the selection of research cases. It elaborates on the instrument design, pilot study, sampling techniques and sample size, data collection process, and data analysis methods.

Chapter 4: Presents the results of both quantitative and qualitative analyses. The quantitative analysis includes findings from scenic beauty evaluation and landscape feature evaluation. The qualitative analysis discusses the mechanisms through which key landscape features indicators influence visual landscape quality, as well as strategies and framework for protecting and preserving the visual landscape quality of traditional villages.

Chapter 5: Compares and discusses the findings from the quantitative and qualitative analyses in relation to existing research, providing further insights into the significance of the results.

Chapter 6: Summarizes the key findings, contributions, implications and limitations of the study and proposes directions for future research.