



Rural Public Space Design and Behavioral Characteristics: A Case Study of Nanuo Village, Yunnan Province

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Abstract. As urbanization accelerates, China's traditional villages are facing multiple challenges, including weakened cultural identity, ecological destruction, and social structural transformation. As a region characterized by both cultural diversity and ecological sensitivity, the heritage protection and spatial design renewal needs of traditional villages in Yunnan Province are particularly urgent. This research takes the traditional village of Nanuo in Yuanjiang County, Yunnan Province, as a case study to systematically examine the characteristics of public space usage behaviour and satisfaction levels through a questionnaire survey. The results indicate that public spaces, as the core carriers of villagers' daily lives, have overall low satisfaction levels, with cultural element design and spatial functional design configuration performing the worst. Usage behaviour exhibits significant generational differences, with the elderly group having significantly higher average daily usage duration than the young and middle-aged groups. Villagers have urgent needs for basic services such as resting space design and sanitation facilities. Based on these findings, a three-pronged renewal strategy of 'cultural integration, functional optimisation, and technological enhancement' is proposed: cultural identity is established through the application of ethnic patterns, functional layout design is improved, and modern technologies such as modular sanitation units are adopted to enhance service efficiency, providing theoretical and practical basis for the renewal of public spaces in traditional villages.

Keywords: traditional village, public space, design renewal, rural revitalization

1 Introduction

1.1 Research Background

The 19th National Congress of the Communist Party of China formally proposed rural regeneration in 2017. This momentous assignment signals a new era in our country's "three rural issues" and is a milestone. Rural public spaces are essential to rural construction and serve as the hub of villagers' everyday social interactions and public activities. They also help define the countryside's identity. The "Rural Revitalization Strategic Plan (2018-2022)" emphasizes the need of planning and using rural public spaces

to meet people's growing need for a better life. Rural public spaces carry the village's long-standing cultural traditions, historical recollections, and residents' nostalgia^[1]. They help create social order throughout rural transitions. Damage to rural public areas varies^[2]. Traditional village squares, streets, and courtyards serve many social and cultural purposes. These venues display and transmit rural culture as well as villagers' daily activities^[3-4]. Rebuilding and optimizing rural public places' value system, functions, and structure is critical to rural revival^[5]. Ping et al. (2024)^[6] stress the necessity of creating public places to meet villagers' demands to improve quality of life and social peace.

Qin et al.(2023)^[7] identified rural public spaces as crucial to villagers, optimizing design to revitalize spaces, facility allocation, and cultural heritage, hence improving these places is essential for rural rejuvenation. However, Some towns in Nanuo Township suffer from functional deficiencies in public spaces and low cultural recognizability, which affect residents' sense of identity and spatial vitality. It is necessary to study the villagers' needs to optimize the design.

1.2 Literature Review

Research has focused on designing rural public spaces from an environmental behavioral perspective. Ning et al. (2019)^[8] identified the behavioral and psychological needs of villagers, particularly regarding safe transportation and public facilities. The importance of artistry and ergonomics in enhancing the functionality and accessibility of public spaces was emphasized by Jing et al. (2025)^[4]. Ping et al. (2024)^[6] introduced a new planning perspective from a human care standpoint, focusing on individual needs. The study explored the significance of traditional markets in southwestern Nigeria from the perspective of users, emphasizing their crucial role as heritage sites, social venues, aesthetically valuable areas, and the important function of "third spaces"^[9].

The research also delves into the behavioral characteristics of rural public spaces. Ziqi et al. (2018)^[10] analyzed the functional and location-based gathering styles of the elderly. Geomorphology(2020)^[11] utilized case studies, whereas Ziqi et al. (2018) employed both quantitative and qualitative methods to analyze community facility usage patterns. G. Jing et al. (2021)^[12] explored the relationship between behavioral patterns of different age groups and the optimization of public spaces.

The design of rural public spaces must take into account the diverse needs of villagers. Ping et al. (2024)^[6] indicated that core variables such as the natural environment, social networks, and facility configuration significantly impact space design. C. Jing et al.(2025)^[4] suggested that public spaces can be optimized through artistic expression and humanized design, which not only meets the social, leisure, and cultural activity needs of the elderly, as emphasized by Zhang & Qiu(2020)^[13], but also promotes their well-being. Moreover, aging-friendly design is crucial in preserving regional characteristics, enhancing accessibility and space recognition, and reducing usage barriers, aiming to build rural spaces that are both functional and caring for the aging population, while Su et al. (2023)^[14] emphasized user-oriented landscape preferences. Agboola, (2022b)^[15] stressed the cultural relevance of public spaces. Veitch et al. (2013)^[16] provided a new perspective for design from the perspectives of aesthetics and facilities.

These studies suggest that the design of rural public spaces should pay more attention to user needs and cultural values to improve resident satisfaction and quality of life.

In conclusion, the natural environment, social networks, and facility layout are the primary factors influencing rural public space design. Appropriate layout and design can significantly improve space utilization and resident satisfaction.

2 Materials and Methods

This paper takes Nanuo Rural Village in Yuanjiang County as the research object, and adopts the methods of literature review, questionnaire survey, fieldwork and analyses and generalisation. Quantitative analysis of public space behavioural characteristics and needs of villagers in Nanuo Countryside was carried out through questionnaire star and SPSS. A total of 210 questionnaires were distributed, with 210 valid questionnaires.

3 Behavioural Characteristics of Rural Public Space and Residents' Needs in Nanuo Township, Yuanjiang

3.1 Research on the Behavioural Characteristics of Residents' Public Space

The survey collected 210 questionnaires. Female respondents constituted 64.3%, exceeding the 35.7% male participation rate, indicating higher female engagement. The age distribution showed that respondents aged 31-45 years were most prevalent at 29.9%, followed by those aged 46-60 years at 24.8%. This suggests a significant demand for public space activities among these age groups. The majority of respondents (74.8%) were local villagers, with foreign workers and tourists accounting for 10.0% and 7.1%, respectively. Other statuses made up 8.1%. Regarding residency duration, 50.0% had lived in the village for over five years, indicating a strong reliance on and familiarity with public spaces (see Table 1).

Table 1. Basic information about the respondents

		Quantity	Percentage			Quantity	Percentage
Gender	Male	75	35.70%	Identity	Local Resident	157	74.80%
	Female	135	64.3%		Outside Worker	21	10.00%
Identity	Under 18	23	10.9%	Residence Duration	Tourist	15	7.10%
	18-30	44	20.90%		Other	17	8.10%
	31-45	63	29.90%		Less than 1 year	42	20.00%
	46-60	52	24.80%		1-5 years	63	30.00%
	Over 60	28	13.30%		Over 5 years	105	50.00%

3.2 Examination of the Characteristics of Residents' Behavior in Public Spaces

A survey in Nanuo, Yuanjiang, revealing diverse usage patterns. 38.1% of villagers used public spaces 3-5 times per week, 23.8% used them daily, and 14.3% used them multiple times a day, highlighting their importance and dependency. Regarding duration, 50.0% stayed for 30 minutes to 1 hour, 21.4% for 15-30 minutes, 9.5% for less than 15 minutes, and 19.0% for over 1 hour, indicating varied demands. In terms of cultural activities, a festival square satisfaction survey found 14.3% were ‘completely satisfied’, 28.6% were ‘basically satisfied’, and 57.2% were ‘not quite satisfied’ or ‘not satisfied at all’, suggesting the need to improve the plaza's conditions, activity diversity, accessibility, and safety(see Figure 1).

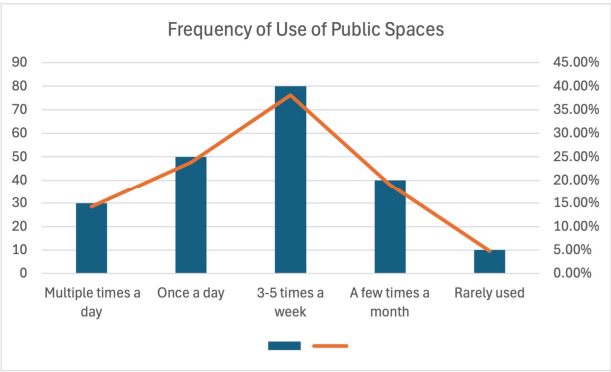


Fig. 1. Frequency of Use of Public Spaces

3.3 Demand for Public Space Activities

The satisfaction survey of the festival square design reveals that only 14.3% of villagers are “totally satisfied” and 28.6% are “essentially satisfied,” while a significant 57.2% are “not nearly content” or “not satisfied at all.” This discontent likely stems from issues related to the plaza’s physical conditions, variety of activities, accessibility, and safety, indicating a need for future design improvements. Additionally, when assessing the sufficiency of social gathering locations, 11.9% of villagers find them “totally adequate,” 33.3% “essentially adequate,” but 40.5% “not quite adequate” and 14.3% “entirely inadequate.” This shows a mixed perception, with a considerable portion feeling that current locations do not meet their needs. Furthermore, satisfaction with the guest reception area is low, with only 9.5% “completely satisfied,” 19.0% “basically satisfied,” 52.4% “not nearly content,” and 19.0% “not satisfied at all.” These findings highlight the urgent need for future design to optimize the visitor reception area and overall public space to enhance satisfaction and functionality.

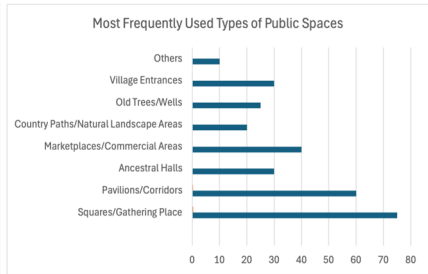
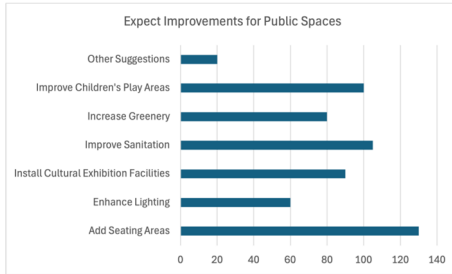


Fig. 2. Expect improvements for public spaces **Fig. 3.** Frequently used types of public spaces

3.4 Public Space Design Satisfaction and Expectations

Survey results show low satisfaction with current public spaces design: only 4.8% "very satisfied," 7.1% "relatively satisfied," 28.6% "not too satisfied," and 50.0% "completely dissatisfied." For cultural aspects, 4.8% "very satisfied," 7.1% "relatively satisfied," 23.8% "not too satisfied," and 59.5% "completely dissatisfied." Functionality satisfaction mirrors these rates. The data highlight a need for substantial improvements in public spaces.

Villagers' feedback highlights key areas for public space enhancement: seating (61.9%), lighting (28.6%), greenery (38.1%), and sanitation (50.0%). There's also strong interest in cultural facilities (42.9%) and children's play areas (47.6%). These findings point to a need for comprehensive public space upgrades addressing practical and cultural needs(see Figure. 2) .

3.5 Use of Public Space in the Countryside

Survey data indicate that squares and meeting areas are the predominant public spaces used by the villagers, constituting 35.7% of responses. Pavilions and corridors follow, comprising 28.6% of the total. Ancestral halls and marketplaces/commercial areas account for 14.3% and 19.0%, respectively. Country paths and natural landscape areas, along with old trees and wells, are utilized less frequently, representing 9.5% and 11.9% of the responses. Village entrances are moderately favored, making up 14.3% of responses. The least favored are other types of public spaces, comprising 4.8% of the total. These findings suggest distinct preferences for certain public spaces among villagers. Furthermore, the findings from the public space satisfaction survey conducted in traditional villages of Nanuo Countryside in Yuanjiang indicate that villagers exhibit a general dissatisfaction with the current public spaces, particularly regarding their cultural and functional aspects (see Figure. 3) .

4 Conclusion

This study explored the behavioral characteristics of public space usage and villagers' satisfaction in the traditional village of Nanuo, Yuanjiang, through a questionnaire

survey. Results indicate that public spaces are a crucial part of villagers' daily lives, but overall satisfaction is low, particularly in cultural element design and functional aspects. The frequency of use and duration of stay in public spaces vary among villagers, with some showing high dependence on existing spaces. However, deficiencies in cultural expression, facility completeness, and functional layout are evident. Satisfaction levels differ significantly across public space types, with tourist reception areas, bazaars, and commercial areas receiving lower ratings, highlighting the need to optimize functional layouts design and service quality. Villagers mainly expect improvements in rest design areas, sanitary conditions, and lighting, reflecting a high demand for better basic facilities. In conclusion, future public space planning and optimization should focus on enhancing cultural and functional aspects, rationalizing functional layouts, increasing multifunctional space supply, and improving basic facilities and sanitary conditions to boost villagers' satisfaction and quality of life.

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Disclosure of Interests

The authors have no competing interests to declare that are relevant to the content of this article.

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