

Evolution and Prospects of Research on Traditional Rural Settlements in China

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ABSTRACT: Traditional rural settlements carry China's long-standing agricultural civilization and the production and daily life of the vast majority of its people, constituting the largest and most widely distributed cultural heritage system. With the advancement of the national rural revitalization strategy, the conservation and sustainable development of traditional rural settlements face significant opportunities and challenges. It is necessary to review the evolution of research on traditional rural settlements and explore the direction and prospects of its future development. By delving into and organizing historical materials such as major academic journals, newspapers, monographs, and policy documents, and integrating them with the national economic, cultural, and social background as well as the actual situation of rural construction and development, this study reconstructs the entire process of the development of traditional rural settlement research in China since the 1930s. The study reveals the historical context, driving forces, and research paradigm characteristics of different development stages of traditional rural settlement research, and assesses and forecasts its future trends and directions, with the aim of advancing both academic inquiry and practical conservation efforts.

KEY WORDS: traditional rural settlements; rural construction; cultural heritage; famous historic and cultural villages; traditional villages; research paradigms

Introduction

The study of traditional rural settlements in China was nurtured within the study of traditional vernacular dwellings, germinated during the nationwide construction of modern rural houses, was inspired by international heritage conservation concepts, developed under the influence of the systems governing cultural relics, famous historic cities, and historic towns, grew alongside the conservation policies for famous historic and cultural villages and traditional villages, and was ultimately refined through the

process of New Rural Construction and the Rural Revitalization Strategy, evolving into a thriving comprehensive research field today. In recent years, the state has attached great importance to the conservation and utilization of the cultural heritage of rural settlements. The execution of large-scale surveys and the introduction of a series of policies and regulations have encouraged experts and scholars to conduct research from different fields, which has powerfully advanced the conservation and utilization of rural heritage and accumulated rich theoretical and practical re-

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sults. Currently, with the advancement of the national rural revitalization strategy, rural areas have entered a new stage of high-quality development, imposing new requirements and bringing new opportunities for the conservation and development of traditional rural settlements. Therefore, it is necessary to review, reflect on, and project the study of traditional rural settlements.

The term “traditional rural settlements” is used here in a broad sense, unlike “famous historic and cultural villages” and “traditional villages”, which specifically refer to villages listed in the national registers. These terms are officially designated and have only been used frequently in the last 20 years. However, research in this field had already been conducted before this, although the terminology was not uniform, such as “traditional ethnic villages”, “traditional settlements”, and “ancient villages”. This paper attempts to conduct a diachronic review over a broader time span; thus, the term “traditional rural settlements” is adopted for its greater inclusivity. Against this background, this paper takes architecture as its primary disciplinary perspective while incorporating relevant research from geography, history, anthropology, ethnology, and related disciplines. It also situates these studies within China’s rural development practices and policy context since the 1930s. Guided by evolving academic understandings of traditional rural settlements, the paper reviews key archival materials from major journals and newspapers—including *Architectural Journal*, *The Architect*, *Urban Planning*, and *China Construction News*—together with recent scholarship to provide a stage-by-stage review of the field. It clarifies the developmental trajectory, achievements, remaining research gaps, and future directions of traditional rural settlement research, with the aim of advancing both academic inquiry and practical conservation efforts.

1 Conception stage (1930s to before reform and opening up)

For a long time, “traditional rural settlements” was not a clearly defined research field, but this does not mean that research in this direction did not exist. In 1939, Fei Xiaotong published *Peasant Life in China: A Field Study of Country Life in the Yangtze Valley* in the UK [1], which studied the production, life, community organiza-

tion, and economic activities of rural settlements in China from the perspective of social anthropology. It remains an important milestone in the study of rural China. At the same time, Chinese architectural historians began to expand their focus from their previous emphasis on “palaces, mausoleums and temples” to the “residential buildings of the vast majority of the people” in rural areas [2].

The origins of research on traditional Chinese vernacular dwellings can be roughly traced back to the ancient building surveys conducted by the Society for Research in Chinese Architecture in the 1930s in vast rural areas. In their article *A Brief Record of Pre-survey of Ancient Architecture in Jinfen Area (Taiyuan, Shanxi)* published in 1935[3], Liang Sicheng and Lin Huiyin dedicated a section to “Shanxi Vernacular Dwellings” and clearly put forward the concept of “vernacular dwellings” research. By the time their works such as *Overview of Southwest Ancient Architecture Survey*, *A Survey of Northeast Kunming Township*, and *The Stamp Dwellings in Yunnan* were published, vernacular dwellings had already received widespread attention from architectural scholars [4,5]. Liu Dunzhen also wrote *Overview of Chinese Residential Buildings*, which systematically discussed the forms of traditional Chinese vernacular dwellings, laying the foundation for the study of traditional vernacular dwellings to be established as an important branch of architecture [6].

Although the concept of traditional rural settlements did not emerge at this time, judging from the literature on vernacular dwellings, it is undeniable that villages were being studied as a background for vernacular dwelling research. In the early articles on vernacular dwellings published in the bulletin of the Society for Research in Chinese Architecture, many scholars paid attention to the style and layout characteristics of vernacular architecture at the scale of the settlement as a whole. For example, the section on vernacular dwellings in the ancient architecture survey report of Shanxi and other places completed by Liang Sicheng and Lin Huiyin was completed after visiting villages such as Daxiang, Xinghua, Xiaoxiang, and Wutun. These vernacular dwellings are distributed in a vast rural area and are often presented in the form of clusters. There-

fore, it was only natural to consider the village as a whole when examining these vernacular dwellings. In their *A Brief Record of Pre-survey of Ancient Architecture in Jin-fen Area (Taiyuan, Shanxi)* [3], they wrote: “From the overall layout, the rural dwellings in Shanxi make the best use of the terrain, following the gentle or steep slopes of the cliffs, layering up to create a naturally picturesque landscape”. These descriptions highlight the simple beauty of the integration of village settlements with natural terrain. Their statement that “no matter the size of the village, there is rarely one without a gatehouse. The village may not necessarily have walls around it, but where the main road enters the village, such a monumental structure must be built to remind travelers and tell them that they have arrived at another town or village” reveals their concern for the layout, boundaries, and other elements of the village as a whole, reflecting architectural scholars’ early insights into and understanding of village spaces.

After the founding of the *Architectural Journal* in 1954, it served as a leading platform for architectural scholars to publish their academic views, and the articles published there also occasionally touched on traditional rural settlements. In his 1956 article, *Vernacular Architecture in the Coastal Areas of Central Guangdong* [7], Cen Shuhuan summarized the overall spatial pattern of villages in the region in detail. He conducted an in-depth analysis of the spatial location and arrangement characteristics of ancestral halls, residential buildings, ponds, wells, threshing grounds, etc., drew a plan of the overall layout of the village (Fig. 1), and analyzed the causes of this layout pattern from different perspectives. From a historical perspective, this article has a very accurate grasp of the traditional village morphology in the Guangfu region, which is consistent with the “comb-like layout” model of Guangfu proposed by Lu Yuanding and others later. Some studies on traditional dwellings of ethnic minorities often include descriptions of the overall morphology of the village. For example, Sun Yitai’s study on the Ma-lan (stilt-raised) architecture of the Zhuang ethnic group in Guangxi [8] and the study on the Dai ethnic dwellings on the border of Yunnan by the Ethnic Minority Architecture Survey Group of the Yunnan Provincial Architectural Engineering De-

sign Office [9] both analyzed the site selection characteristics and overall spatial layout of the villages and drew accurate general layout plans (Fig. 2). This kind of depiction of villages has gone beyond the scope of previous studies on individual buildings.

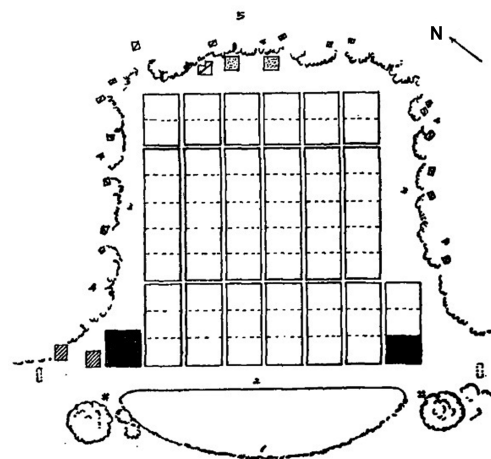


Figure 1 Overall layout of villages in the coastal areas of central Guangdong

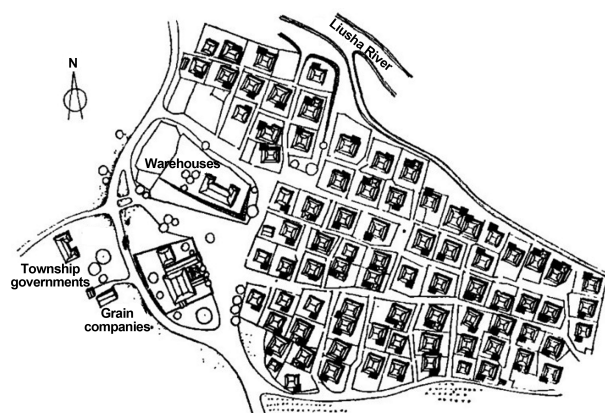


Figure 2 General layout of Manjing Dai Village in Jinghong

Although the above studies touched upon the village morphology as a whole, their ultimate goal was not the village itself but the architecture, and therefore they cannot be considered as independent studies of traditional rural settlements. However, these arguments reveal that architectural scholars have already recognized the necessity of examining vernacular dwellings within the context of the entire village. The seeds of this idea were planted in the study of vernacular dwellings from the 1930s to the 1950s, and began to emerge in the 1960s. Although these early research results were sparse and scattered, they were invaluable. However, with the sudden arrival of the Cultural Revolution, academic work was severely impacted,

and research on vernacular dwellings and rural settlements came to a temporary halt.

It was also during this period that professional and technical personnel intervened in rural construction practices on a large scale for the first time, which was the first “designers going to the countryside”. In response to the national rural system reform, the development of people’s communes and the “Learn from Dazhai in Agriculture” movement, professionals actively participated in the exploration of rural planning under the new economic and social system [10-13]. In the late 1950s, the *Architectural Journal* published a series of plans for rural people’s communes (Table 1). The purpose of these plans was to promote the transformation of rural areas from scattered small-scale farming to collective production, thereby driv-

ing the breakthrough and reconstruction of the spatial pattern of traditional rural settlements. These plans drew on the layout of urban “workers’ new villages” and brought about several spatial and functional transformations, including a shift from dispersion to concentration, functional progression from mixed-use to clear zoning, and the transition of the settlement core from religious and ritual spaces to political service spaces [14, 15]. Since the mid-to-late 1960s, the post-disaster reconstruction of Dazhai Village in Xiyang County, Shanxi Province, was established as a model, and the “Learn from Dazhai in Agriculture” movement swept the country, leading to the standardization and unification of rural planning. High-profile model villages such as Huaxi New Village in Jiangyin, Jiangsu Province also emerged [16-18].

Table 1 A selection of planning and design schemes for people’s communes published in the journal *Architectural Journal* in late 1958

Article title	Authors	Issue
Planning for Qingpu County and Hongqi People’s Commune	Li Dehua, Dong Jianhong, Zang Qingsheng, Yang Mingding, Yao Zhiqi, Fang Qisheng	1958(10)
Planning and Design of Residential Areas in the “July 1st” People’s Commune in Shanghai	People’s Commune Design Group, Shanghai Civil Architecture Design Institute	
Preliminary Planning and Design of Xiaozhan People’s Commune in Tianjin	Xiaozhan Planning Group, Department of Architecture, Tianjin University	
Planning and Design Scheme for a New People’s Commune Village in Shanghai	Wang Hua, Ao Xinzong, Wan Guoqiang	
Rural Planning for the Pioneer Agricultural Cooperative in Suburban Shanghai	Wang Jizhen	
Planning of Suicheng People’s Commune, Xushui County, Hebei Province	Wang Yanzheng, Wu Tianguai, Zhang Guoying, Luo Cunzhi, Wu Zhengbi, Wang Zhihui	1958(11)
Introduction to the Master Planning and Residential Design of Longtan People’s Commune, Chengdu	Xu Shangzhi, Wu Defu, Zhang Hanxing, Deng Jinghui	
Insights from the Planning and Design of the Dongfanghong People’s Commune in Lugouqiao, Fengtai District	Su Xueqin	
Survey and Settlement Planning of Natural Villages in Dongshan and Puzhuang People’s Communes	Architectural History Teaching and Research Group, Department of Architecture, Nanjing Institute of Technology	
Introduction to the Planning of Gongzhuang People’s Commune, Boluo County, Guangdong Province	Quan Jun, Cui Wei, Yi Qi’en	1958(12)
Planning Introduction of Jinyang Township People’s Commune, Wuwei County, Gansu Province	Planning Office of Gansu Provincial Construction Engineering Bureau	
Planning of Xi’an Dongfeng People’s Commune	Xi’an University of Architecture and Engineering	

During this period, professionals began to realize that traditional rural settlements have their own inherent order and laws, and planning should respect and “make concessions” to them [19]. For example, in determining the scope of planning, the original townships should be incor-

porated into the same brigade as much as possible, while the division of production teams should coincide with the boundaries of natural villages as much as possible [20]. In order to explore how to better utilize the original buildings in the construction of the People’s Commune, the Archi-

tectural History Teaching and Research Section of the Department of Architecture at Nanjing Institute of Technology conducted an in-depth investigation on the characteristics of the original natural villages and residential buildings, and proposed that some buildings that are naturally and appropriately combined with the local terrain and materials and have historical and artistic value can be preserved as educational examples in the future [21]. Even if these trade-offs were primarily aimed at reducing construction costs and obstacles, they also reflected professional researchers' understanding of the organic, systematic, and historical nature of traditional rural settlements as social units.

2 Germination stage (reform and opening up~1980s)

After the reform and opening up, Chinese society entered a new period of historic development, with the focus of economic work shifting to the realization of socialist modernization and the gradual opening up of culture. The vigorous development of village and town construction and rural housing construction brought about an urgent need for rural environment and landscape design and heritage conservation. The promulgation of the *Law on the Protection of Cultural Relics*, as well as the conservation research and planning of famous historic and cultural cities and historic towns, also brought inspiration to the understanding, research, and practice of traditional rural settlements. It was during this period that traditional rural settlements gradually became a specialized topic and came into the view of scholars.

2.1 Demands for rural housing construction and village/town planning

The two most representative events in China's rural reform in the late 1970s and early 1980s were the promotion of the household contract responsibility system and the development of township and village enterprises. The implementation of the household contract responsibility system stimulated farmers' enthusiasm for independent production and construction, and the increase in farmers' income laid the economic foundation for individual housing construction following the implementation of the homestead policy for a period of time. At the end of 1978, the state convened the "First National Conference on Ru-

ral Housing Construction", which relaxed the controls over self-built houses in rural areas. Farmers' demand for self-built houses exploded, and problems such as demolishing old houses to build new ones and illegally occupying farmland emerged one after another. Therefore, the main task of the "Second National Conference on Rural Housing Construction" in 1981 was to study and take practical measures to guide rural housing construction onto a track that was led, planned, and implemented step by step. Comrade Wan Li, then Vice Premier of the State Council, emphasized: "Rural housing construction must also be scientific, safe, functional and aesthetically pleasing, while reflecting local characteristics and rural landscapes"[22].

Following the meeting, the construction department, in response to the chaotic situation of self-built houses in rural areas, began to conduct cadre training and carry out planning compilation across the country. Although the planning focused on how to better adapt to the needs of rural housing construction, since most villages at that time still retained their traditional form, some experts suggested that attention should be paid to the characteristics of rural landscapes, which involved the issue of understanding the historical built environment. In April 1983, Feng Hua, an expert on rural and urban construction from the Architectural Society of China, published an article titled *A Brief Discussion on Coordinated Development of Urban and Rural Areas* in the journal *Architectural Journal* [23]. He pointed out that rural and urban construction should emphasize environmental construction. "The layout of buildings should feature the coexistence and interspersion of the old and the new, integrated harmoniously to create a rich and diverse landscape for towns and villages... Moreover, buildings of historical value should be preserved as much as possible; without altering their original appearance, their internal living functions should be appropriately renovated and upgraded so that people can enjoy modern 20th-century civilization in a quaint and elegant environment." It can be seen that by this time, experts in the construction field had already formed a reasonable understanding of rural spatial environment, the integration of old and new, and heritage conservation. In 1989, Feng Hua once again published an article in the journal emphasizing

issues such as traditional style, natural harmony, and group coordination in rural landscape, advocating that old houses should be appropriately renovated and utilized to give full play to their historical value: “Rural areas should also attach importance to the renovation and utilization of old houses, and not demolish them all. Some houses can be transformed into charming buildings... Some characteristic buildings with historical significance can not only be preserved, but can also shine again” [24]. These perceptions reflect a shift in the understanding of traditional rural architecture from simply viewing it as an object of aesthetic appreciation within the general living environment and landscape to recognizing it as a carrier of local historical culture and social and emotional values.

Alongside the promotion of the household contract responsibility system, township and village enterprises emerged as a powerful force. In 1983, Fei Xiaotong delivered a lengthy speech titled *Big Problems of Small Towns* at the Jiangsu Province Small Towns Symposium, proposing that “the construction of small towns is a major issue for developing the rural economy and resolving the employment and relocation of the rural population” [25], which caused a huge reaction in society. The small towns referred to here were mostly villages and towns, especially some small market towns, which were not much larger than the surrounding villages and only served commercial functions. Therefore, at this time, rural settlements entered the research field of scholars as the concept of “villages and towns”. For example, the current magazine *Small Town Construction* was also named *Village and Town Construction* when it was founded in 1983.

With the support of national policies, township and village enterprises developed rapidly, and the role of village and town construction in local socio-economic development became prominent. For some villages and towns with high historical and cultural value and traditional features, how to balance the relationship between conservation and development became a practical issue that needed to be discussed. Some scholars believed that traditional villages and towns at that time had “already encountered serious problems due to the disorderly development of industry”. In a certain historic town in southern Sichuan that

they investigated, “the river bend was filled with bearing factories, machinery factories and cement factories, with thick smoke and deafening noise. Industrial wastewater was discharged without treatment, and fish were almost extinct. These problems urgently need to be solved”. They proposed that “such towns should be planned and designed, and construction regulations should be established to avoid arbitrary arrangements” [26]. However, since village and town planning was still in its early stages at that time, experience and technical expertise in the conservation of traditional towns and villages were severely lacking. Consequently, conservation planning often adopted conventional planning approaches developed for ordinary towns, with insufficient respect for the historical and cultural heritage. Scholars pointed out with concern: “Without culture and history, lacking consideration in composition, and without serious research on new technologies and processes, relying solely on a little technical knowledge, arbitrarily adding some incongruous things to the composition created by people over thousands of years will sooner or later arouse people’s resentment” [26]. Some scholars, based on a careful study of the spatial characteristics of the water towns in Shaoxing, pointed out that “due to improper layout, the architectural styles of the two towns have been affected to varying degrees”. Even more disturbing was that the town plan proposed to fill in the main river and widen the old street in order to introduce a highway, thus carrying out a “complete transformation” of the water town. If this plan had been implemented, the town’s distinctive features would be completely destroyed [27].

The urgent need for the development of conservation plans for traditional villages and towns prompted many architecture and planning professionals to dedicate themselves to this field. The Yangtze River Delta region, which was the area where township enterprises were most developed and the economy grew fastest, while also preserving a large number of ancient water towns, took the lead in exploring the balance between development and conservation of ancient towns, becoming a highly notable phenomenon in the study of villages and towns during this period [28-30]. At the same time, Ruan Yisan presided o-

ver a survey of ancient water towns in the Jiangnan region and successively compiled conservation plans for ancient water towns such as Zhouzhuang, Tongli, Luzhi, Wuzhen, Xitang, and Nanxun. These plans played a very positive exemplary role in promoting the conservation of ancient water towns and also provided important insights for the conservation and development of traditional rural settlements across the country.

2.2 Promotion of cultural relic conservation work and related laws and regulations

Since the founding of the People's Republic of China, the country has gradually established a system for the conservation and management of immovable cultural relics with cultural relic conservation units as the core¹⁾. However, the objects of conservation were mainly individual buildings, which led to a certain gap between the conservation needs of traditional rural settlements and existing regulations. How to protect collective architectural heritage within the existing legal framework became an urgent problem to be solved.

In 1981, China launched its second national cultural relic census, which far exceeded the scale and results of the first census. More than 400,000 immovable cultural relics were investigated and registered, and 2,351 national key cultural relic conservation units were subsequently announced. At the urging of numerous experts and scholars, this census also identified some well-preserved and distinctive village and town architectural groups as cultural relic conservation units, thus bringing traditional rural settlements into the national cultural relic conservation system. For example, Tongli Town in Suzhou City, as a representative of ancient water towns, was designated as a cultural relic conservation unit of Jiangsu Province in 1982, becoming the first town to have its overall settlement integrated into the cultural relic conservation system. In subsequent batches of cultural relic conservation units, there were examples of entire villages and towns being designated as cultural relic conservation units. For example, Dingcun in Linfen, Shanxi Province, gained widespread attention as early as 1964 because its archaeological site was listed as a national key cultural relic conservation unit. Later, due to the well-preserved and valuable ancient

Ming and Qing dynasty architectural groups, it was announced as a whole as part of the third batch of national key cultural relic conservation units in 1988. The Dingcun Conservation Plan, compiled in 1985, identified three ancient building protection zones and proposed the idea of gradually restoring the original appearance of ancient buildings. It broke through the general regulatory indicator restrictions in the configuration of public buildings, distinguished between tourism reception and services for local residents, and also put forward requirements on the overall appearance of the village and the contrast between the old and the new [31] (Fig. 3). The village was planned relatively early and was oriented towards the conservation of cultural relics, making it somewhat representative.

Although the number of traditional villages and towns included in the cultural relic conservation system in the early stages was not large, it showed that the state had recognized the importance of traditional villages and towns and was trying to recognize them in the legal system. This greatly promoted the research on traditional rural settlements, which was still in its infancy.

On the one hand, cultural relic conservation units had many rigid conservation requirements at the legal level, such as delineating the conservation scope and construction control zone, and formulating conservation measures, which already reflected the importance attached to the overall "surrounding environment and landscape" that transcends the cultural relics themselves [32]. In particular, the ICOMOS *International Charter for the Conservation and Restoration of Monuments and Historic Sites* (Venice Charter) and the *International Charter for the Conservation of Historic Towns and Urban Areas* (Washington Charter) were introduced to China in 1982 and 1986, respectively [33, 34], and more scholars in China recognized the importance of the holistic conservation of the village clusters and their surrounding environment.

On the other hand, national-level recognition and promotion greatly stimulated the enthusiasm of researchers and practitioners. In 1987, Hu Lichen of the Zhejiang Provincial Department of Construction organized researchers to conduct research on the ancient village groups in his hometown and published an article in the *Architectural*

Journal entitled *Antique, Elegant, Agile and Diverse: The Architectural Style of Nanxi River* [35]. He introduced the architectural style of villages such as Tanxia Village, Furong Village, Cangpo Village, Donggao Village, and Pengxi Village from the perspective of the then-popular perspective of scenic and cultural tourism, and called on “the national architectural and landscape architecture circles to pay attention to these architectural treasures buried in the deep mountains and valleys”. Chen Zhihua of Tsing-

hua University also said excitedly after the research trip: “Xinye Village and the village groups in the middle reaches of Nanxi River have made us very excited. We are like archaeologists who have dug up an underground palace with a shovel, and our eyes are full of rare treasures [36].” This trip also laid the groundwork for Chen Zhihua’s later series of surveys on vernacular architecture in the Nanxi River Basin, and laid the ideological foundation for the overall research and conservation of vernacular settlements as units.

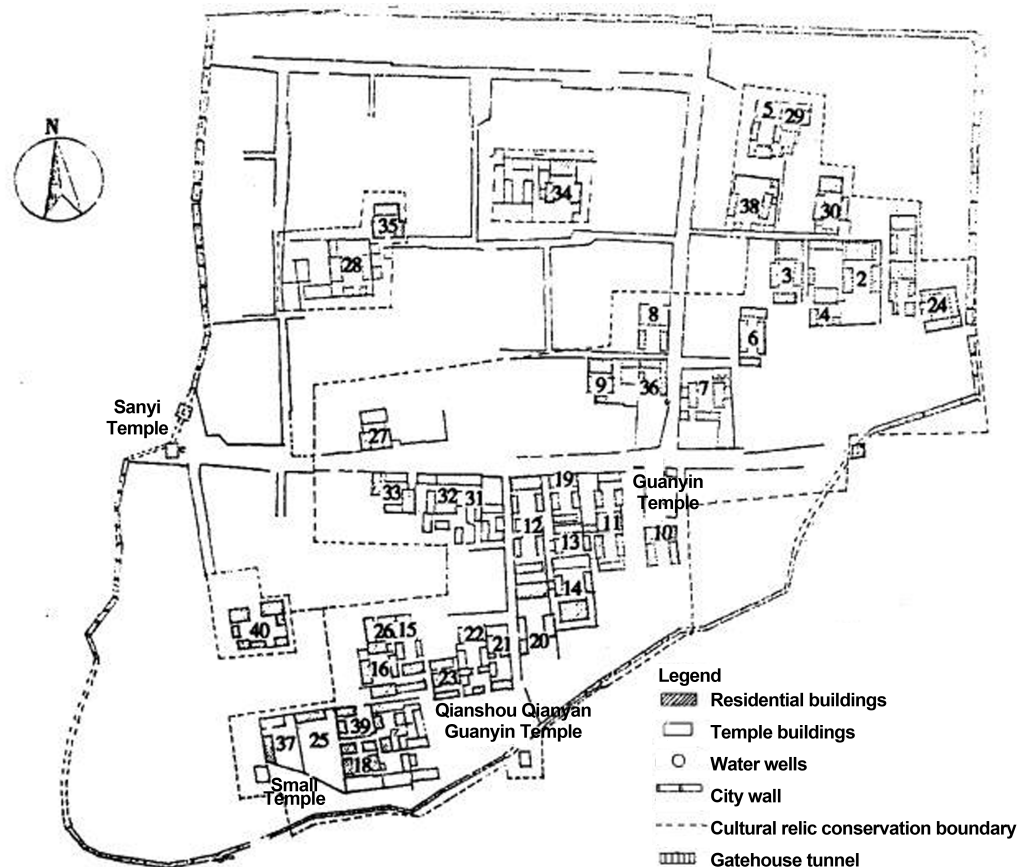


Figure 3 Conservation plan map of Dingcun

2.3 Lessons Learned from the Practice of Protecting Famous Historic and Cultural Cities

The emergence and development of China’s system for conserving famous historic and cultural cities has also had a significant impact on the research on the conservation of traditional rural settlements. Since the 1980s, with the advancement of urbanization, cities expanded rapidly. Due to the lack of corresponding cultural heritage conservation concepts, many precious heritage sites were damaged to varying degrees. In light of this situation, in 1982 the State Council forwarded the *Request for Instructions*

on Protecting China’s Famous Historic and Cultural Cities submitted by the State Construction Commission and other departments, approving the first batch of 24 cities with significant historical value and revolutionary significance as famous historic and cultural cities. The Law on the Protection of Cultural Relics, promulgated in the same year, also explicitly stipulated in its articles that cities “with particularly rich cultural relics and of great historical and revolutionary significance” would be designated as famous historic and cultural cities, thus establishing their legal status.

It is worth noting that in 1986, the State Council forwarded the report from the Ministry of Construction and the Ministry of Culture entitled *Report on Requesting the Announcement of the Second Batch of National Famous Historic and Cultural Cities*, which not only put forward the approval standards and conservation planning requirements for famous historic and cultural cities, but also explained the concept of “historic and cultural conservation areas” in great detail. The report pointed out: “Districts, groups of buildings, towns, and villages that possess a relatively concentrated collection of cultural relics and historical sites, or that can fairly completely reflect the traditional style and local ethnic characteristics of a certain historical period, should also be protected. The people’s governments of provinces, autonomous regions, municipalities directly under the Central Government, or cities and counties may, based on their historical, scientific, and artistic value, verify and announce them as ‘historic and cultural conservation areas’ at their respective levels. The conservation measures for ‘historic and cultural conservation areas’ can refer to the practices for cultural relic conservation units, focusing on protecting the overall features and characteristics.” The report proposed for the first time to protect towns and villages, but suggested that the conservation methods used for cultural relic conservation units should be referenced. This indicates that the state had a full understanding of the historical and cultural value of traditional villages and towns, but was still in the exploratory stage in terms of institutional supply and supporting measures. The statement that emphasis should be placed on “protecting the overall features and characteristics” clearly reflects an inherent meaning of referring to the overall conservation of famous historic cities.

As settlements, famous historic cities and traditional villages and towns share certain commonalities. They both appear as groups of buildings with high historical and cultural value, so the concept of overall conservation is the same. However, cities are fundamentally different from villages and towns, differing in scale, spatial form, and socio-economic operation. As a component of famous historic and cultural cities, “characteristic districts” are similar to traditional villages and towns to some extent. Therefore,

given the unclear legal framework for the conservation of traditional villages and towns, it was in line with the reality at the time to consider including “districts, groups of buildings, towns, and villages” in the “historic and cultural protection zone”. In fact, when the first batch of famous historic and cultural cities was announced in 1982, the requirements for the preparation of conservation plans included distinctive districts as the essence of the cities, which were one of the important contents of the conservation plans. As a result, research results on districts gradually became richer, and there was a certain accumulation of experience in practice. These research findings and practical experiences were used as a reference for the research and conservation planning of similar traditional villages and towns. From this perspective, the system for conserving famous historic and cultural cities played a role in promoting the conservation and research of traditional villages and towns.

Overall, the academic community’s attention to traditional rural settlements during this period evolved from being driven by the initial needs of village and town construction to a proactive research enthusiasm and pursuit of ideals, and the endogenous driving force for the study of traditional rural settlements was emerging. In the mid-to-late 1980s and early 1990s, China Architecture & Building Press published a series of books on vernacular dwellings by province [37, 38]. Most of these books dedicated a section to the overall layout of villages or settlements, becoming the earliest systemic research achievements on vernacular dwellings and rural settlements. At the same time, the development of the disciplines and related practices such as cultural heritage protection laws progressed in tandem and mutually promoted each other, which also led to public recognition of rural heritage. For example, the “Chinese Dwellings” special stamps issued by China Post in 1986 reflected that the recognition of the value of vernacular architectural heritage had broken out of the academic circle and begun to attract public attention.

3 Startup stage (1990s)

In the 1990s, China comprehensively advanced the development of a socialist market economy, and the reform and opening up entered a period of vigorous development.

The country's overall national strength continued to improve, and its international exchanges also reached a new level. From the late 1980s to the early 1990s, many international charters and concepts on the conservation of small settlements and historic towns were translated and introduced into China by experts and scholars, which promoted the renewal and iteration of the concept of historic and cultural heritage conservation nationwide, and the research on traditional rural settlements also made steady progress. This coincided with a new period of accelerated urbanization in China, where large-scale development and construction across the country brought new challenges to the conservation of cultural heritage. Based on extensive research and practice in the conservation planning of traditional rural settlements, many representative achievements were also formed during this period.

3.1 The promotion of foreign cultural heritage conservation concepts

A review of the guiding documents for international cultural heritage conservation reveals that the *Athens Charter* of the 1930s proposed conserving individual monuments and sites, while the *Venice Charter* (1964), the *Nairobi Recommendation* (1975), and the *Washington Charter* (1987) of the 1960s-1980s successively proposed the concept of protecting historic towns and urban areas, expanding the scope of conservation from individual sites to groups. In particular, the International Council on Monuments and Sites (ICOMOS) issued the *Tlaxcala Declaration on the Regeneration of Small Settlements* in 1982, pointing out that local materials and traditional construction techniques should be used to strengthen local cultural characteristics and conserve the historical, cultural, social, and economic aspects of rural settlements. The subsequent *Charter on the Built Vernacular Architectural Heritage* (ICOMOS, 1999) explicitly states that the conservation of vernacular architecture should be achieved by maintaining and preserving groups of buildings and villages with distinctive characteristics.

Most of these regulations and documents were translated by Chen Zhihua and published in journals such as *World Architecture* in the late 1980s and 1990s [39, 40]. With the spread of new concepts from abroad, the under-

standing of architectural cultural heritage conservation in China began to shift from individual sites to groups, from the site itself to the environment, and from material form to history and culture, becoming more comprehensive in its conservation philosophy. In 1991, the Academic Committee of Famous Historic and Cultural Cities held its annual meeting on the theme of "Conservation and Renewal of Historic Sites". More than ten experts attended the meeting and had a heated discussion. Zhu Zixuan cited the *Nairobi Recommendation* and believed that "villages, hamlets and groups of historic buildings" should all belong to "historic areas". The *Several Suggestions on the Protection of Historic Areas* [41] issued after the meeting emphasized that many valuable traditional districts and towns lack corresponding conservation and management because they are not famous historic cities. This should attract the attention of relevant departments, academic circles, and leaders at all levels, and efforts should be made to secure their status in the legislative process. Liu Peilin also proposed that a system for the conservation of famous historic villages should be established, based on the holistic understanding of the historical environment in the *Venice Charter* [42]. Influenced by international conservation charters and driven by new conservation concepts and practices, the outline of research on traditional rural settlements gradually became clearer, and its connotations were continuously enriched. It also gained recognition and popularity among experts, scholars, and practitioners, laying a solid foundation for the next stage of research.

3.2 Formation and development of research paradigms

3.2.1 Development of research paradigms on settlement spatial morphology

Studies of traditional villages and towns in the 1970s and 1980s largely served the purpose of scenic tourism and conservation planning. Researchers were mainly from the disciplines of architecture and planning, and the research topics, apart from conservation planning itself, mainly focused on the spatial morphology of traditional villages and towns. Many of the works mentioned above exhibit this characteristic. After more than a decade of accumulation, the concepts, methods, and technologies involved in spatial morphology research gradually converged into a spe-

cific paradigm, becoming the foundation for architectural and planning scholars to conduct cognitive and practical research on traditional rural settlements. This “morphological analysis paradigm” analyzes various elements and their structural relationships and composition methods in traditional villages and towns based on professional technical drawings, including the overall layout of the settlement, the planar, elevational, and sectional features of buildings, the form of streets, squares, and public spaces, etc. It is accompanied by neat, exquisite, and beautiful hand-drawn perspective drawings, using a language unique to architects and planners to articulate their cognitive logic

and methods for understanding traditional rural settlements, demonstrating a very distinctive professional characteristic. Peng Yigang's book *Analysis of Traditional Village Settlement Landscape* [43] systematically discusses the formation process of traditional village and town settlements with a large number of hand-drawn drawings and photos (Fig. 4), and clarifies that due to the different regional climate, topography, living customs, ethnic cultural traditions, and religious beliefs, the village and town settlement landscapes vary across different regions. This book has both academic and practical guiding value, and is of milestone significance in the study of village and town settlements.

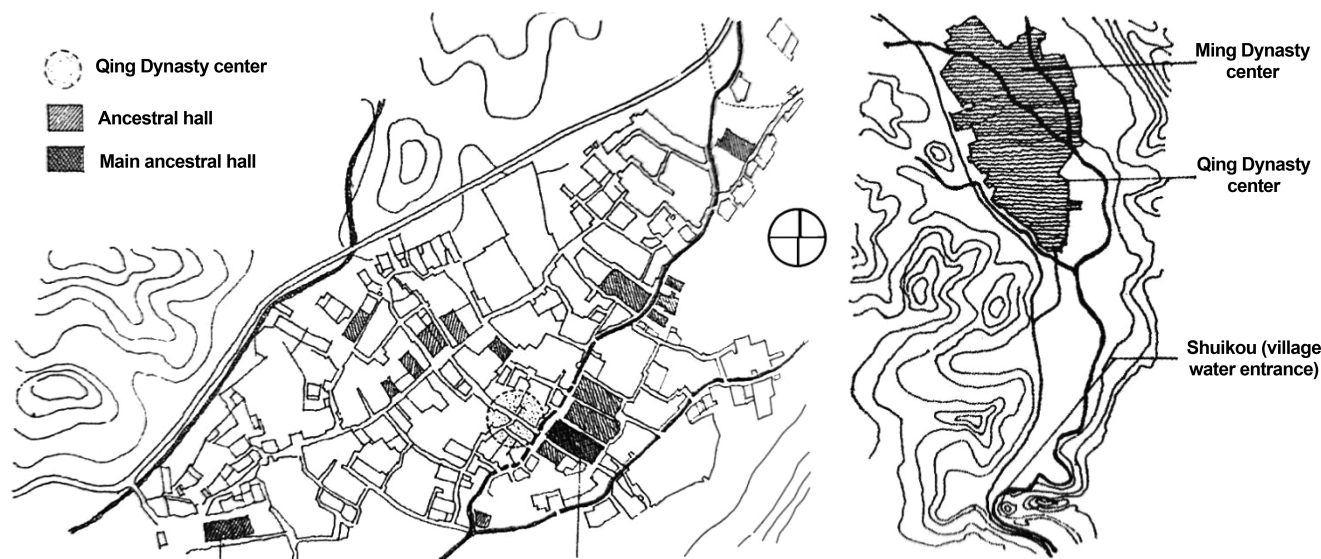


Figure 4 Schematic diagram of the overall layout and surroundings of Xidi Village, Yi County, southern Anhui Province

During this period, the ancient villages of Huizhou attracted widespread attention from the art, photography, theater, and other cultural circles due to their typicality, integrity, and profound cultural heritage. They also became the focus of architectural research using the morphological analysis paradigm [44-46]. Among them, a group of master's and doctoral students from Southeast University, such as Dong Wei, Zhang Shiqing, and Han Dongqing, carried out systematic research on the ancient villages of Huizhou (southern Anhui) [47-49]. It is safe to say that the high attention and in-depth research on the villages of Huizhou by the academic community during this period greatly contributed to the fact that the ancient villages of southern Anhui became the first village-type World Cultural Heritage site in China in 2000.

3.2.2 Deepening of the case study paradigm

In the 1980s, research on traditional rural settlements mainly served the purpose of conservation planning, and the subjects of study were living, individual villages. Therefore, the interpretation of individual villages became a main theme of the research. At that time, most of the research findings were general introductions to rural settlements, lacking theoretical discussions and systematic analysis. Since the 1990s, scholars began to study traditional rural settlements in a more in-depth way. Through detailed field surveys, mapping, photography, interviews, and other methods, they presented the visual characteristics and local customs of traditional rural settlements to the world in a nuanced manner. A prominent figure who employed this method in research is Professor Chen Zhihua of Tsinghua

University. Since 1989, Chen Zhihua, together with Lou Qingxi, Li Qiuxiang and other teachers and students, had begun to investigate and study vernacular architecture. He proposed to use “living circles” as the unit rather than study individual houses in isolation, and to study the changes in villages and houses caused by social, economic and cultural development in a dynamic way. In this way, he could conduct comparative studies on the architectural types, layouts, construction techniques, formal styles and settlement morphologies of a region with other regions. He also published a series of works such as *Ancient Villages in the Middle Reaches of Nanxi River*, *Xinye Village* and *Zhuge Village* [50-52], which generated a strong response in the academic community. Chen Zhihua’s research emphasizes that settlements are “the whole that forms a social, cultural, living and spatial structure” and “the basic unit of the human settlement environment” [53]. He pointed out the significance of settlement research in the study of vernacular architecture and vernacular culture, and comprehensively systematized the basic content and research methods of settlement research, thus establishing a systematic and solid research framework for the study of vernacular settlements.

In the deepening of case studies, the methods and perspectives of disciplines such as history and anthropology, which excel at case analysis, were often borrowed and applied. For example, Shen Kening’s analysis of the settlement morphological structure of Longmen Village in Fuyang County, Hangzhou, combined the social structure of patriarchal blood ties for mapping and analysis [54]. This trend also sparked great interest among scholars at home and abroad in traditional rural settlements across China. In addition to the Jiangnan region, typical rural settlements in Guangdong, Hunan, and Taiwan also came into the scholars’ view [55-57].

3.2.3 The Emergence of Multidisciplinary Research

Traditional rural settlements are places where villagers live and conduct their daily lives. They contain rich historical and cultural information and connotations, which need to be explored from different disciplines and perspectives. A deeper understanding of the rich connotations of traditional rural settlements has prompted scholars

from various fields to spontaneously learn from and integrate multidisciplinary perspectives and methods. Beginning in the 1990s, the interdisciplinary paradigm gradually became a new paradigm that scholars were eager to explore. Compared with the two research paradigms mentioned above, the “morphological analysis paradigm” is a classic paradigm in architecture and planning, which focuses on “form” and articulates it using the professional language of the discipline; the “case analysis paradigm” is a systemic and in-depth analysis of cases based on field research; and the most essential feature of the “interdisciplinary paradigm” is to use the knowledge framework of different disciplines to explore the hidden generative logic behind traditional rural settlements and reveal some universal patterns. For example, Liu Peilin started with the landscape imagery of traditional rural settlements, taking them as a carrier of regional culture, and studied the distribution of this landscape phenomenon using the framework of classical cultural geography [58-61]; additionally, from the perspective of cultural anthropology, through the examination of a series of factors such as folklore, kinship systems, morality, ethics, and education, studies revealed how traditional culture affects the daily life of village residents and how these influences are reflected in spatial forms [62-64]; and works conducted from the perspective of ecology mainly analyze how traditional villages and towns achieve harmonious coexistence between humans and the natural environment by constructing spatial forms that are adapted to the local region and climate [65-67]. Lu Yuanding of South China University of Technology and the settlement and vernacular dwelling research team he led attempted to integrate the strengths of geography, ethnology, archaeology, and architecture in settlement research, and proposed a theoretical framework for human settlement research based on four systems: natural ecology, economy and technology, social organization, and cultural ideologies [68]. This laid the theoretical foundation for the subsequent research on settlements and vernacular dwellings of the major Han sub-groups in South China.

4 Development stage (2000s~)

At the turn of the millennium, China’s urbanization rate reached 36.2%, marking the beginning of a new phase

of rapid urbanization. In 2001, the *Outline of the Tenth Five-Year Plan for National Economic and Social Development* elevated the urbanization strategy to a national strategy on par with the national strategies of reinvigorating the country through science and education, sustainable development, and the development of the western region, thus propelling urban and rural construction into a new era. In 2005, Wang Guangtao, the former Minister of Construction, published an article in *Urban Planning Forum*, pointing out that China already possessed “the economic and social foundation of industry supporting agriculture and cities supporting rural areas”, and that “central leaders have required the Ministry of Construction to effectively strengthen the construction of villages and towns” and “to study the construction of a New Socialist Countryside using the ideas and concepts of integrated urban and rural development” [69]. Since the 18th National Congress of the Communist Party of China, the “three rural issues” (issues concerning agriculture, rural areas, and farmers) have become a top priority for the Party, and rural development has played an increasingly important role in national economic and social development as a national strategy. The conservation and utilization of rural built heritage, as an important issue in the process of rural construction, have received widespread attention from experts and scholars, and the study of traditional rural settlements has thus developed rapidly and significantly.

4.1 Designation of famous historic and cultural towns and villages (2000-2012)

In 2000, the “Ancient Villages of Southern Anhui” were successfully inscribed as a World Cultural Heritage site, marking a major event in China’s heritage conservation field in the new millennium and sparking unprecedented enthusiasm for the study of traditional rural settlements. In October 2002, the Standing Committee of the National People’s Congress issued the *Law of the People’s Republic of China on the Protection of Cultural Relics* (2002 Amendment), which introduced the concept of “historic and cultural villages and towns”. For the first time, villages and towns were recognized as independent and named objects of conservation and formally incorporated into the highest legislative framework for the conservation

of cultural relics in China, marking a landmark event in the history of rural settlement heritage conservation.

The 2002 version of the *Law on the Protection of Cultural Relics* stipulates that “towns, streets, and villages that are particularly rich in cultural relics and have significant historical value or revolutionary commemorative significance shall be designated and announced as historic and cultural districts, towns and villages”, and requires local governments to “organize the preparation of special conservation plans for historic and cultural cities, districts, towns, and villages, and incorporate them into the overall master plan.” This provided a direct legal basis for the conservation of historic and cultural villages and towns, and clarified the basic framework for related work. The conservation of historic and cultural villages and towns became an important public affair, or even an administrative task, and entered the urban and rural planning system, being positioned as a special chapter or specific topic of the master plan. It should be noted that the prerequisite for being designated as a historic and cultural village or town was that it possessed an exceptionally rich collection of cultural relics. At that time, the number of rural settlements that met this condition was limited, and the selected units were truly the cream of the crop.

Based on the *Law on the Protection of Cultural Relics*, starting in 2003, the Ministry of Construction and the State Administration of Cultural Heritage jointly organized the selection of “China’s Famous Historic and Cultural Towns and Villages”, formally establishing the specific terminology of “Famous Historic and Cultural Towns and Villages”. In addition to the standards for cultural relic resources stipulated in the *Law on the Protection of Cultural Relics*, it also added the description of “towns and villages that can fairly completely reflect the traditional features and local ethnic characteristics of some historical periods”, reflecting the functional needs of the construction department in conserving the historical and cultural heritage of towns and villages in the process of urban and rural development. In the same year, the Ministry of Construction, together with the State Administration of Cultural Heritage, issued the *Measures for the Selection of China’s Famous Historic and Cultural Towns (Villages)*²⁾, which determined

the basic conditions, evaluation standards and implementation methods for the selection. One of the prerequisites was that “a scientific and reasonable master plan for the town or village has been prepared”. This condition greatly promoted the development of research on historic and cultural villages in various regions, because research is the basis for planning, and the number of villages applying for the title of historic and cultural village nationwide was much greater than the number that were approved. From 2003 to 2019, the two ministries announced seven batches of 487 famous historic and cultural villages in China, establishing the status of ancient villages as conservation objects at the national level, making them an important part of the urban and rural built heritage conservation system.

In this process, the State Council promulgated the *Regulations on the Conservation of Famous Historic and Cultural Cities, Towns and Villages* in 2008. This nationwide legal document gave the conservation of historic and cultural villages legal force, which is of great significance. The regulations provide specific definitions for the application criteria for famous villages. In addition to the requirements for selecting famous villages mentioned above, they also add requirements such as “historic buildings are concentrated in contiguous groups and retain traditional layout and historical features”. This is partly because after the implementation of the *Urban Purple Line Management Measures* for a period of time, the conservation of “historic buildings” gradually became an important area for construction departments to manage architectural heritage. Many historic buildings in various regions were also located in villages. Therefore, in addition to cultural relic conservation units, it was necessary to consider the factor of historical buildings. The term “concentrated in contiguous groups” is used because historic buildings differ from immovable cultural relics in terms of their value attributes. Especially in rural areas, many buildings did not meet the requirements for cultural relics on an individual level, but their group composition had high value. On the other hand, the regulations also stipulate that the conservation plan for famous villages should be completed within one

year of its approval and publication, and should include “the requirements for the conservation of traditional layout and historical features”. This is the main feature that distinguishes settlement-scale heritage from individual cultural relics. It is applicable to famous cities, towns, districts and villages. This also reflects the basic understanding of the national construction departments and the discipline of architectural planning on this issue.

4.2 Designation of traditional chinese villages (2012-2022)

Since the 18th National Congress of the Communist Party of China, General Secretary Xi Jinping has visited traditional villages many times and given important instructions on the conservation of traditional villages, emphasizing that “rural civilization is the main body of the history of Chinese civilization, and villages are the carriers of this civilization.”³⁾ In 2012, the Ministry of Housing and Urban-Rural Development, the Ministry of Culture, the State Administration of Cultural Heritage, and the Ministry of Finance jointly launched a survey of traditional Chinese villages to investigate villages with certain historical and cultural value across the country and to grasp the baseline data of traditional villages. This work was strongly advocated by CPPCC members such as Feng Jicai, and the joint efforts of the four departments also reflected that traditional villages had become a common focus of the country and society. The workload of this task was considerable, but it was completed quickly within six months, indicating that various regions across the country had a basic grasp of the situation of traditional villages. The aggregated national data showed that there were nearly 12,000 villages with traditional characteristics at that time [70], but the actual number would be much larger. The principle of this survey was “not to conduct a village-by-village census”⁴⁾, but to make full use of existing resources and carry out the survey through multiple channels, including data collection by relevant departments, reporting by grassroots organizations, and information on eligible villages provided by social groups, schools, research institutes, experts and scholars, and other social forces. Based on this, the Ministry of Housing and Urban-Rural Development, the Ministry of Culture and the Ministry of Finance

reviewed 5,121 villages that were recommended for inclusion in the list of traditional Chinese villages, and announced the first batch of 646 traditional Chinese villages in December 2012. Since then, the investigation and application process for traditional villages has continued, and to date, six batches totaling 8,155 traditional Chinese villages have been announced. During this period, the General Office of the CPC Central Committee and the General Office of the State Council issued the *Opinions on Implementing the Project for the Inheritance and Development of Excellent Traditional Chinese Culture* in January 2017, proposing to focus on implementing the “Traditional Chinese Villages Conservation Project”, which raised the importance of the conservation of traditional villages to a new level and put forward higher requirements.

As can be seen from the investigation notice issued by the four departments⁴⁾, the connotation of traditional villages has been significantly expanded compared to famous historic and cultural villages. First, they “were formed relatively early”, rather than explicitly specifying the Qing Dynasty or earlier; second, they “possess relatively rich traditional resources”, adding intangible cultural heritage in addition to tangible cultural heritage; and third, they have “certain historical, cultural, scientific, artistic, social, and economic value”, which is also a relatively broad description. It is important to note that the notice states that the “traditional architectural style should be kept intact”. Here, traditional architecture includes three categories: historical buildings, vernacular architecture, and cultural relics. The mention of “vernacular architecture” was unprecedented, yet it aligned well with the reality of traditional villages. Many buildings in villages are neither cultural relics nor historic buildings in a legal sense, but rather vernacular architecture with a certain traditional style. However, they play a structural role in the formation of the overall style of traditional villages. This conceptual shift not only integrates the practical needs of various departments for the management of traditional villages, but also reflects the characteristics of rural cultural heritage, leading to a more accurate understanding of the richness of the connotations of traditional villages.

The list of traditional Chinese villages has received widespread attention from all sectors of society since it was announced. The management department has also made a series of work arrangements across the country to promote the conservation and utilization of traditional villages [71]. At the policy and regulatory level, requirements and opinions on the investigation, planning, implementation of conservation projects, warnings, and withdrawal of traditional villages have been formulated and issued. In terms of publicity and training, a “digital museum of traditional villages” has been built, image logos have been solicited, and training and a series of publicity activities on the conservation and development of traditional villages have been organized. Meanwhile, in terms of funding, the central government has allocated a total of 13.1 billion yuan since 2014, providing subsidies of 3 million yuan per village to villages included in the list. In 2020, the Ministry of Finance, together with the Ministry of Housing and Urban-Rural Development, launched a demonstration program on concentrated and contiguous conservation and utilization of traditional villages, selecting 10 demonstration cities, including Huangshan in Anhui and Fuzhou in Jiangxi, with the central government allocating a subsidy of 150 million yuan to each city; and adding 40 and 35 more cities in 2022 and 2023, respectively. The government’s continuous, intensive, and comprehensive efforts to promote the conservation and utilization of traditional villages have greatly encouraged researchers and technicians to pay attention to these villages, deepened their understanding of village cultural heritage, and pushed the conservation of rural settlement cultural heritage to a new height.

4.3 The Vigorous Development of Research

Thanks to the state’s emphasis and societal attention, research on traditional rural settlements has shown a vigorous development trend. An analysis of the keywords in relevant research over the past 20 years since the new millennium reveals the following characteristics: First, the research intensity is strongly correlated with policy cycles. For example, a series of papers emerged in years of key policy milestones such as “New Rural Construction”

(2007), “Traditional Chinese Villages” (2013), and “Rural Revitalization Strategy” (2019) (Fig. 5); Second, conservation and development (revitalization) are the two main themes (Figs. 6 and 7), with a consistent preference for a focus on space; Third, internet technology has driven an explosive growth in knowledge, and new research entry points exhibit a statistical long-tail effect, such as

digital villages and image studies. In terms of research content, methods, and resources, the field is characterized by a flourishing and diverse landscape. In particular, the development of technologies such as big data, digital twins, and artificial intelligence in recent years has brought new insights into the study of traditional rural settlements.

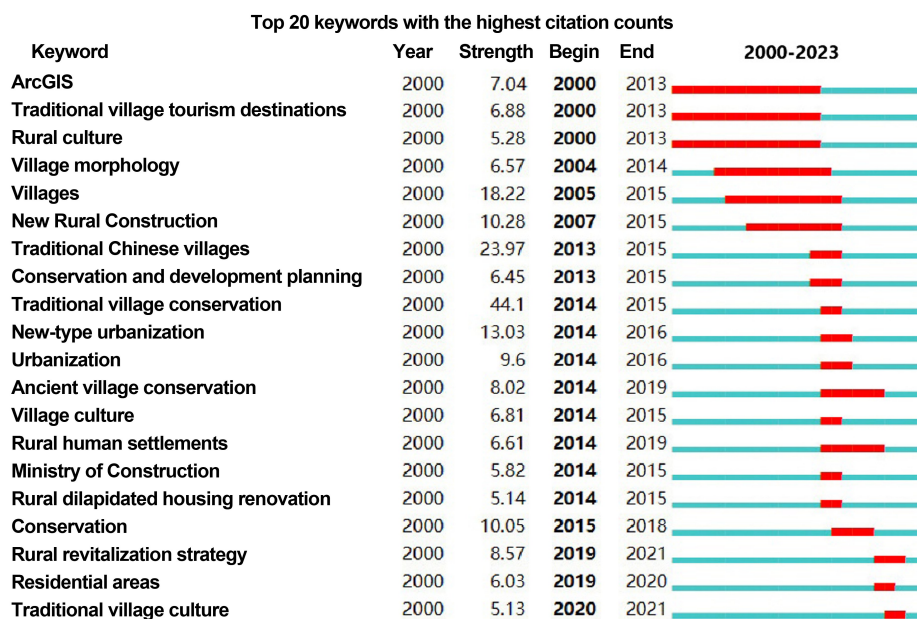


Figure 5 Top cited keywords and their emergence time spectrum in research related to traditional rural settlements from 2000 to 2023

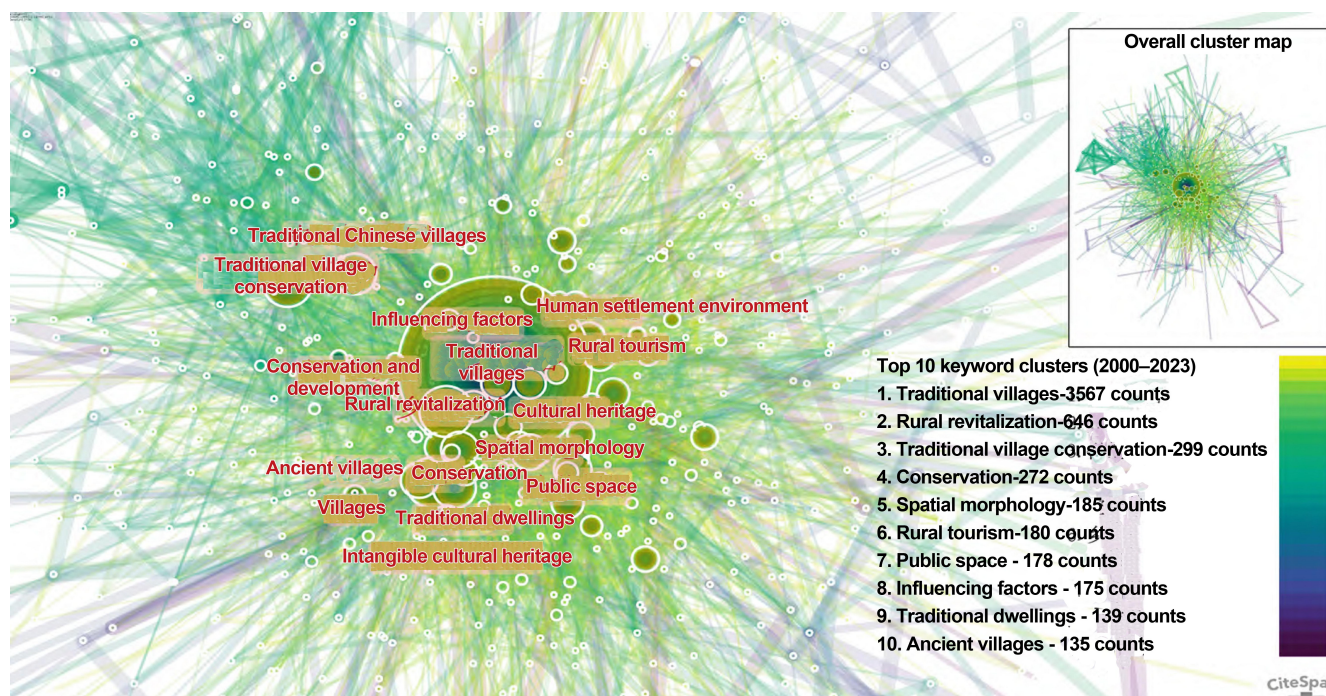


Figure 6 Keyword network diagram related to traditional rural settlements research from 2000 to 2023

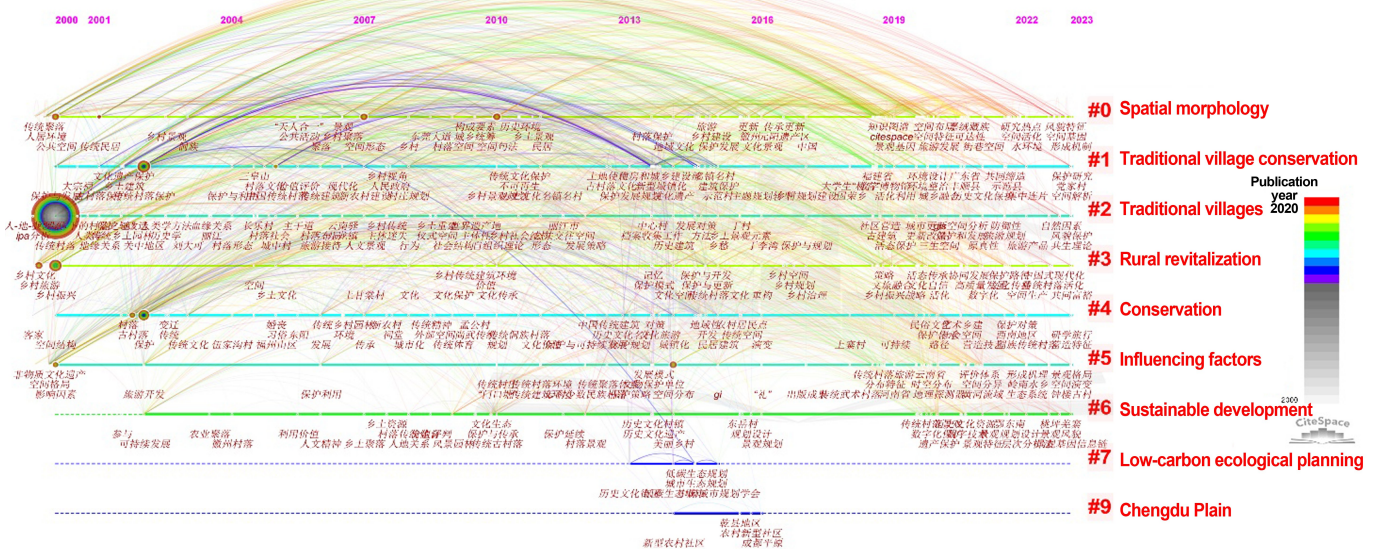


Figure 7 Keyword clustering and timeline diagram of keywords related to traditional rural settlements from 2000 to 2023

4.3.1 Research Fields and Contents: A Flourishing of Multidisciplinary Research

Traditional rural settlements are complex objects with multiple attributes, spanning the past, present, and future, and involving diverse dimensions such as society, economy, culture, and technology. Consequently, their study relies on the collective efforts of various disciplines. Based on existing literature, the most abundant research is found in fields such as architecture, planning, landscape, geography, and tourism; in terms of research content, both basic theoretical research and practical application research have made significant progress.

In terms of basic research, a defining characteristic of architectural disciplines in traditional rural settlement studies is their focus on “space”. Previous studies paid more attention to the objective description of space, whereas since the new millennium, research has placed greater emphasis on explaining the connotations and mechanisms of space from diverse perspectives. Given that traditional rural settlements are geographically widespread and occupy highly diverse natural environments, the environmental adaptability of settlement spaces has emerged as a crucial research direction. Related research includes:

(1) The influence mechanisms of natural climate conditions on the morphology of traditional rural settlements, such as the cold-alley system of settlements and its wind-

pressure-driven ventilation and cooling mechanisms under the hot and humid climate in the south [72-74]; meanwhile, in severe cold regions, the focus is on how settlements traditionally reduce heating energy consumption through site selection, layout, and the construction of public spaces [75, 76]. The orientation of these studies is to reveal the natural adaptive wisdom inherent in traditional settlements and provide insights for their creative transformation and development in the design and construction of modern green human settlements.

(2) The relationship between topographic and landform conditions and village settlement layout, such as linear villages at foothills in hilly areas [77], the layered villages in high mountain areas [78, 79], the network-like water town settlements in dense water network areas [80], the polder settlements in delta areas [81], and the nomadic settlements in plateau areas [82, 83]. The spatial construction of these settlements is often interdependent with the local characteristic agricultural landscape. Research places the settlements in the landscape system that integrates human settlements, production, and the natural environment, providing an in-depth perspective for analyzing the coupling relationship between human habitation and nature.

(3) Research on disaster prevention and control in rural settlements [84-88], including fire, wind disasters, floods, geological disasters, and freezing rain and snow

disasters, etc. This direction has received increasing attention under the guidance of the current ecological civilization development concept and sustainable development concept, with the examination of settlement ‘resilience’ emerging as a hot topic [89-92].

On the other hand, traditional rural settlements have profound humanistic connotations and carry a wealth of traditional and ethnic culture, making research from a humanistic perspective an important component. For example, the relationship between social organization patterns and settlement structure in rural areas of South China has attracted attention due to their strong kinship characteristics[93]. The shaping of settlement structure by ritual regulations and ceremonial activities, as well as the interaction between the two, are often discussed from an anthropological perspective [94, 95]. The space for carrying folk culture in traditional rural settlements, especially ethnic minority villages, has also become the main focus of the discussion on the preservation and survival of cultural diversity [96, 97]. In addition, the impact of special historical and social environments such as immigration and military systems on traditional rural settlements has also entered the purview of settlement research scholars [98, 99].

The discipline of geography focuses on the relationship between humans and the land, and studies the distribution characteristics of traditional rural settlements on the Earth’s surface at a macro scale, as well as the relationship between these distribution characteristics and factors such as population, economy, and geographical location [100-102]. In the past decade, the interdisciplinary integration of geography and architecture has opened up new avenues for the study of traditional rural settlements. Scholars have collected structural and elemental characteristics of settlement spatial morphology at the micro level on a large scale and placed them in macro-geographical contexts to conduct regionalization and lineage studies in large-scale geographical spaces such as provinces and river basins, and then explored the regularities of local cultural dissemination, exchange, and integration reflected behind them. Related research includes the proposal by Academician Chang Qing’s team at Tongji University to conduct a lineage analysis of vernacular architecture based

on “linguistic systems” and craftsmanship systems [103, 104]; a series of cultural geography studies on traditional villages and vernacular dwellings in provinces or across provinces conducted by Professor Xiao Dawei’s team at South China University of Technology in South China [105-108]; and the “landscape gene map” of traditional villages proposed by Liu Peilin’s team [109, 110]. All of these have broken through the previous perspective of single-site and single-type, and turned to the construction of a regional system.

In terms of practical applications, research on traditional rural settlements involves multiple fields such as theories and methods for the conservation and utilization of cultural heritage, conservation planning and assessment techniques, improvement of the human settlement environment, community governance, and cultural tourism development, with a wealth of topics in each field. Related research includes:

(1) Exploration of the connotation of rural heritage and theoretical methods of conservation and utilization: The development of concepts such as cultural ecology, regional holistic conservation, and rural landscape heritage [111-115] has refreshed the value perception of rural heritage. From built cultural heritage such as buildings and facilities to the intangible cultural heritage carried by settlements and the agricultural and industrial heritage that depend on them, from “single buildings” to “rural environments”, from typical villages to routes and regions, the connotation of heritage has been continuously expanded, and correspondingly, practical ideas and models such as eco-museums, cultural ecological conservation areas, cultural routes, and concentrated and contiguous conservation have emerged [116-124]. In addition, Li Bohua’s team applied the “human settlement environment” theory proposed by Academician Wu Liangyong in 1990 to traditional rural settlements, combining the “living-production-ecology” (three-life) space and the “material-culture-society” three-dimensional space to explore the organic renewal path mechanism of the human settlement environment system in traditional villages, which has also had a great influence in recent years [125, 126].

(2) Comprehensive assessment of conservation and

development: Comprehensive assessment of the conservation and development of traditional rural settlements has become an essential link throughout the entire lifecycle of conservation and utilization. The assessment criteria often have different biases depending on the practical stage they are facing, such as early cognition, mid-term implementation, and late assessment. In the early stages, the focus was on recognizing and assessing the historical and cultural value of villages [127, 128], and sorting out the key points and requirements for the conservation and utilization of historical and cultural resources of traditional rural settlements; while in the mid-term development and specific project implementation stages, more emphasis was placed on examining the resource conditions and industrial adaptability of villages, focusing on the long-term development of traditional rural settlements, so as to guide traditional rural settlements to choose appropriate revitalization and utilization models [129, 130]. In recent years, the living-state development of traditional rural settlements has gradually become a more comprehensive concept. However, there is still much room for discussion regarding how to effectively monitor implementation processes, establish early warning mechanisms, and conduct post-implementation evaluations [131-134], so as to provide timely problem response and directional adjustment.

(3) Conservation and utilization planning techniques: Guided by theoretical exploration and value assessment, conservation planning research directly addresses the practical needs of planning compilation and implementation. Spanning from the survey and database construction technology of traditional rural settlements [135] to the definition of conservation objects and conservation boundaries [136, 137], and to the integration and refinement of planning methods and technologies [138-141], this research directly responds to the challenges encountered in over a decade of traditional rural settlement conservation practices, reflecting contemporary trends toward digitalization, modeling, and precision. While focusing on the conservation and inheritance of rural heritage, traditional rural settlements, as spaces that carry modern life, need to transform and renew their human settlement environment to meet the needs of rural residents for living conditions in

order to ensure the organic survival of the whole village. This has become an important aspect of conservation and utilization. Scholars and rural practitioners have thus proposed strategies for the restoration, improvement, and renewal of the human settlement environment from the aspects of land use layout, ecological environment, infrastructure, and management system of traditional rural settlements [142-144].

(4) Comprehensive development and governance: Compared with the intervention of architecture in the material space and environment of rural settlements, disciplines such as planning, tourism, management, and art actively face the prospects of rural revitalization, carry out discussions on the development momentum, development model, and institutional management of traditional rural settlements, and propose development concepts such as livability and workability, endogenous development, cultural and tourism integration, multi-party participation, and cultural ecology reshaping [145-158]. They also actively participate in the revitalization practice of traditional rural settlements with new models such as art-based rural development and “Internet + ” [159-163]. For example, the heritage conservation and sustainable tourism development plan carried out by Professor Bao Jigang’s team at Sun Yat-sen University in the Azheke traditional village of the Hani ethnic group’s terraced fields in Honghe, Yunnan, is a successful case of combining the conservation and utilization of traditional rural settlements with the practice of university-assisted poverty alleviation in rural areas. These practices, under specific national conditions and domestic and international theoretical trends, have mutually promoted each other, greatly enriching and broadening the research field and practical paths of traditional villages.

It is evident that the multidisciplinary trend in the study of traditional rural settlements became increasingly prominent during this period. The cross-disciplinary borrowing of perspectives from related disciplines such as history, culture, anthropology, ethnology, sociology, economics, tourism, and ecology became more common, and there was a relatively systematic dialogue in the dimensions of nature and humanities, as well as science and society (Fig. 8). However, some scholars have pointed out that

current interdisciplinary research still needs to be deeply integrated in terms of theory and methodology in order to

promote the further integration of knowledge and results [164].

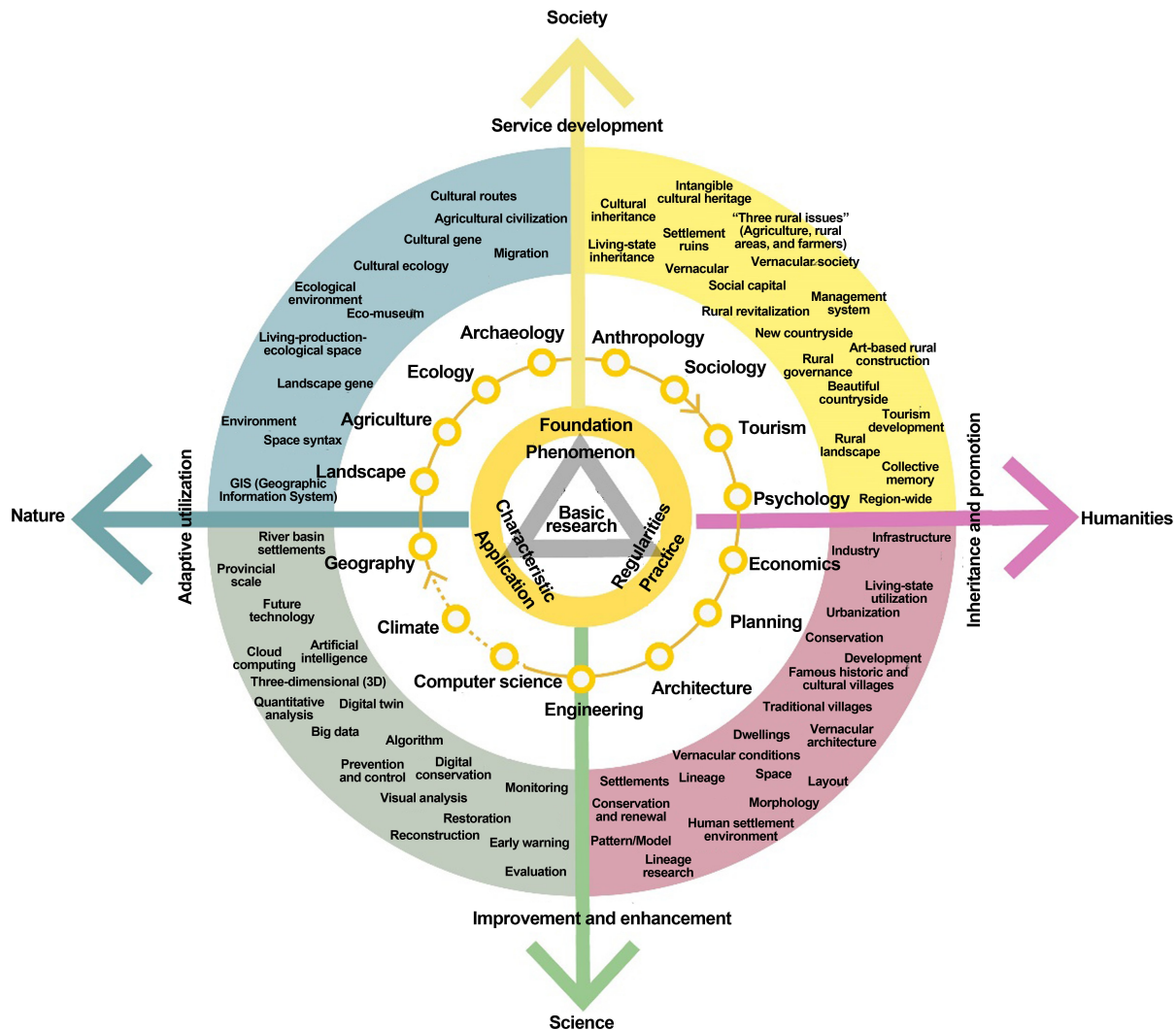


Figure 8 Multidisciplinary perspectives on the research content of traditional rural settlements

4.3.2 The Rise of Quantitative Analysis and Data-Driven Research Paradigms

With the widespread implementation of the national survey and selection of traditional villages and the expansion of research directions, the demand for scientific and standardized archiving, data sharing, and platform display of traditional rural settlements has become increasingly prominent. The construction of an information database on traditional rural settlements has become an important foundation for their research and conservation. Various sectors, including national departments, universities, and non-governmental organizations, have participated in this work, reflecting the whole society's emphasis on the conservation of traditional rural settlements. In 2014, commis-

sioned by the Ministry of Housing and Urban-Rural Development, the China Folk Literature and Art Association, the China Photographers Association, and the China Literature and Art Foundation jointly organized, and the Research Center for the Conservation and Development of Traditional Chinese Villages at Tianjin University implemented, the "Preserving Nostalgia - Survey on the Archiving of Traditional Chinese Villages" project and the compilation of the "Database of Traditional Chinese Villages". The project published guidance and normative materials such as the *Field Manual for the Archiving Survey of Traditional Chinese Villages* [165] and the *Archiving Survey Template of Traditional Chinese Villages* [166], and established the "Traditional Chinese Villages Network" (ht-

tp://www.chuantongcunluo.com), which promoted the information preservation and display of traditional rural settlements.

Accompanying the work on traditional rural settlement information databases is the rapid development of data collection tools and technologies. With the widespread use of satellite imagery, the advancement of modern transportation and network information, and the application of modern instruments and equipment such as high-definition aerial drones and 3D spatial data scanners, large-scale, high-volume, and high-precision surveys and measurements that were previously impossible for human labor can be carried out. This has led to an explosive growth in relevant data on traditional rural settlements, laying an important foundation for the development of quantitative analysis and research on traditional rural settlements.

Compared with qualitative research, quantitative analysis can uncover potential features and patterns within big data statistics through specific numerical calculations, and conduct larger-scale and deeper explorations with the support of intelligent algorithms, thereby expanding new dimensions of traditional rural settlement research. On the other hand, precisely because of the richness of the connotation of traditional rural settlements, relying solely on quantitative analysis makes it difficult to achieve full and complete expression of information. Therefore, qualitative analysis is still necessary. Many studies combine qualitative and quantitative analysis methods or establish comprehensive indicator systems, providing an adaptable pathway for the introduction of intelligent algorithms and statistical models. On this basis, the development of a new paradigm of data-driven research has been gradually promoted.

(1) Quantitative analysis of the spatial morphology of traditional rural settlements based on quantitative indices

There are various methods for quantitative analysis of the spatial morphology of traditional rural settlements, which are applicable to different spatial scales. Among the analytical methods for individual villages, the more mature one is the space syntax based on topology [167]. This analytical tool was initially widely used in urban district anal-

ysis and was later introduced into the field of traditional rural settlement research [168-171]. However, since space syntax is mainly for enclosed spaces with defined boundaries, it is not applicable to villages with scattered layouts. In addition, there is the fractal dimension calculation, which originated from fractal geometry. This method can be used to measure the self-similarity of the shape of objects at different scales, but it is still necessary to conduct more scientific and rigorous research on which calculation scale is more suitable for traditional rural settlements [172-174]. In China, quantitative research on spatial morphology at the settlement level mainly includes the quantitative indices for the planar morphology of traditional settlements proposed by Pu Xincheng [175], which is mainly used to analyze the characteristics of the boundary outline of the settlement as a whole, and the mathematical analysis model of settlement configuration diagrams constructed by Wang Yun based on the relationship between the area, orientation, and spacing of building units [176].

In quantitative studies at the regional and group scales, spatial analysis methods using Geographic Information Systems (GIS) are frequently employed. These methods use the geographical coordinates of traditional settlements as point elements to examine the distribution patterns of traditional rural settlements in geographic space. By overlaying spatial positioning and geographic attributes, the distribution patterns of village groups or different types of villages, such as the degree of agglomeration and agglomeration core, can be accurately and intuitively visualized. The correlation between these distribution characteristics and other geographic elements can be analyzed [101, 102, 177, 178]. Alternatively, based on certain attribute characteristics of villages, statistical methods such as clustering can be used for classification to replace or assist previous qualitative inductions, resulting in conclusions such as regional types or zoning [179-181]. There are also mathematical models built based on a certain attribute or evaluation index of villages to evaluate the relationship between points in a village cluster, such as spatial network analysis based on gravity models [182, 183]. Methods in landscape ecology use landscape patches with different attributes as elements to examine and evalu-

ate the overall spatial structure composed of patches of various land use types, feature types, or village and town boundaries [184, 185]. In cutting-edge artificial intelligence applications, traditional rural settlements can also be directly fed into machines for deep learning in the form of comprehensive information such as images or text, so as to uncover their features and patterns [186, 187].

(2) Elucidation and dynamic simulation prediction of traditional rural settlement mechanisms based on mathematical models

Research on the spatial generation and evolution mechanisms of traditional rural settlements aims to support planning and construction decisions in the conservation and development of traditional rural settlements, and to help us determine the value elements that should be emphasized and the development laws and patterns that should be followed in the conservation and utilization of traditional rural settlements. However, since a village is an organic self-organizing system, its development and evolution have significant nonlinear and complex characteristics. Previous qualitative analyses of the factors influencing the space of traditional rural settlements have mostly focused on only one or two main factors, making it difficult to comprehensively judge the relative importance and degree of influence of different factors. Based on the introduction of quantitative indicators to describe the spatial morphology of traditional rural settlements, existing statistical models such as multiple regression, structural equation modeling, and geographic detectors can be applied to conduct a comprehensive analysis of the relationship between certain attributes of traditional rural settlements and multiple influencing factors—or conversely, the relationship between the morphological elements of traditional rural settlements and target variables such as place identity and tourism intentions [188-190]. Furthermore, based on the establishment of models to simulate the evolution process of traditional rural settlements, predictions or decisions can be made about the future development and construction of traditional rural settlements, using approaches such as system dynamics models and cellular automata [191, 192].

(3) Interaction analysis of “spatial-cognition” and “spatial-behavior” based on behavioral data

Traditional rural settlements are spaces for human activities. Interventions such as designing and building them

should proceed from people’s embodied experiences, taking into account their subjective feelings and perceptions of the space, and using this as a basis for evaluation. In traditional research methods, human perception information is mainly obtained through researchers’ observation records, questionnaires, and field interviews. However, due to limitations in manpower, these methods are mainly used for case studies or comparative studies of a few typical cases. In recent years, technologies such as network information, VR, eye-tracking/EEG devices, and MRI have been gradually applied to the analysis of human behavior patterns in traditional rural settlements. Researchers can obtain a large amount of data related to human behavior and perception, including passively shared data such as GPS tracking trajectories, heat maps, map POI (points of interest) data, travelogues or historical texts, as well as actively generated experimental data such as VR tour experiments and eye-tracking experiments. By statistically analyzing this “digitized” behavioral information, the relationship and interaction mechanisms between village space and human behavior patterns can be analyzed [193-195].

4.3.3 Scientific research strength: Major projects support the growth of the research team

Scientific research projects and plans represent the key research areas that a country focuses on during a certain period. Since “traditional villages” officially became an official concept in 2013, National Key Technology R&D Programs and National Key R&D Programs related to traditional rural settlements have been launched one after another, especially after 2018, with a large number of projects being initiated, including “Research on key technologies for the conservation planning and technological inheritance of traditional villages”, “Research on key technologies for the conservation, utilization and modern inheritance construction of traditional villages”, “Research on appropriate technologies for the conservation of traditional villages and strategies for their living-state utilization”, “Digital simulation and evaluation model for the spatial reconstruction of village and town settlements” and “Mechanisms of and design optimization for the sustainable development of village and town settlements”.

Support for research on traditional rural settlements

in the National Natural Science Foundation of China (NSFC) began in the 1980s, such as the general program *Formation of Traditional Village and Town Settlement Morphology and Creation of Contemporary Living Space* led by Academician Peng Yigang. According to incomplete statistics, as of 2023, NSFC has approved 165 research projects related to traditional rural settlements, with a total funding of over 70 million yuan. There was a significant increase, especially starting in 2012, which coincides strongly with the timeline of the appraisal and selection of traditional Chinese villages (Fig. 9). These funded projects

are mainly undertaken by researchers from three disciplines: architecture, urban and rural planning, and human geography. Architecture is the core force, which has been present throughout the entire development period. In contrast, research on traditional rural settlements in the discipline of urban and rural planning has seen significant growth in the past 10 years and has gradually surpassed that of architecture and geography. From a regional perspective, research on traditional rural settlements is concentrated in five provinces and municipalities: Hunan, Beijing, Jiangsu, Guangdong, and Yunnan (Fig. 10).

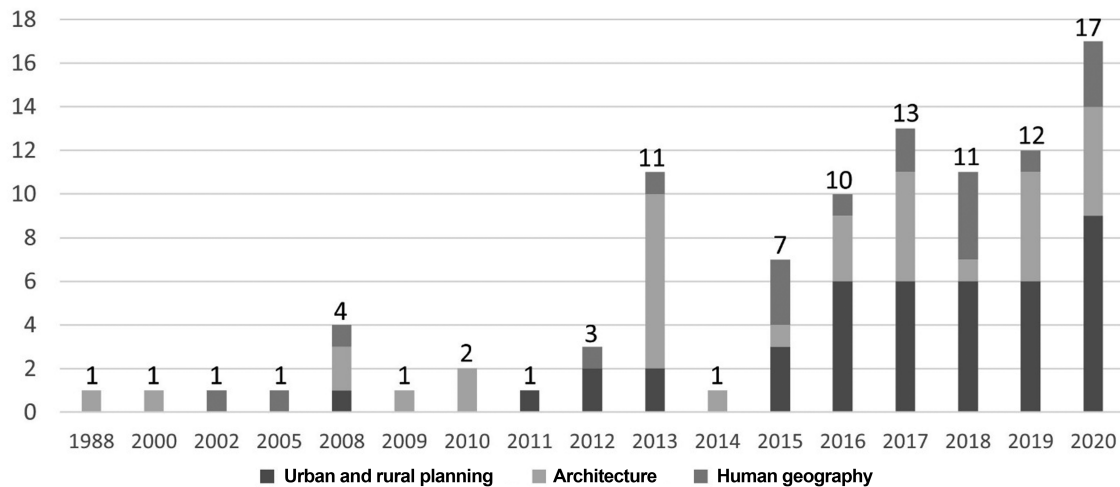


Figure 9 Number of NSFC projects related to traditional rural settlements undertaken by discipline from 1997 to 2020

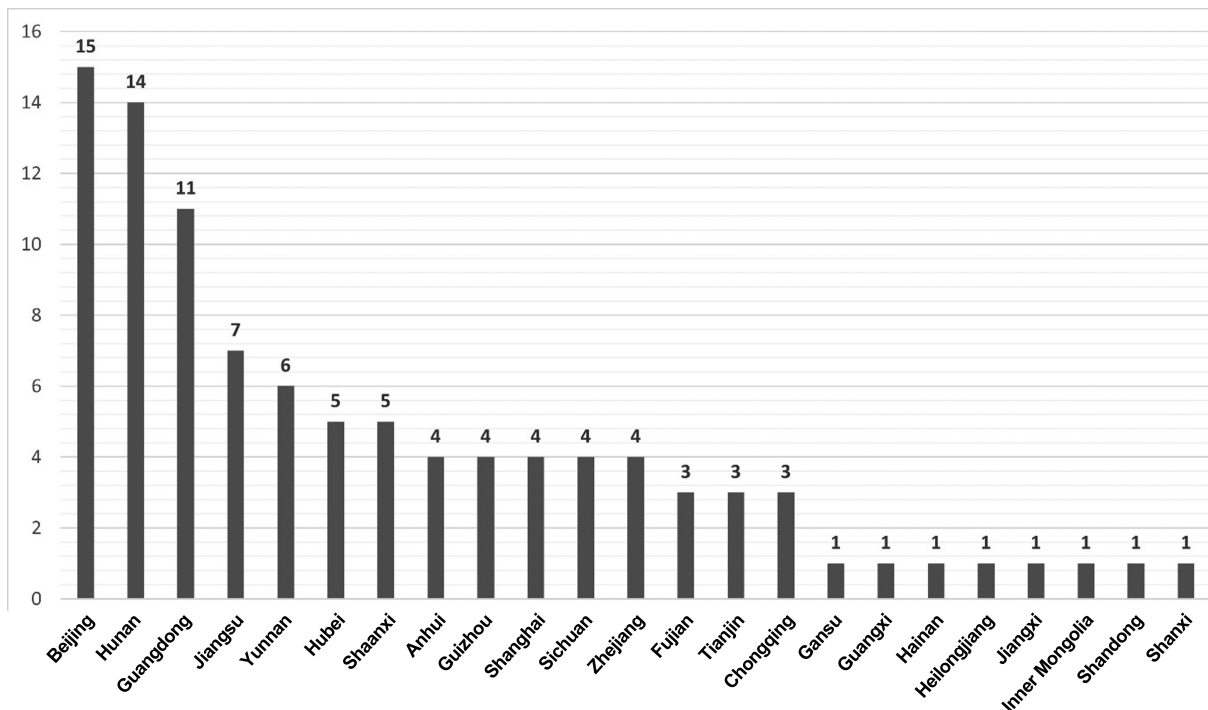


Figure 10 Number of NSFC projects related to traditional rural settlements undertaken by research institutions by region of the host institution from 1997 to 2020

The National Social Science Fund of China's (NSSFC) funding for research on traditional rural settlements has developed in a similar manner to that of the National Natural Science Foundation. A total of 118 related projects were found in the National Social Science Fund database between 2007 and 2023. The number of projects funded also took a turning point in 2012 and has been growing in a spiral in three-year cycles since then (Fig. 11). "Ethnology"

and "sociology" are the main research disciplines (accounting for 73% in total) (Fig. 12). Institutions in Guangdong, Zhejiang, and the Sichuan-Chongqing regions have undertaken the most projects. Compared with the National Natural Science Foundation, the research efforts have shifted to the southwestern ethnic minority areas (Fig. 13). It can be seen that the social sciences' attention to traditional rural settlements is more from an ethnological perspective.

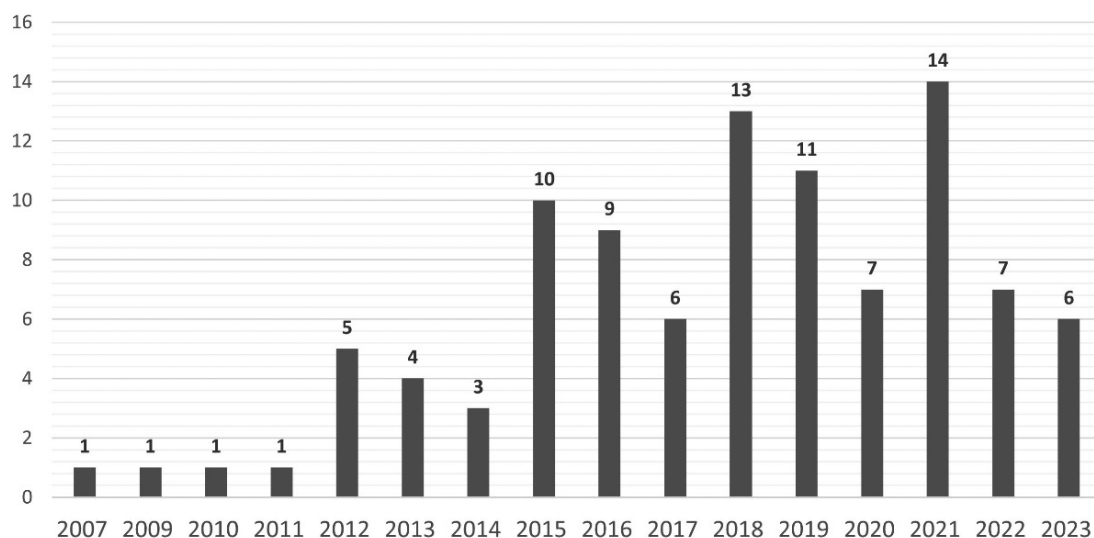


Figure 11 Number of NSSFC projects related to traditional rural settlements from 2007 to 2023

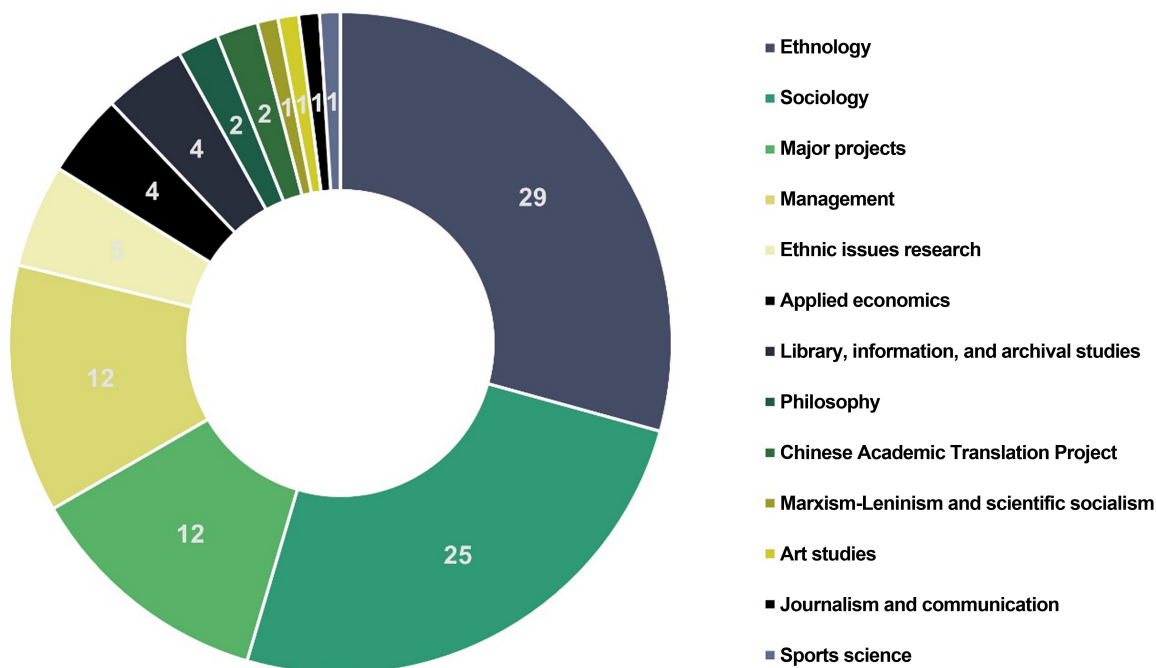


Figure 12 Disciplinary distribution of NSSFC projects related to Traditional Villages from 2007 to 2023

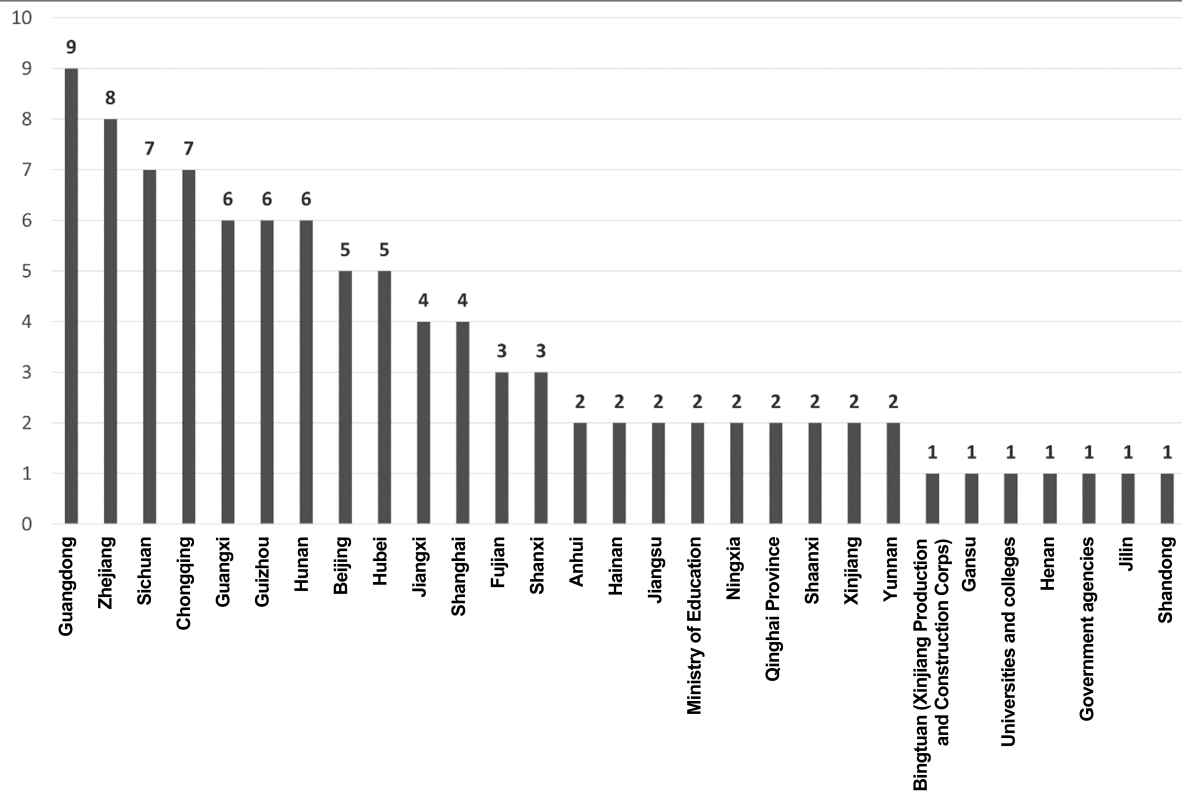


Figure 13 Number of NSSF projects related to traditional rural settlements undertaken by region of the host institution from 2007 to 2023

In terms of research direction, the National Natural Science Foundation of China projects have consistently focused on the spatial morphology of villages as a research object, and have continued to delve deeper, refine, and gradually exhibit interdisciplinary characteristics. Since the rise of research on traditional rural settlements, the funded projects have mainly focused on specific scientific and engineering problems of traditional rural settlements. The research methods and technologies have also followed the trend of digital identification, hot-humid environment simulation, CHGIS, and other popular trends. Projects after 2018 have particularly emphasized the importance of data and quantitative research. The research has placed more emphasis on the balance between humanities and sciences, and the study of scientific laws and mechanisms has become the mainstream. In its early stages, the National Social Science Fund mainly focused on the conservation and tourism development of ancient villages, paying more attention to ethnic culture. In its later stages, it gradually showed interdisciplinary characteristics, and research perspectives and methods from science and engineering disciplines such as digitization, heritage,

space, homesteads, revitalization, and architecture began to merge. The research scope also gradually reflected local and specialized characteristics. Overall, the conservation, inheritance, and utilization of traditional rural settlements is a research field with relatively obvious specialized characteristics, but at the same time, it also has certain comprehensive and interdisciplinary features.

In 2022, China Architecture & Building Press, together with experts in vernacular architecture and rural settlement research from architectural colleges across the country, completed the *Series on the Protection of Traditional Chinese Settlements*, a major national publishing project of the 13th Five-Year Plan and a national publishing fund project. The series provides a detailed overview of traditional settlements in various regions from aspects such as settlement formation and development, human geography, spatial pattern, type characteristics, functional composition, group combination, settlement style, and traditional settlement conservation strategies. From a few books on Chinese vernacular architecture in the 1980s and 1990s, to the *Chinese Vernacular Architecture Series* (18 volumes) covering 15 provinces and 3 major regions (Northeast,

Northwest, and Hubei and Hunan) in the early 21st century, and then to the *Settlement Research Series* covering 27 provinces and regions with traditional settlements as the research object, it marks the gradual maturation of the theoretical system of rural settlement research.

Conclusions and future work

This article systematically reviews the research history and related historical background of traditional rural settlements since the 1930s, hoping to explore the development characteristics and changes in the research of traditional rural settlements through mutual reflection between the national rural construction and development perspective and the value of historical and cultural heritage. This article divides the nearly 100-year research history of traditional rural settlements into four stages: ① From the 1930s to before the reform and opening up, the study of traditional rural settlements was incubated with the start of the study of vernacular dwellings, and experienced stagnation and fluctuation during the wars and reforms. ② From the late 1970s to the 1980s, with the reform and opening up, the construction of rural houses and the development of township enterprises, the study of traditional rural settlements was driven by the realities of development and began its exploration under the guidance of the conservation of cultural relics and famous historic and cultural cities. ③ In the 1990s, the alignment with international cultural heritage conservation concepts and the popularization and promotion of the value of rural heritage promoted the intrinsic motivation for the study of traditional rural settlements, forming a preliminary research framework, system and paradigm, and the study of rural settlements gradually deepened. ④ Since the beginning of the 21st century, the attention paid to rural heritage resources such as famous historic and cultural villages and traditional Chinese villages by all sectors of the country and society has risen to an unprecedented level. The study of traditional rural settlements has become a highly-regarded discipline, with a flourishing of theoretical research across multiple disciplines. Practical research is also being continuously promoted amidst national strategies such as rural revitalization and the rejuvenation of national culture (Fig.14).

Currently, China's urban and rural development has entered a new era of high-quality development. The conservation and development of traditional rural settlements face both many practical problems and excellent development opportunities. As a rural production and living space, a built heritage, and a historical and cultural resource, how can traditional rural settlements integrate into the urban-rural development framework under new conditions, realize greater value, and play a greater role in the process of rural revitalization. There are still many issues worth exploring and researching.

Continuously excavating and organizing the resources of traditional rural settlements and consolidating the territory-wide basic data system is an important research direction for the future. This fundamental work is urgent because traditional rural settlements are still disappearing rapidly. Although the state and local governments have established a conservation list system mainly based on famous historic and cultural villages and traditional villages, it is undeniable that many traditional rural settlements of high value have not been included in the list for various reasons and have not received the conservation they deserve. Protecting unlisted "quasi-built heritage" during rapid rural development is a highly challenging task, and resource investigation, research, and excavating and sorting form the foundation of this task. Meanwhile, the establishment of a territory-wide basic data system is an important support for the formulation of national policies on the conservation and utilization of traditional rural settlements. Traditional rural settlements exhibit differences in characteristics, quantity, and value density across the country's spatial distribution. To correctly understand these regional differences and formulate reasonable macro-regional policies, a comprehensive and systematic approach is needed, which in turn requires the establishment of a sound basic data system. Some of the work currently underway, such as the demonstration of the conservation and utilization of traditional villages in concentrated and contiguous areas, is an attempt to address this issue from this perspective. However, from the perspective of a holistic understanding across regions, there is still much work to be done.

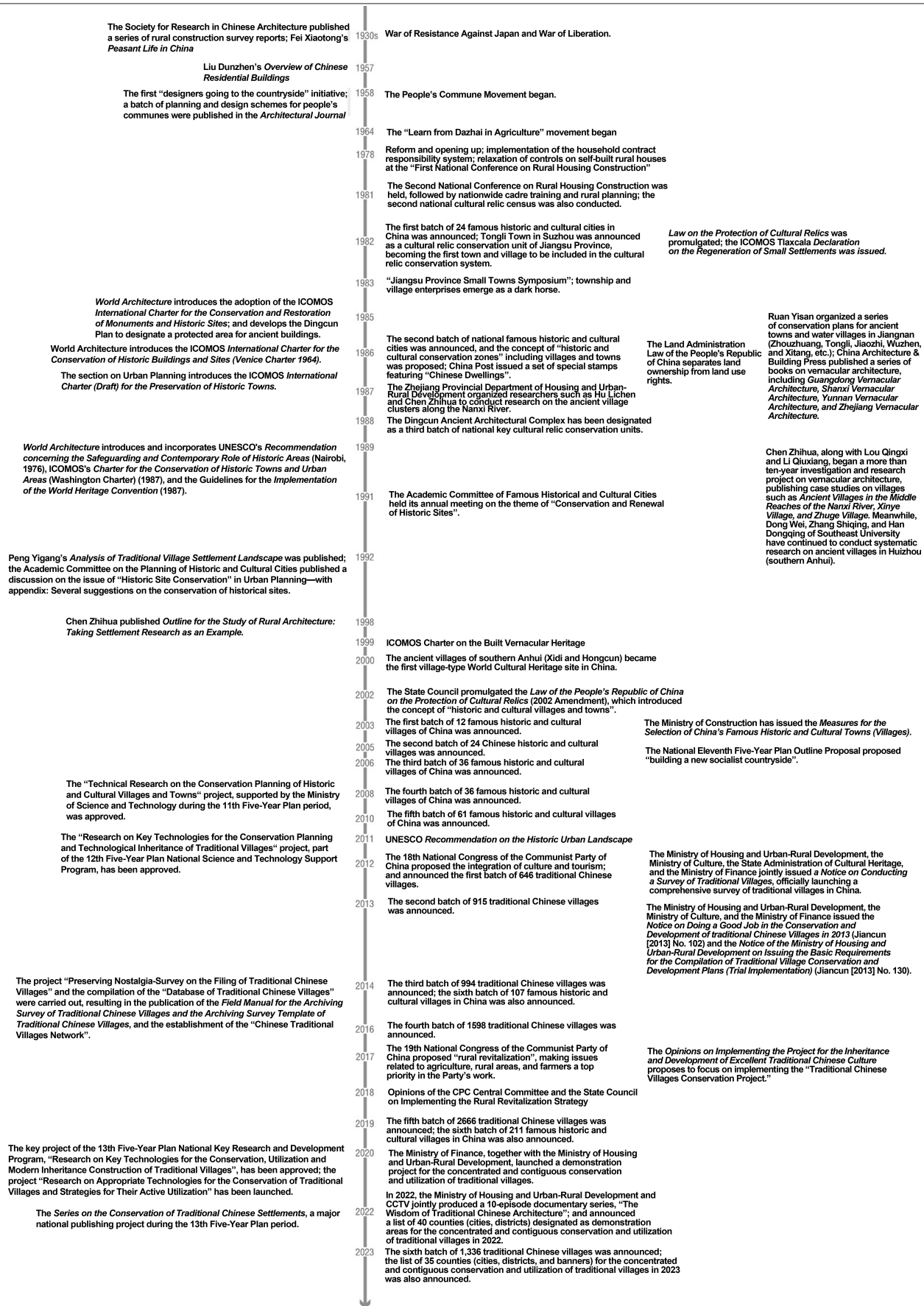


Figure 14 Historical background and research process of studies on traditional rural settlements

Systematically sorting out the characteristics and relationships of traditional rural settlements across the country and establishing a nationwide, fine-grained lineage of traditional rural settlement types is also a very valuable research topic. In fact, existing research has already built a basic framework for this issue. What needs to be further broken through in the future is how to conduct more refined and in-depth research by continuously acquiring and accumulating basic data. While research on traditional rural settlements in various regions, especially at the provincial level, is relatively mature, research at a larger regional level is still in the exploratory stage. In the future, research at cross-regional spatial scales such as river basins, ancient roads, border areas, and coastlines will become an important direction. This type of research is based on large-scale, detailed sample data, and pays more attention to holism and interconnectedness. Through continuously developing technological means, it supports the detailed characterization of settlement samples in large-scale regional spaces, and forms systematic and open results from the perspectives of cultural exchange, interaction, and integration. Based on this, research on the types, characteristics, distribution, and lineage of traditional rural settlements can be significantly developed, and the accuracy and precision of existing research frameworks can be improved.

The digitization of traditional rural settlement heritage will play an increasingly important role in future research. In recent years, with the rapid development of high-resolution remote sensing, high-precision sensing, computers, the Internet, data science and other fields, research and practice on the digitization of heritage in traditional rural settlements are constantly emerging. Technologies such as 3D real-scene modeling, high-fidelity real-time rendering, the Internet of Things, and artificial intelligence will play a vital role in various aspects of traditional rural settlements, including surveying, archiving, simulation, monitoring, early warning, display, and management, and related sub-fields of research will flourish. In the past, the application of new technologies in rural settlement heritage has often been considered instrumental; however, the development of new technologies in this round may bring a new paradigm to traditional settlement

research, especially when villages are created as digital twins or become AI-generated objects. Related research may no longer rely on the material entities of villages, but on virtual objects. This transformation may be disruptive, and the paradigm and even ethical issues involved will attract scholars to conduct discussions.

In addition, the living continuity and development of rural settlement heritage is also a key issue that needs attention under the new circumstances. Simply put, the reuse of idle, damaged, and unused heritage objects is considered vitalization; while “heritage living continuity” also include a large number of traditional objects in use in rural areas, whether listed or unlisted heritage. The protection of the value of rural heritage, the improvement of its physical condition, the configuration of modern facilities, and the continuation, transformation, and development of its functional status should all fall under the category of “living continuity and development”. This involves not only basic institutional issues such as land and housing, but also policy and technical issues such as heritage conservation, renovation and upgrading, and facility configuration. It also involves market issues such as industry, capital, operation and maintenance, and talent, as well as the development and governance of villages and communities. Its connotation is richer, and the subjects involved are more diverse. How to properly handle the relationship between the public sector, the collective, and the private sector is a fundamental issue. Public sector supply policies require responses from collectives and the market; the market can provide various resources such as capital and technology, but the premise is that it obtains the support of collectives and individuals; collectives own property rights, but they do not necessarily have the ability to lead the conservation and utilization of heritage. How to build a community that enables heritage to realize public value, the private sector to realize benefits, and the collective to achieve development and governance, thereby promoting the living and sustainable development of rural settlement heritage, is indeed a question with many profound issues worth exploring.

Sources of Figures and Tables

Figure 1: Adapted from reference[6];

Figure 2: Adapted from reference[8];

Figure 3: Adapted from reference[31];

Figure 4: Adapted from reference[44];

All other figures and tables were drawn by the authors of this article.

Notes

1) Relevant documents and policies include: the State Council of the Central People's Government's *Instructions on Protecting Historic and Revolutionary Cultural Relics in Basic Construction Projects* (October 12, 1953); the State Council's *Notice on Protecting Cultural Relics in Agricultural Production and Construction* (Guo Er Wen Xi Zi No. 6, April 1956); and the State Council's *Provisional Regulations on the Protection and Management of Cultural Relics* (March 4, 1961), etc.

2) *Measures for the Selection of Famous Historic and Cultural Towns (Villages) in China* (Ministry of Construction, October 8, 2003).

3) *Speech at the Central Urbanization Work Conference* (December 12, 2013), *Selected Important Documents Since the 18th CPC National Congress* (Volume 1), Central Party Literature Press, 2014, pp. 605-606.

4) *Notice from the Ministry of Housing and Urban-Rural Development, the Ministry of Culture, the State Administration of Cultural Heritage, and the Ministry of Finance on Conducting a Survey of Traditional Villages* (Jiancun [2012] No. 58).

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