

## The Transformation of Rural Spatial form and its Contributing Factors in China: A Literature Review

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To Link this Article: <http://dx.doi.org/10.6007/IJARBSS/v13-i11/19574> DOI:10.6007/IJARBSS/v13-i11/19574

*Published Date: 09-11-2023*

### Abstract

Rural space is where rural folks live and rely on and is also a vital conduit for rural social and economic growth. Its distinct attractiveness from cities, is reflected in its unique and rich spatial shapes and dynamic layout. However, challenges have arisen in most of China's rural areas due to globalization and urban-rural convergence, necessitating the re-organization and re-planning of rural spaces. Since 1978, the Chinese government has aggressively pursued a series of new socialist rural policies, such as the construction of beautiful rural areas and the revitalization of the rural regions, to address many of the problems that have arisen due to industrialization and urbanization. This paper used the systematic review as an analysis method and explored the transformation of rural spatial form. The authors separated rural spaces into ecological, productive, and dwelling environments. According to the authors' assessment of the literature, the rural spatial form has undergone the following changes: (1) Rural production space has grown on the premise of occupying ecological and living areas, which is influenced by changes in the industrial structure; (2) The rise of rural tourism promotes the diversification of production and living space; (3) Rural tourism, modernization development, and rural living environment policies all have a direct impact on the surface form of living space. In a nutshell, the combined effects of society, economy, and politics have resulted in a change in the rural spatial layout.

**Keywords:** Rural Space, Spatial Form, Ecological Space, Production Space, Living Space

### Introduction

Rural space is frequently viewed as a witness to and recorder of rural everyday activities, preserving the particular social culture of the area. However, since the early 1990s, China has undergone significant industrialization and urbanization (Wang & Zhang, 2021). As Feng et al.

(2019); Li et al (2018); Zhang et al (2019) have argued, this lack of coordination has led to some possible obstacles and opportunities for rural development. Consequently, the 19th National Congress of the Communist Party of China (CPC) proposed the "rural regeneration" approach to address a number of issues, including the decline of the countryside. The proposed strategy aided in the re-creation of rural spaces in an indirect manner (Tao et al., 2021).

Based on Wan et al.'s (2020) previous study, rural space is the area of land where rural residents live and depend on; Yang et al (2022) also demonstrate its importance, i.e., the relationship between humans and their surroundings. Correspondingly, This research found that in most cases when scholars study rural space issues, they divide them into production, residential, and ecological spaces (Duan et al., 2021; Li et al., 2021; Long, 2014b; Yang et al., 2020).

In addition to being driven by globalization, the significant changes in the countryside have also played a considerable role in promoting the country's multi-dimensional transformation under the state's intervention (Chen et al., 2019). Social, capital, and political pressures will influence the many systems of rural space. Rural space is continually being recreated as national structures evolve (Hu et al., 2019b; Wang & Liu, 2020). Long (2014a) has proposed that the villagers' urgent desire to develop the rural economy, improve output, as well as improve the living and environmental environment is the driving force behind land consolidation and rural space creation. Since the government has abolished the people's commune system and encouraged the development of rural enterprises, many villages have seized this opportunity and developed a prosperous collective economy (Zang et al., 2020).

Notably, the government plays the role of a leader and a decision-maker in China's rural governance (Shi & Ty, 2022). In 1978, economic reform policies promoted the development of China's tourism industry. Thus far, China's tourism industry has transformed from a political activity that is dominated by a socialist market economy model to the current economic activity (Zhang et al., 1999). Hu et al.'s (2019a) research has also confirmed this. During the capital-led process, villagers have gradually opened up part of their private living spaces to tourists and commercial areas for economic benefits. At the same time, rapid urbanization has triggered significant changes in rural areas (Fahmi & Sari, 2020). Consistent with Zuo et al.'s (2022a) assertion, we agree that in the rural commodification that is driven by economic capital, the main functions of traditional houses have changed from residential and agricultural use to commercial use for tourists, and private spaces have become public spaces. While the transformation of production relations provides a sustainable network hub for a group of stakeholders in rural tourism it also challenges the rural space where there is production and consumption activity (Panzer-Krause, 2020). While Gao and Cheng (2020) proved that the development of old production relations and new mechanisms could accelerate the reorganization of tourism-driven rural spaces, however, they had ignored other influencing factors besides production relations and mechanisms. For example, Fu et al. (2021) have proposed that there is a close connection between the spatial pattern of traditional villages and local culture, which can protect the authenticity and integrity of historical culture and spatial form. On the other hand, Nurdiani et al (2020) advised the use of local culture to create creative economic spaces and improve the condition of areas, layout, and physical quality to provide economic value to the community.

As Zhou and Wang (2018) have said, the countryside is the primary form of human gathering, with unique and rich spatial forms and dynamic spatial layout, showing the special attraction of the city. Puren et al (2018) understood this process of linking abstract, intangible phenomena to spatial conditions as a process of place creation. From a morphological point

of view, the spatial form of the rural settlement is not only a symbol of agricultural culture and traditional rural construction concepts but also a reflection of local rural lifestyles (Wang & Yuan, 2019). Therefore, its size, shape, and layout are the consequence of a combination of natural and artificial forces (Tan et al., 2021). The natural and architectural features of the countryside enrich the country's spatial structure and relationships (Sui et al., 2018), hence, it becomes essential to respect the morphological characteristics of the village and not destroy the rural spatial form due to industrial development (He, 2021). Correspondingly, Sui et al (2018) have agreed that extracting general meanings, elements, and regularities in village construction in an open and integrated manner can address the root causes of regional cultural aphasia, ecological environment degradation, and the lack of spatial form.

Spatial forms and elements are an essential part of the village's identity, and many factors change it. For example, Setiadi and Depari (2021) summarized the political and cultural factors that drive the change of spatial form from the perspective of internal and external factors. That is similar to Yanbo et al.'s (2018) point of view that improving social living conditions is an external inducement factor for transforming spatial patterns, and the change in the macro policy system is a vital inducement factor. In addition to the above, environmental factors also profoundly affect the spatial form of the countryside, which is reflected in the patches of the country. Since rural spatial forms are affected by the collective actions of various elements and exhibit significant regional differences, effectively organizing spatial forms can help improve the quality of life in rural areas (Juan et al., 2019). Also, the spatial form of the countryside is influenced by cultural and historical factors (Wilkoosz-Mamcarczyk et al., 2020). Different spatial forms may affect people's behavior and the frequency with which they communicate (Sun et al., 2020). This research can find that, among the many factors of socio-economic development, many spatial forms in rural areas are threatened under the influence of China's modernization. As the residents' living spaces and activities change with the change of production mode, the change accelerates the transformation of the spatial form (Li et al., 2019). Xiong et al (2021) believe that the imbalance and dynamic mechanism of spatial formation is the main reason for the uneven development of urban areas. Therefore, in line with Gao's (2020) point of view, grasping the relationship between urban and rural areas within the context of spatial form relationship may help deepen the research on the scale of human living in the sustainable development of environment planning. Furthermore, the use of Geographic Information System (GIS) and Remote Sensing (RS) techniques can capture changes in various stages of space and provide rational recommendations for sustainable development in rural areas through quantitative indicators (Ayhan et al., 2020; Li et al., 2020; Randelli & Martellozzo, 2019). With the help of GIS and Yanbo et al (2018) revealed the large-scale characteristics of "point-line-surface" space from a macro perspective and thoroughly explored the influencing factors and formation mechanism of rural spatial form.

GIS and RS have been widely utilized to evaluate land use and large-scale spatial forms, however, according to the authors' literature assessment most research focus on the macroscopic exploration of urban or rural space. There is limited research on small-scale spatial structures such as villages, especially when it comes to analyzing the change variables of spatial forms from a qualitative standpoint. The range of existing research horizons on the spatial forms of rural spatial structures could be a possible obstacle for this study. As a result, the authors review and analyze related research on China's rural spatial form in numerous domains in order to better understand the influence of various causes on the development of rural spatial arrangements. In addition, the analysis methods of spatial arrangement are presented as fully as possible by studying relevant literature, and the variables that encourage the evolution of spatial structure in China's rural areas are investigated. From a literature

review perspective, this study will investigate the characteristics of Chinese rural spatial forms, explain the driving reasons for spatial evolution, and attempt to provide references for research on rural spatial circumstances.

## Methods

The development of rural spatial form is a continuous historical process. The authors searched a large number of studies related to this research topic and conducted the study using a systematic review approach. This research takes the development of rural construction in China in 1949 as the background, the spatial form as the primary perspective, and based on the theme, the method, where sources from 1985 to 2022. In the literature review, the authors first identified four state interventions to promote rural forms of development from China's rural development history. Then, the existing research perspectives are summarized and classified, and the methods of spatial morphology research and the application scope of different technologies are explored. Finally, this research analyzes the impact and spatial form of rural areas in China based on the history of rural development in China and the new ideas for land space optimization and the development that has been proposed in the National Homeland Security Plan (2016-2030) Ecological Production-Living Space in January 2017. By systematically reviewing relevant literature, this research not only summarize and analyze the existing research but also identify the main formal characteristics and influencing factors of the above three types of spaces.

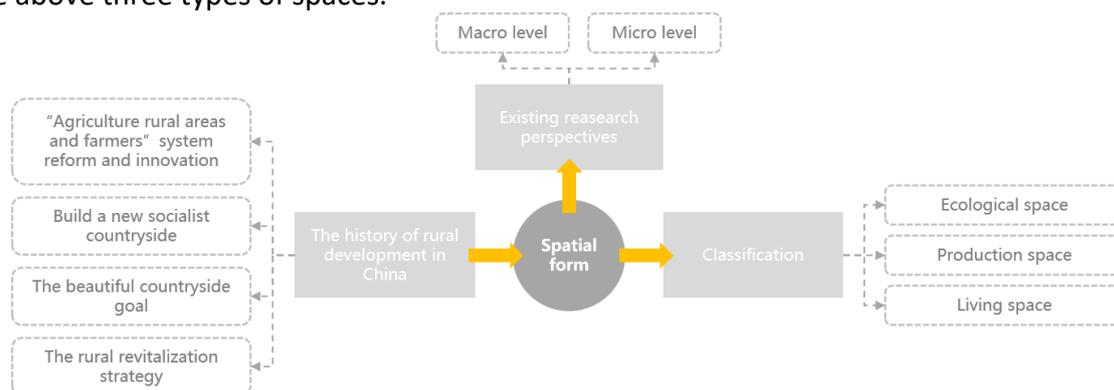


Figure 1: Research approach

## Results

### Rural development in China

China is a predominantly agricultural country with more than 690,000 administrative villages (Yong, 2020). There has been a significant shift in the stability of rural spatial development since the founding of the People's Republic of China (PRC) (Yang et al., 2020). The authors mainly review the development of China's rural construction under the state intervention after 1949, focusing on the policy intervention since reform and opening up (1978).

From 1958 to 1978, China's urban and rural socio-economic systems were completely independent as the linkages between the regions were strictly controlled (Wang et al., 2016). At the same time, with the continuous expansion of cities that were driven by urbanization and industrialization, China's rural land use had also undergone tremendous changes (Long et al., 2012), which triggered the emergence of rural recession problems such as hollow villages, idle housing, and lagging industries (Liu et al., 2010; Long & Liu, 2016; Sun et al., 2011). In their research, Liu et al (2014) pointed out that between 1996 and 2008, the population of rural residents in China had decreased by 135.2 million. Zang *et al* (2020) have

also emphasized that the migration of a large number of young laborers to cities has exacerbated the aging of the rural population.

To this end, since the early 2000s, the Chinese central government has continuously promoted the reform and innovation of the "Agriculture, Rural Areas And Farmers" system and has introduced a series of new procedures and new policies in terms of agricultural tax subsidies and cultivated land use (Chen et al., 2019). Subsequently, to alleviate the imbalance of urban and rural development and maintain the sustainable development of the countryside, the National People's Congress in early 2006 has included "build a new socialist countryside" in the government policy (Ahlers & Schubert, 2009). It also advocates the establishment of a comprehensive indicator framework through a series of requirements such as adjusting the industrial structure, improving productivity, optimizing social welfare, and strengthening the infrastructure (Guo et al., 2009). On this basis, Anji County, Zhejiang Province, first proposed the concept of "beautiful countryside" construction in 2008. Five years later, the central government formally proposed building a "beautiful countryside" to promote the construction of a new socialist countryside and ecological civilization-building (Yang et al., 2016). Through the research of Y. Xiong and Dong (2021), the authors can conclude that the proposal to construct a beautiful countryside has brought unprecedented attention to the integration of rural land and optimizes the production and living space to a large extent. In other words, China's rural management has gradually advanced to the national strategic level through local practice. Moreover, to promote the transformation of emerging market industries, ecology, production, life, society, and cultural elements, the construction of beautiful rural areas has become a necessary way to narrow the gap between urban and rural areas (Zheng et al., 2020).

In 2017, the Chinese government implemented a rural revitalization strategy to comprehensively solve various recession problems in rural areas (Zhou et al., 2020). The significance of rural revitalization is to "maintain the priority of rural prosperity and development, establish a sound urban-rural integrated development system and policy system, and accelerate rural modernization following the overall requirements of industrial capital, ecological livability, rural civilization, effective governance, and affluent life". Wang et al (2018) believe that the rational planning and utilization of rural space as the carrier of economic, social, and environmental elements is a crucial premise and foundation for the implementation of the rural revitalization strategy. At the same time, it also promotes the orderly and gradual evolution of rural space (Sun et al., 2021).

By reviewing the main policy changes in China's rural construction, the authors can conclude that since the reform and opening up (1978), China's rural construction has mainly revolved around a series of problems accompanying the development of urbanization and industrialization. From a macro perspective, the focus of rural space construction has gradually shifted from improving the infrastructure to covering all development elements (see Figure 2). Under the intervention of national policies, the focus of planning and construction in all stages of rural China is the main driving force for the subtle transformation of space form. However, as (Zheng et al., 2020) agreed, driven by urbanization, informatization, beautiful rural construction (BRC), and other factors, rural space continues to be diversified in a differentiated way.

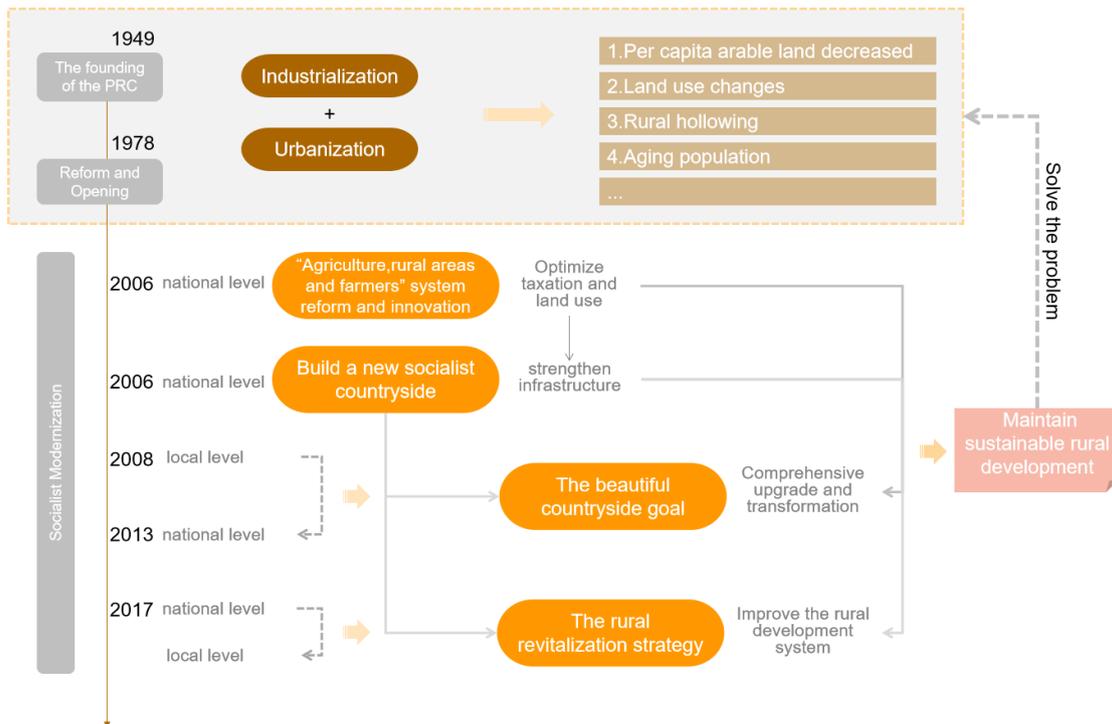


Figure 2: An Overview of China's rural construction and development after 1978

**The research perspective of space form**

Before exploring the influencing factors of Chinese rural spatial form, it is necessary to understand the concept of spatial form. However, through a literature review, the authors have found that there is currently no official definition. Therefore, after analyzing the existing related research, as shown in Figure 3, the authors divide the rural spatial form research into macro-level and micro-level analyses.

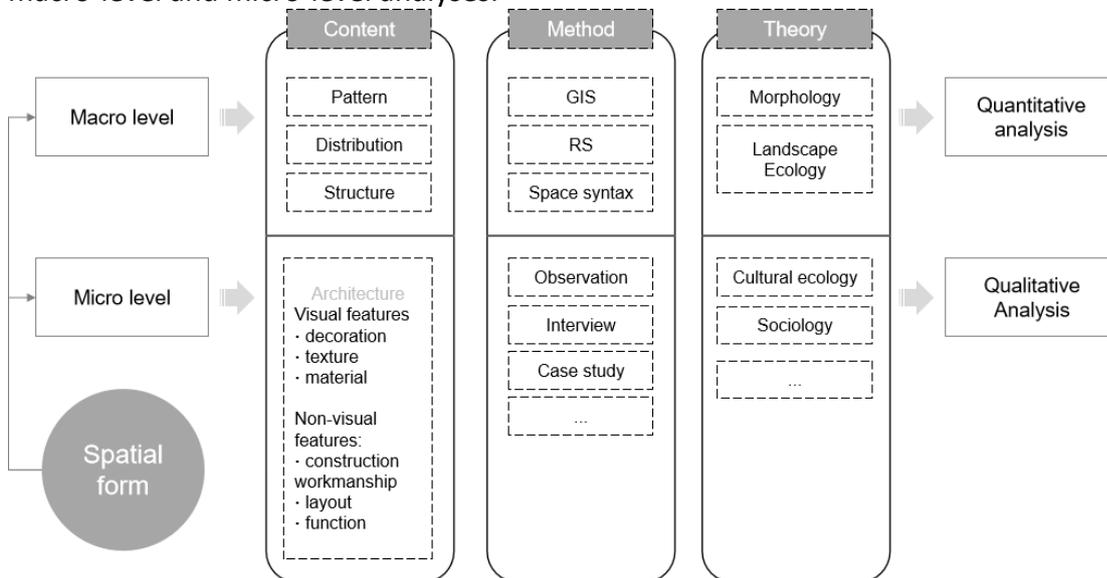


Figure 3: Macroscopic and Microscopic Study of Spatial Forms

The first is the analysis of the rural spatial form at the macro level. Xu et al (2018) mention that rural spatial morphology is the spatial organization in the relationship between man and land. In their research, the spatial form includes physical space forms such as geographical location, terrain, roads and water systems, the village economy, culture, population, policy,

etcetera, and other intangible social and economic forms of the carrier. Being influenced by the natural environment and human activities, it reflects the spatial order and characteristics of the spatial morphology of settlements (Wang & Yuan, 2019). Many scholars have used geographic information systems (GIS) and remote sensing technology (RS) to capture the changes or distribution characteristics of spatial patterns from a morphological perspective (Xi et al., 2015; Yanbo et al., 2018). For example, Xi et al (2015) elaborated on the spatial morphological changes of rural settlements induced by tourism from three aspects: spatial expansion of land use, changes in land function, and resulting landscape changes. Frazier (2019) previously showed that interdisciplinary research on landscape ecology contributed to the development of innovative approaches to spatial pattern analysis. For instance, Yu et al. (2019) described the impact of geospatial technology on landscape ecology in data collection, process modeling, scale conversion, the development of results analysis, and visualization as advanced. Therefore, this research refers to Marcus et al.'s (2019) work on the macro-level research on the rural spatial form that uses landscape ecology of patches, corridors, and landscape mosaics of matrices to explore the form of urban streets, plots, and buildings combination.

The related research of landscape ecology mainly focuses on ecological sustainability-related issues (Chen & Liu, 2014; Norton et al., 2016; Potschin & Haines-Young, 2013), landscape ecology that emphasizes the interaction between spatial patterns and environmental processes, and the causes and consequences of spatial heterogeneity at different scales (Turner & Gardner, 2015, p. 2). In addition, some scholars use space syntax to objectively describe the spatial structure and characteristics from the three aspects of Connection, Depth, and Integration and explore the relationship between spatial morphology and human behavior and activities (Liu, 2018; Yang et al., 2019; Zou & Liu, 2021).

Although the above three technologies are all quantitative analysis and are different from GIS and RS technology, spatial grammar is also the theory of quantitative analysis of spatial form; it can measure space with mathematical models and abstract the relationship between areas into a connection diagram. Furthermore, spatial morphology can be explained through specific numerical values (Li, 2021; Turner, 2003).

The second is to study the rural spatial form from the micro-level. One approach is to explore the mutual adaptation between the spatial combination, functional distribution, architectural structure and other spatial elements of local dwellings, and the unique local cultural elements such as the environment from the perspective of cultural ecology (Huang et al., 2021). This emphasis is largely due to the fact that employing cultural ecology in traditional rural research aims to elucidate the essential dynamics of traditional rural spaces within their natural, social, and cultural contexts, thereby aiding in the maintenance of the sustainability of established spatial forms (Chen et al., 2020). The other approach is to discuss the shapes, materials, construction methods, architectural decoration, and other contents of rural buildings, arguing that architectural forms indirectly reflect the local geographical environment, culture, and social characteristics (Muktadir & Hassan, 1985; Paul & Modi, 2014; Prajnawrdhi, 2018). For example, Lawrence and Low (1990) proposed that the built environment is not only influenced by the natural environment but also reflects the cultural inquiry form that produces the natural environment. Correspondingly, Prajnawrdhi (2018) has briefly analyzed local traditional houses from geometric images, where the house's arrangement and layout have pointed out the changes in conventional homes and their influence. It is not difficult to find in the research that is reviewed above that form has a purpose, and the form and nature of space cannot be determined solely by the purpose of its existence as interpretation requires an understanding of the laws of formation and development of space (Hillier, 1985).

In summary, GIS and RS at the macro level mainly capture dynamic changes in spatial patterns, while spatial grammars are good at logic. They describe the characteristics of spatial axes and differences in spatial patterns or contours in great detail. Unlike the research at the macro level, the research at the micro level focuses on the elements of rural architecture. The study mainly uses qualitative analysis and focuses on the internal relationship between form and social, cultural, and other factors. This study reviews qualitative and quantitative research in the study of spatial form and focuses on the internal link between condition and social, cultural, and other elements to describe the scope of application of different analytical methodologies.

### **Changes in the rural spatial form**

#### **Ecological space**

Ecological space is the essential condition for human survival (Qu et al., 2020). Since China's reform and opening up, that is, in the early stage of rural construction and development, the rural ecological space has been threatened by industrialized development and faced various environmental problems. In 2005, Chinese officials proposed the concept "Lucid waters and lush mountains are invaluable assets", to guide the construction of rural ecological civilization in China.

The wave of industrialization and urbanization has caused human activities to degrade ecosystems at an unprecedented rate and scale, posing risks to human society (Tu & Long, 2017). Accordingly, the authors refer to Zaizhi's (2000) use of the GIS system to analyze the landscape patterns in three different periods (1972, 1985, and 1995) from the structure, shape and pattern index, and have found that land management decisions and planning are at the root of the changing spatiotemporal patterns of landscapes. According to Liu et al. (2014), the changes in China's land system from 1976 to 2008 have indirectly resulted in the sacrifice of farmland for rural areas. The increase in landscape patches and their reduction in size during China's economic transformation confirms the fragmentation of ecological space (Long et al., 2009). The landscape patch has also been proven to lose rural ecological space and is threatened by the urgent need for rapid economic growth and urbanization development in the rural ecological environment (Yao & Xie, 2016). Tu and Long (2017) took four villages as examples to explore the index changes of landscape diversity, aggregation, and fragmentation, and concluded that from 1986 to 2006, the landscape diversity and aggregation degree showed a downward trend. At the same time, the fragmentation showed an upward trend. While the collapse of ecological space is not a threat to all regions of China, it is a significant trend in developing rural space in China (Qu et al., 2020).

Villages, forests, farmland, water bodies, and other elements together form the natural-economic-social complex ecosystem of rural landscapes. With the opportunity for spatial reconstruction and renewal in rural areas, the traditional ecological space becomes a complex "ecology + production" spatial transformation (Gao & Cheng, 2020). The ecological function of space is the premise for the existence and development of other rural functions. With the completion of urbanization and industrialization, the protection of rural ecological space has also begun to receive attention. According to Long (2014a), the current ecological space development should focus on land integration and rural ecosystem protection, improving the ecological network and green infrastructure construction, and improving habitat quality and landscape diversity. That is because optimizing and integrating ecological space is one of the keys to enhancing rural attractiveness and stimulating rural tourism (Cong et al., 2019). Namely, for villages whose ecological function is greater than the landscape function, the

restoration of the ecosystem is conducive to the establishment of the ecological tourism industry (Yu et al., 2020).

In general, the form of ecological space is a macro-level change, and through quantitative analysis, some scholars believed that it was mainly affected by the following aspects. In the first place, the acceleration of urbanization and industrialization has directly led to the threat to the rural ecological environment. To sum up, the adjustment of land policy has changed the pattern of ecological space in China's rural areas. In addition, ecological space has gradually been occupied by residential space, and the area has gradually decreased. Therefore, the characteristics of fragmentation have appeared.

### **Production Space**

Rural areas are where agricultural products and fiber production are the main functions (Jia et al., 2020). However, with the increase of idle housing in rural areas, the production space has gradually become less "agricultural" oriented. As a result, and driven by the tourism trend, a production space centered on tourism has gradually formed (Gao & Cheng, 2020).

The focus of the rural economy has gradually shifted from agricultural production to non-agricultural production (Liu et al., 2014), and the increase in non-agricultural land has shrunk traditional agriculture and led to a sharp decrease in the area of rural arable land. Industrial production has gradually become the primary source of the rural economy (Zou et al., 2020). This results from the combined effect of multiple policies such as industrial structure adjustment, rural tourism development, improvement of the rural living environment, mobility, and protection of traditional villages (Wang et al., 2019). The reduction of agricultural land and the scattered distribution of production space reflect the changes in rural land use and are the result of the gradual advancement of industrialization (Xu, 2004). In addition to the economy, the unsatisfactory ecological environment will also inconvenience production and living spaces (Wang & Li, 2019). There is no doubt that the reconstruction of living space and production space in China's rural areas has benefited from the realization of industrial economic transformation and agricultural modernization (Zhou et al., 2013). On the other hand, Long and Liu (2016) believed that the scattered dispersal and hollowing out of rural residents had caused the direct consequences of confusion in the production space (He et al., 2019).

Different from ecological space, rural production space shows an increasing trend. Tu et al (2018) show that due to tourism development, production space and ecological space tend to be combined. According to Gao et al (2019), the symbiosis of production space can be realized through the integration of "production, village, and scenery" through the development of rural conditions. Diversified tourism forms are conducive to the integration of rural space, especially for the integration of production space and the transformation of forms. For example, the all-for-one tourism policy relies on local industries to achieve organic integration of regional resources, integrated development of industries, and social co-construction and sharing and promotes coordinated economic and social development through tourism (Xiong et al., 2021). In the face of the hollowing out of the countryside, the development and popularity of rural tourism have become a turning point for the dilemma of the hollowing out of the countryside, mainly for farmhouses, especially the living spaces such as idle farmhouses, which are gradually transformed into serving rural tourism homestay spaces (Long et al., 2018; Lv et al., 2021; Qianda et al., 2021).

In contrast to the ecological space, the production space constantly expands under the stimulus of economic growth. Affected by the adjustment of industrial structure, the cultivated land area has decreased significantly, and the production space has shifted from

the output of agricultural products to the output of industrial products. To some extent, this change results from the cost of occupying a particular area of ecological space. In addition, under the joint action of rural tourism development, the production space shows accelerated growth, differentiation, and disorderly distribution at the macro level.

### **Living Space**

The term "rural living area" refers to a combination of activities that local inhabitants engage in on a daily basis, such as living, conversing, and relaxing. It depicts the rural inhabitants' everyday lives, highlights the intricate link between urban and rural regions, classes, and individuals who are affected by government policies, and expresses the rural residents' daily sentiments. The space is a collection of the local residents living, communication, rest, and other daily life. It is a complex system that includes all development factors such as regional ecology, society, and economy, and the countryside provides cultural heritage and social security for living space (Hong et al., 2017). Changes in productivity and production methods, on the other hand, have presented both obstacles and possibilities for the development of rural areas.

From 1996 to 2008, many rural people migrated to the city in China. Meanwhile, the housing registration system and the land ownership system accelerated the rural hollowing out, and the expanded initial living space had also stopped growing (Liu et al., 2010). For rural settlements, Yanbo et al (2018) have concluded that the natural geographical conditions are the stable factors of spatial differentiation in the macro system. The economic and social conditions are the dynamic factors affecting the medium scale, and the institutional policies restrict and optimize the spatial form. For some traditional villages, dwellings were not only the manifestation of local social and cultural materialization (Li et al., 2022) but also substantial evidence of past lifestyles (Razali & Talib, 2013). The functional decline and loss of rural dwellings had brought a series of challenges to the sustainable development of the countryside. Rural houses are being developed for commercial purposes. The living space is transferred from private to public space and gradually commercialized (Zuo et al., 2022b). In the capital-led process, to gain economic benefits, villagers have gradually opened up part of their private living spaces to public tourism and commercial spaces (Hu et al., 2019b). Like the production space, affected by the development of rural tourism, the functions of the living space show diverse characteristics (Gao & Cheng, 2020). The increasingly prominent rural multi-values promote the gradual intensification of living space (Tu et al., 2018). In particular, the rise of farmhouses has transformed the initially closed farmhouse space in the countryside into a relatively open and continuous space (Park, 2014).

With the development of the countryside and the start of the economy, the problem of human settlements is exposed. To create a beautiful and livable village, in 2014, under the guidance of the national level, the infrastructure, rural style, and sanitary environment of the village have been further improved (Hong et al., 2017; Liu et al., 2022). As a result, the rural living space has become clean and tidy in promoting the construction of beautiful villages, notably rectifying the visual space characteristics of the building facades and walls (Ye et al., 2020). In addition, the acceleration of the modernization process has promoted the transformation of rural architectural styles, where the blind pursuit of modernization will quickly lead to the loss of local characteristics (Li et al., 2021). As a result, the visual characteristics of the rural living space have changed significantly under the intervention of external forces, and the construction materials, building structure, and spatial layout show entirely different characteristics from the past (Su et al., 2019).

Rural living space is both a physical and social entity. The geographic limit is formed by the daily living range of rural dwellers, and the everyday lifestyle determines the spatial structure. From a macro-level analysis, living space was in the growth stage before 1995. However, from 1996 to 2008, due to the influx of rural labor into cities, the space stopped growing and showed a clear downward trend. From the micro-level analysis, influenced by the rise of rural tourism, the function of living space has also changed. First, from the initial focus on the daily life of residents to a space that is opened to tourists, the space also breaks the completely closed form. Secondly, the improvement of the living environment and the development of modernization have promoted the intuitive transformation of the visual characteristics of the space.

### **Discussion**

Rural issues are a persistent research topic in China and the development of China's rural areas since 1978 can be said to have achieved unprecedented progress. Rural spaces are constantly being refurbished by new opportunities, driven by the constant flow of labor, capital, and technology, and agricultural or productive activities are insufficient to fully represent the "rural" (Galani-Moutafi, 2013). As Bascom (2001) has said, the significance of "rural" is shifting from production-oriented to consumption-oriented. With the urgent need for rural space reconstruction in China, in January 2017, the National Homeland Security Plan (2016-2030) proposed to optimize land space through the development and construction of "ecological-production-living spaces" (PLEs). In November of the following year, the "Rural Revitalization Strategy"(2018-2022) further optimizes the decision-making and arrangements for the development of the current situation (Wang et al., 2021). The concept of PLEs is linked to the multifunctionality of agriculture in the context of sustainable land use (Wiggering et al., 2006). The proposal of ecological, production, and living space aimed to establish a sound space planning system and provide theoretical support for the development, protection, and planning of space (Lin et al., 2022). Through the literature review, Tu and Long (2017) have explained that the spatial form in rural China shows a trend of scattered living space, disordered production space, and deteriorating ecological space. In their research, Wang et al (2011) have summarized ecological space as a collection of natural, artificial, and semi-artificial environmental units, which refers to wild spaces that maintain regional environmental security (Duan et al., 2021). The adjustment of rural spatial structure should be closely combined with the rural social and economic development (Yao & Xie, 2016). Secondly, production space is the core carrier of the accumulation of productive capital. As the main functional space, it provides industrial, agricultural, and service products as the main functional space. It also helps to direct economic benefits to the region (Lin et al., 2022). Last but not least, the living space is mainly to carry and guarantee human life (Duan et al., 2021), including rural homesteads, public administration, and public service land, and transportation land (Tu et al., 2018).

Depending on the fact that rural space is a complex multifunctional system, the authors draw on the policies that are advocated in China and the division of rural space in the existing literature. The factors that are driving various spatial forms in rural areas are analyzed from ecological production and living space perspectives.

### **Conclusion**

Since 1978, China's major rural development initiatives, such as the construction of a new socialist countryside, beautiful countryside, and rural regeneration, have been reviewed in this study. From the perspectives of ecology, living space, and production space, the authors

examine the influencing elements of changes in the spatial form of China's rural areas, as illustrated in Figure 4. The determinants of spatial arrangement are geographical considerations. As mentioned above, 1978 was an important node for rural development in China, and urbanization and industrialization led to the reconstruction of rural space. The natural and geographical conditions of the region determine the spatial layout. State intervention and government policies are the direct factors in the change of the rural pattern, which have played a staged optimization. De-ruralization has become the mainstream knowledge of rural building and changes to dissolve the urban-rural divide. Unlike urban space, each distinct rural space records the unique cultural meaning of the area. Due to a shortage of space, the culture of Chinese villages, particularly traditional villages, can quickly become unsustainable, resulting in the extinction of culture and identity.

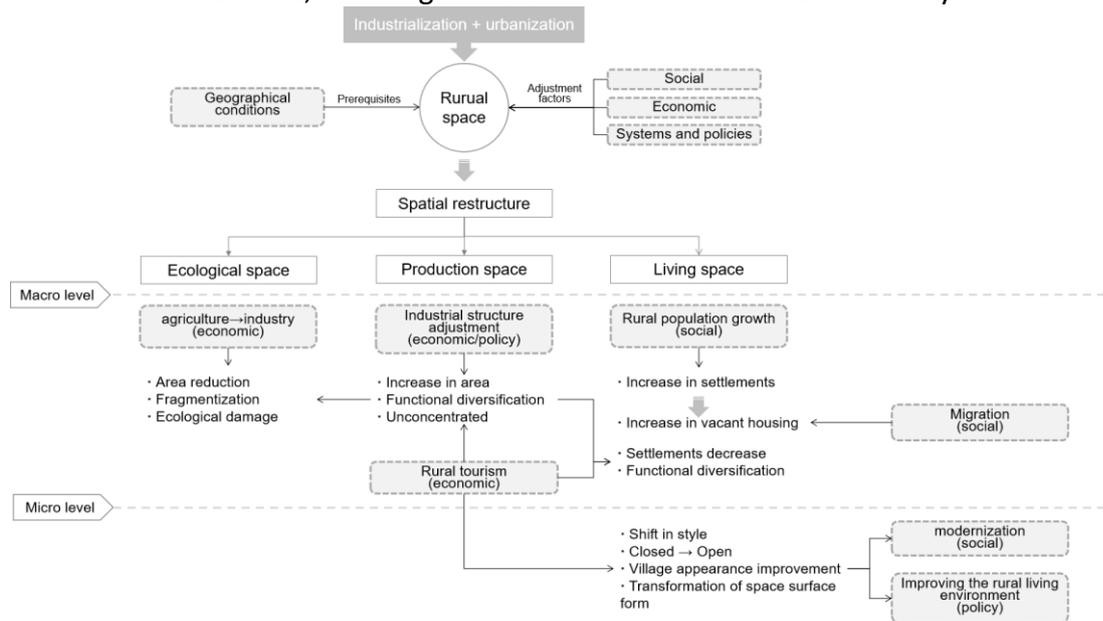


Figure 4: Summary of the influencing factors of the rural space form

China's rural area has seen significant changes as a result of the country's ongoing efforts to enhance regulations that encourage long-term rural development. To begin with, the demand for industrial restructuring and economic development has prompted a rapid expansion of rural production space based on the assumption of occupying ecological space. The regional ecological environment has been irreversibly harmed as a result of this. Simultaneously, the diverse manufacturing space divides the original entire environmental region. After the living space, the spatial form changes rapidly. In 1995, affected by the growth of the rural population, rural housing has been in a trend of expansion on the macro level. From 1996 to 2008, due to labor migration, settlements stopped growing, and vacant housing increased. At the same time, affected by the adjustment of industrial structure and the rise of rural tourism, the functions of living space have begun to diversify, and the form of space has changed from a closed state to an open state and is gradually commercialized.

Last but not least, from a microscopic level, the surface form of living space is mainly driven by three forces: rural tourism, modernization, and policies to improve the rural living environment. Based on the reviewed existing literature, the authors have found that the production and ecological space changes mainly manifest in the macroscopic layout and distribution. In contrast, the living space changes have macroscopic and microscopic levels in visual characteristics.

Rural life topics are getting more diverse in China, and the line between urban and rural life is becoming increasingly blurred. The diverse rural life themes and heterogeneous rural social

structure, in particular, have produced a new "center-periphery" urban-rural structure, defining the identity of rural vulnerable groups and marginalized social space. Many authors have explored the spatial distribution characteristics and changes through quantitative analysis. Still, there are few qualitative analyses and explorations of the form of living space, especially the lack of research on the spatial visual characteristics of specific traditional villages. Therefore, to expand the horizons of related research, the authors will try to focus on and capture the form and transformation of specific rural living spaces in China in future research.

## Reference

- Ahlers, A. L., & Schubert, D. G. (2009). "Building a New Socialist Countryside" – Only a Political Slogan?: *https://doi.org/10.1177/186810260903800403*, 38(4), 35–62. <https://doi.org/10.1177/186810260903800403>
- Bascom, J. (2001). "Energizing" rural space: The representation of countryside culture as an economic development strategy. *Journal of Cultural Geography*, 19(1), 53–73. <https://doi.org/10.1080/08873630109478297>
- Chen, C., Woods, M., Chen, J., Liu, Y., & Gao, J. (2019). Globalization, state intervention, local action and rural locality reconstitution - A case study from rural China. *Habitat International*, 93, 102052. <https://doi.org/10.1016/J.HABITATINT.2019.102052>
- Chen, J., & Liu, Y. (2014). Coupled natural and human systems: a landscape ecology perspective. *Landscape Ecology*, 29(10), 1641–1644. <https://doi.org/10.1007/s10980-014-0125-9>
- Chen, X., Xie, W., & Li, H. (2020). The spatial evolution process, characteristics and driving factors of traditional villages from the perspective of the cultural ecosystem: A case study of Chengkan Village. *Habitat International*, 104(August), 102250. <https://doi.org/10.1016/j.habitatint.2020.102250>
- Cong, L., Zhang, Y., Su, C.-H. (Joan), Chen, M.-H., & Wang, J. (2019). Understanding Tourists' Willingness-to-Pay for Rural Landscape Improvement and Preference Heterogeneity. *Sustainability* 2019, Vol. 11, Page 7001, 11(24), 7001. <https://doi.org/10.3390/SU11247001>
- Duan, Y., Wang, H., Huang, A., Xu, Y., Lu, L., & Ji, Z. (2021). Identification and spatial-temporal evolution of rural "production-living-ecological" space from the perspective of villagers' behavior – A case study of Ertai Town, Zhangjiakou City. *Land Use Policy*, 106. <https://doi.org/10.1016/j.landusepol.2021.105457>
- Fahmi, F. Z., & Sari, I. D. (2020). Rural transformation, digitalisation and subjective wellbeing: A case study from Indonesia. *Habitat International*, 98(April 2019), 102150. <https://doi.org/10.1016/j.habitatint.2020.102150>
- Feng, W., Liu, Y., & Qu, L. (2019). Effect of land-centered urbanization on rural development: A regional analysis in China. *Land Use Policy*, 87, 104072. <https://doi.org/10.1016/J.LANDUSEPOL.2019.104072>
- Frazier, A. E. (2019). Emerging trajectories for spatial pattern analysis in landscape ecology. *Landscape Ecology*, 34(9), 2073–2082. <https://doi.org/10.1007/s10980-019-00880-1>
- Fu, J., Zhou, J., & Deng, Y. (2021). Heritage values of ancient vernacular residences in traditional villages in Western Hunan, China: Spatial patterns and influencing factors. *Building and Environment*, 188. <https://doi.org/10.1016/j.buildenv.2020.107473>
- Galani-Moutafi, V. (2013). Rural space (re)produced – Practices, performances and visions: A case study from an Aegean island. *Journal of Rural Studies*, 32, 103–113. <https://doi.org/10.1016/J.JRURSTUD.2013.04.007>

- Gao, C. (2020). Study on the Development of Settlement Spatial Form of Famous Historical and Cultural Villages in Mentougou District of Beijing. *Journal of Physics: Conference Series*, 1622(1). <https://doi.org/10.1088/1742-6596/1622/1/012085>
- Gao, C., & Cheng, L. (2020). Tourism-driven rural spatial restructuring in the metropolitan fringe: An empirical observation. *Land Use Policy*, 95. <https://doi.org/10.1016/j.landusepol.2020.104609>
- Gao, C., Cheng, L., Iqbal, J., & Cheng, D. (2019). An integrated rural development mode based on a tourism-oriented approach: Exploring the beautiful village project in China. *Sustainability (Switzerland)*, 11(14). <https://doi.org/10.3390/su11143890>
- Guo, X. Y., Yu, Z. G., Schmit, T., Henahan, B., & Li, D. (2009). Evaluation of new socialist countryside development in China. *China Agricultural Economic Review*, 1(3), 314–326. <https://doi.org/10.1108/17561370910958882>
- He, J. (2021). Using Rural Planning to Promote the Integration of Primary, Secondary and Tertiary Industries in Rural China. *Frontiers in Business, Economics and Management*, 1(2), 10–14. <https://doi.org/10.54097/fbem.v1i2.16>
- He, Q., Tan, S., Yin, C., & Zhou, M. (2019). Collaborative optimization of rural residential land consolidation and urban construction land expansion: A case study of Huangpi in Wuhan, China. *Computers, Environment and Urban Systems*, 74, 218–228. <https://doi.org/10.1016/J.COMPENVURBSYS.2018.11.005>
- Hillier, B. (1985). The Nature of the Artificial: the Contingent and the Necessary in Spatial Form in Architecture. In *Geoforum* (Vol. 16, Issue 2).
- Hong, H., Xie, D., Liao, H., Tu, B., & Yang, J. (2017). Land Use Efficiency and Total Factor Productivity—Distribution Dynamic Evolution of Rural Living Space in Chongqing, China. *Sustainability 2017*, Vol. 9, Page 444, 9(4), 444. <https://doi.org/10.3390/SU9040444>
- Hu, X., Li, H., Zhang, X., Chen, X., & Yuan, Y. (2019a). Multi-dimensionality and the totality of rural spatial restructuring from the perspective of the rural space system: A case study of traditional villages in the ancient Huizhou region, China. *Habitat International*, 94(1), 102062. <https://doi.org/10.1016/j.habitatint.2019.102062>
- Hu, X., Li, H., Zhang, X., Chen, X., & Yuan, Y. (2019b). Multi-dimensionality and the totality of rural spatial restructuring from the perspective of the rural space system: A case study of traditional villages in the ancient Huizhou region, China. *Habitat International*, 94, 102062. <https://doi.org/10.1016/J.HABITATINT.2019.102062>
- Huang, X., Xu, H., Xie, N., Xu, M., & Zhao, J. (2021). Analysis of spatial structure and living culture of patio and courtyard dwellings in southern Hubei from the perspective of “cultural ecology” - Taking Ruijin Chuanfang ancient residence as an example. *IOP Conference Series: Earth and Environmental Science*, 675(1). <https://doi.org/10.1088/1755-1315/675/1/012020>
- Jia, K., Qiao, W., Chai, Y., Feng, T., Wang, Y., & Ge, D. (2020). Spatial distribution characteristics of rural settlements under diversified rural production functions: A case of Taizhou, China. *Habitat International*, 102. <https://doi.org/10.1016/j.habitatint.2020.102201>
- Juan, X., Hongtu, M., Jing, L., Xiaoping, H., Xingbo, Y., & Simin, Y. (2019). Spatial optimization mode of China’s rural settlements based on quality-of-life theory. *Environmental Science and Pollution Research*, 26(14), 13854–13866. <https://doi.org/10.1007/s11356-018-3775-3>
- Lawrence, D. L., & Low, S. M. (1990). THE BUILT ENVIRONMENT AND SPATIAL FORM. In *Annu. Rev. Anthropol* (Vol. 19). [www.annualreviews.org](http://www.annualreviews.org)
- Li, J. (2021). The Application of Computer 3D Technology in the Protection of Traditional Village Space Form. *Proceedings - 2021 International Conference on Computers*,

- Information Processing and Advanced Education, CIPAE 2021*, 192–195. <https://doi.org/10.1109/CIPAE53742.2021.00054>
- Li, J., Sun, W., Li, M., & Linlin Meng. (2021). Coupling coordination degree of production, living and ecological spaces and its influencing factors in the Yellow River Basin. *Journal of Cleaner Production*, 298, 126803. <https://doi.org/10.1016/J.JCLEPRO.2021.126803>
- Li, L., Xu, D., Chen, X., & Fadelelseed, S. (2019). Inheritance and Evolution of the Spatial Form of Traditional Rural Settlement. *Journal of Architecture Research and Development*, 3(5), 5–8.
- Li, Y., Jia, L., Wu, W., Yan, J., & Liu, Y. (2018). Urbanization for rural sustainability – Rethinking China’s urbanization strategy. *Journal of Cleaner Production*, 178, 580–586. <https://doi.org/10.1016/j.jclepro.2017.12.273>
- Li, Y., Zhu, Y., Yu, L., Bi, Z., & Huang, G. (2021). Typology in Vernacular Architecture - Qianmo Tower Post Station in Mingyue Village. *E3S Web of Conferences*, 237. <https://doi.org/10.1051/e3sconf/202123703019>
- Li, Z., Diao, J., Lu, S., Tao, C., & Krauth, J. (2022). Exploring a Sustainable Approach to Vernacular Dwelling Spaces with a Multiple Evidence Base Method: A Case Study of the Bai People’s Courtyard Houses in China. *Sustainability 2022, Vol. 14, Page 3856, 14(7)*, 3856. <https://doi.org/10.3390/SU14073856>
- Lin, G. ;, Jiang, D. ;, Fu, J. ;, Zhao, Y., Lin, G., Jiang, D., Fu, J., & Zhao, Y. (2022). A Review on the Overall Optimization of Production&ndash;Living&ndash;Ecological Space: Theoretical Basis and Conceptual Framework. *Land 2022, Vol. 11, Page 345, 11(3)*, 345. <https://doi.org/10.3390/LAND11030345>
- Liu, J. N., Wang, X. L., & Hou, Y. Z. (2022). The Impact of Village Cadres’ Public Service Motivation on the Effectiveness of Rural Living Environment Governance: An Empirical Study of 118 Chinese Villages: <https://doi.org/10.1177/21582440221079795>, 12(1). <https://doi.org/10.1177/21582440221079795>
- Liu, S. (2018). Research on Spatial Morphology and Protection of Traditional Rural Settlements Based on Space Syntax: Taking Xiazhuang Village and Shijia Village in Huzhou as .... *International Journal of Architectural and Environmental Engineering*, 12(4), 437–442. <http://publications.waset.org/10008851/research-on-spatial-morphology-and-protection-of-traditional-rural-settlements-based-on-space-syntax-taking-xiazhuang-village-and-shijia-village-in-huzhou-as-example>
- Liu, Y., Liu, Y., Chen, Y., & Long, H. (2010). The process and driving forces of rural hollowing in China under rapid urbanization. *Journal of Geographical Sciences*, 20(6), 876–888. <https://doi.org/10.1007/s11442-010-0817-2>
- Liu, Y., Yang, R., Long, H., Gao, J., & Wang, J. (2014). Implications of land-use change in rural China: A case study of Yucheng, Shandong province. *Land Use Policy*, 40, 111–118. <https://doi.org/10.1016/J.LANDUSEPOL.2013.03.012>
- Long, F., Liu, J., Zhang, S., Yu, H., & Jiang, H. (2018). Development Characteristics and Evolution Mechanism of Homestay Agglomeration in Mogan Mountain, China. *Sustainability 2018, Vol. 10, Page 2964, 10(9)*, 2964. <https://doi.org/10.3390/SU10092964>
- Long, H. (2014a). Land consolidation: An indispensable way of spatial restructuring in rural China. *Journal of Geographical Sciences*, 24(2), 211–225. <https://doi.org/10.1007/s11442-014-1083-5>
- Long, H. (2014b). Land consolidation: An indispensable way of spatial restructuring in rural China. *Journal of Geographical Sciences 2014 24:2, 24(2)*, 211–225. <https://doi.org/10.1007/S11442-014-1083-5>

- Long, H., Li, Y., Liu, Y., Woods, M., & Zou, J. (2012). Accelerated restructuring in rural China fueled by 'increasing vs. decreasing balance' land-use policy for dealing with hollowed villages. *Land Use Policy*, 29(1), 11–22.  
<https://doi.org/10.1016/J.LANDUSEPOL.2011.04.003>
- Long, H., & Liu, Y. (2016). Rural restructuring in China. *Journal of Rural Studies*, 47, 387–391.  
<https://doi.org/10.1016/j.jrurstud.2016.07.028>
- Long, H., Liu, Y., Wu, X., & Dong, G. (2009). Spatio-temporal dynamic patterns of farmland and rural settlements in Su-Xi-Chang region: Implications for building a new countryside in coastal China. *Land Use Policy*, 26(2), 322–333.  
<https://doi.org/10.1016/J.LANDUSEPOL.2008.04.001>
- Lv, L., Hu, J., Xu, X., & Tian, X. (2021). The Evolution of Rural Tourism in Wuhan: Complexity and Adaptability. *Sustainability 2021, Vol. 13, Page 13534, 13(24)*, 13534.  
<https://doi.org/10.3390/SU132413534>
- Marcus, L., Pont, M. B., & Barthel, S. (2019). Towards a socio-ecological spatial morphology: Integrating elements of urban morphology and landscape ecology. *Urban Morphology*, 23(2), 115–124.
- Muktadir, M. A., & Hassan, D. M. (1985). *Traditional House Form in Rural Bangladesh A case study for Regionalism in Architecture*. Dhaka, 81–86.  
<http://archnet.org/system/publications/contents/3676/original/DPC0287.pdf?1384775936>
- Norton, B. A., Evans, K. L., & Warren, P. H. (2016). Urban Biodiversity and Landscape Ecology: Patterns, Processes and Planning. *Current Landscape Ecology Reports*, 1(4), 178–192.  
<https://doi.org/10.1007/s40823-016-0018-5>
- Nurdiani, N., Hendarti, R., & Tedja, M. (2020). Physical Quality of Creative Economic Space on Cultural Tourism Areas in Java Island. *IOP Conference Series: Earth and Environmental Science*, 452(1). <https://doi.org/10.1088/1755-1315/452/1/012057>
- Oluwagbemiga Paul, A., & Zango Modi, S. (2014). " DEVELOPMENT OF TRADITIONAL ARCHITECTURE IN NIGERIA: A CASE STUDY OF HAUSA HOUSE FORM ". June.  
<https://www.researchgate.net/publication/317379363>
- Park, C. H. (2014). Nongjiale Tourism and Contested Space in Rural China. *Modern China*, 40(5), 519–548. <https://doi.org/10.1177/0097700414534160>
- Potschin, M., & Haines-Young, R. (2013). Landscapes, sustainability and the place-based analysis of ecosystem services. *Landscape Ecology*, 28(6), 1053–1065.  
<https://doi.org/10.1007/s10980-012-9756-x>
- Prajnawrdhi, T. A. (2018). An investigation of spatial arrangement, form, and structural system of traditional houses in Pedawa indigenous village-Bali. *MATEC Web of Conferences*, 159. <https://doi.org/10.1051/mateconf/201815901002>
- Puren, K., Roos, V., & Coetzee, H. (2018). Sense of place: using people's experiences in relation to a rural landscape to inform spatial planning guidelines. *International Planning Studies*, 23(1), 16–36. <https://doi.org/10.1080/13563475.2017.1329087>
- Qianda, X., Guoquan, Z., Hussein, M. K., Fazamimah, N., Yazid, M., & Yunos, M. (2021). Identification of rural vernacular building character and conservation strategy from the perspective of rural tourism -- a case study of Yayou Gou Village in Shandong Province, China. *In E3S Web of Conferences*, 251(EDP Science), 02076.
- Qu, L., Li, Y., & Feng, W. (2020). Spatial-temporal differentiation of ecologically-sustainable land across selected settlements in China: An urban-rural perspective. *Ecological Indicators*, 112, 105783. <https://doi.org/10.1016/J.ECOLIND.2019.105783>

- Razali, N. H. M., & Talib, A. (2013). Aspects of Privacy in Muslim Malay Traditional Dwelling Interiors in Melaka. *Procedia - Social and Behavioral Sciences*, 105, 644–654. <https://doi.org/10.1016/J.SBSPRO.2013.11.067>
- Setiadi, A., & Depari, C. D. A. (2021). THE TRANSFORMATION OF RESIDENTIAL SPATIAL AND FORM IN KAUMAN VILLAGE YOGYAKARTA. *Journal of Islamic Architecture*, 6(4), 286–300. <https://doi.org/10.18860/jia.v6i4.11665>
- Shi, S., & Ty, I. (2022). Research on Popular Participation in Chinese Rural Governance—The Case of Shunde, Guangdong. *Academic Journal of Humanities & Social Sciences*, 5(2), 86–92. <https://doi.org/10.25236/ajhss.2022.050212>
- Su, K., Hu, B., Shi, K., Zhang, Z., & Yang, Q. (2019). The structural and functional evolution of rural homesteads in mountainous areas: A case study of Sujiaying village in Yunnan province, China. *Land Use Policy*, 88, 104100. <https://doi.org/10.1016/J.LANDUSEPOL.2019.104100>
- Sui, X., Lin, L., & Sun, C. (2018). Study on Activation Mechanism and Sustainable Development of Rural Human Settlements Based on Landscape Construction. *E3S Web of Conferences*, 38, 1–5. <https://doi.org/10.1051/e3sconf/20183801053>
- Sun, H., Liu, Y., & Xu, K. (2011). Hollow villages and rural restructuring in major rural regions of China: A case study of Yucheng City, Shandong Province. *Chinese Geographical Science*, 21(3), 354–363. <https://doi.org/10.1007/s11769-011-0474-0>
- Sun, L., Xie, B., & Ge, H. (2021). Rural Space Classification and Value Evaluation Under the Perspective of Rural Revitalization Strategy. *Proceedings of the 2021 5th International Seminar on Education, Management and Social Sciences (ISEMSS 2021)*, 571(Isemss), 337–343. <https://doi.org/10.2991/assehr.k.210806.063>
- Sun, X., Wang, L., Wang, F., & Soltani, S. (2020). Behaviors of seniors and impact of spatial form in small-scale public spaces in Chinese old city zones. *Cities*, 107. <https://doi.org/10.1016/j.cities.2020.102894>
- Tan, S., Zhang, M., Wang, A., & Ni, Q. (2021). Spatio-temporal evolution and driving factors of rural settlements in low hilly region—a case study of 17 cities in Hubei Province, China. *International Journal of Environmental Research and Public Health*, 18(5), 1–18. <https://doi.org/10.3390/ijerph18052387>
- Tao, Z., Guanghui, J., Wenqiu, M., Guangyong, L., Yanbo, Q., Yingying, T., Qinglei, Z., & Yaya, T. (2021). Dying villages to prosperous villages: A perspective from revitalization of idle rural residential land (IRRL). *Journal of Rural Studies*, 84(February), 45–54. <https://doi.org/10.1016/j.jrurstud.2021.02.010>
- Tu, S., & Long, H. (2017). Rural restructuring in China: Theory, approaches and research prospect. *Journal of Geographical Sciences*, 27(10), 1169–1184. <https://doi.org/10.1007/s11442-017-1429-x>
- Tu, S., Long, H., Zhang, Y., Ge, D., & Qu, Y. (2018). Rural restructuring at village level under rapid urbanization in metropolitan suburbs of China and its implications for innovations in land use policy. *Habitat International*, 77, 143–152. <https://doi.org/10.1016/J.HABITATINT.2017.12.001>
- Turner, A. (2003). Analysing the visual dynamics of spatial morphology. *Environment and Planning B: Planning and Design*, 30(5), 657–676. <https://doi.org/10.1068/b12962>
- Turner, M. G., & Gardner, R. H. (2015). Landscape Ecology in Theory and Practice. In *Landscape Ecology in Theory and Practice*. <https://doi.org/10.1007/978-1-4939-2794-4>
- Wan, J., Su, Y., Zan, H., Zhao, Y., Zhang, L., Zhang, S., Dong, X., & Deng, W. (2020). Land functions, rural space governance, and farmers' environmental perceptions: A case study

- from the Huanjiang Karst mountain area, China. *Land*, 9(5), 1–19. <https://doi.org/10.3390/LAND9050134>
- Wang, C., Ren, M., Li, H., & Zhu, Y. (2019). Understanding the Rural Production Space System: A Case Study in Jiangjin, China. *Sustainability* 2019, Vol. 11, Page 2811, 11(10), 2811. <https://doi.org/10.3390/SU11102811>
- Wang, D., & Liu, Z. (2020). Progress and implications of international rural space research. *Journal of Geography and Cartography*, 3(1), 84–99. <https://doi.org/10.24294/JGC.V3I1.1308>
- Wang, H., & Zhuo, Y. (2018). The Necessary Way for the Development of China's Rural Areas in the New Era-Rural Revitalization Strategy. *Open Journal of Social Sciences*, 06(06), 97–106. <https://doi.org/10.4236/jss.2018.66010>
- Wang, J., & Zhang, Y. (2021). Analysis on the evolution of rural settlement pattern and its influencing factors in China from 1995 to 2015. *Land*, 10(11). <https://doi.org/10.3390/land10111137>
- Wang, R., Li, F., Hu, D., & Larry Li, B. (2011). Understanding eco-complexity: Social-Economic-Natural Complex Ecosystem approach. *Ecological Complexity*, 8(1), 15–29. <https://doi.org/10.1016/J.ECOCOM.2010.11.001>
- Wang, Y., & Li, Y. (2019). Promotion of degraded land consolidation to rural poverty alleviation in the agro-pastoral transition zone of northern China. *Land Use Policy*, 88(April), 104114. <https://doi.org/10.1016/j.landusepol.2019.104114>
- Wang, Y., Liu, Y., Li, Y., & Li, T. (2016). The spatio-temporal patterns of urban–rural development transformation in China since 1990. *Habitat International*, 53, 178–187. <https://doi.org/10.1016/J.HABITATINT.2015.11.011>
- Wang, Y., & Yuan, Q. (2019). Morphological characteristics of rural settlements from morphogenesis perspective: A case study of rural settlements in Heilongjiang Province, China. *Energy Procedia*, 157, 1266–1277. <https://doi.org/10.1016/j.egypro.2018.11.292>
- Wang, Z., Zhang, K., Yi, H., Lv, J., Li, X., Yuan, Z., & Bedra, K. B. (2021). Study on the Sustainable Planning and High Efficiency Utilization of Rural Areas Based on Ecological-Production-Living Space – A Case Study of Shuihu Village, Hengdong County, China. *E3S Web of Conferences*, 293, 03025. <https://doi.org/10.1051/e3sconf/202129303025>
- Wiggering, H., Dalchow, C., Glemnitz, M., Helming, K., Müller, K., Schultz, A., Stachow, U., & Zander, P. (2006). Indicators for multifunctional land use—Linking socio-economic requirements with landscape potentials. *Ecological Indicators*, 6(1), 238–249. <https://doi.org/10.1016/J.ECOLIND.2005.08.014>
- Wilkosz-Mamcarczyk, M., Olczak, B., & Prus, B. (2020). Urban features in rural landscape: A case study of the municipality of Skawina. *Sustainability (Switzerland)*, 12(11), 1–24. <https://doi.org/10.3390/su12114638>
- Xi, J., Wang, X., Kong, Q., & Zhang, N. (2015). Spatial morphology evolution of rural settlements induced by tourism: A comparative study of three villages in Yesanpo tourism area, China. *Journal of Geographical Sciences*, 25(4), 497–511. <https://doi.org/10.1007/s11442-015-1182-y>
- Xiong, B., Zhong, X., & He, J. (2021). On Sustainable Development of Rural Tourism in Jiangxi Province from the Perspective of All-for-one Tourism. *IOP Conference Series: Earth and Environmental Science*, 651(3). <https://doi.org/10.1088/1755-1315/651/3/032109>
- Xiong, G., Cao, X., Hamm, N. A. S., Lin, T., Zhang, G., & Chen, B. (2021). Unbalanced development characteristics and driving mechanisms of regional urban spatial form: A case study of Jiangsu Province, China. *Sustainability (Switzerland)*, 13(6). <https://doi.org/10.3390/su13063121>

- Xiong, Y., & Dong, Q. (2021). Research on rural land consolidation under the background of beautiful countryside construction. *IOP Conference Series: Earth and Environmental Science*, 692(4). <https://doi.org/10.1088/1755-1315/692/4/042049>
- Xu, W. (2004). The changing dynamics of land-use change in rural China: A case study of Yuhang, Zhejiang Province. *Environment and Planning A*, 36(9), 1595–1615. <https://doi.org/10.1068/a36185>
- Xu, X., Liu, J., Xu, N., Wang, W., & Yang, H. (2018). Quantitative study on the evolution trend and driving factors of typical rural spatial morphology in Southern Jiangsu Province, China. *Sustainability (Switzerland)*, 10(7), 5–7. <https://doi.org/10.3390/su10072392>
- Yanbo, Q., Guanghui, J., Yuting, Y., Qiuyue, Z., Yuling, L., & Wenqiu, M. (2018). Multi-scale analysis on spatial morphology differentiation and formation mechanism of rural residential land: A case study in Shandong Province, China. *Habitat International*, 71, 135–146. <https://doi.org/10.1016/j.habitatint.2017.11.011>
- Yang, K., Hu, C.-X., Zhang, Z.-M., & Li, Y.-L. (2016). A Study of Household's Environmental Cognitive Behavior and Influencing Factors on the Construction of Beautiful Countryside in Zhejiang Province. *International Conference on Applied Mathematics and Mechanics*. <https://scholar.archive.org/work/lr4u346z3fatfe2krgl3rl3gna/access/wayback/http://d-pi-proceedings.com/index.php/dtetr/article/download/7435/7017>
- Yang, X., Kong, Z., & Li, X. (2019). Research on the Spatial Pattern of Traditional Villages Based on Spatial Syntax: A Case Study of Baishe Village. *IOP Conference Series: Earth and Environmental Science*, 295(3). <https://doi.org/10.1088/1755-1315/295/3/032071>
- Yang, X., Song, K., & Pu, F. (2020). Laws and Trends of the Evolution of Traditional Villages in Plane Pattern. *Sustainability 2020, Vol. 12, Page 3005, 12(7)*, 3005. <https://doi.org/10.3390/SU12073005>
- Yang, X., Xu, K., Cai, W., & Niu, L. (2022). Study on the Evolution and Influencing Factors of Ruralism-ecology Spatial Pattern in QinLing Mountains: A Case Study of YangXian County. *Proceedings of the 2022 International Conference on Social Sciences and Humanities and Arts (SSHA 2022)*, 653(Ssha), 831–836. <https://doi.org/10.2991/assehr.k.220401.160>
- Yang, Y., Bao, W., & Liu, Y. (2020). Coupling coordination analysis of rural production-living-ecological space in the Beijing-Tianjin-Hebei region. *Ecological Indicators*, 117. <https://doi.org/10.1016/j.ecolind.2020.106512>
- Yao, G., & Xie, H. (2016). Rural spatial restructuring in ecologically fragile mountainous areas of southern China: A case study of Changgang Town, Jiangxi Province. *Journal of Rural Studies*, 47, 435–448. <https://doi.org/10.1016/J.JRURSTUD.2016.07.014>
- Ye, C., Ma, X., Gao, Y., & Johnson, L. (2020). The lost countryside: Spatial production of rural culture in Tangwan village in Shanghai. *Habitat International*, 98, 102137. <https://doi.org/10.1016/J.HABITATINT.2020.102137>
- Yong, S. (2020). The Practical Consideration of Ecological Landscape Design of Beautiful Countryside-The Practice and Consideration of Landscape Design of Countryside in Changan District, Xi'an. *IOP Conference Series: Earth and Environmental Science*, 495(1). <https://doi.org/10.1088/1755-1315/495/1/012051>
- Yu, C., Li, G., Wang, J., Fang, X., Zhou, L., & Liu, Y. (2020). Distinct types of restructuring scenarios for rural settlements in a heterogeneous rural landscape: Application of a clustering approach and ecological niche modeling. *Habitat International*, 104, 102248. <https://doi.org/10.1016/J.HABITATINT.2020.102248>
- Yu, H., Liu, X., Kong, B., Li, R., & Wang, G. (2019). Landscape ecology development supported by geospatial technologies: A review. *Ecological Informatics*, 51(March), 185–192. <https://doi.org/10.1016/j.ecoinf.2019.03.006>

- Zaizhi, Z. (2000). Landscape changes in a rural area in China. *Landscape and Urban Planning*, 47(1–2), 33–38. [https://doi.org/10.1016/S0169-2046\(99\)00069-9](https://doi.org/10.1016/S0169-2046(99)00069-9)
- Zang, Y., Liu, Y., Yang, Y., Woods, M., & Fois, F. (2020). Rural decline or restructuring? Implications for sustainability transitions in rural China. *Land Use Policy*, 94(January), 104531. <https://doi.org/10.1016/j.landusepol.2020.104531>
- Zhang, H. Q., Chong, K., & Ap, J. (1999). An analysis of tourism policy development in modern China. *Tourism Management*, 20(4), 471–485. [https://doi.org/10.1016/S0261-5177\(99\)00020-5](https://doi.org/10.1016/S0261-5177(99)00020-5)
- Zhang, R., Jiang, G., & Zhang, Q. (2019). Does urbanization always lead to rural hollowing? Assessing the spatio-temporal variations in this relationship at the county level in China 2000–2015. *Journal of Cleaner Production*, 220, 9–22. <https://doi.org/10.1016/j.jclepro.2019.02.148>
- Zheng, L., Li, G., Guo, Y., & Wang, H. (2020). The Endogenous Mode of Beautiful Rural Construction: A Case of China. *Journal of Human Resource and Sustainability Studies*, 08(04), 349–370. <https://doi.org/10.4236/jhrss.2020.84020>
- Zhou, G., He, Y., Tang, C., Yu, T., Xiao, G., & Zhong, T. (2013). Dynamic mechanism and present situation of rural settlement evolution in China. *Journal of Geographical Sciences*, 23(3), 513–524. <https://doi.org/10.1007/s11442-013-1025-7>
- Zhou, W., & Wang, J. (2018). *Research on Public Art Intervention in Rural Public Space Transformation*. 232(Icadce), 319–322. <https://doi.org/10.2991/icadce-18.2018.67>
- Zhou, Y., Li, Y., & Xu, C. (2020). Land consolidation and rural revitalization in China: Mechanisms and paths. *Land Use Policy*, 91, 104379. <https://doi.org/10.1016/J.LANDUSEPOL.2019.104379>
- Zou, H., & Liu, Y. (2021). A Comparative Study on the Spatial Characteristics of Traditional Residential Houses in Zhangguying and Laodong Villages Based on Space Syntax. *IOP Conference Series: Earth and Environmental Science*, 769(3). <https://doi.org/10.1088/1755-1315/769/3/032078>
- Zou, L., Liu, Y., Yang, J., Yang, S., Wang, Y., Cao zhi, & Hu, X. (2020). Quantitative identification and spatial analysis of land use ecological-production-living functions in rural areas on China's southeast coast. *Habitat International*, 100, 102182. <https://doi.org/10.1016/J.HABITATINT.2020.102182>
- Zuo, D., Li, C., Lin, M., Chen, P., & Kong, X. (2022a). *Tourism , Residents Agent Practice and Traditional Residential Landscapes at a Cultural Heritage Site : The Case Study of Hongcun Village , China*.
- Zuo, D., Li, C., Lin, M., Chen, P., & Kong, X. (2022b). Tourism, Residents Agent Practice and Traditional Residential Landscapes at a Cultural Heritage Site: The Case Study of Hongcun Village, China. *Sustainability* 2022, Vol. 14, Page 4423, 14(8), 4423. <https://doi.org/10.3390/SU14084423>