Spatial Distribution Characteristics of Ethnic Traditional Villages Based on Schema Language

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Abstract: *With the rapid development of new rural construction, industrialization and urbanization in recent years, traditional villages in many areas appear to be hollowing out, or replaced by modern elements, and the number of traditional villages is decreasing. Through the analysis of the spatial layout of Zhagana Village, it is found that in the process of adapting to the needs of life and natural environment, the elements and spatial structure of traditional villages have been continuously modified under the joint influence of human and natural factors. The spatial layout of traditional villages shows very high consistency, integrity and adaptability. It provides guarantee for the planning and protection of village landscape and sustainable development of villages.*

Keywords: *Ethnic minorities; Traditional villages; Schema language; Spatial distribution characteristics*

1. Introduction

Ethnic minority traditional villages are rich in cultural heritage, with great economic, historical, artistic, cultural and scientific values, which are important carriers of cultural inheritance and memory. However, with the rapid development of new rural construction, industrialization and urbanization in recent years, traditional villages in many areas appear to be hollowing out or replaced by modern elements, and the number of traditional villages is decreasing rapidly. At the present stage, with the integration of multiple disciplines, more and more new perspectives and new methods are applied to the study of traditional minority villages. As a research method based on schema and schema logical relations, schema language can accurately reflect the spatial layout of scenery and its logical relations, and help to fully grasp the spatial characteristics and the combination order of various elements of traditional minority villages[1]. This paper takes Zhagana Village, a traditional minority village in northwest China, as the research object, and implements its spatial structure in order to activate and protect traditional villages and achieve sustainable development of traditional villages.

2. Overview of the study area

Northwest ethnic minority regions mainly include Shaanxi Province, Qinghai Province, Gansu Province, Xinjiang Province and Ningxia Province. Located in the northwest inland of China, this region has less annual rainfall, and its landform is dominated by mountains, plateaus and basins, with fragile ecological environment and low vegetation coverage rate. The Northwest ethnic minority areas are the places through which the Silk Road passes. They have a long history of development and are rich in ethnic, historical and cultural resources. Under this special historical and natural ecological background, traditional villages with the local characteristics of the northwest have been born. Currently, a total of 208 traditional villages in the Northwest ethnic minority areas have been included in the national protection list. These villages are sparsely distributed, and the regional density is only 0.67/10,000 km2. Diebu County of Gannan in Gansu Province is the key distribution area of traditional minority villages in northwest China, and 7 local traditional villages have been included in the list of Chinese traditional villages. Gannan Diebu County in Gansu Province has irreplaceable landscape features and historical and cultural deposits, which is an important treasure house for the study of Chinese minority culture.(Figure 1)
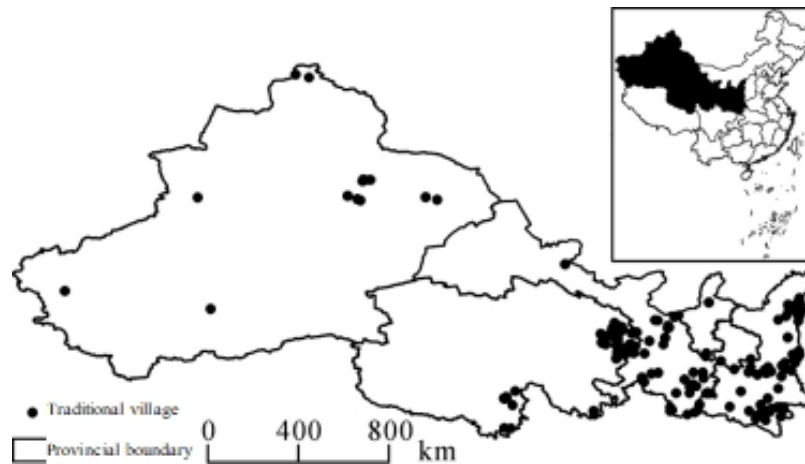
Figure 1: Distribution of traditional minority villages in Northwest China

3. Schematic language and spatial layout of minority traditional villages

The local characteristics and cultural connotation of the spatial distribution of traditional ethnic villages together constitute a highly patterned and typical cultural landscape pattern. The spatial order, spatial combination, development logic and design language of the development context of traditional villages are in common with the linguistic structure context, which makes traditional villages form a unique spatial distribution schema language. In fact, under the influence of language structure, logic and other factors, the distribution schema language of traditional villages is a comprehensive process of grammaticalization, lingualization and unitization of the layout of traditional villages, which is specifically manifested as universality and localization.

Due to the different relationship between internal logic and spatial elements, different villages usually form a differentiated schema language system, which is manifested through different schema grammar, vocabulary and syntax[2]. The nesting of words or phrases from different spatial scales makes the layout of traditional minority villages realize the unification and reverse schema structure, which is an important point of view of schema language theory. Based on the linguistic characteristics of the traditional village distribution schema, the construction of the traditional village schema language system is considered to be based on the phrases, characters and words contained in the schema vocabulary, and under the interaction of corresponding grammar, morphology and syntax, each element is nested with each other, so as to form a rich, diverse and well-ordered village spatial pattern.

Although some differences of the same type of space in transformation and splicing and spatial element composition, its overall distribution features enjoy universality. Through in-depth excavation of excellent sample space, creating landscape space with extremely local characteristics is of great research significance for the overall grasp of the combination order, spatial characteristics and spatial relations of the elements of traditional minority villages in Northwest China.

4. Spatial distribution characteristics of ethnic minority traditional villages based on schema language

4.1. Basic vocabulary schema of the spatial layout of Zhagana Village

The spatial distribution of Zhagana village is mainly dominated by big houses, and the space connection carrier is mainly corridor, with stone Bridges and Wells as auxiliary Spaces. The above three spatial elements together constitute the spatial schema of Zagat village. (1) For residential space, the "word" level mainly includes three basic elements: stone columns, walls and patios, with a total of 12 schemes; the "word" level mainly includes four types: They are patio combination, wall combination, wall space combination and wall-pillar combination, with a total of 21 spatial schemes; (2) Spatial connection link, the "character" level includes three basic elements, namely roadway, corridor and stone bridge, with a total of 12 schemas; On the "Ci" level, there are mainly two combination types of corridor bridge and roadway, with a total of 6 schemes.

4.2. Vocabulary combination schema of the spatial layout of Zhagana Village

The spatial layout of traditional villages of ethnic minorities in Northwest China is mainly determined by the spatial sequence relationship composed of multi-spatial vocabulary in a specific context. This stable and complete spatial sequence relationship is called spatial morphology.Fundamentally speaking, spatial morphology includes formation process morphology and spatial relation morphology.Based on the spatial layout context of Zhagara Village, through two perspectives of formation process and spatial relationship, the schema words were spliced and nested to form a variety of phrases with spatial sequence, including: connection, auxiliary space combination; The combination of living and connecting spaces; There are four types of connection, residence and accessory space combination. The specific combination schema analysis includes:

(1) Combination of living and connecting space. The living space of this combination is mainly manifested as block distribution, realizing the communication between material and people in the space connection, which is an important channel to maintain the emotion and life of residents in each space[3].

(2) Combination of connection and ancillary space. Most of these spatial connections belong to adjacent water buildings, and the spatial layout is mostly linear, and the village ancillary space is also point-like or linear. From the perspective of spatial layout, the connection and ancillary space are cross or parallel;

(3) Residential and auxiliary space. On most occasions, residential space is the core of the auxiliary space, which is located at the edge of the residential space, providing ecological security and basic materials for residents' normal life and work;

(4) Combination of connection, living and attached space. This kind of multi-element space has a very complex spatial structure. The core of this space is the living space. (Table 1)

Table 1: The lexical combination pattern of the spatial layout of Zhagana village and its functions

Combination pattern	Combination of connection, living space	Combination of connection and ancillary space	Residential and auxiliary space	Combination of connection, living and attached space
Presentations	Clustered distribution	Linear distribution	Clustered distribution	Clustered distribution

4.3. Syntactic features of the spatial layout schema language system in Zhagana village

The so-called space syntax refers to the organization structure and arrangement order of various elements in the space, and it is the logical relation or spatial criterion that the complex space unit and basic space unit should follow in the construction of the overall space unit. As the most basic space element, schema vocabulary can reveal its spatial meaning only in the space syntax. Influenced by many factors such as geographical environment and cultural rituals, the spatial layout elements of Zhagana Village are nested and spatial-mosaic. The particularity of context gives Zhagana Village its unique spatial layout meaning, and the spatial combination form formed is unique. The spatial design syntax of Zhagara village is complex and varied, and has various forms. However, the most common spatial design syntax is spatial nesting superposition, consistency and continuity.

4.3.1. Independent and complete layout of single space

In the spatial layout of Zhagana village, the independent and complete spatial layout corresponds to the single syntax, and the relationships of the spatial elements mainly include three categories: non-correlation, high correlation and loose correlation. Spatial elements have a very high correlation under single syntax, that is to say, the spatial elements presented are the same, showing the spatial distribution of tendency and echo.

The spatial layout of Zhagana village is represented by a single building space, typical of which is the courtyard of the large houses. The scale of the large houses in Zhagana village is very large, but the overall structure is simple, and the single building space is repeatedly laid in the space according to the fixed syntax.The center of a single architectural space is the patio, which is mainly composed of screen door, hall and wing room, etc. Different spatial elements have strong correlation with each other, forming an independent and complete overall spatial layout[4]. Based on this, the courtyards of Zhagana village was constructed based on the organizational structure and spatial arrangement and the

hierarchical order and patriarchal system, thus forming a traditional architectural community with east-west vertical symmetry, middle-axis symmetry, patios as the center and north-south depth.

4.3.2. Complex and changeable multi-space layout

In Zhagana village, the complex and varied multi-space layout corresponds to the complex syntax.Village spatial elements show no correlation in complex syntax, and each spatial element forms a complex multi-type layout of network, fusion, superposition and parallelism with the help of spatial combination[5]. For example, the pond in Zhagana village functions as fire prevention, which is an important part of the daily living space. The houses in the big house and the overall spatial structure show a parallel relationship.However, influenced by the ancient idea of geography, the village space nesting design is the dragon eye of the spatial layout of Zhagana village. The spatial structure links also complement the building groups of Zhagana village, thus forming an integrated compound village.

4.4. Design grammar of spatial layout schema grammar system in Zhagana village

Based on linguistic organization structure and thinking logic, schema language combines spatial elements into chapters, clauses, phrases and words through linguistic logic such as grammar, morphology and syntax, and then shapes the chapters into a complete literary work of village landscape. The spatial layout schema grammar of Zhagana village is the custom and traditional ritual that should be followed during the period of the construction of villages in Beijing. It describes the spatial relationship and its combination mechanism through the fixed logic method. Language design grammar of Zhagana village spatial layout schema includes: (1) Scale. From the single courtyard space, the space is continuously spliced and copied to form a grand scale of the trunk house; (2) Temporality and tense. The various architectural groups in Zhagana village were built in different times with different ideas. At first, they showed a cross-shaped spatial layout, and later they formed a font layout. (3) Order. During the construction of Zhagana village, axial symmetry, east-west longitudinal and North-south depth of the trunk layout is selected; (4) The modifiability. The central axis of the house in Zhagana village shows the construction pattern of the back mountain and water, the horizontal axis is expanded in accordance with the space of the house, and the vertical axis is expanded from inside to outside. The courtyard area of the house continues to expand. In order to improve the living environment, the villagers constantly revise the spatial structure, element details and syntax of Zhagana village. (5) Rhetoric. The spatial layout of Zhagana village is made with a large number of rhetorical devices, among which contrast, parallelization, emphasis, repetition and metaphor are more commonly used. For example, the upper circle under the courtyard of the council hall and the wooden pillars and stones on each side of the screen door are one circle. The villagers' thoughts of internal persistence and external reasonableness are expressed through metaphor.(Table 2)

Table 2: Spatial layout schema based language design grammar of Zhagana village

Design grammar	Scale	Temporality and tense	Order	Modifiability	Rhetoric
Layout	Branch layout	"Feng"typed layout	Branch layout	Vertical and horizontal axis layout	Rhetoric layout

5. Conclusion

Through the analysis of the spatial layout of Zhagana village, it is found that the spatial layout of traditional villages shows very high consistency, integrity and adaptability. Under the joint influence of human and natural factors, the elements and spatial structure of traditional villages have been continuously modified. The spatial layout of traditional minority villages is largely affected by the geographical environment, and the design concept and construction elements of traditional villages have strong regional characteristics with distinct features in spatial and lexical rules and other regions of village schema language. Based on the characteristics of schema language, it is helpful to solve the problem of regional feature loss in the transformation of traditional minority villages.

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