

Study on the Characteristics of Cultural Landscape of the Hani People's Living Environment Forest, Water, Field and Village: A Case Study of Jiayin Town

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Abstract: The Hani people have formed a unique cultural landscape system during the long-term use of natural transformation. They have the vertical gradient characteristics of mountain forests, villages and terraces, and the water system is the link. Among them, the forest and water system are the ecological components of the cultural landscape, and the terraces and villages are the production and living carriers of the cultural landscape. Taking the Hani terraced fields in Honghe County as an example, the natural and human characteristics of each element are analyzed. The characteristics can be summarized as follows: the mountain forest is the base of ecological protection and the spiritual guardian of the Hani people; the water system plays the role of longitudinal replenishment link. The terraces are the core plaques production, and the Hani farming culture is formed in the rice production process; the village has the characteristics of “large dispersion, small settlement” and is the center of living places.

1. Introduction

In the alpine valley area on the south bank of the Red River in Yunnan, the Hani people created the Hani terraced human settlement environment and culture landscape in order to meet their own survival needs. The cultural landscape has a history of more than 1,300 years, and its regional and national characteristics are outstanding. However, it faces the contradiction between protection and development. The analysis of its intrinsic characteristics can provide a scientific basis for protection and development.

Hani terraces are mainly distributed along the south bank of the Yunnan Red River in Yuanyang, Honghe, Lvchun and Jinping County^[1]. Among them, “Honghe Hani Terraces Cultural Landscape” was included in the World Heritage List in 2013. The total area of the heritage area is 461km², and the core area of the heritage is 166km². The cultural landscape of the Red River Hani terraces belongs to the “organic evolution landscape”, which is generated by the needs of the initial social, economic, political, religious and other aspects, and is adapted to the surrounding natural environment during development, reflecting the simple ecological concept of “Heaven and Man are united” and “adapted to local conditions” of the Hani people.^[2-3]

At present, the research on the cultural landscape of Hani terraces mainly focuses on the characteristics and functions of cultural landscapes^[4-5], the research and protection of cultural heritage values^[5-7], tourism development and planning [8-10], etc. Most of the study areas of the landscape are in the core area of the heritage, and there are few studies on the buffer zone. Jiayin Town is the main settlement of the Hani people in Honghe County, with distinct national characteristics. The Hani terraces in Jiayin Town are located in the World Heritage Buffer. Compared with the core area of the heritage, the cultural landscape is less affected by the external environment, which is more conducive to the study of its inherent core features. Taking the terraced fields of Jiayin Town, Honghe County, Yunnan Province as an example, this paper discusses the cultural landscape characteristics of Hani terraces based on ecology, production and living, and provides ideas for the overall protection of cultural landscape.

2. Basic overview of the study area and cultural landscape characteristics

2.1 Basic profile

Jiayin Town is affiliated to Honghe County, Honghe Prefecture, Yunnan Province. It is located in the alpine gorge area on the south bank of the Red River. It belongs to the deep-cutting middle mountain landform. 96% of the area is mountainous. The terrain has a large undulation, the elevation is in the range of 561m-2358m, and the terrain is high in the south and low in the north. The water resources in Jiayin Town are abundant, and the east and west sides are incised by the Hujie River and the Menglong River. The population of the territory is composed of Hani, Han, Yi and Yao, of which the Hani population has the largest population, accounting for 85% of the total population.

The natural environment in Jiayin Town has obvious vertical gradient characteristics: the upper part of the mountain has a higher altitude, the climate is cold, the rainfall is abundant, and there are large forests. The middle section has a mild climate and is suitable for living. The Hani Village is concentrated here; the bottom half of the mountain has a higher temperature and more precipitation. The environment of high temperature and high humidity are suitable for rice growth, and the Hani people reclaim large terraces here.

Previous studies have shown that the landscape type of Jiayin Town has obvious heterogeneity characteristics in vertical and horizontal directions, and the landscape types are diverse, but the degree of fragmentation is high, and the connectivity is normal. The proportion of the flat area in Jiayin Town is small, and the land with slope $>25^\circ$ is close to 1/3 of the total area, and the construction suitability is poor overall (Figure 1).

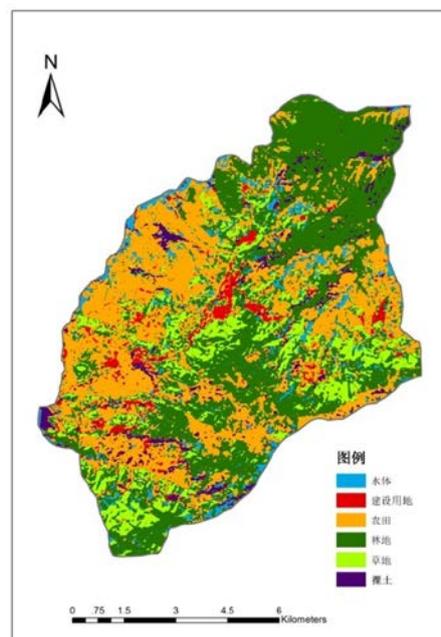


Fig.1 Landscape type analysis of Jiayin town

2.2 Characteristics of human settlements and cultural landscapes

In the process of adapting to nature, the Hani people have transformed the alpine gorge area to form the utilization mode of the mountain and water, terraces and villages with both natural and humanistic characteristics in order to meet their own living and living needs. Through the analysis of the landscape pattern of Jiayin Town, the landscape pattern characteristics of Jiayin Town are strongly influenced by the elevation, and the forest, village, terrace and water system form a four-in-one landscape pattern with obvious vertical gradient differentiation characteristics (Fig. 2).

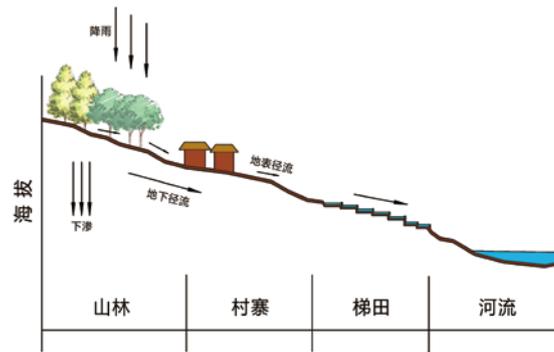


Fig.2 Analysis of vertical gradient differentiation of forests, villages and terraces

From the perspectives of ecology, production and living, mountain forests and water systems are the ecological components, while terraces and villages are the production components and living components respectively. They together constitute the Hani terrace culture landscape. As the basis of the sustainable and stable cultural landscape of Hani terrace, the forests, villages, terraces and water systems are interrelated and jointly maintain the stable state of Hani terrace cultural landscape.

3. The mountain forest - ecological protection base

As the ecological protection base of the Hani cultural landscape system, the forest plays a controlling role in the ecological landscape pattern, providing a continuous source of water for terraced irrigation and village life. The Hani people also regard it as the sacred forests and annual festival sacrifice are held.

3.1 Analysis of natural characteristics

Ecological protection is the basis of ecological stability of cultural landscape of the Hani people's living environment. The most ecologically effective landscape types for the environmental protection of Jiayin Town are forest land and grassland, and the forest land plays a decisive role in maintaining the water resources of terraces. Studies have shown that as the main plaque of Jiayin Town, the area of forests exceeds 1/3 of the total area of the landscape, accounting for 37.73%. Some forest plots have large plaques, high plaque connectivity, and relatively concentrated spatial distribution. They are dominant landscape types and control the ecological landscape pattern. In vertical distribution, forest land is mainly distributed in higher altitude areas. forest - Village - terraces Vertical gradient features. The forest landscape is mostly distributed in the slope with large slope, and the area within the slope of $>15^\circ$ accounts for 76.73% of the total area of the forest. The forest land does not occupy the artificial construction land, and it is distributed to adapt to the topographical features of high mountains and steep in the plateau mountains, playing a huge role in water conservation and protection.

3.2 Analysis of humanistic characteristics

The original religious concept of the Hani people has had a huge impact on the way rice fields are produced. The Hani people planted the sacred forests above the village to bless the village and the rice harvest, while the large forests provided water for rice production^[5].

Large areas of forest in the upper half of the mountain provide water for village life and terraces production. Therefore, the Hani people always say that “there are no reservoirs in the terraces, and the forests are the reservoirs.” The Hani people regard the trees as the gods of the Hani villages. They regard the forests above the Hani villages as the sacred forests, prohibiting felling and setting strict punishment measures. Every “Angmatu” Festival, the Hani people will sacrifice to the gods in the sacred forests, strengthen the sense of sacredness of the mountains in people's hearts, which fully reflect the simple ecological concept of the Hani people.

4. The water system - vertical supply tie

The water system is the skeleton of the all cultural landscapes, which serves as a replenishment link and connects each culture landscape. For example, Twelve Dragon Springs is a symbol of the Hani people's worship of nature. In order to make full use of water resources, the Hani people invented the “woodcut water distribution” water resource allocation method.

4.1 Analysis of natural characteristics

In the environment where the Hani people live, the forests and water systems in the valley are evaporated a lot of water, and the water vapor rises during condensation, forming a large amount of rainfall in the upper part of the mountain; the mountain forest in the upper half of the mountain absorbs rainwater, forming a large amount of spring water. That is, “how high is the mountain, how high is the water”; the spring water flows through the villages and terraces from top to bottom, providing water for the village life and terrace production, and finally re-into the river valley, and in cycles. The forest has the ecological function of conserving water and soil. The water system has the ecological functions of series forests, villages and terraces, and jointly maintains the ecological stability of the Hani terrace culture landscape.

4.2 Analysis of humanistic characteristics

Under the natural worship of the Hani people on the mountain forest, the virgin forest above the Hani village was well preserved, and a large amount of spring water in the forest flowed into the Hani village. Twelve Dragon Spring, located at the mouth of the village of Tasa Village in Jiayin Town, provided the village with domestic water and terrace irrigation water, and the water outlet was carved into a dragon head shape, symbolizing the Hani people's worship of the water source. The villagers will present sacrifices in the lunar calendar every year to worship the Twelve Dragon Springs.

In order to make full use of water resources and achieve better irrigation effect on terraces, Hani people excavate the canals to introduce water into the terraces to form a unique gravity flow irrigation system. The Hani people have strict regulations on the distribution of water sources. Each terrace can only be irrigated with water from a specific canal and cannot be changed without authorization. In order to rationally distribute water sources, the Hani people invented the unique method of water resource allocation. “Woodcut water separation” is to place a crossbar at the water outlet of the ditch. According to the actual required water consumption of each terrace, the grooves of different widths are marked on the crossbar so that the water resources can be properly distributed.

5. Terraces – the core plaque of production

Terraced fields are the core of the Hani cultural landscape, and they occupy a dominant position in terms of industry, proportion, value and other cultural, landscape and functional aspects. In the terraced rice production, the corresponding Hani farming culture is formed to strengthen the terrace production function under the characteristics of plateau mountains.

5.1 Analysis of natural characteristics

Through the analysis of the landscape pattern of Jiayin Town, it can be found that the farmland landscape is distributed horizontally on the east and west sides of Jiayin Town. The distribution in the vertical direction is greatly affected by the elevation and it is concentrated in the bottom half of the mountain of 1200m~1600m. Besides, there are distributions in two adjacent elevation sections: 1600m ~ 1700m and 561m ~ 1200m. Studies have shown that the farmland area accounts for 34.32% of the total area of Jiayin Town, only second to the forest landscape. 47.93% of the farmland landscape is composed of large-scale patches of 500 ~ 1000hm², with high connectivity and relatively concentrated spatial distribution, which has certain dominance.

Combined with the protection and utilization of the water system, the Hani people form a unique terraced landscape. Because the overall slope of Jiayin Town is large, it is easy to form soil erosion. Once the sloped mountain is turned into flat terraces, the water source and the sediment it carry can be

intercepted in it and settled gradually with each layer of terraced fields to maintain water and soil. After flowing through the forests and villages, water carries a large amount of organic matter and flows into the terraces to bring high-quality fertilizer.

5.2 Analysis of humanistic characteristics

For more than 1300 years, the Hani people have formed the corresponding farming techniques, such as farming calendar, festival sacrifices, farming techniques, and rice farming, in the terraced rice production. The “October Phenology Calendar” of the Hani people is a traditional calendar based on the production rules of terraced farming. The calendar determines the start and end dates and festival schedules based on the time nodes of the terraced farming. The “October Phenology Calendar” divides the year into a cold season, a warm season and a rainy season. At the corresponding replacement nodes, there are three major festivals, “Angmatu”, “Kuzaza” and “October”, corresponding to the three farming time nodes of spring tillage, autumn harvest and fallow.

6. Villages - the center of living places

Hani Village is the living center of the Hani people. The unique spatial pattern of the Hani people's living environment provides convenience for Hani's production and life, and also guarantees the safe living space for the Hani people.

6.1 Analysis of natural characteristics

In Jiayin Town, affected by natural conditions, the construction land is small, accounting for only 7.8% of the total area of Jiayin Town. Moreover, the plaques of construction land are highly fragmented, and the spatial distribution is scattered relatively, forming the characteristics of “large dispersion and small aggregation”. The construction land is strongly affected by the elevation and is concentrated in the Zhongshan section of 1600m~1700m. The construction land and the farmland have the closest spatial proximity.

The living environment of the Hani people presents the spatial pattern of the mountain forests - villages - terraces from top to bottom. This provides a convenient way for the Hani people to go up the mountain to hunt and gather and farm the terraced fields down the mountain. Villages are located above the terraced fields. Natural precipitation is intercepted by the forest above the village and it flows into the village in the form of spring water to provide a clean water source for the village. The humus and garbage manure in the village flow into the terraces along with the water flow to enhance the fertility of the terraces and the village also achieves the effect of self-purification.

From the perspective of safety, the alpine valley area on the south bank of the Red River is rich in precipitation, and the slope of the mountain is large. It is prone to natural disasters such as mountain torrents and mudslides. The terraces are located below the village to avoid potential collapse and provide a safe living space for the Hani people.

6.2 Analysis of humanistic characteristics

The Hani people follow the oral tradition of Hani in the layout of the villages. The connotation is similar to the geomancy theory of Han nationality based on agricultural civilization. All the villages are selected with sufficient water, safe and convenient space. According to the description of the ancient rules of Reluo, the Hani village is composed of the front, center and end of the villages. In order to alleviate the population pressure, the village established a sub-village system that matches the radius of the terraced service and improved the living function of the village.

7. Conclusion

In the process of research in Jiayin Town, it was found that the Hani people's living environment has a four-in-one culture landscape pattern system of mountains, water, terraces and villages. In the future protection and development, we should take the ecological civilization construction as the guide to protect the three-dimensional landscape pattern system composed of forests, water systems,

villages and terraces; establish ecological protection zones, strengthen the protection of key ecological patches, and Ensure the ecological stability of Hani terrace cultural landscape; coordinating the relationship between ecological protection, tourism development and targeted poverty alleviation; Raise the income level of terraced rice production, increase the added value of green agricultural products in terraced fields, avoid farmers changing land use types due to low income; controlling population growth rate to alleviate the pressure on terraced rice production and establish a multi-party linkage terraced rice cultivation mechanism. At the same time, strengthen the control of the village's style, improve the living environment of the village, effectively protect the texture of the village, improve the infrastructure construction, improve the quality of life of the Hani people; break the limitations of the traditional small-scale peasant economy, integrate the advantageous resources within the village. Through commercial competition, Hani village is injected with new vitality and created with the times.

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References

- [1] Gao Kai. The shape and spirit of the cultural landscape of Hani Terrace in Honghe[J]. Journal of Kunming University of Science and Technology (Social Science Edition), 2013, (06): 91-97.
- [2] Wang Yi. Type Characteristics and Evaluation Criteria of Cultural Landscape[J]. Chinese Garden, 2012, (01): 98-101.
- [3] Gao Kai, Fu He. Research on the World Heritage Value of Honghe Hani Terrace Field Cultural Landscape from the Perspective of Ecological Wisdom[J]. Landscape Architecture, 2014, (06): 64-68.
- [4] Jiao Yuanmei. The Characteristics of Hani Cultural District--The Cultural Landscape of Hani Terrace Field[J]. Yunnan Geographic Environment Research, 2003, (01): 51-56.
- [5] Huo Xiaowei, Li Lei, Zhang Jie. Research on the Protection of Traditional Villages in Cultural Landscape--Taking Quanfuzhuang Village of Hani Terraced Field in Yuanyang as an Example[A]. China Urban Planning Society, Nanjing Municipal Government. Transformation and Reconstruction--2011 China Proceedings of the Urban Planning Annual Conference [C]. China Urban Planning Association, Nanjing Municipal Government, 2011: 6.
- [6] Liu Qiang. Key to the protection of Hani terraces: sustainable development of people [J]. China Economic and Trade Guide, 2014, (10): 56-58.
- [7] Duan Yibo, Zhang Cuiping, Li Shuying, et al. Research on the Protection and Sustainable Development Model of the Nuohani Terraced Fields in Yuanjiang, Yunnan Province[J]. Anhui Agricultural Sciences, 2015, 43(7): 130-132.
- [8] Zhang Lin. Rural Landscape Characteristics and Planning Thinking from the Perspective of Tourism--Taking the Yuanke Village of Yuanyang, Yunnan as an Example[J]. Landscape Architecture, 2017, (5): 87-93.
- [9] Liao Yan, Zhou Invent. A Review of Terraced Culture and Its Tourism Development Research [J]. Rural Economy and Technology, 2016.