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Research on Traditional Village Spatial Differentiation from the Perspective of Cultural Routes: A Case Study of 338 Villages in the Miao Frontier Corridor

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Abstract: The traditional villages in the Miao Frontier Corridor are the products of migrations, social interactions, and transportation, as well as production interchanges between the central plains and the frontiers of China in ancient times. They have made significant contributions to local multicultural inheritance and regional social development. However, with the increasing pressure of heritage conservation and sustainable development, there is growing attention on how traditional villages can tap into their cultural continuity and distinctiveness. This study introduces the concept of cultural routes, with the aim of integrating traditional villages of different ethnicities, regions, and characteristics from the perspective of diversity. It analyzes their spatial differentiation characteristics and the factors influencing them, providing basic support for the overall protection of traditional villages with special characteristics. Following this idea, 338 remaining traditional villages in the Miao Frontier Corridor were selected as the research objects. With the help of 91-satellite maps and a geographic information system (GIS), a cultural and geographic database of the traditional villages in the Miao Frontier Corridor was constructed to objectively explore the roles of the traditional villages' natural geography, historical, and humanistic elements in the spatial categorization on a large scale. This study shows that the spatial distribution of the traditional villages in the Miao Frontier Corridor is uneven, exhibiting a cluster structure with of a "single primary nucleus with multiple secondary nuclei". The spatial differentiation of traditional villages exhibits a similar clustering pattern based on individual natural geographic factors, such as elevation, mountain undulation, slope, and water systems. Additionally, there is discernible regularity concerning historical and humanistic factors, such as ethnicity type, age of village establishment, and the presence of guard stations. Further exploring the micro-spatial level, the natural geographical environment serves as the structural foundation of traditional village space, while the historical and humanistic environment fosters multiple differentiations in traditional village space in terms of influencing factors. Together, these factors jointly influence the spatial differentiation of traditional villages. This study enriches the dynamic aspects of linear cultural heritage preservation and also provides new insights into the specialized development within the overall protection of traditional villages.

Keywords: spatial distribution; influencing factors; physical geography; history and humanities; structural basis foundation; multiple differentiation

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1. Introduction

According to the relevant documents from the Ministry of Housing and Urban–Rural Development of China and other ministries, traditional villages (TVs) are defined as "villages that have been formed at an early stage, possess rich traditional resources, and

have certain historical, cultural, scientific, artistic, social and economic values that should be protected". How to enhance the effectiveness of the protection and development of TVs is an important issue in the implementation of major national strategies, such as rural revitalization, cultural empowerment, and targeted poverty alleviation [1–3]. On one hand, TVs serve as a microcosm of the historical development and evolution of local society, and they are also a precious "gene bank" of excellent Chinese traditional culture. They help to demonstrate historical continuity, allowing people to understand past lifestyles, social structures, and cultural evolution. They represent the most direct and effective real-life contexts for tracing, reproducing, and experiencing historical culture. They hold significant value in promoting the protection and utilization of cultural heritage, upgrading national cultural self-awareness and self-confidence, and promoting the construction of ecological civilization [4–7]. On the other hand, under the impact of globalization and urbanization, traditional cultural characteristics and lifestyles are gradually marginalized. Simultaneously, widespread issues, such as land abandonment, environmental decay, and depopulation collectively contribute to the serious crisis of alienation, loss of cultural vibrancy, and extinction faced by TVs [8,9]. Since the declaration and selection of "China Traditional Village" was launched in 2012, not only have six batches comprising 8155 "China Traditional Villages" been recognized by the Ministry of Housing and Urban–Rural Development and other ministries, with the implementation of related policies such as the plaque protection system [10,11], but tourism development of TVs has also become a new growth point of rural tourism development in China and the main means of rural revitalization [12,13]. This reflects the great importance attached to TVs at the national level and the extensive attention paid to them by all sectors of society.

Therefore, over the past decade, the protection and development of TVs has gradually become a topic of widespread concern in academia, particularly in areas such as cultural heritage, rural tourism, sustainable development, and human settlements [14–17]. Scholars' research on TVs has yielded abundant results, focusing on three core questions: "What?", "Why?", and "How?" Concurrently, it has formed three clear research paths regarding the spatial and cultural landscapes of TVs: "Types and genealogies" [18–20], "Formation patterns and mechanisms of evolution" [21–23], and "Social impacts and value manifestations of protection and development" [24–26]. Additionally, in terms of the research scale, with the coverage of TV protection, scholars also realize that research on TVs cannot be interpreted purely from a single case or the protection practice of a specific region, and that the overall and systematic study of TV protection and development will be more beneficial for the formulation and implementation of related policies on land use, heritage protection, cultural heritage, and community governance [27–30]. Additionally, the common sense of "feng shui" behind the TV habitat has become the basis for traditional Chinese housing theory and modern built environment planning and design [31]. As a result, academia has begun exploring the protection of TVs from a larger-scale regional perspective. This includes comprehensive studies of ethnic residential areas [32,33], the cultural geography of TVs and residences [34,35], genealogical studies of traditional settlement landscapes [31,36], and spatial genealogies [37,38]. These studies emphasize the importance and scientific nature of holistic research for the effective protection of the same type of TVs. Similarly, from 2020 to 2024, the Ministry of Finance and the Ministry of Housing and Construction successively announced 120 centralized contiguous protection and utilization areas for TVs. This initiative spurred a series of scientific research fund projects focusing on overall regional studies of TVs in administrative areas such as Shaanxi, Guizhou, and Inner Mongolia, as well as in natural geographic units like the Ganjiang River Basin, the Wuling Mountain Area, and the Loess Plateau. Additionally, attention has been given to transportation routes such as the Taihang Bajing, fostering the concept of "concentrated and contiguous" protection. The existing studies have provided valuable perspectives for us to understand the geographic differences of TVs and have also shown a tendency to develop from external representations to internal structures and from static descriptions to dynamic interpretations. However, there are still several issues that have

not been fully addressed due to the vast number, wide distribution, complex types, and significant protection challenges of TVs in China, as well as uneven development and severe homogenization [39]. In particular, the existing literature has not yet provided a clear answer on how to enhance the characteristic development of villages while ensuring the overall protection of TVs. Moreover, further exploration is needed to re-evaluate the relationship between the "commonality" and "individuality" of regional TVs in contrast to case studies and systematic research.

Given this situation, this paper suggests that the "commonalities" of regional history, culture, and geography should be regarded as an important cornerstone for understanding the spatial "individuality" of TVs to explore the common underlying logic behind the diversity of village spaces. Therefore, this paper adopts the perspective of cultural routes to conduct systematic basic research on TVs with significant features and historical connections. This approach aims to provide a scientific basis for subsequent differentiated development. The concept of cultural routes is a term in the field of cultural heritage [40], referring to routes that have significant importance due to specific cultural or historical reasons [41]. It may be related to activities such as trade, warfare, migration, and cultural exchange [42]. Cultural routes were first formally proposed by European scholars in 1994 and later incorporated into international documents by the International Council on Monuments and Sites (ICOMOS) in 2008. This led to discussions on various types of "cultural routes" in China, such as the Grand Canal, the Silk Road, the Tea Horse Road, and the Sichuan-Salt Road [43]. The cultural route perspective helps capture and analyze the continuity of social and cultural aspects within space, transcending the limitations of traditional static spatial views and providing TVs with a new dynamic spatial perspective. As a result, some scholars began to discuss the sustainability of history and culture from the spatial type characteristics and spatial evolution of TVs in linear spaces, such as channels and river basins [44–47]. However, Hunan, Guizhou, and Yunnan are the provinces with the largest number of remaining Chinese TVs, the most complex ethnic groups, and the most diverse spatial types. In the existing literature, the research in Hunan mainly focuses on exploring the spatial type and feature identification of Xiangxi or ethnic TVs [48,49], Guizhou mostly explores the spatial protection and development mode of ethnic villages [50,51], and Yunnan mostly focuses on tourism development and sustainable research [52,53]. Within the three provinces, research on TVs is relatively fragmented, with research techniques and methods primarily concentrated on qualitative induction, case analysis, and comparative studies. Quantitative research is also still in its infancy. It often focuses on administrative regions (states, cities, counties), single-ethnicity villages, or typical case studies, lacking a relatively systematic overall perspective to link them. In addition, cultural accumulation and interactions at the regional scale have led to differences in the "core" and "peripheral" characteristics of TVs' spatial characteristics. In the existing research, in the scope, object, and main content of research in terms of topics such as folklore, cultural geography, and landscape genetics [54–56], there is mainly a focus on typical regions, such as the cultural phenomena in the core areas of TVs, and less on cultural peripheral areas and multicultural intermingling areas. However, these peripheral and intermingling areas are precisely where the spatial differentiation of TVs is more abundant and diversified. This leads to insufficient identification of the spatial characteristics of TVs among different ethnic groups, thereby revealing the problem of homogenization of regional characteristics in the overall protection process, which makes it difficult to develop TVs distinctively. Therefore, studying the spatial differentiation of TVs from the perspective of cultural routes not only reflects the fundamental value of overall regional protection but also highlights the potential development value of spatial distinctiveness. Under the cultural work mainline of "strengthening the consciousness of the Chinese nation as a community and building a shared spiritual homeland for the Chinese nation," it will have even greater practical value.

This paper takes the Miao Frontier Corridor, one of China's six major ethnic corridors, as the research area and focuses on 338 TVs as the study subjects. Using geographic information systems (GIS) and morphological spatial analysis methods, supplemented by

qualitative approaches, this study predominantly employs a quantitative approach. Its aim is to reveal the spatial differentiation characteristics of TVs in the Miao Frontier Corridor. The objective is to explore the influencing factors of spatial differentiation and further provide suggestions for the overall protection of TVs. This study specifically addresses the following three questions: (1) What are the spatial differentiation characteristics of TVs along the Miao Frontier Corridor? (2) What causal relationships exist between these spatial differentiation characteristics and the cultural–geographical environment? (3) What characteristic references can be drawn for the future development of TVs from the perspective of overall conservation?

2. Research Design

2.1. Research Area

The Miao Frontier Corridor is a traditional migration route dating back to the Yuan and Ming dynasties, connecting the southwestern borderland Yunnan to the Central Plains. It originated in Changde, Hunan Province, and spanned east to west across Zhenyuan, Kaili, Guiyang, and Anshun in central Guizhou Province, extending into Fuyuan, Yunnan Province, and reaching Kunming via Qujing. The corridor has a total length of about 2300 km. The Miao Frontier Corridor is a cultural concept with a somewhat vague geographical spatial scope. This paper takes the division of the ancient Miao Frontier Corridor determined by Zhiqiang Yang, Xudong Zhao, and Duanbo Cao as the basis [57]. It combines the 32 counties and cities passed by the ancient stagecoach road during the Ming and Qing Dynasties to delineate the scope of this paper (Figure 1). The Miao Frontier Corridor spans across three provinces: Yunnan, Guizhou, and Hunan, encompassing 6 city districts, 5 county-level cities, and 21 county-level districts (7 minority autonomous counties). The geographic location ranges from 102°19′ to 112°17′ E longitude and 24°38′ to 29°37′ N latitude.

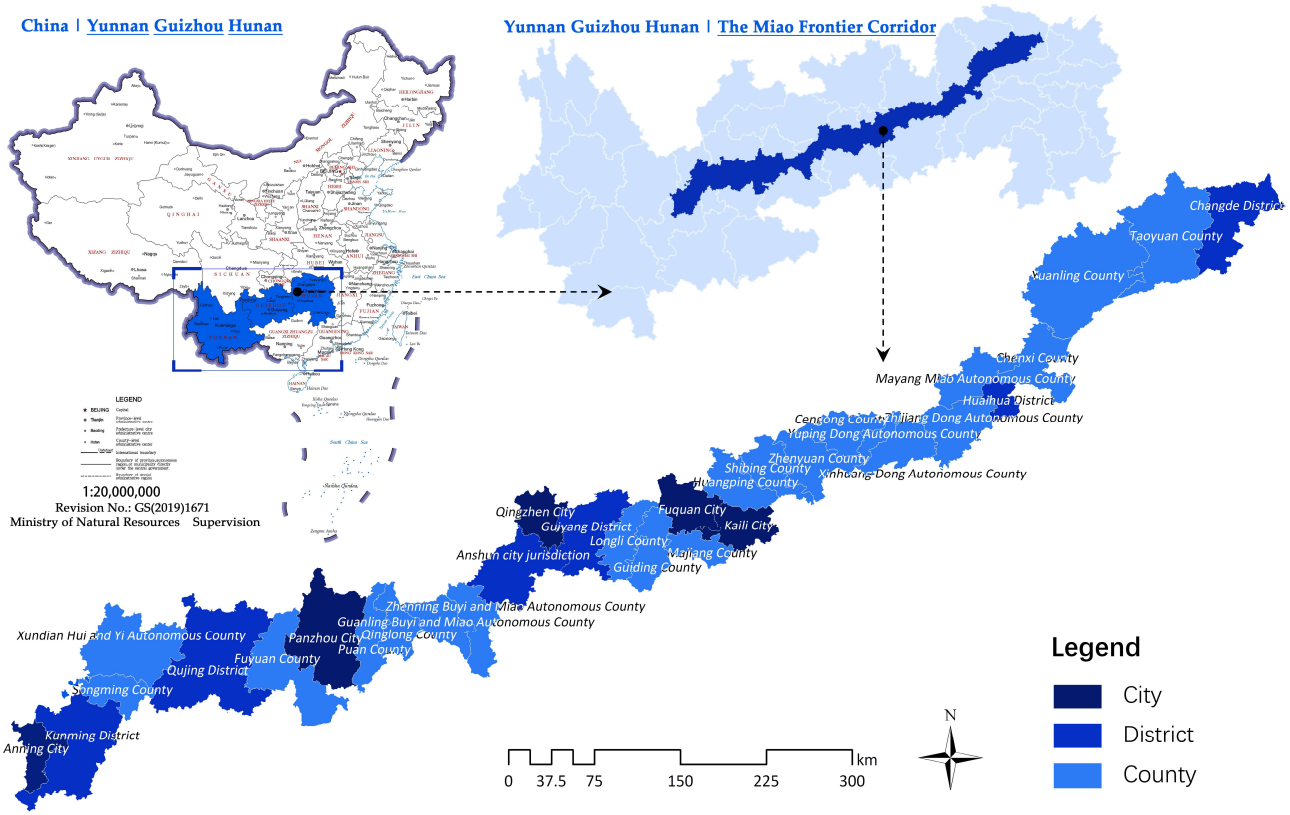
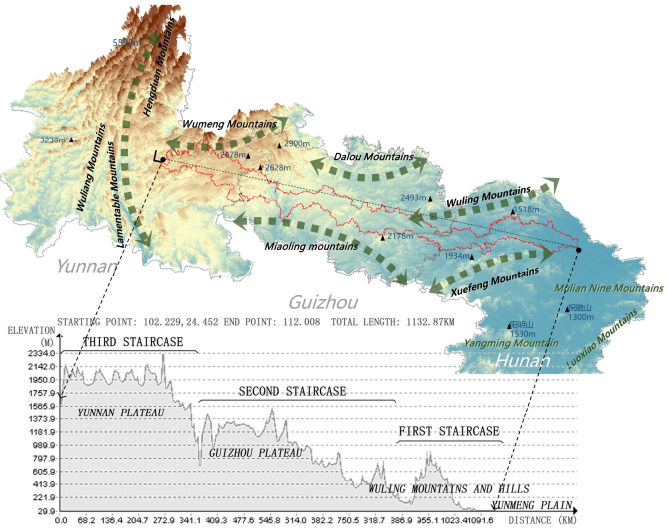
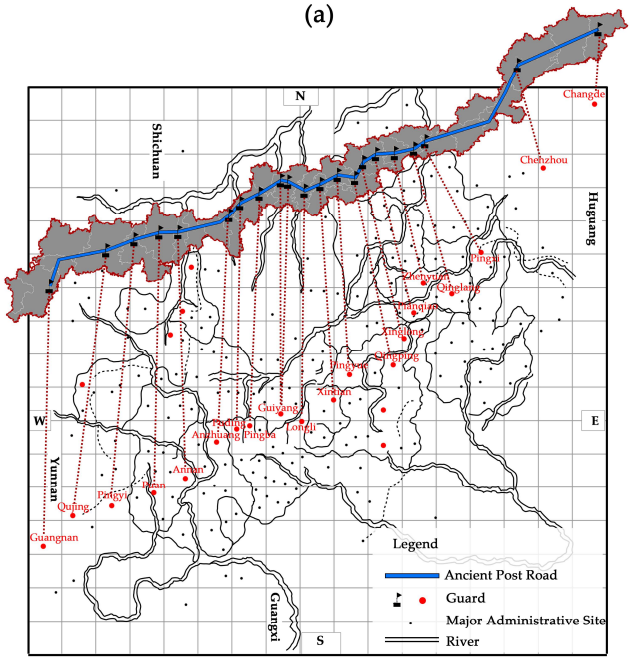


Figure 1. Research scope and location.

The selection of the Miao Frontier Corridor as the research scope holds significant implications for the study of TV conservation and development. On one hand, the multiple spatial meanings of the Miao Frontier Corridor can deepen our understanding of the relationship between the remaining TVs within the corridor and its historical geography. It serves as a natural "linear stepped corridor" traversing the Yungui Plateau, linking the Central Plains with the borderlands, surrounded by mountains on both sides (Figure 2a). It also represents a "nationalized corridor" that facilitated the unification of the southwestern borderlands with the Central Plains in ancient China, as well as facilitating modern economic feedback from the southwestern borderlands to the Central Plains (Figure 2b). Moreover, it serves as a "civilization corridor," facilitating the integration of the local economy of the southwestern borderlands into the national market economy and facilitating the migration of various ethnic populations (Figure 2c). On the other hand, the Miao Frontier Corridor serves as the core zone where multiple ethnic groups converge, allowing for a full experience of the rich ethnic cultural heritage and diverse cultural phenomena of TVs. For example, there are various types of TVs and distinctive ethnic architecture (Figure 3). Additionally, amidst ethnic convergence, historical social factors, such as inter-ethnic marriage, free trade, and population migration behind spatial interactions within TVs are easier to discern, which makes the inheritance and continuity of the unique spatial characteristics within TVs clearer. Furthermore, ethnic cultures such as the Tunpu culture of Anshun and the folk activities of the Miao and Dong ethnic groups in the corridor are internationally renowned, attracting visitors from around the globe. In conclusion, selecting the Miao Frontier Corridor as a cultural geographic space to study TVs not only helps unearth and preserve the historical and cultural heritage of the villages, promoting the protection and utilization of cultural heritage, but also enhances local economic development and traditional cultural exchanges at home and abroad, and fosters rural revitalization and sustainable development.

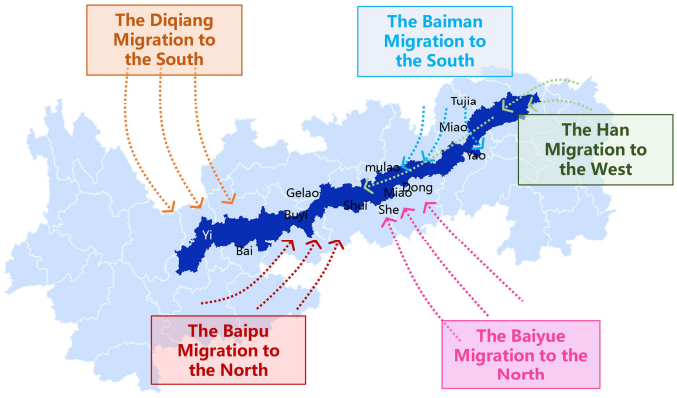


(a)



Distribution map of Guizhou guard posts in the Ming Dynasty (Source: Qianji - Yitu Zhi , 1603)

(b)



(c)

Figure 2. Multi-meanings of Miao Frontier Corridor Space: (**a**) natural geographic corridor, linear and stepped characteristics; (**b**) nationalized corridor, the imperial post roads established by the state, which are part of the military highways; (**c**) civilization corridor, spontaneous ethnic population migration.

Figure 3. Characteristics of TVs and dwellings in the Miao Frontier Corridor: (**a**) morphological characteristics of TVs in the corridor; (**b**) distribution of dwellings in TVs in the corridor.

2.2. Data Source

This paper takes 338 TVs within the corridor as the research object, including 87 "Chinese traditional villages" (all national traditional villages in the first six batches in the corridor) and 251 self-selected villages. The self-selected villages were selected in accordance with the scale, proportion, and richness in the quantitative assessment of the "Traditional Village Evaluation and Recognition Indicator System (for Trial Implementation)" (https://www.mohurd.gov.cn/, accessed on 18 September 2021.) issued by the

Ministry of Housing and Urban–Rural Development and other ministries. Specifically, for the well-preserved villages with high historical and cultural values that have not yet been selected and graded, our research group considered the traditional pattern, overall appearance, historical buildings, and traditional life. Finally, we confirmed 251 self-selected villages by the high-definition satellite imagery of a 91-satellite map through the regional carpet scanning and field research to ensure the objectivity and comprehensiveness of the TV data to the greatest extent possible. Field research was conducted on the villages, and map annotations for the village samples were completed using 91-satellite maps and ArcGIS 10.4 (Figure 4). The data in this paper are divided into two categories. The first category includes natural geographic data, such as the administrative boundaries of the study area, topography, river water system, and so on. The second category comprises the historical and humanistic data of TVs. This includes information such as ethnicity, village establishment age, and Ming and Qing guard stations. The primary data sources of this paper are listed below (Table 1). In addition, all of the village photographs in this paper were photographed and collected by the authors during our field research in December 2021, May 2022, June 2022, July 2023, and August 2023 in the corridor.

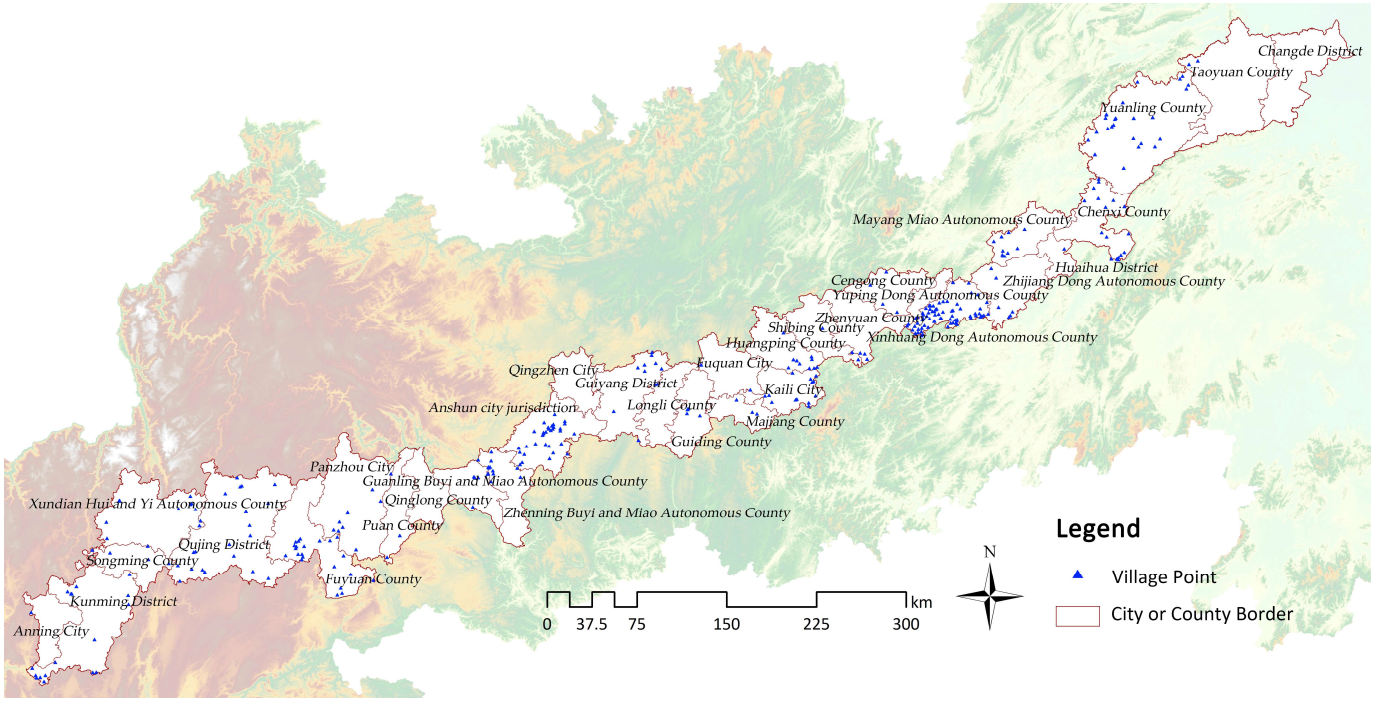


Figure 4. Distribution of TVs in the corridor.

Table 1. Primary data sources.

Category	Dataset	Data Source
Research sample	Point of the TVs (87 Chinese traditional villages, 251 traditional villages)	http://www.chuantongcunluo.com/ (Date was checked on 20 April 2024) 91-satellite maps
Research scope	Administrative boundary data	https://www.resdc.cn/Default.aspx (Date was checked on 20 April 2024)
Geomorphological data	DEM (30 m × 30 m resolution)	https://www.resdc.cn/Default.aspx (Date was checked on 20 April 2024)
	River data	https://www.resdc.cn/Default.aspx (Date was checked on 20 April 2024)
History and humanities data	Ethnicity data	http://dmctv.cn/indexN.aspx (Date was checked on 20 April 2024) Field research, Gazetteers of 32 counties and cities
	Establishment age data	http://dmctv.cn/indexN.aspx (Date was checked on 20 April 2024) Field research, Gazetteers of 32 counties and cities
	Guard stations	https://www.osgeo.cn/ (Date was checked on 20 April 2024)

2.3. Research Method

To scientifically and objectively analyze the influence patterns of natural and humanistic elements of TVs in the Miao Frontier Corridor within a large-scale linear spatial context, this paper adopts two specific research steps:

Step 1: Construct a cultural geographic database of TVs utilizing a 91-satellite map and ArcGIS. Input the locations of 338 TVs on the 91-satellite map image layer, extract their factor data, and summarize them into an Excel table while ensuring standardization. These data are linked with ArcGIS to establish the cultural geographic information database of TVs in the Miao Frontier Corridor (Figure 5). The database comprises administrative division, geographic coordinates (latitude and longitude), factor indicators, and their specific information (Table 2) to ensure the uniformity and objectivity of the subsequent data analysis.

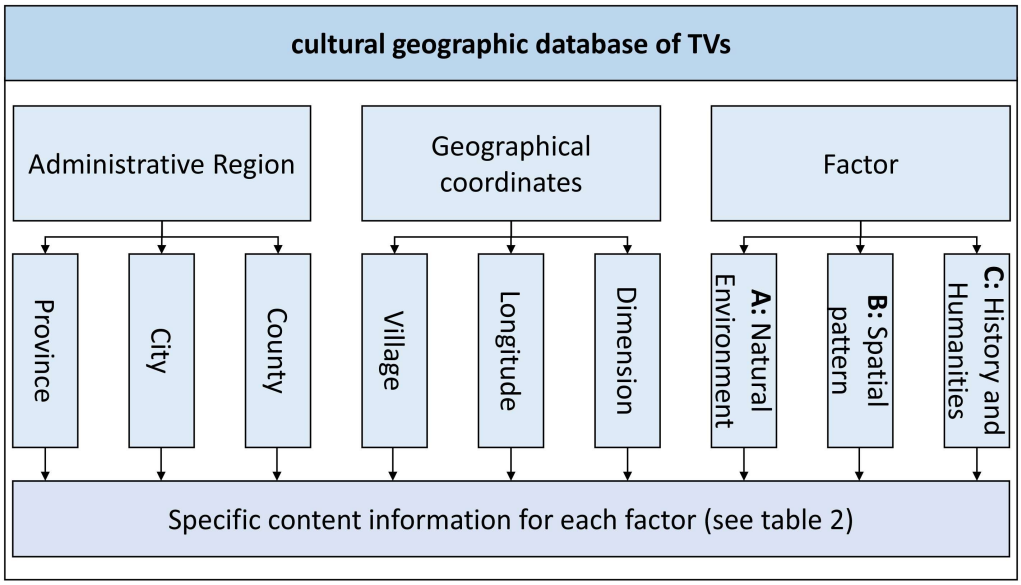


Figure 5. Cultural geographic database of TVs.

Table 2. Factor indicator content.

Category	Factor	Comment Information and Data Reprocessing
Geography data (**A**)	Elevation ($\mathbf{A_1}$)	The elevations of the villages were extracted directly using vector mapping in the 91-satellite maps, and the national 2000 coordinate system was selected
	Relief ($\mathbf{A_2}$)	using the "Focus Statistics" function in the "Neighborhood Analysis" of GIS, selecting a rectangular neighbor type with a side length of 900 (90 × 10) m, and obtaining the degree of terrain relief for the DEM. Then, the Extract Values to Points function was utilized to assign village relief.
	Slope ($\mathbf{A_3}$)	ArcGIS 10.4 was utilized to calculate the slope for DEM, and then the Extract Values to Points function was utilized to assign the village slope.
	River class ($\mathbf{A_4}$)	1 Very large river 2 Large rivers 3 Medium-sized rivers 4 Major river tributaries 5 Small river tributaries 6 Major streams
Spatial pattern (**B**)	Village patterns ($\mathbf{B_1}$)	Two major categories: mountainous, flat dams Nine subcategories: See Figure 3a
	Housing forms ($\mathbf{B_2}$)	Four categories: —-shaped, L-shaped, U-shaped, □-shaped.
History and humanities data (**C**)	Ethnicity ($\mathbf{C_1}$)	Ethnic type: Han, Miao, Dong, Tujia, Ge, She, Yao, Yi, Buyi, Mulao, Shui, and Multi-ethnic Mixture
	Establishment age ($\mathbf{C_2}$)	Before Yuan, Yuan and Song, Ming, Qing, and Republic of China
	Guard stations ($\mathbf{C_3}$)	Guangnan Wei (1396), Qujing Wei (1382), Pingyi Wei (1390), Puan Wei (1382), Annan Wei (1390), Anzhuang Wei (1389), Puding Wei (1382), Guizhou Avant-Garde (1391), Guizhou Wei (1371), Longli Wei (1390), Xintian Wei (1390), Pingyue Wei (1392), Qingping Wei (1390), Xinglong Wei (1389), Pianqiao Wei (1390), Zhenyuan Wei (1389), Qinglang Wei (1390), Pingxi Wei (1390), Chenzhou Wei (1367), Changde Wei (1366).

Note: Classification of rivers is based on the water conservancy industry standards of the People's Republic of China.

Step 2: Combine quantitative and qualitative analysis methods. First, based on the database in Step 1, ArcGIS was used to calculate the nearest-neighbor index, imbalance index, kernel density index, and Thiessen polygon to study the macro-distribution characteristics of the TVs. Secondly, the data visualization function of ArcGIS 10.4 and Excel 2013 was used to quantify the data relationship between the distribution of TVs in terms of the natural geography and history and humanities and to analyze the distribution characteristics of TVs in the corridor with respect to the influencing factors. Finally, on the basis of the macro-distribution pattern, qualitative research methods, such as literature review, case study, comparative study, and descriptive analysis, were supplemented to further reveal the relationship between the spatial differentiation of TVs in the corridor and the

environment from the meso-micro-village level. The specific quantitative research methods are as follows:

① Nearest Neighbor Index serves as a crucial tool for analyzing spatial distribution characteristics, enabling the determination of the random, dispersed, or clustered distribution status of TV elements [58]. The nearest neighbor index is defined as the ratio of the average nearest neighbor distance to the theoretical nearest neighbor distance, and the formula is as follows (1), (2):

$$R = \frac{\bar{r}_i}{\bar{r}_E} \tag{1}$$

$$\bar{r}_E = \frac{1}{2}\sqrt{m/A} \tag{2}$$

In this formula, R represents the nearest neighbor index; $\bar{r}_i$ represents the average nearest neighbor distance; $\bar{r}_E$ represents the theoretical nearest neighbor distance; m represents the number of point elements; and A represents the study area. When $R = 1$, TVs tend towards a random distribution; when $R > 1$, TVs tend towards a dispersed distribution; when $R < 1$, TVs tend towards a clustered distribution.

② Imbalance Index reflects the degree of balance in the distribution of the research object across different levels or regions [59]. Since the county unit has been the most stable in the historical evolution of China's administrative setup, demonstrating the degree of equilibrium using the county as a unit is more representative in a macro perspective. The formula is as follows (3).

$$S = \frac{\sum_{i=1}^{n} Y_i - 50(n+1)}{100n - 50(n+1)} \tag{3}$$

In the formula, S represents the imbalance index, n represents the number of counties and cities in the Miao Frontier Corridor, and Y_i represents the cumulative percentage of TV counts within each county and city, sorted in descending order of the proportion of TV counts to the total number of villages in the Miao Frontier Corridor, up to the i-th position. The value of S falls within the interval [0, 1]. When S approaches 0, it indicates that TVs tend to be evenly distributed across the regions; when S approaches 1, it indicates that TVs are more concentrated in one region.

③ Kernel Density is the density of point elements around each output raster, which can visually reflect the degree of concentration and dispersion of TVs [60]. The formula is as follows (4):

$$f(x) = \frac{1}{nh}\sum_{i=1}^{n} k\left(\frac{x - x_i}{h}\right) \tag{4}$$

In the formula, $f(x)$ represents the estimated value of the kernel density, h represents the bandwidth, n represents the number of points within the threshold range, k represents the spatial weighting value, and $(x - x_i)$ represents the distance from the estimated point x to the event x_i. The higher the value of $f(x)$, the greater the concentration of TVs in the corridor and the stronger the spatial agglomeration.

④ Thiessen polygons (Voronoi Diagram) is commonly used to measure the spatial distribution of point sets effectively [61]. In this study, on one hand, we further validated the characteristics of the TV point set and also served to more intuitively visualize the historical and cultural environmental characteristics of TVs. On the other hand, we utilized Thiessen polygons to leverage the properties of discrete points to describe the characteristics of the area, which can more intuitively demonstrate the adjacency relationships of TVs, such as the relationship between the ethnicity of neighboring villages and the age of their establishment. The formula is as follows (5):

$$CV = (Std/Ave) \times 100\% \tag{5}$$

CV is the coefficient of variation of the Thiessen polygon; Std is the standard deviation of the Thiessen polygon area; and Ave is the mean value of the Thiessen polygon area. A

CV value less than 33% indicates a uniform distribution of TVs; a *CV* value between 33% and 64% suggests a random distribution of TVs; and a *CV* value greater than 64% indicates an agglomerative distribution of TVs.

3. Results

3.1. Spatial Distribution Characteristics

3.1.1. Clustered Distribution

Using ArcGIS 10.4 for nearest neighbor analysis of TVs in the Miao Frontier Corridor, we obtained $\bar{r}_i$ = 5.4 km, $\bar{r}_E$ = 11.47 km, R = 0.47, i.e., $R < 1$. Using ArcGIS 10.4 to analyze the Thiessen polygons of TVs in the corridor, we obtained CV = 173%, i.e., $CV > 64\%$. The results show that the spatial distribution type of TVs in the Miao Frontier Corridor belongs to a clustered distribution. To a certain extent, this corresponds to the distribution pattern of China's ethnic minorities living together [62].

3.1.2. Degree of Spatial Distribution Balance

The imbalance index S = 0.6207 was calculated using Excel, indicating that TVs are unevenly distributed in the Miao Frontier Corridor. Based on the statistical data, a TV Lorenz curve was generated (Figure 6). The top ten counties and cities together account for 80% of the total number of TVs, namely, Xinhuang, Anshun, Yuanling, Fuyuan, Qujing, and Kunming. In contrast, the number of TVs in the last seven counties and cities is notably small. The factors affecting the distribution of the existing TVs in the corridor are complex, and field research has highlighted two prominent influences on this outcome. On the one hand, most of the counties and cities in the corridor, such as Guiyang and Changde, are the core of transportation, material, and population flows, and have developed into central regions of their respective provinces. The expansion of these towns and cities has spurred rapid development of a large number of villages, enabling them to undergo self-renewal or modern construction. On the other hand, ethnic agglomerations are often the pioneers in implementing policies for the protection of TVs. For example, Xinhuang has implemented a strategy that integrates "agriculture, culture, and tourism" to promote rural revitalization, and Anshun has issued a high-quality development plan for TVs for the period of 2021–2025, among others. The differences in protection policies across various regions have also led to an uneven distribution of the remaining TVs within the corridor.

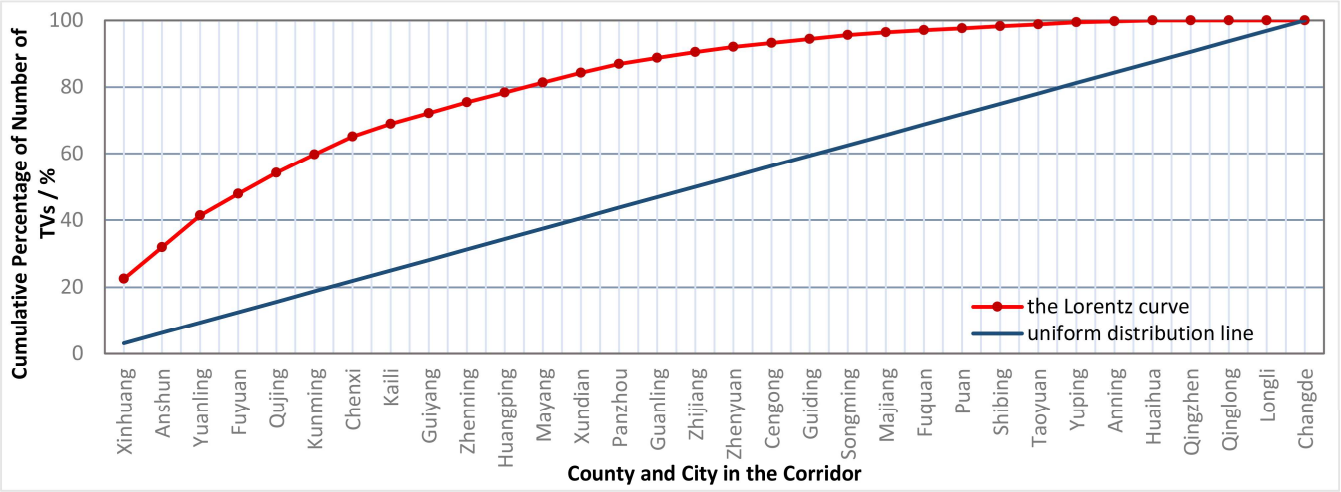


Figure 6. Lorenz curve of distribution of TVs in the corridor.

3.1.3. Spatial Distribution of Kernel Density

Using ArcGIS 10.4, a kernel density analysis was conducted on TVs in the Miao Frontier Corridor (Figure 7). The results reveal a spatial distribution pattern characterized by a "single primary nucleus with multiple secondary nuclei". This includes a highly dense

area centered around Xinhuang Dong Autonomous County, as well as four secondary density areas centered around Yuanling County in the northwest, the southern region of Kaili Huangping County, Anshun Zhenning County, and Qujing Fuyuan County.

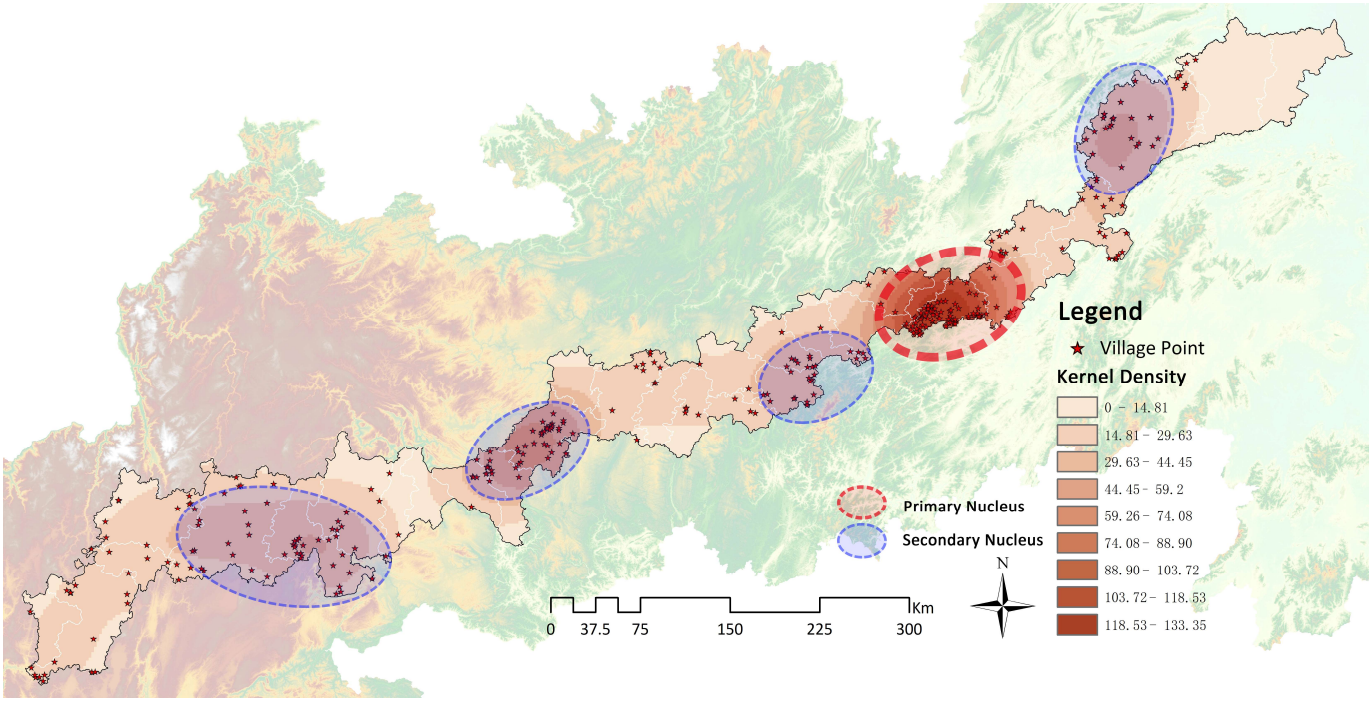


Figure 7. Kernel density of TVs in the corridor.

3.2. The Natural Geographic Characteristics of the TVs in the Corridor

3.2.1. Elevation Effects: Distribution of TVs Is Dominated by Elevations Below 800 m

Elevation is a significant topographic feature of geographical space, exerting a crucial influence on natural environmental factors such as climate, ecological environment, and vegetation distribution. These factors, in turn, affect the livelihoods and production of TVs [63]. We utilized ArcGIS 10.4 to overlay TVs onto the DEM for spatial visualization and created a bar-line chart of the village elevation data using Excel (Figure 8). The results indicate that TVs in the Miao Frontier Corridor are most commonly distributed below 800 m in elevation, with 169 TVs, accounting for 49.99%, nearly half of the total sample. It can be observed that the majority of existing TVs in the Miao Frontier Corridor tend to be located at mid- to low elevations. Some studies universally exhibit similar patterns [64]. However, the difference is that 31.66% of TVs are distributed in the high-altitude ranges of 1201–1400 m and 1801–2200 m. This is closely related to the stepped natural topography of the corridor region. Combined with the specific distribution of TVs in Figure 8, the distribution of TVs within these two altitude ranges is mostly located on the flat terrain of the Yunnan–Guizhou Plateau, where there is ample sunlight and abundant land. This environment is also favorable for villagers' agricultural cultivation [65,66]. Therefore, the particularity of the terrain within the corridor has also led to a distribution characteristic of great similarity with minor differentiation.

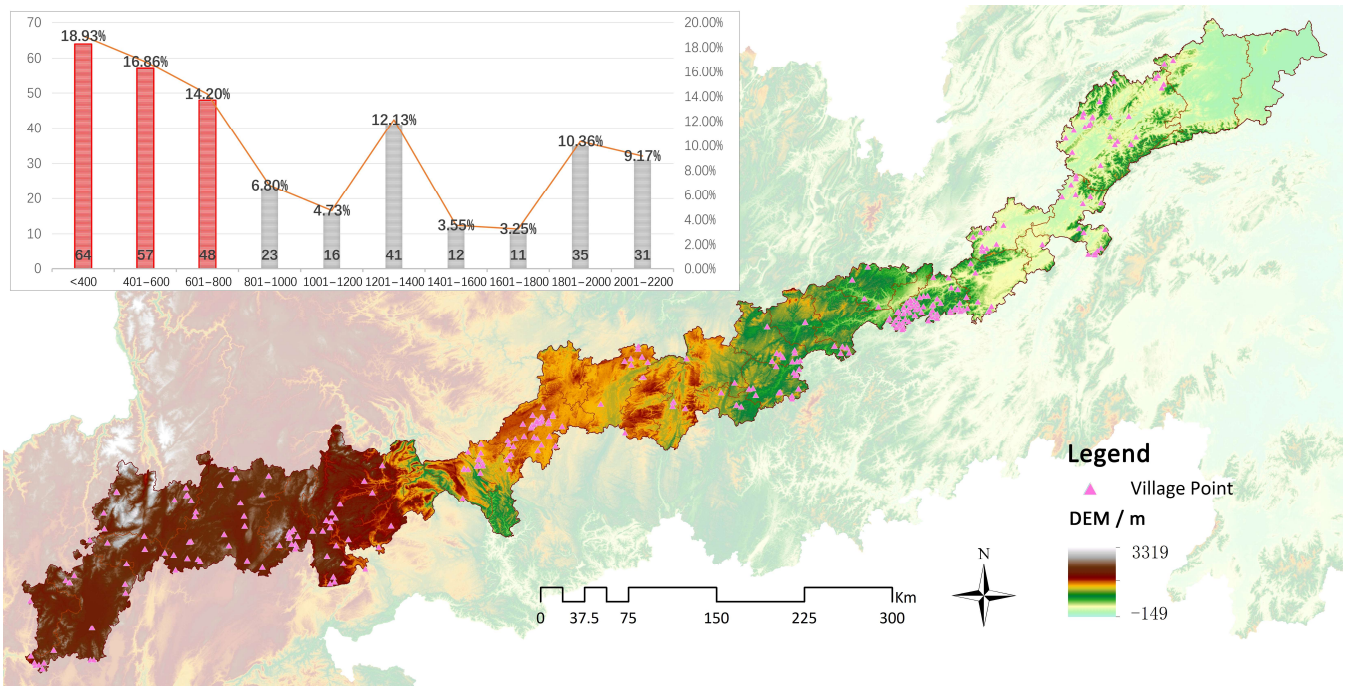


Figure 8. Elevation distribution of TVs in the corridor.

3.2.2. Relief Effects: TVs Are Highly Clustered with a Degree of Relief Ranging from 51 m to 100 m

Relief represents the degree of variation in surface topography. Different relief values reflect varying degrees of geomorphological complexity, which, to some extent, affect the resource utilization of villages. We used ArcGIS 10.4 to overlay TVs onto the topographic undulation of the corridor and created a bar-line chart of the village undulation segments using Excel (Figure 9). The results indicate that the distribution of TVs exhibits a significant normal distribution with changes in relief. Among them, the highest number of TVs, totaling 209, is found within the relief range of 51–100 m, accounting for 61.83%. This reflects the regular characteristic that most TVs in the Miao Frontier Corridor tend to be located within this relief range. Compared with other relief environments within the corridor, it is possible that low relief areas are not conducive to flood control and defense against wars and banditry, while the steep geographical environment of high relief mountainous areas hinders housing construction and resource utilization. In contrast, the relief range of 51–100 m provides a better balance between these disadvantages. Within the context of traditional agricultural production, it represents a consensus range for village construction that is most suitable in terms of resource conditions, the social environment, and safety defense.

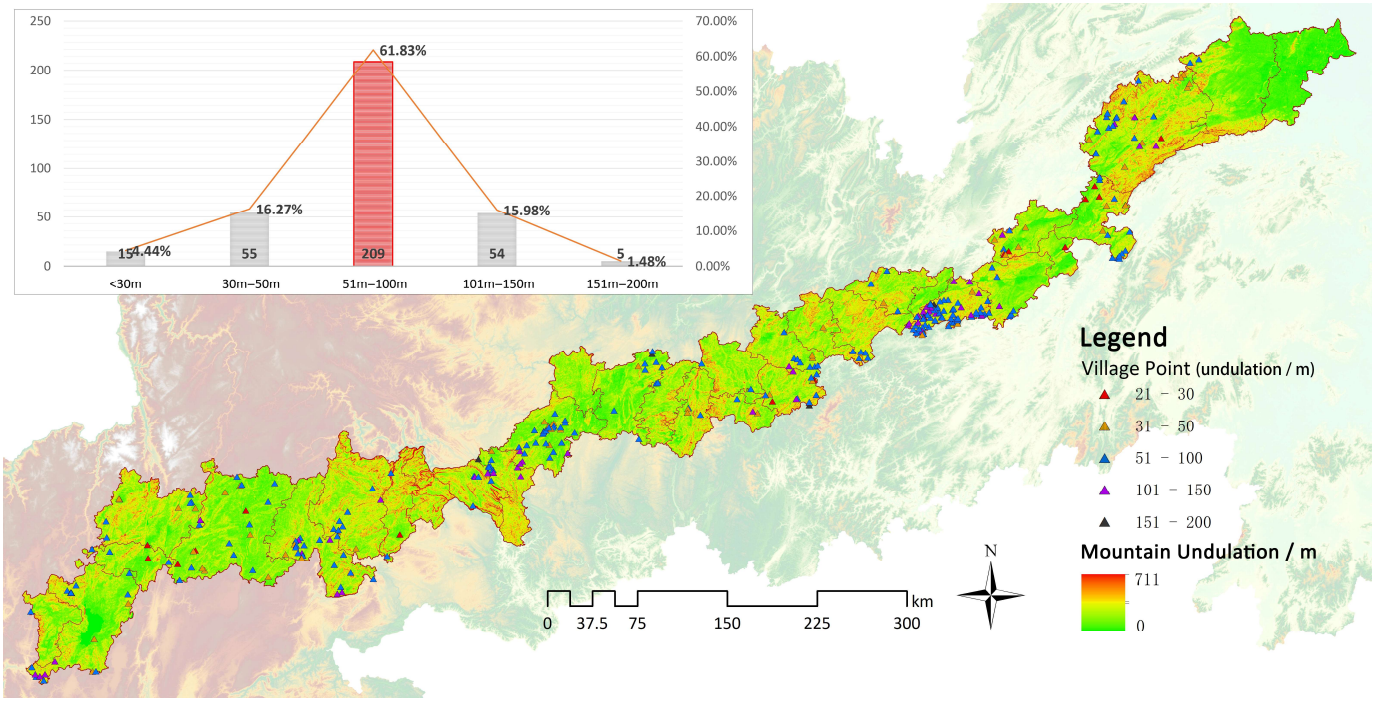


Figure 9. Relief distribution of TVs in the corridor.

3.2.3. Slope Effects: Distribution of TVs Is Dominated by Gentle Slopes of 5–15°

Slope represents the steepness of the terrain surface unit. Unlike elevation relief, slope corresponds to a smaller spatial scale. We employed ArcGIS 10.4 to superimpose traditional villages onto the corridor's terrain slope and then utilized Excel to craft a bar-line chart representing the slope data of the villages (Figure 10). The results indicate that the distribution of TVs exhibits a normal distribution with varying slopes. Within the slope range of 5–15°, the highest number of villages is observed, totaling 206, accounting for 60.95%. This is closely related to the stepped terrain environment and the agriculture-dominated social structure within the corridor. Gentle slopes, abundant in fertile land resources, are primarily utilized for agricultural production. Conversely, steep slopes pose risks such as soil erosion and landslides due to excessive runoff velocities, while the difficulty of land leveling hampers safe construction. Therefore, the selection of slopes between 5° and 15° reflects a culmination of agricultural production and natural drainage considerations, representing accumulated building experience.

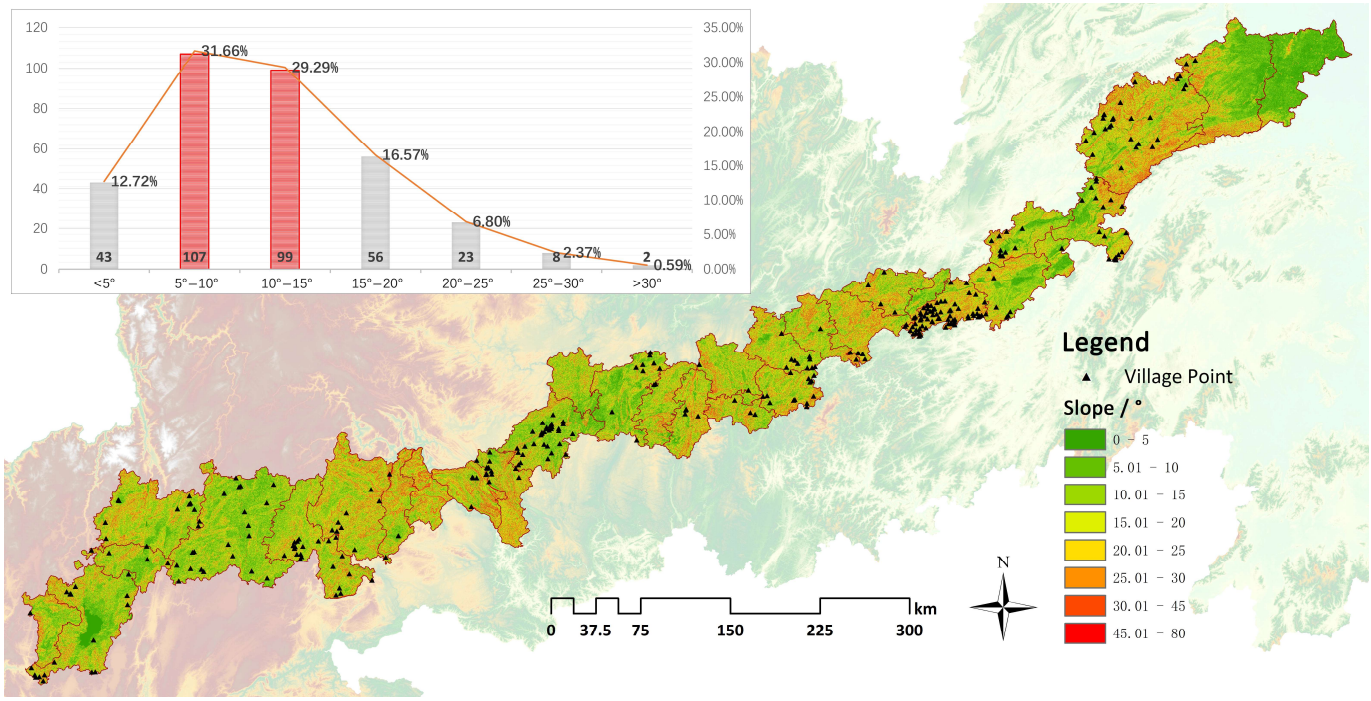


Figure 10. Slope distribution of TVs in the corridor.

3.2.4. River Relationship: TVs Clustered in 200–500 m River Buffer Zones

River systems provide humans with water for living and production, and the distance to water sources directly affects the convenience of water use [67]. We mapped the river buffer zones of the corridor using the multi-ring buffer in ArcGIS 10.4 domain analysis, extracting the number of TVs within 100 m, 100–200 m, 200–500 m, and greater than 1000 m from the riverbanks. Subsequently, we used Excel to create a bar-line chart depicting the distribution of villages across the five buffer zones. (Figure 11). The results show that the number of TV distributions roughly follows a normal distribution as the buffer radius around the rivers changes. The peak number of TVs occurs within the buffer radius of 200–500 m, totaling 97 TVs, accounting for 28.70%. We further employed the proximity analysis in ArcGIS 10.4 to tally the nearest water system hierarchy for TVs, and then used Excel to craft a bar-line chart illustrating the distribution of villages within six levels of water systems (Figure 11). The results indicate that TVs mainly concentrate along fifth- and sixth-order river systems, such as the tributaries of the Wushui River and the upper reaches of the Qingshui River, as well as major streams. From a hydrological perspective, these river systems exhibit abundant water resources, stable flow rates, and relatively slow water velocities. This favors the site selection and development of TVs, providing not only long-term stable water sources for traditional agriculture but also significantly reducing the difficulty of daily water collection and the risk of flood disasters during the flood season [68]. This provides a certain degree of reference for the selection of water source environments for the future revitalization of rural industries.

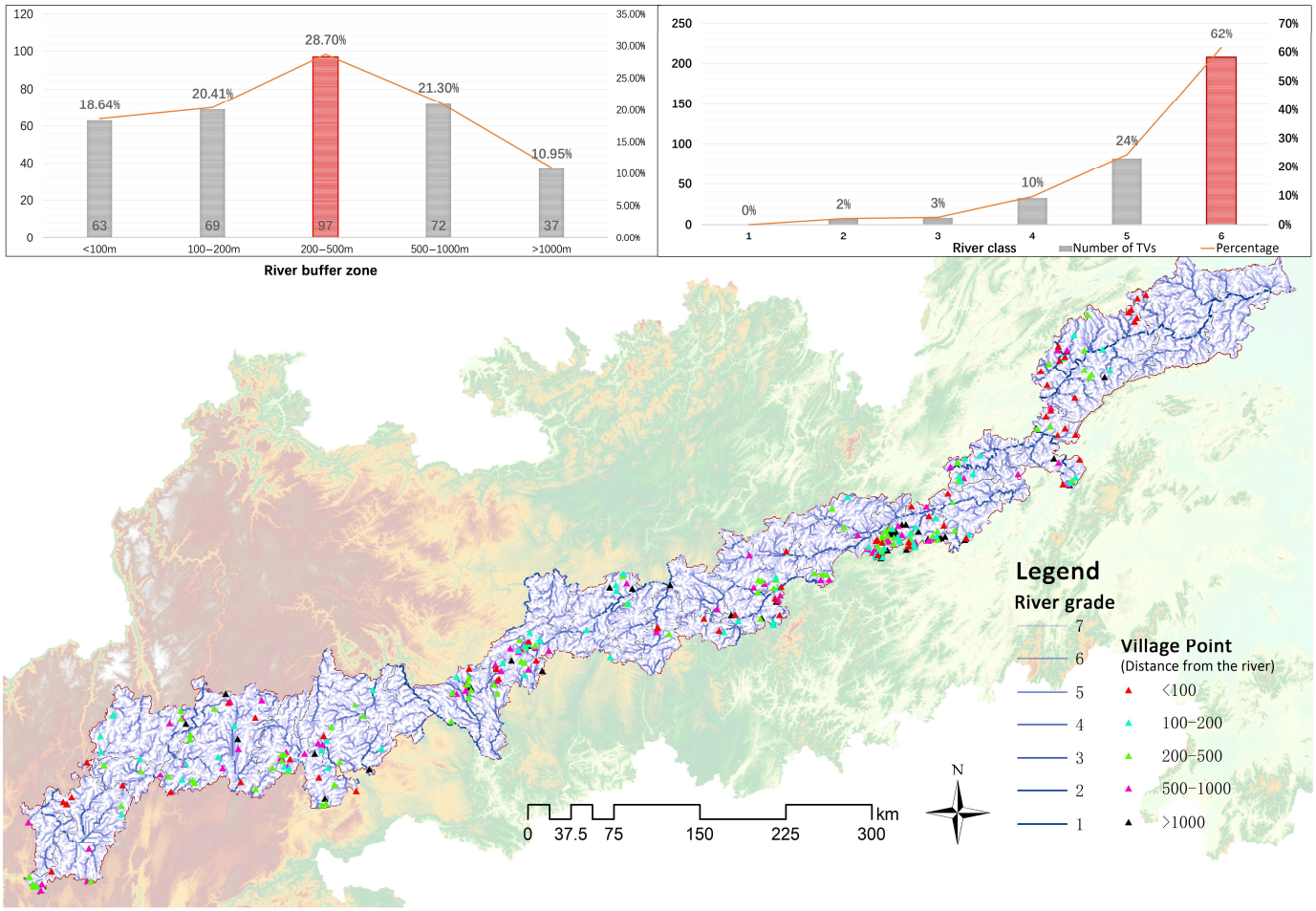


Figure 11. Distribution of TVs in relation to rivers.

3.3. Characteristics of Historical and Humanistic Environment of TVs in the Corridor

3.3.1. Ethnic Characteristics: Overall Segmental Agglomeration, Partial Intermingling, and Mutual Embedding

In order to more clearly demonstrate the ethnic characteristics of TV distribution in the Miao Frontier Corridor, ArcGIS 10.4 was used to conduct a Voronoi analysis on village point features, visualizing the ethnic distribution of TVs (Figure 12). The results show that in the linear corridor space, TVs of the Han ethnicity are distributed throughout the entire corridor, while TVs of other ethnic minorities generally exhibit a "segmental aggregation" overall and "intermingling and mutual embedding" locally. "Segmental aggregation" is characterized by single-ethnic clusters inhabited mainly by the Buyi, Miao, and Dong ethnic groups. Dong TVs are mainly concentrated in counties such as Xinhuang, Zhijiang, and Yuping; Miao TVs are mainly concentrated in areas such as Mayang, Huangping, and Kaili; and Buyi TVs are mainly concentrated in regions such as Guanling, Zhenning, Guiyang, and Longli. "Intermingling and mutual embedding" is mainly characterized by the intermingling of Han and other ethnic minority TVs, primarily concentrated in three major areas. The first is the western section of the corridor in the Kunming and Qujing areas, where ethnic blending is the highest, mainly with Han–Yi ethnic composition. The second is the junction of Anshun and Guanling in the middle section of the corridor, mainly with Han–Buyi ethnic composition. The third is Yuanling County in the eastern section of the corridor, where ethnic coexistence and mixing are relatively high, primarily with Han–Miao–Tujia ethnic composition. To a certain extent, this characteristic also confirms the distribution pattern of Chinese ethnic minorities of "large mixed dwellings and small settlements" from the ethnic village perspective [69].

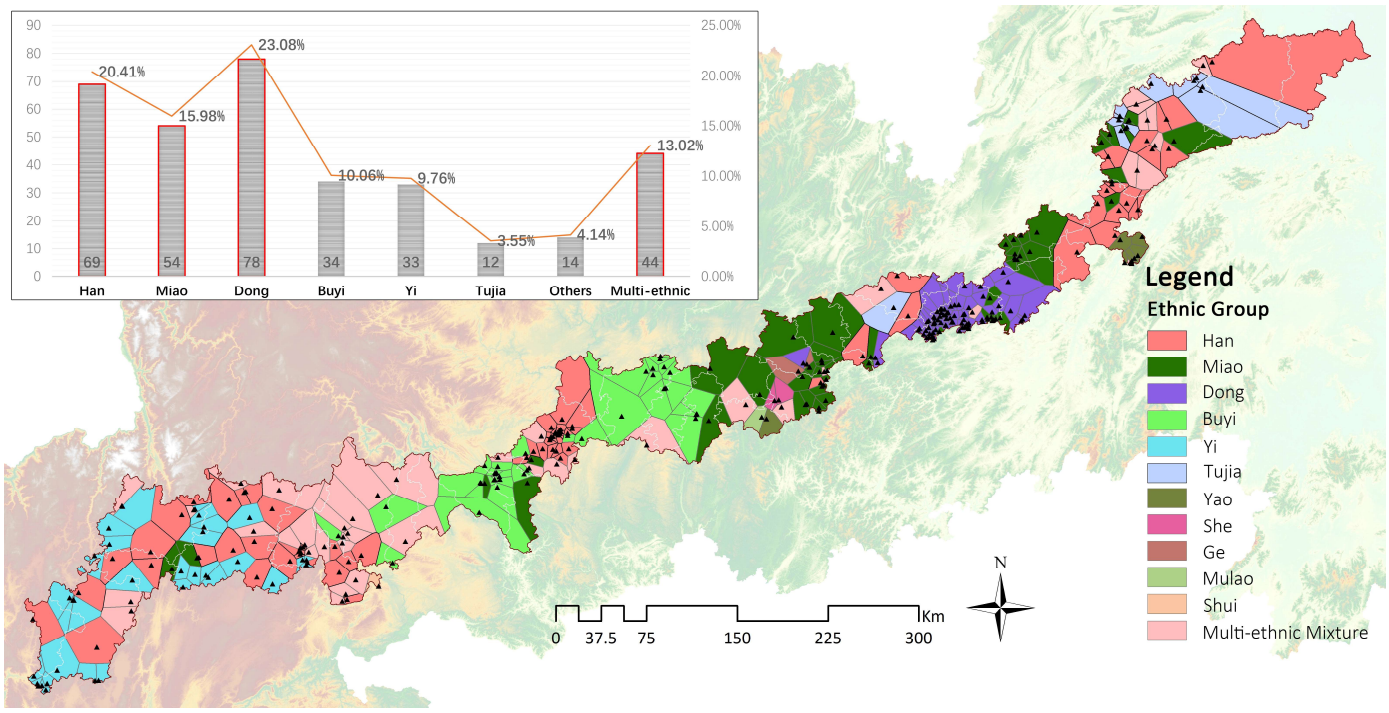


Figure 12. Voronoi diagram of Ethnic distribution of TVs.

3.3.2. Age of TV Establishment: Most in the Ming and Qing Dynasties, Distribution time Sequence Characterized by the Expansion of Circles

Through field surveys, interviews, and review of the literature and relevant documentation, such as TV declaration materials, information on the age of village establishment of 183 TVs was collected. We utilized Excel to create a bar-line chart that represents the timeline of TVs (Figure 13). The results indicate that the Ming Dynasty had the highest number of village foundations, followed by the Qing Dynasty, with the Republic of China and pre-Ming periods having the fewest. The number of villages founded in the Ming Dynasty accounts for the highest proportion at 31.95%, totaling 108 TVs, while those founded in the Qing Dynasty account for 14.79%, totaling 50 TVs. To further analyze the geographical and spatial relationships of the distribution sequence of existing TVs in the corridor, we utilized the Voronoi diagram of the village point elements to conduct a visual analysis of their establishment dates (Figure 13). Meanwhile, in combination with the changes of guard towns and the layout of military settlements in Guizhou during the Ming Dynasty [70,71], it was found that the construction sequence of TVs in the Miao Frontier Corridor follows a certain circular expansion pattern. In other words, the age of the TVs shows a continuous expansion of new villages in all directions centered on the dispersed early villages, eventually spreading over the entire Miao Frontier Corridor.

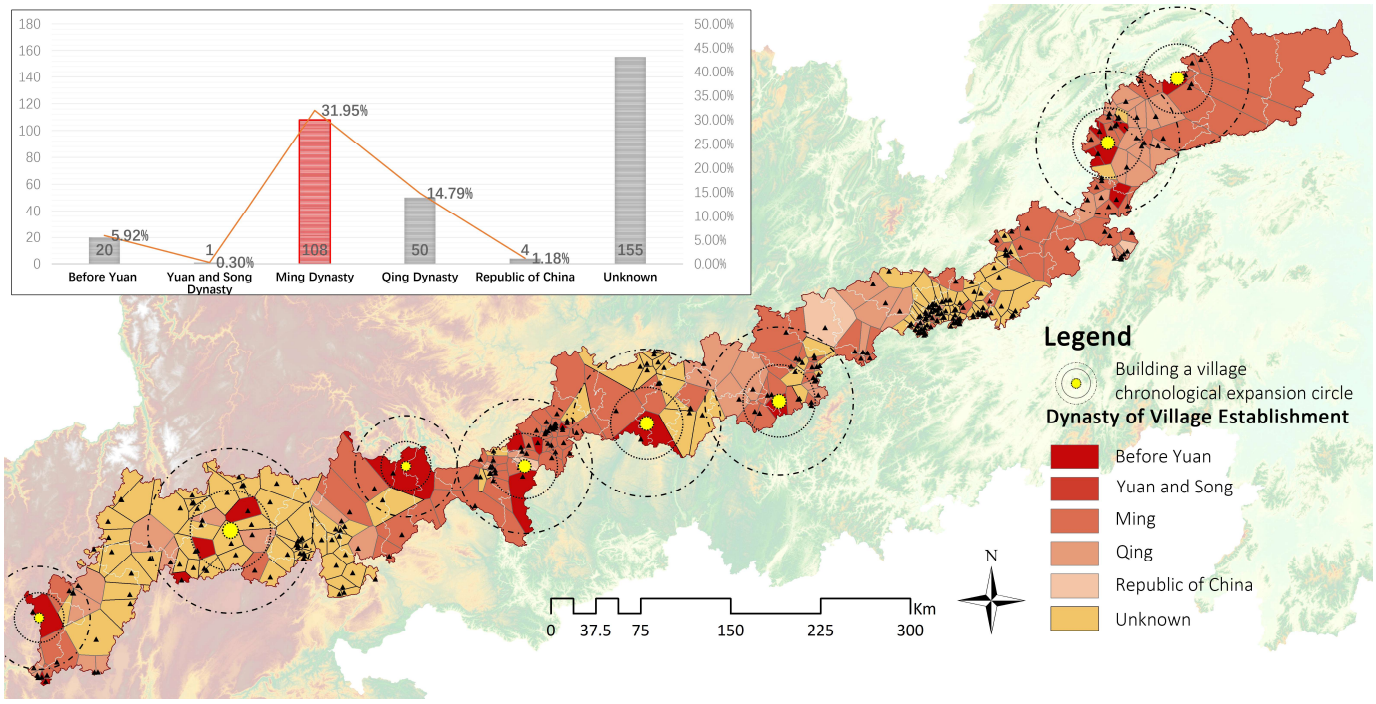


Figure 13. Voronoi diagram of the founding years of TVs.

3.3.3. Weisuo (Guard Station) Effects: Dominated by 10–20 km Circles, Distribution Relationships Characterized by Marginality

The weisuo was a military institution during the Ming Dynasty that penetrated into the frontier ethnic areas of the Central Plains, serving functions such as military defense, administrative management, and maintenance of public security. It was one of the important factors influencing the formation and continuity of TVs in the region. Using ArcGIS 10.4, a buffer zone analysis was conducted for 21 Ming and Qing weisuo within the Miao Frontier Corridor, divided into six intervals. TV sample points were overlaid, and a visual analysis was performed (Figure 14). The results indicate that within a 30 km radius of the weisuo, the distribution of TVs follows a normal distribution with respect to the distance from the weisuo. The highest concentration of villages is observed within a 10–20 km radius, with 98 TVs, accounting for 28.99%. TVs located more than 30 km from the weisuo exhibit a weaker relationship with the weisuo but still constitute the main clustering areas for TVs. Considering that the construction standard for Ming and Qing weisuo was based on a 60 km interval, the maximum radius of the weisuo buffer zone is set at 30 km. Furthermore, it is observed that the distribution of TVs within the corridor shows a strong selectivity towards the weisuo, such as the Pingxi Wei, Chenzhou Wei, Anzhuang Wei, and Puding Wei. Given the historical development of the weisuo, these four weisuo are located at the junctions between provinces, away from local administrative centers to some extent, and are relatively remote in terms of spatial location. Perhaps it is due to the combined effects of relatively relaxed administrative pressure, a relatively stable social environment, and fewer modernization impacts that the number of surviving TVs in the corridor is higher. This indirectly reflects the marginal pattern between the survival of TVs and the weisuo.

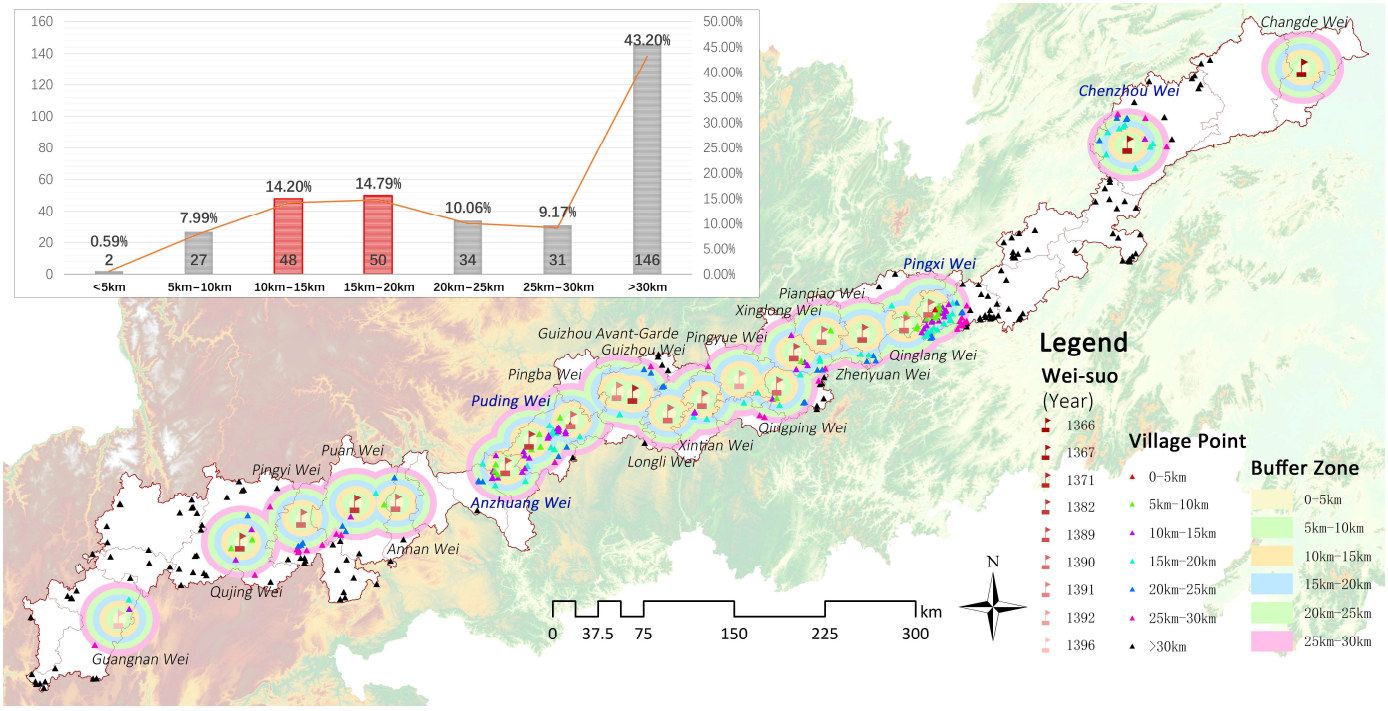


Figure 14. Distribution of TVs in relation to the guardhouse buffer zone.

4. Discussion

The formation of TVs is the result of the joint action of natural, social, humanistic, and economic factors [72,73]. In the entire process, the natural environment, serving as the material basis for human survival, holds a foundational position. However, with societal advancement, the impact of historical and humanistic factors on TVs becomes increasingly significant. Therefore, this study explores the spatial differentiation of TVs along the linear space of the Miao Frontier Corridor from the perspectives of both the natural geographical environment and the historical and humanistic environment.

4.1. Differentiation Relationship I: Natural Geographic Environment Lays the Structural Foundation of TV Space

In the process of site selection and development of TVs, people continuously modify and adapt to various natural geographical environments, gradually forming a relatively stable consensus and experience. The results show that TVs in the Miao Frontier Corridor exhibit an obvious clustering pattern with similar intervals in the single geographic elements of elevation, terrain relief, slope, and water system. In other words, this pattern of agglomeration directly reveals that people's choice of a favorable natural geographic environment follows a similar pattern and also reflects the harmonious coexistence relationship between humans and the natural environment. This finding is consistent with the research results of Zhang [74], Wang [75], and Zheng [76], which are all results discovered through single-factor quantitative statistics. However, this paper is based on the perspective of cultural routes, a cross-regional and cross-ethnic cultural holistic view, to reveal the "regional commonality" rules behind the diversification of village space. This provides more credible reference value for the implementation of policies on a larger scale in terms of ecological environment protection and sustainable agricultural development.

However, from a regional perspective on local village development, natural geography manifests more as a comprehensive impact of factors such as elevation, slope, and water systems, and it mainly involves the micro-scale village level, which is also where the existing quantitative research is relatively weak. To address this, in our field research, we deeply compared and analyzed the relationship between the spatial characteristics of the

village level and the resource characteristics of the natural geographic environment. We found that three different types of TV spatial structures correspond to different resource zones (Figure 15a). The utilization of resources such as "mountains, forests, land, and water" within TVs manifests a structural pattern centered around the village living area. This reflects that during the village site selection period, the differential distribution of various natural resource elements in geographical space leads people to settle in specific areas to maximize resource utilization, resulting in different types of village spatial structures. This demonstrates the fundamental core role of the natural geographical environment in village spatial structure. In addition, there is a certain regularity between the spatial layout of TVs and micro-topography in the corridor. Looking at the three geographical locations of hillside, foot of the mountain, and flat areas without mountains, firstly, the hillside slope dam villages, accounting for 62%, typically covering an area of 1–3.5 hm, are medium-sized villages nestled on the slope and characterized by tight layouts. Secondly, the hillside basin and valley villages, accounting for 16%, usually covering an area of around 1 hm, are small- to medium-sized villages situated at the foot of the mountain. They feature comfortable layouts following contour lines. Thirdly, the hillside flat dam villages, accounting for about 20%, typically covering an area of 3.5–7 hm, are large villages with relatively regular and spacious layouts (Figure 15b). In the process of modernization, these natural geographical features not only help protect and pass on the traditional culture and pattern of the villages but also have a significant impact on the ecological balance and resource utilization of the villages.

Furthermore, in Chinese feng shui, natural geography serves as the fundamental basis for the formation of feng shui, prompting the systematic development of related construction experiences in production and life. This, in turn, drives its broader application. Especially in such a large span of cultural and geographical space as the corridor, feng shui knowledge, which is closely linked to local ethnic cultures, is extremely important in the development of differentiated rural tourism and in guiding ethnic architectural design, planning layout, and urban planning. On one hand, feng shui is regarded as an ecological landscape evaluation system for finding auspicious building sites [77]. Through long-term practice, it has formed an ideal ecological pattern (Figure 16) with universal consensus or basic principles, such as "mountain-backed or water-facing, wind-harnessing and qi-gathering, adapting to local conditions, and yin-backed and yang-facing" [78]. This pattern not only affected the construction of TVs in the past, but also influences the layout of present-day house siting. At the same time, as the three elements of "mountain-water-direction" seek this ideal ecological pattern, this also fully demonstrates the importance of "mountain" and "water", the two natural geographic factors, to the construction of TVs [79]. On the other hand, the philosophy of "unity of heaven and human" in Chinese feng shui further reinforces the foundational significance of nature. Unlike the Western geological view that considers the hydrosphere, atmosphere, and lithosphere as lifeless inorganic environments, and only humans and the biosphere are living organic entities, Chinese feng shui considers the interactions among the sky, earth, life, and humanity as an integrated system that cycles, recurs, and undergoes renewal [80]. The fusion of objective scientific wisdom for inhabitable environments at the natural level and the subjective emotional aspirations at the humanistic level is deeply embedded in people's daily practices, thus subtly influencing the site selection and development of TVs [81,82]. It can be seen that the ecological wisdom of harmonious coexistence between humans and the environment coincides with the concept of modern green development. Not only can policymakers draw on the principles of feng shui to formulate environmental protection policies, but it can also provide guiding suggestions for local tourism, cultural heritage, and social construction. Moreover, the unique feng shui cultural phenomenon can also be part of international cultural exchanges, introducing China to the world and enhancing the diversity of sustainable development content internationally.

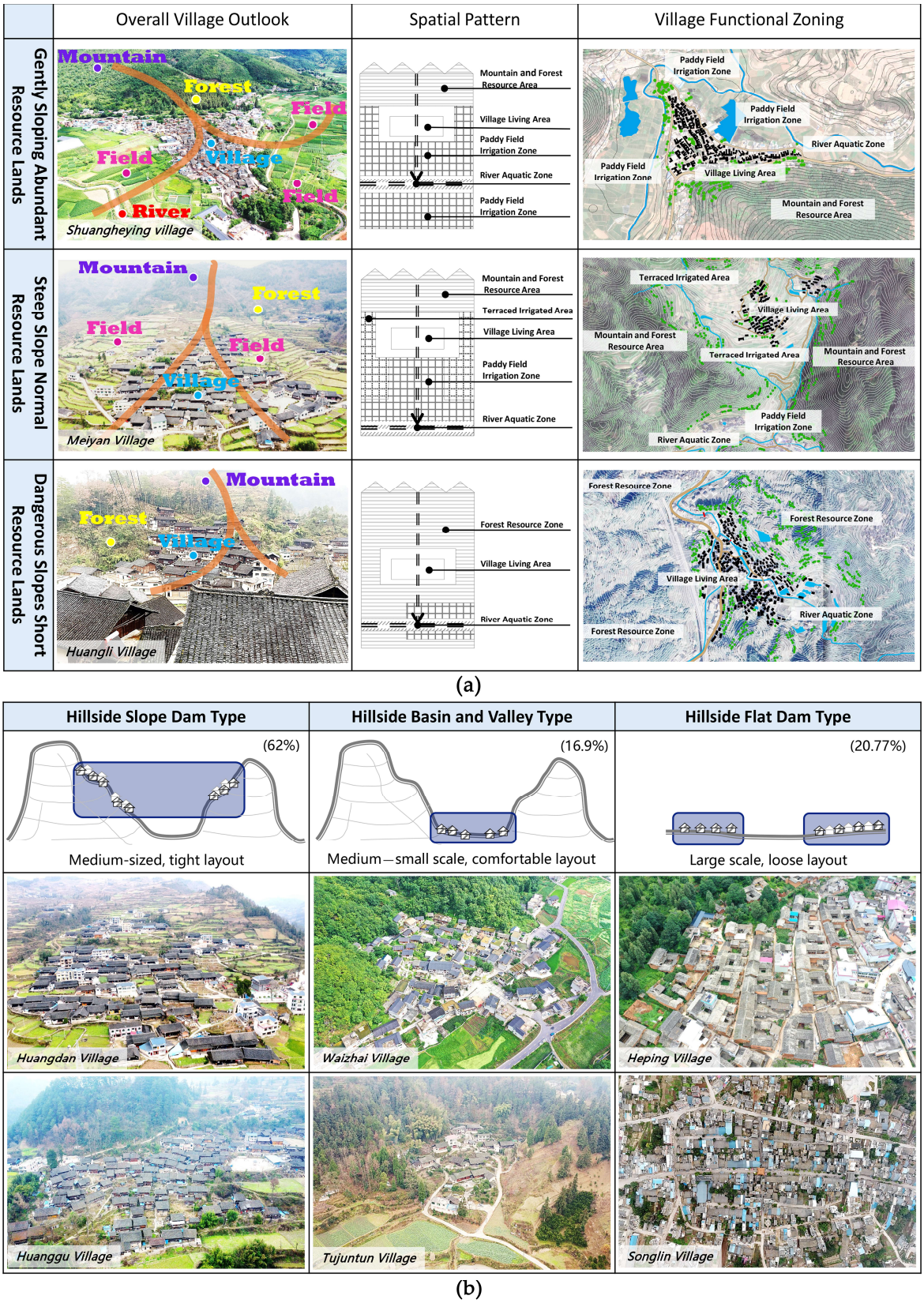


Figure 15. Spatial characteristics of TVs in the corridor: (**a**) spatial structure of TVs under different resource areas; (**b**) TVs in different geographic locations.

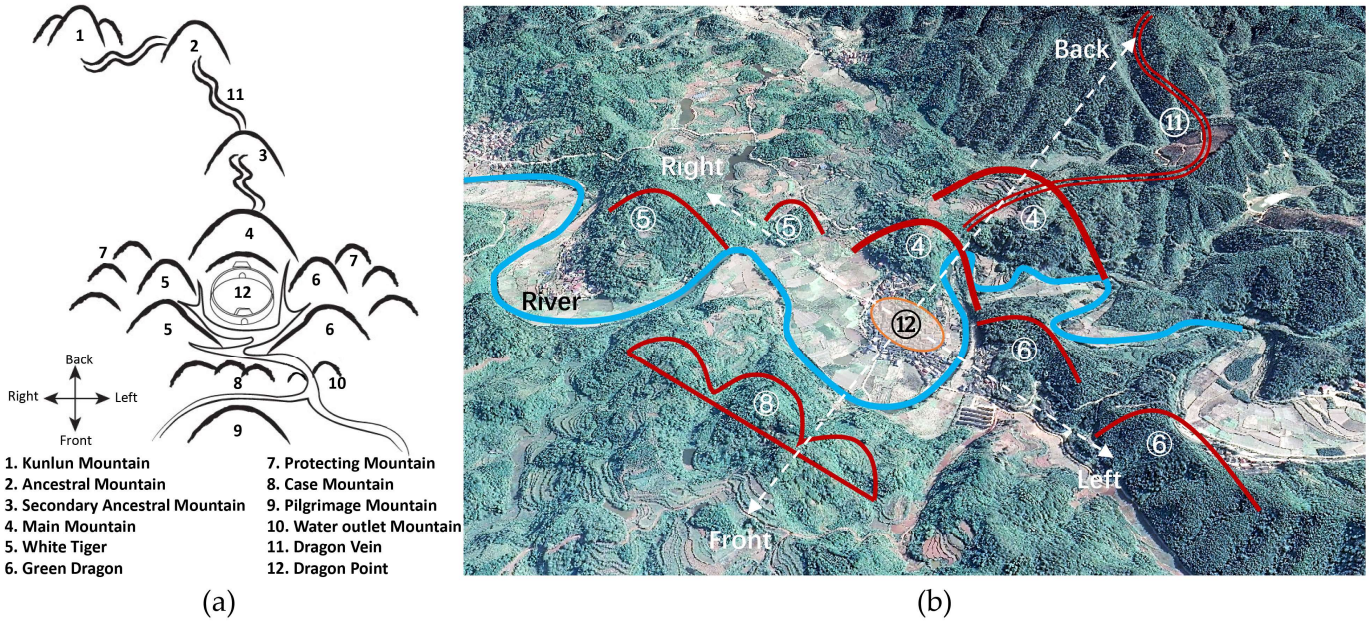


Figure 16. Ideal ecological pattern: (**a**) feng shui ecological pattern; (**b**) ecological pattern of Haoxiaping Miao TV.

4.2. Differentiation Relationship II: Historical and Humanistic Environment Promoting the Diversified Differentiation of TV Space

Regional culture is one of the primary factors leading to the formation of TVs, as the unique historical and humanistic environments in different areas result in the generation of spatial differences among TVs in different areas. The results show that ethnic characteristics, the age of TV establishment, and guardianship have their own characteristic patterns. They clarified that there is a correlation between these factors and the distribution of TVs. This is consistent with the results of Li and Li et al. at the ethnic level [83,84], but whether these factors have a direct impact on the retention of TVs remains to be investigated. In this paper, under this linear corridor space with significant regional cultural differences and a large cross-longitudinal degree, a two-way comparison across space and time can provide a clearer understanding of the self-deposition and external interaction of ethnic cultures. This, in turn, is more beneficial for revealing the factors that influence the spatial structure of TVs in the corridor.

Firstly, the three major mono-ethnic settlements within the corridor have formed three typical traditional village agglomerations (Figure 17) due to their relatively independent geographic environments, the unique developmental logic of the ethnic groups themselves, and their geographic location away from the core weisuo. In concrete terms, the first is Buyi TVs, characterized by strong structural relationships primarily formed around defense and agricultural needs [85]. The second is Dong TVs, characterized by strong structural relationships primarily organized around kuan (clan structures) [86]. The third is Miao TVs, characterized by weak structural relationships primarily formed around functional organizational relationships [87]. It is evident that this is the spatial "personality" of the TVs in the Miao Frontier Corridor, which is of great significance in revealing the cultural diversity and ethnic cultural uniqueness of the corridor's TVs. Especially in formulating differentiated tourism development paths, optimizing policies related to cultural heritage protection, regional development, and ethnic policies, it provides important references for practical applications

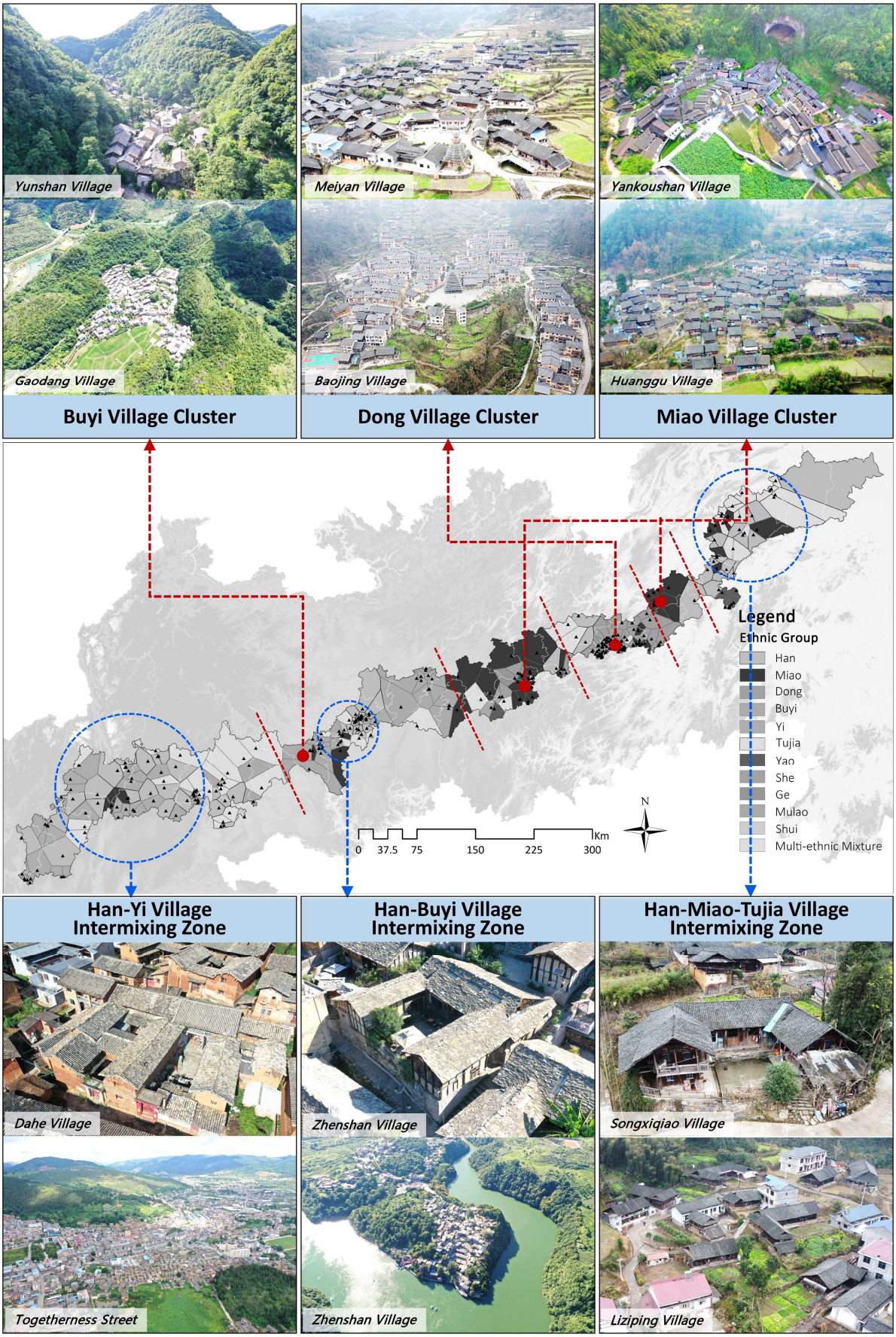


Figure 17. Spatial characteristics of TVs in ethnic agglomeration and intermixing areas.

In addition, the "intermingling and mutual embedding" areas within the corridor serve as the frontier of cultural interaction between ethnicities. The blending of cultures with different historical backgrounds has influenced varying degrees of "ethnicization" evolution in TV spaces, resulting in TV space differentiations. For instance, consider the three major "intermingling and mutual embedding" areas within the corridor (Figure 17). The first is the blending area between the Han and Yi, where commercial trade and military settlements are the dominant factors influencing the "complex, courtyard-style" differentiation of TV spaces, with Qujing being renowned as the "granary of central Yunnan." The second is the blending area between the Han and Buyi, characterized by border garrisons for defense and an independent cultural environment. These are dominant factors influencing the "defensive, enclosed-style" differentiation of TV spaces, with fortified residences being the most typical representation of cultural isolation. The third is the blending area among the Han, Miao, and Tujia, characterized by short-term intense ethnic conflicts and long-term relatively peaceful coexistence. These are dominant factors influencing the "diverse, composite-style" differentiation of TV spaces, with the "Southern Great Wall" being the most iconic event illustrating the differential control between mature and new Miao settlements. The current research on cultural integration zones within corridors is very limited, and it mainly focuses on analyzing a specific integration phenomenon in a single area, such as Li's review of the historical integration of the Han and Bu people to explore the cultural value of the Tunpu heritage [88]. However, this paper takes the dynamic spatial view of cultural routes to better discover the dominant factors affecting the spatial formation of TVs in different geographic regions. It will help us to reveal more accurately the formation mechanism behind diversified and combined spaces in our subsequent studies and help planners and decision makers to design more inclusive and socially participatory planning programs.

4.3. Suggestion: Building a Cultural Line Protection System to Break through the Bottleneck of Differentiated Development in Overall Protection

Based on the results of the previous study, the "commonality" of the TV space in the Miao Frontier Corridor is more prominently manifested in the convergence of natural geographical distribution. The "individuality" of TV space is more prominently manifested in the uniqueness of historical and humanistic distribution. The two are interwoven, together reflecting the formation and differentiation of village space. Therefore, in order to more clearly and accurately recognize and utilize the "commonality" and "individuality" of the TV space, and to enhance the effectiveness of the overall protection and development of TVs, we believe that it is necessary to consider the Miao Frontier Corridor as a cultural space unit for the overall protection of TVs and build a cultural line protection system. There are three reasons. Firstly, the choice of spatial scale: the corridor space can not only reflect the universality of "commonality" more accurately, but also highlight the differences of "individuality" more clearly. Integrating "commonality" and "individuality" into one research scope, the conclusions drawn within this scope will also be more generalizable. Secondly, the choice of cultural space: the continuity and correlation of history, culture, and space within the corridor can more comprehensively reveal the special mechanism behind social spatial differentiation issues, which will help the identity and inheritance of ethnic culture. Thirdly, the choice of village samples: the TVs with distinct and diverse spatial characteristics in the corridor will be conducive to overcome the homogenization bottleneck in the overall preservation process. By exploring the future differentiated development paths of villages from multiple perspectives, such as ethnic differences, folk customs, and feng shui knowledge, this will help alleviate the insufficiency of sustainable development capabilities, with a view to enriching the current centralized and contiguous protection and utilization of TVs in a single administrative unit [89].

Therefore, establishing a TV preservation system centered around cultural corridors can be seen as a crucial component in the overall preservation and utilization process of TVs. Firstly, basic diagnosis is the key prerequisite for the protection and development

of TVs [90], and it is also the foundational basis for extracting the "commonality" and "individuality" of TVs. Using cultural corridors as a guide, the basic resources of TVs in the region are classified and categorized from the perspectives of function, space, and history, and a thorough inventory and registration process is completed. For example, through the results of the previous study on the imbalance of macro-spatial distribution, the corridor can be divided into three sub-districts of high density, medium density and low density to set up protection strategies with different levels of control. Secondly, a comprehensive value assessment of TVs is an essential basis for determining their inherent value within the regional protection and development system [91], and it is also the core link in exploring and utilizing the "commonality" and "individuality" of TVs. After TVs are registered, they are assessed from both protective and developmental perspectives, and a hierarchical classification of preservation and utilization types is formulated based on the value assessment. Taking the common characteristics of natural resources as an example, the TVs can be divided into three types of TVs: hillside slope dam type, hillside basin and valley type, and hillside flat dam type. Taking the ethnic personality as an example, the TVs can be divided into an ethnic concentration area, a multi-ethnic intermingling area, and so on. From this, differentiated conservation strategies can be set to emphasize ecological feng shui patterns, village texture, multiculturalism, and historical sites. Finally, based on the basic diagnosis and value assessment, specific practical strategies are proposed. Flexible linear preservation and development plans are formulated through a combination of rigidity and flexibility, and differential development strategies are implemented based on the classification types. For example, we suggest linking the tourism development of different ethnic routes on the main line of the corridor, establishing a comprehensive monitoring and dynamic adjustment mechanism, and setting up lasting development guidelines for the protection of different types of TVs to realize the sustainable protection and development of TVs. Additionally, efforts are made to enhance the coordination of resources at all levels to collectively promote the overall preservation and characteristic development of TVs (Figure 18).

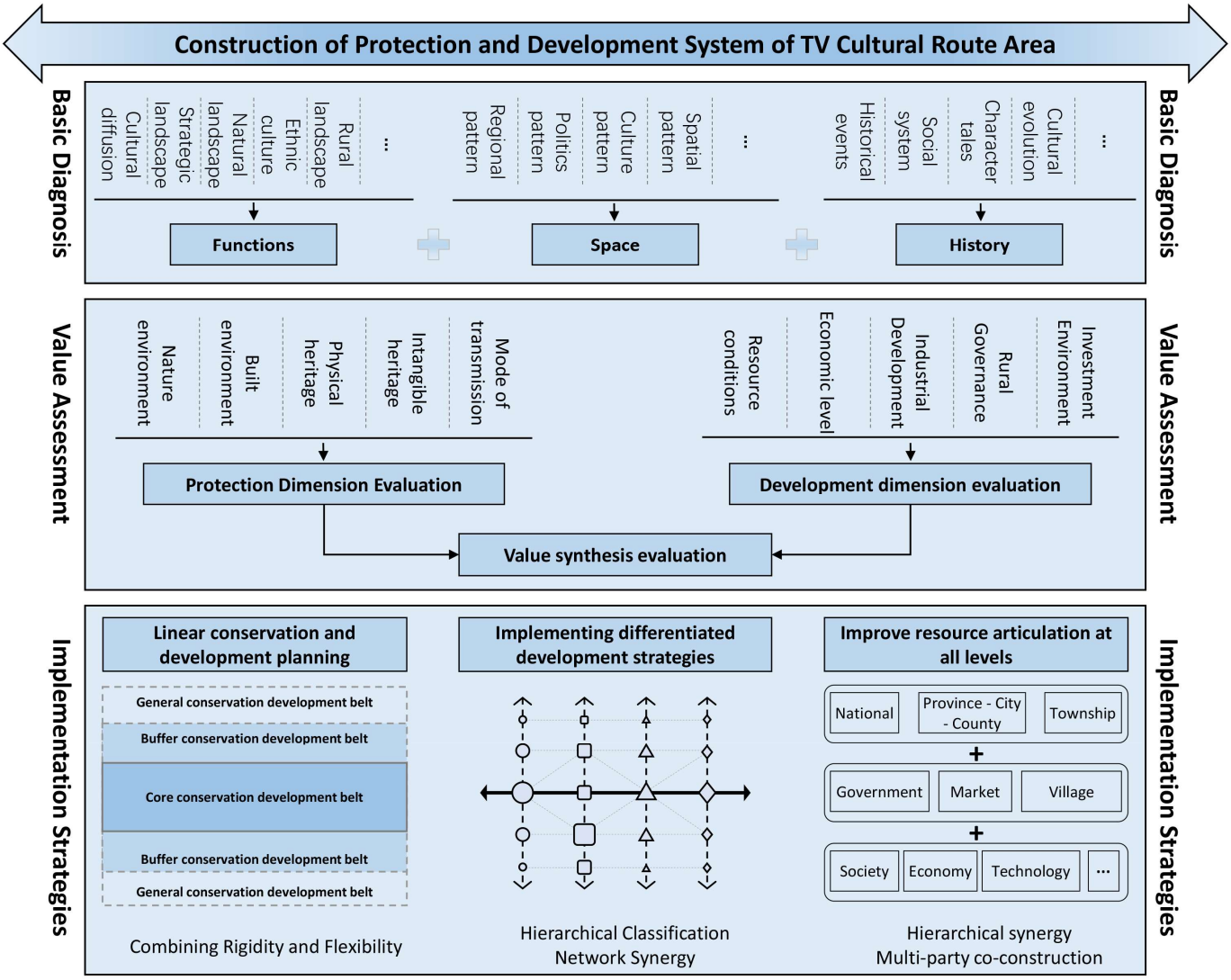


Figure 18. Ideas for the construction of a protection system of the TV cultural route area.

5. Conclusions

This study examined 338 TVs in the Miao Frontier Corridor. Firstly, a cultural geographic database of TVs was constructed using 91-satellite maps and ArcGIS to enhance the scientific management and credibility of the data. Then, the distribution characteristics of TV spaces along the Miao Frontier Corridor were analyzed through nearest-neighbor and kernel density analyses. Secondly, the natural geographic and historical–humanistic factors contributing to spatial differentiation of TVs were analyzed using ArcGIS's spatial analysis tools. Finally, based on the characteristics of these factors and field research, the influencing factors of spatial differentiation of TVs and development recommendations were discussed. The research shows the following:

1. Spatial Distribution: TVs in the Miao Frontier Corridor are unevenly distributed, showing a clustered structure in space, characterized by a "single primary nucleus with multiple secondary nuclei" pattern, with Xinhuang Dong Autonomous County as the core and four major secondary spatial aggregation areas distributed on both sides.
2. Characteristics of Natural Geographic Environment: TVs in the Miao Frontier Corridor have an obvious clustering pattern of similar intervals in the single geographic element of elevation, terrain relief, slope, and water systems. The main characteristics of village

clusters include altitudes below 800 m, 51–100 m degree of undulation, 5–15° slope, and 200–500 m interval from the river.

3. Characteristics of the Historical–humanistic Environment: The ethnic distribution of TVs in the Miao Frontier Corridor shows overall segmental agglomeration and localized intermingling. The TVs were built in the Ming and Qing Dynasties, and the construction sequence is characterized by circle expansion. The TVs and the weisuo have the characteristics of marginal selection, and the TVs are most distributed in the interval of 10–20 km from the weisuo.
4. Influencing Factors of Spatial Differentiation: Natural geographic factors have laid the structural foundation of TV space, while historical and humanistic environmental factors have promoted the diversified differentiation of TV space. The natural geographic and historical and humanistic environments have jointly influenced the spatial differentiation of TVs.
5. Suggestions for the Overall Protection of TVs: Building a cultural line protection system helps break through the bottleneck of differentiated development in overall protection.

This study attempts to analyze the characteristics and influencing factors of regional spatial differentiation of TVs from the perspective of cultural routes, with the goal of solving the dilemma of development homogeneity in the overall protection of TVs in China. At present, the study has some limitations. First of all, the research data in this paper mainly show the macro-level spatial differentiation characteristics and do not deeply involve the micro-level spatial and historical–cultural attributes of TVs. Secondly, although cultural routes effectively address the issue of differentiation in village characteristics, they belong to specific historical–cultural regions, making it difficult to directly apply their models to nationwide TV conservation efforts. Thirdly, due to the overall classical nature of the current research methodology, there are certain human errors in the collection of data on the historical and humanistic environmental factors of the TVs, which may make the results of the spatial differentiation of the TVs in the corridor insufficiently in-depth. Lastly, due to the limitation of data collection in TVs, there are no specific written records of historical–cultural indicators, such as past economic levels and village social structures. Field research can only collect one-sided data through interviews, making it difficult to truly capture the historical–cultural factors influencing TVs. Therefore, future research and deepening efforts should focus on micro-level spatial connections within TVs, exploring diverse historical–cultural regions, and conducting long-term immersive field surveys.

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