Article

Spatial Distribution Characteristics and Influencing Factors of Pro-Poor Tourism Villages in China

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Abstract: This paper aims to contribute to the effectiveness of pro-poor tourism in rural areas. We use 5770 pro-poor tourism villages in China as the research objects; the spatial distribution characteristics of pro-poor tourism villages in China are analyzed using a combination of disequilibrium index, kernel density analysis, and spatial autocorrelation; their influencing factors are detected using a geographical detector and overlay analysis. The study results show the following: (1) The distribution of pro-poor tourism villages is exceptionally uneven in three zones, eight regions, and inter-provincial levels, forming a high-density cluster belt that includes Hebei, Henan, Anhui, and Hubei, and five high-density cluster cores that include southern Gansu, Sichuan–Gansu–Shaanxi border area; Guizhou, Hunan, and Chongqing border area; southern Sichuan; and southwest Guizhou. (2) Regarding spatial correlations, the pro-poor tourism villages in central and western regions are in hot spots, while those in eastern regions are in cold spots. The hot spots gradually increase, while cold spots gradually decrease, and the clustering trend of the distribution of the pro-poor tourism villages is increasingly apparent. (3) Pro-poor tourism villages are affected by social, economic, industrial, and other human factors as well as natural geographical factors such as terrain, precipitation, river, and climate, among which the industrial factors have a more significant impact. Pro-poor tourism villages are concentrated in humid mountainous areas with an altitude of about 1000 m and an annual precipitation of more than 800 mm, and they are mostly distributed in the subtropical monsoon climate zone closer to the river and more suitable climate. (4) It is suggested that pro-poor tourism villages can be divided into four types: the resource underutilization type, mountain environment restriction type, traffic location non-optimization type, and industrial development lagging type, and the sustainable development strategies of different types of pro-poor tourism villages are proposed.

Keywords: rural tourism; pro-poor tourism villages; spatial distribution characteristics; geographic detector

1. Introduction

Although it is still controversial whether tourism contributes to reducing poverty worldwide, China is witnessing a dramatic reduction in the poverty rate due to the Chinese government's implementation of the Poverty Alleviation Tourism Policy (PATP) [1]. As an effective solution to poverty, pro-poor tourism attracted the attention and recognition of Chinese society by promoting supply-side structural reforms in poor areas, facilitating the integration and development of related industries, and revitalizing accommodation assets in rural areas [2,3]. Poverty rates are high in these vast and remote mountainous and rural areas, yet at the same time, these areas have unique tourism resources [4]. Therefore, it is imperative to implement pro-poor tourism in rural tourism-rich areas so that these poor areas can be lifted out of poverty and can prosper, narrowing the gap.

As described by the UK Department for International Development, tourism that generates net benefits for the poor can be defined as pro-poor tourism [5]. In research conducted from 1999 to 2019, Scheyvens and Russell et al. found a growing trend in the

academic literature that investigates the relationship between geography, tourism, and poverty alleviation, globally attracting significant academic attention [6]. Ashley and Roe, among others, proposed pro-poor tourism and sustainable tourism-eliminating poverty (ST-EP), which led the research on tourism for poverty alleviation to a climax [7]. Since then, a large number of scholars have conducted more in-depth and systematic studies on tourism poverty alleviation, focusing on the concept of tourism poverty alleviation [8], tourism poverty alleviation methods [9], tourism poverty alleviation models and tourism poverty alleviation effects, among others [10,11].

Mekawy (2015) first introduced the concept of tourism-led poverty reduction (TLPR), highlighting the importance of research on the effects of tourism on poverty reduction [12]. As Novelli and Hellwig pointed out, the contribution of tourism to poverty reduction is primarily economic [13]. In general, tourism affects the poor in three ways: direct effects, secondary effects, and dynamic effects [14]. As stated in their book, direct effects include labor and other forms of income and improvements in non-economic livelihoods [15]. Secondary effects include the redistribution of tourism income and income from non-tourism industries arising from tourism activities [16]. Dynamic effects are the long-term local and macroeconomic impacts, including some environmental impacts. The development of tourism industries in poor areas may result in (1) increased regional and personal incomes, optimizing the north-south wealth distribution system [17]; (2) employment opportunities for the poor to participate in tourism activities [18]; (3) the revitalization of the local economy and increased value added to natural and cultural resources [19]; (4) and linkages with related industries and the creation of cross-industry value chains [20].

Since the Guizhou Provincial Tourism Bureau introduced PATP in 1991, tourism has been seen as an effective method for increasing personal incomes and government tax revenues in China's poorest regions [21]. The year 2000 established the first National Tourism for Poverty Alleviation Pilot Zone (NTPAPZ) in Liupanshan in the Ningxia Hui autonomous region. Since then, pro-poor tourism in China entered a new development phase marked by the issuance of tourism treasury bonds and the establishment of national and local pro-poor tourism pilot zones. The year 2013 experienced the identification of Alshan in Inner Mongolia, Fuping in Hebei, and Ji'an and Ganzhou in Jiangxi as three new NTPAPZs, becoming typical examples of PPT practices in China. Moreover, in 2020, China achieved a comprehensive victory in the battle against poverty, with 98.99 million rural poor people lifted out of poverty, 832 poor counties removed from the list, and 128,000 poor villages released from the list, delivering the task of poverty eradication to a successful conclusion. Compared to the world's poverty ratio, China succeeded in reducing poverty.

To summarize, the exploration of tourism poverty alleviation in academia is not sufficient. Although there have been studies on the impact of tourism activities on the poor population in developing areas from the perspectives of economics, management, and sociology, there are few studies on the spatial structure of tourism poverty alleviation stations from the perspective of geographic space. Currently, the tourism development of China's tourism poverty alleviation villages comprises serious homogeneity, extensive development is obvious, and there are some unreasonable phenomena in the spatial layout. The effect of tourism poverty alleviation needs to be further improved. As the main point of China's tourism poverty alleviation, a systematic analysis of the spatial distribution characteristics and influencing factors of tourism poverty alleviation in pro-poor tourism villages is a necessary condition for studying the research topic of tourism poverty alleviation. Based on the geospatial perspective, this study systematically analyzed the spatial distribution characteristics and influencing factors of 5770 pro-poor tourism villages in the first and second batches by using geographic information system (GIS) geospatial analysis technologies, entropy methods, geological detectors, and other methods. On this basis, the spatial layout of pro-poor tourism villages was optimized, and relevant suggestions were proposed for the differentiated development of pro-poor tourism villages. The purpose of this study is to exert further the function of the pro-poor tourism villages tourism industry to enrich the people, to provide a theoretical basis for consolidating the achievements of

China's poverty alleviation and for promoting the implementation of the rural revitalization strategy, and to provide certain references for the rational layout and healthy development of tourism poverty alleviation sites in other countries or regions on this basis.

This article is organized as follows (Figure 1). The first section explains the significance and goal of studying the pro-poor tourism villages. The second section introduces the research area, the methodology, and the data source. The third section analyzes the spatial distribution characteristics and influencing factors of pro-poor tourism villages in China. The fourth section contains the conclusions and discussion. Based on the previous research, the last section discusses the practical meaning of these findings and states the limitations of our research.
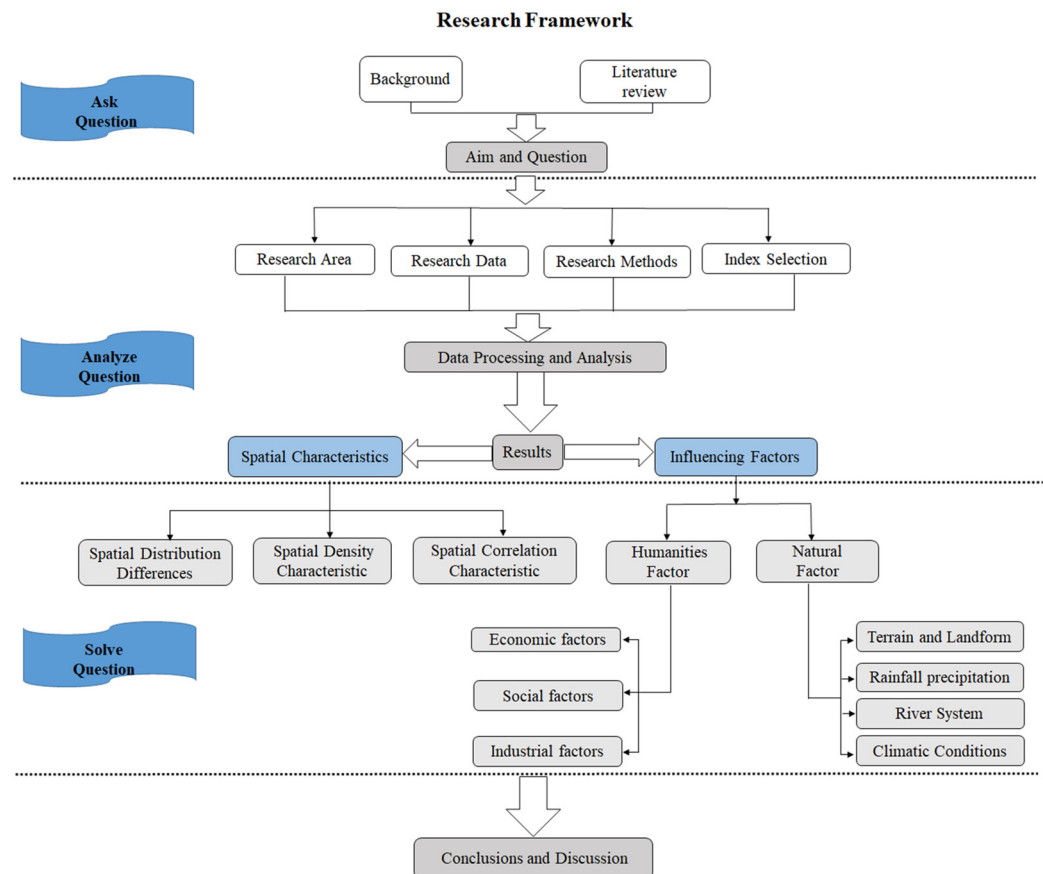

Figure 1. Research framework and steps.

2. Literature Review

Pro-poor tourism is a form of tourism development method that can promote poverty alleviation. It is the net benefit of tourism for the poor population. It emphasizes that the benefits of tourism for the poor must be far greater than the costs they pay. The goals of pro-poor tourism include the following: (1) economic benefits [22]; (2) other life benefits (natural, social, and cultural) [23]; (3) intangible benefits [24]. Therefore, tourism planners, managers, and policy makers cannot simply aim at raising the majority of poor individuals above the poverty line. In spite of this, economic growth is still the premise and the fundamental goal of tourism poverty alleviation.

As for the related content of tourism poverty alleviation, the research on tourism poverty alleviation was in its infancy before 2010, focusing on the poverty alleviation strategies of developing countries and poor areas and their impact on the economy, environment, and other macro perspectives [25]. For example, Luvanga, Shitundu et al. studied the impact of tourism development on the economic development of less developed countries [26]. Since 2010, research has focused on the research on poverty alleviation via tourism at the micro level and takes less developed countries such as Africa as cases. The

research contents focus on the participation of poor people in poverty alleviation [27], the benefits, and the positive and negative effects of poverty alleviation, and it has also started to pay extensive attention to poverty alleviation via ecotourism. Research has also focused on poverty alleviation via tourism from the perspectives of religion and gender. Zhao et al. conducted data collection and in-depth interviews with government departments, leaders, tourism associations, and other places to study the local performance of tourism poverty alleviation [28].

Based on previous studies, it can be found that the research on poverty alleviation tourism lacks quantitative analysis; in particular, the spatial analysis of tourism poverty alleviation is rare. In addition, there is a lack of macro-scale systematic analysis at the national level in the research area. Therefore, this study is very different from previous studies. It adopts geospatial analysis methods comprehensively; selects natural factors such as elevation, precipitation, river, and climate; and constructs humanistic factors using the three dimensions of society, economy, and industry. In the selection of regions, the entire territory of China is taken as the research object. This paper analyzes the geographical spatial distribution characteristics and influencing factors of China's tourism poverty alleviation villages in more detail and proposes the spatial optimization path and differentiated development strategy of pro-poor tourism villages, which is conducive to the healthy and sustainable development of China's pro-poor tourism villages, and provides experience for the world's poverty reduction cause.

3. Study Methods and Data Sources

3.1. Study Methods

3.1.1. Nearest Neighbor Index

The nearest neighbor index is the distribution type characteristic of point features in geographic space, which can effectively identify the degree of proximity of point features in space [29]. Its formula is described as follows:

$$R = \frac{\bar{r}_1}{\bar{r}_E},\tag{1}$$

where $\bar{r}_E = \frac{1}{2\sqrt{D}} = \frac{1}{2\sqrt{n/A}}$ is the theoretical value of the nearest neighbor distance, $\bar{r}_1$ is the average value of the nearest neighbor distance, D is the density of the research point, A is the size of the research area, and n is the number of pro-poor tourism villages. It represents the proximity of pro-poor tourism villages in geographical space. When $R = 1$, it presents a random state distribution. When $R > 1$, it presents uniform state distributions, and when $R < 1$, it presents condensed state distributions [30].

3.1.2. Disequilibrium Index

The disequilibrium index is an indicator that reflects the evenness of the distribution of pro-poor tourism villages within each province. The value range of the disequilibrium index is generally between 0 and 1. The closer the index is to 1, the more concentrated the distribution of pro-poor tourism villages. The closer the index is to 0, the more discrete the distribution trend is [31]. The formula is described as follows:

$$S = \frac{\sum\limits_{i=1}^{n} Y_i - 50(n+1)}{100n - 50(n+1)}\tag{2}$$

where n is the total number of regions and Y_i is the cumulative percentage of the i rank after ranking the proportion of pro-poor tourism villages in each region from large to small. It reflects the equilibrium degree of distribution of pro-poor tourism villages in the region. If $S = 0$, it is evenly distributed in all regions. If $S = 1$, it is all in one region. The range of S is between 0 and 1 [32].

3.1.3. Spatial Correlation Analysis

Spatial correlation analysis comprises an integration of spatial analysis methods and techniques and a comprehensive analysis of the correlation between research objects in geographical space. This research method can effectively reveal the interaction of the objects in geographical space. In this paper, Moran's I and Getis-OrdGi* were selected to explore the spatial correlation structure model and the distribution difference of spatial cold and hot spots in pro-poor tourism villages, respectively. The formula is described as follows:

$$I = \sum_{i=1}^{n} \sum_{i=1}^{n} W_{ij}(X_i - \overline{X})(X_j - \overline{X}) / S^2{}_j \sum_{i=1}^{n} \sum_{j=1}^{n} W_{ij} \tag{3}$$

where X_i and X_j are the numbers of pro-poor tourism villages in the geographical space of i and j, respectively. The space weight matrix is set to W_{ij}, the value is 1 when the space is adjacent, and it is 0 when the space is not adjacent. The value of Moran's I is distributed between -1 and 1, and the closer the value is to 1, the cluster with similar properties is represented. The closer it is to -1, it means that those with different attributes are clustered together. The closer it is to 0, it means that there is no spatial autocorrelation.

Since Moran's I index represents the global agglomeration state of pro-poor tourism villages, Getis-OrdG$_i$* is generally used for measurement analyses to further identify the distribution of hot and cold spots in local pro-poor tourism villages. The formula is as follows:

$$I = \sum_{i=1}^{n} \sum W_{ij}(d)X_j / \sum_{j=1}^{n} X_j \tag{4}$$

By standardizing it, we can obtain the following:

$$Z(G_i^*) = [G_i^* - E(G_i^*)] / \sqrt{Var(G_i^*)} \tag{5}$$

where $E(G_i^*)$ is the expected value, $Var(G_i^*)$ is the variance value, and $W_{ij}(d)$ is the spatial weight matrix. When $Z(G_i^*)$ is greater than 0 and passes the test, it indicates that the pro-poor tourism villages in this region are the hot spot area and present high-value agglomerations in space. If $Z(G_i^*)$ is negative and passes the test, it indicates that the pro-poor tourism villages in this region are cold spot areas, presenting low-value agglomerations in space.

3.1.4. Geographical Detector

Geographical detectors are new statistical methods for detecting spatial heterogeneity and for revealing the drivers behind it, which assume wireless, and elegant forms and possess clear physical implications. Its model is as follows:

$$q = 1 - \frac{\sum_{h=1}^{L} N_h \sigma_h^2}{N \sigma_h^2} = 1 - \frac{SSW}{SST}$$
$$SSW = \sum_{h=1}^{L} N_h \sigma_h^2, SST = N \sigma^2 \tag{6}$$

where h (h = 1, 2, ...), L is the stratification of variable Y or factor X, and N_h and N are the number of units in layer h and the entire area, respectively. σ_h^2 and σ^2 are the variances of layer h and the entire regions Y values, respectively. SSW and SST are the sums of the variance within the layer and the total variance of the entire region, respectively [33]. The range of q is [0, 1]. The value of q is proportional to the spatial differentiation of Y. If stratification is generated by independent variable X, the larger the q value, the stronger the explanatory power of independent variable X relative to attribute Y, and vice versa.

3.1.5. Overlay Analysis

An overlay analysis is the overlay of two or more layers of map features to form a new layer that makes it easy to compare and analyze the relationships between different layer features. In this paper, the spatial distribution map of pro-poor tourism villages in China was superimposed with other attribute maps, such as topography map, river distribution map, climate distribution map, etc., and the number of pro-poor tourism villages in different elevations, different river levels, and different climate areas was counted to compare and analyze the distribution differences of pro-poor tourism villages in various factors [34].

3.2. Data Sources and Indicator Selection

The study area covers 31 provinces, municipalities, and autonomous regions in mainland China, excluding pro-poor tourism villages in Hong Kong, Macao, and Taiwan. The data of pro-poor tourism villages were obtained from the list of the first batch (1996), and the second batch (3774) of pro-poor tourism villages is published on the official website of the Ministry of Culture and Tourism (https://www.mct.gov.cn/, accessed on 10 November 2021). These pro-poor tourism villages are the main carriers of rural tourism poverty alleviation in China, and the target of the Chinese government's focus and support, with strong representativeness and typicality. By taking this as the research study's data sample, this study used Google Earth to accurately locate, extract, and calibrate the geographical coordinates of 5770 pro-poor tourism villages in two batches and realized the visualization of point elements of pro-poor tourism villages on the map of China in the ArcGIS10.7 software (Figure 2), thus presenting the spatial distribution map of pro-poor tourism villages.
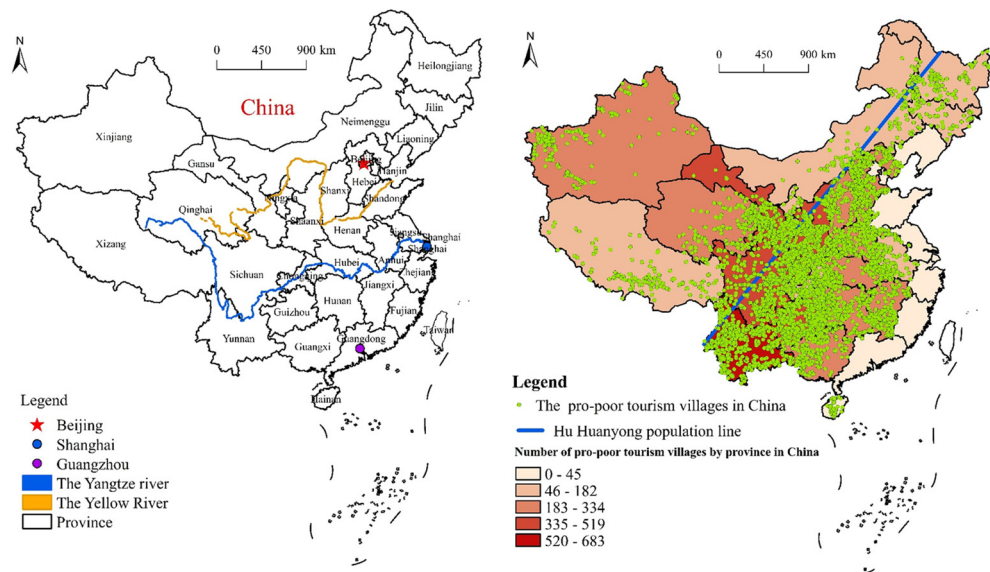

Figure 2. Geospatial distribution map of pro-poor tourism villages in China.

On this basis, the spatial distribution pattern and causes of the pro-poor tourism villages were analyzed and studied. The selection of the influencing factor index is based on the feasibility and availability of data, focusing on the two aspects of humanity and nature. Human factors are analyzed from the three dimensions of society, economy, and industry, while natural factors are systematically explored from terrain, precipitation, rivers, and climate. The national vector map of 1:4 million in the national basic geographic information system database was used as the source of basic vector data in this study. The data of China's DEM digital elevation (resolution is 30 m), precipitation, river system, and climate division are all derived from the Resources and Environmental Science and Data Center, Institute of Geographic Sciences, and Natural Resources Research, Chinese Academy of Sciences (http://www.resdc.cn, accessed on 10 November 2021). The social

and economic data of each province comes from the official website of the National Bureau of Statistics (http://www.stats.gov.cn/, accessed on 10 November 2021).

4. Results

4.1. Characteristics of Spatial Distribution Differences

4.1.1. Overall Difference

In this paper, the nearest neighbor index was used to distinguish the spatial distribution type of pro-poor tourism villages. The nearest neighbor index of the first batch, the second batch, and the two batches of pro-poor tourism villages are 0.391, 0.379, and 0.344, respectively, and their values are all less than 1, indicating that the spatial distribution of the pro-poor tourism villages presents a cohesive distribution trend [35]. In particular, the spatial distribution difference is obvious (Figure 1): (1) The overall spatial distribution shows the pattern of "large agglomeration and small dispersion". The spatial clustering of pro-poor tourism villages is characterized by a cluster-like distribution in the western region, supplemented by a strip-like distribution in the central region. Most of them are distributed in economically underdeveloped and relatively small populations of the central and western regions. (2) According to the Hu Huanyong population line, 4257 pro-poor tourism villages are located east of the Hu Huanyong population line, accounting for 73.8 percent of China's pro-poor tourism villages, while 1513 pro-poor tourism villages are located west of the Hu Huanyong population line, accounting for only 26.2 percent. The results showed that the difference in quantity and density of the east and west in the pro-poor tourism villages was significant, which had obvious characteristics exhibiting meridian regional differentiation.

4.1.2. Regional Differences

It is observed that the distribution of poverty alleviation tourism villages in the three regions is unbalanced. There are 3758 pro-poor tourism villages in western China, accounting for 65.1%. The number of pro-poor tourism villages in central China is 1633, accounting for 28.3%. The number of pro-poor tourism villages in eastern China is 379, accounting for only 6.6%, which is significantly different from the central and western regions. It shows that the distribution of pro-poor tourism villages tends to gather in the central and western regions.

According to the calculation of the disequilibrium index, the disequilibrium index of the pro-poor tourism villages in the eight regions is 0.56, indicating that the distribution of the pro-poor tourism villages in the eight regions is not balanced (Figure 3). Specifically, the pro-poor tourism villages are mainly concentrated in southwest China, northwest China, the middle reaches of the Yellow River, and the middle reaches of the Yangtze River, accounting for 89.5%. The number of pro-poor tourism villages in southwest China is the largest, with 1963 villages accounting for 34.0%; the northwest region followed with 1494, accounting for 20.3%. In the southern coastal areas, there are 45 pro-poor tourism villages, accounting for only 0.78%. The regional quantitative characteristics of pro-poor tourism villages reflect that pro-poor tourism villages tend to gather along the southwest and northwest regions.

4.1.3. Provincial Differences

As can be seen from Figure 4, there is a big difference in the number of pro-poor tourism villages in each province. There are 5770 pro-poor tourism villages in 31 provinces, of which 6 provinces have more than 400 pro-poor tourism villages, 9 provinces have 204 to 334 pro-poor tourism villages, 5 provinces have 125 to 182 pro-poor tourism villages, 3 provinces have 45 to 72 pro-poor tourism villages, and 9 provinces have no pro-poor tourism villages. The disequilibrium index of the distribution of pro-poor tourism villages at the provincial scale was 0.54, indicating that the imbalance of the distribution of pro-poor tourism villages at the provincial scale was not as significant as that of the eight regions. In terms of the specific provinces of the spatial agglomeration of pro-poor tourism villages,

they are mainly concentrated in Yunnan, Guizhou, Gansu, Shaanxi, Sichuan, Hebei, and Hunan, while there are a few in Ningxia, Jilin, and Hainan, which reflects that pro-poor tourism villages tend to be concentrated in provinces with relatively rich ecological tourism resources and relatively backward economies.
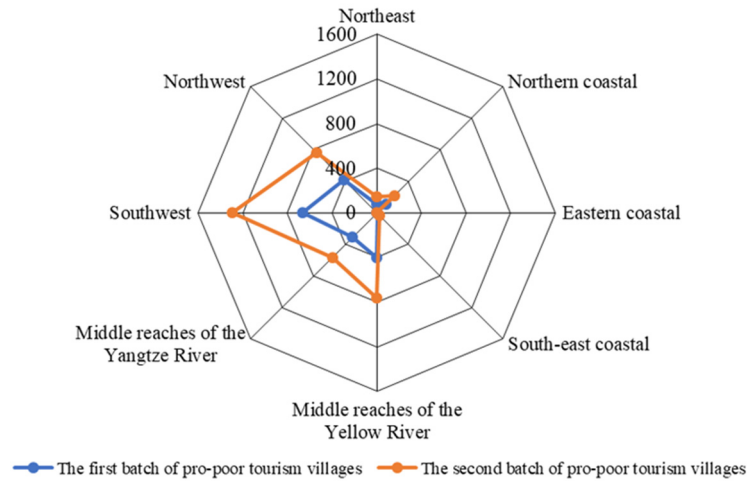

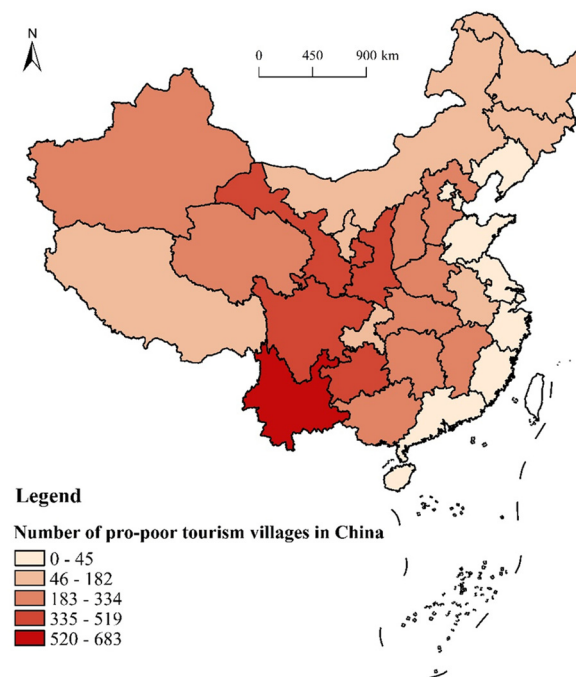**Figure 3.** Spatial distribution of pro-poor tourism villages in eight regions.

Figure 4. Spatial differences of pro-poor tourism villages at the provincial level.

4.2. Spatial Density Characteristic

The kernel density map of pro-poor tourism villages was drawn by kernel density analysis in the ArcGIS10.7 spatial analysis tool. As shown in Figure 5, (1) the first batch of pro-poor tourism villages generally showed a distribution trend of "one belt and five cores areas clustered in mountainous areas". They form the Hebei–Henan–Anhui–Hubei contiguous high-density cluster belt. There are five high-density cluster cores in southern Gansu, the border area of Sichuan, Gansu, and Shaanxi; the border area of Guizhou, Hunan, and Chongqing; southern Sichuan; and southwest Guizhou. Among them, the "One Belt and five Cores" high-density areas show clustering distributions around Yanshan Mountain–Taihang Mountain, Qilian Mountain–Qinling Mountains–Hengduan Mountains, Wu Mountain–Xuefeng Mountain, and other mountainous areas. (2) The second batch of

pro-poor tourism villages is distributed based on "One Belt", forming a new cluster center at the junction of the Anhui and Hubei provinces. Based on the first batch of pro-poor tourism villages, the density value and distribution range of "five cores" increased. The cluster center in southern Gansu extended to the east of Gansu and connected with the middle and west of Shaanxi. The distribution range in the border area of Sichuan, Gansu, Shaanxi, and southern Sichuan continued to expand. (3) According to the kernel density distribution of the two batches of pro-poor tourism villages, the high-density area of the distribution of pro-poor tourism villages is always located in China's central and western regions. The formation of this difference reflects the longitude zonal characteristics of China's natural and human geography.
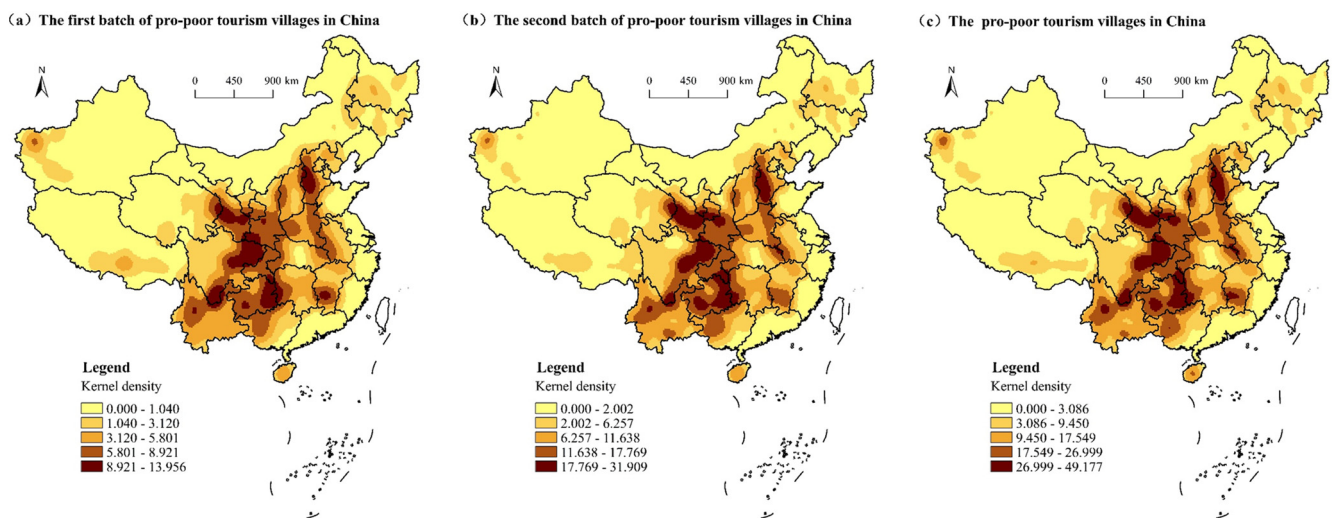

Figure 5. Kernel density map of pro-poor tourism villages in China.

4.3. Spatial Correlation Feature

By taking 31 provincial administrative regions as basic spatial units, the global autocorrelation of the spatial distribution of pro-poor tourism villages in China was analyzed by using the ArcGIS10.7 spatial autocorrelation analysis tool, and the Moran's I estimated values of the first and second batches of pro-poor tourism villages were 0.2163 and 0.2099, respectively. The normal statistical value Z is 3.0721 and 3.0048, respectively; the values are both positive, and the test effect is significant, indicating that the spatial distribution of the two batches of pro-poor tourism villages presents a relatively significant spatial autocorrelation.

We further analyzed the spatial cold-hot correlation characteristics of pro-poor tourism villages and calculated the local auto-correlations index on the provincial scale. We used the Jenks natural fracture method to divide the spatial distribution of pro-poor tourism villages into four types—hot spots, subhot spots, subcold spots, and cold spots—and obtained the spatial hot spot distribution map of pro-poor tourism villages. As shown in Figure 6, from the perspective of the spatial distribution pattern, the first batch of hot spots in pro-poor tourism villages showed patchy distribution characteristics, and the hot spots were mainly located in the Loess Plateau, the Sichuan–Chongqing region and the Yunnan–Guizhou Plateau region. The cold spots agglomeration areas are banded along the northeast and east coasts of China. The second batch of hot spots of pro-poor tourism villages extended to the northwest, and their distribution expanded, while cold spots gradually decreased from the northeast and southeast regions to the east coast. In general, the spatial distribution pattern of central and western pro-poor tourism villages is hot, and that of eastern pro-poor tourism villages is cold. The hot spots increase slowly, while the cold spots decrease gradually. The distribution of central pro-poor tourism villages becomes more and more concentrated, and the spatial pattern of cold and hot spots becomes more and more stable.
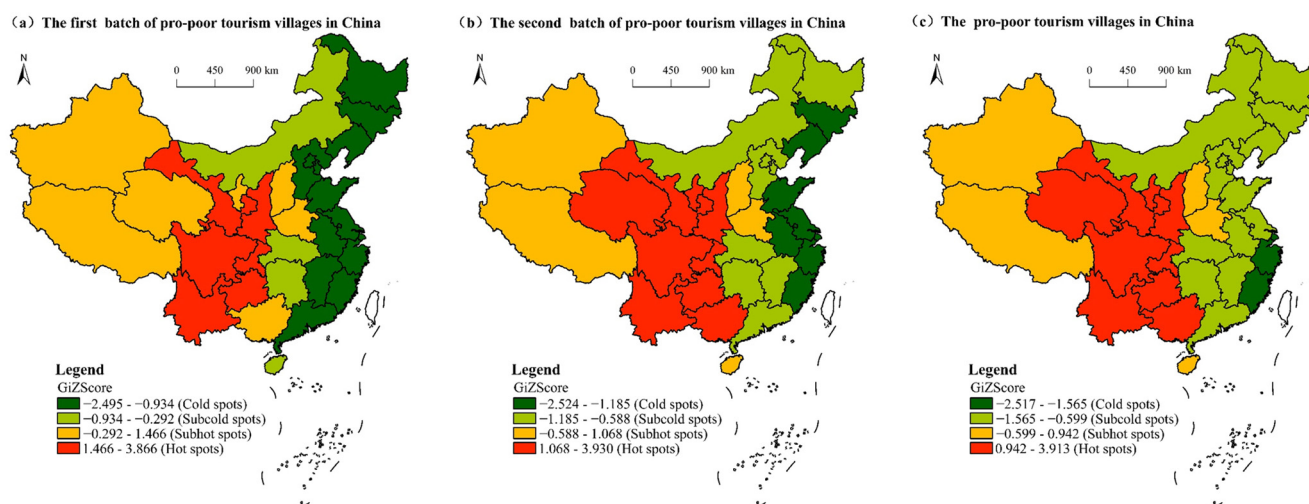
Figure 6. Hot spot region diagram of spatial pattern of pro-poor tourism villages.

5. Factors Influencing the Spatial Distribution of Pro-Poor Tourism Villages

5.1. Humanities Factor Detection Analysis

With the help of geographical detectors, we conducted factor detection analyses on the primary and secondary influencing factors of the spatial distribution of pro-poor tourism villages. The q value of factor detection can indicate the influence ability of this influencing factor on the spatial distribution of pro-poor tourism villages [36]. According to the factor detection results in Table 1, it can be observed that the influence strength of the primary factor on the distribution of pro-poor tourism villages shows that the industrial factors (0.41) > the economic factors (0.35) > the social factors (0.16), in which the industrial factors have the greatest influence, while the social factors are slightly weaker. The influence intensity of the secondary factors on the distribution of pro-poor tourism villages showed some variabilities, among which the influence intensity of the number of inns and lodges, domestic tourism revenue, per capita GDP, and gross regional product were all above 0.4.

Table 1. Influence factor detection results of the spatial distribution of pro-poor tourism villages.

Primary Influencing Factors	q-Value	Secondary Influencing Factors	Unit	q-Value
Economic factors	0.35	Urbanization rate	percent	0.31
		Gross regional product	Chinese CNY	0.43
		GDP per capita	Chinese CNY	0.43
		Per capita disposable income of rural residents	Chinese CNY	0.28
Social factors	0.16	Size of population	person	0.22
		Educational attainment (preschool)	person	0.14
		Educational attainment (elementary school)	person	0.28
		Educational attainment (high school)	person	0.21
		Number of beds per 1000 people	/	0.38
		Number of doctors per thousand	/	0.14
		Integrated density of railroad network	$km \cdot 10{,}000 \ km^{-2}$	0.38
		Integrated density of highway network	$km \cdot 10{,}000 \ people^{-1}$	0.30
Industrial factors	0.41	Domestic tourism revenue	Chinese CNY	0.45
		Number of tourist receivers	/	0.24
		Number of scenic spots above grade 4A	/	0.40
		Number of travel agencies	/	0.03
		Number of star-rated hotels	/	0.22
		Number of inns and lodges	/	0.63

5.1.1. Economic Factors

Economic factors have a direct influence on the spatial distribution of pro-poor tourism villages. In terms of their secondary influencing factors, the explanatory power of the urbanization rate, gross regional product, and GDP per capita are 0.31, 0.43, and 0.43, respectively, indicating that these three factors have a greater influence on the spatial distribution of pro-poor tourism villages. Regions with lower gross regional products and GDP per capita have a higher number of pro-poor tourism villages distributed. These two indicators reflect the overall economic development level of the region. Regions with low economic development levels can make use of local, high-quality rural tourism resources to promote the economic development of the region via the development of rural tourism and realize the residents' income increase and prosperity. The urbanization rate also has an impact on the spatial distribution of pro-poor tourism villages, and regions with low urbanization rates have a higher number of spatial distributions with respect to their pro-poor tourism villages. Generally speaking, in areas with low urbanization rates, on the one hand, the flow of population and production factors is slow, the development of the regional economy is backward, the income of residents is not high, and the support of public services such as medical care is not perfect, on the other hand, in areas with low urbanization rates, ecological resources have better background conditions, so we should fully respect the existing rural topography, village appearance and idyllic scenery, agricultural industry, and ecology, and it is more feasible for the poor be lifted out of poverty and to become wealthier by promoting the integration of agriculture and tourism development. For example, Yunnan, Guizhou, Gansu, and Shaanxi, which are less economically developed and have lower urbanization rates, have a large number of pro-poor tourism villages [37].

5.1.2. Social Factors

On the whole, the influence of social factors on the spatial distribution of focal villages is relatively small. However, in terms of their secondary influencing factors, the explanatory powers of the number of beds per 1000 people, railroad network, and highway network are 0.38, 0.38, and 0.30, respectively, indicating that these three factors also have some influence on the spatial distribution of pro-poor tourism villages, among which the indicator of the number of beds per 1000 people is an important reflection of regional medical conditions, and the integrated density of the railroad network and highway network is an important expression of thus, transportation conditions. The low level of medical care has led to a high number of people living in poverty due to illnesses in the pro-poor tourism villages; we are developing tourism based on the beautiful natural resource background conditions to help lift poor residents out of poverty. Transportation is the basis for the formation and development of pro-poor tourism villages, and it plays the role of a bridge connecting tourist sources and tourist destinations; it is a very important component of the rural tourism system. Pro-poor tourism villages are mainly located in economically backward rural areas with imperfect transportation infrastructure and poor accessibility. However, backward traffic is a reason why pro-poor tourism villages are less connected with the outside world, and closed environments also create conditions for the preservation of authentic natural conditions and distinctive customs and traditions of pro-poor tourism villages. These include tourism attraction, which is the driving force for the development of rural tourism to alleviate poverty. However, traffic is also an important bottleneck that restricts the development of tourism in pro-poor tourism villages. Therefore, pro-poor tourism villages should further solve traffic constraints and open up their village so that tourists can "go in and have fun", thus realizing the rapid development of the tourism industry in pro-poor tourism villages.

5.1.3. Industrial Factors

Industrial factors have an important influence on the spatial distribution of pro-poor tourism villages. From their secondary influencing factors, the explanatory power of domestic tourism income, the number of inns and lodges, and the number of scenic spots

above the 4A level are 0.45, 0.63, and 0.40, respectively, indicating that these three factors have a greater influence on the spatial distribution of pro-poor tourism villages. There is a symbiotic relationship between pro-poor tourism villages and the local tourism industry. On the one hand, the development of tourism industries can promote the development of tourism resources in pro-poor tourism villages and produce a strong radiation-driven effect; on the other hand, the economic development of pro-poor tourism villages can also promote the further growth of the local tourism industry, achieving a win–win situation. Specifically, domestic tourism incomes can reflect the level of regional tourism development, and the development of pro-poor tourism villages cannot be separated from the support of the overall local tourism industry; moreover, the more developed the local tourism industry is, the stronger the support capacity for pro-poor tourism villages. Scenic spots rated at the 4A level are high-quality carriers of tourism resources, and their influence on the distribution of pro-poor tourism villages is greater. There are a large number of high-quality tourism resources and scenic spots around pro-poor tourism villages, and the related tourism-supporting facilities in the scenic spots are relatively good; thus, pro-poor tourism villages can be attached to scenic spots to achieve linkage development. The number of inns and lodges has a great influence on the distribution of pro-poor tourism villages in the region, as they are an important form of tourism product development in pro-poor tourism villages, and the surrounding villages can expand the inn and lodges business around the scenic spots. For example, Guizhou, Yunnan, and Shaanxi provinces have a high number of inns and lodges, and the distribution of their pro-poor tourism villages is also higher in number.

5.2. Natural Factor Detection Analysis

5.2.1. Terrain and Landform

Topography not only serves as an independent natural geographic element as the foundation for the layout of pro-poor tourism villages, but it also is an important landscape element, which is an important factor in attracting tourists to visit different pro-poor tourism villages. In this paper, the influence of topography and geomorphology on the spatial distribution of pro-poor tourism villages was examined by elevation, and the spatial distribution map of pro-poor tourism villages was overlaid with the national topographic elevation map to produce Figure 7. The main characteristics of China's topography are as follows: the topography is high in the west and low in the east, with a step-like distribution. Statistics on the altitude of pro-poor tourism villages show the following: the number of pro-poor tourism villages located on the second level of the terrace (1000–2000 m above sea level) is the largest, at 3753, accounting for 65.04%; the number of pro-poor tourism villages on the third level of the terrace (below 500 m above sea level) is the second largest, at 1283, accounting for 22.24%; and the number of pro-poor tourism villages located on the first level of the terrace (above 4000 m above sea level) is the lowest, at 734, accounting for 12.72%. It is easy to find that the distribution of pro-poor tourism villages has the characteristic of pointing to the middle and low altitudes. The second level of the ladder is mainly located in the central region of China, which is relatively economically backward, but its average elevation is lower than the first level of the ladder, and its tourism resources are relatively good, and the infrastructure conditions, such as transportation are relatively well-established, which create conditions for carrying out tourism poverty alleviation. In addition, the relatively undulating terrain enables the preservation of complete topographic features, which can bring tourists a rich sense of tourism space, while the high-quality natural ecological environment provides the basic tourism resource guarantee for the development of rural tourism poverty alleviation activities.
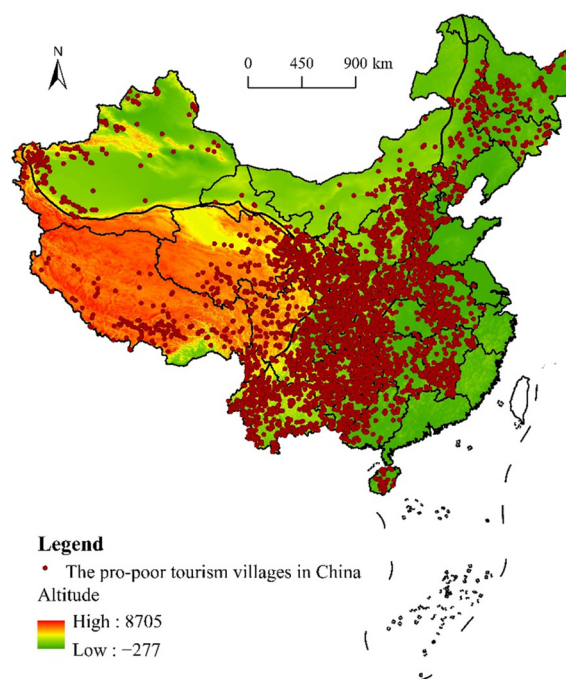
Figure 7. Pro-poor tourism villages in China and terrain overlay analysis map.

5.2.2. Rainfall Precipitation

Precipitation has a great impact on the natural landscape, vegetation landscape, and the ecological environment of pro-poor tourism villages, and it has a strong correlation with the development of tourism industries in pro-poor tourism villages. In order to explore a relationship between annual precipitation and the distribution of pro-poor tourism villages, we superimposed the distribution map of pro-poor tourism villages with the annual precipitation in the national region to obtain Figure 8. We extracted the number of pro-poor tourism villages under different annual precipitation values, and the results showed that the correlation coefficient between the two was 0.863, and the test passed. In order to further study the coupling effect of precipitation and the distribution of pro-poor tourism villages, we divided it into four types according to different precipitation: arid area, semi-arid area, semi-humid area, and humid area. On this basis, we counted the number of pro-poor tourism villages in four types of areas and found that the number of pro-poor tourism villages shows humid areas > semi-humid areas > semi-arid areas > arid areas in the distribution of four types of areas. The number of pro-poor tourism villages in humid areas with annual precipitation of more than 800 mm is the largest, the number of humid and semi-humid areas with annual precipitation of more than 400 mm accounts for 87.5%, and the number of arid areas with annual precipitation of less than 200 mm is the lowest at, only 3.9%. Based on the above analysis, it can be seen that the spatial distribution of pro-poor tourism villages is greatly affected by annual precipitation, showing a trend of increasing distributions with the increase in precipitation value. Precipitation is an important influencing factor in the distribution of pro-poor tourism villages, and the areas with high annual precipitation are rich in forest vegetation resources and excellent ecological landscapes, which creates good conditions for the development of tourism in pro-poor tourism villages.

5.2.3. River System

Water sources are the main factors affecting the spatial distribution of pro-poor tourism villages. Most rural tourism sites are built according to the terrain and are near water, forming a unique rural tourism style and directly influencing the spatial distribution pattern of pro-poor tourism villages. The spatial distribution map of pro-poor tourism villages is overlaid with major rivers in China to obtain Figure 9. We analyzed the buffer zones of

major rivers in China with a radius ranging from 5 to −15 km by ArcGIS10.7 software and counted the number of pro-poor tourism villages in buffer zones with a radius ranging from 5 to −15 km. The results showed that: there were 1158 pro-poor tourism villages in the 5 km buffer zone of major rivers, accounting for 20.07%; 2171 pro-poor tourism villages in the 10 km buffer zone of major rivers, accounting for 37.63%; and 3220 pro-poor tourism villages in the 15 km buffer zone of major rivers, accounting for 55.81%. Further analysis of the correlation between the number of pro-poor tourism villages within the buffer zone and the distance of the buffer zone shows that the correlation coefficient between them is 0.976 and passes the test. This shows that as the buffer zone continues to expand, the more the pro-poor tourism villages within its buffer zone are distributed, and they are distributed roughly along the perimeter of the water course [38]. A good water source is conducive to improving the local climate and integrating with the surrounding environment to form a beautiful ornamental landscape and a unique rural tourism style, which becomes an important resource support for rural tourism development. Therefore, the river system is an important factor affecting the spatial distribution of pro-poor tourism villages.
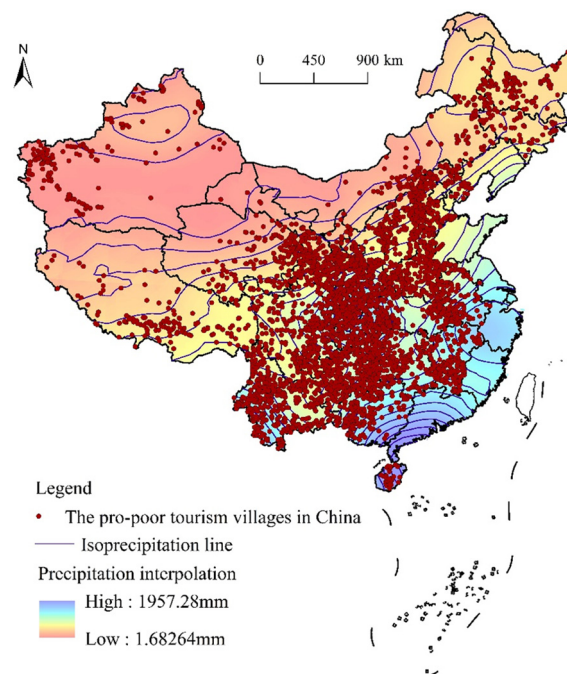

Figure 8. Pro-poor tourism villages in China and rainfall precipitation overlay analysis map.

5.2.4. Climatic Conditions

Climate is an indispensable resource in the tourism industry. Differences in climate often determine the differences in temperature and precipitation within a region, which are important factors in the formation of tourism resources. The spatial distribution map of pro-poor tourism villages was spatially overlaid with the climate zones of China to obtain Figure 10. After the zoning statistics, there are 4539 pro-poor tourism villages in temperate monsoon and subtropical monsoon climate regions, accounting for 78.67%, among which the subtropical monsoon climate region has the most pro-poor tourism villages, accounting for 2928, or 50.75%, and the temperate monsoon climate region has 1611 pro-poor tourism villages, accounting for 27.92%. In addition, the pro-poor tourism villages in the temperate continental climate and highland mountain climate region also have a certain distribution; these two regions accounted for 18.01%, while the tropical monsoon climate zone has the lowest distribution of pro-poor tourism villages, accounting for only 3.33%. The subtropical monsoon climate has obvious winter and summer seasonal changes, with high temperatures and rainfall in the summer and milder temperatures and lower rainfall in the winter. The annual average temperature is 15–22 °C, which is relatively

hot and has a unique climatic advantage. Under this climate condition, tourists can have a strong comfort level by giving full play to their climatic advantages when traveling to tourist sites. Good water and heat conditions are an important basis for the formation of tourism resources in pro-poor tourism villages, as they create conditions for enriching biodiversity and improving the quality of their natural ecological environments. Therefore, good climatic conditions are an important part of the tourism resources of pro-poor tourism villages with a certain tourism orientation and are an important influence factor in the distribution of pro-poor tourism villages [39].
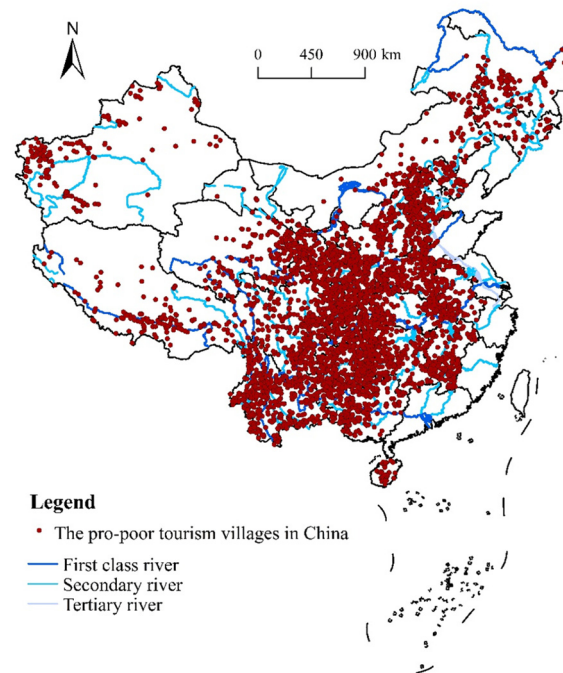

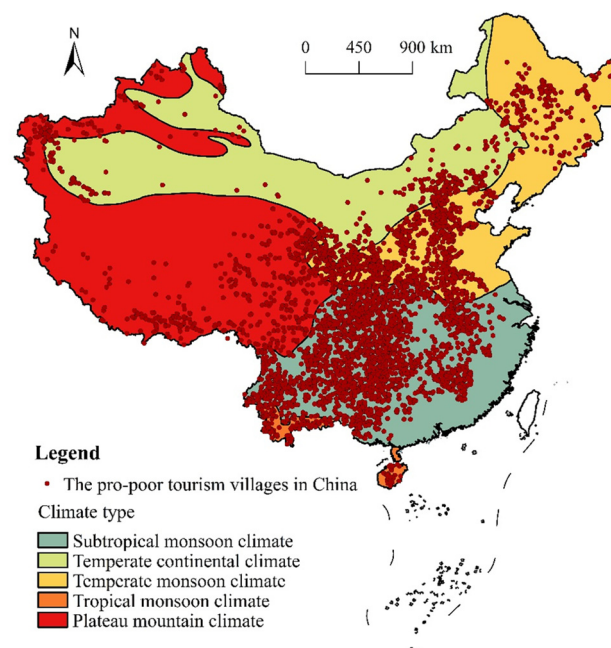**Figure 9.** Pro-poor tourism villages in China and major rivers overlay analysis.

Figure 10. Pro-poor tourism villages in China and climate overlay analysis.

6. Discussion

6.1. Study of Spatial Distribution Characteristics to Help Optimize the Spatial Layout of Pro-Poor Tourism Villages

First, the spatial layout of pro-poor tourism villages needs to be optimized. Currently, the number of pro-poor tourism villages in the central region is relatively small, and the degree of aggregation is not high. Thus, we should increase the tilt of the central region and achieve full coverage of pro-poor tourism villages in the central and western regions with improved tourism resource endowments. While consolidating the achievements in poverty alleviation, we will effectively link them with rural vitalization strategies.

Second, tourism products need to be innovated and developed. According to the situation in which most pro-poor tourism villages are clustered around poor mountainous areas with beautiful ecological environments and relatively independent environments, we should protect the development and utilization of the original ecological natural environment, dig deeply into the highly representative regional culture, develop characteristic tourism products, and enhance tourism attractions and the competitiveness of the pro-poor tourism villages. Pro-poor tourism villages in Yanshan Mountain–Taihang Mountain, Qilian Mountain–Qinling Mountains–Hengduan Mountains, Wu Mountain–Xuefeng Mountain, and other mountainous areas should fully use the advantages of red culture, ecological culture, and local culture and create innovative tourism products of inns and B&B to meet market demands.

Third, we should strengthen coordinated regional developments. As for the pro-poor tourism villages with high-density distributions in the edge and border areas of provinces and regions, we should take tourism as the link to speed up the exchange of people, logistics, and capital flow. Relevant government departments should strengthen policy coordination and resource sharing, reduce the cost of tourism poverty alleviation, and promote the coordinated development of tourism in pro-poor tourism villages. In addition, we will actively promote the coordinated development of pro-poor tourism villages in southern Gansu; the border area of Sichuan, Gansu, and Shaanxi; the border area of Guizhou, Hunan, and Chongqing; southern Sichuan; and southwest Guizhou; and eventually, form a cluster area of pro-poor tourism villages for rural tourism poverty alleviation with world influences.

6.2. The Study of Influencing Factors Provides New Ideas for Implementing Rural Revitalization Strategies in Pro-Poor Tourism Villages

Finally, according to the cause analysis of the distribution pattern of pro-poor tourism villages, the main causes of poverty in pro-poor tourism villages can be further analyzed, corresponding types can be demarcated, and different types can be classified to guide developments and construction:

(1) Underutilization of resources type: We should deeply embody cultural connotations based on existing local eco-tourism resources and the development foundation of the surrounding tourism industry; innovate and develop rural tourism products; strengthen exchanges and cooperation with surrounding A-level scenic spots; achieve complementary functions, resource sharing, and dislocation development; and fully absorb its "spillover effect".

(2) Mountain environment constraint type: Different types of tourism poverty alleviation focus can be established according to the characteristics of mountain areas at different altitudes. For example, for critical alpine villages above 4000 m, tourism development costs should be taken into full consideration, and the mode of "relocation for poverty alleviation" should be adopted to preserve their original living environment and serve as carriers of tourism experience, sightseeing, and extreme sports. Pro-poor tourism villages within the range of 1000 m to 2000 m should pay attention to the characteristics of mountain resources and develop characteristic tourism projects such as mountain health preservation and sliding grassland. Pro-poor tourism villages with low mountain altitudes below 1000 m can develop tourism projects such as rural tourism guesthouses, agricultural picking gardens, and planting of characteristic flowers and Chinese herbal medicines.

(3) Non-optimal transport location type: It is necessary to increase the construction of transportation infrastructures such as highways, railways, and waterways; increase internal and external connection lines; open up roads leading pro-poor tourism villages; focus on improving accessibility; and create a good development environment for tourism poverty alleviation.

(4) Industrial development lag type: It is observed that regional industrial development factors have a great impact on poverty alleviation in tourism villages. Therefore, in the future, we should actively cultivate the tourism industry system of poverty alleviation tourism villages and, in particular, increase investments in scenic spot creation, accommodation facilities construction, and travel agency development so as to create a good development environment for the development of poverty alleviation tourism villages and improve the performance of tourism poverty alleviation. Of course, more than one type of pro-poor tourism village exists. However, they may overlap and are comprehensive, which requires a scientific and comprehensive analysis of pro-poor tourism villages when carrying out tourism poverty alleviation studies and carrying out tourism development according to local conditions. In addition, poverty alleviation tourism villages should further improve the education level of residents and improve the regional medical level so as to comprehensively help the economic and social development of the tourism poverty alleviation villages and realize the poverty alleviation of poor residents.

From the perspective of research, previous scholars mainly studied tourism poverty alleviation from the perspectives of sociology and management, etc. This paper systematically studied the spatial pattern of China's tourism poverty alleviation from the perspective of geographical space. Qin and Xu et al. studied the positive and negative impacts of tourism poverty alleviation on China's population from the perspective of management [5]. Rogerson and Saarinen studied the role of tourism poverty alleviation in the political and economic impacts of the Global South from a sociological perspective [40].

In terms of research methods, the current research studies on tourism poverty alleviation mostly adopt qualitative research or survey research and analyze the status quo of tourism poverty alleviation at case points. This study systematically adopts geospatial analysis methods and relevant mathematical models to quantitatively study the spatial distribution pattern and influencing factors of tourism poverty alleviation. Liang and Bao identified some factors influencing the performance of tourism poverty alleviation by conducting interviews with 273 entrepreneurs [41]. By using a questionnaire survey, Zhao studied whether the system of 29 provinces in China will affect poverty alleviation via tourism.

In terms of research objects, most scholars studied populations and villages previously, but this study focuses on China's whole-region tourism poverty alleviation areas. Xu and Wang et al. conducted relevant research on rural women in tourism poverty alleviation [42]. Feng and Wei et al. took Hunshui Village in Anhui Province, China, as the research object and explored a multi-industry integration network targeted poverty alleviation innovation rural tourism, as well as the impact of poverty alleviation tourism on rural development [43].

6.3. Limitations and Future Research Prospects

Some limitations exist in our study. For example, due to data acquisition and other reasons, this study still requires further improvement, such as the classification of different levels and different types of pro-poor tourism villages; further exploring the influence of soil, nature reserves, and other factors on the distribution of pro-poor tourism villages; and using different mathematical models to compare the impact intensity of the impact factors, which is also of greater research value and significance, and these research directions will also be the focus of the next research study. Pro-poor tourism villages are an essential carrier of China's tourism poverty alleviation and rural revitalization strategy, a concentrated embodiment of the concept of targeted poverty alleviation "from village to household to person", and an effective fulcrum to promote social and economic development in

poor areas. In the future, pro-poor tourism villages should continue to play the powerful hematopoietic function of poverty alleviation via tourism, improve villagers' ability to obtain tourism benefits, create more and better development opportunities for them to effectively prevent villagers from returning to poverty in poor areas, and finally promote the compelling connection between poverty alleviation and rural revitalization strategies.

7. Conclusions

(1) Based on GIS spatial analysis technologies, this paper systematically analyzes the spatial distribution characteristics of the first and second batches of pro-poor tourism villages by using the methods of the nearest proximity index, disequilibrium index, kernel density analysis, and spatial autocorrelation. On this basis, an index system of influencing factors is constructed from the two aspects of human and natural factors. In addition, geographic detector and superposition analyses are used to conduct quantitative geospatial detection and analysis of the factors affecting the spatial distribution of pro-poor tourism villages. The following main conclusions were drawn. The overall spatial distribution pattern shows a "large concentration and small dispersion" pattern. Regarding spatial agglomeration, the spatial pattern is characterized by clusters in the western region and supplemented by strips in the central region. East of the Hu Huanyong population line, there are 4257 pro-poor tourism villages, accounting for 73.8% of the country, while west of the Hu Huanyong population line, there are 1513 pro-poor tourism villages, accounting for only 26.2%. This shows that the difference in the number and density of east and west pro-poor tourism villages are significant and have apparent characteristics such as longitudinal geographical differentiation.

(2) The regional distribution of pro-poor tourism villages is extremely uneven across three major zones, eight regions, and at the inter-provincial level. The proportion of pro-poor tourism villages in central and western regions was 93.4%, while that in eastern regions was only 6.6%. The spatial disequilibrium index of the pro-poor tourism villages in the eight regions was 0.56, indicating that the pro-poor tourism villages were disequilibrium in the eight regions, mainly concentrated in the southwest region, the northwest region, the middle reaches of the Yellow River, and the middle reaches of the Yangtze River, accounting for 89.5%. The spatial disequilibrium index of provincial pro-poor tourism villages was 0.54, mainly distributed in Yunnan, Guizhou, Gansu, Shaanxi, Sichuan, Hebei, and Hunan provinces, with a small number in Ningxia, Jilin, and Hainan provinces.

(3) In terms of the overall density, pro-poor tourism villages show a distribution trend of "one belt with five cores gathering in the mountainous area", forming a high-density agglomeration belt connecting Hebei–Henan–Anhui–Hubei; five massive high-density clustering cores in southern Gansu; the border area of Sichuan, Gansu, and Shaanxi; the border area of Guizhou, Hunan, and Chongqing; southern Sichuan; and southwest Guizhou. The "One Belt, Five Cores" high-density area shows clustering around the Yanshan–Taihang Mountains, Qilian–Qinling–Hengduan Mountains, and the Wushan–Xuefeng Mountains.

(4) In terms of spatial association, the spatial distribution of both groups of pro-poor tourism villages shows a more significant spatial autocorrelation. In general, pro-poor tourism villages are spatially clustered, with hot spots clustered in the Loess Plateau, Sichuan, and Chongqing regions and the Yunnan–Guizhou Plateau, and cold spots clustered in the northeast and east coast of China in a striped distribution, showing a hot spatial distribution pattern of in the central and western areas and cold distributions in the east coast. The hot spot areas are slowly increasing, and the cold spot areas are gradually decreasing. The trend of clustering pro-poor tourism villages is becoming increasingly obvious, and the spatial characteristics of hot and cold patterns are becoming increasingly stable.

(5) Regarding influencing factors, pro-poor tourism villages are influenced by human factors such as social, economic, and industrial factors and natural geographical factors such as topography, precipitation, rivers, and climate. The intensity of the humanities level indicator factor on the distribution of regional pro-poor tourism villages shows industrial factors (0.41) > economic factors (0.35) > social factors (0.16). The five factors of secondary indicator factors, namely gross regional product, GDP per capita, domestic tourism income, the number of scenic spots above grade 4A, and the number of guest houses and lodges, have a more obvious influence on the distribution of pro-poor tourism villages. The natural distribution of pro-poor tourism villages tends to be humid mountainous areas with an altitude of about 1000 m and an annual precipitation of more than 800 mm, and it is mostly distributed in the subtropical monsoon climate zones close to rivers with more suitable climates.

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