Spatial Polarization of Villages in Tourist Destinations: A Case Study from Yesanpo, China

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Abstract: Spatial perspectives were applied to examine the processes of growth and development in rural settlements affected by tourism. Based on field surveys and GIS spatial analysis methods, we studied the spatial evolution of two villages (Jiaojiejou and Gougezhuang) in the Yesanpo tourist area over the last 25 years. The results revealed a polarization trend, with Jiaojiejou becoming a ‘hollowed’ village and Gougezhuang developing into a ‘new-type’ tourist town. This polarization indicates the unsustainability of rural development in tourist destinations, which is manifested by the following features: only some villages benefit from the development of tourism; there is simultaneously a shortage of land in tourist villages and a wastage of land in traditional villages; and the function of the villages is deficient. Nevertheless, the spillover of the effects of tourism may provide an opportunity for the development of traditional villages. To better utilize this opportunity, we propose that: (1) integrated rural tourism management should be developed to explore effective methods of promoting tourism as part of a rural development strategy; (2) different land use policies are required for different villages; and (3) the balance between government regulation and community participation should be emphasized.

Keywords: Spatial polarization; Land use change; Rural tourism; Traditional villages; Sustainable development

Introduction

Since the launch of reform and open-door policy in 1978, China has experienced unprecedented rural transformation development (RTD) (Cai 2001; Liu 2007; Long et al. 2011), mainly characterized by changes in residential land use (Henle et al. 2008; Long et al. 2009b; Mander and Jongman 1998; Vos and Meekes 1999), the rural landscape (Hara et al. 2005; Long et al. 2007) and rural production and lifestyles (Nepal and Thapa 2009). During the RTD process, traditional villages have been reshaped in different ways. Some have been transformed into ‘new-type’ villages with the introduction of new industries, whereas others have gradually declined to become ‘hollowed’ villages as a result of rapid external urbanization and the consequent depopulation and

A spatial perspective is an important dimension in the interpretation of the RTD process. Research on the spatial dynamics of villages has attracted widespread academic interest in various fields, including changes in land use (Lin 2006; Liu et al. 2010; Wang and Scott 2008; Wei and Zhao 2009; Yu and Ng 2007), the formation and evolution of the ‘village in the city’ (Tong et al. 2011) and the decline or spatial reconstruction of traditional villages (Hessel et al. 2009; Käyhkö et al. 2011; Long et al. 2009d). However, these studies were mainly conducted in industrial or traditional agricultural regions (Cheng et al. 2001; Feng and Chen 2003; Lei 2002; Li and Li 2008; Liu 2007; Long and Li 2012; Long et al. 2010; Wang et al. 2005; Xue 2001).

Rural tourism has been a significant driving force for rural urbanization and RTD in China (Long et al. 2009c; Qian et al. 2012), especially in remote regions where tourism is the dominant industry. Therefore rural tourist destinations are important areas in studies of rural development. The differentiation of villages within tourist destinations has emerged as a common phenomenon. Only some parts of villages benefit from tourism development. Some workers have reported a hierarchical structure of rural settlements in rural tourism destinations with core–peripheral traits (Lee et al. 2013; Nepal 2007). This differentiation is a crucial feature that should be taken into account in the design of integrated tourism management and the sustainable development of rural tourism, but so far it has not received much attention.

The rural settlement space is a compound system of multiple spatial attributes, among which physical morphology, land function and population distribution are the most fundamental (Xing et al. 2007). We compared the spatial dynamics of two villages – Jiaojiekou (a non-tourist village) and Gougezhuang (a tourist village) – in the Yesanpo tourist area over a 25-year period with the aim of: (1) investigating the influence of rural tourism on these two villages and revealing the differentiation between their spatial dynamics; (2) identifying the driving mechanism for this differentiation; and (3) providing suggestions for integrated rural tourism management and rural development at tourist destinations.

1 Materials and Methods

1.1 Study area

The study villages are located in the Yesanpo tourist area (115.16°–115.30°E, 39.35°–39.40°N), a famous tourist resort in Hebei Province, China (Figure 1). Yesanpo is a mountainous region 100 km from Beijing and covers a total area of 498.5 km². It has 56 administrative villages and, in 2012, more than 30,000 permanent residents, an increase of about 75% from the population in 1985. Yesanpo was designated as a five-star (5A) tourist area by the China National Tourism Administration in 2011 and has plenty of tourism attractions, such as steep canyons, primeval forests, beautiful rivers and abundant rural folk culture. It is a popular rural tourist destination for the citizens of Beijing as a result of the well-preserved natural environment and its proximity to the city. Yesanpo received 2.24 million tourists in 2011, generating 670 million RMB in revenue. There are six independent tourist areas in Yesanpo, among which Baili Canyon is the main scenic location.

Jiaojiekou is located at the Yugudong tourist spot, adjacent to the Xiaoxi River. It has

Figure 1 Location of the study villages in Yesanpo tourist area.
convenient transportation links, with national highway 108 to the west; the planned Zhang-zhuo highway will also cross the village. Jiaojiekou is a traditional non-tourist village and the main incomes of the villagers are from farming crops, forestry, the fruit industry and other non-agricultural jobs.

Gougezhuang is located near the entrance to the Baili Canyon along the Juma River. As a main reception base for the Yesanpo tourist area, Gougezhuang plays an important role in providing tourism services, including accommodation, catering, shopping and entertainment. By 2010, there were 533 family inns in Gougezhuang and 82.1% of the villagers were engaged in tourism operations. Table 1 provides detailed information about the two villages.

### 1.2 Data sources

Both primary and secondary data sources were used in this study. The secondary data sources included published and unpublished literature on the development of tourism in the Yesanpo tourist area, including reports, policy documents, journal articles, planning maps (1986 and 2007) and high-resolution spatial imagery (QuickBird, November 8, 2012) from Google Earth with a ground spatial resolution of 2.8 m. As the image data only covered the years 1986, 2007 and 2012, it was insufficient to follow the whole process of spatial evolution of the villages. Therefore we also carried out face-to-face interviews to collect the historical land use data and drew land use maps for 1986, 1995, 2005 and 2010; the detailed procedure for this has been reported by Xi et al. (2011). To better reveal the process of spatial evolution and the underlying mechanisms, the interviews also included some socio-economic information. The interviews covered three main areas: basic family information (family size, family structure, labor force composition and educational level of family members); the economic status of the family (the level and structure of family income and expenditure); any non-farming jobs of the family members; the area of cultivated land, garden land and other land use categories generating revenue; and family migration within the village. In Gougezhuang, we also studied in detail tourism-related information, including the type of tourism operation, the share of tourism revenue, and accommodation capacities, monthly occupancy rate and information of the employees of family inns or hotels. The interviews covered 136 households in Jiaojiekou and 532 households in Gougezhuang and were conducted from June 23 to 26, 2013. Information about the remaining households was obtained from neighbors and the village heads.

### 1.3 Methods

To interpret the spatial evolution characteristics of the villages, we adopted the following three indices.

1. Change in spatial morphology

   The hollow rate ($E$) was used to quantify the degree of hollow of rural settlements (Liu et al. 2009) and can be calculated as follows:

   $$ E = \frac{M_a - N_a}{M_a} $$

   where $M_a$ is the total area of rural housing land (m²) and $N_a$ is the area of rural houses currently in use (m²). Higher values of $E$ indicate a higher degree of hollow in rural settlements and vice versa.

   The floor area ratio ($F$) is the ratio of the total floor area of buildings to the size of the piece of land on which they are built (Zou 1994). It was used to represent the intensity of land use of the study area and can be calculated as follows:

   $$ F = \frac{R}{H} $$

   where $R$ is the total area on all floors of all

<table>
<thead>
<tr>
<th>Village basic materials</th>
<th>Jiaojiekou</th>
<th>Gougezhuang</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total area of village (ha)</td>
<td>812</td>
<td>2058</td>
</tr>
<tr>
<td>Distance to Baili Canyon (km)</td>
<td>9.4</td>
<td>0.5</td>
</tr>
<tr>
<td>Number of permanent residents</td>
<td>1986: 904</td>
<td>1036</td>
</tr>
<tr>
<td></td>
<td>1995: 893</td>
<td>1215</td>
</tr>
<tr>
<td></td>
<td>2005: 842</td>
<td>1367</td>
</tr>
<tr>
<td></td>
<td>2012: 820</td>
<td>1552</td>
</tr>
<tr>
<td>Per cultivated area in 2012 (m²)</td>
<td>4864</td>
<td>2480</td>
</tr>
<tr>
<td>Annual per capita income in 2012 (yuan)</td>
<td>3200</td>
<td>6480</td>
</tr>
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</table>
buildings on a certain plot and $H$ is the area of the plot.

(2) Change in land function

The value of the functional change ($IV$) represents how important a certain type of land function change is compared with other types of change in the study area. It is able to identify the dominant trend of land function change (Zhu et al. 2001). The calculation can be expressed as follows:

$$IV = \frac{1}{2} \times \left( \frac{D_i}{D} + \frac{B_i}{B} \right) \times 100\%$$  \hspace{1cm} (3)

where $D_i$ represents the spot number of a certain change type, $D$ is the spot number of all change types, $B_i$ is the area of a certain change type and $B$ is the total area of all change types.

(3) Population migration

The migrant ratio is used to measure the extent of migration in villages, including both seasonal and permanent migration. It is defined as the ratio of the population that are away from a village permanently or for a long time to the total population of the village in a certain time period (Lei 2002). Considering the seasonal characteristics of population migration in tourist villages, we modified this index by first considering both immigration and emigration and, second, by using the duration of stay as a weight. This modified migrant ratio ($G$) can be calculated as follows:

$$G = \frac{(I \times r - E \times k)}{T} \times 100\%$$  \hspace{1cm} (4)

where $I$ is the number of in-migrants, $r$ is the immigration weight (which can be calculated as the ratio of the duration of stay of in-migrants to the total duration of a certain period – one year in this instance), $E$ is the number of out-migrants, $k$ is the emigration weight (calculated as the ratio of the duration of stay of out-migrants to the total duration of a certain time period) and $T$ is the total population of the village. A positive value of $G$ indicates net immigration into the village and vice versa.

2 Results

2.1 Changes in spatial morphology

Figure 2 shows that the peripheries of both Jiaojiekou and Gougezhuang expanded from 1986 to 2012. However, old houses in the central area of Jiaojiekou have been abandoned, resulting in a substantial increase in the hollow ratio from nearly zero in 1986 to 0.4028 in 2012 (Figure 3a). In contrast, the central area of Gougezhuang has been either renovated or reconstructed. The intensity of
land use in Jiaojiekou has been consistently low because the newly built residences are still mostly only one-story high. In comparison, increasing numbers of multi-story buildings have been constructed in Gougezhuang, especially along the Juma River and the main street, leading to a considerable increase in the floor area ratio from 0.1826 in 1986 to 0.4513 in 2012 (Figure 3b).

2.2 Changes in land function

Land function categories and the corresponding abbreviations are provided in Table 2. Figure 4 shows that Jiaojiekou has had a consistently simple and spatially homogeneous land function structure from 1986 to 2012. In contrast, the land function in Gougezhuang has shown an obvious trend of heterogenization and multiple functions, changing from meeting the living needs of villagers to satisfying the demands of tourists for accommodation, shopping, catering and entertainment.

As shown in Figure 5 and Table 3, much of the land used for agricultural production in the periphery of Jiaojiekou has been converted to residential use. At the same time, the residential function in the central area has been gradually declining, especially from 1996 to 2005, during which time about 4553 m² of cultivated and garden land were converted to residential use and 2954 m² of residential land were abandoned. In Gougezhuang, about 21,387 m² of residential land started to be used to provide tourist accommodation and catering services from 1986 to 1995, with an IV value of 61%. From 1996 to 2005, much cultivated land was encroached and used for tourist accommodation, catering and residential purposes, with an IV value of 16%. From 2006 to 2012, the diversification and degree of multi-functionality of the land were further improved when family inns started to provide one-stop services, including tourist accommodation, catering, shopping and entertainment. Figure 4 shows the spatial patterns of the changes in land

![Figure 3 Hollow ratio (a) and floor area ratio (b) of Jiaojiekou (open symbols) and Gougezhuang (solid symbols) in different time periods.](image)

<table>
<thead>
<tr>
<th>Table 2 Land function and the corresponding abbreviations</th>
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<tr>
<td><strong>Abbreviation</strong></td>
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<tr>
<td>CL</td>
</tr>
<tr>
<td>GL</td>
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<tr>
<td>WL</td>
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<td>TL</td>
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<td>WI</td>
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<td>PMS</td>
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<td>AR</td>
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<td>RS</td>
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<td>TC</td>
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function of the two villages. For Jiaojiekou, the expansion of the residential function on the periphery and its decline in the central area led to a ‘core–periphery’ spatial pattern. For Gougezhuang, the areas with good transportation links and suitable environment and landscape conditions were preferred, leading to multiple functions for the land along the Juma River and the main street.

2.3 Changes in population distribution

Figure 6 shows the population densities of...
Jiaojiekou and Gougezhuang during each stage. The population densities were obtained by dividing the number of people in a certain building by the area of the building. The processes of population migration in Jiaojiekou and Gougezhuang were distinct from each other, as manifested in the following two aspects. (1) From the perspective of migration within the village, there was a continuous migration of villagers from the central area to the peripheral area in Jiaojiekou, whereas in Gougezhuang people gradually migrated to the main settlement from surrounding settlements. (2) From the perspective of outward migration, including both immigration and emigration, an increasing number of people in Jiaojiekou tended to move out to seek non-farming jobs, giving rise to a substantial increase in the absolute value of the migrant ratio from 0.07 in 1986 to 0.51 in 2012 (Table 4), whereas in Gougezhuang, the population inflow was dominated by tourists during the peak season for tourism and this became increasingly prominent over time.

The processes of migration led to different population distribution patterns in the two villages. In Jiaojiekou, the population declined in the central area and increased in the periphery, especially along the main street heading towards the village entrance, which resulted in a ‘core–periphery’ population distribution pattern. In comparison, the pattern of population distribution in Gougezhuang showed seasonal characteristics. During the tourism off-season, the population distribution was spatially homogeneous and the population density was relatively low. However, during the peak tourism season, large numbers of tourists were concentrated along the Juma River and the main street.

### 2.4 Driving mechanisms of the polarization between the two villages

Figure 7 presents the driving mechanisms for the polarization between the two villages. Their different locations determined their different development paths, which were influenced by socio-economic factors, government regulations and the rational adjustment of the villagers. Jiaojiekou and Gougezhuang have become a progressively dilapidated ‘hollowed’ village and an increasingly prosperous tourist village, respectively.

<table>
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<tr>
<th>Year</th>
<th>Jiaojiekou</th>
<th>Gougezhuang</th>
</tr>
</thead>
<tbody>
<tr>
<td>1986</td>
<td>-0.07</td>
<td>0.00</td>
</tr>
<tr>
<td>1995</td>
<td>-0.18</td>
<td>0.21</td>
</tr>
<tr>
<td>2005</td>
<td>-0.48</td>
<td>0.87</td>
</tr>
<tr>
<td>2012</td>
<td>-0.51</td>
<td>1.13</td>
</tr>
</tbody>
</table>
However, tourist arrivals in Yesanpo are still increasing rapidly, with a current annual growth rate of 10–15%. As the reception capacity of Gougezhuang has now become saturated, the spatial overflow of the effects of tourism may provide an opportunity for the development of non-tourist villages such as Jiaojiekou. An analysis of the factors driving the spatial polarization of villages in rural tourist destinations should consider the following factors.

1. **Different locations**

   The location is directly connected with the roles that villages play in the tourist destination system and, consequently, determines their development paths. Gougezhuang is located near the entrance to Baili Canyon, with three million tourist arrivals in 2013 and an average staying time of around six hours. This advantageous location makes Gougezhuang an important reception base for Yesanpo, providing various tourist services. Jiaojiekou, which is situated near the Fishbone Tunnel with only 200,000 tourist arrivals and an average staying time of two hours, has almost no access to the benefits of tourism development.

2. **Socio-economic factors**

   Socio-economic factors are the most fundamental issues in the differentiation of villages as they determine their non-agricultural paths, such as the endogenous tourism-induced path for Gougezhuang and the path driven by external industrialization and urbanization for Jiaojiekou. In Gougezhuang, the large-scale arrival of tourists has resulted in the appearance and flourishing of various tourist-related businesses, such as family inns and hotels. For Jiaojiekou, the improvement in agricultural productivity liberated a large proportion of the rural labor force from land cultivation. The accelerating external industrialization and urbanization process increased the demand for cheap labor and reforms in the household.

*Figure 6* Population density of Jiaojiekou and Gougezhuang from 1986 to 2012.
Figure 7: Driving mechanisms of the spatial polarization of Zhangye and Congezhangxiang.
registration system led to the migration of the surplus rural labor force to urban areas. This process of depopulation has resulted in a large amount of land being abandoned in rural districts.

(3) Rational adjustment of villagers

The increased income from tourism has enabled villagers to build new houses at the periphery of settlements as the poor environment and old houses in the center did not satisfy the needs of their (or those of the tourists in Gougezhuang). In Jiaojiekou, the old houses in the center have been abandoned, but not pulled down as a result of the traditional concept of inheritance. In Gougezhuang, the development of tourism has increased the demand for land resources. Old houses in the center have generally been repaired or rebuilt to accommodate tourists.

(4) Governmental regulation

Governmental regulation is influential through the establishment of institutions affecting land allocation, agriculture development, household registration and, especially, homestead management, town planning and census migration (Bao and Su 2004; Caffyn and Jobbins 2003; Jenkins and Henry 1982). Overall, the management and regulation of the spatial expansion of the villages by governments changed from the early non-interference stage to a strict control stage. However, governmental regulations always lag behind the development of villages and this has also contributed to spatial polarization. In tourist villages, this lag in policy has led to a rapid increase in the intensity of land use and, consequently, a loss of rural environment. In non-tourist villages, the transaction of rural houses is not allowed in the current land property system, resulting in villagers being either unwilling or unable to dispose of idle houses. Specific rules on the management and planning of abandoned houses are also absent, which has aggravated the trend of ‘hollowed’ villages.

Figure 7 shows the specific influence of these driving factors during different stages of development. In stage 1 (1986–1994), the very beginning of rural tourism, the two villages were similar to each other. The rural houses were mainly used for residential purposes and for agricultural production, including the breeding of poultry or livestock and vegetable cultivation. However, the agricultural function of rural residences in Jiaojiekou started to decline and the tourism function in Gougezhuang began to intensify. Although traditional stem families were still dominant in both villages, the transformation to nuclear families had commenced, leading to the preliminary migration of villagers to the periphery of rural settlements. In stage 2 (1995–2004), the rapid transformation stage, the differentiation between the patterns of spatial evolution of the two villages became increasingly obvious, with the accelerating development of rural tourism. For Jiaojiekou, the accelerating external industrialization and urbanization process prompted the seasonal emigration of villagers to non-farming jobs, giving rise to a decline in the residential function of the settlements. The old houses were unable to satisfy the needs of the villagers and, coupled with the continuous transformation from stem to nuclear families, this encouraged migration from the central to the peripheral areas of the settlements. Old houses in the center were abandoned rather than being demolished or reconstructed. Consequently, the residential function in the center continually declined and agricultural function in the periphery was encroached by the residential function. Overall, Jiaojiekou became increasingly ‘hollowed’ during this stage. In Gougezhuang, a large inflow of population dominated by tourists emerged during this stage, raising large demands on the reception capacity and, consequently, leading to an expansion in land use in both the horizontal and vertical dimensions. Old houses in the center were generally reconstructed and the tourism function of the settlement intensified. In stage 3 (2005–2012), the stable development stage, villagers in Jiaojiekou started to move to the city permanently, resulting in the decline of both residential and agricultural functions. The village ‘hollowing’ problem was further aggravated. In Gougezhuang, external investors entered during this stage. Increasing tourism activities and demands for reception capacities resulted in the emergence of increasing numbers of multi-story buildings, especially in superior locations. The tourism function was becoming increasingly diverse. Overall, the changes in land function, spatial morphology and population migration, and the differentiation trend of these two villages,
gradually stabilized during this stage.

3 Discussion

Rural tourism has been perceived as an effective method to promote rural urbanization in China. The transformation of Gougezhuang from a traditional village to a tourist village shows similar characteristics (i.e. the rapid expansion of urbanized built environment, a unique pattern of land use and land development, booming of non-agricultural industry dominated) according to the influencing factors. The ‘hollowing’ process of Jiaojiekou belongs to the first type. The present study proposes that tourism-driven rural urbanization and village ‘hollowing’ processes have occurred simultaneously in rural tourist destinations, revealing a spatial polarization trend for different villages.

This trend indicates the unsustainability of current rural development in tourist destinations, which are manifested in the following aspects. (1) Tourism radiation effects are limited and can only benefit parts of villages. The development of other villages may even be hindered, as the requirement of tourism for a high-quality environment will squeeze other industries. (2) The current land use patterns are unsustainable. Large shortages of land resources in tourism villages and the development of idle land in traditional villages have occurred simultaneously. In tourist villages, rural tourism development has substantially increased the demands for construction land, creating large conflicts between land use for growing tourism and a limited land quota for construction. The absence of an integrated plan has led to the spontaneous and disordered expansion of villages and consequent damage to traditional rural culture and the environment; this has been a universal problem during the tourism-driven rural urbanization process (Qian et al. 2012). For traditional non-tourist villages, the phenomenon of ‘one household, multiple housing lands’ and the abandon of old houses in the central area have resulted in massive land waste and the encroachment of cultivated land. (3) The function of villages is deficient. In non-tourist villages, the loss of both production and living function are increasingly aggravated. In tourist villages, the currently scattered, small and spontaneous family inns or hotels can hardly meet the needs of tourists for service quality and will cause problems such as insufficient infrastructure and a lack of public service and space.

To solve these problems, the following measures should be taken. (1) Integrated rural tourism management, taking full account of the various resources of villages (cultural, social, environmental, economic), their use and the role of pertinent stakeholders, should be developed to explore effective methods of promoting tourism as part of a rural development strategy (Panyik et al. 2011). The existing management and planning system should be adjusted according to the roles of different villages and the interactions among them. It is also essential to improve the transportation infrastructure and tourist routes to strengthen the radiation effects of tourism. (2) Different land use policies are required for different villages. For tourist villages, restrictions on the supply of construction land should be gradually removed under the premise of meeting the living needs of villagers and the land quota should be allocated according to the scale of tourism development and the demands of tourists. A proper circulation mechanism for rural collective land is also required for an effective and sustainable supply of land. For non-tourist villages exhibiting a ‘hollowing’ trend, strict land management and effective land consolidation measures are imperative to improve the efficiency of land utilization. (3) The balance between government regulation and community participation should be emphasized. The experience of Gougezhuang indicates that tourism is an effective and important way of achieving local urbanization in rural China. However, there are still various problems, especially the conflict between the development of tourism and protecting the rural environment. Thus governments need to strengthen the management of villages and regulate the behavior of villagers through village planning and the establishment of policies and training. At the
same time, villagers should be encouraged to participate in tourism development (Kolahi et al. 2014a, 2014b, 2014c) and the management of rural community affairs to achieve self-government. Through the initiatives of villagers, protection of the rural environment and harmony between humans and nature can be realized.

4 Conclusions

Using GIS spatial analysis methods, we compared the spatial dynamics of two villages in different locations in the Yesanpo tourist area of Hubei Province. The results showed a polarization trend between the two villages. Jiaojiekou had turned into a ‘hollowed’ village and became increasingly dilapidated, whereas Gougezhuang gradually evolved into a new-type tourism town and increasingly flourished. This polarization has been interpreted spatially from the perspective of spatial morphology, land function and population distribution. The polarization between the two villages is derived from different locations and the consequent interaction among socio-economic factors, government regulation and the rational adjustment of the villagers.

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References


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