Spatial Relationships Of Cultural Amenities In Rural Areas

Hee-Jeong Yun*
Department of Tourism Administration, Kangwon National University, Chuncheon, Republic of KOREA

Amenity resources are relevant to rural economic development, population migration, income distribution, and tourism development. For this reason, many government officials have adopted these amenities as regional planning and development strategies. Because government officials use spatial characteristics when they establish rural policies, this study analyzes the spatial distribution of amenity resources using GIS (geographic information systems) and analyzes their spatial autocorrelation using related tools. The study chooses seventeen amenities based on the official amenity database and finds that most cultural amenities are not clustered spatially and that, according to the global spatial autocorrelation index (Moran's I), they have few positive correlations. Finally, an analysis of LISA (local indicator of spatial association) shows some "hot spots" in the spatial distribution of the cultural amenities, but additional research is needed to determine whether these amenities affect regional economies.

Key words: rural tourism, spatial autocorrelation, spatial distribution, traditional amenities, recreation amenities

Introduction

Exploratory spatial data analysis (ESDA), which is based on Geographical Information Systems (GIS), is a set of techniques used to explore geographical distribution, to describe and visualize spatial distributions; to discover spatial patterns, clusters, or "hot spots"; and to suggest spatial regimes or other forms of spatial heterogeneity (Anselin 1988). Rural tourism has a close connection with the rural geographical situation, as geographical resources like nature, culture, landscape, and agriculture are considered tourist attractions. Therefore, some studies in the tourism field have used ESDA (Lee *et al.* 2013).

Today, amenity-based rural tourism is regarded as a savior of rural areas, with many governments recognizing its potential in fostering regional economic development (Jackson and Murphy 2006; Lee *et al.* 2013). In addition, the importance of amenities in explaining rural development patterns is becoming widely accepted within the rural development literature (OECD 1999; Isserman 2001), which has shown correlations between these amenities and economic development (Deller *et al.*

*Email: hjyun2@kangwon.ac.kr

2001; Green 2001; Kuentzel and Ramaswamy 2005; Marcouiller *et al.* 2004; Poudyal *et al.* 2008; Shaikh and Rahpoto 2009; Waltert and Schläpfer 2010).

However, most studies have dealt with the relationship between natural amenities and regional development (McGranahan 1999; Marcouiller *et al.* 2004) and have yet to address the spatial relationships between cultural amenities. Cultural amenities play the role of latent primary factor inputs to the tourism and recreation sector in rural areas, and the spatial relationship between cultural amenities in rural development is relevant to economic, social, and environmental dimensions. In addition, as rural development takes place, cultural amenities are more affected than other resources are because they tend to be built resources, and many planners think they can create new cultures as needed.

Therefore, in this study, ESDA, based on GIS techniques, is used to explore the geographic distribution of the cultural amenities in rural areas. The purpose of this study is to determine whether there is a spatial relationship among cultural amenities and, if so, what kinds of spatial patterns exist. This work can help rural tourism planners develop regional policy and distribute the necessary resources according to the spatial distribution of cultural amenities.

Literature Review

Previous studies about the spatial characteristics of amenities have targeted natural amenities, but only recently have efforts been made to evaluate empirically the effects of natural amenities on economic development. Theoretically, local amenities affect land prices and are important determinants of population migration (Marcouiller *et al.* 2002; Hunter *et al.* 2005; Wu 2006; Zhang 2008; Kahsai *et al.* 2011). Power (1988) refers to natural amenities as motivators of regional migration and tourism demand and as a foundation for regional quality-of-life attributes. From this view of economic growth theory, amenities can be considered latent regional factor inputs to the local development (Marcouiller 1998; Marcouiller *et al.* 2004).

Nord and Cromartie (1997) and McGranahan (1999) develop natural amenity maps using the natural amenity index and focusing on climatic characteristics, topography, and water areas. Isserman (2001) includes natural areas, outdoor recreation, broad vistas, and peaceful sunsets, which natural amenities are viewed in rural America as a source of competitive advantage that can create new economic opportunities. In addition, Marcouiller *et al.* (2004) use the *Gini* coefficient to explain income distribution in terms of natural amenities, whether land-based, river-based, lake-based, warm weather-based, or cold weather-based. Kim *et al.* (2005) analyze the spatial autocorrelation of natural amenities and find that the spatial patterns of both human activities and natural amenities validate the suggested spatial econometric models (Kim *et al.* 2005). In sum, the amenity characteristics of natural resources are becoming accepted as important growth determinants for regions endowed with such amenities (Deller *et al.* 2001; English *et al.* 2000; McGranahan 1999).

Research on amenities other than natural amenities has also been conducted. Zhang *et al.* (2011) investigate the spatial dependence and mechanisms of international and domestic tourist distributions in mainland China through a set of GIS-based spatial statistical tools. Their results show that there is a significant neighboring effect (i.e., positive spatial correlation) in both international and domestic tourist distributions. Other research has investigated tourism and leisure amenities (Jim and Chen 2006; Kovacs and Larson 2007) and landscape amenities (Waltert and Schläpfer 2010; Waltert *et al.* 2011).

However, research about culture-based amenities has been rare. Falck *et al.* (2011) show that the share of high-human-capital employees is larger in regions with many cultural amenities than in regions with few cultural amenities. However, since Flack *et al.* (2011) use only opera as an example of cultural amenities, their result is limited and does not show the spatial distribution of all cultural amenities. Therefore, this study broadens the scope of the extant literature by analyzing the spatial characteristics of the integrated cultural amenities in rural areas.

Methodology

Global and Local Spatial Autocorrelation

This study conducted an ESDA to highlight particular spatial features and to detect spatial patterns (Kim *et al*. 2005), using a three-step analysis process: first, ArcGIS was used to map the spatial distribution of cultural amenities in the rural villages (ESRI 2006); second, the analysis conducted the global spatial autocorrelation (Moran's *I* statistic); and third, the local spatial autocorrelation (local indicator of spatial autocorrelation, or LISA) was mapped.

The spatial relation analysis was conducted using GeoDA (Anselin 2003). Previous study results have shown that the Moran's *I* is reliable for analysis of spatial autocorrelation (Kim *et al.* 2005, Zhang *et al.* 2011). Moran's *I*, the slope of the regression line, based on neighbor relationships, expresses a row-standardized spatial weights matrix (Anselin 1995). The spatial weights matrix, which refers to adjacent relationships between spaces, usually uses the continuity weight and/or the distance weight, where the continuity weight calculates how many spaces are adjacent, and the distance weight uses the distance decay function.

Moran's *I*, which refers to the global spatial autocorrelation of each resource in the study area, ranges from approximately +1 to −1. A perfectly positive spatial autocorrelation is +1, while a perfectly negative autocorrelation (perfect dispersion) is -1, and the value in the absence of autocorrelation is approximately 0. There is a positive spatial autocorrelation when similar values tend to occupy adjacent locations and a negative autocorrelation when high values tend to be located next to low values.

Moran's *I* is a global index, but it does not indicate where the clusters are located or what types of spatial autocorrelation occur (Anselin 1995). Therefore, the local indicator of spatial autocorrelation (LISA) is applied to indicate local spatial associations (Anselin 1995). LISA shows a set of visual maps: the cluster map, the significance map, and so on. The cluster map consists of five categories: the HH–type (high–high) indicates clusters with high scores (positive spatial autocorrelation); the LH–type (low–high) indicates a space with a low score that is adjacent to a space with a high score (negative spatial autocorrelation); the LL–type (low–low) indicates clusters with low scores (positive spatial autocorrelation); the HL–type (high–low) indicates a space with a high score that is adjacent to a space with a low value (negative spatial autocorrelation); and "not significant" indicates spaces with no spatial autocorrelation. In addition, the significance map presents p–values in four categories: 0.0001, 0.001, 0.01, and 0.05.

Data and Analysis

The Rural Development Administration (RDA) in Korea has been surveying nationwide rural amenity resources in order to build the official databases of rural

amenities since 2005. This study uses the official amenities databases investigated by RDA from 2005 to 2008 and the cultural amenities related to rural tourism, although standardized definitions of cultural amenities vary widely. Amenity data were compiled, indexed, and standardized to a mean of zero and a standard deviation of one, as outlined in the methodology section. These data elements represent community-level attributes, such as tradition, landscape, recreation, welfare, education, folk religion, and cultural activity. These amenities are regarded as important factors in rural tourism because they are used for activity programs in accordance with the special characteristics of the rural community. In particular, rural community forests and nurse trees are considered symbols of the traditions of the community, so they are added as cultural amenities despite their natural characteristics. Table 1 shows how cultural amenities are divided into seven categories.

This study uses 1,726 amenities in seventeen types of cultural amenities. The unit of space analysis is statutory Ri, which is the minimum fixed boundary for governmental administration in South Korea. The study area selected is Yesan, where the rural amenity resources survey by RDA has been concluded. Yesan, which is designated a "slow city" with many agricultural and cultural amenities, has eleven rural tourism villages and twenty-five education- and activity-based agricultural farms related to rural tourism (http://www.yesangt.com). Yesan is divided into twelve districts: two Eups (central areas) and ten Myeons (peripheral areas), each with 177 statutory Ri. The total area of Yesan is about 540 km^2, and the total population is about 88,000. The study area is shown in Figure 1.

Table 1: The Classification of Cultural Amenities

Variable		Number of amenities*	
Tradition amenities	Old house	129	145
	Feng shui	16	
Landscape amenities	Forest landscape	119	614
	Residential landscape	248	
	Agricultural landscape	247	
Recreation amenities	Park	107	131
	Children's playground	12	
	Exercise area	12	
Welfare amenities	Community hall	288	517
	Senior-citizen center	229	
Education amenities	Elementary school	16	30
	Middle-high school	14	
Folk religion amenities	Rural community forest	46	238
	Nurse trees	137	
	Symbol of folk religion	55	
Cultural activity amenities	Urban and rural communication	8	51
	Residents' cultural activity	43	
		1,726	1,726

* 2005 RDA survey area: Two districts in Yesan (Gwangsi and Shinyang)
2006 RDA survey area: Two districts in Yesan (Ducksan and Bongsan)
2008 RDA survey area: Eight districts in Yesan (Yesan, Sabkyo, Goduck, Shinam, Daeheung, Oga, Eungbong, and Daesul)

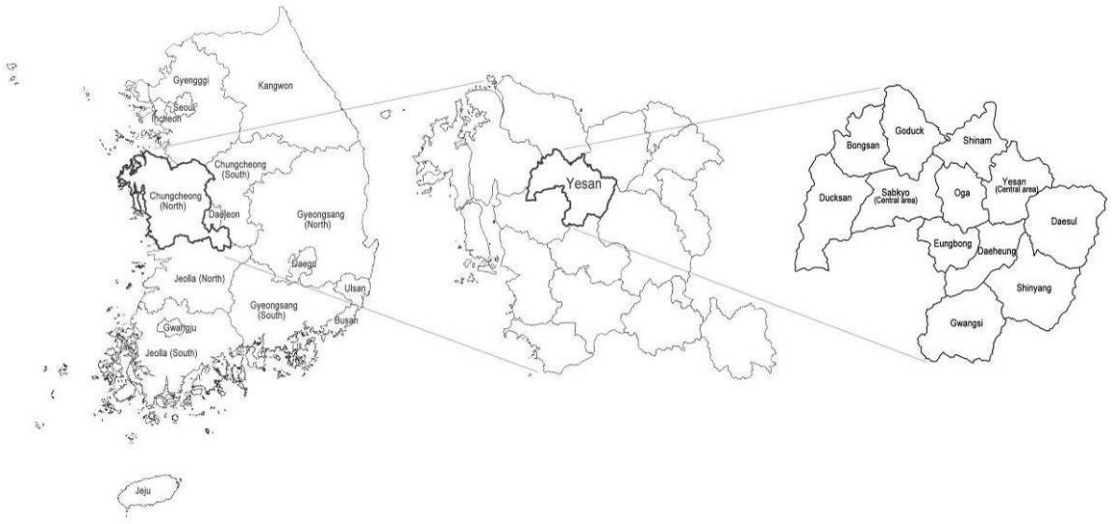
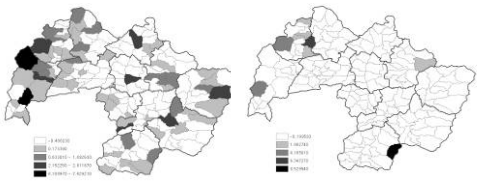


Figure 1: Location Map of the Study Area

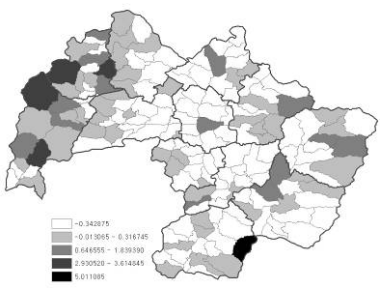
Study Results And Discussion

Spatial Distribution

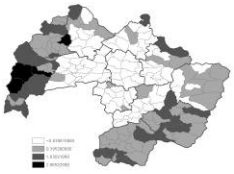
Figure 1 shows thematic maps of the seventeen cultural amenities and the mean scores using GIS. The maps of the seventeen amenity resources and the maps of the eight mean scores indicate that the spatial patterns of cultural amenities are not clustered, with the exception of forest landscapes, parks, residents' cultural amenities, and a few others. For example, the average traditional amenity map shows that the northwestern villages of Yesan have many resources, while the eastern villages have fewer cultural amenities. All of these villages in the northwestern area are located in Ducksan Natural Park, so designated by Chungcheong Province. Therefore, the results of this study show the possibility of a weak relationship between natural amenities and some cultural amenities, but the maps do not show the specialized clusters, and the relationships are not consistent. The map of total cultural amenities shows the characteristics of this spatial dispersal clearly. These results differ from earlier findings about natural amenities, including those of Nord and Cromartie (1997), McGranahan (1999), Marcouiller *et al.* (2004), and Kim *et al.* (2005). However, since the mapping of cultural amenities is only visually descriptive, statistics for the spatial patterns are needed.



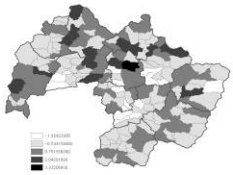
Old house Feng shui



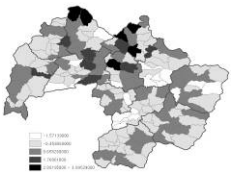
Mean (tradition amenities)



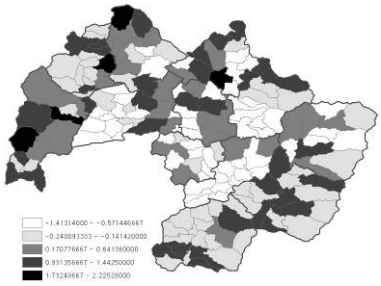
Forest landscape



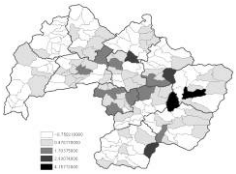
Residential landscape



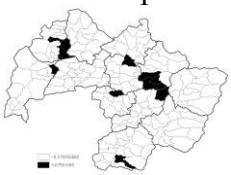
Agricultural landscape



Mean (landscape amenities)

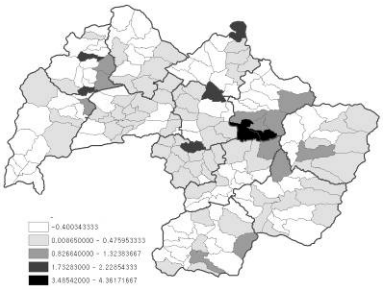


Park

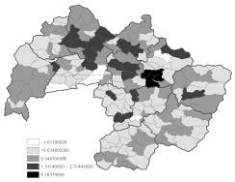


Children's playground

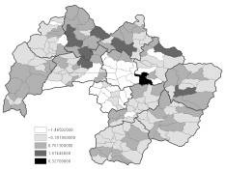
Exercise area



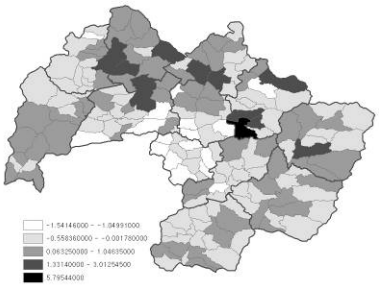
Mean (recreation amenities)



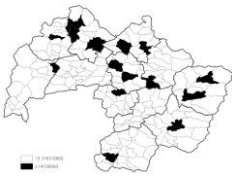
Community hall



Senior-citizen center

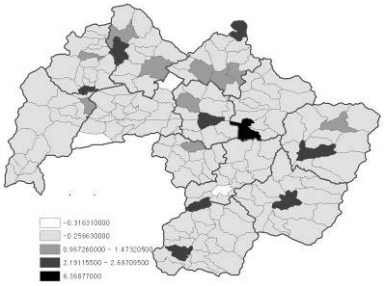


Mean (welfare amenities)

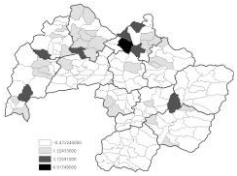


Elementary school

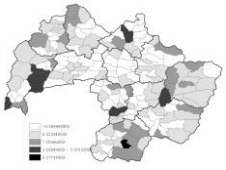
Middle-high school



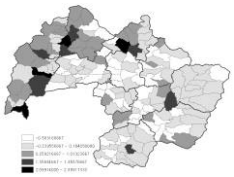
Mean (education amenities)



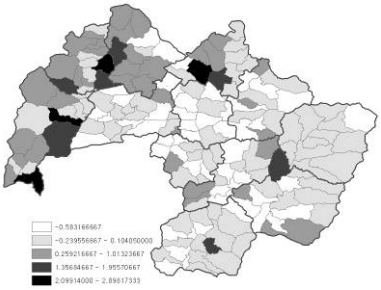
Rural community forest



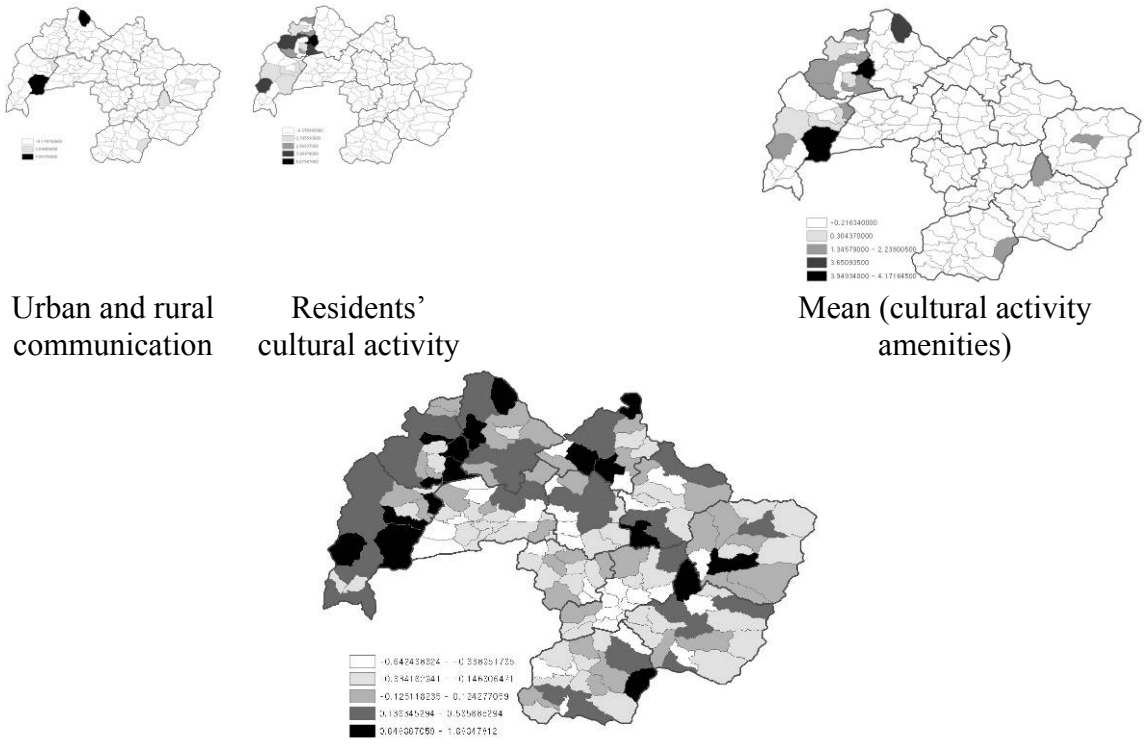
Nurse trees



Symbol of folk religion



Mean (folk religion amenities)



Urban and rural communication | Residents' cultural activity | Mean (cultural activity amenities)

The mean of total cultural amenities

Figure 2: Spatial Distribution of Cultural Amenities using GIS

Global Spatial Autocorrelation

Global spatial autocorrelation uses the means of Moran's *I* spatial autocorrelation statistics and is visualized in the form of a Moran scatter plot using a space weight matrix based on continuity or distance (Anselin 1995). Table 1 shows the value of univariate and multivariate Moran's *I* for all cultural amenities. The univariate Moran's *I* is the slope of the regression line, which illustrates the global spatial autocorrelation of each resource about the whole study area. This value is useful in establishing the overall spatial autocorrelation of one variable but is limited in aiding an analysis of the spatial autocorrelation between variables. Therefore, this study adopts the multivariate Moran's *I* to find this spatial relationship. The multivariate Moran's *I* is also the slope of the regression line, but it refers to the degree of linear association between the variable on the horizontal axis and the values for the variable on the vertical axis at its neighboring location, as defined by spatial weights (Anselin 2003). In this study, the variables for multivariate Moran's *I* are selected based on the categories found in the patterns based on GIS mapping results.

With the exception of schools and urban-rural communication, most univariate Moran's *I* statistics are positive in global spatial autocorrelations and show weak correlations or no correlation. The only forest landscape related to natural amenities shows the strongest correlation (I = 0.5279), followed by the residents' cultural activity (I = 0.2883) and symbols of folk religion (I = 0.2737). A high intensity in the global association index (Moran's *I*), such as that of the forest landscape, indicates a tendency toward geographic clustering of rural villages with cultural amenities, and a low value indicates a lack of similarity among villages (Zhang *et al.* 2011). The results of the multivariate Moran's *I* show that there are no correlations among similar variables. According to previous study results, most natural amenities—such as land-based, river-based, and lake-based amenities—have relatively strong spatial

autocorrelations (Kim *et al.* 2005). However, the cultural amenities in rural areas have weak correlations or no correlation.

These results suggest that most cultural amenities are related to the social infrastructure, such as parks, exercise areas, community halls, and schools, so the governments operate their policies to distribute these facilities based on regional fairness. In addition, some cultural amenities that include traditional resources, such as old houses and *feng shui*, have disappeared because of rapid economic development in the region. For this reason, the spatial pattern of traditional amenities has remained irregular and does not show clustered areas. Finally, cultural amenities are associated with population density, economic size, and industry. Yesan is a rural area where the population density is low and most residents are engaged in primary industry, such as agriculture. Therefore, the characteristics of the population and the industry could be reflected in the spatial distribution of cultural amenities.

Table 2. Global Spatial Autocorrelation of Cultural Amenities

Variable		Univariate Moran's *I*		Multivariate Moran's *I*	
		Moran's *I*	Spatial autocorrelation	Moran's *I*	Spatial autocorrelation
Tradition amenities	Old house	0.0817	No correlation	0.1032	No correlation
	Feng shui	0.0614	No correlation		
	Mean	0.1590	No correlation		
Landscape amenities	Forest landscape	0.5279	strong correlation(+)		
	Residential landscape	0.1566	No correlation	0.1529	No correlation
	Agricultural landscape	0.1787	No correlation		
	Mean	0.2451	weak correlation(+)		
Recreation amenities	Park	0.1862	No correlation	0.0730	No correlation
	Children's playground	0.2155	weak correlation(+)		
	Exercise area	0.0294	No correlation		
	Mean	0.2227	weak correlation(+)		
Welfare amenities	Community hall	0.2629	weak correlation(+)	0.0520	No correlation
	Senior-citizen center	0.1815	No correlation		
	Mean	0.1980	No correlation		
Education amenities	Elementary school	-0.0679	No correlation	-0.0441	No correlation
	Middle-high school	-0.0510	No correlation		
	Mean	-0.0753	No correlation		
Folk religion amenities	Rural community forest	0.1003	No correlation		
	Nurse trees	0.1075	No correlation	0.058	No correlation

	Symbol of folk religion	0.2737	weak correlation(+)	5	
	Mean	0.2575	weak correlation(+)		
Cultural activity amenities	Urban and rural communication	-0.0245	No correlation	-0.0182	No correlation
	Residents' cultural activity	0.2883	weak correlation(+)		
	Mean	0.1090	No correlation		
Total mean		0.2172	weak correlation(+)		

Local Spatial Autocorrelation

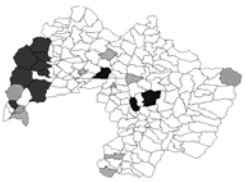
Local spatial autocorrelation analysis is based on the local Moran's *I* statistics (LISA) (Anselin 1995). A LISA presents both the univariate LISA and the multivariate LISA, and both results show the localized characteristics of resources: HH (high-high), LL (low-low), HL (high-low), LH (low-high), and not significant. A LISA is derived from the spatial autocorrelation between a spatial unit and its immediate neighbors. A high value in the local Moran's *I* statistic indicates a clustering of similar values (either HH or LL), and a low value of the statistic shows a clustering of dissimilar values (HL or LH) (Kim *et al.* 2005). This study uses the univariate LISA first, and then adopts multivariate LISA if the similar patterns in univariate LISA analysis found. Figure 3 shows the value of univariate LISA of cultural amenities.

A univariate local Moran's *I* at 5 percent pseudo-significance level on the Moran significance maps is presented in Figure 3. The map of total cultural amenities shows that the most significant HH-type spatial autocorrelations apply in the northwestern band of Yesan (Ducksan, Bongsan and Goduck), while LL-type correlations apply in center area of Yesan (Sabkyo and Eungbong). However, significant negative spatial autocorrelations, such as the HL-type (higher values than their neighbors) and the LH-type (lower values than their neighbors), do not show on the total average map. The LISA maps indicate that the spatial patterns of cultural amenities are clustered in the northwestern regions, so these areas can be called "hot spots" of culture-based amenities. However, these spatial patterns are not consistent, and this result is similar to the results of the global spatial autocorrelation.

In sum, the average tradition amenities, average landscape amenities, and average folk religion amenities show similar spatial patterns, with the HH-type and LL-type in particular representing positive autocorrelation. In addition, average recreation amenities are characterized as strong HH-types in Yesan and Daeheung, and average welfare amenities also show the HH-type in Goduck. Finally, average cultural activity amenities are the HH-type, the HL-type, and the LH-type in the northwestern and southeastern areas. There are no positive correlations of the HH-type or LL-type in the map of average education amenities.

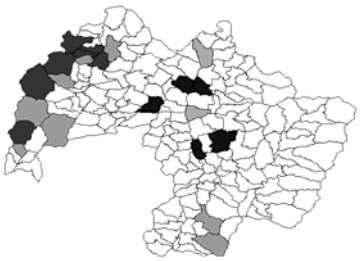
Figure 4 shows the results of multivariate LISA among the averages of three types of amenities: tradition, landscape, and folk religion amenities. The LISA maps indicate that these three cultural amenities, which are related to traditional culture and nature, have stronger positive correlation than other amenities do and are relatively fixed and continuous. On the other hand, the spatial distribution of the more modern cultural amenities, such as recreation, welfare, and education amenities, do not show

these spatial patterns. All of these results lead to the conclusion that there are similarities in the spatial structure of the nature-based and tradition amenities. Finally, the ESDA results show that some cultural amenities are spatially associated with natural amenities, but additional research is needed to determine the spatial inter-correlation between cultural amenities and natural amenities and to find the resulting regional economic impacts using spatial econometric models.



Old house

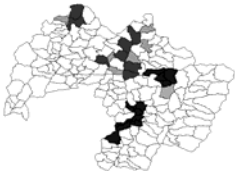
Feng shui



Mean (tradition amenities)

Forest landscape

Residential landscape



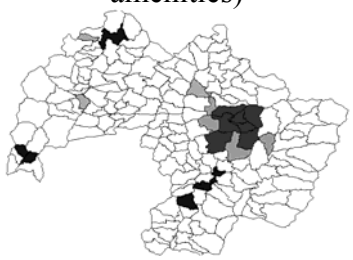
Agricultural landscape

Mean (landscape amenities)

Park

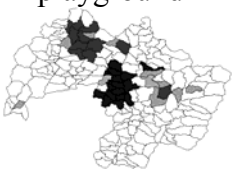
Children's playground

Exercise area



Mean (recreation amenities)

Community hall



Senior-citizen center

Mean (welfare amenities)

Elementary school

Middle-high school

Mean (education amenities)

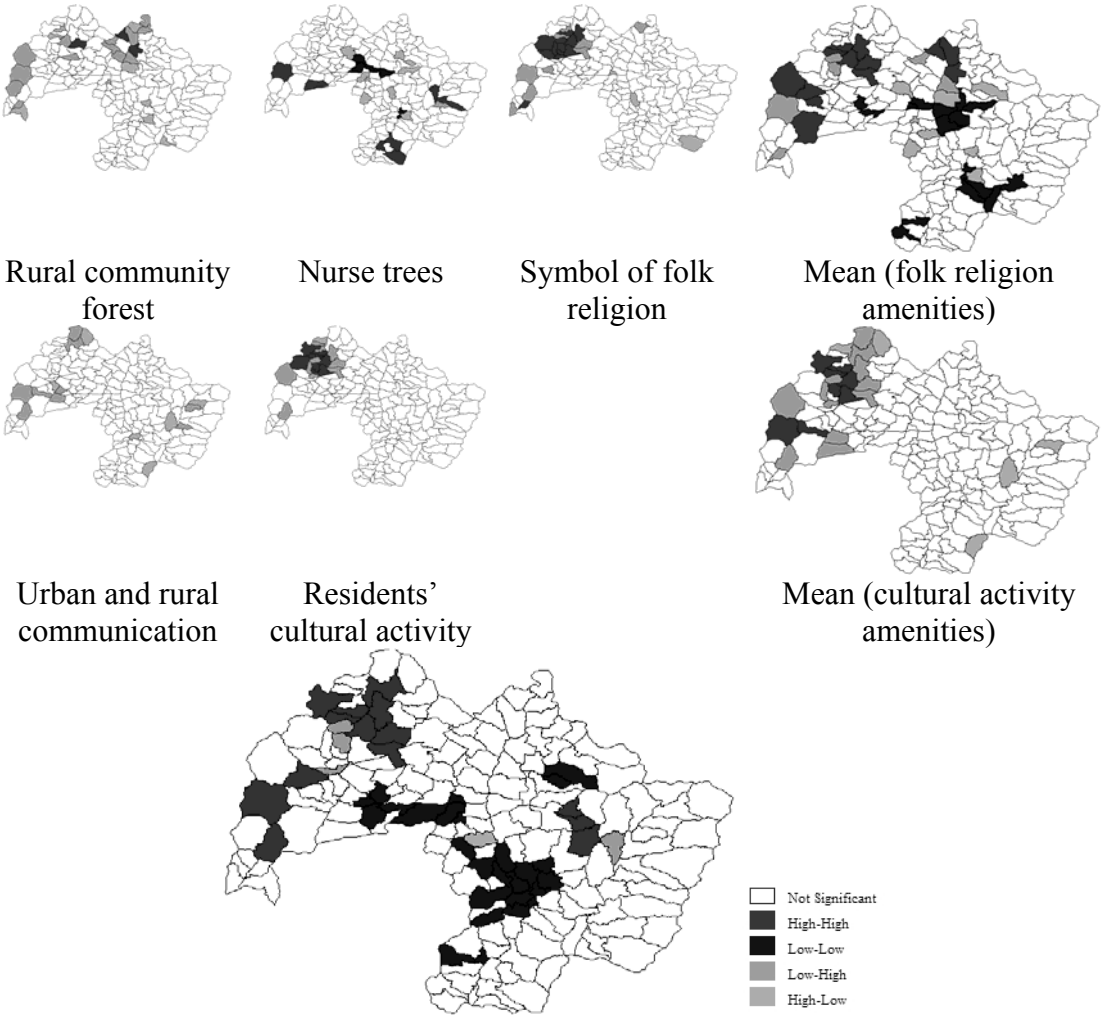


Figure 3: Local Spatial Autocorrelation (Univariate LISA) of Cultural Amenities

Figure 4: Local Spatial Autocorrelation (Multivariate LISA) of Cultural Amenities

Conclusion

Rural tourism today is considered important in accelerating regional economic development because it brings the possibility of regional ecological, socio-cultural, and economic sustainability to lagging rural area and eventually helps regional regeneration. These amenities are especially important to villages that depend on rural tourism. While most extant studies have focused on natural amenities, ignoring cultural amenities, this study used GIS-based ESDA to analyze the distribution

disparities of the cultural amenities in rural areas.

This study demonstrated that cultural amenities' spatial characteristics with natural amenities differ. More precisely, the spatial analysis of the cultural amenities indicates weak positive global spatial autocorrelations or no spatial autocorrelation at all. Univariate and multivariate LISA showed that the spatial patterns of the cultural amenities are clustered in the northwestern regions around some amenities that have positive spatial autocorrelations (HH, LL). The LISA also showed that there are similarities in the spatial structure of the nature-based and tradition-based amenities, and some cultural amenities may be associated with natural amenities spatially.

Policy makers should focus more on the spatial relationship of community's cultural amenities because these amenities are so important in rural tourism. For example, the cluster regions of cultural amenities can adopt culture-based rural tourism and can be used as the core areas of rural tourism networks. At the same time, the regions in which these amenities are more widely dispersed can develop network strategies among neighboring communities.

Unlike previous studies about natural amenities that have found a strong positive autocorrelation of natural amenities, this study did not find that cultural amenities have strong associations in terms of spatial distribution. Further research is needed to determine the relationship between natural and cultural amenities and to identify their regional economic impacts using ESDA models.

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