

# Analysis of the Spatial Pattern and Influencing Factors of Green Food Enterprises in Yunnan Province

Zhihao Tu<sup>1,2</sup>, Wujun Xi<sup>1\*</sup>, Feng Cheng<sup>2</sup>

<sup>1</sup>School of Chemistry and Geographical Sciences, Chuxiong Normal University, Chuxiong, China

<sup>2</sup>Faculty of Geography, Yunnan Normal University, Kunming, China

Email: \*173202430@qq.com

**How to cite this paper:** Tu, Z.H., Xi, W.J. and Cheng, F. (2026) Analysis of the Spatial Pattern and Influencing Factors of Green Food Enterprises in Yunnan Province. *Open Journal of Applied Sciences*, 16, 69-81.

<https://doi.org/10.4236/ojapps.2026.161006>

**Received:** December 3, 2025

**Accepted:** January 4, 2026

**Published:** January 7, 2026

Copyright © 2026 by author(s) and Scientific Research Publishing Inc.

This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

## Abstract

The spatial distribution of green food enterprises reflects the level of agricultural modernization and ecological civilization construction within a region. Research into this distribution carries guiding significance for promoting the rational layout of regional food production units and the coordinated development of the social economy. This study utilizes data from the 2024 Green Food Database of the China Green Food Development Center. This study employs the kernel density estimation model as the analytical method, which measures the spatial agglomeration pattern of green food-certified enterprises in Yunnan Province for the year 2024. Furthermore, a geographical detector is applied to conduct a correlation analysis of the influencing factors underlying the spatial distribution pattern of these enterprises. The results show that: 1) Green food-certified enterprises in Yunnan Province in 2024 demonstrate a clear trend of agglomeration in geographical space; 2) The spatial agglomeration locations of different types of green food-certified enterprises vary significantly; 3) The influencing factors on the spatial distribution of green food-certified enterprises are ranked in descending order of impact as follows: provincial average annual precipitation > provincial annual accumulated temperature > provincial topographic slope > total retail sales of consumer goods in prefecture-level cities (autonomous prefectures) > annual Gross Domestic Product (GDP) of prefecture-level cities (autonomous prefectures) > registered household population of prefecture-level cities (autonomous prefectures).

## Keywords

Green Food Enterprises, Kernel Density Estimation Model, Geographical Detector, Spatial Pattern Differentiation

## 1. Introduction

Green food refers to food products that are processed according to specific standards and production methods and that have been certified through specialized procedures. The development status of green food enterprises serves as an important indicator for assessing regional development levels, reflecting both the progress of agricultural modernization and the advancement of ecological civilization within a region [1]-[3]. Therefore, studying the quantity and spatial distribution of green food enterprises is of significant importance for regional social development.

The spatial distribution characteristics of regional green food enterprises can effectively reflect the development status of the local green food industry [4]-[6]. The systematic research on green food enterprises can be traced back to 1999, when scholars such as Liu Lianfu and Huang Li focused on discussing the role of these enterprises within the market economy at that time [7] [8]. Scholars such as Zeng Geqi and Zhang Yong conducted provincial-level, regionally segmented research on the development status of green food enterprises [9]-[11]. Subsequently, related studies gradually shifted toward employing spatial analysis methods to analyze the spatial distribution patterns and characteristics of green food enterprises. Cai Yingying [12] systematically analyzed the spatial coupling between the industrial structure and industrial agglomeration of green food enterprises in Hunan Province using methods such as the entropy method, grey relational model, and spatial autocorrelation model. Subsequently, Gu Bojun [13] investigated the spatial distribution of green food-certified enterprises across China from 2011 to 2020 by applying spatial correlation descriptive methods combined with long-term time-series data, thereby elevating the research scale to the national level.

Building upon the research findings of the aforementioned scholars, the authors take Yunnan Province as the study area. Utilizing data from the 2024 Green Food Database of the China Green Food Development Center and applying the kernel density estimation model, the authors analyze the spatial agglomeration of four categories of green food-certified enterprises in Yunnan Province—vegetables, grains, fruits, and tea. Furthermore, a geographical detector is employed to explore the influencing factors behind their spatial agglomeration patterns. The study aims to provide a decision-making basis for future socio-economic development and ecological civilization construction in Yunnan Province.

## 2. Data Sources and Research Methods

### 2.1. Overview of the Study Area

Yunnan Province is located in the southwestern frontier of China and comprises 16 prefectural-level administrative divisions (including prefecture-level cities and autonomous prefectures). Characterized by a predominantly plateau and mountainous topography, the province features extensive mountainous terrain. The landform generally descends stepwise from the higher northwest to the lower southeast. While Yunnan Province is abundant in hydrothermal resources, the distribution of these resources is uneven both temporally and spatially.

## 2.2. Data Sources

### 2.2.1. Sources and Processing of Vector Map Data

The vector administrative boundary data used in this study were obtained from the 1:250,000 National Fundamental Geographic Information Database, accessible through the National Catalogue Service for Geographic Information. The base data were produced in 2017. Subsequent administrative division adjustments within Yunnan Province have been incorporated by modifying the dataset accordingly. Finally, the data were projected and converted to the WGS84 coordinate system. Meanwhile, the geographic coordinates of the enterprises involved in the study were obtained from the Baidu Map Coordinate Picking System and were spatially adjusted to the WGS84 coordinate system using ArcGIS10.8.

### 2.2.2. Sources and Processing of Raster Map Data

The topographic raster data used in this study were sourced from the SRTM DEM 90M resolution original elevation dataset provided by the Geospatial Data Cloud. These data were then spatially rectified to the WGS84 coordinate system using ArcGIS10.8. Subsequently, they were masked and extracted within the boundary of the study area based on research requirements.

### 2.2.3. Sources and Processing of Statistical Data

The names, types, and quantities of green-certified enterprises within the study area involved in this research were obtained from the China Green Food Development Center. The studied enterprises were categorized into four major types—vegetables, grains, fruits, and tea—based on the product category they primarily produce. In cases where an enterprise was involved in multiple product categories, it was classified according to the category with the highest output volume. The precipitation data for various prefecture-level cities (autonomous prefectures) in Yunnan Province for 2024 were sourced from the Yunnan Province Water Resources Bulletin 2024, published by the Yunnan Provincial Department of Water Resources. Data on the annual Gross Domestic Product (GDP), registered household population, and total retail sales of consumer goods for prefecture-level cities (autonomous prefectures) in Yunnan for 2024 were obtained from the Yunnan Statistical Yearbook 2024, published by the Yunnan Provincial Bureau of Statistics. The annual accumulated temperature data for Yunnan Province were obtained from meteorological station records published by the National Oceanic and Atmospheric Administration (NOAA) of the United States.

All the aforementioned statistical data were imported into ArcGIS10.8, underwent spatial interpolation, and were subsequently rectified to the WGS84 coordinate system.

## 2.3. Research Methods

### 2.3.1. Kernel Density Estimation Model

The kernel density estimation is a method for analyzing spatial density distribution, which provides a smooth and intuitive representation of the spatial differ-

tiation patterns of geographical phenomena and objects within geographic space. Its fundamental principle is that geographical events or objects are assumed to be possible at any location within the geographical space, yet their probabilities of occurrence vary across different positions. Areas with a high concentration of points correspond to a higher probability of event occurrence, whereas sparsely distributed points indicate a lower probability [14]-[16]. The kernel density estimation is defined as follows: Let the set of  $n$  points,  $X_1, X_2, X_3, \dots, X_n$ , be a sample drawn from a population with a distribution density function  $F$ . The kernel density estimate of  $F$  at a given point  $X$  is denoted as  $F(X)$ . The expression is given by:

$$F(X) = \sum_{i=1}^n \frac{k}{h^2} \left( \frac{s - c_i}{h} \right)$$

In the formula,  $F(X)$  represents the kernel density value at the spatial location of point  $X$ ;  $h$  is the distance decay threshold;  $n$  denotes the number of feature points whose distance from point  $X$  is less than or equal to  $h$ ; and  $k$  represents the spatial weight function. The geometric interpretation of this formula is that the kernel density value reaches its maximum at each core element  $c_i$  and gradually decreases as the distance from  $c_i$  increases, eventually falling to zero beyond a specific distance [16].

### 2.3.2. Geographical Detector

Geographical Detector is a spatial statistical method that serves as a tool for investigating, analyzing, and quantifying the spatial heterogeneity of geographical elements and phenomena, and for explaining the changes in geographical spatial entities along with their underlying driving factors. Its core theoretical premise is that if an independent variable exerts a significant influence on a dependent variable, then the two variables should exhibit similarity in their spatial distributions [17]. The geographical detector has been widely applied to the detection of spatial heterogeneity across various geographical phenomena [18]-[20]. Based on the objectives of this study, the factor detector within the Geographical Detector is employed to quantify and explain the extent to which objective geographical factors influence the spatial distribution of green food enterprises. Its mathematical expression is as follows:

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

In the formula,  $q$  represents the extent to which the selected independent variable factors influence the spatial distribution of green food-certified enterprises, with its value ranging from [0, 1]. The value of  $q$  closer to 1 indicates a stronger correlation between the independent variable factor and the spatial distribution of green food-certified enterprises, signifying a greater degree of influence. Conversely, the value of  $q$  closer to 0 reflects a weaker correlation and lesser influence. Here,  $L$  denotes the total number of selected independent variable influencing factors;  $N_h$  and  $N$  represent respectively the number of unit partitions in stratum  $h$

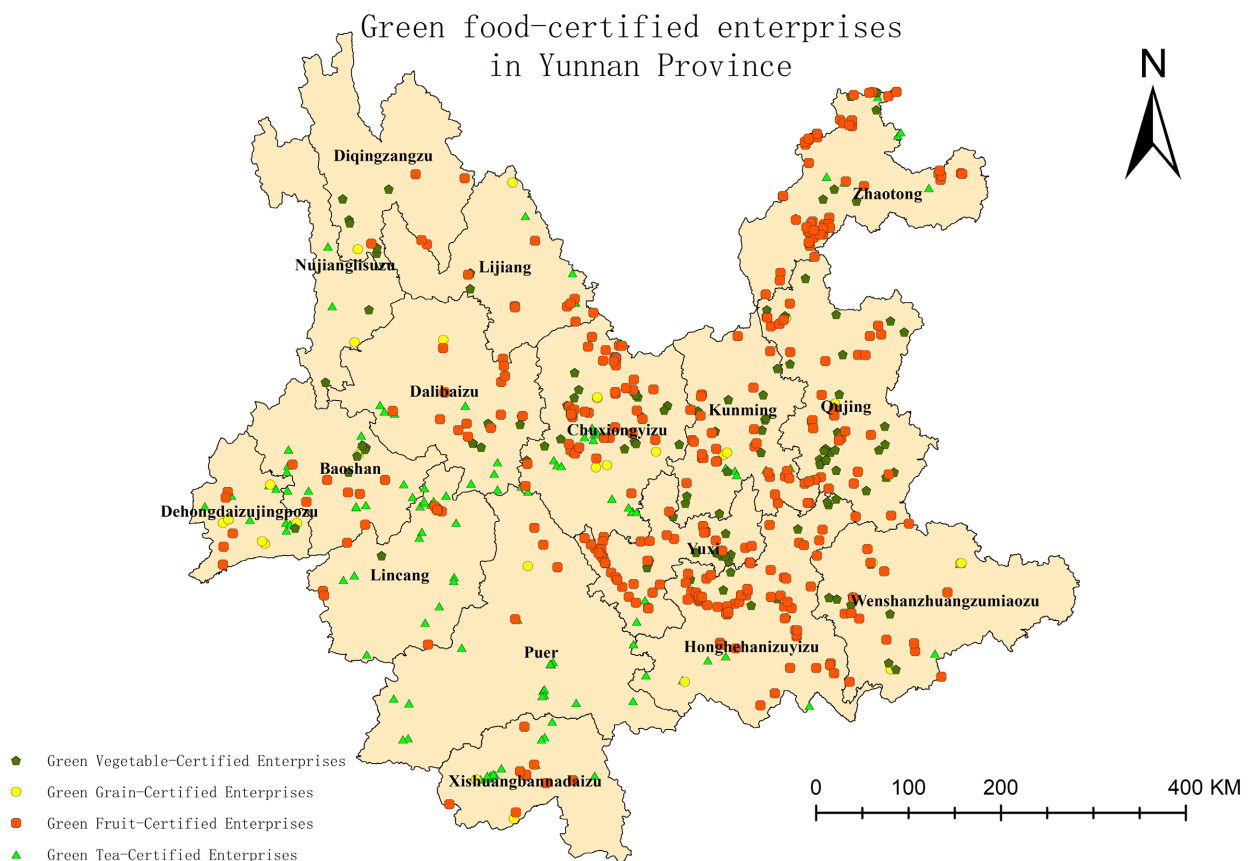
and the total number of unit partitions in the entire sample;  $\sigma_h^2$  and  $\sigma^2$  are the variances of the Y values in stratum h and the entire sample, respectively; SSW and SST refer to the within-stratum sum of squares and the total sum of squares, respectively.

### 3. Results and Analysis

Using the Kernel Density Estimation model, we calculated the kernel density values for four categories of green-certified enterprises. Based on these values and utilizing ArcGIS10.8, we mapped the spatial distribution ranges of the kernel density for these four categories of green-certified enterprises. Furthermore, by integrating the geographic coordinates of the relevant enterprises, the spatial distribution of the four categories of green food-certified enterprises across Yunnan Province was visualized.

#### 3.1. Overall Spatial Characteristics of Green Food-Certified Enterprises

As shown in **Figure 1**, green food-certified enterprises in Yunnan Province are primarily concentrated in regions such as central, eastern, and northeastern Yunnan—including Kunming, Yuxi, Zhaotong, Chuxiong, Honghe, and Qujing—demonstrating a clear trend of regional agglomeration. Along the corridor from

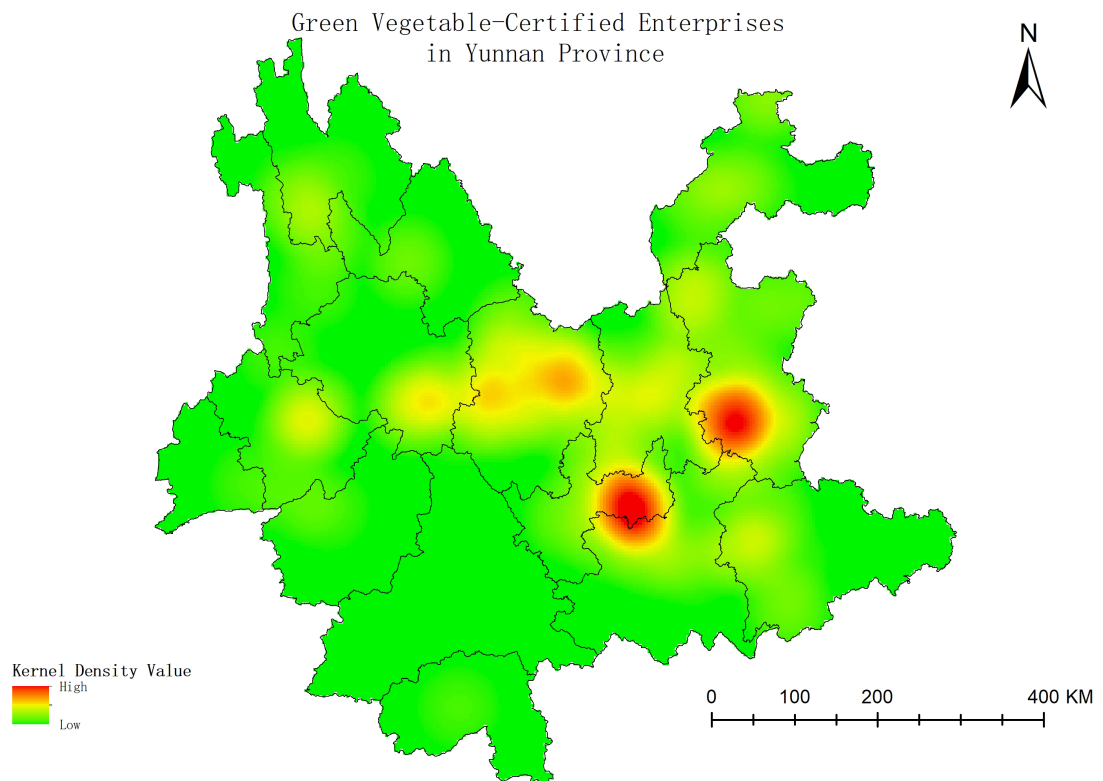


**Figure 1.** Overall spatial distribution of green food-certified enterprises in Yunnan province.

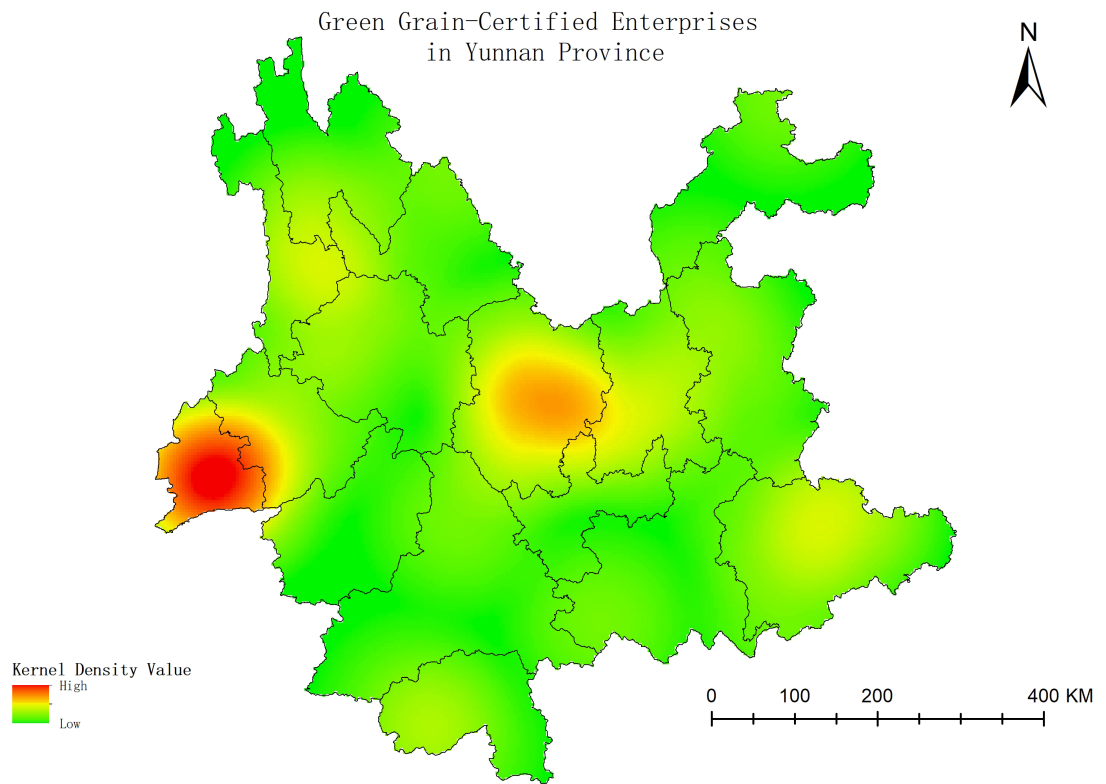
Dali to Dehong, green food enterprises exhibit a linear concentration pattern. Although the number of enterprises in this belt is relatively fewer compared to the main concentrated areas, it still demonstrates a trend of agglomerated distribution. In contrast, the number of green food-certified enterprises in northwestern Yunnan—including Diqing, Nujiang, and Lijiang—as well as in southwestern regions such as Lincang, Pu'er, and Xishuangbanna remains relatively low, and their spatial distribution is scattered, without forming a distinct agglomeration pattern.

### 3.2. Spatial Agglomeration Characteristics by Category

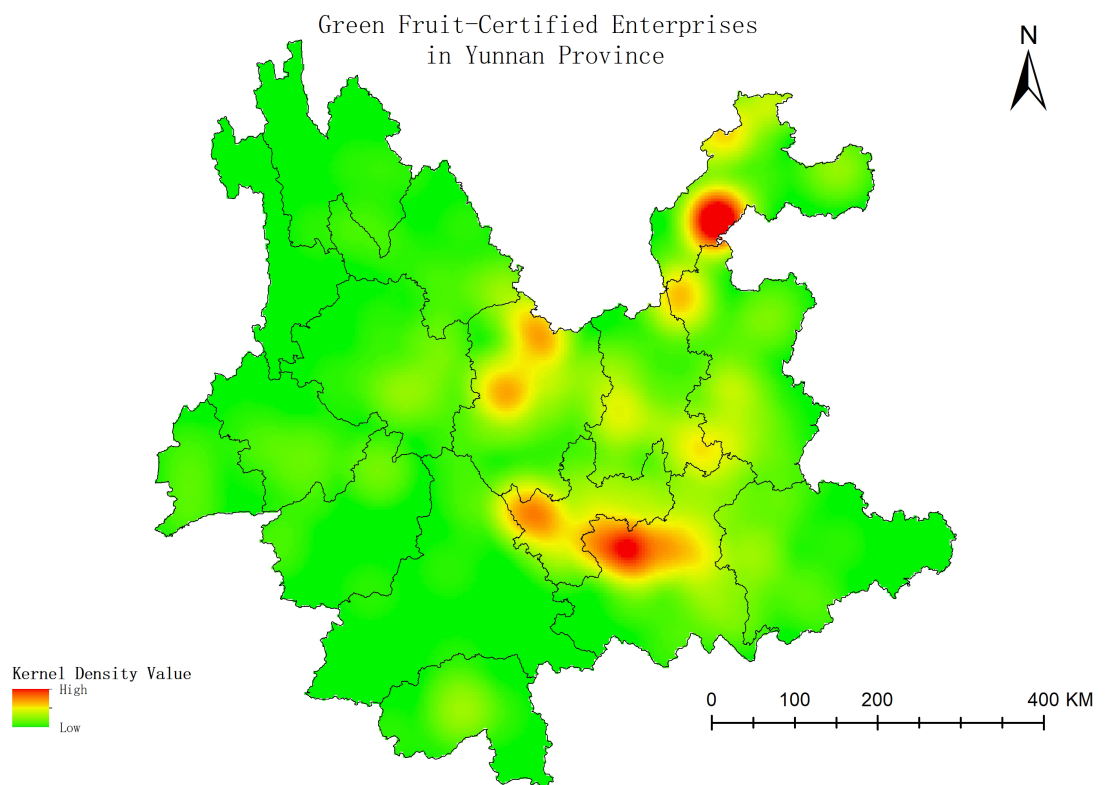
As shown in **Figures 2-5**, all categories of green food-certified enterprises exhibit strong spatial agglomeration within the study area, which is manifested geographically by high kernel density values in specific regions. Different categories of green food-certified enterprises exhibit distinct spatial clustering patterns across geographical locations. Green vegetable-certified enterprises show high kernel density values primarily concentrated in the Yuxi, Qujing, and Chuxiong regions, while their agglomeration is less pronounced in other areas. Green grain-certified enterprises exhibit notable spatial clustering in Chuxiong and Dehong, with relatively weaker agglomeration observed in a few other regions. Green fruit-certified enterprises show relatively pronounced agglomeration in Zhaotong (northeastern Yunnan), Chuxiong and Kunming (central Yunnan), as well as Yuxi and Honghe (southern Yunnan). Green tea-certified enterprises tend to cluster spatially in



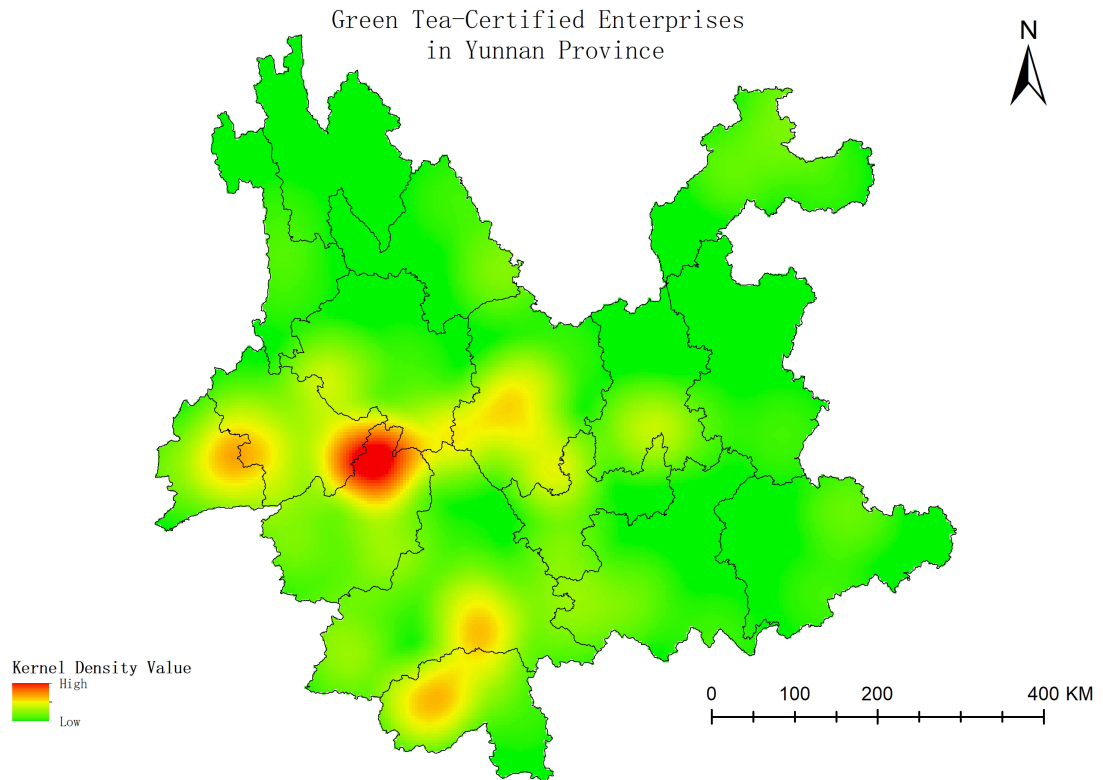
**Figure 2.** Green vegetable-certified enterprises in Yunnan province.



**Figure 3.** Green grain-certified enterprises in Yunnan province.



**Figure 4.** Green fruit-certified enterprises in Yunnan province.



**Figure 5.** Green tea-certified enterprises in Yunnan province.

Baoshan, Lincang, Xishuangbanna, and Pu'er.

### 3.3. Spatial Correlation Analysis

Both natural geographical factors and socioeconomic factors can influence the location selection of food enterprises to a certain extent [21]-[25]. The distinctive topography, climatic conditions, and complex socioeconomic context of Yunnan Province may potentially affect the geospatial distribution of green food-certified enterprises in the region. Therefore, building on previous research [26]-[30] and taking into account the practical scope of this study as well as data availability, the following variables were selected as potential natural and social factors representing influences on the spatial distribution of green food-certified enterprises in Yunnan Province: topographic slope ( $X_1$ ), annual accumulated temperature for 2024 ( $X_2$ ), average annual precipitation for 2024 ( $X_3$ ), annual Gross Domestic Product (GDP) of prefecture-level cities (autonomous prefectures) for 2024 ( $X_4$ ), registered household population of prefecture-level cities (autonomous prefectures) for 2024 ( $X_5$ ), and total retail sales of consumer goods in prefecture-level cities (autonomous prefectures) for 2024 ( $X_6$ ). The dependent variables selected were: green vegetable-certified enterprises in Yunnan Province ( $Y_1$ ), green grain-certified enterprises ( $Y_2$ ), green fruit-certified enterprises ( $Y_3$ ), and green tea-certified enterprises ( $Y_4$ ). First, the relevant statistical data were imported into ArcGIS10.8 and then linked to the spatially rectified location points of prefecture-

level cities (autonomous prefectures) in Yunnan Province. Subsequently, spatial interpolation was applied to the data associated with each location point, constrained within the extent of the study area. This process generated raster data, which were then further subjected to spatial correction. Finally, sampling points were generated at the pixel level for the derived raster data and the spatial aggregation data of the four categories of green food-certified enterprises, and sampling was performed accordingly. The sampling results were exported as a tabular file via ArcGIS10.8, followed by the removal of outliers. The results from the previous step were imported into the geographical detector, with the six selected influencing factors as independent variables and the spatial agglomeration data of the four categories of green food-certified enterprises as dependent variables. The model was then executed to obtain the results.

Based on the  $q$  statistic derived from the factor detector of the geographical detector, the degree of influence exerted by each independent variable on the spatial agglomeration patterns of various green food-certified enterprises was reflected.

**Table 1.** Geographical detector results of factors influencing the spatial distribution of green food-certified enterprises in Yunnan province.

	$X_1$	$X_2$	$X_3$	$X_4$	$X_5$	$X_6$
$Y_1$	0.89	0.91	0.95	0.73	0.61	0.83
$Y_2$	0.84	0.93	0.97	0.78	0.67	0.82
$Y_3$	0.85	0.96	0.98	0.83	0.72	0.87
$Y_4$	0.86	0.92	0.94	0.74	0.65	0.81
MEAN	0.86	0.93	0.96	0.77	0.6625	0.8325

As shown in **Table 1**, overall, all six influencing factors exhibit a significant effect on the spatial distribution of green food-certified enterprises, with the mean  $q$  value of each exceeding 0.6. Moreover, the average  $q$ -value of natural geographical influencing factors is higher than that of socio-economic independent factors, indicating that natural geographical conditions exert a greater influence on the spatial distribution of green food-certified enterprises compared to socio-economic conditions.

Within the natural geographical influencing factors, the magnitude of influence among the factors is ranked in descending order as: precipitation ( $X_3$ ) > temperature ( $X_2$ ) > topography ( $X_1$ ). This indicates that, among the various natural elements, precipitation exerts the most significant influence on the spatial distribution of green food-certified enterprises.

Among the socio-economic factors, the total retail sales of consumer goods in prefecture-level cities (autonomous prefectures) ( $X_6$ ) exert a greater influence on the spatial distribution of green food-certified enterprises compared to demographic factors ( $X_5$ ) and economic output factors ( $X_4$ ).

## 4. Conclusions and Suggestions

### 4.1. Conclusions

In 2024, green food-certified enterprises in Yunnan demonstrated a pronounced clustered distribution pattern within the geographical space. Among them, central Yunnan—including Chuxiong, Kunming, Yuxi, and Qujing—along with Zhaotong in northeastern Yunnan and Honghe in southeastern Yunnan, form the primary clusters of green food-certified enterprises. Areas such as Dali and Dehong in western Yunnan, along with Lincang and Xishuangbanna in southwestern Yunnan, constitute secondary clusters of green food-certified enterprises. Other regions are characterized by a relatively sparse presence of such enterprises.

Different types of green food-certified enterprises exhibit distinct spatial clustering patterns across geographical locations. Green vegetable-certified enterprises are predominantly clustered in the Yuxi and Qujing regions; green grain-certified enterprises are primarily concentrated in Chuxiong and Dehong; green fruit-certified enterprises show agglomeration in Zhaotong, Chuxiong, Yuxi, and Honghe. Green tea-certified enterprises are primarily clustered along the Chuxiong-Lincang-Dehong corridor, with limited agglomeration also observed in Pu'er and Xishuangbanna, albeit on a smaller scale.

The spatial agglomeration pattern of green food-certified enterprises in Yunnan Province is shaped by multiple factors. Overall, natural geographical factors exert a stronger influence on their geospatial distribution relative to socioeconomic factors. Among the specific variables examined, precipitation shows a higher correlation with the distribution pattern compared to other influencing factors, suggesting that it may serve as a fundamental driver in shaping the spatial layout of these enterprises in the province. Meanwhile, socioeconomic factors, particularly market scale, also contribute to influencing the geospatial distribution pattern of green food-certified enterprises in Yunnan to some extent.

Studying the geospatial distribution of green food-certified enterprises holds significant implications. First, based on the findings of this research, government departments at various levels can utilize the basic spatial distribution pattern of such enterprises to establish a provincial green food industry chain. This would allow for financial support and policy assistance to areas with a low agglomeration level of green food-certified enterprises, while encouraging enterprises in highly concentrated zones to relocate to less concentrated regions. As a result, the spatial layout of green food-certified enterprises across the province can be optimized. Second, government departments can formulate annual regional economic development goals and policies based on the results of this study. Finally, relevant green food-certified enterprises can use the research findings, in conjunction with their own practical circumstances, to identify suitable development space.

### 4.2. Suggestions

Although the above analysis has provided insights into the geospatial agglomeration of green food-certified enterprises in Yunnan Province and its influencing

factors, this study still has certain limitations. First, the data selected for this research were limited to the year 2024, which precludes an analysis of the temporal dynamics and evolution of green food-certified enterprises in the province. Second, this study does not encompass all potential factors that could influence the distribution of such enterprises in Yunnan. Variables such as regional soil type distribution, transportation infrastructure, and government economic and development policies may also affect the spatial layout of green food-certified enterprises, but they were not included due to significant challenges in data acquisition. These limitations are expected to be addressed in subsequent related research.

### Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

### References

- [1] Zhang, Z.H. (2001) Analysis of Problems and Countermeasures in the Development of China's Green Food Market. *Issues in Agricultural Economy*, No. 6, 24-27.
- [2] Wu, X.X. and Zhang, S.Y. (2017) The Formation and Future Trend of the "Green Development" Concept. *On Economic Problems*, No. 2, 30-34.
- [3] Yang, T.H. (2006) An Empirical Study on the Quality and Safety of Agricultural Products Based on Farmers' Production Behavior. Doctoral Dissertation, Nanjing Agricultural University.
- [4] Zhang, A.J. (2023) Research on the Spatial Distribution and Influencing Factors of Green Food Production in China. Master's Thesis, Chinese Academy of Agricultural Sciences.
- [5] Li, H., Shi, L.L. and Li, H. (2025) Spatial Distribution and Influencing Factors of Green Food Enterprises in China: A Factor Detection Analysis. *Journal of Research on Dietetic Science and Culture*, **42**, 35-42.
- [6] Shi, X.J., Jiang, M.Q., Yao, A.Y., Cai, R. and Zhang, Z.Y. (2023) Measurement of Green Food Industry Agglomeration Level and Analysis of Influencing Factors in Jiangsu Province. *Grain Science and Technology and Economy*, **48**, 42-46.
- [7] Liu, L.F. (1999) The Role of Leading Enterprises in Agricultural Industrialization from the Perspective of Green Food Development Practice. *Food and Nutrition in China*, No. 4, 41-43.
- [8] Huang, L. (2000) Green Marketing: The Choice for Jiangxi Food Enterprises' Trans-Century Development. *Truth Seeking*, No. 2, 38-39.
- [9] Zeng, G.Q. (2000) Preliminary Discussion on Measures for Developing Green Food in Hunan. *Hunan Agricultural Sciences*, No. 3, 27-28.
- [10] Zhang, Y. (2001) Analysis of the Development Status of Green Food in Liaoning Province. *System Sciences and Comprehensive Studies in Agriculture*, No. 1, 72-76.
- [11] Ren, X.Z., Li, X.H. and Wang, W.Z. (2002) "Point Survey" and Analysis of the Green Food Industry in Heilongjiang Province: An Analysis of the Development of the Green Food Industry in Mishan and Hulin. *Commercial Research*, No. 24, 130-134.
- [12] Cai, Y.Y., Liu, L.Q. and Wang, X.Y. (2023) Spatial Coupling Analysis of Green Food Industrial Structure and Industrial Agglomeration in Hunan Province and Suggestions for Development Models. *Quality and Safety of Agro-Products*, No. 4, 42-47+66.

- [13] Gu, B.J., Zhu, H.D. and Fu, Y.F. (2023) Spatial Distribution Pattern and Evolution of Green Food Certification in China: An Empirical Analysis Based on Panel Data of China Green Food Certification from 2011 to 2020. *Journal of Zhejiang Ocean University (Natural Science Edition)*, **42**, 429-438.
- [14] Tong, Y.Q. (2014) Research on the Spatial Differentiation of Traditional Villages in China Based on GIS. *Human Geography*, **29**, 44-51.
- [15] Mu, S., Na, N.D. and Su, L.D. (2023) Research on Cultural Landscape of Place Names in Hohhot Area Based on GIS. *Geospatial Information*, **21**, 85-89+169.
- [16] Yu, W.H. and Ai, T.H. (2015) Visualization and Analysis of POI Points in Cyberspace Supported by Kernel Density Estimation. *Acta Geodaetica et Cartographica Sinica*, **44**, 82-90.
- [17] Wang, J.F. and Xu, C.D. (2017) Geodetector: Principle and Prospect. *Acta Geographica Sinica*, **72**, 116-134.
- [18] Liu, Y.S. and Li, J.T. (2017) Geographic Detection and Optimizing Decision of Rural Poverty Alleviation in China. *Acta Geographica Sinica*, **72**, 161-173.
- [19] Wang, H., Gao, J.B. and Hou, W.J. (2019) Quantitative Attribution of Soil Erosion in Different Geomorphological Types of Karst Areas Based on Geodetector. *Journal of Geographical Sciences*, **29**, 271-286. <https://doi.org/10.1007/s11442-019-1596-z>
- [20] Wu, L., Liang, H., Yu, H.J. and Huo, R.M. (2021) Spatial Differentiation and Driving Factors of Integrated Development of Culture and Tourism in China. *Economic Geography*, **41**, 214-221.
- [21] Ren, S.X., Li, E.L., Deng, Q.Q. and Zhao, J.C. (2024) Spatial Pattern and Influencing Factors of Grain Crop Seed Enterprises in China. *Economic Geography*, **44**, 124-133.
- [22] He, Z.Q., Shang, X., Zhang, T.H. and Yun, J.Y. (2022) Ecological Suitability Zoning and Driving Mechanism Analysis of Jujube in Northern Shaanxi Based on GIS Coupled with Geodetector Model. *Journal of Irrigation and Drainage*, **41**, 97-106.
- [23] Song, Y., Wang, T.T., Zhang, Y., Qian, S.T. and Wang, S.J. (2021) Evolution of Enterprise Spatial Pattern and Factors of Location Choice in the Three Northeastern Provinces of China. *Scientia Geographica Sinica*, **41**, 1199-1209.
- [24] Lyu, D.G., Geng, Q., Jian, Z. and Lu, R. (2019) Market Size, Labor Costs and Location Choice of Heterogeneous Enterprises—An Explanation for the Regional Economic and Productivity Gap in China. *Economic Research Journal*, **54**, 36-53.
- [25] Liu, X.Y. and Zhang, X.L. (2010) Agglomeration Economies and Enterprise Location Choice—An Empirical Study Based on Enterprise Data at Prefecture Level in China. *Journal of Finance and Economics*, **36**, 83-92.
- [26] Wen, B.F., Wu, N.L. and Shi, B.Y. (2023) Spatial Pattern and Regional Characteristics Analysis of Featured Agricultural Product Advantage Areas in China. *Chinese Journal of Agricultural Resources and Regional Planning*, **44**, 72-85.
- [27] Xu, X.C., Wang, H.L. and Wu, Y.D. (2025) Spatiotemporal Evolution and Driving Mechanisms of E-Commerce for Agricultural Products in China: Empirical Evidence from Location Data. *Progress in Geography*, **44**, 699-715. <https://doi.org/10.18306/dlkxjz.2025.04.004>
- [28] Wang, H.R., Wang, Y.H. and Liu, X.H. (2023) Analysis of Spatial Dependence and Influencing Factors of Organic Agricultural Enterprise Bases in China: A Case Study of Sichuan Province. *Chinese Journal of Agricultural Resources and Regional Planning*, **44**, 67-76.
- [29] Jiang, H. and Liu, Z.Y. (2020) Spatial Distribution Characteristics and Influencing

Factors of Leading Agricultural Industrialization Enterprises in China. *Journal of Jishou University (Social Sciences Edition)*, **41**, 94-101.

- [30] Hu, S.L., Zhou, L. and Teng, T.W. (2019) Spatial Distribution Characteristics and Influencing Factors of Development Zones at Provincial Level and Above in China. *Economic Geography*, **39**, 21-28.