Research on the Coupling Coordination Effect of Green Agriculture Development Level and Rural Tourism in Sichuan and Chongqing Based on SPSS

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Abstract: This paper uses SPSS software and computer system technology to calculate, modify and analyze the data on the development level of green agriculture, the development level of rural tourism, and the degree of coupling and coordination between the two in 15 districts and counties in Sichuan and Chongqing. Integration, the research shows that the coupling and coordinated development between the two industries in Sichuan Province are significantly higher than that in Chongqing, which is related to Chongqing's local physical and geographical environment. The research conclusion has particular value for the coordinated development mode and method of green agriculture and rural tourism in the Sichuan-Chongqing region. Based on these conclusions, corresponding recommendations are given.

1 INTRODUCTION

Developing an ecological economy based on resources and the environment is a meaningful way to revitalize the countryside. Rural tourism combines the five parts of ecology, industry, humanities, culture, and organization. It is also an important starting point for the rural revitalization strategy and an inevitable choice to achieve shared prosperity. The integrated development of green agriculture and rural tourism can tap agricultural resources, improve the ecological environment, bring more traditional culture and folk customs back into focus, and speed up the process of urbanization. (Qiu, 2022) Since 2019, the rapid and high-quality development of rural tourism has been affected by the epidemic, but it has also provided markets and opportunities for domestic rural tourism. The rapid spread of foreign epidemics and the epidemic policies of foreign governments forced tourists to change: from foreign tourism to domestic tourism, from inter-provincial and inter-regional tourism to intra-provincial and intra-regional tourism; the time had to be postponed. By the end of 2020, Chongqing will have 29 national-level key demonstration areas for leisure agriculture and rural tourism. The coordination of green agriculture and rural tourism is related to the local implementation of the rural revitalization strategy.

In this paper, the entropy method is used to measure the development level of green agriculture and tourism in the Sichuan-Chongqing region. The SPSS software is used to carry out mathematical modeling and visual display through computer technology. The joint development of the tourism industry and its analysis have specific research value for the integrated development of agriculture and tourism in Sichuan and Chongqing and the promotion of rural revitalization.

2 THEORETICAL MECHANISM OF THE COUPLING AND COORDINATION OF GREEN AGRICULTURE AND RURAL TOURISM

As a new development concept, green agriculture has gained popularity recently, which is also an essential step in the rural revitalization strategy. The green transformation and upgrading of agriculture provide

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places, resources, and personnel for developing the rural tourism industry. Rural tourism can provide new platforms and opportunities to stimulate green agriculture to generate more significant economic benefits. (Li, 2021) Therefore, it is necessary to understand the relationship between the two interdependence.

3 DATA SOURCES AND RESEARCH METHODS

3.1 Data Sources

This paper selects 15 typical districts and counties in Sichuan and Chongqing, such as Chengkou County, Pingwu County, etc., through the data on their green agricultural and rural tourism development levels and uses SPSS software to optimize the data in terms of computer system technology, research and analyze the coupling degree, coupling coordination degree, and the integration and development relationship between the two. The data comes from China Statistical Yearbook, China Environmental Statistical Yearbook, China Tourism Statistical Yearbook, and statistical reports from regional governments.

3.2 Research Methods

3.2.1 Development Level Index

The data in the Sichuan-Chongqing area is optimized by the range method, the optimized data is calculated by the entropy method on SPSS using computer technology, and finally, the development level index is obtained. (Zheng, 2001)

3.2.2 Coupling Coordination Degree Model

The degree of coupling refers to the degree of interdependence between subjects, and the degree of coordination refers to the degree of fusion between subjects. Based on the former, this paper builds a model with the help of computer technology and software SPSS as follows:

$$D = \sqrt{C \cdot T}$$

$$C = 2 \cdot \sqrt{(U_1 \cdot U_2) \Big/ (U_1 + U_2)^2}$$

$$T = a \cdot U_1 + b \cdot U_2$$

U_1: Development level of green agriculture

U_2: Development level of rural tourism

D: The degree of coupling and coordination between the development level of green agriculture and the development level of rural tourism

C: The coupling degree between the development level of green agriculture and the development level of rural tourism

T: Coordination index of green agriculture development level and rural tourism development level

a, b: 0.5 (both have the same effect)

3.2.3 Grade Division

According to the former's research on coupling coordination degree, its level is divided, as shown in the following table:

Table 1: Classification standard of coupling coordination degree [self-painted].

No.	Coordination Degree	Coordination Level
1	0.00-0.09	Extremely out of balance
2	0.10-0.19	Severely disordered
3	0.20-0.29	Moderate Dissonance
4	0.30-0.39	Mild Dissonance
5	0.40-0.49	Nearly out of balance
6	0.50-0.59	Barely coordinated
7	0.60-0.69	Primary Coordination
8	0.70-0.79	Ultimate Coordination
9	0.80-0.89	Well coordinated
10	0.90-1.00	High-Quality Coordination

Table 2: Coupling degree and coupling coordination degree in the Sichuan-Chongqing region [self-painted].

Area / Year	C and D	2013	2014	2015	2016	2017	2018	2019
Chongqing (5 districts and counties)	C	0.511	0.775	0.907	0.941	0.914	0.93	0.931
	D	0.191	0.258	0.336	0.373	0.432	0.494	0.546
Sichuan (10 districts and counties)	C	0.999	0.993	0.986	0.965	0.996	1	1
	D	0.66	0.679	0.743	0.792	0.901	0.954	0.995

4 COUPLING COORDINATION EFFECT OF GREEN AGRICULTURE AND RURAL TOURISM IN SICHUAN AND CHONGQING

Using SPSS software to analyze the coupling coordination degree of the optimized data, the following table is obtained.

From 2013 to 2019, the degree of coupling and coordination in the Sichuan-Chongqing region has steadily grown, showing that green agriculture and rural tourism have shown a well coordinated development trend. It is not difficult to see from the above table that from the data of coupling degree alone, 12 values are greater than 0.8, showing a high level of coupling, but among the values of coupling coordination degree, only 3 data are higher than 0.9, showing a high-quality coordination state; 2 data greater than 0.7, showing the ultimate coordination state. The above results show that in the early stage, due to imperfect policies in various aspects, and the need for time to improve various infrastructure and service quality after capital investment, the coupling coordination degree was low; in the later stage, the coupling and coordinated development of green agriculture and rural tourism gradually showed high quality.

5 RESEARCH CONCLUSIONS AND POLICY RECOMMENDATIONS

5.1 Research Conclusions

Combining the 15 districts mentioned above and counties in the Sichuan-Chongqing region, the coupling degree of green agriculture development, the coupling degree of rural tourism development, and the level of coupling and coordinated development between the two can be seen: The coupling and coordinated development between the two industries in Sichuan Province are significantly higher than that in Chongqing, which is related to the local physical and geographical environment of Chongqing.

5.2 Policy Recommendations

5.2.1 Precise Policy Implementation

Based on the above results, the development level of green agriculture and rural tourism in Chongqing is relatively low. Because of the unique geographical environment of Chongqing, the mountainous area has more arable land and less area. It is necessary to prescribe the right medicine and focus on improving the innovative technology of green agriculture, (Liu, 2014) improve the infrastructure of its surrounding environment, promote the development of green agriculture through the development of rural tourism, and use this to improve the quality of farmers, improve the service quality of rural tourism, do an excellent job in the introduction of high-quality talents and ensure publicity.

5.2.2 Digital Development

Under the background of big data, it is necessary to use computing system technology to integrate and analyze the data of green agricultural innovation process, results, and rural tourism, solve problems in time after finding problems and make up for the inadequacy of policy formulation and the problematic implementation in the implementation process—pain points. Big data platforms, such as Weibo, Xiaohongshu, do good publicity in the early stage, increase publicity efforts, and form a unique local brand and reputation. (Zhou, 2021)

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