

# Research on Coupling Degree of Ecological Protection and High-quality Economic Development

—Based on the construction of beautiful villages in Huangshan City

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**Abstract:** At present, my country's modernization is advancing rapidly and steadily, but at the same time as the rapid development of industrialization, the ecological environment has also suffered a price that is difficult to restore. First, this article relates the ecological and economic development data of 20 villages in Huangshan City from 2015 to 2019. Analysis and principal component regression analysis reveal six main factors affecting the development of ecological economy. Secondly, based on the six influencing factors screened out, an evaluation index system was established based on two aspects: economic support capacity and ecological environment support capacity. Based on the coupling coordination model for the construction of beautiful villages in Huangshan City, the coordination degree of the coordinated development of ecological economy in each year from 2015 to 2019 is solved, and a comprehensive index system is constructed. It is concluded that the development of the city's rural ecological economy is at the primary level of coupling coordination and is increasing year by year.

Finally, based on the analysis of the above results, we give reasonable suggestions for the future sustainable development of the beautiful rural construction of Huangshan City from the two aspects of ecological environmental protection and high-quality economic development for the six influencing factors.

**Keywords:** Ecological Economy; Sustainable Principal Component Regression Analysis; Coupling Coordination Model

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## 1. Introduction

### 1.1 Research background

As the economic development trend is getting better, my country's modernization drive is steadily advancing. But with the rapid development of industrialization, the ecological environment has also paid the price of destruction. Therefore, developing a green economy and transforming a predatory economy into a sustainable economic model is the best choice for promoting ecological environmental protection and high-quality economic development. <sup>(1)</sup> National Bureau of Statistics of the People's Republic of China. China Statistical Yearbook, 2002. China Statistics Press, 2002)

Huangshan City is located in the mountainous area of southern Anhui. In recent years, driven by the Huangshan Scenic Area, it has given full play to its unique resource advantages. It has the Lingnan Provincial Nature Reserve in Anhui Province. Both ecological agriculture and ecological tourism have their own characteristics. Land use and forestry resources, protection, and industrial production are in good condition. This article takes the ecological economic development model in the construction of beautiful villages in Huangshan City as an example to study its coordinated

development model in depth to explore the interactive development relationship between economic development and ecological protection, and to provide reference for the coordinated development of economy and ecology in similar areas. (<sup>[2]</sup> Zhang Jianping. *Eco-tourism theory and practice* [M]. Beijing: China Tourism Press, 2001)

## 1.2 Research significance

Since the reform and opening up, Huangshan City has made remarkable achievements in economic and social development, and the comprehensive competitiveness of the city has increased significantly. (<sup>[3]</sup>F. Lawson and Baud-Bovy. *Tourism and Recreation Development*. London: The Architectural Press, 1977) However, with the rapid development of the world economy today, economic, social, population, resource and environmental issues have become increasingly prominent under the pressure of strong competition. For this reason, this paper studies the direction, mode and countermeasures of rural construction in Huangshan City from the perspective of ecological economy.

### 1.2.1 Application value

From the perspective of ecological economy, this article discusses how to achieve a win-win situation between ecology and economy, which can not only maintain the ecological balance to the greatest extent, giving full play to the ecological benefits, but also create more material wealth for the society with less resources and obtain the best economic benefits of the company which have achieved the simultaneous improvement of ecological benefits and economic benefits.

## 2. Analysis of factors affecting the sustainable development of rural ecological economy

In the current process of building beautiful villages, there are many factors that affect the coupling of high-quality economic development and ecological environmental protection. To achieve the accurate positioning of the main influencing factors, we must first screen out the variables that play an important role in the process of ecological economic development and determine the corresponding, as well as to objectively and scientifically reflect the coupling and coordination level of high-quality economic development of rural construction and ecological environment protection.

Since the study of sustainable development of ecological economy includes two sub-systems of economy and ecological environment, in order to explore the degree of coupling between the two, we use rural per capita disposable income and air quality index as dependent variables, respectively. (<sup>[4]</sup>Yu Kongjian. *Approaches and effectiveness of sustainable environment and development planning*[J]. *Journal of Natural Resources*, 1998) After excluding irrelevant variables with Y1 and Y2, we obtain 7 indicators in the economic subsystem: urbanization rate, per capita agricultural output value, per capita net income of rural households, rural Engel coefficient, and the proportion of employees in the primary industry, which are referred to as Q1, Q2, Q3, Q4, Q5, Q6, Q7. We also get 8 indicators per capita sown area of crops, forest coverage rate, fertilizer application per farmland, pesticide application per farmland, water resources per capita, dust emissions, sulfur dioxide emissions, and soil erosion control area in the ecological environment subsystem, respectively represented with W1, W2, W3, W4, W5, W6, W7, W8. According to the experimental data, Q2 and Q4, Q5 and Q7 are highly correlated. Taking into account the accuracy and comprehensiveness of the data, we remove Q4 and Q7, that is, per capita grain output and per capita expenditure on cultural, educational and entertainment services of household consumption expenditure. W3 and W4, and W2 and W8 are highly correlated. Considering the accuracy and comprehensiveness of the data, we remove W3 and W8, which are the amount of chemical fertilizer applied per unit of farmland and the area under water and soil erosion control.

## 3. Measurement of the level of coordinated development of the main villages in Huangshan City

According to the calculation formula of the coupling coordination degree mentioned above, 2015-2019 is selected

as the research period, and the data mainly comes from the 2015-2019 Statistical Yearbook of Huangshan City. This past uses MATLAB software to calculate the coordinated development level of Huangshan City's ecological economy from 2015 to 2019. ([5] Ye Zhengbo. Sustainable Development Evaluation Theory and Practice [MI. Beijing: China Environmental Science Press 2000])

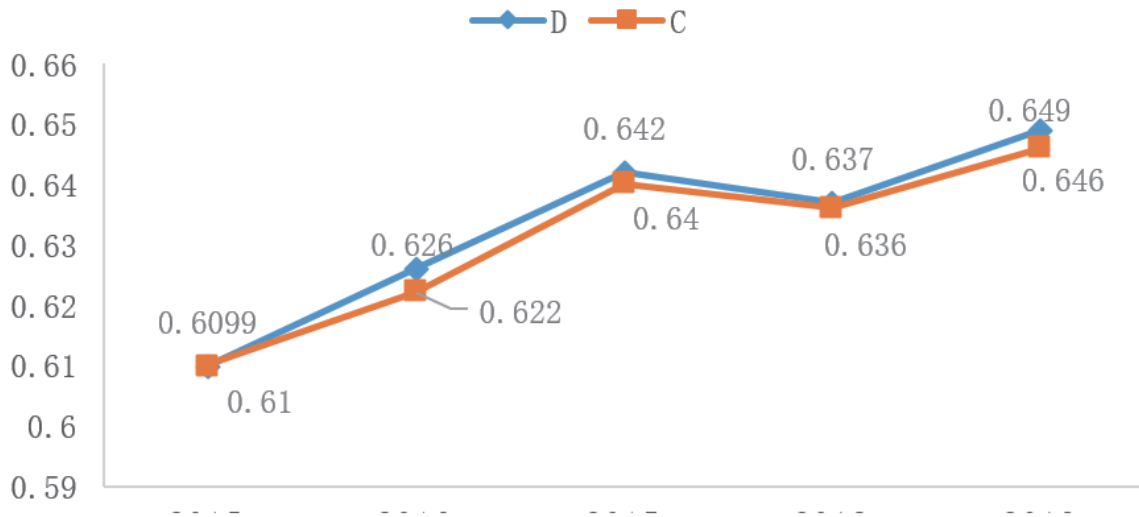


Figure 1: Changes in the level of coordinated development of rural areas in Huangshan City from 2015 to 2019

It can be seen from the Figure 1 that from 2015 to 2019, Huangshan City's rural eco-economic coupling degree and incidental coordination degree have shown an upward trend year by year. In terms of coupling degree, the coupling degree of both rural ecological economy in Huangshan City has increased year by year and both are greater than 0.5. It has been in a benign coupling stage for a long time, and ecological environmental protection and economic development can develop together. In terms of coupling and coordination, the overall coordination of the rural ecological economy in Huangshan City has shown a continuous upward trend, from 0.6099 in 2015 to 0.6487 in 2019, with an increase of 0.0397 in 5 years, indicating that the coordination relationship between the two systems of ecology and environment has continued to improve. It is in the primary coupling and coordination state, but the coupling coordination type is in the new rural economy priority and the rural ecological lagging type, indicating that the new rural economy of Huangshan City has a good momentum of development. ([6]World bank, Word Bank Develops New system to Measure Wealth of Nations[M]. Washington DC, 1995) With the support of reasonable policies, the overall coordination of the new rural ecological economy has gradually improved, which has promoted the degree of coupling and coordination between the two has been further improved. However, in general, the rural ecological environment of Huangshan City is still in a lagging state, and the sustainable development level of rural ecological economy in Huangshan City still has a large room for development.

#### 4. Research results and recommendations

In this research, we mainly set up an evaluation index system for the economic support capacity and ecological environment support capacity in rural construction in Huangshan City. ([7]Zhao Jingzhu. Theoretical research on evaluation indicators for sustainable development of society-economy-natural complex ecosystems[J]. Acta Ecologica Sinica, 1995) In the process of coupling degree analysis, the economic support capacity and the ecological environment support capacity are used as the criterion level. Using analytic hierarchy process in two general directions and six dimensions: urbanization rate, per capita agricultural output value, rural Engel coefficient, rural forest coverage, per capita water resources, and sulfur dioxide emissions to determine the indicator types one by one, and calculate the coupling based on the data The average coordination degree is about 0.6, which is judged to be the primary coupling

coordination and has an upward trend year by year. We give the following suggestions:

#### **4.1 Constructing an ecological county development model**

Huangshan City's ecological city construction is a more feasible way and a systematic project. The choice of model lies in how to choose a leading industry that meets the characteristics of rural development in Huangshan City, and give full play to the industrial advantages based on the development requirements of ecological requirements, combined with our comprehensive investigation From a standpoint, I think the Three Guiding Industry Department is the best solution

#### **4.2 Development direction of ecological economy**

Huangshan City has the famous scenic spot of Huangshan Mountain. At the same time, the planting industry and agriculture are also developing well. The establishment of a characteristic ecological agricultural economic tourist zone is currently a breakthrough and challenging strategy. The development direction of the ecological economy is clear. The promotion of tea planting and production technology, the development of agricultural and sideline product processing, and the formation of an industrial chain supporting planting, processing and transportation will help products go out of the market and drive economic consumption. The focus of ecological protection and construction is to build production bases for pollution-free agricultural products, green food, and organic food, so as to create product brands to increase influence and added value.

Secondly, with the inherent advantages of urban construction and industrial development, an ecological industrial park can be built in this area. Centering on the requirements for building characteristic, innovative and ecological parks, we will adhere to high-start planning, high-standard construction, high-threshold access, industrial parks with complete functions, prominent main businesses, standardized management, and beautiful environments, and strive to build a model of scientific development area. ([8] Zheng Chongwen, Xue Dawu. Ecological evaluation index and evaluation standard system of natural reserves in my country [J]. Journal of Rural Eco-Environment, 1994)

#### **4.3 Suggestions for the development of ecological economy**

Ecological economic development is a systemic dynamic process involving three levels of economy, environment, and society. Only by going hand in hand can we better promote the construction of beautiful villages and promote the sustainable development of regional economy. At the same time, Huangshan City should adhere to the principle of "ecological priority, scientific development, and overall development" to promote the development of the city's economy.

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