

# Research on the Impact of Rural Tourism Development on the Economic Benefits of Bama County in Guangxi

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**Abstract.** Bama County, one of the top five tourist spots in Guangxi Zhuang Autonomous Region, began developing rural tourism in 2006. After 17 years of growth, it has become a representative example of rural tourism development for ethnic minorities in Guangxi Zhuang Autonomous Region. To explore the influence mechanism and function of rural tourism in Bama County in the context of rural revitalization, this study collects relevant data on Bama County from 2015 to 2022. The cointegration and Granger causality tests are used to examine the relationship between the number of tourists Bama County receives and its economic impact. The test results show that the fluctuation in the number of tourists visiting Bama County has a significant impact on the county's tax revenue. Furthermore, based on the research findings, this study offers recommendations for how Bama County can achieve long-term development through rural tourism.

## 1 Introduction

In recent years, the development of rural tourism has been reflected in the remarkable economic and social benefits, and these two aspects have always been the focus of theoretical research. Through the associated changes in demand and supply, the development of rural tourism enriches the diversity of destinations, deepens urban tourists' understanding of rural landscapes, and teaches them the importance of agricultural production. Rural tourism has increased the sales of agricultural products and by-products as additional tourism products, promoted the diversified growth of the rural economy, expanded income sources, and effectively reduced unemployment in rural areas. Some experts have indicated that the surplus labor force in rural areas can be effectively utilized by the tourism industry, which may result in indirect income growth and the advancement of rural economic development [1].

According to general surveys, research on the impact mechanism of rural tourism on the rural economy is not comprehensive. Some researchers use short-term and one-sided economic data for analysis. Therefore, there is a lack of research on multi-panel and multi-chain analysis. Taking Bama County, Guangxi Zhuang Autonomous Region as an example, this paper analyzes the impact of the development of diversified rural tourism on ethnic minority counties with relatively slow economic development, explores new models of rural tourism development in this kind of counties, and explores ways to solve new problems in rural tourism development in underdeveloped areas [2]. This is crucial for the rapid revitalization of rural areas and sustainable economic development in disadvantaged areas.

## 2 The Current Situation of Rural Tourism in Bama County

### 2.1 Overview of Tourism Development

By 2022, there will be five 4A-level scenic spots, three 3A-level scenic spots, nine star-rated hotels, and sixteen travel agencies in the tourist area of Bama. Leveraging Bama's long-standing health preservation culture, this resource has attracted numerous tourists from China and abroad. It has been developed in conjunction with the scenic areas in Donglan and Fengshan County. Following extensive excavation and research, the Bama Cultural Tourism Bureau discovered the distinct appeal of adopting longevity tourism as its marketing tactic. It effectively established a tourism development system focused on health preservation and vacation. Currently, the system is quite developed, offering diverse and abundant experiences for visitors [3].

Since the Bama County government established a global tourism demonstration zone encompassing the entire region, it has prioritized developing tourism projects as a key focus of its cultural tourism efforts [4-5]. The construction of many key tourism projects, such as the Bama Tourism Distribution Center and Cifu Lake International Longevity Health Resort Town, has been further strengthened. Among them, the Bama International Health Preservation Center, the starting project of the Cifu Lake International Longevity Health Resort Town Project, has been completed. In 2018, it successfully received guests from around the world as the main venue of Bama Forum. Based on the strategic

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goal of "International Health and Longevity Tourism Resort" given by the autonomous region [7], the local government and the Cultural Tourism Bureau have put into effect the initiative "New city, beautiful countryside, village self-governance, prosperity for the people" to create a sustainable and ecological living environment in the country. Additionally, Bama aims to create a 10 billion yuan healthy aquaculture sector, a 10 billion yuan longevity food processing industry, a 10 billion yuan cultural tourism and health care industry, a 10 billion yuan digital economy industry, and four rural revitalization demonstration zones to rejuvenate and advance rural areas (including modern characteristic agriculture rural revitalization demonstration zone, longevity and health care rural revitalization demonstration zone, revolutionary culture tourism rural revitalization demonstration zone, and industrial tourism cultural rural revitalization demonstration zone) to revitalize the integrated development of urban and rural areas. Based on the philosophy of "big industry,

great tourism, comprehensive health, and big brand," they will build a new pattern with high-quality urban development.

## 2.2 Tourism-Related Economic Indicators

Given the impact of the epidemic on the local tourism industry between 2020 and 2022, and the unconventional nature of economic indicators during that period, data from Bama County between 2017 and 2019 were selected for analysis to provide context for the economic situation. Table 1 illustrates that from 2017 to 2019, the majority of visitors to Bama County were domestic tourists, while the proportion of inbound tourists remained relatively low. However, the number of domestic and foreign tourists and the growth rate of total social tourism consumption exhibited a notable increase during this period.

**Table 1.** The tourism economic income ratio of Bama County from 2017 to 2019

| Year | Index                            | Number         | Year-on-year growth rate |
|------|----------------------------------|----------------|--------------------------|
| 2017 | Foreign and domestic tourists    | 5.298 million  | 21.89%                   |
| 2018 |                                  | 6.5785 million | 24.20%                   |
| 2019 |                                  | 8.2585 million | 25.54%                   |
| 2017 | Total social tourism consumption | 4.758 billion  | 28.59%                   |
| 2018 |                                  | 6.496 billion  | 36.53%                   |
| 2019 |                                  | 8.448 billion  | 30.05%                   |
| 2017 | Domestic tourists                | 5.2597 million | 22.03%                   |
| 2018 |                                  | 6.5381 million | 24.30%                   |
| 2019 |                                  | 8.2156 million | 25.66%                   |
| 2017 | Number of inbound tourists       | 38,300         | 5.12%                    |
| 2018 |                                  | 40,400         | 5.50%                    |
| 2019 |                                  | 42,900         | 6.30%                    |

## 3 An Empirical Study on the Impact of Rural Tourism on Economic Development in Bama County

### 3.1 Data Sources and Variable Selection

In this study, the number of domestic and foreign tourists in Bama County (measured in ten thousand people) is used to assess rural tourism development.

Additionally, the gross domestic product (GDP) of Bama County (measured in billion yuan) serves as the indicator for the county's economic performance. The panel data from 2015 to the first half 2022 are taken as the main analysis body. To align the data more closely with our model construction hypothesis and address the heteroscedasticity in the analysis, we applied a logarithmic transformation to X and Y, resulting in LNX and LNY. We then conducted a statistical analysis using SPSS and Python to evaluate the transformed data.

### 3.2 Descriptive Statistics and Correlation Analysis

**Table 2.** Bama County tourism economic income ratio from 2015 to the first half of 2022

| Year | Number of domestic and foreign tourists (100,000) | County GDP (100 million yuan) |
|------|---------------------------------------------------|-------------------------------|
|------|---------------------------------------------------|-------------------------------|

|                          |       |       |
|--------------------------|-------|-------|
| <b>2015</b>              | 37.35 | 33.83 |
| <b>2016</b>              | 43.47 | 37.20 |
| <b>2017</b>              | 52.98 | 42.96 |
| <b>2018</b>              | 65.79 | 46.33 |
| <b>2019</b>              | 82.59 | 75.67 |
| <b>2020</b>              | 64.41 | 82.99 |
| <b>2021</b>              | 76.82 | 92.72 |
| <b>2022 (1-6 months)</b> | 30.45 | 47.37 |

As illustrated in Table 2, the number of domestic and foreign tourists in Bama County, along with the county's GDP, exhibited a notable linear upward trajectory prior to the onset of the epidemic. However, during the

epidemic period, the two variables demonstrated a simultaneous decline, indicating a relatively synchronous and close coupling relationship between them.

**Table 3.** Linear correlation coefficient table of X and Y

|                 | LN <sub>Y</sub> | LN <sub>X</sub> |
|-----------------|-----------------|-----------------|
| LN <sub>Y</sub> | 1.000000        |                 |
| LN <sub>X</sub> | 0.863890        | 1.000000        |

We use Stata to calculate X and Y; the linear correlation coefficient is  $r = 0.863890$  from Table 3. It shows that there is a strong positive correlation between the two. We analyze the panel data in three steps to further verify its correlation: (1) The unit root test

analyzes data stability and checks for autocorrelation. (2) The co-integration test assesses whether time series data share a common long-term trend or requires model adjustments for improved data fitting. (3) Granger causality test.

**Table 4.** Coefficient r correlation

| The interval to which r belongs | [0.75,1]                    | [-1, -0.75]                 | (-0.75, -0.30] | [0.30,0.75) | [-0.25,0.25] |
|---------------------------------|-----------------------------|-----------------------------|----------------|-------------|--------------|
| Correlation strength            | Strong positive correlation | Strong negative correlation | Moderate       | Moderate    | Weak         |

### 3.3 Unit Root Test

The empirical data selected in this paper is time series, so it is necessary to test its stability. According to the

AIC criterion, the lag order of the sequence is 2; that is, there is a high-order lag correlation. Therefore, we use the ADF test to avoid false regression caused by data and ensure the accuracy and effectiveness of data analysis.

**Table 5.** Unit root test results

| Variable         | The form of test (C,T,K) | ADF test value | 5% significance level | P value | Is it stable? |
|------------------|--------------------------|----------------|-----------------------|---------|---------------|
| LN <sub>Y</sub>  | (C,T,2)                  | -2.8263        | -2.6281               | 0.113   | NO            |
| LN <sub>X</sub>  | (0,0,2)                  | 0.6221         | -1.0012               | 0.926   | NO            |
| DLN <sub>Y</sub> | (0,0,2)                  | -1.8265        | -1.0045               | 0.086   | NO            |
| DLN <sub>X</sub> | (C,T,2)                  | -2.2736        | -2.8239               | 0.083   | NO            |

|       |         |         |         |       |     |
|-------|---------|---------|---------|-------|-----|
| DDLNY | (0,0,2) | -3.1243 | -0.9238 | 0.001 | YES |
| DDLNX | (C,T,2) | -4.1287 | -2.1213 | 0.005 | YES |

Table 5 presents the results of the ADF test. The variables X and Y in the original sequence fail to meet the requisite stationarity conditions. However, the final P-value of the second-order difference sequence of the two at the 5% significance level indicates that it is a flat sequence, thereby establishing the absence of a unit root.

Cointegration analysis is needed to verify the long-term equilibrium relationship between variables.

### 3.4 Cointegration Analysis

**Table 6.** Cointegration Regression Analysis

| Variable  | Regression coefficient | Standard error | T statistic | P value |
|-----------|------------------------|----------------|-------------|---------|
| LNK       | 0.780012               | 0.068974       | 14.65980    | 0.0000  |
| C         | -0.974001              | 0.411012       | -2.153110   | 0.0054  |
| R-squared | 0.880064               |                |             |         |

**Table 7.** Sequence ADF test results

|                      |     | t-Statistic | Prob.  |
|----------------------|-----|-------------|--------|
| ADF test statistic   |     | -2.631089   | 0.0014 |
| Test critical values | 1%  | -2.203021   |        |
|                      | 5%  | -1.630215   |        |
|                      | 10% | -1.387729   |        |

Based on the above data, the Johansen cointegration test is used to test whether there is a cointegration relationship between economic development and rural

tourism in Bama County. Furthermore, the variables in this study show no clear trend and are not close to zero, indicating that the default value is constant c.

**Table 8.** Johansen cointegration test (Trace)

| H                                    | Eigenvalue | Trace  | 10% critical value | 5% critical value | 1% critical value |
|--------------------------------------|------------|--------|--------------------|-------------------|-------------------|
| None (No cointegration relationship) | 0.412      | 43.013 | 36.429             | 39.312            | 37.010            |
| at most 1 cointegrating vector       | 0.221      | 28.062 | 15.676             | 19.413            | 22.233            |
| at most 2 cointegrating vectors      | 0.687      | 7.955  | 3.705              | 5.911             | 8.005             |

As evidenced by the data presented in Table 8, the trace statistic value for the null hypothesis of "None" suggests the presence of at least one cointegrating relationship. For the hypothesis of at most one cointegration, the value of the trace statistic indicates

that there is more than one cointegrating relationship. For the hypothesis of "at most two cointegration", the value of the trace statistic means that there are more than two cointegrating relationships. In summary, there is a cointegrating relationship between the sequences.

### 3.5 Granger Causality Test

**Table 9.** Granger causality test results

| Null hypothesis            | Obs. | F Statistics | P value | Conclusion |
|----------------------------|------|--------------|---------|------------|
| LNx does Granger Cause LNy | 16   | 4.36721      | 0.0822  | Rejected   |
| LNx does Granger Cause LNx |      | 0.67118      | 0.9255  | Accepted   |

Based on the Johansen test, the equilibrium relationship between logarithm LNy and LNx is further tested by the Granger causality test at a 5 % confidence level. Table 9 shows that LNx accepts the null hypothesis at a 5% confidence level, indicating that the number of domestic and foreign tourists in Bama County is the Granger cause of GDP change.

### 3.6 Analysis of Empirical Results

ADF test shows that the series contains no unit root and is stationary. Analysis of co-integration reveals that the reception of both domestic and foreign tourists positively impacts the local GDP in Bama County. Simultaneously, fluctuations in domestic and international tourism will directly impact the country's GDP. The Granger causality test demonstrates that the fluctuations in domestic and international tourist arrivals are a key factor in GDP variations. In other words, the impact on GDP is positive in the case of relatively long-term accumulation. However, the change in GDP has little influence on the number of domestic and international tourists, which shows that the promotion of economic aggregate has not greatly promoted the number of tourists.

## 4 Conclusions and Suggestions

### 4.1 Conclusions

To sum up, our empirical study on the impact of rural tourism in Bama reveals that it has become an essential component of the local economy in Bama County. Additionally, rural tourism plays a positive role in promoting economic development in the area. However, the improvement of economic benefits has not fed back rural tourism to a great extent, and so far, it has not formed a virtuous circle of reaction. Tourism, a key sector in the tertiary industry, has not significantly benefited from funding and lacks the momentum to be driven by other industries.

### 4.2 Countermeasures and Suggestions

#### 4.2.1 Rural Tourism Boosts Economic Development and Improves Efficiency

Developing rural tourism in minority areas is profitable with the strongest radiation driving force, the widest participation, and the most direct benefits for the people.

The government can strongly support the rural tourism industry in the areas of policy funds, planning guidance, and talent team training. In addition, establishing a diverse development approach in this area, providing extensive training for workers transitioning from agriculture, and educating a skilled group of rural tourism experts are recommended to enhance the impact of rural tourism on the revitalization strategy. Rural tourism development involves agriculture, science and technology, industry, commerce, foreign trade, and other departments, which requires the efforts and cooperation of all parties to form an effective linkage mechanism and ultimately enhance economic benefits.

#### 4.2.2 Economic Development Feeds Back the Rural Tourism Industry and Forms a Virtuous Circle

Through field investigation, the author discovered several urgent issues that need to be addressed in the rural tourist attractions of Bama County. These include inadequate transportation facilities, low levels of electronic intelligence, varying degrees of expertise among tour guides, and significant shortcomings in infrastructure. On the one hand, we should increase the capital investment in rural tourism, promote the improvement of the infrastructure of the original scenic spots, and enhance the experience, convenience, and traffic accessibility of rural tourism. Taking the "Bama" Forum as the medium, it is suggested to establish the Bama Tourism Economic Zone, expand domestic demand for tourism by increasing investment, and then promote the transformation and upgrading of the "tourism+" industrial chain, and promote the rapid development of the rural tourism with capital investment [6]. On the other hand, it is important to utilize the "longevity area" benefits, attract investments, improve collaboration between local government and businesses, involve companies in tourism development, and boost Bama's tourism reputation and global recognition.

#### 4.2.3 Examine the Cultural Connotations Associated with Ethnic Minorities and Develop Innovative Approaches to Tourism Positioning

Currently, Bama's tourist offerings focus primarily on leisure health services and sightseeing, and the tourism sector is in its initial phase of experiential growth, characterized by outdated positioning and a lack of innovation. The culture of ethnic minorities is the basis for tourism growth in their regions, and efforts should

be made to explore new models of rural tourism to enhance ethnic minority cultural tourism. To make the local culture "spread out of the mountains", the county strengthens the cultural innovation of ethnic minorities. In addition to relying on the intuitive display of architectural features, rural scenery, and folk performances, it is also necessary to consider the growing spiritual needs of the people and fully analyze the preferences of tourists of all ages and types. By showcasing minority cultural exhibitions through live performances, engaging in participatory farming, and incorporating advanced Internet technologies, we will develop diversified, innovative tourism products that highlight cultural characteristics. This approach aims to attract tourists' attention and invigorate consumer interest.

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