Research on Ecological Rural Tourism Development Based on Green Environmental Protection Model

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Abstract. Ecological environment is the foundation and prerequisite for the development of rural tourism. The development of rural tourism promotes the rural ecological environment. The coordinated development of the two is of great significance to the sustainable development of rural tourism and the construction of ecological civilization in rural areas. Here, this article briefly summarizes the current plight of rural tourism and the relationship between rural tourism and the ecological environment, and puts forward some suggestions for the joint development of rural tourism and ecological environment protection, and pays attention to the protection of the ecological environment while recognizing the development of rural tourism, to achieve the harmonious and common development of rural tourism and the environment.

Keywords: Green environmental protection, ecological countryside, rural tourism, rural tourism project development.

1. Introduction
Rural tourism is a type of tourism in which rural society is the place of activity and the unique production form, life style and idyllic scenery of the village are the objects. In recent years, the fast pace of cities has made more and more people yearn for a slow life in the countryside, and appreciate the natural scenery, folk customs and customs in the countryside. Therefore, rural tourism has become a popular tourism development, and it not only provides urban residents with a place for leisure and vacation. It also promoted the economic development of the countryside. However, with the increase in passenger flow, environmental problems such as the destruction of air and water quality in the countryside and the random stacking of garbage have become increasingly prominent while economic benefits have improved. While the great development of rural tourism creates economic and social benefits, it will also cause a series of environmental problems. The deterioration of the ecological environment will in turn restrict the sustainable development of rural tourism. Therefore, the development of rural tourism within the range that the ecological environment can bear, and the gradual improvement of infrastructure and supporting services that are conducive to the construction of ecological civilization during the development process, and finally achieve the coordinated development of rural tourism and the ecological environment, are necessary to achieve sustainable regional development [1]. The paper uses the game equilibrium theory in game theory to analyse the
game equilibrium state of the stakeholders in the rural tourism development project in the income and environmental protection mode. A model that reaches or approaches the Nash equilibrium will help rural tourism development income and environmental protection. The stability of the model ensures the sustainable development of rural tourism activities.

2. The status quo and problems of domestic rural tourism
With the rapid development of society and economy, the pace of urbanization is gradually becoming faster. As people's material and economic living standards are improving, the pace of life and work is also accelerating. Compared with many urban residents, living in the city for many years has no spiritual support. Enjoyment, the pressure cannot be released, and it is easy to get bored for a long time. Therefore, rural tourism is yearned by the majority of urban residents. Rural tourism can provide tourists with a natural and simple living environment. So far, it has shown a multi-form and diversified development trend. While meeting the needs of urban residents, it also increases the source of villagers' income and improves the living standards of materials. However, with the rapid development of rural tourism, the environmental damage caused by it cannot be ignored. An important prerequisite for the development of rural tourism is to maintain a good ecological environment. With the continuous development of the rural tourism economy, more and more tourists come to rural tourism. The solid waste generated for the development of supporting facilities is discarded at will, the domestic garbage brought by tourists is littered everywhere, and rural tourist attractions also damage the ecological environment. Increasingly prominent, hindering the balanced and coordinated development of rural tourism development and ecological environment protection. It mainly includes two aspects. On the one hand, in the process of rural tourism development, a large number of tourist facilities, transportation tools, and developed experience tourism projects occupy a large amount of agricultural land [2]. The unreasonable development plan leads to inconsistent development with the surrounding ecological environment. On the other hand, the increase in tourists has caused damage to rural land and vegetation. The littering of rubbish and waste generated during the tourism process causes air and water pollution. The corresponding gathering of tourists generates more commercial activities, leading to tourist attractions. The noise pollution, visual pollution and other problems are caused by noise pollution and visual pollution. The resulting environmental damage has caused widespread public concern.

3. Game analysis of environmental protection in rural tourism development
Game theory is to study the decision-making when the behaviour of the decision-making subject directly interacts and the equilibrium of this kind of decision-making, that is to say, when a subject, the choice of a person or a company is affected by the choices of other people and other companies, And in turn affect the decision-making and equilibrium problems of other people and other companies when they choose. In a certain sense, game theory is the science of studying the most likely decision-making results of decision-making entities that influence each other. The harmony of tourism development and environmental protection in rural tourism destinations involves decision-making and behaviour among tourism enterprises, government departments and residents of tourist destinations. The interests they represent are mutually influenced and restricted [3]. All parties must not only consider themselves the payment for environmental protection must also consider the payment of other parties. For this reason, it is necessary to study the relationship among stakeholders such as tourism companies, government departments, and residents of tourist destinations. To deal with these relationships, in fact, it is to study the game problem between all stakeholders and find the equilibrium point of the game. Jump out of the unfavourable equilibrium point.

3.1. Game analysis of tourism development and environmental protection among enterprises
There are two tourism companies, A and B. They are of the same scale and provide the same products to the market. In the development of rural tourism, they have two choices for the local environment: protection and non-protection. Now make the following assumptions: (1) If they do not protect the
environment, the benefits are $I_1$ and $I_2$ respectively; (2) When investing in environmental protection, the benefits are $R_1$ and $R_2$. When protecting, the environment is improved, but due to the long-term nature of environmental improvement and positive externalities, the investment in environmental protection is often greater than the short-term direct benefit from it, that is, $I_1 > R_1, I_2 > R_2$. Then the pay-out matrix of Figure 1 can be obtained:

![Figure 1. Game payment matrix between tourism companies](image)

First, let's look at the decision-making situation of A. Assuming that B chooses protection, then the income when A chooses protection is $R_1$, and the income when it does not protect is $I_1$. Because of $I_1 > R_1$, A's optimal strategy is no protection; it is obvious that when pay-out B chooses not to protect, A's optimal decision is still not to protect. In the same way, no matter which decision A chooses, the optimal decision of B is not to protect ($I_2 > R_2$). Therefore, (no protection, no protection) constitutes a Nash equilibrium of the game, and $(I_1, I_2)$ is the corresponding equilibrium return, which forms a typical "Prisoner's Dilemma".

3.2. Game analysis among residents in tourist destinations

For rural tourism destinations, the development of tourism has promoted the development of the local economy, improved the living standards of farmers, and increased the employment rate in rural areas. This is undoubtedly a good opportunity for farmers who have been in poverty for a long time to develop rural tourism. And people in the real world are "rational economic people", and the pursuit of profit maximization is their goal. Especially farmers living in rural areas, due to scientific and cultural knowledge, economic development level and cognition and other reasons, will often sacrifice the interests of the environment for their own interests. Assuming that there are two residents of households A and B, they have two attitudes towards the local ecological environment, namely protection and non-protection. When both parties do not protect, the ecological environment of the place will be further deteriorated, so both parties will lose R; when both parties adopt an active protection attitude, they both need to pay a certain price, so each gets I. However, in the game between the two parties, no matter which side adopts a positive attitude or a negative attitude, the other side will adopt a negative attitude [4]. This is because the improvement of the ecological environment is a public product with strong externalities. Once it is produced, there will be no People will be excluded from enjoying the benefits it brings, and are often consumed by groups. If Party A actively protects, it will not only bear the cost of ecological construction, also bear the loss caused by Party B’s non-cooperation, therefore loss $R_1 (R < R_2)$. Because Party B does not cooperate and does not need to pay the cost, but can enjoy the benefits brought by the improvement of the ecological environment, it obtains $I_1 (I < I_2)$, and vice versa (see Figure 2). Therefore, the Nash equilibrium is (no protection, no
protection), and \((-R, -R)\) is the corresponding equilibrium benefit, that is, neither party will take the initiative to actively participate in and implement ecological protection and reconstruction.

4. Theories and models of coupling and coordination of rural tourism and ecological environment

4.1. Coupling degree model

The evaluation of the coupling degree of rural tourism and ecological environment needs to establish an efficacy function first. Let the number of subsystems be \(i\), \(U_{ij}\) is the effect of the \(j\)-th index of the \(i\)-th subsystem on the coupled system. \(X_{ij}(i=1,2,\ldots,n)\) is the corresponding index value. \(\alpha_{ij}, \beta_{ij}\) is the upper limit and lower limit of the corresponding index when the coupled system is in a stable state. Accordingly, the efficiency coefficient \(U_{ij}\) can be expressed as:

\[
U_{ij} = \frac{X_{ij} - \beta_{ij}}{\alpha_{ij} - \beta_{ij}} = \frac{\alpha_{ij} - X_{ij}}{\alpha_{ij} - \beta_{ij}}
\]

In the formula: \(U_{ij} \in [0,1]\) reflects the contribution of variable \(X_{ij}\) to the efficiency of the coupled system. \(U_{ij}\) approaches 0, the lower the degree of each evaluation index reaching the target value, and \(U_{ij}\) approaches 1, reflecting the closer each evaluation index is target value. When calculating the total power value of each index in the subsystem, the commonly used methods are geometric average method and linear weighted sum method. This study uses the linear weighted sum method to calculate the total power of each subsystem index. The construction function is as follows:

\[
U_{i} = \sum_{j=1}^{n} \lambda_{ij} \times U_{ij}
\]

Among them, \(\lambda_{ij}\) is the weight of each evaluation index in the system, and satisfies \(\sum_{j=1}^{n} \lambda_{ij} = 1\). Because the rural tourism and ecological environment in different regions show a dynamic development trend, and the development process and level are quite different, therefore, in the initial stage of development, when the comprehensive evaluation value of the subsystem is small and similar in size, the above formula can be obtained. The result of the evaluation is that the degree of coupling is high, which does not match the actual situation, which is the so-called pseudo-coordination.
4.2. Coupling coordination degree model

\[ D = \sqrt{CF} \]

\[ F = au + bh \]

In the formula: D represents the degree of coupling coordination, C represents the degree of coupling, F reflects the overall synergy or contribution of the two subsystems, and a and b are undetermined values.

5. Rural tourism development approaches under green environmental protection

5.1. Innovating the concept of ecological development of rural tourism

When carrying out rural tourism project construction and development activities, all localities should integrate the concept of "green water and green mountains are golden mountains and silver mountains" into the overall development, and promote the development of rural tourism development in the direction of "ecological benefits". This requires effective integration with the three industries in the specific development process, especially focusing on solving the problem of integration of rural tourism resources, and unified planning and design of rural tourism in various regions to make rural tourism development more effective. It is necessary to effectively solve the relationship between rural tourism development and protection, focus on promoting the steady development of rural tourism, strengthen the protection of the ecological system and production system in rural areas, and plan and design in accordance with the requirements and standards of decolonialization. Tourism resources must also effectively protect the ecological system. Only in this way can rural tourism enter the track of sustainable development.

5.2. Consolidate the construction of rural tourism infrastructure

For any tourism business, the level of infrastructure construction is directly related to its attractiveness, influence and competitiveness. Especially since rural tourism has strong ecological attributes, more attention should be paid to infrastructure construction, otherwise Will restrict its scientific development. In the process of rural tourism development, all localities must upgrade infrastructure construction to a strategic level, especially starting with the "four modernizations" of ecological, green, environmental, and sustainable, focusing on protecting rural production relations and ecosystems. Increase investment in the development of rural tourism resources and the systematic, characteristic, and targeted design of facilities, closely integrate it with farmers' daily production, rural industrial development, and agricultural transformation and upgrading, and strive to create "one village, one product" and "one town, one product" Rural tourism brands solve the problem of "homogenization" and make rural tourism infrastructure more attractive. More attention should be paid to the overall, systematic and coordinated construction of tourism infrastructure construction such as food, accommodation, transportation, guide, shopping, and tourism, and the concept of "circular economy" should be applied to the construction of rural tourism infrastructure, which not only reflects the importance of rural tourism. Features, but can also achieve ecological protection, green tourism and low-carbon consumption.

5.3. Enhancing the environmental protection awareness of enterprises

Because rural tourism resources are not completely "smoke-free industries", tourism resources are not inexhaustible and inexhaustible. Therefore, it is necessary to conduct environmental impact assessment (EIA) and environmental audit (EA) in areas where rural tourism is developed, determine reasonable environmental carrying capacity and tourist capacity, predict the impact of tourism development on the environment and the risks assumed, and determine "eco-economic fitness" Only by taking appropriate environmental protection measures on this basis can the development of rural tourism be built on the capacity of the ecological environment and meet the requirements of local
economic development and social ethics [5]. Tourism developers and operators should implement "grading" assessment to determine whether they have the ability and rights to develop and operate, vigorously develop and develop green products and ecological products, and promote and guide the use of various ecological and ecological products in rural tourism activities. Natural, pollution-free facilities and equipment, set up "public education halls" to educate tourists on ecological environment protection and cultivate their ecological personality. Certain economic or labour penalties should be imposed on tourists who damage the environment. "Ecological monitoring stations" should be established in mature rural tourism destinations to monitor the changes in the rural ecological environment caused by tourism activities.

5.4. The government must use economic leverage to protect the environment

5.4.1. Environmental taxes. The result of game analysis shows that whether an enterprise actively pursues environmental protection is mainly determined by its investment in environmental pollution prevention and control. It does not depend on the number of employees or the size of the equipment. From a policy perspective. Under market economy conditions. Due to the change of the country's status in the entire economic operation, it is required to make full use of taxation methods: 1) To evaluate the pollution prevention and control work of enterprises. And use it as a basis for determining the level of corporate taxation; 2) In the tax system design and tax legislation. Strengthen environmental awareness. Add environmental taxes and environmental protection clauses 3) Incorporate environmental resource factors into economic accounting. When pricing the products produced, environmental resources are included in the cost and price of the products. 4) Increase tax incentives and support green industries. Guide consumers to switch to green products. In this way, if companies increase investment and loans in pollution control, on the one hand, they can reduce taxes, and on the other hand, green products that can be produced on this basis will be rewarded by raising prices and sales.

5.4.2. Subsidies. The policy tool of subsidies has both pros and cons. On the one hand, subsidies distort the market price of resources, leading to waste and abuse of resources; on the other hand, subsidies for the development and promotion of technologies that are conducive to environmental protection produce good results. In the development of rural tourism, the government should give certain subsidies to environmental protection enterprises that adopt pollution-free new materials and advanced technologies to stimulate their environmental protection enthusiasm.

5.4.3. Trading of emission rights. This is another system design that uses market mechanisms to control the total discharge of pollutants. Through the permit system, society can set an upper limit on the annual pollution discharge or data consumption, and the price of the permit is determined by the market supply and demand relationship. The government sets prices for pollutant emissions, and the number of pollutants is determined by environmental capacity and the market. This method can be used to control the rapid increase in the number of cars entering the country. For example, in 1992, the price of a car license in Singapore was equivalent to a quarter of the price of a mid-range car.

6. Conclusion
The coordinated development of rural tourism development and environmental protection requires the participation of the government and the majority of the community. We should fully realize the importance and necessity of rural tourism environmental protection, and face the inevitable connection between rural tourism development and environmental protection. The quality of the ecological environment directly affects the development of rural tourism, and is also an important factor in the sustainable development of rural tourism. By strengthening management and supervision and adopting effective governance measures, the coordinated development of rural tourism and environmental
protection is realized, and a virtuous circle between rural tourism and environmental protection is promoted.

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