Game Analysis on Agritainment Owners' Participation in Rural Tourism Collective Management

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Abstract. Combing with author's field investigation of Shuikou Township in Changxing County, using the method of Game Theory and Collective Action Theory, this paper analyzes the decision-making problem of agritainment owners' participation in collective management in rural tourism. The strategies of the township government are Incentive, Negotiation and Administration, while the strategies of the agritainment owners are obedience and resistance. The game results suggest that, when developing the collective management model of rural tourism, the township government should pay attention: when making decisions, they can reduce subsidies on the agritainment owners, make it less than their costs, and then adopt the method of negotiation. Besides, additional incentives for agritainment owners can be improved to maintain the maximum profit advantage, and then incentive method can be successfully adopted.

Introduction

Under the current booming situation of agritainment rural tourism, it generated two management modes—Individual Management and Collective Management, in which the Individual Management model appeared, that is "Small, Dispersion, Disorder" phenomenon. Wang Wenping and Jin Lu (2019) took Houan Village of Tiantai County as an example, and found that there were bottlenecks such as insufficient overall planning, obvious off-peak and peak seasons, relatively single business type and lack of popularity [11]. First, small-scale. Rural agritainments are mainly engaged in a single "family" operation. Second, management dispersion. In some areas, the responsibilities of the regulatory departments are unclear, and lacking mature management system to regulate agritainment owners. Third, management disorder. Most of the agritainments are single and homogenized, failing to form a rural tourism brand and industrial chain. While, the Collective Management mode, which is a kind of management mode jointly, carried out by village collectives. It overcomes the "Small, Dispersion, Disorder" problem of individual management and has been proved to be a good model.

By comparing the two models, it can be found that the trend of rural tourism will be Collective Management mode. Thus, this article introduces the theory of collective action, and applies Dynamic Games of Complete Information to rural tourism study. In order to make comprehensive analysis of the Game behavior of agritainment owners and township government, making it convenient for the township government to better drive the farmers to participate in the Collective Management.

Collective Action Theory and Rural Tourism Management

Collective Action Theory

Mancur Olson (1965) put forward the collective action theory on the basis of the hypothesis of economic man. He believes that participants are rational and pursue their own utility maximization. Later, Olson divided the collective into small collective and large collective according to the scale [6].
Whether an individual participates in the collective action or not is the result of rational calculation of the cost and benefit of individual action, that is, there is a critical value. The closer to this critical value, the greater the balance between individual interests and collective interests. On the contrary, the two will produce conflict \([1,3]\). However, collective action is not impossible. Internalizing externalities through forced arrangements or adopting selective incentives are both effective solutions to the free-rider and prisoner dilemmas. Combined with the above scheme, Ostrom (2000) found in the experiment that in multiple repeated games, there would be a tendency of cooperation between actors. Therefore, what is needed in collective action is trust \([7]\).

**Collective Action in Rural Tourism Management**

At the *Model level*: Zhu Tianyi and Zhang Lirong (2017) analyzed the orientation conflict between individual management and centralized management, and pointed out that individual management preference emphasizes increasing individual income in the short term and narrowing the gap between rich and poor to achieve the policy objectives. Collective Management emphasizes to enhance the sustainable endogenous development ability of villages through the development of village self-organization and collective industrialization, and to increase the welfare of vulnerable groups and reduce the financial burden of the government through Collective Management profits \([12]\).

*Method level*: Liu Xiaomei (2007), using the game theory analysis, when the body of the farmers as a separate directly to tourists, inevitably under the condition of the opportunism mental work with shoddy service for additional benefits, and provides advantages services generated by would also be affected, produce the phenomenon of bad money drive out good money, even in a "prisoner's dilemma". Under the collective management mode, farmers can choose to accept or reject the cooperative intention. If you refuse, the game ends immediately. If accepted, it is a benign benefit \([5]\).

*Case level*: The successful case of Yuanjia Village in Shaanxi Province highlights the benefits of collective development. Through the participation of the whole people, Yuanjia Village's industry has finished a three-step strategy from Guanzhong folk tourism, rural vacation, to the agricultural and sideline products related industrial chain. Then put forward the collectivization development mode, "advocate to guide all villagers to participate in the cooperative, joint-stock system and other ways, so as to achieve the fundamental goal of farmers to become rich" \([9]\).

**The Analysis of Interest Groups in Rural Tourism Collective Management**

**Township Government**

The township government here includes the local government, the competent departments and the local agritainment association. The township government's role is mainly to plan and organize the implementation of tourism resources, integrate public and tourism resources, as the competent department to manage and supervise farmhouse entertainment and related industries as well as tourism professionals. At the same time, it is also the coordinator of the interests of rural tourism, pursuing collective public interests \([4]\).

**Agritainment Owners**

The agritainment owners refer to the farmers who operate agritainments in the village. On the one hand, agritainment owners, as beneficiaries of rural tourism activities, want to improve their income level by participating in the distribution of tourism benefits. On the other hand, as the bearer of the influence of rural tourism development, the local villagers have created local customs and village culture, and the villagers' daily activities have also become a kind of tourism resource. Therefore, Chen Qiuhua (2016) believes that the Game between the local government and the villagers is mainly reflected the conflicts of interest in land requisition and the game of later management \([2]\).

**Behavior Analysis of Township Government and Agritainment Owners**

*Incentives methods*: Shao Yanmin (2014) discussed the Huaxi village model. A community-based
joint-stock cooperative system with collective holding, villagers’ equity participation and diversified property rights subjects enables farmers to really participate in the management. In addition, the three distribution systems of distribution according to work (salary and bonus), according to need (welfare of villagers) and according to capital (dividends of villagers' shares) will be complementary to realize the unity of fairness and efficiency, stimulate the enthusiasm of farmers to maintain and develop the collective economy, and the important role of incentive mechanism will be brought into play to realize the simultaneous increase of collective and individual income and wealth [8].

Negotiation methods: Wang Minxian (2018) proposed the village collective management mode. The village committee should standardize and manage the development and management of rural tourism. Villagers should participate in rural tourism management activities according to the principle of voluntariness. And they can also take shares in land, so villagers are both shareholders and employees of the company. They directly participate in the development, management and decision-making of rural tourism and the distribution of benefits, which reflects their status as participants in rural tourism and greatly improves the enthusiasm of the villagers [10].

Administrative Methods: ShuiKou Township has adopted policy adjustments in the management of agritainment. In terms of housing approval: First, all houses must be built along the homestead instead of being built in other places. Second, the height dropped to 12 meters—three floors. Third, the ratio of courtyard to building is 1:1. It was forbidden to repair the courtyard. In terms of access permits: First, a special trade license must be obtained to operate agritainment; Second, the number of rooms must be below 15. Third, before approval, agritainment owners need to provide the structural drawings, functional layout drawings, decoration drawings, etc. of the house.

Dynamic Game Analysis between Agritainment Owners and Township Government

The process of rural tourism collective management is actually a process of game. Township government and agritainment owners all know each other's characteristics, strategies and results clearly, so the game is a complete information game. Moreover, the game between township government and agritainment owners has the sequence. Thus, the behavior of them constitutes a Complete Information Dynamic Game Model. The author made the following assumptions:

1. Assuming that the township government pursues the maximization of overall benefits, that is, the sum of the income of the township government and the agritainment owners; agritainment owners are rational economic people who pursue the maximization of their personal interests.

2. Assuming the township government adopt three ways: Incentive, Negotiation, Administration.

3. Assuming that there are only two types of pure strategic space for agritainment owners, namely, obedience and resistance.

Thus, the payment matrix of the two interest groups are shown in the table1.

| Township government | Agritainment Owners |
|---------------------|---------------------|
|                     | Obedience | Resistance |
| Administration      | A+E-D,B-E | A+E-D,B-E+F |
| Negotiation         | A,B       | A,B-C      |
| Incentive           | A,B+G     | A,B+G-H    |

In the table, assuming that the township government adopt the negotiation methods. If agritainment owners obey, then the profit of the township government were A and the profit of agritainment owners were B. Obviously, this is a rational and balanced state. If agritainment owners resist, the cost would be C; Assuming that the township government adopts administrative methods, their cost would be D, and the agritainment owners’ losses caused by administrative methods were E, which is same as the
township government’s additional income. If the agritainment owners resist, the compensation obtained from the township government were F; Assuming that the township government adopts incentive methods, the additional income of agritainment owners were G; If resist, the cost of agritainment owners would be H. The following figure shows this game model more intuitively.

According to the method, if the township government chooses the Administrative methods, then the agritainment owners will choose to resist, because the income B-E+F>B-E, the result will be (A+E-D, B-E+F). If the township government chooses the Negotiation methods, so agritainment owners will choose to obey, because B>B-C, the result will be (A, B). If adopting Incentives, agritainment owners will choose to obey, because B+G>B+G-H, the result will be (A,B+G).

Because it is a Dynamic Game of Complete Information, the township government knows the selection method of agritainment owners, and then pushes back to the first stage. According to hypothesis 1, it is necessary to compare the sizes of A+E-D+B-E+F and A+B and A+B+G. If the township government adopts Incentives, the fact of the matter will be:

\[
A+E-D+B-E+F<A+B+G \quad (1) \quad A+B+G>A+B \quad (2)
\]

According to formula (1)(2), F-D<G, that is, the difference between the compensation F obtained by agritainment owners' resistance and the cost D of Administrative methods paid by the township government is smaller than the additional income G obtained by agritainment owners under the Incentive methods, the township government will choose to adopt Incentive methods. Therefore, the sub-game refined Nash equilibrium of the game will be (Incentive, {Obedience, Resistance}).

If the township government adopts Negotiation methods, there is:

\[
A+E-D+B-E+F<A+B \quad (3)
\]

According to formula (3), F<D, that is, the compensation F obtained by agritainment owners’ resistance were less than the cost D of Administrative measures paid by the township government, the township government will choose Negotiation. Therefore, the sub-game refined Nash equilibrium of the game will be (Negotiation, {Obedience, Resistance}). On the contrary, if F>D, the sub-game refined Nash equilibrium will be (Administration, {Resistance, Obedience}).

**Game Analysis and Policy Implications**

**Game Analysis**

Combined with the above game, the sub-game refined Nash equilibrium set of the game between the agritainment owners and the township government are as follows:

\[
\begin{align*}
F-D&<G, (\text{Incentive, \{ Obedience, Resistance \}}) \quad \text{(1)} \\
F-D&<0, (\text{Negotiation, \{ Obedience, Resistance \}}) \quad \text{(2)} \\
F-D&>0, (\text{Administration, \{ Obedience, Resistance \}}) \quad \text{(3)}
\end{align*}
\]

That is, how does the township government choose Incentive, Negotiation and Administration:
① If the difference between the compensation obtained by agritainment owners' resistance under the Administrative methods and the cost of Administrative measures is less than the additional income obtained by the agritainment owners under the Incentive methods, the township government will choose to adopt Incentive measures, and the agritainment owners will not choose to resist.

② If the compensation received by agritainment owners' resistance under the Administrative methods is less than the cost of Administrative methods, the township government will choose Negotiation, and agritainment owners will not resist, so both interest groups will achieve a win-win result.

③ If the compensation received by agritainment owners' resistance under the Administrative methods is more than the cost of Administrative methods, the township government will choose Administrative. Then the agritainment owners will adopt resistance attitude.

Policy Implications

From the perspective of the township government, first of all, it pursues the maximization of the overall interests. Meanwhile, from the above-mentioned Game conclusion, it is known that the methods adopted are all related to the cost of Administrative methods and the compensation received by the agritainment owners under such methods. Therefore, when considering how to choose the methods, the township government can start from the comparison of costs and subsidies. Secondly, both theory and practice have proved that Negotiation and Incentives are more effective methods. Consequently, the township government can reduce subsidies for agritainment owners until less than the cost they paid, when making decisions, then adopting Negotiation methods will be smoothly. In addition, the township government can improve the extra rewards for the agritainment owners, so that they can maintain the maximum profit advantage, and then smoothly adopt Incentives.

Conclusion

Through the analysis of the Game model in this paper, we can find that the application of Game Theory in rural tourism can help the township government and agritainment owners to make effective decisions. At the same time, Incentives and Negotiation have been proved to be more effective, and in these two cases, agritainment owners choose to obey, which also means maximizing their own interests. In fact, for township government, the pursuit is not only to maximize the collective benefits of the sum of the township government’s and the agritainment owners’ income, but also to ensure the living conditions of local farmers and the harmonious relationship with the township government. Therefore, participating in the collective management of rural tourism not only protects the interests of the agritainment owners, but also enhance the relationship with the township government.

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