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The Efficiency of Tourism Poverty Alleviation and Its characters of Temporal and Spatial in Impoverished Mountainous Areas-A Case of Dabie Mountain in Hubei Province China

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Abstract: Poverty alleviation efficiency is the core indicator to test the success of poverty alleviation measures. Sixteen counties (districts) in Dabie Mountains of Hubei Province were used as research objects. Data Envelopment Analysis model (DEA model) was used to calculate the poverty alleviation efficiency of each county (district) from 2010 to 2017, Comprehensive technical efficiency was analyzed, and the spatial and temporal evolution characteristics of poverty alleviation efficiency were revealed by using Arc GIS 10.5. The results show that: 1) the overall efficiency of tourism poverty alleviation in this region is at a low level (0.472), and only four counties (districts) such as Xinzhou District achieved a high level; 2) The efficiency of tourism poverty alleviation among counties (districts) is of great difference and obviously imbalanced, southeast counties (districts) are higher than that in Northwest counties (districts); 3) The comprehensive efficiency of tourism poverty alleviation is greatly influenced by scale efficiency, but less by pure technical efficiency; 4) The efficiency of tourism poverty alleviation is not directly related to the level of tourism development in the region, but is closely related to the level of economic development in the region. The lower the level of economic development is, the more obvious the efficiency of regional tourism poverty alleviation is.

Keywords: Efficiency of tourism poverty alleviation, DEA model, spatio-temporal evolution.

Introduction

Poverty is a universal phenomenon all over the world. The Chinese government has put forward the strategic goal of the 2020 overall well-off, 2020 precision poverty alleviation. Poverty alleviation through tourism has become an important choice for poverty alleviation strategy. To solve the

problems of “agriculture, rural areas and rural residents” and win the battle against poverty, it is undoubtedly to promote “tourism poverty alleviation” throughout the country [1,2].

Many scholars carried out a series of studies on the efficiency of poverty alleviation through tourism. Western scholar’s research on the efficiency of poverty alleviation by tourism mainly focuses on Pro-poor tourism model, the impact of tourism on poverty alleviation. The study area was concentrated in developing countries. General equilibrium theory was used for studying the economic role of tourism by Blake and cooperators [3-7].

Chinese scholars’ research on Tourism poverty alleviation mainly focuses on the methods of measuring tourism efficiency, the research objects and the effects of tourism poverty alleviation at the macro-regional level and so on. Deng Weijie and cooperators put forward suggestions on constructing concepts of targeted poverty alleviation through rural tourism, promoting rural tourism products and establishing incentive mechanism by setting up a model of targeted poverty alleviation in rural tourism [8]. Few scholars have studied the efficiency of tourism poverty alleviation in Dabie mountains.

The economic development in the old revolutionary areas of Dabie Mountains relatively backward. Making full use of the abundant natural resources of Dabie Mountains to develop tourism is an effective way to solve the problems of poverty of residents. Based on the evaluation of the efficiency of tourism poverty alleviation in the Dabie Mountains of Hubei Province, this paper reveals the spatial and temporal evolution characteristics, which could provide certain guidance both theoretically and practically on alleviating poverty and implementing rural revitalization strategy.

Research methods and data sources

Research methods

“Data Envelopment Analysis (DEA)” are used to measure efficiency of tourism poverty alleviation, ArcGIS 10.5 Mapping Software are used to analyze the spatial characteristics of tourism poverty alleviation efficiency.

“Data Envelopment Analysis (DEA)” was originally developed from the technical efficiency of Farrell’s concept of production boundary estimation. It is a very useful tool for evaluating multi-input and multi-output decision-making units. This method is based on the “relative efficiency evaluation” and is used to evaluate the efficiency level of a group of multi-input and multi-output decision making units (DMU). DEA has been widely used in economic management and other fields because it does not need any weight assumptions and relevant production functions, and has obvious advantages in simplifying operations, reducing errors and avoiding interference from subjective factors.

Object selection and index construction

According to the Revitalization and Development Plan for the Old Revolutionary Areas of Dabie Mountains issued by the State Council in 2015,

the regional scope of targeted poverty alleviation proposed by nation, and the actual situation of the research region, 16 counties (districts) are selected as the research objects, which named Tuanfeng County, Macheng City, Hongan County, Luotian County, Yingshan County, Qichun County, Xishui County, Huangmei County and Wuxue City; Xiaochang County, Dawu County and Anlu City of Xiaogan City; Suixian and Guangshui City of Suizhou City; and Xinzhou District and Huangpi District of Wuhan City.

According to the requirement of DEA model, the number of DMUs is more than twice the product of input and output indicators. Therefore, two inputs and outputs indicators are selected respectively. In order to give consideration to data availability and evaluation objectivity, the per capita tourism income and the per capita tourist reception volume are selected as input indicators. GDP per capita and disposable income per capita of rural permanent residents should be taken as output indicators.

Data sources

The data needed are mainly from the "Statistical Data of Hubei Province" in 2011-2017 and the Statistical Bulletin of National Economic and Social Development of 16 counties (districts) in 2010-2017 covered by this paper. A small amount of data is from the administrative departments such as county (district) Tourism Bureau and statistical bureau. Some missing data are obtained by linear regression analysis based on the data of previous and next years.

Process and analysis

Overall analysis

From Figure 1, we can see that the efficiency of poverty alleviation through tourism in Dabie Mountain counties (districts) of Hubei Province is unstable from 2010 to 2017, and some counties (districts) fluctuate greatly. It shows that poverty alleviation through tourism takes a trend of decreasing firstly, then increasing and gradually stabilizing in Figure1. Specifically, it reflects the following characteristics: 1) the overall level of poverty alleviation efficiency of tourism is low, indicating that the development of tourism in the region has not fully played its role of poverty alleviation; 2) the efficiency of poverty alleviation of tourism in various counties (districts) is quite different and obviously imbalanced; 3) the efficiency of poverty alleviation of tourism in various counties (districts) was very unstable before 2013, and then gradually became stable, indicating the development of tourism industry was greatly influenced by external conditions before 2013, and then gradually became mature.

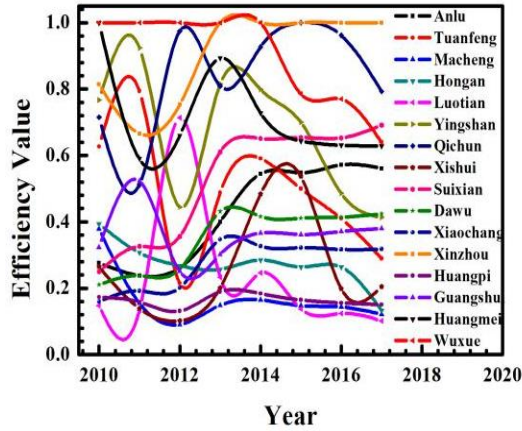


Figure 1. Change of comprehensive efficiency of tourism poverty alleviation in Dabie Mountains, Hubei Province, 2010-2017

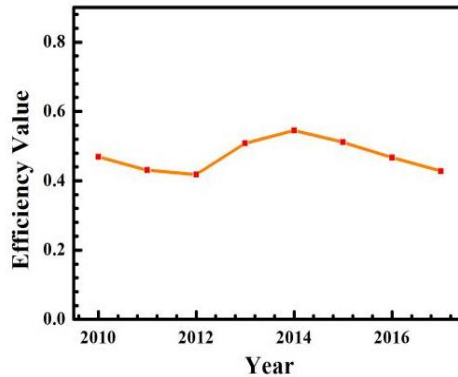


Figure 2. Changes in the mean value of comprehensive efficiency of tourism poverty alleviation in Dabie Mountains, Hubei Province, 2010-2017

From Figure2, we can find that the average comprehensive efficiency shows a trend of decreasing firstly, then rising and then declining during 2010-2017. The overall level is very unstable, with two major fluctuations. the average comprehensive efficiency of poverty alleviation by tourism in 2011 was 0.469, The period between 2010 and 2012 is the initial stage of rural tourism in the Dabie Mountains, and then many policies were introduced by Chinese government to support around the development of tourism, the comprehensive efficiency of poverty alleviation through tourism has risen rapidly. In 2014, the overall efficiency of poverty alleviation through tourism was 0.545, being the highest in these years. However, since then, the overall efficiency of poverty alleviation through tourism has declined year by year. Mainly due to a lot of marketers and factors flooded into the region, resulting in disorderly competition.

Concrete analysis

There are 4 counties (districts) with relatively effective comprehensive efficiency of poverty alleviation through tourism named Xishui County, Xinzhou District, Wuxue City and Huangmei County. From the average level, the average poverty alleviation efficiency of tourism in Dabie Mountains of Hubei Province is 0.472, which is in the middle-lower level. According to the changing trend, the average efficiency of tourism poverty alleviation decreased from 0.469 in 2010 to 0.428 in 2017 in the Dabie Mountains of Hubei Province, and the average efficiency of tourism poverty alleviation reached the highest value in 2014 (0.545); the pure technical efficiency of tourism poverty alleviation is at a high level (0.774). nine counties (districts) with pure technical efficiency of poverty alleviation had achieved the best production frontier of DEA, but they account for only 56.25% of the total number of counties (districts); the average scale efficiency of tourism poverty alleviation is 0.596 in the counties (districts) of the Dabie Mountains in Hubei Province from 2010 to 2017, which shows that in the future, there is a lot of room to improve the comprehensive benefits of tourism poverty alleviation. The scale efficiency of poverty alleviation through tourism in most counties (districts) of Dabie Mountain in Hubei Province is on the decrease. This shows that the growth rate of poverty alleviation output of tourism in this region is less than that of input growth, and the scale of tourism development should be further controlled by reducing input.

Spatial characters analysis of tourism poverty alleviation efficiency

The spatial distribution characteristics of the average efficiency of poverty alleviation through tourism were reflected from Figure 3. It can be seen that there exists a certain agglomeration tendency as for the comprehensive efficiency of poverty alleviation through tourism in the counties (districts). A high-value area with high average efficiency represented by Xinzhou District and Wuxue City has initially formed and radiated outward. This phenomenon shows that the development of tourism poverty alleviation among counties (districts) is not independent, but interacts and restricts each other. From the perspective of spatial distribution, the average efficiency of tourism poverty alleviation in southeast counties (districts) is generally higher than that in northwest counties (districts). The spatial distribution of tourism poverty alleviation efficiency indifferent counties (districts) is quite different obviously imbalanced. The counties in the southeast attract a large number of citizens to go sightseeing because of distance effect and citizens' desire to flee the city. Therefore, the efficiency of tourism poverty alleviation in this region is relatively high.

The spatial evolution characteristics of poverty alleviation efficiency in this region were reflected from Figure 4, Figure 5 and Figure 6. The tourism poverty alleviation efficiency in Xinzhou District has been at a high level, reaching the production frontier, and being in the DEA effective state, which is consistent with the above research results; the comprehensive efficiency of Anlu City, Dawu County, Tuanfeng County and Xishui County has been improved slightly. The comprehensive efficiency of Qichun City, Wuxue City,

Hongan County, Macheng City, Luotian County and Huangmei County has been in a state of decline. The low efficiency of tourism poverty alleviation in Huangpi District and Suixian County show that the two counties have not fully utilized their resource potential and there is a large room for tourism poverty alleviation.

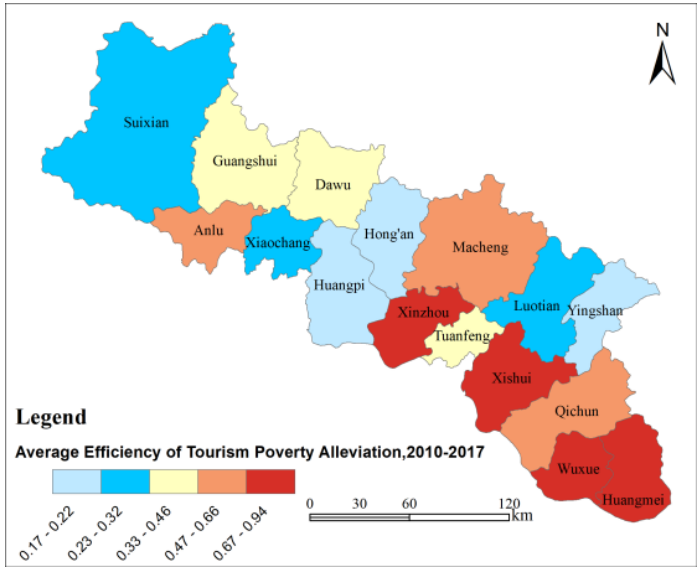


Figure 3. Average Efficiency of Tourism Poverty Alleviation, 2010-2017

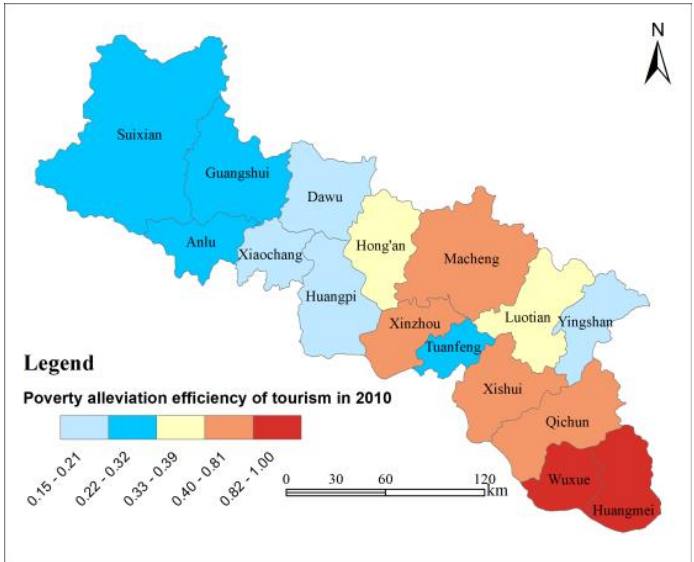


Figure 4. Poverty alleviation efficiency of tourism in 2010

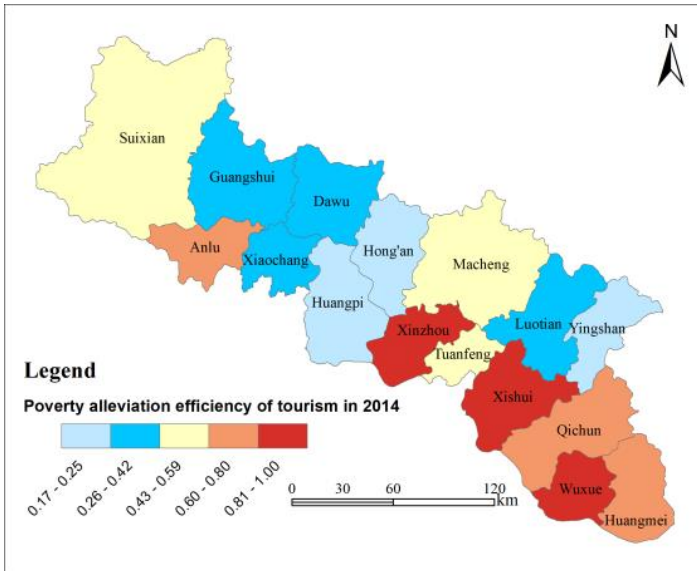


Figure5. Poverty Alleviation Efficiency of Tourism in 2014

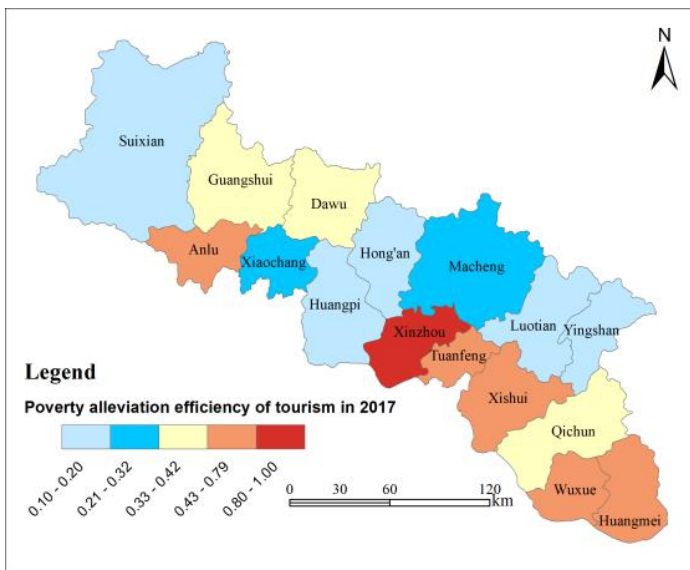


Figure 6. Poverty alleviation efficiency of tourism in 2017

Conclusion

Taking Dabie Mountains in Hubei Province as an empirical target, the paper measured the efficiency of tourism poverty alleviation by means of DEA model based on output orientation. ArcGIS 10.5 was applied to analyze its spatial and temporal evolution characteristics to reveal the spatial evolution law of tourism poverty alleviation efficiency. We have obtained the following

conclusions.

Overall, the comprehensive efficiency of tourism poverty alleviation was at a low level (0.472) in the Dabie Mountains of Hubei Province. Only four counties (districts), such as Xinzhou District, Wuxue City, Xishui County and Huangmei County, achieved DEA effectiveness and reached the best frontier production in terms of the tourism poverty alleviation efficiency. There is a great room for other counties (districts) to improve the efficiency of tourism poverty alleviation, and input and output need to be optimized urgently.

The spatial distribution of tourism poverty alleviation efficiency was quite different and obviously imbalanced in Dabie Mountains of Hubei Province. The average efficiency of tourism poverty alleviation in southeast counties (districts) were generally higher than that in northwest counties (districts). The comprehensive efficiency of tourism poverty alleviation was greatly influenced by scale efficiency, but less by pure technical efficiency.

The efficiency of tourism poverty alleviation was not directly related to the level of tourism development in the region, but closely related to the level of economic development in the region. The lower level of economic development is, the more obvious the efficiency of regional tourism poverty alleviation is.

In view of the above conclusions, some suggestions are put forward as follows: First and foremost, the mode of poverty alleviation through tourism should be innovated, The technical efficiency of poverty alleviation should be improved, the motive force of economic growth in poverty-stricken areas should be enhanced and more new forms of tourism industry should be cultivated. Besides, all of us should pay attention to ecological protection and the training of tourism talents, and promoting the sustainable development of poverty alleviation through tourism. Moreover, the whole society should develop tourism resources, improve tourism supporting measures, optimize tourism industrial structure, actively implement the global tourism strategy, improve the competitiveness of tourism industry, and broaden the efficiency space of tourism poverty alleviation. Last but not least, the level of government management and technology development of tourism development should be further enhanced, the proportion of poverty alleviation investment in tourism should be properly reduced, and the scale of tourism development should be reasonably controlled.

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