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LETTER TO THE EDITOR

Impact of Ecological Pollution on the Economy of Coastal Cities

Xiaoting Li[1*], Jingling Bao[2], Jianguang Sun[3], Ji Wang[4]

1 School of Economics and Management, Hebei University of Technology, Tianjin 300130, China

2 Tianjin Ecology and Environment Bureau, Tianjin 300130, China

3 School of Mechanical Engineering, Hebei University of Technology, Tianjin 300130, China

4 China Electronics Technology Group Corporation Eighteenth Institute, Tianjin 300130, China

[*]Email: aonic-1@163.com

While developing tourism economy, coastal cities need to pay attention to protecting the ecological environment of the city itself, because the development of coastal cities relies on the ocean, the urban ecological environment will directly affect the corresponding marine environment. Soil pollution has a serious impact on the ecological environment of coastal cities. Dealing with the relationship between ecological environment and economy of coastal cities is the premise of sustainable development of urban ecological environment and even marine environment. Based on the theory of coordinated development, the calculation formula of coordinated development degree is established, which provides a quantitative basis for the coordinated development of ecological environment and economy of coastal cities.

Soil Pollution; Coastal Cities; Eco-economic

1 INTRODUCTION

In recent years, the economy of coastal cities has made rapid progress. Driven by the economic development, the appearance of cities, infrastructure and people's living standards have also been improved. Coastal cities show vigorous vitality to the world. However, economic development will inevitably cause environmental damage to a certain extent. On the contrary, environmental pollution will also restrict economic development. Taking soil pollution as an example, it seriously pollutes the ecological environment of coastal cities. In the economic support of coastal cities, a major focus is tourism industry. Tourism, known as “sunrise industry”, has gradually become an important part of the economic development of coastal cities. Today, with the return to nature, simplicity, eco-tourism and 3S (Sea, Sun, Sand) tourism, marine tourism has become a favorite destination for tourists, and coastal cities have become the preferred destination for tourists. However, while tourists enjoy the ocean and feel the nature, people have realized that the tourism industry which has been considered as “smokeless industry” has brought huge profits to the urban economy, and the urban ecological environment has been damaged to varying degrees, some scholars have studied it.

Jin (2019) published an article entitled “Corrosion Resistance of Stainless Steel Structures in High Temperature Polluted Water Environment” on Issue 107 of Ekoloji in 2019. This paper focuses on the corrosion resistance of stainless steel structures in high temperature polluted water environment. Taking 361 L stainless

steel as the research object, the corrosion resistance of 361 L stainless steel in desalinated seawater environment was analyzed by electrochemical test, pitting characteristic potential test and stress corrosion test. The corrosion type and corrosion rate of stainless steel were evaluated by electrochemical noise. The results show that the corrosion of stainless steel surface is enhanced, the pitting corrosion ability of passive film on stainless steel surface is reduced, the corrosion resistance is poor, and the stress cracking of stainless steel is strengthened with the increase of environmental temperature of desalinated seawater. The electrochemical noise analysis shows that the current noise value and fluctuation amplitude are obviously increased, and the corrosion rate of stainless steel is accelerated.

Wu et al (2015) conducted a survey in Foshan City, which is a more developed area, to analyze residents' willingness to pay for soil pollution and the level of payment. CVM technology was used to analyze residents' willingness to pay for soil pollution control in Foshan City. The residents' willingness to pay for soil pollution control in this region is low, 52.0% of them are willing to pay, with an average payment value of 9.56 yuan/household/month. From the Logit model, the significant factors affecting the residents' willingness to pay are: education level, monthly income, attention to soil pollution, satisfaction with the current status of soil ecological environment, trust in environmental management departments and their environmental governance. From the multiple linear regression model, the factors affecting the payment level of residents are gender, monthly income, the degree of concern about soil pollution, the distance between housing and soil pollution sources, and the initiative to understand the information of soil pollution.

Cities are the carrier of society. Urban ecological environment is closely related to people's lives. Once the ecological environment of coastal cities is destroyed, it directly threatens the marine environment. Protecting the ecological environment of coastal cities is directly related to the sustainable development of the marine environment (Danovaro et al. 2018, Myles et al. 2018; Rumolo et al. 2017). Therefore, the development of tourism economy in coastal cities should be combined with the ecological environment of the city itself, which can neither advance much nor lag behind a lot, and the coordinated development of the two should be achieved. Based on the theory of coordinated development and the quantitative evaluation method of coordinated development of eco-environment and tourism economy, the coordinated development of eco-environment and tourism economy of different coastal cities (or regions) and the same coastal cities (or regions) in different periods can be quantitatively evaluated and compared, which can provide a reference basis for coastal cities to develop tourism strategy, protect urban ecological environment and protect marine environment.

2 IDEA DESCRIPTION

2.1 Coordinated development

“Coordination” and “development” are two completely different concepts (Zaror et al, 2018). Development refers to the process of change of system or system elements from small to large, from simple to complex, from low to high, from disorder to order; otherwise, it is called “negative development” or “reverse development” which keeps the status quo unchanged between the two. Coordination is the guarantee for the healthy development of multiple systems or elements. “Harmonious development” is the intersection of the concepts of “coordination” and “development”. It is the overall deepening process from low to high, from simple to complex, from disorder to orderly, on the basis of harmony, coordination and virtuous circle among the elements of the system or system. Harmonious development is not a single development, but a pluralistic development. In the process of coordinated development, development is the direction of system movement, while coordination is the intentional restriction and regulation of such directional behavior (Yang et al, 2018). With the development of

society, the concept of pluralistic development has replaced the previous single economic development concept, because people gradually realize that narrow development is at the cost of destruction or even destruction of other systems or elements, such as economic development causing environmental damage, which itself is a huge economic loss. Therefore, in order to achieve diversified development, we must establish the concept of coordination (Gil-Lopez et al, 2017).

2.2 Urban Ecological Environment and Tourism Economy

Urban ecological environment is a huge and complex ecological system, which can be divided into three subsystems: natural ecological environment system, economic environment system and social environment system. Under each subsystem, it can be divided into different levels of secondary subsystems (Xing et al. 2018). These subsystems constitute the urban ecological environment system according to certain morphological structure and nutritional structure. In a narrow sense, urban ecological environment system refers to the natural ecological environment system. Tourism economy is the sum of the demand-supply relationship between tourists and tour operators, which is formed by commodity exchange in tourism activities, and the economic relationship between tourism industry and government and other related industries in social economy. It can be seen that the broad sense of ecological environment and tourism economy are inclusive relations. Based on the principle of simplifying complexity, the narrow sense of urban ecological environment is adopted to avoid the intersection between the two. According to the theory of coordinated development, the urban ecological environment and tourism economy should not sacrifice each other, but should be harmonious, coordinated and virtuous circle, and finally rise to overall deepening, that is, to achieve a win-win situation of urban ecological environment and tourism economy.

3 RESULTS

3.1 Computation of Coordination Degree

Coordination degree is a quantitative index to measure the degree of coordination between systems or elements. This method can be used to measure the coordination of eco-environment and tourism economy in different development stages of a city or region. The emphasis of eco-environment and tourism economic development in different regions may be different, and the selection of indicators can be based on local conditions. For example, inland ecological environment focuses on water resources environment, animal and plant environment, tourism economy focuses on the number of tourists and tourism income, coastal city ecological environment focuses on water resources environment and atmospheric environment, tourism economy focuses on tourism facilities and tourism services. Setting up a collection of urban ecological environment: $X=\{x_1,x_2,\ldots x_i,\ldots,x_m\}$, ($x_i>0$, m is natural number), x_1 is the characteristic vector describing the ecological environment.; Setting up a Collection of Tourism Economy: $Y=\{y_1,y_2,y_j,\ldots,y_n\}$, ($y_j>0$, n is natural number), y_i is the characteristic vector describing the tourism economy; Then the comprehensive environmental evaluation function and the comprehensive tourism economic evaluation function are as follows:

$$f(X)=\sum_{i=1}^{m}a_i\hat{X}_i \tag{1}$$

$$f(Y)=\sum_{j=1}^{m}b_j\hat{Y}_j \tag{2}$$

Where, a_i , b_j is undetermined weights, the value of $\hat{X}_i$ is given by the following formula:

$\hat{X} = X_i / \lambda_{max}$,When the bigger the indicator, the better;

$\hat{X} = \lambda_{max} / X_i$,When the smaller the indicator, the better.;

Where, $\lambda_{\max}$ is the planning values for corresponding indicators X_i 。

3.2 Harmonious Development Degree

Although the degree of coordination can reflect the degree of coordination between ecological environment and tourism economy, it is of great significance to promote their healthy and coordinated development. It is difficult to reflect the overall function of ecological environment and tourism economy or the size (or level of development) of comprehensive environmental and economic benefits. That is to say, the level of development of eco-environment and tourism economy will be different in cities or regions with the same degree of coordination. According to the definition of coordinated development, the quantitative index to measure the level of coordinated development of ecological environment and tourism economy is called coordinated development degree, which is expressed by D .

$$D = \sqrt{C \times T} \tag{3}$$

Where, D represents the degree of coordinated development (coefficient); C represents Coordination Degree; T represents the comprehensive evaluation index of eco-environment and tourism economic benefit (development level); In practical application, it is the best that $T \in (0,1)$, this will ensure that $D \in (0,1)$, to easy to use analysis.

4 CONCLUSION

Quantitative evaluation can be made on the ecological environment and tourism economy of coastal cities by the method of coordinated development degree, which provides a basis for inspecting and formulating the urban development strategy of coastal cities. The method is described as follows:

Firstly, the selection of eco-environmental and tourism economic indicators of different coastal cities can be determined according to the characteristics of the city, but when comparing the time series of the same city, the selection of indicators must be consistent, otherwise there is no comparability. Secondly, the evaluation criteria should be established by the State Environmental Protection Administration or the State Tourism Administration to ensure the scientificity, applicability and comparability of the calculation results. The disadvantage is that the calculation result of coordinated development degree is a judgment of the past, and the prediction of the future needs to be further explored. Nowadays, people's outlook on life has changed gradually. Tourism and leisure will become a part of people's life. The content and form of tourism leisure tend to be diversified, but the overall development trend is to be close to nature. Not only tourists, but also people living in coastal cities will pursue the pleasure and elegance of hydrophilicity and facing water. While developing the economy, cities should strive to make room for citizens and tourists and protect the ecological environment of coastal cities.

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