Research on Application of Ecological Compensation Based on Spatial Distribution of Parameters in Marine Ecological Resources Management

Ye Tao

Hainan University College of Ecology and Environment, Danzhou, Hainan, 571700, China

Keywords: Marine resources; Ecological environment; Ecological compensation; Space distribution

Abstract: Faced with the rapid population growth and the increasing shortage of various land resources, making full use of marine resources has become an inevitable choice for China's economic development. The ocean is one of the most important ecosystems in the earth's biosphere and the birthplace of human civilization. China has yet to establish a regulatory policy system that can effectively coordinate the development and protection of marine ecology. The ecological environment cost of marine development activities cannot be effectively compensated, resulting in a series of increasingly serious marine ecological environment problems. In order to ensure the smooth implementation of the established marine ecological compensation mechanism, we must take corresponding countermeasures to solve various problems that may occur in the implementation process. In this paper, based on the practice of marine ecological resource management in China, the possible problems in the current marine ecological compensation mechanism are analyzed based on the spatial distribution of parameters, and the corresponding implementation countermeasures are put forward.

1. Introduction

Marine ecological resources provide resources and ecological services for human beings. They are not only an important component of the earth's life support system, but also the foundation for the sustainable development of human society and environment [1]. The ocean is one of the most important ecosystems in the earth's biosphere, with vast space and abundant resources. With the development of social economy, the demand for marine resources and development space is increasing, and the speed of marine development is gradually accelerating [2]. Ecosystem approach is an effective tool to deal with the contradiction between the utilization and development of human and natural resources. It has changed the disadvantages of traditional division of resources management and taking administrative areas as the management boundary [3]. The ocean is one of the most important ecosystems in the earth's biosphere and the birthplace of human civilization. As the contradiction between economic growth and the land environment intensifies, the rich resources in the ocean become the essential material foundation to support economic development [4]. In many simulation experiments, simple models have consistent performance with complex models. After the establishment of the marine ecological compensation mechanism, it will inevitably face many obstacles and problems in the initial stage of implementation. If no measures are taken to overcome these obstacles and resolve existing problems, it will restrict the deepening of the implementation of marine ecological compensation [5].

How to rationally utilize and protect marine resources and realize the value of marine ecosystems, so as to promote the sustainable development of marine economy and the environment, has become an urgent problem to be solved [6]. The rapid development of China's marine economy has basically followed the model of epitaxial growth mainly based on scale expansion, which has seriously threatened China's offshore marine ecosystem [7]. Due to the individual characteristics of marine ecosystems in some subregions, the practice of taking parameters constant throughout the study area led to large regional deviations in the simulation results [8]. This deficiency cannot be solved by modifying the physical mechanism, so it must be improved. The marine ecological compensation mechanism can assist marine management departments to integrate marine resources

  DOI: 10.25236/iwass.2019.245

into asset management, and can reflect the value of marine ecosystems [9]. It is an effective means to coordinate the relationship between marine development and marine environmental protection, and promote the intensive use of marine resources and marine environmental protection. The natural characteristics of large marine ecosystems require an ecosystem-based approach to management, which is the current world trend in integrated marine and coastal zone management [10]. Based on the practice of China's marine ecological resource management, this paper will analyze the problems that may occur in the current marine ecological compensation mechanism based on the spatial distribution of parameters, and propose corresponding implementation countermeasures for the existing problems.

2. Theoretical Basis of Marine Ecological Compensation

2.1 Connotation of Marine Ecological Compensation

In the field of ecology, ecological compensation is considered as a self-repairing and compensation mechanism for natural ecosystems affected by external influences. In the field of economics, ecological compensation is considered as an institutional arrangement to regulate the relationship between relevant stakeholders in the process of environmental protection by economic means. At present, there is no uniform definition of ecological compensation, and an important factor is that everyone defines it from different disciplines and theories [11]. Although the definition of ecological compensation is not completely unified, it is through internalization of environmental external costs to solve the external problems of resources and environmental protection so as to achieve the goal of sustainable development of environment and resources. Marine ecological compensation is an important part of ecological compensation in China, which is still in its infancy. For the ecological compensation of marine ecosystem, its connotation can cover the above three fields. For example, in the marine protection and management, the proliferation and release and the establishment of natural reserves are to realize the compensation for the marine ecosystem through the way of artificial restoration and self restoration of the natural ecosystem. Marine ecological compensation is a kind of public system for the better development and utilization of the ocean, the comprehensive use of government and market means, the regulation of stakeholder relations, and the realization of sustainable development of the ocean.

2.2 Theoretical Basis of Marine Ecological Compensation

Marine ecological compensation includes three aspects, one is to compensate the marine environment itself, the other is to compensate the opportunity cost of individual, group or area to protect the ocean, and the third is to stop the destruction of marine environment. In order to coordinate the development and protection of marine resources and solve the marine ecological crisis, it is necessary to implement the integrated management of the ocean, and the management of the ocean with the ecosystem method has become the main trend of the future development of the integrated management of the ocean. We can define ecological compensation as a kind of economic incentive policy in order to make rational use of natural resources and ecological environment, protect ecological system, maintain ecological balance, promote the appreciation of natural capital and adjust the relationship between stakeholders. Although the ocean is fixed in a certain range, the marine pollution has great mobility. These pollution characteristics will make the marine ecology in the intertwined of various pollution, and it is difficult to distinguish the polluter and the responsible subject. At present, China's marine management mode is mainly based on administrative or geographical region, which is far from the comprehensive scientific management based on ecosystem. To determine the value of marine ecological resources is the premise of marine ecological compensation, and the main body of changing the value of marine ecological resources is stakeholders. The imposition of charges for marine development and utilization and penalties for marine environmental pollution reflects the coercive effects of economic leverage and laws. Its ultimate aim is also to reduce the damage to the marine ecological environment and promote the self-compensation of the marine ecological system.

The marine ecosystem consists of two parts, biological and non-biological. The non-biological part includes all kinds of mineral resources, seawater and other marine spatial environmental systems, and is the material and energy source of the marine ecosystem. Planktonic algae living in photic zone, benthic algae and marine seed plants in shallow sea areas are producers in the ocean, strange animals such as herbivores, carnivores and some omnivorous zooplankton are consumers in the ocean, heterotrophic bacteria and fungi are decomposers in the ocean. The composition of marine ecosystem is shown in Figure 1.

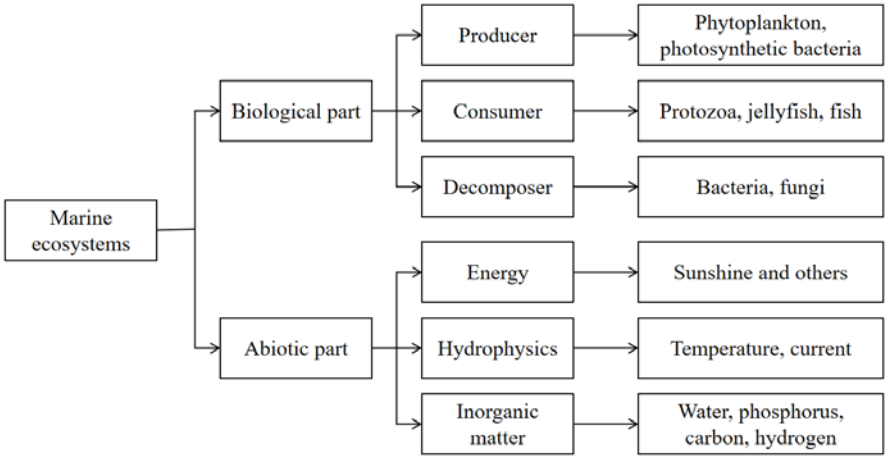

Figure 1 Composition of marine ecosystem

3. Application Strategy of Ecological Compensation in Marine Ecological Resources Management

The government can be the only compensation subject for the marine ecological problems that the compensation subject is missing, such as the marine ecological damage caused by natural reasons or the uncertainty of the subject causing the damage. It is necessary to enact laws aiming at marine ecological compensation at the national level and establish marine ecological compensation as a system. The government-led mode refers to a compensation mode in which the government is the main payer of ecological compensation for gains and losses. It mainly includes regional transfer payment system, collection of ecological compensation tax, establishment of ecological compensation fund system, and direct compensation by the government. In order to provide a more credible basis for the implementation of marine ecological compensation, the national marine administrative department should apply this technical index system to the field of marine ecological compensation on the basis of the established index system of marine ecosystem service function classification, quantification and value calculation.

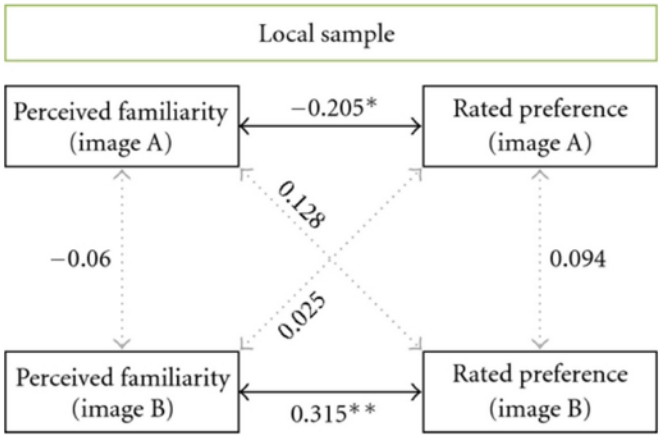

Figure 2 Relationship between local samples and non-local samples

Marine environmental protection is an undertaking that can benefit the present and the future. The establishment of marine ecological compensation system can better promote the sustainable

and stable development of marine environmental protection. Ecological education is a life-long education of the whole people, which covers both school ecological education and social ecological education. This requires the state and government to construct our country's ecological education system from both school and society. The structural relationship between the independent perceptual familiarity of local samples and non-local samples and the scores is shown in Figure 2.

In order to improve the ecological concept of the public, we must strengthen ecological education with sustainable development, population issues and resources and environment issues as its main contents. In the aspect of environmental cost confirmation, enterprises should be guided to incorporate their internal and external environmental costs into their cost accounting through the innovation of confirmation methods. We should establish a comprehensive management organization for marine ecological compensation at the national level, straighten out the inter-departmental and inter-industry interest relations, clarify the responsibilities of all relevant departments, and improve the supervision and management system. In the stage of social ecological education, the government should carry out various forms of public ecological education through various channels to strengthen the ecological awareness and ecological concept of the public [12]. In the accounting treatment of environmental costs, the important issues to be considered are the setting of environmental cost accounting accounts and the methods and contents of accounting treatment. Environmental cost report is an important part of environmental accounting system. It can provide environmental cost information for all stakeholders and is the necessary basis for all stakeholders to make environmental decisions. The market-oriented operation mode should take the market-oriented operation as the main body and combine various practical modes. On the basis of the state's implementation of financial subsidies, the ecological tax system should be perfected step by step, taxes or fees should be strictly levied on environmental saboteurs or resource users, and the income tax expenses should be compensated for the expenses of ecological restoration or the payments of ecological builders.

4. Conclusion

China's marine economy is at a stage of rapid development, but the internal structure of marine industry is not perfect. Various marine industries have damaged the service function of marine ecosystem to varying degrees in the process of development. At present, there are few empirical studies on ecological compensation of marine ecological resources in China. A large number of empirical studies are needed to test whether the criteria, scope and approach of ecological compensation of marine ecological resources are recognized by society. In order to ensure the sustainable development and utilization of marine resources, the effective implementation of marine ecological compensation must be ensured during the development and utilization of marine resources. On the basis of the state's financial subsidies, we need to improve the ecological tax system step by step, and strictly levy taxes or fees on environmental saboteurs or resource users. We should establish the marine ecological compensation mechanism as soon as possible, and give the compensation right to the main body of ecological protection so as to balance the rights and obligations between the main body of ecological protection and the main body of ecological benefit. The theory of service function and ecological value of marine ecosystem is the economic basis of improving ecological compensation management policy. The implementation of marine ecological compensation, the establishment of marine ecological compensation management mechanism based on the spatial distribution of parameters, and the improvement of marine ecosystem management are of great significance for the protection of marine ecological environment and the promotion of sustainable utilization of marine resources.

References

[1] Li Sijia. On marine ecological compensation mechanism and its implementation [J]. Frontiers, 2014 (Z7): 97-98.

[2] Li Xiaoxuan, Liu Dahai, Liu Fangming. Research on the Connotation of Marine Ecological Compensation and Institutional Design [J]. Marine Environmental Science, 2016, 35 (6): 948-953.

[3] Liu Shixin. Review of marine ecological compensation research [J]. Cooperative Economy and Science and Technology, 2015 (10): 176-177.

[4] Huang Xiurong. Typical empirical and empirical analysis of marine ecological compensation in the United States and Japan [J]. Macroeconomic Research, 2016 (8): 149-159.

[5] Sun Zhaoming, Hu Xuqian. Game Analysis of Loss Compensation for Coastal Wetlands in the Blue Economic Zone [J]. Journal of Ocean University of China (Social Science Edition), 2015 (1): 38-43.

[7] Wang Lian, Xu Xiaomin. Research Status and Prospect of Marine Ecological Compensation Mechanism [J]. Economic Research Review, 2016 (22): 25-29.

[8] Shi Haonan, Zhao Xinrui, Zhou Guang, et al. Marine ecological compensation mechanism and its enlightenment [J]. Cooperative Economy and Science and Technology, 2016 (21): 190-192.

[9] Wang Guimei. Problems in China's Marine Ecological Compensation Mechanism and Suggestions for Improvement [J]. Academic Exchange, 2014 (8): 118-121.

[10] Luo Hangao. Thoughts on Establishing Ecological Compensation Legal Mechanism in Marine Environmental Protection [J]. Journal of the Party School of the Shanxi Provincial Committee, 2015 (2): 63-67.

[11] Chen Zhongyu. Research on Basic Legal Issues of Ecological Compensation in Sea Areas [J]. Journal of Southwest Jiaotong University (Social Science Edition), 2016, 17 (3): 136-141.

[12] Xie Gaodi, Cao Shuyan. The status and trends of the development of ecological compensation mechanism [J]. Enterprise Economy, 2016 (4): 32-35.