

Discussion on the Ecological Compensation in the Yangtze River Economic Belt

Guo Xingmeng¹, Diao Chunyan^{1,*} and Li Jianfeng²

¹Guizhou Minzu University, Guiyang, Guizhou, 550025 China

²School of Environment, Guangdong Key Laboratory of Environmental Pollution and Health, Jinan University, Guangzhou, 510632, China

*The corresponding author: Diao Chunyan, e-mail: diaoxuanji@126.com, Telephone number: +86-18286031937

Abstract. In recent years, the ecological environment of the Yangtze River Basin has become increasingly prominent, and the sustainable development of regional economy, society and environment is facing severe challenges. As an important means to alleviate the contradiction between environment and economic development, the ecological compensation mechanism is an important link in the ecological protection of the Yangtze River Economic Belt. Therefore, doing a good job of cross-border ecological compensation in the Yangtze River Basin is of great significance to the construction of the Yangtze River Economic Belt. Many foreign countries, such as the European Union countries, the United States and Australia, have extensively established and implemented the basin ecological compensation mechanism, which has achieved good results in practice, and its experience is worth to learn. In view of the transboundary characteristics of the Yangtze River Basin, through the combing of the three major river basin profiles, management models and ecological compensation related practices, the article summarizes the ecological compensation models of three international transboundary basins by comparing the three typical transboundary basins (Rhine River Basin, Tennessee River Basin, Murray-Darling River Basin). The experience of ecological compensation promotes the establishment and implementation of the ecological compensation mechanism in the Yangtze River Basin.

1. Introduction

Trying best on cross-border ecological compensation in the Yangtze River Basin is a great significance to the construction of the Yangtze River Economic Belt. At present, many foreign countries, such as the European Union countries, the United States and Australia, have extensively established and implemented the basin ecological compensation mechanism, which has achieved good results in practice, and its experience is worthy of our reference. Due to the transboundary characteristics of the Yangtze River Basin, this study selected three typical transboundary basins (Rhine River Basin, Tennessee River Basin, Murray-Darling River Basin) for research. The ecological compensation models of three international transboundary basins are summarized, and the establishment and implementation of the ecological compensation mechanism of the Yangtze River Basin are promoted by drawing on the experience of ecological compensation in these basins.



2. European ecological compensation model

The main practice of the European transboundary basin ecological compensation model is based on government payment, supplemented by corporate payment and environmental fund payment. Among them, government payment mainly includes public financial payment and environmental tax reduction and exemption; corporate payment is mainly for pollution accident compensation, including payment to countries, regions, and individuals; the environmental protection fund payment is mainly to directly allocate funds to the ecological restoration project [1].

In order to reduce the pollution, German-owned companies in the Rhineland will levy taxes according to the actual discharge of pollutants. The rate is determined according to the composition of water pollutants (COD, heavy metals, etc.) [2]. The sewage discharge standard will continuously update with the advancement of control technology. Once the sewage discharge of the company is confirmed to be up to the standard, the collected rate can be reduced by 75%. Implementing the sewage reduction incentive policy through tax reduction is equivalent to that the government pays indirectly a certain amount of ecological compensation to the company. The French potassium mine company paid about 1.7 million euros to the Dutch commercial vegetable garden operators for compensation for crop losses in the event of a potassium chloride pollution incident, and paid about 8 million euros to the North Holland Province and the Amsterdam City Government for compensation for water pipe loss due to pollution corrosion [3]. These are typical cases in which enterprises pay ecological compensation to countries, regions, and individuals. In addition, some foundations established by NGOs have also played an active role in implementing ecological compensation and environmental protection, such as the "Sandoz-Rhine Foundation" and the "World Wildlife Fund" to help restore the ecosystem that was damaged by the Sandoz accident co-financed a three-year plan to restore the Rhine flora and fauna.

3. American ecological compensation model

America has begun to carry out ecological compensation practices a long time ago, and there are many experiences which can be borrowed. The Tennessee River Basin is the most representative of transboundary basin ecological compensation [4]. The American ecological compensation model is based on the overall payment of river basin profit funds, including direct payment and indirect payment.

The most striking feature of the Tennessee Valley ecological compensation is that its ecological compensation sources are widely sourced, partly from the profitability of electricity, shipping and water conservancy, and partly from the social funds absorbed by the use of ecological projects through listing financing and bank loans. There are two methods of paying for ecological compensation: direct payment and indirect payment. For example, in order to reduce soil erosion, the Tennessee River Basin Committee directly compensates the landowners of cultivated land and marginal grassland around the basin [5]; The research on chemical fertilizers has promoted the farmers in the basin, which not only improved the output level of agriculture, but also reduced the water pollution caused by the application of chemical fertilizers, and increased the income of farmers, and indirectly compensated farmers.

4. Australian ecological compensation model

The Australian ecological compensation model is based on market compensation and is supplemented by the National Natural Trust Fund provided by the government [6].

The experience of eco-environment management in the Murray-Darling River Basin focuses on legislative development, planning, monitoring and evaluation, and public participation. At present, the legislation of the state governments in the basin begins to define the property rights and uses of water, separating the ownership of water and land ownership, and facilitating trade in water resources; the goal of environmental water planning is to protect existing environmental water and coordinate water use in the whole basin. Its defined water abstraction is conducive to the sustainable development of the river basin environment, that is, water resources can be mined in the basin without damaging

environmental resources and ecosystem functions [7]; the river basin planning has developed a monitoring and evaluation. Planning effectiveness, monitoring, and evaluation programs will establish a framework for assessing the effectiveness of watershed planning content, including certification and implementation of water resources planning in states, compliance with sustainable water diversion limits, and environmental water planning, water quality and salinity management [8].

Due to the relatively complete legislation of the Murray-Darling River Basin water resources, the market development is relatively mature, and the basin state compensation has typical market characteristics. For example, Australia carried out the water evaporation credit transaction: the watershed caused excessive environmental damage due to excessive logging, the water evaporation credit system requires downstream farmers and beneficiaries to pay the funds to the upstream at a certain price, for afforestation in the upper reaches [9]. In addition, the Australian federal government will directly subsidize local governments and farmers through financial means such as transfer payments, such as the natural heritage trust fund provided by the federal government for the land care program.

5. Present Situation and Problems of Ecological Compensation in the Yangtze River Basin in China

Many places in the Yangtze River Basin, such as Jiangsu Province, Hunan Province, Guizhou Province, and Shanghai have carried out some exploration on ecological compensation in the basin. It provides a good foundation for promoting the establishment of ecological compensation mechanism for the Yangtze River Economic Belt. However, due to the different ecological environment conditions and different levels of development stages in different river basins, the demands for ecological compensation in river basins are also quite different. It is the key challenge facing the construction of ecological compensation models across river basins. At present, the main problems in the construction of the ecological compensation mechanism in the Yangtze River Basin are as follows: The construction mentality of ecological compensation mechanism is controversial. Because the situation and characteristics of various areas in the upper and lower reaches of the basin is really complex, under the premise of maintaining and ensuring the ecological environment of the river basin, taking the improvement of water environment quality and ensuring the ecological base flow as the core, coordinating the economic interests and ecological benefits of all parties, and establishing a watershed ecological compensation mechanism which is a fair, reasonable and long-term operation is a difficulty. How to build the mechanism, how to determine the standards is controversial.

The ecological compensation standard system is not complete. There are still some technical obstacles in the construction of the compensation mechanism, compensation object, compensation standard, etc. The determination of compensation standard is a major difficulty in the compensation benefit mechanism. Before establishing a compensation fund system, it is necessary to clarify the scientific causal relationship between the ecological compensation construction and environmental protection measures and the ecological effects provided. Overall, the current ecological compensation standards implemented in some areas of the Yangtze River Basin are generally low. On the one hand, due to the limited financial resources of the policy, on the other hand, the methods for compensating standards are scientifically inadequate, lack of methodological support, and are not fully established. On the basis of the compensation and the willingness to pay, the compensation for the ecological environment is often difficult to compensate for the construction cost of ecological protection and the opportunity cost of development.

The compensation mechanism model and resource mechanism are relatively simple. At present, the ecological compensation for river basins implemented in various regions is mainly the government-led model. The sources of compensation funds and compensation methods are single. The compensation method mainly relies on financial transfer payment, special funds for ecological function construction and related tax and fee policies as the main means, while other channels such as investment in enterprises and institutions, preferential loans, and social donations are obviously missing. In addition

to financial subsidies, compensation methods such as industrial support, technical assistance, talent support, and employment training have not received due attention.

The implementation of the ecological compensation mechanism is not sound. The water environment resource property rights system in the Yangtze River Basin has not yet been established, the property rights relationship is not clear, and the ecological environment rights trading circulation system is not established. It is difficult to fully exert market power and it is difficult to mobilize the enthusiasm of upstream and downstream stakeholders in the basin. The implementation of the ecological compensation mechanism in the Yangtze River Basin still lacks an effective supervision system, the regulatory capabilities are not matched, and the foundation of the implementation of the ecological compensation mechanism is not strong. In addition, the incentives and rewards and punishments mechanism for the ecological protection of river basins are not perfect, which has caused the internal motivation of the relevant parties in the basin to implement ecological environmental protection work to a certain extent.

6. Revelation of international experience for ecological compensation in the Yangtze River Basin

The three international ecological compensation models all have significant background characteristics. The ecological compensation model background in Europe is mainly based on ecological environment protection under pollution control. The background of ecological compensation model in the Americas is mainly based on ecological environment protection under comprehensive watershed development, and the background of Australian ecological compensation model is based on the ecological environment protection of water resources marketization. Throughout, these ecological compensation models can provide reference for ecological compensation in different development stages of the Yangtze River Basin in China.

It needs to accelerate establishing a regional coordination mechanism for the Yangtze River Basin to achieve integrated management of the basin. The experiences of ecological compensation in the three major international river basins show that establishing an effective ecological compensation regional coordination mechanism is the key to promoting the implementation of ecological compensation. At present, the management departments of the Yangtze River Basin are still in a state of self-government, and the responsibilities between departments and between river basins and river basin units (provinces) are intertwined and chaotic, and there is a lack of overall coordination and cooperation. Therefore, it is recommended that the Yangtze River Basin follow the international experience, accelerating to establish a regional coordination mechanism for the Yangtze River Basin, and coordinating to develop ecological compensation from the perspective of the river basin.

It is proposed to strengthen the construction of spatial three-dimensional joint monitoring network for ecological compensation and the construction of data information sharing mechanism. In the process of implementing ecological compensation for transboundary rivers, joint monitoring is not only an important technical means and means for effectively determining the ecological compensation payers and compensated parties, but also the basis and guarantee for the ecological compensation accounting in the basin. The four major river basins have formed a relatively mature monitoring plan design specification and a relatively complete monitoring network, which has realized the automation of information collection and data transmission, as well as the intelligence of data analysis and evaluation. It can quickly form an annual monitoring plan and provide ecological compensation for the basin. Provide the basis for decision making.

It is suggested that establishing an accounting system for ecological compensation standards in the Yangtze River Basin carries out classified accounting and management. The scientific ecological compensation accounting standard is an important guarantee for realizing ecological compensation horizontal transfer payment and fairness. The three major river basin environmental protection committees can effectively formulate environmental protection plans to implement ecological environmental protection, benefit from its unified, scientific and reasonable monitoring standards system, and the ecological compensation standard accounting methods of the four major river basins have their distinctive regional characteristics. Stage characteristics and economic characteristics. It is

suggested that the Yangtze River Basin should construct an ecological compensation standard accounting system that conforms to its own development characteristics according to the current economic development status and ecological environmental protection status. It is recommended to consider from the perspectives of water quality, water quantity, cost input, and ecosystem services, and according to the ecological characteristics of each section of the basin. Classification and management of environmental and economic development.

It is recommended that exploring innovative ways of ecological compensation in the Yangtze River Basin promotes the implementation of ecological compensation tasks. There are also some differences in the ecological compensation methods of the three major river basins. The European basin ecological compensation method tends to the government's vertical payment and the enterprise's horizontal transfer. The American basin water compensation method tends to the government's vertical direct payment and vertical research support indirect payment, the Australian basin ecology. The compensation method tends to be horizontal transfer payment from various stakeholders, and the government only plays a role in trading guidance. According to Chinese basic national conditions and the current state of ecological compensation development, on the basis of drawing on foreign experience, it will form an ecological compensation method with local characteristics, that is, while exploring market-based ecological compensation methods, vigorously innovate policy support and implement counterpart assistance projects. To carry out scientific and technological project support and development in different places, it needs to focus on intellectual compensation and technical compensation. To develop market-oriented ecological compensation, it is necessary to establish a relatively clear property rights system, supporting fiscal and taxation and financial policies.

It is suggested that establishing an evaluation system for ecological compensation effects in the Yangtze River Basin strengthens performance appraisal of ecological compensation. The three major river basins not only focus on the implementation of ecological compensation actions, but also pay more attention to the review and evaluation of the implementation effects. Based on the evaluation, the ecological environmental protection and ecological compensation framework agreements are continuously adjusted.

7. Conclusion

Integrating revelation in the section 6 and the *Ecological Priority, Green Development Strategic Positioning in China's Yangtze River Economic Belt*, there are many specific measures to complete the ecological compensation. Firstly, it supposes to establish a contact conference system in the Yangtze River Basin whose members are composed of relevant responsible persons from all provinces in the river basin. They will prepare an annual work plan and establishing the ecological environment protection of the Yangtze River Basin and the ecological compensation target. Then it recommends to work out system of regulation rules of the Yangtze River Basin for providing a legal basis for ecological compensation mechanism in the Yangtze River Basin. Secondly, according to the natural and economic characteristics of the upper, middle and lower reaches of the Yangtze River, it can be divided into two categories, respectively, ecological function-based areas and areas with water quality improvement. The former ecological compensation accounting method should be adjusted by cost input and economic coefficient. The value of post-ecosystem services is the main accounting basis, supplemented by cross-border section water quality and water quantity ecological compensation accounting, while the latter area with water quality improvement should be based on cross-border section water quality and water quantity ecological compensation accounting, with cost input. It is supplemented by ecological compensation accounting based on the value of ecological services. At last, it is recommended to establish an ecological compensation effect evaluation system in the Yangtze River Basin which can be established from seven aspects: economic coordinated development, social impact, water conservation and protection, environmental pollution prevention, ecological environmental protection, environmental protection technical support, environmental monitoring capability, and fund management level.

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