

The Research on the Original Ecological Compensation Mechanism in the River Basin of the Central Soviet Area: From the Angle of Ecological Civilization

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Abstract: Most of the areas of economic poverty are the birthplace of most rivers in China, at the same time; these areas are extremely important ecological function reserve. For the whole society, It makes much sense to take effective protection to river basins to, in this process, the construction of ecological compensation mechanism is the key to the protection of river basins, not only be conducive to the protection of the ecological environment, but also be useful to the harmonious development of river basin upstream and downstream. From the perspective of ecological civilization, this paper analyzes the related theories of river basin ecological compensation mechanism, according to Coase's law of environmental economics and Pareto optimality; it explains the related model of river basin ecological compensation mechanism in China. And on this basis, we present the corresponding policy implications.

1. Introduction

As is known to all, in China, the source of river basins are mostly located in the areas of poor economy, the living conditions in these areas is relative poor, and there gather a lot of poor people and poor counties. During the period of a long history, the river basin area plays a key role in the protection of ecological civilization and ecological environment plays in each link, considering the prohibition and restriction of the related policy, which restricts the development and utilization of resources and the development of economy of these areas, making a tremendous difference in the economic and social development of the basin upstream and downstream, and this gap is further expanding, the result is the reduction of the enthusiasm of the upstream area to protect the environment, but also the increasing of the environmental protection pressure. In order to better establish the protection of river basin ecological compensation mechanism in our country, the implementation of ecological compensation to the river source area is the top priority. We have a systematic elaboration in river basin ecological compensation mechanism and a general instructions for practice patterns at home and abroad, we take the central Soviet area in our country as the object, and explore the subject and relevant object of compensation, including its principle and method, etc., at the same time, we have also designed the ecological compensation mechanism and ecological protection of the central Soviet area. This move will make much sense to better establish compensation mechanism for watershed ecology in China.

2 The Latest Theoretic Achievements of Compensation Mechanism in the River Basin

2.1. The Relative Concepts of River Basin Ecological Compensation

From the angle of economics, a particular area of the basin is surrounded by the watershed, and the important spatial unit to organize and manage the national economy as well as the important spatial unit to the development and utilize the water resources, which constitutes the basic unit of economic management system.

Under the existing administrative system in China, the basin has strong integrity and high correlation, which is why it usually divided by different administrative areas. Especially under the background of market economy, various local government has relatively independent economic interests, therefore the level of local development is the ultimate goal of local government, so in the process of development and utilization of the watershed, it is inevitable that the administrative region at all levels will have kinds of conflict on the watershed. Especially that upstream and downstream regions will have problems in the governance of the environment, construction of ecology as well as the development and utilization of water resources and other issues, it is common that interests the government and ordinary people is not in the line, therefore it is necessary for the upstream and downstream are basin to build ecological compensation mechanism, so that we can better realize the maximization of the interests between different administrative regions and resources sharing, only in this way can the regions that the river passes get more harmonious development.

What is the ecological compensation? It refers to a concept that government get a more appropriate use of river basin water resources through some relevant economic and management strategy, in order to achieve water efficiency maximization, including protection of compensation and damage compensation. Relevant definition about protection of compensation is like this, under the legal, administrative and market channel, those region that are protected in the basin will meet a variety limitation, even lose many opportunities for development in the protection of basin, considering these problems, the government will give the corresponding compensation, including policy, fund and technology compensation.

2.2. River Basin Ecological Compensation Research and Practice at Home and Abroad

With different river basin ecological compensation theory, foreign scholars always focus on the future in this field and realization channel as well as the role that the government and market plays in the process. Among them, the Owusu is mainly studied on the protective layer of drinking water, the forest reserves play a role in the process. Kosoy also put much time on the research of environment pay related issues on Central America. In the concrete practice, the United States has adopted relevant compensation mechanism on its soil and water conservation for a long time, Germany has a similar compensation mechanism and so on. [1]

In our country, there are also many research achievements on the river basin ecological compensation research. ZhuangGuoTai simply analyzes the externality of river basin ecological protection, Liu Yi also explores the related countermeasures of water resources management in our country, Li-jie Qin has made a research on the basin water resources utilization and the use of the inquiry, at the same time, Zhou Dajie also has done similar research. And other scholar have done all kinds of discussion on the cases, Jun-xiang Fan take Miyun reservoir as an example, he has explored the ecological benefits of the water source conservation forests, at the same time, evaluated the corresponding value. About damage compensation, Gao Yongzhi has studied inter-district river compensation mechanism. About water compensation in the basin, there are also scholars who will focus on the externality of water environment and water level, etc. [2].

On the concrete practice in our country, many local governments have established a protection mechanism on the tentative city drinking water source, even established ecological compensation mechanism on small and medium-sized basin between administrative jurisdiction, the following cases are typical representative of the local government act: the Dongjiang basin of Guangdong," Deqing mode" of Zhejiang as well as the mechanism of the upstream and downstream of Fujian. [3]

2.3. The Research Achievements on the Ecological Compensation Mechanism in the Central Soviet

With the development of the society, the ecological compensation of river basin in Jiangxi Gannan region has become the focus of many scholars' areas. Jiahuai Lin put their focus on the river ecosystem service functions of ecosystem, Liuqing and others have made studies on the regional ecosystem services of this area. The other studies focus on policy recommendations about the ecological compensation mechanism. [3]

As we can easily see, most of the studies are discussed from the aspect of ecosystem services value level, and every research draw different conclusions, regional development level is hard to bear the total compensation amount, so, in the concrete practice, it is hard to get effective application. Among several related policy proposals, there exist no corresponding legal laws, project design, the share of compensation costs and relevant channels to make detailed explanation and illustration.

3. The Characteristic of Gannan Region Water System Characteristic and its Foundation of River Basin Ecological Compensation Mechanism

3.1. Drainage Characteristics of Gannan Area

Gannan area is located in Jiangxi province, with the biggest area in Jiangxi province and the most population and administer counties. Jiangxi mountain is the cradle the Ganjiang, also one of the origins of the pearl river and the dongjiang river. Chapter fed on thousands of tributary of the river, water, Meijiang, Jean jiang, Cotton, the Xiangjiang river, the Songjiang, Jiangping, Taojiang nine major tributaries. In one chapter of river, water and correctly by the river. The remaining 7 tributaries merged into GongJiang, ZhangGongjiang meet in it and into the Ganjiang river, north into the Poyang lake, become the Yangtze river basin in Ganjiang river. Another one hundred tributaries from find Wu, fully confident flows into the Pearl River basin, south, east river, Beijiang river and Korea tied the plum river basin.

3.2. The Social and Economic Development Level of Gannan Region

Compared with overall level of Jiangxi province as well as the country, the development level of the central Soviet area is still relatively low, the development foundation is weak, the living conditions of social populations is bad, which has produced all kinds of social and economic problems on that area. Gannan region is adjacent to Guangdong province, which is prosperous, however the gap between the two places is very large.

By the end of 2012, the total population of Jiangxi province is about 9.3 million, including agricultural population of 7.4 million people, which takes about 80% of total population; Per capita GDP is 17299 yuan, this value is lower than the entire province average level, far below the national average level; Per capita fiscal revenue is 1778 yuan, also lower than the entire province average level, far below the national average. [4]

3.3. Important Ecological Problems and the Reasons in Gannan Area

Most ecological problems of Gannan area are embodied in the following several aspects: one is serious water pollution, the other is the soil and water loss induced from the degradation of the water conservation. Relevant data show that ,in 2014 the total area of soil and water loss in Gannan area is 91378, among them , strength loss covers an area of 28731, accounts for 33%;the rolls sedimentation in house is 1.6 million m³, accounts for 87% of the total capacity of reservoir. According to the monitoring results that the relevant departments have done, we can easily know that part of the basin have been in class IV, even in bad V level. [5]

There are a variety reasons that can explain the all kinds of environmental problems in Gannan area, but overall, it is mainly caused by the following reasons: 1) It is endowed by nature. Gannan region consists by agriculture and forestry region, most of them are hills and land, steep mountains, hills is formed by the granite weathering crust, so it is difficult to develop successfully, coupled with loose surface, once the vegetation has been destructed ,such problems like as soil and water loss will occur immediately; 2) Non-point pollution is relatively serious. Without treatment, All kinds of garbage and sewage in the area has been casually sent into the basin, the pollution level and scope of the breeding and fruit industries have been more worrying, some regions even hoarda large amount of waste residue, which seriously polluting water and farmland; 3) The deterioration of the forest resources is serious. Industrial and life become more and more reliant on forest resources, this will seriously damage the forest in the system, and makes the deterioration of soil and water loss even serious, compared with the middle of the last century, the worsening condition is ten times or even dozens of times; 4) The increasing seriousness in development of mountain, up to now, with increasing mountain has been destroyed, and the trend is going to grow; 5) The harmful effects on the long-term development of mineral. Gannan region has always been a high production of rare earth, the exploitation that regardless of environmental bearing capacity makes local environment overtaxed.

3.4. The Policy Basis That the Central Soviet Buildriver Basin Ecological Compensation Mechanism

In July 2007, the state council has issued the relevant documents, which requires to increase the fiscal transfer payments that limit and prohibit development area for public service and compensation for ecological environment. After that, the environmental protection administration has also stated to establish ecological compensation of ecological functional areas, and distinguish the Gannan area for water conservation ecological function type area. In February 2008, law of the People's Republic of China on the prevention and control of water pollution has been revised ,the article 7 states: the nation has the right to build ecological compensation mechanism of water environment through fiscal transfer payment, which means to better the drinking water sources conservation area and river, lake, reservoir upstream region.

4. The Environmental Economics Explanation that Build River Ecological Compensation Mechanism

According to the efficiency principle of environmental economics and the law of Coase, The model of the ecological compensation mechanism in Gannan area is shown as following:

According to the law of efficiency, take the influence that ecological destruction has on the Jiangxi Gannan region area into consideration, regardless of its externality, then, the optimal protection level is described like this: the marginal cost of ecological protection and pollution control is equal to the marginal damage level of ecological destruction and environmental pollution. Consider that the economic development level and technical level of central Soviet area is relatively backward, ecological protection and pollution control level is relatively backward too. pollution source usually be the important water conservation of downstream, pollution control and ecological protection has

strong externality to downstream region, according to the principle of efficiency, the optimal level of source area pollution control and ecological protection is located in that position: the marginal cost of pollution control and ecological protection is equal to the marginal cost of pollution damage and ecological destruction, namely Q^* . However, the latter will not cover the adverse effects of the source of river area, but also the damage to the downstream area. Usually, the development level of the downstream region is higher, and the population there also have advantage, therefore, once upstream suffers damage, the marginal damage to downstream is greater than its own marginal damage, what is more, also far greater than the marginal cost of upstream ecological protection. Under the principles of efficiency, without considering the premise of externalities, the effective level Q^* of ecological protection as well as pollution prevention and control is higher. If there is no external intervention (such as government adopt the method of ecological compensation or make stronger ecological requirements, etc.), the people in upstream will not have motivation to protect the ecological environment, from another point of view, the marginal cost of ecological pollution of upstream on downstream is far greater than its marginal cost of itself, but also far greater than the marginal cost of the ecological protection and the pollution control of upstream region, once downstream region offer certain compensation to upstream region, in order that the upstream can control the pollution of further deterioration and make environmental protection, it would be a mutually beneficial result to both part, not only effectively solve the insufficient funds of upstream region, but also promotes the development of their own (once the upstream of the water quality has improved, the environment will get improvement as a result, which will bring many benefits to upstream area). So, it is meaningful to the society to make the construction of ecological compensation mechanism, downstream will offer a certain amount of compensation to upstream region, which will get a better unification of efficiency and fairness.

From a theoretical perspective, the optimal protection degree that downstream area give the source area is Q^1 , and for the downstream, it doesn't make any sense to compensate any more (the ecological costs is less than the returns). In order to achieve the optimal protection level Q^* , it becomes more important that the upstream and downstream have cooperation and negotiation. [6]

From the perspective of environmental economics, we have already demonstrated the importance and the feasibility of river basin ecological compensation mechanism. But see from the condition of our country and abroad, although the downstream areas have realized that the establishment of ecological compensation mechanism is of great benefit to itself, but it often lacks the enthusiasm to offer related subsidies to upstream region. So, if the economic conditions of upstream and downstream vary widely, it will be easy to get the establishment of ecological compensation mechanism, mutual benefit and reciprocity has become the principle that downstream compensate to upstream.

5. Several Key Points of Ecological Compensation Mechanism in Gannan Region

5.1. Correct Identification of Compensation Main Body and the Compensation Subject

The compensation main body of river basin has two aspects: one kind is nation or middle and downstream region. Another kind is the upstream region. National compensation is like this: the government give corresponding subsidies and fiscal revenue to the upstream region, so that it can achieve the construction of the ecological civilization; the upstream and middle region compensation is like this: the upstream and middle region undertake corresponding responsibilities of the basin's ecological civilization, and offer a certain compensation to the upstream region; Upstream compensation refers to the government where the upstream locates directly offer the corresponding compensation for the ecological civilization construction. But now, National compensation and the

upstream and middle region compensation are the compensation mode that is widely used nowadays, the upstream region compensation is not widely used.

In the Gannan region, nation is the compensation body most time. During the "Twelfth five-year" period, the state has arranged for hundreds of millions of special funds for the river basin ecological protection work, then, the river shelter-forest system has also been established, after that ,the implementation of returning farmland to forest and soil and water loss management has been done. Part of the local government and related beneficiary urban residents on the downstream region pay the corresponding compensation. Because there are many problems in the process of compensation, the direct compensation main body is part of the local government, and the relevant beneficiary urban residents is indirect compensation main body.

In terms of the compensation subject, among the related basin, the ones who have paid and made sacrifice for water resources protection should be the compensation subject, it includes: the local government of river basin upstream, residents and companies. Similarly, the local government of river basin upstream is the direct subject, the related enterprises and residents are indirect compensation subject.

5.2. Compensation Project and Specific Calculation Method of Compensation in Gannan Region

5.2.1. The Basis and Calculation of Compensation Standard

In this paper, we have analyzed the course of river basin environmental and ecological problems, regard the cost - benefit and opportunity cost as our computing basis, and take the development level of the downstream area as a condition of a comprehensive consideration, and finally to clear the standards of compensation mechanism. In order to better protect the water from further pollution, Gannan region has already put a lot of manpower, financial and material resources, including national investment and its input, and its investment accounted for most of the investment. However, the calculation of the previous investment and income will produce certain difficulty, therefore, we based our work on the relevant government documents, after comprehensively considering the actual situation of Gannan area, we have measured the cost of ecological civilization construction and watershed protection cost, the amount is 21.1 billion yuan in 2013

5.2.2. The Cost Constitution of Ecological Civilization Construction and Environmental Protection.

According to related files and project summary, we usually will cost for the calculation of the following: one, protects the environment directly into: in monitoring water quality, prevent water loss and soil erosion and protect the river basin, the direct investment of 321 million yuan. Second, for the protection of the ecological compensation and returning farmland loss, and the costs as high as 211 million. Three, because the loss of the right to development is restricted, the neighboring counties and cities of residents per capita disposable income and compares the per capita disposable income of the upstream area, in the case of other conditions, concludes that income gap of residents in different counties and cities in order to reflect the economic development under the underutilized losses, as the reference, compensation concrete calculation process is as follows: $\text{Offsets} = (\text{refer to counties and cities of urban residents per capita disposable income} - \text{the upstream area counties and cities of urban residents per capita disposable income}) \times \text{upstream area (refer to counties and cities of per capita income of farmers per capita net income of farmers in upstream areas and counties)} \times \text{upstream region agricultural population}$.

6 Suggestions to Perfect the Ecological Compensation of Gannan Basin

6.1. Introduction of Ecological Compensation Tax

Gannan basin is complex, with many tributaries. Communication and coordination between the upstream and downstream is particularly important. The ecological compensation tax can turn in ecological links in economic relations with few provinces linked. Originally effective up and down management mechanism in fact starts failure in the watershed management. There exist unilateral demand in the upper and lower reaches of the river basin. For the contradiction between the current administrative areas and ecological, you cannot use the original administrative management but club. The government led, by the river basin ecological government independently added, through democratic consultation between the members of the club, on the distribution of water resources, ecological compensation, water project construction, major investment projects of consultations and negotiations. Through the long-term cooperation and the game, the original dominant strategy equilibrium is broken, and the new balance is established. Every club member has to pay a certain amount of margin. For club members to carry out a strict system of rewards and penalties by in internal members of cooperative behavior rewards and penalties for non-cooperative behaviors to governance of local government protectionism. Starting to levy a tax on the river can make the ecological compensation mechanism to establish a solid financial base.

6.2. To Explore the Possibility of Market Operation

For ecological protection, scholars believe that this is an externality, should not be resolved through the market. In fact, if only the government lead, and the market do not participate in, it's inefficient. Specifically, the basic requirements of the market is through the establishment of compensation activities of market system and the market mechanism, make compensation has become the market economic activities, through the use of market regulation to ensure the fairness of the river basin ecological compensation. The regional and enterprise excise plans to gradually promote resource use rights trading and emission trading and economic means to the irreplaceable advantages to supplement the lack of administrative means. The establishment of ecological compensation mechanism of the starting point and the foothold is to change "blood transfusion" to "blood", simple funding support for the project. Channel sand forms to promote the sustainable development of watershed upstream and underdeveloped areas and important ecological function areas. Cooperation in the establishment of the upstream and downstream of the "construction project environmental enclave" is to achieve a good form of the inter regional ecological compensation, can guide upstream projects to downstream the implementation of off-site development. By introduced policies to encourage the investment project of the upstream area into the development area of the middle and lower reaches of the county (city), profits and taxes are returned to the upper reaches of the development, in order to support the upstream. In order to promote the river basin ecological compensation mechanism of long-term sustainable development, we must actively explore government led market-oriented operation mechanism of river basin ecological compensation

6.3 To Establish Third Party Assessment Agencies

In the establishment of ecological compensation mechanism, in fact, with how to define the watershed, watershed of the scope of the liability affairs is crucial. No clear division of powers, can not really establish a reasonable and effective ecological compensation mechanism. The river basin ecological compensation mechanism is refers to "the municipalities and districts to industrial and urban living water as the basis, in accordance with the province to develop the standard estimates from the fiscal

expenditure of forest ecological benefit compensation funds, turned over to the provincial financial accounts, a unified standard of the upstream area to protect the forest ecological function can and land and water resources and to make the contribution of farmers compensation system". Visible, the river basin ecological compensation mechanism has not yet been introduced environmental profit and loss of the third party evaluation mechanism, standard of compensation is not according to the basin at the actual environmental profit and loss degree of compensation, the lack of scientific. Therefore, it is necessary to establish the third party evaluation mechanism of environmental profit and loss, employ various disciplines of senior experts committee of experts on the basin, in accordance with the river basin administrative district at the junction of the section of the water quality of the target responsibility system, reasonable water supply and pollution control project implementation effect, pollutant emission control targets the completion of the establishment of the corresponding assessment methods, detailed assessment indicators; then according to the results of the river basin administrative district environmental profit and loss evaluation will balance environmental profit and loss as the formulation of the principle of compensation standards, focusing on according to the upstream and downstream between water quality and water distribution indicators to determine all the administrative regions of the specific standard of compensation.

6.4 Maintain Policy Stability

Ecological civilization construction is a long-term project, policy support should the project and adapt, only the policy is of the integrity and stability, it was to play the maximum effectiveness. According to past experience, regional ecological construction laws and regulations are often not able to continue to perform, leading to the behavior subject for policy expectations is temporary, and not with the long-term vision to look at. Especially in Gannan area, due to the original economic foundation is weak, people's cultural level of awareness is not high, ecological protection consciousness is not strong. This will cause more inconstant in policy. Should the government struggled to maintain the stability and authority of the policy, let people feel the determination and the importance of protection of ecological civilization. Only in this way, the ecological compensation mechanism of watershed in Gannan area can be set up correctly, but also play an important role.

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