



Research on Geo-environmental Compensation Mechanism in Sustainable Development of Three Gorges Reservoir Area

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Abstract

Geo-environment deterioration, which caused by Three Gorges reservoir area development program, is leading to frequent geological disasters and seriously hampering the sustainable development of the reservoir area. This article expounds the geo-environment's compensation status quo and existing problems in the reservoir area at first. Then it explains that geo-environment were underestimated or even loss of status, and analyses its performance and the relationship between the geo-environmental compensation mechanisms improving and sustainable development of Three Gorges reservoir area. Finally, it points out that the Government need appropriate institutional arrangements immediately, and makes relevant policy recommendations to improve the geo-environment compensation mechanism for the sustainable development of the reservoir area to provide important protection system.

Keywords: Three Gorges reservoir area, Geo-environment, Compensation Mechanism

1. Introduction

Three Gorges reservoir area Development Program is one of the largest world's artificial water conservancy projects. She plays a flood control, irrigation, farming, etc., in particular to support China's huge population and industrial power consumption of electricity problems. But at the same time, from the Three Gorges Project started in 1993 to final completion in 2009, the Three Gorges reservoir water level elevates to 175m has brought increasingly serious geological problems, such as the mountain landslides, mud-rock flow, collapse, which are serious threat to the reservoir area people's lives and property, restricting the sustainable development of the reservoir area. But the people in this area always has been in a passive state.

2. Three Gorges Reservoir area's geo-environment and compensation status quo

2.1 Three Gorges Reservoir area's geo-environment status quo

From 1990 to now, the Department of Geology and Mineral Resources, Ministry of Water Resources, Third Construction Committee, the Ministry of Land and Resources, to allocate special funds for the Three Gorges reservoir area's geo-environment and geo-disasters. The "Yangtze River Three Gorges Project reservoir banks stability " total volume seized more than 100,000 cubic meters of landslide 404, the total volume of 2.936 billion cubic meters and cracked mud-rock flow Ditch 90."Yangtze River Three Gorges Project reservoir submerged treatment and the resettlement of migrants overall plan for dealing with landslides in the report "have uncovered 175 meters following landslides in 1302 (including the mine in situ" 175 "seized of the slump), the total volume of 3.334 billion cubic meters. Completion of the reservoir area 19 counties (districts) of geological disasters investigation, the establishment of 19 county-level monitoring stations, the group completed a preliminary measurement monitoring and forecasting network; completed the risk of geological disasters in Three Gorges area zoning; built a Yangtze River Three Gorges reservoir area of geological disasters monitoring and forecasting model zones.

2.2.1 Three Gorges Reservoir area's geo-environmental compensation status quo

Although the Three Gorges geo-environment and geological disaster management work to solve the geological disasters in the reservoir area to ensure security and safety of people's lives and played a positive role can not be questioned, but the Three Gorges reservoir area of environmental compensation has not yet to perfect the mechanism and implementation. The so-called geo-environmental compensation refers to the geo-environment pollution or destruction of the compensation and the geological features or geological value of the compensation. Including: the

geo-environment for their own compensation; use of economic means to damage the geo-environment of conduct be punished, the economic activities of the internal and external costs; regional or personal protection of geo-environment, or to give up the opportunity to develop the practices of compensation, reward or compensation; great value to the regional geological targets for the protection of the input of over-exploitation and use of resources once the practices of restrictions on the recycling economy and environmental protection industries, and other resource-saving and environment-friendly mode of development, and other economic activities be encouraged.

Environmental Protection in the Three Gorges reservoir area can be divided into two categories. First, the Three Gorges Project for Environmental Protection include 11 projects, about 923 million Yuan (see table 1). Other is the reservoir submerged in dealing with the resettlement of Environmental Protection Compensation expenses, including the reservoir resettlement environmental protection, protection of species resources, the protection of migrant population health, water quality protection, environmental detection and management of the project, about 300 million Yuan.

3. Lacking of geo-environmental value is the system obstacles for the reservoir area sustainable economic development

On the road to development as a strategic turning point, the Chinese government in 2004 put forward a concept of sustainable development as the core of the "scientific concept of development" of the 16th National Party and the Fifth Plenary Session. The development of recycling economy is building a resource saving and environmentally friendly society to achieve sustainable development and an important way. However, restricting the sustainable development of the Three Gorges reservoir area there are many factors, including geological resources of economic value was not fully aware of and are not reflected, resulting in the geo-environment value is undervalued or even loss of the system is an important factor.

3.1 Geo-environmental property rights is not clear

Many environmental resources are not sustainable by the development and utilization of an important reason for this is due to the lack of clear property rights. In the traditional economy and society, people have always been the geo-environment as a public goods, commons (Commons), can be opened (Open Access) no property rights of the property, is access to means of subsistence production, the emissions from waste sites. As the general market will not property rights for transactions of goods, making the scarcity of natural resources and the geo-environment can become a free for all mining and use of public goods, any person at any time can be free possession and consumption. When people can abuse the geo-environment to avoid the cost of production and life, the pursuit of profit maximization objective will enable the rapid spread of such abuse, the consumption of natural resources over natural regeneration capacity and natural purification capacity, leading to damage of the geological, Resource depletion and environmental pollution. Due to the lack of economic incentives, the operators engaged in environmental protection and engage in clean production and green consumption, recycling, the producer and consumer rights are not achieving ecological benefits, rights and obligations in relations between the states of imbalance.

3.2 Natural resources and the geo-environment is obviously not the external economy

Pigou founder of welfare economics study found that in commodity production and consumption process, there are social costs and private costs of inconsistency, the gap between the cost of two on the outside of the composition. Outside of the "external" is relative to the terms of the market system, referring to those who have been excluded from the market mechanism outside the by-product of economic activity or side-effects; more strictly speaking, the price system has not been reflected in that part of the economy Activities of the by-products or side effects. These by-products or side effects may be useful, as are external, such as Marshall referred to the growers on bee beekeeper of the benefits. However, the vast majority of the outside is harmful, not as an external economic or negative externalities. The reality of economic life, the use of natural resources only reflects the prices of resource extraction or acquisition costs, without taking into account the ecological costs, resulting in the use of cost far less than the cost of ecological community, with obvious negative externalities. Environmental capacity are public property, when used with open access and use the results of exclusive, personal use of the proceeds are always stronger than the cost sharing. China's environmental capacity has not been strict regulation, enterprises and the public to pay the sewage charges far below the compensation for pollution damage and pollution control costs, so that waste emissions have significant negative externalities, such negative external constraints of a resource-saving and environment-friendly production, lifestyles implementation.

3.3 Price formation mechanism unscientific

For a long time, there are resources in China has been invaluable, low-priced raw materials, high-priced products of the distorted pricing system, raw materials production and processing enterprises with the environmental resources of free or low-priced possession may reap excessive profits of environmental resources without compensation. The current system based on market conditions and from re-use and environment-friendly raw materials not only not dominant performance, price is often not an advantage, therefore, recycling and environment-friendly production methods

intended to achieve reductions, recycling and sound of Most links are unenviable choice. This caused a number of reasons: First, because the initial resources and renewable resources of different price formation mechanism, such as in mining production in the prices of mineral resources and environmental costs of production low pay, low-cost equivalent to the misappropriation of public resources, raw materials The price significantly low. Second, in the international division of labor in the provision of raw materials and energy prices are obviously unfavorable factors. Third is a large-scale, for the characteristics of the modern intensive production system makes most of the raw material extraction and processing costs of increasingly reduced, and all kinds of waste products, waste due to varieties, complex, isolated scattered, their collecting, collating, transport costs The high cost of renewable technology development lags behind, the poor economies of scale. Fourth, it is biodegradable, environmentally friendly sound of the production technology and product development costs than traditional propaganda production costs. In this way, with the use of traditional production techniques and the use of one-time resources compared to the operating mode, resources recycling and the use of environment-friendly raw materials prices higher, the general will increase the operating costs of enterprises, reducing their market competitiveness of the enterprises do not want to bear. This constitutes the promotion of recycling and environment-friendly production methods of price barriers.

4. The establishment of the geo-environment compensation mechanism is to achieve sustainable economic development of the reservoir system needs

Ecological Economics from the point of view, the geo-environment as a resource, it is the carrier of economic activity, but also a production factor. Geo-environment as a resource is a price or value of its scarcity value by the size and extent of the impact of development and utilization of conditions, the value of a once with the interests of the people seek, can bring on a value of the value of the capital was. As a reflection of the capital, Environmental capital has a natural attribute of the capital. In accordance with the operating capital of the attributes that certainly is for making money, it must be in accordance with the rules of the market operators, the inevitable competition laws are subject to the domination of the other On the one hand, with ecological and environmental capital of the basic attributes, and we must follow ecological laws. In the development and construction of the Three Gorges reservoir area, we must to follow both the capital of diminishing returns and ecological balance. With the scarcity of geological products have become increasingly prominent, people can not always aware of the natural obtain, and to invest in the natural, but with the proliferation of ecological capital, if the geo-environment operators and protectors cannot get the return on their enthusiasm Will be seriously hurt. Government adopted an urgent need compensation to make the geo-environment in the economic value reflected in reality, to resolve the geo-environment operators and protectors of a reasonable return. We can create the Three Gorges reservoir area of geo-environment and sustainable development of resources economic momentum, Reservoir provide an institutional guarantee for sustainable development, achieve environmental, economic, and the reservoir area of sustainable development.

Geo-environment is a compensation mechanism for the coordination and implementation of ecological compensation system and a series of policy arrangements. Its purpose is to establish or support the Three Gorges reservoir area of the geo-environment resources property rights and vigorously promote the natural and geo-environment of compensation for the use of the system to correct economic activity in the geo-environment of negative externalities, the geo-environment of the mining and use of resources is no longer free. Guide the economy through the main "cost-effectiveness of a" choice to actively engaged in geological and environmental construction, the implementation of the economic cycle "reduction, reuse, recycling" (that is 3 R) principle, so that the reservoir area geo-environment protection, rational use of natural resources by.

Improving the geo-environmental compensation mechanism has the important strategic meaning for achieving sustainable development as following:

(1) The establishment and improvement of geo-environmental compensation mechanism helps the Three Gorges reservoir area to integrate utilization of resources and economic and social development process by useful economic incentives and social macro-management tools. To achieve purposes on the whole reservoir area on the economic and social Activities of macro-regulation, the destruction of geological, environmental pollution and ecological functions of the recovery and treatment systems management. Geo-environmental compensation mechanism will allow the protection of geological outcome of the "beneficiaries" to pay the cost, and "damage" to some compensation, to resolve this particular geological products in the consumption of public goods "free-rider" phenomenon, to resolve Ecological investors a reasonable return. Encourage people engaged in geological and environmental protection and management, geological and environmental capital proliferation.

(2) The establishment and improvement of geological environment compensation mechanism is conducive to safeguarding social equity and achieving the coordinated development of the Three Gorges reservoir area. It is well known, and safeguard social fairness is the responsibility of the Government. Equitable and sustainable development is consistent with the other hand, does not lead to the development of the fair is not sustainable. If the ecology of the areas not to change the reality of poverty, the survival of the enormous pressure eventually will lead to ecological damage,

ultimately affect the entire society's sustainable development. From the vertical equity, in order to allow future generations to have equal opportunities in resources from the ecological environment in wealth and welfare, we now cannot be arbitrary destruction of these natural resources; the sustainable use of natural resources must find a way. Geological environment compensation mechanism can be properly resolved due to ecological protection and the protection of regional and other non-protected areas between the increasingly widening social inequalities.

(3) The establishment and improvement of geo-environment compensation mechanism, the source of production help from the Three Gorges reservoir area on the promotion of economic development in harmony with environmental protection, geo-environment to overcome the cost of the external environment-friendly mode of development formed in costs and prices obstacles to sustainable development Provide an institutional guarantee. Environmental compensation mechanism can change the business permission to use the habit of geo-environmental resources, forcing enterprises in production when calculating the loss of geo-environment. This is the fundamental sustainable economic development and infrastructure.

(4) The establishment and improvement of geo-environment compensation mechanism is conducive to the financing of geo-environmental protection funds, but also conducive to establish a universal ecological awareness, to solve the geo-environment with the development of the conflict and confrontation. Geological and environmental construction of social welfare undertakings requires a large amount of capital input for protection.

5. Speed up establishing the geo-environmental compensation mechanism for the sustainable economic development of the reservoir area to provide protection system

Establishing the geo-environmental compensation mechanism adheres to the "polluter who governance, who destroyed who recovery, benefit pays" principle. Recommendations from the following aspects proceed accelerate the improvement of the geo-environment compensation mechanism for the sustainable development of the Three Gorges reservoir area to provide protection system.

5.1 Improve the geo-environment of economic compensation mechanisms

According to the environmental economics theories and the value of external economic theory, the use of the geo-environment should pay the corresponding compensation costs. At present, China has established some economic compensation mechanisms, such as the charging system, the collection of resources tax. However, the charging system only to enterprises discharge pollutants collection of sewage fees, and charges low efficiency in the use of poor, in particular, does not require the production and development to the destruction of the ecological functions of implementing any compensation. Thus affecting the environmental effects of the implementation of the policy; resources of the collection of fees has not spread, with the consent of the limited resources of the cost of not fully use the building of the geo-environment, resulting in compensation is not in place of the situation. Thus, the compensation mechanism needs further improvement.

First, to increase sewage charges to slightly higher than the cost of pollution control. Such as the acceleration of price reform, a comprehensive introduction of urban sewage treatment fees of accelerating the establishment of solid waste disposal charging system. The second is to expand the scope of resources tax, the levy of land resources for resources, the exploitation of mineral resources in implementing the progressive tax rate, strictly according to plan restrictions on mining of the super-exploitation of lesson plans to re-tax, to avoid over-exploitation and mining accidents from happening. Third, the introduction of the geo-environment tax as soon as possible, according to the geo-environment in the development and utilization of resources on the geo-environmental compensation. In a regulated way of compensation, fees levied based on strengthening the use of funds and management. 5.2 The establishment of the geo-environment of economic compensation mechanism

Financial compensation mechanism is that the virulence of environmental damage to the payment of compensation to the victims. Eco-saboteurs must pay compensation for ecological restoration projects completed or in the form of affordable and geo-environmental damage corresponding to the economic, social responsibility. Therefore, we should accelerate the establishment of geological damage to the environment responsible for the economic compensation system. Because of the geo-environment pollution led to the development of geo-environmental vulnerability, triggered geological disasters, should be given to residents in the reservoir area of the corresponding financial compensation. Project development, production and operation of enterprises, such as the environment surrounding the damage caused by the project developer, business owners bear the cost of environmental restoration, project approval to take joint and several liability. Gradually explore the establishment of the ecological environment of other factors responsible for the economic damage compensation system; the departments concerned should step up study of the development of ecological damage, environmental pollution in the implementation of economic compensation, the compensation law.

Is a fine of sanctions violations of laws and regulations of the common means, China's environmental laws and regulations having a more detailed provision? China, however, is in the low level of fines. At the same time, for different offences set a maximum fine limits. Effective economic and punishment mechanism should be based on the

nature of the offenders' offence, the offender of the proceeds from the offence and the offence caused by the loss to society to determine the amount of fines at the same time. Punishment from the proceeds of the adequacy of environmental pollution at all levels, training of special funds

5.2 Improve the geo-environment of economic incentive mechanism

Ecological environment-friendly products, using renewable resources, such as business, technical inputs and raw materials due to higher costs, need to bear part of environmental publicity obligations and the lack of price competition in traditional business advantage. Therefore, the three West reservoir area should strengthen planning guidance, and increase policy, funds, projects, etc., and the support. The ecological environment-friendly products, cleaner production enterprises, environmental industries, to take the recycling economy development model, can be differences taxation, credit offers, special funds to support environmental protection measures such as giving certain incentives.

5.3 Increase the financial transfer payment in compensation for environmental efforts

As the geo-environment with non-exclusive and non-competitive nature of public goods, and there is a "market failure." Therefore, need government intervention in the provision of public goods, make up for market imperfections. Fiscal policy is to achieve the main objective of the government's economic policy tools should be satisfied that the people of geo-environmental protection expenditure scope of public finance, financial commitment from the part of the ecological environment of the compensation responsibilities. China should improve the public finance system readjust and optimize the structure of financial expenditure, increase financial transfer payment in compensation for environmental efforts.

According to national economic growth and social development and financial situation, the state financial budget should be gradually increased, focusing on support for environmental infrastructure construction, environmental engineering and focus on water and soil conservation, natural resource protection, comprehensive treatment of urban and rural environment, such as ecological compensation benefits clearly the work.

5.4 Actively explore the market of the geo-environment compensation model

China should actively explore the use of resources, mining and other market-oriented trading compensation for the geological model, the use of market mechanisms to reduce pollution control costs and improve efficiency to prevent water pollution.

Actively guide domestic and foreign capital into ecological construction, environmental protection and resource development gradually establish a government guide, the market forward, and all sectors of society and benefit all parties to participate in the diversified, multi-level and multi-channel geo-environment compensation fund investment and financing system. Actively explore ecological construction, environmental regulation and integration of urban and rural land development and effective ways to improve the environment in improving efficiency of land development, land development and environmental protection funds in the accumulation of geological, forming a virtuous circle mechanism.

5.5 The establishment of resources, and environmental value of evaluation system

Speed up the establishment of natural resources and the geo-environment monitoring statistics index system, and actively explore the quantitative value of natural resources and geo-environment evaluation methods, the geo-environment for the establishment of a sound scientific basis for providing compensation mechanism. Actively carry out experimental work of green national accounts. "Green GDP" is from the traditional sense of the GDP in less production and business activities caused by the loss of environmental resources to that part of the cost. This new accounting system will enable the geo-environment and the economy have shown, can more precisely the economic and social development of the relationship between quantity and quality, thus contributing to improving all regions and departments of environmental awareness and the establishment of the geo-environment compensation Mechanism of enthusiasm. "11th Five-Year Plan" period, China should start in the above-scale industrial statistics in the introduction of the output value of the main raw material consumption million, 10,000 Yuan output value of energy consumption, water consumption of 10,000 Yuan output value, 10,000 Yuan output value, "three wastes", such as the total emissions of statistical indicators, A comprehensive evaluation of sustainable development.

5.6 The establishment of geo-environmental protection standards

Geo-environmental protection standards, including ecological protection and construction standards, environmental quality standards, the Three Gorges reservoir area protection and construction standards, pollution control in particular pollutant emissions control objectives, as well as the protection and resources development and utilization of standards. Geo-environmental protection standards must be based on scientific research, feasibility studies and estimates. In connection with the preparation of the Three Gorges reservoir area function zoning, environmental standards established geological reservoir system. Geological reservoir area will set standards for environmental protection standards in the regional Party and government leading bodies and leading cadres performance appraisal system,

included in Hubei Province, Chongqing Municipality building evaluation system.

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Table 1. The Environmental Protection estimates for the Three Gorges Project (Million Yuan)

Item	Total funds	Compensation for environmental protection	State special	Power generation costs	Project
Water Quality Protection	24000	13000	11000		
Ancient trees protection	100	100			
Terrestrial plant protection	1500	1400	100		
Aquatic plants Protection	6500	4400	2100		
Ecological environment monitoring system	11300	9000	2300		
Ecological and environmental protection research	700	700			
Reservoir soil and water conservation	10000	10000			
Landslides and earthquakes	8000	8000			
Geo-environment	6000	6000			
Construction of the environmental protection area	9900	300	9600		
The middle reaches of the river erosion	8000		8000		
Total	92300	34900	18000	13500	25900