

## Study on the Development Ideas of the Prairie Silk Road Economic Belt: —— Economic-Ecological Dual Coupling Perspective

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**Abstract:** On the background of ecology reality that resources are various which is ruined gradually and development slows down in Grasslands Silk Road Economic Belt and it possibly falls into a “resource course”, on the analysis basis of development status and coupling mechanism and introducing systematic idea, the paper discusses the development mechanism of Grasslands Silk Road Economic Belt and thus builds strategic idea of development. The study indicates that economy-supply in grasslands ecologic coupling-recovery mechanism and attribution-mechanism of exchange exists-in Grasslands Silk Road Economic Belt. The capacity and direction of “dual” coupling depends on coupling capacity and coupling willingness each system. The evolution process of grasslands economy-ecology “dual” coupling system is the paradoxical movement process in coupling and contraction between economic system and grasslands ecology system. Development in spirals of economy-ecology “dual” coupling system is a contracting strategic idea to solve economy system and grasslands ecology and an effective way to get rid of “resource course” in Grasslands Silk Road Economic Belt. And thus, the paper promotes a strategic idea for future development of Grasslands Silk Road Economic Belt in order to improve economy-ecology coupling capacity and willingness of Grasslands Silk Road Economic Belt.

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**Key Words:** Grasslands Silk Road Economic Belt; “Dual” coupling mechanism; Development mechanism; Strategic idea

### 1. Introduction

The Grasslands Silk Road Economic Belt is located at the center of the Eurasian steppe. The opening of the China-Europe railway line further extended its core space from China, Mongolia and most of the five central Asian countries to the vast areas of Russia, Ukraine and Hungary. Grassland is the main ecological distribution of Grasslands Silk Road Economic Belt with abundant resources, and it is ecologically important safe barriers, the basic guarantee of food security, and the main matrix of inheriting grassland culture and the reliable guarantee of national unity and long-term stability of border areas.

Far from being a boon to economic growth, China's natural resources may even be a curse to economic development. The "resource curse" effect refers to the limiting and lagging effect of natural resources on economic development<sup>[1]</sup>. The long-term dependence on natural resources in the Grasslands Silk Road Economic Belt may lead to the lagging of regional economic development on the one hand, and on the other hand, it is also an important inducement for the prominent social problems, ecological environment deterioration, resource depletion and other negative problems<sup>[2]</sup>. However, a large number of research results show that the economic growth rate of countries or regions with abundant resources along

the silk road economic belt is slower than that of economies with relatively poor resources.

The grassland silk road economic belt urgently needs to take free flow of production essential elements and optimal allocation of production factors as the goal, take the linkage of resources as the basis for development, and take into account the ecological and economic attributes of the development model<sup>[3]</sup>. Therefore, it is the theoretical premise for the development and sustainability of the grassland silk road economic belt to interpret the development mechanism of the grassland silk road economic belt from the perspective of systematic coupling, clarify the linkage mechanism between economic attributes and ecological attributes, and crack the "resource curse" of the grassland silk road economic belt<sup>[4]</sup>.

### 2. Investigation and analysis of the status of the Grassland Silk Road Economic Belt

#### 2.1 Current situation of economic development of Grassland Silk Road Economic Belt

The grassland silk road economic belt saw frequent trade between countries, and the grassland economy is also in a stage of steady growth, especially the trade between countries and China is frequent, forming a bridge for the exchange and communication of the grassland silk road economic belt. China is a country with large grassland resources, with nearly 6

billion mu (1 mu =1/15 hectare) of various types of grassland, accounting for about 40% of the total land area. Grassland is the main body of terrestrial ecosystem and one of the main battlefields of ecological civilization construction. Western China has 70% of China's grassland, accounting for more than 2/3 of the country's total grassland area and 3.1 times of the national average per capita. China has frequent import and export trade with its neighboring countries along the grassland silk road.

By the end of 2016, Mongolia's population was 3.12 million, and its annual total foreign trade volume was 8.275 billion US dollars, and its trade with China was 4.963 billion US dollars. The number of livestock in Mongolia continued to grow in 2016, with a total stock of about 61,549,200 animals.

As of 2017, Kazakhstan has a population of 17.7 million, and its GDP grew by 4.2% in the first half of 2017. Despite the drop in international oil prices, Kazakhstan's economic development is stable and shows a growing trend. In the livestock sector, Kazakhstan saw growth in production of eight products and steady increases in output of milk, meat and wool.

By the end of 2016, Uzbekistan's population had reached 32.12 million, and the annual trade volume between China and Uzbekistan was about 3.616 billion US dollars. In 2016, Uzbekistan's livestock sector grew 6.6 percent. Among them, the number of cattle was 12.1653 million, 19.7492 million sheep, 2.1718 million tons of meat and 9.7033 million tons of milk. On the whole, the effect of animal husbandry on economic development is not obvious.

In the first half of 2017, Tajikistan's GDP was 24 billion SOM (about \$2.73 billion). Economic foundation is relatively weak, relatively simple structure. In 2011, the animal husbandry reached the output value of 3.958 billion SOM, and has been in the stage of continuous growth in the recent five years. However, as of 2017, Tajikistan's external debt was about 2.276 billion US dollars, accounting for 35.6 percent of Tajikistan's GDP, which is the "red line "

Turkmenistan's GDP grew by 6.4% from January to October 2017, and fixed asset investment grew by 4.6% from January to September 2016: foreign trade grew by -22.2%. As of October 2016, meat production was up 1.7 percent year-on-year. Milk production rose 1.6 percent year-on-year. Wool output rose 0.3 percent year-on-year. But generally speaking, Turkmenistan's economic development is relatively fast, but its overall volume is still small.

## **2.2 Grassland ecological system in the Silk Road Economic Belt**

Ecosystem has the function of providing products and services for human production and life, and create a series of natural environment, development

conditions and economic and social benefits for human survival. The value of ecosystem services is the monetization of a series of products and services provided by the ecosystem for human beings, including the direct use value of material products and cultural and entertainment services, and the indirect use value of maintaining the balance of life and protecting the environment <sup>[5]</sup>.

The grasslands of the countries along the silk road economic belt are vast in area and rich in natural resources. By the end of 2017, the central government had invested more than 100 billion yuan in grassland ecological protection in the past five years, with the average over-load rate of key natural grasslands dropping by 15%, and the fresh grass output exceeding 1 billion tons for six consecutive years. Mongolia has set up 1,500 grass-roots monitoring points to combat desertification, and 14 provinces have formulated plans to combat desertification. Kazakhstan has also done a lot of effective work on grassland ecological protection. The five central Asian countries and Mongolia are rich in grassland mineral resources. The grassland governance act is mostly based on the protection of grassland vegetation and lacks planning and arrangement for mineral exploitation. Unreasonable agricultural reclamation, overgrazing and other reasons have caused the grassland area of the silk road economic belt to shrink to varying degrees, and the ecological environment in some regions has been significantly degraded and deteriorated. At present, the specific performance is as follows: (1) the lake area shrinks sharply, the river shortens or disappears, the river water quantity decreases, the groundwater level drops, and the water quality drops; (2) the area of alkalization land increases: (3) deserts expand and oases shrink; (4) the frequency of sandstorms increases; (5) the area of natural vegetation decreases and the desertification of grassland intensifies. Generally speaking, the grassland ecological problems are the major problems troubling the ecological protection of various countries, which are not only influenced by the objective ecological conditions in the region, but also caused by the excessive absorption of the ecological system by the economic system. The overgrazing of grassland along the grassland silk road economic belt aggravates the resource crisis, especially in Kazakhstan where the economy is developing well. In Kazakhstan, overuse of grasslands has led to a decline in the quality of pasture land and vegetation in three-fifths of the country. The aral sea crisis not only reflects the problem of ecological protection in central Asian countries, but also seriously threatens the grassland with drought and other disasters. Due to the disorderly and unscientific use of grassland and the lack of government management and protection measures,

Mongolia also has serious ecological and environmental problems. 76.8 per cent of the country's land has suffered from desertification to varying degrees, and desertification is still spreading at a rapid rate to the country, including the eastern provinces, Kent and other fine grassland area.

### **2.3 Practical enlightenment from the development of grassland economy and ecosystem**

The analysis of the current economic and ecological situation of the grassland silk road economic belt shows that the economic development of the grassland depends on the consumption of the grassland ecological resources, and excessive consumption of resources will inevitably lead to the imbalance between the ecology and economy, and eventually fall into the "resource curse". Therefore, the scarce nature of resources requires that the ecological system not only supplies the economic system to form the development and upgrading of the economic system, but also requires that the economic system feeds the ecological system to form the closed loop of sustainable development. "resource curse". At the same time, the economic development of the grassland silk road economic belt consumes a lot of resources, causing grassland desertification and other ecological problems. This reality problem has been concentrated in recent years. The debt crisis and political turbulence in central Asia and Mongolia are the realistic manifestations of the improper economic and ecological strategy of the government. The academic circle began to reflect that Yang Haoran and Chu Yanning proposed the mutual coordination and sustainable development strategy between ecological environment and economic growth. To sum up, balancing the relationship between economic system development and ecosystem has become an urgent task for the countries along the grassland silk road economic belt.

To balance the relationship between economic development and ecological protection, it is necessary to break through the boundary between two independent subsystems, that is, to realize the coupling between economic system and ecological system. This coupling manifests itself in the following properties. First, the balancing properties of coupling. The coupling between the two systems is actually an equilibrium state formed between the economic system and the ecological system, which is affected by many factors such as historical origin, system resources and theoretical viewpoints. The long-term development of the grassland silk road economic belt needs to achieve this balance, that is, to meet the needs of social subjects for economy, environment and resources, and to realize the simple idea of symbiosis between man and nature and spectrum. Therefore, how to choose, deal with and coordinate the behavioral

pattern of the transformation between the two subsystems of the economic system and the ecological system determines the development trend of the existing grassland silk road economic belt. Second, the cost attributes of coupling. When the permeability of system boundary between economic system and ecological system is high, the coupling between economic system and ecological system is more reflected in benefits rather than costs. With the enhancement of mutual aid between economy and ecology, the willingness of system coupling will also increase. On the contrary, if the coupling cost is greater than the coupling benefit, there will be more barriers to the integration of economy and ecology, and the willingness of system coupling will be reduced. It also reflects the difference of coupling ability between economic system and ecosystem in different areas. Finally, the differential attributes of system penetration. In the actual coupling process, the net flow of resources from one subsystem to another is a cyclical normal.

Under the background of promoting the construction of the grassland silk road economic belt, the traditional "ecology-grassland" framework has been difficult to adapt to the needs of economic development, and it is necessary to consider the specific situation of the coupling and contradiction between the economic system and the ecosystem M. Core resources and emerging industries under the economic framework will enter the period of value explosion, and the grassland system as the deep foundation of important economic units has been gradually established. Grassland is not only a traditional resource carrier, but also a comprehensive system that accumulates various resource endowments, providing new opportunities and models for economic development under the background of ecological economy. Therefore, the reconstruction of the "dual" coupling mechanism framework of the grassland silk road economic belt should be weakened with the coupling mechanism, which is the only way for the realistic development.

### **3. "Dual" coupling development mechanism of Grassland Silk Road Economic Belt**

Lester r. brown divides the world development model into two broad categories. Namely, ecological economic model and traditional economic growth model. Ecological economic model, guided by ecological law, is a model of material reduction. It can reduce the pressure and force of resource environment by improving the production and utilization efficiency of resource environment. It can be regarded as a supply-compensation mechanism. The traditional economic growth model, based on the market trading mechanism, regulates the balance between ecology

and economy by setting the prices of resources and environment, which can be regarded as the distribution-transaction model. It can be used for reference to solve the economic and ecological development problems of the grassland silk road economic belt by introducing this idea and forming two coupling mechanisms.

### **3.1 Supply-compensation mechanism of economy-grassland ecological coupling**

Grassland is one of the most important renewable resources on earth. Grasslands provide necessary ecological resources, such as pasture, food and mineral resources, which provide necessary impetus for the development of the silk road economic belt and necessary support for the development of emerging strategic core cities, silk road urban belts and economic belts. The directional supply of ecological grassland to industrial economy has the strategic value of supporting the industrial development of silk road economic belt. On the other hand, the economic development of transportation hubs, strategic passageways, urban belts and strategic core cities is inevitable due to the vulnerability of regional ecology. The difference and diversity of grassland resources correspond to the application categories of agricultural civilization, industrial civilization and ecological civilization respectively. The idea of resource utilization that does not match the civilization stage will inevitably lead to the wrong allocation of grassland resources and the system collapse of grassland resources. Ecological economy is a kind of material reduction mode that can maintain the sustainability of the environment. By improving the production and utilization efficiency of resources and environment, it can realize the sustained economic growth with zero or negative growth of ecological expenditure under the pressure of resources and environment.

The grassland silk road economic belt has entered a new period of industrial gradient internalization and economic development center moving to the west. With the new opportunity of "One Belt And One Road" initiative construction, the ecological value of the grassland region also highlights. On the one hand, the supply-compensation mechanism of economy-grassland ecological coupling enables the silk road main functional area to have an ecological foundation in the future. On the other hand, it also enables the economy to further feed the ecology and promote the further continuous improvement of the grassland ecology. Economy, therefore, the supply of grassland ecology coupling - compensation mechanism is not only a grassland's supply of the economy and the feedback of grassland economy, in economic activities and ecological behavior under multiple linkage mechanism, can promote the prairie,

the silk road by coupling state economy long-term development, formed grassland sustainable development system.

### **3.2 Economic and grassland ecological coupling allocation-transaction mechanism**

In fact, there are distribution, trading and other forms of coupling mechanism between grassland ecosystem and economic system. On the one hand, based on the unimpeded pipeline of grassland resource capitalization, New grassland ecological development mode through development of green financial system and the prairie rights trading, attract inflows, build around the grassland resource rights - pools of capital assets, improve the resource allocation of capital structure in our country, and strategically formed more ecological dynamic grassland capital - asset structure, finally promote the development of grassland ecology. On the other hand, grassland ecological resources can be further transformed into various types of eastern grassland taxes (such as livestock and mineral resources), and finally into resources and capital through the channels of green financial assets such as the asset-capitalization of grassland resources.

The distribution and transaction mechanism forms another closed loop. By opening the channels of grassland ecological resources and grassland assets and securitization, the value space of grassland resources can be improved and the further coupling between economy and grassland ecology can be finally formed. This is what the supply-compensation mechanism lacks. The formation of this coupling mechanism benefits from the following strategies: first, the establishment of ecological economic system to cultivate the institutional environment of grassland Eco-economic circle; Third, carry out the ecological finance project and build the green industry chain of the grassland. Fourth, improve the green finance system and realize the harmonious development of economy and ecology. Most countries of the grassland silk road economic belt have the corresponding measures of ecological protection and ecological compensation. The capitalization and financialization of the ecology have formed an economy-ecological capital circulation system. Through exchange or trading means, the economic and ecological coupling of the grassland silk road economic belt and the grassland ecology has been realized.

### **3.3 Evolution mechanism of "dual" coupling of grassland silk road economic belt**

According to relevant theory of ecosystem services, the spatial and temporal heterogeneity of ecosystem makes different space-time scale human ecological well-being has regional differentiation, indications, leading to well-being of regional resources and environmental well-being of total or per capita level difference influence on the economic and social



development, and different economic and social development goals may also cause between different types of ecological well-being, special ecological well-being and human trade offs between economic or social welfare.

Under the "dual" coupling mechanism, the grassland silk road economic belt has a closed cycle system of coupling economic and ecological development. The connotation of ecologicalization of economy is the process of transforming the structure of economic system and the utilization mode of elements, minimizing the influence of the operation of economic system on resources and environment, and achieving the ultimate goal of steady-state economy. Economization of ecology is the process of developing and utilizing the ecological resources in a region to promote the social and economic growth of the region and the increase of human welfare, and to enhance the social and economic value of the region.

First, the coupling level of the "dual" coupling mechanism of the grassland silk road economic belt should be considered. For any system, there exists coupling willingness and coupling ability in system coupling. Coupling willingness refers to the willingness to clear or blur the boundary of another system to satisfy the coupling. Coupling capability refers to the ability to specify or blur the boundary of another system to satisfy coupling. The matching level of coupling willingness and coupling ability determines the realization level of system coupling. The level of system coupling quantitatively represents the effect of the dual coupling mechanism of the grassland silk road economic belt, in other words, without considering other elements and coupling characteristics under the premise of system coupling level is higher, the "dual" coupling effect is better. On the contrary, the low level of system coupling, the "dual" coupling effect is poorer.

In the system coupling problem of the "dual" coupling mechanism of the grassland silk road economic belt, when the two systems realize the interaction of resources, information and capital, there must be the coupling of the unified ecosystem of the economic system and the ecosystem and the economic system. When economics unification of ecosystem coupling level is dominant, then the system coupled by the dominant economic industry subject: when the coupling level dominant ecological system an economic system, the system coupled by the dominant ecological subject: when economics unification ecological system, ecological system economic system of the coupling level is roughly equal, the grassland of the silk road economic belt "binary" coupling mechanism between ecosystem and economic system coupling effect is more balanced. Changing the coupling ability and willingness of any subsystem can

break the original coupling equilibrium state, but to further improve the level of coupling, it is necessary to gradually enhance the coupling ability and willingness of the two systems, forming a spiral "binary" coupling mechanism of benign development path. This has defined the future direction for the development of the grassland silk road economic belt. The ideas, policies and methods of ecological economic construction are not only juxtaposed, but also run through the overall construction of "ecology-economy" [3]. The spiraling development of the "dual" coupling system of grassland economy and ecology is a strategic idea to solve the contradiction between the economic system and the grassland ecology, and an effective way to realize the efficient and rational utilization of the grassland resources in the region. According to the discussion on the coupling mechanism, the "dual" coupling mechanism between the silk road economic belt and China's grassland ecosystem is formed, as shown in Fig. 1.

#### **4. Thoughts on the development of China's grassland silk road economic belt under the background of "dual" coupling mechanism**

##### **4.1 Enhance the ability and willingness of ecosystem coupling to further form and develop the grassland ecological industrial system**

First of all, develop the forage industry, ecological animal husbandry and animal products ecological processing industry to form the basic capacity of ecological economy. The silk road economic belt has the largest grassland system in the world, and its ecological coverage is relatively weak. Relying on the ecological resource endowment, it improves and changes the grassland ecological investment mode, and forms the livestock product processing industry that saves resources, reduces pollution and protects the environment, which is conducive to the coupling of the ecosystem to the economic system. Giving full play to the basic ecological capacity of "small construction, large protection, small oasis and large ecology" of the herbage industry will help support and drive the rational planning and development of modern animal husbandry and promote the strategic adjustment of the economic structure of animal husbandry and rural pastoral areas. Enhance the capacity of the basis of ecological economic region, and develop the section of the grass, water saving, energy saving, energy intensive ecological animal husbandry. While giving play to the basic role of market resource allocation, the production factors of grassland animal husbandry should be rationally allocated, and focus on the coordinated development of animal husbandry in countries along the silk road economic belt, so as to form a new ecological industry belt and industrial zone

for animal products.

Next, seek the environmental management way that gives attention to both benefits. China has invested heavily in desertification control, and the United Nations development programme (UNDP) has put forward the plan of "research, protection and rational utilization of desert resources" in central Asia.

Strengthening the capacity and willingness of Eco-economic development will help promote the development of Eco-industry and improve the efficiency of energy and resources utilization. First, China can jointly develop clean energy like wind energy, nuclear energy and water.

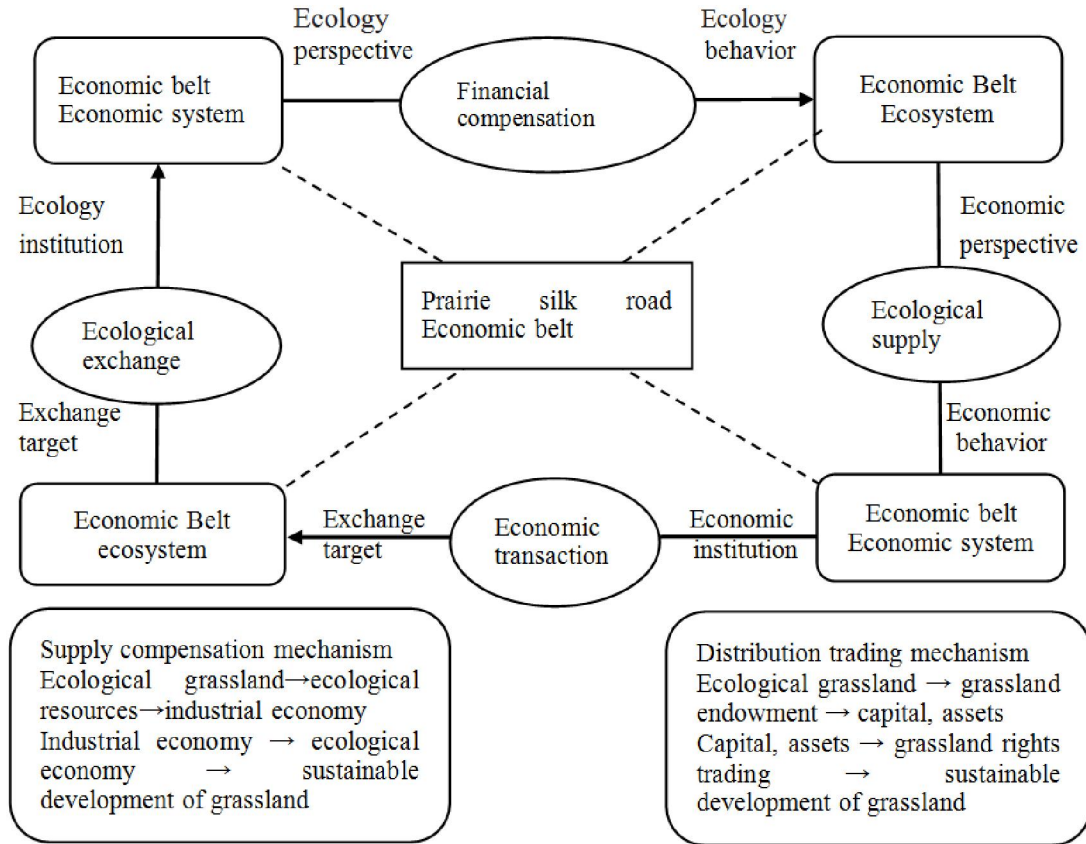


Fig.1 “Dual” Coupling mechanism of grassland Ecosystem

**4.2 Strengthen the ability and willingness of economic and ecological governance, build the grassland ecological capital system and connect the asset and capital channel of the silk road economic belt**

First of all, it is suggested that our government agencies led, the agreement was founded the silk road economic belt of grassland ecological management institution, one is in charge of the silk road economic belt of grassland and its ecological construction supervision and management, and states in grassland protection laws and regulations should be perfected as soon as possible, to study and formulate the prairie ecological environment construction, protection and rational utilization of grassland resources of guidelines, policies, and bear the prairie ecological construction. Second, we should coordinate and supervise the management and use of the ecological and economic

development of the grasslands in the region, formulate policies on financial, price and trade and other economic regulation and mutual assistance for the grasslands and their ecological construction, and organize and guide the establishment and implementation of ecological and economic norms for the construction of the grasslands and their economies. Three is to enhance mutual trust, coordinating national ecological protection mechanisms and pastoral areas, for example, the solution of the water crisis can be achieved by regional cross-border water resources organization consensus, and to build regional water resources database.

Then, we will continue to draw red lines for the protection of grasslands. At present, Inner Mongolia and other provinces have initially completed the red line demarcation project. The red line demarcation project of grassland protection shall follow the

following methods: first, the red line of grassland protection shall be demarcated scientifically and rationally based on technology and with the concept of technology-oriented scientific demarcation. Second, based on the results of technical census combining with the local ecological carrying capacity and current situation of the development of animal husbandry, scientifically setting grassland protection of red line area; third, on the basis of grassland red lines drawn, by investing in education and science and technology to realize scientific livestock entire hectare-age, breeding, to solve the contradictory between breeding; the fourth, We will harness desertification and degradation of grasslands through advanced technologies, carry out ecological construction and supervision, and realize sustainable development of grasslands.

Finally, we will explore the sustainable development model of modern ranching, and provide a new development mode for the development of pastoral areas in countries along the silk road economic belt. On the basis of comprehensively planning the industrial structure, protecting and improving the ecological environment, preventing and controlling pollution and maintaining the ecological balance, we will improve the stability and sustainability of the grassland ecosystem and promote the sustainable development of the grassland. On the

one hand, we will promote large-scale operation of animal husbandry through institutional innovation, and promote ecological restoration and green management; on the other hand, we will realize ecological governance by relying on institutional innovation, and promote ecological governance.

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