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Ideas and Countermeasures for Optimum Design of Environmental Protection System Based on Ecological Security

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Abstract. Effective environmental protection system is an effective way to promote the coordination between economic and social development and resources and environment. Based on the combing analysis of the development process of China's environmental management institutions, systematically expounds the process of continuous improvement and change of the environmental management system. Combined with the characteristics of China's economy from the stage of rapid growth to the stage of high-quality development, the key problems at present are analysed. Focusing on the demand of future ecological civilization construction and sustainable development, while on the basis of elaborating ecological security systematically, and then this paper puts forward the idea of optimum design of environmental protection system based on ecological security. According to the actual task of economic structure adjustment and economic layout adjustment under the construction of national ecological security, this paper focuses on improving the function of ecological services, and puts forward the countermeasures for optimizing the environmental protection system in China and the basic means for effective implementation of the safeguard system.

1. Instruction

At present, China has established three policies of "prevention first, prevention and control combined", "who develops, who maintains, who pollutes, who controls" and "intensifying environmental management", and the eight major systems, including the environmental impact assessment system, the "three simultaneous" system, the collection and discharge fee system, the quantitative assessment system for the comprehensive improvement of the urban environment, the environmental target responsibility system, the pollutant discharge permit system, the deadline control system and the centralized control system [1], have formed a relatively complete set of basic environmental management system. The establishment of the environmental management system has provided effective support for the rapid and sound economic development, safety and clean development. China has avoided the rapid deterioration of environmental conditions under the condition of rapid economic growth and promoted the sustainable and healthy development of economy and society. At present, China is gradually establishing an environmental management system supported by "environmental protection optimization and development instead of environment for development", which initially forms a "four beams and eight pillars" system framework for the construction of ecological civilization.



After more than 30 years of sustained and rapid economic growth, China has consumed a large amount of resources and energy, destroyed the ecological environment, the resources and environment pressure increasing. Then now we must attach importance to ecological civilization construction and the new stage of sustainable development, which requires our country's economic development must get rid of the resource-consuming and environment-destructive development mode and turn to the high-quality development mode of low consumption, low pollution and low emissions [2]. Environmental management system is an important ways to realize the sustainable development of ecological environment and promote the national economy. However, compared with the new characteristics of our economic development and the new requirements of ecological civilization construction, the traditional environmental management system in China has been obviously unable to meet the requirements. The key issues are as follows: (1) The current environmental management system is mainly based on the environmental impact assessment system as the core around the pollution reduction and total control design, but due to the strong subjectivity and administrative nature of the total amount control system, it cannot accurately reflect the control effect. At the same time, because the emission permit system in China has not been carried out nationwide, and currently only for the control of conventional pollutants, relevant laws and regulations are not perfect, resulting in the system does not meet the quality control requirements [3]. (2) In some systems areas, there are still vacancies and segmentation circumstances, the implementation and execution of some systems are not in place, and the system design is not strict enough to meet the unified needs of current and future environmental management [4]. (3) The ecological environmental protection needs the common role of all sectors of society and relevant systems, but the current environmental management system in china is unable to comprehensively deal with and combine economic construction, political construction, cultural construction, social construction and ecological civilization construction, while fails to meet the overall layout requirements of "five-in-one". As a result, China cannot fully realize environmental protection when making macro decisions [5-6]. So based on the current problems of environmental management system, this paper combined with the feature of China's economic development and the requirements of ecological civilization construction and sustainable development, meanwhile according to the concept of ecological security, put forward the new trend of China's environmental management system optimization.

2. Changes of China's Environmental Management System

Since the 1970s, China's environmental protection system and environmental protection institutions have undergone a transformation from scratch.

A series of environmental pollution incidents took place in China before the 1970s. In response, The First National Environmental Protection Conference held in 1973 put forward the "32-word policy", which made people initially realize the seriousness of environmental problems. In 1974, China established the State Council Leading Group on Environmental Protection, achieving the transition from non-existence to existence of environmental protection institutions. However, the work functions are still distributed in water conservancy, land and other resource management units, the environmental protection work has not been fully carried out. In 1982, the State Council Leading Group on Environmental Protection and other institutions jointly constituted the urban and rural environmental protection units, and the capacity of environmental protection units was gradually reduced, making it more difficult to adapt to the needs of environmental protection functions. At the beginning of 1984, The Second National Environmental Protection Conference formally confirmed that environmental protection is a basic national policy of China, proposed the "three synchronization" and "three unification" strategy of environment and development, meanwhile formed a policy system focusing on "prevention first, combination of prevention and control", "who pollutes, who controls" and " intensifying environmental management" [7]. In 1988, the establishment of the State Environmental Protection Administration (SEPA) promoted the function of ecological protection of environmental protection units. In the following year, The Third National Environmental Protection Conference proposed a new "five-point system", calling for strengthening the system construction and

promoting the coordinated development of economy and environment. The Fourth National Environmental Protection Conference held by the State Council in 1996 put forward that environmental protection is the key to the implementation of sustainable development strategy, and implemented the "total pollutant emission control plan" and "cross-century green project planning" two major measures, China's environmental protection work and economic development model has entered a new stage.

In the new century, The Fifth National Environmental Protection Conference in 2002 deployed the specific requirements of environmental protection work during the Tenth Five-Year Plan period in accordance with the requirements of socialist market economy, providing guidance for the healthy development of China's economy. The "three transformations" proposed at The Sixth National Environmental Protection Conference in 2006, promoting the comprehensive, coordinated and sustainable development of China's economy and society. In 2008, China's Ministry of Environmental Protection was formally established, covering pollution prevention and control, ecological management, nuclear and radiation safety prevention and control inspection and other three aspects, and expanding the scope of management of China's environmental protection agencies. The Seventh National Environmental Protection conference held in 2011 stressed the importance of actively exploring new paths for environmental protection and opening up new prospects for environmental protection work in an all-round way. The Eighth National Environmental Protection conference in 2018 proposed to intensify efforts to promote ecological progress and solve ecological and environmental problems, resolutely fight pollution prevention and control, push China's ecological progress to a new level, and promote the transformation of China's high-speed economic growth model into a high-quality growth model. The seventh national environmental protection conference held in 2011 stressed actively exploring new paths for environmental protection and opening up new prospects for environmental protection work in an all-round way. The eighth national environmental protection conference in 2018 proposed to strengthen efforts to promote construction of ecological civilization, solve ecological environmental problems, and resolutely fight the key battle of pollution prevention and control. Moreover push China's ecological progress to a new stage, and promote the transformation of China's high-speed economic growth model into a high-quality growth model.

3. Needs of National Ecological Security Construction under the New Normal State of Socio-economic Development

For a long time, China's extensive economic development and lack of supervision of environmental management system have led to environmental damage, affecting the normal life of the people, and restricting China's economic development model from "quantitative change to qualitative change". The report of the Nineteenth National Congress of the Communist Party of China clearly points out that strengthening the overall design and organizational leadership of the construction of ecological civilization, improving the ecological environment management system and optimizing the ecological environment are the important embodiment of the new era economy.

"Eco-security" was put forward in the second half of the 20th century, which means that "the ecological environment on which a country depends for its survival and development is in a state of not being damaged or less threatened". The meaning of eco-security is extensive. This paper summarizes the understanding of different experts and scholars on the connotation of eco-security, and forms the basic framework as shown in Figure 1 below. That is, the eco-security is interacted and maintained by environmental and resource security, biological and ecosystem security, natural and social system security, while it can destroy the balance of ecological security if problems arise in any tache.

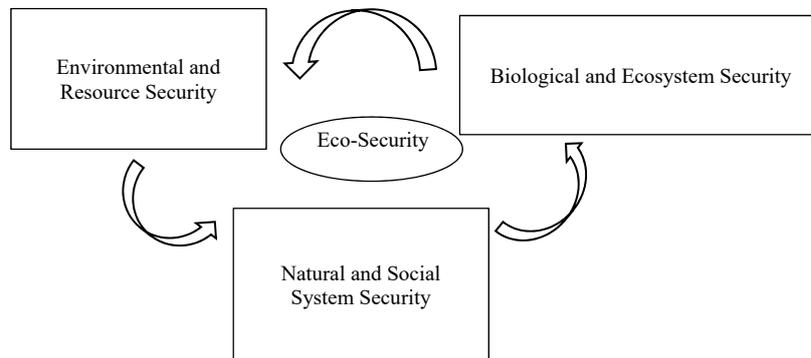


Figure 1. Connotation map of ecological security

In the National Outline of Eco-environmental Protection issued in 2000, the goal of "safeguarding national ecological environment security" was clearly put forward for the first time. At the first meeting of the Central National Security Committee in 2014, ecological security was clearly integrated into the national security system, moreover it was pointed out that ecological security, like political security, military security and economic security, is a security field that has a great impact on national security. Consequently, eco-security has become the focus of national attention and a major issue concerning the well-being of the people and the future of the nation. Therefore, we need to start from the strategic aspect of national security, adhere to the implementation of sustainable economic development strategy, explore scientific and reasonable ecological security concept under the new normal economic development of our country, establish a sound ecological security system, and ensure our ecological security.

4. Optimization idea of national environmental protection system based on ecological security

Ecosystem security is the foundation of resource and social system security. Once the ecosystem is destroyed, it will cause great loss of human living space and resources, and even the collapse of the regime and economy, the death of personnel and the destruction of social civilization threaten national security. Therefore, in order to ensure the national security and the long-term stable development of social economy, we must do our best to protect the ecological system security of our country, meanwhile proceeding from reality, protecting the ecological environment with the system, optimizing the environmental management system, and maintain the ecological security.

China has initially established an ecological environmental protection system covering the source, process and end of land space control system, environmental supervision system, environmental management system and accountability and appraisal system (Figure 2). The system of ecological environmental protection began with the eight systems of "old three" and "new five" environmental management, which is the embryonic form of China's environmental policy system. On this basis, the constant development of environmental policy system in China. Since the 18th year of the CPC, under the framework of the reform of the ecological civilization system, positive progress has been made in pollutant discharge charges (environmental tax), EIA reform, pollutant discharge permit system reform, total amount control system reform and "three lines, one single" system. China's environmental policy system has entered a new stage of comprehensive upgrading [8]. Therefore, on the basis of the current environmental management system in China, combined with the requirements of ecological civilization construction and sustainable development, and on account of the concept of ecological security, this paper proposes the optimization idea of environmental management system from the source to the end.

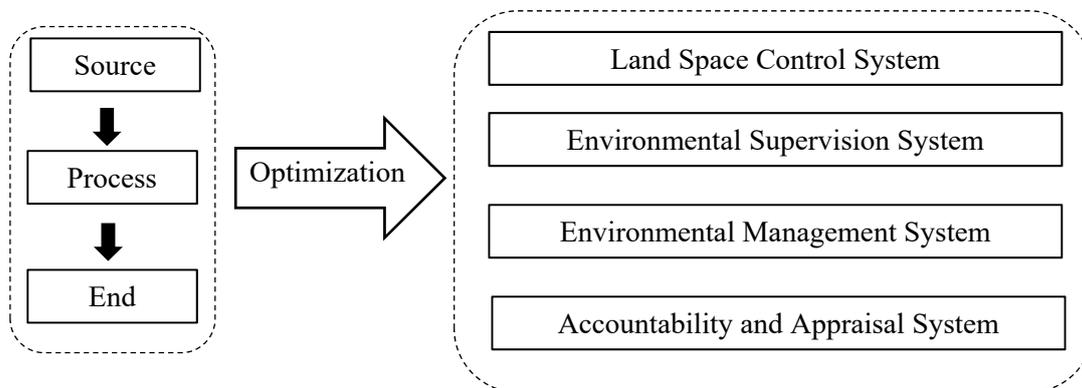


Figure 2. Optimization design roadmap of China's ecological environmental protection system

5. Countermeasures for optimizing the national environmental protection system

5.1 Improve the Land Space Control System

Simplify the top-down land use index system, and adjust the method that distribution of indicators based on administrative amount of land area radix. The index of development intensity is decomposed into county administrative regions as a binding index to control the total amount of construction land. Expanding land space control system to all natural ecological spaces, delimiting and strictly abiding by the ecological red line. Improving the monitoring system covering all land space and dynamically monitor land space changes.

5.2 Improving the Environmental Supervision System

The environmental impact assessment system needs to take the improvement of environmental quality and the acceptable level of environmental risk as the basic criteria and preconditions at the project, planning and strategic levels; Environmental planning should set the objectives of ecological environment quality according to the integrity and synergy of ecosystem and ecological environment elements, and allocate policy tools and means around the objectives of improving ecological environment quality and environmental health risks. Enterprise pollutant discharge permits covering all fixed pollution sources should be established nationwide. As soon as possible, and establishing a unified, fair, standardized and guiding the whole process management of national pollutant discharge permits. Standard the economic behavior of polluting emissions, actively carry out trials to reform the compensation system for environmental damage, and effectively solve the problem of the absence and inadequacy of compensation for damage to the ecological environment.

5.3 Improving the system of environmental management.

Gradually unify the environmental supervision departments and try to unify the authoritative environmental law enforcement system; Construct an integrated ecological environment monitoring network, and gradually realize the "National Network, National Construction, National Monitoring, National Assessment" [8]. The regional coordination mechanism for joint prevention and control of air pollution and the linkage cooperation mechanism for prevention and control of water pollution should be improved in combination with the geographical characteristics, pollution levels, urban spatial distribution and pollutant transport laws of various regions. The responsibility system for quality assurance of environmental monitoring data should be established in an all-round way, while improving the quality management system of environmental monitoring, then the mechanism for preventing and punishing fraud of environmental monitoring data should be established to ensure that environmental monitoring data are comprehensive, accurate, objective and true.

5.4 Accountability and Appraisal System

According to the main function positioning of different regions, implement differentiated performance evaluation. A lifelong accountability system for ecological and environmental damage shall be established to clearly define the accountability and identification procedures for the leading officials, relevant leading personnel and department heads of local party committees and governments on the basis of the situation of ecological and environmental damage. While If the circumstances are distinguished and the ecological environment is damaged, they shall be warned and encouraged, ordered to apologize publicly, organized and handled, or punished by Party discipline and government discipline, and shall be investigated for criminal responsibility in accordance with the law, which constitutes a crime. And then, a complete environmental law enforcement supervision system should be established to ensure clear rights and responsibilities, code of conduct, strong supervision and efficient operation.

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References

- [1] Meng Wei and Sun Qihong 2015 Innovation of China's Environmental Management System under the Background of Ecological Civilization. *Environmental Protection* **1** 34-37.
- [2] Li Zuojun 2017 China's Economy Has turned to a Stage of High-quality Development. *China Report* **12** 94.
- [3] Meng Wei and Sun Qihong 2014 Innovation of China's Environmental Management System under the requirement of Ecological Civilization. *China Population, Resources and Environment* **24** 196-199.
- [4] Zhang Yongliang, Yu Hai and Xia Guang 2015 Strictest Environmental Protection Institution: Status, Experiences and Policy Recommendations. *China Population, Resources and Environment* **25** 90-95.
- [5] Li Haiqin 2018 China's Environmental Management System Innovation under the Background of Ecological Civilization Construction. *Environment and Development* **1** 177-179.
- [6] Li Yang 2017 Innovation of China's Environmental Management System under the Background of Ecological Civilization. *Low Carbon World* **7** 31-32.
- [7] Gao Shiji, Wang Haiqin and Li Weiming 2018 Course and Orientation of Ecological Civilization System Reform over 40Years of Reform and Opening-up. *Reform* **249** 49-63.
- [8] Xia Guang 2018 On the Historic Changes of the Ecological and Environmental Protection since the 18th National Congress of the Communist Party of China. *Environment and Sustainable Development* **43** 11-20.
- [9] Wang Haiqin and Gao Shiji 2017 The Overall Framework and Orientation of Eco-environment Monitoring Network Construction. *Reform* **5** 15-34.