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Study on Dynamic Coordination between Natural Resources Development and Ecological Carrying Capacity

Jiabin Zhang[1, 2], Jingjing Peng[1, *]

[1]*Taishan University, Taian, China*
[2]*New Era University College, Kuala Lumpur, Malaysia*
**Correspondence: 271828339@qq.com.*

ABSTRACT. *The depletion of natural resources and the destruction of ecological environment are common problems faced by all mankind. This study analyzes the relationship between the development intensity of natural resources and ecological carrying capacity from the perspective of ecological carrying capacity. Firstly, it explores the concept and basic theory of ecological carrying capacity. Furthermore, the paper puts forward some methods, such as developing circular economy, adopting ecological compensation measures, and issuing and implementing relevant protective policies by the government, so as to provide references for handling the relationship between natural resources development and ecological environment protection.*

KEYWORDS: *Resources; Development; Ecology; Carrying capacity; Coordination resources; Develop; Ecology; Carrying capacity; Coordination*

1 Ecological carrying capacity -- from biological concept to sociological concept

The concept of carrying capacity was first applied to natural ecosystems in the 1870s, that is, the carrier is a natural system, but it still stays at the level of physical quantities (such as animals) that can be transported by natural systems (such as rivers)[1]. In biology, eco-capacity can be defined as the Maximum number of a species that a particular habitat can carry without causing long-term damage to the ecosystem on which it depends and reduces the future capacity of that species[2].

Bearing of ecological carrying capacity is a natural ecological system, and carrying objects are organisms. With the rapid development of industrial civilization, the natural resources development and utilization of scope expands unceasingly. The influence of human social activities on the ecosystem gradually deepened, and the bearing capacity of ecological research also extended to sociology research field. Scope of the concept of ecological carrying capacity is rising. The ecological carrying capacity refers to, in a specific environment conditions, (mainly refers to the living space, the combination of nutrients, sunlight and other ecological factors),

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a number of individual existence in the maximum limit. The integration, sustainability and coordination of the ecological system and proposal of ecological carrying capacity lay a foundation for realizing the progress from simply supporting human social progress to promoting the harmonious development of the whole ecological system.

2 Dialectic relationship between natural resources development and ecosystem balance

From the point of view of the whole natural system, resource system and environmental system are part of the ecosystem. In order to maintain normal social activities, human beings must consume resources and at the same time discharge a large amount of wastes. Therefore, in order to survive sustainably, human beings must have a continuous supply of resources. At the same time, there must be enough environmental capacity to accommodate the waste discharged by human beings. However, resources are limited and environmental capacity is also limited. Therefore, human development is limited not only by resources, but also by environmental capacity, that is to say, by both environmental carrying capacity and resource carrying capacity.

2.1 The dynamic balance of the ecosystem

Ecosystem balance refers to the coordinated and stable state reached by interaction between organisms and environment and between organisms in an ecosystem within a certain period of time, including stability in the structure, function and energy input and output of the ecosystem. It is a dynamic balance. Human beings play a great role in the natural forces, and the balance of ecosystem has become a major issue of common concern to all mankind. When the ecosystem reaches the most stable state of dynamic balance, it can self-regulate and maintain its normal function and can overcome and eliminate external interference to a large extent to maintain its own stability. However, the self-regulating function of ecosystem itself will be damaged, which will lead to ecological imbalance and even ecological crisis. The causes of ecological balance destruction include natural disasters and inappropriate human activities.

2.2 Stability of the ecosystem

The stability of an ecosystem is a relative stability that can be changed rather than fixed. Therefore, although ecological carrying capacity exists objectively, it is not fixed. Therefore, it is believed that we should actively improve the ecological carrying capacity of the system in a way that is beneficial to us. The stability of the ecological environment is not only manifested at the ecosystem level of small units, but also at the ecosystem level of landscape, region, region and biosphere. Similarly, the carrying capacity of the ecosystem is also shown at the above levels, and at different levels, the carrying capacity is different.

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2.3 Sustainable Development of Natural Resources and Ecosystem

2.3.1 Sustainable development of natural resources

The traditional development concept holds that natural resources are the nurturers of human beings, and human survival depends on the material life provided by natural resources[3]. Along with the rapid increase of population and the rapid development of industrial level, all kinds of the expansion of consumer demand led to the natural resources of the excessive consumption, coupled with the discharge of wastes in the process of production, ecological environment is destroyed. The survival of our homes have gradually lost the habitability of before, the sustainable development of economy has also been seriously affected[4].

All over the world, the rational development and utilization of natural resources have attracted the attention of governments of various countries, and people begin to reflect on the negative impact of development at the cost of excessive consumption of natural resources and environmental pollution. Relevant scholars have carried out researches on economic structure, economic development mode, production technology and resource utilization mode, and put forward concepts and methods of developing circular economy, clean production, comprehensive utilization of resources, etc., in order to minimize the problem of resource waste and excessive consumption.

2.3.2 Ecosystem sustainable development

In the process of exploitation and utilization of nature, human beings should not exceed the ecological bearing threshold of the ecosystem and nature itself, and should maintain the harmonious coexistence between human and nature[5]. Due to the destruction of nature by human beings, ecological crisis, water crisis, food crisis and energy crisis are threatening the survival and sustainable development of human beings. It first appeared in the *World Natural Resources Conservation Outline* of the International Union for Conservation of Nature in 1980: "It is necessary to study the basic relationships among natural, social, ecological, economic and the utilization of natural resources in order to ensure the sustainable development of the world. After 40 years of development and improvement, the theory of sustainable development has been greatly developed, and the thought of sustainable development has gradually been deeply rooted in people's hearts, which has become the consensus of all mankind, and is also the strategic theory to deal with the relationship between man and nature. It is a common task for the international community to apply the theory of sustainable development into practice, establish a sustainable development model and find a realistic way of sustainable development.

The carrying capacity of resources and environment is an important index to comprehensively measure whether the population, resources and environment are coordinated and whether the economic development is sustainable[6].Although under the guidance of the concept of sustainable development, resources and environment

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protection development in some areas has obtained the success, but the research of regional resources environmental bearing capacity is still relatively small. Around the regional resources environmental bearing capacity theory system has not yet formed. The connotation and denotation of regional resources environmental bearing capacity, basic characteristics, the bearing mechanism and evolution mechanism is of great importance to strengthen the study of basic theory.

3 Measures for controllable resource development and ecological protection shall be implemented

The ecological environment carries all kinds of human social activities, and human social activities will also have an impact on the ecological environment. If we don't limit ourselves to obtain resources from the nature, it will bring disastrous consequences to the natural environment. Therefore, systematic evaluation and management must be carried out at the same time of resource development, scientific and reasonable measures should be taken to control the utilization of natural resources, and relevant countermeasures for ecological protection should be actively implemented.

3.1 Rational development and utilization of natural resources

With the dramatic increase of industrialization and population, the huge human demand for natural resources and the large-scale exploitation and consumption of natural resources led to the weakening, degradation and even depletion of foundation of natural resources, and further affected balance of ecological environment.

Natural resources are the natural prerequisite for social and economic development. They not only provide indispensable spaces and places for social and economic production, but also provide essential raw materials for social and economic production. Without the various materials and energies provided by natural resources, social production would become water without source and trees without roots, and human society could not sustain itself. Natural resources are the material basis of social and economic development, as well as the objects of technological innovation and institutional innovation. Although there are various types of natural resources, their significance and role in sustainable development are also different, but every social material production cannot be separated from natural resources.

3.2 The government promulgate and implement relevant laws and policies

The management function of the government is the responsibility and function that the executive organ of the state administration should assume when managing the state's political, economic and social public affairs according to law. The State has included the protection of natural environment and resources in its laws and

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regulations, and has imposed certain punishment measures on citizens who have seriously violated the laws, regulations. Policies should be adopted to strengthen the protection of natural resources to better serve human beings. The government should always take into account the requirements of ecological laws and reflect the principles of ecological laws in the protection of natural resources. In the formulation of laws and regulations, the laws of natural ecological environment and the evolution of resources are fully considered, and these laws and principles are taken as the basic theories for formulating relevant policies to protect natural resources in accordance with these principles.

3.3 Ecological compensation should be adopted

Ecological compensation is based on the conservation and sustainable use of ecosystem for the purpose, with economic means to give priority to, regulating the relationship between its stakeholders to promote compensation activities, mobilize the enthusiasm of the ecological protection rules, incentive and coordination of system arrangement. Compensation, restoration and comprehensive treatment for the damage caused by human social and economic activities to the ecosystem and natural resources and the pollution are caused to the environment. The key points of ecological compensation are to clarify the compensation subjects, improve the compensation standard system, explore and implement diversified compensation modes, and establish a scientific ecological compensation system to make the ecological environment harmdoers pay the corresponding costs. At the same time, the benefits of ecological environment protection should be internalized, so that the protector can be compensated and encouraged, so as to realize the conscious, voluntary and self-interested ecological environment protection behavior, and to persist in it sustainably.

3.4 Optimization of industrial structure

In today's deepening global economic integration, any country is a member of the global industrial chain. No matter where it is, it will transfer resource consumption and environmental pollution to the nature through the industrial chain, ultimately damaging the earth's ecosystem. Therefore, to optimize the industrial structure, change the mode of economic development and develop an energy-saving and environment-friendly economy is the inevitable choice to solve the problem of resources and environment and take a new path of chemical industry. This path is not only for developing countries, but also for all the international community including developed countries.

3.5 Research and utilize new technology to develop circular economy

While improving the production efficiency, it can reduce the damage to the environment and harm to human beings. It can improve the utilization rate of natural resources and reduce the damage to the natural environment by improving the

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production technology and production equipment. From the perspective of material cycle, the traditional industrial production mode is a linear one-way flow trend of material resources, that is to say, industrial production is always a one-way flow from resources to products to wastes. The development of this one-way linear economy must be achieved at the expense of a large number of natural resources, which will be severely damaged. Research and development and adoption of new technologies to develop the circular economy, form a circular process from resources to products and then to resources, greatly reduce the waste discharge in the industrial production process, so as to promote the recycling of natural resources and promote the sustainable development of the economy.

4. Conclusion

Natural resources are an organic part of the natural ecological environment, and all social activities of human beings are inseparable from the carrying role of the ecological environment. The development and progress of human society is based on the development and utilization of natural resources. How to deal with the relationship between resource development and the ecological environment will affect the future development direction of human beings. Therefore, this study proposes measures and means to prevent and control environmental pollution and waste of natural resources and protect the environment for human survival by rationally developing and utilizing natural resources, introducing and implementing relevant laws and policies, adopting ecological compensation measures, optimizing industrial structure, and developing circular economy with new technologies.

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