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Study on Evaluation Index System of Sustainable Development of Resource - based cities

Li xin[1,a],Yan Hongcai[2,b] and Cao Hongjun[3,c]

[1]School of Environmental Science and Engineering,Ocean University of China,Qingdao,China

[2]School of Management,Ocean University of China,Qingdao,China

[3]School of Environmental Science and Engineering and School of Management ,Ocean University of China,Qingdao,China

[a]lixin_zhaozhao@126.com,[b]15683409107@163.com,[c]hongjunsd@163.com

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Abstract. To achieve the goal of the sustainable development and think of the "five major development" concepts as the guiding ideology ,according to the basic principles and research methods of constructing the evaluation index system of sustainable development of resource-based cities,this paper builds up a set of evaluation index system of sustainable development of resource-based cities as the basis of fully understanding the development characteristics of resource-based cities. The evaluation index system is divided into evaluation index system of sustainable development of resource-based cities; the development system of "innovation, coordination, green, openness and sharing";social support system, economic support system, resource support system and environmental support system;four index system including social index group, economic index group, resource index group and environmental index group.

Introduction

China is one of the resource - rich countries in the world.Resource-based cities thinking on exploitation and primary processing of mineral resources as the leading industries account for the national total of 1/3.In the early years of the founding of China,it made the tremendous contribution for social economy development.However, under the action of the industrial development law and non-renewability in the process of mineral resources development,there will be a cluster fading phenomenon in such leading industries.This lead to the industrial efficiency decline and the resource-leading industries shrinking,and in the conditions of alternative industries having not yet formed, more result in urban economic decline,increasingly serious environmental and ecological problems, surplus labor productivity, unsustainable issues and other issues distinctly.Therefore, achieving the sustainable development of resource-based cities has become one of the major problems resolved urgently in the construction of ecological civilization in China.On the basis of summarizing the characteristics of resource-based cities, following the basic principles of constructing evaluation index system of sustainable development , constructing the evaluation index system of sustainable development of resource-based cities can provide reference for the design of resource-based cities transformation and development path.

The Characteristics of Resource - based Cities

The characteristics of resource-based cities based on the development of resource mining areas are different from other cities. Only by fully understanding their development characteristics can the objective and scientific evaluation index system of sustainable development be constructed.The development characteristics are as follows:

Highly depend on resource-based industries, a single industrial structure;

Urban function is imperfect, and comprehensive competitiveness is low;

Science and technology education is backward, and the per capita education level is low;

Due to the exploitation of large areas of resources, land resources are destructed and ecological environment problems become increasingly serious;

The fading of leading industries has resulted in a sudden increase in unemployment, surplus labor productivity, high employment pressure and imperfect social security system.

The Basic Principles and Research Methods of Constructing Evaluation Index System

The basic principles of constructing evaluation index system

Under the premise of fully considering the development characteristics of resource-based cities, the evaluation index system of sustainable development of resource-based cities should be designed to target the sustainable development and evaluate the sustainable development level of resource-based cities objectively, scientifically and comprehensively with certain principles.In this paper, designing the evaluation index system of sustainable development of resources-based cities abides by the following basic principles:

Systematic principle

The system of sustainable development of resource-based cities itself is a large and complex system,just from the concept of sustainable development, the inherent link of economy-society-ecology environment system can be reflected.The construction of the index system should be hierarchical, from macro to micro layer by layer, forming a complete evaluation system.

Scientific principle

Designing the evaluation index system of sustainable development of resource-based cities must be based on relevant scientific theories, which can objectively reflect the development characteristics and status of resource-based cities and the scientific connotation of sustainable development.

Typical comparable Principle

The evaluation index system of sustainable development of resource-based cities is a fairly complex system, in which each sub-system is superimposed and interacted with each other. In order to describe the trend of sustainable development, a typical representative index system should be selected.The selection and calculation of the data should take a unified caliber to ensure it is comparable.

Dynamic principle

The sustainable development of resource-based cities is an urgent goal and a dynamic development process. Therefore, the evaluation index system should take full account of the dynamic characteristics of resource-based cities and reflect the development trend of the system on the basis of relative stability.

Goal - oriented principle

The establishment of evaluation index system of sustainable development of resource-based cities is to guide the scientific transformation of resource-based cities and achieve the sustainable development of urban social economic and ecological environment. Therefore, the construction of

evaluation index system must follow this principle.

Comprehensive principle

In the evaluation index system, the factors that affect the sustainable development of resource-based cities should be considered,analyzed and evaluated comprehensively.

The research methods of constructing evaluation index system

There are many methods to construct the evaluation index system.In this paper ,the methods adopted to construct the evaluation index system of sustainable development of resource-based cities are as following:

Relevant strategic analysis tools of the development, mainly including pest, swot and so on, are used to study the macro environment,internal micro-environment and other environmental factors of sustainable development of the resource-based cities .

The method of Investigation interview

These methods like questionnaires and field interviews are adopted to study the constraints, the design of relevant index system and development goals and other issues of sustainable development of resource-based cities.

The method of component extraction

The relationship of each subsystem in the evaluation index system of sustainable development of resource - based cities is complex and it is difficult to judge the level of urban development intuitively from each index. Through the method of component extraction, the index weight is determined from the objective scientific point of view, that is to extract a few simple comprehensive indexes from multiple indicators, and then to get the comprehensive evaluation model of the sustainable development level of resource-based cities.

4.The method of fuzzy analysis

In order to achieve the goal of sustainable development,the hierarchical hierarchy of the evaluation system of sustainable development of resource-based cities should be established and analyzed layer by layer to obtain the optimal plan of the sustainable development of resource-based cities and provide reference for relevant regions and management departments.

The Construction of Evaluation Index System

To get rid of the decline and take the road of sustainable development, the resource-based cities must follow the development law of the sustained, stable and coordinated economy - society - ecology environment.Therefore, in this paper, a four-level index system is built to achieve the goal of the sustainable development and think of the "five development" concepts as the guiding ideology . The first-level index system is the evaluation index system of sustainable development of resource-based cities; the second-level index system is the development system of "innovation, coordination, green, openness and sharing", which consists of "five major development" concepts;The third index system is composed of four parts: social support system, economic support system, resource support system and environmental support system;The fourth index system is composed of social index group, economic index group, resource index group and environmental index group. (Specific relationships are shown in Figure 1)Based on the full understanding of the development characteristics of resource-based cities, according to the basic principles of constructing evaluation index system of sustainable development of resource-based cities, applying the relevant development strategy analysis tools and using the method of investigation interview, the method of component extraction and the method of fuzzy analysis, a set of evaluation index system of sustainable development of resource-based cities is constructed in this paper.(Specific indexes are shown in table 1)

Figure1 structure of evaluation index system of sustainable development of resource - based cities

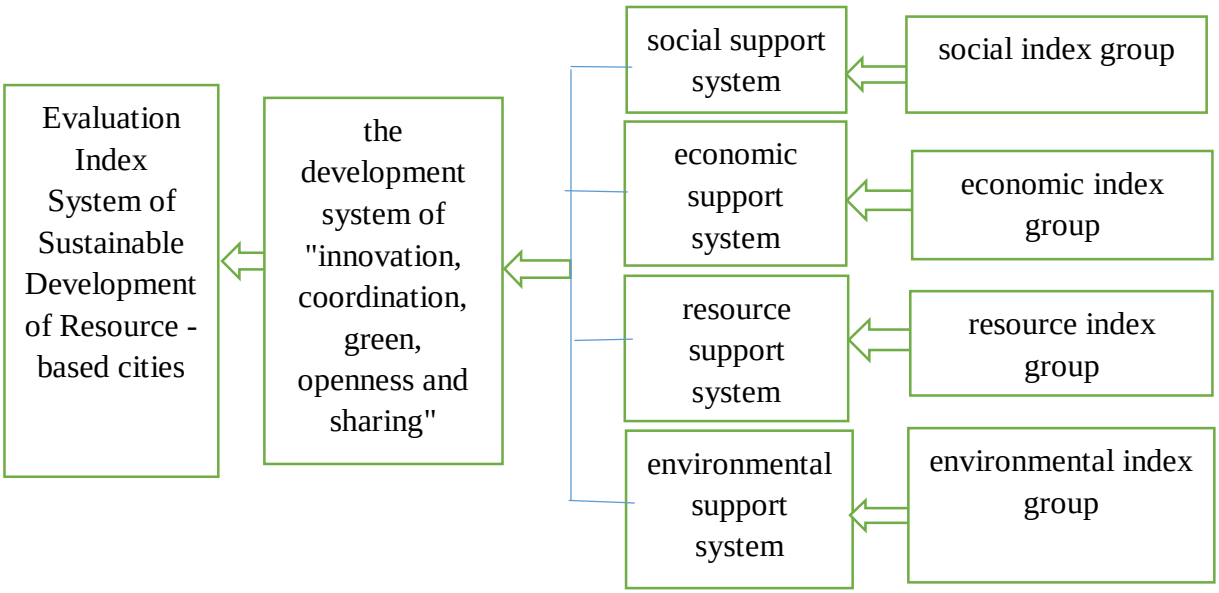

Table1 evaluation index system of sustainable development of resource - based cities

The first-level index	The second-level index	The third-level index	The fourth-level index	
evaluation index system of sustainable development of resource - based cities	the development system of "innovation, coordination, green, openness and sharing"	social support system	the population	total population; the density of population ; the natural population growth rate
			the science-education-culture-health	the proportion of education expenditure in GDP; the proportion of scientific undertaking in GDP; the important scientific and technological achievements; the contribution rate of science and technology; the number of students in the college with more than 10 thousand people; the number of libraries owned by ten thousand people; the number of health medical aid stations owned by ten thousand people
			social security	the employment rate of urban population; the unemployment rate of urban population ; the percentage of social security expenditure in GDP
			infrastructure	the penetration rate of central heating;the coverage rate of natural gas pipeline ; the density of urban sewage pipeline ; the total business volume of telecommunications network ;the number of buses owned by ten thousand people ; the number of parks owned by ten thousand people
			the quality of life	per capita income; Per capita savings deposits; the consumption level of residents ; urban per capita living space
		economic support system	economic level	GDP; per capita GDP; green GDP;the investment of fixed assets in the whole society;the proportion of scientific and technological innovation in the production and application of enterprises

			economic structure	the ratio of Resource - oriented industries in GDP;the ratio of high - tech industries in GDP; the ratio of tertiary industry in GDP; the distribution ratio of the social capital investment in three industries
		resource support system	the endowment of leading resource	the types of advantages resources have been proven ;the reserves of resources have been proven ; the annual recoverable amount of resources; the years of development and utilization of leading resources
			living resources	per capita available arable land; per capita water resources
		environmental support system	environmental quality	the rate of coverage of urban green space; per capita urban green area; the high quality rate of air quality ; the treatment rate of domestic sewage
			environmental pollution	the emissions of industrial waste gas;the production of industrial waste solid and waste water ;the emissions of domestic waste ;the surface subsidence area due to exploitation of resources
			environmental governance	the compliance rate of treatment of industrial waste gas;the compliance rate of discharge of industrial waste water; the comprehensive utilization rate of solid waste ; the harmless treatment rate of domestic garbage; the repair rate of subsidence surface ; the rate of total investment of environmental governance in GDP

Conclusions

Based on the premise of full understanding of the development characteristics of resource-based cities,thinking of the "five major development" concepts as the guiding ideology,the construction of evaluation index system sustainable development of resource-based cities is conducted, which is beneficial to the sustainable development of resource-based cities and provides the basis reference values to design transformation development path of resource-based cities and provide reference solutions to promote the transformation development path and policy advice of resource-based cities for the relevant regions and management.

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