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Practical Study on Standardization of Local Ecological Civilization- A Case Study of Zhangjiakou

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Abstract. The basic compositions of the systematic framework in line with the characteristics of Zhangjiakou was determined and the basic framework for the standard system of the ecological civilization standardization in Zhangjiakou was proposed in this study based on the related policies and mechanisms for ecological civilization construction in Zhangjiakou, the survey over the pilot project and the study on standardization development in the field of ecological civilization, in combination with the main tasks and related evaluation indexes of ecological civilization construction, so as to promote the coordinative development of ecological environment and support the construction of ecological civilization in Zhangjiakou.

1.Introduction

As an important support and technical guarantee for accelerating the construction of ecological civilization, the standardization of ecological civilization is of great significance in establishing and implementing systems relevant to spatial arrangement optimization, industrial restructuring, acceleration of energy conservation and emission reduction, and cyclic utilization of resources, realizing the rational resource allocation, optimizing the industrial structure, dissolving the overcapacity, and promoting the ecological civilization construction in China to high-level development. Currently, the construction of Zhangjiakou Ecological Civilization Demonstration Zone has achieved preliminary success, with all works carried out in an orderly manner. Furthermore, there are increasingly higher requirements on the construction of ecological civilization system. It is necessary to summarize the experiences of pilot and demonstration projects, copy and popularize the successful model, and propel the in-depth development of ecological civilization construction. At present, the advancement of works regarding the ecological civilization construction standard system in Zhangjiakou is faced with many challenges [1-3].

Firstly, the framework of the ecological civilization construction standard system needs to be improved. In consideration of the connotation of national ecological civilization and Zhangjiakou's social and economic development planning, ecology, energy, cities and towns, characteristic industries and transportation will become key areas of ecological civilization construction in Zhangjiakou. As the work concerning the standardization of ecological civilization construction involves many departments and is distinguished by its wide range, high technical requirement and extensive influence, although standard systems in some professional fields have been basically established, there is still a lack of overall design for the ecological civilization construction standard system [4,5]. Secondly, some standards for the construction of ecological civilization need to be improved. It is necessary to speed up the revision of standards related to ecological civilization, establish and strengthen the coordinative mechanism of technology, patents and standards, carry out benchmarking and target hitting activities,



and promote the upgrading of standards [6]. Thirdly, the implementation of standards for ecological civilization construction needs to be enhanced. More efforts shall be made to enhance the enforcement of relevant ecological civilization construction standards, improve supervision measures and develop effective information feedback and evaluation mechanism for practicing standards.

2. Methodology of Constructing the Standard System of Ecological Civilization in Zhangjiakou

The following technical methods were adopted in this study to establish the framework for the standard system of the ecological civilization in Zhangjiakou:

2.1 Literature research

Literature research and data collection were applied to explore relevant research progress at home and abroad. On the basis of preliminary theoretical exploration and practical experience of ecological civilization construction in Zhangjiakou, the trends of urban-rural coordinative development, environmental-friendly industry development, resource conservation and recycling, ecological environment protection, and ecological culture implementation were thoroughly investigated and studied, scientific and effective technical methods were developed by focusing on the construction work that supports the ecological progress and quality improvement in Zhangjiakou. In addition, relevant laws and regulations, policies, standards of ecological civilization construction in China and their development were investigated, international and foreign advanced standards and related materials were analyzed, the current and future work requirements for Zhangjiakou's ecological civilization standardization were fully understood, and the research scope and boundary of the ecological civilization standard system were determined in compliance with the scope of relevant laws and regulations.

2.2 Standardization theory

The ecological civilization construction in Zhangjiakou was set as the standardization target, the whole set of standards for practicing the key task and assessment index of ecological civilization standardization was developed and designed, the system coverage and elements were determined, the scientific rationality, systematic comprehensiveness, coordination and compatibility, advanced predictability of the standard system were highlighted to coordinate and optimize standards by steps and by phases. A standard system was developed to guide the ecological civilization construction and quality improvement in Zhangjiakou.

2.3 Analytic hierarchy process

The hierarchy of content categories included in the ecological civilization system of Zhangjiakou were analyzed, and the affiliation or inclusion relation of the standard object was reflected. The commonality of the object was reflected by a high-level standard, while the concreteness of the object was reflected by a low-level standard. The requirement for standards and mutual supporting relations of standard functions were clarified, the dimensional criteria were established by defining and studying ecological civilization standards, the key links to be regulated in the standard system were identified, and the ecological civilization standard system, where standards at different levels support each other, was built.

3. Ecological Civilization Standard System in Zhangjiakou

In view of the construction achievements gained by Zhangjiakou Ecological Civilization Demonstration Zone and Zhangjiakou's ecological civilization construction program and standard requirement condition, a well-structured, well-bedded, scientific and applicable framework of ecological civilization standard system concerning foundation and management, urban-rural development integration, environmental-friendly economic development, ecological environmental protection and ecological culture cultivation was built in Zhangjiakou in compliance with the *Opinions*

of the CPC Central Committee and the State Council on Accelerating the Ecological Civilization Construction and Integrated Reform Plan for Promoting Ecological Progress, as shown in Figure 1.

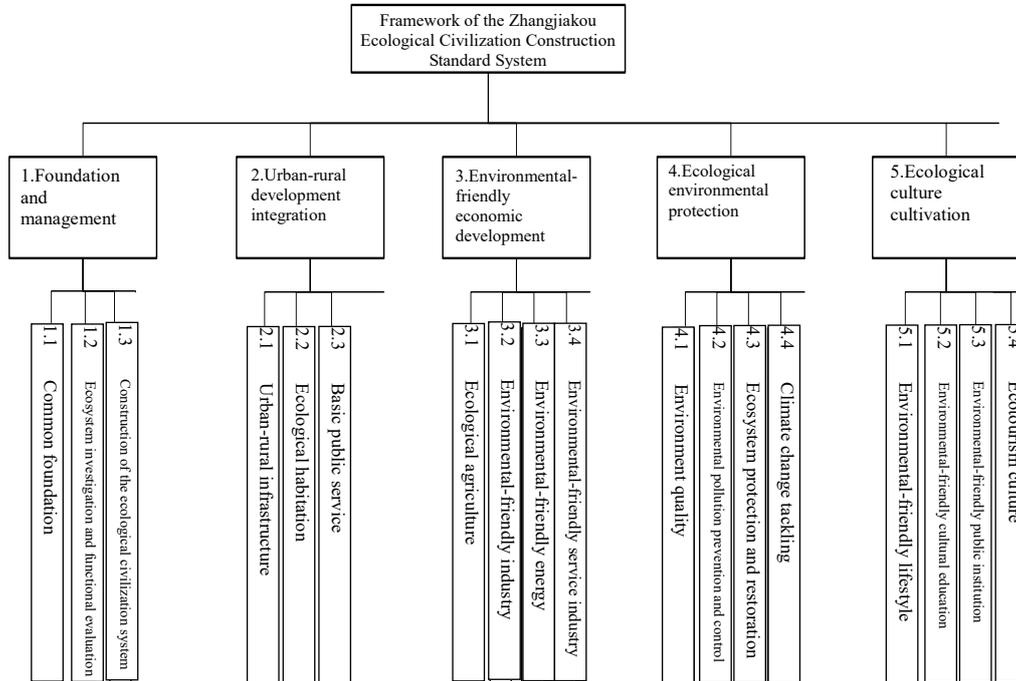


Figure 1 Framework of the Zhangjiakou Ecological Civilization Construction Standard System

3.1 Foundation and management standard subsystem

After fully summarizing the ecological civilization construction work, standardized methods and tools were used to build a foundation and management standard subsystem consisting of standards related to universal foundation, ecosystem investigation and functional evaluation, construction of the ecological civilization system, so as to provide basic, universal and overall guidance for ecological civilization construction.

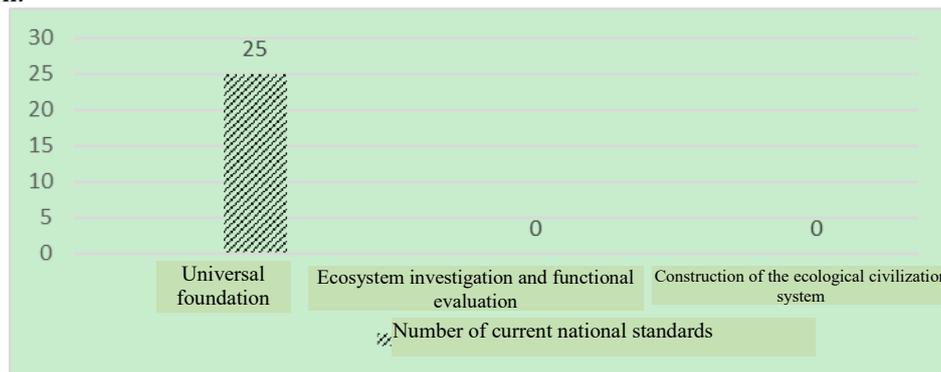


Figure 2 Distribution Diagram of Current National Standards for Foundation and Management Standard Subsystem

3.2 Urban-rural development integration standard subsystem

Focusing on urban-rural infrastructure, ecological habitation and basic public services, relevant specific national standards, such as water supply and drainage, environmental-friendly transportation, new energy, environmental protection and sanitation, beautiful countryside, basic social services, employment services, medical and health care, social insurance from three dimensions, namely urban and rural infrastructure facilities, ecological habitation and basic public services, were included. In total, 48, 65 and 56 current national standards for urban-rural infrastructure, ecological habitation and

basic public services were sorted out respectively.

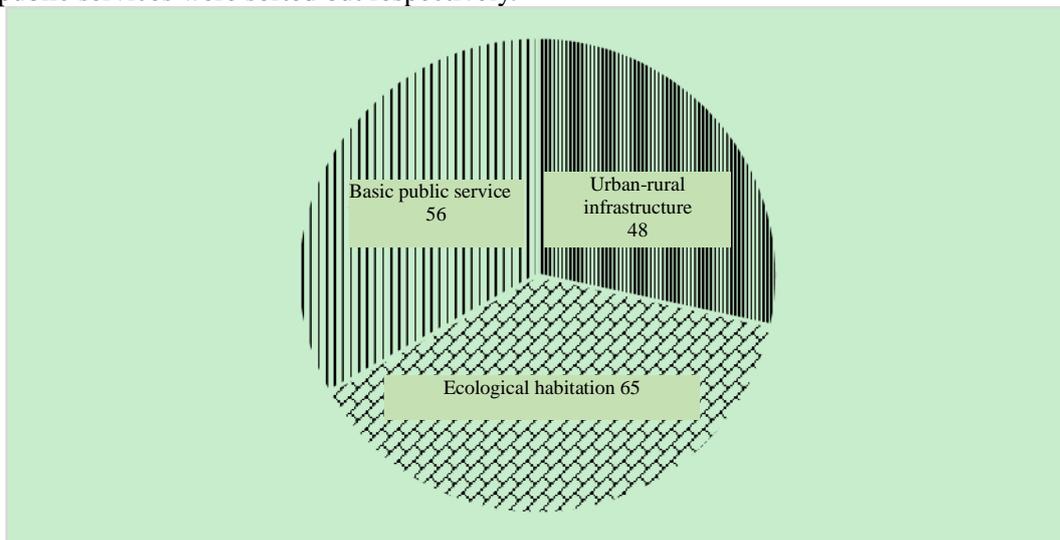


Figure 3 Distribution Diagram of Current National Standards for Urban-Rural Development Integration Standard Subsystem

3.3 The environmental-friendly economic development standard subsystem

The environmental-friendly economic development standard subsystem consists of the contents related to universal foundation and management, ecological agriculture, environmental-friendly energy, environmental-friendly industry, environmental-friendly service industry and so on. The ecological agriculture subsystem involves all links in the entire life cycle of agricultural products, including seed selection, planting, processing, transportation, recycling and the like. In terms of environmental-friendly industry, standards relevant to conservation and comprehensive utilization of industrial resources, environmental-friendly products, environmental-friendly enterprises and environmental-friendly industrial parks were summarized. The environmental-friendly energy subsystem includes seven aspects: solar energy, wind energy, biomass energy, geothermal energy, hydrogen energy, clean energy and regional energy. The environmental-friendly service industry subsystem mainly involves two aspects, namely environmental-friendly supply chain and environmental-friendly finance. After retrieval and arrangement of standards, 417 standards of universal foundation and management, 125 ecological agriculture standards, 284 environmental-friendly energy standards, 233 environmental-friendly industry standards and 51 environmental-friendly service industry standards were sorted out.

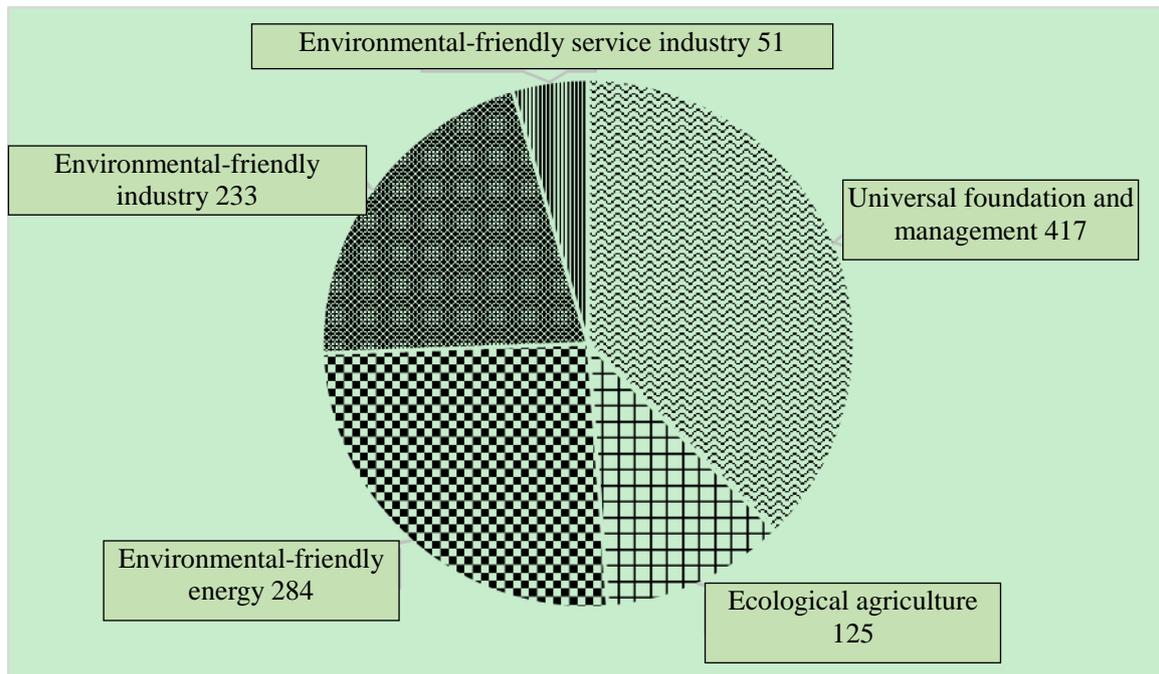


Figure 4 Distribution Diagram of Current National Standards for Environmental-friendly Economic Development Standard Subsystem

3.4 Ecological environmental protection standard subsystem

The ecological environmental protection standard subsystem includes four aspects, namely environmental quality, environmental pollution prevention and control, ecosystem protection and restoration and climate change tackling. The environmental quality standard subsystem, for which there are 90 national standards in total currently, is composed of five parts including environmental monitoring technical standards, environmental benchmark and risk assessment standards, emission allowance standards for environmental pollutants, environmental quality assessment and grading standards, and environmental management technology and tools. The environmental pollution prevention and control standard subsystem, for which there are totally 85 national standards at present, contains seven types of standards related to air pollution prevention and control, water pollution prevention and control, solid waste and chemical pollution control, soil pollution prevention and control, agricultural diffused pollution prevention and control, noise pollution prevention and control, and radiation prevention and control. The ecological environmental protection and restoration subsystem, for which a total of 51 relevant standards are sorted out, involves 12 categories: ecological protection and restoration management, planning and construction of the ecological function area, forest ecosystem protection and restoration, scrubland ecosystem protection and restoration, prairie/grassland/meadow ecosystem protection and restoration, water and wetland ecosystem protection and restoration, farmland ecosystem protection and restoration, wilderness/rock desert/karst ecosystem protection and restoration, biodiversity conservation, comprehensive treatment of drainage basins, disaster prevention and reduction, and early warning, prevention and control of ecological security. The work concerning the standardization on climate change tackling commences relatively late, with 14 national standards released.

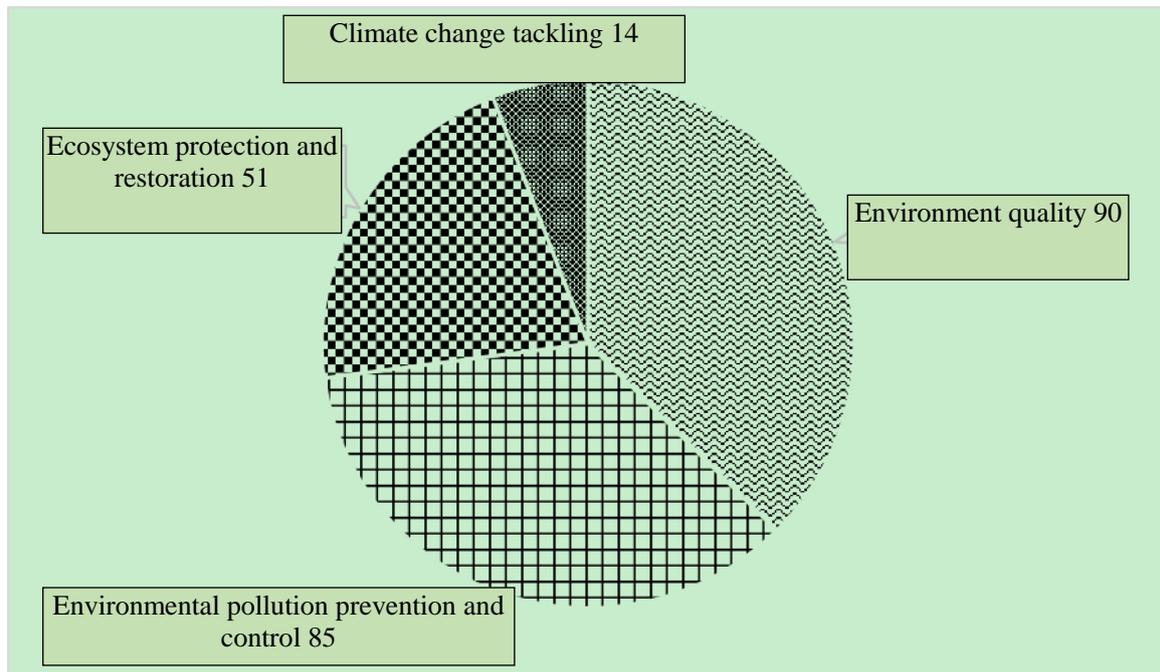


Figure 5 Distribution Diagram of Current National Standards in the Ecological Environmental Protection Standard Subsystem

3.5 Ecological culture cultivation standard subsystem

Ecological culture cultivation standards concern environmental-friendly lifestyle, environmental-friendly cultural education, environmental-friendly public institutions and ecological tourism culture. In terms of environmental-friendly lifestyle, there is no key environmental-friendly living standards for environmental-friendly offices, environmental-friendly shopping malls and supermarkets, environmental-friendly procurement and environmental-friendly travel nor environmental-friendly cultural education standards for environmental-friendly cultural education activities and the construction of environmental-friendly education demonstration bases. When referring to environmental-friendly public institutions, there are 13 relevant standards, including 3 standards for environmental-friendly shopping malls and supermarkets, 0 standard for environmental-friendly buildings, 7 construction standards for conservation-oriented institutions, 3 construction standards for environmental-friendly schools and 0 construction standard for environmental-friendly hospitals. In terms of eco-cultural tourism, there is a lack of national standards for humanistic ecotourism. Four national standards for environmental-friendly Winter Olympic Games mainly concern the construction of sports venues.

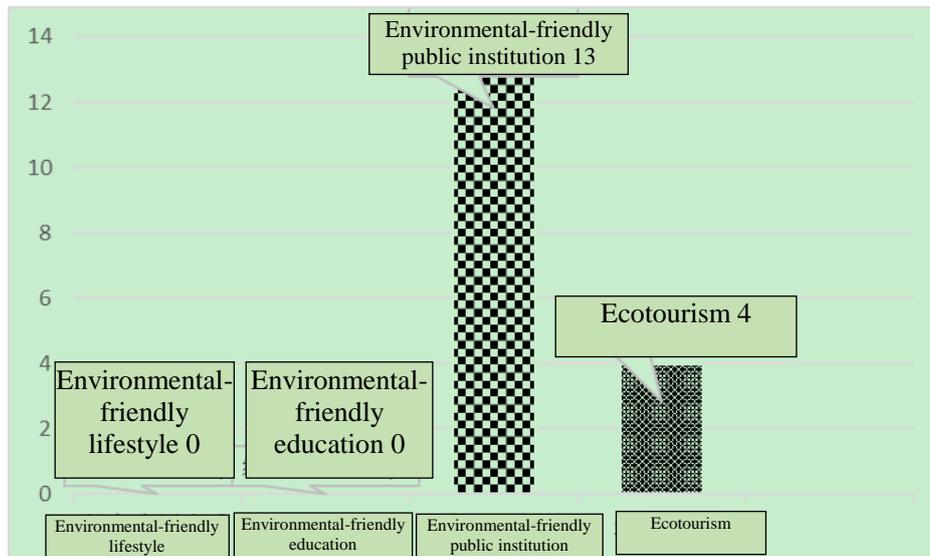


Figure 6 Distribution Diagram of Current National Standards in the Ecological Culture Cultivation Standard Subsystem

4. Conclusions

The standard system for the construction of ecological civilization in Zhangjiakou is studied by means of relevant approaches to provide strong support for ecological civilization and quality improvement. As the overall layout of standardized ecological civilization construction, the study of standard system classification framework visualizes the actual direction and classification situation of the standard system and supporting relations among categories. On this basis, the standard collection list and the missing standard formulation list are determined and a list for developing key standards is worked out, so as to guide the formulation, revision and management of Zhangjiakou's future standards. In the construction process of ecological civilization and quality improvement in Zhangjiakou, the orderly, complete and balanced development of the ecological civilization standardization in Zhangjiakou will be promoted by establishing the standard system to carry out the standardization work and applying related achievements to safeguard the planned and step-by-step construction of ecological civilization. This is of great significance to achieve the goal of the ecological civilization construction in Zhangjiakou and promote the sustainable development of economy and society.

Acknowledgments

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References

- [1] Xun Qingzhi (2014) Ten Theoretical and Practical Issues in Promoting the Construction of Ecological Civilization, *Journal of Beijing Administrative College*, 4, pp. 69-78.
- [2] Gu Shuzhong et al. (2013) Scientific Connotation and Basic Path of Ecological Civilization Construction, *Resources Science*, 1, pp. 2-12.
- [3] Huang Qin et al. (2015) Research Progress in Promoting Ecological Civilization Construction in China, *Chinese Journal of Population Resources and Environment*, 2, pp. 111-117.
- [4] Fang Shinan et al. (2013) Deep Understanding of the Important Role of Ecological Civilization Construction in the Five-In-One Overall Layout, *Tribune of Study*, 1, pp. 47-50.
- [5] Wang Canfa (2014) Discussion on the Construction of the Legal Guarantee System for Ecological Civilization Construction, *Chinese Legal Science*, 3, pp. 35-53.
- [6] Guan Hailing (2014) A Comprehensive Method for Evaluating the Development Level of Urban Ecological Civilization, *Statistics & Decision*, 15, pp. 55-58.