Construction Method of Evaluation System of Water Conservancy engineering Heritage

Mengjiao Ding, Jianfeng Yao*, Wenye Li, Bing Lu, Hanxiao Wang, Siyu Chen

College of Civil Engineering and Architecture, Zhejiang University of Water Resources and Electric Power, Hangzhou 310018, China

*Corresponding author’s e-mail address: yaojf@zjweu.edu.cn

Abstract. At present, socialism with Chinese characteristics has entered a new era, and the reform and development of water conservancy is facing new situations, new tasks and new requirements. With the establishment of the list of "Heritage Irrigation Structures" in 2014, the ancient irrigation system in China has been gradually excavated, and the irrigation engineering heritage of our country has reached 23 items. The protection and display and utilization of ancient irrigation heritage is conducive to transforming the advantages of historical and cultural resources into social and economic advantages and promoting the development of local economy. Through the collection of literature and field research, this article deeply studies the formation and characteristics of water conservancy project heritage, analyzes the value composition of water conservancy project heritage, and summarizes and extracts the indexes of water conservancy project heritage value, and this paper points out the principles of selecting index items. In this paper, the index system is divided into target layer, criterion layer, supplementary criterion layer and index layer. The target layer is five values, the criterion layer is the specific classification of the target layer, the supplementary criterion layer is the corresponding supplement of the criterion layer, and the index layer is the quantification of the criterion layer.

1. Introduction

Five thousand years of Chinese civilization, it left a large number of water conservancy engineering heritage. They fully and completely show the situation of water conservancy construction in different regions in different periods and its relationship with politics, economy, society, culture, environment and ecology, and fully embody the great wisdom and innovative spirit of the ancestors. It is also an important part of China's world cultural heritage. [1]

The first prerequisite for the protection and utilization of water conservancy engineering heritage is to carry out scientific and accurate value evaluation, and the selection of appropriate methods to establish an accurate and appropriate value evaluation system is an effective method for the identification of water conservancy engineering heritage value.
Although the commonly used evaluation methods have many advantages, they are not applicable in the evaluation of water conservancy engineering heritage, such as the relationship between the influencing factors of water conservancy engineering heritage and not necessarily constitute a comparative relationship. Accordingly, this paper suggests that in the process of evaluating the heritage of water conservancy projects, we should comprehensively use AHP and Delphi method to carry out weight research, use fuzzy evaluation method [2] establish mathematical model, and construct a set of value evaluation index system of comprehensive water conservancy project heritage, which scientific, ecological, economic and cultural aspects. Finally, the validity and scientificity of the evaluation system of water conservancy engineering heritage value established by this study are verified by the actual measurement of water conservancy engineering heritage value evaluation system.

2. Steps to establish an indicator system
AHP is to decompose the elements always related to decision into goals, criteria, schemes and so on, on the basis of which qualitative and quantitative analysis of the decision method.

2.1. Establishment of the target layer
Referring to the Principles for the Conservation of Heritage Sites in China (2015), the value of world irrigation heritage is summarized into four aspects: economic value, scientific value, cultural value and social value.

Based on this, through literature collection and field investigation, the formation and characteristics of water conservancy engineering heritage are deeply studied, and the value composition of water conservancy project heritage is analyzed. From this, five target levels of water conservancy project heritage value are summarized and extracted: historical value, economic value, social value, ontology value and added value.
2.2. Establishment of the guidelines layer
In addition, the criterion layer and the supplementary quasi-test layer are shown in Establishment of an indicator system.

| Target layer | Criteria layer               | Supplementary guidelines layer |
|--------------|------------------------------|--------------------------------|
| historical value | Integrity                    | Ancient and modern              |
| economic value   | Good reputation              |                                |
|                  | Cultural transmission        |                                |
|                  | Impact and significance      |                                |
|                  | Repair costs                 |                                |
|                  | employment rate              |                                |
|                  | tourism                       |                                |
|                  | Other local industries       | Agriculture, etc.              |
|                  | Government support and protection |                              |
|                  | Enforcement at lower levels |                                |
|                  | Protection from external concerns |                          |
| social value     | Group of Concern             | Age structure, status          |
|                 | Media exposure               |                                |
|                 | social position              |                                |
|                 | Repair difficulties          |                                |
| ontology value   | Value of water               | Ancient and modern             |
|                 | Rare and Unique              |                                |
| added value      | aesthetic value              |                                |
|                 | Religious folklore           |                                |
|                 | Multi-cultural and multi-disciplinary blend |              |

3. Principles established by each indicator layer

3.1. Overall
The selected indicators covers all aspects of water conservancy engineering heritage, which can fully reflect the integrity of the evaluation system. Among them, each indicator item is independent of each other, but there is a certain connection. This evaluation system is different from the independent elaboration of a single influencing factor or the combination of mechanical assembly, but pays attention to the internal connection, and finally forms the whole evaluation system.

3.2. Scientific and stability
Scientific and stability is the basic principle established in this indicator layer. First of all, when selecting indicator items, specific indexes should be selected and each index should be clearly defined to avoid ambiguity or ambiguity. Secondly, the standardization and standardization of index selection is also essential.

3.3. Dynamic pertinence
The criterion layer listed in this paper has some pertinence, such as additional value for some water conservancy engineering heritage with special value. Under the influence of national policies and laws and regulations, the indexes of water conservancy engineering heritage are dynamic, which requires dynamic evaluation at the index level.
3.4. Typical and brevity
When the target layer is selected, it should be typical to ensure that the selected target layer can fully represent the evaluation goal. Secondly, it should be avoided too cumbersome, should fully reflect the essential characteristics, using concise to describe.

4. Advantages of selecting the evaluation method
The water conservancy engineering heritage of our country can be divided into flood control engineering, irrigation engineering, urban water conservancy, canal engineering, garden engineering and so on according to the engineering benefit and function [3]. However, almost every water conservancy project is not a single individual and covers two or more engineering benefits.

In addition, the methods used in this paper are comprehensive application of AHP, Delphi method and fuzzy evaluation method. AHP has the characteristics of practicality, simplicity and system, so it can deal with many practical problems that can not be solved by traditional optimization technology. However, the inherent uncertainty and imprecision of engineering problems can not be effectively dealt with in the process [4] application, and this fuzzy evaluation method can be solved very well. The risk assessment method of fuzzy theory can deal with the uncertainty that can not be taken into account by considering the influence of various risk factors on the system. Several methods complement each other and are more conducive to solving dynamic problems.

5. Conclusion
In the contemporary social environment, sustainable inheritance and development is a problem we must face, and the evaluation system can maximize the advantages of water conservancy heritage resources under the premise of protection. Most of the ancient water conservancy engineering heritage in China is still playing its role. The functional value of water conservancy is the basic value of water cultural heritage. The classification of water conservancy engineering heritage not only saves the cost of new water conservancy facilities, but also reduces the cost of protecting water conservancy engineering heritage [5]. The establishment of the system aims to encourage the sustainable use of water resources and promote the protection of water conservancy heritage. It can effectively evaluate the value of the existing water conservancy heritage and play a guiding role in its protection and utilization.

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