



Construction of comprehensive evaluation index system of water-saving irrigation project integrating penman Monteith equation

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Abstract

In order to solve the post evaluation system construction of high-efficiency and water-saving irrigation projects, this paper puts forward the research significance of post evaluation technology of high-efficiency and water-saving irrigation projects, summarizes the research status and development trends of post evaluation of projects at home and abroad, and analyzes the existing post evaluation theories and research methods. Based on the actual situation of high-efficiency water-saving irrigation projects, the post evaluation index system of high-efficiency water-saving irrigation projects is constructed from five aspects: construction process, operation management, economy, impact, goal and sustainability by using the method of combining expert questionnaire survey and statistical theory; Study the advantages, disadvantages and scope of application of the existing post project evaluation index weight determination methods and evaluation methods, put forward five single post evaluation standards: post construction process evaluation, post operation management evaluation, post economic evaluation, post impact evaluation, post objective and sustainability evaluation, determine the evaluation process and form five single post evaluation models. Based on the five individual post evaluation models, the project success evaluation model is constructed to form the "5 + 1" post evaluation model of high-efficiency water-saving irrigation project. Taking a high-efficiency water-saving irrigation project as an example, the application process of post evaluation index system and evaluation model of high-efficiency water-saving irrigation project is given, and the feasibility of applying the index system and evaluation model proposed in this paper to production practice is analyzed.

Keywords: High efficiency and water saving irrigation project; Post evaluation; Index system; Evaluation model

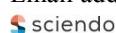
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1. Introduction

Water plays an irreplaceable role in people's daily life. It is the basic element supporting the survival of all things. Water can be used for drinking, cleaning, transportation, etc., especially for agricultural irrigation, which requires more and more water resources. However, the current shortage of water resources has reached an unprecedented level and has become an important bottleneck hindering economic development [1]. Experts warn that in the face of the increasingly serious shortage of water resources, the battle for water is about to intensify. The crisis of water resources has become an issue of concern all over the world.

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After a long time of exploration and research, people finally found that using scientific and technological means to alleviate the crisis will be the main way out. The utilization rate of irrigation water in China is only 45%. With the continuous adjustment of China's agricultural structure, improving the utilization rate of water has attracted the attention of experts and scholars. It is urgent to promote effective water-saving irrigation technology, which is an important strategy to solve the problem of agricultural drought and water shortage according to the current situation of water use in China.

Drip irrigation is an irrigation method that uses special pipeline system and equipment to send low-pressure water to the soil at the root of crops through the orifice or dripper on the capillary with a diameter of about 10mm. Drip irrigation is only around the roots of crops, not large-area and aimless irrigation. Therefore, it can effectively save water resources and improve water utilization. Drip irrigation has the advantages of saving water and fertilizer, maintaining soil structure and improving crop quality. Drip irrigation equipment has the advantages of simple use, convenient maintenance and many applicable occasions. It is widely used in both greenhouse and field crops [2]. Intelligent irrigation system can supply the water lost by crops regularly, quantitatively and accurately. It not only improves labor efficiency, but also saves cost. Therefore, the development of intelligent irrigation system is another important way of water-saving irrigation. The organic combination of automatic control technology and drip irrigation technology is of great significance to improve the automation level of water-saving irrigation and the economic benefits of agricultural investment. Therefore, the research and development of intelligent drip irrigation control system with low cost, convenient use and strong system function is a very meaningful work.

Water saving agriculture has experienced decades of development. Especially in some developed countries, water-saving irrigation has a wide range of use and a high degree of scale. The United States, France, Britain, Japan, Israel and other developed countries have adopted advanced water-saving irrigation systems to monitor and predict the water use in irrigation areas, and adopt remote sensing technology to monitor crop growth and implement dynamic management ". These countries have mature schemes for the research of irrigation control system, and have successively developed multi-functional and cost-effective water-saving irrigators. Israel, known as an agricultural technology power, is a leader in the field of water-saving irrigation. The water-saving irrigation equipment produced and developed by Israel is widely used in field planting, greenhouse, orchard and other fields. The automatic control system promoted by Israel in the country can directly send water and fertilizer to the roots of crops regularly and quantitatively, and the utilization rate of water resources can reach 90%. The intelligent irrigation system produced by Israel is widely used in occasions with large irrigation area. It uses advanced technology to realize intelligent irrigation. The system can automatically and accurately implement irrigation work from any distance through different communication methods, such as direct cable connection communication, telephone communication or radio transmission [3]. The United States, Japan and other countries have also developed their own automatic irrigation products, which are widely used. The EPS-MC controller in the United States is divided into six models, which can control up to 120 solenoid valves and set four control procedures, which can be opened many times in a day. The controller has good application effect, especially in greenhouse, and can realize timely irrigation. There are many factors affecting the amount of irrigation, such as soil moisture, plant transpiration, air humidity, etc. in the 1980s, the United States developed an irrigation control system based on monitoring soil moisture. In the 1990s, the United States further developed an irrigation control system that can monitor soil information and air humidity, which improved the previous design. Subsequently, Azari MD and others applied the pressure sensor to the irrigation control feedback system to measure soil moisture [4]. Uygan D and others summarized the 15 year underground drip irrigation of tomato and other crops conducted by the American Institute of water management, and showed that underground drip irrigation can improve crop yield and water use efficiency, and high-frequency irrigation can reduce deep infiltration. Computer control is widely used in water-saving irrigation in Japan, and the monitoring system mostly adopts distributed structure. A central management machine is used to centrally monitor the water pump and pipeline, and wireless communication is used between the extension and the central management machine [5]. Surendran U and others believe that this control mode facilitates the remote operation of users and makes the system more practical. Australia has also successfully developed a series of irrigation controllers. The buried humidity sensor can send back the information about soil moisture to the host computer. Some sensor systems can determine the irrigation interval of plants by detecting the diameter changes of plant stems and fruits [6]. This computerized mode is accurate and convenient, which not only saves labor but also improves work efficiency. It is mainly used in small-area irrigation occasions such as household irrigation. In short, the automation level of water-saving irrigation has become more and more mature. After long-term research and practice, it has developed in two directions: micro controller and large-scale distributed control system. At the same time, advanced monitoring technology is adopted to form a relatively perfect water-saving irrigation automation

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system.

2. Methods

The content of post project evaluation mainly includes: the construction of index system, the selection of evaluation methods and the establishment of evaluation model. The specific operation process is to select the evaluation indicators describing some characteristics of the evaluation object from different aspects according to the characteristics of the object to be evaluated, then screen and merge the evaluation indicators according to different evaluation purposes, establish the index system, and then determine the weight value of the indicators according to the influence of different indicators on the research object. Finally, a mathematical model is established to synthesize multiple evaluation index values into an overall comprehensive evaluation value. The logic process diagram of post evaluation is shown in Figure 1.

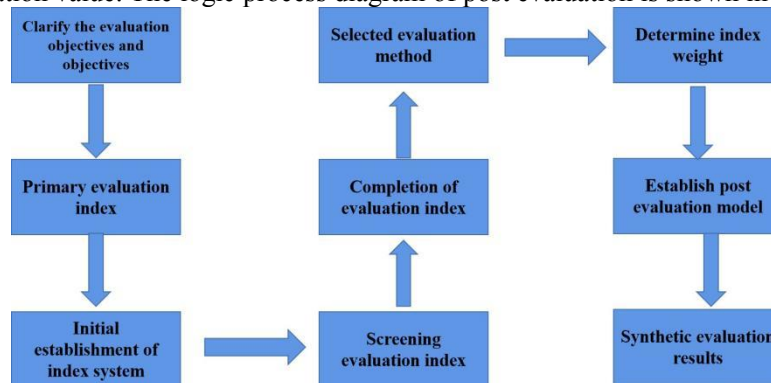


Figure 1 Logic process diagram of post-evaluation

The post evaluation of the construction process of high-efficiency water-saving irrigation project is to systematically summarize and review the whole process of project construction after the completion of the project in accordance with the current relevant regulations and systems, and analyze and measure the work performance of high-efficiency water-saving irrigation project based on various documents, reports and records produced during the formation and operation of the project. Summarize the experience and lessons in decision-making and project construction management, find out the deviation between the actual situation and the predicted situation, analyze the reasonable degree of deviation and the reasons for the deviation, and put forward practical countermeasures and measures, so as to accumulate experience for strengthening the preliminary work and further improving the project management of high-efficiency and water-saving irrigation projects in the future. The post evaluation of the construction process shall cover the contents of each stage of the project from decision-making to completion, and can reflect the characteristics of the main links of each stage. According to the project construction cycle, the content of post construction evaluation is divided into three aspects: project approval decision evaluation, preliminary work evaluation and construction implementation evaluation. Through the evaluation and analysis of indicators in these three stages, the construction of post construction evaluation index system is completed [7]. After the construction of high-efficiency and water-saving irrigation project is completed, it is a very important task to make it run well and manage effectively, and all departments and institutions also attach great importance to this work. In 2002, the office of the State Council transmitted the opinions of the State Economic Reform Commission on the implementation of the reform of water conservancy project management system (State Office (2002) 45) and comprehensively deployed the reform of water conservancy project management system. The Ministry of water resources also proposed to fully complete the task of water conservancy project management system reform by 2008, and all localities are promoting it in an all-round way, and pay close attention to the implementation of "two fixed positions" (fixed posts and fixed personnel) and "two fees" (basic expenditure funds for public welfare personnel and project maintenance and maintenance funds). Project operation management stage refers to the process of project delivery, production and project scrapping. It is a process of realizing and giving full play to the comprehensive benefits of the project and plays an important role in the whole project process. Good operation and management can bring the benefits of the project into play for a long time, continuously create and increase income for the masses, and promote the sustainable development of agriculture and the preservation and efficiency of state-owned assets. Post evaluation of operation management is the re evaluation of the actual operation management status and investment benefits in the project operation

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management stage. It is an indispensable content in the post evaluation of the project. It mainly includes five contents: operation management organization evaluation, management fund evaluation, water management evaluation, operation status evaluation and management quality evaluation. The economic post evaluation of engineering project is to re evaluate the economic benefits after the project is put into operation, calculate the actual economic benefits of the project, compare them with the evaluation indicators in the design report, and find out the deviation and the causes of the deviation. The economic post evaluation of high-efficiency and water-saving irrigation projects mainly includes national economic post evaluation, effect evaluation and financial post evaluation. Different from large-scale water conservancy and electric power projects, high-efficiency water-saving irrigation projects are infrastructure projects with strong public welfare. The construction scale is relatively small and the profitability of the projects is generally low. Some projects also need to be supported by national or local governments through policy subsidies or preferential policies such as tax reduction or exemption. Its benefits are mainly reflected in local development, regional stability and other social aspects. Therefore, the post evaluation of high-efficiency water-saving irrigation projects should focus on the national economic post evaluation and effect evaluation, and only use the financial post evaluation results for analysis and reference or do not do the financial post evaluation. If the main body of the project is an independent economic accounting unit, such as companies, enterprises and large Grain Growers, the financial evaluation can also be carried out. In the post economic evaluation, the regional differences of the project should also be considered, and some evaluation indexes reflecting the personality and characteristics of the project should be supplemented, such as average investment per mu, investment payback period, etc., so as to make the evaluation conclusion more scientific and reasonable. The post impact assessment of high-efficiency water-saving irrigation project is to analyze the impact of the project construction on the technical economy, society and natural environment of the project area, mainly including three aspects: post assessment of technical impact, post assessment of social impact and post assessment of environmental impact. Objective and sustainability evaluation is a forward-looking evaluation, including objective evaluation and sustainability evaluation. Objective evaluation mainly analyzes the degree of achievement and adaptability of objectives. Sustainability evaluation is based on the perspective of post project evaluation. The analysis is to analyze the possibility of project survival and development from the aspects of technology, management, finance, policy and environmental protection, whether the project objectives and expected benefits can be realized, as well as the necessary conditions and risks. The goal of high efficiency and water saving irrigation project and the main research indicators of sustainability post evaluation. Index weight reflects the importance of different aspects of the evaluation object. It is a comprehensive measure of the subjective evaluation and objective reflection of the relative importance of the index in the evaluation problem. In the index system, the influence side and importance of each index are different. Therefore, the weight coefficient of each index should also be given different values according to its importance and the amount of information. The weight coefficient has a great impact on the evaluation results, and its rationality also plays an important role in the rationality of the evaluation results. Therefore, it is necessary to find an appropriate weight determination method to ensure that the weight coefficient is scientific, objective and suitable for the evaluation project. By comparing the advantages and disadvantages of various weight determination methods (see Table 1), and combined with the characteristics of post evaluation of high-efficiency and water-saving irrigation projects, an appropriate weight determination method is selected [8].

Table 1 Weight Determination Method Comparison Table

Weight determination method	advantage	shortcoming
Analytic Hierarchy Process	The analysis idea is clear and the data used is less	① When the order of judgment matrix $n > 3$, the judgment matrix may not be a consistent matrix; ② Large amount of calculation
		① The ambiguity and uncertainty of each attribute of the sample are considered; ②
Fuzzy Cluster Analysis		① When the sample size is large, it is difficult to obtain the results; ② Only the weight

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	The classification of sample data has good convergence	of classified indicators can be obtained, so it is inconvenient to determine the weight of single indicators.
Delphi method	Considering the relative importance of indicators and the authority coefficient of experts, it is more rigorous and perfect	It takes a lot of manpower and material resources, and it takes a long time to get the results, which is inconvenient
Entropy weight method	It has wide adaptability and can be used to determine the weight of any aspect, and can also be combined with other methods to determine the indicator weight.	① It is too sensitive to abnormal data, and the calculated weight value of non important indicators may be too large; ② Lack of horizontal ratio between indicators
Relative comparison	Simple and practical, easy to promote	① When there are many indicators, the workload of comparison is large; ② It is greatly affected by subjective factors.

In order to carry out the post evaluation of high-efficiency and water-saving irrigation projects as soon as possible, the method of determining the weight should be fast and simple, and should be suitable for the current situation of the technical level of grass-roots industry departments and the statistical data that can be collected. In the process of development, we should follow the principle of guidance for improvement, popularization first and then improvement. The work should be carried out first. In the process of development, it will develop with the continuous improvement of the technical and business level of the industry. Considering the above, the relative comparison method is used to calculate the weight after the evaluation of high-efficiency water-saving irrigation projects. This method is simple and intuitive, easy to apply, and there is no limit to the number of elements in the same level. In view of the shortcomings of this method in many indicators and large workload, the index system is divided into five parts and used one by one. In view of the disadvantage that the indicators are greatly affected by subjectivity, when determining the weight, the relative comparison method is applied. Firstly, a number of experts from different units, different levels and different positions are consulted. Based on the assignment of statistical experts, the index weight is analyzed and determined one by one. At present, there are many evaluation methods applied to project post evaluation, comprehensively considering the advantages and disadvantages of investigation and data collection method, comparison method, success degree method, logical framework method, trend extrapolation method, grey prediction method, linear weighted comprehensive evaluation method and other methods (see Table 2). According to the characteristics of high-efficiency and water-saving irrigation projects and the constructed evaluation index system, the post evaluation methods used in each evaluation model are finally selected (see Table 3).

Table 2 Comparison of evaluation methods

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Evaluation method	Advantage	Shortcoming
Investigation and data collection method	Wide range of applications, the survey form can be adjusted according to different survey contents	Compare the consumption of time, money and manpower
Contrast method	Through comparison, the general situation of the real economic, social and environmental benefits of the project can be determined, so as to easily judge the role and impact of the project on economy, technology, society and environment	Most of the conclusions are the deviation degree of each evaluation index, so it is impossible to find out the key factors affecting the project, let alone analyze the causes of the deviation
Success degree method	The principle and operation of the method are simple and easy to understand, the conclusion is clear, and it is easy for decision-makers to grasp the overall evaluation conclusion of the project	It is greatly influenced by the subjective factors of the evaluators, with more qualitative analysis and less quantitative analysis
Logical framework method	It clearly shows the intention of the project design, facilitates the analysis of the causal relationship between the evaluation levels, and helps the evaluator master the key factors and problems of the project.	It requires high level of detail and accuracy of data, excessively compares with the original target, ignores the actual possible changes, and is limited by the scope of post evaluation
Trend extrapolation	It can predict the future development trend of the project and quantitatively predict some functional characteristics	Relatively mechanical, difficult to master, and high requirements for information quality
Grey prediction method	Consider and reflect the unknown and uncertain factors in the project, in line with objective facts	The operation is complex, the determination of weight is very subjective, the evaluation results tend to be uniform and

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System dynamics method	It can easily deal with various nonlinear problems and time-varying phenomena. It is also suitable for long-term and dynamic simulation analysis and research	the resolution is not high The theory is profound, the modeling is difficult, the accuracy of medium and short-term prediction and distribution problems is poor, and the accuracy of simple software is poor, which is easy to go astray When there are many indicators, the statistical workload is large, the precise algorithm of eigenvalues and eigenvectors is complex, and there are many qualitative components.
Analytic hierarchy process	It is simple and practical, systematic and requires less quantitative data information	The weight coefficient has a significant impact on the evaluation results The determination of index weight vector is highly subjective, and the determination of membership function varies from person to person, so there is no systematic method
Linear weighted synthesis method	Simple calculation and strong operability	
Fuzzy comprehensive evaluation method	Avoid the disadvantages of discontinuous classification and reflect the uncertainty existing in the project	

Table 3 Post-evaluation methods for high-efficiency water-saving irrigation projects

Evaluation process	Main assessment methods used
Post construction evaluation	Survey data method and comparative method (process evaluation method)
Post-operation management evaluation	Investigation data method and comparison method (process evaluation method)
post-economic evaluation	Linear survey method, data interpolation method, benefit evaluation method
Post impact assessment	Survey data method and comparative method (systematic review method)
Objective and sustainability post evaluation	Survey data method and comparative method

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(impact assessment method and systematic
review method)

Comprehensive post evaluation

Linear Weighted Synthesis and Success

There are many projects involved in the project post evaluation. The whole process includes six links: Post Evaluation of construction process, post evaluation of operation management, post evaluation of economy, post evaluation of impact, post evaluation of objectives and sustainability and evaluation of project success. Each evaluation link has different processing processes, whether in the selection of evaluation indicators, or in the establishment of evaluation standard system and evaluation method system. Therefore, this paper will establish a single evaluation model for the first five links of the whole project post evaluation, and evaluate each single post evaluation system separately. Finally, according to the established project success evaluation model, the evaluation results of each single post evaluation are comprehensively processed to obtain the final evaluation results [9].

The "four systems" in construction projects refer to the project legal person responsibility system, project construction supervision system, bidding and contracting system and contract management system. The closer the index is to 1, the better the implementation effect of the "four systems". It can be calculated by the following formula (1):

$$\begin{aligned} & \text{Implementation rate of "four systems"} \\ &= \frac{\text{The number of "four systems" that have been implemented}}{4} \times 100\% \end{aligned} \quad (1)$$

The change rate of actual total investment reflects the deviation degree between actual investment and planned investment. When the index > 0 , the actual investment of the project exceeds the planned investment, otherwise it is less than the planned investment. It can be calculated by the following formula (2):

$$\begin{aligned} & \text{Rate of change in actual total investment} = \\ & \frac{\text{actual investment} - \text{planned investment}}{\text{planned investment}} \times 100\% \end{aligned} \quad (2)$$

Project scale change rate project scale change rate reflects the deviation degree of the comparison between the actual project scale and the planned project scale. Here, it mainly refers to the change rate of the actual irrigation area and the planned irrigation area. It can be calculated by the following formula (3):

$$\begin{aligned} & \text{Project size change rate} = \\ & \frac{\text{Actual irrigated area} - \text{planned irrigated area}}{\text{planned irrigation area}} \times 100\% \end{aligned} \quad (3)$$

Actual construction period change rate actual construction period change rate refers to the deviation degree of the comparison between the actual construction period and the planned construction period. When the index > 0 , it means that the actual construction period is shorter than the planned construction period. On the contrary, the actual construction period is longer than the planned construction period. It can be calculated by the following formula (4):

$$\begin{aligned} & \text{Actual duration change rate} = \\ & \frac{\text{Actual Duration} - \text{Planned Duration}}{\text{Planned Duration}} \times 100\% \end{aligned} \quad (4)$$

The engineering design change rate of the project refers to the ratio of the engineering quantity applied for changing the design to the total engineering quantity during the construction of high-efficiency and water-saving irrigation project, which reflects whether the survey and design of the project is reasonable and comprehensive, and whether the construction technology is scientific and advanced. Design changes mainly occur in the late design stage and construction stage [10]. The main reasons for design changes are:

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① The design team is inexperienced and thoughtless, resulting in major changes in the design scheme; ② Unreasonable design schedule, resulting in excessive overlap between design cycle and procurement cycle; ③ The design change caused by the inconsistency between the equipment data provided by the manufacturer and the design documents is not the design reason; ④ Before starting the design, the owner and the design team failed to communicate timely and accurately, resulting in design changes in the later stage, which is not the cause of the design; ⑤ Design changes caused by design errors or procurement problems found in the construction stage.

Management quality evaluation: in the management quality evaluation, we should grasp the main contradiction, mainly analyze and evaluate the project management unit's regular maintenance and regular maintenance of fixed assets of the project and the inspection and management of project benefits. The standard degree of engineering design ability is used to measure the irrigation quality after the project is completed and put into operation. Good management should keep the design function of the project unchanged. In the evaluation process, the influencing factors of the index should be compared one by one and comprehensively evaluated according to the engineering design scheme and production report. The good degree of management mainly analyzes and evaluates the maintenance and repair of various buildings and equipment in the project area. After the project is put into operation, the original appearance shall be maintained through the maintenance of various buildings and equipment, the original scale and standard shall not be changed, and regular inspection and maintenance are required. When local defects are found, they shall be handled in time to maintain the benign operation of the project. Benefit monitoring and management unified organization, unified standards and standardized project benefit monitoring and management can accurately measure the success or failure of the project and further guide the operation of the project and the design and construction of the project to be built.

3.Experiment and discussion

Two principles should be followed when comparing indicators: (1) determine the weight according to the amount of information [11]. The index weight value with more information is large, on the contrary, the index weight value with less information is small. For example, economic indicators have more information than environmental impact indicators, so the weight of economic indicators is greater than that of environmental impact indicators. (2) The weight is determined according to the importance of the index. The more important the index, the greater the weight value. For example, in engineering projects, post construction management is more important than the power in the construction process. As the saying goes, three construction and seven management. Although the quality of engineering construction is an important factor affecting the benefits of the project, post construction management is the key factor for the sustainable benefits of the project [12]. Dujiangyan, an ancient water conservancy project in China, has still played a great role in irrigation and drainage, thanks to the implementation of scientific and complete maintenance, water distribution and other management systems year after year. In order to facilitate comparison, the most commonly used method of relative index comparison - adjacent index comparison method is selected to weight the evaluation index. The adjacent index comparison method is a weighting method that first qualitatively sorts the evaluation indexes, and then quantitatively assigns values (compares and judges the assignment between adjacent indexes in turn).

The preliminary work evaluation includes six indicators: the level of feasibility study, the quality of survey work and survey documents, the quality of planning and design and the level of design scheme, the quality of bidding work, the quality of bidding work and the implementation of construction conditions. According to the ascending order of the amount of information and importance, it is the quality of bidding work < the quality of bidding work < the implementation of construction conditions < the level of feasibility study < the quality of survey work and survey documents < the quality of planning and design and the level of design scheme. The construction implementation evaluation includes seven indexes: the implementation rate of the "four systems" of the construction project, the change rate of the actual total investment, the change rate of the project scale, the change rate of the actual construction period, the change rate of the project design, the rate of the project quality reaching the standard, and the completion acceptance. According to the ascending order of the amount of information and importance, the change rate of the actual construction period < the implementation rate of the "four systems" of the construction project < the change rate of the actual total investment < the change rate of the project scale < the completion acceptance < the change rate of the project design < the rate of project quality compliance. During the post construction evaluation, the evaluation indicators are divided into qualitative indicators and quantitative indicators. For qualitative indicators, refer to the interpretation of indicators, and give the index score

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according to the relevant collected data and the evaluation standard table on the basis of fully mastering their meaning. For the calculable qualitative index, the index value is calculated according to the calculation formula given in the index introduction and the collected data, and the index score is obtained by comparing with the evaluation standard table; Count the score of each index, and calculate the average value as the final score of the index. Add the scores of each index to obtain the final score of post construction evaluation [13]. According to the score results, make a qualitative evaluation on the construction process of the project and put forward improvements.

Project success evaluation is a summary evaluation, which makes a qualitative conclusion on the success of the project from the overall perspective of high-efficiency and water-saving irrigation project. It is based on the completion of post evaluation of construction process, post evaluation of operation management, post evaluation of economy, post evaluation of impact, post evaluation of objectives and sustainability [14]. Through the success evaluation, it is finally necessary to judge whether the project initiation decision and planning design are reasonable, whether the economic and social benefits meet the design requirements, summarize the experience and lessons of project construction and management, put forward improvement measures and suggestions for its shortcomings and deficiencies, and provide experience for similar construction projects in the future. The project success evaluation adopts the linear weighted synthesis method and the success degree method to construct its evaluation model. For high-efficiency water-saving irrigation projects, due to the characteristics of small area, less investment, short construction period, large number, wide distribution and mostly managed by farmers or individuals, the linear weighted comprehensive method is used to calculate the total score, which is simple and easy to operate. The success degree method is used for summary evaluation. The results are clear at a glance and the specific construction method of the model [15].

4 Conclusion

Developing efficient and water-saving irrigation projects is not only in line with the fundamental requirements of the economic development of the new socialist countryside, but also an important measure to solve the shortage and uneven distribution of water resources; At the same time, it is conducive to adjusting the agricultural planting structure, increasing agricultural output and farmers' income. The post evaluation of high-efficiency and water-saving irrigation projects can fully understand the whole process of project construction management, analyze the economic, social and ecological benefits of the project, predict the sustainability of the project, and evaluate the correctness of project construction decisions, so as to provide reference for the construction and management of similar projects in the future. Based on the theory of post project evaluation, combined with the characteristics of high-efficiency water-saving irrigation and the combination of theoretical research and case verification, this paper discusses the post evaluation technology of high-efficiency water-saving irrigation from the establishment of post evaluation index system and evaluation model of high-efficiency water-saving irrigation project. On the basis of summarizing the background and future development of high-efficiency and water-saving irrigation projects, combined with the current situation of post evaluation of such projects in China, this paper expounds the necessity and significance of post evaluation of high-efficiency and water-saving irrigation projects. This paper summarizes the development process and theoretical methods of post project evaluation, and summarizes the commonly used post project evaluation methods.

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