A Study on the Performance Evaluation of Small-scale Water Conservancy Project Management System Reform in Nanhai District of Foshan City

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Abstract: This paper constructs the performance evaluation system of management system reform of small-scale water conservancy projects in developed areas in China. Firstly, based on the analysis of the basic requirements of the management system reform of small-scale water conservancy projects in Guangdong Province, the project reform of small-scale water conservancy projects in Nanhai District is analyzed. Then, based on the literature, the performance evaluation indexes of small-scale water conservancy project management system reform were extracted and selected by content analysis and investigation, and the reliability and validity were tested by SPSS software. Finally, the performance evaluation index system of small-scale water conservancy project management system reform with 4 first-level indexes, 10 second-level indexes and 39 third-level indexes was constructed. Finally, taking the management system reform of small-scale water conservancy projects in Nanhai District of Foshan City as an example, its performance is evaluated, and the evaluation result is excellent. This study theoretically enriches the research content and theory of management system reform of small-scale water conservancy projects, and provides reference for management system reform of small-scale water conservancy projects in similar areas.

Keywords -Nanhai District, small-scale water conservancy project, management system reform, performance evaluation, SPSS

1 Introduction

China's small-scale water conservancy projects are great in terms of quantity, field and function, involving flood control and drought relief, urban and rural water supply, irrigation and drainage, ecological environment projection and improvement, and so on. For most projects, the rural collective organizations are responsible for the operation, management and protection, and farmers make repair, maintenance and renovation through the volunteer work. After the implementation of household contract responsibility system with remuneration linked to output, especially the abolishment of "the two kinds of labor" in rural taxation system reform, the traditional management mode of small-scale water conservancy project has been facing severe challenges. The collective, the subject of small-scale water conservancy project management, is defined vaguely, leading to the blurring, loss and absence of management and maintenance subject. The management of small-scale water conservancy project is not adapted to the

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extensive and complicated reform and great changes in the rural area currently and has problems such as poorly defined property ownership, unclear management & maintenance subject and responsibilities, and the lack of management & maintenance fund. A lot of small-scale projects are "in service without any person or money for its management", so the project benefit reduces greatly and then affects people's life and production and rural economic development [1].

Foreign research on rural small-scale water conservancy project management focuses on the following points: first, the management subject of rural small-scale water conservancy projects expands to be farmers and water user associations [2, 3]; second, it's necessary to innovate the property right system of rural small-scale water conservancy project, improve irrigation efficiency and increase the economic benefit of farmers [4]; third, there is a need to strengthen the government's support and budget subsidy to water user associations and establish corresponding water charge system [5, 6].

Domestic research on rural small-scale water conservancy project management focuses on the following points: first, the research started from the field of rural political sociology shows that since the 21st century, the rural small-scale water conservancy projects in China have been in an unprecedented severe situation under the negative influence of taxation expense reform and two-kind labor abolishment, in which case farmers are unwilling to put in money or labor voluntarily or participate in actively and thus result in the growing difficulties in the maintenance of small water conservancy projects established [7, 8]; second, Chinese academic circle of irrigation and water conservancy studies rural water conservancy management system and management mode [9], rural water conservancy modernization [10] and rural small-scale water conservancy property right system reform [11]; third, the research on the composition and fund of water user associations [12].

All provinces in China made the reform of small-scale water conservancy project management system successively, but there hasn't been a complete theoretical system, especially an established performance evaluation system for small-scale water conservancy project management system reform. Based on this, this paper summarizes and analyzes the management system reform and performance evaluation of small-scale water conservancy projects in Nanhai District, Foshan City, and uses content analysis and SPSS software to form an innovative model and performance evaluation system for the management system reform of small-scale water conservancy projects in developed areas in China, which can provide reference for the management system reform of small-scale water conservancy projects in similar areas.

2 Basic requirements of small-scale water conservancy project management system reform of Guangdong province

2.1 Guiding Ideology

Under the guidance of scientific development view, the government should thoroughly implement the series of great decisions and arrangement of the Central Committee of the CCP and the Province on accelerating water conservancy reform & development, further deepen small-scale water conservancy project's property right ownership system reform, make overall plans and take all factors into consideration and promote the reform by classification. In the premise of being dominated by the government and respecting the farmers' will, the district

should clearly define the property ownership, management subject and responsibilities, make the market allocation better play its crucial role, further arouse the initiative of the village collective, benefited farmers and various of new-type agricultural production subjects, explore to establish various market-oriented and socialized water conservancy project management modes, establish a sound and scientific management system and a positive operation mechanism, ensure the safe operation of project and give full play to the benefit, and offer strong support for taking the lead in establishing a well-off society and realizing the modernization.

2.2 Basic Principles

The first principle is the consistency of power and responsibility, referring to clearly defining the ownership, the management right and the use right, the management and maintenance subject and responsibilities. The second principle is the government plays a dominating role, referring to enhancing governmental responsibilities, strengthening organizational leadership, arousing the initiative of parties and promoting the reform comprehensively. The third principle is defining the priority, referring to first dealing with the problems of defining the management and maintenance subject, responsibilities and fund. The fourth principle is adjusting measures according to local conditions. The government should promote the reform according to the basic-level water conservancy service system construction goal in the province, which is “every town has a water management office, every village has a water management staff, and every project has a manager”, and the local conditions without using a single solution in all cases; clearly define the property ownership and management & maintenance responsibilities, and explore various social and professional project management modes to ensure the safe operation and give full play to project benefit; for projects with clearly defined property ownership, maintain current property relationship.

2.3 Reform Goal

By 2018, Guangdong Province has basically completed the small-scale water conservancy project management system reform in the provincial scope and established a scientific and standard management system and a good operation mechanism meeting the economic and social development requirements of Guangdong Province. The reform aims to establish a project management system with clearly defined property ownership and responsibilities, build various project social and professional management and maintenance modes, establish a project operation mechanism with sound system and standard management and maintenance practice, develop a stable, reliable and high-efficiency project management & projection fund guarantee system, and establish a project management & supervision mechanism with clear reward & punishment regulations and scientific checks.

2.4 Reform Scope

The reform covers the small-scale water conservancy projects on and under the county level, mainly including small reservoirs, medium and small rivers and dikes, small sluices, small farmland water conservancy projects and equipments, small rural water supply projects, small hydropower stations and other types of small-scale water conservancy projects. The small-scale water conservancy projects built and used by single framer are not included in the reform scope.

2.5 Reform Content

The reform content includes clearly defining the property ownership of project, making clear project management and maintenance subject and responsibilities, putting project management and maintenance fund into practice, exploring project management modes and enhancing training support and industrial supervision.

3 Basic situation of small-scale water conservancy projects in Nanhai district

Nanhai District located in the central area of Pearl River Delta with an area of 1073.82km^2, one of famous Four Tigers in Guangdong Province, is an advanced city with the harmonious development of economy and society, a national demonstrative city of informatization, a national sanitary city, a top tourist city of China, a national cultural advanced county, a regional technology innovation demonstrative city in China, and a strong educational district in Guangdong Province. In 2014, Nanhai ranked the second in the 100 strong districts in China. In 2015, Nanhai District governed 1 sub-district (Guicheng sub-district), 6 towns (Lishui Town, Jiujiang Town, Danzao Town, Dali Town, Shishan Town and Xiqiao Town), has 67 village committees and 182 neighborhood committees. The district has a population of 2.5888 million..

Nanhai District of Foshan City, Guangdong Province has 1869 small-scale water conservancy projects in which 22 are small reservoirs typeI, 8 are small reservoir type II, 32 are level-4 bunds, 245 are sluices, 343 are pump stations and 1219 are inner rivers.

(1) Bund: Nanhai District has 32 bunds with the total length of 255.28km. They belong to the village collective and are managed and maintained by water conversancy management offices in towns (sub-districts), irrigation and drainage stations (centers) and professional maintenance companies.

(2) Pump station: There are 343 pump stations. They belong to the town collective or village collective and are managed and maintained by water conversancy management offices in towns (sub-districts), irrigation and drainage stations (centers) or village committees.

(3) Reservoir: There are 30 small reservoirs of which 22 are small reservoirs typeIand 8 are small reservoir type II. They belong to the town collective or village collective and are managed and maintained by water conversancy management offices in towns (sub-districts), irrigation and drainage stations (centers) or village committees.

(4) Sluice: There are 245 small sluices of which 48 are in Guicheng, 12 are in Jiujiang, 57 are in Xiqiao, 13 are in Danzao, 36 are in Shishan, 47 are in Dali, and 32 are in Lishui. They belong to the town collective or village collective and are managed and maintained by water conversancy management offices in towns (sub-districts), irrigation and drainage stations (centers) or village committees.

(5) Inner river: There are 1219 rivers in the region. The rivers are divided into the main river, the branch river and the branch brook. The total length is 2004km. The total length of main river is 384.6km, the total length of branch river is 245.4km and the total length of branch brook is 1385.1km. The rivers belong to the town collective or village collective and are managed and

maintained by water conversancy management offices in towns (sub-districts), irrigation and drainage stations (centers) or specialized maintenance companies.

4 The analysis on small-scale water conservancy project reform in Nanhai district

4.1 Led by the Government and Supported by Leaders

According to the general requirement of "the property right has the ownership, the management has the carrier, the operation has the mechanism and the project has the benefit", the government made the reform plans of *The Notice of Hanhai District People's Government Office of Foshan City on Printing and Issuing The Work Plan of Deepening Small-scale Water Conversancy Project Management System Reform in Nanhai District, Foshan City* (NFBH〔2014〕No.187) and *The Notice of Nanhai District Land Resources, Urban Construction and Water Conservancy Bureau, Foshan City, on Printing and Issuing The Work Plan of Deepening Small-scale Water Conversancy Project Management System Reform in Nanhai District, Foshan City* (NSW〔2014〕No.102), and made a bold attempt to implement and further promote the process of small-scale water conservancy project management system reform.

4.2 Make the Situation Clear and Build a Standing Book

The government makes classified statistics of various small-scale water conservancy projects in the administrative region and builds a standing book to define the scope and tasks of the reform.

Table 1. Statistical Table of Small-scale Water Conservancy Projects in Nanhai District

Village/Town/ Sub-district	The Number of Small Reservoir Type I	The Number of Small Reservoir Type II	Medium and Small Rivers (km)			Dike (km)	Small Sluice	Irrigati-on Pump Station	Drainag e Pump Station
			Main River	Branch River	Branch Brook				
Guicheng	0	0	23.26	22.49	73.38	77.21	34	10	15
Jiujiang	0	0	34.00	32.37	224.17	36.03	12	2	5
Xiqiao	1	2	95.44	68.35	354.79	47.57	14	5	13
Danzao	1	0	34.09	43.48	182.61	55.97	13	3	12
Shishan	4	15	107.5	23.09	167.94	43.55	33	5	30
Dali	1	3	45.45	23.72	81.36	25.74	25	0	24
Lishui	1	2	44.83	31.95	187.53	53.31	34	3	13
Total	8	22	384.57	245.5	1271.8	255.3	165	28	112

4.3 Clearly Define Rights, Scope and Responsibilities

Nanhai District began the right defining work of water conservancy project in 1988 by issuing *The Opinion on Designating the Land Used for Water Conservancy Project and Issuing Certificate for Defined Right* and issued the *Collective-owned Land Construction Land Use Permit* to the owners of some projects meeting requirements. In 2013, to further define project ownership and small-scale water conservancy project management & maintenance subject and responsibilities, according to the requirements of *The Notice of Guangdong Water Conservancy*

Department and Guangdong Finance Department on Printing and Issuing The Work Plan of Deepening Small-scale Water Conversancy Project Management System Reform, Nanhai District restarted the right defining work based on the principle of "the one investing owns, benefits from and bears responsibilities of the project" and issued the use and management right certificate for the small-scale water conservancy projects with defined project management right in the towns (sub-districts). With regard to specific work, the District Government authorizes the District Land Resources, Urban Construction and Water Conservancy Bureau to issue the water conservancy project management right certificate to further define the project's property right ownership and make clear the small-scale water conservancy project's management and maintenance subject and responsibilities. Currently, in Nanhai District, for the small-scale water conservancy projects, the people's government in towns and sub-district offices have confirmed the property right ownership, the people having the use and management right and the supervision and administration people responsible for the safe operation of project, and issued the management right certificate to the people having the use and management right. The people having the use and management right shall be shown in the materials hung on the wall in the project. The people with the use and management right are registered and in unified management. By December 31st, 2015, the right confirmation rate of small-scale water conservancy project in Nanhai District reached 100%.

4.4 Level-to-level Investment and Prepare Fund

To ensure fund investment, District Government issued documents many times to refine and improve water conservancy project management and maintenance fund subsidy standards and increased the fund according to practical situation. According to the documents, water conservancy project management and maintenance fund shall be shared by district finance, the town or sub-district, and the owner of project in a certain ratio, in which case the parts of two levels of district and town shall be 5:5 and the insufficient section shall be solved by the town or sub-district with a whole plan.

In Nanhai District, the public welfare state-owned small-scale water conservancy project management units and personnel fund and maintaining fund are all included into the financial annual budget on the same level according to the principle of level-to-level management and graded responsibility. The village-managed small-scale water conservancy projects included into goal management get the subsidy of 80% of state-owned small-scale water conservancy project for management & repair, maintenance fund and managing staff fund. In addition, there is a same-pace growing mechanism of managing staff fund and project management and maintenance fund subsidy standards. The government also arranges the water conservancy project management and maintenance fund from the irrigation and water conservancy construction fund withdrawn from the foundation for water works, water conservancy fees income and land leasing income.

Table 2 The Statistical Table of Small-scale Water Conservancy Project Management and Maintenance Funds (￥0.01 million)

Village/Town /Sub-district	The Number of Small Reservoir Type I	The Number of Small Reservoir Type II	Medium and Small Rivers (km)			Dike (km)	Small Sluice	Irrigation Pump Station	Drainage Pump Station
			Main River	Branch River	Branch Brook				
Guicheng	0	0	60.48	58.47	80.71	198.60	231.75	162.28	274.88
Jiujiang	0	0	88.40	84.16	246.59	118.76	55.05	32.54	134.46
Xiqiao	30.8	0	248.15	177.71	390.27	151.85	67.40	78.23	290.85
Danzao	30.8	34.40	88.63	113.05	200.87	171.04	50.35	51.09	274.62
Shishan	123.2	258.0	279.50	60.03	184.74	117.05	143.55	82.61	503.78
Dali	30.8	51.60	118.17	61.66	89.50	61.76	178.35	0	416.69
Lishui	30.8	34.40	116.56	83.07	206.28	127.94	225.60	51.60	243.72
Total	246.4	378.4	999.89	638.16	1398.95	947.01	952.05	458.33	2138.99

4.5 Reform the Institution and Separate Management from Maintenance

Nanhai District integrated the original basic-level water conservancy departments and divided them into the water conservancy management office and the irrigation and drainage maintenance station and defined the nature, personnel allocation, post and responsibilities strictly. There are 13 management offices (including the District Central Station of Irrigation and Drainage Maintenance) and 7 water conservancy irrigation and drainage maintenance stations. The water conservancy management office is the sending agency of District Water Conservancy Bureau, included into the category of district public welfare institution and classified as a pure public welfare water management institution mainly responsible for water conservancy project planning, administrative management, supervision, water resource management and three-proofing work. The town (sub-district) irrigation and drainage maintenance station belongs to the category of public welfare institution according to its nature, and is mainly responsible for the operation and maintenance of town (sub-district) water conservancy, drainage and irrigation projects. The District Water Conservancy Irrigation and Drainage Station is subordinate to the District Water Conservancy Bureau, responsible for the daily operation maintenance of projects of project management units in the district.

Since 2013, the Nanhai District has been deepening the small-scale water conservancy project management system reform by implementing the “separation of management and maintenance” and improving the management mode of “water conservancy office + maintenance station” to further make clear the responsibilities of Water Conservancy Management Offices and Irrigation and Drainage Stations, supervise and urge the sections to perform their won duties and give full play to the basic-level water conservancy service organization and management function. The management offices and maintenance stations in towns (sub-districts) make daily checks, management and maintenance and organize acceptance checks each month and submit the results to Nanhai District Land Resources, Urban Construction and Water Conservancy Bureau. The district implements the separation of management and maintenance and has partially realized social maintenance in the way of government purchasing services.

Table 3 Basic Situation of Small-scale Water Conservancy Project Management Units in Nanhai District

No.	Management Unit	Village /Town	Manning Quotas	Total Number of Actual Staff
1	Guicheng Water Conservancy Office	Guicheng Town	18	18
2	Jiujiang Water Conservancy Management Office	Jiujiang Town	13	13
3	Xiqiao Water Conservancy Management Office	Xiqiao Town	13	13
4	Danzao Water Conservancy Management Office	Danzao Town	13	13
5	Shishan Water Conservancy Management Office	Shishan Town	29	26
6	Dali Water Conservancy Management Office	Dali Town	14	14
7	Lishui Water Conservancy Management Office	Lishui Town	12	12
8	District Irrigation and Drainage Station		10	10
9	Qiaosangyuanwei Management Office		31	27
10	Dongfeng Reservoir Management Office		15	13
11	Beicun Sluice Management Office		17	17
12	Quality Supervision Station		8	7
13	Drainage Monitoring Station		12	11
Total			205	194

4.6 Attract Talents and Improve Techniques

In the process of system reform and institutional adjustment, Nanhai District makes efforts to prevent the outflow of talents. With the staffing status of government affiliated institutions and salary as incentive measures, Nanhai District attracts good talented people to supplement fresh blood. The District mainly uses the following measures: first, defining the minimum number of managing people of various water conservancy projects, such as reservoir, pump station, sluice, and so on, in goal management evaluation approaches and implementation regulations; second, improving the quality and professional skills of basic-level maintenance staff through vocational skill training, technical training, and so on; third, enhancing the treatment of basic-level maintenance staff widely. The District Government issued documents stipulating that the annual salary of water conservancy management and maintenance staff should not be less than ￥0.036 million.

With the measures above, the management and maintenance team grows and becomes more stable; water conservancy equipment operation and daily management level improves greatly; staff's age structure is becoming younger and education background rises continuously.

4.7 Enhance the Supervision and Grasp Jointly & Manage Concertedly

Nanhai District established a perfect water conservancy project management & maintenance supervision system. The professional management and maintenance staff of basic-level water conservancy project, Sub-district Water Conservancy Management Office, Maintenance Station and District Water Conservancy Bureau take their own responsibilities, find and report problems or potential safety hazards to related units and solve the problems in time. The professional management and maintenance people implement the 24h patrol system. The Sub-district Water Conservancy Management Office and Maintenance Station check and supervise each day, find and solve problems in time and report the problems to the Bureau for the record. The Nanhai District Water Conservancy System checks irregularly, find problems in time and communicate with management and maintenance units to solve problems and make rectification. The District Land Resources, Urban Construction and Water Conservancy Bureau established a water conservancy project management dynamic report system. The towns and sub-districts report the

management situation of water conservancy project, the problems found, solutions, and follow-up of problems in the month to Land Resources, Urban Construction and Water Conservancy Bureau through the bureau network system each month, and form series of materials online for the check of related superiors or personnel to gain the first-hand data of water conservancy project management. The inspection team organized by district and town water conservancy management departments also makes flight checks irregularly, and reports the problems or potential safety hazards found to related units to solve the problems and hazards in time. The water administration law-enforcing department makes routine checks to river channels and issue rectification notices in time when finding anyone violating laws or rules and order the violator to correct the violating phenomenon. In addition, district and town governments and their water administration departments also supervise and offer business guidance to the safe operation and management of water conservancy projects, gain the latest situation of first-line project management through daily patrol and offer work instructions. In this case, there is a good situation of collaboration of higher and lower levels and grasping jointly & managing concertedly.

In addition, the District strengthens the supervision of water conservancy project management and maintenance fund. The management and maintenance subsidy is a special financial subsidy included into financial budget management for a fixed purpose and in special accounting. The district and town financial, audit and water conservancy departments build a management supervision system for the fund to strengthen the use and management of the fund and take measures to solve the problems in management.

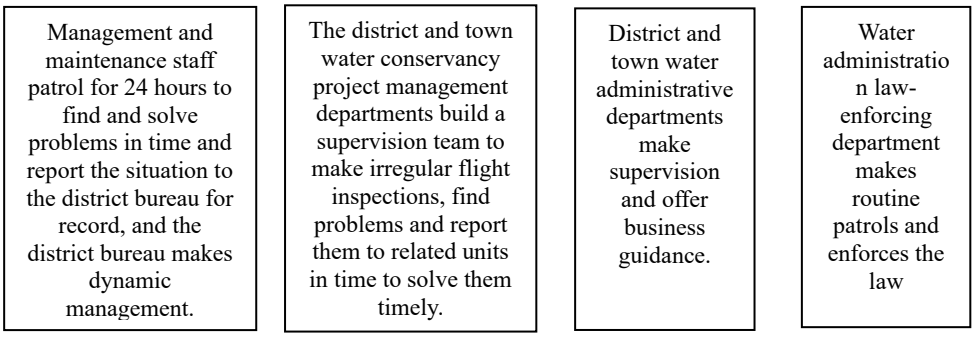

Figure 1. Small-scale Water Conservancy Project Supervision Function in Nanhai District

4.8 Check for Acceptance and Meting out Rewards or Punishments Fairly

According to the Water Conservancy Project Management Assessment Methods of Water Conservancy Department and related systems of province and city combined with local conditions, to include small-scale water conservancy projects, such as bunds, pump stations, reservoirs, sluices and inner rivers, into the goal management system. The district clearly defines the management scope, basic principles, responsible subject, target task and personnel allocation of various water conservancy projects and puts goal management standards and operation management fund into practice by making related management regulations, to realize the standardization, institutionalization and normalization of management of various water

conservancy management.

Nanhai District implements multiple-level assessments according to the goal management assessment criteria of various water conservancy projects, such as bunds, pump stations, reservoirs, sluices and inner rivers, and metes out rewards or punishments fairly according to assessment results, which have a good incentive effect. Town and sub-district water conservancy management offices and maintenance stations make checks for acceptance to the water conservancy projects under administration monthly and praise the projects with outstanding performance. District Water Conservancy Bureau organizes an assessment and acceptance team to make two checks before and after the spring tide each year, grade the work on the site according to assessment criteria, and then issue the certificate to the project passing the check and report the situation, apply for the fund to District Finance Bureau, and circulate a notice of criticism on the projects with problems. In the end of each year, there is an overall appraisal in which the advanced units and demonstrative projects elected shall be summarized and popularized and get the commendation plaque.

5 Small-scale water conservancy project management system reform performance evaluation in Nanhai district

5.1 Small-scale Water Conservancy Project Management System Reform Performance Evaluation Indexes

This study takes academic literature as research data, uses content analysis method to code and analyze the data, and combines literature analysis method and expert opinion method to extract the preliminary performance evaluation index of small water conservancy project management system. Then, the indicators were screened according to the actual survey results. SPSS software was used to test and analyze the reliability and validity of the selected index system, and finally the performance evaluation index system was obtained.

1) Data collection

This paper will use the method of literature search to obtain research data. The literature are mainly from the core set database of CNKI and Web of Science, with a total of 20 Chinese literature and 15 English literature.

2) Extraction of evaluation index

In this paper, the content analysis method is used to encode and classify the literature, and the dimensions and indicators of performance evaluation of small-scale water conservancy project management system are constructed. According to the steps of content analysis method [13]: firstly, two coders summarized the literature materials, extracted the original sentences from the literature, and combined similar information sentences with similar items with the help of NVIVO 12 plus software, thus obtaining 248 analysis units; Secondly, code the analysis unit of induction, analyze and extract the main structure from it, that is, get the sub-category; Finally, the sub-categories are coded again to get the main category. During the coding process, the two coders repeatedly discussed and revised their views, and finally formed a unified preliminary index.

After obtaining the preliminary indicators, the field survey was conducted, and then the preliminary indicator system was screened according to the actual survey results. Finally, a total of 4 first-level indicators, 10 second-level indicators and 39 third-level indicators were extracted for the performance evaluation index system of small-scale water conservancy project management system reform (see Table 4). The first-level indicators include Measures of reform work, Reform result achieved, Questionnaire survey on people's satisfaction and Work innovation. In addition, this paper adopts expert scoring method to determine the specific score or weight of each index.

3) Reliability and validity test.

In the content analysis method, the reliability and validity test is an important link. Reliability means that different researchers have the same analysis views on the same data. The higher the reliability, the higher the accuracy of the coding process and results. In this paper, Cohen's Kappa coefficient is used to test the reliability of the coding results. Generally speaking, the coefficient should be no less than 0.6. The reliability coefficient of this study is 0.876, which indicates that the coding results are more accurate. Specifically, first, two coders independently analyze the coding; Second, after the coding is finished, two observers observe the analysis unit of literature research, observe the consistency of the two coders' coding of literature, and compare the coding results. At the same time, this paper made the selected index system into a questionnaire, sent it to 10 experts related to water conservancy for scoring, and analyzed its reliability and validity by SPSS25.0 software. The result showed that the reliability coefficient was 0.823, which met the requirements. In addition, this paper invites three experts who have been engaged in the performance evaluation of water conservancy project management to revise the rationality, representativeness and operability of the evaluation indicators to further improve the validity of the index system.

Table 4. Nanhai District Small-scale Water Conservancy Project Management System Reform Performance Evaluation Index Table

Grade I Index	Grade II Index	Grade III Index	Full Mark
Measures of reform work (60 marks)	Institutional framework implementation and policy documents (10 marks)	Set up a work leading team and the working body	3
		Print and issue the specific implementation plan. For each lacuna in the plan, deduct 2 marks	5
		Organize and open a mobilization meeting for extensive publicity	2
	Define property ownership clearly	Clearly define the classification of small-scale water conservancy project	2
		Issue the certificate of title or use and management right certificate to the project with clearly defined property ownership	2
		Declare the people having the ownership and the people having the use and management right	2
		Register the people having the ownership and the people with the use and management right for unified management	2
		Register small reservoirs	2
	Make clear	Clearly define public welfare state-owned small-scale	2

	management and maintenance subject and responsibilities and put into practice (10 marks)	water conservancy projects, put management units and manning quotas into practice	
		Clearly define the management of basic-level water user association	2
		Define the responsible units and people of other small-scale water conservancy projects	2
		Define the administrative people responsible for the supervision and management of safe operation of project	2
		Publish the responsible person in the public media for social supervision	2
	Make clear management and maintenance fund and put into practice (15 marks)	As for public-welfare state-owned small-scale water conservancy projects, the management unit and personnel fund, maintenance and repair fund should be fully included into the financial year budget on the same level according to the principles of level-to-level management and responsibilities.	3
		There are financial subsidies for the management and maintenance fund and management staff und of other small-scale water conservancy projects	3
		Establish a same-pace growing mechanism of management staff fund subsidy	3
		Arrange special water conservancy project management and maintenance fund from the irrigation and water conservancy construction capital withdrawn from the foundation for water works, water conservancy fee income and land leasing income	3
		There is a stable growing mechanism for the public welfare project management and maintenance fund	3
	Explore project management mode (10 marks)	Make water conservancy project management and maintenance standards or system	2
		Examine and assess project management units	2
		Make centralized and professional management	2
		Give full play to basic-level water conservancy service organization's management function	2
		Realize the separation of management and maintenance and social maintenance through government purchase of services if local conditions allow	2
	Training, support and industrial supervision (5 marks)	Encourage and support a market-oriented professional maintenance team	2
		Offer technical training to basic-level water conservancy service staff regularly	2
		The county water conservancy bureau offers technical guidance to the basic level regularly	1
Reform result achieved (25 marks)		Have a sound project management and operation system, and clearly defined administration authority and limit	3
		There are explicit official approval and regulations for management institution setting and manning quotas. Staff in key positions should have the certificate.	2
		There are improved management regulations and system and show them on the wall	2
		Project management meets standards and equipments run normally	2

	Check, repair and maintain regularly and register and report as specified	2
	The project is equipped with emergency supplies like the emergency power supply as specified	2
	Implement the responsibility system of flood prevention, develop the pre-arranged plan for flood prevention, prepare proper and intact flood prevention and emergency supplies meeting specifications and the standing book is clear	2
	Various files of project are in standard management and there are special person responsible for the management	2
	Make clear the source channels of project management and maintenance fund and operation fund	3
	Pay managing staffs salaries in time and in full amount, the benefit package is not lower than the minimum salary standard locally, pay for social insurance as specified	3
	Charge water rate as required by laws and the charge rate >90%	2
Questionnaire survey on people's satisfaction (10 marks)	Issue 100 questionnaires. Each questionnaire with the investigation result of "satisfied" or "basically satisfied" gets 0.1 mark.	10
Work innovation (5 marks)	Each innovation in the reform made according to local conditions gets 1 mark. There are totally 5 marks.	5

5.2 Small-scale Water Conservancy Project Management System Reform Performance Evaluation Result and Analysis

Nanhai District of Foshan City is one of the two state-level pilot counties in Guangdong Province. Nanhai District small-scale water conservancy project management system reform performance evaluation got the evaluation result basing on the discussion of evaluation team composed by experts. The overall evaluation result of excellence. The following table shows the evaluation on specific index.

Table 5. Nanhai District Small-scale Water Conservancy Project Management System Reform Performance Evaluation Result

Evaluation Index		Total Mark	Mark Obtained	Cause of Deduction
Measures of reform work	Institutional framework implementation and policy documents	10	9	Deduct 1 mark for the lack of evidence material for the mobilization meeting held, there are no minutes of the meeting
	Define property ownership clearly	10	9	Deduct 1 mark for there is no evidence material for the public declaration of the people having the ownership and the people having the use and management right.
	Make clear management and maintenance subject and responsibilities and put into practice	10	9	Deduct 1 mark for the lack of measures to define the management and maintenance subject and responsibilities of agricultural water and irrigation water

	Make clear management and maintenance fund and put into practice	15	15	
	Explore project management mode	10	10	
	Training, support and industrial supervision	5	5	
Reform result achieved		25	24	Deduct 1 mark for the lack of evidence materials for the management institutions of agricultural water and irrigation water.
Questionnaire survey on people's satisfaction		10	9.8	Three questionnaires get the result of "dissatisfied", so deduct 0.2 mark according to the actual situation
Work innovation		5	4	Deduct 1 mark for the insufficiency in the innovation of rural small water conservancy management system reform
Total		100	94.8	

6 Conclusion

Based on the analysis of the basic requirements of the small-scale water conservancy project management system reform in Guangdong Province and the basic situation of the small-scale water conservancy project in South China Sea, this paper constructs the performance evaluation index system of the small-scale water conservancy project management system reform by using the content analysis method and SPSS software, determines the index score by using the expert scoring method, and evaluates the performance of the small-scale water conservancy project management system reform in South China Sea. To sum up the reform work and form the experience which can be popularized is of guiding significance to the reform of small-scale water conservancy project management system in developed areas. The main conclusions are as follows:

(1) A series of reform & innovation measures in Nanhai District have practical results, and Nanhai District's small-scale water conservancy project management reaches a new level and truly realizes the reform goal of "the property right has the ownership, the management has the carrier, the operation has the mechanism and the project has the benefit". The small-scale water conservancy project management system reform in Nanhai District is very successful and has formed an innovative mode of small-scale water conservancy project management system reform in the developed area. With distinct characteristics, the mode is called the Nanhai Mode.

(2) The Nanhai Mode has the characteristics of superior consciousness, sound organization, sufficient fund and improved system. The superior consciousness means the staffs on levels of district, town and village all have the superior consciousness of managing the small-scale water conservancy project well and the superior leaders attach importance to the reform, so there is a consistent faith from top to bottom and there is the determination of reform, which is the premise of the success in reform. The sound organization refers to that water administration departments on levels of district, town and village are sound in organization and has reasonable personnel allocation. Besides, the water conservancy office and the irrigation and drainage maintenance

station have reasonable division of labor. The reasonable institutional framework and personnel team compose the core force in the reform. The sufficient fund is the most important characteristic of Nanhai mode. The financial investment of ￥80 million each year is a huge expenditure, which is an important guarantee for the reform going on smoothly. The improved system means there are improved project safe operation system, project goal management system, and project assessment and reward & punishment systems, offering rules to the project management and maintenance work and forming the sustainable and good project operation mode.

(3) The content analysis method was used to encode and analyze the primary and secondary data, and a total of 4 first-level indicators, 10 second-level indicators and 39 third-level indicators were extracted. These Measures of reform work, Reform result achieved, Questionnaire survey on people's satisfaction, and Work innovation are the first level evaluation indicators.

(4) Expert scoring method was used to determine the score of each indicator. Measures of reform work (60) was the highest, followed by Reform result achieved (25). Then the Questionnaire survey on people's satisfaction (10), Work innovation (5) the lowest score.

(5) The author uses the expert scoring method to evaluate the performance of the management system reform of small-scale water conservancy projects in Nanhai District, and the evaluation result is excellent.

In addition, on the basis of the research in this paper, the next work is to use quantitative methods for empirical research.

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