

The Reform and Development of the Research on the Management System of Small Scale Water Conservancy Project Counties

Taking Jiangsu Suqian County as an Example of a Water Conservancy Project Management

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Abstract: With the rapid development of social economy, small water conservancy projects have become an important infrastructure for social development [1]. Jiangsu Suqian County's water conservancy project management is relatively backward therefore; the existing infrastructure lacks maintenance and has been constantly attenuated. The lack of water conservancy project management has brought great hidden dangers for the national economy, therefore, in order to fundamentally solve the problem, a huge sum of money is required to fully utilize the facilities of small water conservancy project. Therefore, it is an urgent need to promote small-scale water conservancy project management system reform. This paper mainly focused on Jiangsu Suqian County's water conservancy project management as an example, and analyzed the management situation and the existing problems. Moreover, the study also improved the management system of small water conservancy project, by making necessary reforms in the project, and by putting forward principles, objectives and key measures which have practical significance.

Keywords: Basic problems, project management, small water conservancy, system reform.

INTRODUCTION

Water is essential to life, production and economy. With the development of society and economy, water conservancy management, which is meant for the public good, has become an important support for the social development [2]. Suqian County is located in the lower and medium reaches of the Huaihe River, which is the direct cause of the emergence of floods and droughts. The reform in the management system of the small water conservancy projects is key for the social and economic development. Currently, Jiangsu Province organized a management of water conservancy projects for flood control, irrigation, water transfer and other purposes, but the anti-flood and water resource management system still call for further improvements to better cope with floods, draughts, extreme climate and other natural disasters. Therefore, it is necessary to study the management system of the county-level small water conservancy project, in order to achieve modernization in the water conservancy infrastructure construction to effectively guarantee the completeness and modernization in the management system of the water conservancy projects.

1. BASIC SITUATION OF THE SMALL-SIZED WATER CONSERVANCY PROJECTS AND ANALYSIS OF THE EXISTING PROBLEMS

1.1. Basic Situation

Located in the lower reaches of the Huaihe River, Suqian County covers an area of 8,555km², into which nine basin

watercourses of more than 200,000km² exist in the upper and medium reaches flow. In the southern and northern banks of the Hongze Lake, the water area reaches 233,000km², which belongs to an area stricken by floods and droughts. Due to the maintenance and restoration implemented in the recent years, a management system of water conservancy projects for flood control, drought control and other purposes has been preliminarily established. The system boasts 62 flood-resisting watercourses, whose length is 1,735.6 km in total; 39 small reservoirs and more than 2,500 electromechanical pump stations. The management of the county-level water conservancy projects features the combination of unified management and level-to-level management. There are 21 irrigation areas and anti-flood units and 43 water conservancy project management units. 2,561 staffs are employed by water conservancy projects in Suqian County. The inspection, maintenance, restoration and control of some water conservancy projects can enhance the role of water conservancy projects in flood control, drainage of waterlogged farmland, which can effectively ensure the long-term and stable development of water conservancy projects in Suqian County.

1.2. Analysis of the Existing Problems

In recent years, the county-level small-sized water conservancy projects have been confronted with following problems during the construction period:

1.2.1. Management and Maintenance Fees

Statistics showed that Suqian County has an annual average fund of 7.46 million yuan for the management and

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maintenance of its small-sized water conservancy projects. However, actual spending is 2.43 million yuan. The appropriation of various levels of governments' makes a total of 540,000 yuan. Most water conservancy management units in Suqian County are confronted with operation difficulty in managing county-level water conservancy projects, whose fixed assets are worth 2.03 billion yuan. Annually, the maintenance and reinforcement fees reach 7 million yuan. In recent years, more than 4 billion yuan were allocated for comparatively dangerous water conservancy projects on an annual basis. However, this still failed to meet the practical demand of water conservancy project management. For example, the Flood Control Management Institution of Water Conservancy Projects in Suqian County has 62 staffs, whose salaries make a total of 740,000 yuan, but the institution's annual revenues are just 160,000 yuan. The gap is extremely wide. The basin embankment of the small-sized water conservancy projects in Suqian County covers an area of 1,198km, of which 174km has safety issues. More than 70 water conservancy projects have extremely aging buildings and more than 30 call for renovation or restoration. The flood control crack is 5 to 7mm, which greatly impairs the water conservancy projects' drainage of floodwater and water supply capability. The medium flow, high water level and large flood prevention projects have a severe status. It is imperative to reform the management system of the water conservancy projects.

1.2.2. Management Facilities and Methods

The production, operation and management facilities of the county-level small-sized water conservancy projects also have fundamental problems [3]. There are about 40 small-sized reservoirs within the project area, most of which are not equipped with the subsiding observation facilities, basin embankment, anti-scalding facilities, displacement and observation facilities and facilities to check the hidden dangers. The electromechanical pump stations seriously lack the devices for check and maintenance as well as measurement. There are no funds for the maintenance of the small-sized water conservancy projects. Some of them are seriously aging and damaged. Among 43 project management units, 70% of them do not have the transportation tools. The offices of some embankment management units are seriously damaged and they are in need of new operation along with production and modernized management facilities. Most small-sized water conservancy projects do not have supervision specialists. Some of them even have not yet established a complete management system. For example, Luoma Lake Embankment Management Institution is entrusted with 26.5 km management area, but most area has been seriously damaged.

1.2.3. Water Bill Collection of the Water Conservancy Projects

Following problems exist in the water bill collection of small-sized water conservancy project management in Suqian County [4]. Under general conditions, rice and wheat farmlands are charged for 15yuan/mu (1mu \approx 666.67m²); farmland with economic crops for 8yuan/mu; and

dry farmland for 3yuan/mu. However, since the water bill collection standards are not detailed enough and the factors considered are not comprehensive, therefore water bill collection based on "mu" is not proper. The water supply department is of the view that the rate of the water for agricultural use is relatively low, whose price is 46% of the cost. However, for all farmers the current water rate is relatively high. Many farmers even directly refused to submit the water bill charged of the dry farmland. Meanwhile, the responsibilities of the water supply and bill collection institutions are not clarified. Some water supply institutions do not charge for water and some bill collection institutions do not provide water. The lack of macro regulation mechanism has directly resulted in the conflicts and nonstandard operations of the water bill collection in the management process of the small-sized water conservancy projects.

1.2.4. Internal Management

The internal personnel in small-sized water conservancy project management institutions are more than required, which results in their low comprehensive qualities. Most personnel are more than 45 years old. Besides, the education level of more than 72% seniors is high or below. Some are even illiterate [5]. The age of personnel in the management institutions of small-sized water conservancy projects in Suqian County averages about 40. 57 who are still at work, but 16 have been retired. Now, the annual salary of the personnel is 37,500 yuan, therefore, the monthly salary is just 40% of the nationally stipulated rate. 36 personnel need to take long holidays. Based on the analysis of the personnel, Suqian County's Small-sized Water Conservancy Project Management Company conducted comprehensive treatment of the flood control and drainage project in northern part of the Huaihe River and the Ximinbianhe River, but, due to lack of specialized management institutions, the drainage of the small-sized water conservancy projects was conducted by proxies, thus resulting in obscure responsibilities and complex management steps. Violation of rules and regulations is a common phenomenon, which will directly influence the safety and benefits of China's small-sized water conservancy projects.

2. ANALYSIS OF RELEVANT DATA OF SUQIAN COUNTY AND REFORM OF WATER CONSERVANCY PROJECT MANAGEMENT

2.1. Data Analysis

The following table shows the short-duration rainstorm of Suqian County's water conservancy projects from 1992 to 2014. The values were chosen according to the maximum value during the 15 independent durations, namely 5, 10, 15, 20, 30, 45, 60, 90, 120, 180, 240, 360, 540 and 720. This paper mainly analyzed the rainstorm data from 1996 to 2014 and the problems existing in the small-sized water conservancy project management in Suqian County based on the consideration of comprehensive factors. Based on the analysis, this paper came up with a method to reform the small-sized water conservancy project management system. The statistical data are shown in the following Table 1 [6].

Table 1. Short-duration rainstorm statistical table over the years in Suqian County.

Durations (min)	5	10	15	20	30	45	60	90	120	240	360	540	720
Length	23	23	23	23	22	22	22	22	21	21	21	21	22
Average	6.5	10.2	13.2	16.1	20.1	24.1	27.3	29.7	32.0	33.4	37.5	41.5	46.5

Table 2. The rainstorm frequency adaptation table of various durations in Suqian County.

Durations (min)	5	10	15	20	30	45	60	90	120	240	360	540	720
Average	6.5	10.2	13.2	16.2	20.2	24.1	27.3	29.7	32.0	35.4	37.5	41.5	46.5
Cv	0.49	0.45	0.45	0.50	0.50	0.50	0.50	0.50	0.52	0.52	0.52	0.52	0.53
Ca	3Cv												

According to the time of the rainstorm and the diagram, the storm rainfall frequency is drawn on the curve chart. P-III curve was adopted to organize the chart. The distribution, adaption and curve chart are shown in Table 2.

According to the frequency curve identified above, the relation among the recurrence interval, rainfall intensity and rainfall duration was obtained and a~p~t relation curve was drawn [See Fig. (1)].

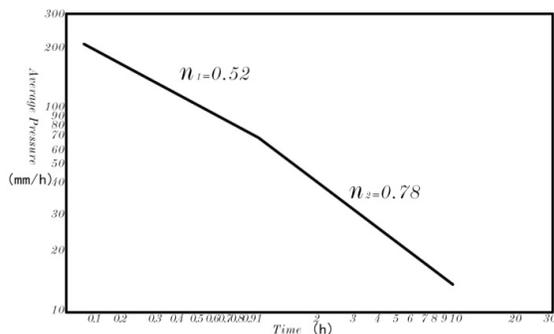


Fig. (1). Recurrence interval—rainfall intensity and rainfall duration relation chart.

Based on the analysis of the basic situation in Suqian County, a formula reflecting different rainfall intensities was designed. Besides, the relationship between the existing problems in the small-sized water conservancy project management and the daily and annual maximum was analyzed, thus providing an important basis for the rainstorm ascertainment.

2.2. Reform Direction of the Small-sized Water Conservancy Management System

2.2.1. Importance of Reforming the Management System

Small-sized water conservancy project management is an important infrastructure for social and economic development [7]. Suqian County established water conservancy projects, which formed the small-sized water conservancy assets and a water conservancy project management system for flood control, drainage and other purposes. All these water conservancy projects can effectively safeguard the safety of

the county’s economy and society and promote the sustainable development of the agricultural production in the face of flood, drought and other natural disasters. Therefore, they are linchpin for the protection of land resources and the improvement of the ecological environment. However, these small-sized water conservancy projects have some problems in terms of their internal management. For example, the lack of proper maintenance and protection has directly resulted in the reduction of the profits of the small-sized water conservancy projects. The poor management of some small-sized water conservancy projects even poses a great threat to the safety of national economy and people’s life and property.

2.2.2. Principles of the Management System Reform

Firstly, the relationship between social and economic benefits must be clarified to effectively reduce the operation cost of the small-sized water conservancy management under the prerequisite of maximizing the economic and social benefits. Secondly, the management system of the property right should be identified and the relation among responsibilities, interests and rights should be properly handled. In this paper, the author made clear the responsibilities and rights of the government and the water conservancy management units according to the nature of the small-sized water conservancy project management. Thirdly, ecological harmony should be made a rule to be strictly followed. Finding the rules of nature and social and economic development, properly developing and effectively utilizing water resources and effectively optimizing and protecting water resources should also be promoted. In addition, the investment should be increased on a regular basis along with the guarantee of public finance for the development of the water-related undertakings, and the social capitals’ participation in the construction of water-related infrastructure should be advocated to form a pattern where the government and the public work together to improve water conservancy projects [8]. Moreover, the relationship between the development and stability, and short-term goal and long-term goal of the small-sized water conservancy assets management should be correctly handled. More efforts should be made not only to achieve the reform objectives of the small-sized water conservancy management system, but also to bring benefits in the management benefits

of the water conservancy projects, thus contributing to the virtuous circle of China's ecological environment and the society's coordinated development.

2.2.3. Reform Objectives of the Small-sized Water Conservancy Management System

Initially, the requirements of the county-level small-sized water conservancy project's management were put forward and the management mechanism and operation mechanism of the small-sized water conservancy projects were formulated according to the balance of the ecological environment. Secondly, the county-level small-sized water conservancy project management was made prompt to achieve maximum social benefits and a complete network management system was proposed. Thirdly, a society-based, professional and market-oriented management and maintenance system for the small-sized water conservancy projects and a scientific operation mechanism for the small-sized water conservancy project management system were established. Only when long-term strategic goals are established, the county-level small-sized water conservancy project management can achieve the maximum social and economic benefits.

3. MEASURES TAKEN FOR THE REFORM OF THE COUNTY-LEVEL SMALL-SIZED WATER CONSERVANCY PROJECT MANAGEMENT SYSTEM

3.1. Intensify the Construction of the Basic Flood Control Projects and Standardize the Management

Firstly, the construction efforts of the basic flood control projects were enhanced, and a new round of the small-sized water conservancy project construction was conducted to promote the construction of the Huaihe River project and to effectively improve the 50-year project to renovate the Huaihe River. The county-level small-sized water conservancy project management system was standardized and various management institutions were held accountable for the small-sized water conservancy project management. These management institutions are mainly responsible for monitoring maintenance and safe operation of the small-sized water conservancy projects and the use and management of the funds for these projects. Besides, the construction efforts should be intensified to improve the infrastructure for flood control, drainage and other purposes in accordance with the quarterly reinforcement plan of the Huaihe River's embankment stipulated in the 50-year treatment project, and the standards of the county-level flood control and drainage were also enhanced. Besides, in line with the principle of "separating public service and enterprise affairs from the government," the government should transform its function to effectively improve the management style and level. Last but not the least, units and personnel should take up their responsibility of maintenance and management of water conservancy projects in line with the government and the new water conservancy project management system to ensure maximum economic and social benefits of the small-sized water conservancy project management.

3.2. Dividing the Management Rights

The author is of the view that the management rights should be divided among the small-sized water conservancy

project management institutions as many as possible and capable units or experienced operations should be made for the management task by cooperative selling, contracting and renting. This can effectively ensure not only the original value of the state-owned assets, but also the due benefits of the small-sized water conservancy projects. The small-sized water conservancy projects under the county-level management include the ongoing projects, small-sized reservoirs, village and town water supply projects, irrigation stations of more than 500 kilowatts, comparatively large river treatment projects, state-invested small basic projects, state-delivered water conservancy devices and materials, etc. The water conservancy projects under the village-level management include small-sized reservoirs, small reservoirs in the important hilly area, village water supply projects, small water-course treatment projects, small basin treatment projects and 500~1,000 mu irrigation projects. The small-sized water conservancy projects under the residential committee include small reservoirs in the hilly area, independent reservoirs and natural village water supply projects. The small-sized water conservancy projects under the individual management include irrigation projects smaller than 100 mu, contracted small basin treatment projects and self-established and self-operated small-sized water conservancy projects.

3.3. Promotion of the Water-related Affairs Management System in an All-around Way

Firstly, the nature of the small-sized water conservancy projects was accurately distinguished, and the types of the management systems were classified to establish a complete management system and operation mechanism. The government financial departments of all levels allowed the private and official philanthropic management units to share the maintenance fees according to the requirement of the level-to-level management. Secondly, the water rate reform of the small-sized water conservancy projects was actively reported. Moreover, the adjustment effect of the water rate was properly achieved to promote water conservation and effective adjustment of the industrial structure. Thirdly, the training related to the maintenance of the water-related projects was enhanced for complete water-related project maintenance and proper repair system. Moreover, the rate of the water for the life use of urban dwellers was properly adjusted. The establishment of the system of capacity water rate and measurement of water rate was proactively promoted and price policies encouraging water recycling and reuse of the recycled water were also introduced [9]. The enhancement of infrastructure construction, including the monitoring of the water-related project safety and automatic control system, can greatly improve the automatic and informatized level of the management and effectively ensure the sound operation of the water-related projects. Last but not the least, various levels of financial departments in China should give proper amount of subsidies for the operation and management of the fees of the agricultural irrigation projects to alleviate the farmers' burden.

3.3.1. Comprehensive Coordination and Improved Quality and Effect

Firstly, the conflicts between the water management departments and the stakeholders were analyzed comprehensively and government subsidy was provided. The stake-

holders of the county-level small-sized water conservancy project management were distributed in different areas significantly different from each other. Thus, the conflicts between them were well coordinated. The government should adopt every means to ensure stakeholders in different areas to obtain the same profits in accordance with the principle of fairness and justice. Secondly, the reform of the county-level small-sized water conservancy management was accelerated by rewarding the units and individuals achieving remarkable results in the name of the party committee and the government of all levels [10]. The water conservancy management units should enhance the popularization of scientific knowledge related to the disaster prevention of the small-sized water conservancy projects, sharpened Suqian people's awareness of the water disasters and water protection and extensively mobilized the social forces to participate in the construction of water-related undertakings. At the same time, the water-related project management should be included in the scope of public welfare publicity with a favorable opinion atmosphere established for water-related affairs to accelerate the reform of the small-sized water conservancy project management system.

3.3.2. Enhancement of the Safety Monitoring of the Water Conservancy Projects and Promotion of the Construction of the Rural Drinking Water Safety

First, a high quality team should be organized to be responsible for the monitoring work safety of the county-level small-sized water conservancy projects on a regular basis. In this way, potential dangers can be diagnosed immediately. Secondly, the safety of the rural drinking water and, the management of the county-level water supply should be enhanced with extended water supply to fully solve the issue of rural drinking water safety. Thirdly, the monitoring mechanism of the county-level small-sized water conservancy project management should also be established. Departments of various levels came up with a solution plan for the smooth operation of the small-sized water conservancy projects according to the local conditions. Once some dangerous reservoirs are discovered, they should be immediately repaired. In addition, the monitoring of the protection of water resources and drinking water safety should be increased and the emergency management of both should also be considered. The government should carefully implement the preferential policies of the rural drinking water safety project and promote the rural food safety.

CONCLUSION

To sum up, this paper analyzed the basic situation of Suqian County in Jiangsu Province and the status of the water conservancy management system. Based on the analysis, the author pointed out the factors to reform the county-level small-sized water conservancy project management system, enhance the concept of the system reform and unify the re-

form ideas. Specifically, to promote the reform of the county-level small-sized water conservancy projects, municipal departments of various levels should unify their ideas, catch up with the time and lay a solid foundation for making great breakthroughs in the development path of Suqian County and building Suqian County a comparatively well-off society. Besides, the government should mobilize various active social forces based on the practical situations of the projects to achieve diversification, socialization, enterprization and marketization of the management system and materialize the social profits of the small-sized water conservancy projects.

CONFLICT OF INTEREST

The author confirms that this article content has no conflict of interest.

ACKNOWLEDGEMENTS

Declared none.

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