

Objectives and Tasks of Water System Governance in Healthy City of Shandong Province

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Abstract. “Water system governance” is a state of advanced development that is advancing with the times in the process of water conservancy development. It is a stage-by-stage development that continues to evolve with the progress of modern society. It is an important part of agricultural modernization, national economic modernization and social modernization, and is a stage of modern water conservancy development. How to determine the overall goal of water system governance in Shandong Province from the perspective of healthy city? How to combine qualitative and quantitative in evaluation? What are the main tasks to achieve water system governance? This is the issue we are currently going to discuss urgently.

1. Overall objective

The construction of "Healthy City" has been paid more and more attention in China. Many scholars study healthy cities from the viewpoint of healthy city concept, identity and culture formation.[1-4] Comprehensive scholars on the study of healthy cities, we can give a simple summary of healthy cities. The so-called healthy city refers to people-centered in all aspects of urban planning, construction and management. It constantly expands social resources so that people can support each other in terms of enjoying life and realizing their full potential.[5-7]The Chinese government attaches great importance to the construction of healthy cities and provides a solid policy foundation. At present, a system of government-led, departmental cooperation and social participation has been established.[8] Accompanied by the construction of healthy cities, urban water system management has also become the focus of attention. Especially for Chinese cities, the governance of urban water is more severe, so a large number of related studies have emerged. In recent years, the research results show that the main focus on urban water environment and water pollution control.[9-10]In the rapid urbanization, urban water pollution is considered by scholars as the key issue in current large and medium-sized cities.[11]However, it is important to point out that the connotation of healthy urban and water system governance is far more abundant than that of water pollution control.

Under the vision of a healthy city, the overall goal of water system governance in Shandong Province is guided by the scientific concept of development. The goal contains several principles: due to water system, livelihood priority, reform and innovation, government-led. On this basis, the specific content of the goal is to speed up the reform and development of water conservancy in Shandong Province, and strive to fundamentally reverse the water conservancy construction in Shandong lags far behind the economic and social development through 10 years of efforts. By 2020

basically realize the modernization of water conservancy. And earnestly guarantee the food security, economic security, ecological security and social security in Shandong Province.

2. Evaluation index of water system governance in Shandong Province from the perspective of healthy city

As a process of achieving the objectives of the phase, the water system governance involves a wide range of aspects and should have a set of scientific and reasonable evaluation methods. However, it is difficult to evaluate comprehensively only by means of qualitative or quantitative indicators. Therefore, this study uses the combination of qualitative and quantitative methods to evaluate the governance system of water system in Shandong Province. It is hard to summarize the whole picture of modern water conservancy without qualitative indicators. Without quantitative indicators, it can not reflect the main features and signs of modern water conservancy, but not conducive to assessment and evaluation. To this end, proposed water conservancy modernization evaluation index system.

2.1. Qualitative indicators

There are six qualitative indicators.

First, a fully functional modern water network. The water network is basically completed, the density of the water network and the connectivity of the water system reach a high level, and the functions of water supply, flood control and ecology are complete and the intelligence level is high.

Second, strong flood control and drought mitigation capabilities. The ability of flood control, drought relief and disaster reduction of the whole society has reached a high level, capable of coping with extreme weather conditions and being able to withstand sudden and extraordinary floods and droughts.

Third, good water ecology and water environment. Water ecological environment and water environment have been fundamentally improved, drinking water safety in urban and rural areas has been guaranteed, water pollution control has been achieved, water functional zones have achieved high standards and water and soil loss have been basically managed.

Fourth, advanced water-saving society. The establishment of a sound water-saving social system, water efficiency at or near the level of developed countries, the general public awareness of water-saving.

Fifth, improve the mechanism and system of water system. Water conservancy system and sound system, the most stringent water resources governance system has been implemented, all water affairs can be law-based, scientific and technological development of water conservancy has been effectively protected.

Sixth, a strong water science and technology support capabilities. Water conservancy science and technology reached or approached the level of medium-sized developed countries, high contribution rate of science and technology innovation.

2.2. Quantitative indicators

2.2.1. Modern water network indicators

The construction of a modern water network uses the density of the water network as the evaluation index, which refers to the length of the water network within the unit drainage area.

2.2.2. Flood control and drought index

First, flood safety index refers to the comprehensive protection capacity of flood control and disaster reduction system for flood protection objects, including both engineering measures and functions as well as flood control effects of non-engineering measures. Second, the loss rate of floods and droughts refers to the proportion of floods and droughts in the national economy.

2.2.3. Water indicators

First, the total amount of water. With the rapid social and economic development, the whole society will continue to rise in water demand. To this end, we must control the total amount of water in society. In addition, encouragement is given to the use of unconventional water resources to optimize the structure of water supplies.

Second, water efficiency. The whole society water efficiency uses 10,000 yuan GDP to reflect. That is, the amount of water that needs to be used for every 10,000 yuan GDP generated.

Third, domestic water. Domestic water use of urban water-saving appliances and popularization rate of urban and rural water supply to reflect. Among them, the prevalence of water-saving appliances in urban life, refers to the urban population, the proportion of the population of water-saving appliances to the total population. Urban and rural water supply penetration, it refers to urban and rural residents to enjoy the water quality requirements of tap water supply and centralized water supply population as a percentage of the total population.

Fourth, industrial water. Industrial water efficiency uses 10,000 yuan industrial added value of water to reflect. That is, the amount of water that needs to be taken up for every 10,000 yuan of industrial added value produced.

Fifth, agricultural water. Agricultural water use is mainly reflected by the effective irrigation area and irrigation water utilization coefficient. The former refers to the basic facilities supporting irrigation projects, and the water supply guarantee rate of 75% can reach the irrigation area; the latter refers to the ratio of the amount of water needed to supply crop water into the field and the total amount of water introduced into the canal.

Sixth, urban water supply. It uses water supply network leakage rate and water supply water quality compliance rate to reflect. Among them, water supply network leakage rate refers to the proportion of water lost in the water supply process to the total water supply; water supply water quality compliance rate refers to the proportion of water sources to drinking water quality standards.

2.2.4. Water environment indicators

Water environment use water functional area compliance rate, soil erosion control rate and plain area groundwater over-extraction rate to reflect. Among them, water functional area compliance rate refers to the proportion of water functional areas to meet the corresponding functional requirements of water quality; soil erosion control rate refers to the ratio of the area of water and soil loss that has been managed to the total area of water and soil erosion; plain area groundwater over-extraction rate refers to the ratio of overdraft and recoverable amount of groundwater.

2.2.5. governance indicators

We choose improvement rate of laws and regulations and water governance institutions improve the rate of construction to reflect. Improvement rate of laws and regulations refers to the number of established and implemented regulations and systems to achieve the total amount of the establishment of the implementation of the system of laws and regulations; water governance institutions improve the rate of construction refers to the number of water governance agencies that have been constructed to achieve the total amount of water governance agencies should be established.

2.2.6. Technology, education capacity indicators

In terms of science and technology and education, we use the Information index and the proportion of college graduates to reflect. Information index refers to the level of water information index has reached the level of planning or setting. The proportion of college graduates refers to the proportion of persons with college education or above in the total number of water conservancy workers.

Table 1 shows the quantitative targets of water system governance in Shandong Province from the perspective of healthy city.

3. Core tasks

In order to realize the goal of Shandong Province's water system governance under the vision of a healthy city and to promote the development of modern water conservancy, we should focus on the following tasks considering the current outstanding problems.

3.1. Strive to strengthen the connectivity of rivers and lakes as the main modern water network construction

We use Shandong section of East Route of South-to-North Water Diversion Project and Jiaodong water transfer project constitute the "T" font water transfer artery as the skeleton. Local cities and counties planning and construction of local water network as a context. By reservoirs, lakes, canals connectivity, completely changed the view on the matter. We will gradually build a modern and intelligent water network that integrates urban and rural development, has both storage and discharge, and has complete functions. So as to truly achieve the province's surface water, groundwater, rain water and the Yangtze River water, the Yellow River water transfer and other water dispatching and optimal allocation of configuration. Really make the potential of water into a practical and available water resources.

Table 1. List of main quantitative indexes of water system governance in Shandong Province from the perspective of healthy city.

Category	Indicators	2020 goal
Modern water network indicators	Water network density(km/km ²)	0.30
Flood control and drought index	Flood safety index (%)	60
	Drought loss rate (%)	0.008
Water indicators	Total water consumption (100 million m ³)	-
	Million yuan GDP water(m ³ ten thousand yuan)	60.0
	Urban life water-saving appliances penetration rate (%)	85
	Urban and rural water supply penetration rate (%)	100
	10,000 yuan industrial added value of water (m ³ /ten thousand yuan)	11.0
	Farmland effective irrigation area (Million acres)	8000
	Irrigation water use factor	0.65
	Urban water supply network leakage rate	8.0
	Water source water quality compliance rate (%)	100
	Water functional area compliance rate (%)	70
Water environment indicators	Soil erosion control rate (%)	80
	Plain area groundwater overdrawn rate (%)	20
	Improvement rate of laws and regulations (%)	95
governance indicators	Water governance institution construction and improvement rate (%)	95
	Water Information Index (%)	90
Technology education capacity indicators	Percentage of college or above (%)	91

In order to do this, first, based on the eastern route of the South-to-North Water Diversion Project in Shandong Province and the water diversion project such as Jiaodong Water Transfer Project, it will promote the construction of the Shuhe Eastward Transfer Project. Plan Yihe-Shuhe flood northward transfer project, to further improve the province's backbone network. The second is to speed up the pace of regional water network construction, the implementation of reservoirs, rivers, channels of connectivity. The third is to speed up the construction of water supply and drainage network. Through the above project construction, the effect of complementing the backbone with the regional water network will be achieved.

3.2. Strive to improve flood control, drought mitigation capacity

The ability to improve flood control, drought mitigation and disaster reduction needs to follow some principles. For example, pay attention to disaster prevention while paying attention to prevention, concerned about the impact of disasters and their causes, engineering and non-engineering measures are combined. Therefore, we should continue to strengthen the weak links in flood control and drought relief, raise the standard of urban flood control and drainage, comprehensively improve flood control and drought relief capacity, and minimize flood and drought losses. Based on strengthening dangerous waters, give prominence to river governance. We should give prominence to river training based on the reinforcement of dangerous water areas such as reservoirs, ponds and sluices at risk. For rivers in areas prone to densely populated areas and floods, there should be stronger governance. And rivers with a catchment area above 200 square kilometers must meet the flood control standards set by the state. Different conditions for the rivers and lakes, we have to take different control measures. For example, science fortification, make the best use of the situation, according to local conditions to take heightening reinforcement and new dikes, river dredging, river control, revetment slope protection and other measures.

3.3. Efforts to build optimal allocation of water resources project

Completed on schedule South-North Water Transfer, Jiaodong water transfer project. Accelerate the construction of supporting projects and a number of regional deployment of water projects, water storage projects, rain and flood utilization projects. And as soon as possible to achieve the Yangtze River water, the Yellow River water and the local surface water, groundwater optimal allocation and joint scheduling. First of all, we must continue to promote water source construction. According to the situation on the ground, respectively, in plains, hills, estuaries, the Gulf and other regions to establish reservoirs. Second, we need to improve the water supply network project. In particular, we should strengthen the urbanization of rural water supply and the integration of urban and rural water supply. Finally, speed up the construction of water purification treatment project. According to the characteristics of water sources and water quality throughout the province, the demand for centralized water supply in cities and rural areas, the construction of water purification treatment works to ensure the safety of drinking water and the optimal utilization of multiple water sources to achieve "excellent water superiority".

4. Conclusions

Under the view of healthy city, the system of water system governance in Shandong Province is a stage process of modern water conservancy development. Its goal is to strive through 10 years of efforts to fundamentally reverse the construction of water conservancy in Shandong lags far behind the economic and social development. We will earnestly guarantee the food security, economic security, ecological security and social security in Shandong Province and basically realize the modernization of water conservancy by 2020. In order to achieve the above objectives, the foundation and core are efforts to strengthen the construction of modernized water networks.

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