Research on construction of Water-saving Society in Source District of Qiantang River——a Case from Changshan County

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Abstract. Changshan County is located in source District of Qiantang River. As a water-rich area in the province, it is the first to explore the creation of a water-saving society. Under the systematic analysis of the Changshan County area, the goal of creating a water-saving society is proposed. The analysis of the construction results can be the source of the Qiantang River. Building a water-saving society to provide practical management experience and technical methods is of great significance to the practical value and leading role of water-saving society construction

1. Introduction
Changshan County is located in Quzhou City, western Zhejiang Province. It belongs to the source area of Qiantang River and is the ecological barrier of Zhejiang. It is responsible for the economic development and protection of the ecological environment. Its ecological protection and construction are not only the demand for sustainable development, but also the economic and social sustainable development of the middle and lower reaches of the Qiantang River. It is related to the ecological environment safety of about half of the province.

In view of the development expectation of Changshan County during the "13th Five-Year Plan" period, whether it is economic and social development to promote industrial transformation, or the improvement of residents' living standards, the ecological environment will lead the way, and all of them propose water-saving and emission reduction, water resources security, and water environment improvement. Higher requirements.

Fully implement the five development concepts put forward by the Fifth Plenary Session of the 18th CPC Central Committee and the strategic plan of the provincial party committee to build the "two beauty" Zhejiang, in accordance with the new water management policy of "water saving priority, space balance, system governance, and two-handed efforts". Based on the work of “five-water joint governance”, Changshan establish and improve the most stringent water resources management system as the core. It is important to lead and perfect the water-saving supervision and evaluation mechanism, focus on the development strategy of “strength industry, leisure city, beautiful village”, promote economic and social development and adapt the water resources and water environment carrying capacity, and provide water resources support and guarantee for building a well-off society at a high level.
2. Regional characteristics

2.1. Water resources and water environment characteristics

The average annual water resources of Changshan County is 1.285 billion m$^3$, of which the surface water resources are 1.285 billion m$^3$, the groundwater resources are 275 million m$^3$, and the surface water and groundwater repeats are 275 million m$^3$. According to the resident population, the per capita water resources in Changshan County are 4,525 m$^3$, which is more than twice the per capita water resources in Zhejiang Province.

According to the results of the “Water Environment Functional Zone Division Plan of Zhejiang Water Functional Zone”, there are 11 water function zones in Changshan County. As the ecological barrier of the Qiantang River source area, it is the current water function zone compliance rate of 100%.

2.2. Water supply characteristics

In 2017, the total water consumption of Changshan County was 130.11 million m$^3$. Among them, farmland irrigation water is 0.7383 billion m$^3$, accounting for 56.7%; forest animal husbandry and fishery water is 0.0285 billion m$^3$, accounting for 2.2%; industrial water is 0.325 billion m$^3$, 25.0%; urban public water is 0.0672 million m$^3$, accounting for 5.1%; ecological environment water consumption is 0.02 billion m$^3$, accounting for 1.8%. It can be seen that the water use in Changshan County is agricultural and industrial water, accounting for 81.7% of the total water consumption. Therefore, it is necessary to dig deep into the water-saving potential of agricultural and industrial water.

According to the results of the 2012-2017 Quzhou Water Resources Bulletin, the annual water consumption of various industries in Changshan County is shown in Table 1.

Table 1 Annual water consumption of various industries in Changshan County (unit: billion m$^3$)

| years | Agricultural water consumption | Industrial water consumption | Comprehensive water consumption | Ecological and environment water consumption | Total Water consumption |
|-------|--------------------------------|-----------------------------|---------------------------------|----------------------------------------------|-------------------------|
|       | Farmland irrigation water      | Fishery and livestock water | Subtotal                        | Urban public water                           | Household water         | Subtotal                | Ecological and environment water consumption | Total Water consumption |
| 2012  | 0.7118                         | 0.3418                      | 1.0536                          | 0.5349                                       | 0.0376                  | 0.1635                  | 0.2014                                      | 0.0134                        | 1.8030                        |
| 2013  | 0.6424                         | 0.3400                      | 0.9824                          | 0.5008                                       | 0.0373                  | 0.1617                  | 0.1990                                      | 0.0123                        | 1.7245                        |
| 2014  | 0.6195                         | 0.2310                      | 0.8505                          | 0.5371                                       | 0.0970                  | 0.1137                  | 0.2107                                      | 0.0378                        | 1.6361                        |
| 2015  | 0.6256                         | 0.0656                      | 0.6912                          | 0.4660                                       | 0.0970                  | 0.1126                  | 0.2096                                      | 0.0262                        | 1.3904                        |
| 2016  | 0.8055                         | 0.0285                      | 0.834                           | 0.3665                                       | 0.0644                  | 0.1148                  | 0.1792                                      | 0.0235                        | 1.4032                        |
| 2017  | 0.7383                         | 0.0285                      | 0.7668                          | 0.3250                                       | 0.0872                  | 0.1181                  | 0.1853                                      | 0.0240                        | 1.3011                        |

(1) Total water consumption: Since 2012, the total water consumption of Changshan County has basically kept decreasing year by year. On the one hand, it should be related to the implementation of the most stringent water resources management system, and on the other hand, it is related to the large amount of precipitation in the past three years.

(2) Agricultural water consumption: Agricultural water consumption is affected by rainfall, and the annual variation is relatively large, but the overall trend is basically stable.

(3) Industrial water consumption: Due to water-saving renovation, industrial transformation and upgrading, the industrial water consumption of Changshan County has generally shown a downward trend. 2017 was 39% less than in 2012.

(4) Domestic water consumption: The domestic and urban water consumption of urban and rural residents has been declining year by year. It should be related to the transformation of water supply pipe network and the promotion of water-saving appliances. Urban public water consumption
fluctuated greatly in 2015 as the median line. It showed an increasing trend before 2015. After 2015, a decrease may be related to changes in statistical caliber.

2.3. Economic structure characteristics
From 2010 to 2015, Changshan County's GDP grew at an average annual rate of 7.96%. Among them, the primary industry showed a slow increase trend, with an average annual increase of 5.15%. The secondary industry experienced significant growth in 2010~2013. After 2013, the growth rate slowed down significantly, with an average annual growth rate of 5.83%. The tertiary industry grew significantly. The average annual growth rate is as high as 11.28%. Changshan County takes "strength industry, leisure city, beautiful village" as its strategy, strengthens green GDP as the guideline, strengthens the industrial environment requirements, and forms an industrial structure system featuring building materials, bearings, calcium, chemicals, food and textiles.

2.4. Water consumption concept
As a water-rich area in the province, Changshan County has insufficient understanding of the importance and urgency of water conservation. There is not enough understanding of the idea that water conservation is to reduce emissions, water conservation is to protect and improve water ecological environment, and water conservation is beneficial to people's livelihood. Therefore, in order to effectively and effectively benefit the water-saving work, it is necessary to carry out a wide range of propaganda and guidance work, establish and improve the public participation mechanism, and strengthen public awareness of water conservation.

3. Overall objective
Focusing on the comprehensive development strategy of “strength industry, leisure city and beautiful village” in Changshan County, in accordance with the guiding ideology and basic principles, through the water-saving society, “establish a management system and working mechanism, improve and perfect a batch of management systems, and build a The overall objectives of the batch of typical demonstration projects, innovative water-saving systems, and the completion of five indicators are as follows:

(1) Establish a management system and working mechanism: establish a set of government-led, departmental division of labor, and the whole society to participate in the construction of a water-saving society management system and operational mechanism to achieve a long-term water-saving society and the most stringent water resources management work Orderly operation.

(2) Improve and improve a number of management systems: In accordance with the requirements of “water saving priority, spatial balance, system governance, and two-handed efforts” in the new era of water management and the most stringent water resources management system, we will continue to implement a number of management systems and improve one. The batch management system was formulated and a batch of management systems were formulated to promote the comprehensive and orderly implementation of the "three red lines".

(3) Establish a number of typical demonstration projects and water-saving carriers: continue to promote industrial restructuring, transformation and upgrading, and water-saving transformation of industry and agriculture around industrial, agricultural and domestic water, and build a number of typical demonstration projects and water-saving models. Enterprises, water-saving irrigation districts and water-saving public institutions.

(4) Innovative water-saving system: In accordance with the requirements of ecological civilization construction, explore the research on water ecological compensation system.

(5) Completion of five indicators: In 2019, the construction of water-saving society in Changshan County was achieved - the total water consumption was controlled below 180.3 million m³, and the domestic and industrial water consumption was below 0.911 billion m³. The water consumption per 10,000 RMB of GDP was lower than that in 2015. 24%, the industrial added value of water consumption decreased by 28% compared with 2015, and the effective utilization coefficient of
farmland irrigation water increased to 0.529.

4. Working ideas

Working ideas for the creation of water-saving society in Changshan County:

Focusing on the overall situation and defining the core requirements for safeguarding measures for water-saving society construction, that is, establishing a management system and working mechanism, establishing a leading group, rationally dividing the division of labor, and implementing the liaison officer system, so that there are plans at the beginning of the year and Supervise and summary at the end of the year, and formulate measures for the introduction of inspections, and strictly enforce them to ensure the smooth development of water-saving society.

Grasp the grasp and carry out the specific tasks of the three aspects: 1 The system saves water and improves and perfects a batch of management systems, including 10 water supply permit and water resources argumentation system, and the construction project water conservation “three simultaneous” system and other 10 management systems and related work To ensure that water-saving measures will be effective for a long time; 2 technical water-saving means to build a number of typical demonstration projects and water-saving carriers, to carry out water-saving transformation of industrial enterprises, pipe network renovation and other engineering construction and water-saving irrigation district water-saving enterprises With the construction of carriers, the water-saving work will be promoted in a comprehensive way. 3 The water-saving mechanism of consciousness is the innovative water-saving system. By establishing the water ecological compensation mechanism and exploring the research on the water rights system of the industry, the benefits of water-saving work will be expanded and the whole society will be encouraged to participate. The enthusiasm of water-based society construction has enabled the implementation of water-saving systems and water-saving technologies to be widely understood by the public and widely supported by society.

5. Summary of the achievements and experience of water-saving society construction

(1) Management system and working mechanism construction

Changshan County has improved the water-saving society construction leading organization. In July 2016, the county government issued official documents to establish a water-saving society construction work leading group. The deputy magistrate is the head of the group, and the member units include more than ten relevant departments, responsible for coordinating and coordinating relevant work in the construction of a water-saving society. At the same time, in order to ensure the effective implementation of all aspects of water-saving society construction, the Changshan County Water-saving Society Leading Group formulated and issued an annual work plan at the beginning of the year. The leading group decomposed the annual work tasks into various departments through regular meetings and issued them as documents. All relevant departments and units; the Office of the Leading Group for Water-saving Society Construction of Changshan County is responsible for supervising the completion of the work tasks in the middle of the year, and forming an inspection report to ensure the timely completion of all tasks in the year; The work task plan is organized by the Changshan County Water-saving Society Construction Leading Group Office to organize member units to hold year-end assessment meetings. Each responsible unit submits feedback on the completion of work tasks to the Leading Group Office according to the plan issued at the beginning of the year. The Office of the Leading Group is responsible for organizing the review of the completion of the annual work tasks and assessment objectives, and forming a year-end summary.

(2) Improve and improve the management system

Changshan County further implemented the adjusted urban water supply price according to the Notice of the Changshan County People's Government Office on Printing and Distributing the Comprehensive Reform Plan for Urban Water Supply Price in Changshan County, and carried out the water management of non-residents in the pipeline network; Changshan County The Notice on Accelerating the Reform and Upgrading of the Industrial Economy (Trial), further improving the support mechanism, optimizing the development environment, accelerating the transformation and
upgrading of the industrial economy, and rewarding 150,000 enterprises that have won the title of “Zhejiang Water-saving Enterprise” Yuan; for the enterprise that completed the water balance test, a one-time subsidy of 80,000 RMB was given. At the same time, Changshan County also issued the "Changshan County Plan Water and Quota Management Measures", "Changshan County Urban Water Conservation" Three Management Measures, and "Changshan County Energy Conservation Special Fund Management Measures" and other management measures, forming a set of savings Water-saving work system for water, water resources management, water supply, drainage, and water management. It provides a strong policy and institutional guarantee for creating work and water saving work.

(3) Water-saving carrier construction
1. Water-saving irrigation area
   Based on the existing foundations, implementation conditions, typicality and representative factors, the water-saving irrigation district construction standards required by the “Zhejiang Water Resources Department and the Zhejiang Provincial Water Conservation Office's Notice on the Establishment of Water-saving Irrigation Districts” Changshan County selected Changshan Qianhong Irrigation District (Gongchuan, Tongling Area) and Changshan Shizikou Reservoir Irrigation District (Zijiang Area) irrigation area to create water-saving irrigation areas, which have been completed and awarded “Zhejiang Province”. Water-saving irrigation area (park, filling film) title.

2. Water-saving enterprise
   There are 6 enterprises in Changshan County currently belonging to the seven key water-using industries. In 2016-2017, 7 companies completed the water-saving type. The company was awarded the title of “Zhejiang Water-saving Enterprise” and “Quzhou Water-saving Enterprise”, among which 4 enterprises belonged to seven key water-using industries, and the completion rate of water-saving enterprises in key water industry has reached 66.7%.

3. Public institution water saving unit
   Changshan County has a total of 50 county-level government agencies and 102 subordinate institutions (county-level). By the end of 2017, 72 water-saving public institutions (50 institutions, 22 businesses) have been completed, and the water-saving coverage rate of public institutions is 47.37%.

4. Water saving type community
   There are 28 property management districts in Changshan County. According to the establishment criteria of provincial water-saving communities, Xingyuewan Community has been named as a water-saving community in 2017. The current water-saving community coverage rate is 3.57%.

(4) Water saving system innovation
   According to the “Implementation Opinions on Establishing Compensation Mechanism for Horizontal Ecological Protection of Upstream and Downstream Basins in the Province”, Changshan County took the lead in carrying out the compensation for the horizontal ecological protection of the upper and lower reaches of the basin, and successively signed the “Landscape Protection of the Upper and Lower Reaches of Qiantang River” with Quzhou City and Kaihua County. The Compensation Agreement will integrate the water quality and water quantity water efficiency into the horizontal ecological compensation mechanism evaluation index system, and calculate the water quality compensation index according to the monitoring results of the surface water environment automatic monitoring station of the administrative section of the upper and lower administrative areas in the previous year. The water consumption and water efficiency compensation index of the water quantity in the previous year was measured. Comprehensive water quality and water quantity compensation index will form an annual horizontal ecological compensation index. Through the joint efforts of water quality and water quality, we will ensure that the water environment quality of the Qiantang River Basin is stable and the water use efficiency and efficiency continue to improve.

(5) Indicator completion
   According to the 2017 Water Resources Bulletin of Quzhou City, the total water consumption of Changshan County is 130.11 million m$^3$; the industrial and domestic water consumption is 0.5746 billion m$^3$; the water consumption per 10,000 RMB of GDP is 100.13 m$^3$/million, compared with 2015 (126 m$^3$/10,000). The decrease was 20.53%; the industrial added value of 10,000 RMB was
75.79m$^3$/10,000 RMB, down 24.96% from 2015 (101m$^3$/million); the effective utilization coefficient of farmland irrigation water was 0.521, and the most stringent water resources management system assessment in 2016 and 2017 was obtained in Changshan County. Excellent, the city ranked first.

6. Conclusion
This paper analyzes the characteristics of regional water resources in the upper reaches of Qiantang River by taking Changshan County as an example, points out the overall goal and working ideas of water-saving society construction in Changshan County, and puts forward the work experience and achievements of water-saving society construction in Changshan County. Strengthen management system and work mechanism; improve and improve management system; vigorously promote water-saving carrier construction; actively explore water-saving system innovation.

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