Water saving situation in southern water rich areas in the new era and research on implementing national water saving action
Taking Haining as an example

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Abstract. Haining City is one of the top 100 counties in China's county economy. In 2020, Haining City ranks 19th among the top 100 counties in China's county economy, and is a strong economic County in Jiaxing City and even Zhejiang Province. The implementation of national water-saving action proposed in 2019 is not only the embodiment of the national will, but also the only way to solve the bottleneck of water resources and water security. It is of great significance to implement the national water saving action to improve the level of intensive utilization of water resources, to support the high-quality development of economy and society and to serve the construction of ecological civilization in Haining. At present, the water-saving work in Haining City is faced with a series of problems, such as the lack of water-saving awareness, the lack of water-saving work breadth and depth expansion. Based on the full analysis of the current water-saving situation in Haining City, the "1536" water-saving policy system and work system with Haining characteristics are put forward.

1. Introduction
The construction of water-saving society is a long-term strategic task and a fundamental way to solve the problem of water resources in China. The 19th National Congress of the Communist Party of China put forward the strategic decision of implementing the national water-saving action, taking water-saving and emission reduction as an important measure to promote the optimization of economic structure and the construction of ecological civilization [1] [2] [3]. It has become an important task for China's water control work in the new period to implement the water control policy of "water saving priority, spatial balance, systematic management, two hands" and build a water-saving society in an all-round way. On September 18, 2020, general secretary Xi Jinping emphasized again at the Symposium on ecological protection and high quality development in the Yellow River River Basin. We must emphasize that we should adhere to the principle of "setting the city with water, setting the water in accordance with the water, setting people in water, setting the production with water", "taking the water resources as the biggest rigid constraint", and implementing the whole society's water-saving action. Haining City is a resource-based and water-based water shortage area, and the contradiction between supply and demand is relatively prominent. Therefore, Haining City carried out the construction of water-saving society in 2013, and achieved great success in four aspects: organization guarantee, system construction, demonstration project construction and water-saving...
carrier construction. In December 2015, Haining successfully established the first batch of water-saving society counties and cities in Zhejiang Province. In November 2019, it was successfully selected into the second batch of counties (districts) in China that have reached the standard of water-saving society.

However, compared with "national water saving action" and "Zhejiang water saving action implementation plan", there are still some problems in Haining City, such as unbalanced water-saving level, imperfect water-saving system and mechanism, few water-saving hands and inadequate development of water-saving industry. Therefore, Haining put forward the "implementation plan of water saving action in Haining City", aiming at building an international and quality-oriented city in the Yangtze River Delta, focusing on further improving the water resources carrying capacity of the city, accelerating the construction of water saving projects through deepening and improving the system and mechanism, strengthening and improving the management system, and striving to be the vanguard of water control ideas in the new era, Strive to be at the leading level in the province's water-saving work.

2. Current Situation of Water Saving in Haining City

2.1. Water Resources in Haining City

Haining is located in the north of Zhejiang Province, the North Bank of Qiantang River, east of Shanghai, west of Hangzhou, is one of the five counties and cities in Jiaxing City. With a total area of 862.74 square kilometers, the city has eight towns, four streets and three provincial development zones under its jurisdiction, with a permanent population of 107.62 million, with a GDP of 103.078 billion yuan in 2020.

Haining has a dense river network and developed water system, involving the Qiantang River, Canal and Shangtang River. There are 5151 river channels with 1963 kilometers. The average annual total water resources in Haining is 384 million cubic meters, and the per capita water resources occupancy is 360 cubic meters, which is about a quarter of the per capita water resources in the whole province. With the development of Haining's economy and society and the advancement of the construction of water ecological civilization, the dual crises of resource-based and water-quality water shortage restrict the sustainable development. Therefore, the implementation of water-saving action is not only a practical action to implement the idea of "water saving first", but also an inevitable requirement to deepen the "five water co governance", promote the whole society to save water and protect water, and create "two beautiful" Haining.

Table 1. Completion of main water saving indexes during the 13th Five Year Plan period in Haining City

| Serial number | Index name                                      | "13th five year plan" goal | Completed at the end of the “13th five year plan” |
|---------------|------------------------------------------------|---------------------------|--------------------------------------------------|
| 1             | Total water consumption (100 million m$^3$)     | 3.8422                    | 3.0579                                           |
| 2             | Domestic and industrial water consumption (100 million m$^3$) | 1.6775                    | 1.5503                                           |
| 3             | Decrease rate of water consumption per 10000 yuan GDP (%) | 22                        | 39                                               |
|               | Water consumption per 10000 yuan GDP (m$^3$)     | 38                        | 29.7                                             |
| 4             | Water consumption decrease rate of RMB 10000 industrial added value (%) | 16                        | 31                                               |
|               | Water consumption per 10000 yuan of industrial added value (m$^3$) | 20.1                      | 16.6                                             |
| 5             | Effective utilization coefficient of irrigation water | 0.659                     | 0.661                                            |
2.2. Situation of water saving work in Haining City in the new period

From the external point of view, the national and Zhejiang Province's water control strategy has put forward higher requirements for water saving. According to the 19th National Congress of the Communist Party of China, China's economy has changed from a stage of high-speed growth to a stage of high-quality development. Water is an important natural resource and material basis for economic and social development. In order to promote high-quality economic and social development in the new era, we must give priority to water saving. The construction of ecological civilization provides new opportunities for water conservation. We should give priority to water conservation, improve the utilization efficiency of water resources, form the spatial pattern and industrial structure of resource conservation and environmental protection, and promote the formation of green development of production and lifestyle [4] [5] 「The national water saving action plan clearly proposes to recognize the importance of water saving from the strategic height of realizing the sustainable development of the Chinese nation and speeding up the construction of ecological civilization, and requires to adhere to the policy of giving priority to water saving, take water saving as an important measure to solve the problem of water shortage in China, and run through the whole process and all fields of economic and social development」 「The "168" work system and policy system of water-saving action are put forward in the water-saving action implementation plan of Zhejiang Province. Through the implementation of "one action", the promotion of "six major projects" and the improvement of "eight mechanisms", a new water-saving pattern of "government led, market driven, social participation and national action" is constructed 「According to the implementation plan of water saving action in Jiaxing City, Jiaxing will strengthen the rigid restriction of water resources, implement the target responsibility, implement water-saving projects, strengthen supervision and management, innovate the system, policy, technology and mechanism, accelerate the establishment of an intensive water use mode, and improve the water use efficiency of the whole society, It will provide strong support for the construction of the Yangtze River Delta ecological and green integration development demonstration zone and the construction of the "most wonderful plate" in the "important window" to comprehensively display the superiority of the socialist system with Chinese characteristics in the new era.

From its own point of view, the demand of economic and social development of Haining City puts forward higher requirements for water-saving work “During the period of the 14th five year plan, Haining will build an international fashion science and technology innovation new city and a famous cultural tourism city in the growth triangle, an industrial highland of Hangzhou Bay, and a quality new city with deep integration with Hangzhou. In the stage of high-quality economic development, it is more urgent to form green development kinetic energy, and the accelerating progress of industrialization and urbanization has brought greater pressure on water resources management and water ecological environment protection. At the same time, the contradiction between the high-quality development of economy and society and the development and utilization of water resources is still prominent, which puts forward higher requirements for the support and guarantee ability of water resources.

| Name and unit of evaluation index | Haining City | Southeast district | conclusion |
|----------------------------------|-------------|--------------------|------------|
| Water quality up to standard rate of water function areas in important rivers and lakes (%) | 13 | 64 | | |
| New efficient water saving irrigation area (Ten thousand mu) | 2 | 3 | | |
| Name and unit of evaluation index | Haining City | Southeast districta | conclusion |
|----------------------------------|-------------|---------------------|------------|
|                                 | average level | advanced level of Provincial | Advanced level of city |
| Comprehensive water consumption index | 29.7 | 53 | 35 | 15 | advanced |
| Utilization rate of reclaimed water | 15 | 15.3 | 22.8 | / | commonly |
| Industrial water consumption index | 16.6 | 47.8 | 23.4 | 10 | advanced |
| Reuse rate of industrial water | 80 | 87.1 | 88.9 | 93.0 | Below average |
| Domestic water index | 5.98 | 13.2 | 10.8 | 6.6 | advanced |
| Popularization rate of water saving appliances | 100 | 72.7 | 100 | / | advanced |
| Agricultural water index | 0.661 | 0.565 | 0.736 | / | Below advanced |
| Irrigation water consumption per mu | 368 | 517 | 516 | 498 | advanced |
| Proportion of efficient water saving irrigation area | 9.8 | 9.3 | 38.7 | / | commonly |

*The southeast region involves Shanghai, Jiangsu, Zhejiang, Fujian, Guangdong and Hainan provinces.

### 3. Research on implementation of national water saving action in Haining City

Based on the solid foundation of preliminary work, Haining City learned from the advanced experience outside the province [6] [7] [8], took the problem as the guidance, strictly implemented the requirements of national water-saving action, combined with the actual situation of Haining, focused on the construction of system and mechanism, agricultural water-saving efficiency, industrial water-saving and emission reduction, urban water-saving and loss reduction, water-saving benchmarking demonstration, extraordinary water utilization, water-saving technology promotion, etc, Formulate feasible water-saving objectives and measures.

#### 3.1. Strengthen organizational leadership.

Strengthen the leadership of the party and the government on water saving work, and promote water saving work as a whole. The leading group of implementing the strictest water resources management system in Haining City is responsible for coordinating the major issues in the implementation of water-saving actions. The office of the leading group of implementing the strictest water resources management system in Haining City takes the lead in the daily work of implementing water-saving actions. The Municipal Bureau of water resources, together with the leading units of each sub task, formulates and issues the annual implementation plan, and carries out supervision and inspection on the implementation of the annual implementation plan. The municipal government takes the overall responsibility for the water-saving work in its jurisdiction, strengthens the work coordination, improves the working mechanism, defines the division of tasks, and ensures the completion of water-saving action goals and tasks.

#### 3.2. Implementation of double control management.

Implement "double control management". First, double control of total strength is implemented. The total amount and intensity of regional water use shall be strictly controlled, and the restriction of
indicators shall be strengthened, and the water consumption index shall be decomposed into towns (streets); Carry out the evaluation of water resources carrying capacity in the city, and reasonably determine the industrial layout and development scale. Establish monitoring and early warning mechanism, implement differentiated control measures for overload, critical overload and non-overload areas, and formulate and implement water control plan in the water resources overload area; Second, the whole process management of water use is implemented. We will improve the water resources demonstration system of planning and construction projects, implement water-saving evaluation system and control the intensity of water resources development and utilization. Take water resources as rigid constraints, strictly approve new water intake permits, and resolutely curb unreasonable water demand.

3.3. Improve the five mechanisms.
First, improve quota management and strictly implement water-saving standards; The second is to improve the monitoring and statistics system of water use. According to the requirements of provincial and municipal water-saving digitization, a municipal water-saving digitization platform is built and incorporated into the water management platform to realize the sharing of water-saving data among departments and promote the improvement of water-saving digitization management level; Third, improve the water-saving incentive mechanism, and study the integrated policies and measures to promote water-saving; Fourth, expand the financing mode of water-saving, encourage and guide social capital to participate in the construction and operation of water-saving projects with certain income; Fifth, implement the water efficiency labeling system, implement the "water efficiency labeling management measures", strengthen the market supervision and management of water efficiency labeling of water-saving products, and cooperate with the provincial and municipal deployment to promote the water-saving certification work within the city.

3.4. Promote three reforms.
First, actively promote contract water-saving management, and complete a contract water-saving pilot project by 2022; Second, promote the reform of water resources price and tax, and establish a differentiated tax rate system; The third is to explore the reform of water resources property rights, promote the confirmation of the right to use water resources, reasonably determine the rights and interests of regional water use, and scientifically verify the permitted water quantity of water users.

3.5. Promoting six major projects.
First, agricultural water conservation and efficiency. By 2022, the area of water and fertilizer integration will reach 7500 mu; Seven water-saving irrigation districts have been built; The installation rate of water-saving facilities and equipment in large-scale pig farms with an annual output of more than 10000 pigs reached 100%. Second, industrial water saving and emission reduction. Enterprises that exceed the quota standard shall implement water-saving transformation within a time limit; The water efficiency standard rate of high water consumption industrial enterprises reached more than 90%; By 2022, we will strive to complete the pilot project of circular transformation of warp knitting Park, and promote the establishment of water-saving benchmark Park in industrial park. Third, water saving and loss reduction in cities and towns. Promote the establishment of national water-saving cities; Continue to carry out urban and rural water supply network transformation; Deepen water saving in public domain; By 2022, the leakage rate of urban public water supply network will be controlled within 8%. Fourth, water-saving benchmarking. By 2022, we will build 2 water-saving benchmarking hotels, 2 water-saving benchmarking campuses, 5 water-saving benchmarking communities, 5 water-saving benchmarking enterprises, 1 provincial water-saving publicity and education base, and 1 water efficiency leader irrigation area. Fifth, unconventional water utilization. By 2022, the utilization rate of urban reclaimed water will strive to reach more than 16%. Sixth, promote water-saving technology, increase the introduction and application of advanced technology.
3.6. Strengthen publicity.
We should strengthen publicity and education, integrate water conservation knowledge into daily publicity and primary and secondary education, give full play to the leading role of mainstream news media in public opinion, and improve the public's understanding of the objective law of high-quality economic and social development and sustainable utilization of water resources. Advocate the new trend of green consumption and encourage the purchase and use of water-saving products. We should carry out mass publicity and education activities, popularize water-saving knowledge, and enhance people's awareness of water saving.

3.7. Guarantee capital investment.
Increase the support of special funds for water conservancy construction and development to the implementation of water saving action plan. The municipal financial departments actively play the role of financial functions, focus on supporting the construction of "six major water-saving projects", water resources conservation and protection, water-saving publicity and education, and help the smooth progress of water-saving action.

4. Conclusion.
In order to implement the national water-saving action, we must take "water saving first" as the guide, comprehensively implement the general keynote of "water conservancy project short board, water conservancy industry strong supervision", put water saving into all aspects of production and life, and promote the transformation of the whole society's water use mode from extensive to intensive by improving water-saving policies and regulations, technical methods, institutional mechanisms, etc. Improve the efficiency and efficiency of water resources utilization, promote the implementation of national water-saving action, ensure national water security, and provide strong support for the construction of ecological civilization and the realization of high-quality economic and social development.

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