Exploration on Innovative Model of Water-draw and Utilization Assessment: Regional Water-draw and Utilization Assessment + Water Consumption Standard System

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Abstract. Water-draw and utilization assessment is a basic water resources management system. According to the requirements of "running at most once" and "strong supervision of water resources", aiming at the inadaptability of current water-draw and utilization assessment, this paper puts forward the overall design framework of "regional water-draw and utilization assessment + water consumption standard" system, explores and establishes an innovative management system to replace the traditional way. The key links of the system design are also analysed in this paper, and the register and commitment management pattern for water-draw permission and long-term supervision mechanism based on water consumption index are proposed respectively.

1. Introduction of water-draw and utilization assessment system

China's water-draw and utilization assessment system began in 2002. The Ministry of Water Resources and State Planning Commission jointly issued "Management Measures for Water-draw and Utilization Assessment on Construction Projects", focusing on the analysis of regional water resources and their development and utilization, the analysis of water rationality, the assessment of water sources, and the impact of water intake and withdrawal. The water-draw and utilization assessment system has effectively controlled the construction of high water consumption and pollution projects from the source, and has become one of the important means to promote water saving and emission reduction and to build a resource-saving and environment-friendly society.

Through long-term practice, it can be seen that the water-draw and utilization assessment system on construction projects also has some limitations, which focuses on the assessment of the "point" where the project is located, without considering the carrying capacity of water resources or the optimal allocation of water resources in the whole region, and without effectively controlling the impact of macroscopic water resources development and utilization such as planning. Therefore, the assessment for water resources planning has been put forward, insisting on water-based fixed production, water-based fixed city and water-based development with considering the future development. The assessment for water resources planning is mainly used to assessment the adaptability between planning and regional water resources conditions, and then to adjust or optimize the planning.

With the new requirement of further simplification and decentralization and deepening the reform of administrative examination and approval system put forward at the Third Plenary Session of the...
Eighteenth Central Committee, Premier Li Keqiang put forward in the Government Work Report in 2016 that we should continue to focus on streamlining administration, delegating more powers to lower-level governments and society, improving regulation and optimizing services. For this reason, Zhejiang Province first put forward the reform of "running at most once". Then, in order to simplify the work of water-draw and utilization assessment and approval of water-draw permit, achieve the goal of "running at most once" on water-draw management, the Zhejiang Provincial Department of Water Resources put forward the system of "regional water-draw and utilization assessment + water consumption standard".

2. Inadaptability of the traditional water resources assessment methods

2.1. New situation of water resources management
"Running at most once" is an important orientation of the government's approval service in the new period of our country. Government services should optimize the process of management, integrate government resources, integrate online and offline, and use new means to achieve that the masses and enterprises can go to the government to handle one thing at most once, minimize government management, optimize and simplify the relevant process.

In addition, the main contradictions of water control in China have undergone profound changes, from changing nature and conquering nature to adjusting people's behavior and correcting people's wrong behavior, which means that "water conservancy projects make up the shortcomings, water industry strengthen supervision" has become a new focus of water control work in China in the future.

2.2. Analysis of inadaptability
The water-draw and utilization assessment on construction projects can be directly used as the support basis for the approval of water-draw permit. However, it is necessary for construction projects to carry out the assessment one by one, and then be accepted for approval. This cannot effectively improve the efficiency of government management, nor can it reflect the requirement of simplifying the examination and approval and optimizing services by running at most once. And the assessment for water resources planning focuses on the rationality of planning from the perspective of water resources, which is weak in linking up with the management of water-draw users, and it is difficult to achieve strong supervision of water intake. At present, it cannot be used as the main basis for approval of water-draw permit.

In addition, after the approval of water intake, the water-draw and utilization assessment on construction projects has very weak constraints on the daily management of water-draw users, and it is difficult to achieve strong supervision of water intake. Moreover, the focus of the assessment for water resources planning is not at the management level, and the pertinence at the management side is even less optimistic. Obviously, the traditional way of water resources assessment is difficult to adapt to the new requirements of water reform of "running at most once" and "strong supervision of water resources" [1].

3. Design of innovative model of water-draw and utilization assessment

3.1. Overall framework of innovation model
In order to meet the new requirements of water resources reform, the overall framework of the system of "regional water-draw and utilization assessment + water consumption standard" is mainly divided into three levels [2-4]: pre-management, in-event filing and post-event supervision, as shown in the following figure.
Overall framework of the system of "regional water-draw and utilization assessment + water consumption standard"

The pre-management mainly carries out the full demonstration to the regional water resources condition, provides the basis for the after-the-event management. The in-event filing mainly optimizes and simplifies the process of water intake licensing, and minimizes the examination and approval management matters. The post-event supervision mainly implements strong supervision and management measures for water-draw users who have approved water intake, and realizes strong supervision of water intake.

3.2. Advantages of "regional water-draw and utilization assessment + water consumption standard"

The system of "regional water-draw and utilization assessment + water consumption standard" absorbs some relevant contents of the traditional water resources assessment methods. Compared with the water-draw and utilization assessment on construction projects, its system and comprehensiveness are stronger, and the coverage of the results is wider. Similarly, compared with the assessment for water resources planning, its emphasis on water-draw management is stronger, and the results are more operable and feasible in water-draw management.

Moreover, the system of "regional water-draw and utilization assessment + water consumption standard" is no longer confined to the conventional assessment link, but extends to the management side, further strengthens the management of the total amount of regional water use, and simplifies the process of water-draw permission to the greatest extent through "register and commitment management pattern". And through "water consumption standard" control constraints, it provides an important basis for daily supervision and management of water intake.

4. Key links of "regional water-draw and utilization assessment + water consumption standard"

4.1. Determination of the indicators for the total control of regional water use

The determination of regional water consumption total control index should start from two aspects [5-6]: water resources carrying capacity and water environment carrying capacity. The factors such as
water resources endowment condition, economic and social development index and spatial layout, and 
"three red line" control index of water resources management should be fully considered. On the basis 
of meeting the current situation of regional water use, the remaining water space of total water use 
index is allocated among regions according to the principle of fairness and efficiency, thus the total 
water use control index is determined.

4.2. Determination of regional water consumption standard
Regional water consumption standards are mainly oriented by the economic and social benefits of 
water resources per unit. At present, water consumption per unit output value and water consumption 
per unit land are recommended as evaluation indicators [7-9]. For the existing industry types in the 
region, we should scientifically determine them according to the principle of green development and 
embodying advanced technology, mainly based on the typical sample survey in the region. And for the 
industry types which have not been introduced in the region, it is mainly determined according to the 
requirements of regional planning and development and water use efficiency control.

4.3. Register and commitment management pattern
Water-draw users make water-draw commitments in accordance with the requirements of regional 
water intake management, and record them truthfully. If they promise to meet the advanced water 
quota of similar industries, they can approve their water-draw applications. After the completion of the 
water-draw project and its trial operation, if the water consumption standards of the region are met 
after verification, the approved water-draw amount shall be approved and the water-draw permit shall 
be issued.

4.4. Regional post-event supervision pattern
If after the completion of the water-draw project, the water-draw users fail to take water according to 
the conditions promised at the time of filing and registration, and do not take the initiative to cooperate 
with the rectification within the time limit, then the water-draw users are identified as dishonest, and 
their liability shall be investigated afterwards.

In the daily management of regional water intake, the water consumption index of regional water-
draw users is periodically evaluated and the water efficiency level is divided. Among them, rewards 
should be given to those with good water use efficiency, and measures such as progressive price 
increase and rectification within a time limit should be taken to those with poor water use efficiency.

5. Conclusions
In this study, we analyzed the inadaptability of the traditional water-draw and utilization assessment 
system to the new requirements of water resources reform, explored and established the system of 
"regional water-draw and utilization assessment + water consumption standard". Also, the main key 
links in the system were discussed. The main conclusions are summarized as follows.

According to the water-demand principle, on the basis of regional comprehensive assessment, the 
system of "regional water-draw and utilization assessment + water consumption standard" defines the 
water resources conditions for regional support for future development, explores and establishes the 
management system to replace the traditional way, which is an innovative measure of water-draw and 
utilization assessment.

The register and commitment management pattern for water intake permit is put forward, which 
greatly simplifies the process, optimizes government services, improves management efficiency, and 
achieves the reform goal of water intake permit "running at most once".

A long-term regional post-event supervision pattern based on water consumption index is put 
forward, which takes water consumption index as an important basis for regional water use evaluation. 
While implementing the fine management of regional total water use, it provides favorable conditions 
for "strong supervision of water resources".
Water consumption standard is influenced by many factors, such as industry type, water use technology, market environment, etc. It is difficult to establish a complete water consumption standard system through a single regional investigation and analysis. It is suggested that on the basis of ensuring the applicability of the region, according to the principle of gradual development and gradual improvement, large data should be used to accumulate and analyze, and finally water consumption standards for the whole industry should be formed.

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