

Study on refined allocation technology of urban reclaimed water utilization

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Objectives

Deep treatment and allocation of wastewater based on wastewater treatment plants are important for improving the utilization of urban reclaimed water. At present, there is a lack of research on the fine allocation between reclaimed water production enterprises and users. This study aims at the problems existing in the allocation process of reclaimed water utilization, and proposes a technical framework system for classified treatment and refined allocation of reclaimed water. Then, the Suqian City in Jiangsu Province was taken as an example for analysis, which provided a reference for the pilot work of reclaimed water allocation in Suqian City. It has certain reference significance for the allocation of reclaimed water utilization in similar regions domestically.

Methods

This research analyzed the problems existing in the treatment and utilization process of urban reclaimed water, proposed a technical framework for urban reclaimed water treatment and allocation, including systematic survey of the reclaimed water user market, comprehensive assessment of reclaimed water quality, determining classified treatment technique, and formulating refined allocation scheme (Figure 1). In step 1, the systematic survey of the reclaimed water user market was conducted by data collection, on-site investigation and questionnaire issuance. In step 2, wastewater treatment plant water quality monitoring data from January-December 2021 and supplemental monitoring data from March-June 2022 were used to assess the quality of effluent. In step 3, the classified treatment technologies of reclaimed water is determined according to the uses of industrial use, municipal use, environmental use, irrigation use. In step 4, typical sewage treatment plants were taken as examples to formulate refined allocation scheme.

Results and Conclusion

The results showed that the reclaimed water was mainly used for industrial purposes, municipal use, replenishment water of ecology and environment, and irrigation water in the central urban area. The reclaimed water demand for ecological and environmental use is the largest, accounting for 69.9% of the total demand. The water quality of the wastewater treatment plants can meet the Grade A standard of discharge standard of pollutants for municipal wastewater treatment plants. The reclaimed water can be directly used for ecological replenishment and irrigation water. Turbidity and Escherichia coli need to be treated when the reclaimed water is used for municipal use. For industrial use, total dissolved

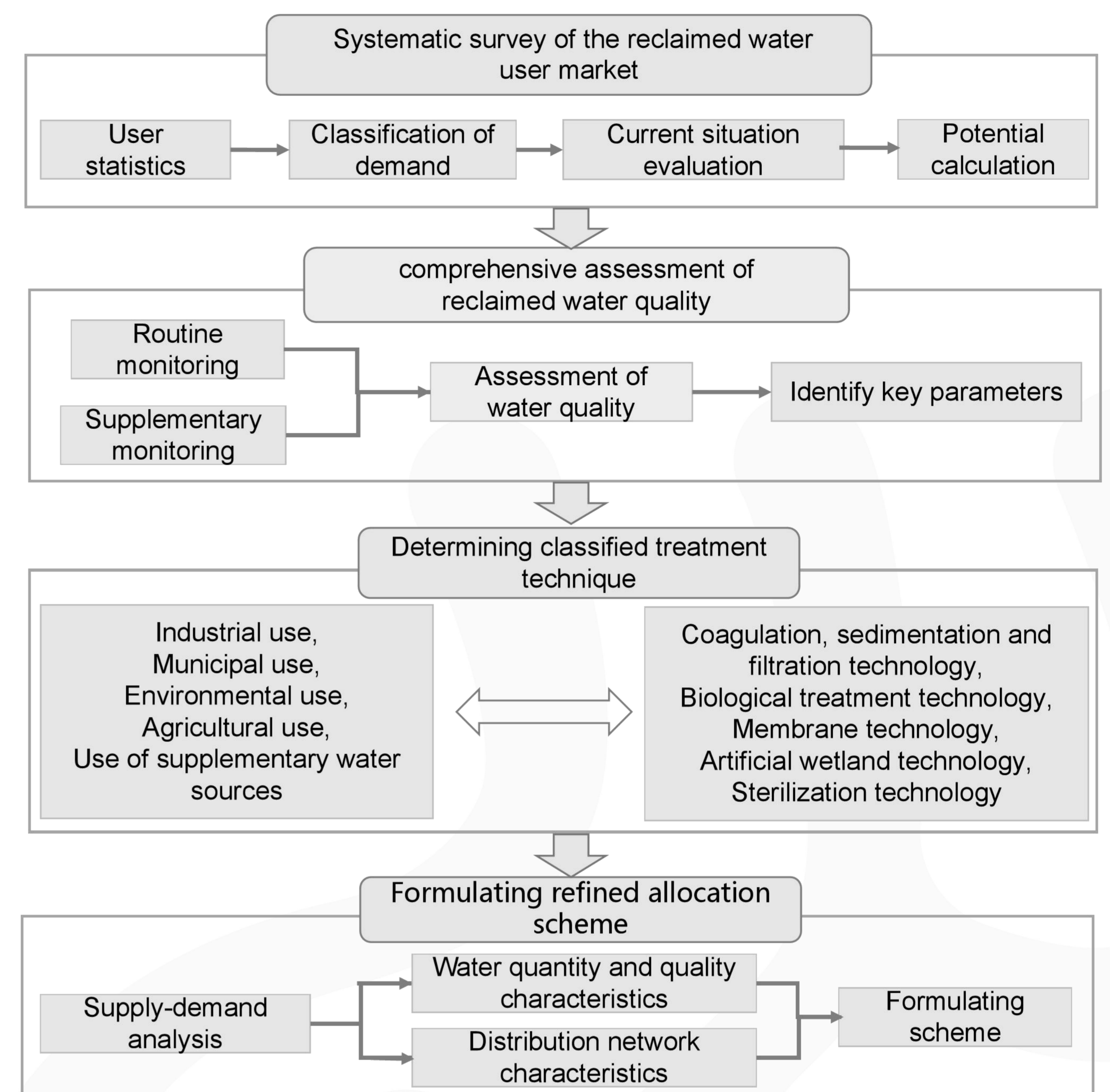


Figure 1 Refined allocation technical framework of urban reclaimed water

solids in reclaimed water of some wastewater treatment plants need to be treated additionally. According to the demand of reclaimed water users and the comprehensive water quality assessment results of the wastewater treatment plant, the classified treatment techniques covering different utilization ways in Suqian city were recommended. Finally, the refined allocation schemes for typical wastewater treatment plants were formulated based on the supply and demand relationship between the sewage treatment plant and users (Figure 2).

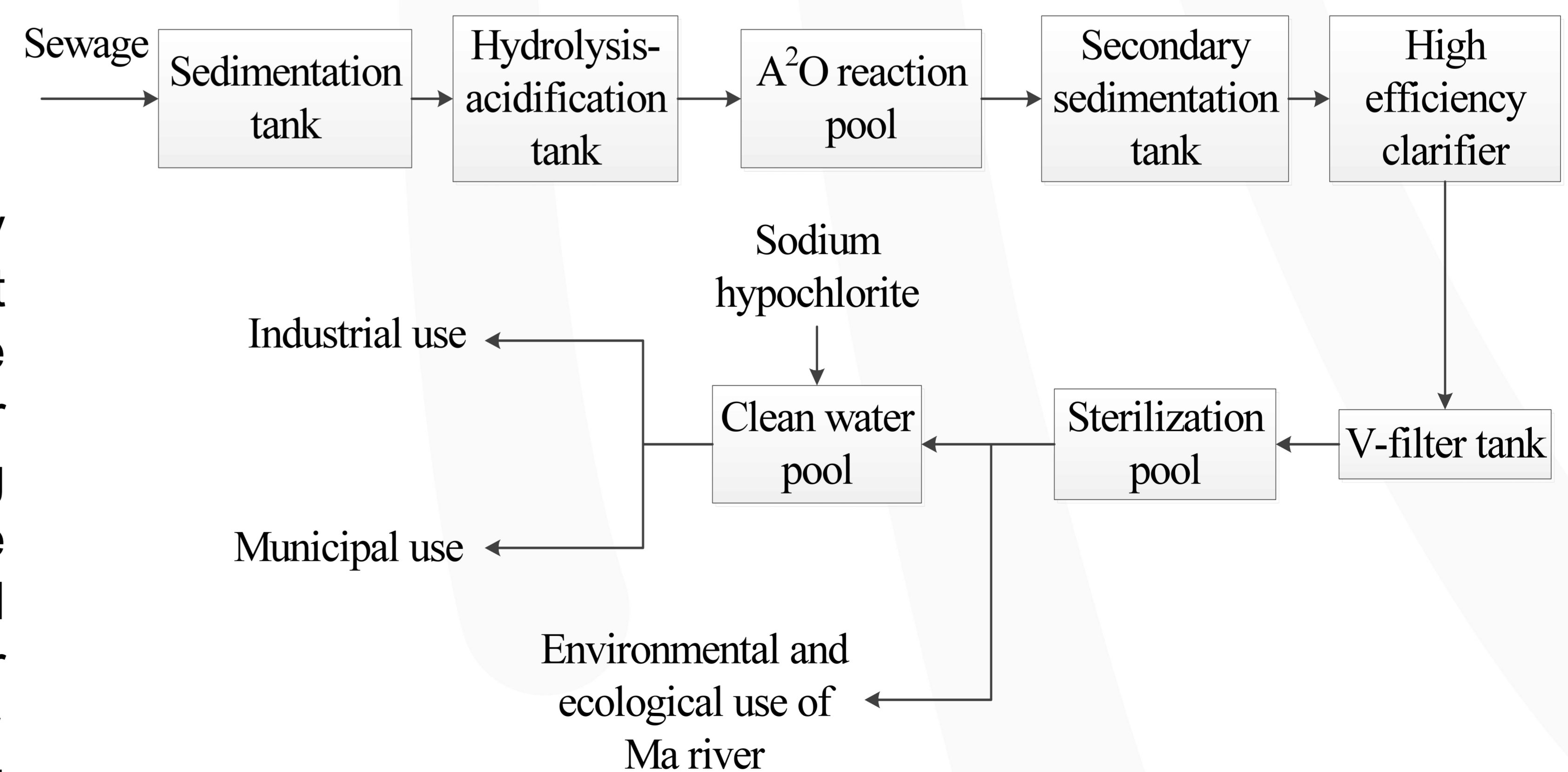


Figure 2 Reclaimed water treatment and allocation scheme of a sewage treatment plant