

Strategic research on ensuring the water resources security in the Guangdong-Hong Kong-Macao Greater-Bay Area

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Objectives

Building the Guangdong-Hong Kong-Macao Greater-Bay Area is a key measure for deepening reform and opening. According to the statistical data, the 9 cities in the Greater-Bay Area in Guangdong, which accounts for 62% population and 81% GDP, occupies only 30% of water resources, and is perennially affected by saltwater intrusion during the dry season. In order to ensure the water resources security in the Guangdong-Hong Kong-Macao Greater-Bay Area, the study aimed at solving four crucial problems:

- Cracking the current contradictions between economic development and water resources distribution;
- Ensuring high-quality drinking water for people's health requirement;
- Improving the efficiency and benefits of water resources utilization;
- Optimizing the allocation of water resources, and strengthening water resources management.

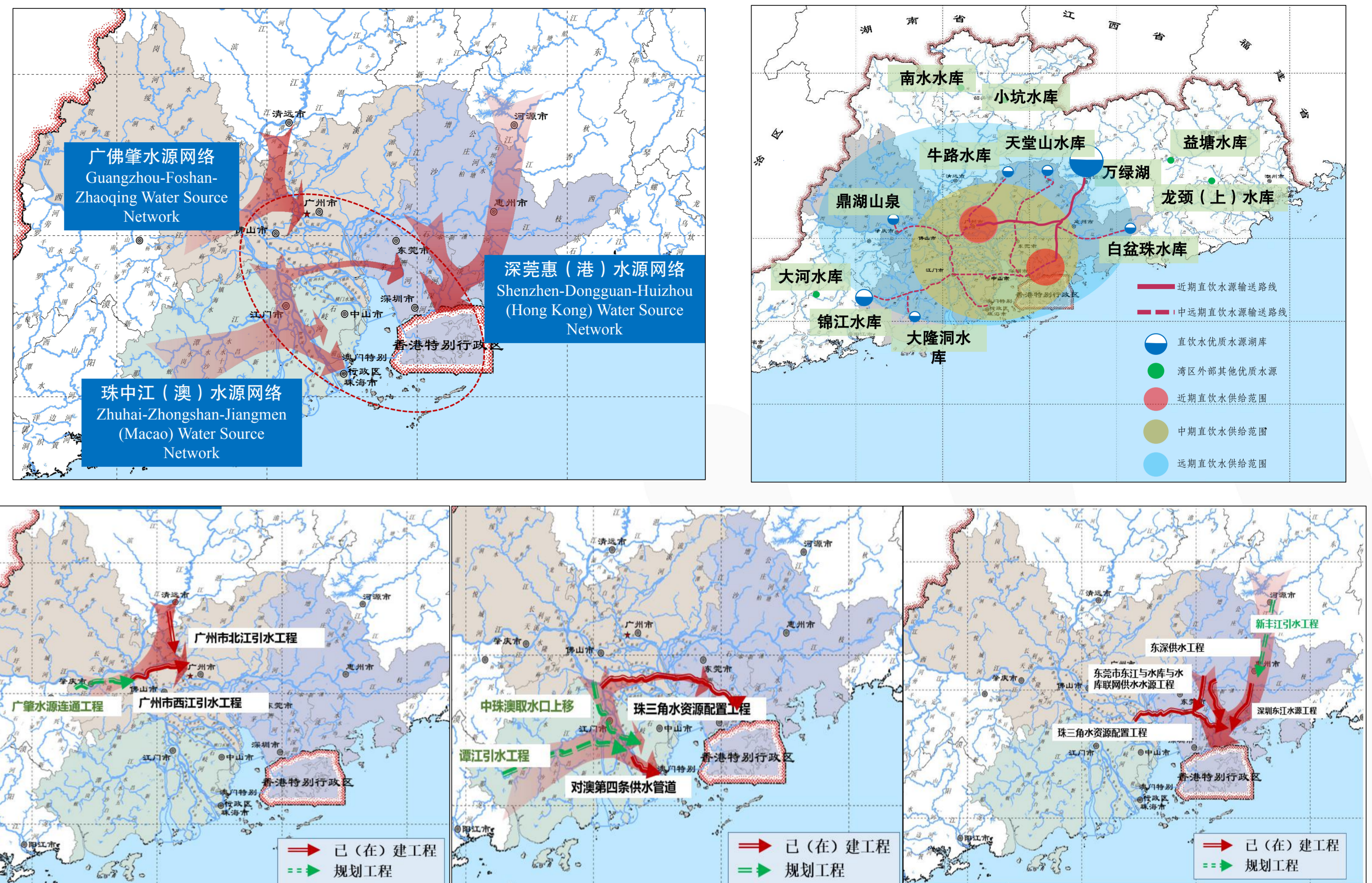
Methods

The study used the systemic method to analyze the present situation of water resources security in the Guangdong-Hong Kong-Macao Greater-Bay Area, identify the key problems and challenges, and then put forward the strategic systems for water resources security under high quality development demand. Besides, the study proposed a dirty basin theory, which evaluated water resources considering influence of river and lake water quality.

Results

The study proposed four strategic systems to ensure water resources security, which could provide strong support for high-quality and sustainable development.

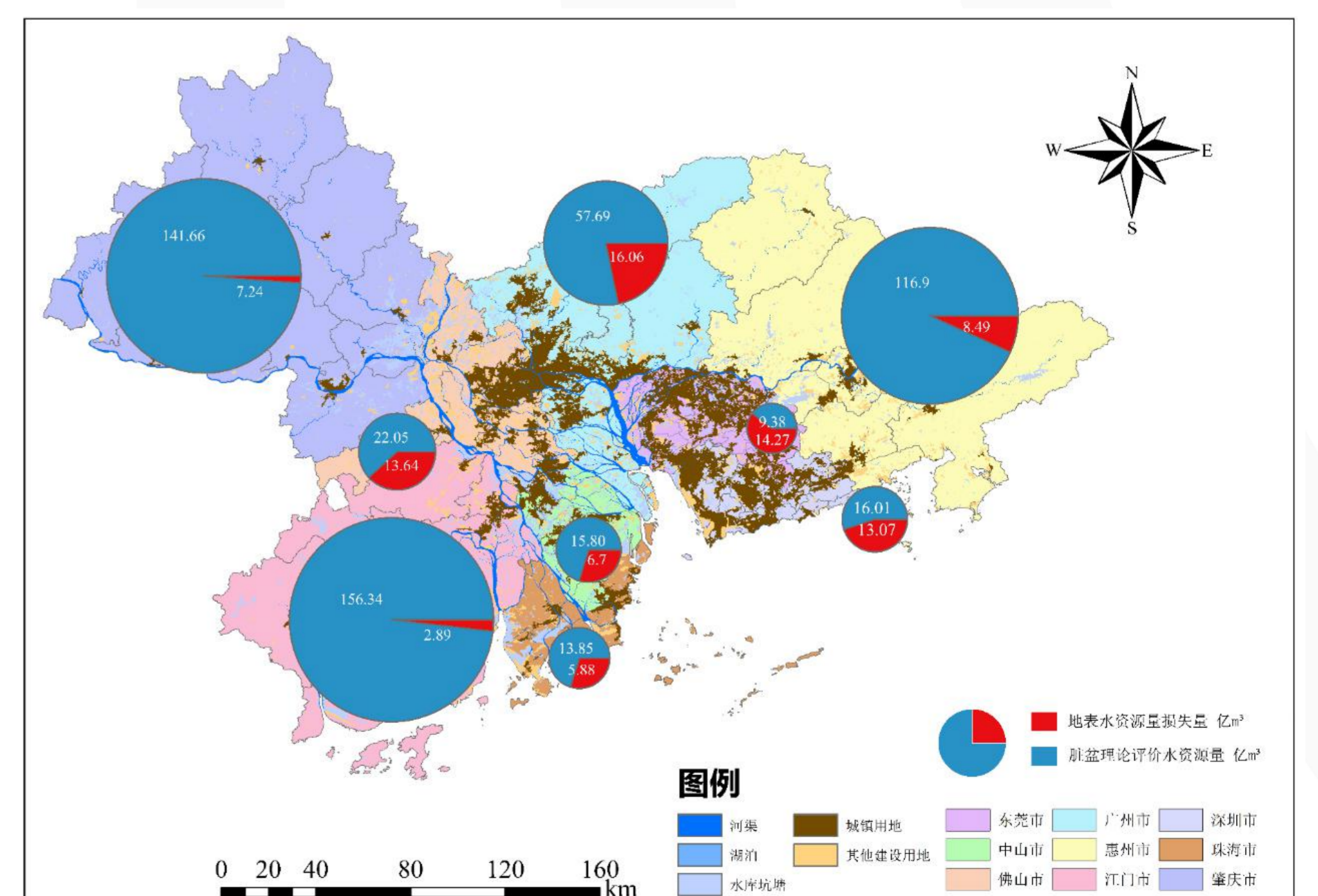
- **Safe Utilization.** The study suggested building an interconnected water supply network based on three major water sources (Dongjiang, Xijiang and Beijiang), to achieve spatial equilibrium. And then, it is necessary to construct emergency reserve water sources projects which could provide enough temporary water supply.
- **Quality Drinking.** The study proposed to build a high-quality and high-standard direct drinking water supply network, to improve the quality of drinking water.
- **Efficient Saving.** It is important to construct wastewater reuse projects to improve unconventional water sources utilization; then, promote the construction of water right trading market to increase the endogenous dynamic of water saving.
- **Scientific Management.** The results of dirty basin theory showed that excessive human pollution emissions could cause a 13.8% loss of water resources in the 9 cities, so it's necessary to take clean basin actions.



Spatial Distribution of Water Resource Allocation Network

Conclusions

The study tried to analyze the present situation of water resources security in the Guangdong-Hong Kong-Macao Greater-Bay Area, then in view of problems and challenges, proposed the countermeasure and suggestion for building water resources security system. The four strategic systems can be summarized as safe utilization, quality drinking, efficient saving, and scientific management. The results were valuable for solving some core problems restricting the water resources security, and achieving water resources spatial equilibrium, effective allocation, and efficient utilization.



Distribution of the Loss Caused by Water Resources Pollution in the 9 Cities in the Greater-Bay Area in Guangdong