



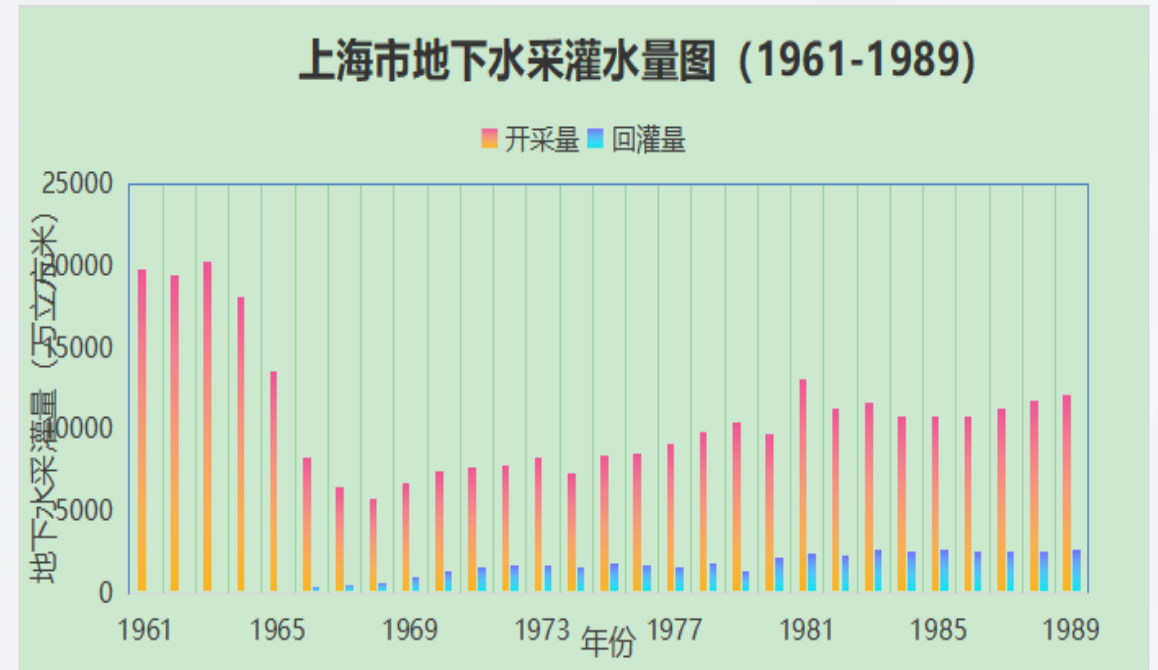
Shanghai Groundwater Artificial Recharge

Mr. Xu Sheng Fu
Shanghai Water Authority

Content

- **Purpose and Significance**
- **Key Issues Resolved**
- **Method and Technical Route**
- **Main Conclusions**

The deep confined groundwater resources in Shanghai are abundant and not easily subjected to external pollution. The development and utilization of groundwater has a long history, spanning more than a hundred years.



Half a century of effort has significantly raised the groundwater level in the area, increasing the reserves of groundwater resources, effectively enhancing the city's capacity to respond to emergencies, and strengthening urban resilience. Simultaneously, as the water level rises, the deep land subsidence caused by groundwater extraction has been well controlled, providing support for the sustainable development of the city.

Measures

- **Implementing strict approval for the construction of deep wells**
- **Striving to improve water use efficiency to reduce extraction**
- **Increasing the efforts of groundwater recharge**

Artificial groundwater recharge in Shanghai refers to the process of injecting tap water or same-layer, same-quality groundwater into the target aquifer through recharge wells.

A sufficient and reliable water source

Establishing comprehensive regulations

Funding input

Technological optimization

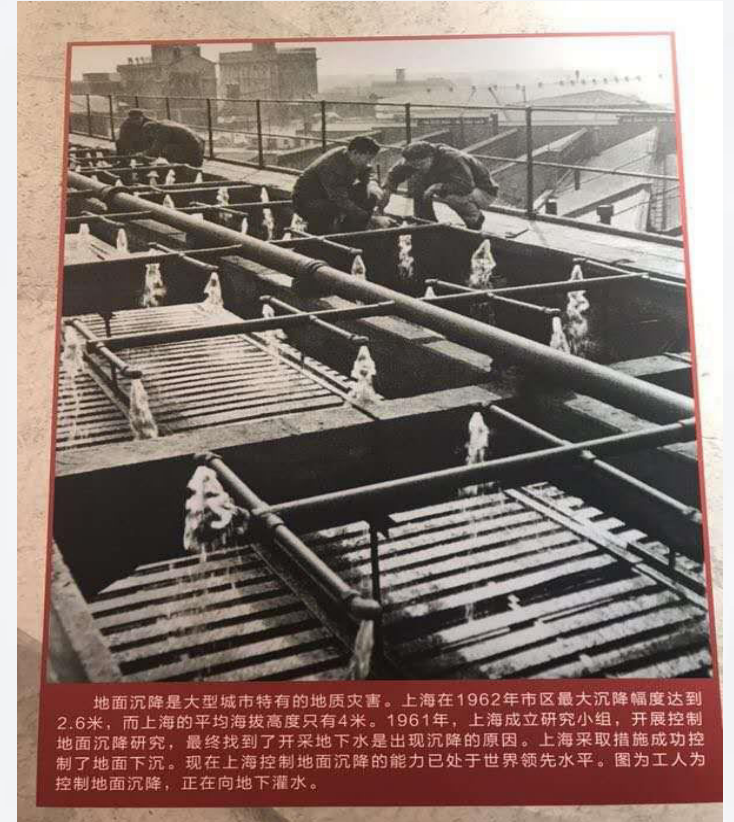
1. SELECT TAP WATER AS RECHARGE SOURCE BASED ON LOCAL CONDITIONS

- ① a clean water source
- ② abundance of surface water resources

Experimental sites for artificial
groundwater recharge

Very limited impact
on groundwater
quality

Raising the
groundwater level
and controlling
land subsidence



2. BUILDING A REGULATORY SYSTEM WITH LAWFUL GUIDANCE AND ORDERLY PROGRESSION

A

Shanghai Deep Well Management Regulations

B

Shanghai Regulations on Strengthening Groundwater Management

C

Shanghai Water Extraction Permit and Water Resource Fee Collection Management Method

D

Shanghai Ground Subsidence Prevention and Control Management Regulations

E

Shanghai Water Supply Plan (2019-2035)

F

Shanghai Emergency Water Supply (Recharge) Deep Well Construction and Operation Technical Guidelines

3. CONTINUAL INCREASE IN FINANCIAL SUPPORT FOR RECHARGE WORK

A

Construction of
recharge
facilities

B

Regular
maintenance

C

Water quality
testing



4. INNOVATION AND OPTIMIZATION: CONTINUAL UPGRADE OF MANAGEMENT TECHNIQUES

01 Mobilizing social resources

03 Committing to technological empowerment

05 Strengthening departmental collaboration



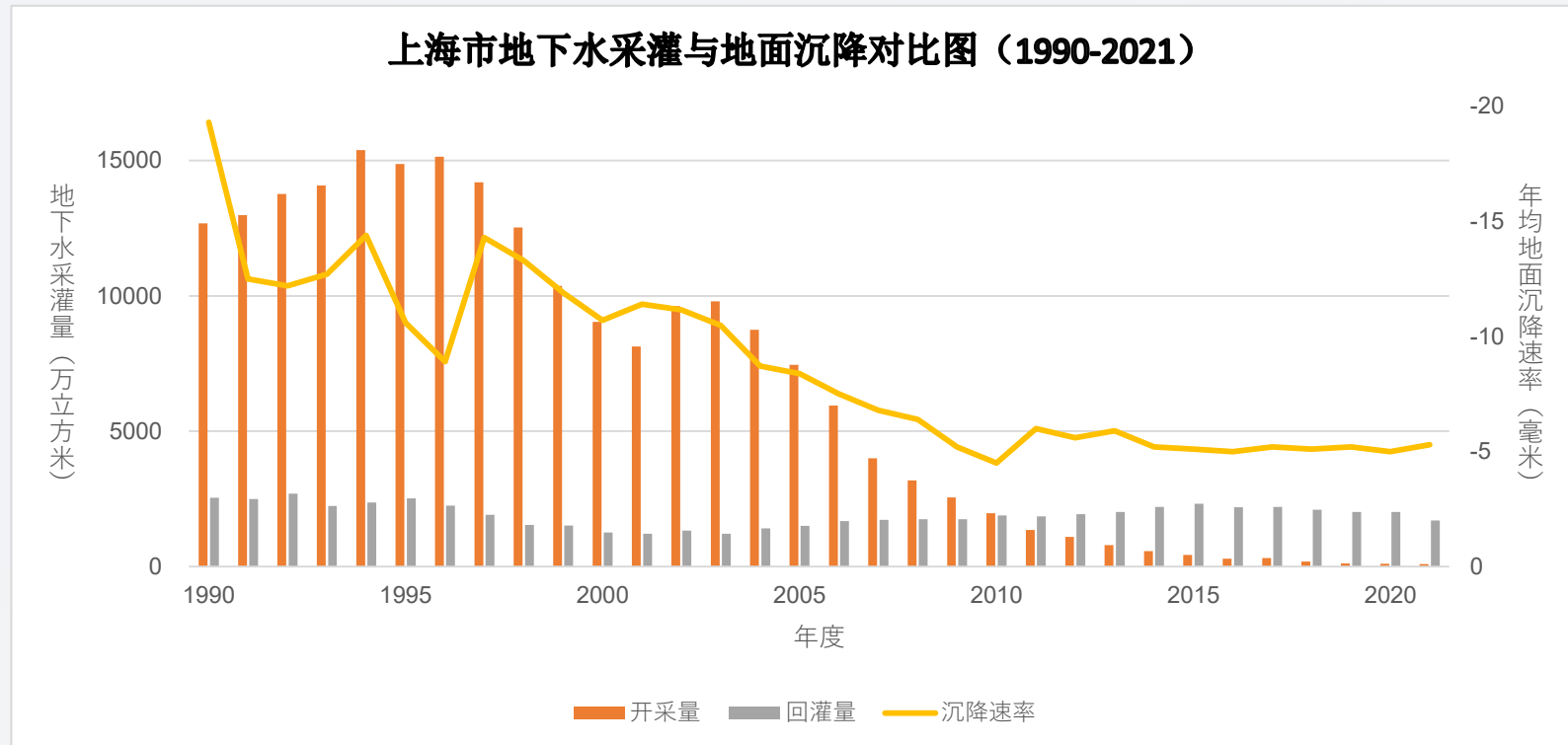
02 Enhancing recharge capability

04 Relying on digital transformation

06 Deepening institutional research



Artificial recharging has a significant effect on the prevention and control of ground subsidence



Comparison Chart of Groundwater Extraction and Recharge and Ground Subsidence in Shanghai (1990-2021)



Artificial recharging has significantly improved the control of groundwater over-extraction



Longitudinal Change Curve of Groundwater Level in Typical Monitoring Wells of the Second to Fifth Deep Confined Aquifers



Artificial recharging effectively replenishes the strategic reserves of groundwater

①

10000000000m³

The cumulative recharge volume



184

Deep wells in Shanghai
capable of recharging

②