

Pilot Project of Groundwater Over-exploitation Control in the North China

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OUTLINE

- **China's Groundwater**
- **Pilot Project of Over-exploitation Control in the North China**
- **Discussion and Conclusion**

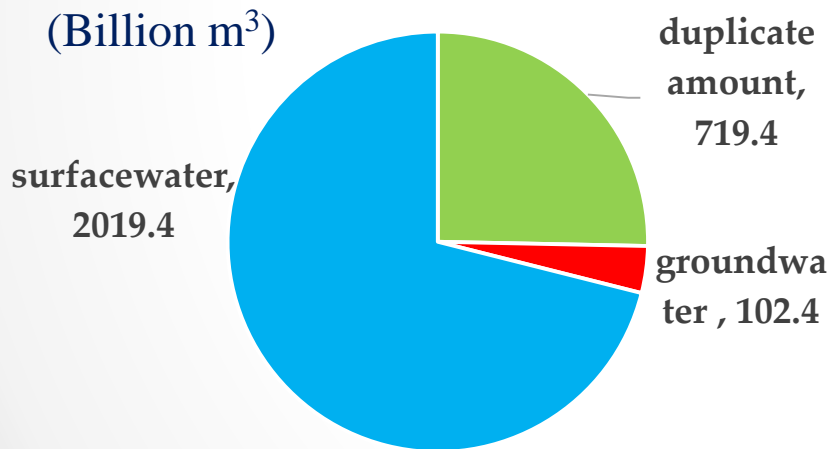
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- **China's Groundwater**
- Pilot Project of Over-draft Control in the North China
- Achievements and Challenges Facing

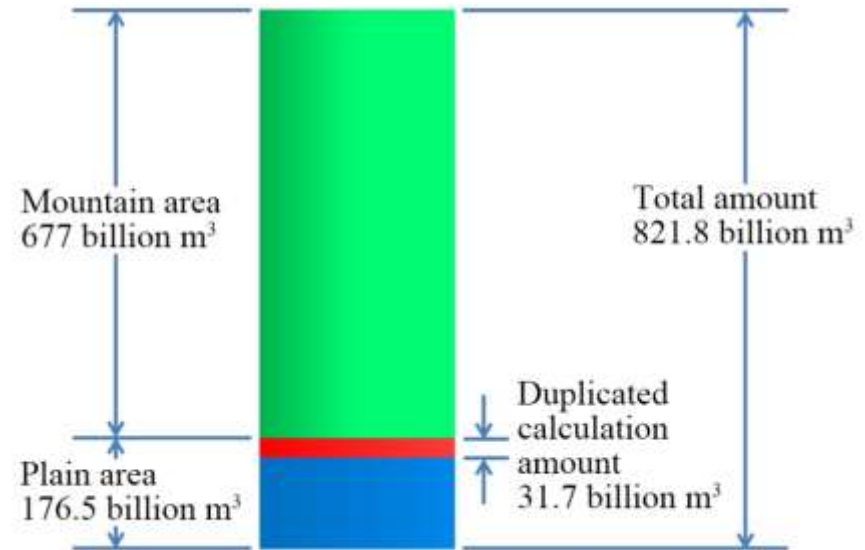
□ China's Groundwater

Amount

Total amount : 821.8 billion m³ , accounts for 30% of total national water resources; 82% of groundwater resources distribute in mountain areas.



Components of water resources in China

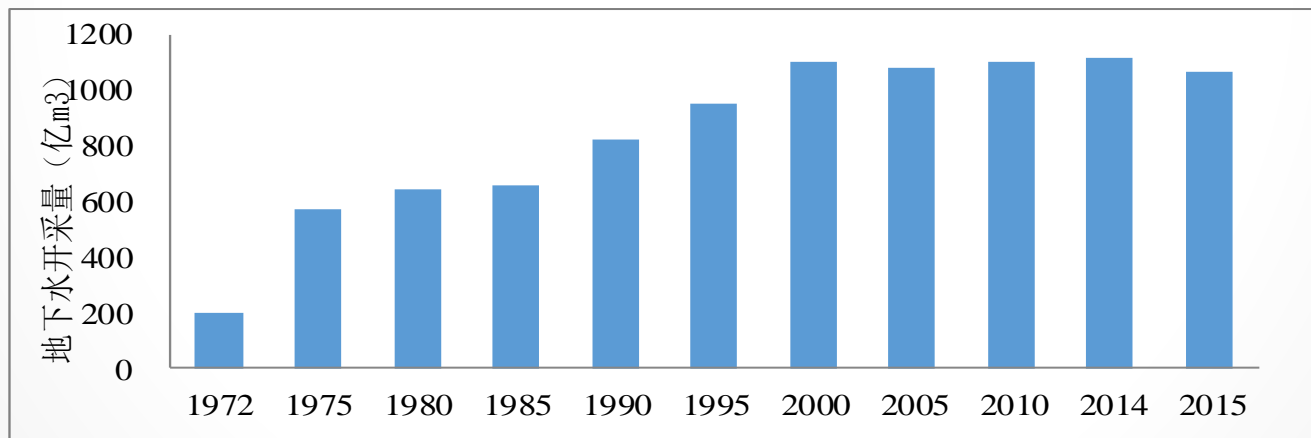


Components of Groundwater in China

□ China's Groundwater

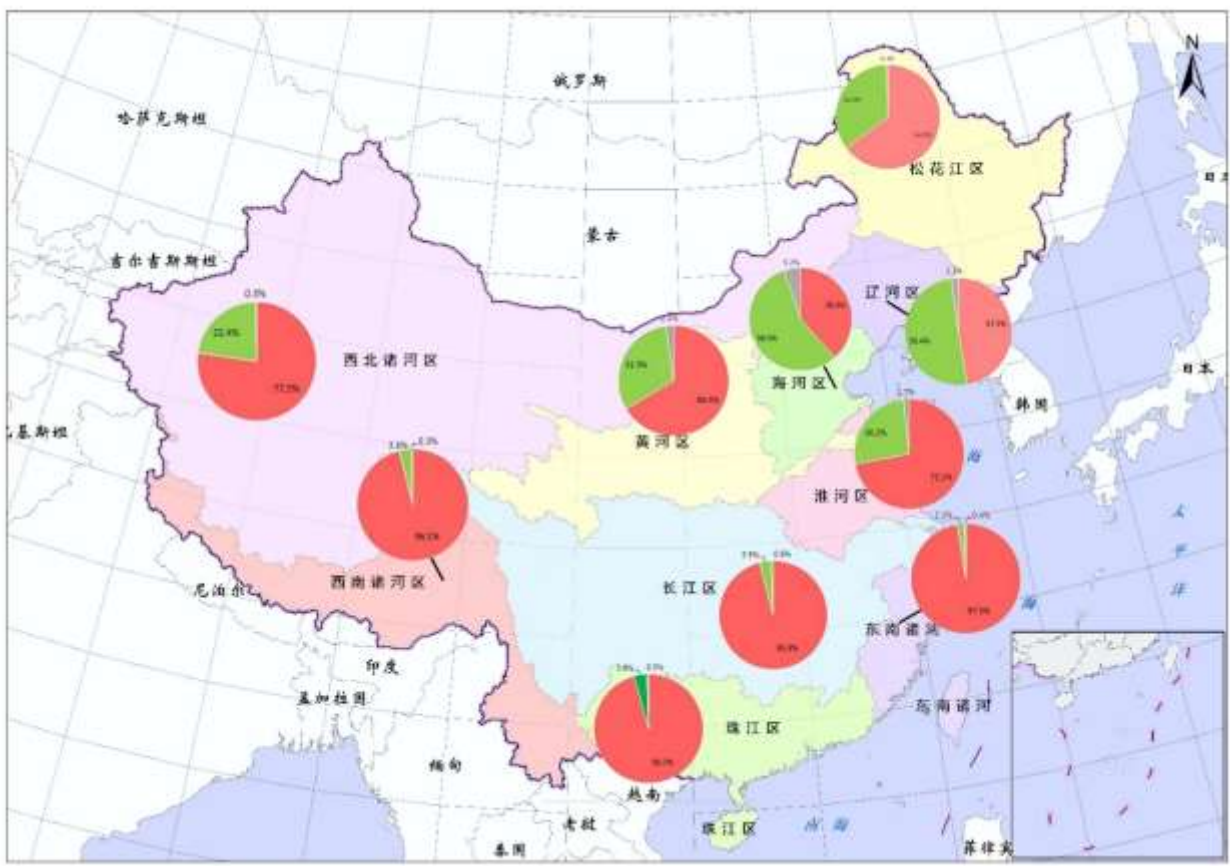
Evolution of GW Utilization in China

- Before 1970s, mainly developed by small scale and distributed way.
- After 1970s, started to intensively develop and groundwater use amount increased dramatically.
- Since 2000, the groundwater use amount have been stable.



Change of groundwater utilization since 1972

GW supply nationwide is 107 billion m³/a , accounting for 18% of national total water supply, while much higher in the north.



Proportions of water supply of ten basins in China

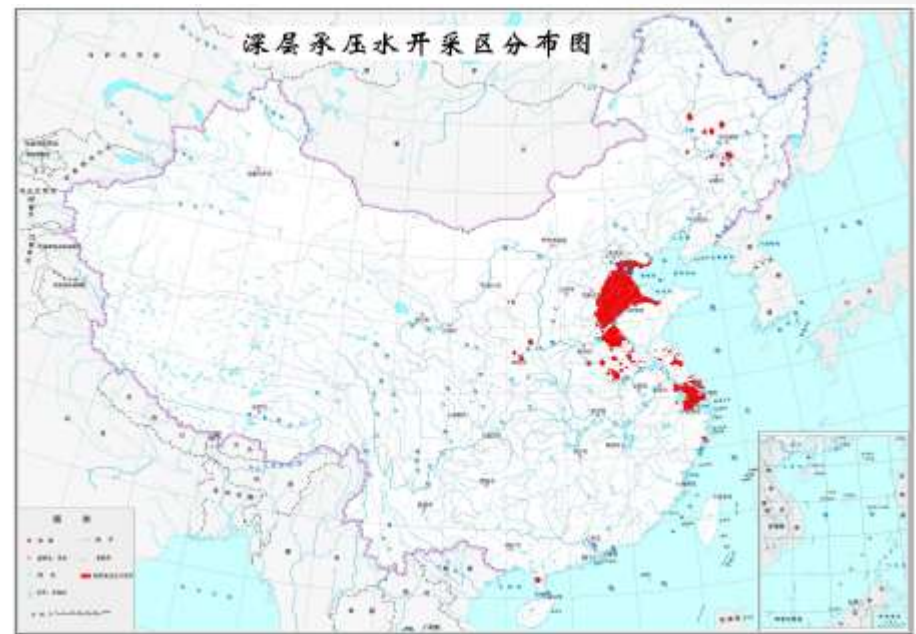
- **Green:** proportion of groundwater supply; **Red:** proportion of surface water supply ●

□ China's Groundwater

Over-exploitation

Total over-exploitation area: about 300,000 km², 95% occurs in the North.

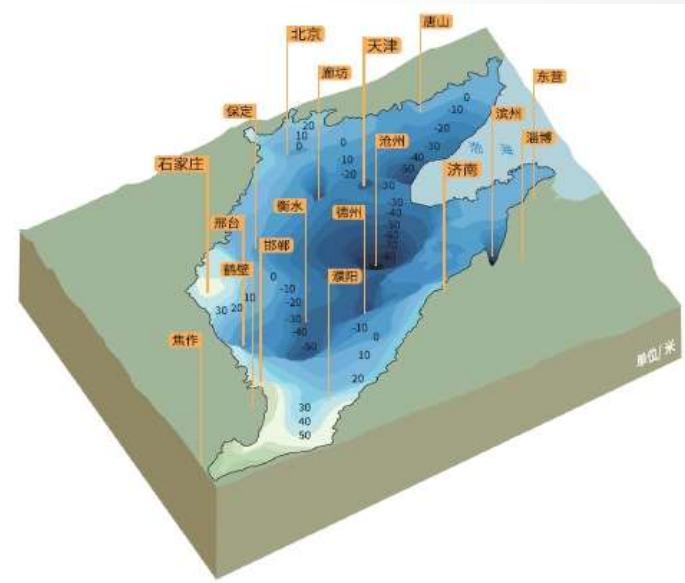
Annual over-exploitation amount is up to 17 billion m³, 99% occurs in the North.



China's Groundwater

Severe problems caused by over-exploitation

Environmental and geological problems caused by GW overdraft:
land subside , Seawater intrusion ,
Vegetation deterioration and desertification.



河北平原地裂缝



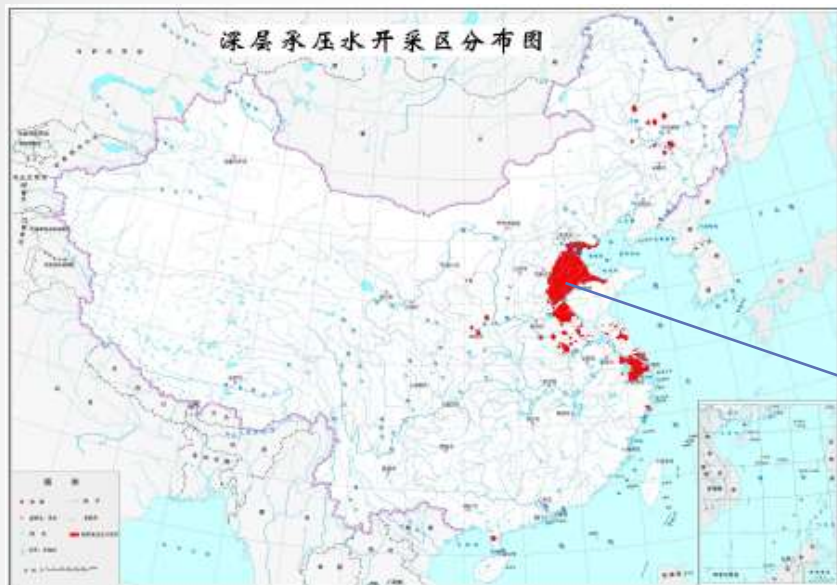
河北平原地裂缝

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Pilot Region



Hebei Province



Over-exploitation---More than 90% plain is groundwater over-draft area.

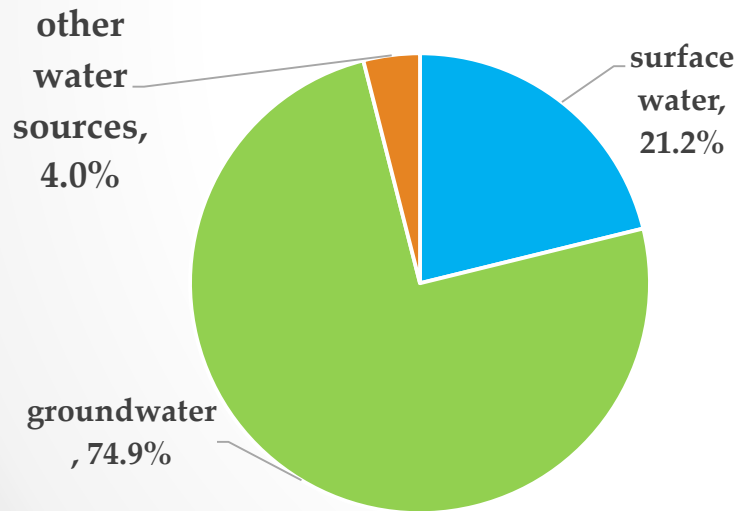
Over-exploitation area : 67000 km², accounts for 25% of the national total.

Over-exploitation amount: 6 billion m³/a, accounts for 34% of the national total.

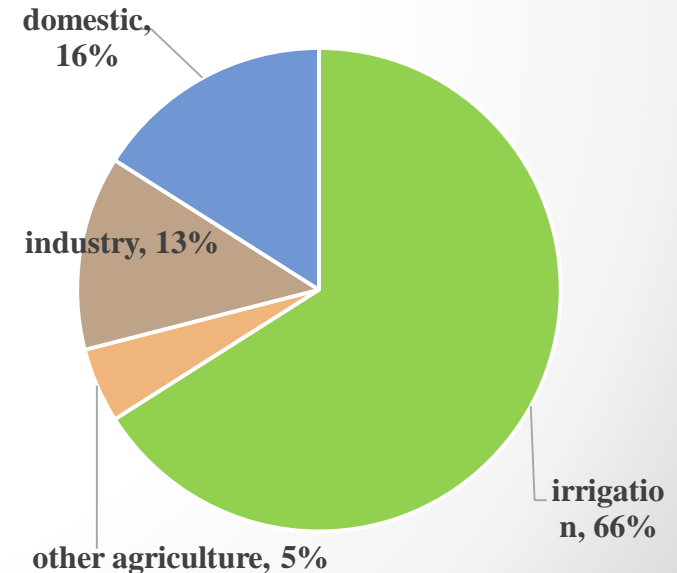
□ Pilot Project of Over-draft Control in the North China

Hebei's Water Resources:

- ✓ Average annual rainfall: 532 mm;
- ✓ Total amount of water resources: 20.5 billion m³/a;
- ✓ Per capita water resources of 307 m³.

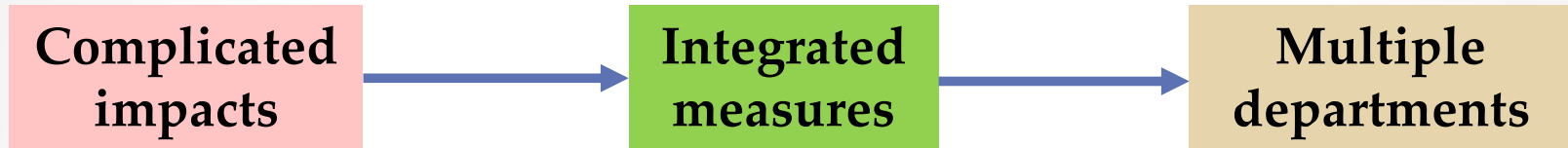


● Proportions of water supply



● Proportions of water use

□ Pilot Project of Over-draft Control in the North China



Ministry of Finance: lead

Ministry of Water Resources: technology lead;

Ministry of Land and Resources: responsible for groundwater table monitoring;

Ministry of Agriculture: responsible for agronomic water saving measures.

□ **Pilot Project of Over-draft Control in the North China**

Integrated measures:

- ✓ **Replacing groundwater supply with surface water**
- ✓ **Adjustment of Agricultural Planting patterns and habits**
- ✓ **Development of Efficient Water-Saving Irrigation**
- ✓ **Improvement of water use right and pricing system**

✓ Replacing groundwater supply with surface water

- Replace extracted groundwater in urban area with water from South-North Water Transfer Project.
- Convert some urban water supply sources back to rural region.
- Divert water from the Yellow River and Weihe River for agricultural use.
- Construct rural ponds, river canals, reservoirs to better store and allocate surface water.



Adjustment of Agricultural Planting patterns and habits

Reduce the planting area of winter wheat irrigated by groundwater, change the former double cropping pattern of winter wheat and summer corn to single cropping pattern of corn, or cotton, or peanut, or oil sunflower, or miscellaneous grains, etc.

In this way, 180 m³ of irrigation water can be saved per mu (1 mu = 1/15 hm²) of arable land per year.

Compensation: about 500 yuan per mu year for stopping planting wheat.



Two seasons cropping

One season cropping

□ Development of Efficient Water-Saving Irrigation

Before the project, the province's irrigation area with water-saving irrigation technology used was less than 30% of the total irrigated area.

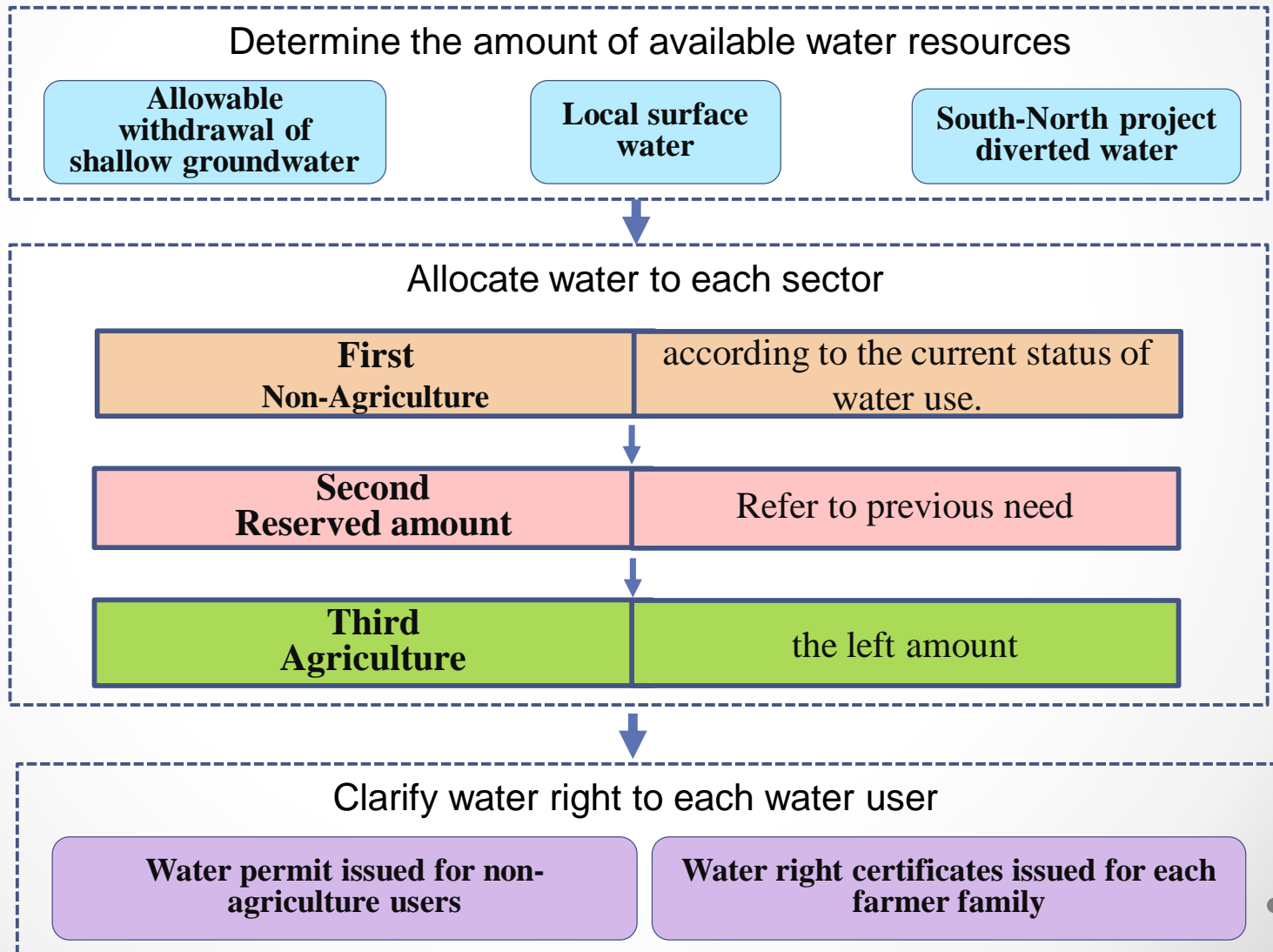
Takes the efficient water-saving irrigation technology as one of the important measures to improve irrigation water efficiency, and reduce water use, mainly by using low-pressure pipes, sprinkler irrigation, micro-irrigation and other measures, to replace the traditional irrigation way.

The pilot area has newly developed more than 400,000 hectare efficient water-saving irrigation area.



Improvement of water use right and pricing system

Clarify water use rights----- assign water use right to each water user



□ Improvement of water use right and pricing system

Clarify water use rights

Determine water use right to each water user

The amount of water use rights of each farmer's family is equal to the amount of agricultural water allocated per mu multiples area of arable land operated by the farmer's family.

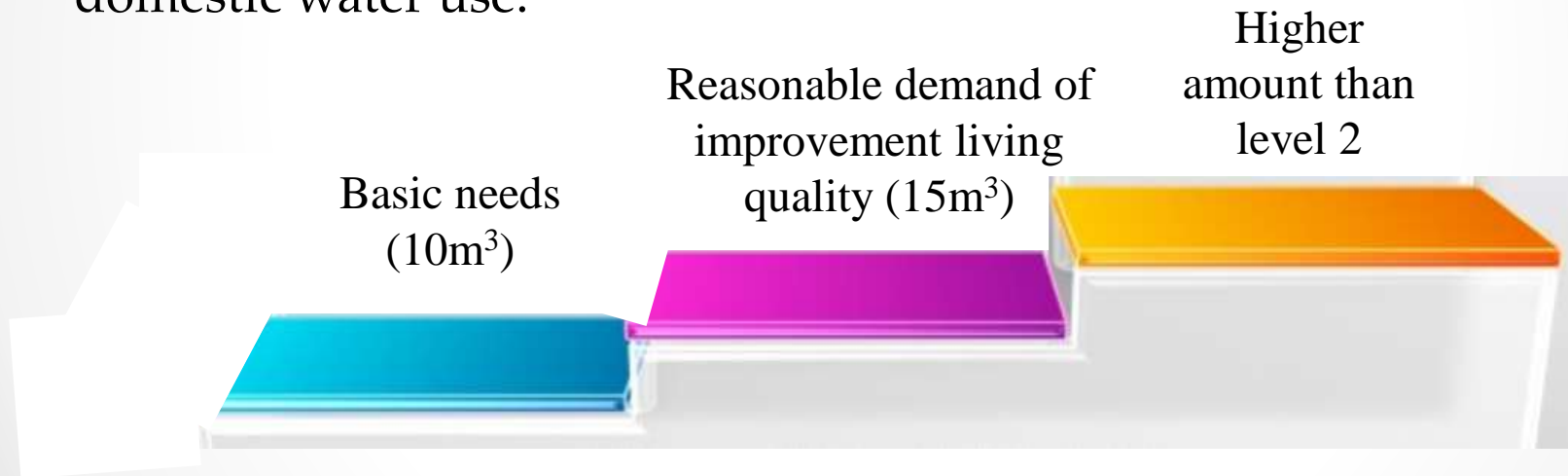
The agricultural water allocated to per mu land varies for different counties, from 70 m³/mu to more than 150 m³/mu.



□ Improvement of water use right and pricing system

Water pricing reform

- Pilot work of changing water resources fees to water resources taxes.
- Implementing the “three-level ladder water pricing system” for domestic water use.



- Third, formulating and collecting agricultural water use prices----- "quota management "

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□ Discussion and Conclusion

- The inter-departmental cooperation and coordination mechanism must be established and enhanced.
- Farmers support are crucial.
 - ✓ Make the farmers understand the whole process of the project
 - ✓ Guarantee farmers interests
 - ✓ Enhance technical training for farmers
- Monitoring and metering system are the foundation of groundwater resources management and exploitation control.
- Effective management regulation needs to be formulated.
 - ✓ legislation
 - ✓ Water right system
 - ✓ Water pricing system

Thank you!