Shall we adjust drainage strategies to water-saving practices - A case study

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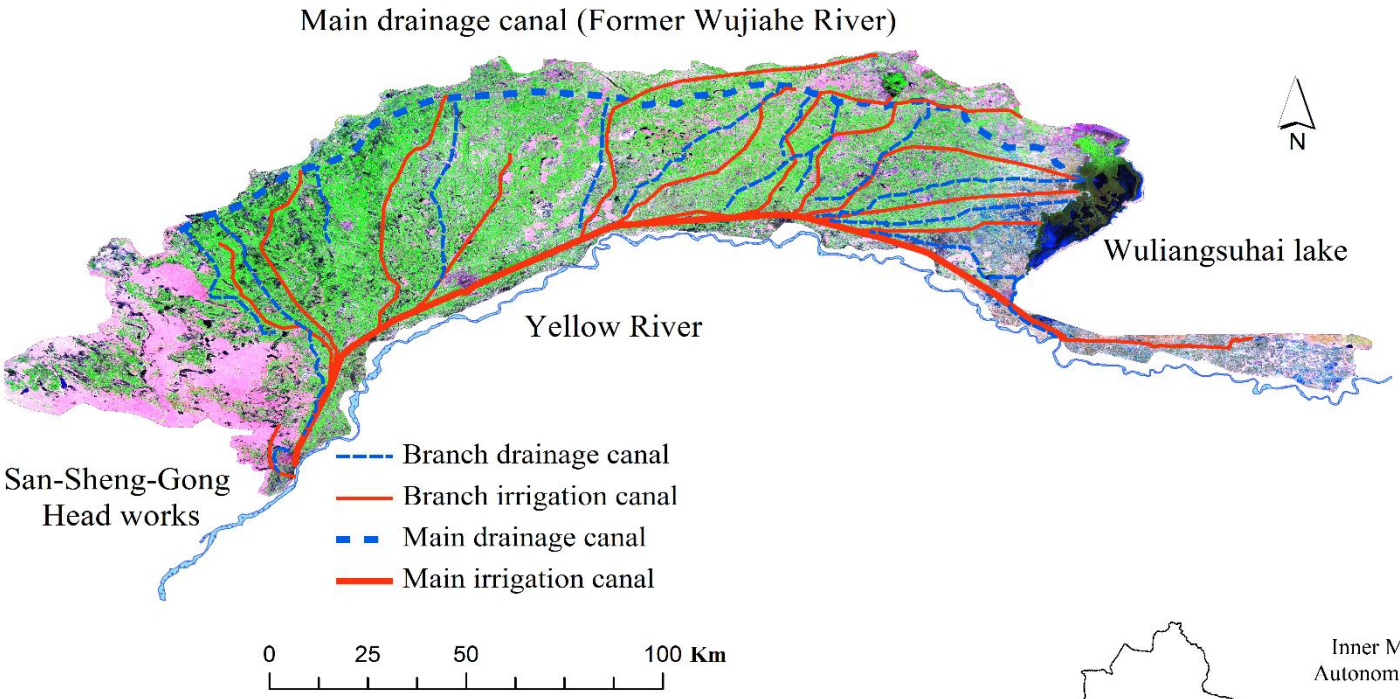
Background

- China has serious water shortage problem, consequently water-saving irrigation practices have reduced the irrigation rate from 6300 m^3/ha to 5400 m^3/ha in the past 15 years.

- More than 60% irrigated farmland will use water-saving measures by 2020.

- Drainage is facing new challenges and the strategies need to be reconsidered in the context of water-saving irrigation.

Study area: Hetao Irri. District



Hetao irrigation District,

Inner Mongolia, North China

P. vs. E=150 mm : 2200mm

Irrigation inlet 5.2 to 40 billion m^3

Water-saving Irrigation practices

Canal Lining

Structure renovation

Water saving irrigation methods

Cropping pattern and farming practices

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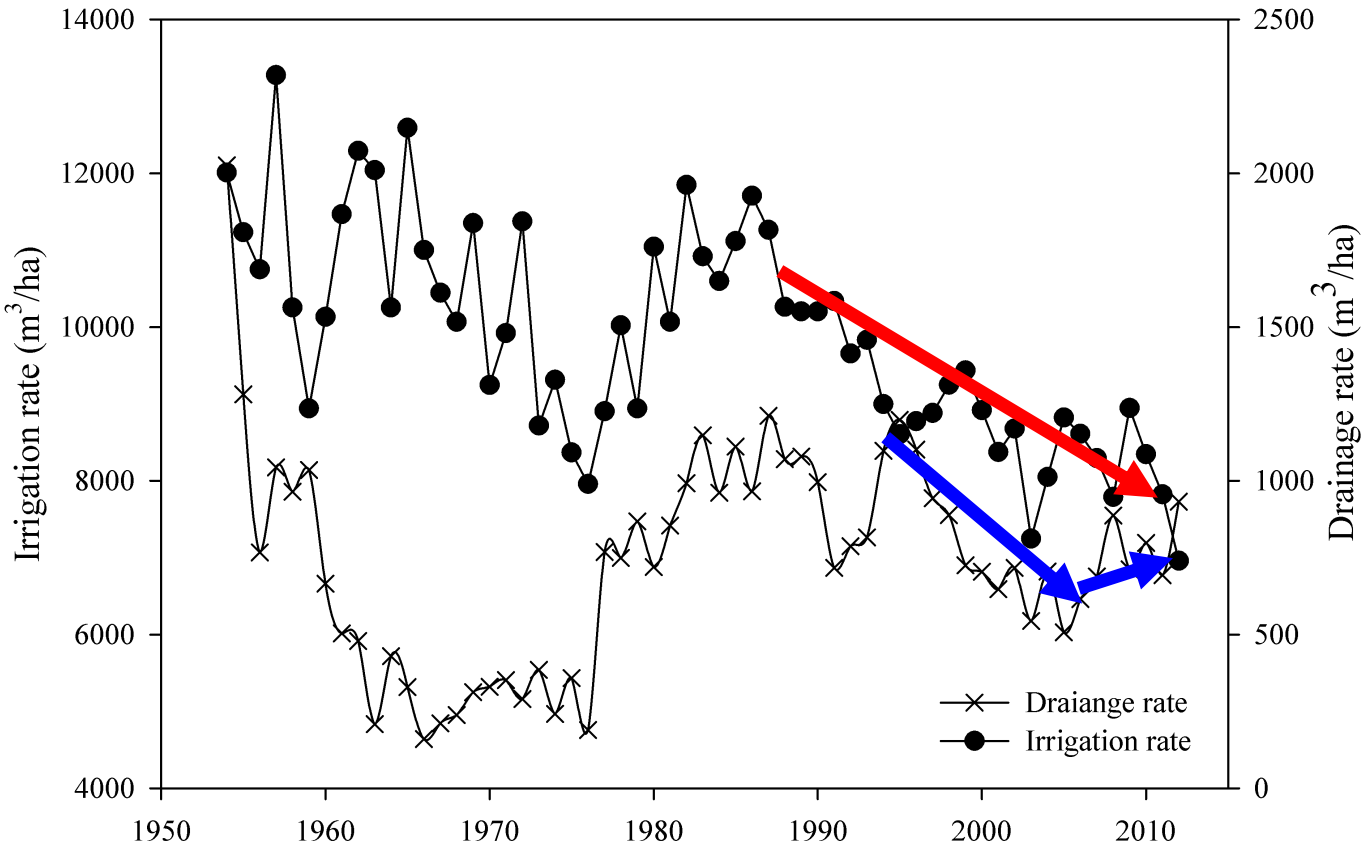
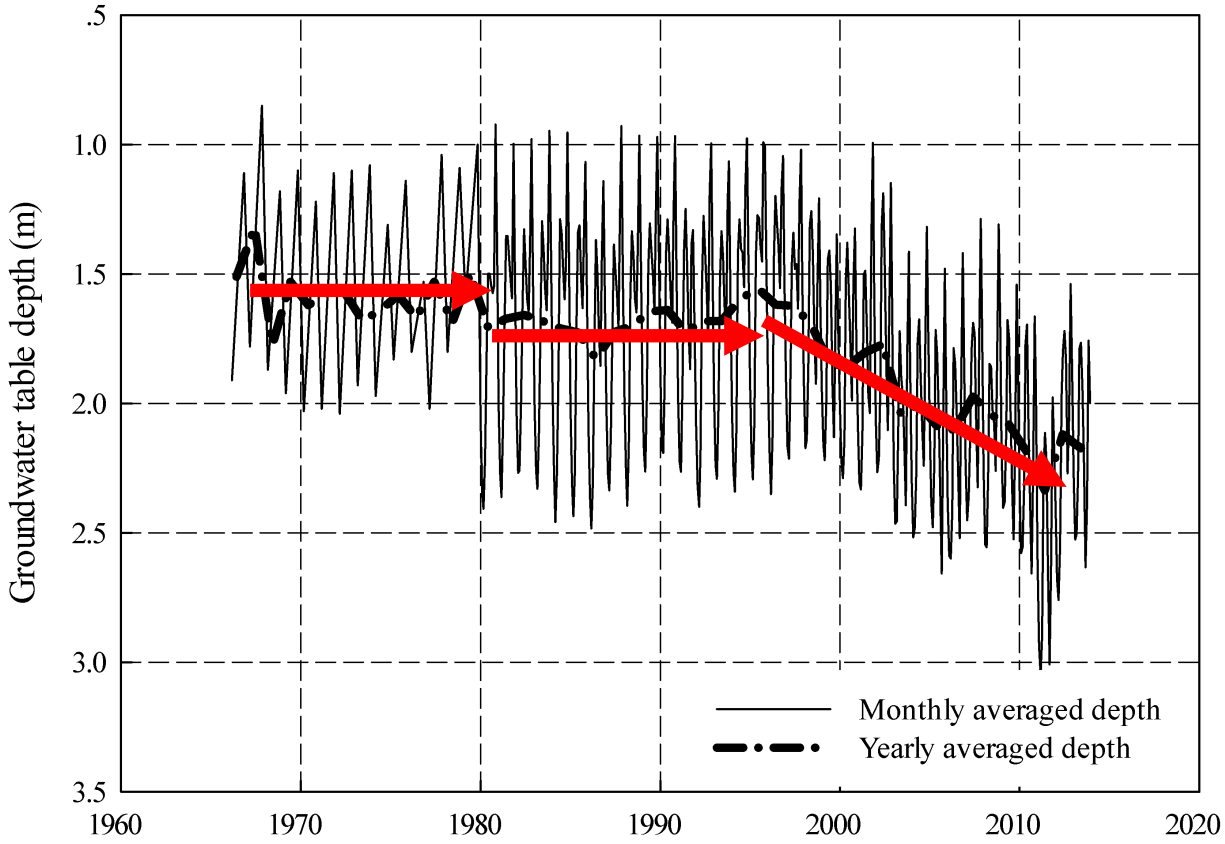
Decreasing Irrigation & Drainage

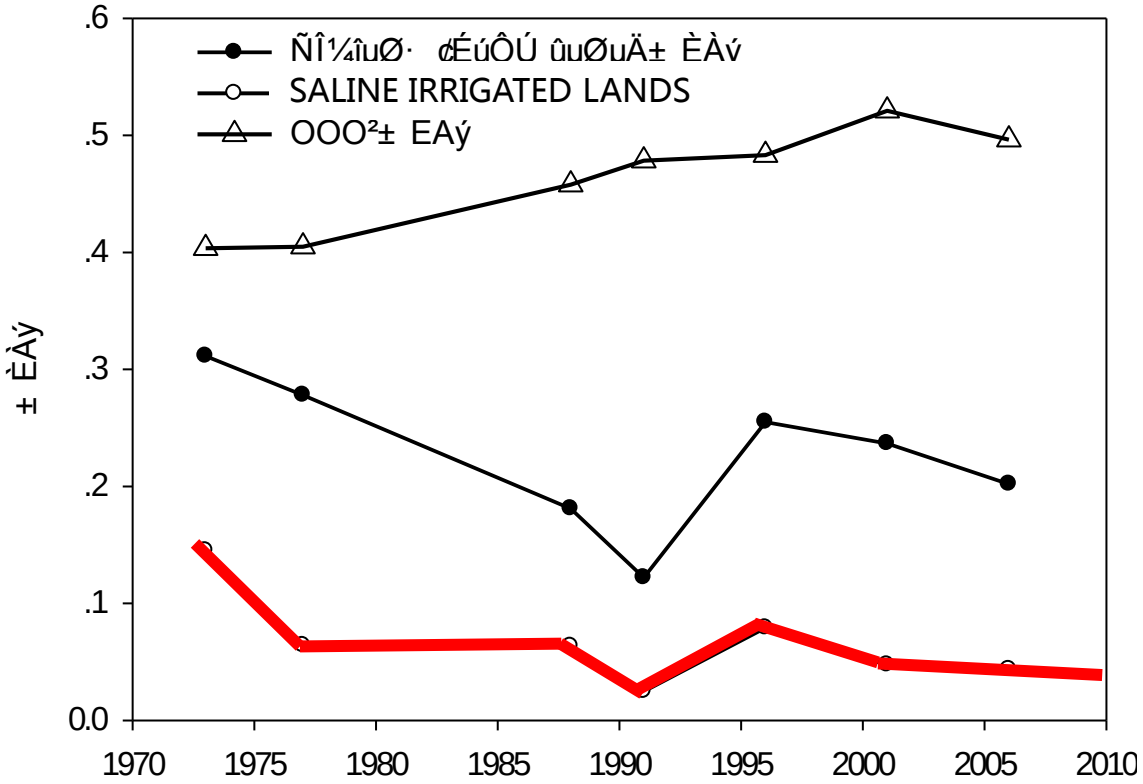


Findings: Falling GW table



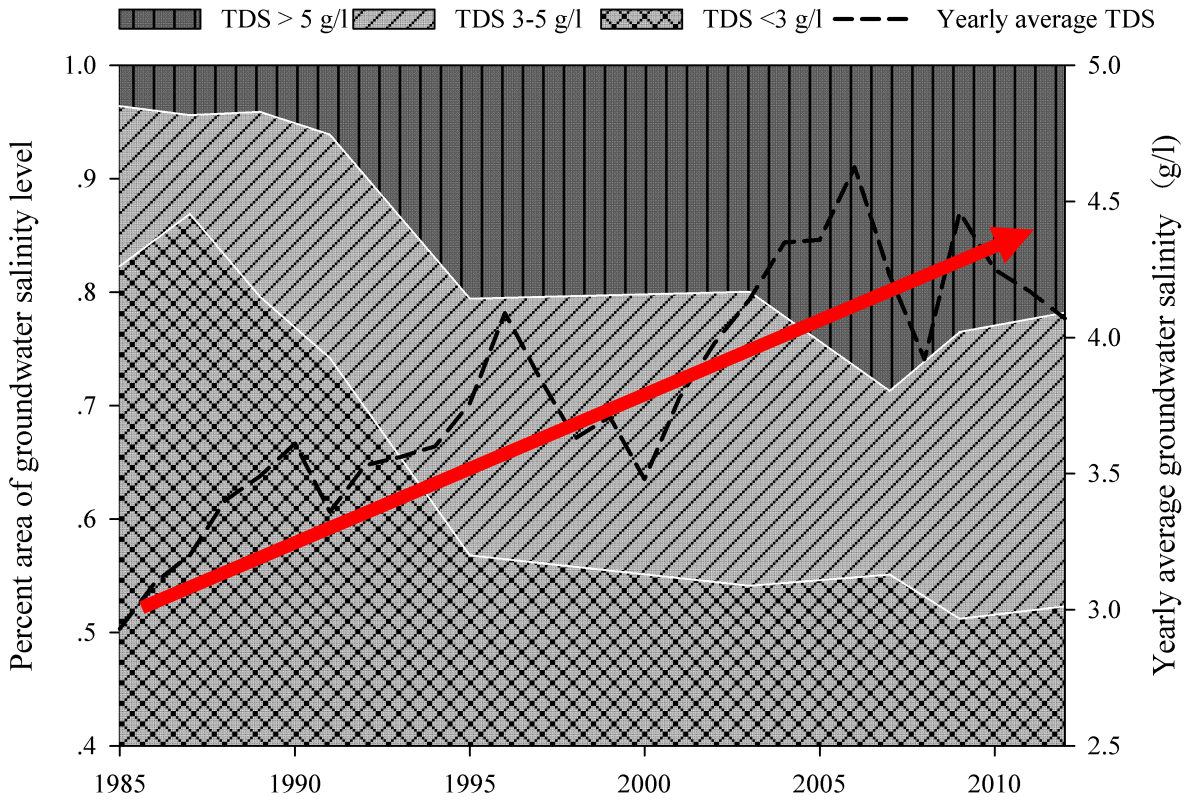
Averaged GW table depth fell from 1.7 m to 2.1 m in recent 15 year

Findings: Controlled soil salinity



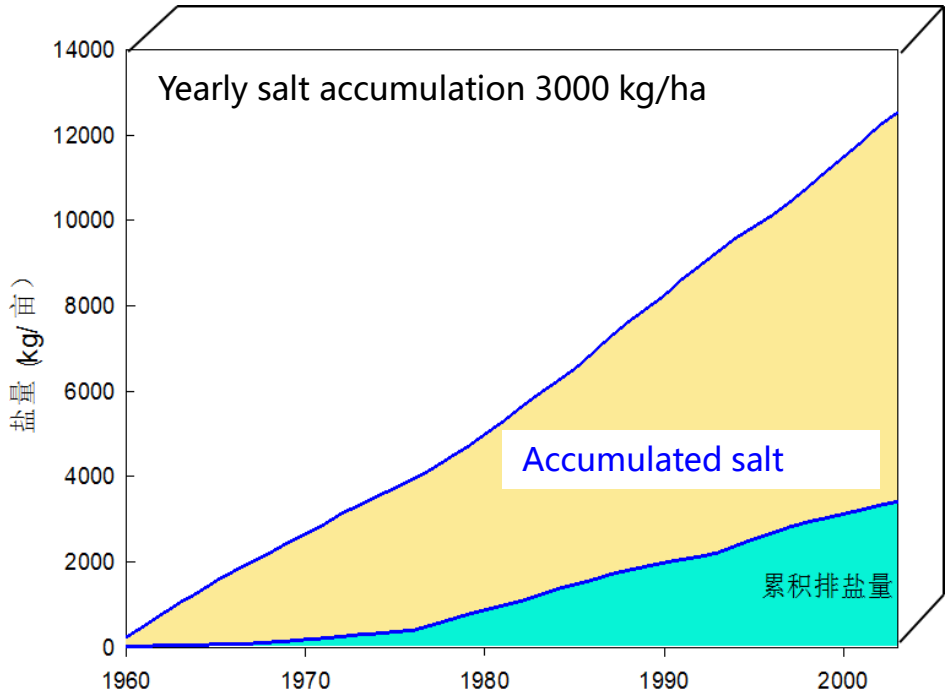
Saline irrigated area decreased continuously in recent years

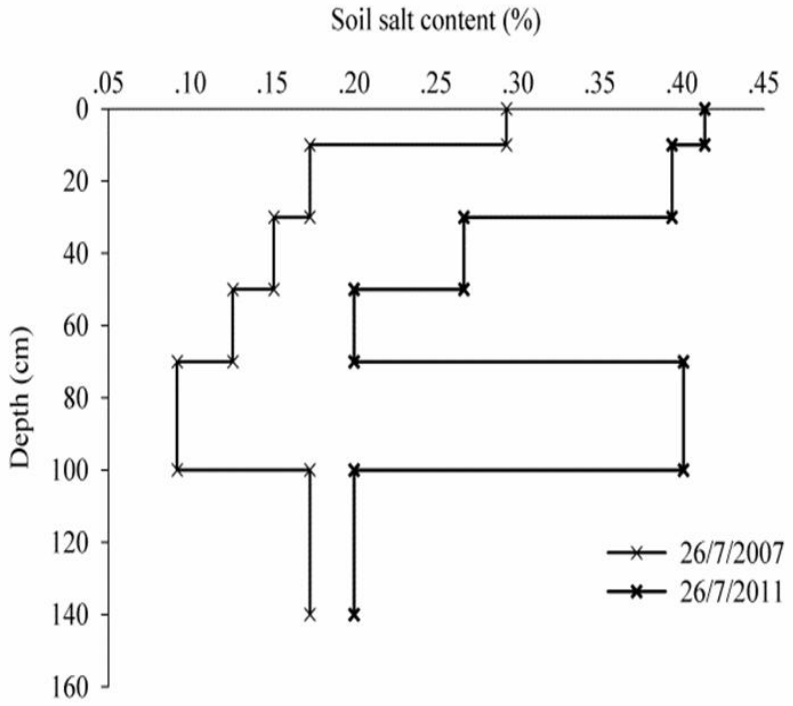
Findings: Worsening GW quality



Averaged groundwater salinity increased from 2.9 g/l in 1985 to 4.1 g/l in 2012.

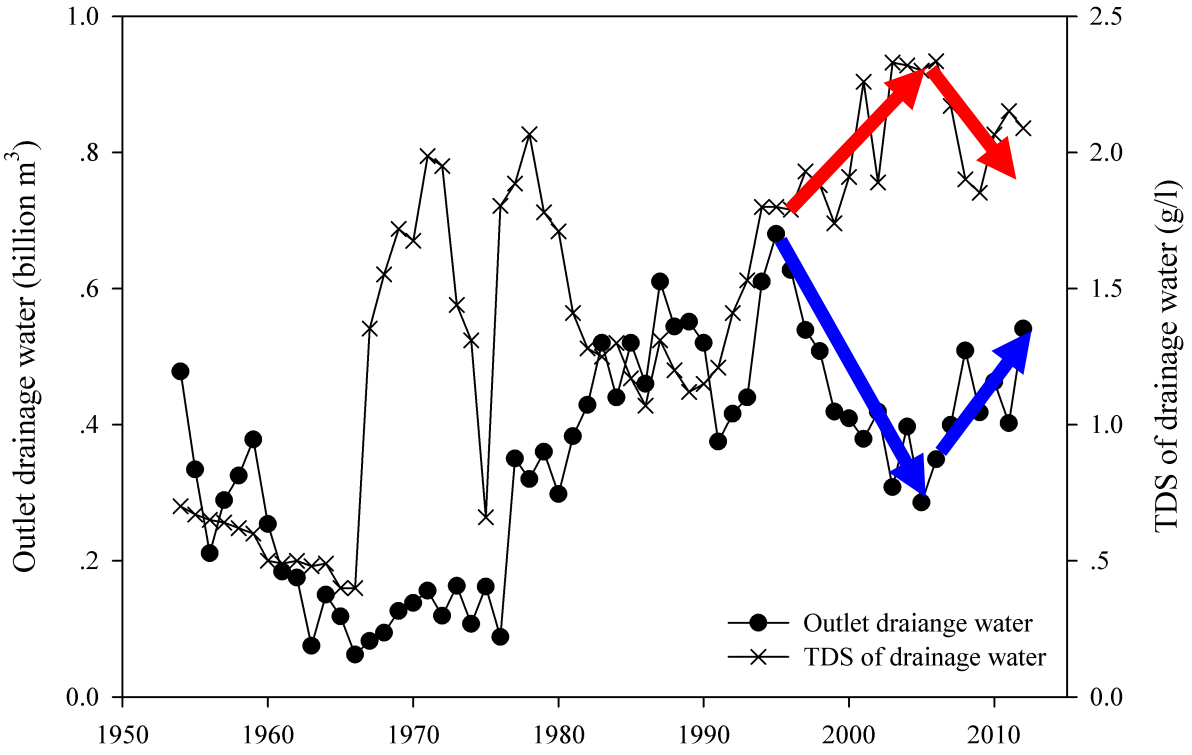
Findings: Potential salinization





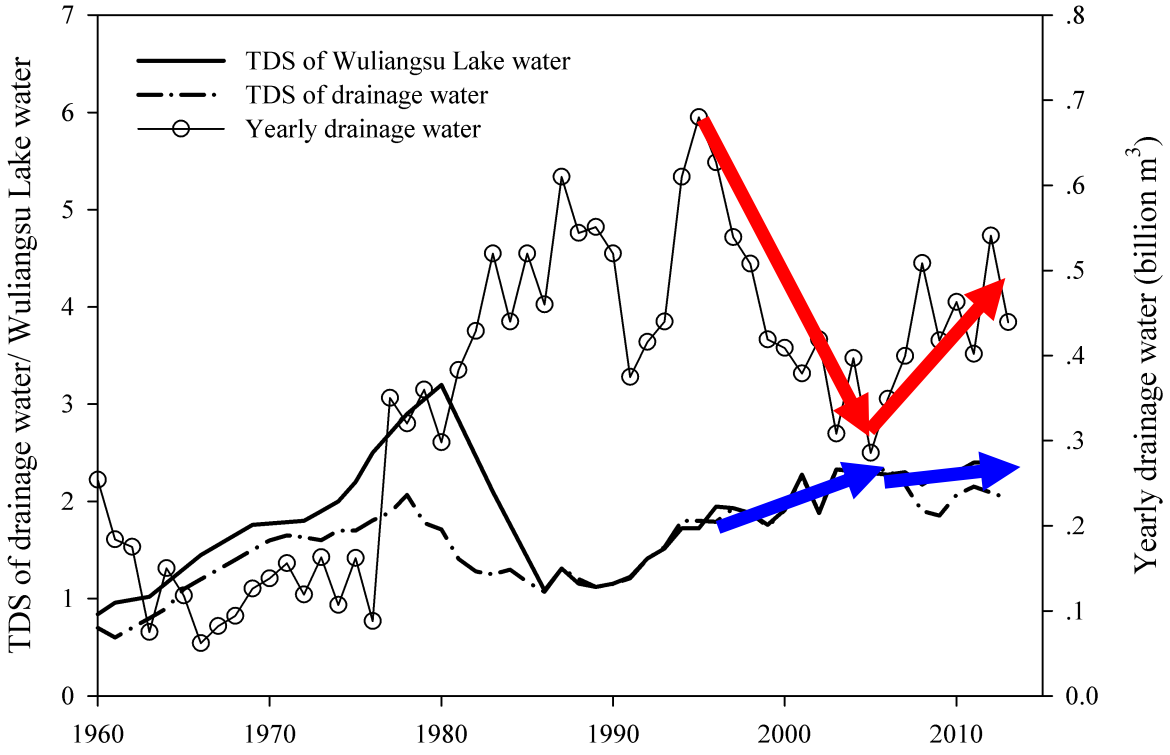
salt accumulation speeds up, potential salinization risk exists.

Findings: Salty drainage water



The quantity and the quality of GW have opposite tendency

Finding: Salty receiving lake



Lake water salinity depends on drainage

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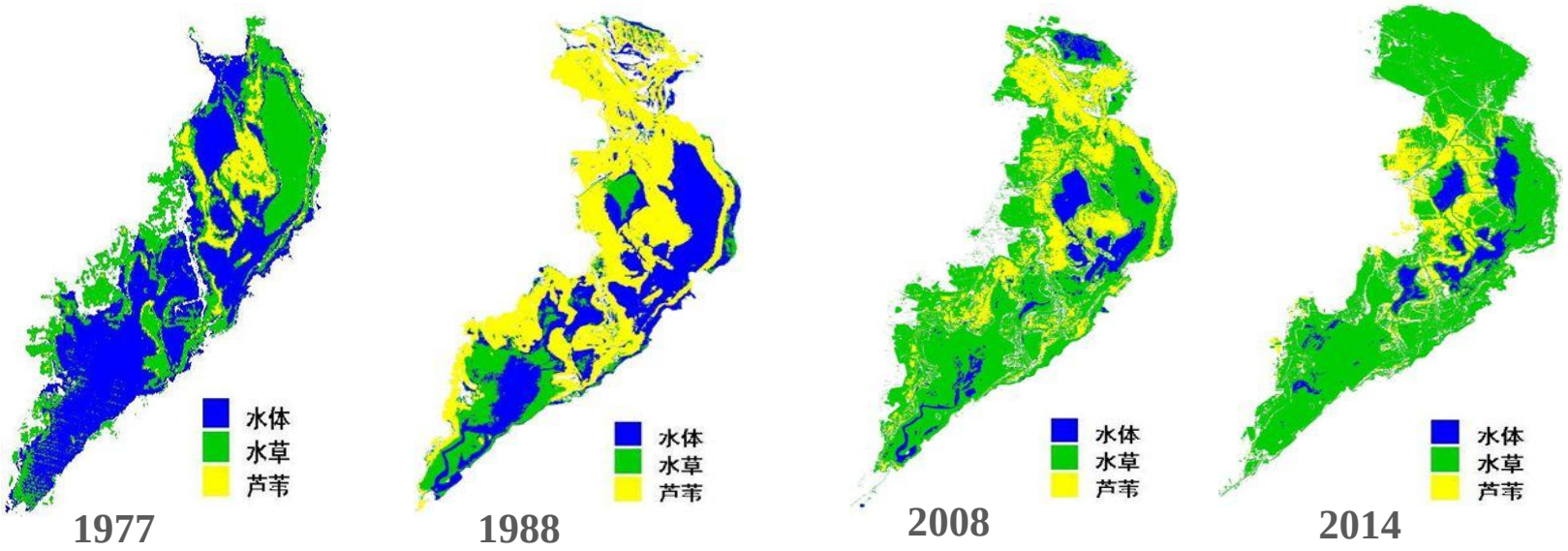
Findings: eutrophicated lake

Finding: eutrophicated lake

Table 1 Main water environmental factors in Wuliangsuhai Lake (Unit: mg/l)

Year	Total Nitrate	Total Phosphate	COD	BOD
1988	1. 75	0. 09	14.44	1. 76
1999	3. 21	0. 25	60. 01	2. 80
2003	14.61	1.52	72.10	33.01
2006	2.66	0.54	80.00	26.00
2009	2.66	0.48	58.40	3.07
2012	2.67	0.47	60.00	11.64



Discussion

- Water saving practices lower GW table, which is good for salinity control

  But they also speeds up salt accumulation, worsen groundwater quality, which possibly leads to potential soil salinization and natural vegetation degradation.

- **what's the balance point?**

- Water saving practices help to control water pollution, but they also feed wetlands, limited drainage will decrease the environmental capacity.

- **What's the balance point?**

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Conclusion

Present drainage strategies need to be adjusted to reach **balance** among soil salinity control, groundwater protection, natural vegetation recovery and wetland protection.

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Thanks for your attention !

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