

**STATUS OF GROUNDWATER IN VIETNAM
AND RECOMMENDATIONS**

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Department of Water Resources Management

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Current Status

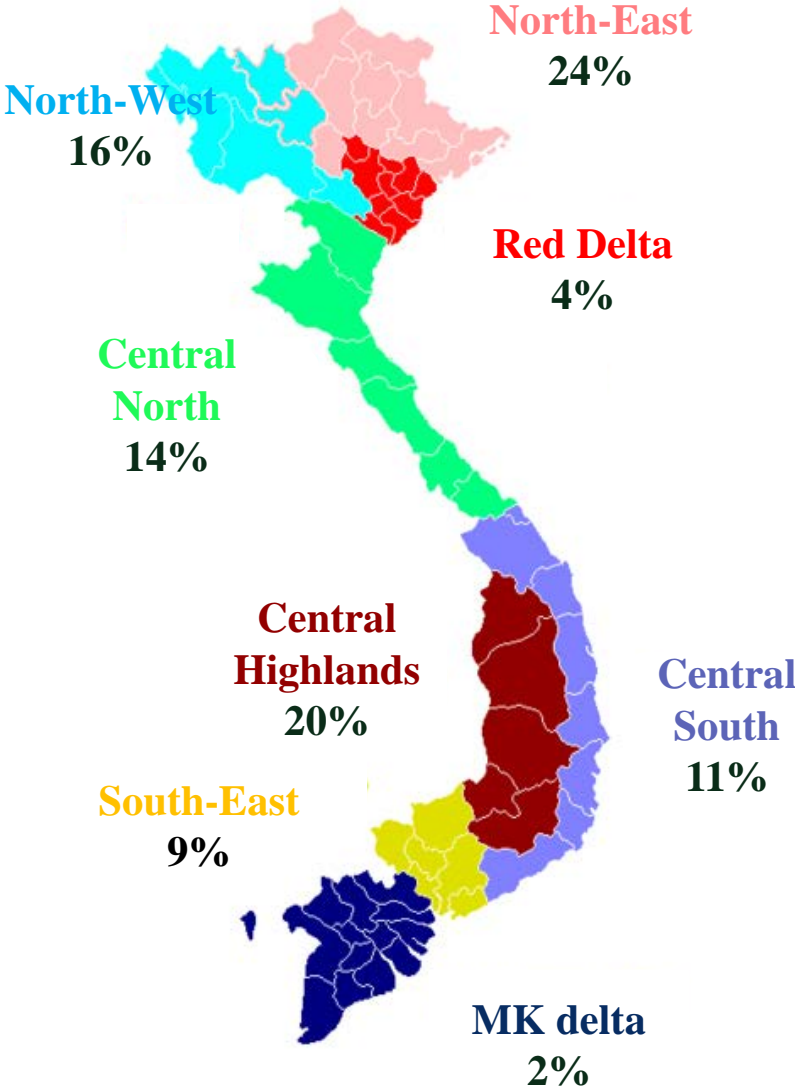
Governance

Major Issues

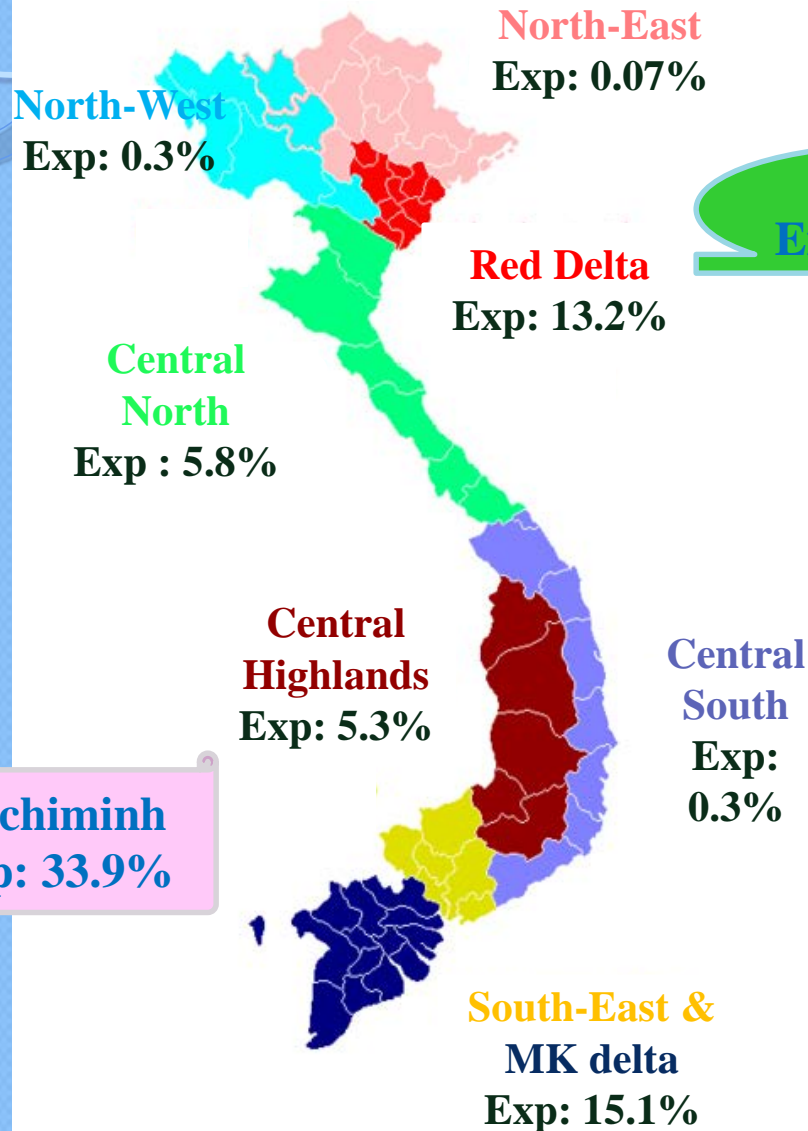
Causes of depletion

Recommendations

Distribution of Groundwater



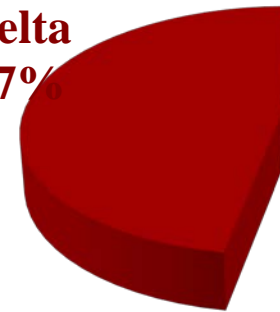
Groundwater Exploitation & Use



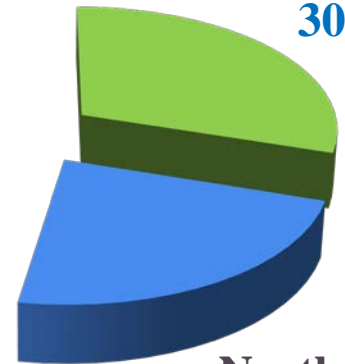
Hanoi
Exp: 21.3%

Groundwater Abstraction in Nation-wide Scope (%)

South-East & MK Delta
47%



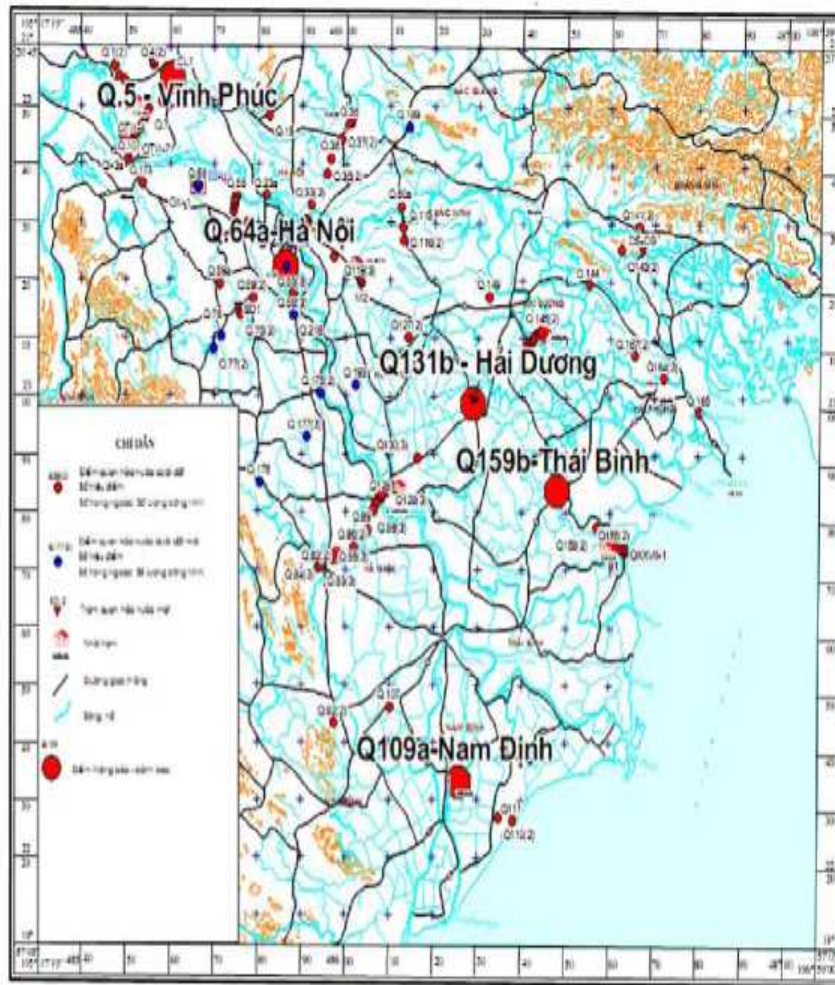
Others
30%



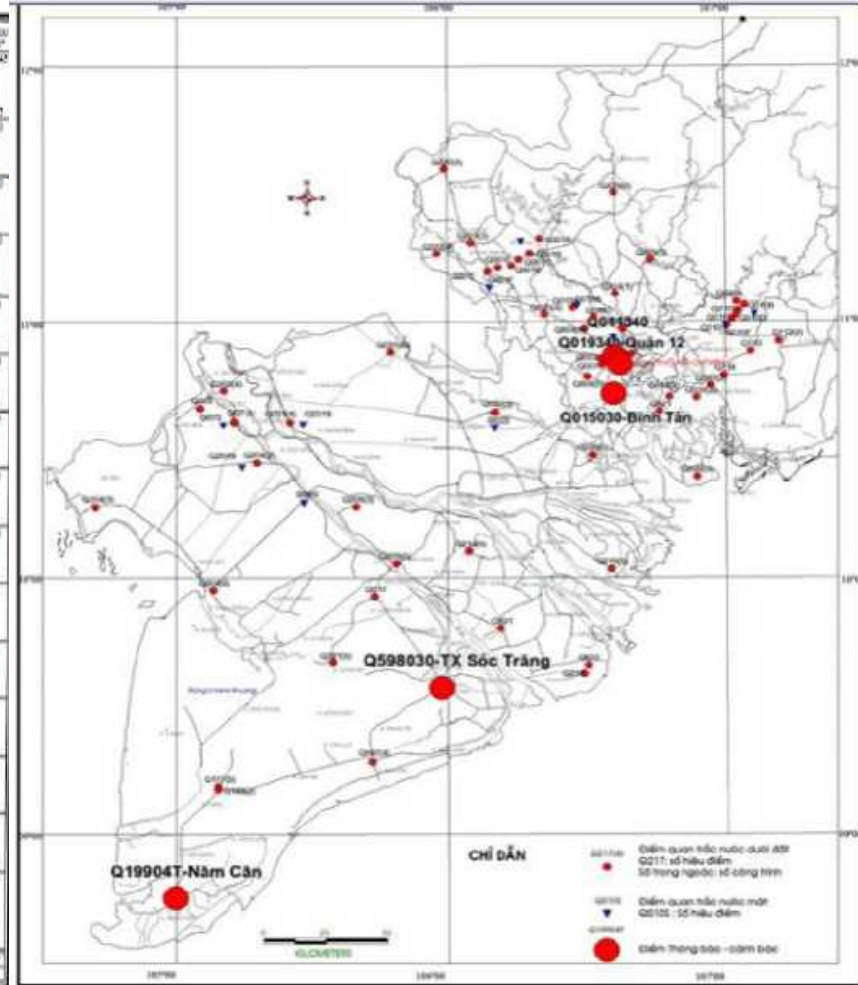
North region
23%

Hochiminh
Exp: 33.9%

Falling of Groundwater Levels



North region: average 0.16m/year



South region: average 0.21m/year

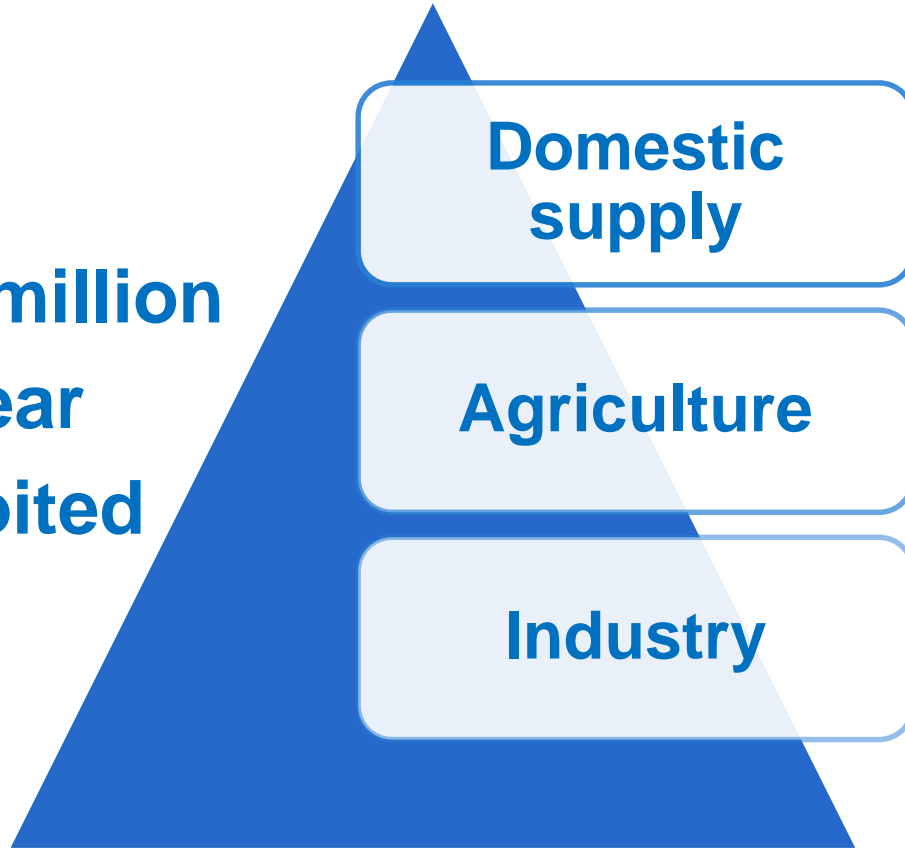
Purposes of Groundwater Use

**8.89 million
m³/year
exploited**

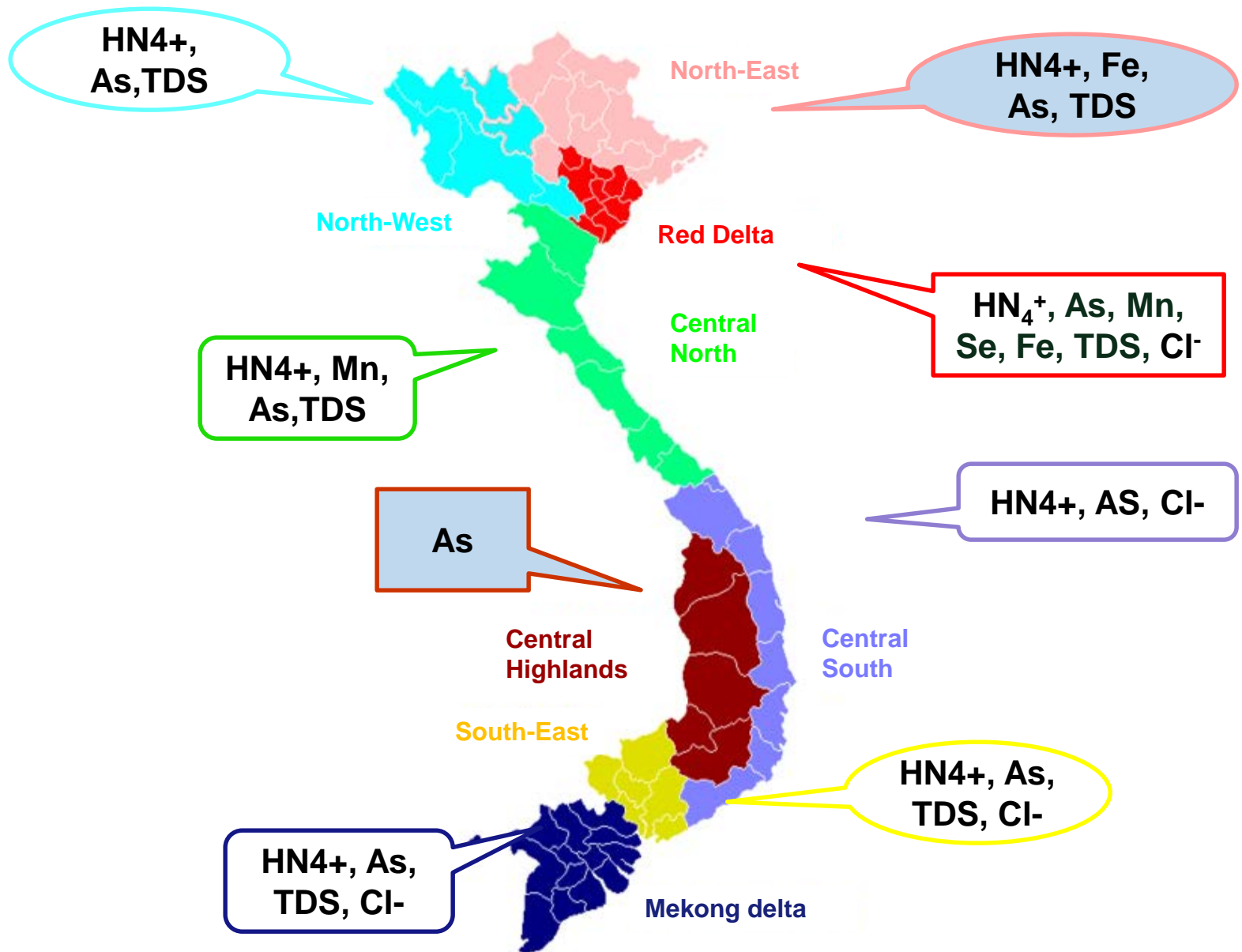
**Domestic
supply**

Agriculture

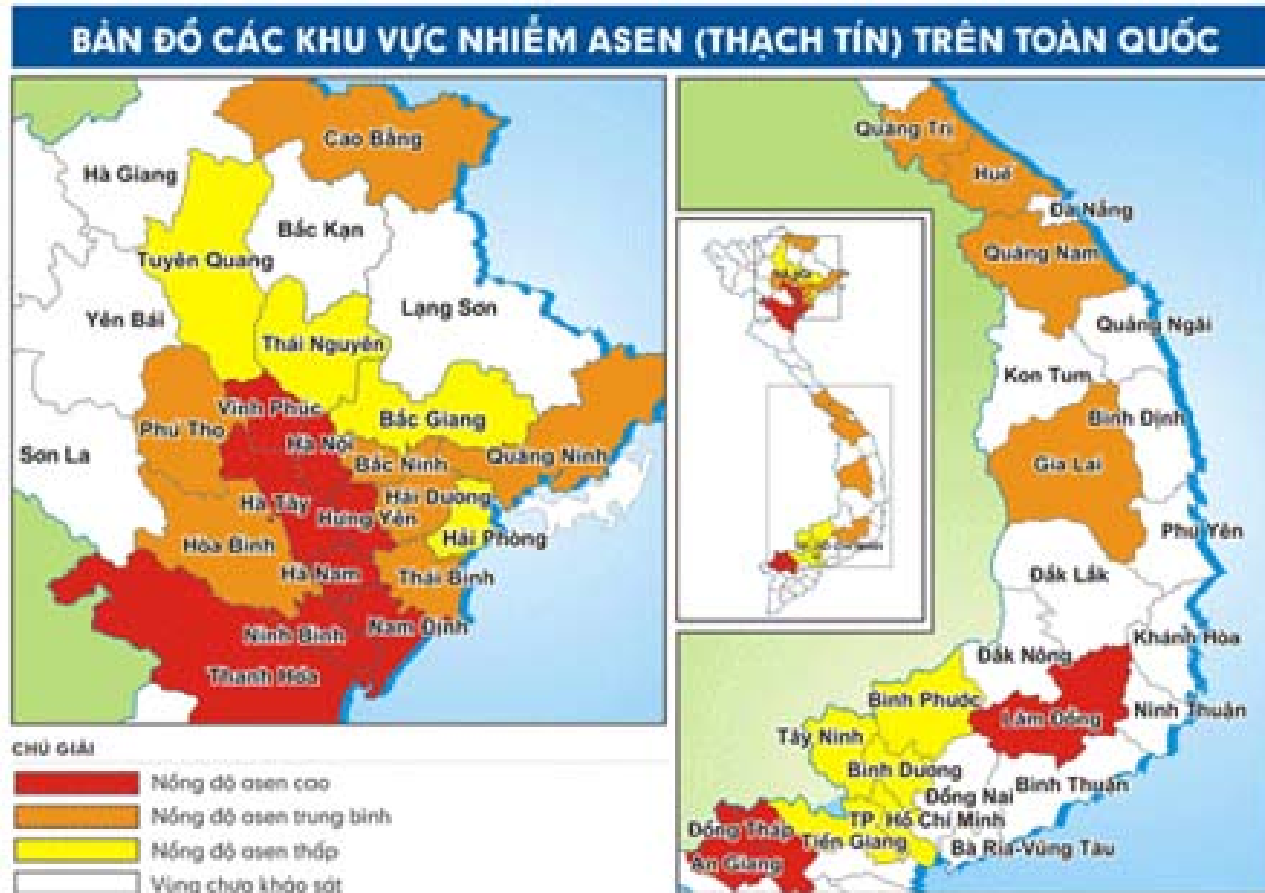
Industry



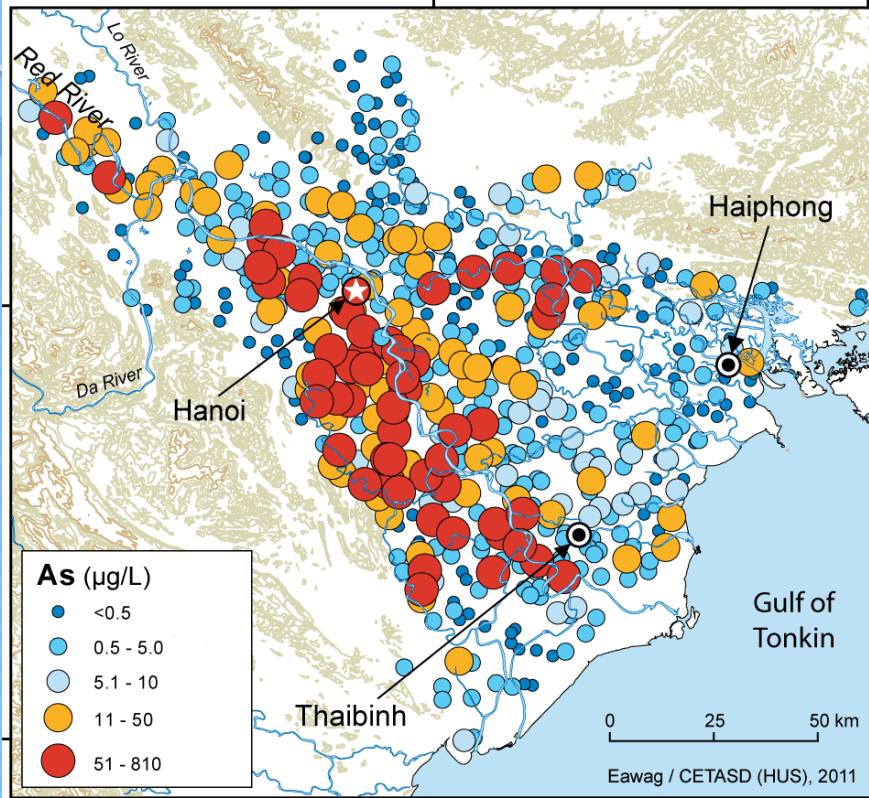
Groundwater Quality



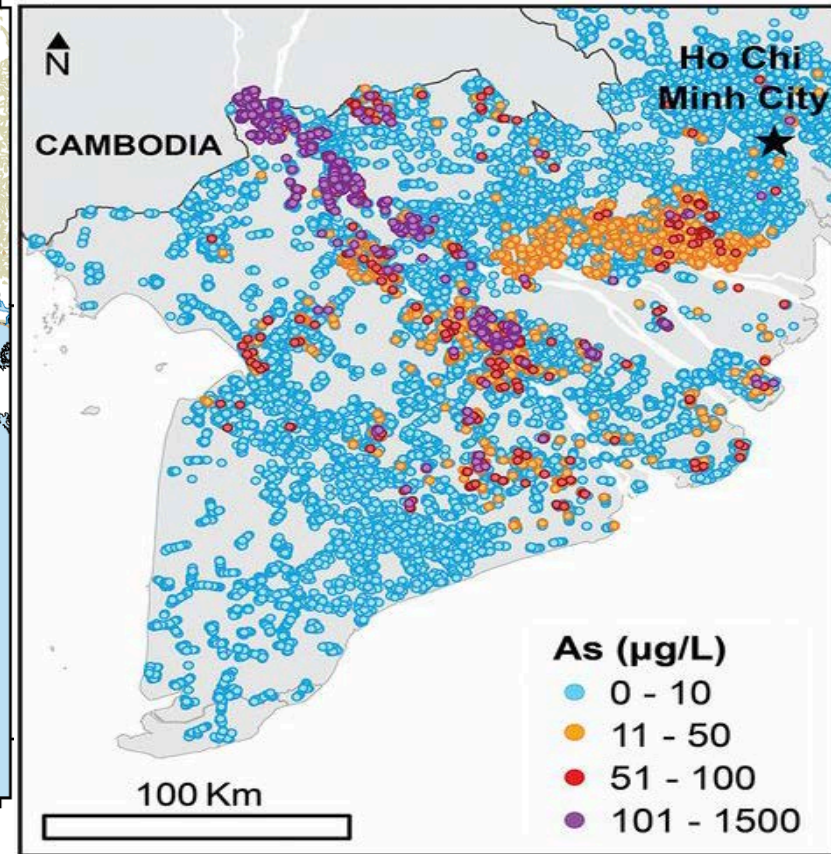
Map of Arsenic Pollution



Map of arsenic pollution (cont.)



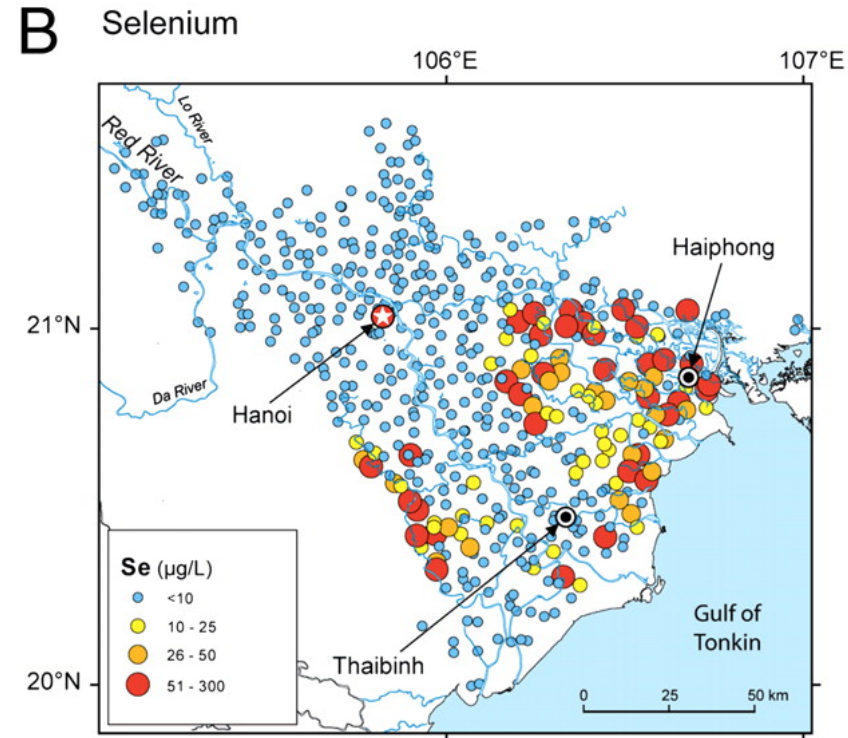
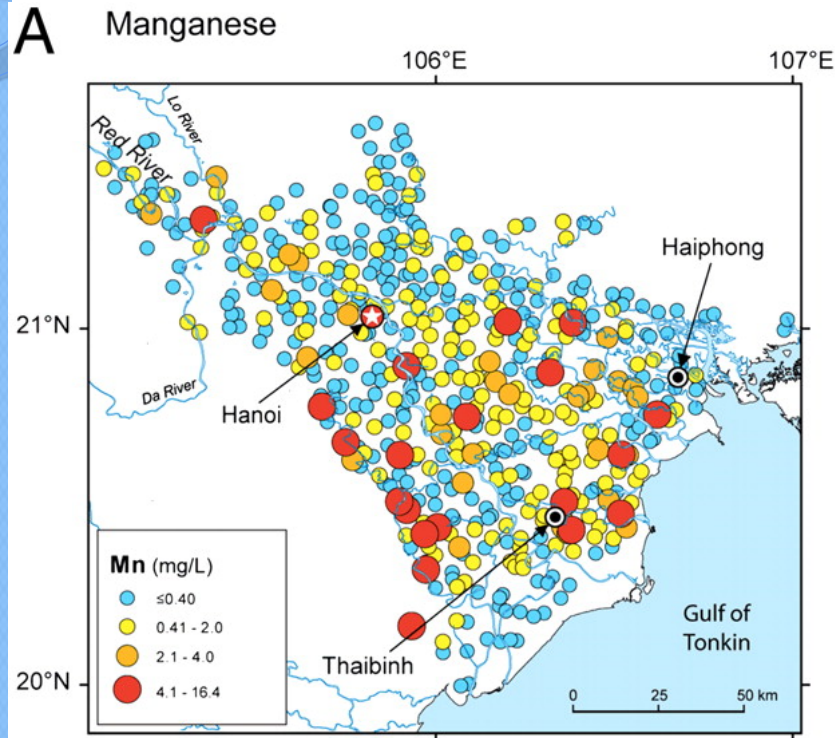
Red Delta



Mekong Delta

Supplementary information to research article "Arsenic pollution of groundwater in Vietnam exacerbated by deep aquifer exploitation for more than a century", published in PNAS. doi:10.1073/pnas.1011915108
Weblink: www.eawag.ch/arsenic-vietnam

Groundwater Pollution (cont.)



Red River Delta

Groundwater Governance

Legal Documents

- Law on Water Resources
- Decree 201/2013/ND-CP
- Circular 27/2014/TT-BTNMT

Key issues

- Licensing
- Planning
- Restriction Zones (prohibited, limited and registered areas)

Major issues

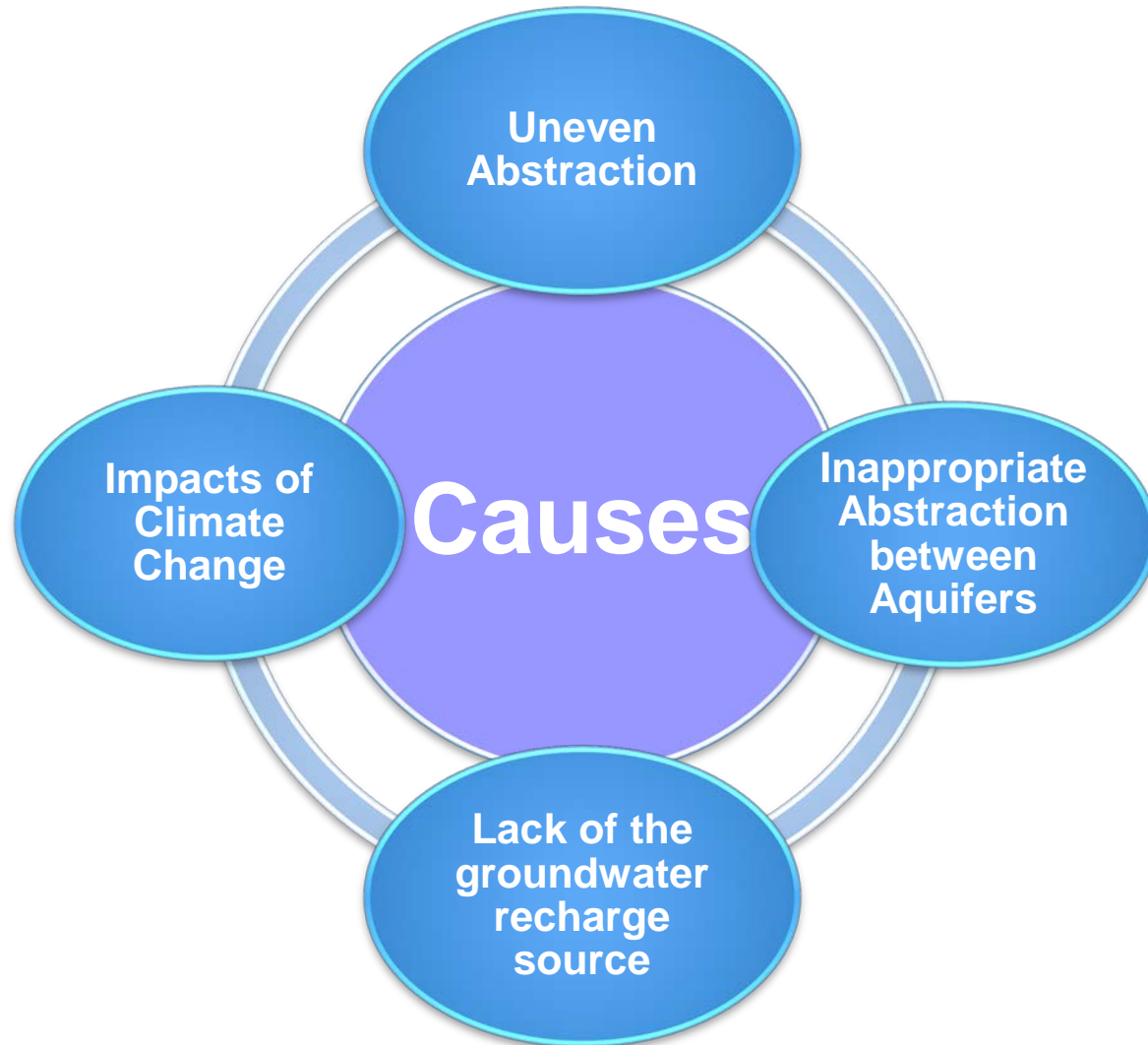
Falling of Groundwater Level

- Red River Delta
- South – East Region
- Mekong Delta

Groundwater Pollution

- **Arsenic:** highest in Red river delta (18.7%) and lowest in North-west (0.1%)
- **Salinity:** coastal-zone provinces, especially in the Central South Region, Dong Nai province and Mekong delta

Causes of Groundwater Depletion



Recommendations

