

Managing the groundwater threat to urban resilience

Urban groundwater management and governance

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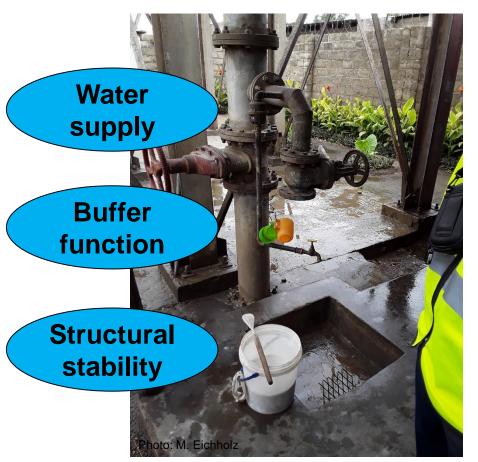
BGR – Policy advice

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Urban groundwater – functions and threats









Groundwater pollution threatens water supply

Lusaka (Zambia):

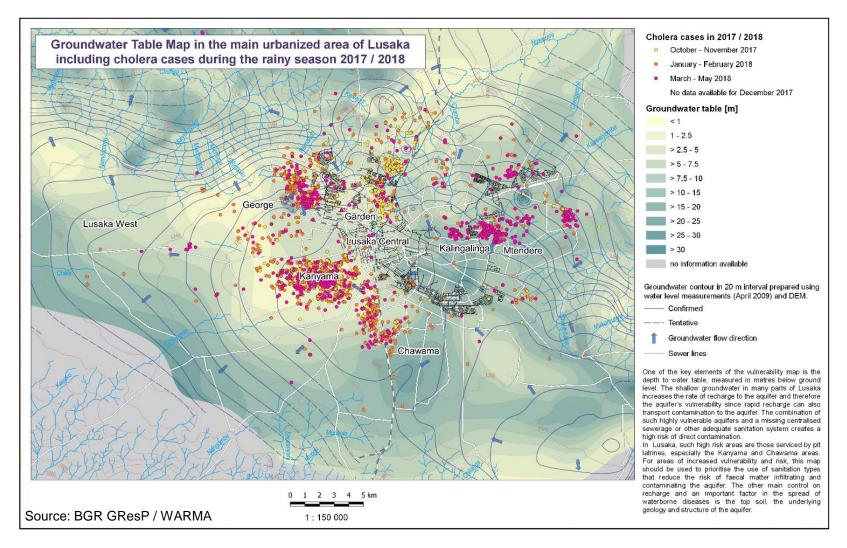
- Nearly 3 Million inhabitants by 2021, 70% live in periurban areas
- Groundwater covers
 Lusaka's water supply (60%)
- Karstic dolomite aquifers with good yields but high vulnerability
- Sanitation often absent: only 17% of the faecal matter safely managed







Groundwater pollution threatens water supply







Groundwater and structural stability

 Bangkok: coastal metropolitan region with about 15 Mio. inhabitants

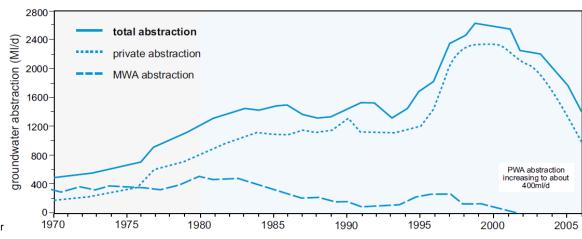
 Heavy groundwater abstraction since the 1950ies, boom of private wells

 Consequences: land subsidence and seawater intrusion

City flooding

Structural damages in infrastructures





Gulf of Thailand





BANGKOK

depression (in m) of piezometric surface of confined 3rd sub-aquifer

> land-surface subsidence

in 1985 20 - 40 cm

Urban groundwater – measures and ways forward

Water supply

Pollution

Protect aquifers

Good groundwater governance

Buffer function

Overexploitation Regulate abstraction

Adaptive groundwater management

Structural stability

Land subsidence

Manage recharge

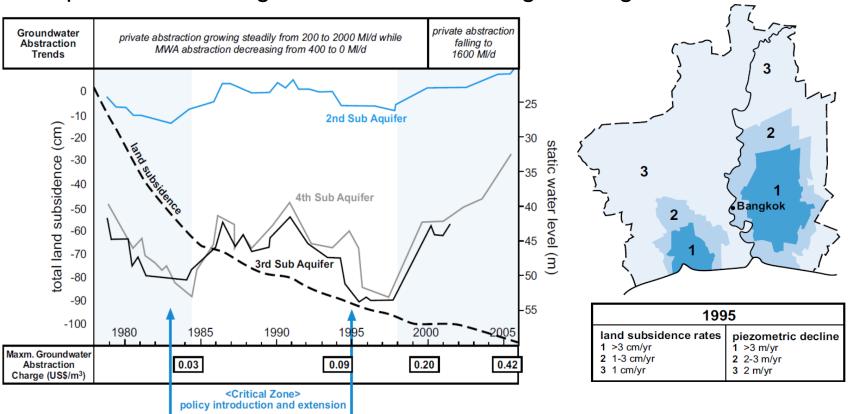
Conjunctive water use





Groundwater regulation and adaptive management: Case Bangkok

Implementation of groundwater monitoring and regulation



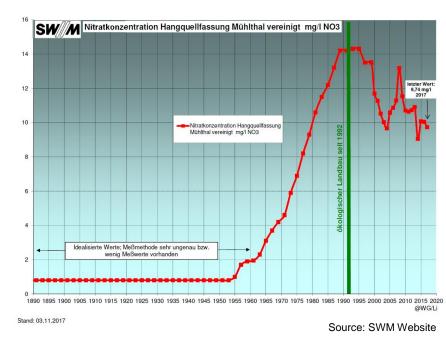




Source: Buapeng & Foster 2008

Good governance for groundwater protection Example: Munich

- Munich: 1,5 million inhabitants, dependent on groundwater from southern rural areas
- Water quality affected by nutrient pollution from agriculture
- Since 1992: collaborative approach to groundwater protection, promotion of organic farming by
 - Buy out of strategic recharge areas
 - Contracts with farmers (incl. direct financial transfers)
 - Utility supports farmers in commerzialition of products
- → Currently 165 farms and 3900 ha are under organic farming
- → Nitrates trend decreasing since 1995







Conjunctive water use and management

Diversification of water Efficiency resources → fosters resilience gains Need for innovation and smart Freshwater demand thinking Wastewater reuse Desalinization Interbasin water transfer Rainwater harvesting Surface water Local Precipitation Artificial recharge recources Groundwater

Timeline





Source: BGR

Thank you for your attention.

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