Challenges of the Groundwater Management in Can Tho City, Vietnam

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BGR- Symposium
Sanitation and Groundwater Protection
14.10.-17.10.2008
Hannover

Environmental Engineering + Ecology
Professor Dr. Harro Stolpe
Ruhr-University Bochum

SANSED-Project

- Closing Nutrient Cycles in Decentralized Water Treatment Systems in the Mekong Delta, Vietnam

- 3 involved Universities
  - Ruhr University Bochum, Germany
  - University of Bonn, Germany (Coordinating)
  - University of Can Tho, Vietnam

- 8 German private companies

- 2003 – 2008

- Funded by the Federal Ministry of Education and Research of Germany (BMBF), PT FZ Karlsruhe

Vietnam

- Can Tho

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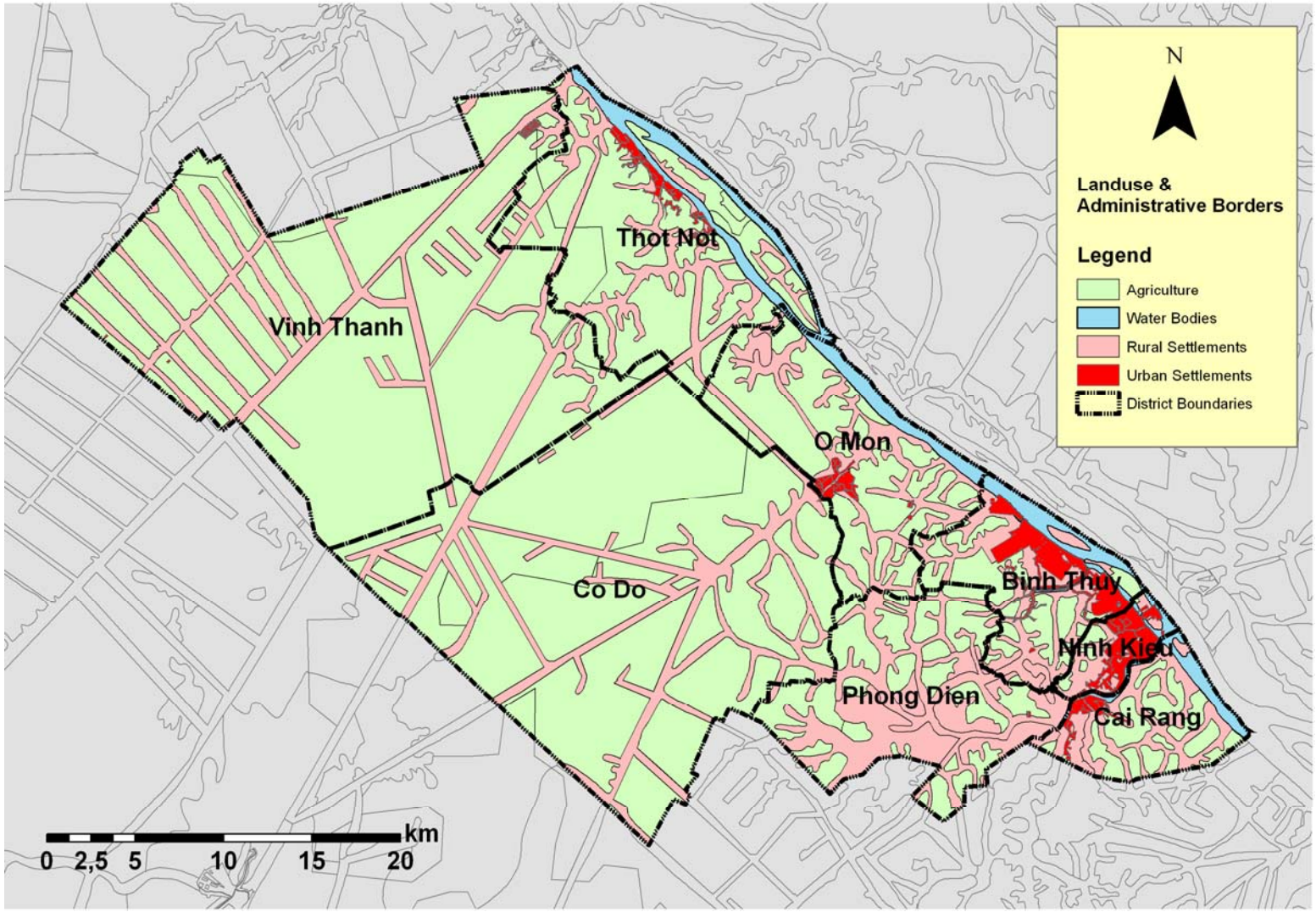
Can Tho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Landuse &
Administrative Borders
Legend
Agriculture
Water Bodies
Rural Settlements
Urban Settlements
District Boundaries
Thot Not
Vinh Thanh
O Mon
Co Do
Binh Thuy
Ninh Kieu
Phong Dien
Cai Rang
km
0 2,5 5 10 15 20

Can Tho

Can Tho

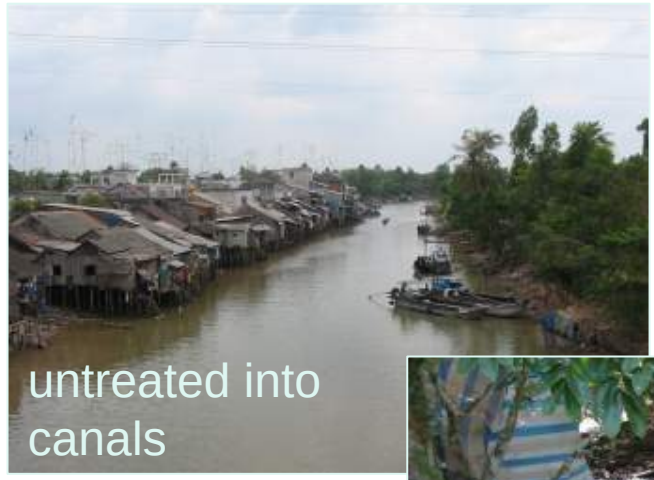
Sanitation in Vietnam

	2005	2010	2020
National Rural Clean Water Supply and Sanitation Strategy up to the Year 2020 (1998)		Rural Areas 85 % acess to a min. of 60 l/d*capita 70 % access to latrines	Rural Areas 100% acess to a min. of 60 l/d*capita 100% acess to latrines
Vietnam Developmet Goals (2001)	Water supply: 60 % (rural areas) 80 % (urban areas)	Water Supply: 80 % (rural areas) 85 % (urban areas) Waste Water Treatment of 100% of the urban waste water	

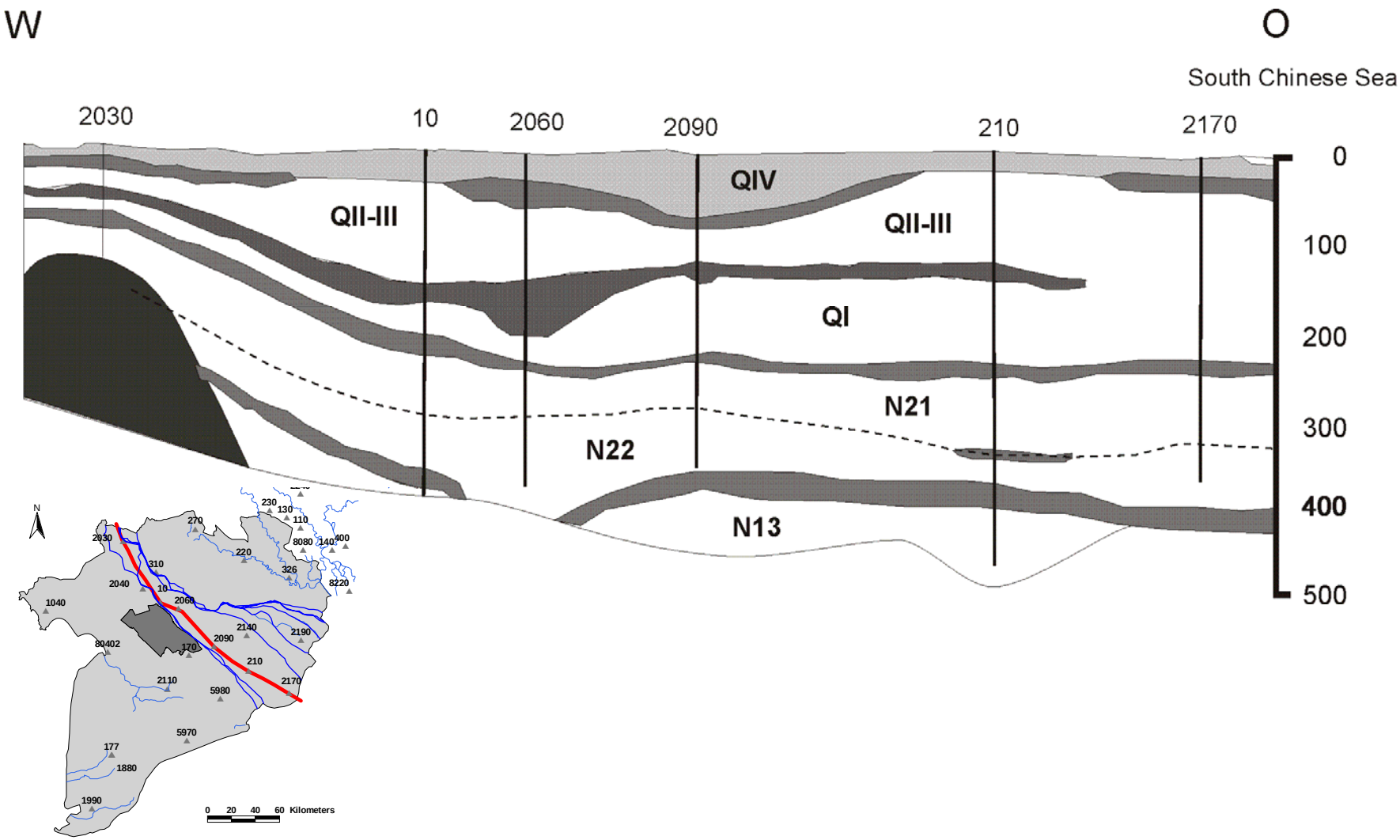
Sanitation

- Responsible Authorities
  - Center of Rural Water Supply and Sanitation (Department of Agriculture and Rural Development)
  - Department of Health
- Concept
  - Use of Septic Tanks
  - Use of Groundwater as hygienically safe drinking water resource
    - Remote areas: Small scale tube wells
    - Decentralized Water Treatment Plants (Groundwater, Capacity 60 m^3/d)
  - VAC(B)-Modell

Waste Water
from households
and farms



Groundwater Use



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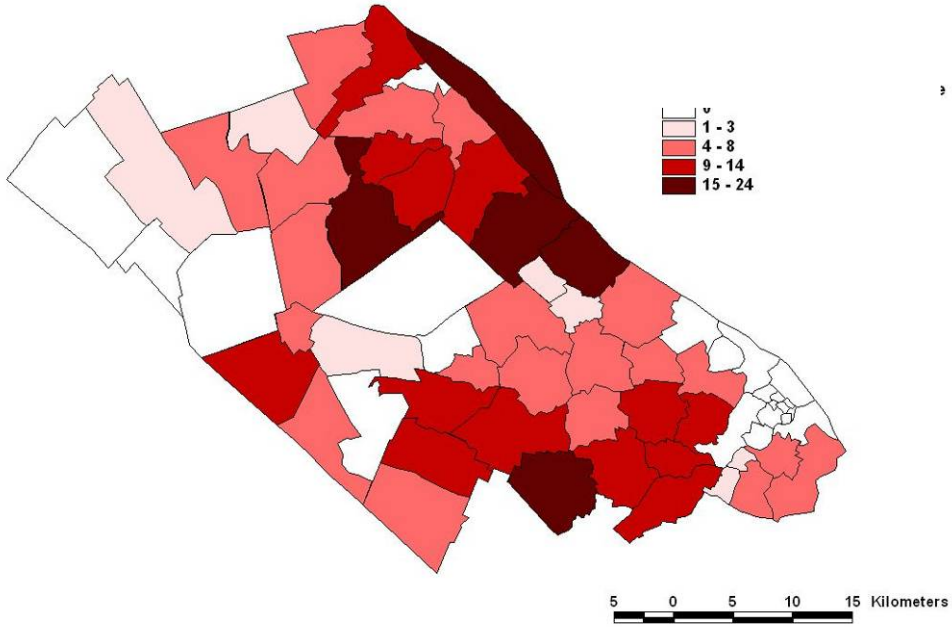
Groundwater Use

Accessed HHs per supply station

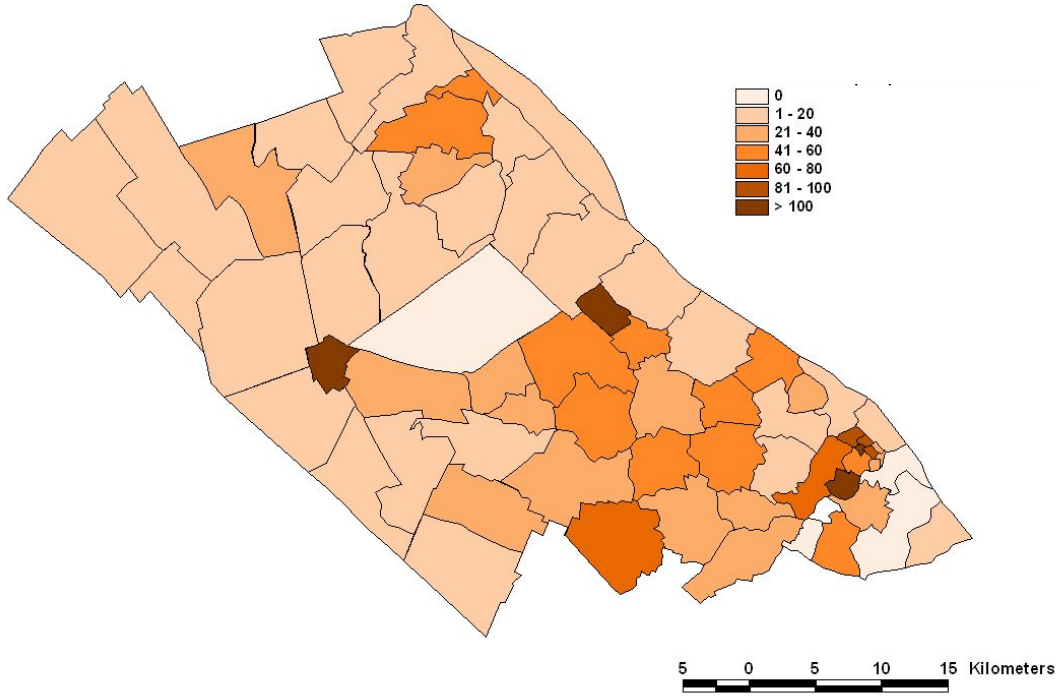
Groundwater supply stations per community



396 ground water supply stations in Can Tho
Accessed to QII-III

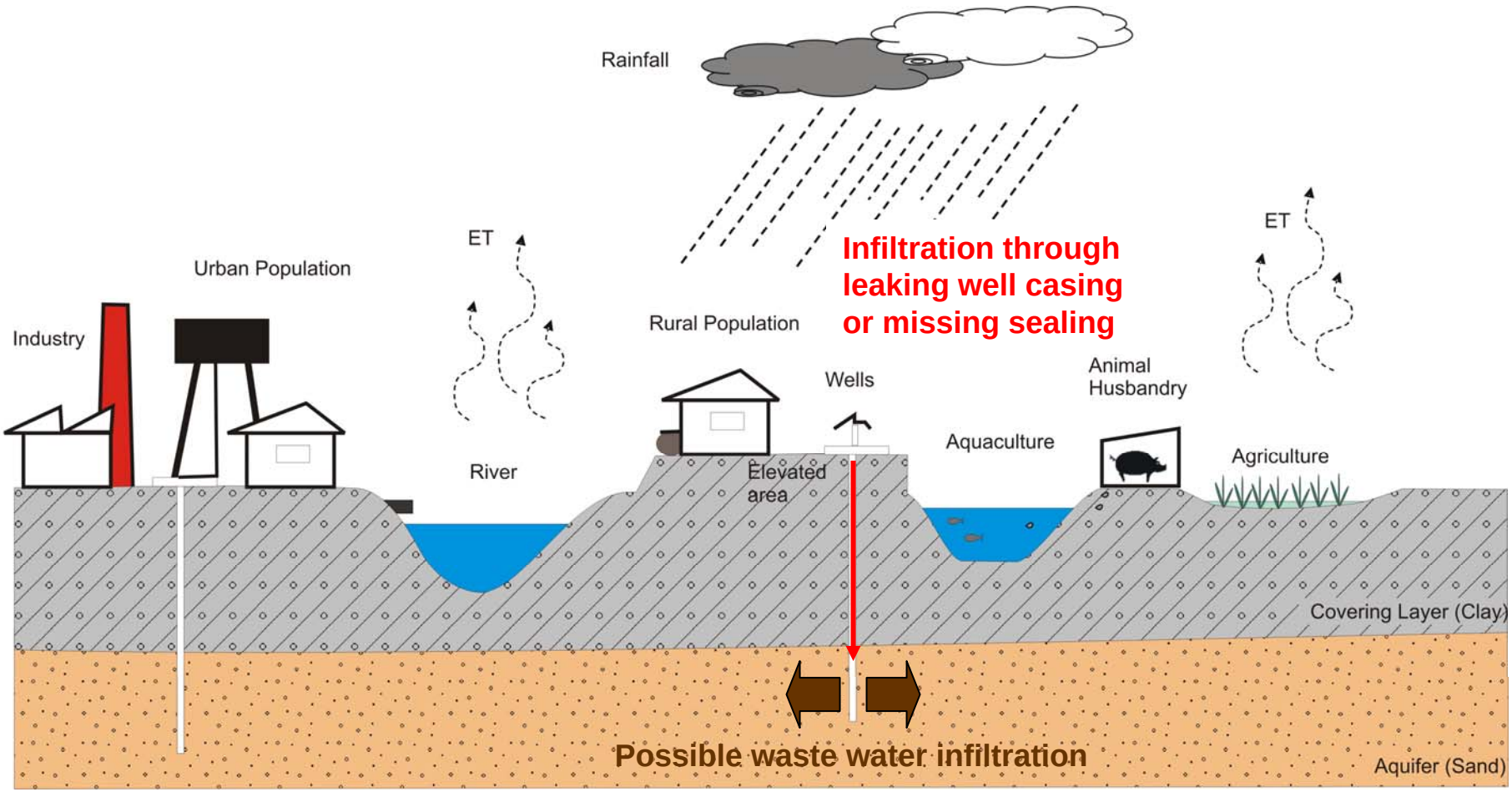
Groundwater Use

Small scale tube wells per km²



32.000 known small scale tube wells in Can Tho
Depth 60 – 100 m below surface

Impacts on Groundwater Quality



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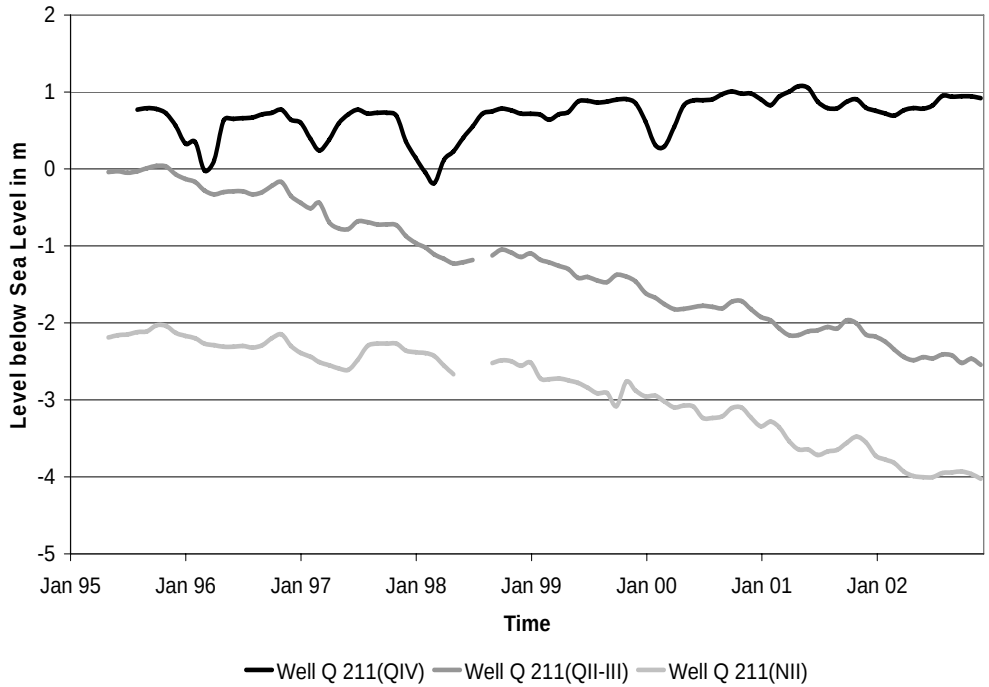
Impacts on Groundwater Quantity

Growing Pressures on Groundwater

- Rapid population and economical growth
- Use of surface water for waste water disposal
- Use of groundwater as a safe source

Groundwater Resource



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Conclusions

QUALITY IMPACTS

- Good protection of main aquifer through the covering layer

- Possible impacts on groundwater quality through wells
  - Short cuts because of leaking well casings or missing sealing
  - Use of „dry“ small scale tube wells for „waste water disposal“ reported

QUANTITY IMPACTS

- Lack of waste water treatment causes higher groundwater abstraction

- Overexploitation of groundwater resources observed
  - Rapid declining groundwater tables
  - In 5 – 10 years use of GW through suction pumps not possible anymore

Approaches

- Implementation of decentralized waste water treatment concepts (www.sansed.uni-bonn.de)

- Removal of small scale tube wells should include sophisticated backfill and sealing

- Implementation of alternative drinking water treatment methods
  - rainwater storage,
  - artificial groundwater recharge,
  - slow sand filtration

- Coordinated groundwater monitoring concept
  - Transboundary monitoring
  - Monitoring of quantity and quality

- Introduction of an IWRM-Concept (www.iwrm.vn)

Contact and more information

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Outline

- Introduction
- Investigation Area
- Sanitation in Vietnam
- Groundwater Use in Can Tho City
- Impacts of Sanitation on Groundwater Quantity
- Impacts of Sanitation on Groundwater Quality
- Conclusions

Involved Private Companies

bioreact
FERMENTATION SYSTEMS & BIOREACTORS

gewitra

HUBER
TECHNOLOGY

sachsenWasser
consulting + operations + management

F+E Arbeitsgemeinschaft
Nachhaltige Aquakultur

B3 BiogasBeratungBornim GmbH
Eine Ausgründung des ATB

Ith Ingenieurbüro für
technische Hydrologie
Thilo Herrmann

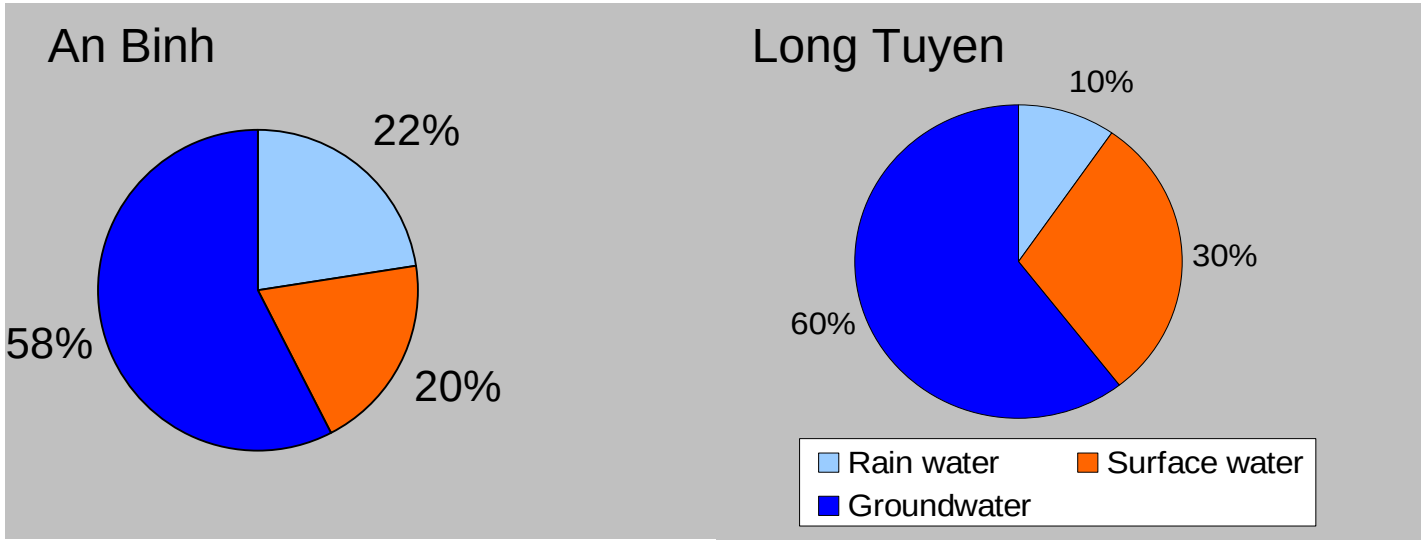
Vietnam in figures

	VN	Germany
Population	80 Mio.	82 Mio.
Area	327 000 km²	357 000 km²
GDP	36,40 Billion Euros	2 168,82 Billion Euros
Economical Growth	8 %	1 %
Average Age	26 years	40 years
Climate	tropical - subtropical	moderate

Can Tho

Idea of the Project

Water sources utilised for drinking water purposes



- 60 % use of Groundwater as drinking water
- General: use of different water sources in parallel

(Wienecke, 2005)