



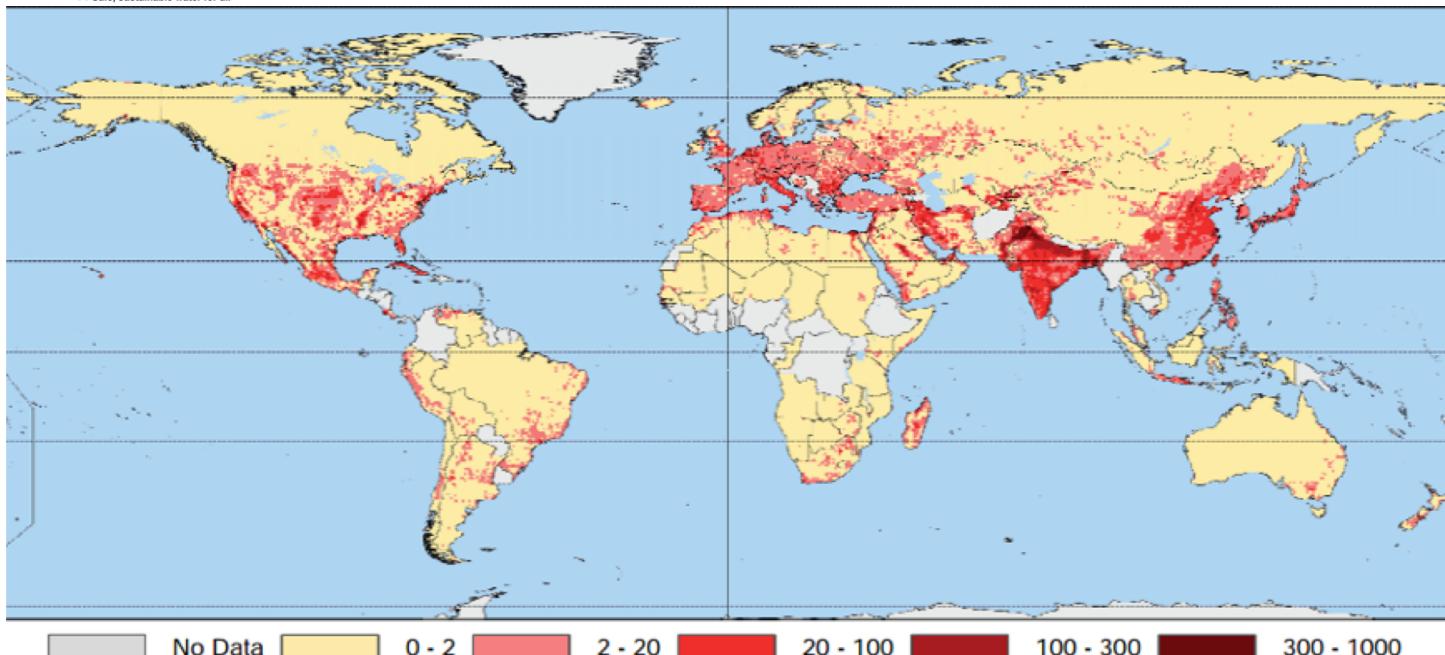
Arghyam

Safe Sustainable Water for All

Urban Groundwater: Challenges & Possibilities

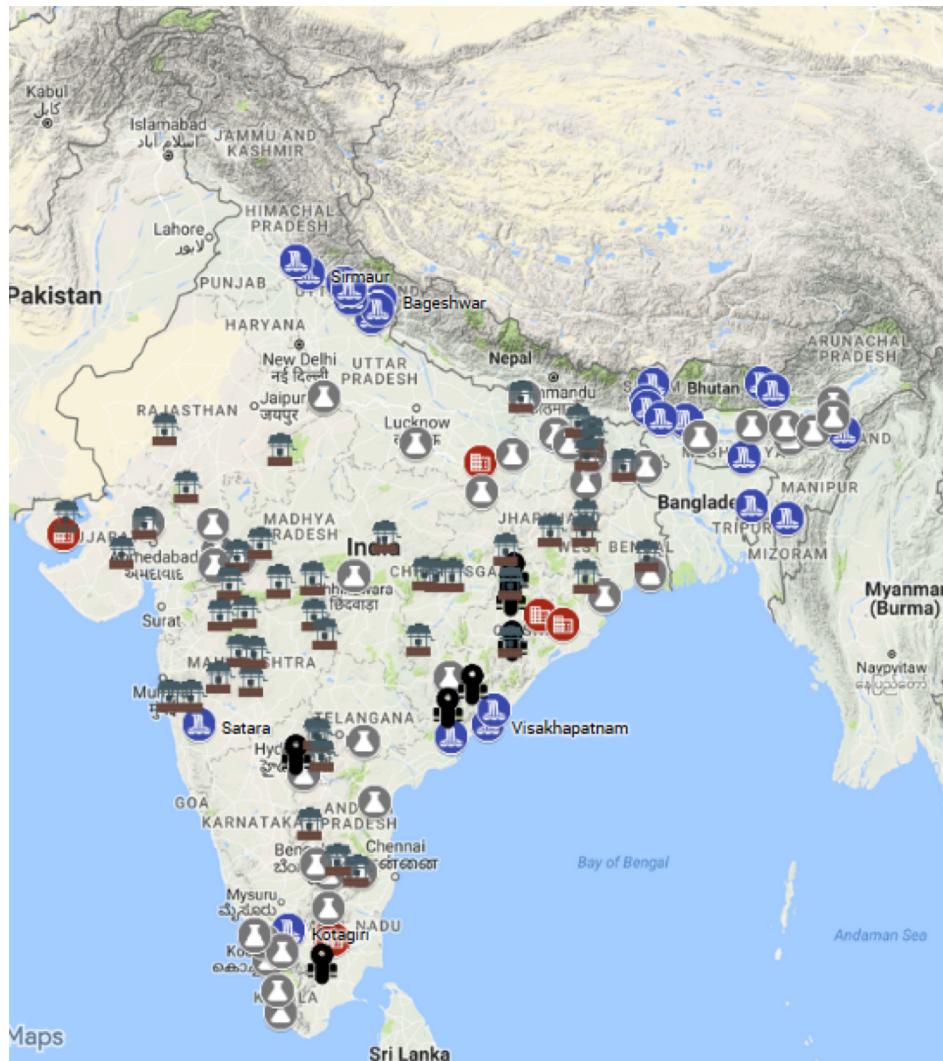
WORLD WATER WEEK
STOCKHOLM, SWEDEN
August 2018

India: World's Largest User of Groundwater



Source: Wade et al 2010, American Geophysical Union

PROGRAMME FOOTPRINT



Groundwater

Springs

Sanitation

Urban

Water Quality

115 projects in 22 states

5 Mn people reached

India water Portal (IWP)

Urban Vulnerability: GW-SAN Nexus

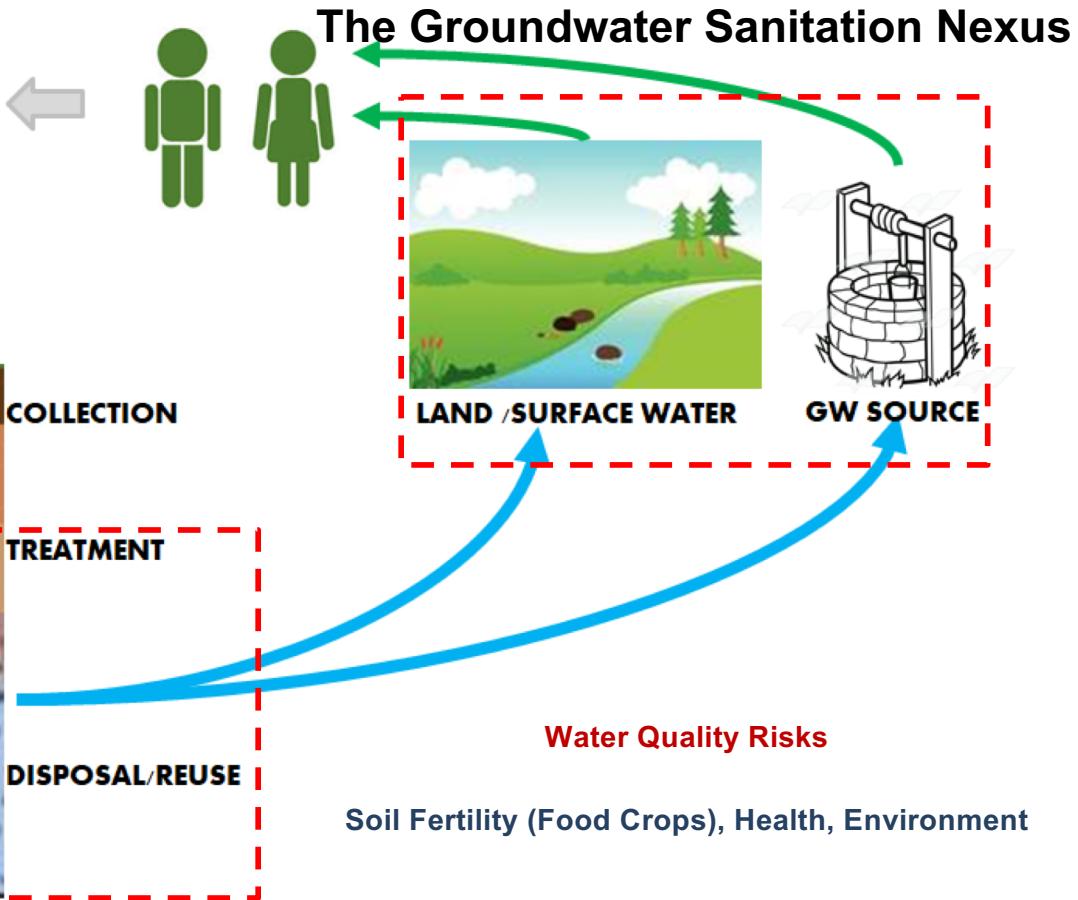
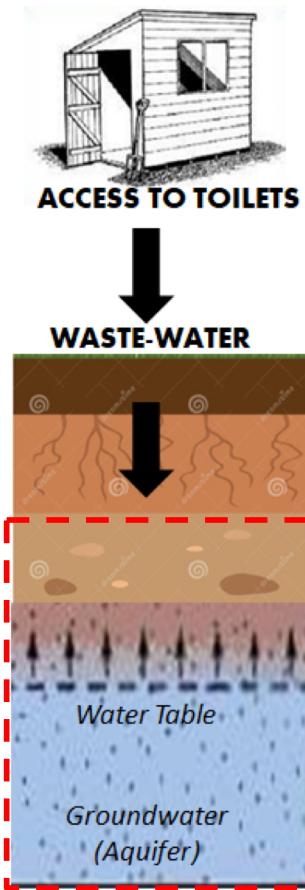
SGD 6 | 200 mn people lack access to safe drinking water in urban areas
Dependence | 50% Domestic use in Urban
Diversity | Hydrogeology & Demography

Institutions | Fragmented
Capacities | Uneven
Policies | Multiple



SGD 6 | Poor Sanitation Systems
Diversity | Urban, Peri-urban, Rural
Contamination | High Coliform

Rural & Urban | Weak
Sewerage | 26% covered
O & M | Weak Systems





GW-SAN RESEARCH GUIDING FRAMEWORK

*Hydro geological
settings*

Climatic conditions

*Contamination
pathways*

Hydraulic loading

Settlement density

**Identify
Parameters**
that influence the
GW-SAN Nexus

**Build
Thrust Areas**
On the interplay of
various parameters

**Physical
Spaces**
Rural
Peri-urban,
Urban

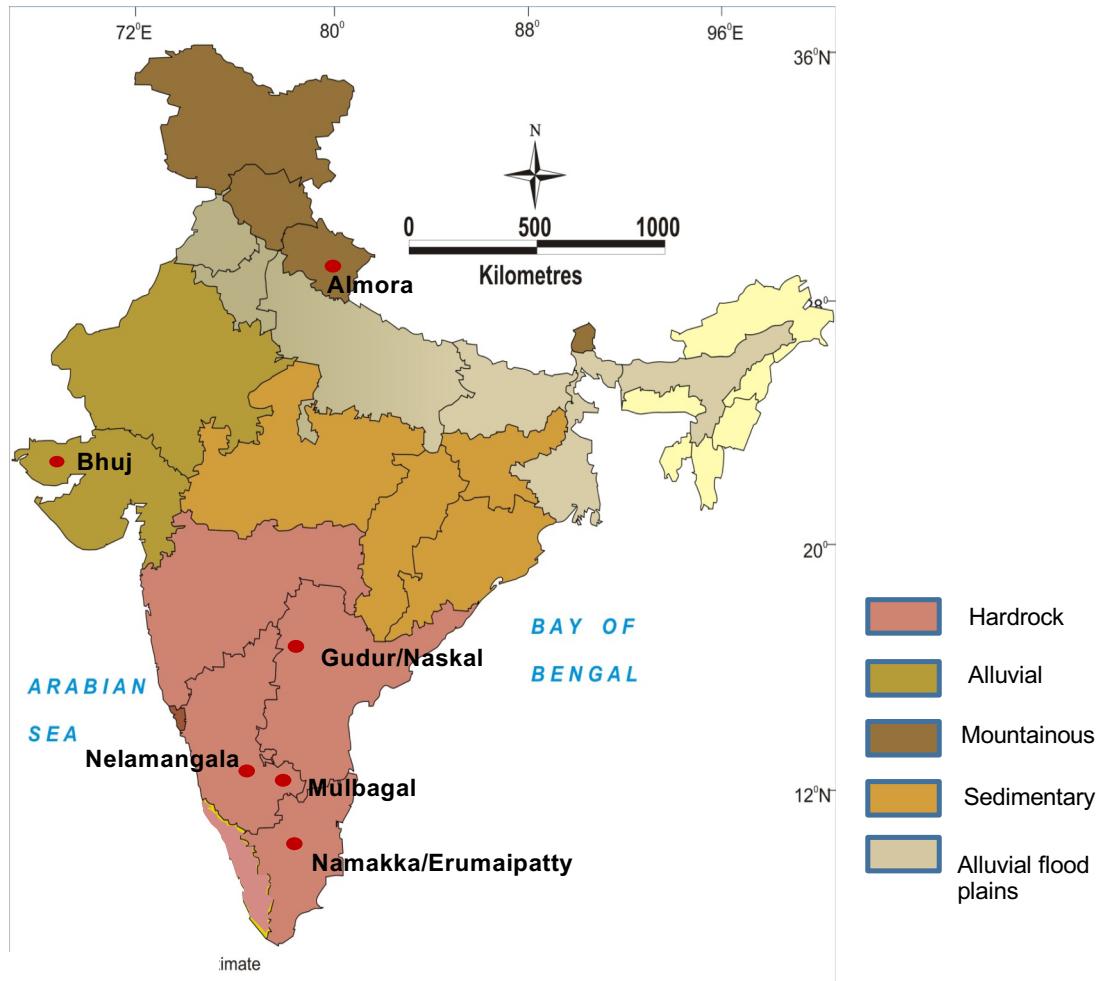
PROJECT FINDINGS

EXPECTED OUTCOMES

- Bridge the knowledge gaps
- Develop / Strengthen design guidelines
 - Designs of toilets and wells
 - Innovative Reuse of Wastewater

INFORM POLICY AND PRACTICE (SERVICE END AND USER END)

Research location and typologies

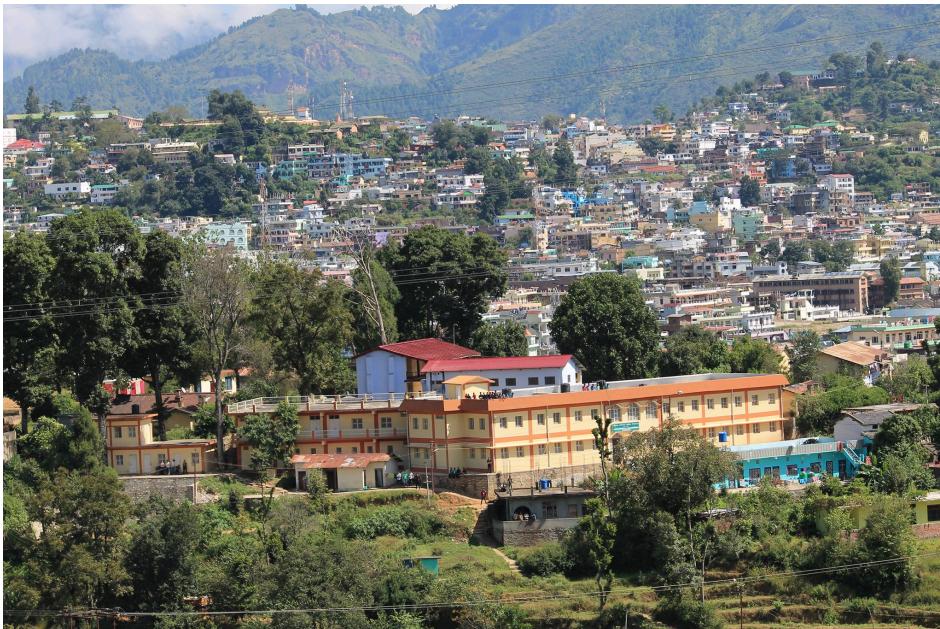




KEY FINDINGS



Seasonal Variation in Fecal Coliform : Mountainous (Almora)



Fecal Coliform contamination in the post monsoon season indicates that soak pits affect groundwater quality

Grey water recharge in Peri-Urban (Nelamangala)



GW samples collected from downstream show increasing COD and decreasing chloride trends indicating greywater recharge

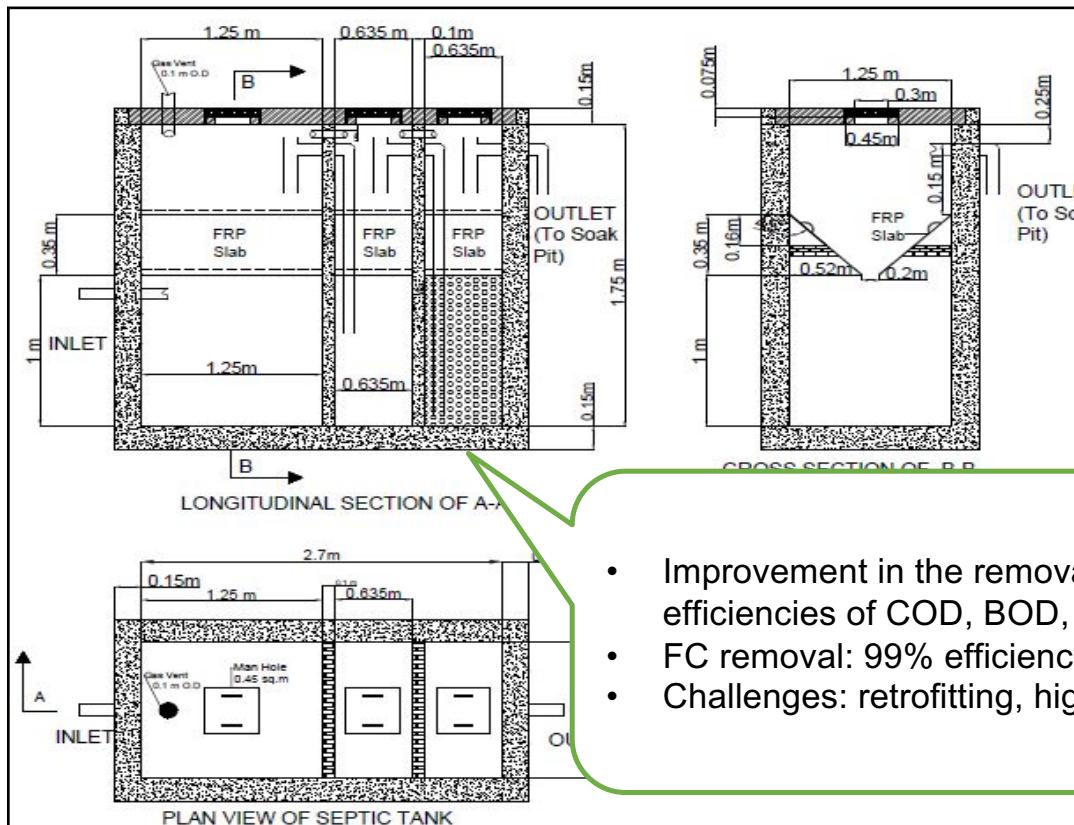
Calls for awareness creation and behaviour change

High Vulnerability of Urban Poor

- No sanitation, no affordable water treatment options
- These households are also likely to live in high density areas which carry higher risk of contamination
- Economic losses 1.75 times the national average



Improved Septic Tank: Advantages and Challenges



- Improvement in the removal efficiencies of COD, BOD, TSS
- FC removal: 99% efficiency (60%)
- Challenges: retrofitting, high cost



Lessons Learnt

- Always factor in the hydrogeological characteristics for planning
- Concentrate on decentralized governance capabilities
- Insist on more scientific or evidence based decision making
- Holistic approach to sanitation: solid+liquid waste management in addition to toilets and hygiene



Key Messages

Need for a Knowledge platform for

- Ensuring collaborations between practice-policy-research
- Removing friction for the flow of usable knowledge and data
- Building distributed capabilities for capacity building
- Data based decision support systems
- Strengthening local institutions and facilitating community participation

NATIONAL POLICY IMPACT- INDIA

- **Recognized need for ongoing action-research**
- **Recommendations may impact National Sanitation Mission phase II**



THANK YOU



www.arghyam.org

www.indiawaterportal.org

