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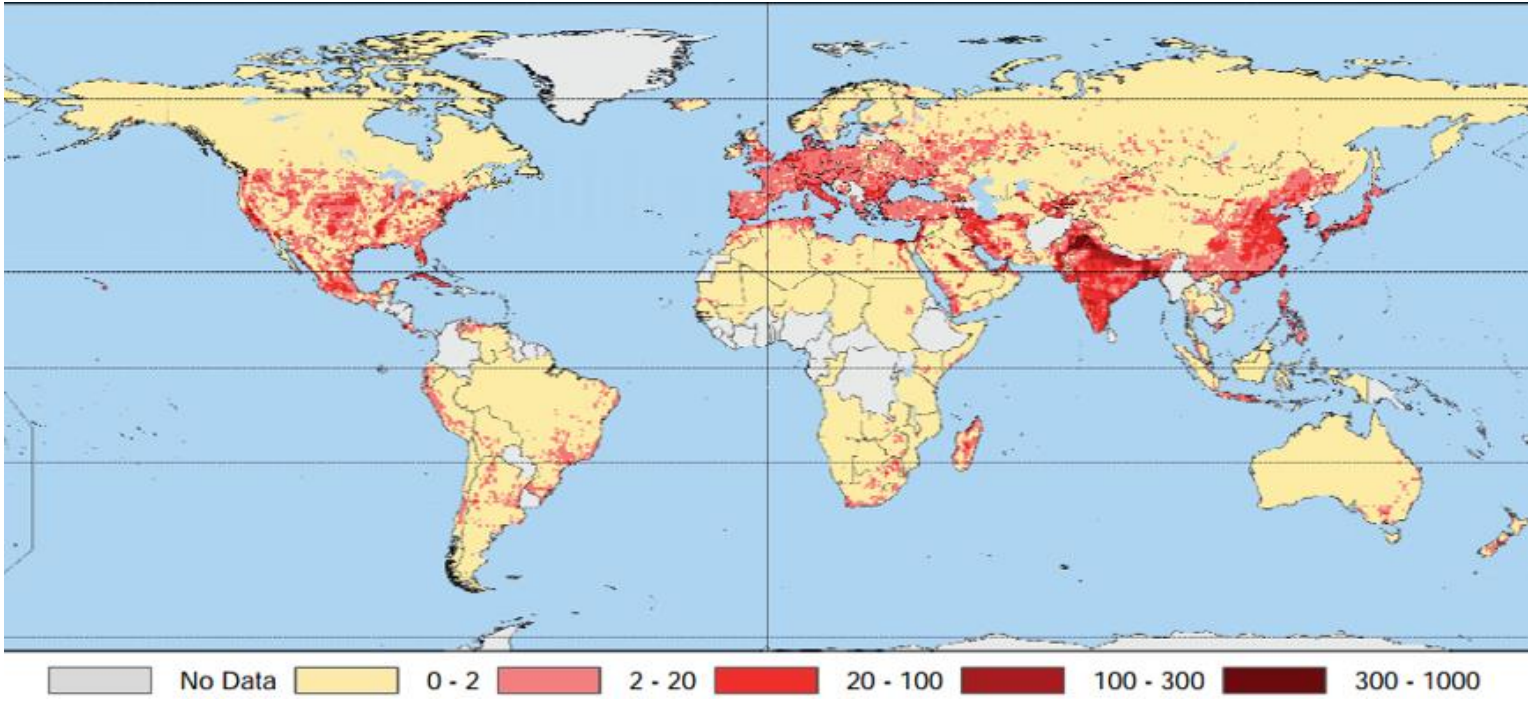
Safe Sustainable Water for All

Urban Groundwater: Challenges for Resilience building

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

SGD 6 | **200 mn people lack access to safe drinking water in urban areas**

Dependence | **50%** Domestic use in Urban

Diversity | **Hydrogeology & Demography**

SGD 6 | **Around 50% overall**

Diversity| **Urban, Peri-urban, Rural**

Contamination | **High Coliform**

Institutions| **Fragmented**

Capacities | **Uneven**

Policies | **Multiple**

Rural & Urban| **Weak**

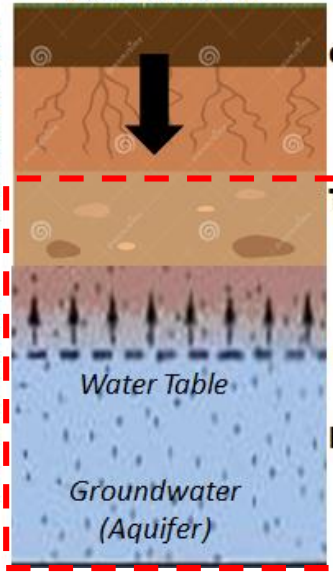
Sewerage| **26% covered**

O & M | **Weak supply & drainage, WQ Testing**

The Groundwater Sanitation Nexus

ACCESS TO TOILETS

WASTE-WATER

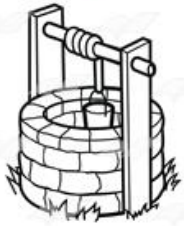


COLLECTION

TREATMENT

DISPOSAL/REUSE

LAND /SURFACE WATER



GW SOURCE

Water Quality Risks

Soil Fertility (Food Crops), Health, Environment

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

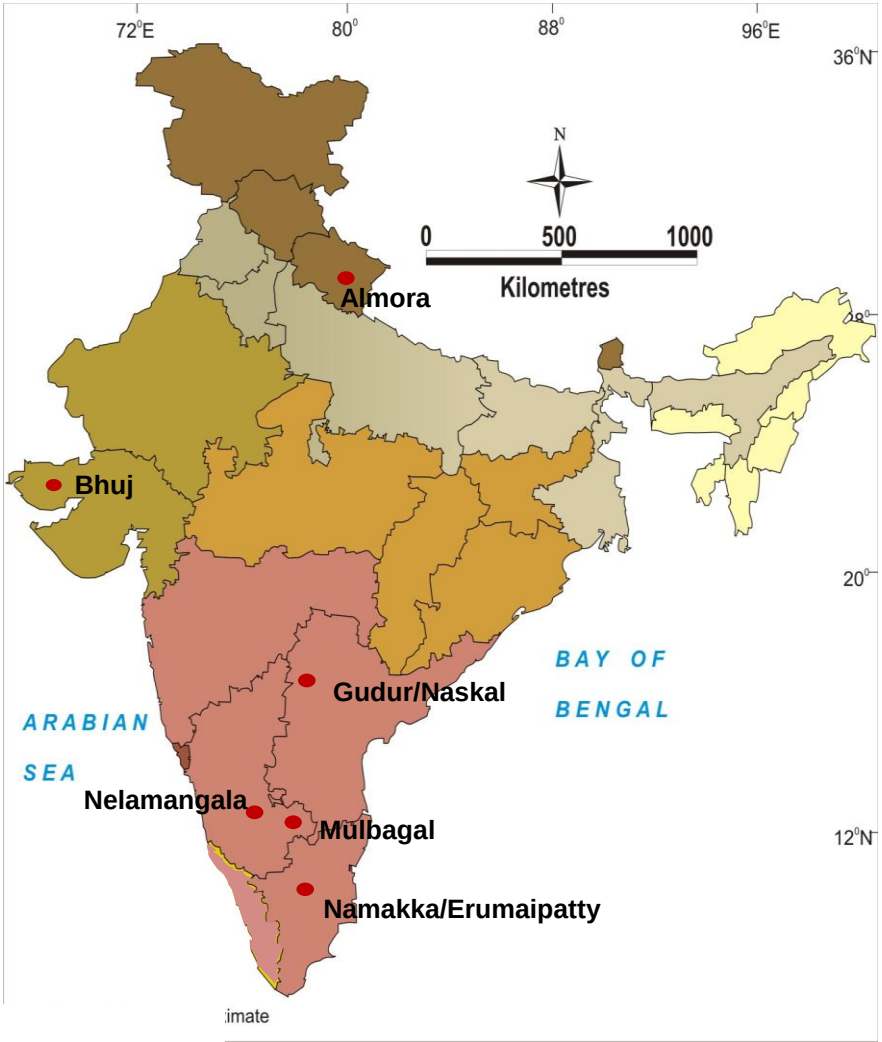
PROJECT FINDINGS

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



Partners

IIHS

IIT-M
IISc
ATREE
WASSAN
ACT
PSI

KEY FINDINGS

1.Groundwater is contaminated and dependence on it is high

- Inadequate piped water supply leaves gaps for quantity and quality of domestic water
- Fecal coliform contamination detected across deep and shallow aquifers
- Across settlement and hydrogeological typologies

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2. Many factors impact contamination

- More likely in dense population areas (urban-rural)
- Not uniform across seasons. Spikes observed during and after rains
- Poor sanitary conditions. On-site sanitation contributes more
- Grey water contributes to both surface and groundwater contaminations

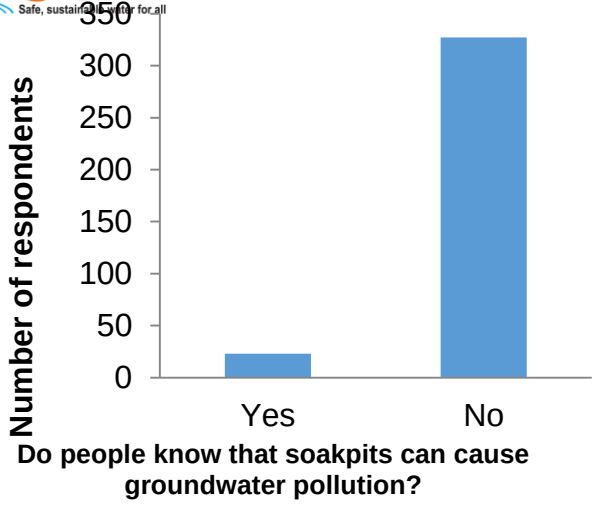
KEY FINDINGS

3. Sanitary systems do not follow standards

- Wide variation in design, construction and maintenance practices
- Most containment systems do not follow technical standards
- Direct discharge of sewage in storm water drains

KEY FINDINGS

4.Poor awareness & high urban vulnerability



- Study shows lack of awareness between septic tanks, soak pits
- Urban poor have less space, resources, awareness – exposed to high health risks
- Greater risks to urban GW due to industrial effluents

Key messages for practice & policy

- Integrate concerns of groundwater and sanitation in both water and sanitation programmes
- Avoid magic bullet solutions. Strengthen decentralised governance (institutions, capacities, science & data based)
- Population scale behavioural change campaigns for people to make informed choices
- Closing the sanitation loop is very important (containment-conveyance, treatment and disposal)
- Invest in groundwater quality testing facilities, monitoring

Challenges for scale and way forward

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 problem solving
- Evidence/ data based decision support systems
- Strengthening local institutions and facilitating community participation

NATIONAL POLICY IMPACT- INDIA

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

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THANK YOU

www.arghyam.org

www.indiawaterportal.org