

3R in Vulnerable Saline Groundwater Areas for Agriculture and Drinking Water

Bangladesh Case Study and Outline of Concept
Note for Out-scaling in Similar Environments



Problem Definition–Geographical

- Vulnerability to reduced surface inflows
- Over use causing ingression
- Impact of brackish water agriculture and aquaculture
- Natural salinity (also in inland areas)



Problem Definition - Overall Context

- Pressure on the water urban abstraction – urban/ population/ tourism – increasing scarcity
- Climate change
- Too little effective recharge
- Inflow reduced or erratic
- Prevent high saline groundwater tables
- No soil drainage



BANGLADESH: LIMITED SOURCES OF SAFE WATER

Ponds Sand Filter



Ponds become unusable for Storm surges/cyclones

Rainwater Harvesting



Deep tube well in limited areas

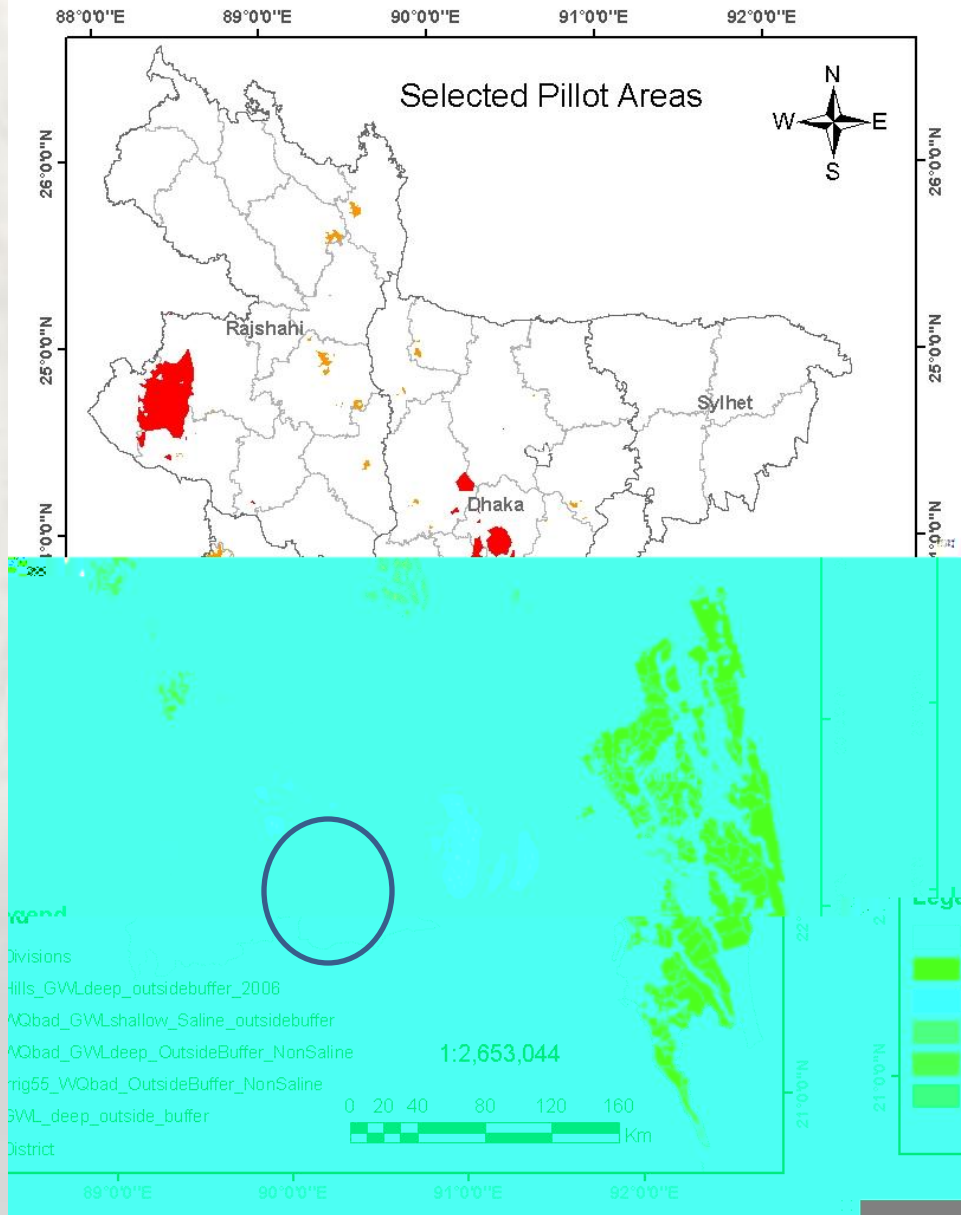
Water Logging Brackish Water Aquaculture



Water Transported from Distant Sources



NATIONAL SCAN FOR WATER BUFFER NEEDS



Dhaka City and Barind Tract with declining groundwater levels;

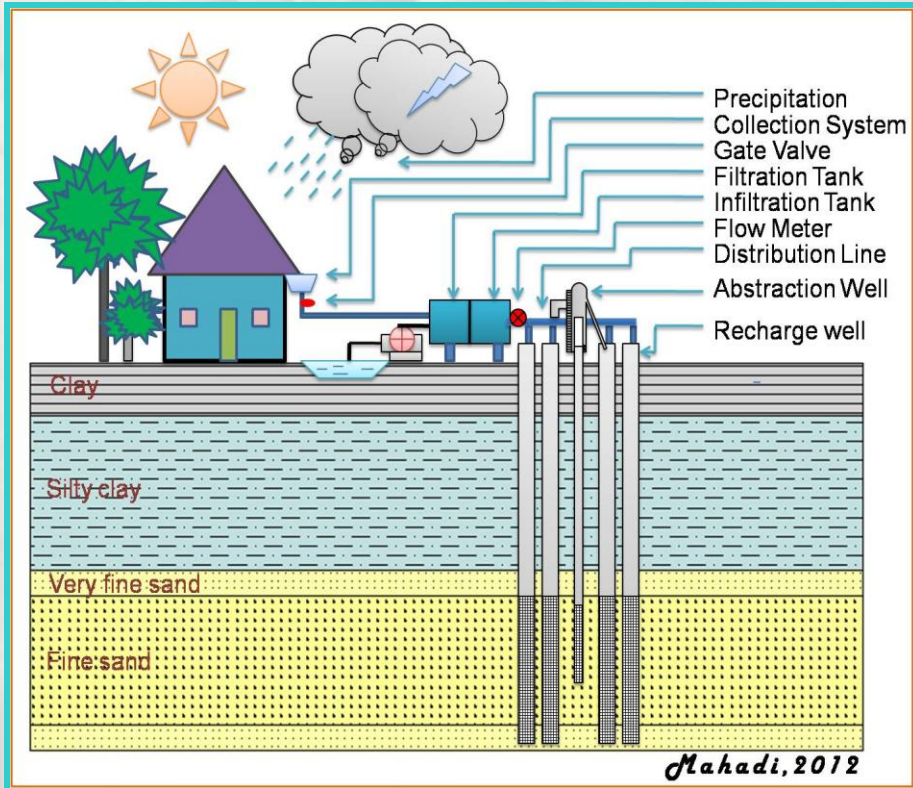
Jessore area with arsenic in water and declining water level;

Hill Tracts with deep water level; and

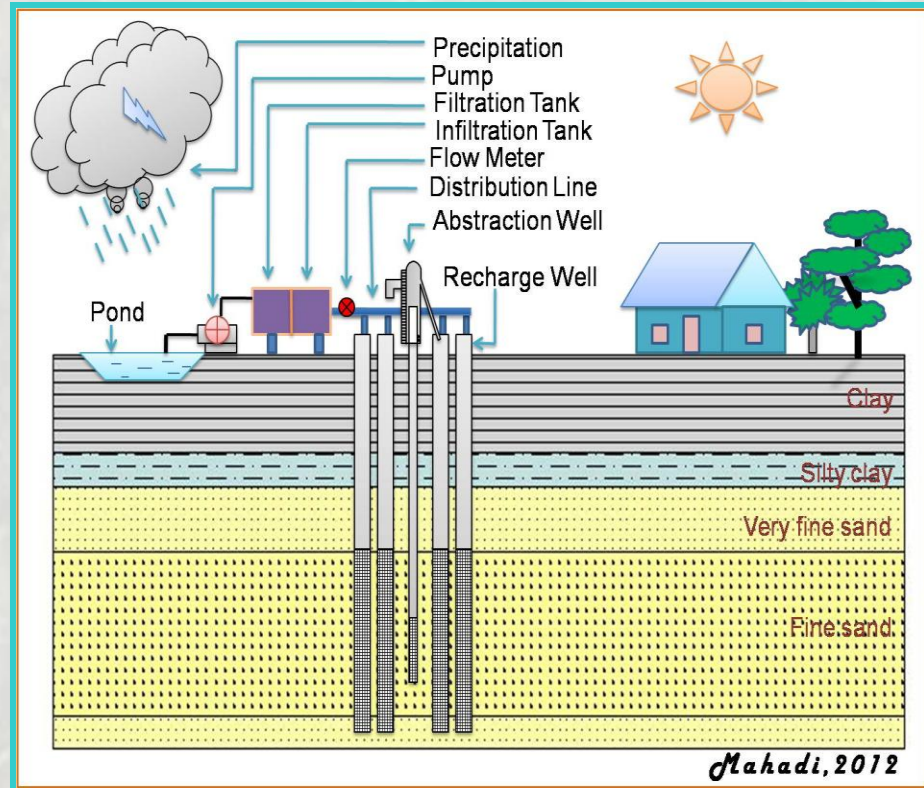
Coastal Area with high salinity in surface and groundwater



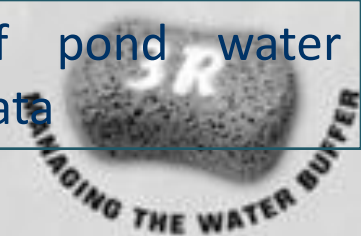
Well Design and Construction



Schematic diagram of rain water and pond water induced MAR in Assasuni



Schematic diagram of pond water induced MAR in Batiaghata



Drilling of 22 inch Infiltration Wells



Assembling and Completing Wells



Constructed Site at Batiaghata (Khulna)

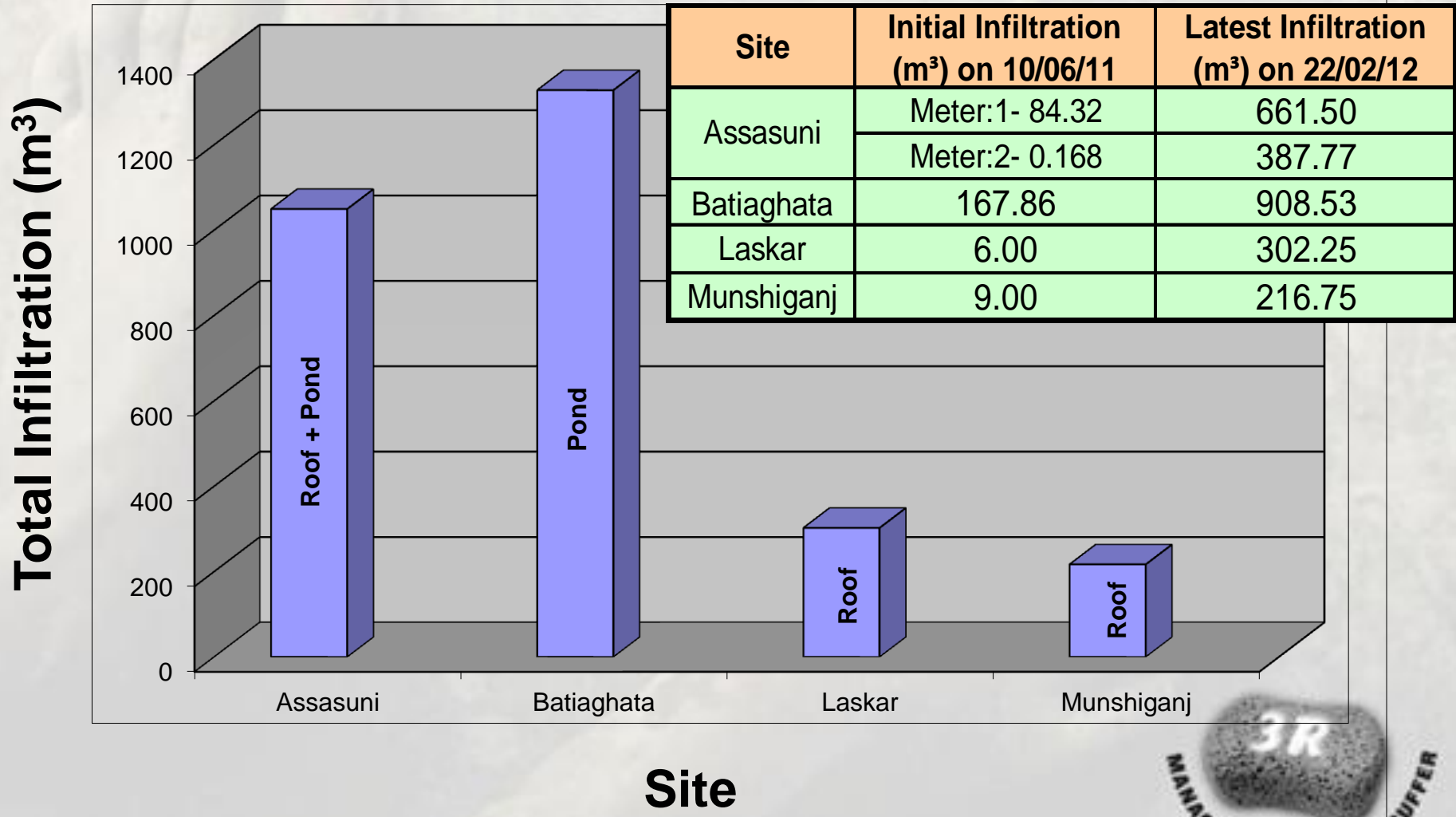


Munshiganj, Shyamnagar, Satkhira

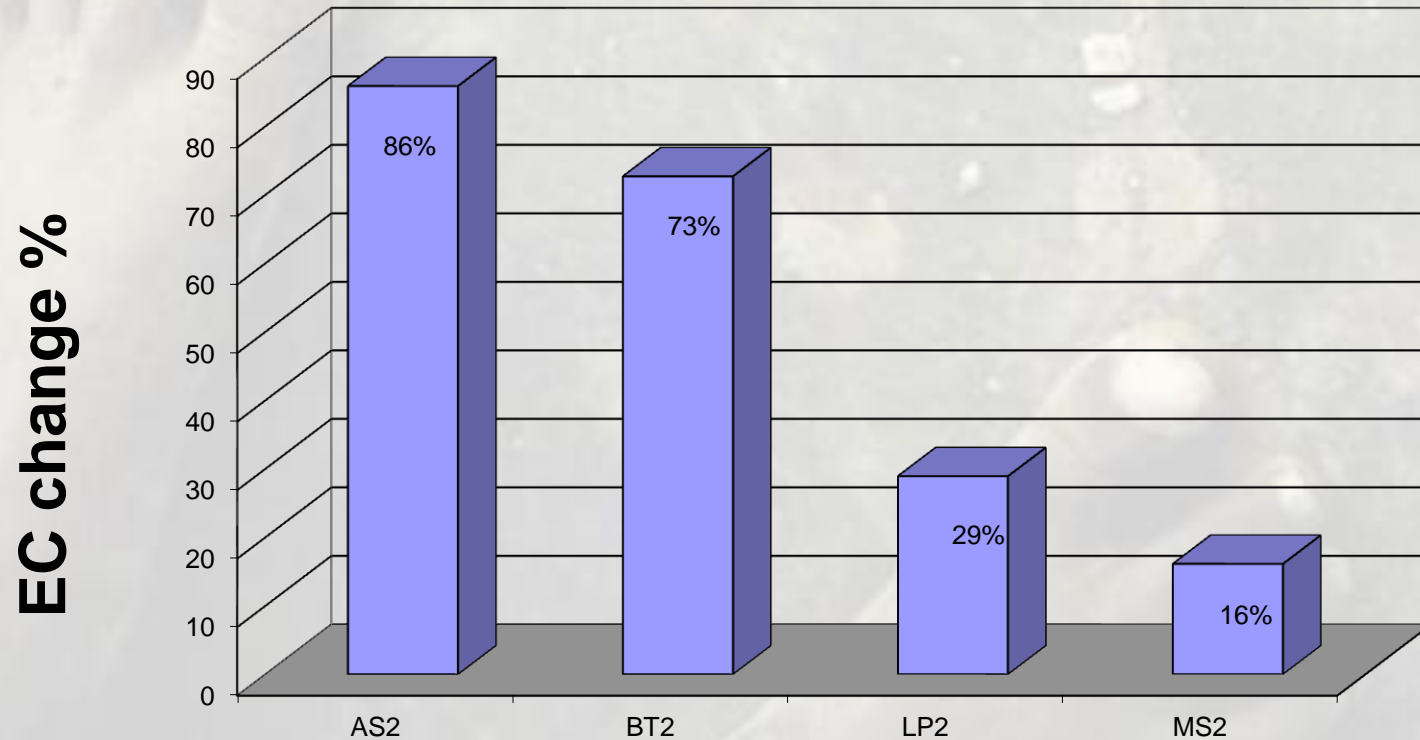
- Four wells to a depth of 80 feet, all 12 inches
- 30 feet casing, 50 feet screen
- Infiltration from roof top rainwater
- 13 piezometers for manual measurements, one for diver



Total Infiltration at Each Site



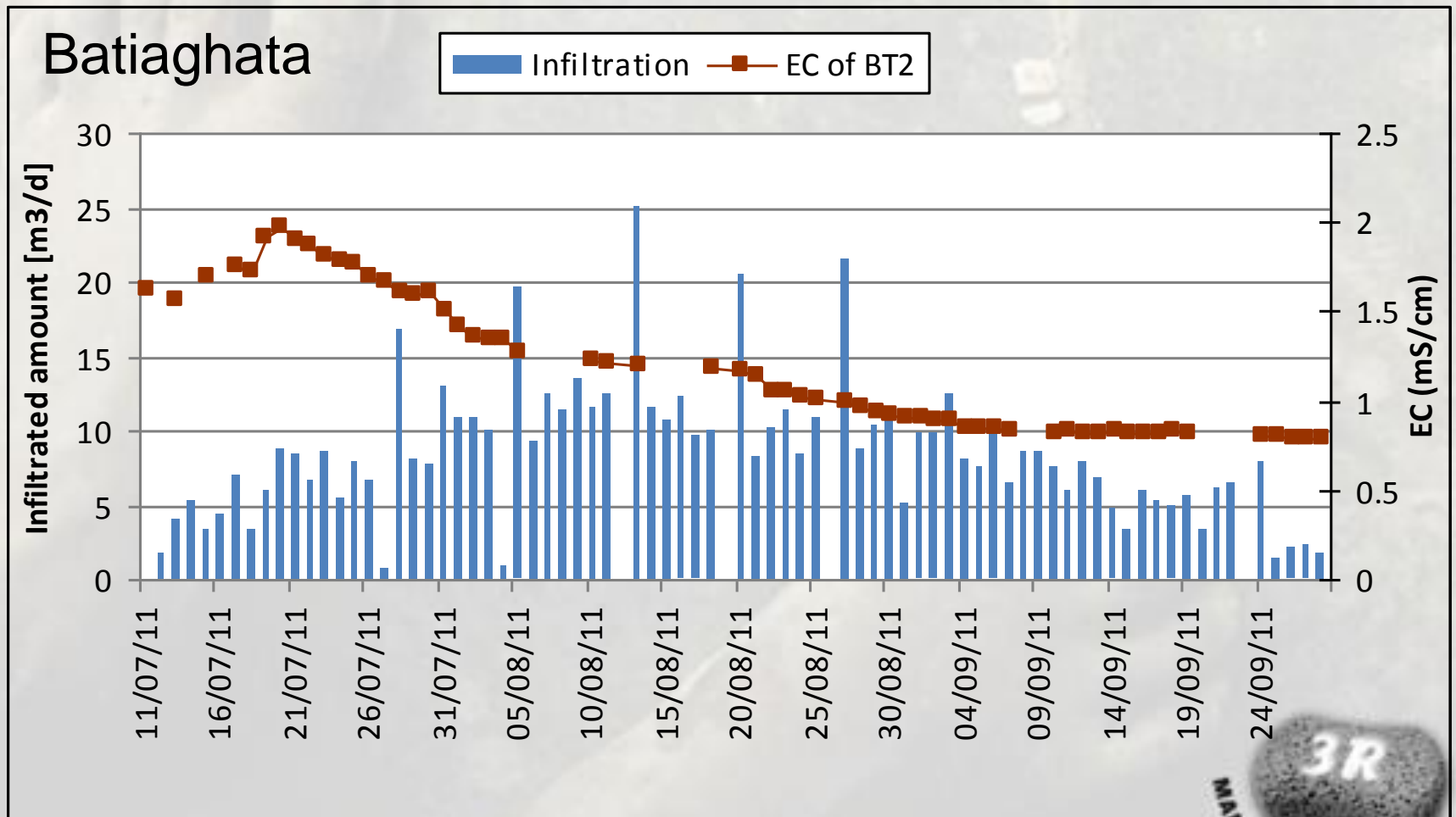
Changes in Salinity as Indicated by EC



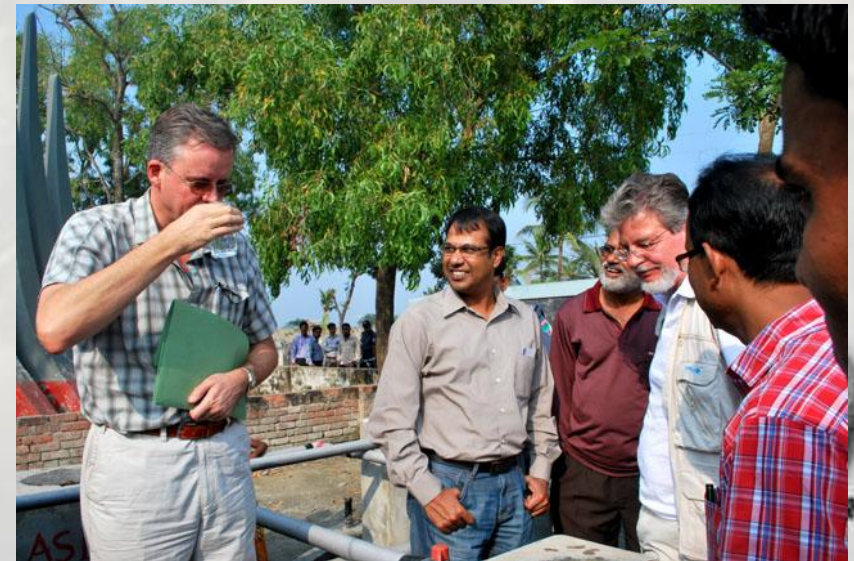
Well ID



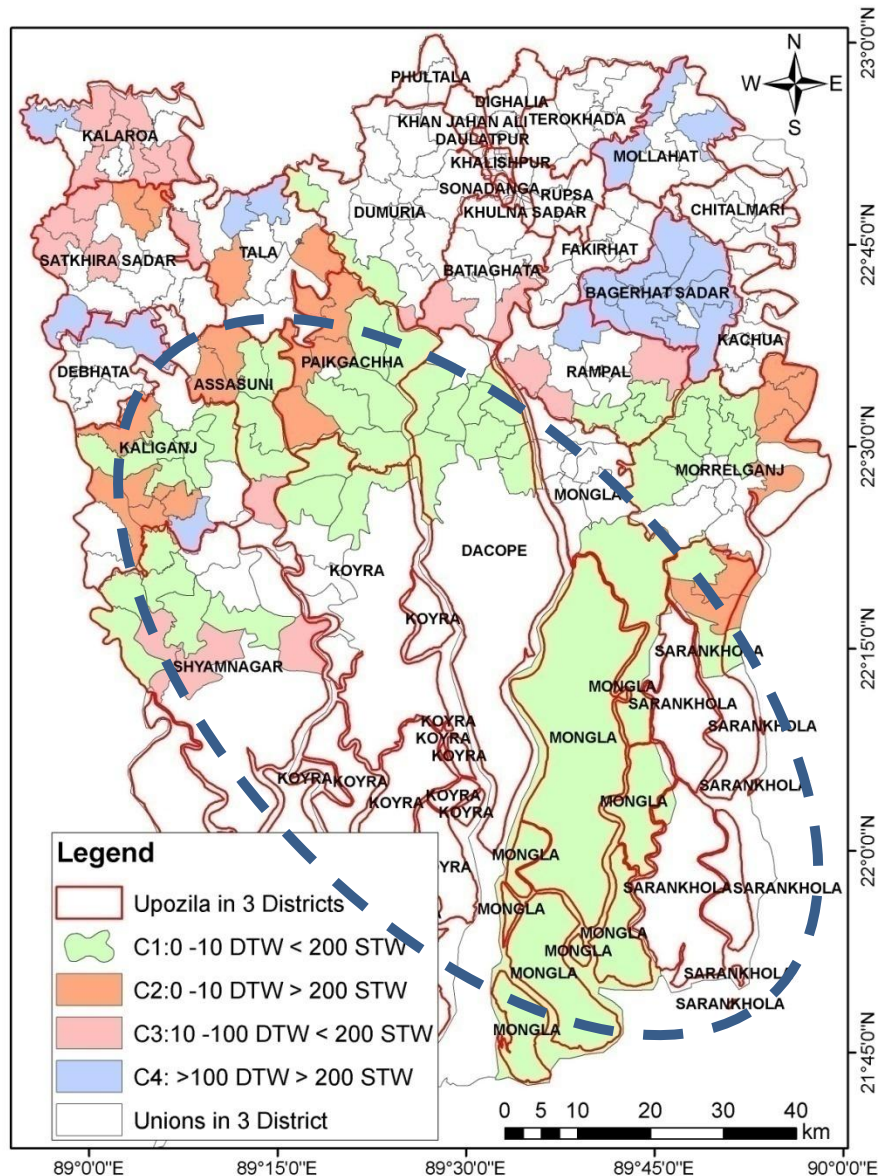
Influence of EC on Infiltration



Assassuni Site, Satkhira Nov, 2011



UPSCALING POTENTIAL: THE NEED



Other criteria:

-Thickness of clay layer

-Salinity of aquifer

-Availability of ponds/roofs

-Accessibility

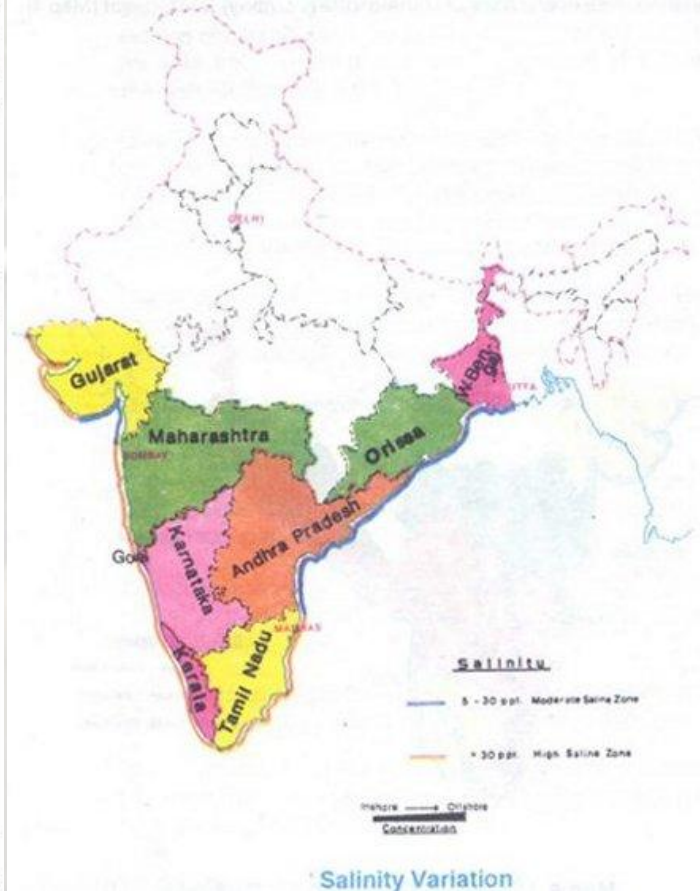
-Community interest and willingness to participate

- DPHE and NGO support



Other Areas

- Pakistan
- India
- Yemen
- Kenya



Saline groundwater areas: worst of the worst's

Kenya: salinization in coastal areas increasing



Pakistan: saline groundwater areas –
No drinking water, bad agriculture

Yemen: Coastal salinization
and moving sand dunes



India
Inland
Saline
Areas
In

Madhya
Pradesh



Goals

- Introduce 3R solution on the ground in the particular contexts
- Develop political, technical and institutional support mechanisms
- Monitor the impact in terms of water quality (chlorine) and quantity



Components of the programme

- Overall water management plan
- Pilots - Specific management interventions
 - Managed aquifer recharge – creating fresh water lenses
 - Localized controlled drainage – depending on time of the year
 - Anticipated ditch level management - groundwater level management
 - Skimming wells
 - Surfacewater storage
 - Modifying cropping agriculture (including salinity tolerant crops)
- Policy awareness issues – bring in rainwater and recharge in policies and strategies
- Capacity building at various levels



Stakeholders/ Partnerships

- Governments/ regulators
- Researchers (National and International)
- LGIs, NGOs and CBOs/ practitioners
- Water service boards – water trust funds
- Ministry of Environment/Water Resources
- Politicians – lobby groups – civil society
- Funders – international agencies



Strategy for Implementation

- Work at landscape basis
- find out low-cost reasonable solutions
- create space for innovation by local communities themselves
- involve a larger group of stakeholders from financing agencies and political decision makers
- build in monitoring of water quality
- capacity building at (1) local maintenance (2) design capacity (3) water management at large



Follow-up

- Building a network
- Submit proposal to adaptation funds



Contact

Join the 3R family for knowledge sharing,
partnering and new opportunities

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www.bebuffered.com





Be Buffered

Sometimes
you're standing
on a solution
without even
knowing it...

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