

Fresh Water Storage in Brackish Aquifers of Bangladesh Coastal Zone

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unicef unite for children



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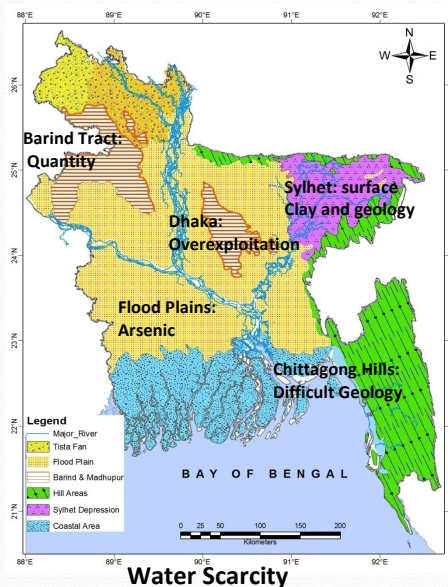
Presentation Outline

- Water Access in Bangladesh
- Prospect of MAR for Improving Water Access
- Action Research of Groundwater Storage in Coastal Region
- Investigations Conducted
- Results of Investigation
- Way Forwards and Scaling up

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Water Supply Situation in Bangladesh

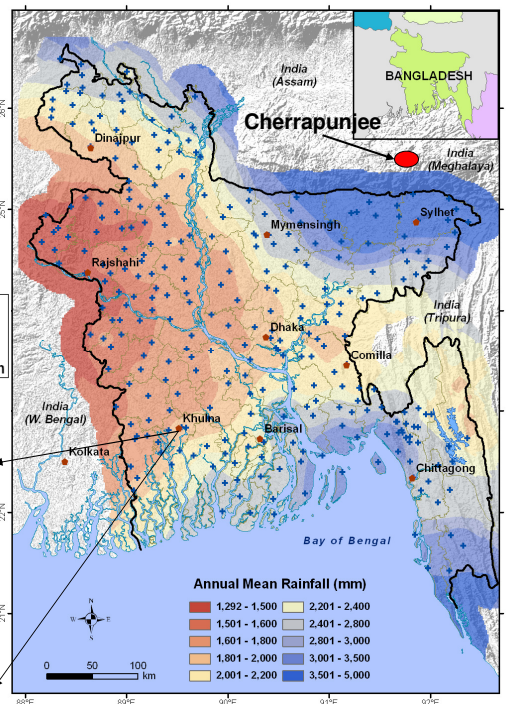
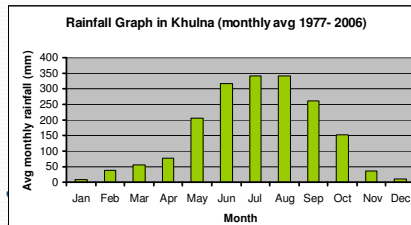
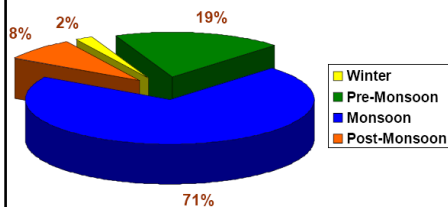
- Bangladesh achieved commendable success in providing access to safe water
- By and large there is no water scarcity
- There are seasonal shortages in certain areas in terms of quality and quantity
- Safe water in some areas is under threat due to climate change



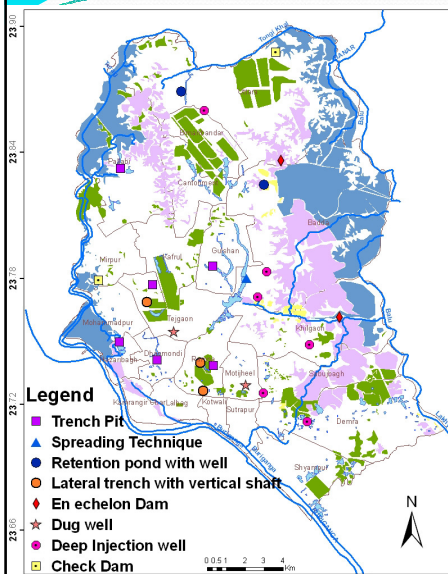
Scope of Applications of MAR in Bangladesh

- Bangladesh has high annual rainfall, particularly during monsoon
- Rainwater harvesting is practiced in coastal and hilly areas
- MAR has not been adopted yet for water management here
- To adapt with Climate Change MAR can be applied in:
 - Managing groundwater recharge
 - Enhancing groundwater storage
 - Improving groundwater quality

Characteristics of Rainfall in Bangladesh



Water Buffering Scopes in Dhaka City

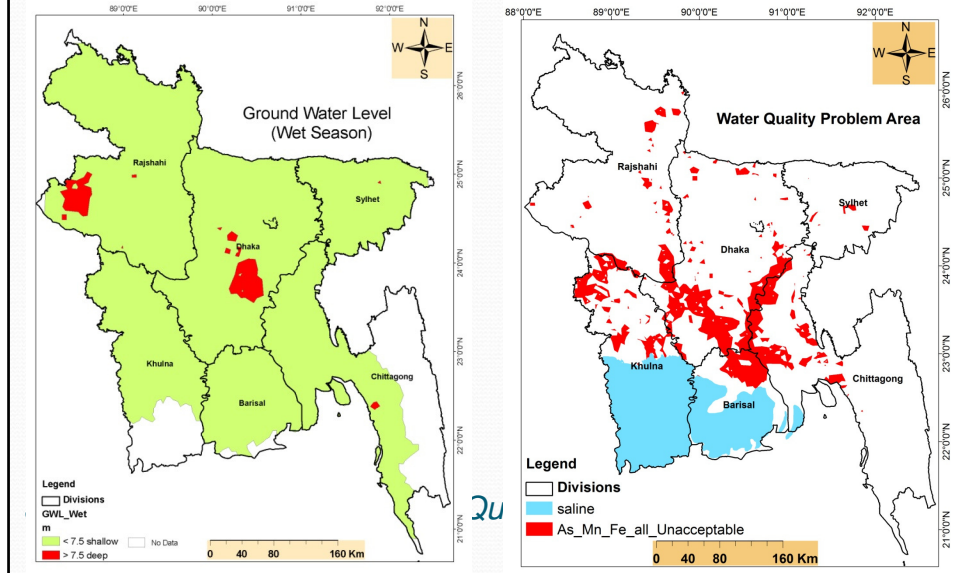


No of Locations	Clay thickness (m)	Method
6	10 - 15	Trench pit
6	40 - 50	Injection well
2	3 - 7	Dug well
3	5 - 15	Lateral trench with vertical shaft
1	0 - 10	Spreading Technique
2	20 - 25	Retention pond with well
2	25 - 35	En-echelon Dam
2	15 - 30	Check dam

Sultana, Sarmin, 2009. Prospects of Artificial Recharge and Other Options for Augmentation of the Upper Dupi Tila Aquifer, Dhaka City, Bangladesh . MS Thesis, Department of Geology University of Dhaka

Action Research on Groundwater Buffering in Bangladesh

GIS Mapping to Identify Potential 3R Applications Sites



Why focus on the Coastal area?

- Most scarce area for local safe water sources
- Surface water mostly saline/brackish
- Deep and shallow groundwater saline/ brackish
- Impacts of inland deep groundwater abstraction
- Brackish water aquaculture making conditions more difficult
- Most vulnerable to climate change
 - Inundation due to Sea level Rise
 - Higher intensity and magnitude of Storm surges
 - Decreasing Dry season rainfall
 - Increase in monsoon rainfall
 - increasing evaporation

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Scarcity of Safe Water



Ponds Sand Filter



Dried Ponds



Rainwater Harvesting

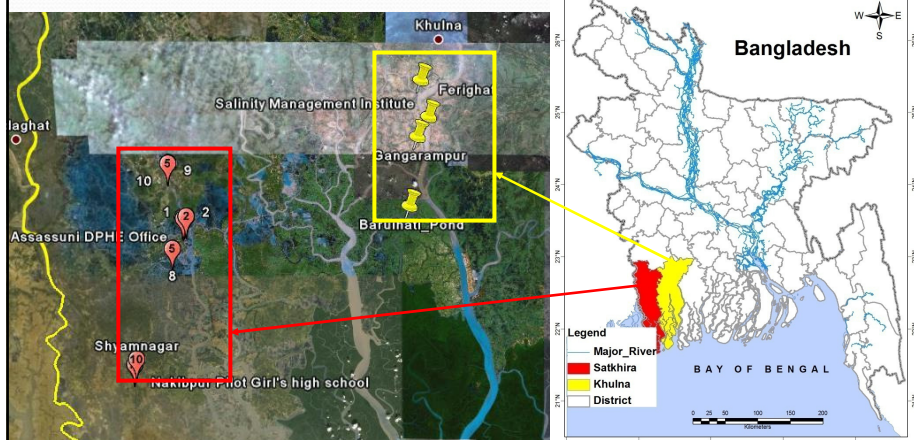


Deep tube well

Location of Potential Sites for Technology Testing

Primary target areas are:

- shallow groundwater is brackish
- no deep fresh groundwater and
- clay layer at the surface



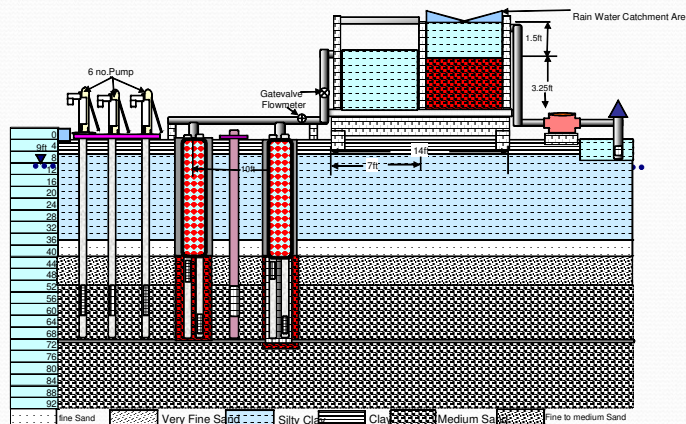
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Investigations Carried out at Potential Infiltration Sites

Location and dimensions of pond/roof and accessibility	WQ of pond/shallow groundwater (As, EC, and Cl)	Borelog and grain size analysis data	Geophysical survey
Pond/roof ownership	Current conditions and use of the pond	Finding suitable local NGO Partner	Proximity to DPHE/NGO

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Construction Design for Technology Testing



- Construction of infiltration schemes
- Monitoring:
 - Volume of water injected
 - Changes in water level
 - Water quality parameters (As, Fe, Cl, TC/FC)

Challenges:

How much water can be pumped in?
How chemistry would change?
Quality and quantity of source water!

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Recent Investigations



Future Plan for up-scaling

- Preliminary estimates show that hundreds of thousand people in 18 upazilas of 3 coastal districts will be benefited if water quality and quantity can be improved by MAR
- Socioeconomic survey
- Develop manual and guideline
- Pilot projects in:
 - Areas where water table is declining for domestic (Dhaka) and irrigation (Barind) pumping
 - Areas water quality is poor (As, Fe, Mn, Cl)
 - Areas where natural recharge is low because of thick surface clay (Sylhet, coastal areas)

Preparations for Upscaling

- Present water supply situation to map the critical areas where there no fresh and potable eater available during the dry season.
- Assessment of the aquifers and groundwater quality in these areas, to see if there is a potential for infiltration in shallow brackish aquifers
- Assessment of the potential sources of infiltration water (ponds, rainwater, surface water streams)
- A socio-demographic survey to map the population and its distribution (villages/towns) and local/national organizations who would be interested to play a role in piloting the infiltration schemes.

Thank you for your
attention!