

Workshop DP2.4: Creating and managing subsurface water buffers as a solution for fresh water shortage in coastal areas
 DELTAS IN TIMES OF CLIMATE CHANGE II INTERNATIONAL CONFERENCE
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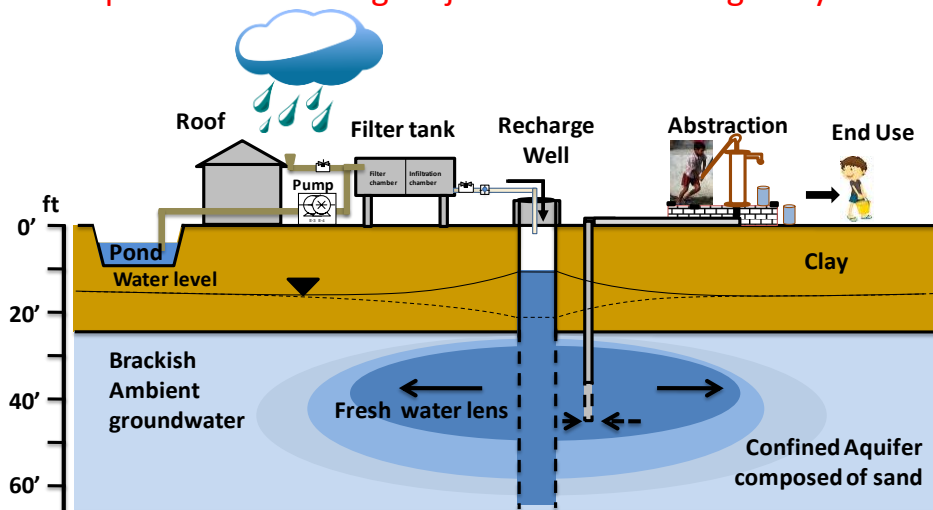
Creating Fresh Water Bubbles in Brackish Water Aquifers in Khulna, Satkhira & Bagerhat Districts, Bangladesh

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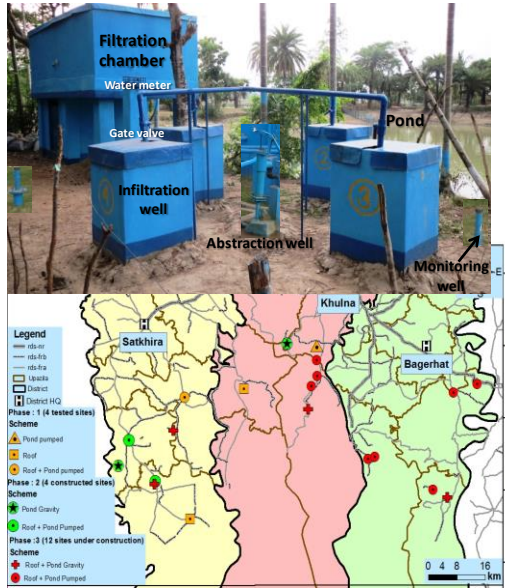


Managed Aquifer Recharge in Coastal Area

To reduce groundwater salinity by injecting rooftop rain or fresh pond water through injection well under gravity .



Overview of MAR Research



- Total site constructed: 20 (until 2013)
- Total successful site: 15 in use, 2 useable, 2 not useable yet and 1 abandoned
- Daily average production: 2 m³/d (max: 1.3-12.9 m³/d)
- Total Number of beneficiaries: 50 HH/site (range 25-87)
- Number of People trained on O&M: 5 member committee at each site

Site Selection Procedure



Drilling & Construction of Large Diameter Recharge Wells



Water Abstractions from MAR Sites



Financial Comparison of Rural Water Supply Options

Total annual cost and number of consumers, water production and supply level									
Scheme type	Life time	Number consumers	Annual production	Days of use	Water use	Capital cost	Annualized capital cost	O&M cost	Total annual cost
	years		m ³	days	l/cd	USD	USD \$/yr	USD/yr	USD/yr
1. MAR system	15	300	800	250	11	8.500	1.118	995	2.113
2. Pond Sand Filter (PSF)	15	200	400	200	10	1.500	197	50	247
3. Rainwater concrete tank	10	10	20	200	10	1.000	163	50	213
4. Rainwater plastic tank	10	10	20	200	10	850	138	50	188
5. Reversed osmosis	10	200	500	100	25	42.000	6.835	7.400	14.235
6. Water vendor	0	200	200	200	5	0	0	2.500	2.500
7. Deep Handpump Tubewell	15	300	2.000	365	18	3.150	414	150	564
8. Rural piped scheme	12	6000	120.000	365	55	251.000	36.838	6.600	43.438
Note: Interest rate (%)	10								

Cost per m ³ and per consumer/family					
Scheme type	Total annual cost per volume		Annual cost per consumer and monthly cost per family (5 P)		
	USD/m ³	TK/liter	USD/cons	TK/cons	TK/fam/month
1. MAR system	2,64	0,21	7	549	330
2. Pond Sand Filter (PSF)	0,62	0,05	1	96	72
3. Rainwater concrete tank	10,64	0,83	21	1659	1245
4. Rainwater plastic tank	9,42	0,73	19	1469	1102
5. Reversed osmosis	28,47	2,22	71	5552	8328
6. Water vendor	12,50	0,98	13	975	731
7. Deep Handpump Tubewell	0,28	0,02	2	147	60
8. Rural piped scheme	0,36	0,03	7	565	232
Note: interest rate (%)	10		1 USD=	78	TK

Options in saline areas { 1, 2, 3, 4, 5, 6, 7, 8 }

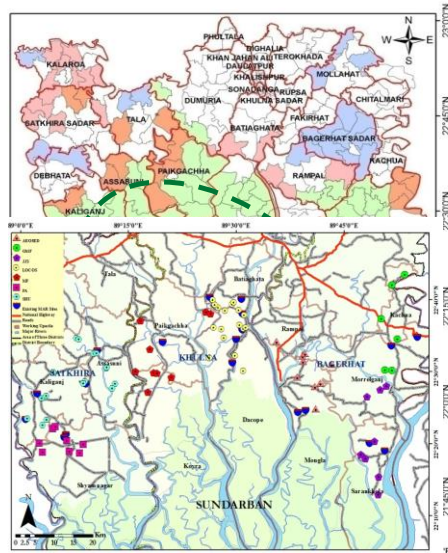
Options for fresh groundwater { 1, 2, 3, 4, 5, 6, 7, 8 }

Management of Sites

- Working with partner NGOs
- User committee has been formed at 15 sites
- Users paying a nominal monthly contribution at one site to cover small maintenance and fuel bill
- Two possible models for running:
 - run by the committee on no loss no profit basis or
 - by institute/land owner/NGO on commercial basis
- Major costs include fuel, caretaker salary, periodic regeneration for clogging management

Up-scaling Area

- Scaling up programme started from October 2013
- 75 sites selected through details technical feasibility survey.
- 7 NGO partners selected for community mobilization and awareness building



Major Challenges

- Cost:
 - Initial construction cost is higher
 - Not affordable by the individual/community
- Technological:
 - Improvement of well design and performances
 - Maintaining good water quality
 - Mobilizing other toxic contaminants by chemical reactions
 - Hydrogeologically difficult areas
- Governance
 - Most critical issue (failure of PSF is a ringing alarm)
 - Three possible models: Community run, NGO run, Privately run
 - Institutional arrangement and capacity building at the local level