

Managed Aquifer Recharging Bringing New Hopes for Low Water Table Areas

Drought is one of the many impacts that climate change has been triggering in Bangladesh. The whole north-western region of the country is hardly hit by drought worsening the prevailing water scarcity situation in the region. With water table going down to 105 feet in average in the High Barind Tract, this part of the country has become hard-to-reach in terms of acute water crisis. Rajshahi, Chapai Nawabganj, Naogaon, Natore, Joypurhat, Kushtia, Pabna and Panchagarh are among the severe dry regions identified in Bangladesh. With the rivers gradually drying up, they are no longer contributing in the recharging of the groundwater. Annual rainfall is low in the drought-prone region as it varies from 1,429 to 4,338 mm. The whole region has been termed as 'drought-prone' by the country's hydro-geologists.





In the dry season, water can only be extracted through Deep Tubewells that turn out insufficient to provide people with even drinking water. Also due to major irrigation abstraction from the exploitable upper aquifers, groundwater table is depleting significantly. As a result, especially during drier months availability of water shrinks down to crisis level resulting in enormous pressure on safe water supply, which, in turn, creates tremendous problem in maintaining health and hygiene. This drying up has also hampered environment and the economy of the region. The entire region which is heavily depended on agro-based economy is facing threat today. NGO Forum for Public Health along with sectoral experts has been piloting the promotion of Managed Aquifer Recharging (MAR) to address the particular water supply & environmental problems of the region.

Exploring the Potentials of MAR in Hard Barind

In 2012, NGO Forum initiated the piloting of the Managed Aquifer Recharge (MAR) - an artificial groundwater recharge technique as an adaptation measure. The MAR method has been applied in Nachole, Chapai Nawabganj. The aims of piloting the Technique are:

- Identify the effectiveness of MAR in Barind area;
- Evaluate the stress on groundwater especially due to meteorological variability and increasing water demand; and
- Assess the quality of groundwater for safe usage after implementing the MAR technique.

As the demand of groundwater irrigation increases day by day here along with meteorological variability, the stress on this resource increases and becoming acute with extension of irrigated agriculture. In this context, management practice through the MAR technique has been explored by NGO Forum as the possible adaption measure for the sustainable use of groundwater resource in the drought-prone Barind area in Bangladesh.

Under the supervision of Dr. Chowdhury Sarwar Jahan, Professor, Department of Geology & Mining and Pro-Vice Chancellor, Rajshahi University, the recharge wells have been constructed in three different locations of Nachole upazila, the driest part of Bangladesh. The adjacent Sheds have been used as the catchment of rain-water which is connected to recharge chamber by using uPVC gutter and pipe network. The groundwater level is monitored by observation wells. After 4 years of close monitoring, NGO Forum has collected the findings and learning and consulted a panel of eminent water experts. Through the engagement of sector and technical experts, NGO Forum finds the possibility of scaling up the MAR technology as a context-specific option for the drought-zone.

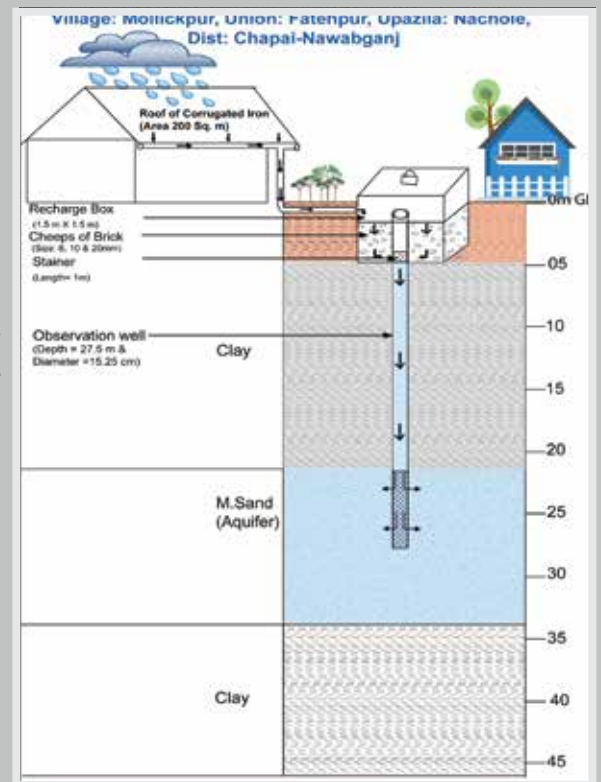


Professor Dr. Chowdhury Sarwar Jahan sharing the research findings with divisional and district administration, national experts & stakeholders in Rajshahi

“Application of the MAR method has succeeded in rising the water table up to the suction mode i.e. 8 to 9 metres in hard Barind areas. It has been successful in solving the drinking water crisis of the people here. I’m optimistic that in near future the technique would play a significant role in the region’s agriculture also. This gives us encouragement to place the MAR technique at the policy level as a scalable option for the drought-hit Barind Tract.

WARPO has indexed the area as ‘water stressed’. Water scarcity has reduced the availability of drinking water while it has negatively impacted the economy of the region. The high amount of water needed in irrigation leaves the cost of paddy production very high which in turn becomes non-profitable for the farmers. Consequently, due to constantly being into poverty the farmer families in this region are suffering from malnourishment. Unavailability of sufficient water is the root cause behind all of it. Both drinking and agricultural water has gone from scarce to rarer. So, the driving force for sustaining the MAR method is there, what we need now is to develop community ownership to ensure the management of the technical application.”

- Dr. Chowdhury Sarwar Jahan
Professor, Department of Geology & Mining and
Pro-Vice Chancellor, Rajshahi University



Advantages

- Improves year-round water availability maintaining quality;
- Suitable for local-scale application;
- Recharging of good quality water improves quality of the aquifer-water;
- No evaporation losses occur due to underground storage;
- Comparatively easy & low-cost and does not require high skilled labor for installation and O&M;
- Aquifer serves as the reservoir instead of storage tank constructed at the ground level;
- Enables early aquifer recovery and contributes to protecting from declination of water table.

Achievements so Far

- Groundwater table started rising in response to the augmented recharge artificially;
- Shallow Tubewells are functioning well than before especially in dry session;
- Using rain-water runoff for aquifer recharging reflects the reduction of rain-water wastage;
- Increases awareness about the usage of rain-water among the community;
- Any sort of surface/chemical contamination has not been found so far;
- Quality of Groundwater increased and proved safe for drinking.

Expert Opinion on MAR

“The pilot study on Managed Aquifer Recharging in Nachole holds immense significance in the context of Barind region’s water crisis and agro-economy.

The study is encouraging as it uses only local technology while applying the theory of the aquifer recharging technology. In my opinion, the Ministry of Science & Technology, the Ministry of Agriculture should come forward to

financially support such studies and take it to international level. What we need is the estimation of actual natural recharge rate to the aquifer and determination of sustainable yield. This will assist in proper management and planning of environmentally viable abstraction schemes. The evidences of change through MAR are visible and people have reported about getting sufficient drinking water even in the driest period of the year. The MAR method could also be applied in other parts of the country such as in Sirajganj, Tangail, Faridpur, Rangpur- where dependency on groundwater is very high. Similar to Barind Tract, the method can be applied in Dhaka’s Madhupur Tract as well where the upper layer of soil is clay making natural recharging very difficult. I hope the study continues.”

- Dr. Ainun Nishat

Professor Emeritus, BRAC University and Leading Water Expert



Government Officials’ Comments

“I would urge to initiate combined efforts among NGO Forum, Rajshahi University, LGIs, Government Departments and other relevant professionals for giving expert inputs and contribute for placing the Aquifer Recharging Technology to the Government as a context-specific innovation for the drought-zone and thus go for further promotion.”

-Helal Uddin Ahmed

Divisional Commissioner, Rajshahi

Remarks from the Beneficiaries

“Previously we did not get any water during the dry season of Chaitra-Baishakh. But this year, we got water from the Tubewells in these times also. Earlier we had to go at a depth of 60 to 70 ft. to avail water but now we are getting it at 45 to 50 ft.”, says Md. Hafiz Mia, an elderly of Kharibari village of Nezampur union, Nachole.

Scalability

Recharging of groundwater is essential for the water aquifers. NGO Forum’s 4-year observation on MAR technique has indicated that the optimum use of rain-water through the MAR technology is a promising solution of water resource management in the critical drought zone. It can also be introduced to other water stressed and fresh water scarce areas ensuring the use of uncontaminated fresh surface or rain-water as recharging water. Based on the primary success of MAR at local level, the GoB could further step forward with its large scale application for developing irrigation facilities by optimum utilization of available ground and surface water.

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