

# MANAGED AQUIFER RECHARGE - MAR

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Estimated cost of MAR: \$0.05 to \$0.26 per cubic meter of water

## Finding a solution to overextraction of groundwater and its depletion in the Barind Tract

**Context and problem**  
The Barind Tract of Bangladesh is a region with low rainfall where water-intensive rice is cultivated using groundwater for irrigation. As a result, groundwater resources become depleted and adverse effects are visible, such as dry drinking water wells.

**Researching this question**  
Implementing MAR in Barind on a large scale is a challenge because of its thick clay layer and turbid water that clogs infiltration wells. Different geographical features make it a challenging region.

**Is managed aquifer recharge (MAR) a feasible solution to counter groundwater depletion in Barind?**

Therefore, to improve recharge, many MAR systems need to be placed to make the water balance sustainable. Costs are estimated to be between \$0.05 and \$0.26 per infiltrated m<sup>3</sup> of water.

## COMPONENTS OF RESEARCH

### 1. Water balance

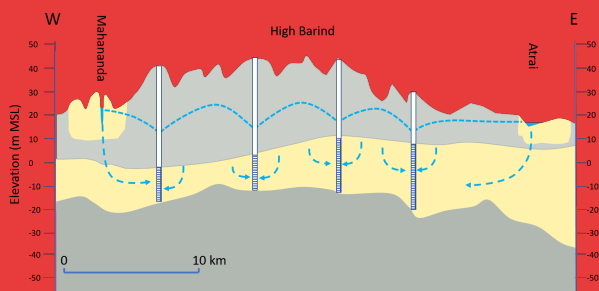
First the ground water system and water balance of the Barind region were assessed. This is important to quantify the discrepancy between groundwater extraction and groundwater recharge, and therefore the amount of additional recharge required to restore the water balance.

### 2. Potential designs for MAR

Second, different technical designs and their yield were explored. These designs varied in complexity and costs, and included methods to minimise clogging and maintenance. Comparing the yield to the figures of groundwater extraction led to an estimate of the number of installations needed to compensate the extraction.

### 3. Economic feasibility

Lastly, the economic feasibility was assessed, by comparing the costs over time per installation and the number of installations needed. From this it was learnt that over time the more expensive installations are the most cost effective, as they keep performing over time when maintenance is carried out. The costs ranged from \$0.05 to \$0.26 per cubic meter of recharged water for different installations.



Cross section groundwater system in Barind

### Feasibility of MAR for Barind

Results from this study can be used to compare MAR with other solutions such as crop change and pumping up surface water, to relieve the groundwater stress in Barind. The study could further be improved by an in-depth study of the water balance and the groundwater system.

## KEY MESSAGE

Barind's groundwater system needs to be studied to assess the design and economic feasibility of MAR, suggested as a solution for groundwater depletion.

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