## About the Project

The FP7 project "*Saph Pani* - Enhancement of natural water systems and treatment methods for safe and sustainable water supply in India" addresses the improvement of natural water treatment systems such as river bank filtration (RBF), managed aquifer recharge (MAR) and wetlands, building on a combination of local and international expertise. The project aims at enhancing water resources and water supply particularly in water stressed urban and peri-urban areas in different parts of the sub-continent. The project focuses on a set of case study areas in India covering various regional, climatic, and hydrogeological conditions as well as different treatment technologies.

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- IIT Roorkee, India
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2013/WP6/5

# Managed aquifer recharge from an integrated perspective

## What is MAR?

Managed aquifer recharge (MAR) is the planned, human activity of augmenting the amount of groundwater available through works designed to increase the natural replenishment or percolation of surface waters into the groundwater aquifers, resulting in a corresponding increase in the amount of groundwater available for abstraction (Oaksford 1985).

## MAR in India?

India has a long tradition in implementing MAR schemes. Artificial recharge of groundwater is one of the oldest activities undertaken all over the country to conserve rainwater above ground and underground.

Since the 1970s numerous watershed development programs (WDP) have been implemented. They include the construction of check dams, percolation ponds or other structures to recharge water to the aquifers.

## What are the experiences?

A large number of reports and studies on MAR structures in India is available. The following section summarizes some of these available

reports with a focus on environmental, social, institutional and economic aspects.

## Environmental perspective

The environmental perspective refers to the impact on the aquifer in quantity and quality.

A study of three WDPs (Gale et al. 2006) in different parts of India showed that the recharged amount of water to aquifers increased by 3 - 23% compared to the natural recharge situation.

Depending on groundwater quality and quality of the recharged water, groundwater quality can improve or detoriate.

Check dam in Chennai
(Picture: M.Starkl, CEMDS, 2012)

## Economic perspective

Implementing MAR structures requires capital and operational costs.

A study of the GOI (2007) showed that construction costs per m³ recharged water vary between 2.5 INR and 455 INR depending on the type of structure applied. Operation and maintenance (O&M) costs are hardly documented.

## Institutional perspective

The institutional aspects encompass the organisational arrangements for O&M.

Most of the systems are implemented in rural areas and are operated by designated committees which are also responsible for collecting user fees. The existing studies showed that building up proper awareness and constant persuasion and motivation is necessary to ensure long-term sustainability of the structures.

## Social perspective

MAR structures provide an alternative water source to humans and therefore the impact on users has to be considered.

Water from the MAR systems is generally well accepted and no problems have been reported.

The recharge structures are assumed to provide community-wide benefits, and are viewed as community assets, to be financed and managed by the community. Nevertheless, land owners are the ones who are benefitting most from the interventions.

## Potential for the future

MAR systems provide communal benefits: higher agricultural yields increase the income resulting in higher quality of life. However, many traditional systems have been abandoned and are not used anymore. The combination with modern technologies (e.g. sand filters, disinfection) is a possible measure to revive the systems with a concurrent improvement of water quality.

As a general recommendation, the investigation of the basin-wide effects should be integral part of new MAR projects.

## References


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Project supported by the European Commission within the Seventh Framework Programme Grant agreement No. 282911