Methodology for assessing Managed Aquifer Recharge project implementation in Chile

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ABSTRACT

Nowadays, managed aquifer recharge (MAR) in Chile is contemplated in the National Water Resources Strategy (MOP, 2013) as an option to face the shortage of the resource in basins with negative water balance. Additionally, the National Irrigation Strategy (MOP, 2013) also contemplates this water management strategy to increase the reserves in the aquifers, to facilitate the transport and to improve the water quality. In addition, artificial recharge is already established in several Chilean regulations (Water Code, Regulations on Groundwater Exploration and Exploitation Standards, etc.). As a result, different individual and private studies of MAR were implemented in Chile in an increasing number from 70s years to the present. In 2013 the General Directorate of Waters (DGA) commissioned a study to evaluate the most favourable areas for MAR in Chile and to stablish the methodological procedures to apply for a MAR project in Chile.

A multicriteria analysis was applied to identify the most favourable areas for MAR. This methodology was developed using those variables of importance for MAR that were available at the national level: permeability, land uses, slope and existence of rivers. Each variable is represented in a cover map and transformed a to harmonized values depending on their dregree of favorability. Afterwards the different variables are weighted by their degree of importance with respect the total of variables in the final feasibility analysis. As a result, the different basins were ranked and those where a priori, the MAR strategy has more feasibility potential were defined.

Despite of this evaluation, all MAR projects need an administrative authorization which requires a series of studies including the hydrogeology of the area, the availability of water and the legal requirements together with a environmental aspects (monitoring plan and action plan). Once the project is approved, a pilot recharge experiment has to be conducted to validate and to ensure that the predicted (positive and negative) impacts.