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Water resources management of coastal semi-arid environments using Managed Aquifer Recharge and participatory modelling approaches.

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Groundwater is a limited resource in coastal hydrogeological systems, especially in semi-arid environments where the irrigation demands are very high. Management of such hydrosystems is a very challenging process; while water conflict between different users as well as climate change conditions are magnifying this problem.

Managed aquifer recharge – storing water in aquifers during times of excess – is considered as a sound engineering technique and a key strategy to support groundwater resources in such hydrologically sensitive regions by providing intermediate storage, bridging the gap between water demand and availability. In addition to the above, innovative modelling techniques that apply participatory approaches can be proved a valuable supporting tool for the management of groundwater resources within an optimized manner.

The coastal field of Argolis (S. Greece) is used as a reference site to illustrate the above, where Managed Aquifer Recharge is applied on a full-scale mode since 1990, using karst groundwater as a recharge water source. The study area involves an extended and complex water infrastructure systems that includes: (a) a main intake structure -a submarine dam exploiting a system of submarine karstic springs-; (b) a conveyance system -mainly open canal structures- that assures the transport of water from the main intake structure and main pumping station up to the agricultural area; and (c) a cluster of Managed Aquifer Recharge facilities that divert water towards the subsurface either through deep groundwater wells or infiltration ponds at selected parts of the aquifer.

This research presents the results of hydro-environmental modelling activities of Managed Aquifer Recharge and the preliminary work on participatory driven water resources modelling scenarios. This study is envisaged to contribute in the identification and valuation of socio-economic and environmental processes and linkages of groundwater uses and services.