

Case Study: Managed aquifer recharge as an integrated water resource management approach for preventing sea water intrusion in Hazmieh, Beirut area, Lebanon (ACCWaM Pilot Project)

Issue: The coastal aquifer around Beirut area can be characterized by overexploitation, seawater intrusion and hence deteriorating water quality. Reasons are (1) a steadily growing water demand due to population growth and urbanization (Fig. 01), (2) a shrinking of the natural groundwater recharge in the watershed area and (3) an increase in surface runoff – in Lebanon presently about 740 MCM per year are flowing unused to the sea (Hoff 2013). The latter two phenomena can be attributed to (1) rapid urban sprawl at the expense of natural landscapes and agricultural land (Fig. 02) and climate change, causing temperature increase, decline in precipitation, reduction of snow cover etc.



Fig. 01: Hazmieh suburb. The few remaining green spots are getting built-up.

In spite of its relatively high annual rainfall it is expected, that Lebanon will be unable to meet its water demand in 2025.

The national water strategy considers managed ground-water recharge as one of the measures to increase groundwater resources. To explore the potential of artificial aquifer recharge using an appropriate integrated water resources management (IWRM) approach, a Project Feasibility Study was commissioned by GIZ-ACCWaM in 2013. ACSAD is taking a share in the project.



Location: Hazmieh, Beirut Area, Lebanon

Technical features: Expected outputs of the Feasibility Study are (1) Available studies and data related to manage aquifer recharge in Lebanon are evaluated; (2) The present impact of sea water intrusion on groundwater quality in the study area is assessed; (3) A remediation process for improving groundwater quality in regard to salinity using an IWRM approach is defined; (4) Implementable measures and techniques for improving groundwater quality in the study area are proposed.

Socio-economic features: The implementation will depend on a close cooperation of State organs, NGOs and the public. Applying an IWRM approach, the solutions will include water demand and supply side measures.



Fig. 02: Upstream areas of Beirut River: Widespread deforestation, new settlements, surface sealing and groundwater pollution

Transferability: The general approach can easily be transferred to other densely populated coastal areas of MENA region, but the specific geographic conditions of each site (regarding topography, climate, geology, land use, etc.) demand adapted solutions. The high costs involved will ask for the involvement of an international donor.

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ACCWaM Adaptation to Climate Change
in the Water Sector in the
MENA Region

Literature: Hoff, Holger (2013): Mainstreaming Climate Change Adaption in National, Strategies and Action Plans in Lebanon. Eschborn: giz.