

## IAH network on “Coastal aquifer dynamics and coastal zone management” QUESTIONNAIRE

IAH national committees, IAH members and non members from all around the world involved in SWI and SGD research and management are kindly asked to fill in the questionnaire in this page with as many details as possible.

A world database will be set up and made available, with basic coastal aquifer main characteristics.

We expect to gather standard and comparable information on the knowledge level and hopefully the state of the art of the research on SWI and SGD, and coastal aquifer management methods adopted around the world

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|-----|---|---|
| 1)  | Location of aquifer (country, more specific location):  | Gaza Strip,Eastern Mediterranean Sea  |
| 2)  | Reported by:  | Ashraf M. Mushtaha and Kristine Walraevens  |
| 3)  | Type of medium (karst, porous, fracture)  | The aquifer has high permeability and porosity values   |
| 4)  | Type of aquifer (phreatic or confined)  | Gaza aquifer is classified as unconfined aquifer  |
| 5)  | Main lithology - (e.g. gravel, sand and clay)   | The aquifer comprises tertiary and quaternary formations.The bottom of the aquifer consists of shallow marine clays, shales and marls called Saqiya Formation. The aquifer itself consists of consolidated quartz sands with calcareous material called Kurkar Formation  |
| 6)  | Hydrochemistry: fresh or saline   | Gaza aquifer is a saline coastal aquifer with freshwater lenses floating above saline water   |
| 7)  | Saltwater intrusion: lateral from sea or lakes - upconing   | The groundwater resource in the Gaza Strip will be polluted by saltwater from sea   |
| 8)  | Aquifer geometry: hydraulic characteristics   | The thickness of the aquifer ranges from few meters in the South East to about 180m in the North West of the Gaza Strip.  |
| 9)  | Aquifer parameters: storage - annual water pumping - (in MCMA - millions cubic meters, annually)  | Annual water pumping: 169 MCMA and more than 50% of the abstracted groundwater was for domestic use(89 MCMA)<br>Groundwater recharge is around an average of 100 – 110 MCM yearly   |
| 10) | Depth of aquifer (water level and bottom) - water level 5-30 m - aquifer depth - 50-200 m   | The aquifer depth is in range of few meters in the South-East to around 100min in the North-West of the Gaza Strip  |
| 11) | Major chemistry (anions - ?; Cations - ?):  | Chloride and Nitrate are the most important parameters  |
| 12) | Major salinity sources:   | Because increased withdrawal of groundwater from the water supply wells near the coast is the main cause of seawater intrusion into the aquifer   |
| 13) | Population:   | The population of the Gaza Strip reaches more than 1.7 Million inhabitants (PCBS, 2012). The population is expected to be around 2 Million inhabitants in the year 2015 and about 2.9 Million inhabitants by the year 2025 (CMWU, 2010)   |
| 14) | Aquifer status: special features - e.g. thermal springs, major faults,...   | Gaza Aquifer is characterized as Kurkar formation (consolidated sand)   |
| 15) | Investigation methods - e.g. water level measurements, EC (electrical conductivity profiles), TDEM (geophysical),                                       | Vertical electrical sounding (VES);Time Domain Electromagnetic Soundings(TDEM)  |
| 16) | Numerical hydrological modeling, chemical and isotopic methods, age determination, IR survey, seepage meters (for Submarine Groundwater Discharge, SGD) | 3D groundwater model  |
| 17) | Monitoring methods applied and duration - water level measurements, EC (electrical conductivity profiles - seasonal)                                    | In the past water level were monitored on a monthly basis but due to some difficulties (political and security),it is being randomly measured   |
| 18) | Management methods:   | The Palestinian institutions related Should look for new water resources(ie seawater desalination ) to secure suitable drinking water to the Gaza Strip people and minimizing the abstraction rate especially in the West of North and Rafah Governorates may decrease the damage of seawater intrusion in case of sea level rise |
| 19) | Aquifer management actions:   | Lowering pumping and find other water resources   |
| 20) | Identification of existing or potential problems:   | The model shows that if pumping from the aquifer continues to increase there is no new water resources for the Gaza Strip   |
| 21) | Annexes:  |   |
| 22) | Observations:   |   |