

HARMONIZATION OF TRANSBOUNDARY GROUNDWATER BODIES IN SOUTH MEDITERRANEAN; CASE STUDY OF EGYPT

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Groundwater resources in the South Mediterranean arid countries are critical water resources, where it plays an important role in the region economical development. It represents in average 37% of the total renewable resources at the region with very wide variation from one to another country; in Egypt 13.86 %, Libya 81.25 %, Tunisia 39.32 %, Algeria 16.05 % and Morocco 33.33 %.

Harmonization of Transboundary groundwater bodies' delineation and characterization in south Mediterranean countries will be needed for setting up efficient Transboundary groundwater management where the situation is rather different from the north Mediterranean countries (EU Member States), where groundwater management comes under the EU Water Framework Directive (WFD).

During the 3rd Tripoli Conference for Managing Shared Aquifer Resources in Africa has suggested formulating sub regional Ground Water Task Force Group (GWTFG) for the South Mediterranean Countries aims to delineate and characterize the Shared Groundwater Bodies at the South Mediterranean Countries in the light of the EU WFD experiences and clarify the groundwater status at the sub region.

This Task Force Group will elaborate informal technical guidance including practice examples and case studies. It will work under the umbrella of the RCSARM in Africa and looking for Cooperation with UNESCO ISARM project and the IHP support.

Based on the EU Water Framework Directive (WFD) definition of a Groundwater Body; it permits a large palette of approaches for the groundwater body's delineation process. This fact will lead to many Groundwater Bodies types and, as a consequence too many misfits between the Transboundary Groundwater Bodies delineated on each side of the borders. Therefore, the implementation of the GWTFG aim to imply a harmonization process between the five countries team work for the Transboundary groundwater body's delineation and characterization. An example of such process presented at the case study of Egypt.

This paper introduce the adapted methodology followed in delineation and characterization of the groundwater bodies in Egypt and how to overcome obstacles due to lack of measured hydrogeological parameters, uneven distribution of the monitoring wells and the population density.

This work considers the first step toward formulation the adapted approach guidelines document, in the south Mediterranean region to delineate and characterize the shared Groundwater Bodies, which is important in order to: develop a common understanding and approaches, share experiences and resources, and to avoid duplication of efforts.

Groundwater bodies in Egypt have been designated according to the EU WFD guidance document no.GW2 (March 2005) in harmony with the horizontal guidance on hydrogeological framework of Egypt and groundwater bodies (RIGW 1999 and Hassan 2007).

The criteria for delineation are:

- The geological type of the aquifer systems; the Nile alluvium; the Nubian sandstone; the Moghra; the coastal and wadi aquifers; the karst carbonate; and the fissured and weathered basement rocks. This criterion implies petrography, structural geology and aquifer hydraulic parameters.
- Groundwater Hydrodynamic includes; confined, unconfined, exploited, unexploited, overexploited, renewable, un renewable, shallow, deep, one layer, multi layered, local, extendable, highly productive, low productive.
- Interaction with Ecosystem; Groundwater which is in continuity with ecosystems and can place them at risk, either through the transmission of pollution or by unsustainable abstraction that reduces base flows.
- Groundwater chemistry; fresh, brackish, saline, monitoring density, polluted, vulnerable for pollution, thermal and mineral groundwater.
- Other types of boundaries includes; hydrographic, political, administrative and geomorphic boundaries.

Following the criteria mentioned above, forty Groundwater Bodies have been identified in Egypt, among them 6 internal GWB's at the Nile alluvium; 12 GWB's at the Nubian sandstone includes 4 shared with western and Southern Borders; 2 internal GWB's at the Moghra; 7 GWB's at the coastal and wadi aquifers includes 2 shared GWB's; 9 GWB's at the karst carbonate includes 2 shared GWB's; and 4 internal GWB's at the fissured and weathered basement rocks.

Although there are some good examples of ongoing programs on Transboundary water cooperation in the region (Nubian Sandstone Aquifer, North Western Sahara ...), such activities are scarce and lack coordination.

Groundwater Monitoring in the South Mediterranean countries need more harmonization of network design, measurement frequency, standards, quality control and data storage and processing for establishment of an efficient Transboundary groundwater monitoring particularly at the coastal aquifers where the existing data are not sufficient or reliable enough to plan regional actions for the sustainable use of groundwater resources.

Almost 58% of the groundwater resources in the South Mediterranean countries come from non renewable resources suffer from overexploitation and water quality deterioration. Agriculture is by far the most important groundwater use activity in the South Mediterranean region, it extract about 81 % of the total groundwater extraction followed by the public supply 12% and the Industrial use 7% .

Delineation and characterization of the shared groundwater bodies in south Mediterranean region will help in refining the on going groundwater modeling simulation activity and efficiently manage the shared water resources.

The author recommends formulating a specific GW expert group for delineation, characterization, mapping of the shared groundwater bodies in the South Mediterranean Countries on the base of EU WFD approaches and clarify the groundwater status in the sub region under the umbrella of UNESCO Regional Centre for Shred Aquifer Resources Management and to be supported by UNESCO, AMCOW, GEF-UNDP, EU and MED EUWI