

*World Water Congress XVI  
International Water Resources Association (IWRA)  
Cancun, Mexico May 29 - June 2, 2017*

**The Nubian Sandstone Aquifer System (NSAS):  
a case of cooperation in the making**

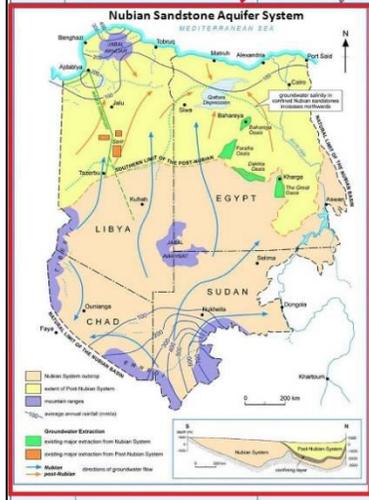
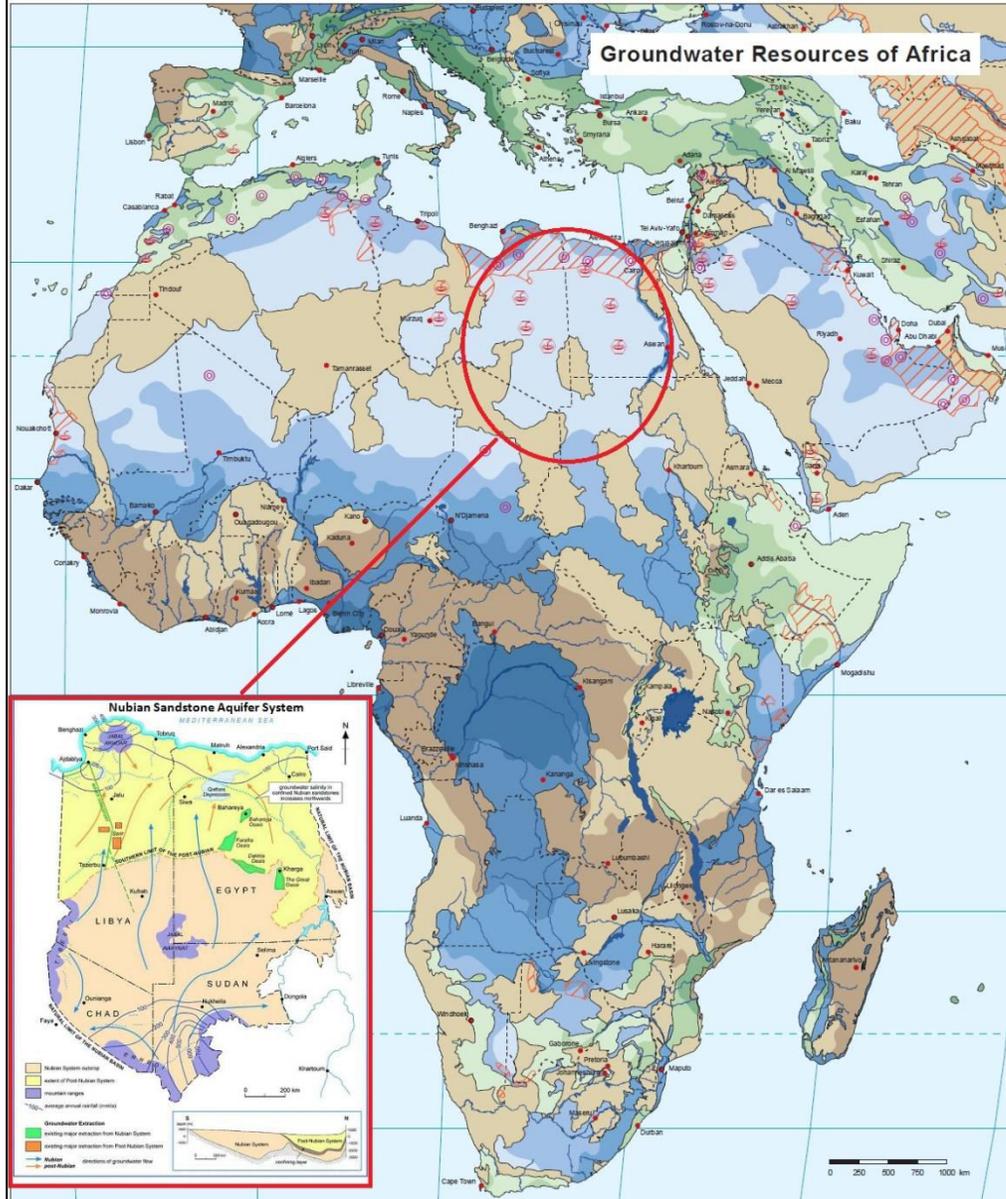
**Elena Quadri**

PhD, Ms

Fellow Researcher

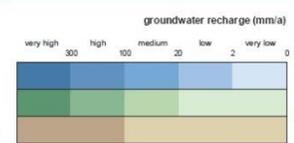
University for Foreigners of Perugia (Italy)

# Groundwater Resources of Africa



### Groundwater resources

in major groundwater basins  
 in areas with complex hydrogeological structure  
 in areas with local and shallow aquifers



### Special groundwater features

- area of saline groundwater (> 5 g/l total dissolved solids)
- natural groundwater discharge area in arid regions
- area of heavy groundwater abstraction with over-exploitation
- area of groundwater mining

© BGR Hannover / UNESCO Paris 2008. All rights reserved.



# Nubian Sandstone Aquifer System (NSAS)

**Is the largest known fossil aquifer in the world  
one of the largest reserves of non-recharging groundwater**

- NSAS lies in Africa, in the eastern part of Sahara and covers a land area spanning over two million square kilometers including:
  - **Egypt** 816.000 km<sup>2</sup> (37,5%)
  - **Libya** 754.000 km<sup>2</sup> (34,7%)      **Downstream States**
  - **Sudan** 373.000 km<sup>2</sup> (17,1%)
  - **Chad** 233.000 km<sup>2</sup> (10,7%)      **Upstream States**

# Nubian Sandstone Aquifer System (NSAS)

- Man made exploitation of this enormous freshwater reserve has been on the steady rise in the past forty years, with 40 billion km<sup>3</sup> extracted by Egypt and Libya, mainly for irrigation and drinking water supply projects.
- The importance of protecting transboundary aquifers from over-exploitation and from pollution, and the importance of cooperation to this end, had led the four countries to put in place some agreements, from 1992 to-date

# Cooperation agreements

Cooperation between **Egypt** and **Libya** had begun already in the seventies; it crystallized in the establishment of the:

- **1992 Joint Authority (JA) for the Study and Development of NSAS**
  - (Sudan joined the JA on 1966 and Chad on 1999)
  
- **2000 Agreement No.1 - Terms of Reference for the Monitoring and Exchange of Groundwater Information of the NSAS**  
and  
**Agreement No.2 - Terms of Reference for Monitoring and Data Sharing**
  
- **2006 Medium Sized Project** (funded by GEF and implemented by UNDP, IAEA, UNESCO-IHP)
  
- **2013 Regional Strategic Action Programme for the NSAS (SAP)**

# An evolutionary cooperation pattern

- **JA «Institutional agreement»** : JA has been conceived of as a joint institution, devoid of authority as regards the management of the shared aquifer; **«internal regulation»** discloses in fact that the Authority has ample power regarding its own internal administrative organization and functioning (no mention is made of its legal personality, prior notification requirements of planned measures and of settlement of dispute).

**However it's a precursor of**

- **2000 «procedural agreements»** signalling a shift from institutional agreement to more specific procedural agreements covering monitoring and data exchange and monitoring and data sharing (neither agreement addresses the management of the aquifer and the decision-making processes)
- **2006 GEF Medium Sized Project preparatory of SAP** constitutes a significant milestone in the slow but steady path to cooperation. The long term goal is to to achieve an **«equitable and reasonable»** management of the aquifer, for socio-economic development and for the protection of bio-diversity and of natural resources. It enables a better knowledge of the aquifer and the attendant issues, and **lays the foundations for the SAP.**

# An evolutionary cooperation pattern

Four objectives concur to the achievement of the project goal:

- First, the identification of priority transboundary threats and their root causes addressed in a Shared Aquifer Diagnostic Analysis (SADA)
- filling gaps in data and capacity through appropriate technical approaches, necessary to make strategic planning decisions
- preparation of a Strategic Action Plan (SAP) delineating the policy, institutional and legal reforms which will be required to deal with the threats and their causes identified in the SADA
- an institutional structure for the implementation of the SAP

# An evolutionary cooperation pattern

The **Regional Strategic Action Programme for the NSAS** (SAP, 2013) is the chief outcome of the 2006 project. The SAP is an «**agreement to agree**», at later stage, on actions for the sustainable management of the aquifer, based on the findings in the SADA.

Three main objectives emerge:

1. the strengthening the role and capacity of the JA in the management of the shared aquifer
2. Development of a dedicated data exchange cooperation structure, entailing a review and update of prior aquifer monitoring and data exchange agreements, with in view to a management framework for the NSAS
3. improving the effectiveness of the JA national offices.

From the project one can glean the intent of the Parties to also prepare a convention for the management of the NSAS as the ultimate goal.

# An evolutionary cooperation pattern

- The SAP advocates legal and institutional mechanisms capable of exerting a regional protection and control of groundwater extractions and of priority groundwater uses.
- The ultimate goal is to enable - through appropriate legal and institutional procedures – transboundary cooperation and integration of aquifer-dependent socio-economic activities, and land use schemes, based on the efficient use of the NSAS groundwater resources, including implications on agriculture (e.g., pollution, chemical standards, industrial discharges), and the control and prevention of migratory flows

# The rules applicable to the NSAS: the UN Draft Articles on the Law of Transboundary Aquifers (2008)

- The need for a legally binding agreement among the four States for the equitable and rational management of the aquifer is readily apparent
- It would be wise to frame a convention for the NSAS and to pattern it after the principles contained in the Draft Articles
- These principles could point in the right direction, as regards substantive norms on equitable and reasonable use (Art.4), on the duty not to cause significant harm (Art.6), and procedural (Art.8) and environmental protection norms (Artt.10-12). It would be useful to add norms for the settlement of disputes, which is not provided for in the Draft Articles

# Conclusions

- the NSAS agreements on record are only about procedural norms of inter-NSAS State behaviour;
- the cooperation borne out of such agreements is “work in progress”, attesting to the will of the Parties to embark on a cooperation path. However, this has not reached full maturity yet. From an “institutional”-type agreement in 1992 the Parties have moved on to more specific accords laying down procedural norms, in 2000. Later, the GEF Project in 2006 laid the foundations for the latest agreement on record, i.e., the 2013 SAP, which reflects a shared vision for the cooperative management of the aquifer, and outlines strategies for implementation. There is still a long way ahead, however cooperation is live and kicking, of course within the limits illustrated in this paper;

# Conclusions

- to-date, the SAP has not moved forward. It is to be hoped that the formation of a stable government in Libya will enable resumption of cooperation with the other three NSAS countries, so as to bring forward what they had envisioned in 2013 for the sustainable management of the NSAS;
- the need for a legally binding agreement, providing substantive and procedural norms of inter-State behaviour, and norms for the settlement of disputes, is readily apparent. To this end, we recommend recourse to the substantive, procedural and environmental norms featured in the UN Draft Articles, with the addition of norms for the settlement of disputes, which the Draft Articles do not provide for.

***Thank you for your attention!***

***Elena Quadri: [elen.quadri@gmail.com](mailto:elen.quadri@gmail.com)***