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**2016 WORLD WATER WEEK** 

Water for sustainable growth



### Sustainable Management of the Shared Nubian Aquifer System

#### Management of Transboundary Groundwater: The Nubian Aquifer Experience



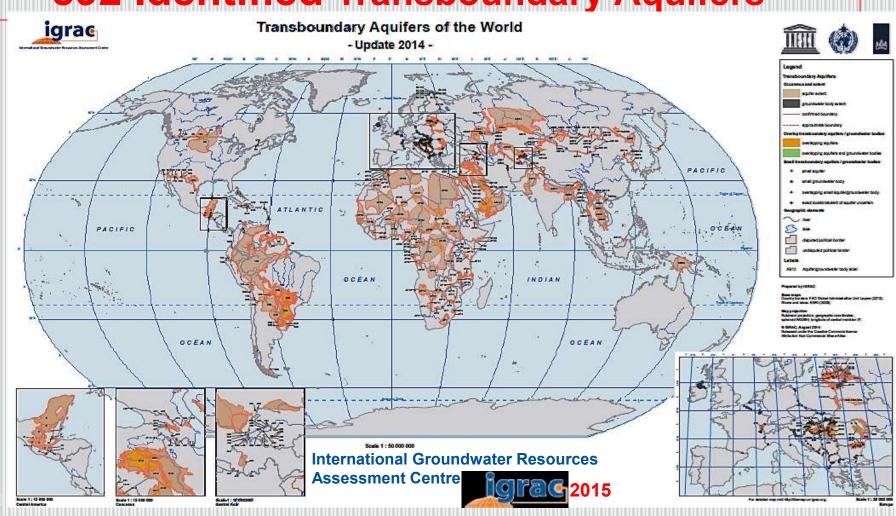


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Groundwater ignores political boundaries

592 Identified Transboundary Aquifers \*

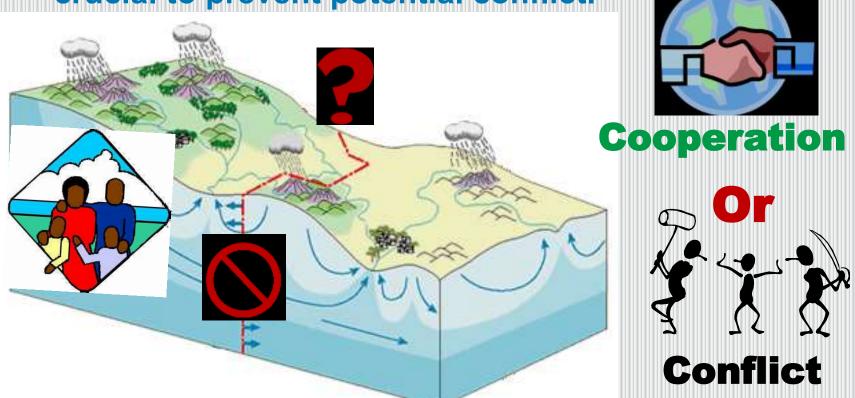


### 1

#### Transboundary Groundwater

Political boundaries complicate full understanding and rational management.

Collaboration between the concerned parties is crucial to prevent potential conflict.





#### **Transboundary Groundwater**

#### **Nubian Sandstone Aquifer System [NSAS]**



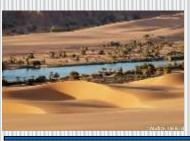
NSAS is the world's largest known fossil aquifer system. It is located in the North East corner of Africa, and spans the political boundaries of Chad (11%), Egypt (38%), Libya (34%), and Sudan (17%).

□ NSAS is a vital resource in such arid region. It is considered nonrenewable, depleting slowly through natural and artificial processes.

#### **Transboundary Groundwater**

#### **Nubian Sandstone Aquifer System [NSAS]**

- The four countries have similar conditions of arid climate, and fragile ecosystem.
- Groundwater is identified as the major future source to meet growing demands.
- Description 12 Each country has given top priority to linking groundwater from NSAS to national development.





Chad





**Egypt** 





Libya



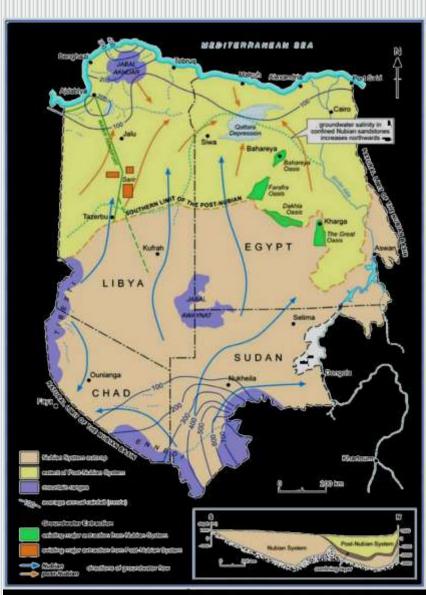


Sudan



#### **NSAS Regional Cooperation**

- The need for regional cooperation is emphasized by the nature of the NSAS as a common pool resource, and since negative transboundary impacts cannot be ruled out.
- Cooperation is therefore needed to manage these impacts, and to harmonize the differing interests.



- □ Groundwater from the NSAS has been utilized since centuries in Oases in the sharing countries.
- Mutual interest in technical cooperation over the NSAS goes back to the early 1970's.
- ☐ Egypt and Libya formalized the process in 1991 with establishing the Joint Authority for the Study and Development of the NSAS. Sudan joined in 1996 and Chad followed in 1999.



#### NSAS Regional Cooperation

- ☐ Continuous support provided from regional and international organizations has helped to improve inter-state understanding of the characteristics and functioning of the NSAS.
- ☐ Such support has been instrumental in maintaining regional cooperation through regional projects.
- In this respect, the IAEA with UNDP/GEF, and UNESCO developed a regional project that was launched in 2006 and concluded in 2013.











#### NSAS Regional Cooperation



The Nubian Sandstone Aquifer
System Project

A joint initiative of the IAEA/UNDP/GEF

- The regional cooperation project has the overall objective of the formulation of an action programme for integrated management of the shared NSAS,
- ☐ Aiming at: filling key gaps in methodologies, data and capacity, and strengthening institutional and legal frameworks



This is addressed through the GEF-IW SADA/SAP management approach.









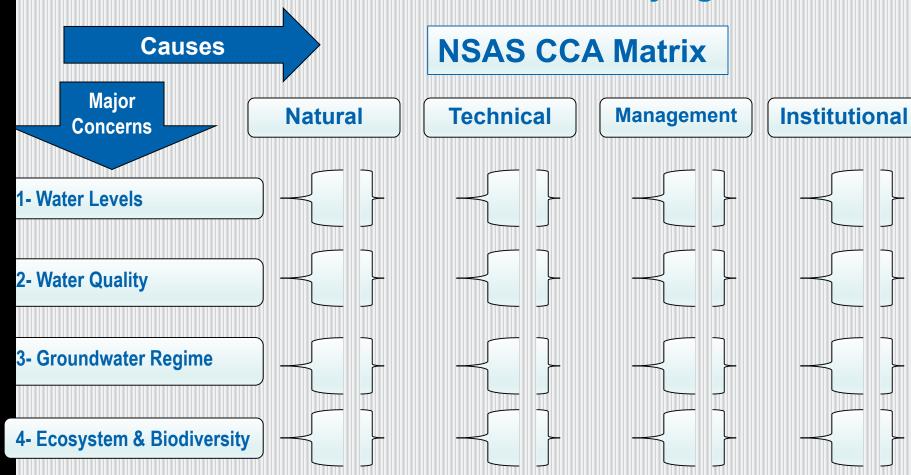




- ☐ Shared Aquifer Diagnostic Analysis (SADA) is based on the (GEF) Transboundary Diagnostic Analysis (TDA) methodology.
- ☐ TDA is an objective, non-negotiated assessment structured on technical fact-finding and stakeholder participation.
- ☐ In the SADA, priority problems of transboundary nature and their root causes, (Physical and socioeconomic), were assessed through the formal process of causal chain analysis.
- ☐ Understanding priority threats and their root causes is the initial step in defining both the technical and institutional challenges in managing the NSAS.

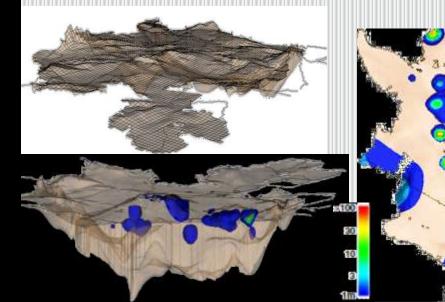


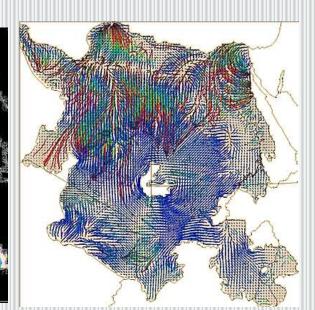
The SADA process comprised causal chain analysis, relating major concerns with their immediate physical causes and their socio-economic underlying causes.





- ☐ The SADA results are harnessed to identify key gaps in data and capacity.
- □ Accordingly, a new regional model of the NSAS was developed to provide mutually accepted technical reference for identification and understanding of the system's transboundary issues and impacts.







- □ Following to a successful preparation of the SADA, the next major step was the formulation of the regional Strategic Action Program (SAP).
- □ SAP is a negotiated policy document that establish clear priorities for action to resolve the problems which were identified in the SADA. SAP has been a co-operative process among the NSAS countries.
- ☐ **SAP** Development Main Steps:
  - Develop a long term vision for the System
  - Attain long-term WR/Eco objectives addressing the vision
  - Set short-term management targets satisfying the WR/Eco
  - Develop monitoring & evaluation indicators
  - Draft the SAP document



**□ NSAS**: Vision Statement

"To establish a rational and equitable management of the NSAS for sustainable socio-economic development and the protection of biodiversity and land resources whilst ensuring no detrimental effects on neighbouring countries."

- ☐ WR/Eco objectives are statements of the 'vision' of how the stakeholders would like to see the state of water resources and the ecosystem of the NSAS in the future.
- ☐ Short-term management targets are the steps to long-term WR/Eco objectives. achieve the Management targets are short-term and could be monitored and reported on perhaps annual basis.

### 3

#### **SADA/SAP Management Approach**

- □ SAP satisfies the NSAS vision through a balanced program of preventive and remedial actions, support both investment and capacity-building, and identify related key activities.
- □ SAP sets out specific actions for each country that can be adopted nationally through National Action Programs, but mutually harmonized among the NSAS countries.
- ☐ Time frame, estimated costs, responsible institutions, success indicators, priority ranking, and involved uncertainty/risk at transboundary and national levels are presented in the SAP management action tables.



#### **Management Action Tables**

		<u></u>	anageme	THE ACTION	Idbics		
VR/ Eco QO 1:	of the	NSAS c	ountries on t cts within ar	the basis of jo nd between o	int regional countries; a	planning in o	y for the benefit rder to minimize e challenges of ange.
/R/ Eco QO 1a:	<b>.</b>	engthen th d aquifer.	e role and cap	acity of the NSA	AS Joint Auth	ority (JA) to effe	ctively manage the
Management Targets	Actions	Time Frame	Estimated Costs (K\$)	Responsible institution(s)	Indicators of Success	Priority (high, medium, low)	Uncertainty / Risks
ransboundary Level							
olicy, Legislative nd Institutional: stablish enhanced rans-national nechanisms to crengthen the	Action 1	2 years	12	UNDP/GEF  JA and four countries	JA enhanced structure and roles	Medium	Technical assistance/Funding
xisting JA poperative role nd explore new reas of poperation.	Action 2	2 years	8	UNDP/GEF  JA and four countries	JA enhanced structure and roles	Medium	Technical assistance/Funding



☐ The finalized SAP document was endorsed by The **NSAS** countries at Ministerial Level.







On behalf of the Government of Arab Republic of Egypt



Ministry of Electricity and Energy

18-69-2013 . VIEWIL Date and Place

On behalf of the Government of Republic of the Sudan



Ministry of Water Resources and Electricity

18-9 2013 Vienia Date and Place

Nubian Sandstone Aquifer System Project





H.E. Eng. Al Hadi S. Henshir

Ministry of Water Resources

18.09.2013 Vienna Date and Place

On behalf of the Government of

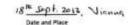
On behalf of the Government







Present Representative













#### **Concluding Remarks**



Regional cooperation over the NSAS is a strategic choice for the riparian countries, who have institutionalized their regional cooperation through the Joint Authority framework.

- □ Application of the SADA/SAP approach has been a co-operative process among the NSAS countries.
- □ NSAS regional cooperation through the SADA/SAP approach provides an example of successful hydrosolidarity at the level of shared aquifers.

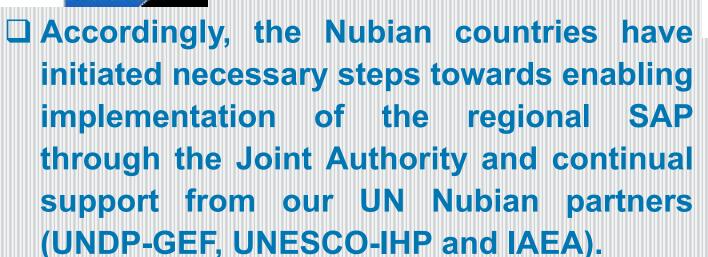
THE

WAY

FORWARD

#### **Concluding Remarks**

□ The regional SAP document endorsed by the four Nubian countries provides a roadmap for the way forward, expressing values, pressures, impacts, actions and critical success factors relating to the implementation of the SAP.





#### **Concluding Remarks**

☐ The major challenge is to further promote transition of regional cooperation from "joint assessment" to "joint management".



Lessons learned from the development of regional cooperation over the NSAS could help guiding cooperation over similar transboundary aquifer systems.

☐ To conclude; "The future is not what will happen, but what we are going to do" this is a major lesson learned from this management practice.





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