The need for groundwater management in Transboundary River Basins

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Introduction to the International Association of Hydrogeologists (IAH)
MISSION
Furthering the understanding, wise use and protection of groundwater resources throughout the world

Regional Training Workshop on Integrating Groundwater Management within River Basins, 15-18 January 2019, RCGW, KEWI, Nairobi, Kenya
• founded in 1956
• 2000 members by 1989
• now 4100 members in 131 countries
• 45 Congresses
• 40 national chapters – more being established
• incorporated and charitable status in 2000
• 304 members from SSA as of August 2018

IAH is now a worldwide professional community, a scientific forum and publisher, an advocate for groundwater resources and an educational and charitable body

http://iah.org/
1. IWRM & groundwater management framework
2. Aquifer system characterization for management
3. Integrated groundwater management in practice
4. Groundwater legislation and regulation
5. Groundwater allocation and licensing
6. Economic and financial instruments in groundwater management
7. Stakeholder participation in groundwater management
8. Groundwater quality protection and management
9. Groundwater monitoring
10. Groundwater and climate change
11. Information management and communication.
Groundwater as an important part of the Water Cycle

Groundwater stored

= Water resources inherited from the past millennia
Facts and figures on Groundwater in Africa

• Key source of water for drinking (urban & rural supplies), livestock, and small scale irrigation.

• Approximately half of the nearly one billion people in Africa rely upon groundwater for their daily water supply.

• Has enabled communities across Africa to adapt to seasonal or perennial shortages in surface water.

• Is indispensable when managing water scarcity, a natural condition in 30 out of 53 African countries.

• Groundwater management is fundamental to effective river basin management e.g 80% of the Niger River water is from groundwater.
Transboundary groundwater aquifers

- Around 41 transboundary aquifers exist in Africa
- Great lack of scientific knowledge on characteristics of TBA (No or very limited aquifer monitoring and assessment)
- Limited cooperation on transboundary aquifer management (limited management organisations and legal frameworks)
The TBAs map

- 80 transboundary aquifers
- 42% of area of Africa
- 30% of African population
- 63 international river/lake basins
- 21 international water basin organisations
River Basins of Africa

- Good scientific knowledge on characteristics of surface waters in river basins (Long term surface water monitoring and assessment)
- Long term cooperation on transboundary surface water management (management organisations and legal frameworks) exist across Africa
WHYMAP

www.whymap.org
Regional distribution of global freshwater - resources

Source: Igor A. Shiklomanov, State Hydrological Institute (SHI, St. Petersburg) and UNESCO (Paris), 1999.
Interaction of groundwater and surface water

GAINING STREAM
- Flow direction
- Unsatuated zone
- Water table
- Shallow aquifer

LOSING STREAM
- Flow direction
- Water table
- Unsatuated zone

DISCONNECTED STREAM
- Flow direction
- Unsatuated zone
- Water table

BANK STORAGE
- Flow direction
- Water table at high stage
- High stage
- Bank storage

How can transboundary aquifers be managed?

Integration of GW in Basin Organisations
Process to support Groundwater Management in River Basin Organizations

- Information basis (desk studies, WHYMAP)
- Needs assessment for BO’s
- Consultative meetings
- Development of training materials/ Policy Briefs
- Training Workshops
Needs Assessment to Support Groundwater Management in Transboundary Basin Organisations (BO) of Africa

A survey of 9 Lake/River Basin Organisations (L/RBO‘s) in Africa
Integration of groundwater in River Basin management

➢ Survey of 9 L/RBO in Africa and key issues looked into:

To which level is GW addressed in BOs?

How can transboundary aquifers be managed?
SWOT - BOs

Strengths

Multi-state agreement => allows transboundary water management.
Permanent secretariat => initiate and carry out transboundary groundwater management.
Can bring groundwater to a higher agenda.
Focal point for political and technical collaboration between riparian states.
IBOs can provide a suitable platform for hosting transboundary groundwater data and for the management and use of the data.
**SWOT - IBOs**

**Weaknesses**

Advisory bodies only => no legal mandate to manage transboundary groundwater. Many BOs are not well integrated with the groundwater management authorities in the riparian states. There is often insufficient understanding of transboundary groundwater issues in BOs. BOs lack data, protocols, staff, suitable computer platform for a groundwater database. Do not have the skills, personnel or equipment for transboundary groundwater management.
Opportunities

Can take the lead in transboundary groundwater management and monitoring.
Can establish multi-state taskforces from the riparian states to deal with TB groundwater issues.
Opportunity to develop protocol on groundwater data sharing for transboundary aquifers.
Opportunity to pool riparian states expertise for transboundary groundwater management.
SWOT - IBOs

Threats

Lack the finances and procedures to carry out transboundary groundwater management / monitoring programs.

Technical complexities and conflicting interests for transboundary groundwater movements makes agreement difficult.

Lack of knowledge of groundwater resources and use.

Training programs for transboundary groundwater management not available.
Consultative Meeting for the Integration of GW in BOs, Ouagadougou/ Burkina Faso in February 2013

- Training manual for the middle management in BO
- Policy brief for the upper management
20 Arguments for including GW in IWRM and RBOs

1. Conflicts over a shared GW resource can be avoided

2. Costs and results of monitoring can be shared

3. Benefits of GW development can be equitably shared

4. General collaboration and goodwill can be enhanced

5. Impacts of GW development and use in one member state may affect another

6. GW impacts across borders may not be obvious without joint monitoring
20 Arguments for including GW in IWRM and RBOs

7. Developing GW in connection with transboundary SW (conjunctive use) may provide a lot of benefits, e.g. flood waters may be used to replenish GW in overdrawn aquifers, and to flush and dilute GW pollution.

8. Conjunctive use of GW and SW may alleviate water problems (quantity and quality).

9. GW may both function to alleviate droughts and floods, if properly managed.

10. Many terrestrial ecosystems are GW-dependent and cannot be properly managed without knowledge on the GW resources.
Continued…

11. GW is paramount in preserving significant ecosystems and biodiversity

12. GW should not be considered as a single and unlimited resource

13. An integrated approach creates better understanding of water flows and water balances within the basin

14. An integrated approach makes it possible to better delineate the basin, including active and connected aquifers

15. SW issues involve or even have root in GW related activities and impacts
Continued…

16. Water from the river may be lost through GW abstraction in the vicinity of the river

17. Lake, river, wetland, estuary water quality may be threatened by GW pollution in adjacent areas (mining, intensive agriculture)

18. Further GW development may threaten traditional GW-based drinking water supply

19. Transboundary GW management is needed for achieving the SDGs, on poverty alleviation, food security, climate change adaptation, and drought mitigation

20. No action and transboundary cooperation may result in disbenefits
INTEGRATION OF GROUNDWATER MANAGEMENT into Transboundary Basin Organizations in Africa

TRAINING MANUAL
Cooperation partners for training manual development

- African Network of Basin Organisations
- AGW-NET Africa Groundwater Network
- Cap-Net
- German Cooperation
- BGR
- IGRAC
- Global Water Partnership
- IWMI International Water Management Institute
Modules

1. GW-Management in Transboundary Basin Organizations in Africa (Needs assessment)
2. IWRM and GW
3. Aquifer Systems Characterisation
4. Management of Transboundary GW
5. GW Monitoring and Information Management
6. GW regulation, licensing, allocation and institutions
Modules

7. Stakeholder participation and communication in GW Management
8. GW Hazards
9. GW and Food Security
10. GW and Environment
11. GW and Climate Change
Outlook for the manual

• Free of use!

• Implementation of trainings through various agencies most especially AGW-net

• Trainings could be held in collaboration with international and regional partners (BGR, UNESCO, RBOs, RECs etc)

• Various pilot-trainings held since 2013 (with ORASECOM in 2013, with BGR during Africa Water Week and RWSN conference both in 2016, Lake Chad Basin in 2016 etc)