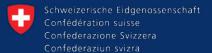


Online Course on Groundwater Management in African Lake and River Basin Organizations



Swiss Agency for Development and Cooperation SDC

Introduction

Arnaud Sterckx, IGRAC











O INTEGRATION OF GROUNDWATER MANAGEMENT into Transboundary Basin Organizations in Africa























TRAINING MANUAL

INTEGRATION DE LA GESTION DES EAUX SOUTERRAINES

dans les Organismes de Bassin Transfrontalier en Afrique



MANUEL DE FORMATION

Transboundary water management is of great importance to Africa as has been emphasized in the African Water Vision 2025; almost all Sub-Saharan African countries share at least one international river basin. In Africa there are about eighty transboundary lake and river basins and at least forty transboundary aquifer basins. The African Water Vision 2025 stresses that groundwater is the major, and often only, source of drinking water for more than 75 % of the African population. Groundwater constitutes over 95% of the fresh water resources in Africa, and pollution and salinization of this resource is often irreversible on human timescale. As a result, a broad consensus has developed in AMCOW and in ANBO/INBO, (African (International) Network of Basin Organizations), that groundwater must be included in integrated river basin management.

Download: https://www.un-igrac.org/special-project/capacity-building-groundwater









MUDULE 1			WODULE 4			
Framework and Needs Assessment of Groundwater Management in			Management of Transboundary Aquifers			
Trans	sboundary Basin Organizations in Africa		4.1	Introduction	4	
1.1	Introduction	4	4.2	What is a transboundary aquifer (TBA)?	4	
1.2	Objectives of the needs assessment	6	4.3	Transboundary aquifers in Africa	6	
1.3	Methodology	6	4.4	Approach and mechanisms for TBA management	10	
1.4	SWOT analysis	7	4.5	Specific challenges and cases of TBA management in Africa	13	
1.5	Overall results	11	4.6	References	15	
1.6	Recommendations	14	4.7	Exercise	16	
1.7	The Training Manual	15				
1.8	References	16	M	DDULE 5		
1.9	Exercise	19	Gro	Groundwater Monitoring and Information Management		
			5.1	Introduction	4	
MC	DULE 2		5.2.	Monitoring practice	7	
Integrated Water Resources Management and the Groundwater Management		anagement	5.3	Data storage and information management	12	
Fram	ework		5.4	Benefits and cost effectiveness of monitoring	15	
2.1	Introduction	4	5.5	Access and exchange of national data to the		
2.2	Groundwater in the hydrologic cycle	5		transboundary basin organisations	16	
2.3	Characteristics of groundwater	7	5.6	Global data	17	
2.4	Sustainable groundwater use	9	5.7	Reference	17	
2.5	What is Integrated Water Resources Management (IWRM)?	10	5.8	Exercise	12	
2.6	IWRM principles and framework	10		ABILLE A		
2.7	Groundwater management for river basins	13	M	DDULE 6		
2.8	Summary	18	Gro	undwater regulation, licensing, allocation and institutions		
2.9	References	18	6.1	Introduction	4	
2.10	Exercise	19	6.2	Regulation of groundwater within a river basin framework	4	
			6.3	Groundwater licensing	7	
MU	DULE 3		6.4	Groundwater allocation	9	
Aqui	fer Systems Characterization for Groundwater Management		6.5	Main interactions in groundwater licensing and allocation system	14	
3.1	Introduction	4	6.6	Allocation of non-renewable groundwater resources	15	
3.2	Groundwater occurrence	4	6.7	Institutional framework for groundwater management	16	
3.3	Groundwater flow	8	6.8	Implementing a groundwater regulatory system	17	
3.4	Groundwater balance and recharge	10	6.9	References and further reading	20	
3.5	Groundwater and surface water interaction	13	6.10	Exercise	21	
3.6	Summary: Critical issues in groundwater characterization	20				
3.7	References	21				
3.8	Exercise	22				











MODULE 7

7.1 Why stakeholder involvement?

Γhe	role	of	stakeholder	participation	and	communication	in	groundwater
man	agen	nen	t					

7.2	Who does stakeholder participation and how is it done?
7.3	Identification and assessment of key stakeholders
7.4	Institutional mechanisms for stakeholder participation in groundwater
	management
7.5	Stakeholder functions in groundwater management
7.6	Who are groundwater stakeholders for Transboundary Basin
	Organizations?
7.7	What is communication and why is it important in groundwater
	management?
7.8	Further reading
7.0	Evernise

MODULE 8

Groundwater Hazards

8.1	Introduction	4
8.2	Groundwater quantity: Over-exploitation	4
8.3	Groundwater quality: Pollution	7
8.4	Assessment of groundwater pollution, aquifer vulnerability and	
	over-exploitation	11
8.5	Groundwater protection	13
8.6	Summary	15
8.7	References	17
8.8	Exercise	18

MODULE 9

Groundwater and Food Security

.1	Introduction and background	4
.2	Why is groundwater use in irrigation so popular?	7
.3	Livelihood impacts	8
.4	Too much and too little groundwater development for irrigation is a concern	12
.5	Solutions to under- and over-use of groundwater for irrigation	13
0.6	The new approach: The nexus between water-, food- and energy security	15
.7	References and further reading	16
8.0	Exercise	17

MODULE 10

Groundwater and Environment

10.1	miroduction	
10.2	Surface and groundwater interaction	
10.3	Groundwater contamination	
10.4	Groundwater-dependent ecosystems (GDEs)	
10.5	Groundwater over-abstraction	1
10.6	Environmental aspects of groundwater management	1
10.7	The role of basin organizations in environmental management	
	of groundwater	1
10.8	References & Further reading	1

MODULE 11

10 12

12

16 17

Groundwater and Climate Change

Groui	Groundwater and Climate Change				
11.1	Introduction				
11.2	Groundwater as part of the hydrologic cycle				
11.3	Climate variability and climate change				
11.4	Climate change scenarios				
11.5	Impacts of climate change on groundwater				
11.6	Climate change and population growth	,			
11.7	Implications for groundwater dependent sectors				
11.8	Adaptation to climate change				
11.9	Summary				
11.10	References and Web Reading				











Day 1: 29th June 2021 Relevance of groundwater

for Lake and River Basin Organizations (L/RBOs)

This session will demonstrate why groundwater resources management and assessments need to be integrated in L/RBOs, and the environmental and societal challenges to which groundwater contributes.

Day 2: 30th June 2021

Creating the conditions for groundwater assessments at L/RBOs.

In practice, carrying out groundwater assessment in L/RBOs requires two things: expertise in hydrogeology and groundwater data. This session will explain how these conditions can be implemented.

Day 3: 1st July 2021

Towards groundwater management, inspiring examples and discussion.

This last session will address the recommended steps towards groundwater management and assessments in L/RBOs, presenting examples. Time will be secured for discussion and answering questions.

Agenda (CEST UTC + 02:00)

9.00 - 9.20:

Opening speeches (UNESCO & IGRAC)

9.20 - 9.30:

Introduction to the course (Arnaud Sterckx - IGRAC)

9.30 - 10.00:

Groundwater activities at AMCOW

(Moshood Tijani - AMCOW)

10.00 - 10.30:

The need for groundwater management in L/RBOs (Callist Tindimugaya - Ministry of Water and Environment, Uganda)

10.30 - 11.00:

Groundwater challenges: food security, climate change, environments (Moustapha Diene - Cheikh Anta Diop University)

11.00 - 11.30: Break

11.30 - 12.00:

Groundwater quality

(Seifu Kebede Gurmessa- University of KwaZulu-Natal)

12.00 - 12.30:

Transboundary aguifers (Christina Fraser - IGRAC)

12.30 - 13.00:

Q&A (Moderation by IGRAC)

Agenda (CEST UTC + 02:00)

9.00 - 9.15:

Groundwater assessment (Arnaud Sterckx - IGRAC)

9.15 - 9.45:

Groundwater monitoring (Claudia Ruz Vargas - IGRAC)

9.45 - 10.00:

Borehole data collection (Arnaud Sterckx – IGRAC)

10.00 - 10.30:

Groundwater data management (Arnaud Sterckx – IGRAC)

10.30 - 11.00:

Fostering data sharing (part 1) (Arnaud Sterckx – IGRAC)

11.00 - 11.30 : Break

11.30 - 11.45:

Fostering data sharing (part 2) (Arnaud Sterckx – IGRAC)

11.45 - 12.00:

Human capacity and expertise in hydrogeology

(Arnaud Sterckx - IGRAC)

12.00 - 12.30:

Case-studies (1) (Moderation by IGRAC)

12.30 - 13.00:

Q & A (Moderation by IGRAC)

Agenda (CEST UTC + 02:00)

9.00 - 10.00: Presentation of two case studies

(IGRAC)

10.00 - 11.00: Discussion

(Moderation by IGRAC)

11.00 - 11.30: Break

11.30 - 12.00:

Regulations

(Callist Tindimugaya - Ministry of Water and Environment, Uganda)

12.00 - 12.15:

Stakeholder engagement (Arnaud Sterckx - IGRAC)

12.15 - 12.30:

O & A

(Moderation by IGRAC)

12.30 - 13.00:

Closing speeches (IGRAC & UNESCO)













Practical information

- For live translation, click on Interpretation

 and select French or English.
- Keep your microphone muted unless you are talking.
- There will be Q&A sessions for interacting with the speakers. Raise your hand Raise Hand and wait your turn before talking. Un-raise your hand afterwards.
- Alternatively, use the chat to interact with the other participants.







