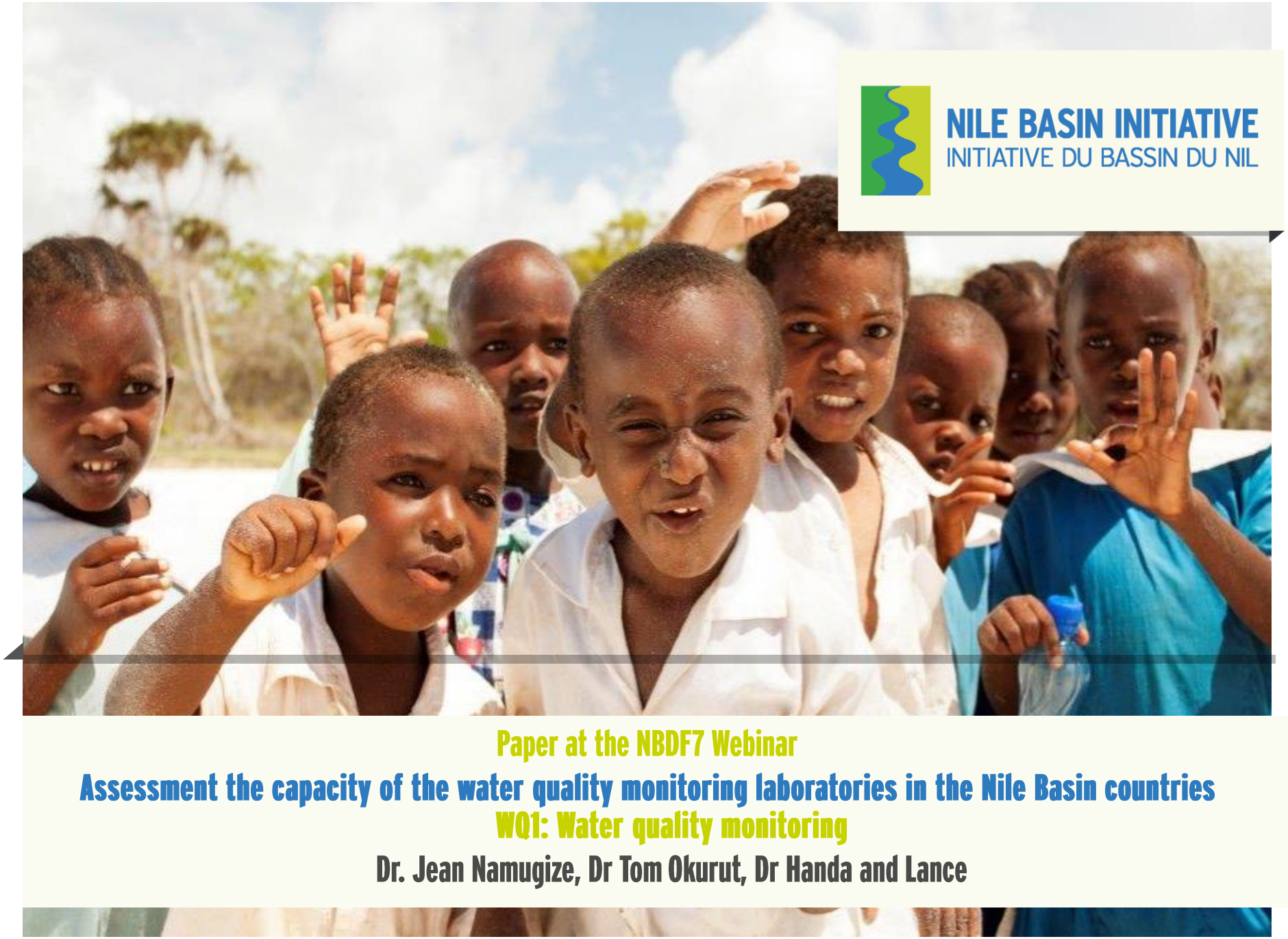

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Paper at the NBDF7 Webinar

Assessment the capacity of the water quality monitoring laboratories in the Nile Basin countries

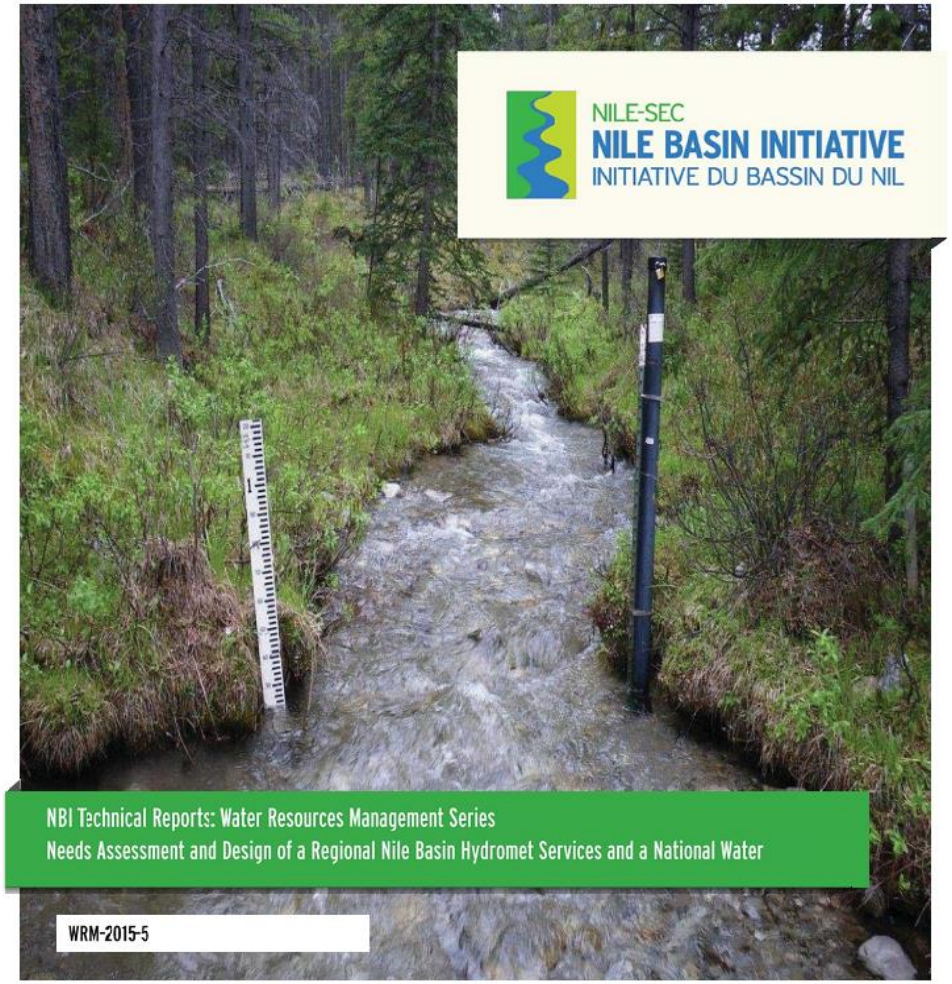
WQ1: Water quality monitoring

Dr. Jean Namugize, Dr Tom Okurut, Dr Handa and Lance

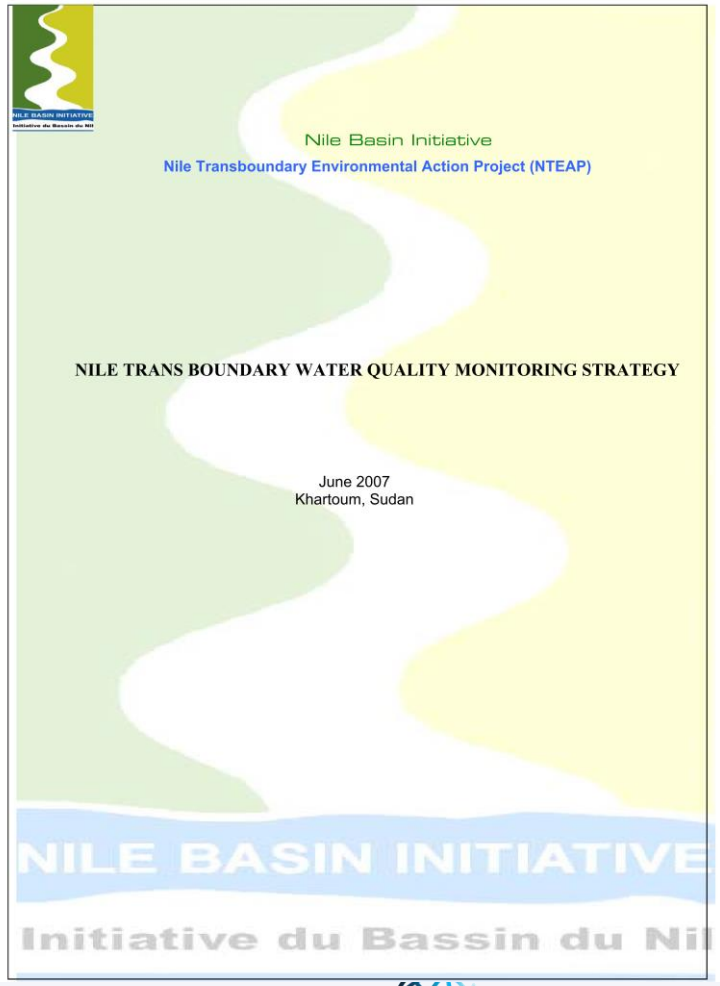
Background information

A design and implementation strategy for a regional water quality monitoring network was developed as part of the regional Nile Basin Regional Hydromet System in 2015. The Hydromet designs included:

- a regional hydrological network,
- a regional meteorological network,
- water quality interventions, among others



Nile Transboundary Environmental Action Project



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Water quality laboratories identified in 2015

Country	Main laboratory(ies)	Status of WQ monitoring
Burundi	• Burundi National Laboratory in Bujumbura	Limited monitoring and limited lab capacity
DRC	• REGIDESO located in Goma	Limited monitoring and Goma Lab needs strengthening
Ethiopia	• Central laboratory in Addis Ababa	WQ monitoring activities are decentralized. Management of WQ labs falls under MoWIE; Regional Water Bureaus and National and Regional Water Works Enterprise, serves private customers.
Kenya	• Regional laboratories in Kisumu and Kakamega	WQ is monitored at 136 sites
Rwanda	• Central national Laboratory under the Ministry. • Support laboratories at NUR in Butare	Monitoring Carried out at the 40 hydrometric sites as well as at water supply intakes, and for drilled wells
South Sudan	• MEDIWR laboratory facility	Currently no regular WQ monitoring
Sudan	• Central Water Testing Laboratory is based in Khartoum	Water quality monitoring network consists of 13 stations located at river gauging stations
Tanzania	• Ministry of Water laboratory within Mwanza	Water quality tests are conducted at several sites within the Lake Victoria basin ranging from a monthly basis to bi-annual frequency of testing
Uganda	• Central Water Testing Laboratory at Entebbe	The water quality monitoring network consists of 119 stations located at river, lake, groundwater, and “impact” sites

Component 1 of NCCR project: Improve national water quality monitoring systems

- Provision of field kits for water quality monitoring
- provision of laboratory equipment,
- proposals for improvement of processes (harmonization of water quality standards for testing and sampling, quality control, implementation of quality management standards/ lab accreditation) and
- capacity building for laboratory technical staff
- Installation of a stand-alone database in national laboratories

Objective and methods

Aims to evaluate the technical and human capacities of the water quality monitoring laboratories in the basin

- Country needs assessment missions in the nine Nile Basin riparian countries
- Visit of the water quality monitoring laboratories and meeting with its managerial and technical staff
- Using of a checklist and questionnaire to assess the human and technical capacities of labs, quality management and accreditation readiness
- 9 labs visited between August 2022 and February 2023 in eight countries

Check list questionnaire

A. Basic Infrastructure Requirements	
B. Equipment/Apparatus/Chemicals Check	
1	Laboratory equipment:
2	Field Kits
3	Laboratory Apparatus
4	Inventory of Equipment
5	Operations Manuals for equipment
6	Chemical Inventory 1 - Non-Hazardous
7	Chemical Inventory 2 -Hazardous

C. Testing Protocols for various parameters	
1	List of parameters tested routinely
2	Documented methods for testing each of the parameters
3	References to WHO guidelines- done or not in reporting; national guidelines
4	Quality Assurance systems
D. Laboratory Systems applicable	
1	Laboratory safety and Quality management system
2	Water Quality data management system
3	Laboratory operations manual

Check list questionnaire

E. Laboratory Operations	
1	Water Quality Monitoring program/schedule
2	Documented list and locations (GPS) of sampling points
3	Laboratory Organogram
4	Laboratory staff key qualifications
5	Laboratory Housekeeping practices
6	Occupational Health and Safety guidelines
F. Training Needs assessment	
G. Advanced Sensors for field & telemetric systems	

Laboratories visits

Comparison of laboratories

Assessment criteria

- Laboratory infrastructure
- Laboratory staffing and management
- Laboratory protocols and standard operating procedures (SOPs)
- Laboratory equipment

Grading of criteria

- **Good** - carrying score 1
- **Satisfactory** - carrying score 2
- **Inadequate** - carrying score 3

Overall country laboratory ranking from 1 to 9 (2022)

Country	Laboratory Infrastructure	Laboratory Equipment	Laboratory Protocols/SOPs	Laboratory Staffing	Score Aggregate	Laboratory Ranking
Burundi	3	3	3	3	12	8
DRC	-	-	-	-	-	-
Ethiopia	2	1	2	2	7	5
Kenya	1	1	2	2	6	4
Rwanda	1	1	2	1	5	3
South Sudan	2	3	3	2	10	7
Sudan	2	2	2	2	8	6
Tanzania	1	1	1	1	4	1
Uganda	2	1	1	1	5	2

Conclusion and recommendations

- Water quality laboratories are at different levels in terms of human resources, infrastructure and equipment and not accredited
- Monitoring of basic parameters is generally done in most of the countries with inconsistency of monitoring frequency
- Water quality database and management systems are lacking in most of the countries
- Capacity building of the staff involved in water quality monitoring and laboratory analysis is needed
- Trainings on operation and maintenance of labs equipment is highly needed


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