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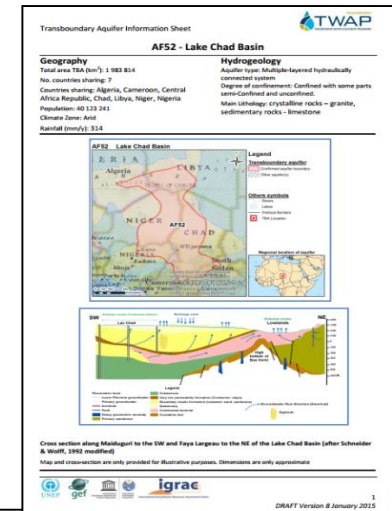
GROUNDWATER MONITORING FOR A BETTER MANAGEMENT OF SHARED WATER RESOURCES: THE CASE OF GEDAREF ADIGRAT AQUIFER

Dr. Neno Kukuric



International Groundwater Cooperation

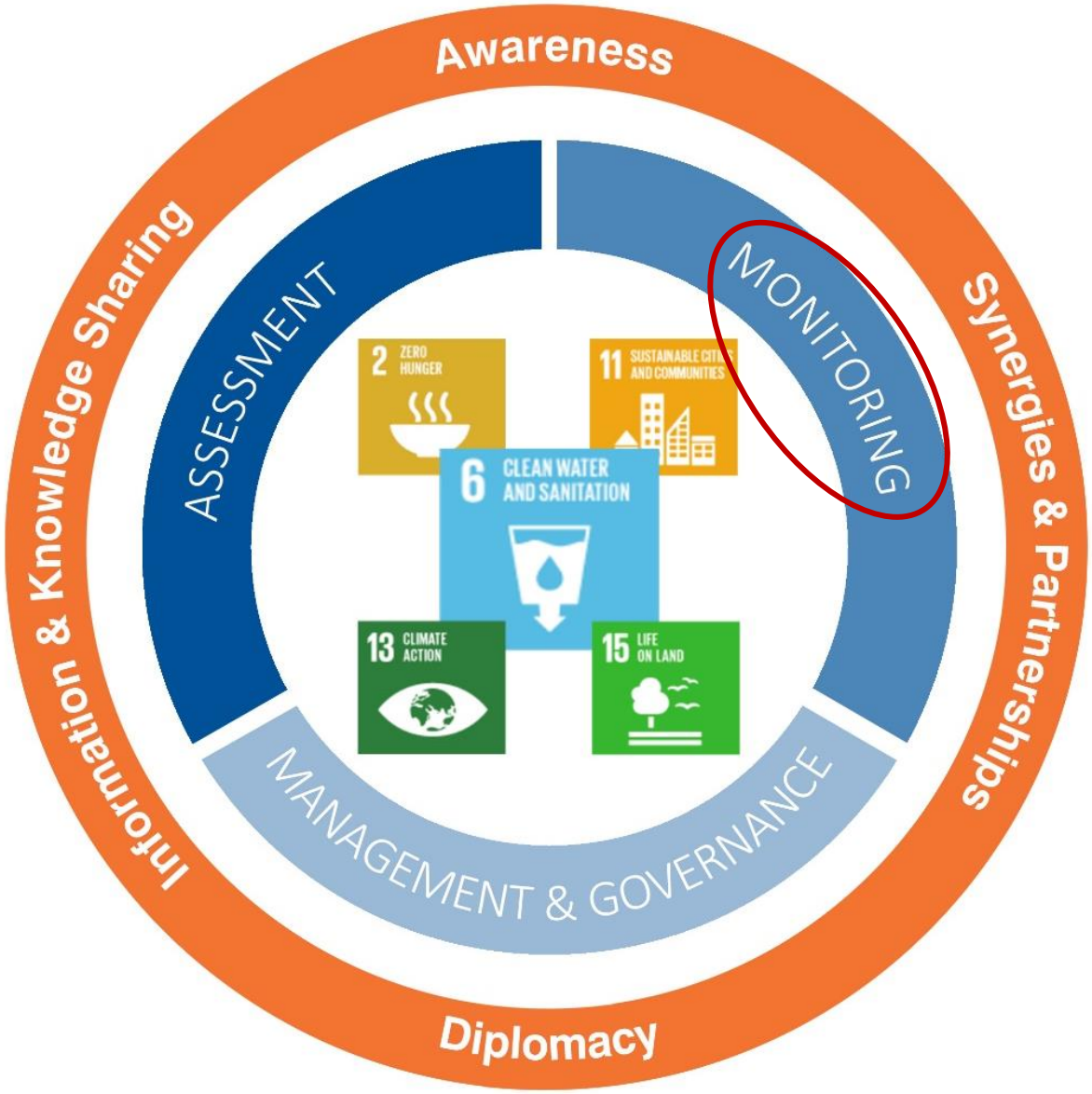
- Long tradition of cooperation on **shared surface waters**, regional and global upscaling since mid last century.
- Broader cooperation on **shared aquifers** have only started in this century with **ISARM** programme, **GEF** projects, **UNECE** assessments, etc.
- In meantime, a **global groundwater baseline** is established and supporting tools for assessment and management developed, including **guidelines, information systems** and **legal documents**.
- Yet, we still don't know sufficient about a **state of aquifers** globally and we keep **depleting and polluting** them.
- Therefore we need to improve **Groundwater Monitoring!**



Groundwater Monitoring

- State of aquifers (both quality and quantity of groundwater) is **changing in time** due to change of various **environmental** processes (e.g. change of precipitation pattern) and **human impacts** (i.e. change of land cover, groundwater abstraction).
- Groundwater needs to be **monitored** over time in terms of **quantity and quality**, to learn about the behavior and state of aquifers, and to identify possible negative **changes** such as over-abstraction, reduced recharge (including climate change effects) and pollution.
- No groundwater **assessment** is complete- and no **prediction** can be made without availability and analysis of historical data.
- **We cannot manage what we don't see or measure!**





Groundwater Monitoring

About 80 countries have **some national groundwater monitoring programme**

Monitoring of groundwater is more **challenging** than monitoring of surface water due to:

- Higher initial **investments** (e.g. drilling a borehole)
- Smaller spatial **representativeness** of monitoring points (hydrogeological heterogeneity)
- Limited assistance of **remote sensing** (so helpful to surface water observations)

Groundwater monitoring data are **also less accessible** than those of rivers and lakes due to

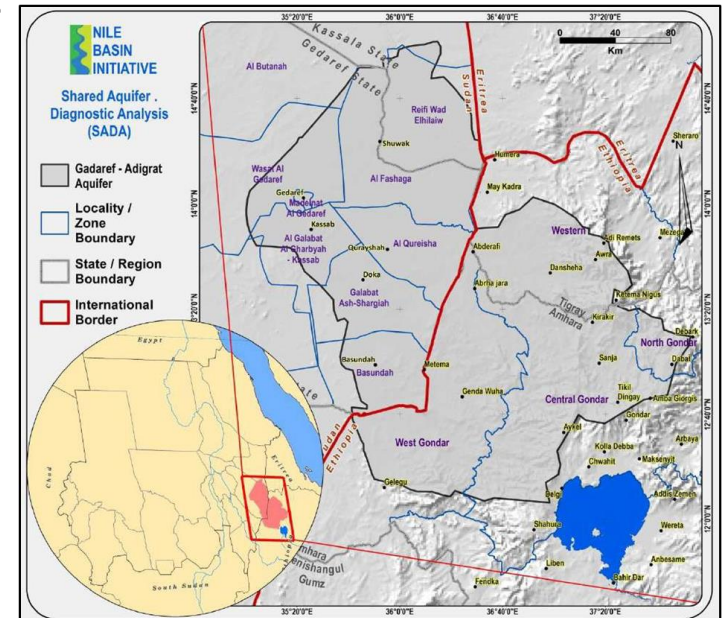
- less visible nature of aquifers
- 'strategic' view on groundwater

SDG 6.5.2 progress report: 50 out of 145 countries that share groundwater resources have **some** regular **exchange** of groundwater monitoring data



Monitoring of the Gedaref-Adigrat Aquifer

- The Review of Current Practices and Policies pointed out **absence of regular groundwater monitoring** in the aquifer, with exception of some water quality monitoring and some withdrawal recording.
- The Review also confirmed a **general lack of monitoring infrastructure, equipment and logistics around monitoring.**
- Groundwater and international water cooperation are included in the policy documents at the national level in both countries, however **elaboration of the policy** through specific directives and guidelines as well as **communication** towards the implementation level is **very deficient.**
- Specialised **knowledge** on groundwater monitoring and a general **awareness** on importance of monitoring and groundwater is **very limited.**



Groundwater Monitoring Action Plan

- Technical and Policy Measures
- Transboundary Groundwater Monitoring Network and
- Capacity Building and Awareness Raising



The core of the Action Plan is a development of a **Groundwater Monitoring Network (GMN)** for the Gedaref-Adigrat aquifer. The **GMN** will be set up as a **multipurpose network**. Indications of **over-abstraction and groundwater pollution** are used to suggest **priority locations** for the monitoring.

Technical Measures prescribe monitoring parameters, network design, type of monitoring and data processing and management (freeware!).

Policy Measures include development of a groundwater **monitoring directive and institutional strengthening**, especially on **community level**. To achieve this, **cooperation** among institutions (vertically and horizontally) is essential. Ins. responsibilities should be leveled with personnel capacity and equipment.

Concluding Remarks

The Gedaref-Adigrat Groundwater Monitoring Action Plan as suggested by the aquifer-states is **very practical** and clearly oriented towards improvement of the groundwater **monitoring on the ground**. Of the total estimated budget (circa six million USD) about 80% is planned for implementation of monitoring wells in the field.

Proposed Groundwater Monitoring Network is a **multipurpose network** with a clear **benefit for various stakeholders** locally, nationally and internationally.

Aquifer-states agreed on a **simple mechanism** to carry out technical and capacity building activities on their respective national territories in a **coordinated** way.

Finding a donor to finance the Action Plan, especially **drilling for monitoring** wells, is the following challenge. Nevertheless, a **clear plan** and **commitment of involved organisations** makes this task easier and eventually achievable.





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**THANK
YOU!**