United Nations Educational, Scientific and Cultural Organization

International Hydrological Programme

Groundwater TWAP TRANSBOUNDARY WATERS ASSESSMENT PROGRAMME

igrac International Groundwater Resources Assessment Centre

Worldwide assessment of Transboundary Aquifers with a focus on the African continent

- work in progress -

by

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UNEP gef UNEP-DHI CENTRE for Water and Environment UNEP DHI

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ILEC

Introduction
Transboundary Waters Assessment Programme

- 2 year programme - GEF funded

Objectives

- **First global assessment** to improve knowledge
- On **all transboundary water systems** (5 components)
- **To raise awareness** on the vulnerability and potential of transboundary water systems
- To provide a **tool for prioritising interventions** and cost-effective allocation of funds to address transboundary water related concerns
- And also: To **develop partnerships** to monitor evolving trends trough future assessments

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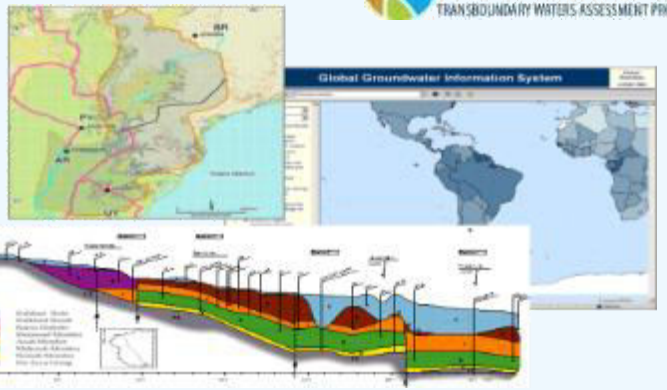
TWAP Groundwater - Methodology & Approach

- Multi-disciplinary approach
- Comparative, indicator based assessment







Global survey	Global model
IGRAC & UNESCO-IHP & multitude of partners	Goethe University Frankfurt

Prior to TWAP no structured database available:

- Data collection via worldwide network of national experts
- Modelling using WaterGAP model

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Outputs
TWAP Groundwater

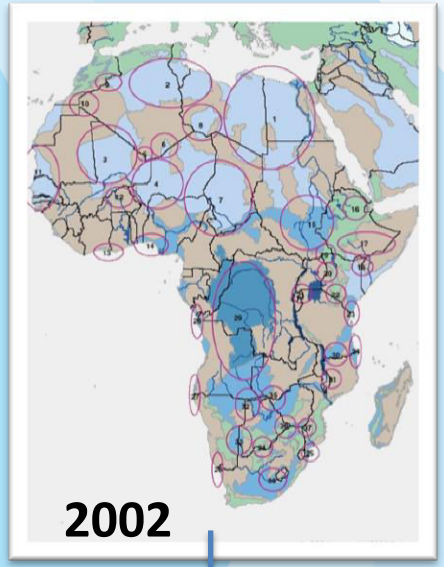
- Structured database
- Information Management System (web-based)

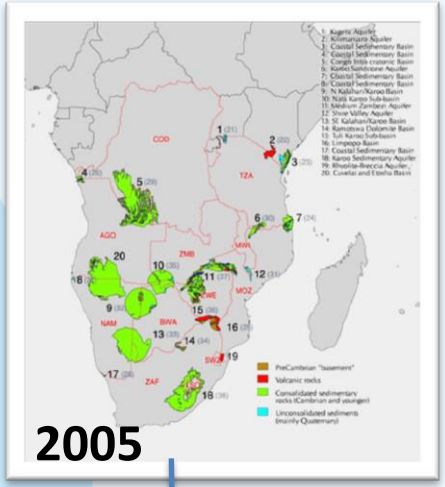
- Multi-disciplinary assessment methodology & questionnaire
- Assessment report of transboundary aquifers worldwide (in progress)
- TBA information sheets,
- Reinforced international networks

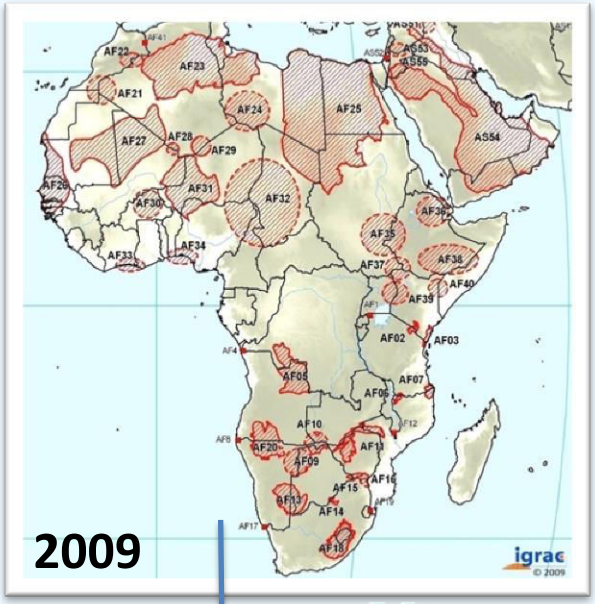
Results

Improved delineations of aquifer boundaries

Progressive development







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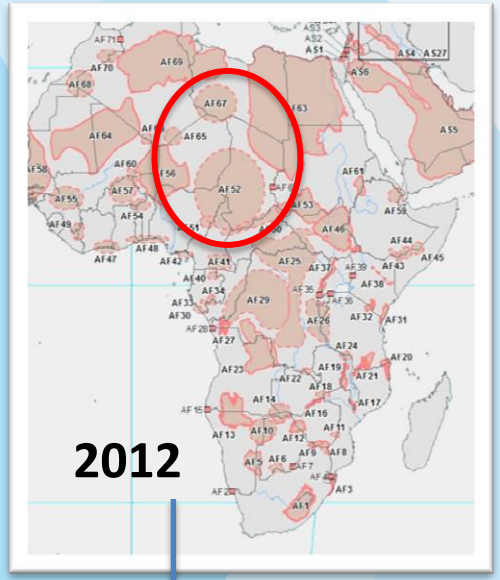
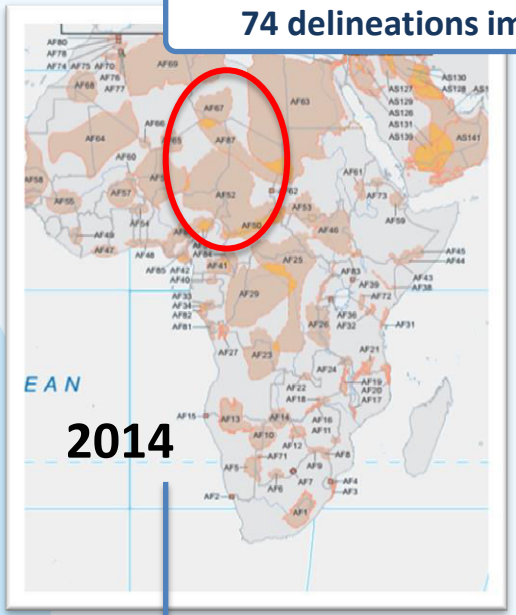
Improved delineations of aquifer boundaries

Progressive development

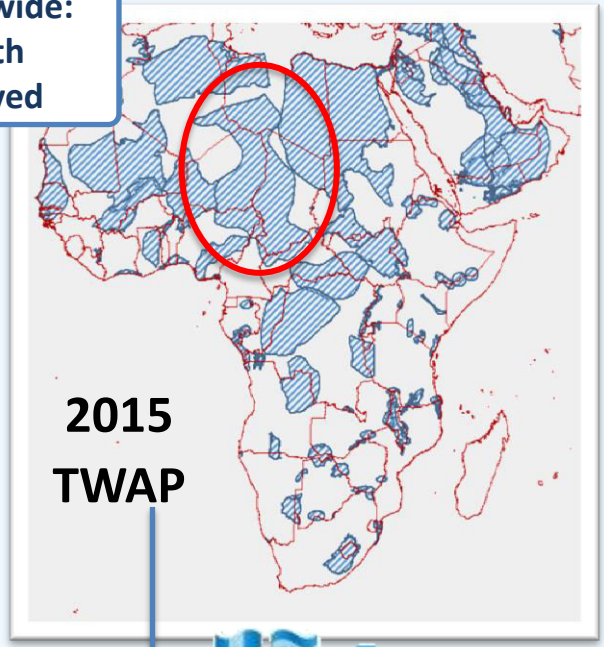
TWAP workshops worldwide:
199 TBAs selected with
74 delineations improved



2012



2014



2015
TWAP

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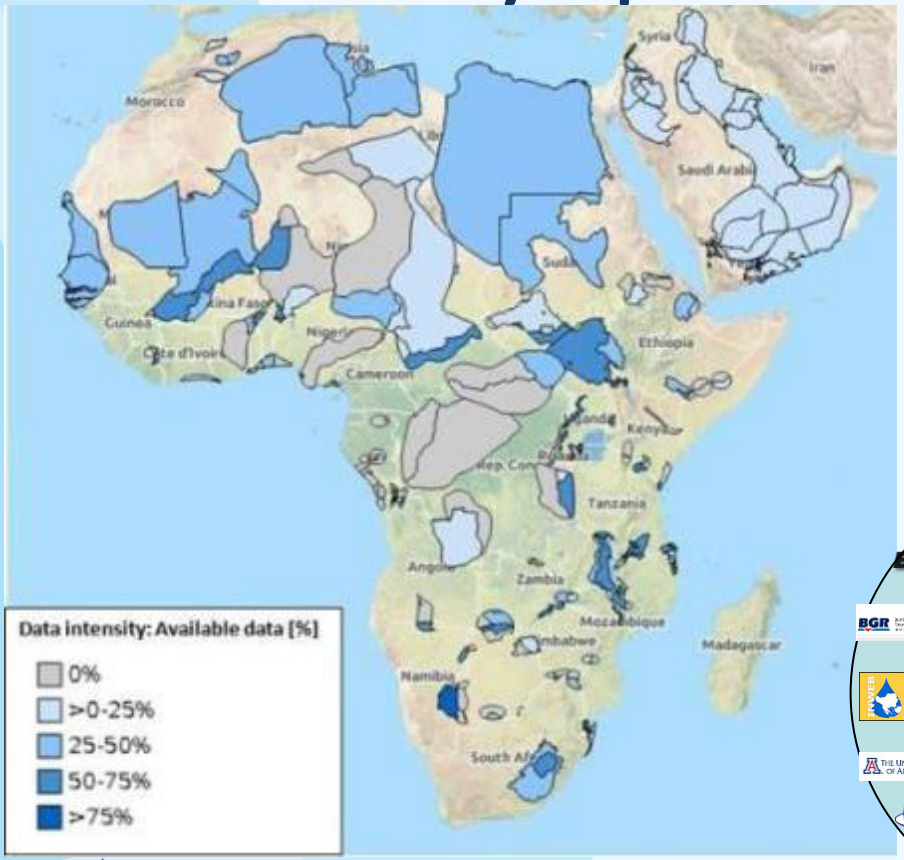
Transboundary Aquifers in Africa



- 66 African TBAs in TWAP,
- consisting of 187 country segments
- shared between 50 countries

gef GLOBAL ENVIRONMENT FACILITY
INVESTING IN OUR PLANET

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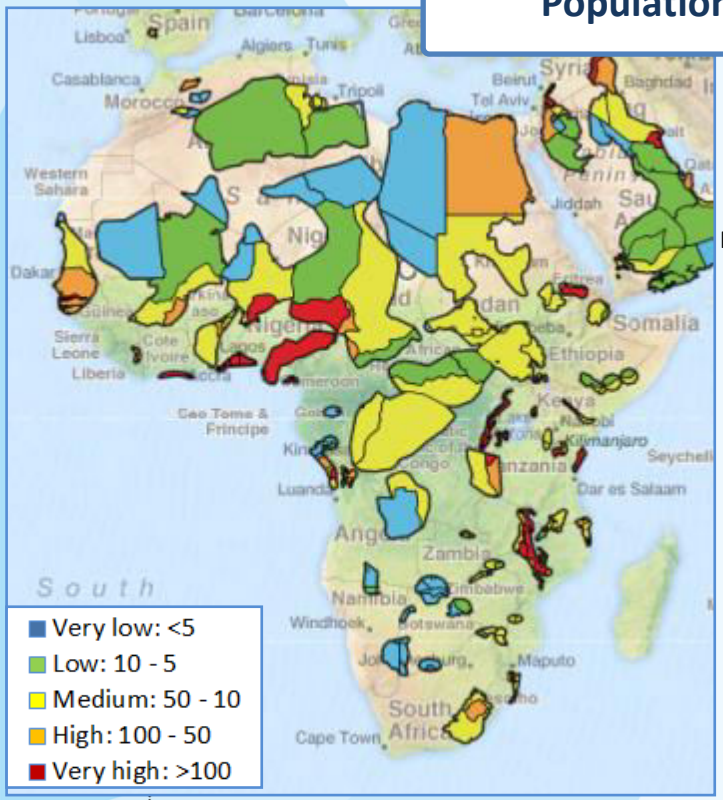
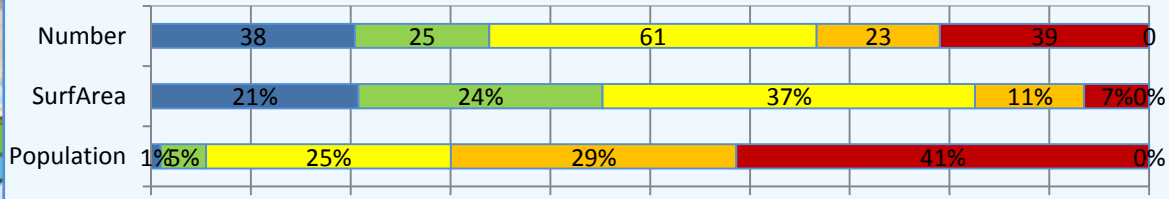
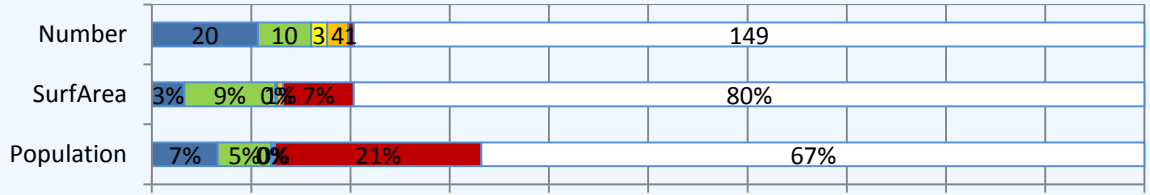
Indicators provide new insights

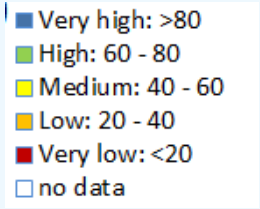
Population density [cap/km²]





Natural background quality [% of surface area with good quality]





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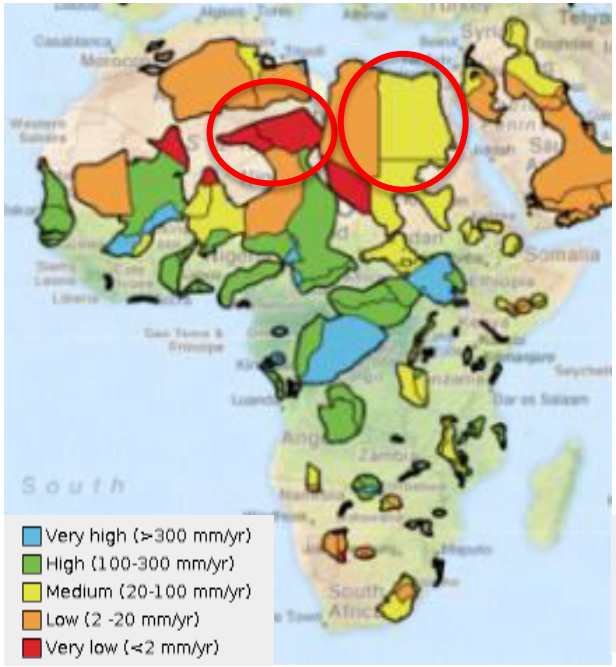
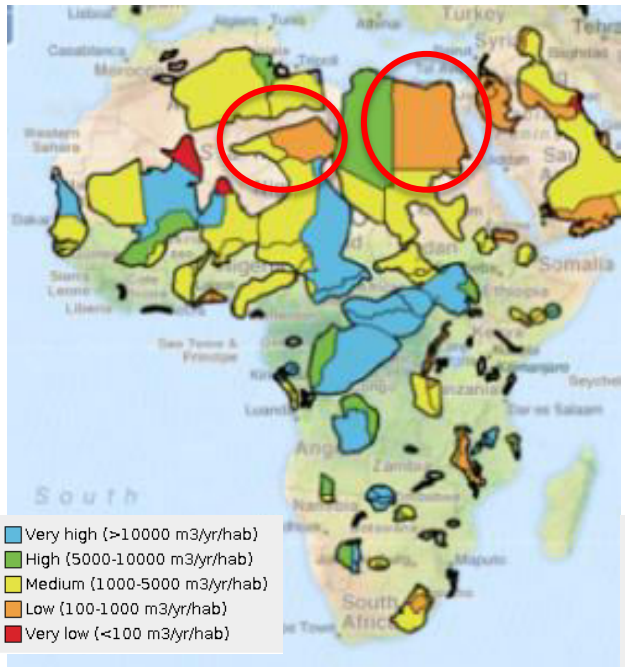
Additional insights through indicators

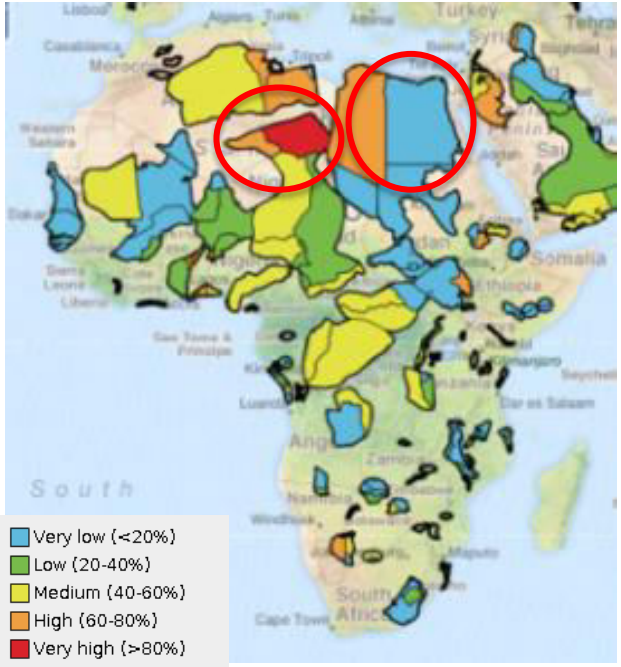
WaterGAP model data - Goethe University Frankfurt



Recharge



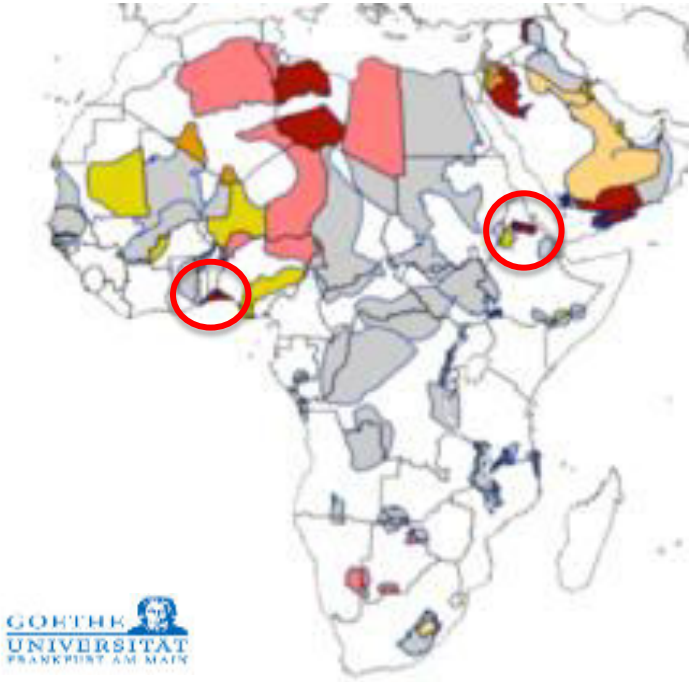
Renewable groundwater per capita



Human dependency on groundwater

Future hotspots of groundwater stress

WaterGAP model data - Goethe University Frankfurt



Hot spots under current conditions

- GW dev. stress >20%, dependency on GW > 40%
- GW dev. stress >20%, dependency on GW < 40%

Hot spots under future conditions

- GW dev. stress >20%, dependency on GW > 40%
- GW dev. stress >20%, dependency on GW < 40%
- Potential economic groundwater stress
- GW dev. Stress <20%, while per-cap. Recharge < 1000m3/yr/cap and dependency on GW > 40%

Concluding

- First **structured** & **publically accessible database** on transboundary groundwater has been established
- **Participatory approach** unlocked groundwater data from national level and triggered cooperation between countries
- Important **data gaps** revealed

But also

- **Data quality** and consistency needs some further evaluation
- **Continued work** needed on defining and researching the aquifer systems

Preliminary conclusions from data analyses

- Important **hotspots** can be defined providing **focus for future work**, both in terms of interventions and research

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Follow progress via:

www.geftwap.org & www.twap.isarm.org

THANK YOU





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Additional information

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10 Core Indicators		Description
1.1	Mean annual groundwater recharge depth (including artificial recharge and point recharge from surface water bodies)	Long-term mean groundwater recharge, including man-made components (return-flows, induced recharge, artificial recharge), divided by area
1.2	**Mean annual per-capita groundwater recharge (including artificial recharge)**	Groundwater recharge, divided by the number of inhabitants of the area occupied by the aquifer
1.3	Natural background groundwater quality	% of TBA area where groundwater satisfies local drinking water standards
2.1	**Human dependency on groundwater**	Percentage of groundwater in total water abstraction for all human water uses
3.1	Groundwater depletion	Current rate of long-term progressive decrease of groundwater storage
3.2	Groundwater pollution	Polluted zones as % of total aquifer area
4.1	**Population density**	Number of people per unit of area on top of the aquifer
4.2	**Groundwater development stress**	Total annual groundwater abstraction divided by mean annual groundwater recharge
5.1.	Transboundary legal framework	Existence of a binding agreement
5.2.	Transboundary institutional framework	Existence of institutions for managing the TBA

Indicators in bold: Projections from WaterGAP model available