Republic of Uganda
Ministry of Water & Environment

Regional Training on Integrated Groundwater Resources Management within River Basins

15th to 17th January 2019.

‘

Country Report on groundwater situation-Uganda

Julius Aheebwa & Susan Akampurira
Directorate of Water Resources Management

General description of Uganda:

- Landlocked country on Latitude: **4012'N and 1029'S** and Longitude: **29034'E and 3500'W** in the eastern part of African
- Bordered by Kenya in the east, Southern Sudan in the north, Democratic Republic of the Congo in the west, Rwanda in the southwest and Tanzania in the south.
- Total land surface area is about **241,559 sqkm** of which **37,000sqkm** is occupied by open water bodies.

Physiography and climate

- **Vegetation cover;** forests, grasslands (wildlife reserves) highlands (mountains) and water bodies (lakes, rivers and swamps).
- **Altitude ranges:** 620masl-Albert Nile area & 5,110Masl -Mt. Rwenzori
- **Major lakes :** Victoria, Kyoga, Albert, Edward and George and **Rivers**: Nile, Aswa and Katonga, **Mountains;** Rwenzori, Elgon and Moroto.
- **Climate:** predominantly tropical equatorial with two rainy and dry seasons.
- **Mean annual Rain fall and Temperatures** : About 1086.0mm and 22.0C respectively except in the North eastern parts of the country.

Drainage:

- Drainage is dominated by the **Nile basin** except a small portion in **NE** that drains into **L. Turkana & Lotikipi basins both in Kenya.**

- The Nile basin is sub dived into **catchments** that are of crucial importance to the county's water resources.

- Lakes in these catchments include; **Victoria, Kyoga, George, Albert & Edward(Equtorial lakes).** Most of these lakes are **transboundary in nature**-shared with the neighboring countries except Kyoga &George.

- The lakes play a key role in the **water balance of R. Nile** and its flow regime .

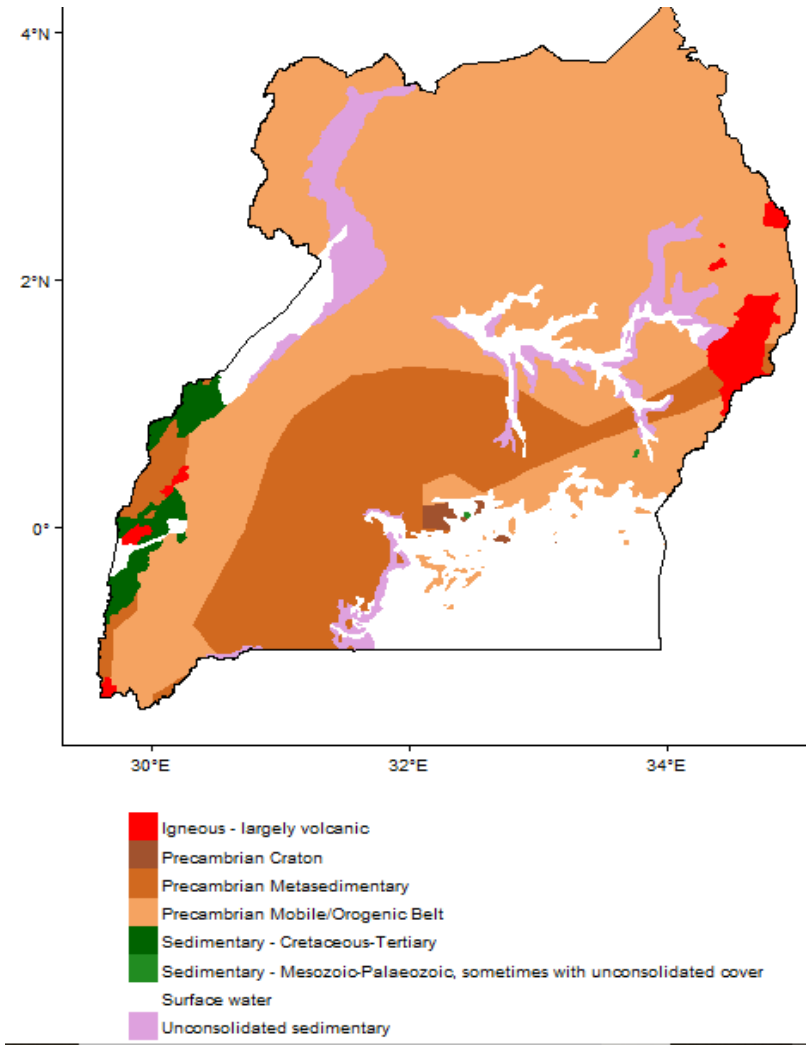
Socio-economic context

- Uganda has a total population of about 32 million people with a growth rate of 3.4%. Only 8 Million people live in urban areas and the rest in rural areas.

- Uganda's economy is predominantly based on **agriculture**, which accounts for over 44% of its **GDP**. Main crops grown are coffee, tea, maize, matooke, Cassava e.tc.
- Safe water coverage stands at about 75% in urban areas and 70% in rural areas and the main source of water supply is mainly groundwater for both urban and rural areas.
- Uganda is member of the Common Market for Eastern and Southern Africa (COMESA) and the East African Community (EAC).

- Main International trade countries : **UAE, China & India.**

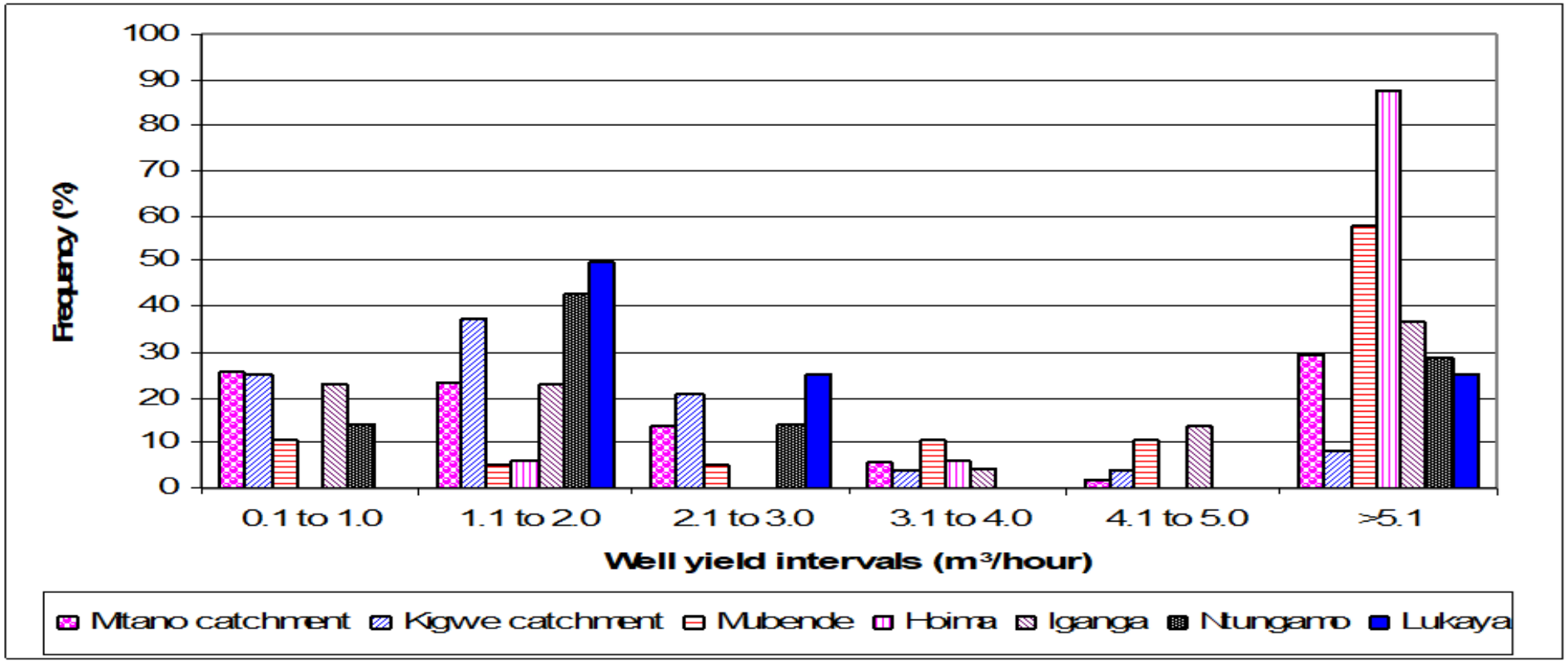
Hydrogeology of Uganda



- **Four major** hydro geological environments in Uganda and are dependent on the geological units ; the **Archean/ Precambrian, Tertiary-Quaternary sediments, Volcanic rocks** and the **River/alluvial sediments.**
- Precambrian crystalline rock aquifers dominates and covers over 90% of the country.
- These aquifers generally have low permeability and low storage and their physical aquifer properties are largely a function of tectonic history and long-term cycles of weathering and erosion.
- Two major transboundary aquifers are known : **Kagera and Mt Elgon aquifers.**

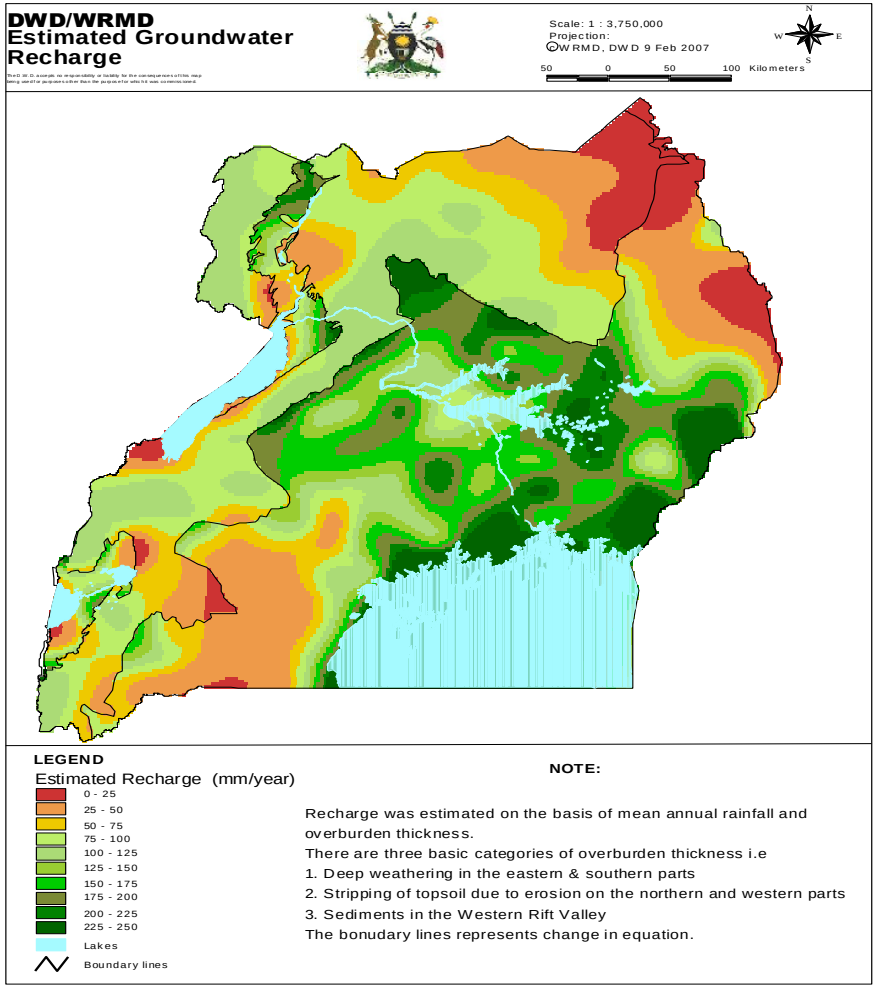
Aquifer yield, recharge and groundwater potential:

Aquifer yields vary randomly and depend on the nature of the aquifer and fracturing of the bedrock. Aquifer yields generally range between 0.1 to 50 m^3/ hour.



Groundwater Recharge

The mean annual groundwater recharge in Uganda is estimated to be about 120mm based on the distribution of mean annual rainfall.



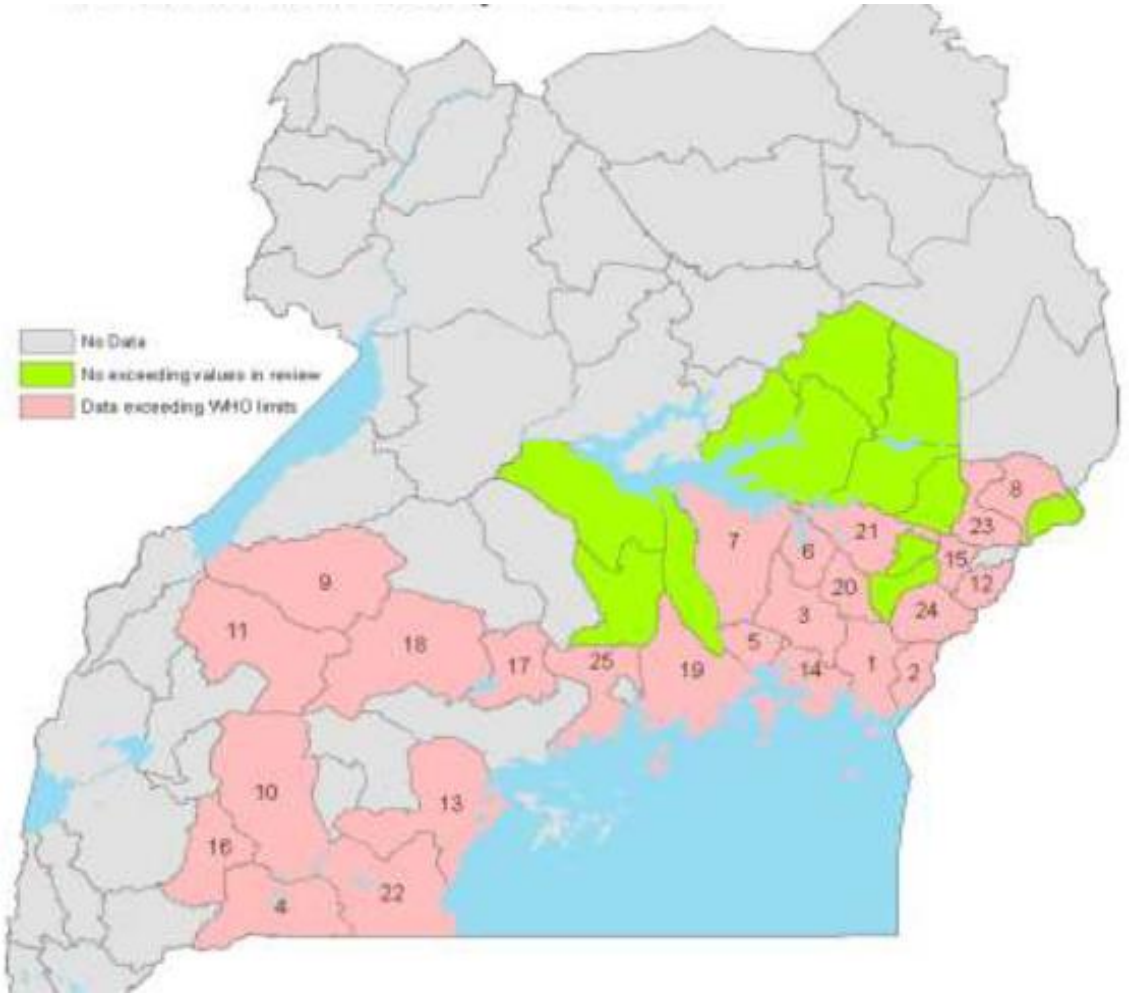
Aquifer potentials

- Aquifer potentials based on two major properties **(transmissivity and storage)** have been estimated using analytical test models in various catchments of the country.
- These properties are highly variable for the **weathered and fractured-bedrock** but relatively consistent for the **alluvial aquifers** and in both cases sensitive to the employed test models.

Aquifer type	Average transmissivity ($m^2 d^{-1}$)	Average storativity
Weathered	16	0.21
Fractured bedrock	14	0.014
Fluvial	34	0.1

Groundwater quality

- Groundwater quality is generally good in most parts of the country.
- The common but isolated problem is microbial contamination related to faecal waste in shallow urban aquifers.
- Sometimes high concentrations of iron and manganese in the crystalline basement aquifers.
- High fluoride concentrations are also often observed in igneous groundwater, for example at Kisoro and Mbale



Groundwater development and utilization:

- Groundwater mapping is done for most parts of the country and various groundwater characteristics maps at district level are available.
- Groundwater in Uganda is mostly developed from the weathered and/or fractured basement aquifers with yields varying from 0.5 up to 50-80 m^3/hours.
- Boreholes and shallow wells with yields <1 m3/hour are installed with hand pumps for rural water supply while boreholes with yields >3 m3/hour are normally installed with motorized pumps for piped water supply.
- An average of 1200 deep boreholes and 900 shallow wells are constructed annually in Uganda.

Groundwater development and utilization…..

- Most boreholes in the country are less than 80 m deep, but a few have gone up to 200m.
- The country has approximately 40,000 deep boreholes, 30,000 protected springs and 16,000 shallow wells.
- A total of 73 of the 98 (75%) urban water supply systems, many industries around Kampala and major towns and over 90% of the rural population are all dependent on groundwater.
- Comparison of groundwater usage in Uganda with other developed countries however still indicates low usage based on its availability per capita.

Institutional and legal framework……

- The two key pieces of legislation governing water management in Uganda are; **The Water Act, Cap 152**, and **The Environment Act.** Others are; **The Water Policy.**

The main regulations under The Water Act are:

- Water Resources Regulations (1998)
- Waste Discharge Regulations (1998)

The main regulations under The Environment Act are:

- Environmental Impact Assessment Regulations (1998)
- The National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations (1999)
- The National Environment (Waste Management) Regulation (1999).

Institutional and legal framework Cont…….

- Under the frame work, the Directorate of Water Development(DWD) and the Directorate of Water Resources Management(DWRM) under the Ministry of Water and Environment are mandated to develop & manage water resources in the country.
- DWD is responsible for water development and water service regulation in urban areas.
- DWRM is responsible for Implementing **National water laws, policies, plans and regulations, monitoring water quality and quantity** and **management of transboundary water resources.**

Institutional and legal framework Con

Since 2012 DWRM is implementing catchment based water resources Management within the four regional water management zones in the country.

-Victoria Water Management Zone
- Kyoga Water Management Zone
- Albert Water Management Zone
- Upper Nile Water Management Zone

Conclusion & Recommendation

- Groundwater resource is providing a significant contribution to achievement of the National Development Plans the and Sustainable Development Goals where access to safe water is one of the main priority.
- Challenge: Limited groundwater information but seemingly abundant availability of groundwater is leading to its excessive development in some parts and may results into negative impacts
- Detailed assessments/studies of the resource and its sustainability with the emerging water demands recommended.

Asante sana!