

Groundwater Resources in the Republic of South Sudan

(Occurrences, Utilization and Management)

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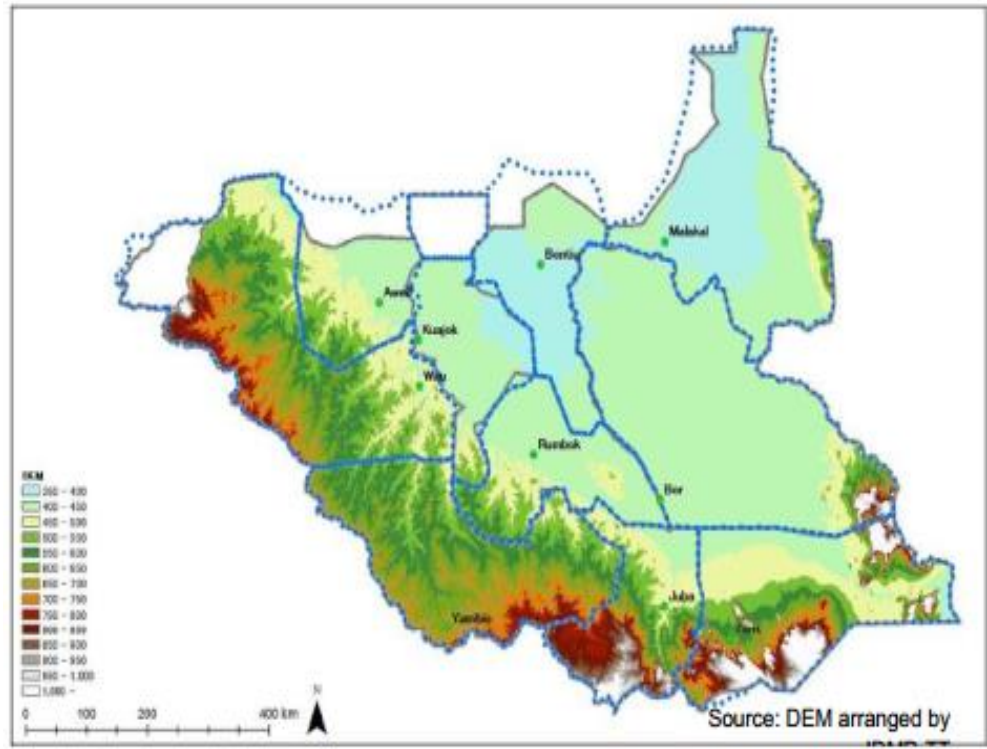
RSS: Geographical context

- ❖ Country Name : Republic of South Sudan, after independence from Sudan on **July 9, 2011**
- ❖ A landlocked country in the Eastern Africa
- ❖ Covers over 640,000 square kilometers area
- ❖ Current Juba is the Capital city and Ramciel being proposed new city South
- ❖ Sudan shares borders with six countries
 - ✓ Sudan
 - ✓ Ethiopia
 - ✓ Kenya
 - ✓ Uganda
 - ✓ DRC
 - ✓ CAR

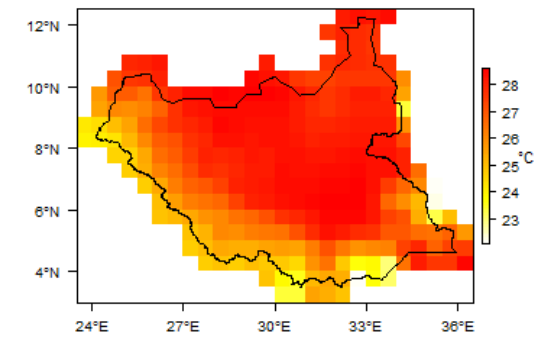
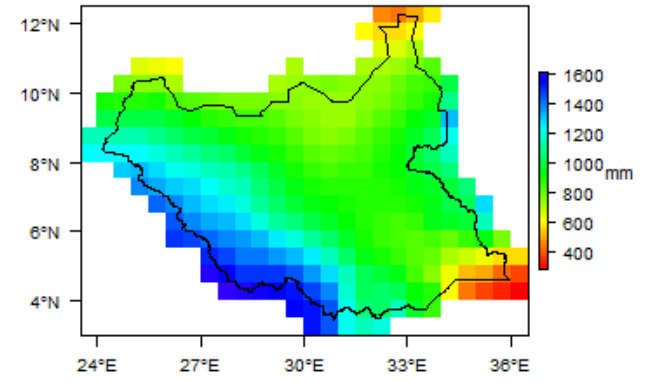


RSS : Physiography and climate

- ❖ Country lies 400-3180masl
- ❖ Low lying central region where the Sudd Wetlands is located
- ❖ Dry and wet climatic conditions; rainfall 400-1600mm annually
- ❖ Generally high temperatures 18-45°C
- ❖ Characterised by high evapotranspiration especially in the Sudd



Topography: Source IDMP (2015)

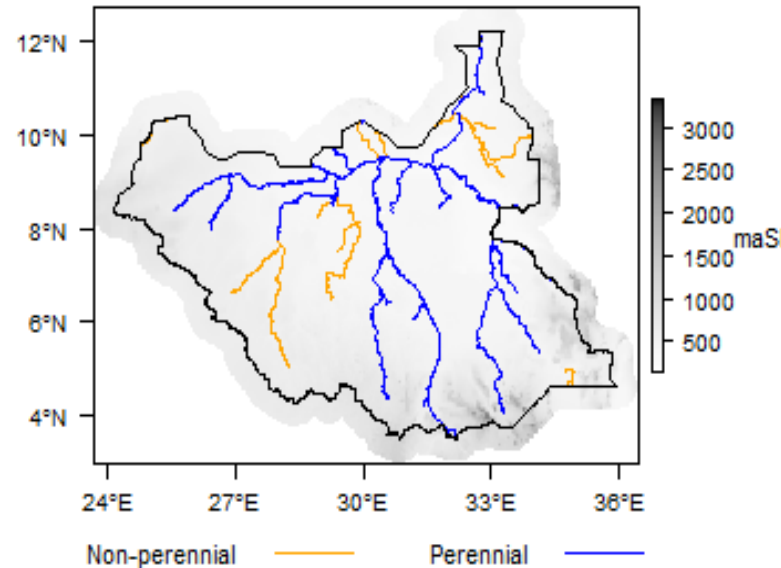


Annual rainfall and Temperature

Source: http://earthwise.bgs.ac.uk/index.php/Hydrogeology_of_South_Sudan

RSS : Surface water and Drainage

- ❖ The Nile River: Traverses the country from South to North and makes up the major perennial river system
- ❖ The River Sobat and Bahr-el-Ghazal are some of the Perennial rivers systems
- ❖ The Sudd (varies between 30,000-40,000 sq. km) and Machar Marses are some of biodiverse wetlands in the Country



Source:
http://earthwise.bgs.ac.uk/index.php/Hydrogeology_of_South_Sudan

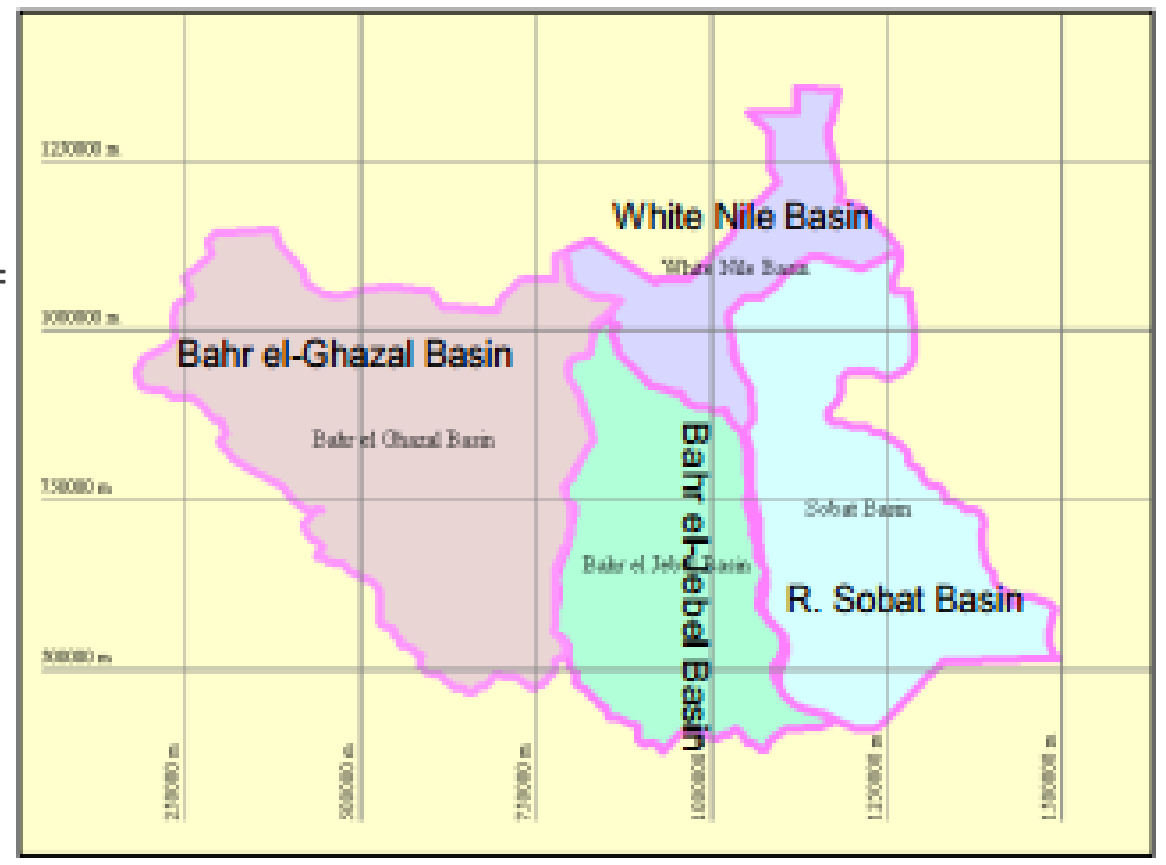


Source:
<https://media1.britannica.com/eb-media/92/150792-004-33D7DA29.jpg>

RSS : Surface water and Drainage Cont'

❖ IDMP 2015; Identifies four river basins in South Sudan:

- ❑ **Bahr-el-Jebel:** $Q_{avg}=28\text{BCM/year}$ at Mangala of which 50% goes into the Sudd wetlands
- ❑ **Bahr-el-Ghazal:** From Nile-Congo divide; $Q_{avg}=14.0\text{BCM/yr}$; only about 3% reaches the White Nile
- ❑ **River Sobat:** $Q_{avg}=13.5\text{BCM/yr}$ into the White Nile Basin
- ❑ **White Nile :** $Q_{avg}=28\text{BCM/yr}$; with minimum of Q_{min} of 46BCM and Q_{max} of more than 100BCM annually in dry and wet seasons respectively



South Sudan Major river basins: Source IDMP (2015)

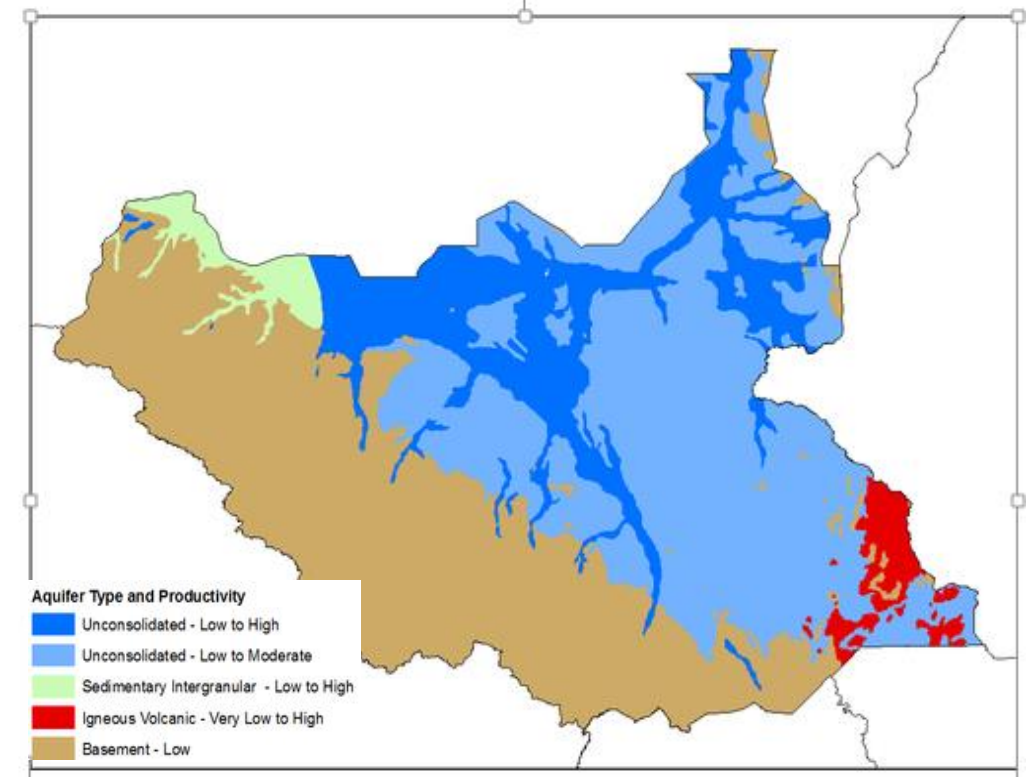
RSS : Demography and Socio-economic context

- ❖ Housing and Population census 2008: 8.26million people
- ❖ Projected population in 2018: More than 12.8 Million People (NBS, 2018). 80% Rural and 20% Urban
- ❖ Average growth rate of 4.96%
- ❖ Human Development Index 0.47
- ❖ Literacy rate : 27%
- ❖ Population under poverty level 50.6%

RSS : Hydrogeology, Groundwater systems, Yield, Recharge, GW Quality

❖ Four aquifers within territory of South Sudan

1. **Alluvial Aquifer:** Unconsolidated silt and sand deposited along the Nile and its tributaries; about 30 to 60m thickness. Porosity greater than 25% and yields between 0.5-20l/s. Rainfall and runoff recharge the aquifer
2. **Umm Ruwaba:** Unconsolidated (sand and gravel); aquifer is between 40m to 1.4km thick; Transmissivity of porosity of 0.1 to 0.25 and yields ranges from 0.1 to 5l/s.
3. **Nubian Sand stone**
4. **Basement complex aquifer** of igneous and precambrian origin producing from less than 0.1l/s to 20l/s



Source: http://earthwise.bgs.ac.uk/index.php/Hydrogeology_of_South_Sudan

❖ Generally of good bio-geo-chemical watert quality

RSS : Groundwater abstraction and Utilisation and management

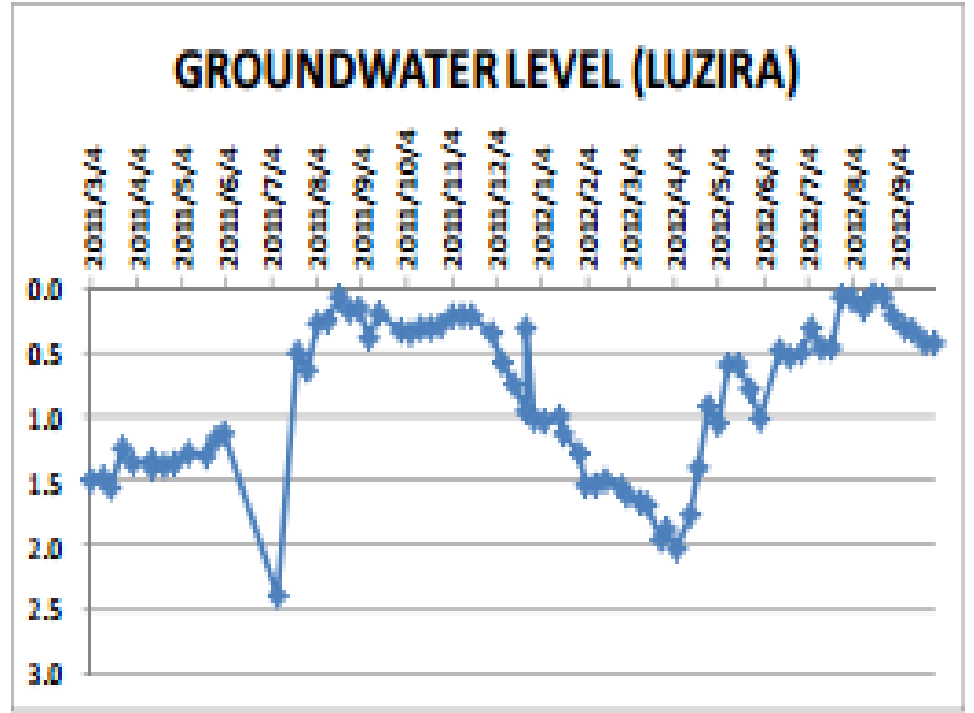
- ❖ Over 10,000 water points exist throughout the country, providing improved drinking water to about 67% of the population mostly in the rural areas
 - ❖ Drilling depth ranges from 2-150m
 - ❖ Surface water level between 0.4 to 140m below ground level
 - ❖ Yield of about **0m³/s** for dry well and more than **20m³/s** recorded in most drilled wells
- ❖ More than 600ha of land irrigated using Groundwater e.g. at Aweil Rice,
- ❖ WIMS sector of MWRI maintains database for water points in the country

Water/GW Management: Institutional and legal framework in South Sudan

- ❖ National and States MWRI in charge of managing water resources
- ❖ Water Policy 2007: Formulated by MWRI, it outlines South Sudan vision for equitable and sustainable future utilization of Surface and Groundwater resources; IWRM
- ❖ WASH strategic framework 2011: Sustainable harnessing and management of water resources in response to public-health issues and livelihood
- ❖ Draft Water Bill: Regulatory provisions; Issuing permits; guides Water Basin boards in pricing for abstraction, effluent discharge and environmental services

Challenges and concluding remarks

- ❖ Dynamic institutional set-up and arrangements (e.g. MEDWRI to MWRI)
- ❖ Lack of groundwater information and monitoring network
- ❖ Conflicts and civil wars
- ❖ Technical capacity- few trained water experts/manager
- ❖ On positive side Institutional, Policy, legal frameworks and water bills are in place e.g.
 - ❖ Water Policy 2007
 - ❖ WASH strategic framework 2011
 - ❖ IDMP 2015
 - ❖ Draft Water Bill



Only ground water monitoring well in WIMS database (Source: IDMP 2015)



Thank You