Mount Elgon Shared Aquifer Shared Aquifer Diagnostic Analysis and Modelling – Key Findings

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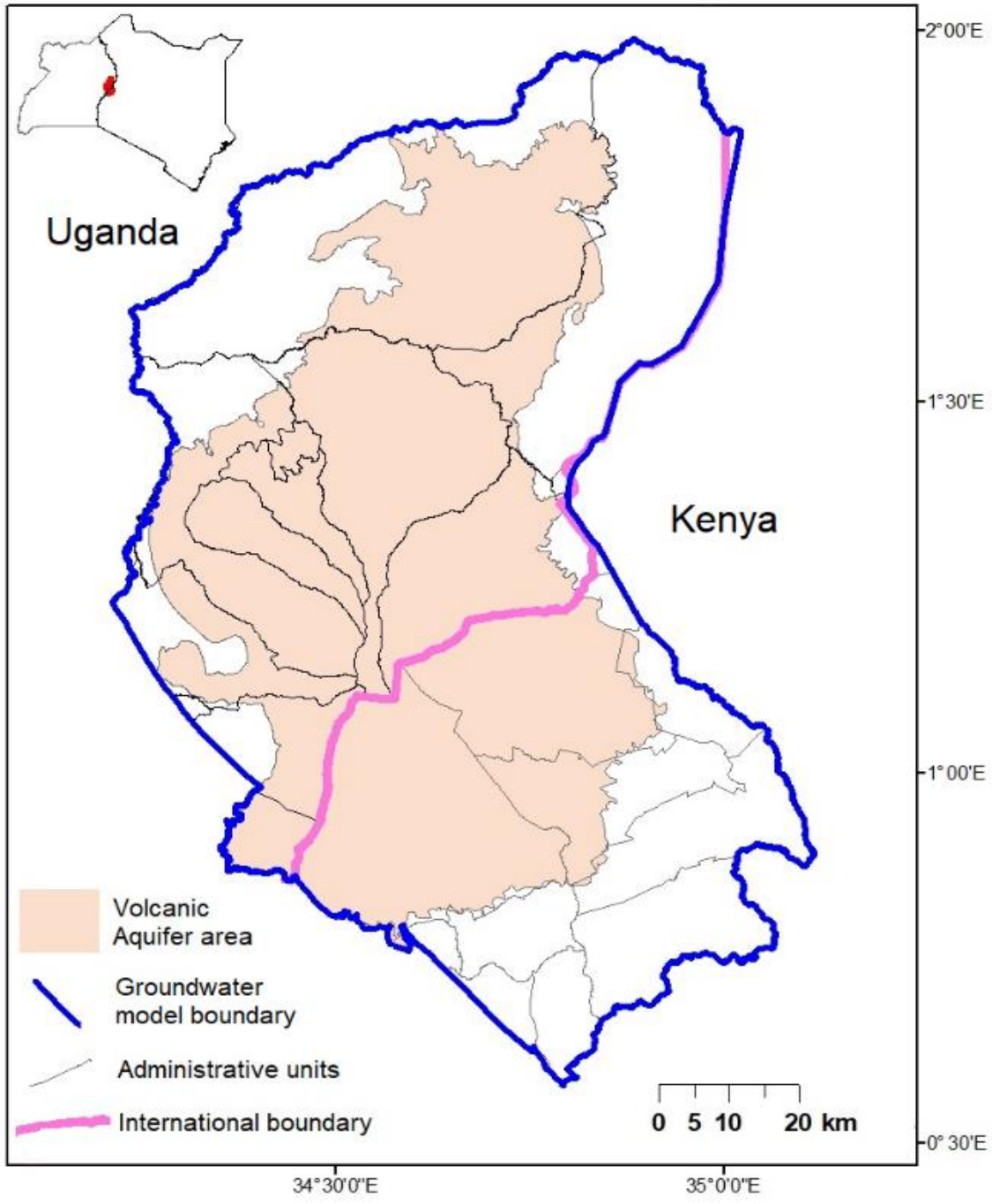

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Mt. Elgon region

- Initially ~4,900 km^2 (IGRAC, 2021), ~85% lying within Nile Basin (AF39); covered 8,500 km^2;
- **Kenya - Lakes Victoria & Turkana basins** (e.g., *Trans-Nzoia, Bungoma West Pokot and Busia* counties);
- **Uganda - Lakes Kyoga & Turkana basins** (e.g. *Manafwa, Bududa, Sironko, Bulambuli, Kapchorwa, Kween, Bukwo, Namisindwa and Amudat* districts);

SADA summary - 1

- **Key stakeholders**; mapped indigenous communities (e.g., Bagisu, Sabinyi, Benet, Ogiek, Sengwer, Yaaku Waata, Endorois); primary (e.g., CBOs) and secondary (e.g., government agencies);
- **Key drivers and pressures**; e.g., agriculture, tourism, mining, water scarcity, climate, population, domestic, industry, land degradation.
- **Shared aquifer characteristics**; over 8,500 km^2 beyond 4,900 km^2 of No. AF39;
- **Groundwater system**; Groundwater replenishment originates from region around volcanic massif (recharge area), runoff & springs on slopes, discharges to outlying catchment & wetlands;
- **Socio-economic considerations**; population, literacy & poverty; agriculture & irrigation; tourism; mining; industry, trade & manufacturing; governance; education; infrastructure & energy; land use & land cover; water supply & access; financial;

SADA summary - 2

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- **Key threats**; over abstraction; decreased recharge; climate change; pollution levels; land use/cover change; population growth; management; finances;
- **Groundwater demand and abstraction**; agriculture, livestck watering, domestic, health, rural water supply, industry, ecosystem;
- **Groundwater monitoring**; 6 groundwater monitoring stations in the region (e.g., Serere, Soroti, Moroto Prisons, Pallisa, Kangole, Bungoma);
- **Baseline water quality**; Parameters include physico-chemical (e.g., pH, TDS) and chemical (e.g., total Fe, F), major chemical (e.g.; Ca, HCO_3)-largely fresh;
- **Policy, legal and institutional framework**; existing groundwater management policies and mandates in each of the two-shared countries is different and require harmonisation;
- **Identified gaps**; identified in terms of measure (e.g., data collection), problem (e.g., lacking/limited) and required policy change (e.g., immediate implementation).

Modelling summary

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- **Spatial recharge** in the Mt. Elgon region is indicated at <9% of mean annual spatial rainfall; >90% include runoff and evapotranspiration;
- **River/spring outflows** form the bulk (>55%) of outflows from the groundwater system supporting surface water flows;
- **Groundwater abstraction** is a small portion (<10%) of total withdrawals with rest (<35%) discharging to adjacent aquifers;
- **Water balance** of the volcanic groundwater system indicates a baseline mean components of recharge (~ 85%); in flux from adjacent aquifers (~15%), abstraction wells (~ 4%), surface drainage (~25%) and flux to adjacent aquifers (-71%);
- **Projections** to 2050 due to climate variability/change result into variable groundwater level changes of up to ~26 m below current levels;
- **Projections** to 2050 due to increased abstraction from population demand result into variable groundwater level changes of up to ~14m;

Recommendations

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- Conjunctive development and management of surface and ground waters;
- Transboundary shared aquifer management policies and frameworks to include data sharing protocols;
- Dedicated groundwater level and quality monitoring proximate to climate observatories;
- Alternative approaches (e.g., use of chemical isotopes and tracers);
- Harnessing of relevant remote sensing approaches (e.g. gravity, infrared and altimetry methods).


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THANK
YOU!