Mapping of Contaminants in Developing World Aquifers for Origination and Risk Assessment

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SUPR WASH
SMU UNHCR Partnership in Research for Water, Sanitation, & Hygiene
UNHCR is currently assisting 34 million stateless persons worldwide.
Project to:

Analyze Drinking Water
Develop Global Database
Identify New Problems
Pilot Novel Solutions
Crisis Mapping
Camp Locations
Methods

- **Field Methods**
  - Standard water sampling techniques

- **Laboratory Methods**
  - Inductively Coupled Plasma – Mass Spectrometry
  - Ion Chromatography

- **Mapping Methods**
  - ArcGIS 10.3
  - Interpolated choropleth mapping technique
Bangladesh
Kutupalong Camp
Djibouti
Ali Addeh & Hol-Hol
Conductivities:
Ali Addeh & Hol-Hol Camps

Ali Addeh Conductivity Summary
➤ All wells had extremely high conductivities, exceeding
the WHO aesthetic guideline of 1000µS/cm

Hol-Hol Conductivity Summary
➤ All wells had extremely high conductivities, exceeding
the WHO aesthetic guideline of 1000µS/cm
Vanadium Levels: Ali Addeh & Hol-Hol Camps

Ali Addeh Summary
- All but 3 wells in Ali Addeh were above the 15 µg/L vanadium guideline

Hol-Hol Summary
- All but 1 well in Hol-Hol were above the 15 µg/L vanadium guideline
Fluoride Levels: Ali Addeh and Hol-Hol Camps

**Ali Addeh Fluoride Summary**
- All wells in Ali Addeh exceeded the WHO guideline of 1.5 mg/L for fluoride

**Hol-Hol Fluoride Summary**
- All wells in Hol-Hol exceeded the WHO guideline of 1.5 mg/L for fluoride
Uganda

Nakivale & Kyaka
Fluoride Levels: Nakivale & Kyaka Camps

**Nakivale Fluoride Summary**
- Many wells in Nakivale exceeded the WHO guideline of 1.5 mg/L for fluoride

**Kyaka II Fluoride Summary**
- Many wells in Kyaka II exceeded the WHO guideline of 1.5 mg/L for fluoride
Conclusion

➢ Increase the spatial resolution of southern Uganda

➢ Use these maps for future well placement

➢ Partner with UNHCR to continue spatial resolution of groundwater contaminants in other developing nations
Acknowledgments

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Thank you!

Questions?