

Using a GIS model to Plan Community Water Resources in Rural Uganda

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Context and Problem

Context

- The study area located about 550KM north of Kampala in the Kyabujingo county.
- 630 square kilometres. It is just south of Kyogo Lake.
- The 2008 census reports the access to safe drinking water in Kalango is 64% and in Kalungi it is 62%.
- 78 boreholes in the study area



Operational Objectives

- Find the site that targets the closest proximity to community facilities, but at the same time
- Find the site that avoids risks to clean water



Data

Ideal for SSA (Data Rich)		Viable (Data Poor)	
Data Layer	Resolution	Data layer	Resolution
DEM	1/9 Arc Second - 3 M	DEM	3 Arc Second - 1 KM
		Land Cover	1 KM
		Population	1 KM
Satellite Imagery	3 M	Satellite Imagery	30 M

Criteria

Factors						
#	Criterion	Measurement	Type	Importance	Data Source	Processing
1	Should be within 1.5 KM of a school	KM	M	High	WV	Projection
2	The land has to be on less than 10% slope	% slope	P	Medium	DEM	Projection
Constraints						
#	Criterion	Measurement	Type	Importance	Data Source	Processing
1	Should not be located within 3 KM of existing clean water well	KM	P	High	WV	Projection
2	Should not be within 1KM downslope a latrine	M	M	High	WV, DEM	Simulate contaminate flow
3	Should not be within 3 KM of stagnant water	KM	P	Medium	WV	Arc Hydro

Analysis

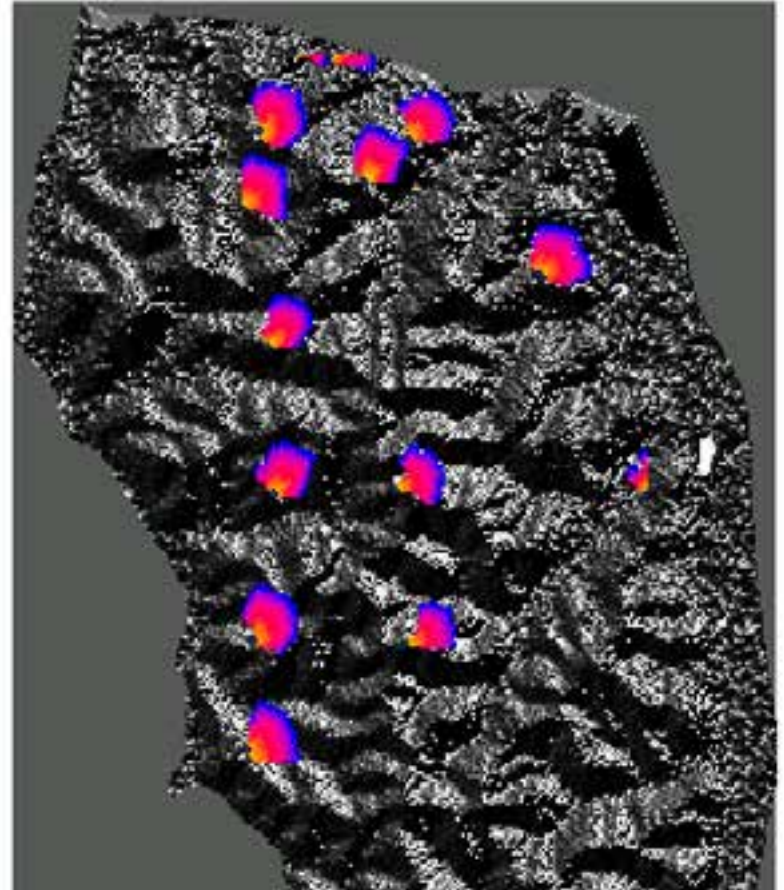
- Analysis 1 – Flow of water pollutant from point
- Analysis 2 – Identify stagnant water sites
- Analysis 3 – Identify flooding zones
- Analysis 4 – Identify slope feasibility
- Results- Membership tool and overlay

Methodology

- Fuzzy Membership
- Fuzzy Overlay

Analysis 1

- Model where pollutants flow from a point
- Path Distance Tool
 - Slope
 - Flow Direction



Analysis 2

- Sink
- 4 or more grouping
- Error



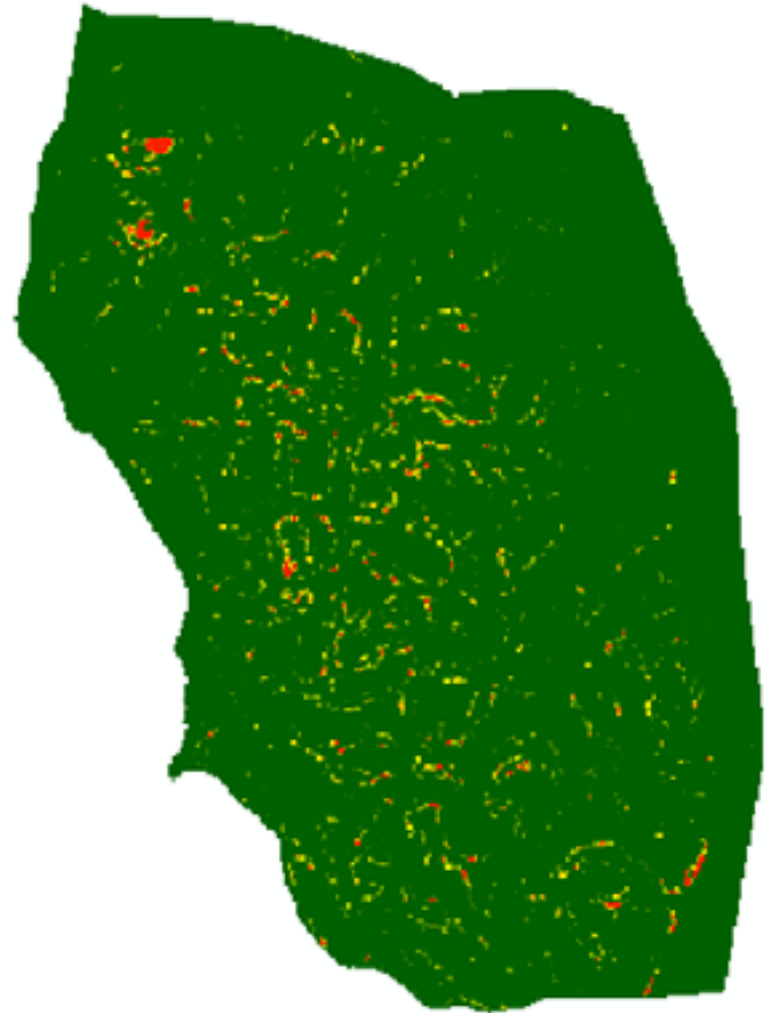
Analysis 3

- 10 of 78 Boreholes in wetlands
- Created polygons -> Random points (25 per polygon) -> extract value to points to get Raster value
 - Min: 1035
 - Max: 1069
 - Mean: 1048



Analysis 4

- Slope



Results/ Discussion

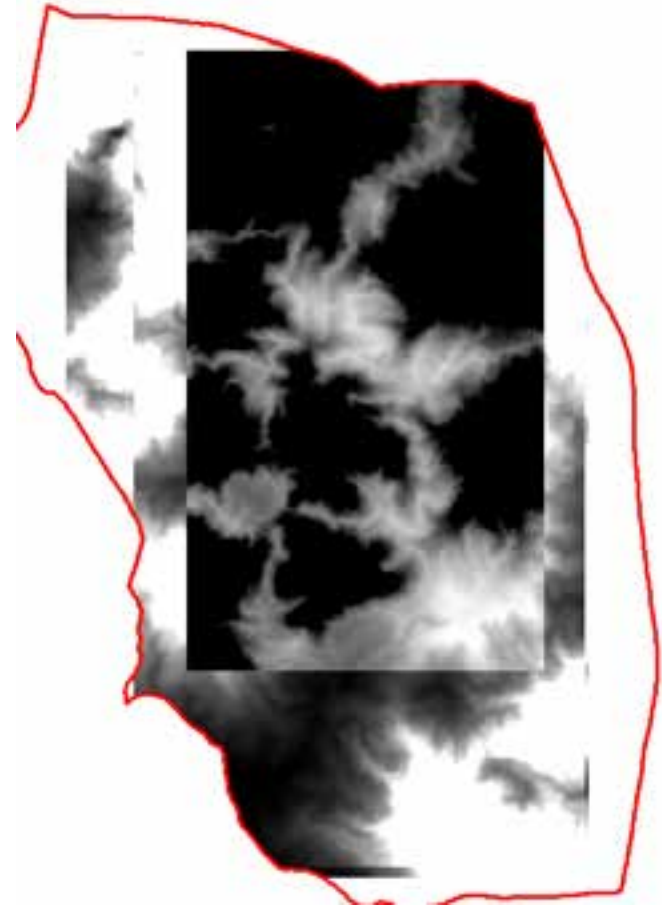
Training_Events_P

FuzzyOv_Fuzz1

Value

High : 0.729311

Low : 0



Future Research

- Cost Distance

