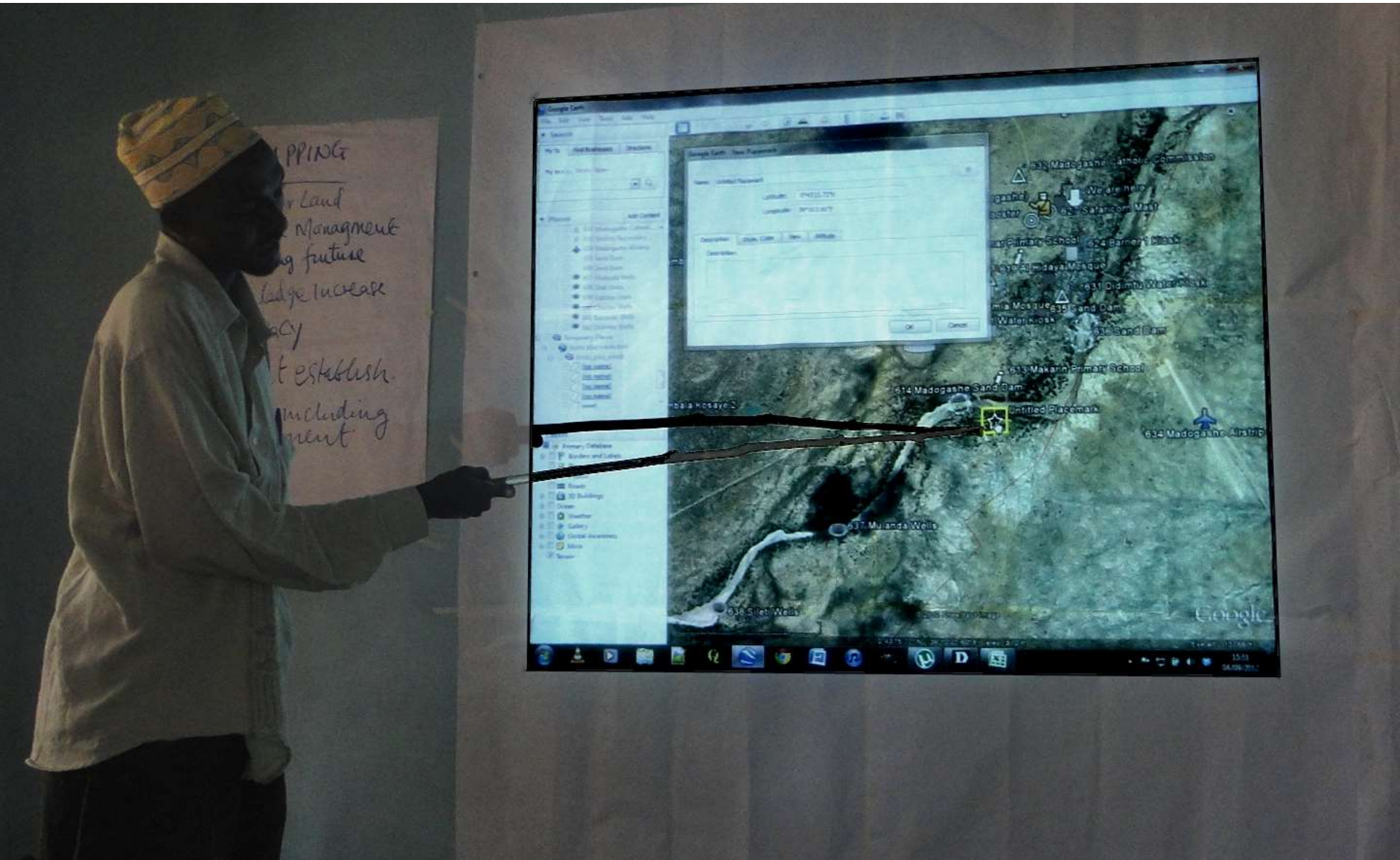
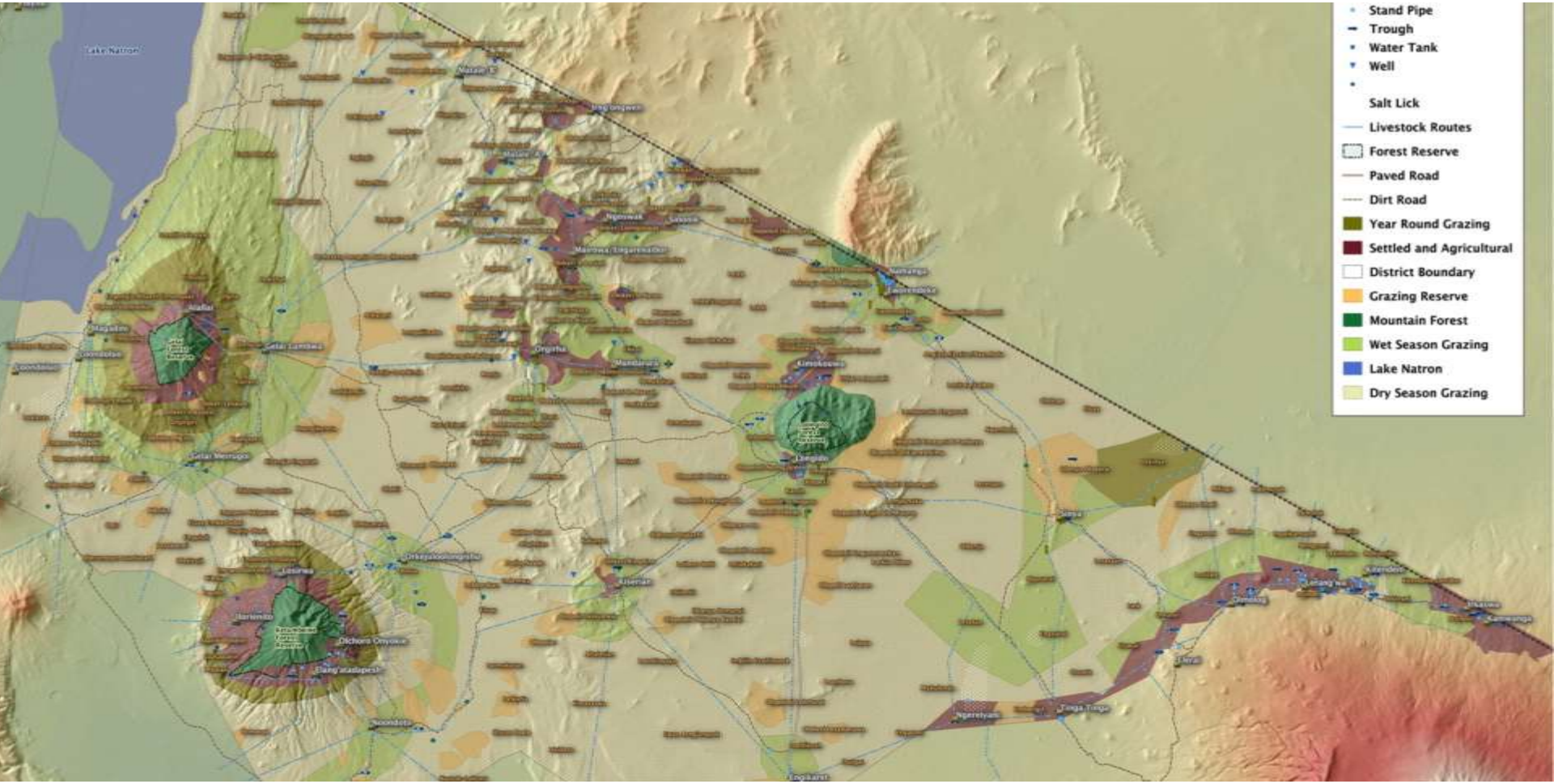
Digital Mapping with Local Knowledge to Support Adaptive Planning

Methods, tools and best practice

Why Make GIS Maps with Community Groups?



To Inventory What is Where, Record Resource Characteristics, and Access Patterns



To Allow Participation For Community Groups to Inform Planners

To Provide the Necessary Precision for Planners to use Local Knowledge Effectively

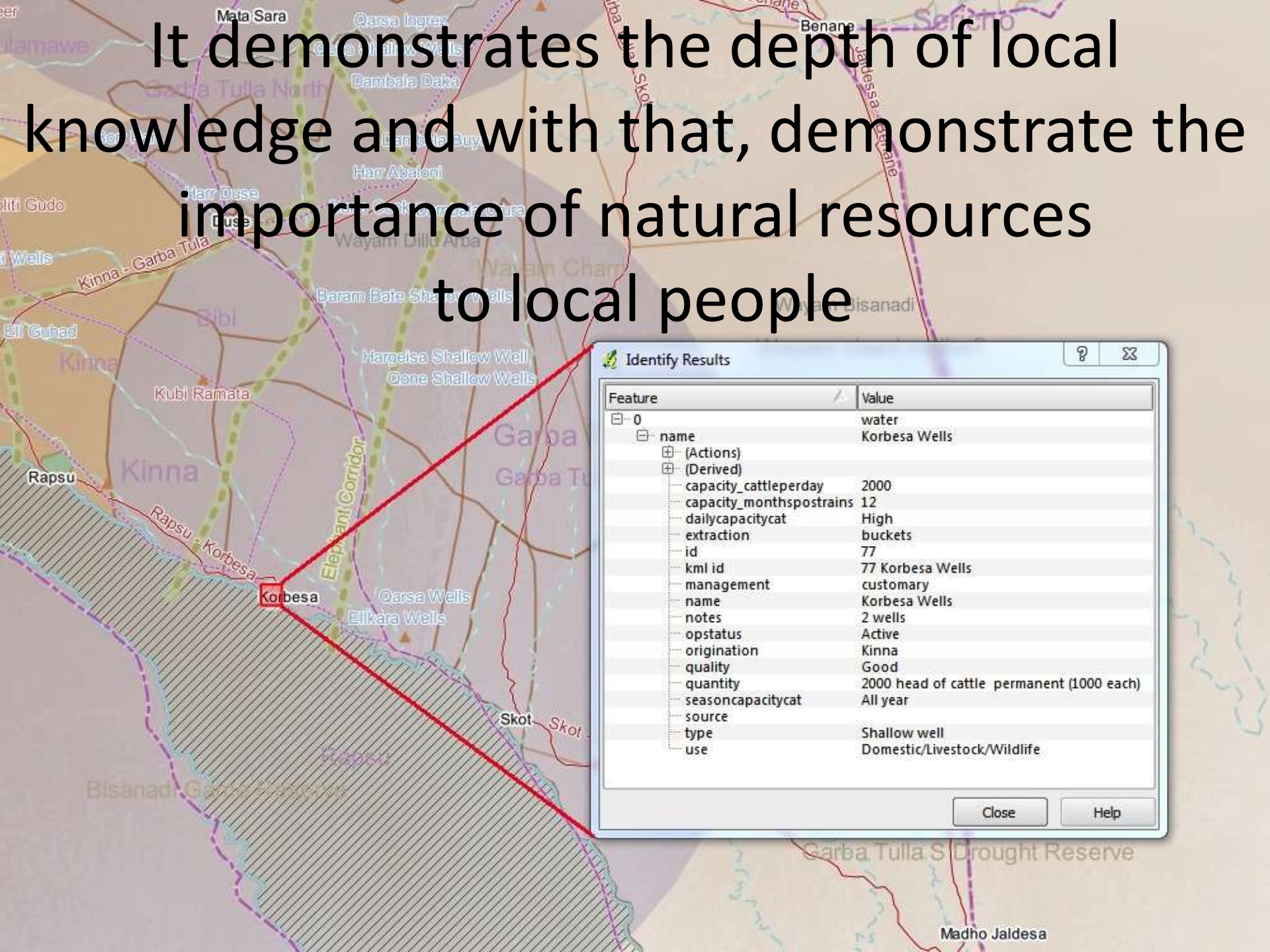
This can make a useful 'bridge' for information to flow between the customary and formal land management systems

Community Based Institutions

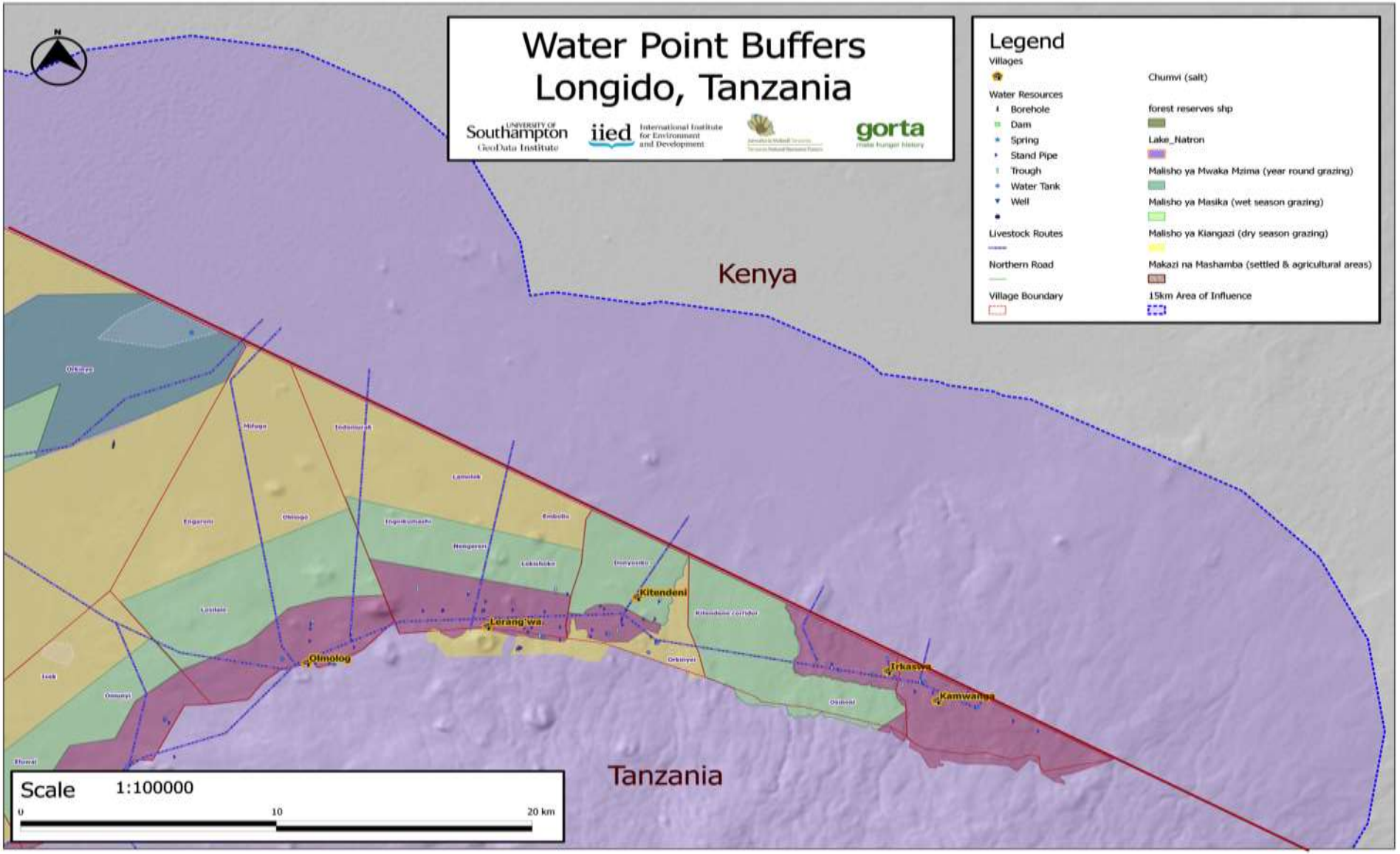
Formal Planning Systems

It is a Communication tool that uses powerful visual language to share ideas

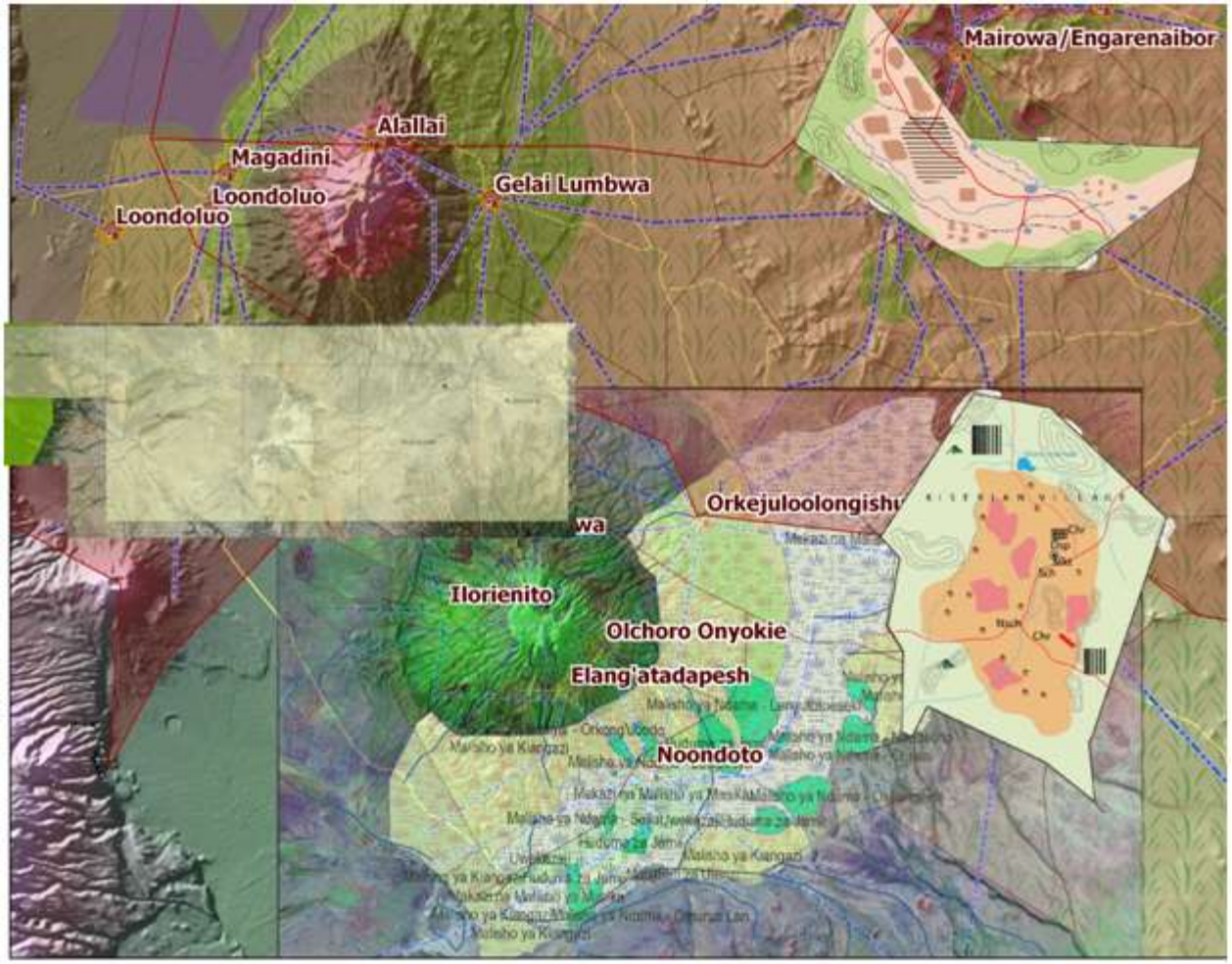
It demonstrates the depth of local knowledge and with that, demonstrate the importance of natural resources to local people

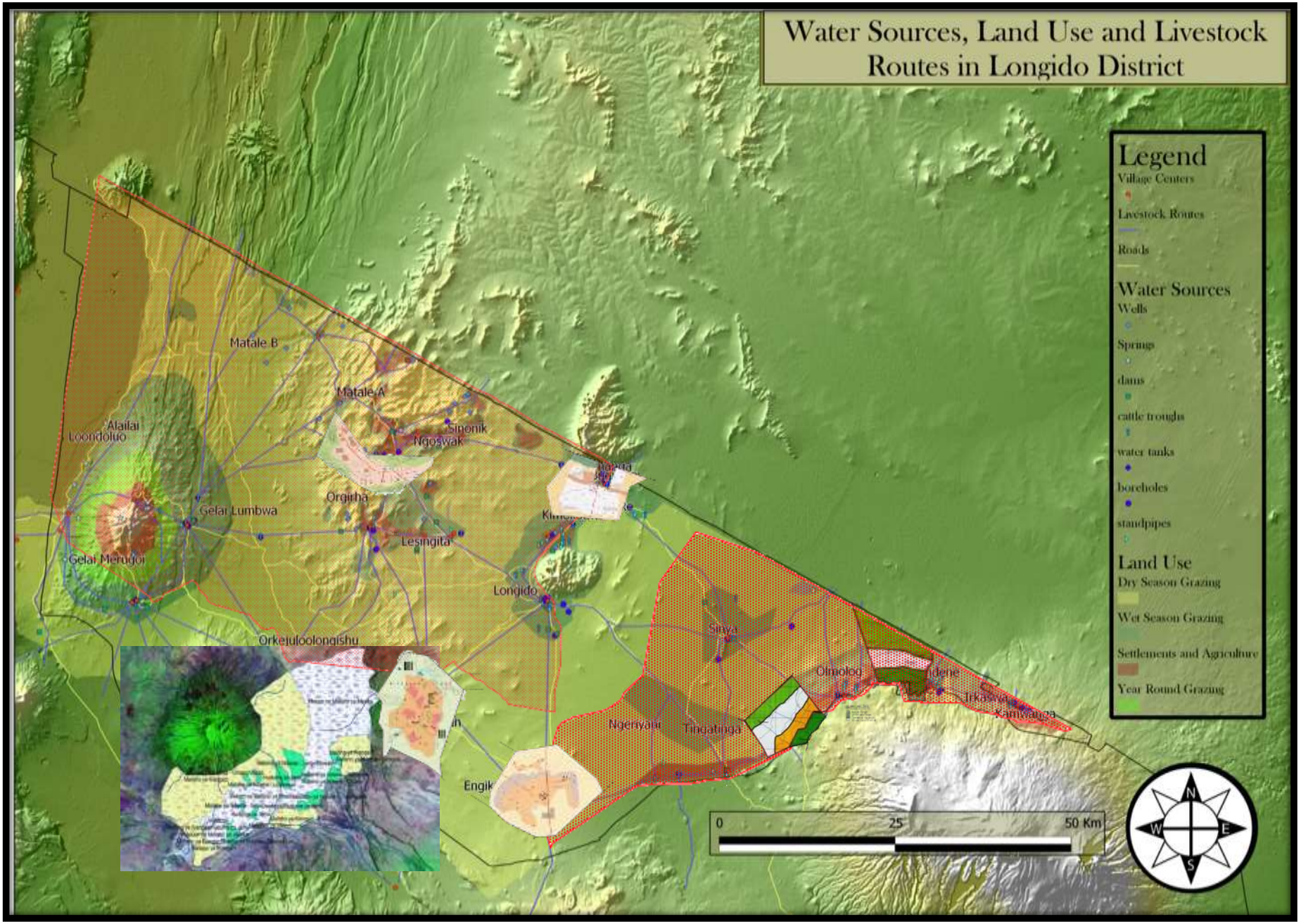


Allows us to identify gaps and risks in the system being mapped using analyses



To compare spatial planning and harmonise different planning types




Water Sources, Land Use and Livestock Routes in Longido District
Legend
Village Centers
Livestock Routes
Roads
Water Sources
Wells
Springs
dams
cattle troughs
water tanks
boreholes
standpipes
Land Use
Dry Season Grazing
Wet Season Grazing
Settlements and Agriculture
Year Round Grazing
Matale B
Matale A
Alailai
Loondoluo
Sinonik
Ngoswak
Orgirha
Gelai Lumbwa
Lesingita
Gelai Merugoi
Longido
Orkejuloolongishu
Sinya
Olmolog
Ngeriyani
Tingatinga
Engik
Kamwanga
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50 Km
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S

In the Context of Climate Change

- Climate change cannot be reversed ..However
- Adaptive capacity can be preserved and key resources protected, if the reasoning behind pastoralist livelihoods can be well represented
- This requires closing the communications gap between government planners and their constituents (and local and national government?!)
- Maps allow us to communicate the copious and pertinent knowledge of pastoralists into a universal visual language that underpins spatial planning, law making and negotiations over land

In the Context of the Project

- Maps help to target and coordinate spending of the Climate Adaptation Fund, designed to fund public good type projects in line with priorities identified by community group members
- Maps can also help justify these investments and quantify/understand/communicate their likely impacts

Current Methods for Map Making

The Expanded Mapping Cycle

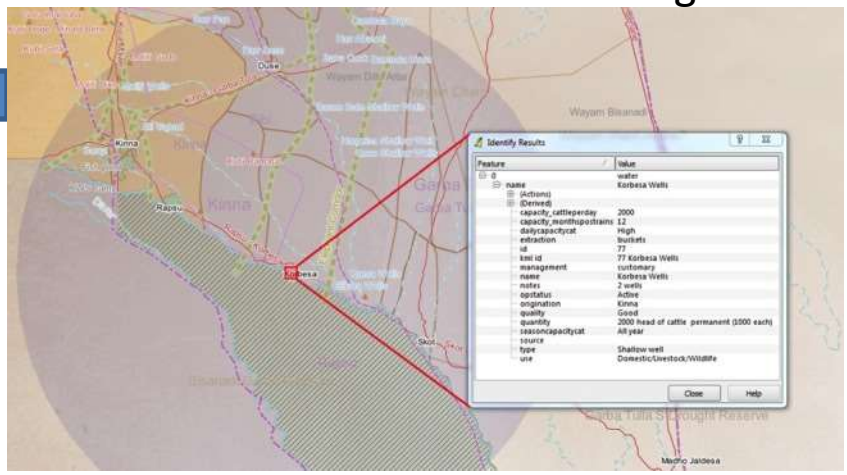
Consultation

Feedback

Repeat

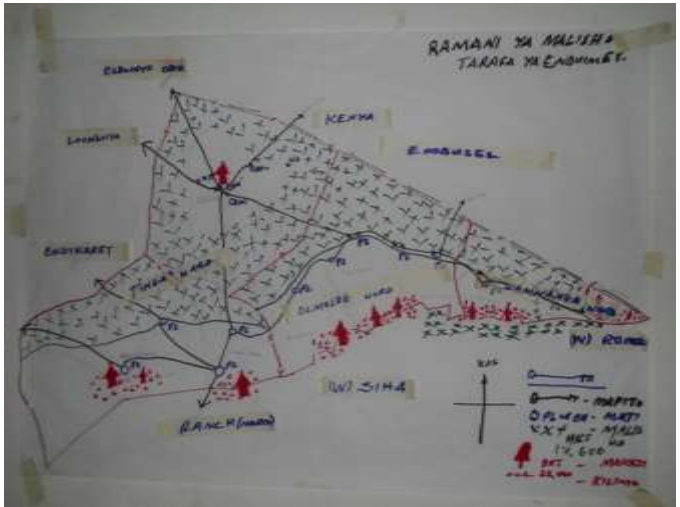
Digitisation

Processing

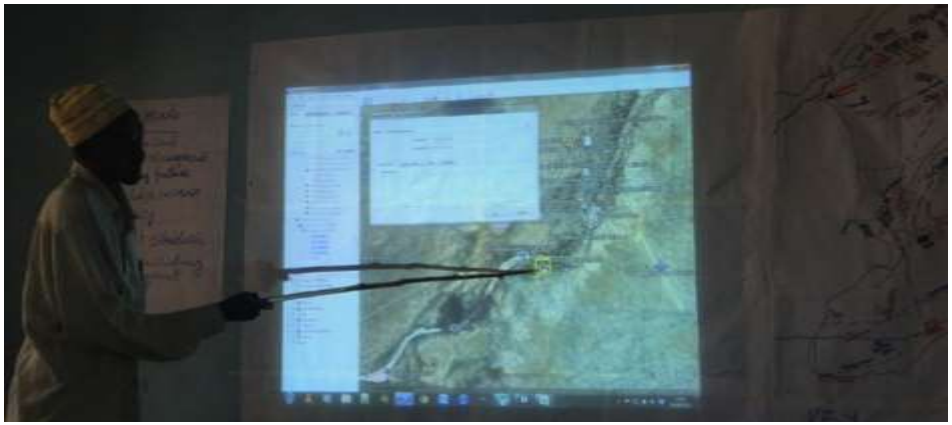


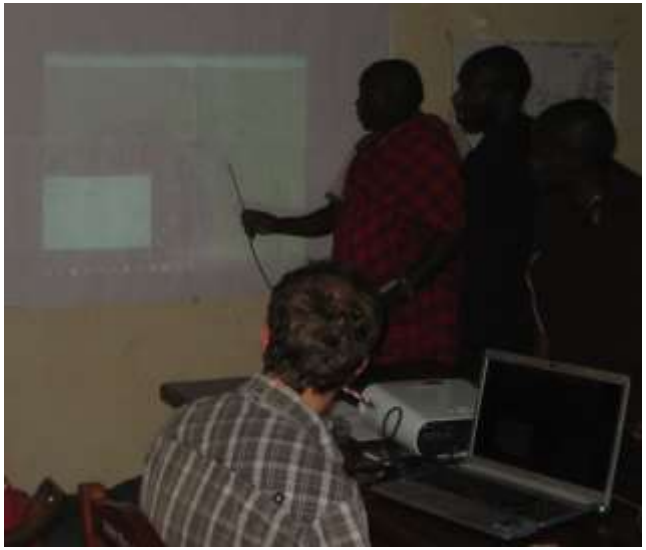
Step 1 maps on the ground

Step 2 Maps on Paper



Step 3 Mapping in Google Earth



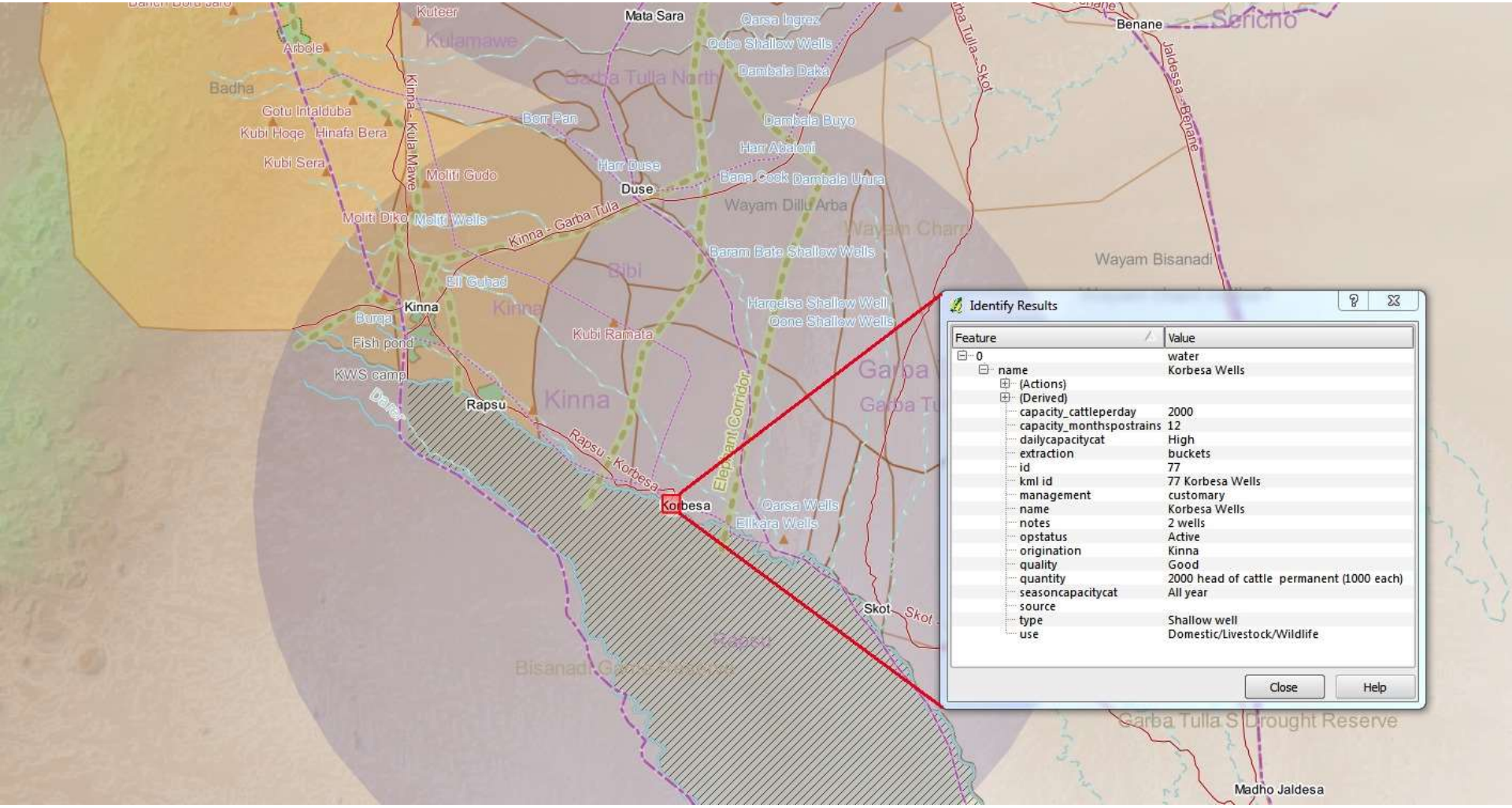


Now lets take a tour of some of the data...

Step 4 Collecting Attributes

	A	B	C	D	E	F		H	I
1	ID	Type	Use	Quality	Quantity	Source	Managemen	Extraction	Notes
100	336	Shallow well	Domestic/Livestock/Wildlife	good	100 cattle per day	groundwater	customary	buckets	
101	351	Shallow well	Domestic/Livestock/Wildlife	good	400 cattle per day gets low on average 5-6 months af	groundwater	customary	buckets	name mea
102	352	Shallow well	Domestic/Livestock/Wildlife	good	2-300 goats per day lasts 2-3 months after rains	groundwater	customary	buckets	
103	353	Scoop	Domestic/Livestock/Wildlife	good	2-300 cattle per day 3 months after rains	groundwater	customary	spades	use spade
104	358	Scoop	Domestic/Livestock/Wildlife	good	200 cattle per day for 2 - 3 months after rains	groundwater	customary	spades	mado mea
105	359	Scoop	Domestic/Livestock/Wildlife	good	300 cattle per day for up to 6 months after rains	groundwater	customary	buckets	
106	361	Scoop	Domestic/Livestock/Wildlife	good	500 catle per day gets low in drought	groundwater	customary	buckets	
107	362	Scoop	Domestic/Livestock/Wildlife	good	4-500 cows per day, generally dries 6m after rains	groundwater	customary	buckets	
108	363	Scoop	Domestic/Livestock/Wildlife	good	100 cattle per day for 2 months after rains	groundwater	customary	buckets	
109	364	Scoop	Domestic/Livestock/Wildlife	good	200 cattle per day for 6 months after rains	groundwater	customary	buckets	
110	365	Shallow well	Domestic/Livestock/Wildlife	good	300 cattle per day permanent	groundwater	customary	buckets	name mea
111	366	Shallow well	Domestic/Livestock/Wildlife	salty	3-400 cattle per day permanent	groundwater	customary	buckets	
112	367	Scoop	Domestic/Livestock/Wildlife	salty	200 cattle per day for 6 months after rains	groundwater	customary	buckets	
113	368	Scoop	Domestic/Livestock/Wildlife	good	200 cattle per day for 2 months after rains	groundwater	customary	buckets	
114	369	Scoop	Domestic/Livestock/Wildlife	good	200 cattle per day for 2 months after rains	groundwater	customary	buckets	
115	370	Scoop	Domestic/Livestock/Wildlife	good	200 cattle for 3 months after rains	groundwater	customary	buckets	
116	372	Spring	Domestic/Livestock/Wildlife	good medicinal	access is limiting, protected	groundwater	Bisan Biliqo C	open water	hot spring,
117	373	Scoop	Domestic/Livestock/Wildlife	variable	2-300 cattle per day permanent	groundwater	customary	buckets	water flows
118	374	Scoop	Domestic/Livestock/Wildlife	salty	200 cattle per day permanent	groundwater	customary	buckets	
119	391	Pan	Domestic/Livestock/Wildlife	good	100 cattle per day for 2 months after rains	rainwater	customary	open water	Natural pa
120	406	Pan	Domestic/Livestock/Wildlife	deteriorates	200 cattle per day for 2 months after rains	rainwater	customary	open water	
121	409	Pan	Domestic/Livestock/Wildlife	deteriorates	200 cattle per day for 2 months after rains	rainwater	customary	open water	
122	410	Borehole	Domestic/Livestock	good	not known	groundwater	customary	diesel genset	Drilled and
123	411	Natural Pan	Domestic/Livestock/Wildlife	deteriorates	200 cattle per day for 2 months after rains	rainwater	customary	open water	
124	412	Pan	Domestic/Livestock/Wildlife	deteriorates	200 cattle per day for 2 months after rains	rainwater	customary	open water	
125	415	Borehole	Domestic/Livestock		800 - 1000 cattle & goats per day	groundwater	VWC	diesel genset	
126	418	Pan	Domestic/Livestock/Wildlife	deteriorates	500 cattle per day for 1 month after rain	rainwater	customary	open water	
127	420	Borehole	Domestic/Livestock	good	3000 (9.8cubic meters per hour) cattle per day perma	groundwater	rangeland use	diesel genset	mainly use
128	421	Dam	Domestic/Livestock/Wildlife	deteriorates	10000 cattle per day (!) for up to 9 months from rains	rainwater	customary	open water	large dam
129	422	Borehole	Domestic/Livestock	good	7.6 cubic metres per day permanent	groundwater	rangeland use	diesel genset	mainly use
130	423	Borehole	Domestic/Livestock	good	1.8 cubic meters per hour permanent (500 cattle over	groundwater	rangeland use	diesel genset	mainly use
131	424	Borehole	Domestic	good	~8 cubic metres per hour	groundwater	customary	diesel genset	pipes wate

Step 5 Merging and Processing data in a GIS

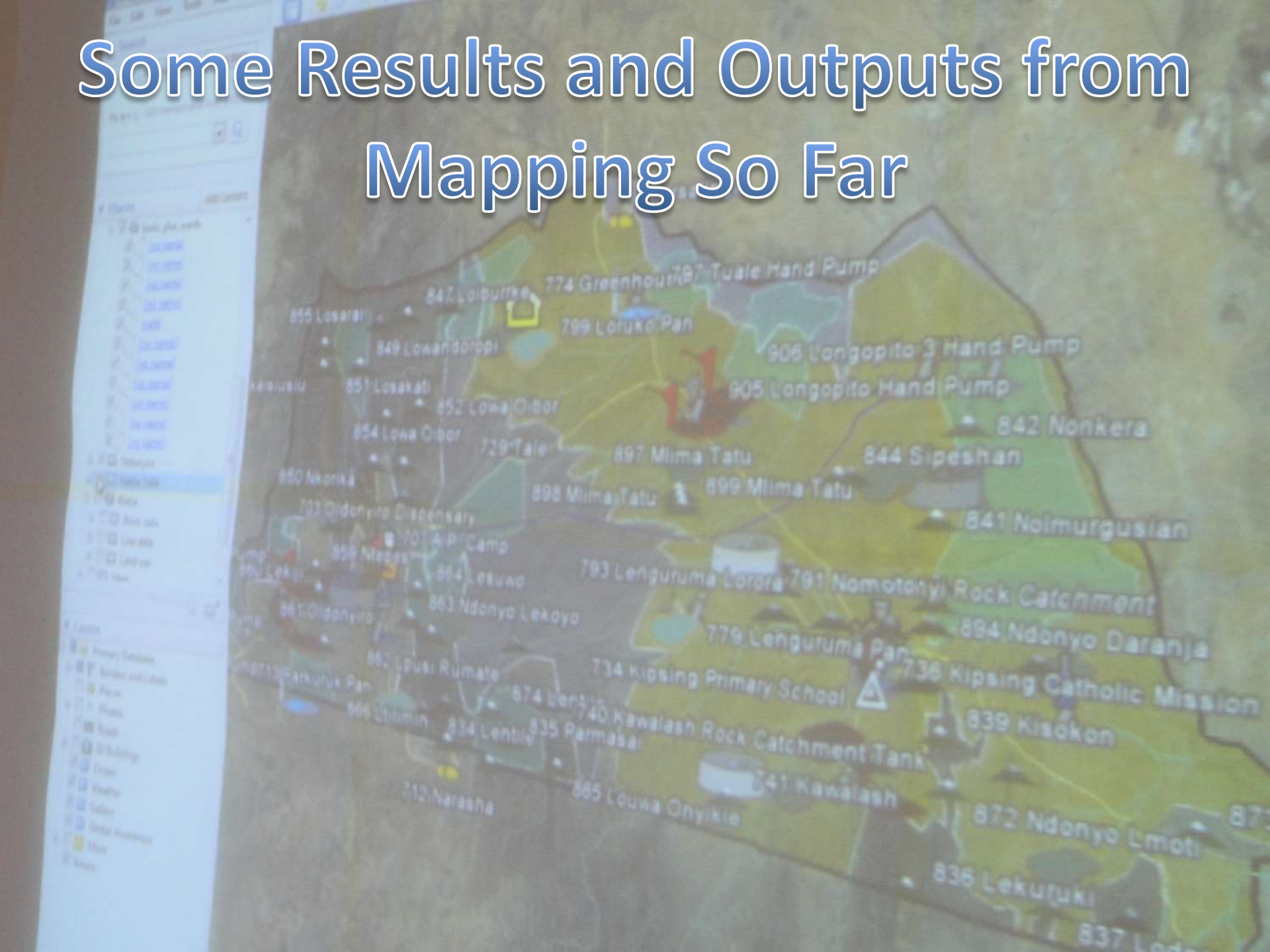


Step 6 Feeding Back Results and Ground Truthing Cycles

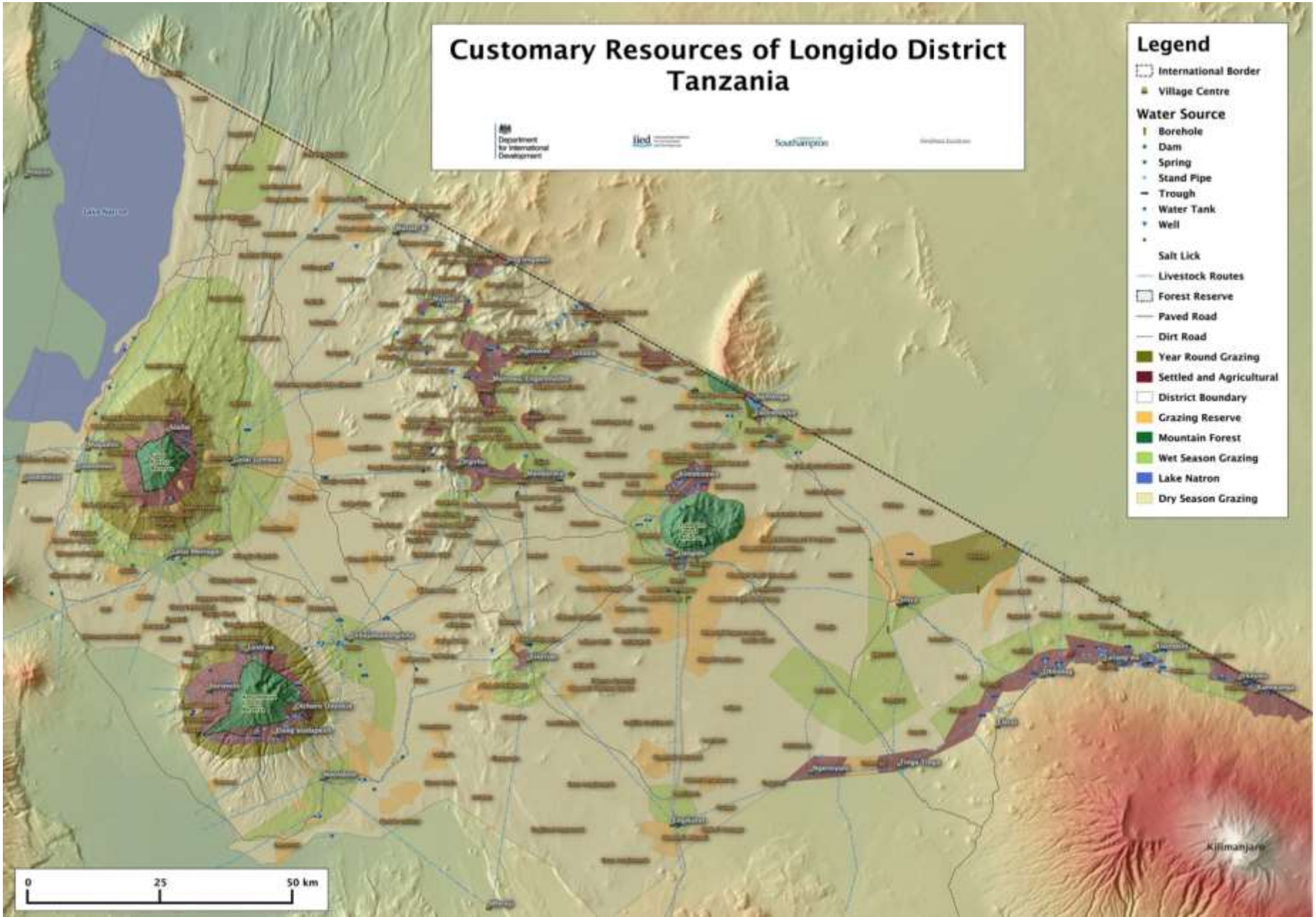
Some Important Considerations

- Good Facilitation
- Broad Participation
- Allowing consensus to be reached on map features
- Undergoing enough cycles of learning to make complete maps that everyone is happy with

Some Results and Outputs from Mapping So Far



The Longido Resource Map (V7)



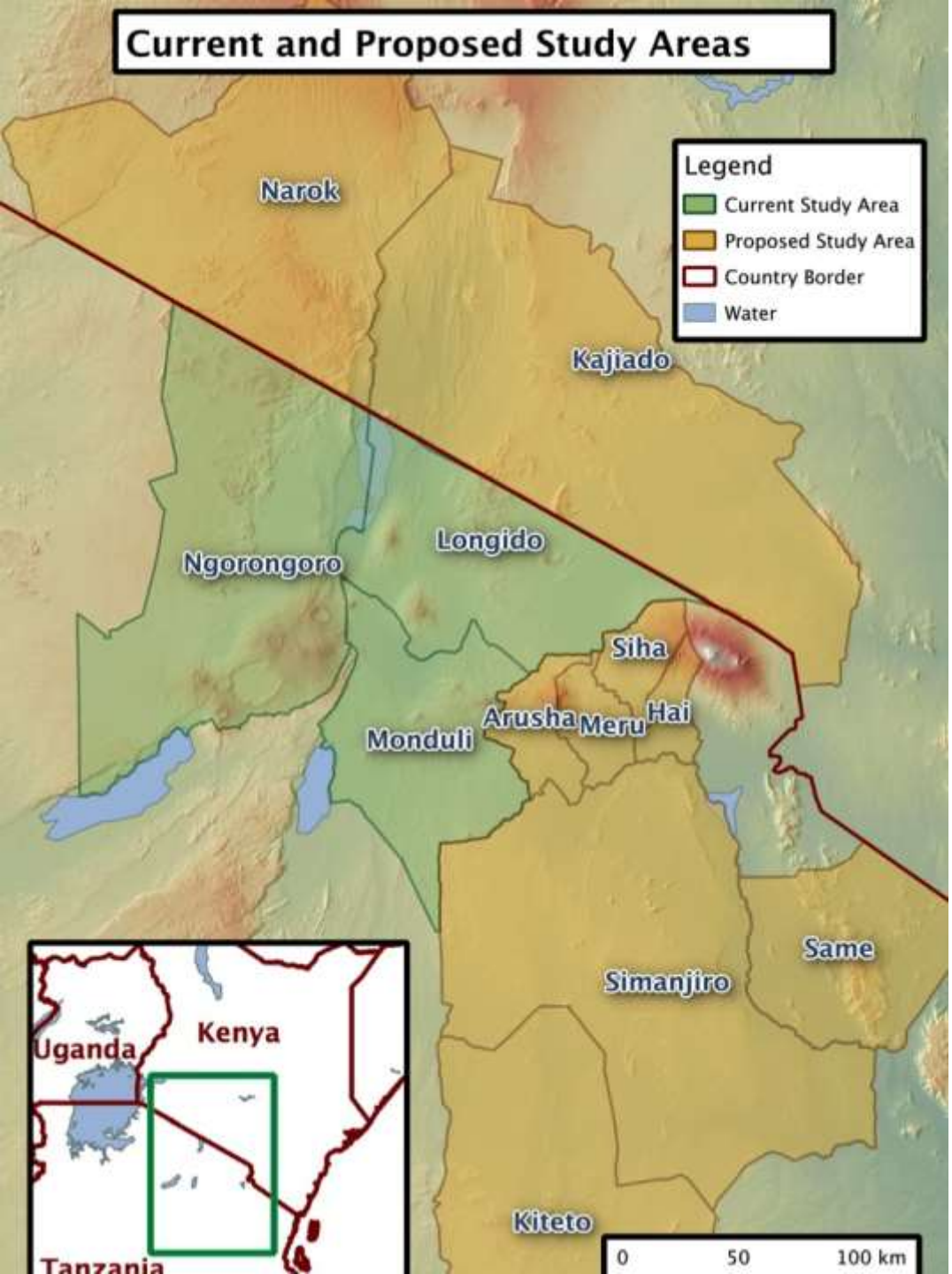
The Isiolo Resource Atlas

Mainstreaming Climate Change Adaptation

Atlas of community-based mapping of pastoralist resources, Isiolo County, Kenya

Available online at http://webgis5.geodata.soton.ac.uk

DRAFT: October 2013



Current and Proposed Study Areas

Considerations Going Forward

- Mapping can be very powerful as a tool for communication and advocacy, and also to support planning and investment in equitable natural resourc management
- However there are several things for us to consider moving forward with mapping as a tool for building climate resilience:

Who Should Make Maps?

- Representative participants in workshops
- Equal opportunities to contribute within workshops
- Consider splitting groups e.g. Men and Women's map (Maps made by different groups can always be recombined later on using the digitised coordinates)
- Who should facilitate, who should be trained? Who should take responsibility for monitoring resources and updating the maps?

Copyright and Ownership of Data

- Google owns whatever you can infer from their imagery…though this imagery can be replaced
- Community groups need to maintain ownership and control over their customary knowledge, but also share it and bring to bear on decision making
- Maps need to be disseminated in different forms; online, in hard copy form, soft copy, as an atlas
- The paradox of introducing and then handing over technological approaches to mapping land issues needs careful management…

Politics, Legitimacy, and Harmonising Planning

- The map making process itself must remain apolitical, BUT making maps will always be construed as a political act, it will always shed light on many real and burning issues.
- Ideally this type of work should be conducted as part of an open dialogue between different stakeholder groups where views are compared and contrasted in constructive manner

Cross Border Mapping

- We must agree on a way to integrate mapping efforts from other counties/district (and from other countries) so that map styles and feature classes are consistent throughout
- This will allow a seamless overview of the whole pastoral ecosystem across many different political zonations and administrative boundaries
- This landscape scale view will be crucial for the effective management of pastoral issues in a context of climate change
- This requires a level of coordination that may be challenging, but also bring with it many other benefits
- For example, horizontal coordination between different CSO as well as better vertical communication between stakeholder groups, local and national government

Validation of Maps

- Maps need to be validated in several different ways:
- By community groups: Are these maps complete and are they representative?
- By officials: Are these maps valid and are they useable?
- By map makers: Are these maps accurate and are they easy to interpret?
- By lawmakers, can they form the basis of byelaws

Making Use of Maps

- Once maps are validated in these ways it is possible to make use of them eg. to underpin the passing of district byelaws for example:
- Protecting key resources, choosing CAF investments
- Maintaining the mobility necessary to access key resources
- Finding solutions to objectively resolve conflicts or different perspectives in the light of objective reality

Thankyou for listening.