

# Socio-ecological resilience to drought and the role of conservation

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# Overview

- Socio-ecological systems and resilience
- Drought and the role of conservation
- Interdisciplinary approach
- Preliminary findings







# Grasslands, people, conservation

- Optimal state for maximum benefits?
- But what about variability? Complexity?
- Complex non-linear systems managed for flexibility and not for maintaining stability?
- Grasslands, people, conservation



# Multidisciplinary Research



- Systems-based conceptualization with dynamic of humans and environment
- Socio-Ecological System (SES) framework (Berkes and Folke 1998, Walker 1993, Ostrom 2009)
- Still leaning towards the qualitative?



# Socio-Ecological Systems and Resilience

- SES resilience - “the capacity of a system to absorb disturbance and reorganise while undergoing change” (Walker 2004)
- Humans have the ability to imagine the future - can influence, manage or prevent undesirable trajectories
- Criticisms
- A widely used term now, particularly in a emergency response context. What is resilience to drought, are there pay offs (if you become more resilient, what do you miss out on?)
- What are the spatial and temporal consequences of resilience?



# SES of East African Rangelands

- Biodiversity
- Large mammals
- Livestock
- Culture

YET:

- Poverty
- Cattle declines (but small stock increases)
- Wildlife declines (Kenya 1975-2005 saw 50-80% declines across all aerial species)
- Grass productivity declines



# Drought as a Shock to SES

- Droughts are:
  - Normal
  - Worsening?
- Restrictions to their drought response mechanisms.
- Serious ecological and social consequences
- Can lead to regime shift or collapse of wildlife, livestock

## Outlook grim as FAO warns of worsening drought

Dec. 23, 2016, 9:00 am | By GILBERT KOECHKOECHJUNIOR\_1



## Tanzanian herders, hit by drought, trade firewood for food

by Kagonda Njagi | [@DavidNjagi](#) | Thomson Reuters Foundation  
Wednesday, 9 November 2016 11:00 GMT

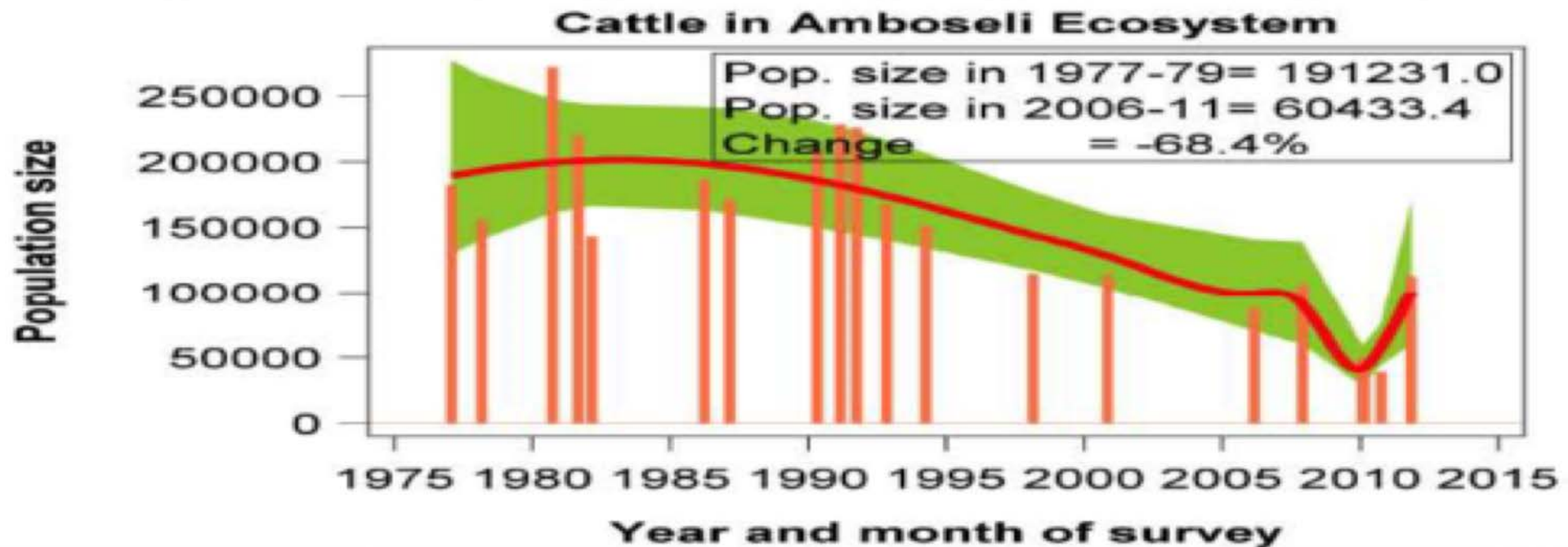
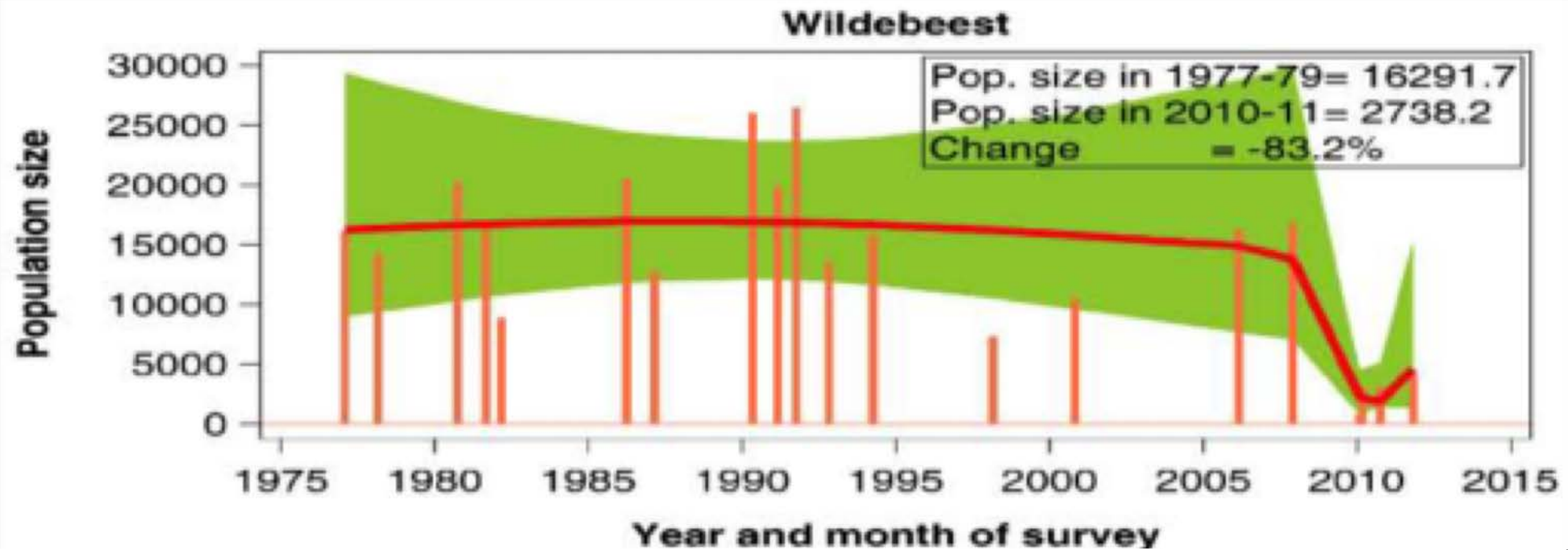
## Drought to intensify in Kenya in 2017, early warning system shows

REPORT from Thomson Reuters Foundation

Published on 13 Dec 2016 — [View Original](#)

## TANZANIA ORDERS DROUGHT-HIT HERDERS TO LEAVE NATIONAL PARKS

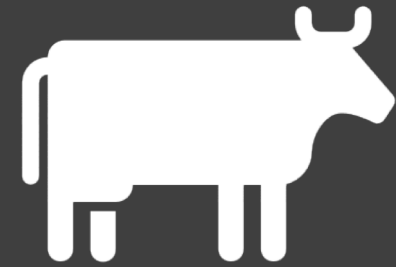
Thousands of heads of cattle, goats and sheep have crossed into Tanzania from neighbouring Kenya and Uganda.





# Kenya's South Rift Borderland

- Ewaso Ngiro river, Shompole swamp, Lake Natron
- Rainfall 400-600mm yr<sup>-1</sup> and 33% annual variation
- Loodokilani, orpurkoi, orkurumani, olarusai, osonjoi
- Livestock 52.2 shoats/km<sup>2</sup>, and 6.23 cattle/km<sup>2</sup>
- Cultivation
- All large herbivores (except rhinoceros)
- 21 sp. of carnivore and growing pop of elephants
- Wildlife densities of Mara and Amboseli
- Conservancies





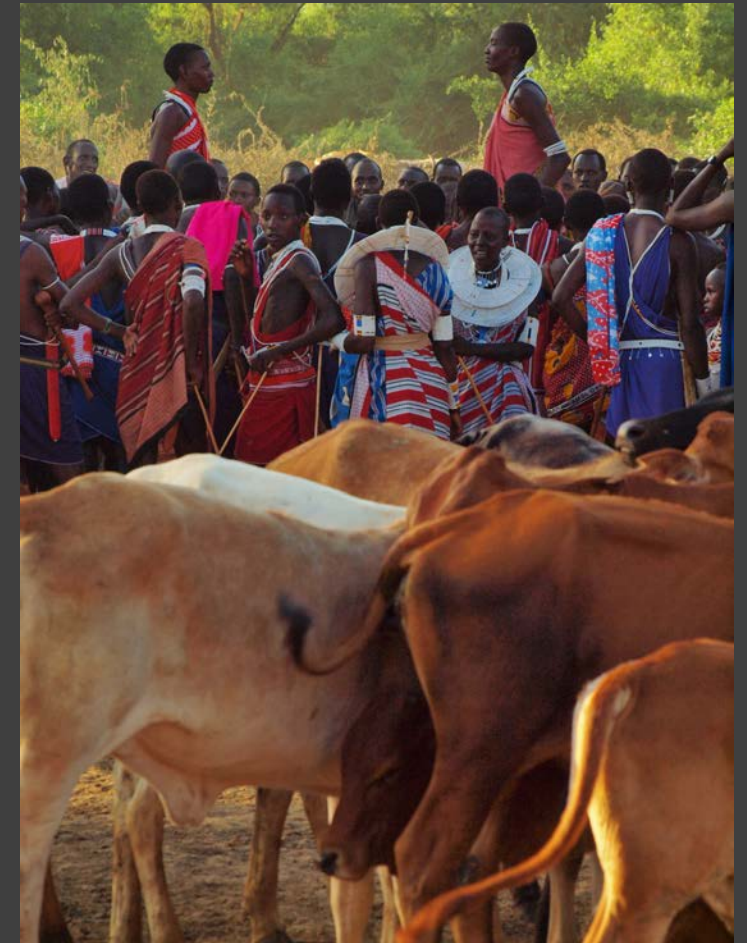
US Dept of State Geographer  
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Google Earth



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# Research Questions

- What is the recent history of socio-ecological resilience to drought in the South Rift?
- How have community conservancies altered the SES of the South Rift?
- How are coping mechanisms in response to drought changing in the South Rift SES?
- What role do community conservancies play in resilience and vulnerability to drought?

# Methodologies



- Ecological – Remote Sensing, Ground biomass data, existing data from ground and aerial surveys
  - Grass Net Primary Productivity using EVI (Enhanced Vegetation Index)
  - Land use change (diversification)
  - Livestock counts (self reporting, ground and aerial)
  - Wildlife (DRSRS since 1977 of ASALs)



# Methodologies



- Social – Quantitative and Qualitative Mixed Methods Approach
  - At household level, surveys (similar to existing e.g. NTRI)
  - Wellbeing
  - Attitudes to conservation
  
- Backgrounds e.g. family portraits
- Responses to drought (e.g. movement histories)

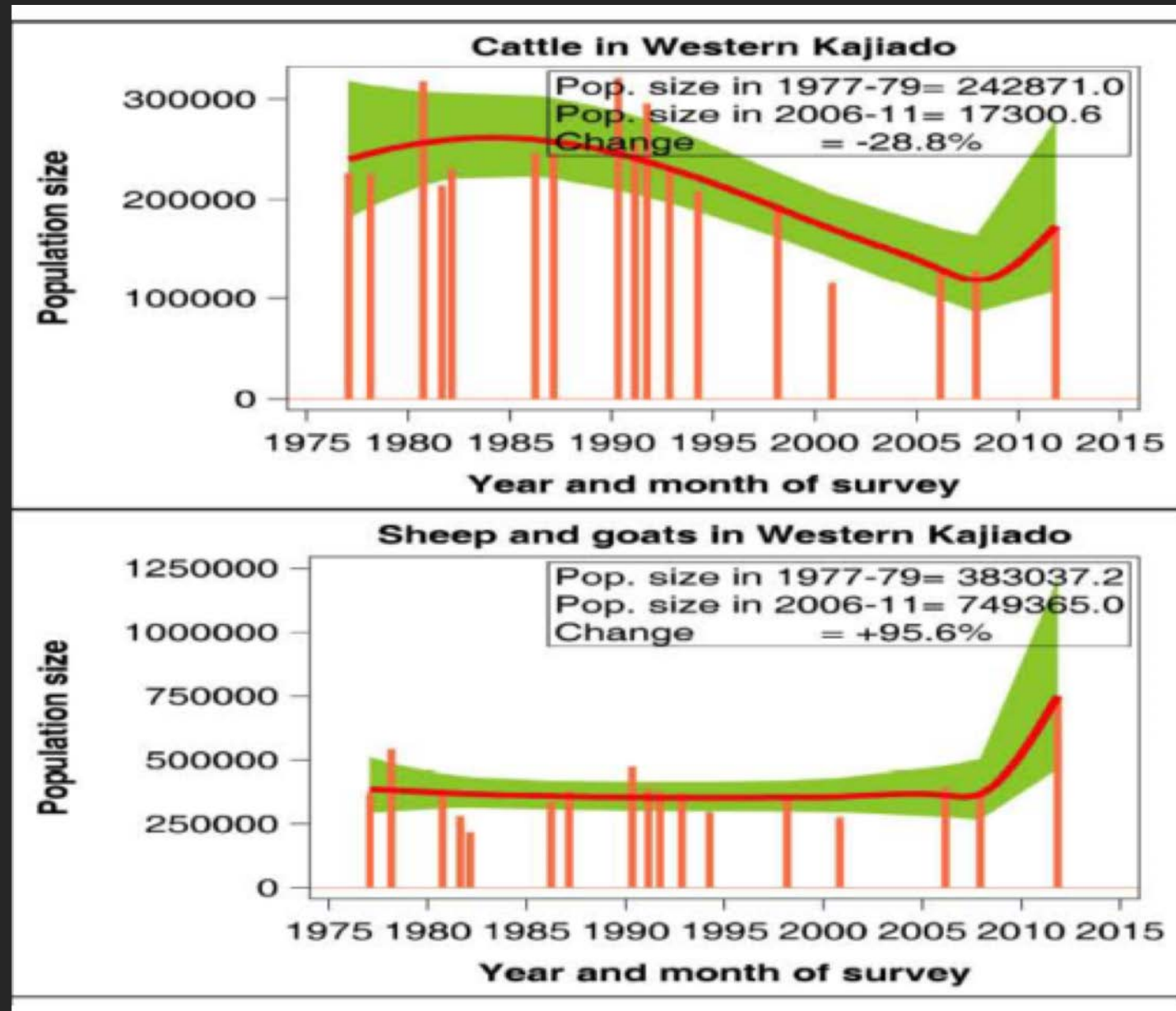




# The socio-ecological context

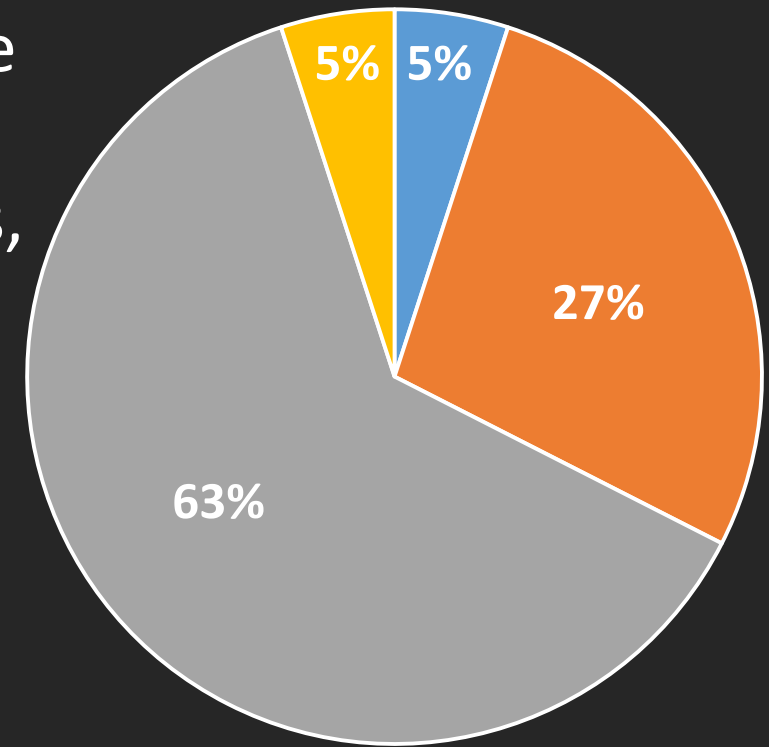
- High diversity of habitats
- High diversity of wildlife
- High density of key tourism species. Lion densities rival National Park densities
- High density of livestock
- Seasonal pastoral mobility still prevalent
- Wildlife use the various habitats seasonally as well
- Key drought refuges are the woodlands and swamps, which are still intact.
- Cases of Kamorora area and Magadi Soda Company...

# Changes in sheep and goat numbers?



# Role of conservancies

- Communal – managed through traditional mechanisms with strong leadership
- Strong ownership
- Take advantage of incredible coexistence and tolerance
- Little perceived sacrifice but important grazing reserve – for whom – only 7% use it often?
- The cash incomes are seen as important contributions, particularly during the drought
- People did not list grazing often, perhaps it is taken as a granted?
- Changing mobility and flexibility:
  - 1999, >33% were mobile as a household and 60% as individuals
  - 2017, only 32% were mobile



■ Whole ■ Partial ■ None ■ Not relevant



# Role of conservancies

- *“Conservation area was never created as a conservation area for a start, it was created as a dry season grass bank and that is how we have always treated it. We've branded it today as a conservation area for purposes of bringing in additional income from tourism ... it's not a space where we have given out but a space where we have enhanced production.”*

# Challenges of (wildlife) conservancies

- Conservancy, or self help project (Ministry of labour, social security and services. Department of social development) – now KWS registration is a requirement at county level for compensation etc
- What does this mean for governance and fitting in with national policies on wildlife protection?
- Limits to grazing access still felt by some
- Human wildlife conflict – felt most acutely during the drought
- Transparency – 85% feel they are not sufficiently informed
- Planned landscape and diversification of livelihoods



# Expansion of Nguruman irrigated agricultural area

- Woodhouse and others in 200 had already identified this as an issue: "Nowhere are the pressures on 'wetland in dryland' areas greater than in Kajiado District"
- 30% cultivated less before conservancy was set up.
- These areas were once the osupuko, or the irasheta.
  - Increasing productivity through underground water piping and irrigation



# Issues are known within the communities

- The sheep and goat are chasing out the cows:
  - “the shoats are finishing the cows, the shoats are finishing the cows because now if they finish this grass there will be nothing for them to graze on.”
- Impact on the grass banks:
  - **Now the shoats, when god brings a little rain, that grass that tries to sprout, the goats welcome it and finish it.** - "Etaa ore intare, tenejo enkiti ai Enkai-asha, ore inana kujit kuti naapuku, neng'amu intare neishu"
  - **So the thing that i see which is finishing, which will destroy the land is the grass species themselves are not growing to the point where they produce seeds.** "Kadol taata ninye ajo ore entoki naiting'ito ninye aarr enkop, nkujit naa ninye nemeeikure ebulu aatum empeku"

# Issues are known within the communities

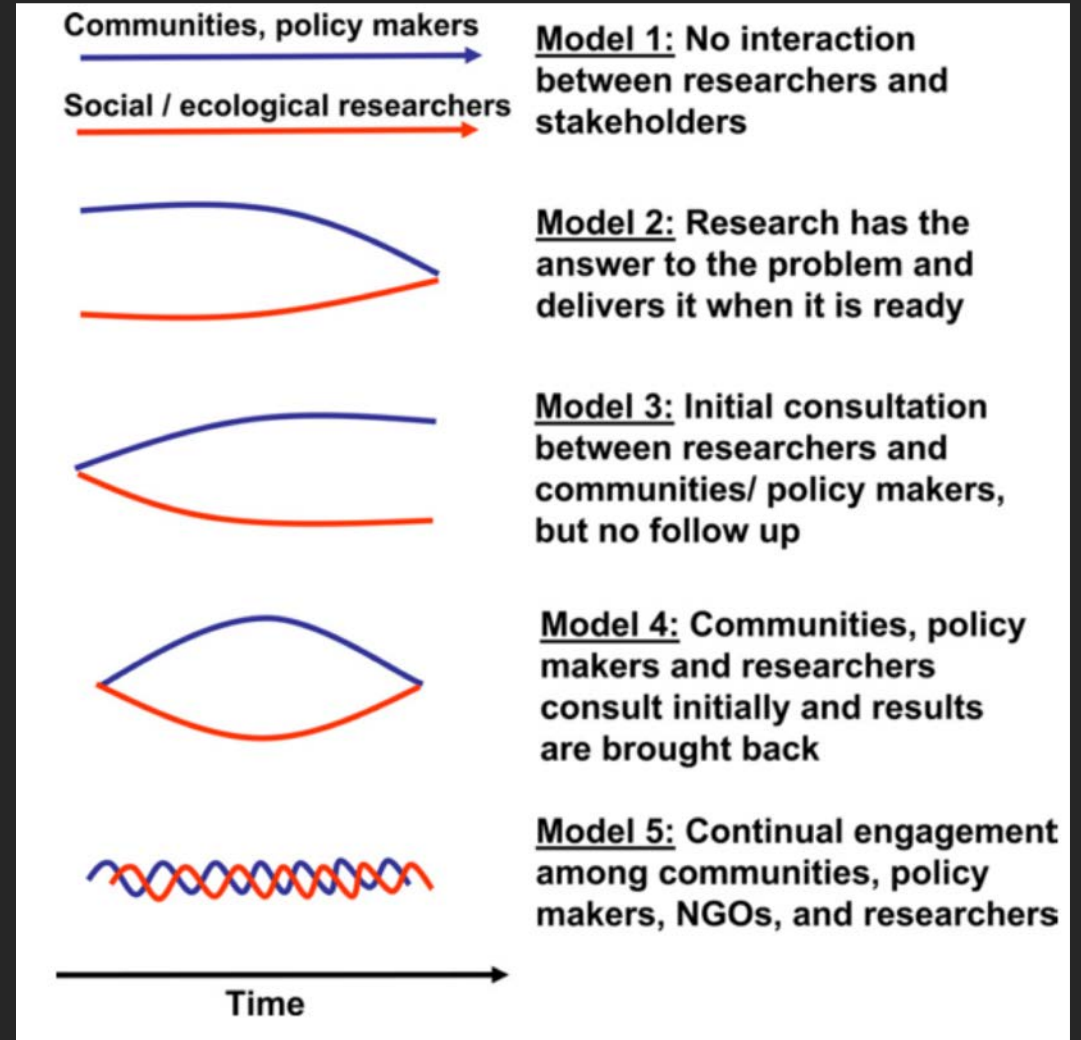
- Loss of cultural mechanisms of management and punishment, tied to increasing formal education and growth of evangelical churches and their rejection of certain cultural practices.
- Although a lot of projects rightly focus on mobility, what about the losses of the osupuko, the highland grazing areas, irasheta, the grass banks? Particularly in semi-arid to arid areas, these are most badly needed during severe droughts.
- Perhaps it is their ability to continue to adapt to maintain resilience to drought that is leading to a race to the bottom?
- Pastoralists are likely to be restricted not by drought, but by restrictions to their drought response mechanisms.

# A final word : ethics of research

Models for linking knowledge with action in pastoral systems (Reid et al. 2009).

Laleenok, eleenore, holding onto knowledge.

"Ore te neyieu I Maasai neidur, nenjasi aareu lewa eleenore, meshomo aaleen enkap napuoi. Ore pee eshukunye, etajoitie are anaa uni nepuonu aalimu eneba nkujit o enkare. Elimu sii eneba ncoorei te nkop nashomo aaleen."



# Thank you



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