

Socio-ecological resilience to soil erosion in East African pastoralist landscapes



Image: Carey Marks

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**UNIVERSITY OF
PLYMOUTH**



Transformative Learning for Sustainable Living

**Schumacher
College**





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through NERC**



Maasai pastoralist communities – northern Tanzania

Image: Carey Marks



Across the landscape pastoralist communities are in transition



Extensive grazing land across the region ... eroding at alarming rate

Image: Carey Marks

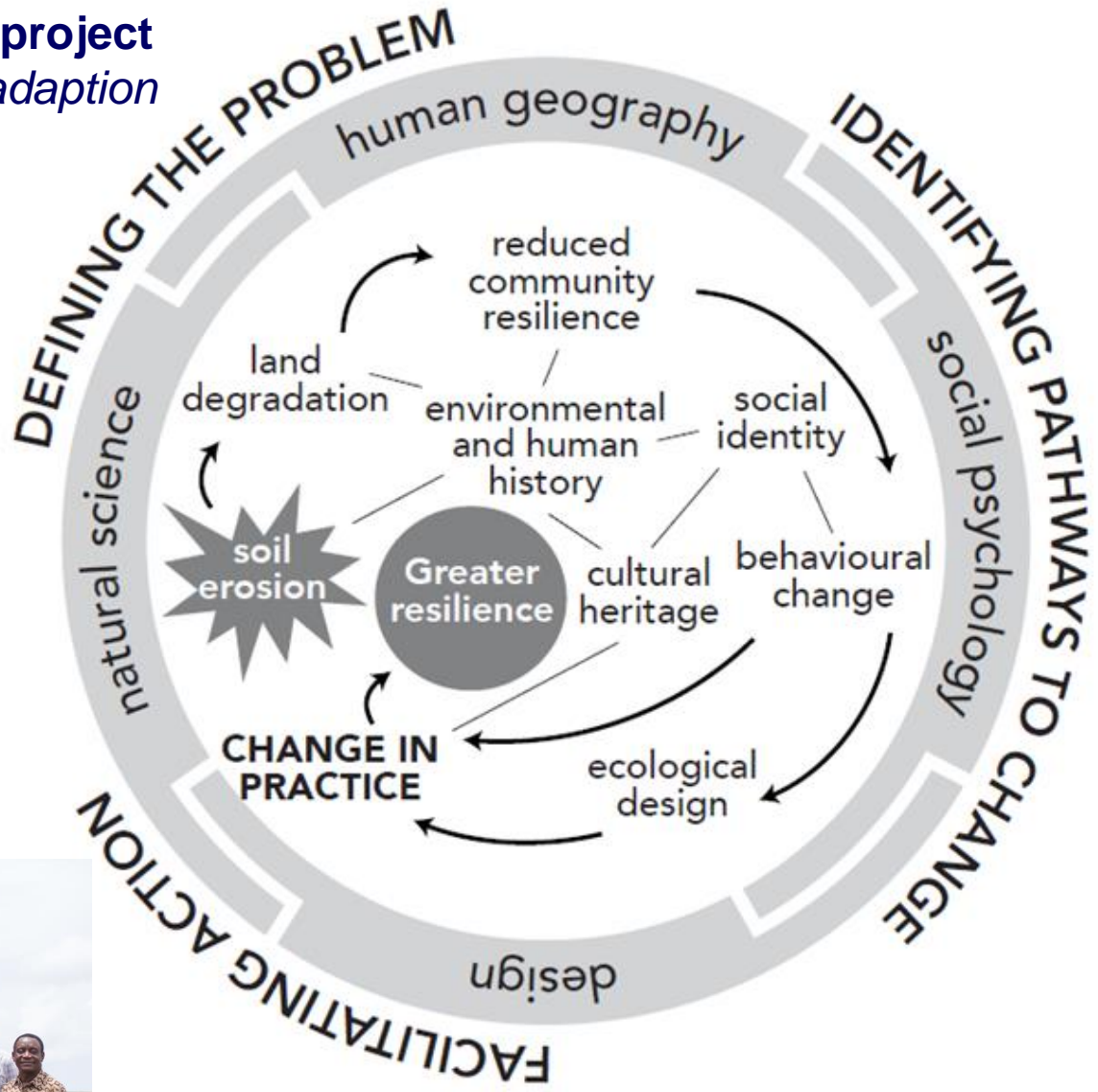


... socio-ecological system at a tipping point?

...soil resource is being washed away also threatening downstream ecosystems and livelihoods



The interdisciplinary *Jali Ardhi* project concept: supporting community adaption to soil erosion challenges

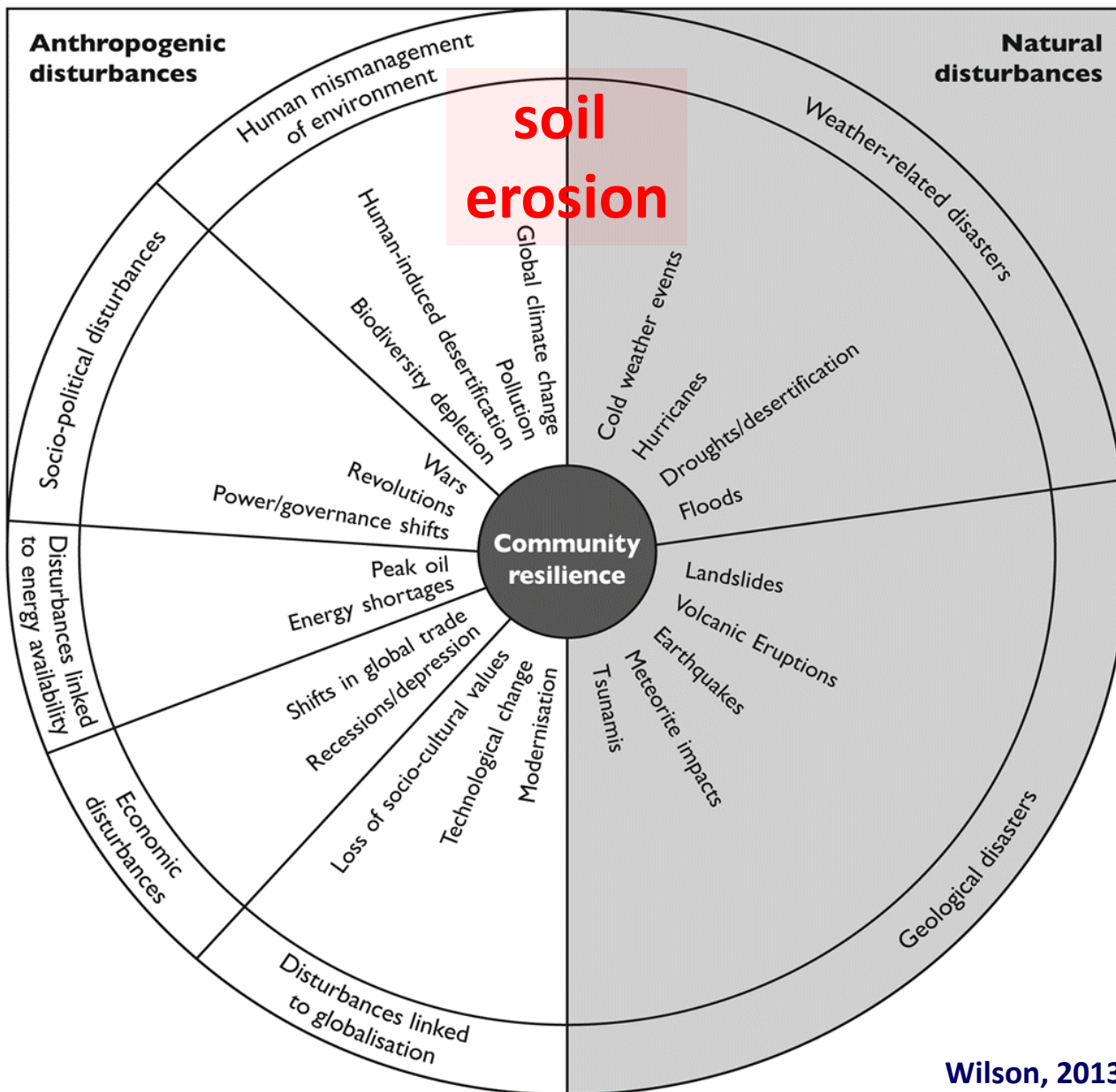


‘Socio-ecological resilience to soil erosion driven by extreme events: past, present and future challenges in East Africa’

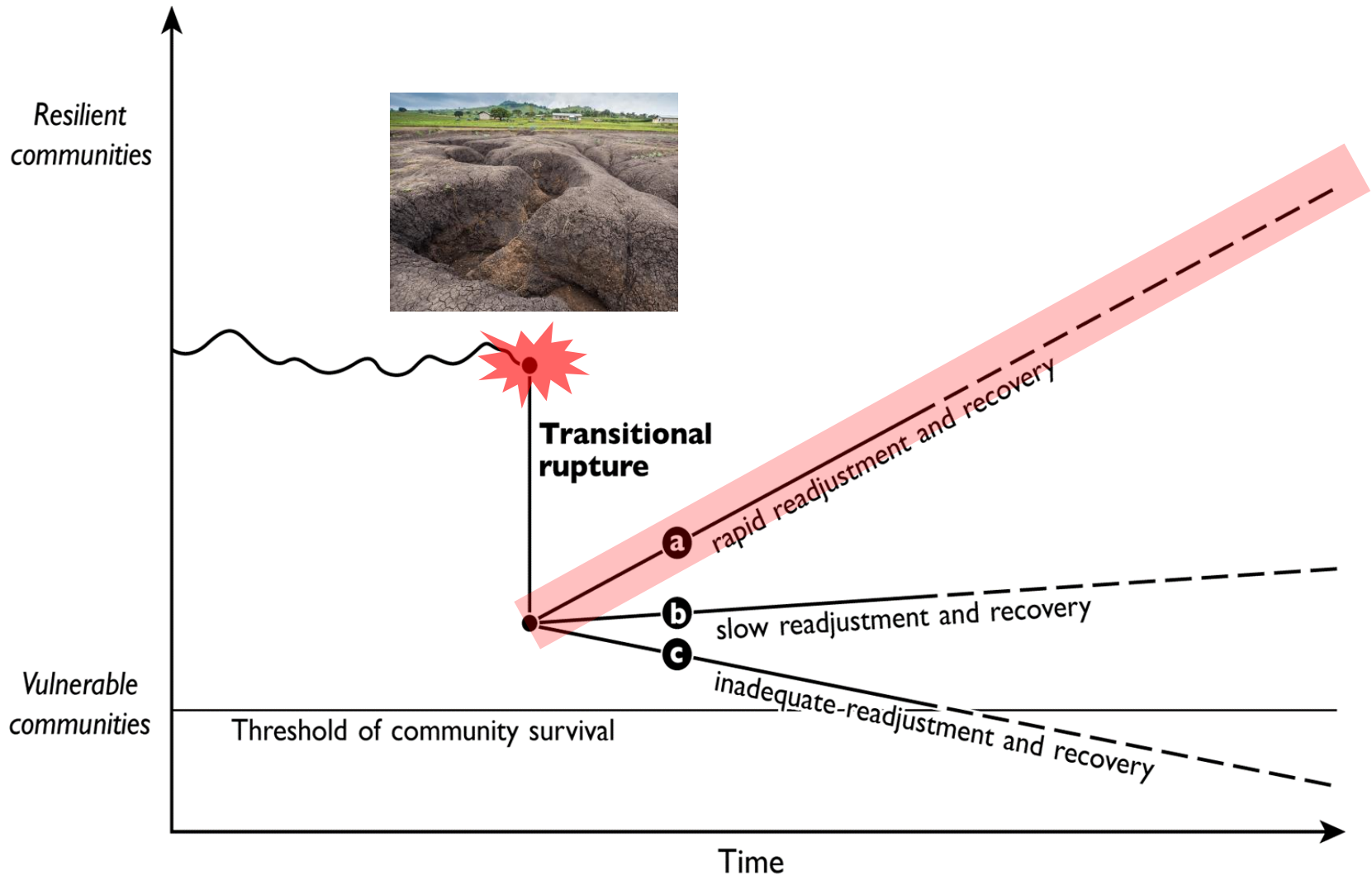
Community resilience and soil erosion

Human factors

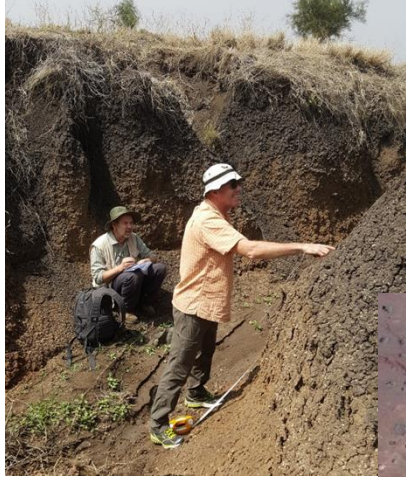
Natural factors



Community response to 'shocks' is complex



Assessing soil vulnerability to erosion past and present



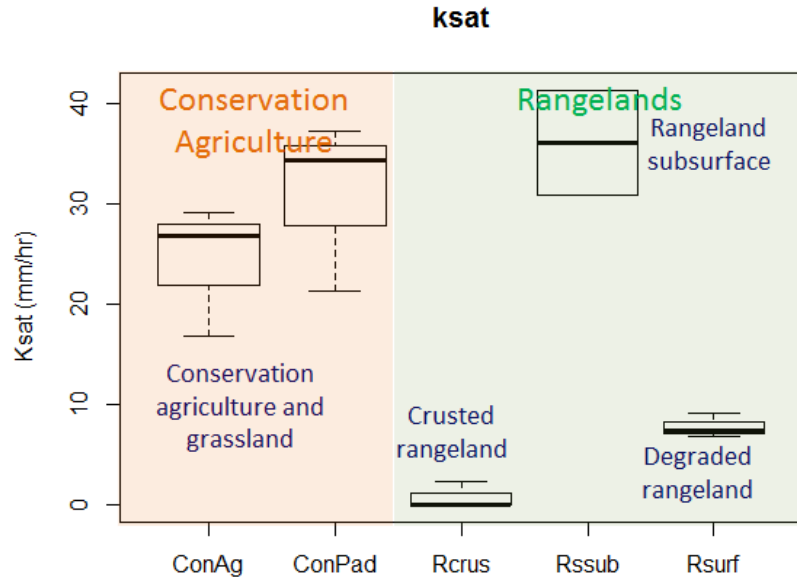
Sedimentary evidence of baselines and rates of change



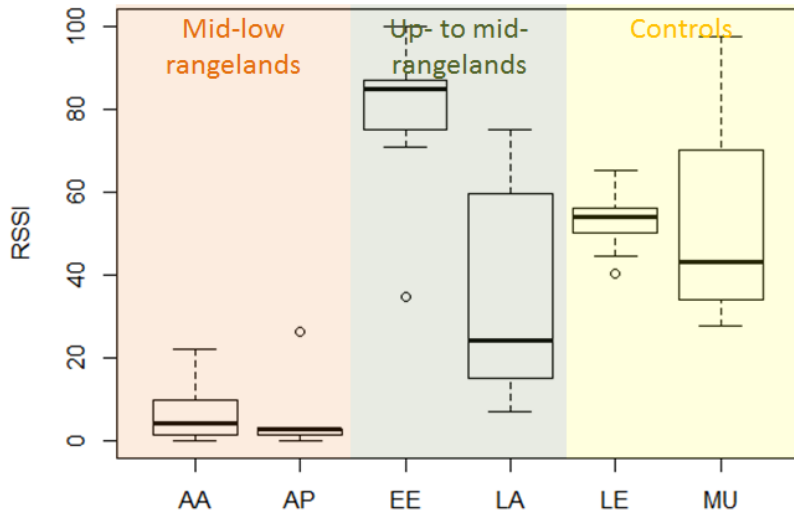
Exploring socio-cultural drivers and challenges



Soil erodibility factors and processes



Relative soil stability index (RSSI)



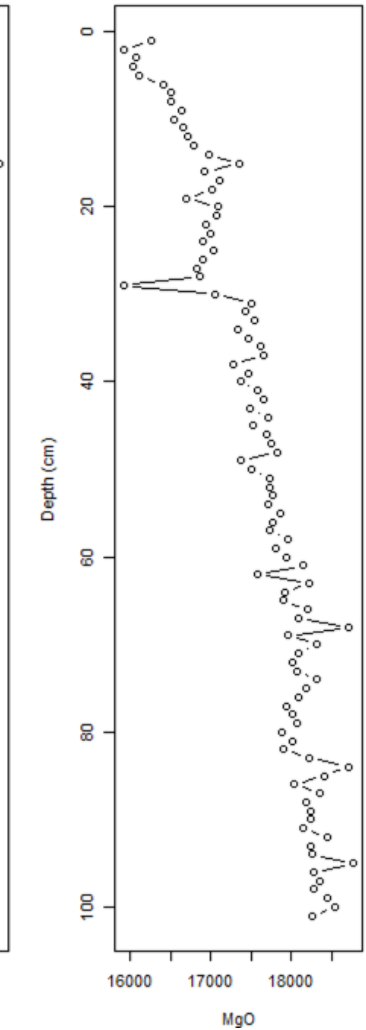
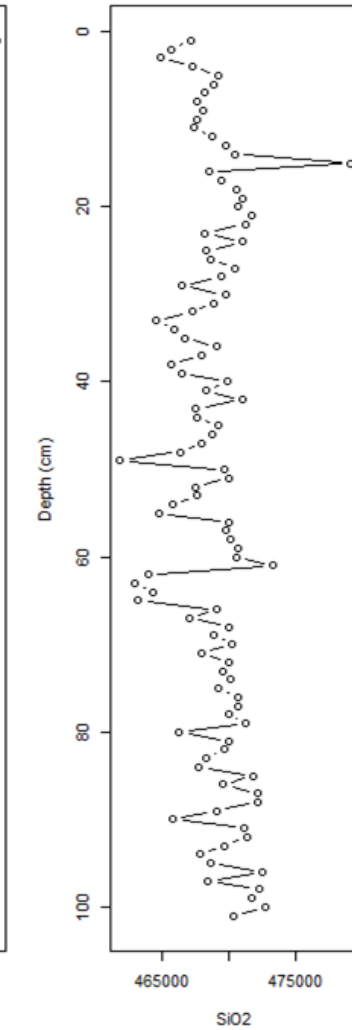
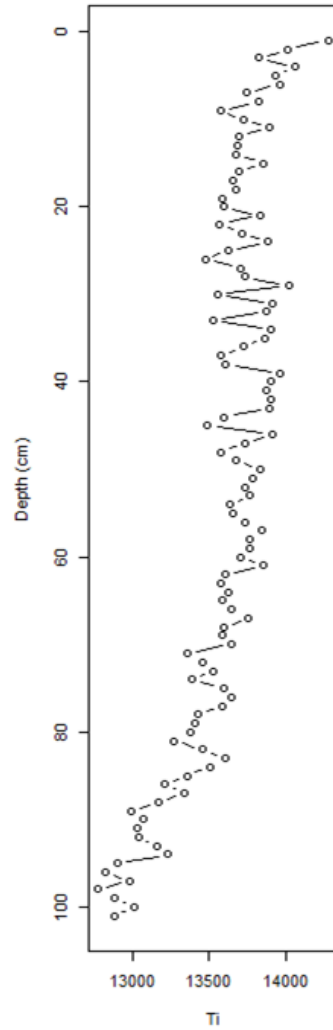
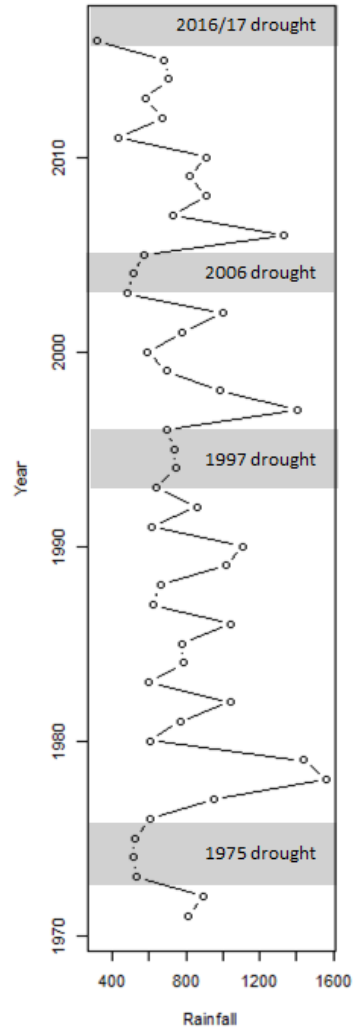
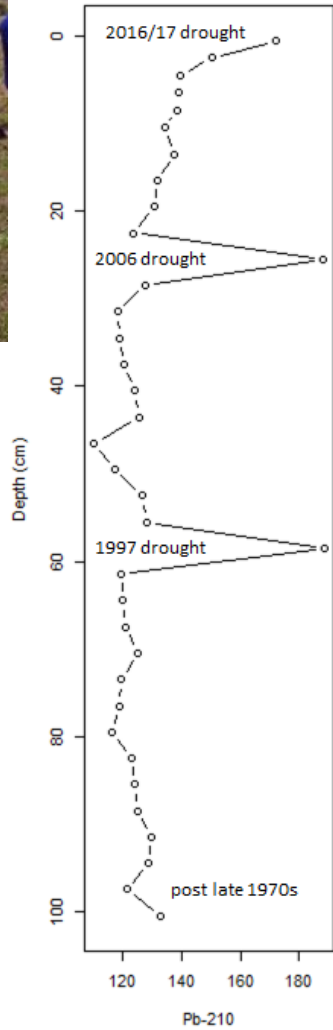
drought -> grazing/clearance -> exposure -> low OM/RSSI -> crusting -> OLF -> incision...

OLF -> convergence -> incision -> connectivity



'Soil erosion in Tanzania: In Pictures' (Guardian online)

Applied environmental diagnostics tools: sedimentary evidence of landscape change





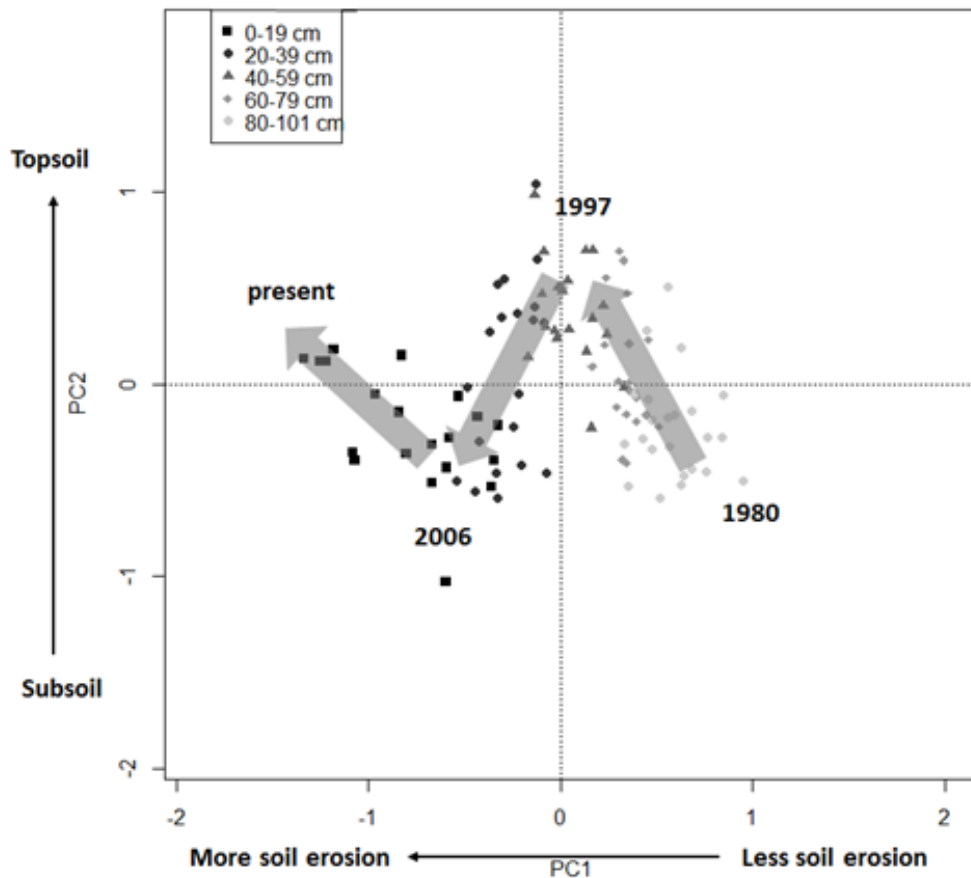
October 2005



January 2013



January 2017



Comparing Local Environmental Knowledge, GE imagery and environmental diagnostics



Soil erosion causes, threats and impacts are becoming clear but adaption strategies are harder to develop and implement...

Image: Carey Marks

Human-environment interactions amplified by climate change and socio-cultural feedbacks



Image: Carey Marks

People are highly aware of the problem, and are concerned about impacts it has on them and future generations

Cultural importance of cattle & cattle as 'savings account'

Who takes responsibility for protecting common land?

Harmony in community is more important than environmental protection

But there are barriers to change...

Perception of high risk in growing crops

Lack of labour/tools for growing

Lack of skills and knowledge to switch to alternative livelihood

Openness to change... but need a catalyst

Education is valued

Learning from others in community

Learning from children

Learning from negative experiences (2016 drought)

Recognition that environment may force change

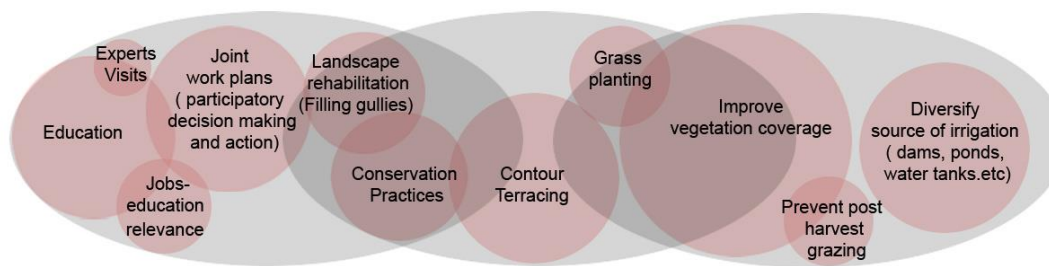
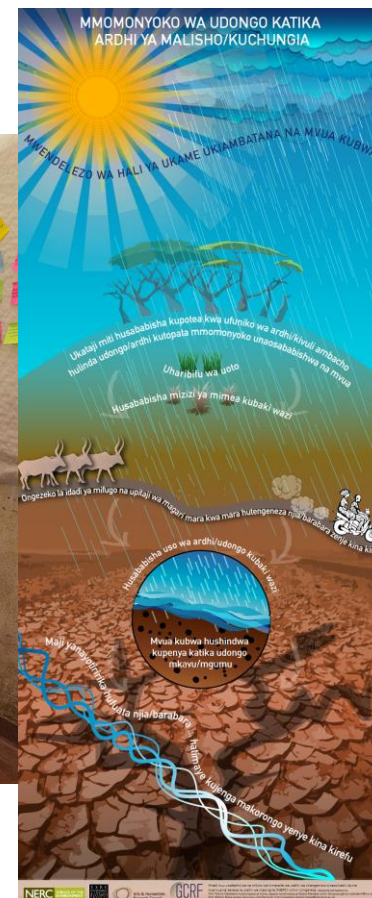
Cohesive communities

Government and NGO schemes

Stakeholder engagement



Exchanging knowledge & co-designing pathways to change through a shared community *vision* for the future

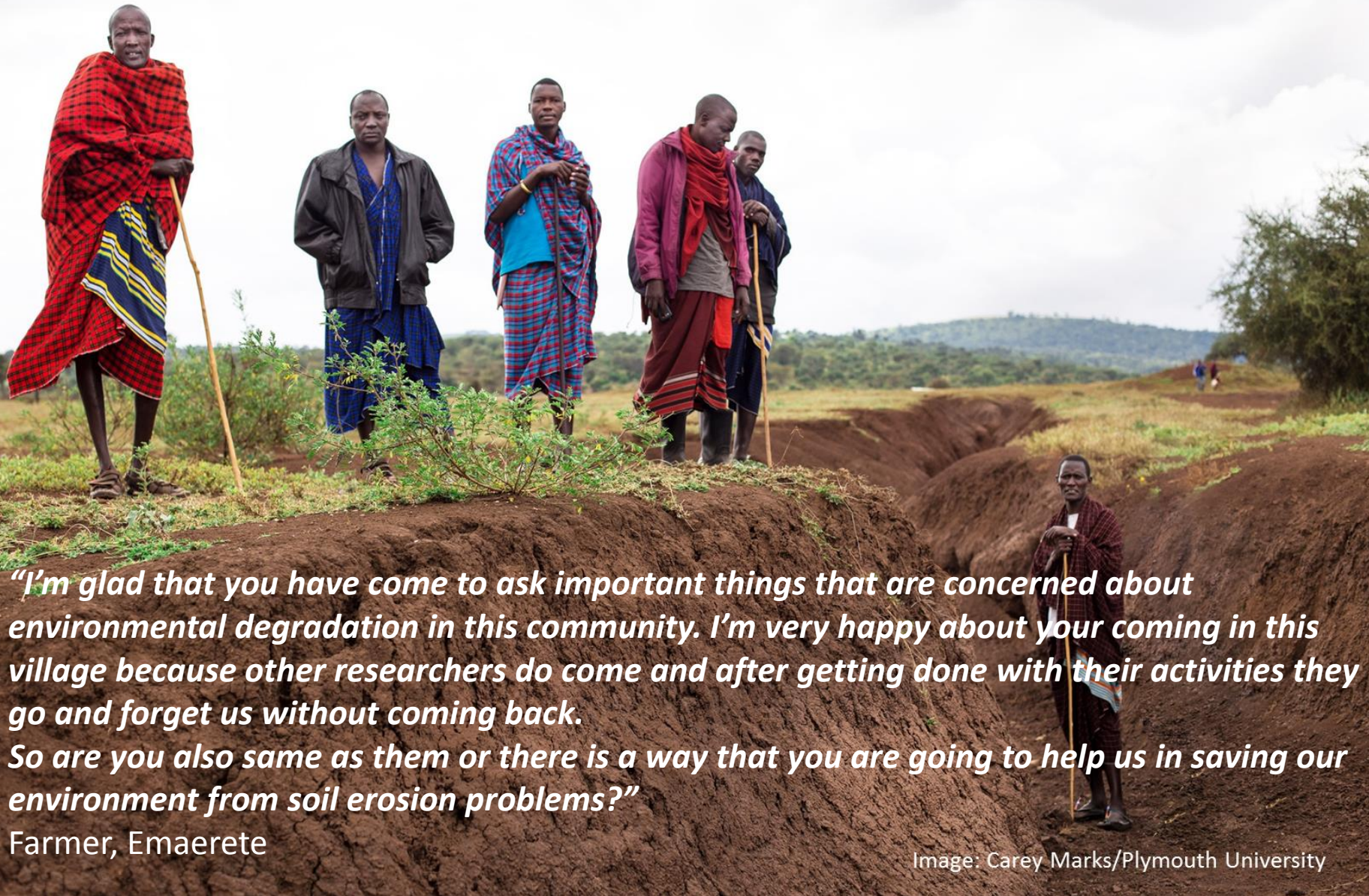


2017

2027

- Time frame (approximity 3 years)
- Activities (scale represents the emphasis)

Next steps...



“I’m glad that you have come to ask important things that are concerned about environmental degradation in this community. I’m very happy about your coming in this village because other researchers do come and after getting done with their activities they go and forget us without coming back. So are you also same as them or there is a way that you are going to help us in saving our environment from soil erosion problems?”

Farmer, Emaerete

Image: Carey Marks/Plymouth University