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# Participatory mapping of ecosystem services and livelihood impacts in agricultural landscapes

African Ecosystem Services Partnership Conference:  
*Ecosystem Services for SDGs in Africa*

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# Outline

- Agroecosystem context and landscape
- Participatory mapping approach
- Ecosystem service changes and implications
- Land access and soil status
- Diverse perceptions and impacts
- Conclusions





# Agroecosystem Context

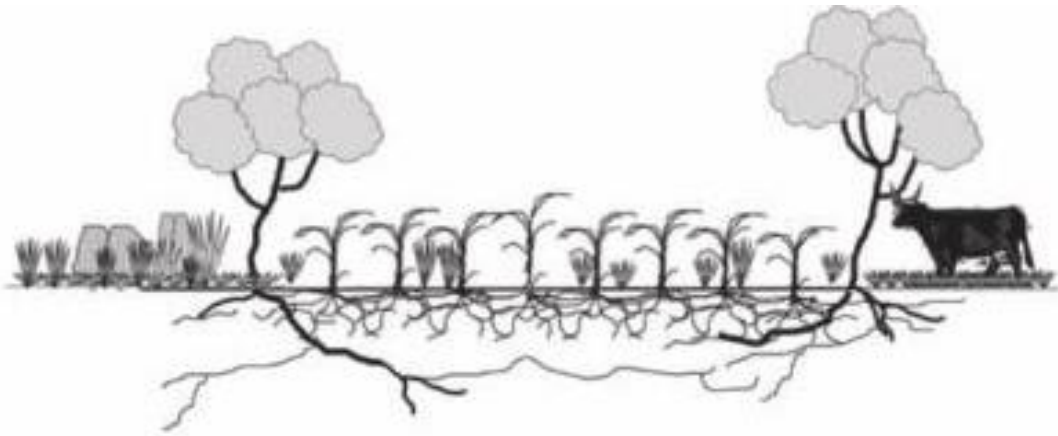
- Small-holder farmers in Sub-Saharan Africa face various interconnected ecosystem degradation challenges:
  - soil erosion, loss of soil fertility, deforestation, decreasing water availability
- This negatively impacts their food security and livelihoods
- Participatory mapping allows for farmers to assess the condition of ecosystem services and impacts on their livelihoods
- Mapping exercise facilitates farmers to explore opportunities to address these challenges



# Agricultural Landscape

How is land use in the broader landscape impacting farmers' livelihoods?

Farmers field



Agricultural landscape



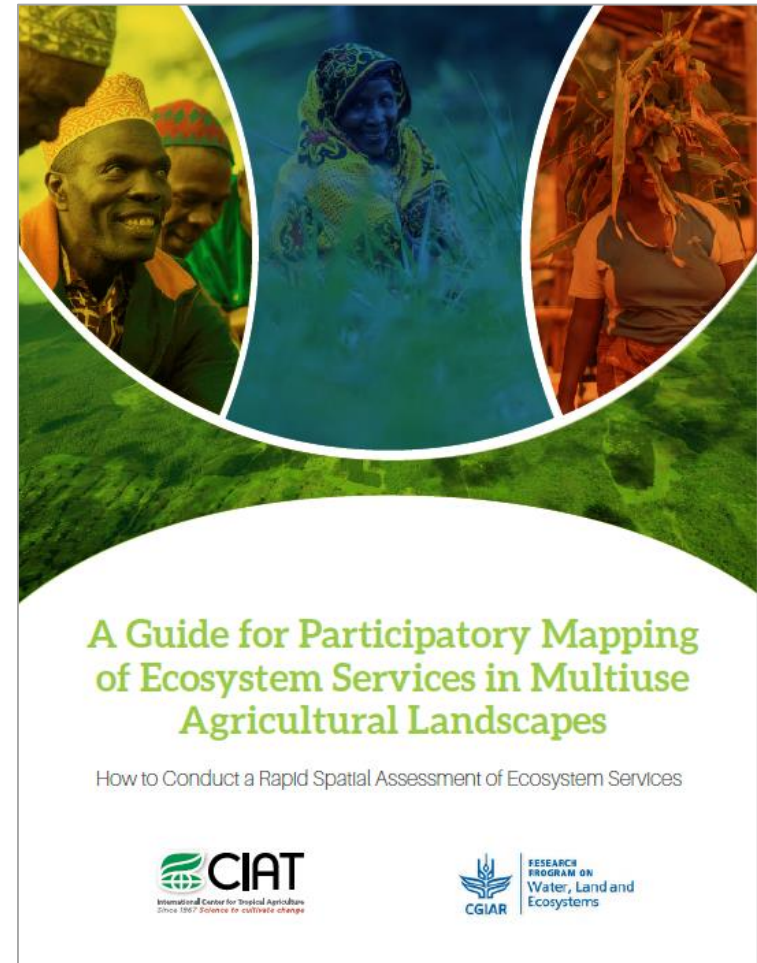
How does management and use of the broader landscape affect ecosystem services that impact farmers' livelihoods?  
e.g. water quantity, erosion



# Participatory mapping of ecosystem services in multiuse agricultural landscapes

- Adapted ecosystem service assessment tools and mapping methods
- Targeted at multiuse agricultural landscapes
- Uses a participatory approach to rapidly assess changes in ecosystem services
- Assesses the impact of these changes on livelihoods

<https://cgspace.cgiar.org/handle/10568/77762>





# Participatory mapping of ecosystem services

## APPROACH

Rapid spatial assessment of the condition and trends in ecosystem service provision across landscapes

## METHODS

High resolution imagery, farming communities map and explain changes in ecosystem service provision

Can feed into scenario development, targeting, development and landscape planning



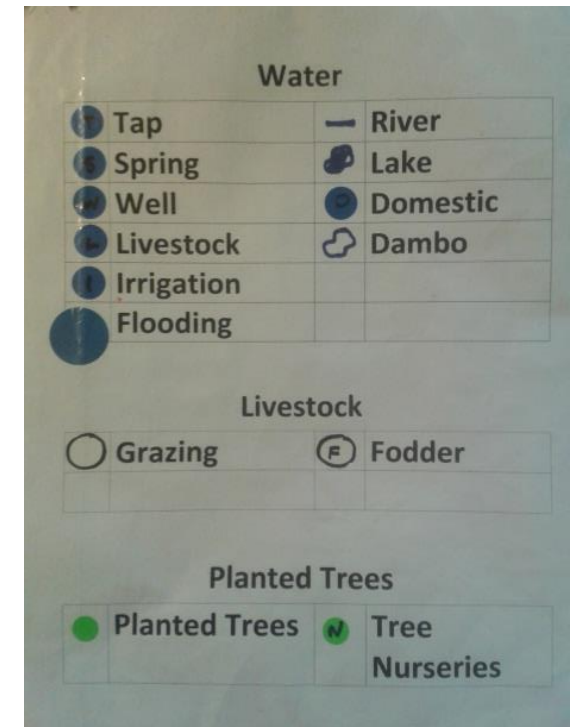
# The steps

- *Community groups of men, women and youth*
- *High resolution maps from Google Earth Pro*



## Questions

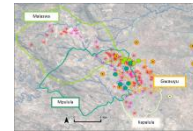
- Where is this resource?
- Have there been any changes in the resource?
- What do you think is driving these changes?
- How do these changes affect your lives?
- How often are you accessing this resource?
- Who has access to this resource - are there any restrictions?



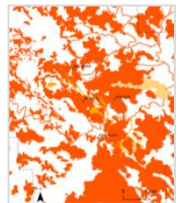
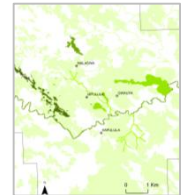
# What information can these maps generate?

Ecosystem services used across the landscape - summarized across villages for each county

County	Water	Soil	Food	Energy	Climate	Biodiversity
...	...	...	...	...	...	...



Compound form	Water	Soil	Food	Energy	Climate	Biodiversity
...	...	...	...	...	...	...

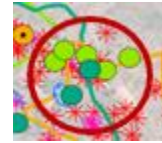


Ecosystem service assessment

Demonstrate patterns for further investigation

Maps of ecosystem service provision

Hotspots of ecosystem service decline



Areas where conflicts arise over different resources



Differences in land use between men, women and youth



Ecosystem services used across the landscape - summarised across villages for each country		Tanzania					Malawi				
		Cultivated areas	Forests	Grasslands (few)	River valleys	Rivers (and banks)	Cultivated areas	Forests	Grasslands (few)	Dambos	Rivers (and banks)
Ecosystem services											
Provisioning	Crop production <i>Soil fertility (nutrient regulation)</i>	↓			→		↓			↑	
	Livestock production	↓	↓	↓			↓	↓	↓	↓	↓
	Wild vegetables and fruit (mushrooms, wild fruit, wild vegetables)	↓	↓				↓	↓			
	Water quantity and quality (Domestic, irrigation, livestock)					↓		→		↓	↓
	Bushmeat, fish					↓		↓			↓
	Fuelwood	↑	↓				→	↓			
	Charcoal							↑			
	Timber/poles	↑	↓				→	↓			
	Fodder	↑		↓				↓		↓	↓
	Thatch							↓	↓	↓	↓
Materials for weaving							↓		↓	↓	
Regulating	<i>Climate regulation</i>		↓					↓			
	<i>Erosion regulation</i>		↓					↓		↓	
	<i>Flood control</i>		↓					↓		↓	
Cultural	Tourism		→								
	Spiritual and religious		↓					↓			→
	Sand mining										↑
	Clay for pots						↓	↓			
	Bricks for houses						↓				
	Quarry for stones	→						→			

Shows the various ways communities use different areas in their landscape

The arrows show whether an ecosystem service was declining, increasing or had not changed over time

The green boxes show those resources that people use to generate income

These include multiple off-farm sources

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	Fodder	↑		↓				↓		↓	↓
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	Quarry for stones	→						→			

The red boxes show the resources that community members now have to buy because their natural supply is dwindling.

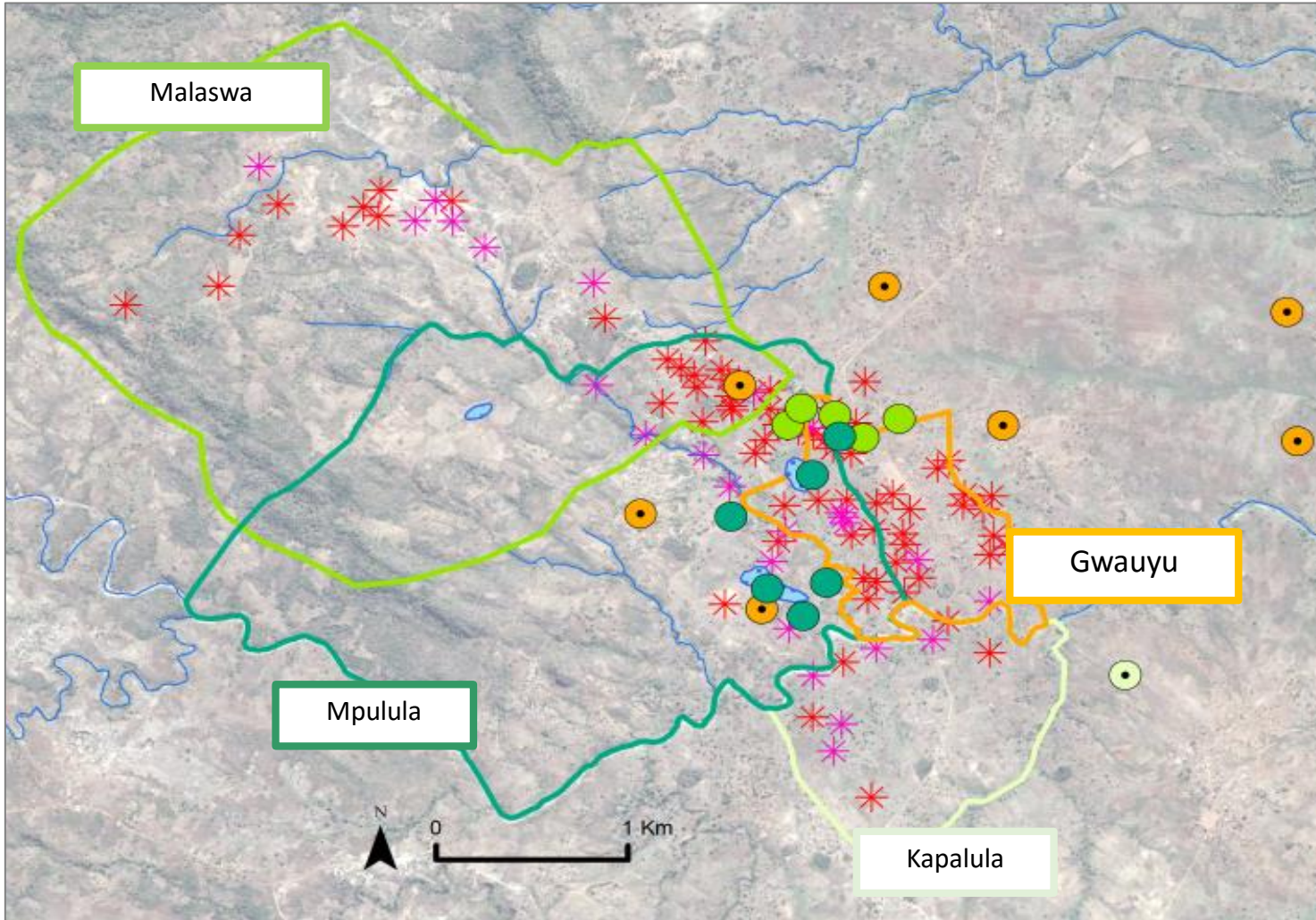
People are spending money on resources they used to access for free

There is less money available for investing in on-farm management.



# Mapping land access and soil status

## Four villages - different resources available to each

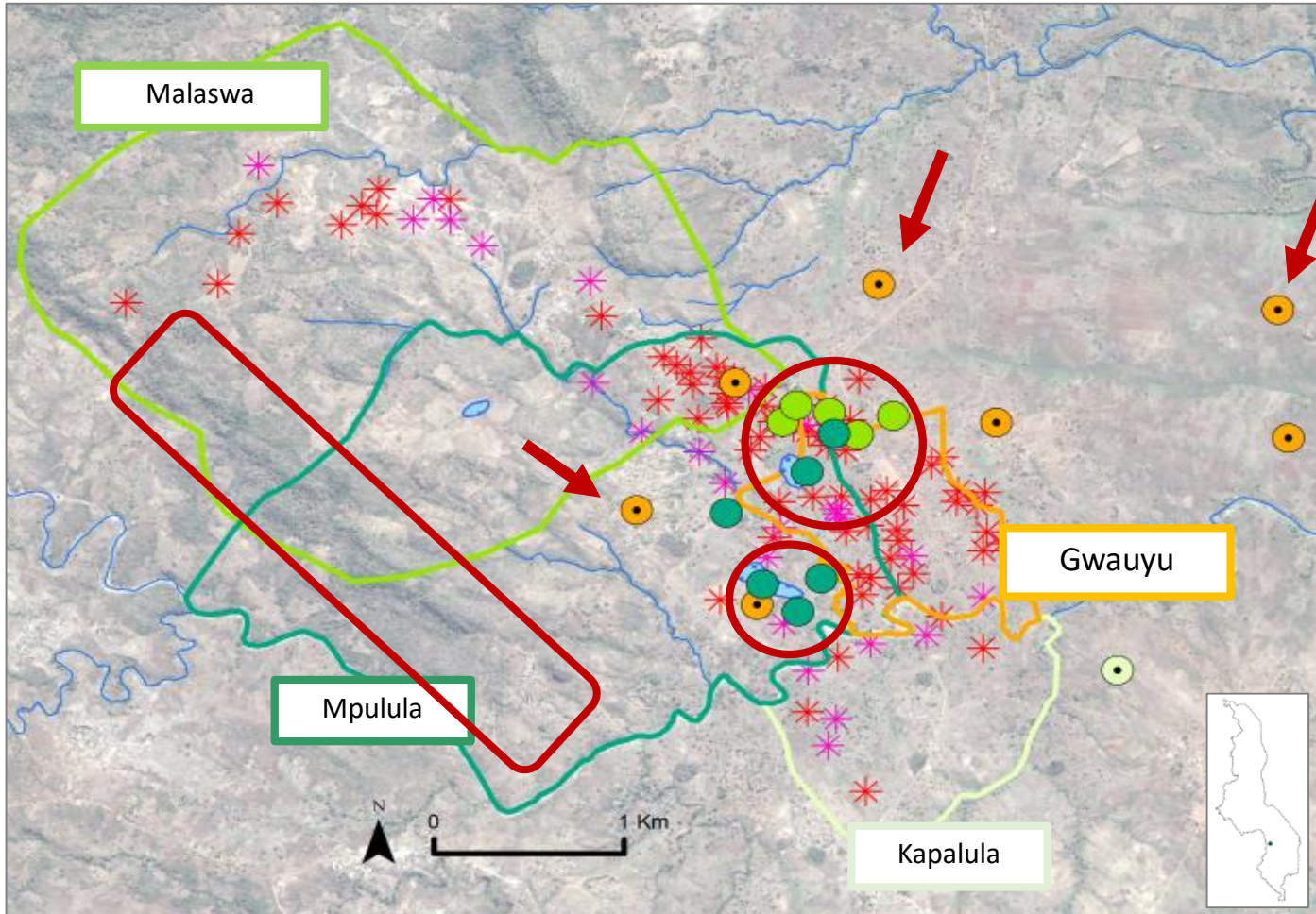


### Legend

- Mpulula renting out
- Malaswa renting out
- Kapalula renting from
- Gwauyu renting from
- \* Soil erosion hotspots
- \* Termite hotspots
- Waterlogged soil



# Land access and soil status implications



**Gwauyu** does not have enough land so farmers have to rent from surrounding villages

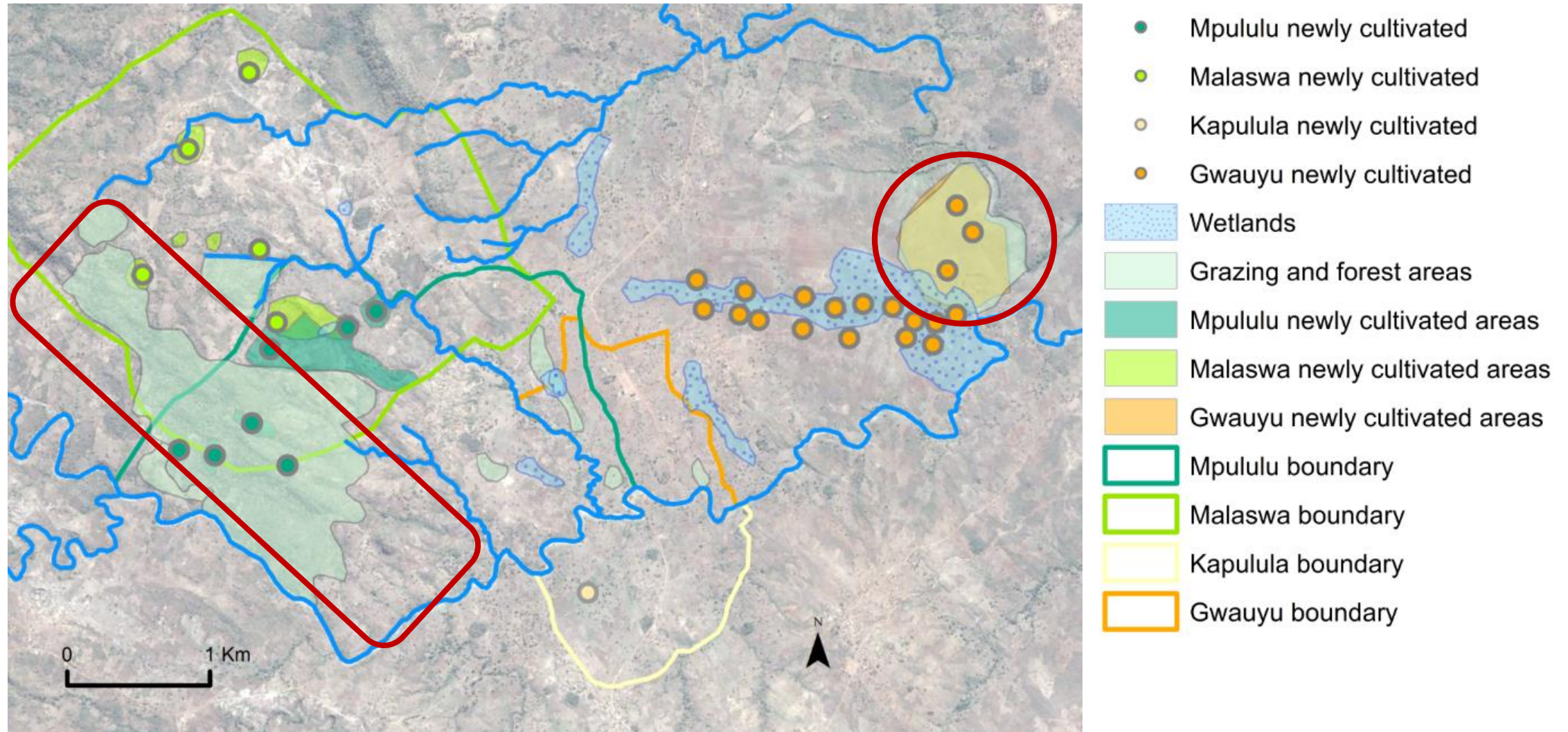
Land leased out by villagers in **Malaswa** and **Mpulula** villages is often waterlogged, eroded or infested with termites

**Malaswa** and **Mpulula** villages have new land available for cultivation in the forest

**Even within a 4 km<sup>2</sup> landscape communities have different challenges to investing in soil management**



# Newly cultivated areas overlap grazing and forest areas



Areas at risk from over use that need to be managed to ensure that communities continue to benefit from the goods and services from uncultivated areas

# Diverse perceptions and impacts

Mapping with different groups (men, women and youth) illuminates differences in importance, access and perceptions of change of resources



In Tanzania, women said that dry season scarcity of water meant they could spend an extra 2-3 hours a day fetching water.

These women are unable carry out their daily activities normally in the dry season



In Malawi, the youth identified new plots along the river and wetland while the older men and women said there were no newly cultivated areas

The youth are under pressure to find scarce farmland and may need targeted land management or livelihood alternatives to conserve forest and wetland areas



# Conclusions

- This approach identifies **who has a stake** in any changes in land management
- These changes will impact users' **access to resources** or require **adoption** of certain natural resource management practices
- Need solutions that are **locally relevant** and likely to be accepted by local communities
- Identify areas where **investment may be necessary** to enhance ecosystem service benefits and sustained improvement in livelihoods



Malawi (Photo: J. Braslow)



# Thank you, Asante, Zikomo



Malawi (Photo: J. Braslow)

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