

Virtual Event

Adapting yet not Adopting? Conservation Agriculture in Central Malawi

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MALAWI

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#IFPRIMalawiLive

Adapting yet not adopting Conservation agriculture (and herbicides) in Central Malawi

Tristin Bouwman, Jens A. Andersson, Ken Giller



Background

Calls for Sustainable agriculture

Food security

Soil degradation

Climate change adaptation

Agricultural transformation

Conservation Agriculture (CA) = sustainable

less work /fuel

earlier planting

less erosion

carbon sequestration (CC mitigation)

better & stable yields (CC adaptation)

CA in Sub-S Africa

Uptake (s)low

Contested

Results are variable



Study site

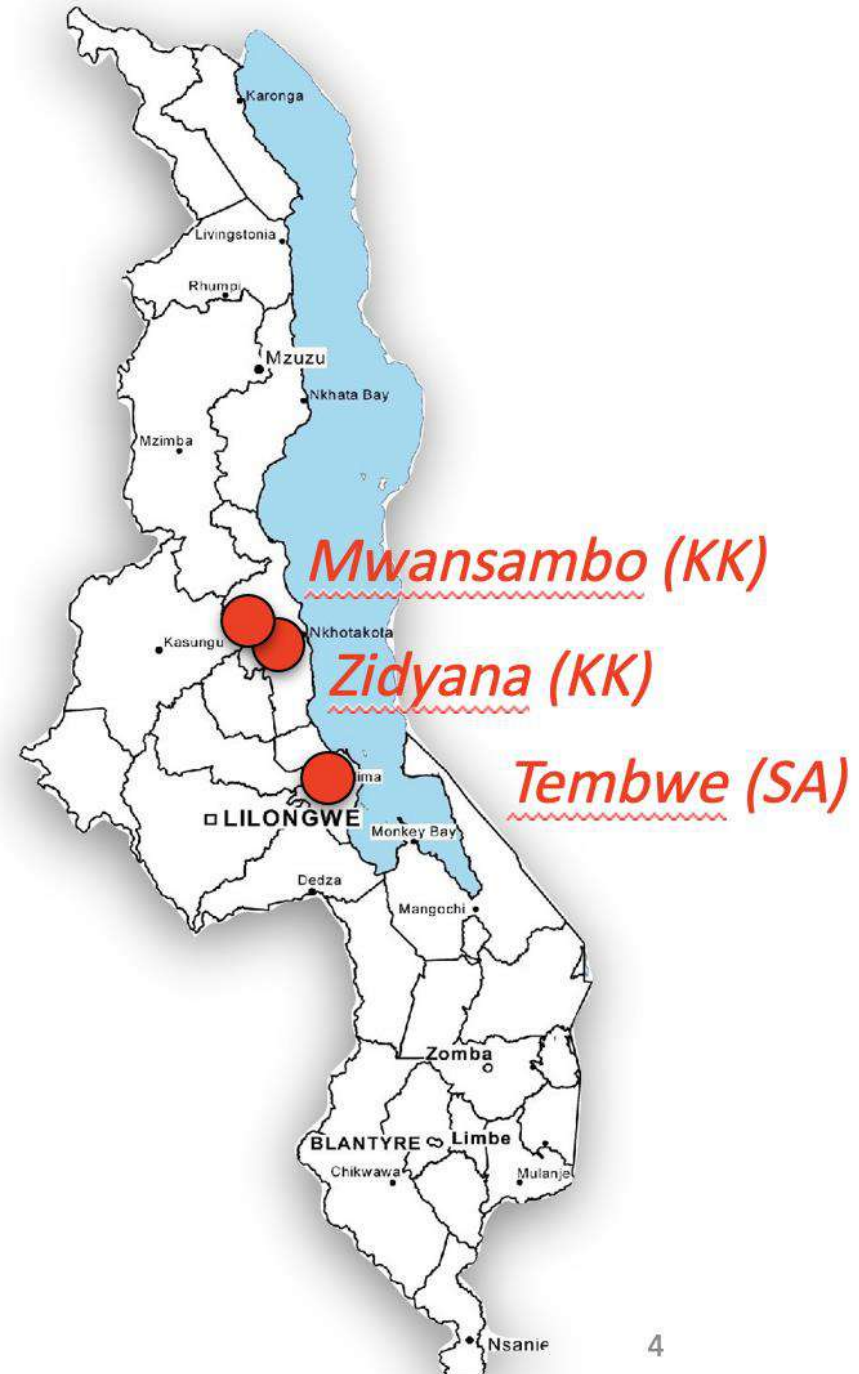
Lakeshore Central Malawi

Why Malawi?

- Limited crop residue competition
- Labor savings compared to ridging
- Long promotion history (since 1990s)
- CIMMYT/TLC

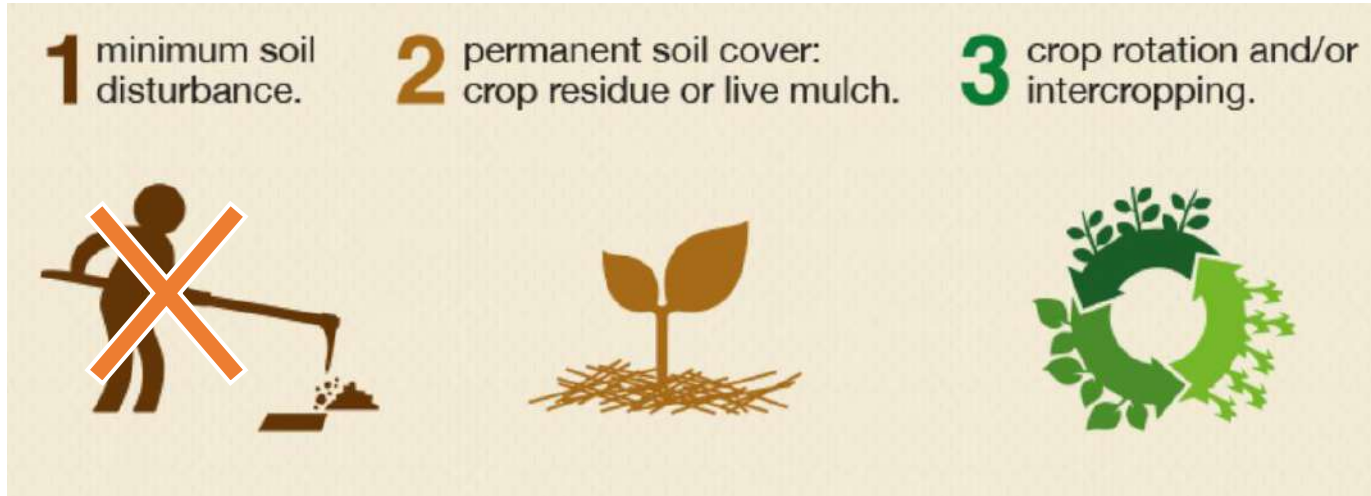
Field research in 2016

- Nkhotakota
- Salima



A review of CA

Conservation Ag



Ridge furrow cultivation



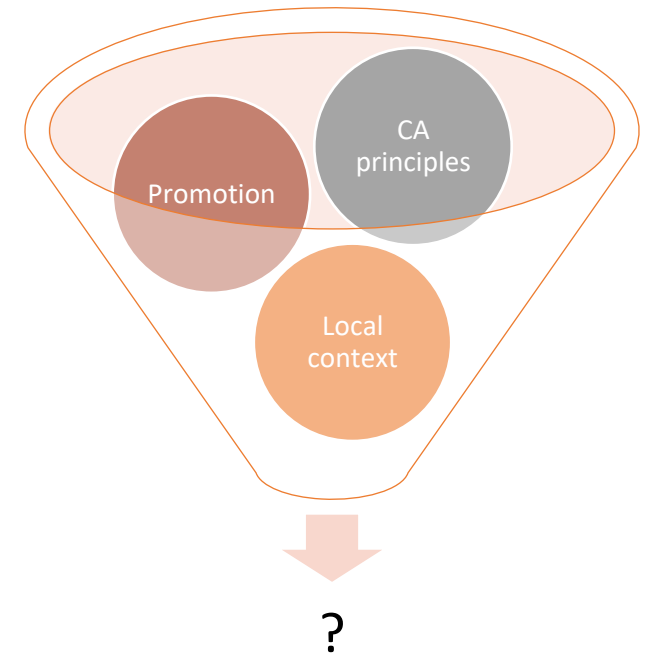
Split ridges annually
Loosen soil
Incorporate residues



Ridges trap rainfall,
prevent erosion



Maize dominant,
Some rotation/
intercropping



What did we do?



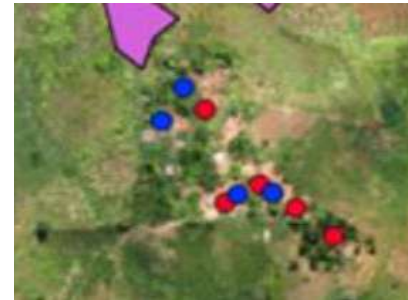
Satellite images

Identified high CA uptake areas



Conversations with staff and farmers

- 2 different types of CA.
- herbicides (promoted with CA), could be problematic.



Selected households

- 3-year CA practicing
- Neighbours

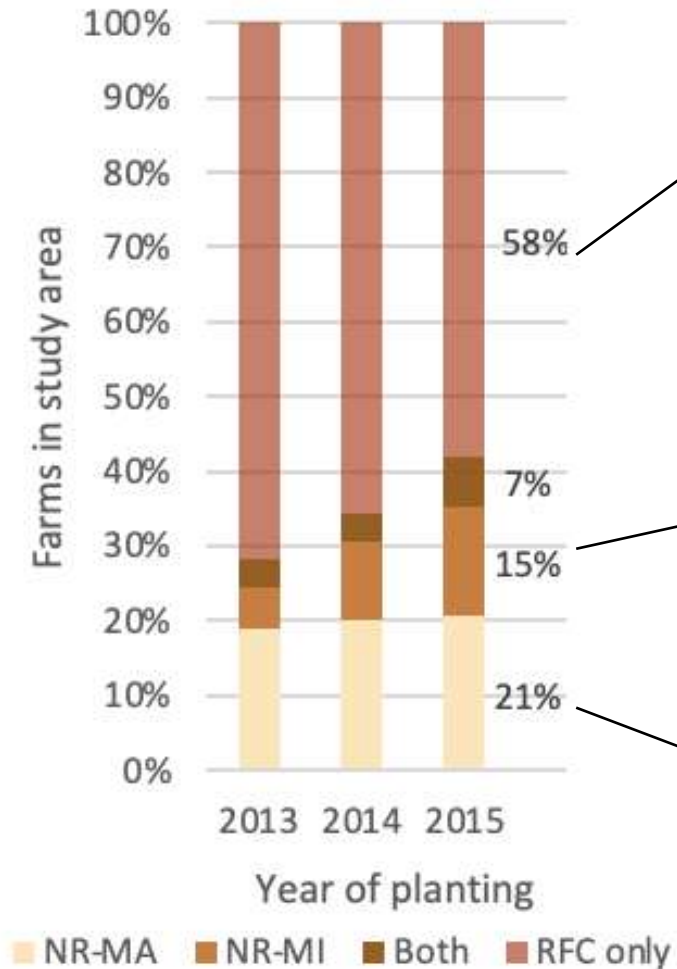


275 Household survey

- 1) How was CA being **practiced**?
- 2) Did the practices fit with the **definitions** of CA?
- 3) Were expected **benefits** achieved?
- 4) Were **herbicides** causing problems?

We found 2 types of 'CA'

Uptake of Not-Ridged (NR) farming



0) Ridge Furrow Cultivation (RFC)

- colonially imposed
- soil conservation
- loose soil for water infiltration



1) Not ridged, Mulch in situ (NR-MI)

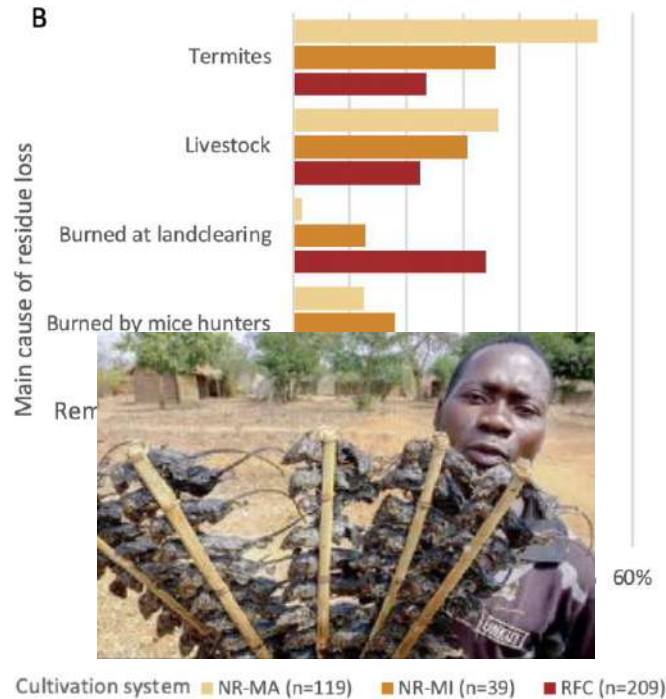
- Planting directly into undisturbed soils



2) Not ridged, Mulch added (NR-MA)

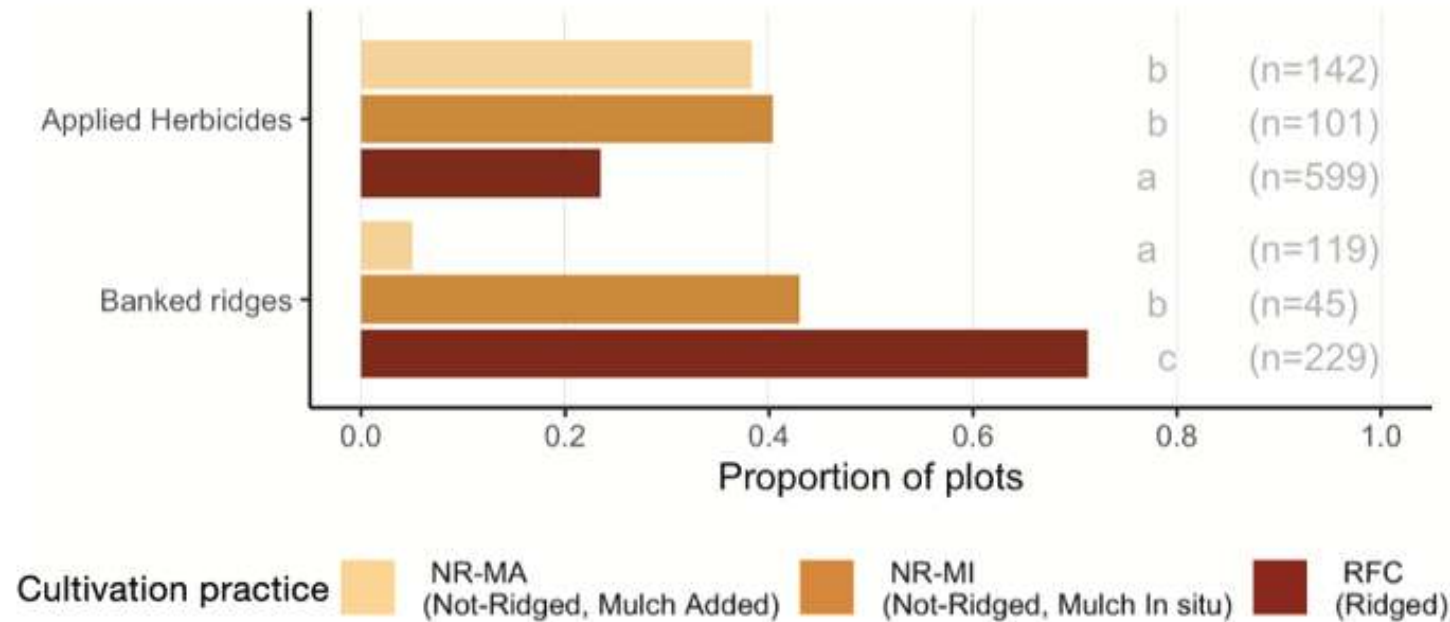
- Bring maize stalks to field
- plant into thick mulch layers

1) Not-ridging with *mulch in situ* (NR-MI)



Bare plots

- Most plots lost most residues
- 60% of plots had no ground cover at planting
- Losses often unavoidable

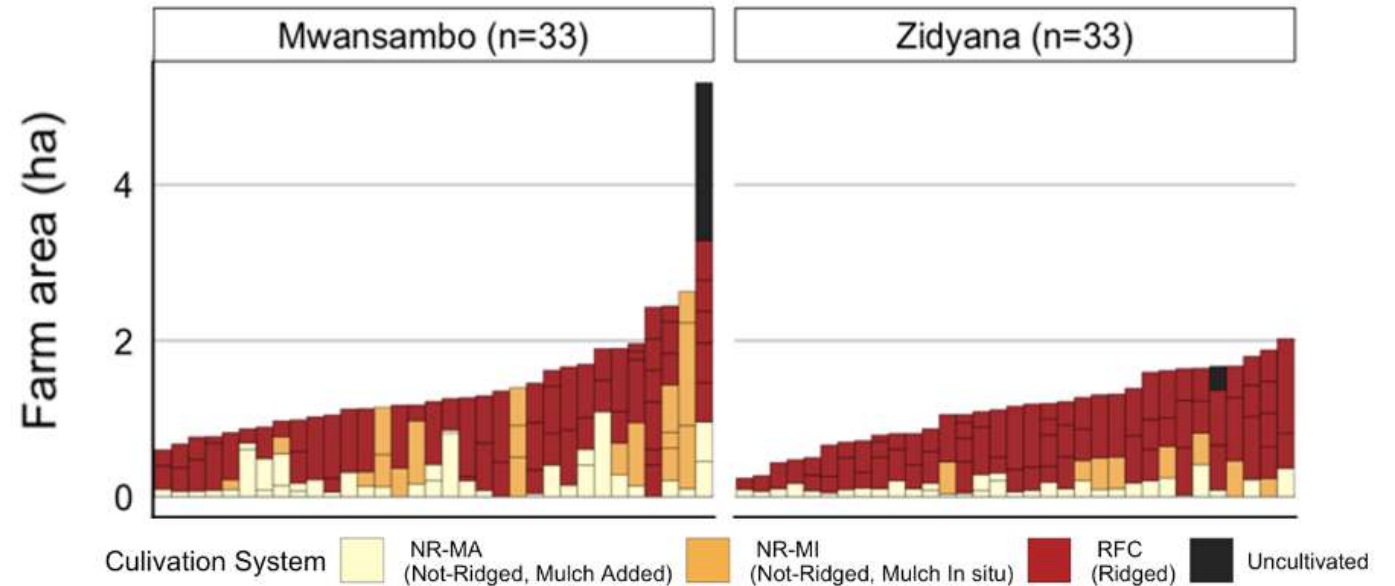


Weed problems

2/3 farmers said it results in too many weeds

2) Not ridging and mulch (NR-MA)

- Thick layers
 - Often 100% ground cover
 - CA usually defined as 30% ground cover
- Purpose
 - Erosion prevention
 - Moisture retention
 - Soil organic matter
 - Weed suppression
 - Better yields
- Higher inputs
- Tied to promotion
- **Scalable? (1/8th of farm area)**



Initially NR-MI promoted (1996-~2005)

Shift back to NR-MI to facilitate scaling (2015-16)

2005

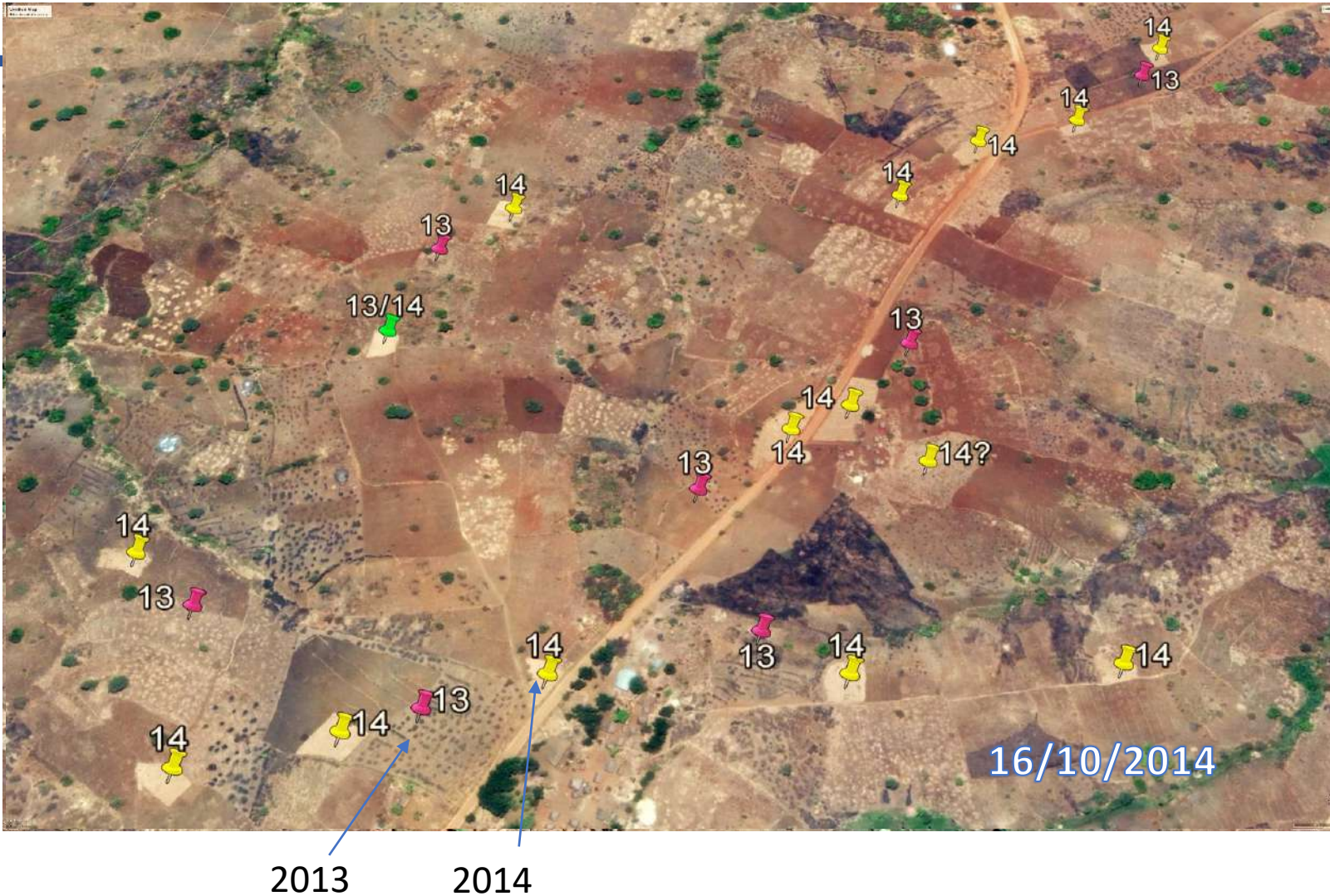
1996

2015

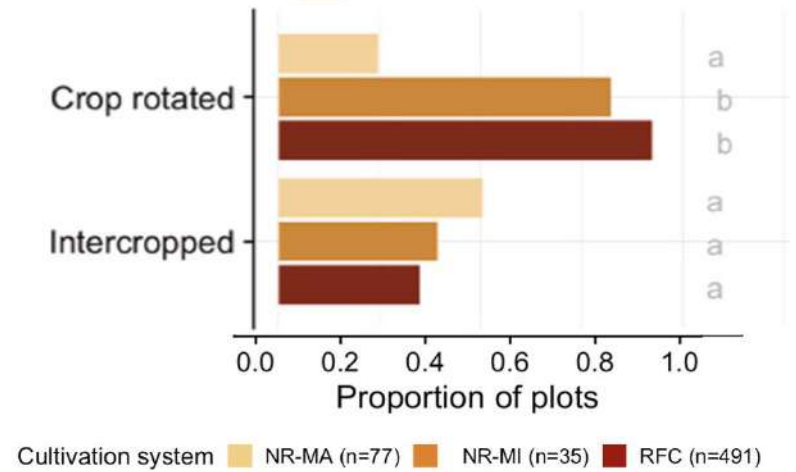
Mulching (NR-MA) incentivized with input support (2005-~2014)



Tillage rotation, not crop rotation



'3-5 before yield benefits can be noticed'



The expected benefits?

- **Labour**

- More person hours for NR-MA than RFC
- NR-MI less but weed issues.

- **Yields**

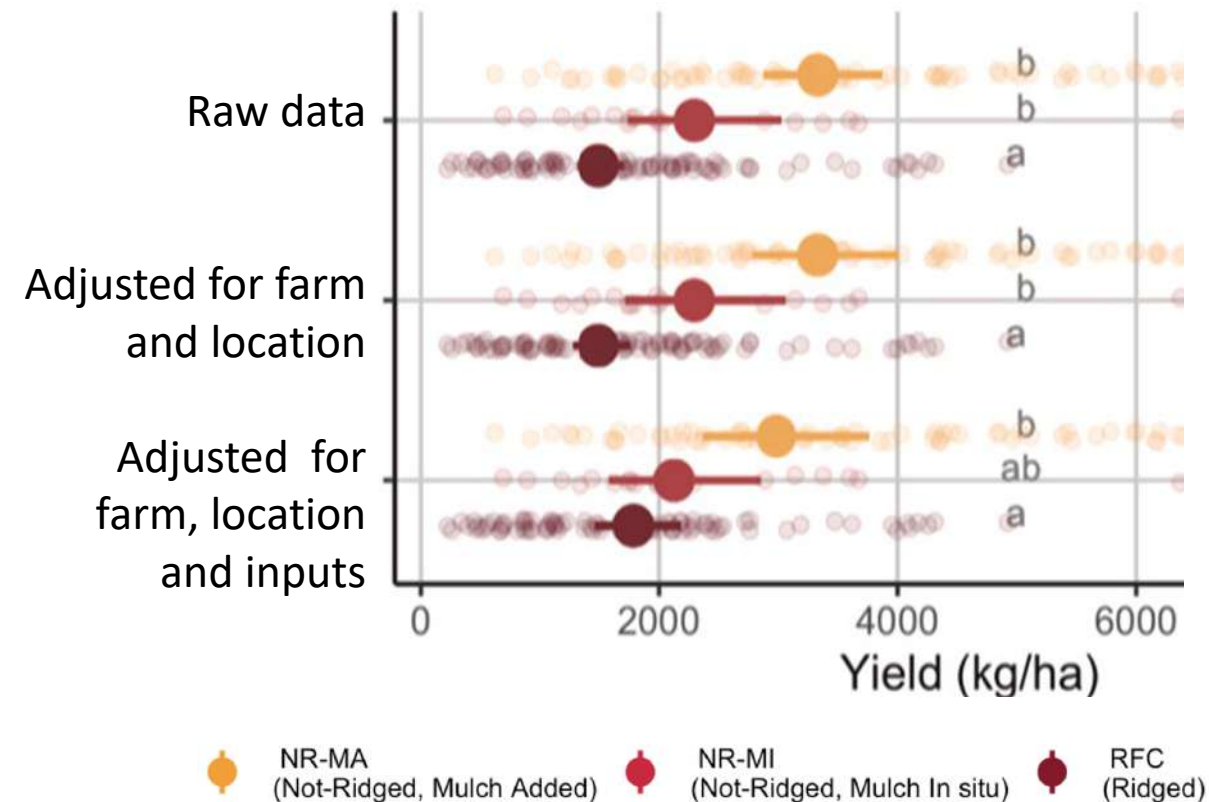
- NR had higher yields and higher inputs
- NR-MI yields no higher after accounting for inputs
- NR-MA improved yields, but is not scalable

- **Soil carbon**

- Moving residues unlikely to have large impacts
- Measured in other studies and are not meaningful increases.

- **Erosion**

- Ridging is a soil conservation method
- No good evidence that not-ridging halts erosion more than ridging.
- Bare soils increase erosion



Adapted, not adopted



- Principle 1: Continuous no-tillage
 - 6/10 hectares not-ridged in 2014 were ridged again in 2015.
 - Crop rotation (maize focused)
 - Pest build up
 - 4/10 NR-MI plots were tilled in-season
 - Due to weeds



- Principle 2: Ground cover
 - 6/10 NR-MI hectares missing ground cover
 - Lack of biomass
 - Inevitable losses in long dry season



- Principle 3: crop diversity
 - Crop rotation decreased with NR adoption
 - Groundnut harvest is easier on loose, uncovered soils
 - Cotton residues must be burned
 - Tobacco nurseries require residues

Adapted but not adopted



Many farmers tried the technology



Most not ridged (4/5) land was not CA.



About 1/20th of the study land area met the definitions of CA

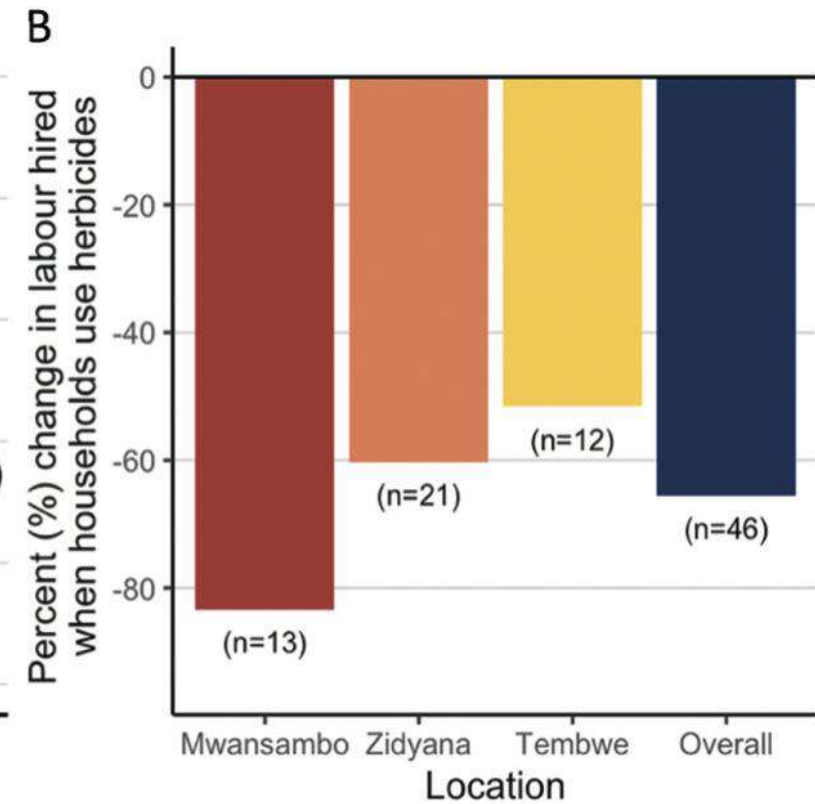
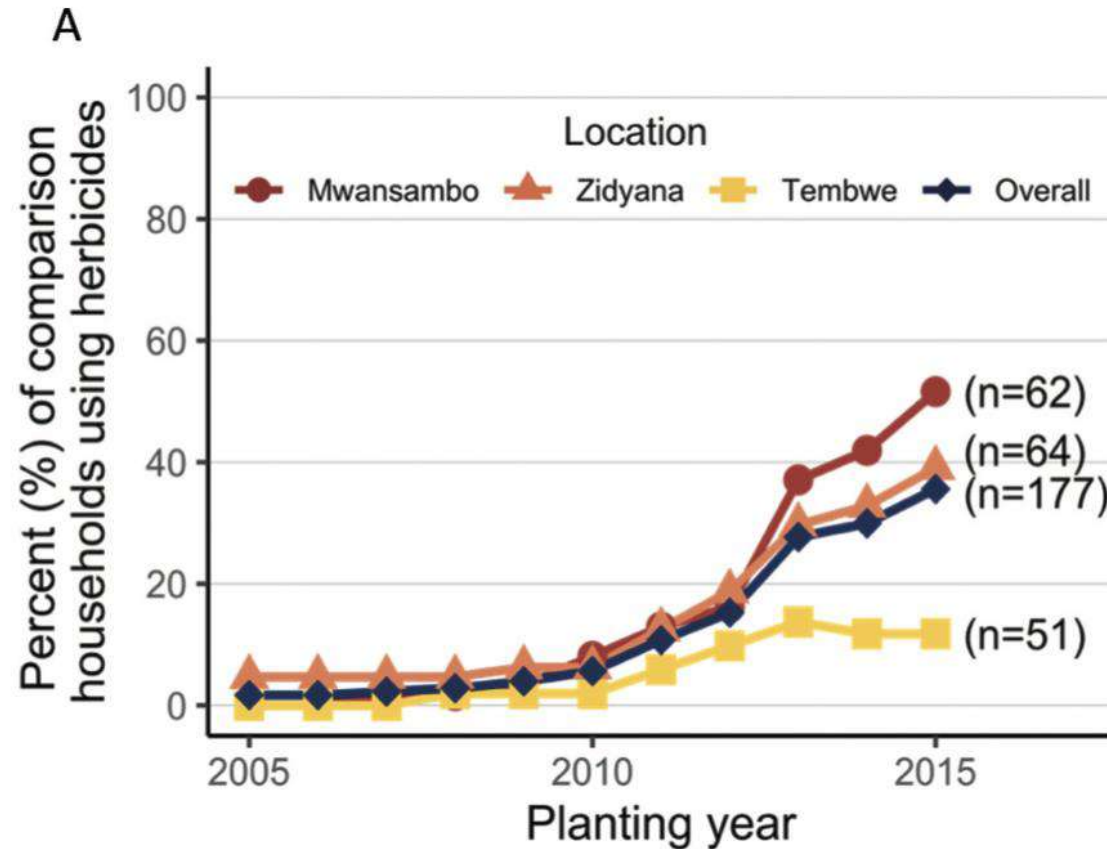


Benefits of CA appear small

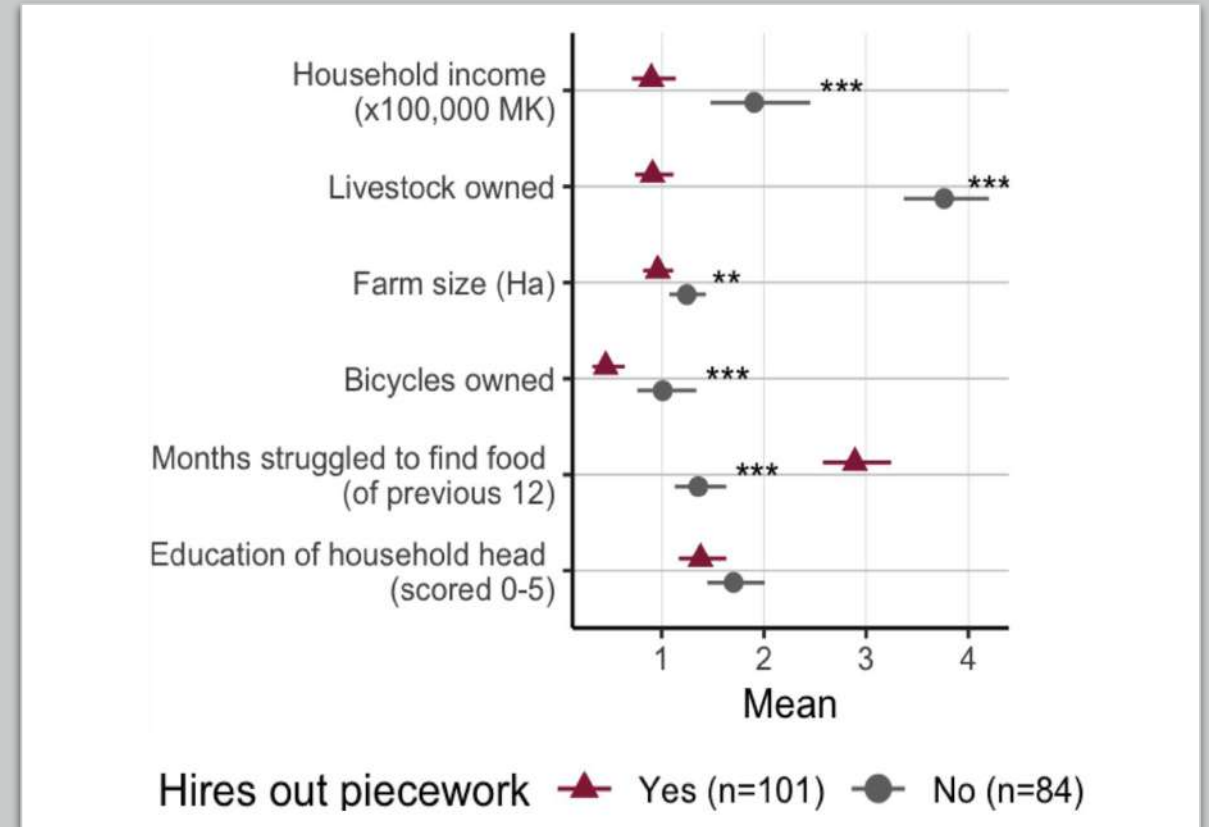
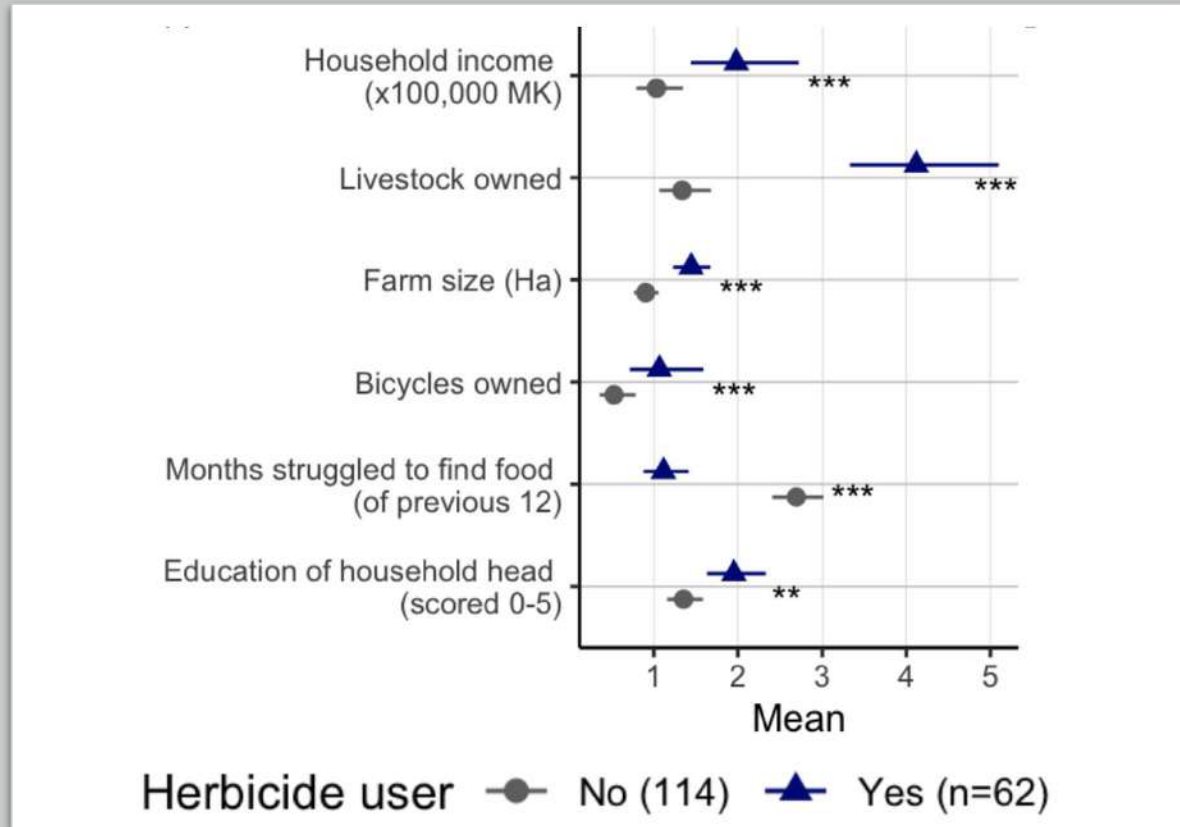
A photograph showing several farmers working in a field of young corn plants. The soil is dark and rich. In the background, there is a large, reddish-brown structure, possibly a wall or a large container. The scene is outdoors, with green vegetation visible in the distance.

Other effects...
Herbicides caused hunger?

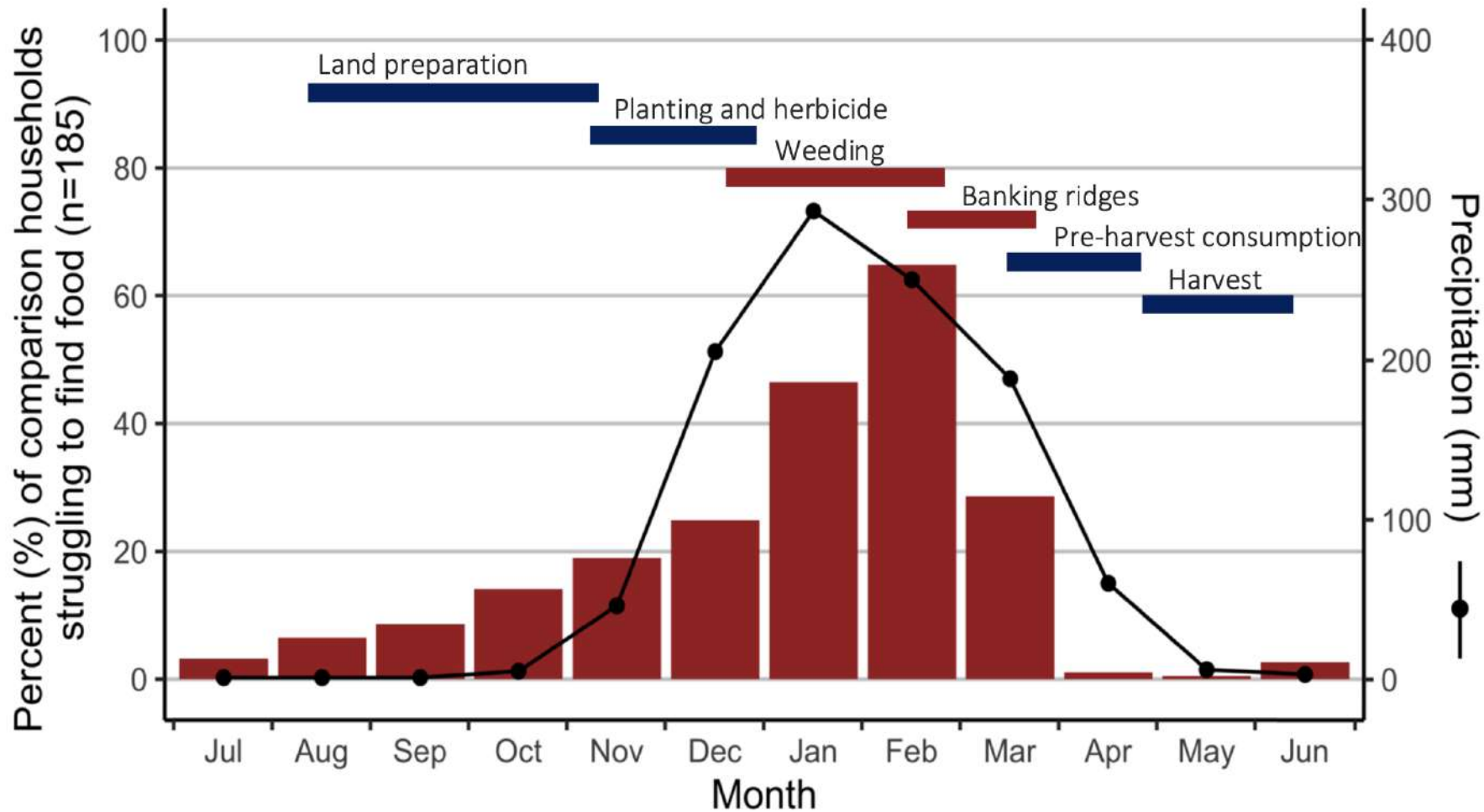
Herbicides replaced (*ganyu*) labour



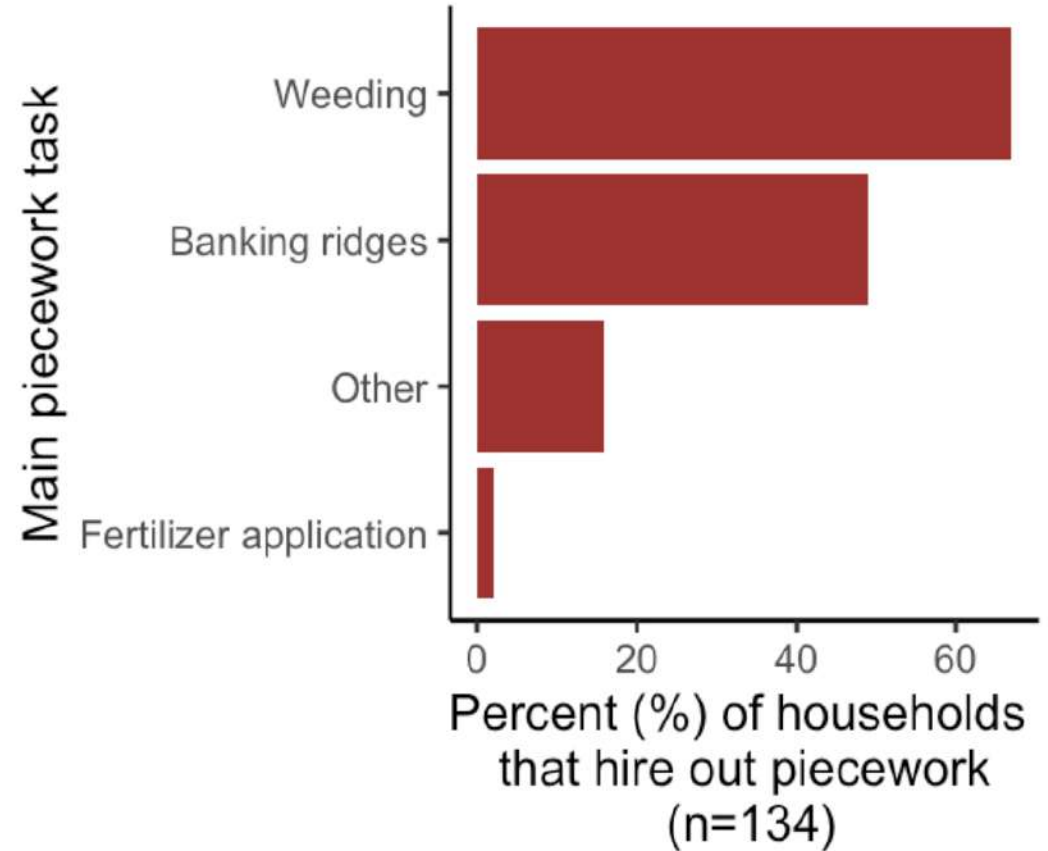
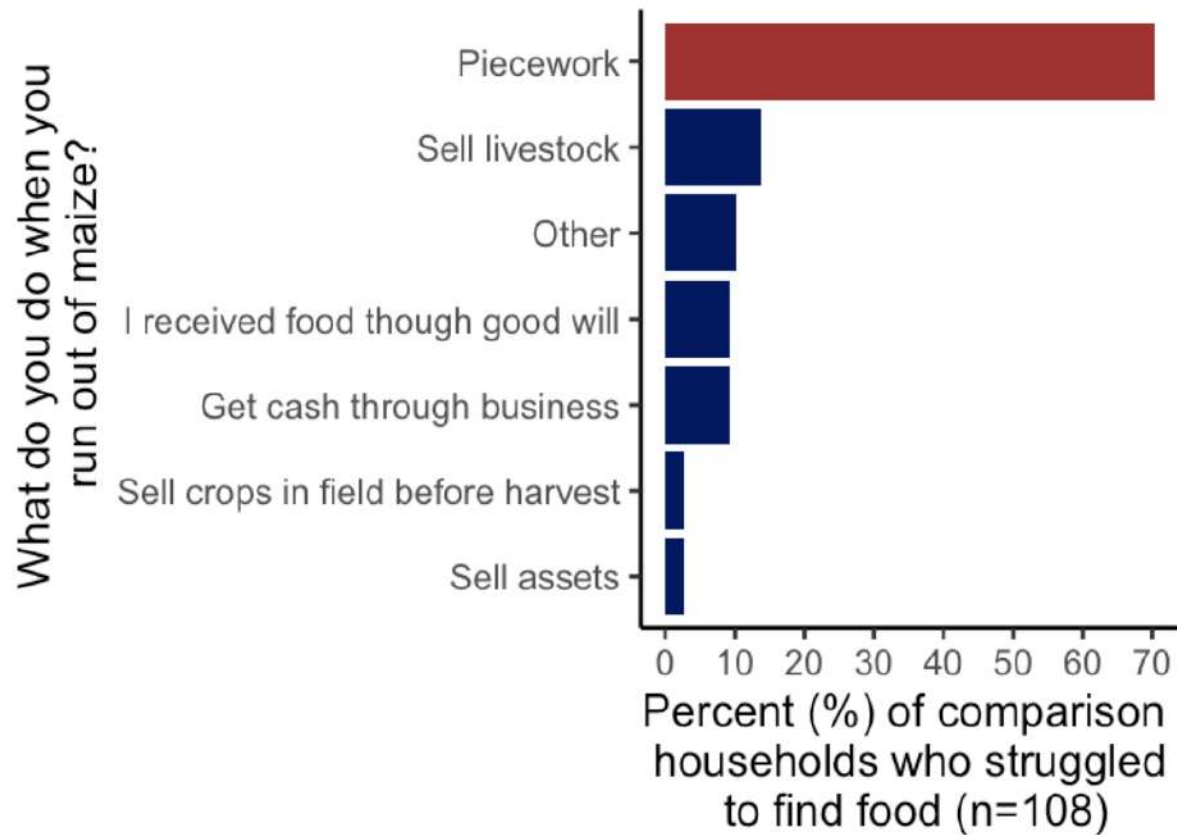
The richer sprayed, the poor worked



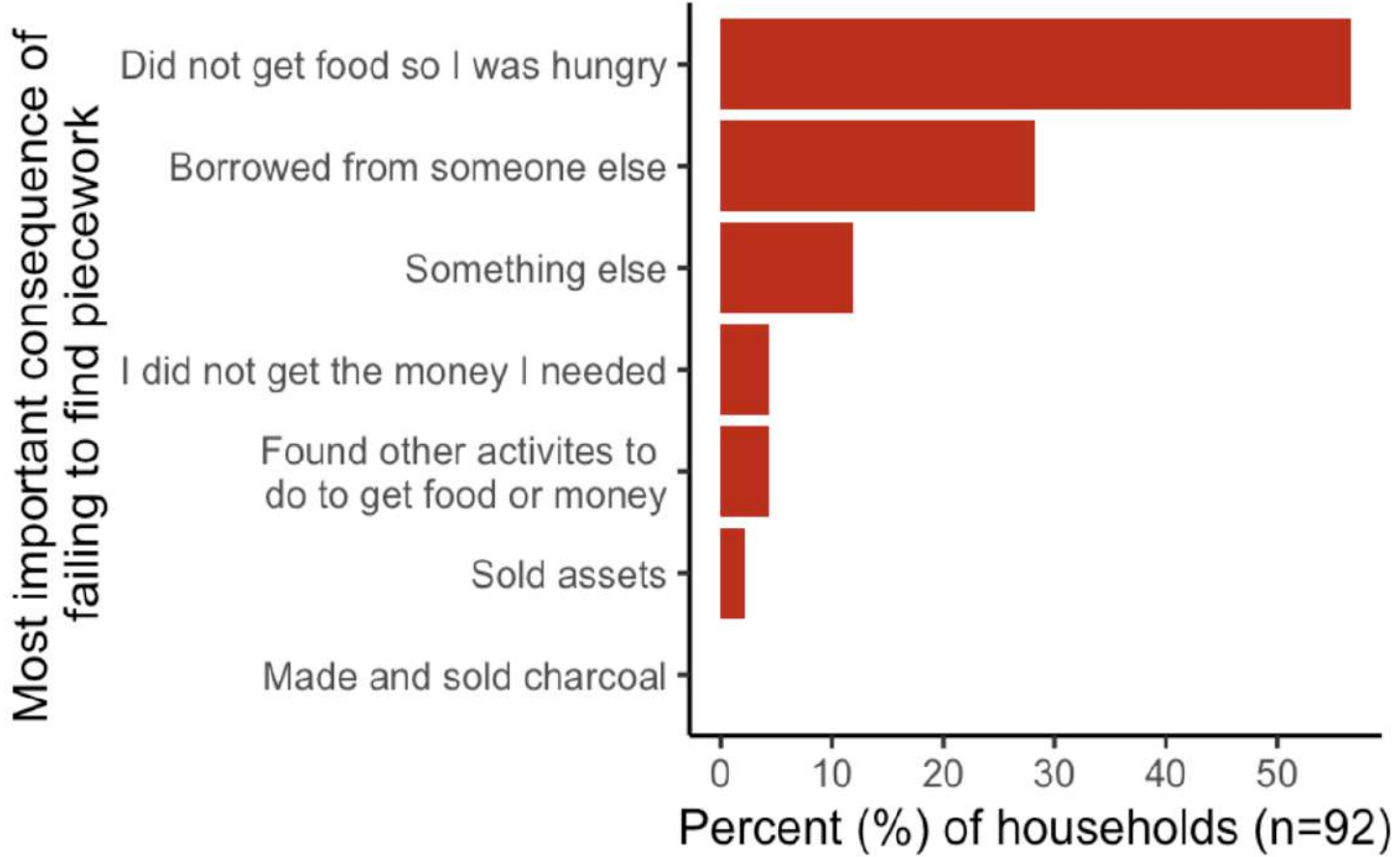
Hunger season = weeding season



The hungry rely on weeding

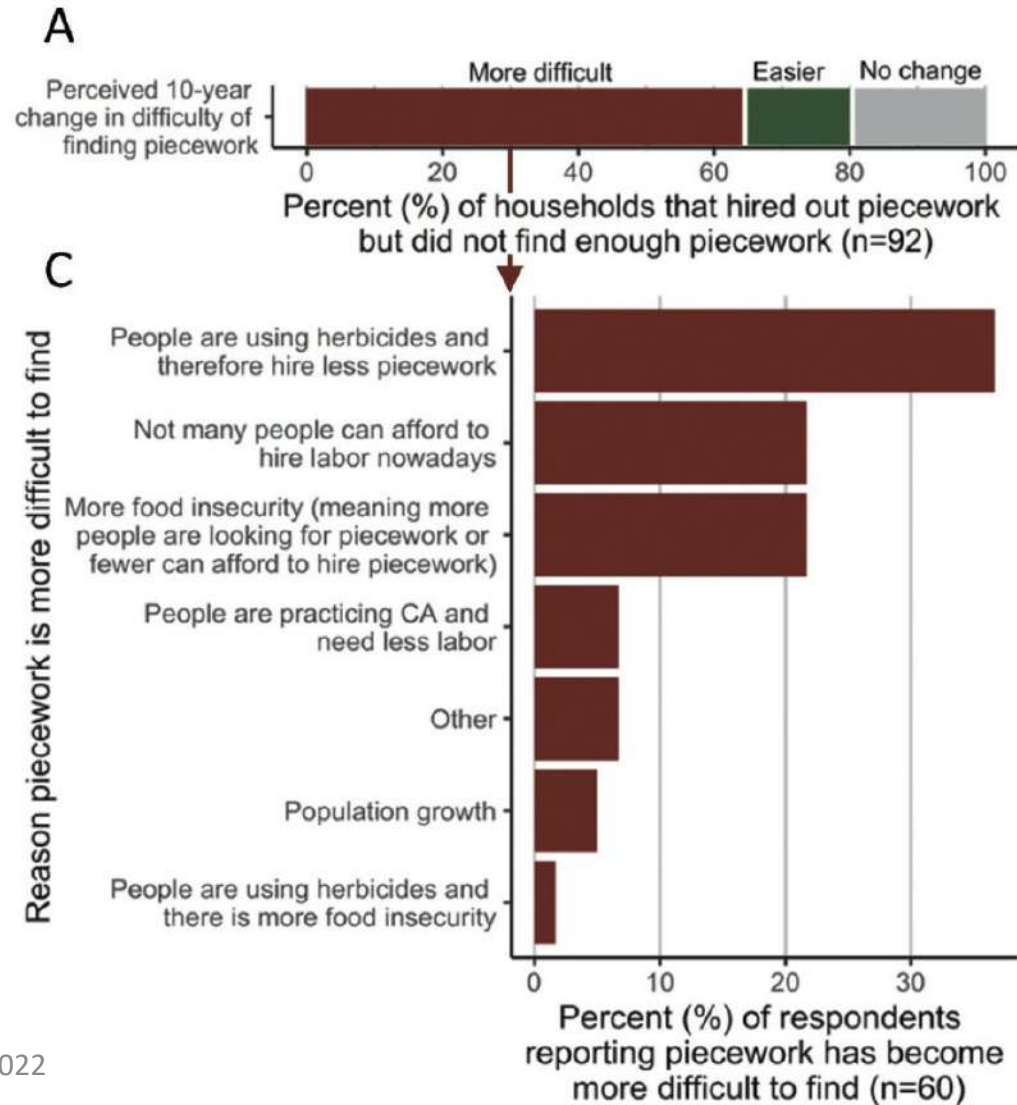


No work, no food



'My fields are clean so I can tell those who ask for ganyu that I have no work.'
'The starving households are denied the ganyu that they used to do in the past.'

Perceptions of piecework shortages



Herbicides contributed to hunger



Wealthier households adopted



Poorer lost work



Herbicide induced hunger common



Herbicides created winners and losers



Implications

Conservation agriculture in Malawi

- Productivity impacts are minimal
- CA with mulch is not scalable
- CA without mulch causes weed infestations
- CA cannot drive agricultural transformation

Socio-economic implications

- Labor saving technology can cause social differentiation
- Individualization of poverty
- Herbicides threaten Malawi's social safety net (*ganyu*)

Methodological implications

- Econometric methods disregard impacts on non-adopters
- Typical adoption/impact analyses suffer from an accounting approach
 - (Don't offer insight into mechanisms of change)
- Qualitative (sociological) understanding informed survey development



Thank you!

Google

wur conservation agriculture



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Conservation Agriculture

For further information on Conservation Agriculture and its promotion in Africa, see:

- FAO website
- Community of Practice for Conservation Agriculture (CA-CoP), an e-mail listserver on CA managed by the FAO
- Weblog on CA
- Promotional films on Vimeo [keywords: Conservation Agriculture Africa]
- Farming God's Way website
- Foundations for Farming

For smallholder farmers in Africa?

Conservation Agriculture (CA) has dominated debates on agricultural development policy in Africa for over a decade. Lots of (donor) money has been spent on the promotion of CA to smallholder farmers and often such interventions have been hailed as a success. At the same time, however, there are numerous reports on low and slow uptake by of CA by smallholder farmers. Yet, we think there is need to question the emergent consensus on Conservation Agriculture in development policy. This page, which provides links to critical and dissenting analyses that tend to be ignored, explains why.

Bouwman, T. I., Andersson, J. A., & Giller, K. E. (2021). Adapting yet not adopting? Conservation agriculture in Central Malawi. *Agriculture, Ecosystems & Environment*, 307, 107224.

<https://doi.org/10.1080/00220388.2020.1786062>

Bouwman, T. I., Andersson, J. A., & Giller, K. E. (2021). Herbicide induced hunger? Conservation Agriculture, ganyu labour and rural poverty in Central Malawi. *The Journal of Development Studies*, 57(2), 244-263.

<https://doi.org/10.1016/j.agee.2020.107224>