



How does labour availability influence pesticide use on cocoa farms?

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I. Background

FiBL



I. Background

Cocoa production systems

- Resource-constrained smallholder farmers in the tropics
- Mainly manual labour
- Low yields

Pest and disease management

Synthetic pesticides

- Common in pest and disease management¹
- “Quick fix” / need to maintain yields
- Issue for human and environmental health²

Alternative pest and disease management

- Labour intensive³
- Knowledge intensive
- Few incentives



Farm labour availability

Household labour

- Demographic changes
- Ageing farmers⁴
- Reduced physical strength

Hired labour

- Costly⁵



I. Background

- Strict governmental response to Covid-19 pandemic in Uganda
 - Increase in farm household members and household labour availability
- Data collection carried out Feb/March 2020 and Feb/March 2022
 - Unique experiment setting comparing farm data for 2019 and 2021

Do changes in household labour availability
(mediated by alternative pest and disease management practices)
reduce pesticide use on cocoa farms?

2. Materials & Methods



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Materials

Quantitative data: Farm pesticide use quantities, farm labour availability, and diverse control variables for 2019 & 2021

Qualitative data: Farmers' estimated changes in labour investment in specific cocoa production activities

Methods

Pesticides

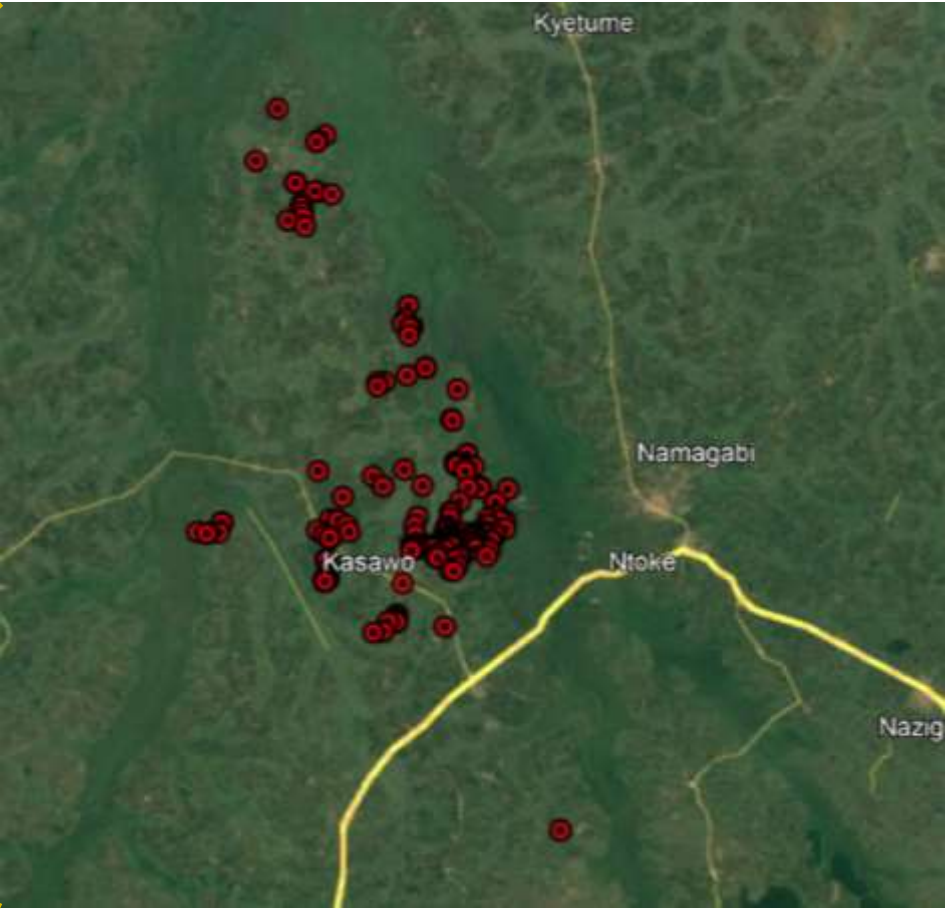
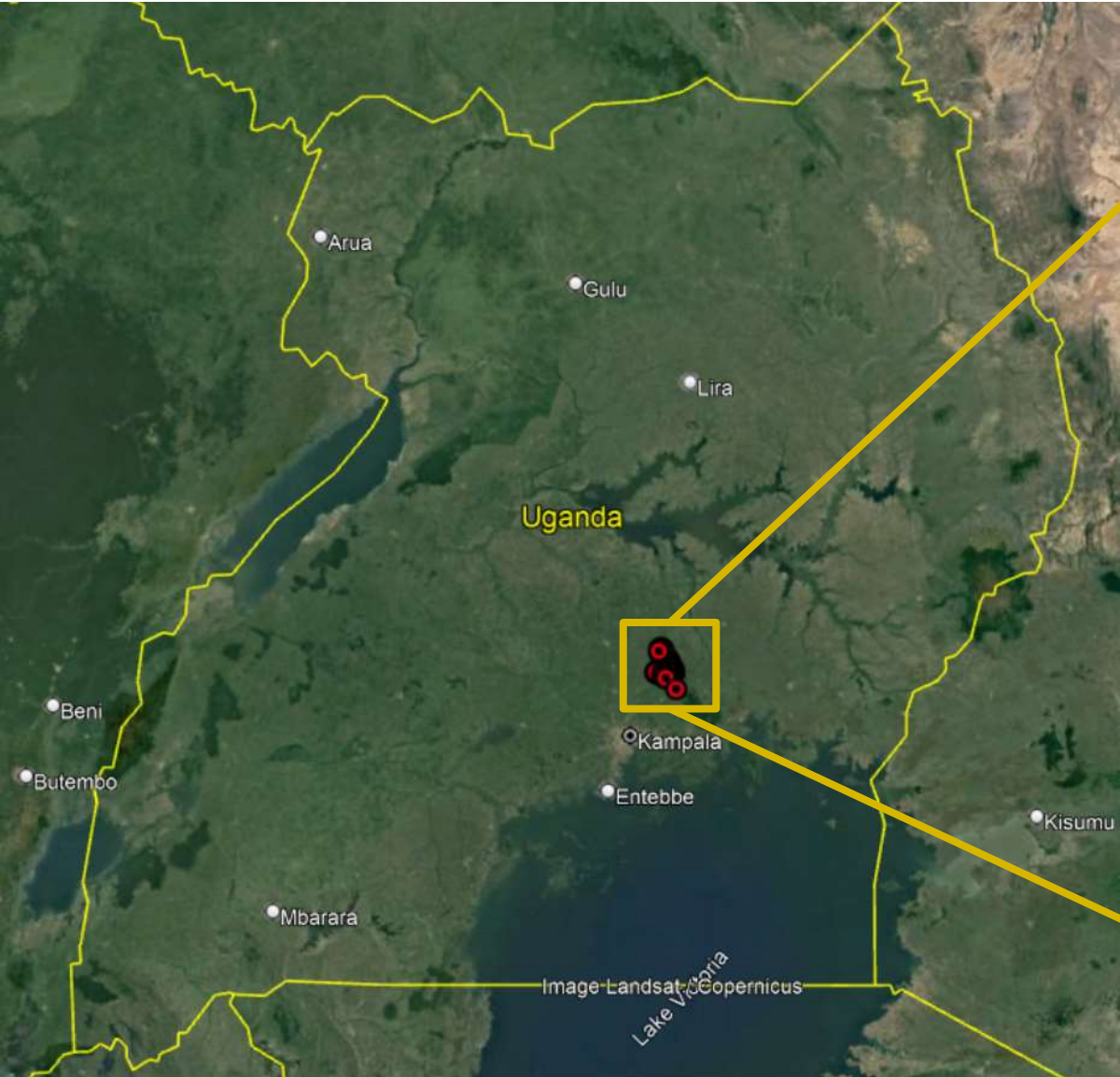
Practices

HH Labour

Ordinary least square (cross-sectional data) and two-way fixed effect (panel data) models

Fisher's exact test to compare response frequencies between farms with / without more household labour availability

2. Materials & Methods



3. Results



3. Results - Descriptives

	2019 (N=194)	2021 (N=194)	p-value
Pesticide use in cocoa (I/O)	77 (39.7%)	82 (42.3%)	0.614
Pesticide active ingredient (kg / ha)	0.86 (2.37)	1.52 (5.15)	0.701
Concoctions use (I/O)	45 (23.2%)	75 (38.7%)	<0.001
Pruning cocoa (I/O)	60 (30.9%)	162 (83.5%)	<0.001
Phytosanitary measures in cocoa (I/O)	76 (39.2%)	122 (62.9%)	<0.001
Household labour (1000 hours / ha / yr)	2.40 (2.58)	3.09 (3.33)	<0.001
Household labour (people)	3.89 (2.38)	4.75 (2.45)	<0.001
Hired labour (1000 hours / ha / yr)	0.48 (0.90)	0.08 (0.19)	<0.001
Total labour (1000 hours / ha / yr)	2.87 (2.60)	3.17 (3.34)	0.140

Note: Paired Chi2 and Wilcoxon rank sum test

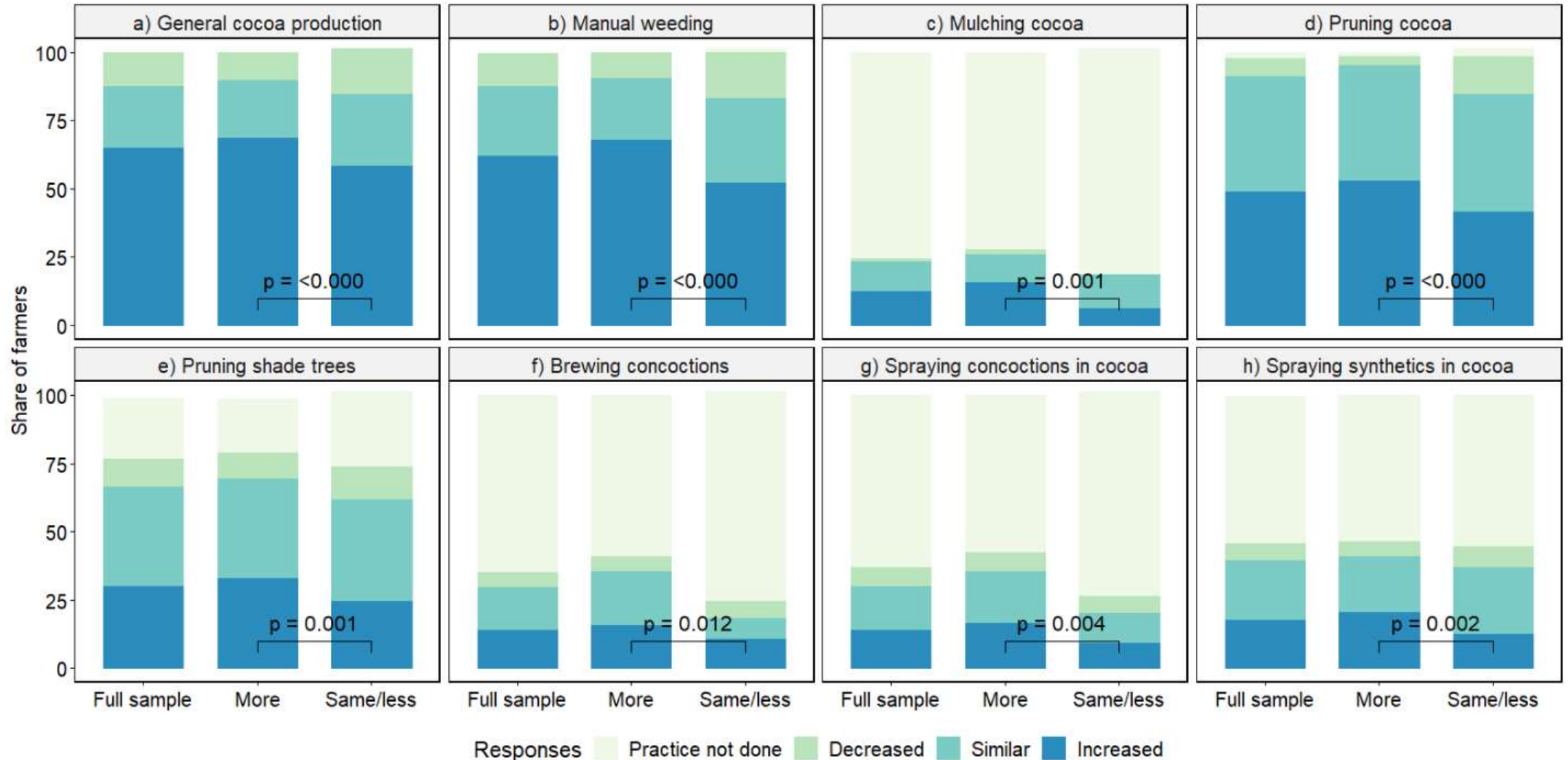
3. Results – Quantitative models

Outcome: Pesticide quantities (g of active ingredient / ha)	OLS	FE	
Pruning cocoa (1/0)	-0.33 (0.96)	-0.82 (0.47)	
Concoctions in cocoa (1/0)	2.85** (0.93)	-1.97*** (0.56)	
Phytosanitary measures (1/0)	-0.34 (0.90)	-1.21** (0.40)	

Outcome: 2021 data	Pruning	Concoctions	Phytosanitary
Change in household labour hours / ha	-0.02 (0.03)	0.06* (0.03)	0.04 (0.02)
Change in hired labour hours / ha	-0.03 (0.05)	-0.04 (0.04)	-0.02 (0.04)

3. Results – Qualitative insights

Perceived changes in time investment in cocoa in 2021 compared to pre-Covid times



4. Conclusions



4. Conclusions

- Increased household labour first used for food production, then cash crops
 - Alternative management practices influenced pesticide quantities
 - Increased household labour did not automatically influence alternative practices
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- Alternative pest and disease management practices important pillar for cocoa production with little / without synthetic pesticides
 - Adoption on cocoa farms should be incentivised more strongly, especially on resource and labour-constrained farms



Thank you!

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Sources

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