

What drives conservation agriculture and mechanization adoption on small farms: Evidence from Eastern and Southern Africa

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Motivation: Large 'know-do' gaps

	Zambia			Zimbabwe		
	Draft animal power	2W tractors	4W tractors	Draft animal power	2W tractors	4W tractors
Know about	98.44	61.90	96.09	99.66	31.96	96.84
Ever used	91.12	1.84	15.90	94.14	1.94	14.48
Ownership	37.33	0.23	1.26	57.10	0.65	1.06
Accessibility	38.75	27.78	17.21	62.78	18.71	16.67
Affordability	25.67	^	6.51	35.60	^	7.84

Notes: Usage (ever used) and ownership are computed for those who know a particular farm power. Accessibility was computed for those farmers who did not hire mechanization services for 2020/21 season but have used before, while affordability was computed for those who know about the mechanization option and think it is possible to hire. ^ statistically invalid, n < 30.

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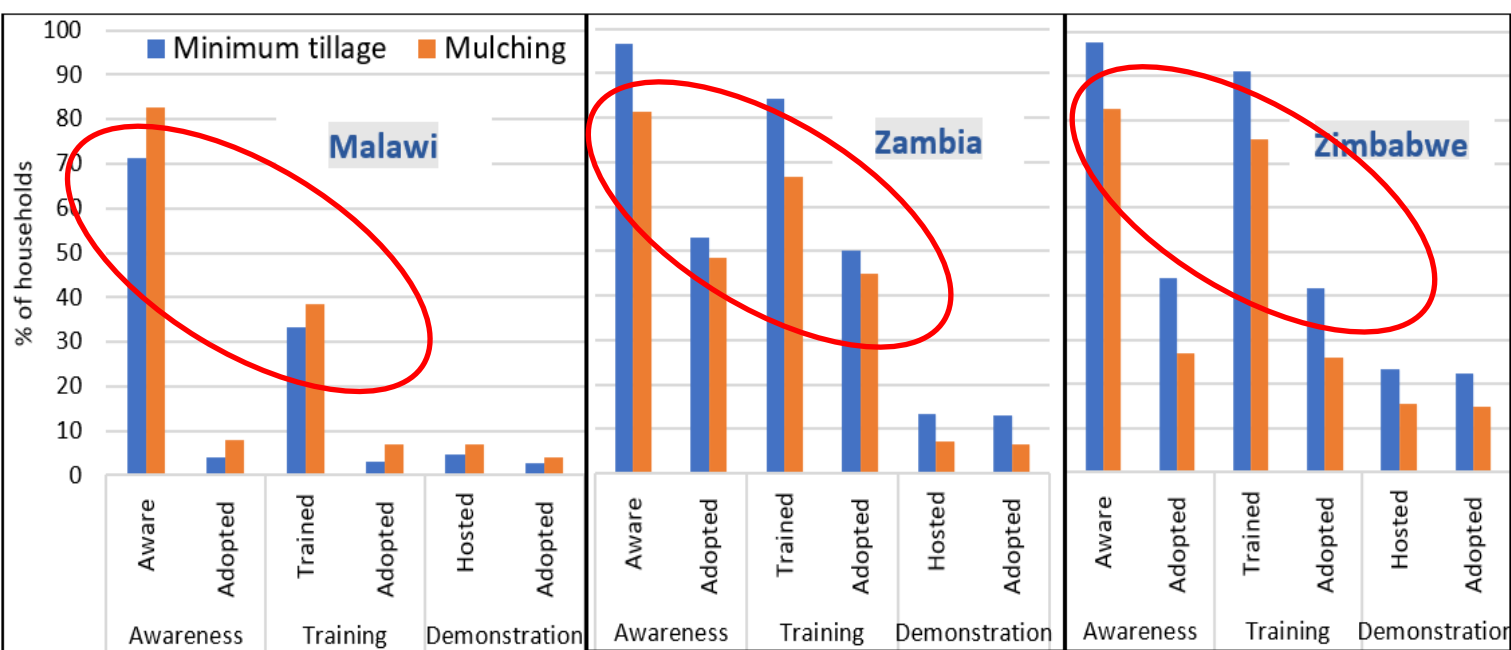
Smallholder farmers' willingness to pay for two-wheel tractor-based mechanisation services in Zambia and Zimbabwe

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Abstract
Mechanisation is back among top development policy priorities for transforming African smallholder agriculture.

← Source: Ngoma et al, (2023)



- Most farmers know about CA and mechanization
- However, few adopt,
- Why?

← Source: Tufa et al (2023)



Drivers of CA adoption

	Extent	Intensity
Membership to farmers organization (Yes=1)		😊
Related to local leadership or chieftaincy (Yes=1)	😊	
Experience (age) of the household head (Years)	😊	😊
Junior secondary education (Yes=1)		😊
Household size (number)		😊
Asset related to conservation agriculture (own=1)		😊
Access to credit (amount in MLW kwacha)	😊	
Exposure to training duration (years)	😊	😊
Participation in CA demonstration plots (yes=1)		😊
Accessing support from a host farmer (yes=1)	😊	😊

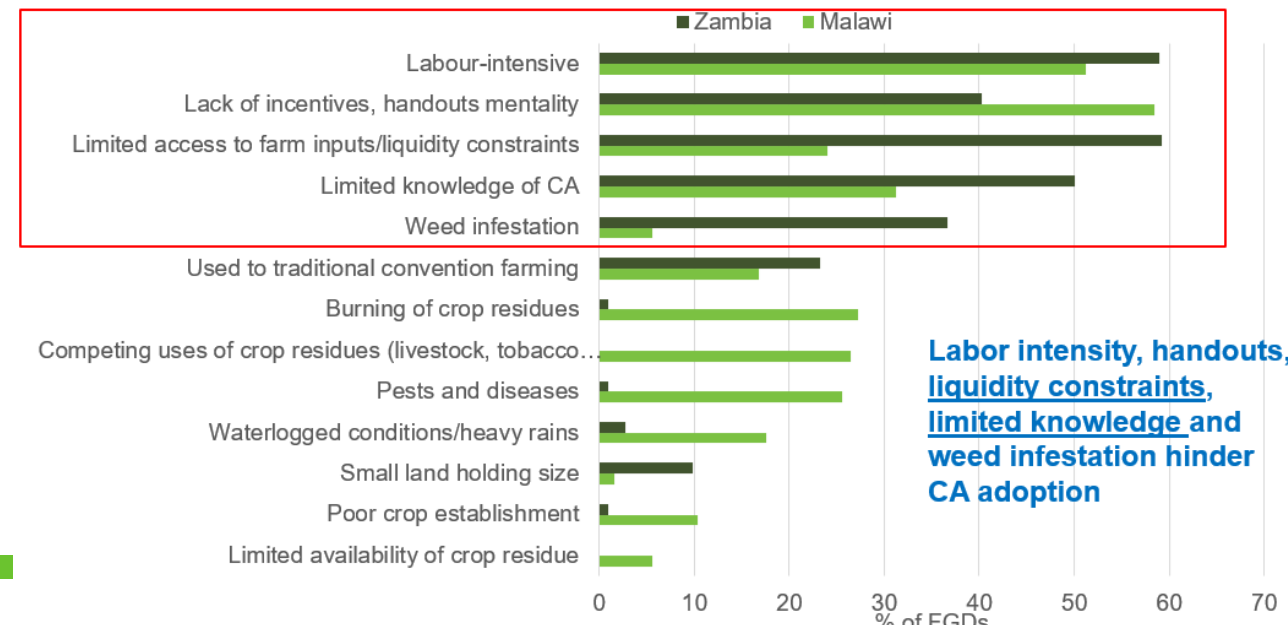
Source: Phiri et al (2024)



Drivers of CA dis-adoption and non-adoption



Source: Tufa et al (2023)



Drivers of mechanization adoption



	(1) Pooled (n=642)	(2) Kenya (n=213)	(3) Zambia (n=186)	(4) Zimbabwe (n=204)
Received mechanization advice (yes =1)	0.039 (0.301)	0.018 (0.066)	-0.106 (-0.336)	0.165 (0.747)
High cost of hire (yes =1)	-0.399*** (-2.947)	-0.100 (-0.356)	-0.531* (-1.662)	-0.678*** (-3.213)
Faced labor shortage (yes =1)	-0.160 (-1.288)	-0.365 (-1.524)	-0.624 (-1.340)	-0.208 (-0.974)
Relatives in leadership (yes =1)	0.360*** (2.635)	0.230 (0.757)	-0.081 (-0.268)	0.659*** (2.957)
Number of years in village	0.012*** (3.068)	0.013 (1.567)	0.018* (1.672)	0.002 (0.235)
Female, household head (yes =1)	-0.026 (-0.180)	0.316 (1.047)	-0.566 (-1.480)	0.151 (0.581)
Age household head	-0.007 (-1.515)	0.008 (0.759)	-0.029** (-2.210)	0.002 (0.157)
Education household head	0.026* (1.648)	0.072** (2.271)	0.087** (2.424)	0.025 (0.706)
Number of male adults	-0.032 (-0.643)	-0.035 (-0.421)	-0.075 (-0.796)	0.125 (1.294)
Livestock number	-0.002 (-0.866)	0.026** (2.416)	-0.001 (-0.357)	-0.001 (-0.108)
Log of household income (USD)	0.138** (2.505)	0.180 (1.596)	-0.066 (-0.388)	0.043 (0.449)
Area cultivated (ha)	0.076** (2.017)	0.304* (1.765)	0.164* (1.902)	0.204* (1.816)
Fertilizer rate (Kg/ha)	0.001*** (3.081)	0.000 (0.366)	0.002 (1.226)	0.002** (2.481)
Number of crops cultivated	-0.023 (-1.178)	-0.042 (-0.797)	-0.045 (-0.808)	-0.043 (-1.158)
Country FE	yes	no	no	no
District FE	no	yes	yes	yes
Constant	-0.925* (-1.856)	-1.876** (-2.010)	3.084** (2.139)	-1.233 (-1.271)

Notes: Robust z-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Thank you for the kind attention!

