

I. Introduction

- Swear **this is not a ppt!** I'd have liked to use the board, but my handwriting/graphs are illegible

- Title of the talk



Targeting, bias, and expected impact of **SI innovations** on developing-country agriculture: Evidence from Malawi

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Ah, clueless
economists...



fact
#21

Farm & Ocean Friendly

Sustainability is the ability to meet the needs of the present without compromising the ability of future generations to meet their own needs.

Source: Brundtland Commission

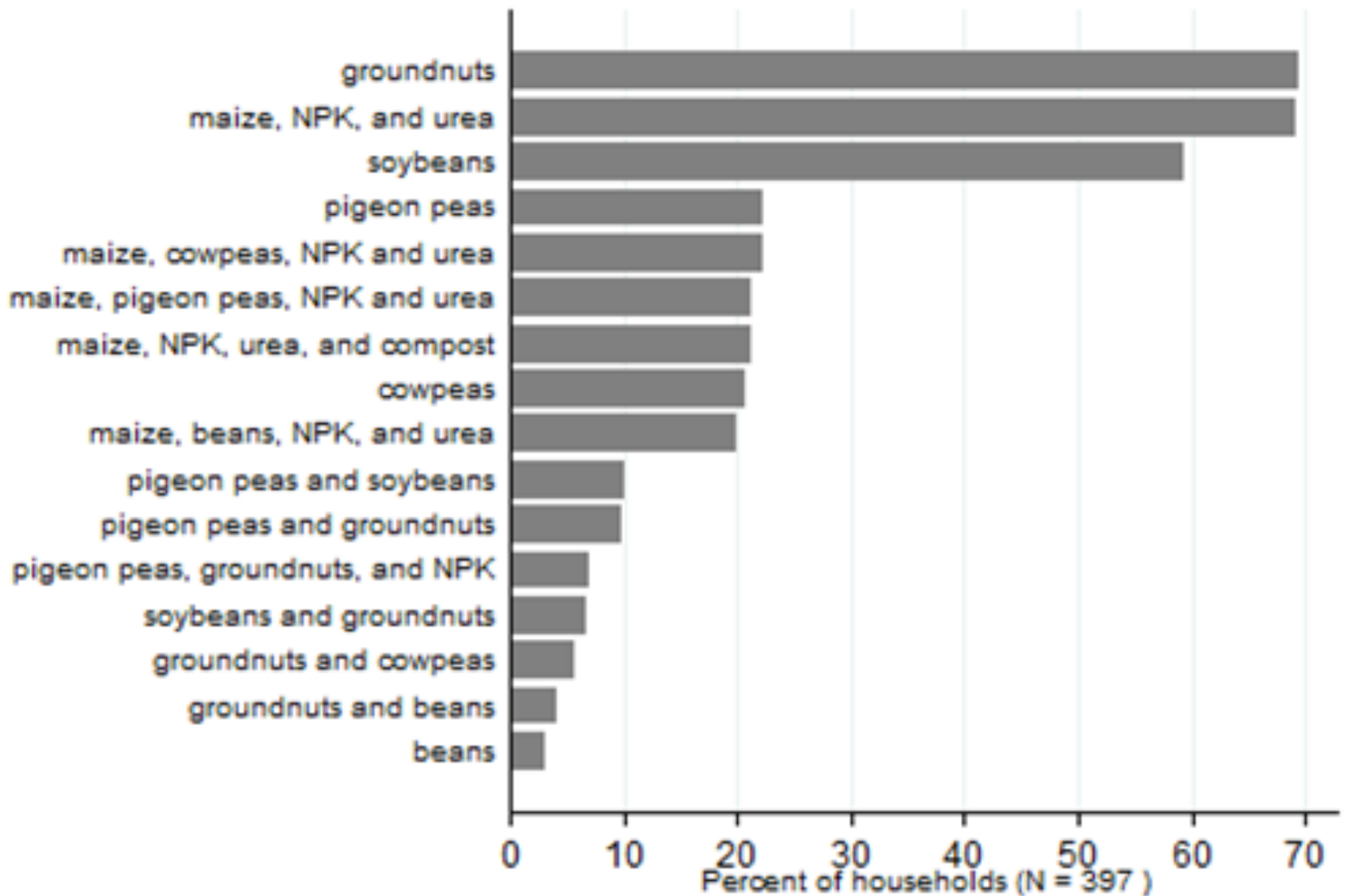
Issue: researchers implement it as a research project, while donor's implicit aim and explicit requirements are for a scalable/development project



“[...] provide pathways *out of hunger and poverty* for small holder families through sustainably intensified farming systems that sufficiently *improve food, nutrition, and income security* [...]” (from the program framework)

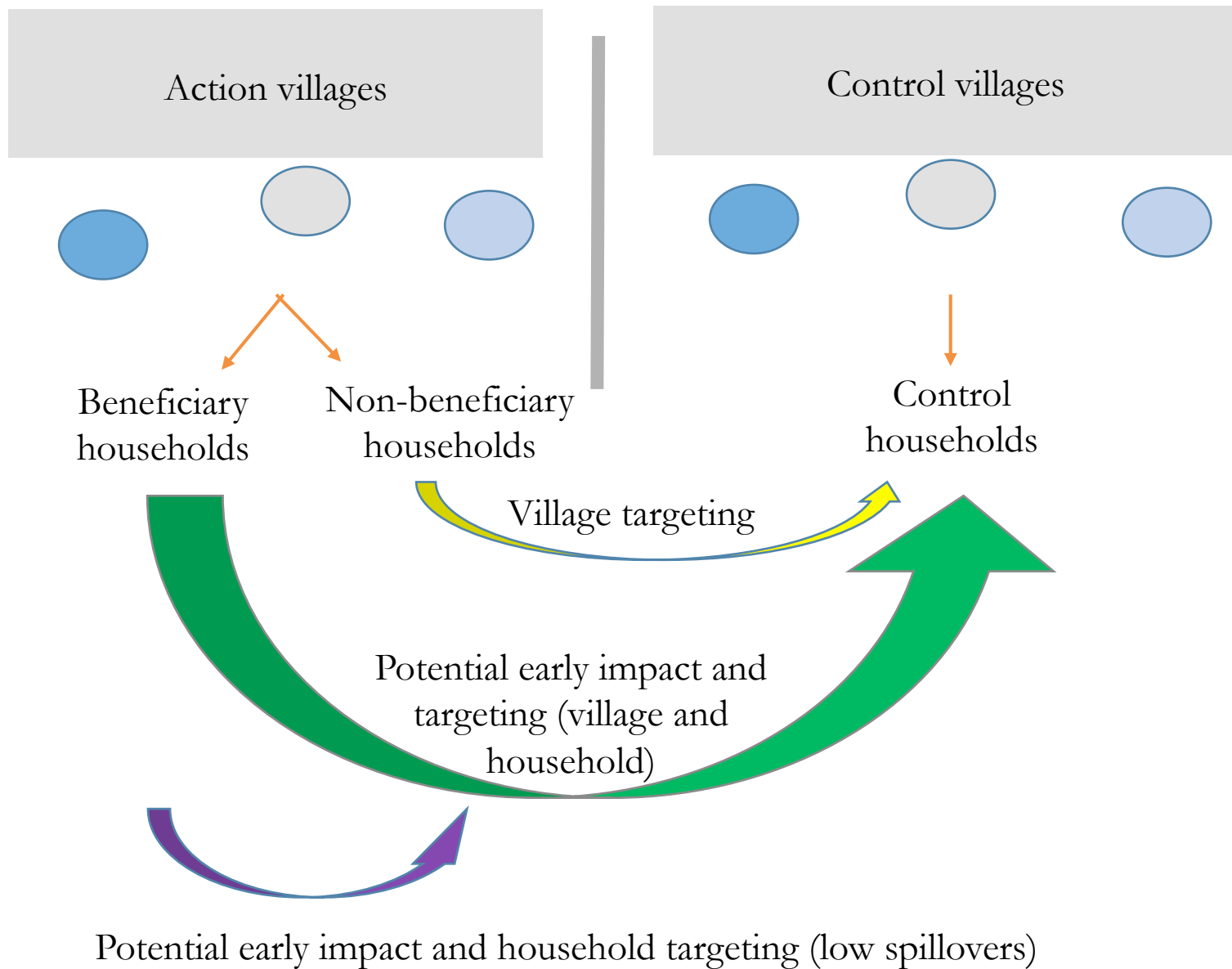
Research hypothesis: integration, adoption, trade-off, innovation sequencing, *scalability* → External validity

II. Innovations (tested by "baby" farmers on at least one plot)



NPK refers to nitrogen-phosphorus-potassium compound.

III. Evaluation design



IV. Village statistics

Variables	AR villages	Control villages
Length of growing period(Days)	162	161
Slope(Degrees)	1	1
Travel time to the nearest town of 20K people(Minutes)	235**	182**
Population density(Number per square kilometer)	198***	332***
Rainfall(Millimeters)	937***	919***
Elevation (Meters)	897	947
Temperature(Celsius*10)	212	209
% of villages w/ tropic warm/semiarid-ARZ	0.85	0.75
Access to basic services index	0.08	-0.04
% of villages w/ extension services	0.96***	0.68***
% of villages w/ veterinary services	0.48*	0.71*
% of villages w/ farmers cooperative groups	0.85***	0.46***
% of villages w/ primary livestock market	0.28	0.18
% of villages w/ access to improved maize seed	0.46	0.43
Observations	26	28

Target villages:
 1. more remote
 2. less densely populated
 3. wetter (with more rainfall)
 4. served more by extension services
 5. with higher number of farmer cooperatives

V. Household statistics

Variables	AR beneficiary (1)	Non-beneficiary (2)	Control (3)	1 vs 2 (4)	1 vs 3 (5)	2 vs 3 (6)
Household size	4.97	4.55	4.59	**	***	
Avg. adult years of education	5.22	4.51	4.72	***	***	
Dependency ratio	1.23	1.28	1.29			
Age of household head (years)	45.7	45.1	45.3			
% households with married head	0.75	0.60	0.65	***	***	
% households with female head	0.27	0.36	0.34	**	**	
Total wealth index	0.21	-0.12	-0.11	***	***	
% of hhs in the 1st (lowest) quintile of wealth	0.099	0.22	0.21	***	***	
% of hhs in the 5th quintile of wealth	0.30	0.20	0.19	***	***	
Value of animals owned (MWK) ('000)	63.9	35.0	24.0	**	***	**
Tropical livestock units	0.46	0.28	0.21	***	***	**
Per capita land operated (ha)	0.28	0.23	0.23	**	***	
% of hhs w/ closest parcel <15 minutes	0.74	0.57	0.54	***	***	
% of hhs w/ closest parcel >60 minutes	0.030	0.030	0.071		***	**

1. Beneficiaries very different from non-beneficiaries & control

2. Non-beneficiaries = control

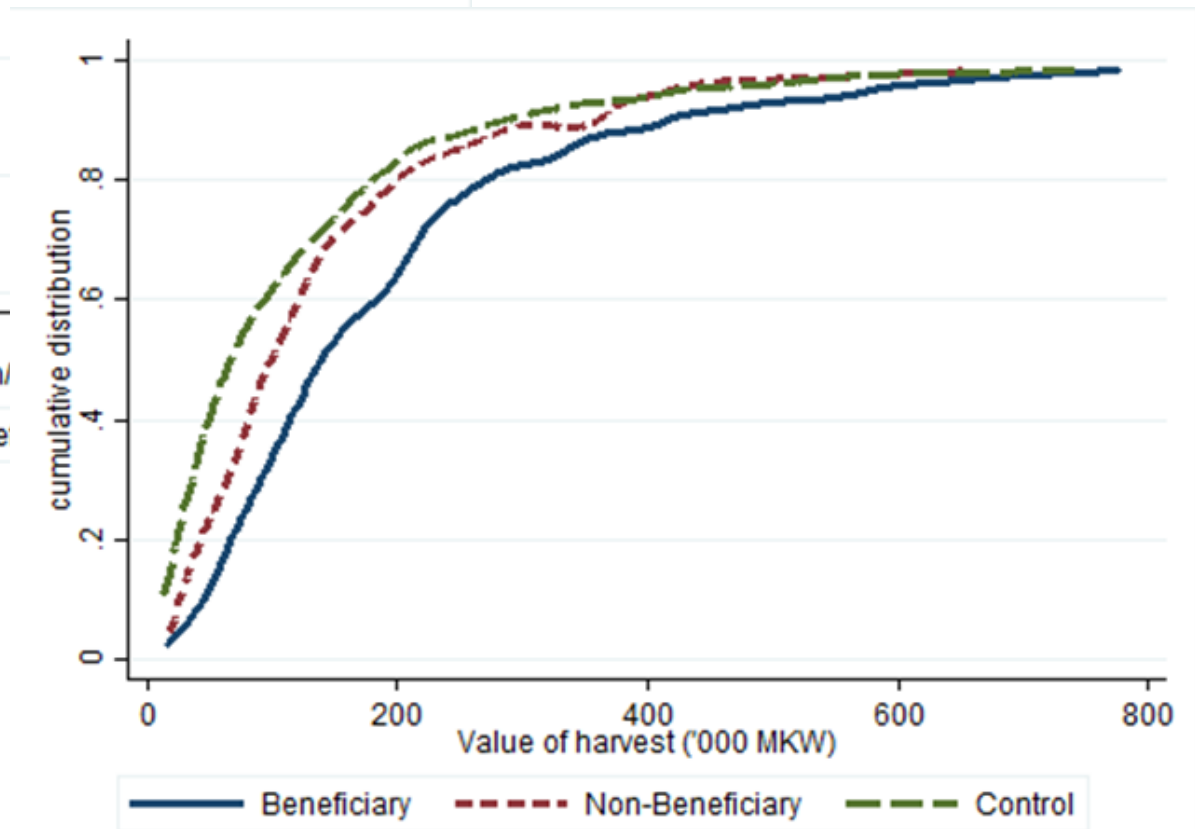
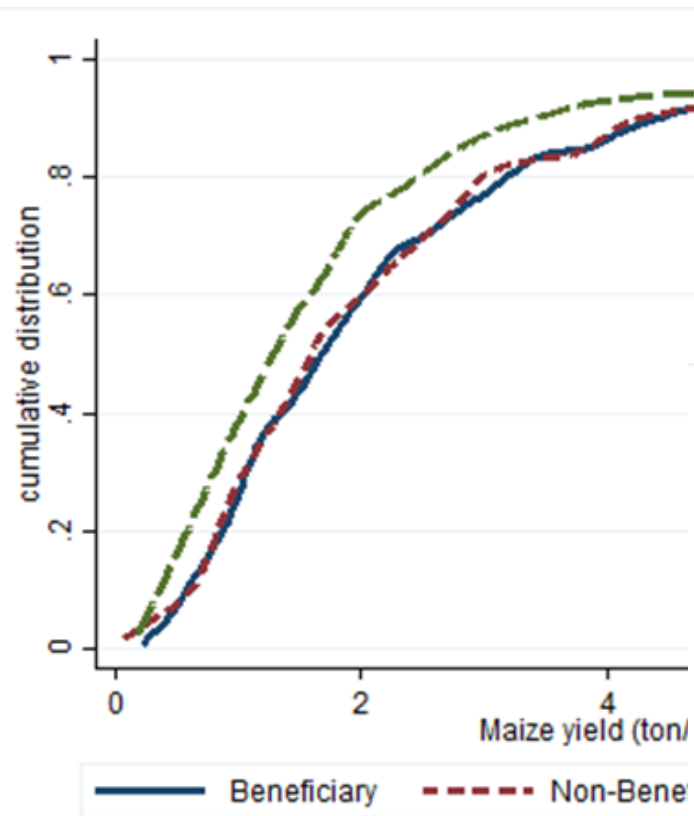
* significant at 10%; ** significant at 5%; *** significant at 1%

(1) and (2): In the same village, selected differently

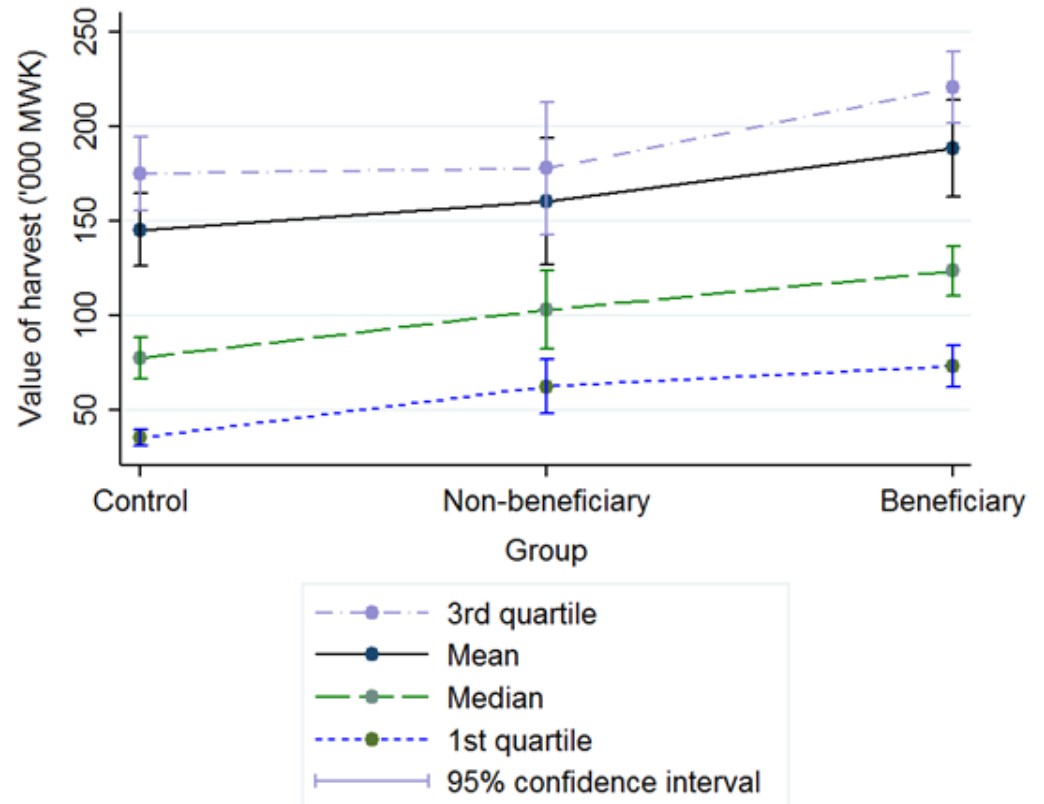
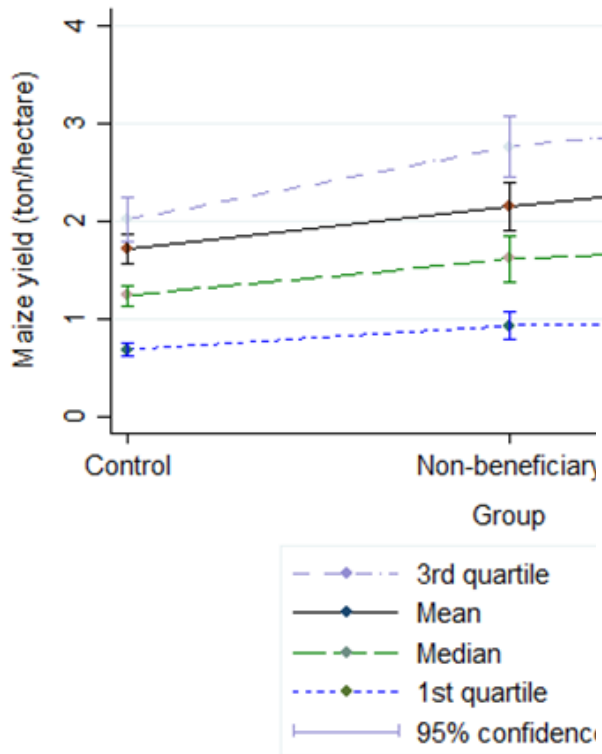
(2) and (3): In different villages, sampled the same way (randomly)

(1) and (3): In different villages, selected differently

VI. Unconditional distributions



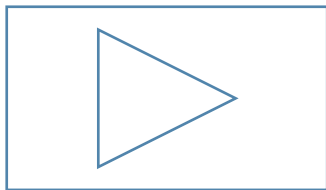
VII. Conditional means and quartiles



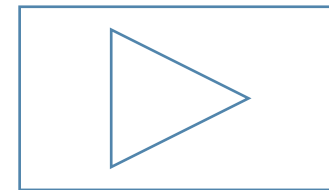
VIII. Conclusions and implications/1

1. Villages: action \neq from control
2. Households: beneficiaries \neq from non-beneficiaries & control (better educated, larger family size, higher farm size, more durable assets, more likely to own livestock, and have better quality housing)
3. Beneficiaries also use more agricultural inputs (e.g., inorganic fertilizer, manure, hired labor), more likely to intercrop and use irrigation, indeed obtaining higher maize yields and value of crops

Example 1



Example 2



VIII. Conclusions and implications/2

4. Rethink targeting criteria, as they could potentially have serious implications upon scaling up (not pro-poor?)

Contestations

#1: what's the role of agronomy?

#2: researchers → Sustainable
Expected adoption rates and outcomes may prove
unsatisfactory when scaled up to the broader (less
endowed) population of farmers. Optimization!

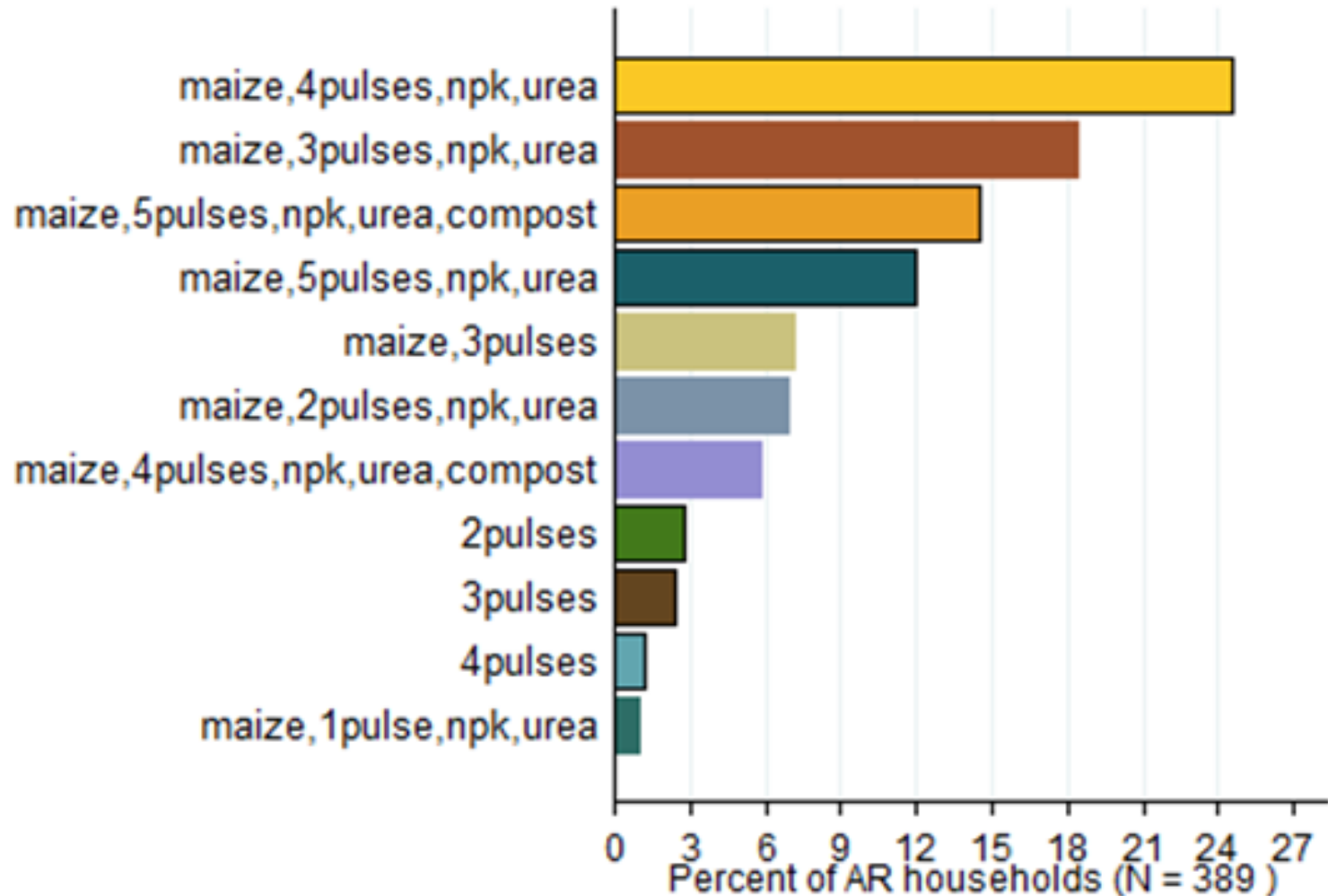
5. Learn to fly with a broken plane? We don't need to fly a plane here, but just basic intercropping, rotation,...

6. Bart: "the rural poor are strikingly prominent in funding proposals, but virtually absent in IE reports"

Thank you!

Addendum

II. Innovations (tested by "baby" farmers at farm level)

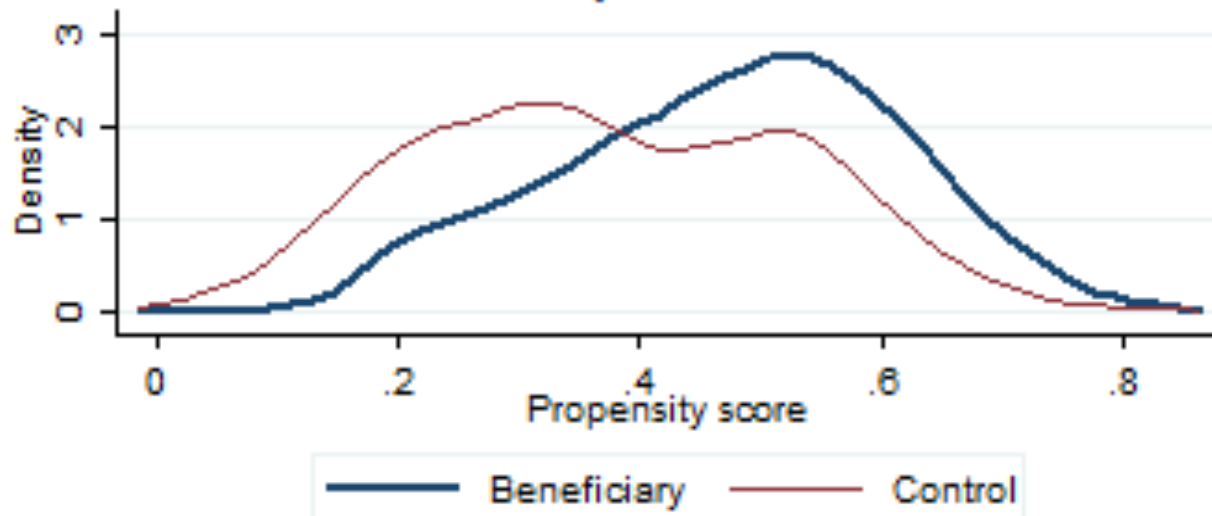


Note: Technology mixes tested by less than 1% of AR households not shown

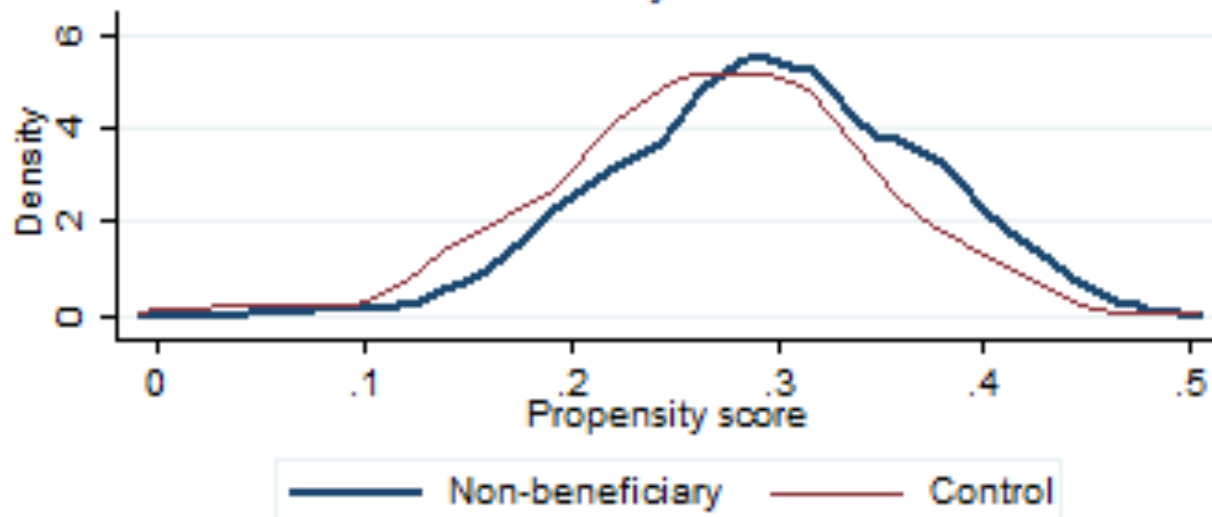
Source: Africa RISING Malawi

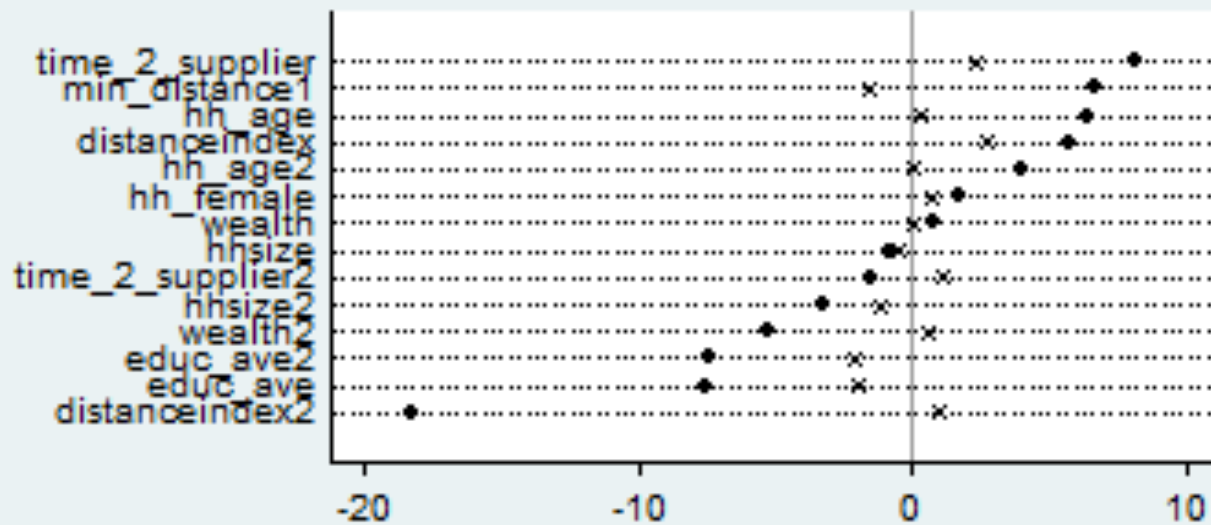
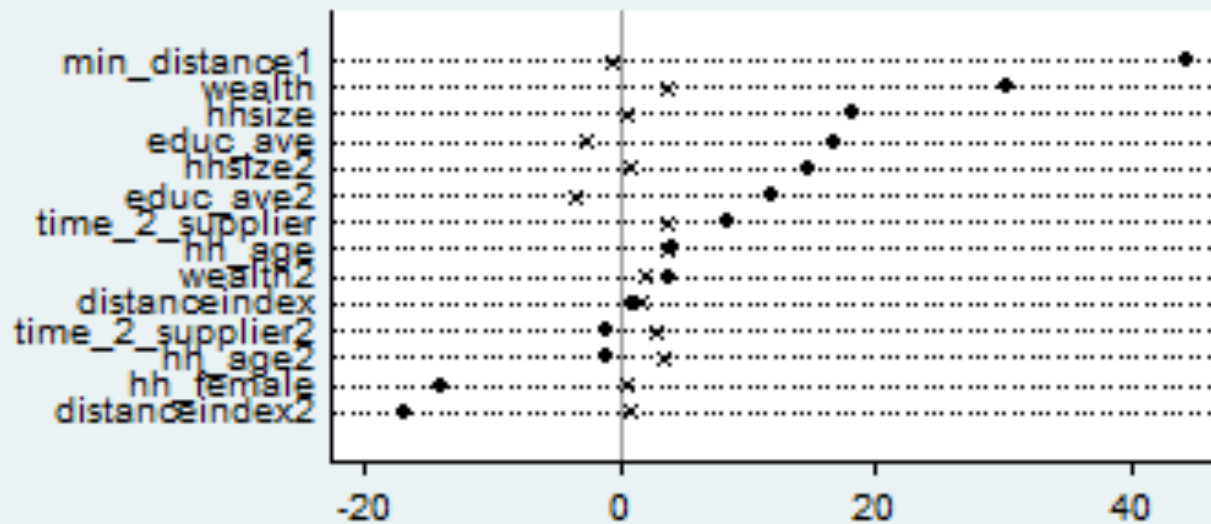
Pulses include groundnut, soybean, pigeonpea, cowpea, and bean

Beneficiary versus Control



Non-beneficiary versus Control





◆ Unmatched × Matched



Variables	B	NB	C	1 vs 2	1 vs 3	2 vs 3
	(1)	(2)	(3)	(4)	(5)	(6)
Amount of fertilizer used(kg)	119.2	83.8	80.2	***	***	
Total person-days used	332.4	241.1	228.0	***	***	
% of hhs with improved maize	0.87	0.63	0.62	***	***	
% of hhs using hired labor	0.50	0.31	0.39	***	***	**
% of hhs practicing intercropping	0.82	0.86	0.68		***	***
% of hhs using irrigation(dry season)	0.15	0.11	0.061		***	**
% of hhs affected by soil erosion	0.70	0.60	0.60	**	***	
% of hhs using manure	0.68	0.56	0.43	***	***	***
Value of harvest(MWK)('000)	205.0	150.3	125.5	***	***	
Maize yield(ton/ha)	2.38	2.35	1.83		***	***
Observations	405	199	538	604	943	737

*p<0.1, ** p<0.05, *** p<0.01.

1 vs 2: Non-random vs random sample(same village), household targeting

1 vs 3: Non-random vs random sample(different village), village/household targeting 2 vs 3:

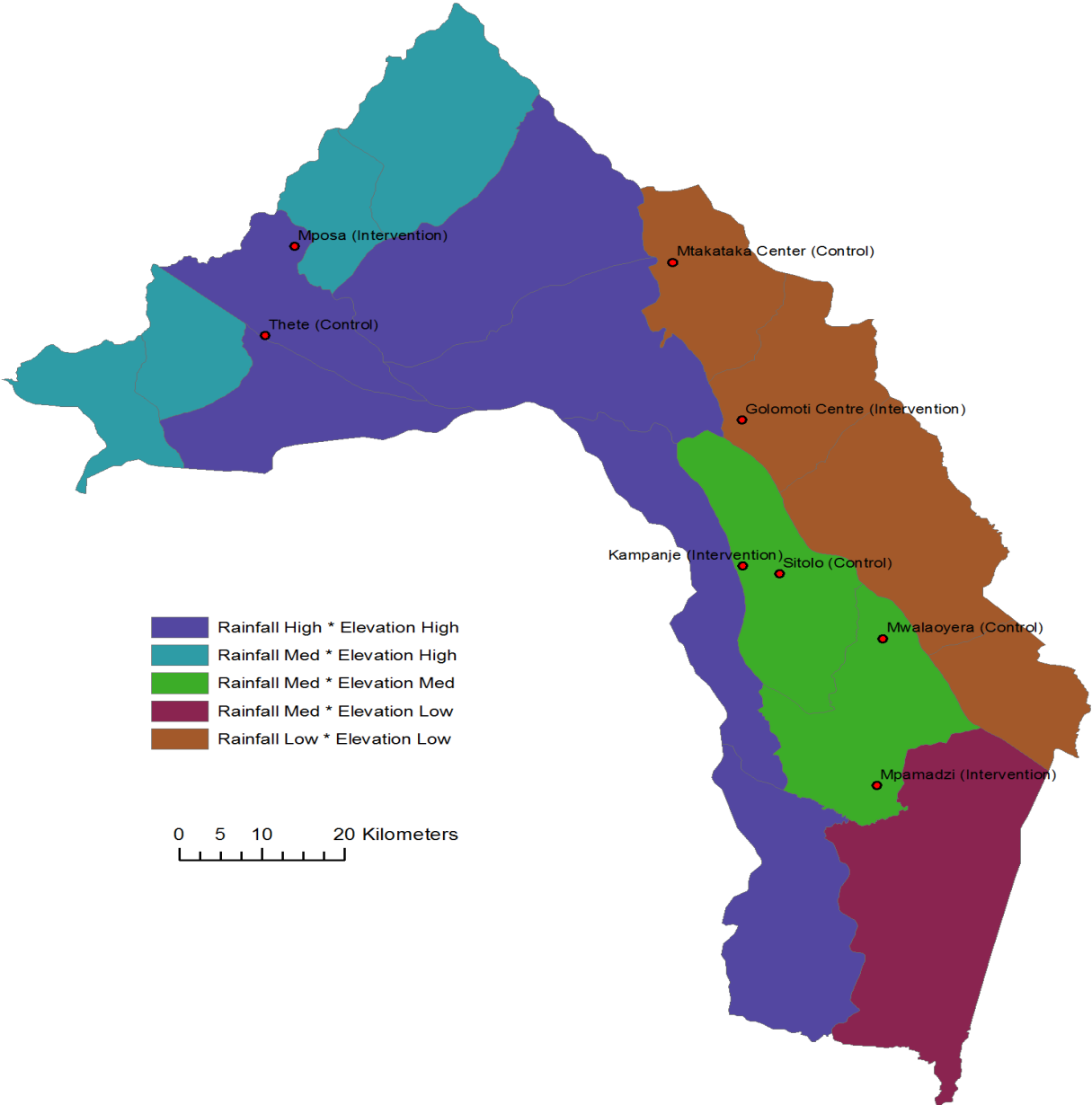
Random sample (different village), village targeting (insignificant differences)

			Panel A. AET	
Beneficiary versus Control	0.83		0.52	1.13
Beneficiary versus Non-beneficiary	0.39		0.03	0.74
Non-beneficiary versus Control	0.44		0.16	0.71
			Panel B. QTE (1st quartile)	
Beneficiary versus Control	0.33		0.22	0.44
Beneficiary versus Non-beneficiary	0.08		-0.08	0.25
Non-beneficiary versus Control	0.24		0.09	0.40
			Panel C. QTE (Median)	
Beneficiary versus Control	0.53		0.35	0.72
Beneficiary versus Non-beneficiary	0.16		-0.12	0.43
Non-beneficiary versus Control	0.38		0.12	0.63
			Panel D. QTE (3rd quartile)	
Beneficiary versus Control	1.14		0.76	1.53
Beneficiary versus Non-beneficiary	0.40		-0.05	0.85
Non-beneficiary versus Control	0.75		0.34	1.15

Significant at the 5 percent level

Higher maize yield for AR households and non-beneficiaries, relative to controls, on average and across the distribution; stronger effect on the right tail

Site stratification



Some examples of AR SI innovations

Country	Technologies
Malawi	<ul style="list-style-type: none">• On-farm adaptive agronomic experimentation (WP1)• Integration of climbing beans (WP2)• Livestock intensification (WP3)• Nutritional status improvement and diversification (WP4)• Dissemination, impact and networking (WP5)
Tanzania	<ul style="list-style-type: none">• Assessment of biophysical production constraints (WP1)• Improved food and feed crop varieties (WP2)• Improved fodder species (WP3)• Local fertilizer & technology complementarities (WP4)• Evaluation of mycotoxin contamination (WP5)• Postharvest nutrition technologies (WP6)
Ethiopia	<ul style="list-style-type: none">• Field crop varietal selection and management• Land, soil, water management• Integrated disease and pest management• Tree-crop-livestock integration for improved biomass, nutrient, energy efficiency and carbon sequestration• Monitoring and evaluating the impact of innovation platforms

Some examples of AR SI innovations

Country	Technologies
Ghana	<ul style="list-style-type: none">• Intercropping, crop rotation and diversification, post-harvest loss reduction, ISFM (WP2)• Biological control of Aflatoxins in maize and groundnut (WP3)• Integration of vegetables into cereal-legume systems (WP4)• Improving productivity of integrated crop-livestock systems (WP7)• Land, soil, and water management (WP8)
Mali	<ul style="list-style-type: none">• Improvement of farm productivity and profitability (WP5)• Natural resources management (WP9)
Ghana & Mali	<ul style="list-style-type: none">• R4D platforms (WP1)• Intensifying livestock and poultry production (WP6)• Improving household nutrition through agricultural and behavioral changes (WP10)