Demand and supply factors constraining the emergence and sustainability of an efficient seed system: A pre-registered report

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Abstract

Agricultural technology remains under-adopted among smallholder farmers in Sub-Saharan Africa. We investigate how the quality of an agricultural technology – improved maize seed – affects its adoption. The research entails three hypotheses that will be tested in a series of randomized controlled trials among agro-input dealers and smallholder farmers in Uganda. In a first hypothesis, quality concerns that constrain uptake are caused by information inefficiencies at the level of the agro-input dealer, who is assumed to lack knowledge about proper storage and handling. An intensive training program is expected to increase improved maize seed quality and subsequent adoption by farmers. A second hypothesis conjectures that information asymmetry between seller and buyer with respect to the quality of seed

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– a classic lemons technology – leads to under-adoption. We implement a crowd-sourced information clearinghouse similar to yelp.com to test this hypothesis. This hypothesis targets the interaction between farmers and input dealers. A third hypothesis targets farmers directly, as sub-optimal adoption is assumed to be caused by learning failures: Farmers might attribute disappointing outcomes to poor input quality, while in reality many input dimensions like the time of planting, weeding and fertilizer application co-determine outcomes. An ICT-mediated information campaign that stresses the importance of paying attention to all input dimensions is implemented to test this hypothesis.

keywords: seed systems, information clearing house, learning failures, information, input quality, agricultural technology adoption

JEL codes: O13; Q12; Q16; D82; D83

1 Balance tables

1.1 Orthogonality test for input dealers

Standard orthogonality tables will be included in the report. At each outcome level (farmer or input dealer), we pre-register 10 variables. Half of these are characteristics that are less likely to be affected by the intervention, while the other 5 picked from the primary and secondary outcomes listed in the next section.

References

Table 1: Orthogonality tests - agro-input dealer level

	mean	dealer training	clearing house	farmer video
age of the person interviewed - years	32.427	2.024	-0.039	-2.662
	(11.492)	(3.002)	(2.514)	(2.483)
gender of the person interviewed - 1 is male	0.595	-0.057	0.054	0.080
	(0.492)	(0.132)	(0.121)	(0.107)
education level of the interviewed - 1 if finished primary	0.897	-0.010	-0.098^{+}	-0.069
	(0.305)	(0.051)	(0.054)	(0.066)
number of years the business has been in operation (years)	5.339	-0.362	0.208	-0.124
	(6.299)	(1.738)	(1.482)	(1.380)
distance of agro-input dealer to nearest tarmac road - km	6.523	2.644	0.917	-1.324
	(10.410)	(3.433)	(3.153)	(2.292)
daily number of customers	41.486	8.954	-3.565	-4.755
	(46.489)	(11.451)	(8.219)	(10.085)
quantity of seed sold during the last season - kg	910.885	562.086	131.991	-24.944
	(2683.235)	(798.484)	(370.020)	(585.445)
quantity of seed that was lost/wasted during the last season - kg	3.504	-3.210	-1.869	-3.394
	(18.651)	(3.232)	(3.387)	(4.053)
Ever received training? (1=yes)	0.526	-0.052	0.006	-0.011
	(0.500)	(0.115)	(0.126)	(0.108)
Knows best seed packaging practice (1=yes)	0.270	0.048	0.095	-0.099
	(0.445)	(0.120)	(0.120)	(0.120)
Number of observations	348	348	348	348

Note: First column reports sample means (and standard deviations below); **, * and + denote significance at the 1, 5 and 10 percent levels. Reported standard errors are clustered at the level of randomization (catchement area).

Table 2: Orthogonality tests - farmer level

	mean	dealer training	clearing house	farmer video
age of household head in years	48.617	1.744	0.202	0.181
	(13.385)	(1.120)	(1.138)	(1.059)
household head finished primary education	0.503	-0.073	0.003	-0.036
	(0.500)	(0.050)	(0.042)	(0.039)
gender of household head (1 is male)	0.777	-0.053	-0.013	-0.047
	(0.416)	(0.044)	(0.046)	(0.042)
household size - number of individuals eating in house regularly	8.695	-0.123	0.035	0.401
	(3.979)	(0.401)	(0.310)	(0.322)
distance of homestead to nearest dealer selling maize seed in km	3.779	-0.807	0.294	0.045
	(4.789)	(0.706)	(0.969)	(0.712)
roof made of iron sheets	0.923	-0.007	-0.005	0.003
	(0.266)	(0.034)	(0.037)	(0.027)
used quality maize seed on any plot in last season	0.492	-0.020	-0.032	-0.041
	(0.500)	(0.046)	(0.037)	(0.038)
thinks that maize seed at agro-input dealers is adulterated	0.685	0.021	-0.044	-0.023
	(0.465)	(0.062)	(0.073)	(0.056)
bought quality maize seed from dealer in last season	0.320	0.000	-0.004	0.000
	(0.467)	(0.044)	(0.041)	(0.035)
maize yields on randomly chosen plot in last season (kg per acre)	864.249	-148.190*	-108.483	-29.801
	(2785.970)	(72.572)	(79.294)	(79.294)
Number of observations	3470	3470	3470	3470

Note: First column reports sample means (and standard deviations below); **, * and + denote significance at the 1, 5 and 10 percent levels. Reported standard errors are clustered at the level of randomization (catchement area).