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 Introduction

This document will evolve into a pre-registered report for the project "Demand and supply factors constraining the emergence and sustainability of an efficient seed system". While currently it only shows the balance tables for the baseline data, all tables with results corresponding to the pre-analysis plan and underlying code will be incorporated in the document before endline data is collected. Simulated data, consisting of random samples from the baseline data, will be used to populated the table. Such a comprehensive approach using "mock reports" have been suggested as a more affective tool against specification search then solely relying on a pre-analysis plan (Humphreys, De la Sierra, and Van der Windt, 2013).

2 Balance tables

2.1 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.

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)	(0.096)
Number of observations	348	348	348	348

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)	(1.085)
household head finished primary education	0.503	-0.073	0.003	-0.036
	(0.500)	(0.050)	(0.042)	(0.043)
gender of household head (1 is male)	0.777	-0.053	-0.013	-0.047
	(0.416)	(0.044)	(0.046)	(0.043)
household size - number of individuals eating in house regularly	8.695	-0.123	0.035	0.401
	(3.979)	(0.401)	(0.310)	(0.344)
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)	(0.731)
used quality maize seed on any plot in last season	0.492	-0.020	-0.032	-0.041
	(0.500)	(0.046)	(0.037)	(0.042)
thinks that maize seed at agro-input dealers is adulterated	0.685	0.021	-0.044	-0.023
	(0.465)	(0.062)	(0.073)	(0.057)
bought quality maize seed from dealer in last season	0.320	0.000	-0.004	0.000
	(0.467)	(0.044)	(0.041)	(0.043)
amount of quality maize seed bought from dealer in kg (NA=0kg)	3.533	-0.376	-0.784	-1.235
	(9.198)	(1.067)	(1.009)	(0.842)
maize yields on randomly chosen plot in last season (kg per acre)	499.517	-60.344	-52.807	-26.771
	(771.173)	(39.345)	(42.556)	(42.351)
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).

References

Humphreys, M., R. S. De la Sierra, and P. Van der Windt. 2013. "Fishing, commitment, and communication: A proposal for comprehensive nonbinding research registration." *Political Analysis* 1–20.