How would smallholders like to access hybrid maize seeds? Evidence from a choice experiment on the attributes of seed distribution system in Ethiopia

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Problem Statement

- Ensuring access to high quality seeds remains a challenge in many African countries
- Seed system in Ethiopia, especially the hybrid maize distribution and marketing has remained under the control of state-sponsored cooperatives
- Research suggests that state-run cooperatives have not been very efficient (Alemu et al.,2010)
- To rectify the problem, an important policy shift was made in 2013, called the 'Direct Seed Marketing' (DSM)
- DSM authorizes seed enterprises to directly sale hybrid maize seeds via cooperatives, private traders or governmental development agents
- Lack of empirical evidence on how smallholders prefer to access hybrid maize seeds, and which attributes of the seed distribution system matter the most to them

Methods and Data

- A choice experiment focusing on 6 hybrid seed distribution attributes conducted (See table below)
- Attributes identified through expert interviews and focus group discussions with farmers
- Household survey with 325 randomly selected farmers in the maize belts of Oromia and Amhara regions (Bako and Mecha districts respectively)
- D-Optimal design, 10 Choice Sets drawn as an optimum minimum and two alternatives + the status quo constructed (see sample below)
- Farmers' preference of the distribution attributes was modeled using the latent class logit model (LCM)

No	Attribute	Description of Attributes	Status Quo	Levels
1	Sales Outlet	Number of hybrid maize seed sales outlets	1	2,3,4
2.	Seed Purity	Expected levels of purity in terms of germination, yield potential, defects and mix-ups with other off types	About 75%	About 80% About 95% About 99%
3	Seed Quantity	Amount of hybrid maize seed a farmer can buy at a time	Limited	Half Increment, Double Increment
4	Group Formation	Partnering with someone to buy seed less than the minimum package size (i.e. 12.5kg)	Individual/Group	Individual/group
5	Credit Provision	Mode of payment during seed purchase	0%(No)	Half (50%), Full (100%)
6	Price of Seed	Average price of 12.5 kg hybrid maize seeds in ETB	600(350)	475, 500,575

Sample Choice Card/Set

Attributes	Choice 1	Choice 2	Status Quo
• Sales outlet • Seed purity • Seed quantity • Group formation • Credit provision • Price	• 4 • About 95% • 50% Increment • Individual • 50%(Half) • 500 Birr	• 2 • About 80% • 100% Increment • Group • 100% (Full) • 575 Birr	• 1 • About 75% • Limited • Group/Ind • 0 %(No) • 475 Birr

Results from the Choice Experiment

- Three classes of farmers identified using the Bayesian Information Criteria (BIC) with the class share of 27.2%, 46.5% and 26.3% respectively
- In general, the Choice Experiment implies that
  - Only 2% prefer the Status Quo alternative
  - 50.7 % & 47.3 % have chosen alternatives 1 and 2 respectively

➢ The results of the LCM on farmers' attribute specific preference is shown in the table below:

Variables	Class 1	Class 2	Class 3
Sales Outlet	-0.227 (0.24)	0.489***(0.07)	0.747***(0.10)
Seed Purity Levels			
About 80%	6.828***(1.51)	3.358***(0.80)	1.033***(0.27)
About 95%	7. 303***(1.48)	4.911***(0.81)	-0.993**(0.37)
About 99%	5. 445***(1.48)	4.019***(0.82)	0.233(0.36)
Quantity (+50%)	-0.249(0.29)	-1.006***(0.09)	0.724***(0.12)
Group	2.824***(0.34)	-0.325***(0.07)	0.569***(0.11)
Credit (50%)	-0.027(0.34)	0.555***(0.07)	0.004(0.11)
Price	-0.036***(0.007)	0.019***(0.002)	-0.009***(0.002)
Class Membership Variables			
Constant	2.820	-3.488	
Gender (1=male)	0.975	1.422	
Education	0.135	0.156**	
Irrig access(dum)	0.091	0.797**	
Landln	0.249	0.178	
Outlet distance(minute)	0.044 ***	0.020**	
Market access(dum)	-0.826 *	-0.519	
District (dum)	-1.327**	-2.809***	
Coop_Memb.(dum)	-0.765*	0.556	
TTLU	-0.106	-0.218**	
Class share (%)	27.2	46.5	26.3
Number of observation	9750	9750	9750
Number of respondents	325	325	325
Log-likelihood	-1882.4263	-1882.4263	-1882.4263
Standard errors in parentheses	*p<0.1, **p<0.05, ***p<0.01 Only few covariates reported		

Way Forward and Policy Implication

- Seed quality, outlet number and mode of payment are positively and homogeneously preferred by majority. Implies the need to:
  - ➔ streamline efforts and keep the promises of DSM, and enhance competition and thereby seed quality
  - ➔ opt for alternative modes of payments
  - ➔ increase sales outlet number
- Significant preference heterogeneity to group, quantity and price attributes implies the need to:
  - ➔ open up alternative minimum packaging size
  - ➔ realignment of the DSM or opt for alternative approaches
- Overall, the result implies that 'one size doesn't fit all'
- Therefore, an approach that intersects farmers' preferences and considers their social and economic circumstances should be in place

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