WTP Case Studies

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Seed related WTP studies conducted with local collaborators (all real auctions using BDM)

- Farmers' perception of seed quality and WTP for perceived quality
  1. **Beans in Tanzania (SUA)**
  2. **Beans in Nicaragua (combined with choice experiments, and information treatment on biofortification) (CIAT)**
  3. **Cowpeas in Ghana (SARI)**

  Perceived quality in these studies was based on double blind field experiments. Farmers assessed quality based on plant performance at flowering stage and harvest stage (no objective data provided)
- **F**armers' willingness to pay for perceived quality seed based on: 1) seed samples (i.e., physical observation of seed) with revealed identity, and 2) based on pictures of plots at flowering stage and harvest stage (blind study)
  4. **Cowpeas in Burkina Faso (INERA)**
- Farmers' willingness to pay for bean varieties and seeds pre-treated and self-treated with Apron Star seed treatment
  5. **Beans in Tanzania (TARI and CIAT)**

Seed related WTP studies conducted (all real auctions based on BDM)

- The Role of Quality Signaling on Willingness to Pay for Potato Planting Material

  6. Potato in Kenya (CIP)

  Experiments included 6 products and 2 information treatments

- Farmer valuation of the quality signal as reflected in packaging, branding, and labeling

  7. Mungbeans in Myanmar (CESD)

  8. Chickpea in Myanmar (CESD)

Case Study 1: Value of Quality Legume Seeds: Evidence from Auction Experiments

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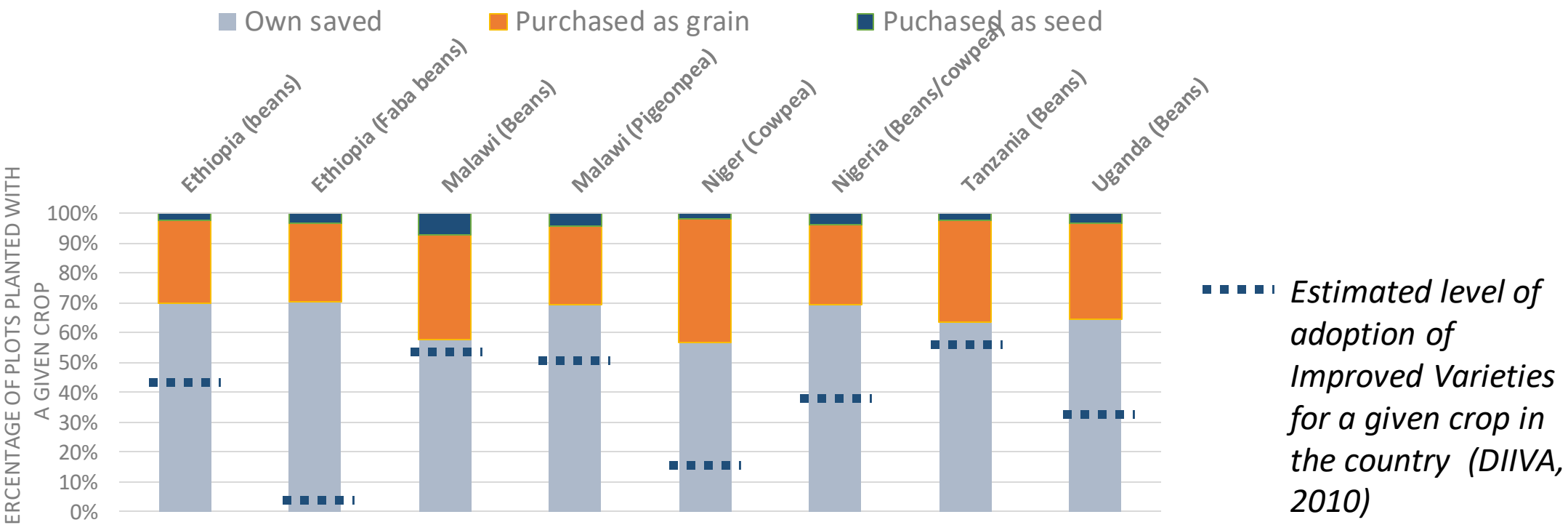
Motivation and objectives…

Sources of seeds planted in previous season – Dry grain legume crops in several countries in SSA



Source: LSMS-ISA nationally representative surveys (various years between 2010-2015)

Stylized facts:

- Self-pollinated crops like beans, cowpeas, pigeon peas, etc. are characterized by low volume (and frequency) of seed purchase
- Adoption of 'quality seed' as a technology is a fraction of adoption of 'improved varieties' for most legume crops in developing countries

Reasons and implications

- Why low demand (or adoption of ‘quality seed’)? Because:
  - ‘Seed’ is highly competitive with ‘grain’ as planting material (at least for 2-3 generations) – **Low seed replacement rate**
  - Farmers may not perceive quality difference between ‘seed’ vs ‘grain’, and thus **not willing to pay higher price for ‘seed’**
  - Seeds are **not available**
- But seeds are not available (i.e., low supply of seeds), because…
  - It costs more to produce ‘quality seed’ than grain
  - Low incentive for private sector to produce seed, because of low demand for seed
- Implications:
  - Farmers grow low quality planting material (even those that are considered as IV adopters) → lowers productivity
  - The seed system has to rely on subsidies → not a sustainable option

Focus of this presentation…

- Why low demand (or adoption of 'quality seed')? Because:
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Research setting

- Focused countries/crops: Tanzania-beans; Ghana-cowpeas
- In these countries--three types of bean/cowpea seed products are potential options available to farmers as planting materials—
  - **Certified seeds produced by seed producers or seed companies from foundation seed and its production/marketing is governed by country's seed certification regulations**
  - **Quality Declared Seeds (QDS) produced by farmer organizations, seed producing farmers from 'quality' seed and good practices, but does not go through the rigor of seed certification process**
  - **Recycled seeds saved from farmers' harvested grain (own, other farmers, grain in market)**

Research setting (cont'd)

- These three types of seeds differ in
  - Seed input (i.e., which generation of seed is used to produce them)
  - Regulatory supervision they receive or do not receive
  - Technical conditions under which they are produced

  → thus vary in cost of producing them (certified seeds are typically 2-3 times the price of grain seed)
- Empirical questions:
  - Do the cost differential across these types of seeds make them qualitatively different products as reflected in their perceived or actual performance of the crop? Does that translate into differential price farmers are willing to pay for these seed types?
- These are rarely addressed in the literature

Research questions

- Our research in four countries was designed to address following two research questions to fill this gap:
  - For a ***given improved variety***, what is the perceived and actual difference in the performance of bean/cowpea crop across seed types available in the market – certified, QDS and farmer saved grain when the seeds are planted and managed by farmers under their conditions?
  - How does the observed differential performance of different types of seed products translate into farmers' willingness to pay (WTP) for these seed technologies?

Methodology

1. Subjective measures of seed performance based on observed characteristics

   a. **Double-blind field experiments (FEs)** (under farmers' management practices; same variety-i.e., keeping genetics constant)

   - FEs were hosted by farmers (1 per village) and planted using farmers' own land and management practices.
   - Farmers from a given village were invited for two filed days. They completed plot performance evaluation and rating of plots based on observable characteristics at flowering and harvest stages (best and worst rating)

Field experiments

Methodology (cont'd)

2. **Experimental auctions**

- Conducted after farmers observed how different types of seeds of a particular variety performed in the field (actual or pictures)
- Becker-DeGroot-Marschak (BDM, 1964) method –
  - Cash endowment was given to farmers for the seed auction (~$1.80 - $2.60)
  - One bid was randomly chosen as binding and a random market price was determined
  - If a farmer's bid is greater than or equal to the randomly drawn price, then that farmer purchased that seed for the randomly drawn price (NOT their bid).
- The difference in the bids between the auctions reveals the premium (or discount) that the farmer is willing to pay due to the different attributes observed in the field
- Before the actual WTP auction for seeds, a practice WTP auction was performed using a bar of soap (farmers were given ~$0.30) for bidding in practice auction

Methodology (cont'd)

- Each farmer was given a bidding sheet and asked to "bid" (in set increments) their maximum willingness to pay for 1 kg of seed for type A, B, C, and D, (or G L M) knowing that one of these four (or 3) auctions will be chosen randomly and the bid for that seed would then be compared to a randomly drawn price between 0 to a set amount = endowment amount.

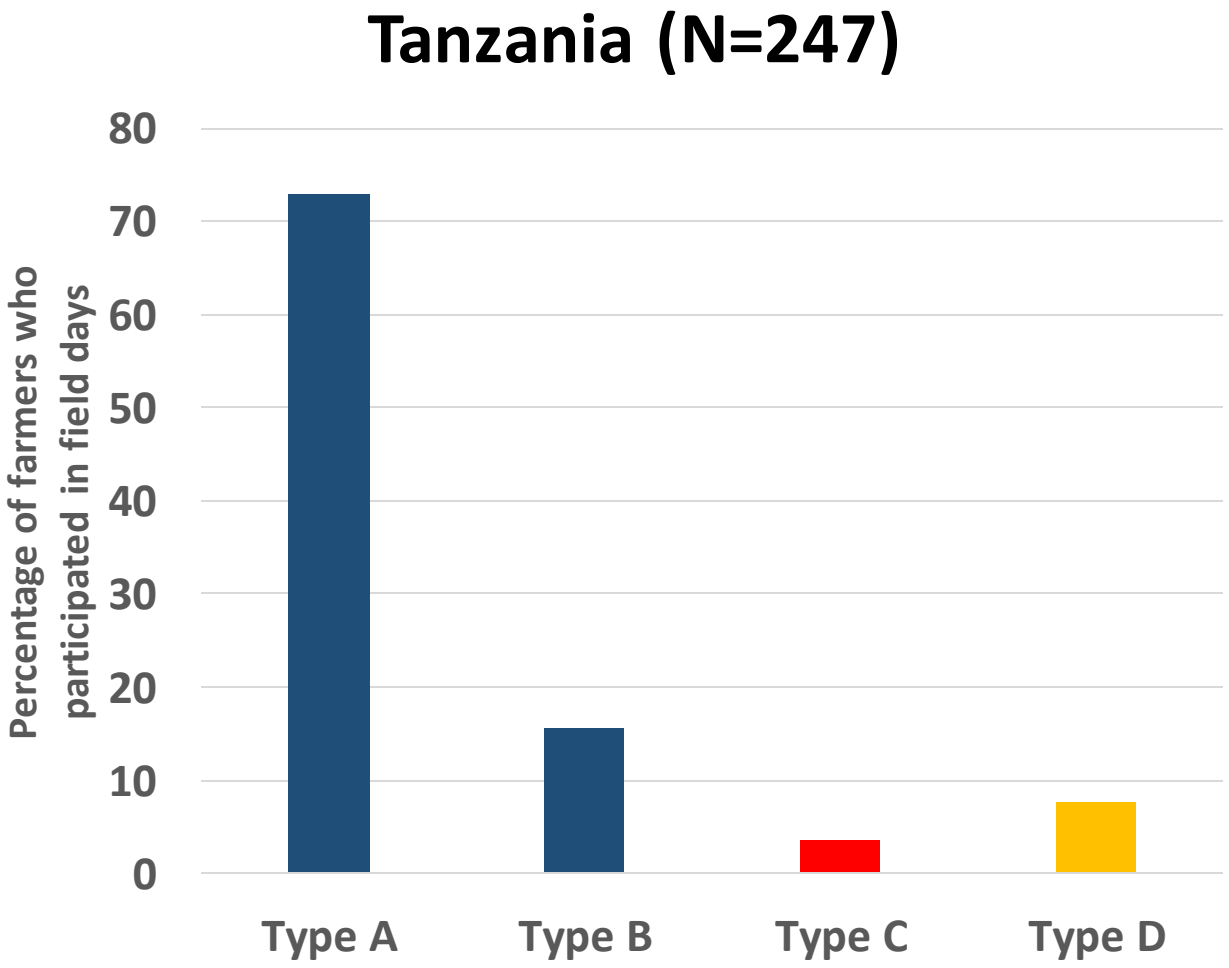
Seed Auction Bidding Sheet

Number on Participant Card/Tag (ID)	
Participant Name	

Your Bid for Plot **A** Seed	Enter the most you are willing to pay. **TS**
Your Bid for Plot **B** Seed	Enter the most you are willing to pay. **TS**
Your Bid for Plot **C** Seed	Enter the most you are willing to pay. **TS**
Your Bid for Plot **D** Seed	Enter the most you are willing to pay. **TS**

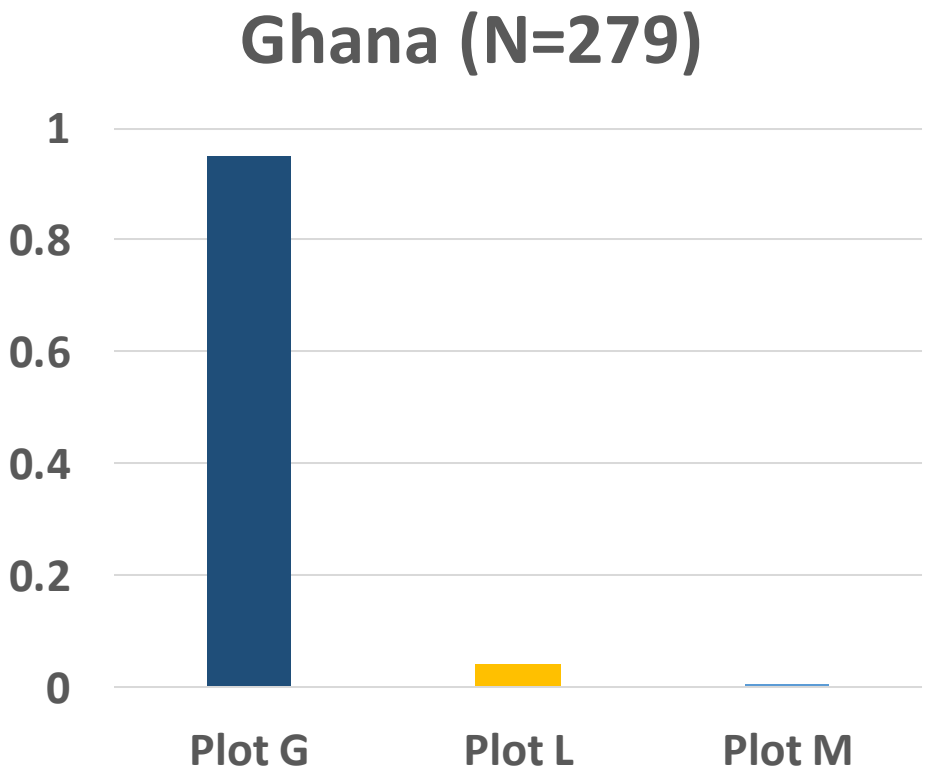
Results

Results of field experiments: Farmer's rating of the BEST plot (Harvest stage)



Note: Type A = Cert 1; Type B = Cert 2; Type C = Recycled; Type D = QDS

Farmer’s rating of the BEST plot (Cont’d)



Type G =Cert; L = QDS; M=Recycled

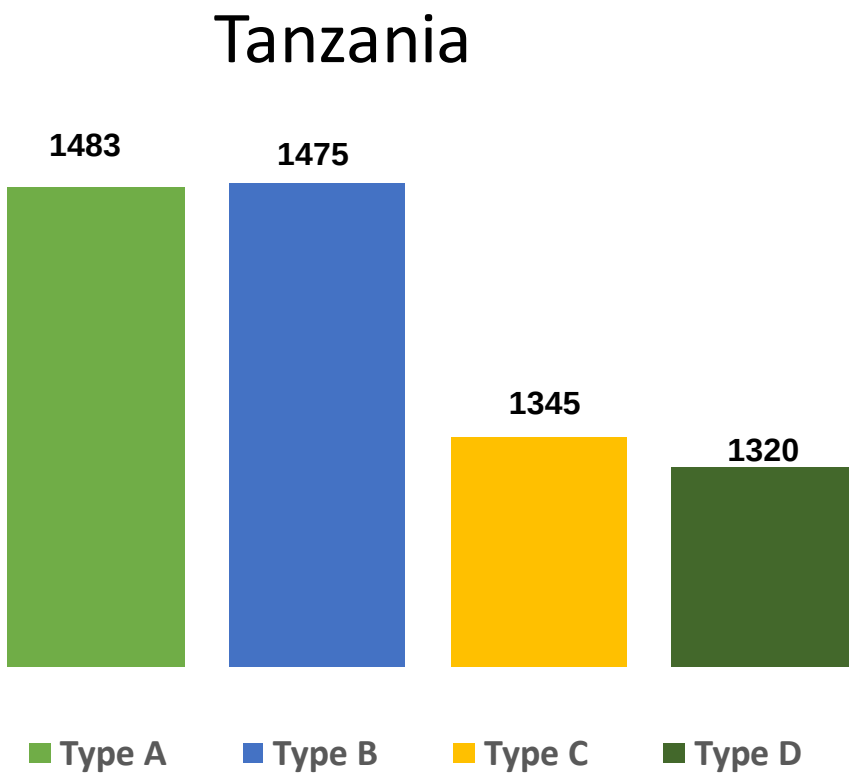
Key points to highlight

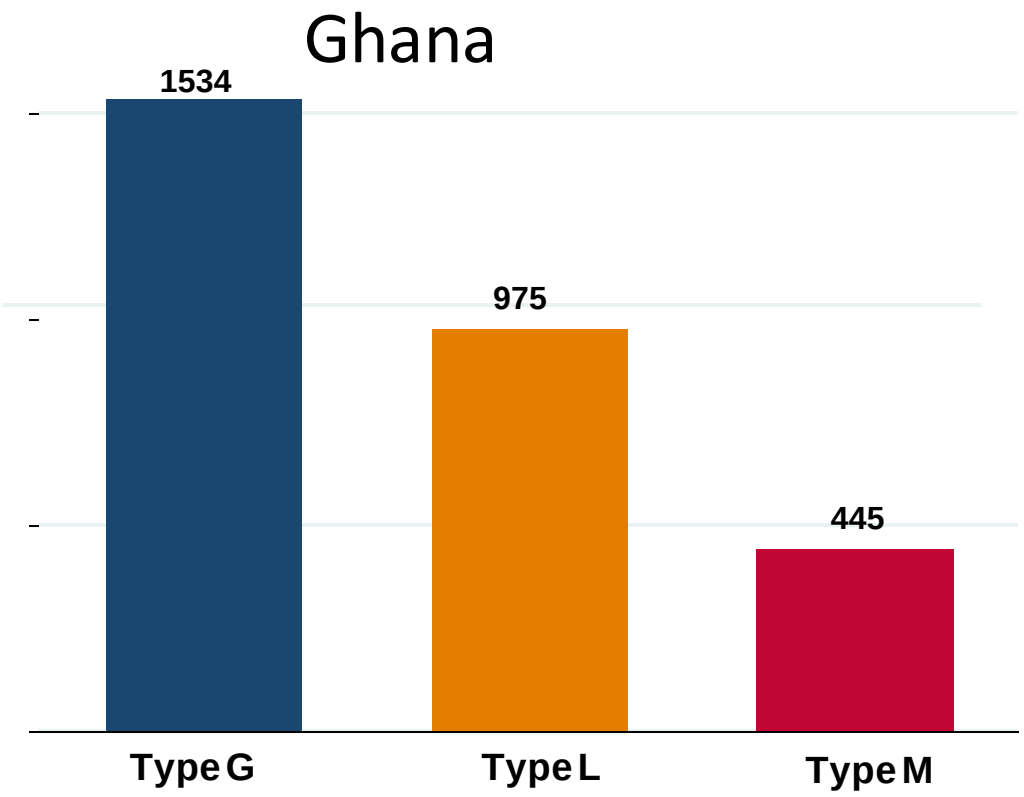
- Farmers perceive quality difference based on plant physiology during growth stage (plant vigor, health, pod formation, number of pods, pod fillings, etc.)
- Farmers' perception of quality highly correlated with actual plant performance as measured by agronomic indicators and grain yield (measured by technical assistants under the guidance of breeders)

Results of field experiments

Relative yields (kg/ha) of different seed types on field experiments

Note: Genetics, environment and farmer practices are constant; only the seed quality type is different

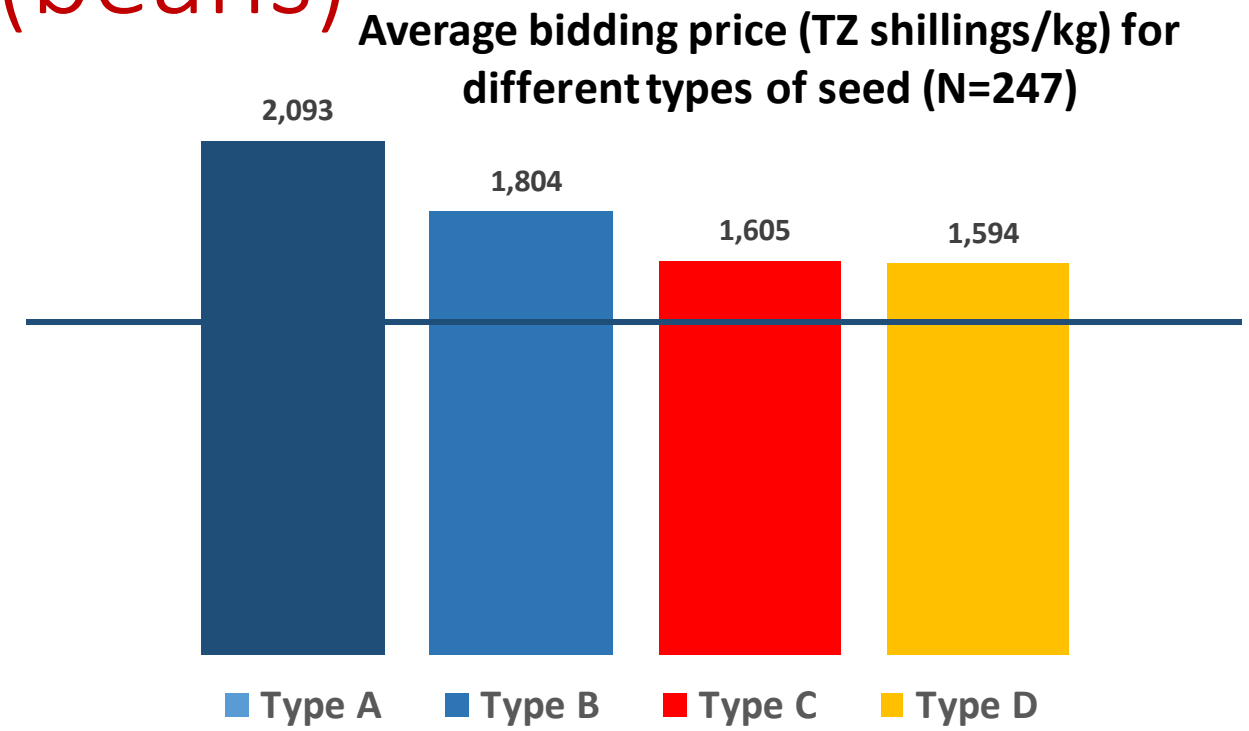




Note: Type A = Cert 1; Type B = Cert 2; Type C = Recycled; Type D = QDS
Tanzania: Yield differences are not statistically significant

Type G =Cert; L = QDS; M=Recycled
Ghana: Yield differences are statistically significant

Results of Bidding Auction Experiments: Tanzania (beans)



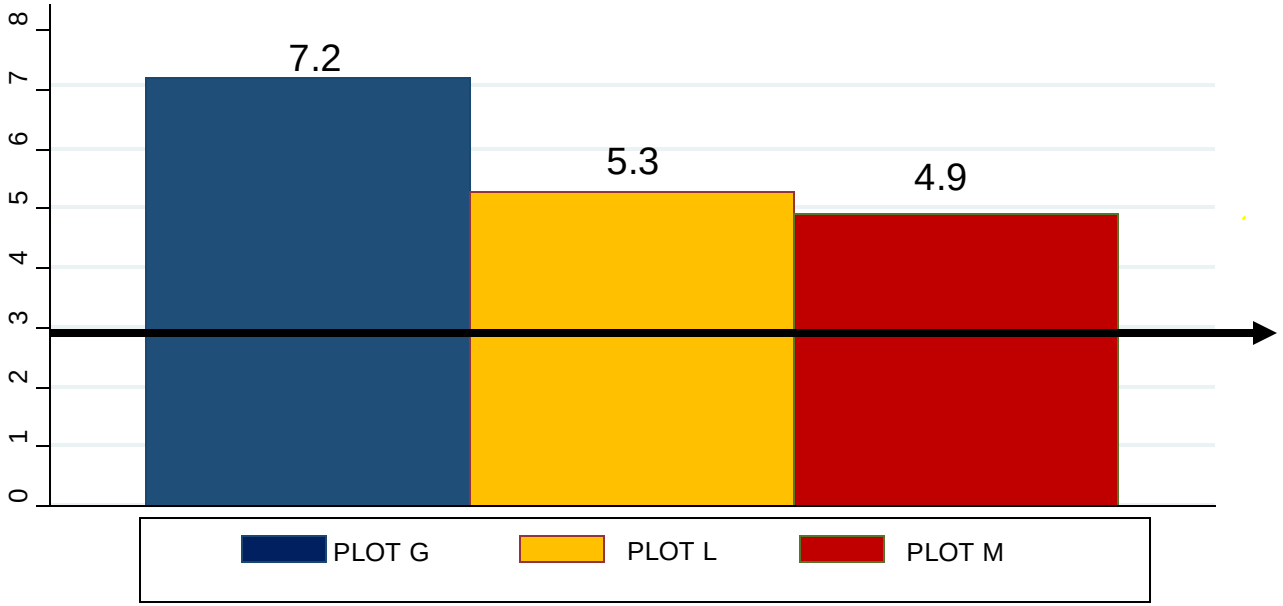
Avg bean grain purchase price (1,577 TS/kg) reported by farmers

- Differences in the mean prices between seed type A and type B, C and D are statistically significant at p=0.01 (***)
- Differences between type B and type C and D are statistically significant at p=0.05 (**)
- Difference between seed type C and D is NOT statistically significant

Note: Type A = Cert 1; Type B = Cert 2; Type C = Recycled; Type D = QDS

Results of Bidding Auction Experiments: Ghana (Cowpea)

Average bidding price (Ghana Cedi GHC/kg) for different seed types(N=269)



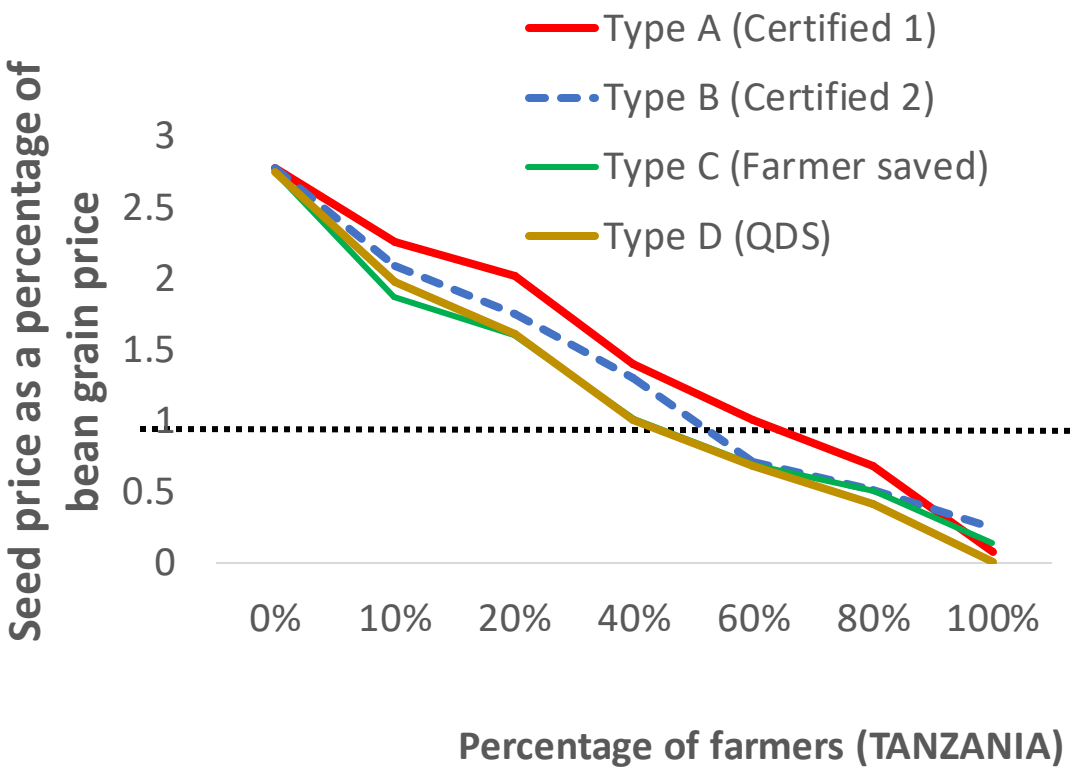
Average cowpea\ Grain price Reported by Farmers was GHC 2.80/kg

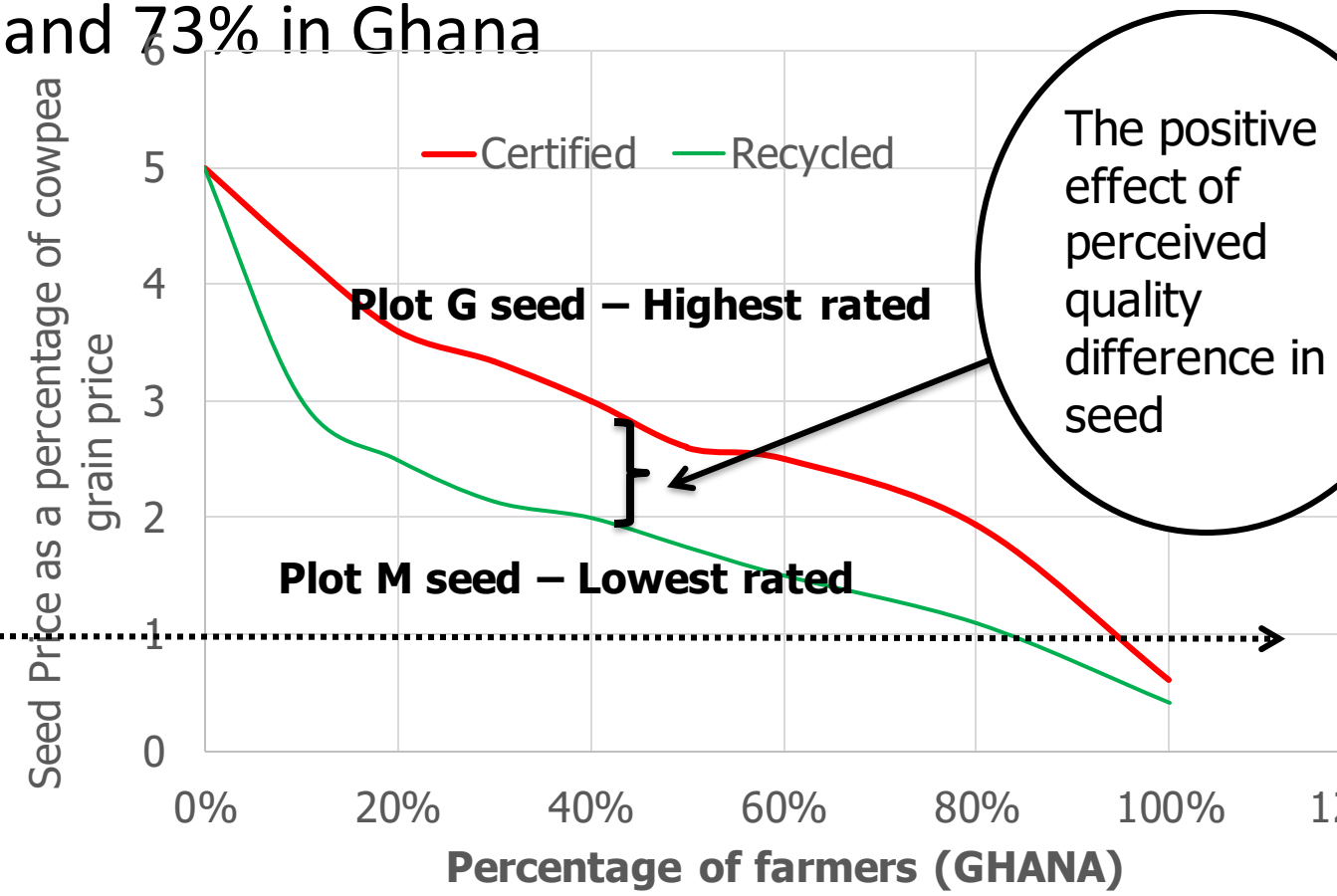
- Differences in the mean prices between type G, L and M seeds are statistically significant at P=0.01

Note: Type G =Cert; L = QDS; M=Recycled

Key point: Farmers are willing to pay a premium for QUALITY seed

- Average price premium farmers are WTP for highest rated seed type (certified seed in both countries) over lowest rated seed type (recycled seed) = 30% in Tanzania and 73% in Ghana





The positive effect of perceived quality difference in seed

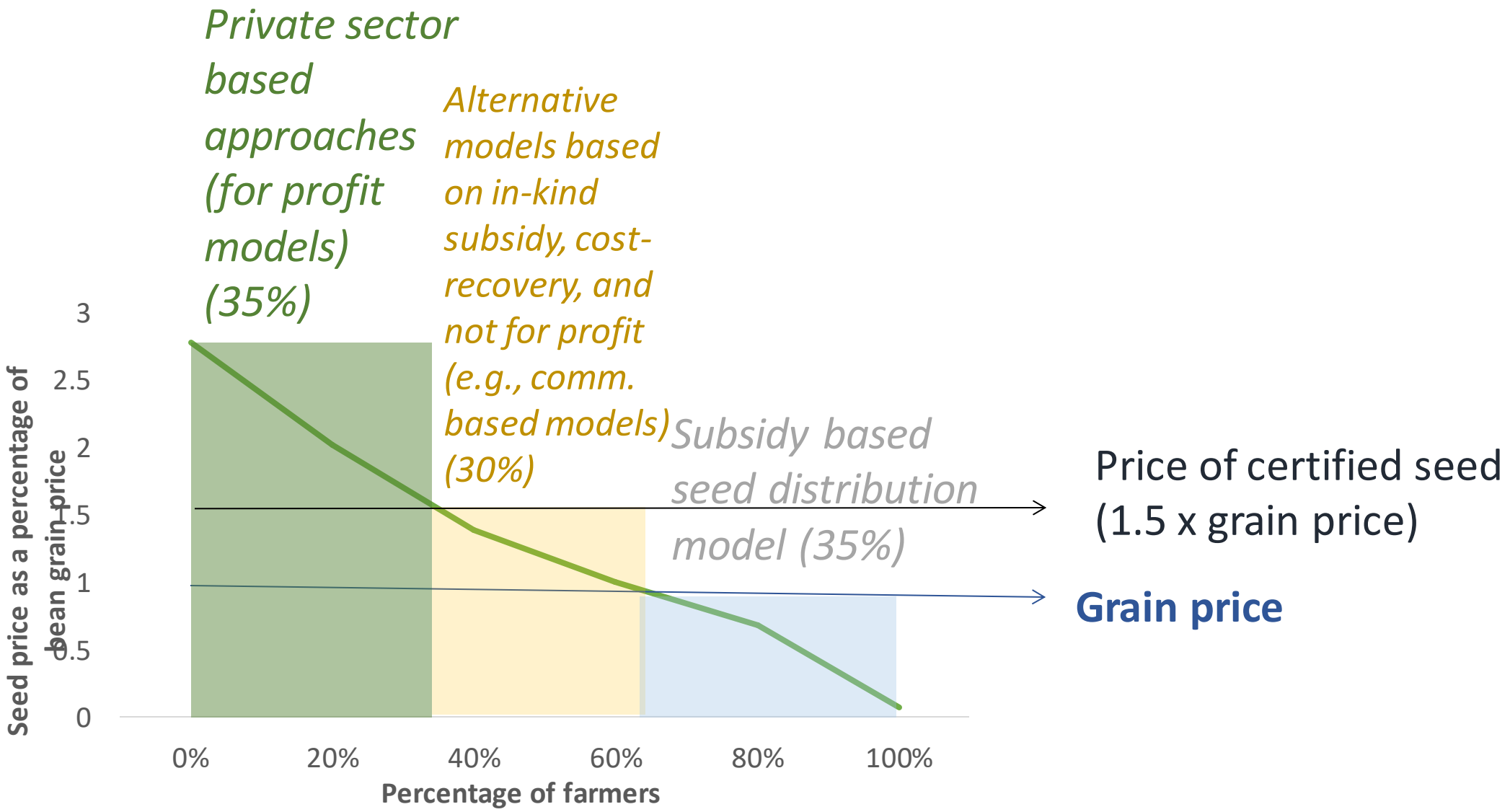
Key Findings	Implications/further research
• Quality seeds (Certified/QDS) perform better in terms of productivity and other important characteristics relative to recycled seeds.	• To increase productivity, it is not sufficient to promote only the adoption of improved varieties, but also quality seed • Need more experimental evidence on productivity differences in seed types across crops and countries
• Farmers are able to perceive quality differences in planting material and are willing to pay a premium for QUALITY seed	• Further research is needed to assess the quantity of seed farmers would be willing to buy at a premium price and the frequency (to gauge the size of the demand)
• However, in practice farmers' use of purchased certified seeds or QDS is much lower than reflected in the percentage of farmers WTP a premium for quality seed	• Is the low demand for seed products a trust issue (i.e., counterfeit seeds)? • How do we ensure quality seeds are sold to farmers?

Key Findings

- Distribution of farmers on a downward sloping demand curve: Only 30-40% farmers' WTP a premium was above the market price premium for certified seeds;
- A majority of smallholder farmers' WTP for quality seed product is lower than the cost of producing quality seed

Implications/further research

Number of farmers willing to pay a premium price for quality seed (downward sloping demand curve)



Key Findings

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Implications/further research

- Need multi-pronged approaches to meet the seed needs of all the farmers
- More research and discussion needs to happen on how to lower the price of seed, but still maintaining some profit margins for seed producers
- One way to lower the cost per unit of 'seed' produced is to:
  - Increase seed yield: i.e., need training, technology, supervision,….
  - Which can reduce the rejection of seeds that don't meet quality standards

Thanks

Welcome questions and feedback

Acknowledgement

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