

Farmer willingness to pay for quality bean seed: Experimental evidence from Tanzania

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Outline

1. Motivation
2. Methodology
3. Emerging results
4. Implications

1. MOTIVATION

Building sustainable seed system for legume crops: Supply and demand side challenges

- One of the important determinants of sustainability of a seed system is the 'effective demand' for seed by farmers
- Self-pollinated crops like beans are characterized by low volume and frequency of seed demand because 'seed' is highly competitive with 'grain' as planting material
- Producing and marketing the bean seed involves taking extra measures to ensure quality; it is thus more costly to produce than bean grain
- **Keeping the genetics constant, the viability of a seed market will depend on the co-existence of following demand and supply side conditions**

Demand side

Are farmers able to perceive the seed product as a quality planting material?

Given the perceived quality difference, are they willing to pay a premium price for seed compared to grain price?

Supply side

Is the price farmers are willing to pay high enough to recover the cost of producing quality seed?

Is the quantity and frequency of seed demanded at that price large enough to attract suppliers to produce and sell quality seed?

Study setting and objectives

- There are no rigorous studies that have examined these demand and supply side dynamics in a systematic manner.
- This study is an attempt to address these questions in the context of Northern Tanzania, where four types of bean seed products are potential options available to farmers as planting materials—
 - **Certified seeds produced from foundation seed (certified 1)**
 - **Certified seed produced from certified 1 seed (certified 2),**
 - **Quality Declared Seeds (QDS)**
 - **Recycled seeds saved from farmers' own harvested grain**
- These four types of seeds differ in seed input (i.e., which generation of seed is used to produce them), the regulatory supervision they receive or not receive, and technical conditions under which they are produced, and thus vary in cost of producing them

Study setting and objectives (cont'd)

- Whether the cost differential across these types of seeds makes them qualitatively different products as reflected in their perceived or actual performance of the plant, and whether that translates into differential price farmers are willing to pay for these seeds are empirical questions rarely addressed in the literature.
- Thus this study is designed to address following two research questions to fill this gap:
 - For a given improved variety, what is the difference in the performance of bean crop across four seed types – certified 1, certified 2, QDS and farmer saved bean grain when the seeds are planted and managed by farmers under their conditions?
 - How does the observed differential performance of different types of seeds translate into farmers' willingness to pay (WTP) for these seeds?

2. METHODOLOGY

Field Experiments (for research question 1) – phase 1

- Double-blind field experiments (FE) were established in 3 villages in the Hai district (northern Tanzania). These FEs were hosted by 16 farmers and planted using farmers' own land and management practices.
- Each seed type for variety *Jesca* were procured by the researchers and given to the host farmers to plant on a 10x10 m plots. A total of $16 \times 4 = 64$ plots were planted with seeds of the same variety under irrigated conditions (July-Sept 2015). Plots were labeled A, B, C and D. Neither the farmers' nor the extension agent who helped in the technical supervision knew the identity of the seed types.
- Six FEs (2 from each village) were selected for two field days where farmers from the village were invited to observe the bean plots around flowering stage (Field day 1) and around harvest stage (Field day 2)
- During the field days, each farmer was asked to evaluate the performance of the 4 plots (i.e., seed type A-D) on characteristics they considered important, and rate one of the plot as the best plot and one as the worst plot (only on Field day 2)



Bidding auctions (for research question 2)

- Once farmers had learned how different types of seeds of a particular variety performed in the field, bidding experimental auctions were carried out during Field Day 2 to elicit information about how much they were willing to pay for these seeds based on the perceived / observed differences in their performance
- We followed the Becker-DeGroot-Marschak (BDM, 1964) method, where participants do not bid against other people, but only against themselves
- 25-30 farmers from each field day participants (only one from a family) were given TS 4000 as their initial endowment (so they don't have to bid using their own money) – total sample size = 113 farmers

Bidding auctions (cont'd)

- Each farmer was given a bidding sheet and asked to “bid” (in increments of 50) their maximum willingness to pay for 1 kg of seed for type A, B, C, and D, knowing that one of the four auctions will be chosen randomly and the bid for that seed would then be compared to a randomly drawn price between 0 to 3950.
- If a farmer’s bid is greater than or equal to the randomly drawn price, then that farmer buys that seed for the randomly drawn price (NOT their bid).
- The difference in the bids between the four auctions reveals the premium (or discount) that farmer is willing to pay due to the different attributes observed in the field
- Before the actual bidding auction for seeds, a practice auction game was played using a bar of soap and by giving each farmer TS 500 for that practice game

Seed Auction Bidding Sheet

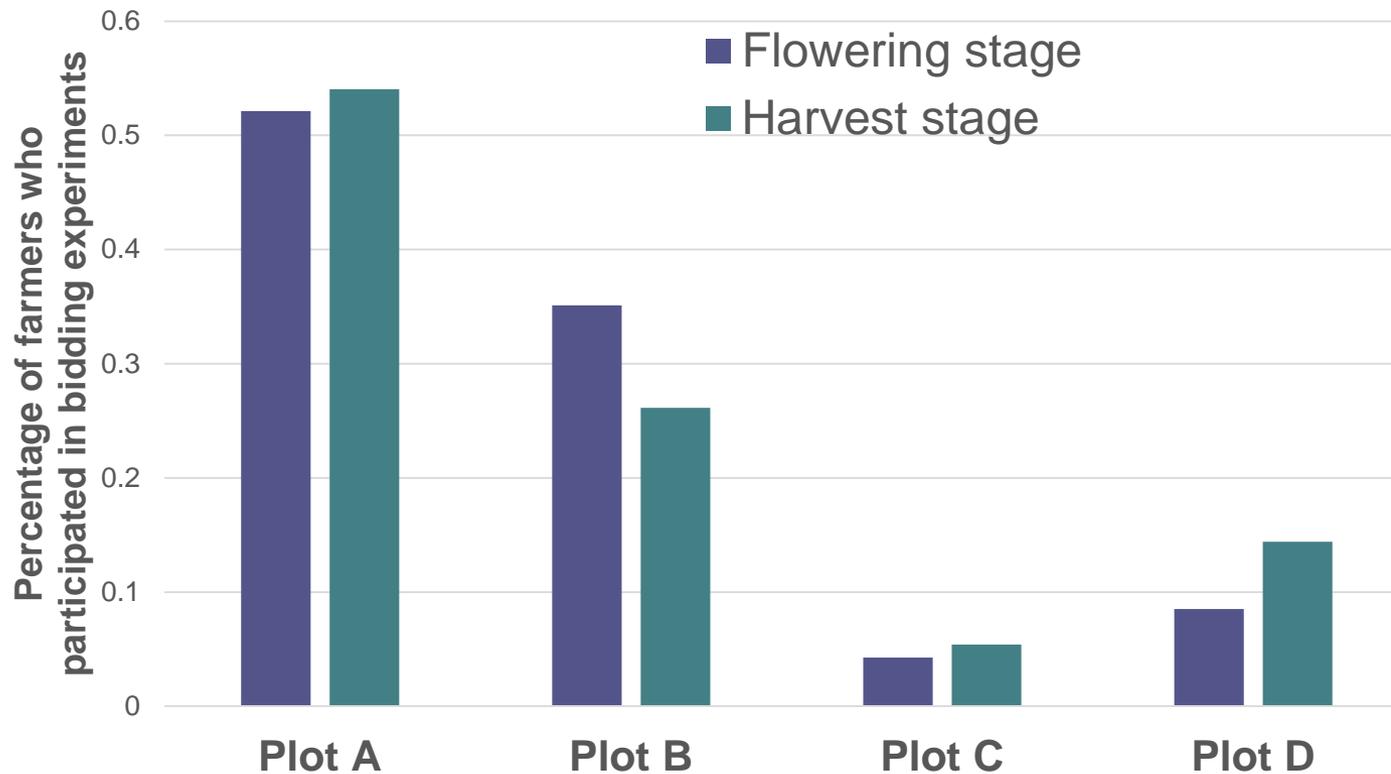
Number on Participant Card/Tag (ID)	
Participant Name	

Your Bid for Plot A Seed	Enter the most you are willing to pay. <div style="text-align: right; font-weight: bold; font-size: 1.2em;">TS</div>
Your Bid for Plot B Seed	Enter the most you are willing to pay. <div style="text-align: right; font-weight: bold; font-size: 1.2em;">TS</div>
Your Bid for Plot C Seed	Enter the most you are willing to pay. <div style="text-align: right; font-weight: bold; font-size: 1.2em;">TS</div>
Your Bid for Plot D Seed	Enter the most you are willing to pay. <div style="text-align: right; font-weight: bold; font-size: 1.2em;">TS</div>

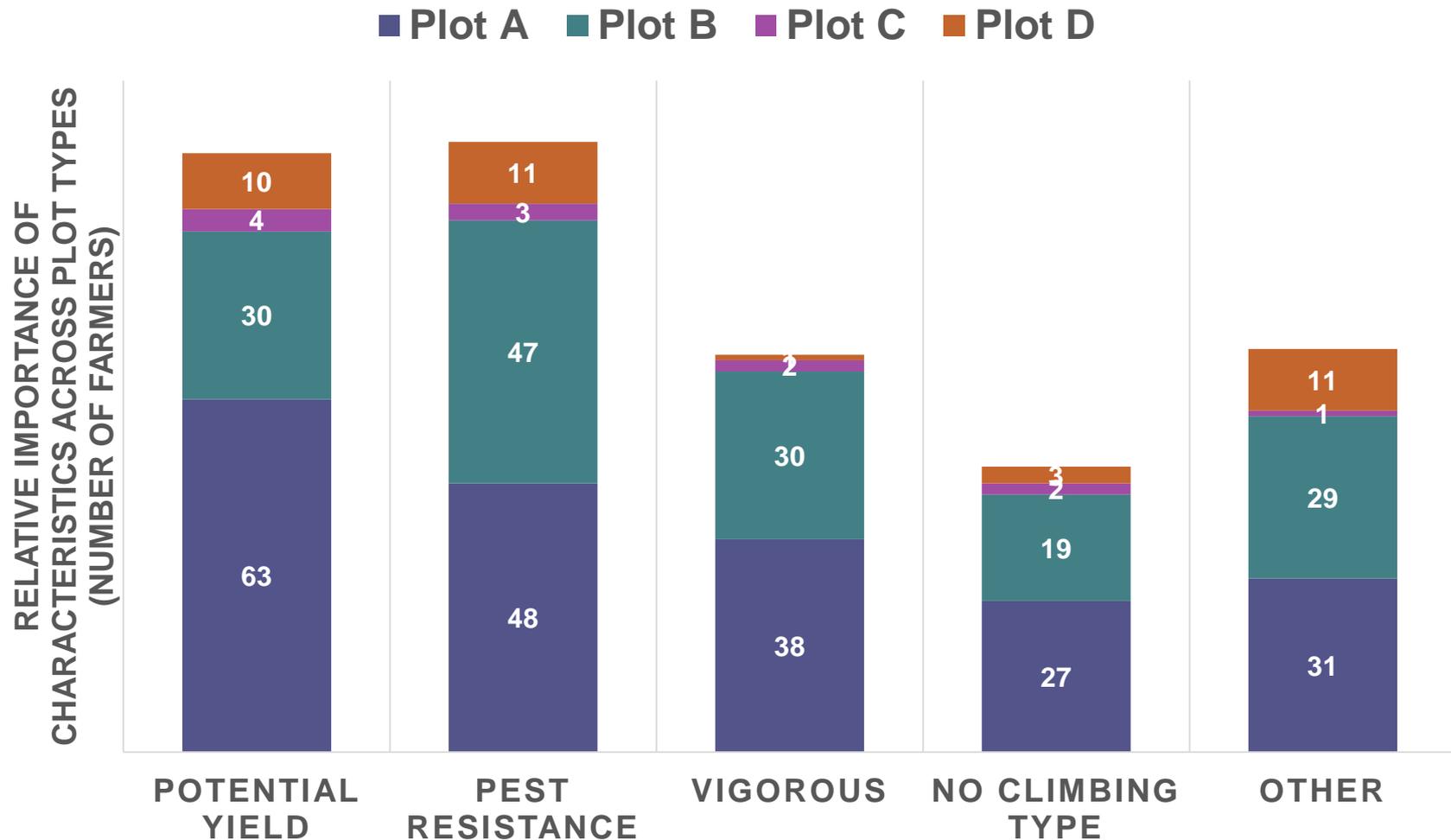
3. RESULTS

Results of field experiments

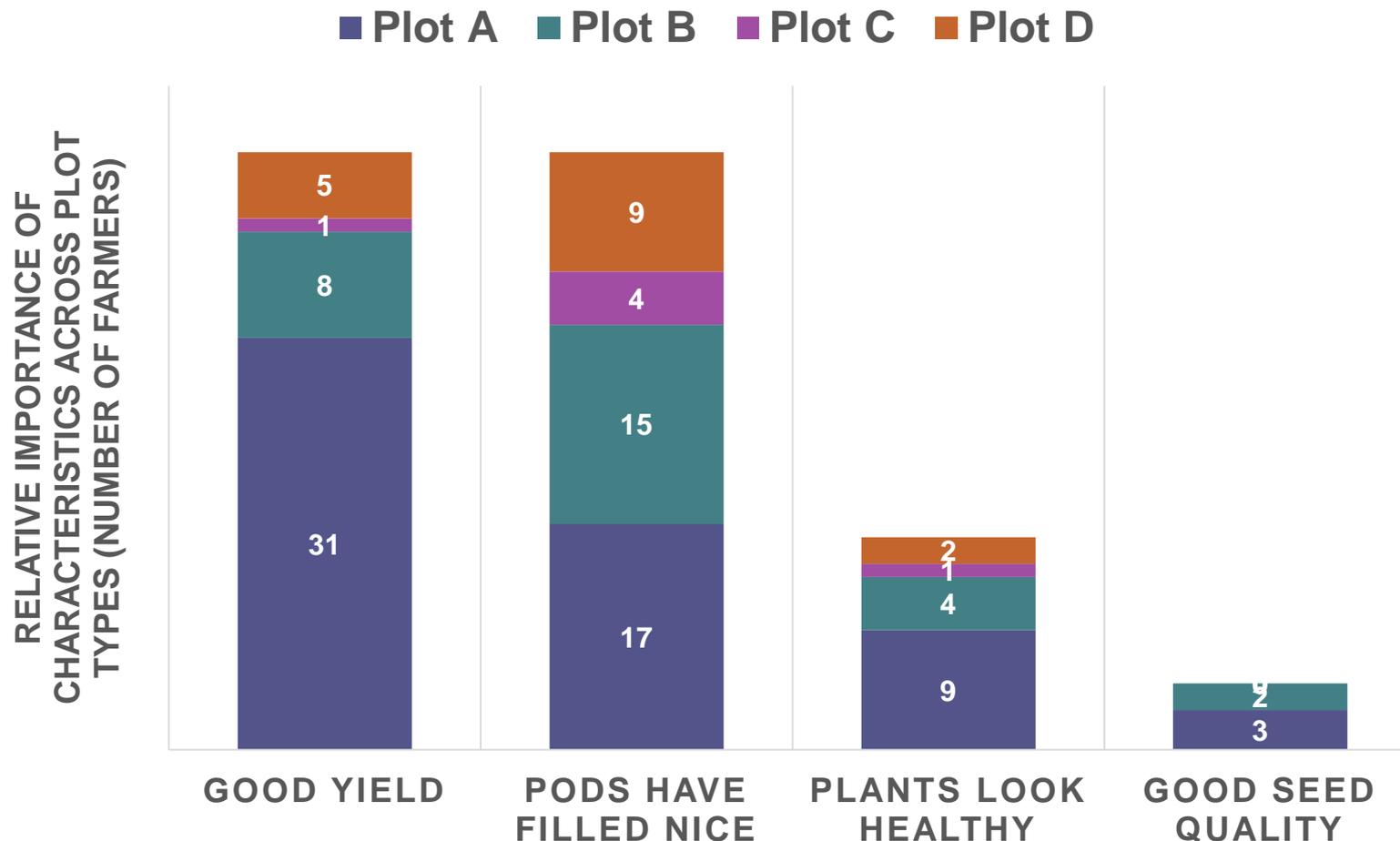
- Farmer's rating of the BEST plot at two stages



Relative importance of different characteristics cited as the reason for rating a best plot (Flowering stage)



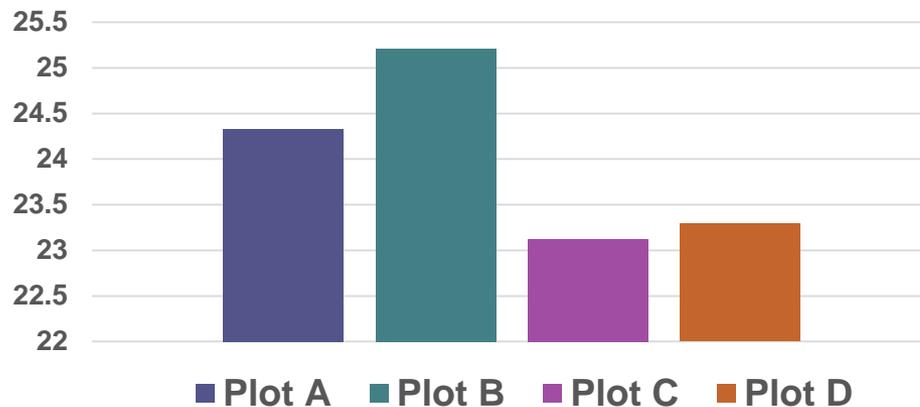
Relative importance of different characteristics cited as the reason for rating a best plot (Harvest stage)



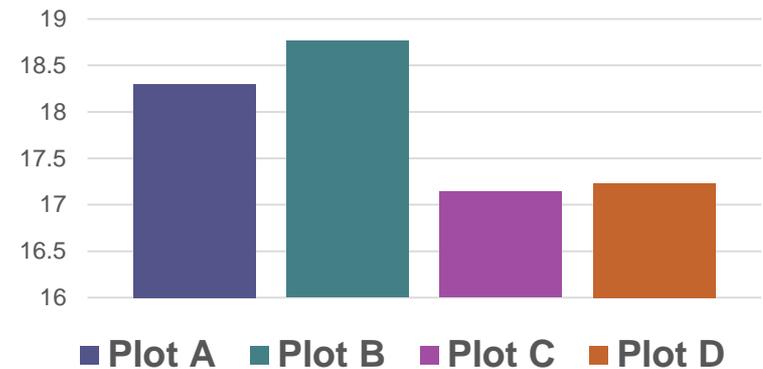
Results of field experiments (cont'd)

Kg of beans harvested from Field Experiments by plot types

In 6 FEs where bidding auction experiments were conducted

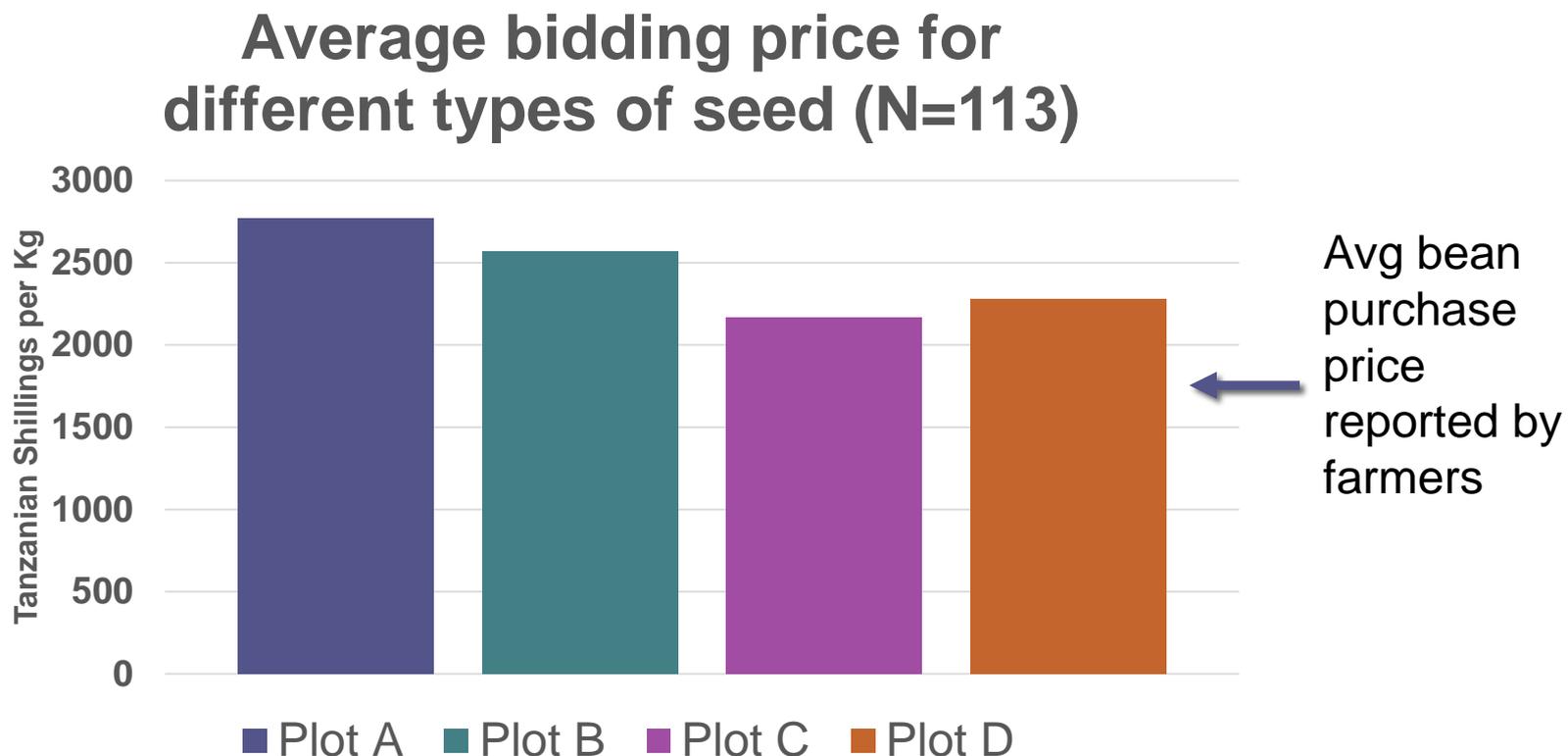


In all 16 Field Experiments



Differences in quantities of beans harvested are NOT statistically significant across plot types in both the graphs

Results of Bidding Auction Experiments



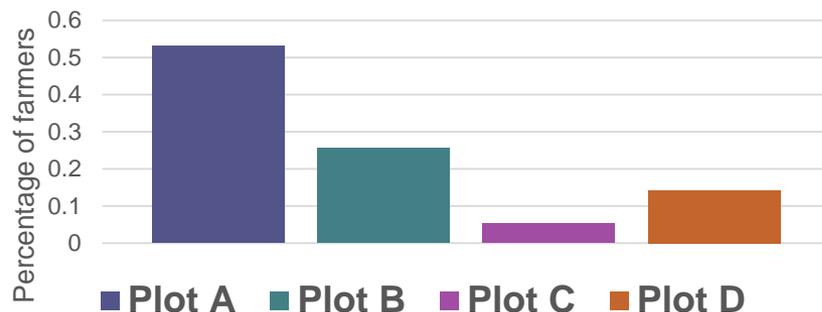
- Differences in the mean prices between seed type A and B and between C and D are NOT statistically significant
- But differences between type A and type C and D; and between type B and type C and D are statistically significant

Comparison of farmers willingness to pay with their perceived quality differences (N=113)

Average bidding price for different types of seed

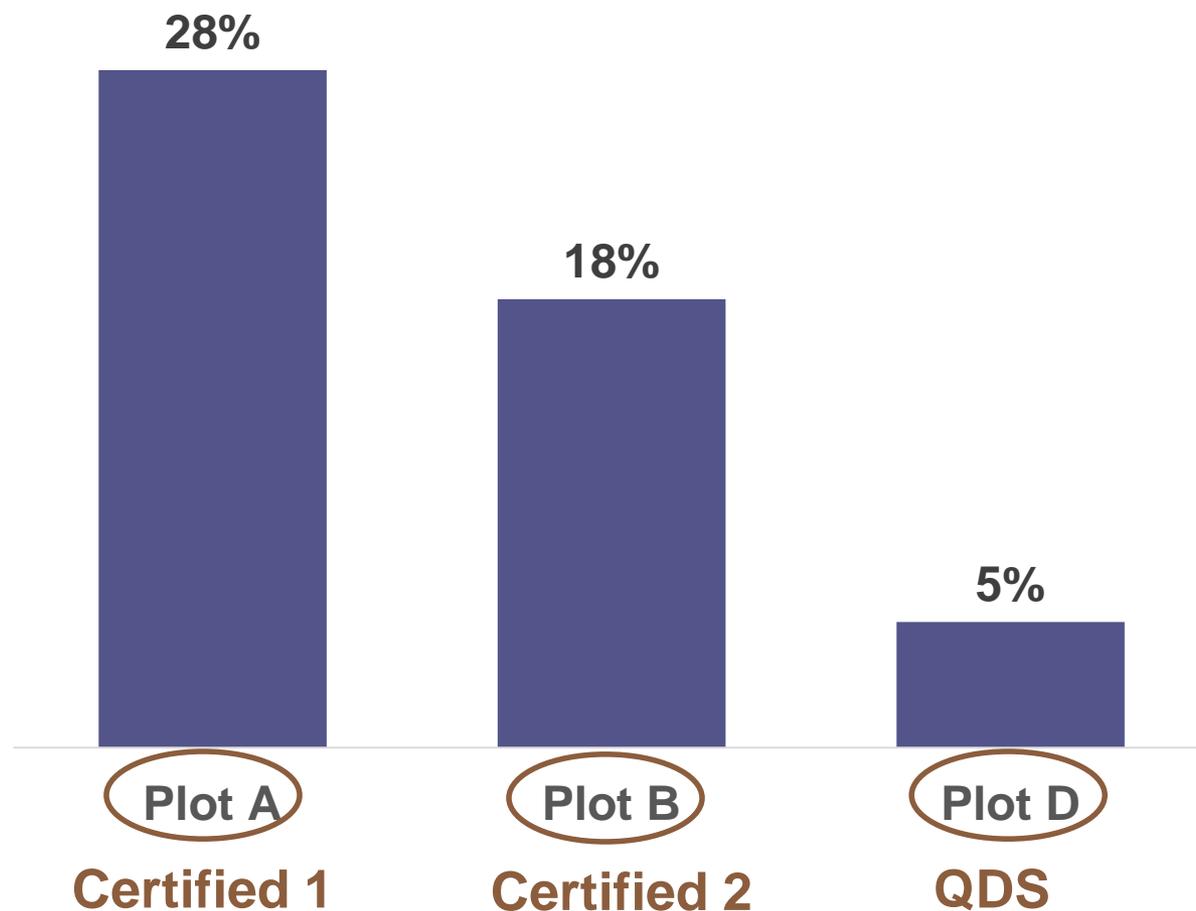


Percentage of farmers that rated a given seed type as the best at harvest

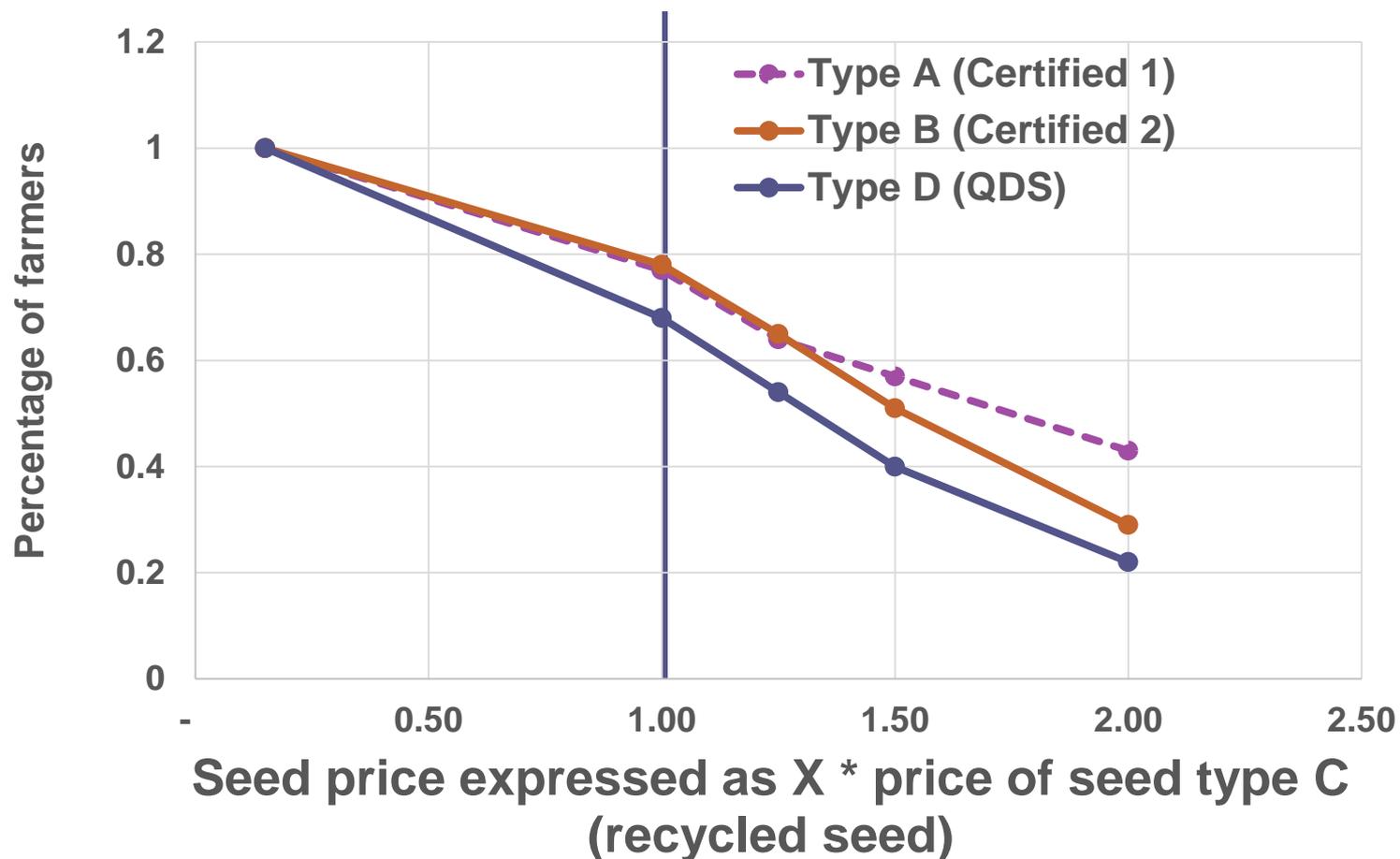


- The relative difference in Farmers' WTP for different seed types is correlated with the relative difference in their perceived quality differences (based on observations only)

Average willingness to pay a premium for seed type A, B and D over the lowest ranked quality seed **type C** **Recycled seed**



Farmer willingness to pay for seed of different perceived quality as a percentage of the lowest ranked seed type

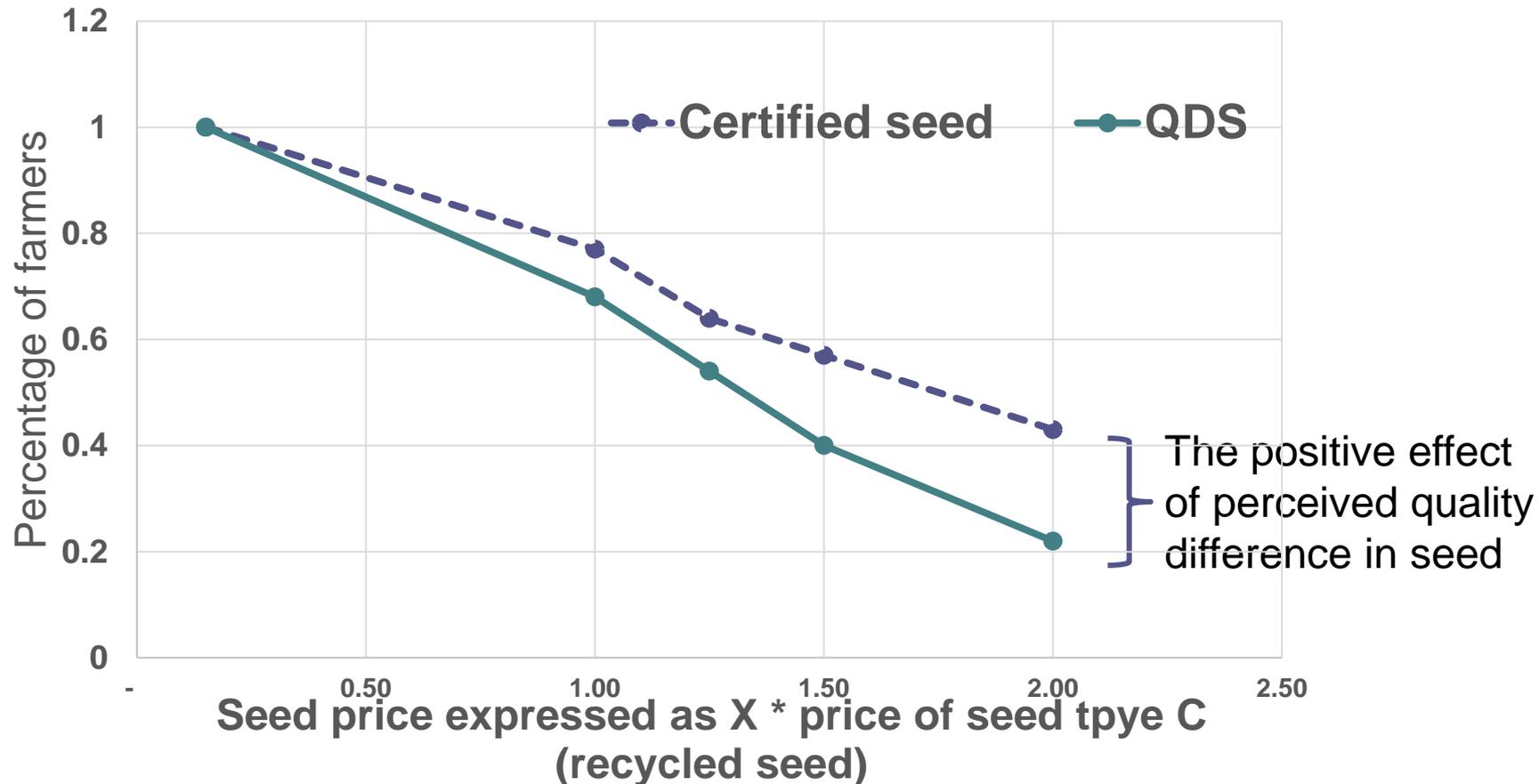


4. IMPLICATIONS

There are three emerging results that have implications for further research and policy action...

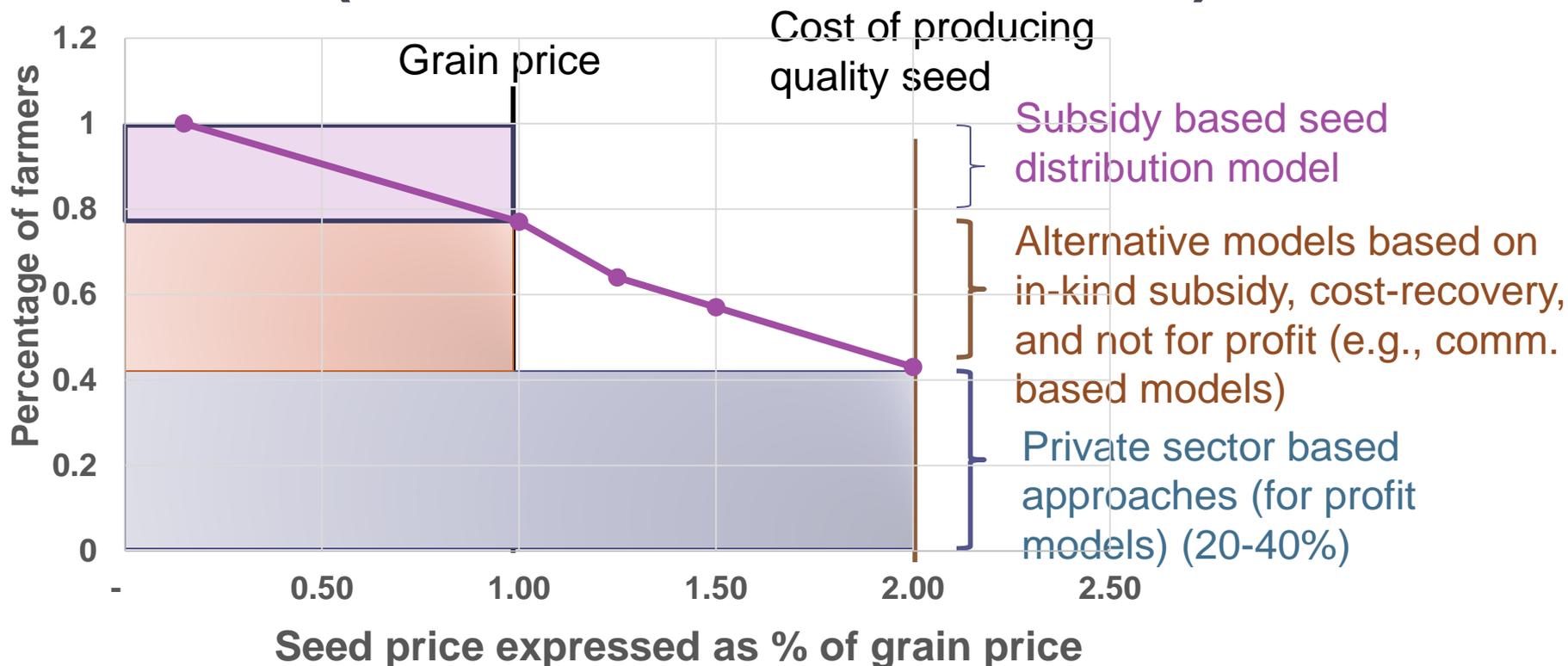
Based on this study and other research by the authors (see poster 395)

1. All else equal, farmers are willing to pay a premium for QUALITY seed



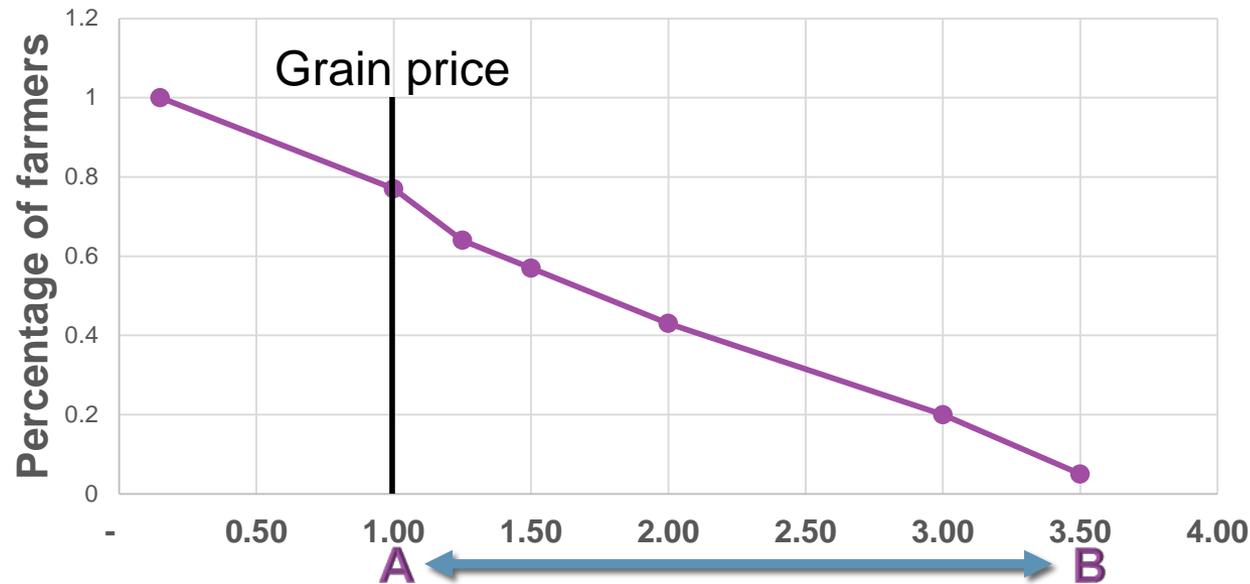
Further research is needed to assess the quantity of seed farmers would be willing to buy at a premium price and the frequency (to gauge the size of the demand)

2. Number of farmers willing to pay a premium price for quality seed declines as price of seed increases (the classic demand curve)



Implications: Need multi-pronged approaches to meet the seed needs of all the farmers

3. The relative importance of the three approaches / models in a specific context will depend on the supply side economics



The importance of private sector, public sector and not-for profit sector in the seed system will depend on at what price in the range between A to B the suppliers can produce and sell seeds that are perceived by the farmers to be of better quality than the grain

Implications

- Closer the price of seed is to point A, the more important will be the role of private sector and greater will be the chances of a sustainable seed system
- The steeper the slope of the demand curve is, the more important will be the need for subsidy based approaches and other alternative community based approaches in the seed system
- Either way, there is a need for:
 - Lowering the cost of quality seed production by increasing seed yield and reducing the rejection of seeds that don't meet quality standards
 - Adopting a flexible seed price system where price of different quality grade seeds are determined by cost of production and not by the government or a seed regulatory agency

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THANKS

WELCOME QUESTIONS AND DISCUSSION