



From Seed to Harvest: Understanding Farmers' Demand and Willingness for Certified Paddy and Pulse Seeds

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Seed is a small item in appearance but a major decision in farming. The quality of seed placed in the soil influences germination, crop establishment, uniformity and, ultimately, the returns that farmers hope to obtain from their land and other inputs. Yet the choice between certified seed and seed saved from the farm or obtained through informal channels is rarely determined by quality alone. Price, availability, trust, previous experience, knowledge, access to farmer institutions and the expected benefit from better seed all shape the decision. This article brings together the main lessons from two recent studies on farmers' willingness to pay for certified rice seed and certified pulse seed. The evidence shows that farmers can value certified seed and may be prepared to pay a premium when they clearly associate certification with better quality and higher returns. In the pulse case, the demand side was studied alongside the cost of producing certified seed, showing that a market can exist but may remain smaller when production, labour and storage costs push prices beyond what many farmers can afford. The rice evidence similarly shows that willingness to pay is not uniform across farmers and is related to characteristics such as age, education, farming experience and participation in farmer groups. The broader message is that increasing certified seed use is not simply a matter of producing more seed. It requires a functioning seed market in which farmers can recognize quality, obtain seed at the right time, trust the source and see the price as reasonable in relation to the expected benefit. Strengthening farmer awareness, local seed enterprises, market information, quality assurance and affordable distribution can therefore help bridge the gap between the potential demand for certified seed and actual purchase.

Keywords: Certified seed, Farmer demand, Willingness to pay, Seed quality, Informal seed system, Farmer seed enterprise, Agricultural productivity

Introduction: Why the Seed Choice Matters?

Every crop begins with a seed, but farmers do not buy seed in the same way that consumers buy an ordinary commodity. A farmer is buying a promise about what will happen after sowing: that the seed will germinate well, establish a reasonably uniform crop, maintain varietal identity and contribute to a productive harvest. Because the outcome is realized months after the purchase, seed quality is closely connected with risk as well as with expected income. This is why the economics of seed demand deserves attention alongside the biological importance of seed. Seed is the vehicle through which improved varieties and their genetic potential reach farmers, making seed systems an important link between crop improvement and farm-level productivity (FAO, 2021; McGuire & Sperling, 2016).

Certified seed is produced and handled under a quality assurance system. The rice-seed study reviewed for this article describes certified seed in terms of registered varieties, traceable origin, labelling and standards covering genetic, physical and physiological quality, with

inspection and testing forming part of the certification process (Aisya & Wijayanti, 2024). The legume study likewise emphasizes standardized quality thresholds such as germination, viability, purity and varietal identity (Win, Maredia, & Boughton, 2023). These features distinguish certified seed from much of the informal seed supply, where farmers may depend on their own saved seed, seed exchanged with neighbours or grain purchased for planting.

The existence of a certified product, however, does not automatically create demand. Farmers compare alternatives. Farm-saved seed may require little or no cash expenditure. Informally purchased seed may be familiar and easily available. Certified seed may carry a higher price because of inspection, testing, packaging, storage, multiplication and other costs. The farmer therefore has to decide whether the additional payment is justified by the expected improvement in crop performance. In economic terms, willingness to pay reflects the maximum amount a farmer is prepared to spend for the perceived benefits of the product (Aisya & Wijayanti, 2024).

This distinction between the value of a product and its market price is important. A farmer can recognize the advantages of certified seed but still decline to buy it if the price is beyond the household's practical budget. Conversely, a farmer may be willing to pay more than the prevailing price if the expected benefits are convincing. Demand therefore lies at the intersection of quality, price, information, risk and purchasing capacity.

Win et al. (2023) examined certified chickpea and green gram seed and compared farmers' willingness to pay with the cost of producing seed through farmer seed enterprises. Aisya and Wijayanti (2024) examined willingness to pay for certified rice seed and the farmer characteristics associated with that willingness. Although the studies were conducted in different settings and used different methods, together they help explain why farmers may want certified seed, why some hesitate to purchase it and what can be done to make the formal seed market more responsive to farmers.

Certified Seed: More Than a Label

For a farmer, the word "certified" has value only when it communicates something useful. Certification is intended to reduce uncertainty about seed quality by applying defined standards and verification procedures. The rice study notes that certification involves documentation, field inspection, inspection of harvesting and processing facilities, and sampling and laboratory testing (Aisya & Wijayanti, 2024). In the legume study, formal quality assurance is associated with measurable attributes such as germination, viability, purity and varietal identity (Win et al., 2023).

These characteristics matter because the farmer cannot fully judge many seed attributes simply by looking at a bag. Good-looking seed is not necessarily genetically pure, physiologically vigorous or correctly identified. Certification therefore acts partly as a quality signal. It provides information that is difficult for an individual farmer to generate independently before planting. The economic value of that information increases when poor seed quality can result in uneven establishment, variable maturity, pest or disease problems, or disappointing yields.

At the same time, certification should not be treated as a guarantee of a particular yield in every field. Crop performance depends on many factors, including variety, soil, water, nutrient management, pest and disease control, weather and farm management. The rice study records an important practical perception: farmers who were unwilling to pay for certified seed considered cultivation practices such as fertilizer use, water availability, weed management and pest control to be major determinants of yield (Aisya & Wijayanti, 2024). This is a useful reminder that farmers make decisions in a complete production system, not about seed in isolation.

Thus, the economic value of certification lies partly in reducing uncertainty and providing credible information about attributes that farmers may otherwise find difficult to verify before planting (McGuire & Sperling, 2016; FAO, 2021).

What Farmers Actually Demand

Farmer demand for seed is often more complicated than the theoretical statement that demand falls when price rises. Farmers are not choosing between identical bags with different prices. They are choosing among products that may differ in quality, source, reputation, variety, availability, packaging and perceived performance. In informal systems, trust may come from a neighbour's experience or a trader's reputation. In formal systems, trust can be supported by certification, labelling and traceability.

The legume evidence is especially revealing because it considers the coexistence of formal and informal seed channels. Win et al. (2023) report that farmers can place a higher value on certified seed than on recycled or informally sourced planting material. In their bidding experiments, certified seed received a premium relative to commonly purchased recycled seed. The study reports premiums for government, private-sector and farmer-seed-enterprise certified seed, with the exact premium differing by crop and source. This suggests that farmers do not view all seed as interchangeable.

The same study also highlights a structural problem: demand for self-pollinated crops can be fragmented across locations, varieties and farmer preferences. Because farmers can often save seed from their harvest, the market for purchased certified seed may be less predictable than the market for other agricultural inputs. Low or uncertain demand can, in turn, discourage commercial suppliers from investing in production and distribution. This creates a cycle in which weak supply reinforces weak demand.

Win et al. (2023) discuss farmer seed enterprises as one way of supplying quality seed where large commercial companies may face difficulty serving fragmented demand. The idea is not that local seed enterprises automatically solve the problem, but that proximity, farmer relationships and local market knowledge can make them useful parts of a broader seed system.

Farmers frequently combine multiple seed sources rather than relying exclusively on either the formal or informal sector. In a cross-country analysis covering 9,660 observations across six countries and 40 crops, McGuire and Sperling (2016) found that informal systems accounted for 90.2% of seed accessed, with local markets alone contributing 50.9%. Although these figures are not directly transferable to paddy or pulse systems in every country, they illustrate why certified seed programmes must compete with, connect to and complement existing farmer seed channels rather than assuming that formal seed will automatically replace them (McGuire & Sperling, 2016).

Willingness to Pay: Listening to the Farmer's Valuation

Willingness to pay (WTP) is a practical way of expressing how much value a farmer attaches to a product. It can be described as the maximum amount a farmer is prepared to pay for the expected benefits of certified seed. The concept is useful because the market price of seed tells us what sellers charge, while WTP tells us something about the buyer's valuation. The difference between the two can influence whether a farmer purchases the product.

The rice study used a contingent valuation approach with a bidding game. Farmers were presented with a hypothetical market situation and the bid was increased until the respondent reached the maximum amount they were willing to pay (Aisya & Wijayanti, 2024). The authors reported that 84 percent of their respondents were willing to pay for certified rice seed, while 16 percent were not.

The pulse study used a different approach: the Becker–DeGroot–Marschak (BDM) mechanism. Farmers placed bids for different seed products in an incentive-compatible experimental market. The study involved 512 farmers, while production-cost information came from 63 farmer seed enterprises (Becker et al., 1964; Win et al., 2023). The advantage of bringing these two pieces together is that willingness to pay can be compared with the price that a seed producer needs in order to cover costs and remain viable.

This comparison produces an important lesson. A farmer may be willing to pay a premium for certified seed, but the size of the farmer's WTP and the cost of supplying that seed have to meet in the marketplace. If production and distribution costs push the required

selling price above the level that many farmers can afford, potential demand may not become actual demand.

The pulse study estimated that 47 percent of chickpea farmers and 53 percent of green gram farmers were willing to pay at least the estimated minimum acceptable price of farmer seed enterprises. The authors explicitly describe these percentages as theoretical upper-bound estimates of potential market share rather than predictions of actual purchases, because real markets contain competing products and farmers make purchase decisions under changing prices and circumstances (Win et al., 2023).

Why Some Farmers Pay More and Others Do Not

Farmers are not a single group with identical budgets, experiences and preferences. The rice study examined several characteristics and found positive associations between willingness to pay and age, education, farming experience and membership in farmer groups. In its regression results, farmer-group membership was particularly notable, while income, land area, land ownership and credit access were not statistically significant in that particular sample (Aisya & Wijayanti, 2024). These results should be read as study-specific evidence rather than universal rules.

Education can matter because seed certification involves information. A farmer who understands why a certified label exists may be better able to distinguish certified seed from an ordinary seed lot. But education is not the only route to information. Extension contact, demonstrations, farmer-to-farmer learning and experience with a variety can also change perceptions.

Farming experience can work in more than one direction. Experienced farmers may have observed the consequences of poor germination or varietal mixing and therefore place a higher value on dependable seed. At the same time, long experience can also strengthen confidence in familiar farm-saved or locally exchanged seed. The direction of the effect is therefore an empirical question, not something that should be assumed in advance.

Farmer groups can reduce information and transaction costs. A group can make it easier to hear about a new variety, compare experiences, organize collective purchases, connect with seed producers and receive technical guidance. The rice study's finding that group participation was positively associated with WTP therefore has a practical dimension: institutions that connect farmers can also influence the functioning of the seed market.

Price remains a central issue even when farmers recognize the benefits of certified seed. The rice study identifies the relatively higher price of certified seed compared with uncertified seed as an important barrier. This is understandable because farm-saved seed can appear much cheaper in cash terms. The relevant comparison for farmers, however, should ideally include not only purchase price but also germination, crop establishment, expected yield, quality of harvest and the risk of having to re-sow or manage an uneven crop.

Income and liquidity also matter in real farm decisions, even though the specific rice study did not find household income to be statistically significant. A farmer can believe that certified seed is beneficial and still postpone the purchase because several input payments are due at the same time. This is why affordability and timing are as important as the nominal price.

Relative to recycled seed, farmers were willing to pay premiums for certified seed from government, private-sector and farmer-seed-enterprise sources. Reported premiums ranged from 10% to 20%, depending on crop and source: government seed attracted premiums of 10% for chickpea and 15% for green gram; private-sector seed, 18% and 20%; and farmer-seed-enterprise seed, 16% and 20%, respectively (Win et al., 2023). The finding suggests that farmers were responding not only to the certification status of seed but also to the credibility of its source.

The Supply Side: Farmers Cannot Buy What the Market Does Not Offer

Demand cannot be separated from supply. A farmer may be willing to pay for certified seed, but that willingness has little practical meaning if the right variety is unavailable at planting time. The legume study illustrates this clearly. It describes seed systems in which the formal

and semi-formal supply of quality seed is limited and farmers consequently depend heavily on recycled or informal seed sources (Win et al., 2023).

The cost structure of certified seed is also important. Seed producers must recover field production costs, opportunity costs and post-harvest expenses. In the pulse study, storage, financing and labour associated with a long interval between harvest and the next planting season represented a major share of production costs. The study reports that post-harvest costs together contributed 39 percent of total seed-production cost (Win et al., 2023). This finding has a wider lesson: a seed market can be constrained not only by what farmers are willing to pay but also by what it costs to keep seed available until the next planting season.

Storage deserves particular attention because seed is a living input. Poor storage can reduce viability and quality, while proper storage requires infrastructure, management and working capital. When a seed producer must hold inventory for several months, money is tied up before the seed is sold. The resulting cost eventually reaches the farmer through the selling price.

Labour, processing, inspection, packaging, transportation and marketing can also raise the final price. These costs are not necessarily wasteful; many are part of delivering a reliable, quality-assured product. The challenge is to identify where costs can be reduced without weakening quality. The pulse study specifically points to reducing post-harvest and labour costs as a way to bring seed prices closer to farmers' willingness to pay (Win et al., 2023).

A functioning seed system therefore has to solve an access problem as well as a production problem. FAO emphasizes that an effective seed system should make quality seed of appropriate varieties available when needed, where needed and at an affordable cost, while involving multiple actors including farmers, seed growers, enterprises, research organizations, input dealers and public institutions (FAO, 2021).

From Willingness to Actual Purchase: The Missing Step

One of the most important distinctions in seed economics is the difference between saying "I am willing to pay" and actually buying seed. A WTP study can show that farmers value certified seed, but actual purchase also depends on whether the product is available, whether the farmer has cash at the time of purchase, whether the preferred variety is offered and whether the farmer trusts the seller.

The pulse study makes this point explicitly by treating its estimated effective demand as an upper bound. A farmer may state a bid during an experiment but face a different choice in a real market where several qualities and prices compete. Therefore, WTP should be used as evidence of potential demand, not as a guarantee of future sales (Win et al., 2023).

The same caution applies to the reported rice WTP. The average amount found in one survey is informative for understanding that sample, but it should not be copied directly into another seed market. Prices, farm sizes, seed rates, household incomes, crop prices and institutional arrangements differ across places and seasons.

For seed producers, the practical question is therefore to identify a price range at which enough farmers are willing and able to purchase. For policymakers and development programmes, the question is how to reduce unnecessary barriers between that price and the cost of producing quality seed. For farmers, the key question is whether the additional cost is likely to be recovered through better establishment, productivity or reduced production risk.

A more useful measure for farmers is therefore not simply the price per kilogram of seed but the cost of seed relative to the expected economic return. For example, a higher-priced seed lot may still be economically attractive if it reduces re-sowing, improves establishment or produces sufficient additional yield or grain quality to offset the additional seed expenditure.

Conversely, a certified seed lot may have limited economic advantage if its variety is poorly suited to the farmer's environment or if complementary production constraints prevent the potential of the variety from being expressed. This reinforces the importance of evaluating seed technologies within the complete farm production system rather than as isolated inputs (FAO, 2006; Aisya & Wijayanti, 2024).

Making Certified Seed More Attractive to Farmers

The evidence from the two studies suggests several practical directions. First, seed quality needs to be visible and understandable. Certification should not remain a technical term known only to officials and seed companies. Farmers need simple explanations of what certification checks, what the label means and how certified seed differs from ordinary grain used for planting.

Second, variety choice matters. Farmers are unlikely to buy certified seed simply because it is certified if the variety does not fit their preferences or production environment. Seed demand is shaped by characteristics such as maturity, yield potential, grain or market quality and familiarity. Seed suppliers should therefore listen to farmers while planning multiplication and distribution.

Third, price needs to be considered in relation to farmer valuation. The rice evidence shows that farmers can have a measurable WTP for certified seed, but price remains a constraint. The pulse evidence similarly shows that the potential market expands when production costs are brought down. A lower-cost seed system does not mean compromising quality; it means finding more efficient ways of producing, storing, financing and distributing quality seed.

Fourth, farmer organizations can play a useful role. Groups can aggregate demand, reduce transaction costs and provide a channel for demonstrations and information. The rice study found a positive relationship between farmer-group participation and willingness to pay, which supports the idea that collective institutions can influence how farmers learn about and evaluate certified seed (Aisya & Wijayanti, 2024).

Fifth, local seed enterprises deserve attention where market demand is fragmented. Farmer seed enterprises can combine local knowledge with formal quality assurance and can potentially serve markets that are too small or dispersed for large-scale suppliers. But their sustainability depends on business fundamentals. They need reliable demand, manageable production costs, appropriate storage, access to finance and institutional linkages. The pulse study shows why simply establishing a seed enterprise is not enough; its price must remain compatible with what farmers are prepared to pay (Win et al., 2023).

Finally, extension should focus on economic evidence rather than promotion alone. Demonstrations comparing certified and commonly used seed under realistic farm conditions can help farmers judge whether the additional seed cost is worthwhile. When farmers can connect seed quality with actual changes in crop establishment, yield and returns, the certification label becomes a meaningful piece of information rather than just a printed mark.

Conclusion

The evidence reviewed here shows that farmers are not indifferent to seed quality. Both the paddy and pulse studies demonstrate that there is measurable willingness to pay for certified seed. Farmers associate certified seed with benefits such as better quality, improved establishment and the possibility of higher production. At the same time, willingness is not the same as unlimited ability to pay. Price, availability, knowledge, experience, institutional connections and the cost of supplying seed all influence whether potential demand becomes an actual purchase.

The rice study illustrates the importance of farmer characteristics and institutions: age, education, farming experience and farmer-group participation were positively associated with willingness to pay in its sample. The pulse study adds the supply-side perspective, showing that even when farmers value certified seed, high production and post-harvest costs can restrict the market. Its estimate that 47 percent of chickpea farmers and 53 percent of green gram farmers were willing to pay at least the estimated minimum acceptable price should be read as an upper-bound estimate of potential market share, not as a promise of sales.

For the future of paddy and pulse seed markets, the lesson is straightforward. Farmers should be offered certified seed that is genuine, suitable, available on time and priced with their economic realities in mind. At the same time, seed producers need a price that allows them to

remain viable. Closing this gap requires better information, efficient production and storage, trustworthy certification, stronger farmer institutions and seed businesses that understand local demand. Farmers may value certified seed and express a willingness to pay a premium, yet the transition from stated valuation to actual purchase depends on price, variety, availability, timing, information, trust and household-level purchasing constraints.

Ultimately, the success of a certified seed programme should not be measured only by the quantity of seed produced. It should also be judged by whether farmers find the seed valuable enough to buy, whether they receive what the label promises and whether the seed market can continue supplying quality planting material without depending permanently on exceptional support. When quality and affordability move together certified seed can become not merely a policy recommendation, but a practical choice that farmers make because it makes economic sense.

References

1. Aisya, S., & Wijayanti, D. E. (2024). Farmers' willingness to pay for certified rice seeds in Madura Island Indonesia. *Habitat*, 35(3), 335–347.
2. Almekinders, C. J. M., & Louwaars, N. P. (2002). The importance of the farmers' seed systems in a functional national seed sector. *Journal of New Seeds*, 4(1–2), 15–33.
3. Becker, G. M., DeGroot, M. H., & Marschak, J. (1964). Measuring utility by a single-response sequential method. *Behavioural Science*, 9(3), 226–232.
4. Evenson, R. E., & Gollin, D. (Eds.). (2003). *Crop variety improvement and its effect on productivity: The impact of international agricultural research*. CABI Publishing.
5. Food and Agriculture Organization of the United Nations. (2006). *Quality declared seed system* (Plant Production and Protection Paper No. 185).
6. Ghimire, R., Huang, W.-C., & Shrestha, R. B. (2015). Factors affecting adoption of improved rice varieties among rural farm households in Central Nepal. *Rice Science*, 22(1), 35–43.
7. Louwaars, N. P., de Boef, W. S., & Edeme, J. (2013). Integrated seed sector development in Africa: A basis for seed policy and law. *Journal of Crop Improvement*, 27(2), 186–214.
8. McGuire, S., & Sperling, L. (2013). Making seed systems more resilient to stress. *Global Environmental Change*, 23(3), 644–653.
9. McGuire, S., & Sperling, L. (2016). Seed systems smallholder farmers use. *Food Security*, 8(1), 179–195.
10. Nugraha, A. G., & Firdaus, M. (2022). Willingness to pay and factors affecting the income of rice and corn farmers in the use of superior seeds in North Raman Sub District. *Jurnal Ekonomi dan Kebijakan Pembangunan*, 11(2), 161–174.
11. Olum, S., Gellynck, X., Juvinal, J., Ongeng, D., & De Steur, H. (2020). Farmers' adoption of agricultural innovations: A systematic review on willingness to pay studies. *Outlook on Agriculture*, 49(3), 187–203.
12. Win, M. T., Maredia, M. K., & Boughton, D. (2023). Farmer demand for certified legume seeds and the viability of farmer seed enterprises: Evidence from Myanmar. *Food Security*, 15, 555–569.