

ASSESSMENT OF RICE FARMERS' WILLINGNESS TO PAY FOR IMPROVED SEEDS IN EBONYI STATE, NIGERIA

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Abstract

The study evaluated the willingness of rice farmers in Ebonyi State to pay for improved rice seed varieties. It ascertained the improved rice seed varieties available to the farmers, profiled their sources of information, determined their willingness to pay for improved seed varieties and analyzed the factors influencing their willingness to pay. Multistage sampling procedure was used in selecting 120 respondents for the study. Data was collected using structured questionnaires and analyzed with inferential and descriptive statistics. Results show that research institutes (74.19%) and mass media (65.00%) were the major sources of information among respondents. Many varieties of improved rice seeds were available to farmers including FARO 44 (71.66%), R8 (68.33%), FARO 52 (65.83%) and Mass 11 (56.67%). Rice farmers are willing to pay for improved rice seed varieties at subsidized rates ($\bar{x}$ = 3.6), and access to agricultural loans ($\bar{x}$ = 3.1) and insurance policies ($\bar{x}$ = 3.5). Yield expectation (β =3.523), income from rice farms (β =5.527), age (β = 8.374), and extension contacts (β =2.361) positively influenced rice farmers' willingness to pay for improved rice seeds. The study recommends that government and agricultural development agencies should provide subsidies, insurance policies and agricultural loans to boost farmers' willingness to pay for improved seed varieties.

Key words: willingness to pay, subsidies, agricultural insurance, improved rice seeds.

Introduction

The level of increase in hunger, malnutrition and other indications of food insecurity in Nigeria is posing a severe threat to sustainable development in the country. Reports of flooding, high temperatures, and population growth have exacerbated this situation. Alterations in climatic variables are also a major challenge to food production in Nigeria because of unpredictable rainfall patterns, increase in desertification and drought etc. with the attendant outcomes on food availability and security (Iroegbu et al., 2025; Izuogu and Ekumankama, 2015). As the temperature continues to rise, it is anticipated that there will be a reduction in crop production. In line with these challenges, national policies that target the strengthening

of food security are expected to be implemented across the country with research evidence that demonstrates the determinants of quality food access and availability (Agou et al., 2024).

Agriculturists in the nation are of the view that increasing the diversification of crop production can support the campaign against hunger thereby facilitating poverty reduction. There have been improvements in cultivars by crop breeders over the years using better breeding lines and this has increased farmers' options as efforts are made to eliminate some of the characteristics of seeds that are perceived to militate against increased production. These characteristics include late maturing, low resilience to drought, flooding, pests and diseases

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etc. (Izuogu et al., 2025). Advancing the livelihood standard of farmers cannot be achieved without putting all the variables that challenge improvement in agricultural production into consideration.

Rice is one of the essential staple crops cultivated in Nigeria and makes a significant contribution to the national gross domestic product while supporting household diets. It is ranked third on the list of important staples for households in Nigeria. Osuji et al (2021) reported that Nigeria is the highest rice-producing nation in the West African region. Ironically, the country is also the highest importer of rice in Africa. This is because domestic demand for rice exceeds local production and this has necessitated an increase in importation. The nation recorded an increase in rice importation by 4% in 2023 as annual import rose from 2.3 million tons in 2022 to 2.4 million tons with a reduction in the area cultivated from 3.6 to 3.5 hectares (Izuogu et al., 2024; Orji et al., 2025).

Few studies relate to rice farmers and their adoption of improved rice seed varieties in Ebonyi State. Izuogu et al. (2025, 2024) ascertained the availability, access and utilization of certified rice seeds by farmers; as well as farmers' attitude towards certified seeds. Chijioke and Akaninyene (2019) analyzed the profitability of the adoption of improved seed varieties among farmers in the nation's capital territory. These studies identified the need for initiating research activities that target the improvement of agricultural cultivars. None of these studies ascertained the willingness of farmers to pay for improved rice seed varieties. Izuogu et al. (2025) reported that rice farmers in the state have understand the benefits of cultivating certified rice seeds but are constrained by the challenges of circulation of adulterated seeds as well as high cost of certified seeds. However, a successful seed breeding program is subsequent upon the level of adoption of the released varieties. Given this, determining the variables influencing the adoption or non-adoption of improved seed varieties by farmers is essential to the improvement of crop production.

There are several theories relating to the implementation of improved technologies by farmers. For instance, farmers, especially those in rural communities execute their agricultural production activities with minimal fiscal resources. These farmers access innovative agricultural practices based on their socio-demographic characteristics. In situations where innovations demand more financial inputs or alterations in current indigenous practices, farmers would make efforts to evaluate them prior to deciding whether to purchase such technologies.

Because of the adverse effects of climate change, adequate knowledge of rice farmers' willingness to pay for improved seeds is important to guarantee sustainability in crop production Njoku et al. (2024a). Farmers' willingness to pay in this context means readiness to purchase and cultivate improved seed varieties. It is an indication of farmers' trust in optimal productivity and encourages plant breeders and extension workers. Izuogu et al., 2025 reported that farmers' adoption decision is based either on the characteristics of an innovation or their interest in purchasing the innovation within an acceptable price range.

To ascertain rice farmers willingness to pay for improved rice seed varieties, the study modelled farmers' willingness to pay for improved rice seed varieties by describing respondents' sources of information on improved rice seed varieties, profiling the improved rice seed varieties available to farmers, ascertaining farmers willingness to pay for improved rice seed varieties and determining the factors influencing respondent's willingness to pay for improved rice seed varieties. Results from this study will assist rice breeding centres with a better understanding of the role of willingness to pay in the adoption process of improved rice seeds. Adequate knowledge of rice farmers' willingness to pay before undertaking a breeding program has the capacity to facilitate the understanding of how profitable the implementation of a breeding program will be. This is a crucial aspect before launching a new breeding program.

Materials and methods

The study was carried out in many communities in Ebonyi State Nigeria covering about 12 villages with 120 rice farmers serving as respondents. The research area covered the villages where rice farmers were cultivating improved rice seed varieties. Agricultural production is the economic activity in the state with rice cultivation taking the lead.

A multistage random sampling technique was adopted in selecting rice farmers who participated in the study. In the first stage, two agricultural zones were selected from the three zones in the state. The second stage was the selection of two Local Government Areas (LGAs) from each of the agricultural zones. In the third stage, three communities were selected from each of the four LGAs to give a total of 12 communities. The final stage was the selection of 10 respondents from each of the communities for a total of 120 respondents who filled out the research questionnaire.

Data was collected through structured questionnaires and analyzed with descriptive and inferential statistics. Sources of information on improved rice seeds and varieties of improved rice seeds available were ascertained on a nominal level of yes = 1 or No =0. Respondents' willingness to pay for improved rice seeds was measured on a four-point Likert-typed scale of not willing (1), somewhat unwilling (2), somewhat willing (3), willing (4). Respondent's scores were summed and the total was divided by 4. The index mean point therefore was 2.5. mean scores above 2.5 implied that respondents were

willing to pay, otherwise means that respondents were unwilling to pay.

To determine the factors influencing respondents' willingness to pay for improved rice seed varieties, the following model was used.

$$Y = BO + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 \quad (1)$$

Where: Y=1 or 0 (1=Willing to pay for improved rice seed varieties 0 = Not willing to pay for improved rice seed varieties).

B_1 - B_4 = Coefficient of the factors
Variables in the study were measured as

X_1 = Yield estimate

X_2 = Yield expectation

X_3 = Income from rice cultivation

X_4 = Age of respondent

X_5 = Household size of respondents

X_6 = Number of extension contacts

Results and discussion

Improved rice seed sources of information

Sources of information relating to improved rice seed varieties among farmers include research institutes (74.19%), mass media (65.00%), agro-input dealers (55.83%), and seed council office (48.33%) as shown in Table 1. This implies that rice farmers had multiple sources of information on improved rice seed varieties. Farmers' sources of agricultural information influence their adoption of innovative practices in their agricultural production

Table 1. Sources of improved rice seed variety information
Tabela 1. Izvori informacija o poboljšanim sortama pirinča

Source of Information	Frequency	Percentage
Research institutes	89	74.17
Mass media	78	65.00
Agro-input dealers	67	55.83
Seed council office	58	48.33
Fellow farmers	56	46.66
Extension agents	32	26.66

system. The presence of multiple sources of information in the study area will improve rice farmers' decision-making and create access to diverse perspectives. This will also ensure that farmers are appropriately informed and serve as a guide to their willingness to pay for these varieties. The result aligns with the findings of Izuogu et al (2025) who reported that farmers have access to many sources of agricultural information in the state. However, Oparaojiaku et al (2024) observed that the existence of multiple information sources could lead to information overload among farmers.

Improved rice seed varieties available to farmers

Table 2 shows that FARO 44 (71.66%), R8 (68.33%), FARO 52 (65.83%) and Mass 11(56.67%) were among the improved rice varieties available to farmers. The result implies that improved rice varieties are available to rice farmers in the study area. The study agrees with Okoro et al. (2023) who reported the availability of improved rice seed varieties for farmers in the Southeastern part of Nige-

ria. In the adoption process, the availability of an innovation precedes farmers' adoption. The availability of many improved rice seed varieties increases farmers' alternatives and ensures that they compare features, costs and benefits of each variety before concluding on which variety to pay for. The National Cereal Research Institute in Baddegi, Niger State is saddled with the responsibility of breeding improved rice varieties in the country.

Willingness to pay for improved rice seed varieties

Evaluation of rice farmers' willingness to pay for improved rice seed varieties shows that farmers will be interested in purchasing these seeds if subsidies ($\bar{x}$ = 3.6), agricultural insurance ($\bar{x}$ = 3.5), and loans ($\bar{x}$ = 3.1) are provided as shown in Table 3. Furthermore, the results show that farmers are willing to raise savings from their income to purchase improved rice seeds. This implies that respondents are willing to pay for these varieties if efforts are put in place to reduce the cost of the seeds as well as improve their buffer capacity against risk through insur-

Table 2. Available improved rice seed varieties
Tabela 2. Dostupne unapređene sorte pirinča

Seed varieties	Frequency	Percentage
FARO 44	86	71.66
R8	82	68.33
FARO 52	79	65.83
Mass 11	68	56.67
Volume 15	62	51.66
FARO 57	54	45.00

Table 3. Willingness to pay for improved rice seed varieties
Tabela 3. Spremnost poljoprivrednih proizvođača da kupe seme unapređenih sorti pirinča

Seed varieties	Mean	SD
Will be interested in purchasing more improved seeds if the subsidy is provided	3.6	0.8
Will be willing to pay for improved rice seeds if insurance is guaranteed	3.5	0.2
Will be kin in making saving for the purchase of improved rice seeds	3.3	0.6
Will be willing to obtain agricultural loans for improved rice seeds	3.1	0.4
Regular extension contact will support interest in improved rice seeds	3.0	0.3
Will be interested in paying any amount for improved rice seeds	2.3	0.6

ance. The increase in challenges arising from the adverse effects of climate change is making it difficult for farmers to experiment with new technologies in the absence of insurance policies (Izuogu et al., 2024; Orji et al., 2025).

However, Table 3 also shows that farmers are not willing to pay exorbitant amounts for improved rice seed varieties. Rice farmers in the study area are mainly smallholder farmers who will guard their financial resources meticulously to ensure fiscal discipline. Seed companies are expected to consider this response while fixing the prices of improved rice seeds within the free market economy.

Determinants of willingness to pay for improved rice seeds

Results presented in Table 4 show that yield expectation ($\beta=3.523$), income from rice farms ($\beta=5.527$), age ($\beta= 8.374$), and extension contacts ($\beta=2.361$) positively influenced rice farmers' willingness to purchase improved rice seeds.

The analysis showed a significant positive relationship between respondents' yield expectation and their willingness to pay for improved rice seed varieties. The implication is that the higher the yield estimate of farmers is, the higher the likelihood of their adopting improved rice seeds. This could be attributed to the attendant increase in income arising from sales. Izuogu et al (2025) and Njoku et al., (2024b) reported that yield per hectare influences farmers' choice of certified rice seeds. As farmers anticipate increased yield, they will be keener to pay for im-

proved rice seeds, while looking out for a higher return on their investment.

As farmers' income from rice cultivation increases, the likelihood of paying for improved rice seed also increases. Higher income has been reported to support adoption among farmers (Oparaojiaku et al., 2024). With the availability of spare revenue, farmers can take risks, knowing that negative outcomes from such risks will not destabilize their production process. Hence, it provides a safety net for their farming operations. Also, as farmers earn more, it is expected that they will invest more in education and other forms of training which will support their capacity to understand and adopt innovative practices.

The result also shows that age had a significant positive influence on farmers' willingness to pay for improved rice seeds. This implies that as farmers' age increases, their willingness to pay for improved seeds also increases. Older farmers may have used indigenous seeds before the dissemination of improved rice seeds. This positions them to understand the benefits of improved seeds, supporting their willingness to pay. Also, they may prioritize long-term production outcomes, establish relationships with seed companies, and be more knowledgeable of the risks associated with poor seed quality. The result does not agree with the findings of Izuogu et al.(2025) who reported a negative relationship between respondents' age and adoption of digital tools in rice cultivation. The difference may be attributed to variations in the study area.

Table 4. Determinants of willingness to pay for improved rice seeds

Tabela 4. Odrednice koje ukazuju na spremnost proizvođača da kupe seme unapređenih sorti pirinča

	Coef.	Std err.	t value	p > t
Yield expectation	3.523-13***	2.781e-01	13.412	0.001
Income from the rice farm	5.527e-04**	1.340e-03	3.018	0.01
Age	8.374e-01***	1.517e-01	-2.518	0.01
Household size	-6.682e-01	2.316e-01	1.435	0.67
Extension contacts	2.361e-02***	3.166e-01	-7.027	0.001
Multiple R-squared	0.554			
Adjusted R-squared	0.553			

* $P \leq 0.05$

Conclusion and Recommendation

The study evaluated rice farmers' willingness to pay for improved rice seeds in Ebonyi State, Nigeria. Results from the study show that the major sources of information on improved rice seeds were research institutes, the mass media and agro-input dealers. Many varieties of improved rice seeds are available to farmers in the study area with FARO 44 topping the list. Farmers are willing to pay for improved rice seed if agricultural subsidies, insurance policies and loans are made available to them. However, farmers are not willing to be exploited in their bid to purchase improved rice seeds. Yield ex-

pectation, age, and income were among the variables that positively influenced farmers' willingness to pay for improved rice seeds.

The study recommends that government and agricultural development agencies should provide subsidies, insurance policies and agricultural loans to boost farmers' willingness to pay for improved seed varieties. Also, more awareness should be created to inform farmers of the yield advantage of the improved rice seeds. Seed companies should be monitored to ensure that they do not exploit rice farmers in their bid to maximize profit.

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PROCENA SPREMNOSTI POLJOPRIVREDNIH PROIZVOĐAČA U DRŽAVI EBONJI - NIGERIJA DA PLATE ZA POBOLJŠANO SEME PIRINČA

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Sažetak

Data istraživanja su se bavila procenom spremnosti proizvođača pirinča u državi Ebonji - Nigerija da plate za seme poboljšanih sorti pirinča. Utvrđeno je da su poboljšane sorte pirinča dostupne poljoprivrednicima, profilisani su njihovi izvori informacija, utvrđena je njihova spremnost da uvedu u proizvodnju poboljšane sorte pirinča i analizirani su faktori koji utiču na njihovu spremnost da plate seme unapređenih sorti. Prilikom odabira 120 ispitanika koji su učestvovali studiji korišćen je postupak višestepenog uzorkovanja. Podaci su prikupljeni putem strukturiranih upitnika i analizirani inferencijalnom i deskriptivnom statistikom. Rezultati pokazuju da su istraživački instituti (74,19%) i masovni mediji (65,00%) bili glavni izvori informacija među ispitanicima. Seme mnogih poboljšanih sorti pirinča bilo je dostupno poljoprivrednicima, uključujući FARO 44 (71,66%), R8 (68,33%), FARO 52 (65,83%) i Mass 11 (56,67%). Proizvođači pirinča su izrazili spremnost da kupe seme poboljšanih sorti pirinča po subvencionisanim cenama ($\bar{x}=3,6$), kao i ukoliko imaju pristup poljoprivrednim kreditima ($\bar{x}=3,1$) i polisama osiguranja ($\bar{x}=3,5$). Očekivani prinos ($\beta=3,523$), prihod sa farmi pirinča ($\beta=5,527$), starost ($\beta=8,374$) i kontakti sa savetodavnim službama ($\beta=2,361$) pozitivno su uticali na spremnost proizvođača pirinča da plate za seme poboljšanih sorti. Studija preporučuje da vlada i agencije za razvoj poljoprivrede obezbede subvencije, polise osiguranja i poljoprivredne kredite kako bi podstakle poljoprivrednike da unaprede svoju proizvodnju pirinča investiranjem u kvalitetno sortno seme.

Ključne reči: spremnost za plaćanje, subvencije, poljoprivredno osiguranje, poboljšano seme pirinča

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