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Perceived Factors Influencing Farmers' Preference for Rice Varieties in Enugu State, Nigeria

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Abstract

The study assessed perceived factors influencing farmers' preference for rice varieties grown in Enugu State, Nigeria. A structured interview schedule was used to obtain information from 150 rice farmers. Data collected were analysed using frequency counts and percentages. The major rice varieties grown by the farmers were Faro 44 (60.7%), R8 (28.7%) and Mass II (20.7%). The farmers' major sources of information that perhaps influenced their preferences for rice varieties were fellow farmers (93.3%) and personal observation (86.7%).The farmers' perceived factors influencing preference of varieties were high yield (74.7%) and cooking characteristics like not sticking together on cooking (64.0%),

nice taste (60.0%) and rising better while cooking (59.4%). Aside from the preference for FARO 44 rice variety because of high yield, the perceived factors influencing farmers' preference of other rice varieties (R8 and Mass) were mainly because of seed availability. Therefore, farmers need information on affordable sources of FARO 44 rice seeds for higher yield that could increase their profit and raise their standard of living

Introduction

Rice (Oryza sativa) is a primary staple food for more than half of the world's population (Akintelu, 2018; Kim, Chung, Lee, et al., 2020) with over 3.5 billion individuals depending on rice for about 20% of their daily calories (Gadal, et. al, 2019). Globally rice is the fourth most cultivated crop after sorghum, millet and maize as regards production and land area cultivated (FAO, 2019). Nigeria is the second largest rice producer in Africa with a growth of 70% over the past decade (United States Department of Agriculture-Foreign Agricultural Service, 2019), which is expected to continue growing over the next decade. Nigeria currently produces around 8 million tons per year but can produce 14 million tons per year if appropriate measures are taken (Goronyo, 2019). As for its consumption, rice is among the foods whose consumption has no cultural, religious, ethnic or geographical limits (Osabuohien et al., 2018). In Nigeria, it is one of the most important staple foods accounting for about 10.5% of the average calorie intake of Nigerians (FAO, 2019) and 6% of household expenses (Toluwase et al., 2019). Rice consumption is increasing rapidly in Nigeria because of the shift in consumer preference towards rice, increasing population growth, increased income levels, and rapid urbanization (Kamai, Omoigui, Kamara, et. al. 2020). Currently, rice consumption has surpassed its domestic production, making Nigeria the second largest rice importer after China with an average of 2.4 million tons per year (Durand-Morat et al., 2019; FAO, 2019). Meanwhile, this is also expected to continue growing over the next decade due to increasing population and urbanization (Durand-Morat et al., 2019; FAO, 2019; USDA-ERS, 2019).

In Enugu State, rice remains one of the major staple crops cultivated by farmers using both the upland and lowland production systems (Okoh, Opata and Umaru, 2022). However, in flood-prone areas, rice production is declining due to flooding (Pirngadi and Rahmawaty, 2022) and perhaps due to issues relating to low-yielding varietal preferences. These rice varieties are produced by small-scale farmers that constitute about 80% of the rice farmers' population on less than a hectare leading to relatively poor yield (Olayinka and Alfred, 2019; Omoare and Oyediran, 2020). Although many improved rice seed varieties (NERICA 1-18, NERICA L18-L60, Igbemo, FARO 44, FARO 51, among many others) with high yielding and early maturing attributes have been disseminated to farmers in Nigeria (Kehinde, Tijani and Ogundeji, 2022), the demand-supply deficit has continued unabated. According to the Central Bank of Nigeria (CBN), (2019) only about 56% of the 6.3 million metric tonnes of rice consumed in Nigeria annually is locally produced, while the supply deficit is augmented through importation. To this effect, about 3 million tonnes of rice valued at US$480 million are imported annually to augment the shortfall (Kamai, Omoigui, Kamara, Ekeleme. 2020). The demand-supply gap could be because of disparities between breeders' and farmers' evaluation criteria in breeding and preference for rice varieties respectively (Maligalig et al., 2018)

On the side of farmers, many factors can influence the preferences of rice varieties and these perhaps are functions of improved yield, early maturity, size of the grain, etc (Jin et al., 2020). The breeders on the other hand may have different criteria which may be different from what the farmers want. As a result, this study sought to ascertain the perceived factors influencing farmers' choice of rice varieties grown in Enugu State, Nigeria. Specifically, the study identified:

i. major varieties of rice grown by the farmers;
ii. farmers' sources of information on rice varieties grown; and
iii. factors influencing preference of varieties grown,

Methodology

The study was carried out in Enugu State, Nigeria, The state is located between $6^0$26 '0''N and $7^0$29'0''E (Akinbile et al. 2019). It has a population of 3,267,837 people, with a total land area of 8,022.95 sq kilometres. The state has 17 local government areas. All the rice farmers in the State constituted the population for the study. A multi-stage sampling procedure was used to select 150 rice farmers for the study. In the first stage, three local government areas were purposively selected based on the preponderance of rice production. The local government areas selected were: Uzo-uwani, Enugu East and Aninri local governments. The purposive sampling technique was also used in stage two to select one town community from the local government selected based on the predominance of rice production. The town communities selected were Adani in Uzo-uwani Local Government, Ugbawka in Enugu East Local Government and Nenwe in Aninri Local Government. In stage three, five villages each were purposively selected from the town communities based on the same reason stated above. In the last stage, 10 rice farmers each with at least five years of rice farming experience were purposively selected from each village community to give a total number of 150 rice farmers for the study.

In the measurement of the variables, objective one sought to identify the major varieties of rice cultivated by farmers. Farmers were asked to list the variety of rice they cultivate and thereafter rice varieties with 20% and above were considered as major rice varieties cultivated by the farmers. In Objective two, rice farmers' sources of information on rice varieties grown were also ascertained by asking the farmers to tick either 'yes' or 'no' from the list of information sources provided. Some of the information sources include fellow farmers, radio, extension agents and so on. Information sources with 50% and above were later considered major sources of information for the farmers. In Objective 3, perceived factors influencing farmers' preference for rice variety grown were also ascertained by asking the farmers to indicate either 'yes' or 'no' against the variables provided. Some of the factors enumerated on the list were: high yield, consumer preferences, seed availability, etc. Data for the study were collected through the use of a structured interview schedule and were analyzed using frequency counts and percentages.

Results and Discussion

Major Rice Varieties Grown by the Farmers

The major rice varieties grown by the majority (60.7%) of the farmers were Faro 44 while 28.7% and 20.7% grow R8 and Mass II rice varieties respectively (Table 1). Farmers' preference for Faro 44 rice varieties could be because of its desirable attributes like higher yield, drought resistance and taste. Higher yield is an attribute

that many farmers could consider for preference of any rice variety. This is because it can lead to an increase in production and this is necessary to attain food security. High yield can also lead to an increase in farmers' income and standard of living which can motivate the farmer to increase the area of land under cultivation. This collaborates with the findings of Jin, Mansaray, Jin, and Li, (2020) that high-yielding rice varieties have the potential of increasing rice production as most rice varieties cultivated by farmers in Sierra Leone often were low-yielding varieties. Fatondji, Adoukonou-Sagbad, Sognigbe, et.al. (2020) assert that farmers' preferences for the selection of rice variety are functions of certain plant features such as high grain yield, and good cooking and eating qualities among others.

Table 1: Major rice varieties grown by the farmers

Preferred rice variety grown	**Percentage** %
Faro 44	**60.7**
R8	**28.7**
Mass II	**20.7**
306	14.0
Authority	7.3
Chinyelugo	5.3
Imo	5.3
Ubagu	4.0
Volume 15	4.0
Onogwu	3.3
Faro 14	2.7
Foreign	2.7
Ekwueme	2.0

Source: field survey, 2021

Farmers' Sources of Information on Rice Varieties

Table 2 indicates that the majority (93.3%) of the farmers sourced information from fellow farmers. Similarly, 86.7% and 66.7% of the farmers indicated personal observation and friends as sources of information respectively. Meanwhile, relations (59.3%) and input dealers (52.0%) were other major sources of information for the farmers. That could influence the preference for rice varieties grown. However, only 25.3% of the respondents indicated they source information from extension agents.

These major information sources are faster, affordable, available and accessible and are disseminated orally in the local languages the farmers could easily understand. In addition to that, these sources though non-institutional, could be trusted by the farmers since they believe in them based on their relationship and perhaps farming experience. However, information from these sources could be erroneous as they may not be research-based. Reliance on such sources could result in poor yield and low productivity that could lead to a poor standard of living for the farmers. On the contrary, the results indicate poor extension support to the farmers on the preference of rice varieties grown. As a formal institution, extension agents play significant roles in supporting subsistent farmers in making informed decision necessary for household food security (Rickards et al., 2018). According to Danso-Abbeam et al. (2018) farmers' participation in agricultural extension activities in Northern Region of

Ghana resulted in a rise in farmers' income and an improvement in the standard of living. In absence of such support, the farmers can resort to self-help by sourcing information from non-institutional sources. It can equally result in farmers sticking to old and traditional methods of rice production as well small-scale rice production technologies even when the preferred rice variety has the potential for high yield.

Table 2: Farmers' sources of information on rice varieties

Sources of information	Percentage
Fellow farmers	**93.3**
Personal observation	**86.7**
Friends	**66.7**
Relations	**59.3**
Input dealers	**52.0**
Paddy dealers	33.3
Miller	32.0
Processors	31.3
Milled rice owners	27.3
Extension agents	25.3

Source: field survey 2021

Perceived Factors Influencing Farmers' Preferences for Major Rice Varieties

FARO 44 Rice Varieties

Table 3 shows that the majority (74.4%) of the farmers indicated that the major factor influencing their preference for FARO 44 rice variety was high yield. Similarly, 64.0%, 60.0% and 59.4% preferred FARO 44 because it does not stick together on cooking, it tastes nice and it rises better while cooking respectively. Also, consumers' preference (58.6%), seed availability (58.0%) and early maturity (56.0%) were other major factors the farmers indicated influenced their preference for FARO 44 rice variety.

These findings imply that farmers place much importance on the high yield potential of FARO 44 for increased rice production compared to other rice varieties. High yield is important as it has the potential to increase farmers' income and overall well-being. It can equally help to bridge the demand-supply deficit for rice in Nigeria, all things being equal. This is in line with the findings of Fatondji, et. al. (2020) that most farmers' preferences for a rice variety were hinged on high yield and good taste. Shaosheng, et. al. (2020) also assert that factors such as potential yield, early maturity, pest-disease resistance, cooking quality, etc influence the preference for rice variety among rice farmers. Similarly, Fatondji *et al.* (2020) revealed that farmers' preferences for rice variety are basically on certain plant features such as high grain yield. According to Rahman and Connor (2022), farmers who adopt rice varieties of high-yielding qualities like FARO 44 have high income and better nutrition.

R8 Rice Variety

The majority (32.2%) of the respondents (Table 3) indicated that seed availability was the major factor influencing their preference for R8 rice variety. Also, not sticking together on cooking (30.2%), high premium (28.9%), farmers' experience (28.2%), trust of seed source (28.2%), formal/informal training of rice farmers (26.8%), source

of information available to the farmer (25.0%) and nice taste (20.8%) were other major factors that influence the preference of R8 rice variety.

Mass II Rice Variety

Table 3 shows that a greater proportion (33.6%) of the rice farmers indicated that seed availability was the major perceived factor influencing the choice of Mass II rice variety. Also, high yield (31.5%), trust of seed source (30.9%), high premium (30.2%), long grain (30.2%) and source of information available to the farmer (29.5) were also major factors that influence the preference of Mass II rice variety. Other major factors include: farmers' experience (27.5%), formal/informal training of rice farmers (25.5%) early maturity (22.8%) and disease resistance (20.1%)

Seed availability was the major factor farmers considered for the preference of R8 and Mass II rice varieties respectively. The preference for rice varieties based on seed availability may not be an informed decision. This perhaps shows that farmers lack extension education in their decision-making and preferences for rice varieties grown. This is because growing any particular rice variety because the seed is available without due consideration of other factors may not lead to an increase in farm yield and productivity. It may not also help in improving the standard of living of the farmer. There is a need therefore for a synergy between farmers and research institutes bases for breeding and preferences of rice seed varieties. as this can be useful for ensuring a high field adoption rate for better yield.

Table 3: Perceived factors influencing farmers' preference for major rice varieties

Factors	Faro 44 (%)	R8 (%)	Mass (%)
High yield	**74.7**	29.5	**31.5**
Seed availability	**58.0**	**32.2**	**33.6**
Disease resistant	40.0	7.4	**20.1**
High premium	26.0	**28.9**	**30.2**
Consumer preference	**58.6**	14.8	22.8
Drought resistant	20.0	4.7	6.7
Flood resistant	8.7	6.0	5.4
Long grain	47.4	13.4	**30.2**
Medium grain	41.0	4.7	12.8
Short grain	6.7	16.8	6.0
Taste nice	**60.0**	**20.8**	18.8
Rises better while cooking	**59.4**	18.8	31.5
Sticks together on cooking	10.0	4.0	11.4
Do not stick together on cooking	**64.0**	**30.2**	19.5
The brightness of the grain	39.3	18.1	19.5
Do not break while milling	36.0	16.8	23.5
It is not labour intensive	18.0	3.4	6.7
Seeds are cheap	16.0	7.4	22.1
Rodent and pest resistant	19.3	4.0	17.4
Source of information available to the farmers	22.7	**25.0**	**29.5**
Farmers experience	28.0	**28.2**	**27.5**
Formal/informal training of rice farmers	16.7	**26.8**	**25.5**
Extension contacts	17.3	5.4	6.0
Weather condition	10.7	0.7	12.1
Soil texture	28.0	5.4	3.4
Early maturity	**56.0**	1.3	**22.8**
Height of rice plant	17.3	6.0	12.1
Cheaper to cultivate	12.0	2.7	18.8
Easier to process	14.6	2.7	5.4
Trust of seed source	4.7	**28.2**	**30.9**

Conclusion and Recommendation

Farmers are heterogeneous in their preferences for the attributes of the rice varieties they grow. However, the preference for rice varieties based on high yield can lead to productivity, an increase in profit and improved farmers' welfare. Farmers' sources of information contribute to farmers' decision-making process. The choice of available but non-institution-based information sources can lead to farmers making wrong preferences. It is imperative therefore for policymakers to recognize the intriguing nature of farmers' diverse preferences for crop attributes and the need for implementing tailored and multiple strategies, in terms of providing improved and high-yielding rice varieties to farmers who need them. There should be synergy among research institutions, extension agents and farmers to synchronize farmers' concerns on rice attributes and breeders' evaluation to encourage the adoption of rice varieties for improved yield, profit and farmers' standard of living.

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