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IMPORTANT CUES AND ATTRIBUTES OF RICE AMONG CONSUMERS IN EKET, AKWA IBOM STATE, NIGERIA

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Abstract
Increasing the market share of Nigerian produced rice within the country without trade policy interference will require understanding rice attributes and cues which consumers prefer and their perception of rice from different origins. By eliciting consumers' ranking of attributes and cues through a survey, and applying the relative importance index post-survey, this study examines which attributes and cues are important to consumers. A Fisher's exact test is further used to assess consumers' association of attributes and cues with rice of different origins –i.e., locally produced or imported. Results show that consumers are more interested in certain experience attributes than cues and do not significantly associate their preferred attributes with rice produced in Nigeria. Despite the preference for experience attributes, informative cues, which minimize the cost of ignorance and have the potential of boosting market shares were less important to consumers and significantly associated with imported rice. Addressing consumers' low regard for informative cues and improving on preferred attributes in locally produced rice may foster its competitiveness without restrictive policies.

Keywords: Attributes, informative cues, imported, locally produced, preference, rice

Introduction

Over the years, the Nigerian government has employed trade policy instruments in the bid to boost production and domestic consumption of locally produced rice (Daramola, 2005; Lançon and Benz, 2007; Johnson and Dorosh, 2017). While isolating and protecting domestic rice brands, such measures also indicate the inability of these brands to compete with their imported counterparts, not only in terms of price but also in terms of quality. The use of trade policy instruments solely for isolating domestic brands, without a corresponding focus on their use as buffer mechanisms for facilitating the development and improvement of the local rice industry and brands, will not only result in the persistent low competitiveness of domestic brands (Lançon and Benz, 2007), but can also affect consumers access to preferred rice attributes. The existence of highly differentiated markets and the opportunity for consumers to choose attribute bundles, which closely align with their preferences, contribute to their welfare (Costanigro and McCluskey, 2011). Paying attention to consumers welfare while boosting the acceptance and consumption of locally produced rice will require close matching of product attributes with consumer preferences, and understanding which attributes are important to them.

Quality differential is vital for consumers when making comparison and choice between imported and locally produced rice (Obih and Baiyegunhi, 2017). Dimensions of quality, which form the basis for consumers' decision, are search, experience or credence in nature (Rutsaert *et al*., 2013). For experience and credence attributes, which are verifiable only after purchase and by regulatory agencies/ third-party certifiers, cues (i.e., features that provide a basis for making inferences, where product information gap exists) offer some form of signal about these attributes. Each cue plays a distinct role. Brands and labels are informative, aiding consumers to select the best choice bundle that suits them from any given choice set and to minimize the cost of ignorance usually suffered due to

lack of information (Unnevehr *et al*., 2010); such costs could range from mere dissatisfaction to complex heath issues. In the absence of fraud, labels specifically serve as nudges and provide details to consumers at the point of purchase about unobservable attributes, while brand enhances patriotic consumption and reputation effect – i.e., traceability of rice producers and products that either satisfy or fail to meet consumers' expectations or the required production standards. Packaging also permits identification of a product, attracts consumers' attention, (Oenning *et al*., 2017), and provides the first impression of the product and producer to consumers. Price, on the other hand, serves as a rationing agent –allowing only consumers who value specific attributes to access them. The literature shows that packaging is important in consumers preference for imported rice (Nwachukwu and Achike, 2020), but price is a more important cue than both packaging and label in consumers' decision to choose Nigerian rice (Obih and Baiyegunhi, 2018; Ojo et al., 2019) and a price increase significantly boosts the probability of accepting locally produced rice for some consumers (Obih and Baiyegunhi, 2018).

In comparison to most rice attributes, the paramount cue identified in the literature (price) is shown to be of little importance to consumers (Ogundele, 2014; Ojo *et al*., 2019; Onya *et al*., 2019), signifying that consumers may be willing to concede to some price increase as a trade-off for preferred attributes. In West Africa, including Nigeria, preferred attributes associated with imported rice shifts demand away from domestic rice and increases the tendency of discounting it (Demont *et al*., 2017). Such preferred attributes for Nigerian consumers identified in the literature are mostly search and experience attributes, and include cleanliness and absence of foreign materials, softness and ease of preparation, slenderness and long grain, taste, and swelling capacity (Abdullahi *et al*., 2019; Demont *et al*., 2017; Nwachukwu and Achike, 2020; Ogundele, 2014; Okeke *et al*., 2015; Onu, 2018; Opeyemi *et al*., 2015). Some of these attributes like taste, swelling capacity and ease of preparation, are equally identified as reasons for the preference of locally produced rice (Abdullahi *et al*., 2019; Ajiboye *et al*., 2019; Nwachukwu and Achike, 2020; Ogundele, 2014; Ojo *et al*., 2019; Onu, 2018). When ranked, it is absence of foreign matter and the shape of grain, which are experience and search attributes respectively, that top the list of important considerations in consumers' rice choice, irrespective of rice origin (Onya *et al*., 2019). Health benefits such as nutritional value, which are credence in nature, are also preferred (Abdullahi *et al*., 2019; Ojo *et al*., 2019; Onu *et al*., 2018), but the absence of verification for specific credence claims or perceptions in majority of the rice sold in Nigerian markets makes it unrealistic for consumers to accurately associate such attributes with rice origin.

The literature on preferred attributes and their association with rice origin is scarce for most parts of the country, and despite the benefits of cues, like labels and brands, there is little empirical evidence on their relative importance to Nigerian consumers in rice purchase decisions. This study adds to the body of literature by providing evidence from the South-South on the relative importance of various rice attributes and cues to consumers, and also highlights how these are associated with rice origin.

Conceptual Framework

Our framework is based on the theory of consumer behaviour with a focus on Lancaster's (1966) approach. The fundamental assumption for a utility maximizing consumer is that in considering the choice between array of goods, the consumer will only choose the alternative that provides higher expected utility. For simplicity, we assume the goods to be rice with two production origins –Nigeria (R_N) and Imported (R_F), which provide utilities denoted as U_N and U_F respectively. Hence, the consumer will only choose R_N over R_F if the expected utility difference between U_N and U_F (i.e. $U_N - U_F) > 0$, and choose R_F over R_N if the expected utility difference between $U_N$and U_F(i.e. $U_N - U_F) < 0$.

In Lancaster's (1966) approach to consumer theory, these differentiated goods are viewed as bundles of attributes, characteristics, features or properties which distinguish them from associated goods. Hence, they are not direct objects of utility, but the utility derived from consuming each of the goods is a function of their characteristics, and utilities are assumed only to rank goods by ranking the characteristics they possess. Therefore, the goods in our framework can be represented as:

$R_N = (N_1, N_2, \ldots\ldots N_K)$, and
$R_F = (F_1, F_2, \ldots\ldots\ldots F_K)$.....(1)
And the Utilities expected from them, respectively, as:
$U_N = U(N_1, N_2, \ldots\ldots N_K)$, and
$U_F = U(F_1, F_2, \ldots\ldots\ldots F_K)$ .....(2)
Where, N_1.....N_K are characteristics of rice produced in Nigeria, and F_1.....F_K are characteristics of rice imported into Nigeria.

It follows that a consumer will prefer R_N over R_F only if (in combination) the characteristics in R_N, i.e., $(N_1 \ldots\ldots N_K)$ is preferred to that in R_F, i.e., $(F_1 \ldots\ldots\ldots F_K)$. The

stability of such preference is hinged on underlying values defined by consumers (Becker, 1976, as cited in Lusk and Briggeman, 2009) from which the range of product characteristics important to consumers originate. For example a consumer who values convenience is likely to appreciate rice that cooks quickly and is stone free (which eliminates the burden of sorting), another who values appearance may rather appreciate rice which is non-sticky after cooking, while another may be status driven and appreciate known brands. Hence, given a consumer's underlying food value(s), he/she can provide an array of rice characteristics which are important to her/him and are the basis for assessing the respective characteristics of R_N and R_F to decide on the expected utilities to be derived.

Methodology

Data description

The data for this study is from a survey carried out in 2019 on rice consumers in Ikot Ebok community of Eket, Nigeria. One hundred and thirty-five (135) respondents were randomly selected and interviewed using a structured questionnaire. Of these, one hundred and thirty-two (132) had complete responses. All participants were provided information about the study, including voluntary participation –i.e., the freedom to refuse to answer any question or opt out at anytime. Confidentiality and anonymity were guaranteed. They all gave verbal consent prior to interview. Based on existing literature, fifteen (15) characteristics –i.e., eleven (11) attributes and four (4) cues– are presented to respondents in order to assess their importance to consumers. The attributes presented are aroma, grain size (with options long and short), swelling capacity, clean and stone free, non-sticky, quick cooking, taste and colour (with options brown, white, and off-white); while the cues are price, packaging, label and known brand. In order to understand the importance of cues to consumers in comparison with attributes, we conduct a joint assessment of ranking across both groups of characteristics. Respondents are asked to indicate the level of importance of each characteristic (i.e., either not important, important, or very important). Post-survey, the levels of importance are converted to a 3-scale rank (i.e., *not* important = 1, important = 2, and very important = 3). To further assess the association between rice origin and rice characteristics, respondents were also asked to indicate the origin (Nigerian, imported or both) and characteristics of rice they purchase. Prior to analysing for the association of origin with characteristics, the data was disaggregated by origin of rice purchased and data from respondents who purchased both imported and Nigerian rice excluded from this particular analysis; this is to ensure that results are absolutely free of any bias that may occur from mis-associating characteristics with origins. Of the one hundred and thirty-two (132) complete responses received, ninety-three (93) were used to assess the association between rice origin and rice characteristics.

Analysis

Important characteristics

We use the relative importance index method (RII) –adapted from Sambasivan and Soon (2007) and Gündüz *et al*., (2013) to assess the characteristics (and sub-categories, where applicable) that are more important to rice consumers. The RII synthesizes the rankings from all respondents to a single value, which indicates a characteristic's order of importance among all characteristics under consideration. In this study, the ranking of each characteristic assigned to the level of importance chosen by each respondent is considered as a weight assigned by that respondent. The highest weight a respondent can assign is the highest rank possible –which is three (3). The RII for each characteristic is estimated as follows:

$$RII_A = \Sigma W_A / HN \quad \text{..... (3)}$$

Where W_A is the weight given to characteristic A, H is the highest weight a characteristic can receive and N is the number of respondents. The RII_A ranges from an infinitesimal value to 1. Given the structure of the question assessing the importance of characteristics in this study, a higher RII_A indicates that a characteristic is more important for respondents.

Association between rice origin and characteristics

Fisher's exact test was used to examine the association between rice origin and characteristics. Fisher's exact is an alternative to the chi-square test when the sample size is small, resulting in the possibility of a number of cells having very small expected frequencies and wrong conclusions (Kim, 2017; Rangaswamy, 2010). It calculates the exact probability of occurrence instead of comparing the observed and expected frequencies, which is the case in a chi-square test. Although its practical application is for small samples, the Fisher's exact test is also valid for large samples (Kim, 2017); this property makes it appropriate for our analysis, because while we envisage small frequencies when data is disaggregated by rice origin and characteristics, we can side-step confirming this possibility without biasing our results. For this study, we adapt the specification of the Fisher's exact test as presented in Kot and Rajiani (2020) and Rangaswamy (2010). Analysis is conducted for only characteristics that are convertible to categorical variables (i.e., all characteristics except price). The configuration of our 2 x 2 contingency table for each characteristic under consideration is given as follows (Table 1):

Table 1: Rice by origin and respective characteristic under consideration

	Characteristic under consideration		
Consumer Groups	**With**	**Without**	**Total**
R_N	R_{N1}	R_{N2}	T_{RN}
R_F	R_{F1}	R_{F2}	T_{RF}
Total	T_W	T_{WO}	n

Where R_N and R_F are as earlier defined; R_{N1}, R_{N2}, R_{F1}, and R_{F2} are the respective cell frequencies; T_W and T_{WO} are the respective column totals and marginal frequencies; and T_{RN} and T_{RF} are the respective row totals and marginal frequencies

The probability (*P)* that for given marginal frequencies T_W, T_{WO}, T_{RN} and T_{RF}, a table with the frequencies R_{N1}, R_{N2}, R_{F1}, and R_{F2} is specified as:

$$log\, P_1 = log\, T_{RN}! + log T_{RF}! + log T_W! + log T_{WO}! - log\, n! - log R_{N1}! - log R_{N2}! - log R_{F1}! - log R_{F2}! \quad .....(4)$$

Or,

$$P_1 = \frac{T_{RN}!\, T_{RF}!\, T_W!\, T_{WO}!}{n!\, R_{N1}!\, R_{N2}!\, R_{F1}!\, R_{F2}!} \quad .....(5)$$

To get an extreme configuration of cell frequencies, Table 1 needs to be reconfigured *m* more times until the smallest cell frequency becomes zero (0), resulting in a total of *m + 1* tables; where *m* is the smallest cell frequency (i.e., either R_{N1}, R_{N2}, R_{F1}, or R_{F2}). The sum of the calculated probabilities as described in equations (4 or 5), for each of all *m + 1* tables gives the final probability of association between rice origin and the characteristic under consideration.

$$P = P_1 + P_2 + P_3 + \ldots\ldots\ldots P_{m+1} \ldots\ldots (6)$$

Results and discussion

Important characteristics

The RII result of the various characteristics (Table 2) shows that overall, the most important characteristics are attributes; implying that consumers are more interested in certain attributes than cues. These leading attributes are clean and stone free, taste, non-sticky, quick cooking, and swelling ability. Studies have also shown these leading attributes to be among the most important for consumers in other parts of the country (Abdullahi *et al*., 2019: Demont *et al*., 2017; Ogundele, 2014; Ojo *et al*., 2019; Onu, 2018) and West Africa (Demont *et al*., 2017). These important attribute are experience-based and only evidenced either after purchase or meal preparation. Given the nature of these leading attributes and the fact that consumers can only form expectations about them in order to make purchase decisions, it is expected that cues such as label (which are meant to provide information about unobservable attributes) and brand name (which makes a product recognizable after a previous experience and helps boost reputation effect for producers) will also be among the most important characteristics for consumers; however, the result shows that both label and known brand are the least important cues for respondents. This is in line with comparable evidence showing that label (Obih and Baiyegunhi, 2018) and brand (Ajiboye *et al*., 2019) are not important factors in consumers' likelihood of accepting locally produced rice. This suggests that consumers are either unaware of the role of these cues or are willing to bear the cost of ignorance, or do not consider these cues as good averters of such cost. It is possible that labels are lacking information on important attributes or that consumers pay little or no attention to labels and brand names due to issues of probable re-bagging and false claims; however further research is needed on these possibilities and any other factor that makes these cues less important to consumers. Also of note is the type of grain size and colour, which are important to respondents – long grains and white grains are more important than other options within their respective categories.

Table 2: RII result of characteristics (*n* = 132)

Characteristic	RII	Rank of Overall Importance of Characteristic	Rank of Overall Importance of Attribute	Rank of Overall Importance of Cue
Clean and stone free	0.9343	1	1	
Taste	0.8611	2	2	
Non-sticky	0.7955	3	3	
Quick Cooking	0.7803	4	4	
Swelling ability	0.7626	5	5	
Price	0.7525	6		1
Packaging	0.7172	7		2
Aroma	0.6970	8	6	
Grain size				
• **Long grain**				
• **Short grain**	0.6818	9	7	
Grain color	0.5884	13	9	
• **White**				
• **Brown**	0.6742	10	8	
• **Off-white**	0.5025	14	10	
Label	0.4697	15	11	
Brand	0.6566	11		3
	0.6237	12		4

The ranking of price after the leading attributes suggests that consumers can make a compromise with slightly elevated prices as long as they are assured of a tasty, non-sticky, quick cooking, swelling, clean and stone free rice. Similar studies (Ojo et al., 2019; Onya et al., 2019; and Obih and Baiyegunhi, 2018) have shown that price either ranks amongst the less important characteristics, or is positively related with the probability of acceptance of locally produced rice –suggesting an association of higher prices with consumers' perception of improved quality. Consumers also rank package higher than the informative cues –i.e., label and brand. There are several implications of this finding. First, it shows that consumers are motivated by visual impression; therefore in addition to ensuring locally produced rice has the preferred attributes, paying attention to packaging can be instrumental in increasing market share. Conversely, it highlights consumers' preference for aesthetic cue rather than informative cues. This is of particular concern for food products because a package, which is an aesthetic cue, may be appealing but by itself barely informs consumers about the inherent attributes of the product; hence, potential product buyers, who lay more emphasis on rice packaging instead of labels, can miss information on preferred attributes or improvements.

Association between rice origin and characteristics

The Fisher's exact results shows that characteristics which consumers strongly associate with rice origin are grain length, white colour, clean and stone free, labelling and brands (Table 3). The percentages of affirmative responses indicate that the most important characteristic to consumers –clean and stone free (Table 2), is associated more with imported than locally produced rice. This is a recurring finding amongst studies (Abdullahi et al., 2019; Demont et al., 2017; Nwachukwu and Achike, 2020; Ogundele, 2014; Okeke et al., 2015; Onu, 2018; Opeyemi et al., 2015), and a pointer to a vital aspect which requires improvement if Nigerian rice is to thrive amidst its imported counterpart. The association of other important characteristics with either locally produced or imported rice is not significant. This implies that neither imported nor Nigerian rice may currently have a significant edge over the other where these characteristics are concerned; hence, locally produced rice has the opportunity to take lead in characteristics which have associations comparable to that of imported rice. However, for important attributes like non-sticky and swelling ability (Table 2), the low percentage of affirmative responses for locally produced rice (Table 3) also signals critical aspects for improvement.

Table 3: Characteristics associated with rice origin (n = 93)

		% of Affirmative Responses	
Characteristic	**Fishers' exact**	**Nigerian Rice Consumers**	**Imported Rice Consumers**
Clean and stone free	0.007[a]	54.55	84.29
Good taste	1.000	63.64	64.79
Non-sticky	0.193	18.18	33.80
Quick Cooking	0.625	50.00	42.25
Swelling ability	0.149	36.36	54.93
Well Packaged	0.808	54.55	49.30
Aroma	1.000	40.91	42.25
Long grain	0.001 [a]	31.82	73.24
White colour	0.051 [a]	31.82	57.14
Labelled	0.052 [a]	27.27	52.11
Branded	0.043 [a]	18.18	43.66
Short grain	0.578	31.82	23.94
Brown colour	0.508	9.09	18.31
Off-white colour	0.237	10.00	2.82

[a] Characteristics significantly associated with rice origin

The most preferred grain size and colour –i.e., long grain and white grain, are associated more with imported rice than locally produced rice. Labels and brands, which are the least important cues, are also associated more with imported rice than locally produced rice. Despite their low ranking of importance, the potential role of brands and verified labels in minimizing the cost of ignorance, and providing information about options and traceability make them budding market share boosters. The significant association of these cues with imported rice implies that if consumers' value for them increases, then it becomes an added advantage for imported rice. Though the careful incorporation of these cues along with important attributes may not seem like an urgent strategy for boosting the demand for rice, it can serve as a forward strategy for Nigerian rice producers.

Conclusion

Ensuring that locally produced rice has a leading market share without restrictive trade policies requires paying attention to identified experience attributes which are important to consumers, and are either notably associated with imported rice or neither of Nigerian or imported rice. It is possible that improving these attributes in domestic rice may result in additional production costs, which will translate to some increase in price for consumers. Nevertheless, producers need not shy away from such improvements due to the cost implication, as results from this and other studies suggest that consumers can make a compromise with slightly elevated prices, as long as they are assured of their preferred attributes. In addition, the role of informative cues as potential nudges and market share boosters seems dormant. Consumers strongly associate informative cues with imported rice than locally produced rice, and are more inclined to aesthetic cues than informative cues in their rice purchase decisions. Understanding consumers' beliefs about informative cues and addressing the reason(s) behind the low ranking is a necessary first step in utilizing these cues as an additional approach for boosting the consumption of locally produced rice; this is of particular interest given the experience nature of the most preferred attributes and the potential role of informative cues for such unobservable attributes during purchase.

References

Abdullahi, A. N., Musa, J., Usman, M., Alhassan, F. B. and Nahantsi, S. (2019). Consumer demand and preference of local and imported rice among households in Sokoto metropolis, Nigeria. *Direct Research Journal of Agriculture and Food Science*, 7(10): 295 –301. doi.org/10.5281/zenodo.3521796

Ajiboye, B., Aminu, T., Adeyonu, A. and Afolabi, J. (2019). Consumers potential demand analysis for local rice consumption in southwest, Nigeria. *International Journal of Mechanical Engineering and Technology*, 10(2): 837-846.

Costanigro, M. and McCluskey, J. J. (2011). Hedonic price analysis in food markets. In J. L. Lusk, J. Roosen & J. E. Shogren (Eds.). *The Oxford handbook of the economics of food consumption and policy.* Oxford, Oxford University Press, Pp. 153 – 161. doi.org/10.1093/oxfordhb/9780199569441.013.0007

Daramola, B. (2005,). *Government policies and competitiveness of Nigerian rice economy*. Paper presented at the 2005 Workshop on Rice Policy & Food Security in Sub-Saharan Africa' organized by WARDA, Cotonou, Republic of Benin. Nov. 7–9.

Demont, M., Fiamohe, R. and Kinkpe, A. T. (2017). Comparative advantage in demand and the development of rice value chains in West Africa. *World Development*, 96: 578-590. doi.org/10.1016/j.worlddev.2017.04.004

Gündüz, M., Nielsen, Y. and Özdemir, M. (2013). Quantification of delay factors using the relative importance index method for construction projects in Turkey. *Journal of Management in Engineering*, 29(2): 133-139. doi.org/10.1061/(ASCE)ME.1943-5479.0000129

Johnson, M. E. and Dorosh, P. (2017). Tariffs, smuggling and economic welfare: A spatial analysis

of Nigerian rice policy options. *Journal of African Economies*, 26(4): 516-538. doi.org/10.1093/jae/ejx008

Kim, H. Y. (2017). Statistical notes for clinical researchers: Chi-squared test and Fisher's exact test. *Restorative Dentistry and Endodontics,* 42(2): 152-155. doi.org/10.5395/rde.2017.42.2.152

Kot, S. and Rajiani, I. (2020). Testing and Identifying Variable Dependency through the Fisher Exact Test in Central Europe Enterprises. *Ekonomicko-manazerske spektrum*, 14(1): 10-18.

Lancaster, K. J. (1966). A new approach to consumer theory. *Journal of Political Economy*, 74(2): 132-157. doi.org/10.1086/259131

Lançon, F. and Benz, H. D. (2007). *Rice Imports in West Africa: Trade Regimes and Food policy formulation*. Poster presented at the 2007 (106th) seminar of the EAAE Pro-poor Development in Low Income Countries: Food, agriculture, trade and environment, Montpellier, France. Oct. 25–27.

Lusk, J. L. and Briggeman, B. C. (2009). Food values. *American Journal of Agricultural Economics*, 91(1):184-196. doi.org/10.1111/j.1467-8276.2008.01175.x

Nwachukwu, C. U. and Achike, A. I. (2020). Determinants of consumption preference of local versus imported rice brands in Enugu state, Nigeria. *Agro-Science*, 19(1): 31-36. doi.org/10.4314/as.v19i1.5

Obih, U. and Baiyegunhi, L. S. (2017). Willingness to pay and preference for imported rice brands in Nigeria: Do price–quality differentials explain consumers' inertia? *South African Journal of Economic and Management Sciences*, 20(1):1-11.doi.org/10.4102/sajems.v20i1.1710

Obih, U. and Baiyegunhi, L. (2018). Consumers' acceptability of local rice brands in Nigeria. Which marketing functions really matter? *Journal of Agribusiness and Rural Development,* 2(48): 183-196. doi.org/10.17306/J.JARD.2018.00412

Oenning, E. J., Guimarães Junior, D. and de Medeiros, D. D. (2018). Brazilian consumer preferences for processed tomato packaging using conjoint analysis. *Journal of Food Products Marketing*, 24(6): 724-744. doi.org/10.1080/10454446.2017.1344598

Ogundele, O. (2014). Factors influencing consumers preference for local rice in Nigeria. *African Journal of Marketing Management*, 6(4): 49-55. doi.org/10.5897/AJMM2011.048

Ojo, A. O., Animoku, O. M. and Ojo, M. A. (2019). Households' consumption willingness for locally processed rice in Kogi state, Nigeria. *Agricultural Science and Technology*, 11(2): 177-183. doi.org/10.15547/ast.2019.02.029

Onu, S. E. (2018). Preference for imported and Nigeria rice among rural households in Imo state Nigeria. *Journal of Agricultural Extension*, 22(3): 53-63. doi.org/10.4314/jae.v22i3.6

Onya, S. C., Okezie, C. A. and Ejiba, I. V. (2019). Double hurdle modelling approach to local rice consumption in Ikwuano local government area of Abia state, Nigeria. *Agro-Science,* 18(2): 20-25. doi.org/10.4314/as.v18i2.4

Okeke, A. M., Iheanacho, A. C. and Obasi, C. C. (2015). Determinants of local rice consumption among households in Makurdi metropolis of Benue state, Nigeria. *International Journal of Food Science and Technology*, 5(1): 1 – 10.

Opeyemi, G., Adedeji, S. O., Komolafe, S. E., Arotiba, K. and Ifabiyi, J. O. (2015). Analysis of consumers' preference in patronizing locally produced and imported rice in Niger State, Nigeria. *Nigerian Journal of Agriculture, Food and Environment*, 11(3): 38-43.

Rangaswamy, R. (2010). *A textbook of agricultural statistics*. 2nd ed., New Delhi, New Age International (P) Ltd Publishers. Pp. 106 – 113

Rutsaert, P., Demont, M. and Verbeke, W. (2013). Consumer preferences for rice in Africa. In M. C. Wopereis, D. E. Johnson, N. Ahmadi, E. Tollens, & A. Jalloh, (Eds.), *Realizing Africa's rice promise*. CABI, Pp. 294-302.

Sambasivan, M. and Soon, Y. W. (2007). Causes and effects of delays in Malaysian construction industry. *International Journal of Project Management,* 25(5): 517-526. doi.org/10.1016/j.ijproman.2006.11.007

Unnevehr, L., Eales, J., Jensen, H., Lusk, J., McCluskey, J. and Kinsey, J. (2010). Food and consumer economics. *American Journal of Agricultural Economics*, 92(2): 506-521. doi.org/10.1093/ajae/aaq007