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**Constraints Faced by Rice Processors in Milling and Branding of Home Grown Rice in Enugu State, Nigeria.**

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**Abstract**

*This study examined the constraints faced by rice processors in milling and branding of home grown rice produced in Enugu State, Nigeria. The objectives of the study were to examine the factors that influence the branding of home grown processed rice and examine the major constraints in processing home grown produced rice into high quality rice. Multi-stage sampling procedure was used to survey 23 respondents across three communities in three local government areas and two agricultural zones selected. Factor analysis, mean and percentages were used to analyse the data collected. Findings showed that along the unit of home grown rice branding, packaging is the only form of branding carried out by processors. The factors that influenced the branding of home grown processed rice in the study area were grouped into four which include inability to appreciate new technology, non-availability of required technology, labour and cost of packaging materials. Also, the major constraints in the processing of home grown rice to improved quality brands are grouped into five factors which are inability to appreciate new knowledge, new technology, communication on storage facilities, labour and marketing information. Rice processors should be trained adequately on branding and improving the quality of home grown processed rice and provision of the required technology. This will improve the competitiveness of home grown rice relative to imported rice thereby increasing its demand.*

**Keywords:** Rice processing, branding, constraints, factor analysis, Enugu State.

**Introduction**

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Rice quality and standardization are not yet well developed in Nigeria because rice milling is concentrated on small-scale milling operators which are mostly cottage industry and supplies 70 percent of domestic rice consumed in the country (Johnson and Masias, 2016). According to Tinsley (2012), rice milling is done by the use of single stage mill which is not as effective as they end up wasting the grains and providing cheap low quality rice. In Southwest Nigeria, the single pass one stage mill is also used by rice millers (Adeyemi, Okoruwa and Ikudaisi (2017). "Rice processors have a major role to play in the improvement of the quality of home grown rice and their efficiency can be considered as a key element in the development of home grown rice market" (Fiamohe, Diagne and Flifli, 2014).

The major problem facing the rice processing industry is the use of traditional huller mills which lead to considerable post-harvest loss (Singha, 2012). The nature of milling equipment also greatly impacts rice quality. Although large-scale rice milling equipment provides the highest quality of rice most efficiently, it is difficult to operate such equipment in areas that do not have sufficient volume of rice and such will make the equipment uneconomical. Most rice in West Africa is milled using small, sometimes portable, milling machines that largely produce low-quality rice with significant levels of impurities and mixed whole and broken grains (Demont and Neven. 2013).

Another problem facing the millers include lack of stock homogeneity as a result of a highly disaggregated and fragmented supply chain arising from assembling rice stocks from different producers; mixture of many varieties in batch processing; because of this the final milled rice is often discoloured with stones, sand and other contaminants, as well as damage to grains (Johnson and Masias, 2016). The traditional method of parboiling rice results in the paddy being overcooked thereby reduces the recovery of head rice and given out offensive odour. This reduces the quality of rice and acceptability by consumers (Danbaba et al, 2019).

There are some differences between home grown processed rice and imported rice. Some of the differences are appearance, swelling capacity, taste and the homogeneity. Consumers of home grown rice brand in Enugu State prefer the brand because of the taste, availability, minimal use of ingredients and swelling capacity. These differences are the main determinants of price between home grown rice and imported rice (Cadoni and Angelucci, 2013; Johnson, Takeshima and Gyimah-Brempong., 2013). This being the case, improving the quality, use of good bagging and branding in addition to the organoleptic properties of the home grown rice will enable it compete with the imported rice, which is one of the objectives of Central Bank of Nigeria Anchor Borrowers' scheme. "Furthermore, in order to benefit from the best market conditions, the value chain must be capable of processing and destoning rice so that it adheres to the quality criteria of consumers" (Cadilhon and Marie-Aude, 2012).

Unbranded and poorly packaged home grown rice are distinguishable from imported rice brand and hence the value is not appreciated by the consumers. When processed home grown rice is branded and packaged, it adds value to it. The high

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cost of investment in agriculture according to Ohen and Ajah (2015) is attributed to the dearth of infrastructure in Nigeria especially power and transport, low access and high cost of finance, high cost of input, weak research institutions, low budgetary allocation to agriculture by the government.

The study specifically sought to describe the socio economic characteristics of rice processors, the branding practices used by processors, determine the factors that influenced the branding of processed home grown rice and examine the major constraints in processing home grown rice into high quality rice.

## **Methodology**

The study was carried out in Enugu State, which is one of the states in the eastern part of Nigeria. The state shares boundaries with Abia State and Imo State to the South, Ebonyi State to the East, Benue State to the Northeast, Kogi State to the Northwest and Anambra State to the West. Economically, the state is predominantly rural and agrarian, with a substantial proportion of its working population engaged in farming (National Bureau of Statistics, 2014). Enugu State lies between latitudes  $5^{\circ}56'N$  and  $7^{\circ}05'N$  of the equator and longitudes  $6^{\circ}53'E$  and  $7^{\circ}55'E$  of the Greenwich meridian (Enugu State Agricultural Development Project (ENADEP) (2009). The State has a population of 3,257,298 (National Population Commission (NPC), 2006).

According to ENADEP (2012), Enugu State comprises 17 local government areas (LGAs) which are divided into six agricultural zones (AZs) namely: Awgu zone, comprising Awgu, Aninri and Oji River; Agbani zone comprising Nkanu East, Nkanu West and Enugu South; Udi zone comprising Ezeagu and Udi; Nsukka zone comprising Igbo Eiti, Nsukka and Uzo-Uwani; Enugu Ezike zone which is made up Igbo-Eze South, Igbo-Eze North, and Udenu; and Enugu Zone comprising Enugu North, Enugu East and Isi-Uzo LGAs.

Multistage sampling procedure was employed in the selection of respondents for this study. The first stage involved a purposive selection of two AZs (Awgu and Nsukka) from the six AZs where rice processors are concentrated. In the second stage, two LGAs and one LGA with higher concentration of rice processors were purposively selected from Awgu and Nsukka AZ respectively to have a total of three LGAs for the study. The selected LGAs were Awgu and Aninri from Awgu AZ and Uzo-uwani from Nsukka AZ. In the third stage, three communities where rice processors operate were purposively selected from the three selected LGAs. The three communities selected were Mgbowo, Nenwe and Adani from Awgu, Aninri and Uzo-uwani LGAs respectively. Finally, sampling frames of processors were collected from the Rice Growers Association in the States where four rice processors were purposively selected from Mgbowo, 11 from Nenwe and 8 from Adani. In all, 23 rice processors were found and where all selected for the study.

Primary data were used for the study. The primary data were collected using a set of semi-structured and pre-tested questionnaire. The questionnaires were administered to the respondents with the help of research assistants. The data for this study were analyzed using descriptive such as frequency distribution, percentages and mean and Factor analysis models.

Factor analysis is a method for investigating whether a number of interests  $Y_1, Y_2, \dots, Y_l$  are linearly related to a smaller number of unobservable factors  $F_1, F_2, \dots, F_k$ . Equamax with Kaiser Normalization was the rotation method used to realize the factors that influence the branding of processed home grown rice. Nine variables: lack of awareness, cost of customized bags, cost of sealing machine, cost of labour, innovativeness, lack of technology, not relevant to have customized bags, lack of training and inadequate capital were used in analysing the factors that influence the branding of processed home grown rice. The model can be shown mathematically as;

$$Y_1 = \beta_{10} + \beta_{11} F_1 + \beta_{12} F_2 + e_1 \dots\dots\dots 1$$

$$Y_2 = \beta_{20} + \beta_{21} F_1 + \beta_{22} F_2 + e_2 \dots\dots\dots 2$$

$$Y_3 = \beta_{30} + \beta_{31} F_1 + \beta_{32} F_2 + e_3 \dots\dots\dots 3$$

$$Y_4 = \beta_{40} + \beta_{41} F_1 + \beta_{42} F_2 + e_4 \dots\dots\dots 4$$

Where:

$Y_1$  to  $Y_4$  are unknown factors or component

$\beta_{12}$  to  $\beta_{42}$  = Factor loadings

$e_1$  to  $e_4$  = error variance

Factor analysis model using Equamax with Kaiser Normalization was the rotation method was also used to examine the major constraints in processing improved rice quality. Sixteen variables - high cost of labour, inadequate capital, high cost of transportation, price fluctuation, lack of training, inadequate storage facilities, poor communication, unavailability of technology, inadequate method of processing, poor marketing information, low quantity produced, high cost of processing equipment, poor pricing, lack of technical knowledge, not open to new innovations, lack of finance of post-harvest machinery were used in identifying the major constraints being faced in processing of improved rice quality. Some of these variables may be more related than others. This was shown mathematically as;

$$Y_1 = \beta_{10} + \beta_{11} F_1 + \beta_{12} F_2 + e_1 \dots\dots\dots .5$$

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$Y_2 = \beta_{20} + \beta_{21}F_1 + \beta_{22}F_2 + e_2$ .....	6
$Y_3 = \beta_{30} + \beta_{31}F_1 + \beta_{32}F_2 + e_3$ .....	7
$Y_4 = \beta_{40} + \beta_{41}F_1 + \beta_{42}F_2 + e_4$ .....	8
$Y_5 = \beta_{50} + \beta_{51}F_1 + \beta_{52}F_2 + e_5$ .....	9

Where:

$Y_1$  to  $Y_5$  are unknown factors or component

$\beta_{12}$  to  $\beta_{52}$  = Factor loadings

$e_1$  to  $e_5$  = error variance

## Results and Discussion

### Type of Branding used by Processors

Findings of this study show that along the unit of home grown rice branding, packaging is the only form of branding carried out by processors. This implied that the processors may not be conversant with branding or lack the necessary skill or technologies needed for branding of their milled rice. After milling, the milled rice are usually put into a 100kg jute bag with their initials written on the bags and taken to the market. The marketers on the other hand re-bag the rice into smaller kilograms of 50kg, 25kg or 10kg bags. Result on Table 1 also showed that majority (60.9%) of the processors do not package their rice after milling and those that package (26.0%) use jute bags (100kg). This is in line with the finding of a study conducted by Basorun (2013), that processors frequently apply local knowledge and experience since they do not have technical skills needed for packaging rice products.

**Table 1: Type of branding used by processors**

Distinguishing your rice from other millers	Percentage (23)
Customers	4.3
Initials on Jute bag	43.5
Not bordered about distinguishing their product	52.2
<b>Package your rice after milling</b>	
Yes	30.4
No	69.6
<b>Type of bag used for packaging</b>	
Jute Bag	26.1
Do not package	73.9

**Source:** Field survey, 2015.

## Factors that Influence the Branding of Processed Home Grown Rice

Principal component analysis extraction method was used to carry out the factor analysis. The results of the analyses are presented in Table 2. Equamax with Kaiser Normalization was the rotation method used, rotation converged in six iterations. Four unknown factors were identified to affect the branding of locally processed rice. Although these factors are unknown in themselves but it can be seen that;

$$\text{Factor 1: } y_1 = 0.456x_3 + 0.797x_5 + 0.851x_7 - (0.885x_9)$$

Factor 1 is influenced by  $x_5$  and  $x_7$ .

$$\text{Factor 2: } y_2 = 0.453x_2 + 0.957x_6 + 0.396x_8 - (0.556x_3 + 0.602x_4)$$

Factor 2 is influenced by  $x_6$ .

$$\text{Factor 3: } y_3 = 0.438x_3 + 0.708x_4 - 0.944x_1$$

Factor 3 is influenced by  $x_4$

$$\text{Factor 4: } y_4 = 0.855x_2 + 0.515x_3 - 0.810x_8$$

Factor 4 is influenced by  $x_2$  and  $x_3$

The factors therefore, affecting branding of processed home grown rice can be grouped into four main factors as:

Factor 1: Inability to appreciate new technology (Not open to new innovation and use of customized bag is not relevant).

Factor 2: Non-availability of required technology (Lack of technology).

Factor 3: Labour (Cost of Labour)

Factor 4: Cost of packaging material (Cost of sealing machine and customized bag).

This is in line with Danbaba et al., (2019), who stated that lack of proper packaging and branding of locally milled rice is one of the problems related to quality of milled rice and marketing.

**Table 2: Factors that influence the branding of processed home grown rice**

Factors	Component			
	1	2	3	4
Lack of awareness	.010	-.128	-.944	-.154
Cost of customized bags	.020	.453	.092	.855
Cost of sealing machine	.456	-.556	.438	.515
Cost of labour	-.343	-.602	.708	.018
Not open to new innovation	.797	-.260	-.322	.105
Lack of technology	-.095	.957	.082	-.006
Not relevant to have customized bags	.851	.154	.268	-.014
Lack of training	-.108	.396	-.081	-.810
Inadequate capital	-.885	.120	.268	-.251

**Source:** Field Survey, 2015

## Major Constraints in Processing of Home Grown Rice

The results of the analyses are presented in Table 3. Results show that five factors were identified to be the major constraints in processing of improved home grown rice quality. Although these factors are unknown in themselves but it can be seen that;

Factor1:

$$y_1 = 0.873x_5 + 0.442x_7 + 0.708x_{12} + 0.498x_{14} - (0.665x_3 + 0.862x_9 + 0.869x_{11} + 0.637x_{13})$$

Factor 1 is influenced by  $x_5$  and  $x_{12}$

$$\text{Factor 2: } y_2 = 0.520x_{12} + 0.875x_{15} + 0.456x_{16} - (0.835x_2 + 0.601x_3 + 0.489x_{13})$$

Factor 2 is influenced by  $x_{12}$  and  $x_{15}$

$$\text{Factor 3: } y_3 = 0.711x_6 + 0.838x_7$$

Factor 3 is influenced by  $x_6$  and  $x_7$

$$\text{Factor 4: } y_4 = 0.884x_1 + 0.495x_{13} - (0.879x_4 + 0.571x_{16})$$

Factor 4 is influenced by  $x_1$

$$\text{Factor 5: } y_5 = 0.815x_{10} - 0.780x_{14}$$

Factor 5 is influenced by  $x_{10}$

Therefore, the major constraints in processing improved home grown rice quality can be grouped into five main factors as:

Factor 1: Inability to appreciate new knowledge (lack of training and high cost of processing equipment).

Factor 2: New technology (high cost of processing equipment and not opens to new innovation).

Factor 3: Communication on storage facilities (Inadequate storage facilities and poor communication).

Factor 4: Labour (Cost of labour).

Factor 5: Marketing information (Inadequate marketing information).

These likely constraints that affect processing of improved home grown rice quality corroborates with that of Ajala and Gana (2015) who observed that low capital, lack of financial incentive, low return, high cost of processing equipment, seasonal and low paddy, poor pricing, lack of technical knowledge and inadequate training affect the rice quality produced by farmers and parboilers in Nigeria. This disagrees with the study by Ibitoye *et al.* (2014) who reported that inadequate capital, price fluctuation and high cost of transportation are problems faced by rice processors.

**Table 3: Major constraints in processing of improved home grown rice**

Factors	Component				
	1	2	3	4	5
High cost of labour	.152	.044	-.155	.884	.214
Inadequate capital	-.009	-.835	.124	.109	.336
High cost of transportation	-.665	-.601	.011	-.078	.306
Price fluctuation	.135	.093	.138	-.879	.086
Lack of training	.873	.071	.292	.040	-.319
Inadequate storage facilities	.005	.334	.711	.084	-.392
Poor communication	.442	-.125	.838	-.167	.020
Unavailability of technology	-.133	.213	-.900	.198	-.102
Inadequate method of processing	-.862	.245	-.377	.121	.063
Poor marketing information	.172	.029	-.032	.172	.815
Low quantity of rice produced	-.869	-.293	-.201	.197	-.092
High cost of processing equipment	.708	.520	.345	-.128	.072
Poor pricing	-.637	-.489	.000	.495	.236
Lack of technical knowledge	.498	.069	-.011	.026	-.780
Not open to new innovations	.006	.875	-.045	-.098	.218
Lack of finance of post harvest machinery	.218	.456	-.427	-.571	-.174

**Source:** Field Survey, 2015

### Conclusion and Recommendation

In Enugu state, Nigeria, branding of home grown rice is constrained by the non availability of required technology, labour and packaging costs. Packaging stands out as the most common form of home grown rice branding by the processors.

Despite the challenges constraints faced by the home grown rice processors in the study area, such as high cost of processing equipment, inadequate storage facilities, inadequate marketing information, among others; there has been a tremendous upsurge in the consumption of home grown rice brand. Consumers are becoming increasingly aware of the organoleptic properties of home grown rice brand; therefore, improving the quality of locally produced rice through quality milling and processing will further improve patronage. This study therefore recommends that the rice processors

should be trained adequately on branding and improving the quality of locally processed rice and provision of the required technology. This will improve the competitiveness of home grown rice in comparison with the imported brand rice thereby increasing its demand.

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