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Factors affecting market participation by smallholder local rice farmers in southwest, Nigeria

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Abstract

Less than half of the rice consumed in Nigeria is grown domestically and demand for local rice is increasing. Consequent on the Rice Transformation Agenda commenced in 2011, official sources indicate substantial increases in rice production. Transforming rice cultivation requires a simultaneous attention to both production and marketing failing which, increased production will crash prices and become a disincentive for rice farmers. Lack of meaningful participation in remunerative markets prevents rural farmers from transiting into commercial farming which stimulates production increases. The general objective of this study is to identify the determinants of market participation by local rice farmers using primary data sourced from 264 farmers. Data analytical tools included descriptive statistics, Z-test and Probit regression model. At average annual income of ₦403,200, farmers make substantial income available for use in expanding rice production. Age, income, education, household size, land size and farming/marketing experience were significantly higher for market participants than non-participants. Thus, these variables effectively discriminated market participants from non-participants. Probit model showed five variables; output, group participation, market information, land ownership status and land under other crops, were significant in determining market participation. The first four variables positively influenced market participation while the last negatively did. It is recommended that government implements a pricing policy that ensures remunerative prices, extends the rice buy-back policy to more states, organizes farmers into virile cooperatives to enhance their bargaining power and initiates an adult literacy programme that enhances farmers' capacity for market information acquisition and utilization.

Keywords: Market; Participation; Smallholder Farmer

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1. Introduction

As the second largest consumed cereal (after wheat), rice (*Oryza sativa* L.) occupies a niche in the lives of millions of people in the world (Braun, 2006). Rice has been and is still playing a major role in sustaining human life as it supplies about four-fifth of the food calorie requirements of more than 50% of the global population. For instance, in response to rapid population growth, soaring rice demands were met through increased rice production. The adaptations in terms of ecological, economical and technological changes around rice facilitated this "partnership between human and rice" (Braun, 2006). Braun (2006) is of the opinion that it is a step in the right direction for humans to continue to nurture this partnership.

In Nigeria, the demand for rice, in general and local rice in particular, is growing quickly due to rapid population growth, urbanization and increased engagement of women, who were erstwhile unemployed, full housewives in formal sector job opportunities (Mafimisebi et al., 2014a). Although, Nigeria's fertile land and rich agro-climatic conditions can support production of sufficient rice to feed its teeming population and leave a marketable surplus for exports**,** the country's domestic production of rice accounts for less than half of its consumption (United States Department of Agriculture [USDA], 2012). The market gap for rice is filled by imports mostly from India, Thailand and Brazil (USDA, 2012). Nigeria's rice production in 2012/13 was forecast at 2.9 million tons, up by 200,000 tons from 2.7 million tons in 2011/12 (USDA, 2012). Official sources have indicated that there is some increased production of local rice in Nigeria's five major rice growing states, namely; Nassarawa, Cross River, Benue, Ekiti and Kebbi following the Rice Transformation Agenda which commenced in 2011. However, it is indicated that facilities are inadequate to expand the cultivation of rice competitively beyond 20 percent of current production capacity by 2015 (USDA, 2012).

Nigeria's estimated annual rice demand is 5.0 million metric tons while annual production is about 2.21 million metric tons of milled rice product. This leaves a deficit of 2.79 million tons which is bridged by importation (National Rice Development Strategy, [NRDS], 2009). The Nigerian rice sector is plagued with a number of constraints which, *inter alia*, includes the highly fragmented nature of the rice value chain from production to marketing. As a consequence of this, the rice sub-sector lacks an established and predictable industrial demand to drive the chain as it is the case for sorghum by breweries, cassava by pharmaceuticals and cotton by textiles. The commercial rice mills that are supposed to drive the value chain are being run by rice merchants who take advantage of Nigeria's inconsistent and often defective policies to focus on brown rice importation to the detriment of locally produced paddy. Other problems include high production cost and poor quality of the product which places local rice in a disadvantaged position in terms of competition with imported rice.

Paddy rice production in Nigeria increased between 2001 and 2006, followed by a decline in 2007 and a positive peak in 2008 (Adamu and Bakari, 2015). Statistics showed a decreasing trend in production between 2008 and 2010 and this has been attributed to a decline in area harvested. This trend resulted into higher yields between 2008 and 2010, despite declining production. Increasing production between 2002 and 2006 has been linked to the implementation of the Presidential Initiative on Rice Production, although decreasing production between 2008 and 2010 was not in line with policies aimed at the development of the rice sector

during those years (Adamu and Bakari, 2015). Such policies include the National Rice Development Strategy and the Federal Market Stabilization Programme (Erenstein et al., 2003, Mafimisebi et al., 2014a).

It is generally agreed that one of the major constraints affecting the development of the Nigerian rice sector is the inability of locally grown rice to match the quality of imported rice (USAID, 2011). Consumers are the ultimate and foremost deciders when it comes to selecting between different types of goods (USAID, 2011). The quality differential between local and imported rice is an important consideration in consumers' choice of which to purchase. Price is, of course, also an important determinant, but it is only one factor among a wide range of attributes that characterize the product. Indeed, imported rice consumption in Nigeria has expanded rapidly in spite of a heavy custom duty (USAID, 2011). This implies that consumers are willing to pay a premium in terms of higher price on the market compared to local rice.

Development policy in Nigeria has placed undue emphasis on increasing agricultural production to serve as a base for agricultural transformation to the neglect of agricultural marketing (Olayemi, 1973; Mafimisebi, 2012). Deliberate plans and policies implemented to increase local rice production need to be accompanied with increased local rice farmers' market participation in order for them to receive remunerative prices that can stimulate further production. Otherwise, increased production will crash prices and become a major disincentive for farmers (Mafimisebi, 2012). The inadequate market participation that many agricultural households face in Africa is considered to be a major constraint to combating poverty (Heltberg and Tarp, 2002; Best et al., 2005). This shows that an efficient, integrated and responsive market that is marked with good performance is crucially important for optimal allocation of resources and stimulating households to increase output (FAO, 2003; Mafimisebi, 2015). It has been established that increasing farming households' participation in output markets is a key factor for extricating rural farmers in African countries from the poverty trap (Delgado, 1995; Heltberg and Tarp, 2002).

In an effort to identify interventions that could stimulate farmers' participation in markets, it is important that factors influencing market participation are identified and their effects understood. This is germane because an increase in market participation makes it easier for farmers to shift into commercial farming, which has been found to lead to increasing economic growth (Jari and Fraser, 2009; Mafimisebi, 2015).

This research therefore, attempted to empirically investigate the factors that induce local rice farmers to participate in the market. The outcome of the study will help to bridge the existing information gap in generating empirical evidence that will provide answers to the following research questions.

1- What are the socio-economic characteristics of the local rice farmers in the study area?
2- What socio-economic characteristics distinguish market participants from non-participants?
3- What factors influence market participation by local rice farmers?
4- What are the constraints to local rice marketing in the study area?

The general objective of this study is to identify the factors affecting local rice farmers' market participation in Southwest, Nigeria. The specific objectives are to describe the socio-economic characteristics of local rice farmers in the study area; establish the socio-economic characteristics that distinguish market participants and non-participants; identify the factors influencing market participation and highlight the marketing constraints faced by local rice farmers.

There have been studies in Nigeria on rice market integration and price transmission in rural and urban markets (Mafimisebi et al., 2014a), profitability of rice processing and marketing (Inuwa et al., 2011) and analysis of rice value chain (Richard, 2012). However, to the best of the researchers' knowledge, little or no study has been done on factors determining local rice farmers' market participation in Nigeria. It is however acknowledged that studies have been conducted in Nigeria and outside Nigeria on factors affecting market participation by farmers growing some agricultural commodities (Randela et al., 2008; Egbetokun and Omonona, 2012; Reyes et al., 2012 and Ohen et al., 2013). A better understanding of farmers' market participation decision is therefore important to produce empirical evidence for policy makers to design appropriate policies and strategies that can contribute to increased income of local rice farmers. It is therefore imperative to identify these factors and show how they influence market participation.

2. Methodology

2.1. The study area

The study was carried out in Ekiti State, which is situated in the South Western part of Nigeria. Ekiti State is located between longitudes $4^0\,45^1$ and $5^0\,45^1$ East of the Greenwich Meridian and latitude $7^0\,15^1$ and $8^0\,15^1$ North of the Equator. It is bounded to the South by Kwara and Kogi States and in the East by Osun State. It is bounded in the East and South by Ondo State. Ekiti State was carved out of the Old Ondo State on October 1, 1996. It has sixteen (16) Local Government Areas (LGAs). It is mainly an upland zone, rising to about 250 metres above the sea level. It has a generally undulating land surface with a characteristic landscape that consists of old planes broken by steep-sided dome rocks that may occur singularly or in groups (Ekiti State Diary, 1996). It enjoys a tropical climate with two distinct seasons; the rainy season (April-October) and dry season (November-March). The temperature ranges between 21^0C and 28^0C with high humidity that varies between 65.0% and 85.0%. The major food crops grown in the state include yam, maize, cassava, cocoa yam and rice. Also, tree crops such as cocoa, kolanut and oil palm are grown. The main livestock species include sheep, goats, pigs and poultry (Basorun, 2013).

2.2. Sources of data

Primary data were used for this study. The primary data were sourced from a set of structured questionnaire administered on local rice farmers through personal interview. Also, an interview guide was used for focus group discussion (FGD) responses which were used to validate data collected from the individually interviewed respondents.

2.3. Sampling procedure and sample size

Multi-stage sampling technique was used to collect primary data for the study. In the first stage, purposive sampling was used to select Ekiti State being the leading state in local rice production in Southwest, Nigeria. In

the second stage, five Local Government Areas (LGAs), namely Ado, Gbonyin, Irepodun/Ifelodun, Ijero and Ise/Orun were also purposively selected because they are prominent in rice production in Ekiti State both in terms of volume of production and number of farmers registered with government. The third stage involved purposive selection of one community each (Igbemo, Ikoro, Aisegba, Kojola and Ise) from the five selected LGAs. Then, sampling frames of rice farmers in the five selected communities were obtained from Ekiti Agricultural Development Programme (ADP) Head Office. From this, simple random sampling proportionate to size was used to select varying numbers of local rice farmers from each community as shown on Table 1. In sum, a total sample size of 264 farmers was selected for the individual interview using the pre-tested structure questionnaire designed for eliciting data. Focus Group Discussion segregated along sex and age lines was also conducted in each selected community. In all, a total of 84 respondents participated in the FGD, out of which 66 were males and 18 were females.

Table 1. Distribution of Respondents across LGAs and Communities

(LGAs)	**Communities**	**Number of Respondents**
Ado	Kajola	44
Gboyin	Aisegba	60
Irepodun/Ifelodun	Igbemo	60
Ijero	Ikoro	60
Ise/Orun	Ise	40
Total		**264**

2.4. Data analytical tools

In analyzing the data obtained for the study, a number of analytical methods were used. These included descriptive statistics, Z test and Probit model. The descriptive statistics used included tables, frequency, percentages and mean. The descriptive statistics was used to present the result of the socio-economic characteristics of the respondents in order to have a general picture of local rice farmers in the area. Descriptive statistics was also used to compute the proportion of produce sold by farmers in the study area as well as constraints to rice marketing. Z-test was used to compare the mean values of selected socio-economic variables to test for significant difference. The formula used for the test is presented in equation 1.

$$z = \frac{\overline{X_1} - \overline{X_2}}{\sqrt{S_1^2 / n_1} + \sqrt{S_2^2 / n_2}} \quad \text{----------1}$$

Where z = standard "Z" distribution value (z calculated)

$\overline{X_1}$ = mean value of the socio-economic variable for market participants.

$\overline{X_2}$ = mean value of the socio-economic variable for non-participants.

S_1 = standard deviation of sample mean value for market participants.

S_2 = standard deviation of sample mean value for non-participants.

n_1 = sample size for market participants (214).

n_2 = sample size for non-participants (50).

2.5. Hypothesis tested in the Study

The null form of the hypothesis tested in this study is:

H_0: There is no significant difference in socio-economic characteristics of market participants and non-market participants.

The socio-economic characteristics compared were the quantitative ones which included age, annual income, years of formal education, household size, cultivated land size and years of marketing experience.

To identify the factors affecting local rice farmers' market participation, the Probit Regression model (normits) for individual or ungrouped data was used. The implicit form of the Probit Model is shown as

$$Y_i^* = X_i \beta + \in_i \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (2)$$

$$Y_i = \begin{pmatrix} 1 \; if \; Y_i^* \geq 0 \\ 0 \; if \; Y_i < 0 \end{pmatrix}$$

Y_i^* = observed dichotomous dependent variable which takes value 1 when the rice farmer participates in the market and 0, otherwise.

Y_i= underlying latent variable that indexes market participation.

X_i = row vectors of the independent variables that affect the probability of a farmer participating in the rice market.

β = vectors of parameters to be estimated.

ε_i = error term which is assumed to have a standard normal distribution.

Drawing from Gujarati (2006), the following explicit function was used for estimation:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \text{---------} + \beta n Xn + Ui \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3)$$

Where:

Y is a binary response variable defined as Y = 1 if the farmer participates in the market given a threshold or critical value (Y*) of above 70% and Y = 0 if Y ≤ Y*

Thus, a market participant in this study is a farmer who sells 70% of the paddy or processed rice produced while any farmer that makes less that 70% of the paddy or processed rice available for sale was regarded as a non-market participant. This value was arrived at after taking due cognizance of the proportion used in other market participation studies in Nigeria involving other commodities. The independent variables are defined as follows:

X_1=Volume of output (kilogramme)

X_2= Extent of market information (number of sources)

X_3=Group participation (membership of group, Yes=1, No=0)

X_4= Road conditions (good=1, bad=0)

X_5=Transportation cost (₦)

X_6=Contractual agreement (Yes=1, No=0)

X_7= Credit access in the last one year (Yes=1, No=0)

X_8=Size of land devoted to other crops (hectares)

X_9= Sex of the farmer (Male=1, Female=0)

X_{10}= Number of years of formal education

X_{11}= Age of the farmer (year)

$X_{12=}$ Ownership of rice land cultivated (owned=1, Not Owned=0)

$B_1 ... B_{12}$ are parameter estimates, B_0 is the intercept and Ui is the stochastic error term.

3. Results and discussion

This section presents the result of analysis of primary data and explanation of the results obtained.

3.1. Socio-economic characteristics of respondents

3.1.1. Age of respondents

The age distribution of respondents as shown in Table 2 revealed that respondents within the age bracket of 31-50 years formed the majority (66.7%). With the mean age of 46 years, it can be deduced that the bulk of the respondents fell in the economically active age bracket, which can have a positive implication on rice output as production and marketing of rice are tedious energy sapping tasks. The age of the respondents ranged from 21-70 years with a standard deviation of 10.2. This result is very similar to the findings of Ayoola et al. (2011) and Mafimisebi et al. (2015b) which put the average age of Zambian cattle farmers and marketers at 43 years and 44 years, respectively.

3.1.2. Sex of respondents

Table 2 showed the sex distribution of respondents. The data summary revealed that majority (about 74.0%) of the respondents was male while about 26.0% was female. The results indicated that rice cultivation and marketing were dominated by males probably because they are herculean tasks which males are, by their more energetic nature, better fitted to do than female. This finding is in line with report by the World Bank (1993) which states that most females find it very difficult to cope with labour-intensive works compared to their male counterparts. The result of the Focus Group Discussion which probed further in order to validate findings

from the individual interviews had the ratio of male to female in the sampled farmers to be 79:21. This is a further corroboration of what was stated earlier that rice production and marketing were male-dominated activities in the study area.

3.1.3. Marital status of respondents

As shown in Table 2, a larger proportion (94.0%) of respondents was married while the remaining was either singles or widowed. This may indicate that majority of the rice farmers were mature persons who had access to the opinions and advice of their spouses in making production and marketing decisions as postulated for cattle marketers by Mafimisebi et al. (2014b).

Table 2. Summary of Socio-economic Characteristics of Respondents

Age	**Frequency**	**Percentage**
21-30	10	3.8
31-40	76	28.8
41-50	100	37.9
51-60	52	19.7
61-70	26	9.8
Sex		
Male	196	74.2
Female	68	25.8
Marital Status		
Single	16	4.5
Married	248	93.9
Widowed	04	1.5
Farming/Marketing Experience		
1-9.99		
10-19.99	16	6.1
20-29.99	82	31.1
30-39.99	112	42.4
40-49.99	38	14.4
	16	6.1
Years of Formal Education		
<1		

1-3	88	33.3
4-6	12	4.5
7-9	82	31.1
10-12	10	3.8
>12	66	25.0
	06	2.3
Household Size		
1-5		
6-10	80	30.3
11-15	164	62.1
16-20	14	5.3
	06	2.3
Farm Size (acre)		
1.00-4.55		
5.00-9.99	28	10.6
10.00-14.99	194	73.5
15.00-20.00	34	12.9
	08	3.0
Land ownership status		
Owned		
Not owned	98	37.1
Access to Credit	166	62.9
Yes		
No	100	37.9
Group Membership	164	62.1
Yes		
No	116	43.9
	148	56.1

Source: Computed from Field Data, 2015

3.1.4. Years of rice cultivation/marketing experience

The results in Table 2 revealed that the majority (74.0%) of respondents had between 10.00 and 29.99 years of experience in rice production and marketing while 6.0% apiece had between 1.00 and 9.99 years and 40.00 and 49.99 years. The mean years of experience in rice farming/marketing was 19 and over 63.0% of the respondents had years of experience above the mean value. It can be deduced that rice farmers in the study area were quite experienced in cultivation and marketing of rice. This connotes that they are likely to be very knowledgeable in rice production and marketing strategies and dynamics. This finding is in line with what was

reported by previous researchers that years of experience highly influenced decision-making by marketers (Mafimisebi et al., 2014b).

3.1.5. Formal education

About 33.0% of the respondents had no formal education while about 5% had only 1-3 years of formal education. Also, 31.0% of the respondents spent 4-6 years in school while only 4.0% spent between 7-9 years in school. About 25.0% spent between 10-12 years in school. Furthermore, the result revealed that 2.0% of the respondents had above 12 years of formal education. This result implied that majority (70.0%) of the respondents ended their education at the Primary School level. This generally low level of formal education may affect farmers' willingness to adopt innovations that may positively impact their cultivation and marketing activities owing to the inability to read and write (Mafimisebi et al., 2014b). This finding corroborates that by Ohen et al. (2013) that majority of rice farmers in Southern Nigeria are without appreciable level of formal education.

3.1.6. Household size

Distribution of respondents by household size (Table 2) revealed that respondents with household size 6-10 were in the majority (62.0%). Household size ranged from one (1) to twenty (20) with a standard deviation of 3.0 a mean value of seven (7). This connoted that farmers can possibly engage some of their household members in rice production and marketing activities. One implication of a large household size is that a huge proportion of income may be spent on consumption which may restrict farm business expansion and reduce the extent of market participation. The fact that farmers' propensity to commercialize their production declines with increasing numbers of household members has been reported by Lapar et al. (2003).

3.1.7. Land size

The result of distribution of respondents by land size revealed that 73.5% had between 5.01 and 10.00 ha while 3.0% had between 15.00 and 20.00 ha. From this result, it can be hypothesized that rice farmers in the study area operated on medium to large size which may by itself induce market participation. This finding contrasts with that of Adamu and Bakari (2015) who found that majority of rice farmers in Taraba State, Nigeria, were smallholder farmers who cultivated less than five hectares with the consequence that rice farming operations were not mechanized. Randela et al. (2008) opined that increased market participation is a function of land productivity and that the size of land is important because transactions costs are largely fixed costs that can be spread across more volume of outputs on large farms.

3.1.8. Forms of land ownership

The distribution of respondents by forms of land ownership showed that majority (63.0%) of rice farmers did not own the land used for rice cultivation. This is because they benefitted from the policy of leasing of 5 ha of land and above to rice farmers by government. This can enhance increased output and market participation.

This result conformed to earlier report from distribution of respondents by land size in this study where majority (73.0%) owned more than 5 ha of land. Also, about 37.0% of the respondents owned the land cultivated to rice through either inheritance or purchase.

3.1.9. Access to credit

The results in Table 2 revealed that about 38.0% of the respondents had access to credit in the last growing season while about 62.0% had no access to credit in the same period. This implied that rice farmers mostly depended on their personal capital to finance farm production and marketing. As a result of this, the production capacity of the farmers is likely to be conditioned by the magnitude of their personal capital base which may, to some extent, determine their level of market participation. These findings were consistent with that of Adenegan et al. (2013) and Hlongwane et al. (2014) who reported that majority of smallholder farmers had no access to credit which hindered market participation.

3.1.10. Membership of associations/groups

Results of summary statistics showed that about 56.0% of the respondents did not belong to any associations/groups, while about 44.0% do. Involvement in associations/groups is one of the key determinants of output market participation as it gives farmers the opportunity for increased market power which enables selling their produce at remunerative prices and satisfactory profit (Adenegan et al., 2013.) Group/association membership is also of assistance in getting relevant information on price, price trend and other market conditions (Adenegan et al., 2013).

3.2. 3.2 Annual income accrued to farmers

Result of distribution of respondents by annual income is displayed in Table 3. From the table, it is revealed that about 60.0% of the respondents earned between ₦200,000-₦400,000 per annum; about 24.0% earned between ₦401,000-₦600,000 while about 17.0% earned above ₦600,000 per annum. The average annual income of the respondents was about ₦403,200. It can be hypothesized that rice farmers in the study area made substantial income from marketing their cultivated rice. This income level, if judiciously used, is capable of bringing about rice acreage expansion thereby increasing the level of market participation by farmers. Samuel et al. (2015) opined that with increased income, the farmer could save more and acquire assets useful in aiding rice cultivation and marketing leading to further income.

Table 3. Distribution of Respondents according to Annual Income

Income (N'000)	Frequency	Percentage
200-300	49	37.1
301-400	30	22.7
401-500	21	15.9
501-600	10	7.6

601-700	07	5.3
701-800	06	4.5
801-900	05	3.8
901-1,000	01	0.8
1,001-1,100	01	0.8
1,101-1,200	02	1.5
Total	132	100

Field Survey, 2015

3.3. Test of difference in socio-economic characteristics

The result of the Z-test is presented on Table 4. The null hypothesis which stated that there was no significant difference in selected socio-economic variables of market participants and non-market participants was rejected at 1% significance level for age, annual income, formal education, household size, land size and farming/marketing experience. The alternative hypothesis was therefore accepted in each case implying that the mean values of these variables were higher for rice farmers who were market participants in comparison with those who were not. Thus, these socio-economic characteristics were those capable of being used to discriminating market participants from non-market participants for policy making purposes.

Table 4. Test of Difference in Socio-economic Characteristics of Market Participants and Non-market Participants

Variables	**Standard error**	**T-value**	**P- value**	**Remarks**
Years of Formal Education	1.084	0.2509	0.019	Reject null
Household size	0.989	2.107	0.046	Reject null
Land size under rice cultivation	0.472	2.653	0.002	Reject null
Age	1.998	5.907	0.000	Reject null
Farming/Marketing Experience	1.199	7.509	0.000	Reject null

Source: Compiled from Z-test Print-out.

3.4. Factors influencing market participation

On Table 5 is presented the results of the Probit model. The dependent variable is the probability of selling the rice produced and the independent variables are as shown in the table. The result revealed that five out of the 12 variables included in the model were statistically significant. The coefficients of rice output, group participation, market information and ownership of rice land cultivated were those that positively determined

market participation. The size of land devoted to other crops was significant, but it negatively affected the probability that a farmer would participate in the market.

There was a strong positively significant relationship between rice output and market participation decision [(p>0.05) β=0.059; p=0.002]. This showed that market participation increased as the volume of rice output increased. This is in conformity with *a priori* expectation and economic theory. Farmers with high volume of output tended to participate in the output market more than those with lower volume. This finding concurs with that of Ohen et al. (2013) that the level of crop production had positive impact on the decision of smallholder farmers to engage in crop output sale.

Group/association participation also had a positive influence on the dependent variable and it was statistically significant at 5% level. Its value of 3.42 indicated that with other variable held constant, if group/association participation increased by one unit, the estimated Probit would increase by 3.42 units indicating a three-fold increase. There is sufficient evidence to support the fact that when farmers have the opportunity to market their produce/product as a group, there is a higher chance of participating in the market. Thus, group participation encourages market penetration among smallholder farmers who find it difficult individually to gain market access (IFAD, 2003; Ohen et al., 2013).

The result further revealed that market information had positive and significant influence on market participation. Its value of 0.23 indicated that with other variables held constant, if market information increased by one unit, the estimated probit would increase by 0.23. This finding agrees with that by Egbetokun and Omonona (2012) that receivers of market information are more likely to engage in more intensive market participation than non-receivers. According to Jari and Fraser (2009), market information access enables farmers to take informed marketing decisions that are related to supplying necessary goods, searching for potential buyers, negotiating, enforcing contracts and monitoring prices. Ruijs et al. (2004) opined that necessary information includes information on consumer preference, quantity demanded, prices, produce quality, market requirements and opportunities. Farmers are likely to exploit a market opportunity which they know more about compared with another which they have no idea of its existence according to Ruijs et al. (2004).

The results also revealed positively significant relationship between ownership of rice land cultivated and market participation decision. It was statistically significant at 1% significance level indicating that ownership of rice land cultivated increased farmers' market participation. Randela et al. (2008) reported that ownership of land exerts a positive impact on both the likelihood to participate in the market and amount of produce that can be sold (participation intensity). In contrast, Adenegan et al. (2013) stated that ownership of land was insignificant and negatively affected market participation.

The size of land devoted to other crops had a negatively significant relationship with market participation. A unit increase in this variable led to 2.29 decrease in market participation. This implied that as the size of land devoted to other crops increased, the land available for rice cultivation decreased thereby reducing output and hence market participation for rice.

Table 5. Probit Estimates for Determinants of Market Participation

Variable	Coefficient	Standard Error	P value
Rice output	0.059**	0.223	0.002
Market information	0.2331**	0.0157	0.000
Group participation	3.4217**	1.3454	0.021
Road conditions	1.2576	2.426	0.604
Transportation cost	0.0021	0.00186	0.248
Contractual agreement	1.849	2.8431	0.516
Credit access	0.2098	4.2243	0.960
Size of land devoted to other crops	-2.2917**	1.0294	0.008
Sex of the farmer	0.5704	1.5090	0.705
Years of education	0.2066	0.1858	0.261
Age of the farmer	1.8248	1.0667	0.087
Ownership of land cultivated	5.4175**	1.6252	0.001
Number of Obs	264		
Chi^2	96.88		
P-value	0.0000		
Pseudo R^2	0.777		

Source: Compiled from data analysis print-out.
*Note: *** = Significant at 1% level, ** Significant at 5% level)*

3.5. Constraints to rice marketing

The constraints associated with rice marketing as given by the respondents are presented in Table 6. Given that multiple responses were allowed, the constraints were presented in terms of their popularity, that is, how many respondents identified them as constraints. Inadequate credit to carry out rice marketing was identified by 51.5% of the respondents. Funds at the disposal of the rice farmers to enable them access better markets were grossly inadequate. This could be as a result of inability to borrow from formal lending sources owing to lack of collateral. Lack of credit facilities limits the capacities of the rice farmers to expand production, processing and sale of rice. About 42.0% of the respondents sampled was constrained by absence of adequate processing facilities for rice which was said to adversely affect rice marketing and lower rice farmers' income. The few private processing units available in the study area charged exorbitant fees. Sometimes, the farmers had to wait for 3 to 4 days before they could have their rice processed.

Poor pricing was also another constraint identified by about 36.0% of the respondents. It was reported to greatly affect a farmer's decision to market rice and the magnitude of income earned from these activities.

About 26.5% of the respondents also adjudged high cost of processing rice as another constraint to rice marketing. Inadequate buyer patronage (19.0%) was another problem revealed by the sampled rice farmers. This low patronage was attributed to consumers' preference for imported rice over locally produced rice. Identified constraints to rice marketing in the study area closely agree with the findings from past research by Musa et al. (2013).

The FGD conducted revealed that 65.0% of respondents sampled affirmed that prices offered by buyers were unfair while 28.0% was of the opinion that prices were fair. Only 7.0% opined that the prices offered for their rice were very fair. One of the reasons given by those who believed that prices were unfair was that they were never involved in the price formation process. It was the buyers alone who dictated the prices at which they wanted to buy. In essence, farmers said they could not make up to the profit they hoped for. Among the reason given by those who opined that prices were fair was that prices were, to a certain extent, uniform for each outlet at certain times of the year. Meanwhile, those that described prices as very fair could not give reasons for their responses. This result corroborated the findings by the individually interviewed respondents that pricing is a constraint to rice marketing in the study area.

The challenges identified by FGD participants were the same as those identified by the individually interviewed respondents. The FGD confirmed that the major challenge of rice marketing was inadequate credit facilities (54.0%) to carry out rice marketing followed by inadequate processing facilities (46.0%) and poor pricing (38.0%). The FGD results also confirmed that the least of the challenges was insufficient patronage.

Table 6. Constraints to Rice Marketing

Constraints	Frequency	Percentage
Inadequate credit facilities	68	51.50
Shortage of processing facilities	55	41.70
Poor prices	48	35.60
High cost of processing	35	25.93
Inadequate buyers	25	18.52

Source: Computed from Field Survey, 2015
*Multiple Responses**

4. Conclusion and recommendations

Lack of meaningful participation in the output market prevents local rice farmers from transiting into commercial farming leading to inability to exit poverty and contribute to economic development. This study examined determinants of market participation by local rice farmers in Ekiti State, Nigeria. The general objective of this study is to determine the factors affecting local rice farmers' market participation in Southwest, Nigeria. The specific objectives are to describe the socio-economic characteristics of local rice farmers in the study area; establish the relationship, if any, between market participation and farmers' socio-economic

characteristics; identify the factors influencing market participation and highlight the marketing constraints faced by local rice farmers in the study area.

The socio-economic characteristics of the respondents were summarized using descriptive statistics such as frequency distribution, percentages and averages. In order to test the hypothesis set up in the study, Z-test was used. Probit regression model was used to determine the factors influencing market participation.

The study revealed that the majority of the respondents was married males and with mean age of about 46 years. The study also revealed that the mean household size was 7 persons. It was concluded from the findings of the study that the majority of the respondents was educated and they were well experienced in rice production and marketing.

The result of the Probit model showed that out of the 12 variables, five were statistically significant at 5% significance level. The coefficients of rice output, group participation, market information and ownership of rice land cultivated were those that positively determined market participation. The size of land devoted to other crops negatively affected the probability that a farmer would participate in the market. The study concluded that age, sex, years of formal education, household size, marital status and farming experience of the respondents had a positively significant effect on market participation by local rice farmers.

Group participation, market information and ownership of rice land cultivated were variables that determined market participation in the study area. It is concluded that increase in market information and group formation would increase market participation. These factors will generate increased rice cultivation and yield resulting in marketable surplus which would translate to increase in households' income. By extension, this will lead to improvement in household welfare.

Based on the results of the study, some important policy recommendations emerge for the various stakeholders involved in the local rice industry in Nigeria. The government should increase the funds available in form of loans to the local rice industry especially to the smallholder producers in order to boost local rice production and marketable surplus which are able to lead to enhanced market participation. Prices offered to local rice farmers should be fair enough to encourage them to produce more for the market. Good pricing policies such as floor prices should be employed. In addition, the buy-back policy currently on ground should be expanded to cover all the rice producing communities of Ekiti State. Formation of cooperatives should be encouraged among the local rice farmers because it will enhance their bargaining power and provide them the opportunity to sell in more lucrative markets that offer high prices for produce delivered and sold through the group. Government should initiate an adult literacy programme for local rice farmers in Ekiti State and the country in general. This will enable rice farmers to have the requisite knowledge necessary for innovation adoption that will enhance market participation.

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