RESEARCH ARTICLE

Determinants of Commercial Production of Rice in Rice-Producing Areas of Kwara State, Nigeria

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Abstract

The quest for self-sufficiency in rice production in Nigeria brought about the focus of this study. Specifically, this study examined the level of commercial production of rice in Kwara State and identified the factors influencing it. Primary data obtained from 180 rice farming households selected through a combination of purposive and random sampling techniques were used for the study. Data collected were analyzed descriptive statistics, household commercialization index and regression analyses. The result of the commercialization index function indicates that the household commercialization index of rice production is 62% implying that there is a gap of 38% for the farmers to attained full commercialization level. The significant factors influencing commercialization of rice production in the study area were educational level ($p<0.05$), farming experience ($p<0.01$), farm size ($p<0.01$) and use of modern technology ($p<0.05$). The study therefore recommends provision of modern inputs and education by government and development agencies as well as expansion of farm land put to cultivation of rice by farmers.

Keywords: Determinants, self-sufficiency, rice, market-oriented, commercialization index.

1. Introduction

Rice is a security crop for meeting food consumption needs globally. It is the world's most important staple food commodity and ranks third in Nigeria [5, 23]. Currently, the per capita rice consumption in Nigeria 40kg per year, translanting to a national consumption volume of five to six million tonnes per year [21].

Despite its suitable ecological and edaphic condition for rice production [1, 2], Nigeria with an estimated population of 167,912,561 people [15] still relies on massive rice importation. Although it is the largest producer of rice in West Africa yet it accounts for 20% of sub-saharan African rice import [26]. Though rice contributes a significant proportion of the food requirements of the population, production capacity is far below the national requirements. Since mid-1970s, rice consumption has risen tremendously at an annual growth rate of 10.3%, as a result of accelerating population growth, increased income levels, increasing per capita consumption, rapid urbanization and changes in occupational structures [1, 2, 3].

In an attempt to make Nigeria self-sufficient in rice production, several measures were put in place by successive governments in Nigeria. These measures include establishment of different programmes and institutes aimed at stimulating interest in local production of rice. Some of these were the Federal Rice Research Station (FRRS) in 1970, the National Cereal Research Institute (NCRI) in 1974, National Seed Service (NSS) in 1975, Operation Feed the Nation (OFN) in 1976, Basin Development Authority (RDBA), Agricultural Development Projects (ADP) (1975), the National Grain Production Programmes (NGPP), the Presidential Initiative on Increased Rice Production, Processing and Export (2003), and the Special Rice Programme, just to mention but a few. Also, the Federal government of Nigeria, at different times, raised the tariff on rice importation in order to protect local producers against massive imports of rice [4]. Despite the various interventions, however, there is still a wide gap between domestic demand and supply of rice in the country. This is partly because rice production in many parts of the country have remained at subsistence oriented level despite comparative advantage of producing in large quantity for commercialization.

Agricultural commercialization may be defined as the proportion of agricultural production that is marketed. It involves the deliberate action on the part of agricultural producer to use factors of production in a way that a greater part of the crops produced is for exchanged or sale [17]. Commercialization of agriculture also involves a transition from subsistence-oriented to increasingly market-oriented patterns of production and input use. The underlying premise is that markets allow household to increase their incomes by producing that which provide the highest returns to land and labor and then use the cash to buy household consumption items, rather than be constrained to produce all the various goods that the household needs to consume [22, 25].

In order to bridge the gap between domestic demand and supply of rice in Nigeria, there is need to produce at market-oriented level in order to enhance self-sufficiency in rice production. This can however be achieved when the factors influencing market-oriented production of the crop are identified and the challenges addressed. From the foregoing, this study examines the determinants of commercialization of rice production in rice-producing parts of Kwara State, Nigeria. Specifically, it decribes the socio-economic characteristics of the rice farming households, determines commercilization level of rice in the study area and identifies factors affecting commercialization of the crop. The outcomes of this study could serve as a pointer to policy options that could be adopted by stake-holders in Nigerian rice industry thereby raising the nation's rice production at the local farm level. This in turn will reduce Nigeria's dependence on rice importation.

2. Material and Methods

This study was carried out in Kwara state of Nigeria. The state lies between latitude 7^015 and 6^018 N of the equator. It has a population of about 2.37million people [14]. The state shares boundaries with Oyo, Osun, Ondo, Kogi, Ekiti, and Niger states. It shares an international boundary with the Republic of Benin. At present, the state comprises sixteen Local Government Areas (LGAs). A humid tropical climate prevails over the state and it has two distinct seasons; the rainy and dry seasons. The rainy season lasts between April and October and the dry season between November and March. The rainfall ranges between 50.8mm during the driest months to 2413.3mm in the wettest period. The mean annual rainfall is about 1500mm. The minimum average temperature throughout the state ranges between 21.1^0C and 25.0^0C while, maximum averages temperature ranges from 30^0C to 35^0C [10]. The mainstay of the economy of the state is agricultural production. As regards rice production, the state is a major rice producer in Nigeria. It is blessed with abundant resources in terms of land mass, rich soil and climatic condition suitable for rice production.

The target population for this study were rice farming households in the study area. A three-stage random sampling procedure was employed to obtain the data. The first stage involved a purposive selection of Patigi and Edu LGAs of the state. This was based on the prior information obtained from the state's Agricultural Development Agency that the two LGAs are the major rice-producing areas in the state. This was followed by random selection of nine farming communities from each LGA using the state's Agricultural Development Project village listing. The third stage involved a random selection of ten rice farming households from each of the selected communities. A total of 180 farming households was used for the study. Information was sourced with the use of structured questionnaire augmented with oral interview. In addition, secondary data were sourced from academic journals, Food and Agricultural Organization (FAO) bulletins, National Cereal Research Institute (NCRI) bulletins, International Institute for Tropical Agriculture (IITA) reports and the Central Bank of Nigeria (CBN) bulletins.

Analysis of the data obtained was carried out with the use of descriptive statistics, commercialization index and regression tools. The descriptive statistics such as mean, mode, percentages and frequency distribution were used to examine the relevant socio-economic characteristics of the respondents. Household commercialization index was used to determine the extent to which rice production is market-oriented in the study area. According to [19, 20], commercialization index is the ratio of gross value of farm output to the value sold. The value ranges from 0 to 100%. The closer the index is to 100 the higher the degree of commercialization. A value of zero is an indication that the farmer is operating under subsistence agriculture. The model as used by [17] and [19] is specified as

$$HCI = \frac{GVS}{GVP} X\ 100\%$$

HCI =household commercialization index

GVS= Gross value of rice sold

GVP = Gross value of rice produced

Factors influencing commercialization were ascertained with regression model. The implicit functional form of the regression analysis is expressed as follows:

$Y = F(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, U)$

Where

Y = Household commercialization index

X_1 = Age of household head (Years)

X_2 = House hold size (number of household members)

X_3 = Educational level (years of successful academic pursuit)

X_4 = Farming experience (years)

X_5 = Farm size (ha)

X_6 = Major occupation of the hoshold head (farming = 1, others = 0)

X_7 = Cooperative membership (yes = 1, No = 0)

X_8 = Extension services (yes = 1, No = 0)

X_9 = Use of modern technology (yes = 1, No = 0)

U = Error term

Since economic theory does not indicate the precise mathematical form of the relationship among the variables, different functional forms of the above models including the linear, semi-log, double-log and exponential functions were fitted. However, the lead equations was chosen on the bases of economic, statistical as well as econometric criteria [7, 9, 18].

3. Results and Discussion

The relevant socio-economic characteristics of the respondents are presented in Table 1. It shows that majority of the respondents were male and about 67% of the respondents were aged between 31 and 50 years and the mean age was 40.6 years. Thus, the bulk of the farmers are still energetic and should be enterprising, which according to [8] has a lot of positive implications for agricultural production. *Ceteris paribus,* these farmers should able to accept farm innovations more easily and vigorously than their aged counterparts. As noted by [16], the risk bearing abilities and innovativeness of a farmer, his mental capacity to cope with the daily challenges and demands of farm production activities and his ability to to do manual decreases with advancing age.

All things being equal, the marital status and household size of a farmer largely determines availability of family labour for farm activities. Majority of the respondents were married. About 96% of the respondents had a household size of more than five members and the mean household size was 12 persons.

Education is an important factor in farm production. Education fastens understanding and adoption of improved technology which inturn increases food production. Fifty-three percent of the respondents had formal education. However, just about 7% of the respondents had tertiary education. This is in consonance with [13] who posited that highly educated people have apathy for agriculture.

Twenty-four percent of the respondents had farming as their major occupation. Seventy-three percent of the farmers cultivated 0.1- 6ha and had a mean farm size of 4.3ha. Table 1 also shows a good number of the farmers had access to extension services. However, majority of the respondents were not members of cooperative societies. Also, 56% of the respondents employed the use of modern agricultural technique in production. Survey showed that the modern technology employed include mechanization and use of rice supplied by the Agricultural Development Agency of the State.

Table 2 shows the distribution of respondents according to their level of commercialization index. The commercialization index of the farmers was 62.0%. Further analysis of the results revealed that about 57% of the respondents fell below this average while the remaining 43% of the respondents had their commercialization level greater than or equal to the average. Also, though the mean of 62% obtained in the study area is relatively high, this result indicates that the farmers still had a gap of 38.0% (100 – 62)% to achieve full commercialization in rice production.

Table 3 shows the results of the regression analysis on factors affecting commercialization of rice by the respondents. The results of the four functional forms run showed that the double-logged function gives the best

Table 1: Socio-economic Characteristics of the Respondents (N = 180)

Characteristics	Frequency	Percentage	Mean
Sex			
Male	164	91.1	
Female	16	8.9	
Marital status			
Single	26	14.4	
Married	146	81.1	
Widowed	8	4.4	
Age (years)			40.57
21 – 30	32	17.8	
31 – 40	64	35.6	
41 – 50	56	31.1	
51	28	15.6	
Household size			12.21
1 – 5	8	4.4	
6 – 10	70	38.9	
11 – 15	72	40.0	
16	30	16.7	
Educational level			
No formal education	84	46.7	
Primary education	60	33.3	
Secondary education	24	13.3	
Tertiary education	12	6.7	
Major occupation			
Farming	44	24.4	
Non-formal	122	67.8	
Formal	14	7.8	
Farm size (ha)			4.3
0.1 – 3.0	18	10.0	
3.1 – 6.0	114	63.3	
6.1 – 9.0	30	16.7	
> 9.0	18	10.0	
Access to extension			
No	64	35.6	
Yes	116	8.9	
Cooperative			
membership	54	30.0	
Yes	126	70.0	
No			
Production technique			
Modern	100	55.6	
Manual	80	44.4	

Source: Field Survey, 2013

Table 2: Distribution of Respondents by Commercialization Index

Commercialization Index	No of Respondents	Percentage	Minimum	Maximum	Mean
20.0	6	3.3	9.4	19.7	17.9
21.0 – 30.0	15	8.3	22.7	30.0	27.8
31.0 – 40.0	23	12.8	32.1	38.5	35.5
41.0 – 50	27	15.0	41.3	49.7	47.8
51.0 – 60.0	30	16.7	56.8	59.9	58.2
61.0 – 70.0	39	21.7	64.3	69.2	67.2
71.0 – 80.0	31	17.2	71.5	77.5	75.7
81.0	9	5.0	81.5	85.3	83.6
Sample	180	100	9.4	85.3	62.0

Source: Field Survey, 2013

Table 3: Regression Results on Factors Influencing Commercialization of Rice Production

Variable	Linear	[+]Double-log	Semi-log	Exponential
Constant	46.314	4.212	142.453	4.187
	(0.68)	(5.05)	(0.81)	(11.25)
Age	-2.342	-0.177	-72.606	-0.006
	(-1.51)	(-0.79)	(-1.55)	(-0.82)
Household size	-13.771	-0.189	-22.353	-0.143
	(-0.83)	(-1.40)	(-0.78)	(-1.58)
Education	5.418*	0.218**	61.239***	0.033**
	(1.84)	(2.50)	(3.33)	(2.02)
Farming experience	42.623***	0.382***	113.968***	0.188***
	(6.29)	(2.62)	(3.70)	(5.05)
Farm size	4.208	0.467***	23.137	0.050***
	(1.33)	(4.13)	(0.97)	(2.86)
Major occupation	75.451**	-0.073	70.364**	0.420***
	(2.56)	(-0.80)	(2.56)	(2.60)
Membership of cooperative	22.282***	0.235	101.594***	0.040
	(3.11)	(1.58)	(3.24)	(1.01)
Extension services	0.065	0.129	13.194	0.103
	(0.00)	(0.99)	(0.48)	(0.65)
Modern technology	-6.583	0.301**	-14.607	-0.016
	(-1.46)	(2.31)	(-0.76)	(-0.64)
R^2	0.6695	0.7148	0.6906	0.6511
Adjusted R^2	0.6324	0.6823	0.6558	0.6119
F-Ratio	18.01	27.36	19.84	16.59

***, **, * - Variable is significant at 1%, 5% and 10% respectively

Note: Figures in parenthesis are T-values; + Lead equation

Source: Field survey data, 2013

The selection was based on the values of R^2 (coefficient of multiple determination), F-statistics, the signs of the coefficients of the regression. The coefficient of multiple determinations (R^2) was 0.7148 indicating that the explanatory variables in the model explain about 71% of the total variations in commercialization level of the crop. The results in Table 3 suggest that level of education, farming experience, farm size, and use of modern agricultural technology were the significant factors influencing commercialization of the crop.

Educational level of the respondents was also significant at 5% and positively related to the commercialization of rice. This implies that the more the level of education of farm households increases, the greater the degree of commercialization.

According to [24], education significantly enhances farmer's ability to make accurate and meaningful management decisions; it could also enhance adoption and the use of improved technologies, thus increasing productivity and hence the degree of commercialization.

Farming experience was also significant and positively related to households'commercialization index. This suggests that farmers who have more farm experience produce more of the crop than those who do not. Experience offers farmers with opportunities to be acquianted with input sources and market outlets and also enhances farmers'ability to manage production and market riks [12].

Farm size had positive coefficient and was also statistically significant. This is in line with theoretical expectation. The implication is that farmers who had more farmland under cultivation produced more rice for the market. On the other hand, limited access to land could reduce farmers ability to produce at commercial level.

Use of modern farm technology was significant and positively influenced commercialization of the crop. This suggests that as the farmers apply modern techniques of production, their level of commercialization of rice increases. This in line with [11] and [27] that new technological innovations lead to a transformation of subsistence-based farming systems.

4. Conclusions

It can be inferrred from this study that production of rice in the study area is oriented towards commercialization. Also, educational level, farm size, farming experience and use of modern technologies are the significant factors determing the level of commercialization of the crop in the study area. Therefore, based on the findings of this study, all tiers of government including the non-governmental organization should gear efforts towards training farmers on how to produce on commercial basis. Besides, farmers should be encouraged to expand the farm size under cultivation. In this regards, measures such as land reform that will enhance more access to farm land should be enforced. In addition, agricultural development agencies should provide the farmers with improved agricultural technologies. This should include provision of improved seeds, fertilizers and tractor at subsidized rate. All these measures will improve market-oriented production of rice in Nigeria and reduce Nigeria's dependency on rice importation.

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