

Comparative Analysis of Rice Milling under Fadama II and Non- Fadama II in Adamawa State, Nigeria

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Abstract

This paper evaluates the performance of rice mill operators that participated in the Second National Fadama Development Project (NFDPII) by comparing them with non- participating rice mill operators. Sixty four (64) rice mill operators in Adamawa State, Nigeria, comprising 30 Fadama II and 34 non- Fadama II participants were selected from the Fadama II participating Local Government Areas (LGAs) in the State using a list obtained from Fadama office and rice millers associations respectively. Data generated were subjected to profitability and chow test analyses. Results revealed that, averagely each Fadama II rice mill operator milled 34.2 tons of rice, working for 30 days (1.14 tons/day) and make a profit margin of ₦53, 479.99 (₦1, 782.67/day), while the non- Fadama II rice mill operator milled 29.1tons within same period of time (0.97tons /day); and make a profit margin of ₦38, 200.30 (₦1, 273.34 /day). Similarly, Chow analysis revealed that Fadama II project had an impact on rice milling in the area, due to observed differences in income between Fadama II mill operators and the non-Fadama II mill operators (Chow Cal. 46 > Chow Tab. 2.10). Further, the results showed that there was a mean difference in Net Assets (Capital) of ₦22, 731.7 and ₦54,083.7between Fadama II and non- Fadama II rice mill operators before and after the project respectively. The study therefore, concluded that the World Bank Assisted Second National Fadama Development Project (NFDPII) had impacted positively on the rice mill operators in the study area.

Keywords: Comparative; Rice; Mill operators; Fadama

Introduction

Rice belongs to the family of gramineae with two distinct varieties, *oryza sativa* and *oryza glaberrima*. *Oryza sativa* has been cultivated for over 5000 years. Its domestication was in the Indian sub-continent, spread to most part of Asia, Europe and America and now grown under tropical and sub-tropical conditions as either a dry land or irrigated crop (Gibbon and Pain, 1985). Further, presently the world annual production stood at over 390 metric tons, of which 90% is produced in Asia while *Oryza glaberrima*, a native to West Africa, was domesticated prior to arrival of the Europeans and is important in West Africa, and Sudan as dry land crop grown under seasonal inundation.

Rice is harvested from rice plant in form of seed called paddy, consisting of husk, bran, germ, and starch which is consumed as milled rice (Hamid, 2007). To get rice from paddy, it needed to pass through several steps namely; cleaning and ventilation, husking, husk separation, paddy separation, polishing and grading, together called

milling furthermore, the basic objectives of a rice milling system is to remove the husk and produce an edible white rice kernel that is sufficiently milled and free of impurities. Depending on the requirement of the consumer, the rice should have a minimum of broken kernels. Most rice varieties are composed of roughly 20% rice hull, 11% bran layers and 69% starchy endosperm, also referred to as the total milled rice. Total milled rice contains whole grains or head and broken rice.

The main objective of the study was to compare Fadama II and non- Fadama II rice millers in Adamawa State Nigeria. Specific objectives however were to: estimate cost and returns of Fadama II and non- Fadama II rice mill operators in the study; and; evaluate the impact of Fadama II on rice mill operation in the study area.

Materials and Methods

The study area

Adamawa State is located between latitudes 8° and 11° North and longitudes 11.5° and 13.75° East (Kornoma et al., 2002), and has a land area of

39,742.12 sq. km which is about 4.4 percent of the land area in Nigeria (Adamawa State Diary, 2005). The State is divided into 21 LGAs (Adamawa State Diary, 2005) and into four agricultural zones based on administrative convenience by the Adamawa State Agricultural Development Programme (ADADP). Zone one has its headquarters at Mubi, while zone two, three and four have their headquarters at Gombi, Mayo-belwa and Guyuk, respectively (ADADP, 2002). In the 2006 population census, the State had a population of 3,178,950 (NPC, 2006). Eighty percent (80%) of the population reside in rural areas and engaged in agricultural production activities (Kormowa et. al., 2002). The State has about 4.2 million hectares of land, out of which 2.9 million are arable but only 0.232 million hectares (i.e. 8%) are under cultivation annually.

Sources of data

Data for the study was basically primary, obtained through the use of structured questionnaire administered to rice millers (Fadama II and non-Fadama II). Personal interview and group discussions were also used. The period covered 2006 to 2016

Sampling procedure

Multi-stage sampling technique was used to draw the respondents for the study. First stage involved purposive use of all the (10) (LGAs) that participated in Fadama II in the State which are Mubi- north, Mubi- south, Michika, Gombi, Song, Fufore, Yola- north, Yola- south, Lamorde, Guyuk and Ganye. Thesecond stage involved purposive selection of Fadama User Groups (FUGs) that registered under rice milling enterprise. Third stage involved random selection of (50%) of the population of Fsadama II mill- operators who served as the respondents. For the non-Fadama II Mill-operators that served as a control within the 10 Fadama II participating LGAs (the list of rice millers was collected from their associations) and fifty percent of the population were randomly selected from each of the associations which gave 48 respondents.

Data Analysis

Profitability of rice mill operator

This study adopted the concept of Gross Profit/ Net Enterprise Income to analyze the profitability of Fadama II and non-Fadama II rice mill operators in the study area.

$$\text{Gross Profit} = V - C = PQ - \sum_i^n p_i q_i \quad (1)$$

Pi = price of the input (₦)

qi = quantity of input (Kg,/Litre etc)

Q= Total quantity of milled rice (kg)

V = Value of milled rice (₦)

C= Total cost of milling (₦)

Chow Analysis

Chow test was used to achieve objective two (2) for this research. The formula for Chow test adopted is given below:

$$C_t = \frac{\frac{ESS \underline{C} - (ESS \underline{1} + ESS \underline{2})}{K}}{\frac{N \underline{1} + N \underline{2} - 2K}{ESS \underline{C} - (ESS \underline{1} + ESS \underline{2})}} \quad (2)$$

ESS₁ and ESS₂ are the error sum of squares from the separate data and ESS_C is the error sum of squares from the pooled (constrained) regression, k is the number of estimated parameters and N₁ and N₂ are the number of observations in the two groups. The resulting test statistic is distributed F (K, N₁ + N₂ - 2K).

Results and Discussion

Net- Capital for Fadama II and non-Fadama II rice mill operators

Table 1 presents results on the Net- capital of Fadama II and non- Fadama II rice mill operators. It shows that Fadama II mill operators had a mean capital of ₦170, 565.0 before implementation in 2006. The amount increased by 38% to ₦470,565 in 2016. The non- Fadama II mill operators at inception in 2006 had a mean capital of ₦147, 833.3. The amount increased by 33% to ₦247,833 in 2016. The results showed that the percentage increase was greater for Fadama II. This could be as a result of Fadama II activities and empowerment.

Table 1: Investment Capital for Fadama II and Non- Fadama II rice mill operators

Enterprise		2006	2016
Mill operator F	34	₦ 170,565.0	₦470, 565(+38%)
Mill operator NF	30	₦147,833.3	₦ 247,833(+33%)
Total	64		

F = Fadama II NF = Non- Fadama II

Source: Survey Data, 2016

Cost and returns for Fadama II and non Fadama II rice mill operators

Table 2 presents results on profit analysis. It shows that averagely, each Fadama II rice mill operators milled 34.2 tons of rice monthly and made a profit margin of N53, 479.99. This translate to 1.14 tons /day and N1, 782.69/day while the non-Fadama II

rice mill operators on the average milled 29.1 tons of rice monthly, and made a profit margin of N38,200.30 which was equivalent to 0.97 tons/day and N1, 273.34/day. Output and Net earnings of Fadama II was greater than the output and Gross earnings of non- Fadama II rice mill operators in the study area.

Table 2: Costs and returns for Fadama II and non – Fadama II mill operators

		Fadama (n= 34)	Non – Fadama (n = 30)
		Average ₦	Average ₦
A.	Value	176,479.99	150,400.30
B.	Variable Cost	123,000.00	112,200.00
C.	Fixed Cost	3,400.00	1,850.30
D.	Gross Profit	53,479.99	38,200.30
E.	Net Milling Income	50,079.99	36,350.00

n = No of observations

Source: Survey Data, 2016

Ranking of variable cost and returns for Fadama II and non Fadama II rice mill operators

Table 3 presented result on variable cost components of Fadama II and non Fadama II rice mill operator in the study area. It showed that costs of labour, fuel and servicing of machines ranked first, second and third respectively for Fadama II and non Fadama II rice mill operators. However Fadama II mill operators spent lesser amount on fuel and labor than the non Fadana II rice mill operators

respectively. Similarly, Fadama II mill operators spent more on servicing than the non Fadama II. The reasons why they spent lesser amount on fuel and labour could be due to improvement on their milling machines. The reason why they spent much on servicing could be due to the realization of the importance of routine servicing of machines. They could have been taught during their capacity building training. The more the servicing of the machines, the longer will be the life span.

Table 3: Variable cost components for Fadama II and non-Fadama II rice mill operators

Components	Fadama II	Rank	%	Non- Fadama II	Rank	%	
		Average ₦				Average ₦	
i.	Diesel/Electricity	50,000.00	2 (44.56)	57,000.00	2 (46.34)		
ii.	Servicing	6,000.00	3 (5.35)	3,500.00	3 (2.85)		
iii.	Rent/Revenue	3,000.00	4 (2.67)	2,700.00	4 (2.20)		
iv.	Labor	53,200.00	1 (47.42)	60,000.00	1 (48.78)		
v.	Total	112,200.00		123,000.00			

Source: Survey Data, 2016

Chow Analysis

Table 4 presents results on Chow Analysis which showed that the calculated value (46) is greater than

the tabulated value (2.10). This implies that the intercept is not the same, indicating that is difference between Fadama II and no-Fadama II participnats.

Table 4: Chow analysis for Fadama II and non – FadamaII mill operators

Mill operators		Sum of squares	Df	Mean square	F	Sig	F(n1,n2)	Cal	Tab
N1(30)	Model	2695262.6	8	336907.82	.841	.576	(9, 46)	46	2.10
	Residual	9610192.0	24	400424.67					
	Total	12305455	32						
N2 (34)	Model	4664531.7	8	583066.46	2.015	.070			
	Residual	11285468	39	289370.98					
	Total	15950000	47						
NC = N1+N2 (64)	Model	15463538	8	1932942.19	4.040	.001			
	Residual	34445351	72	478407.65					
	Total	49908889	80						

Source: Survey Data, 2016
 N₁ = Number of observations
 N₂ = Number of observations
 N_C = Number of observations
 Cal= Calculated Chow= 46
 Chow tab = F (K, N₁+N₂ – 2K) = F (9, 46) = 2.10
 Fadama II
 Non- Fadama II
 Pooled (Fadama II + non - Fadama II)
 Tab = Calculated Chow = 2.10

Conclusion

The study revealed that rice milling is operated on a small-scale basis in the study area, evident from milling capacity. Fadama II rice mill operators had more assets in terms of capital value and milling greater quantity of rice than the non- Fadama II rice mill operators. The income of Fadama II rice mill operators was larger than the non – Fadama II rice mill operators by more than 50%. Further, the income levels per day for Fadama II and non- Fadama II rice mill operators respectively indicated good income in terms of poverty rating. It is therefore concluded that, Fadama II project had positive impact on rice milling in the study area.

Recommendations

- i. Rice mill operators should be encouraged to form co-operative groups to benefit from government and non- governmental agencies.
- ii. Electricity supply should be improved and prices of alternative energy (diesel) be reduced for commercial purposes to serve as incentives
- iii. Modern /appropriate milling machines should be made available and affordable
- iv. The community driven development (Bottom-Top) approach adopted and implemented by the Fadama II Project should be utilised by other projects.

- v. The skills and expertise of rice mill operators should be enhanced through appropriate training on capacity building and advisory services.
- vi. Youth should be mobilised to embark on rice milling as a source of livelihood.
- vii. Rice milling can be used as a veritable tool for food security and poverty reduction in the area
- viii. The public should be sensitised on the prospects of rice milling in the study area.

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