Assessment of Post-Harvest Technology and Rice Farmers Income in Ekiti State

Taiwo Adedeji

Department of Agricultural Economics and Extension Services, Faculty of Agricultural Sciences, Ekiti State University, Ado-Ekiti, Nigeria

Abstract
A major problem with the domestic output of rice in Nigeria is the poor operational techniques of processors which often aids low production. Efforts of government through the agricultural development project (ADP) to improve rice processing especially in Ekiti state have proven ineffective. The study therefore, examines the assessment of post-harvest technology of rice in ekiti state. The study makes use of 80 respondents' farmers and processors in Igbemo-ekiti, using a purposive, snowball and random sampling techniques. The data collected from the study were analyzed using the frequency and percentage tables and budgetary technique. The study reveals that male respondents constitute 55% with 71.3% no of year spent in school and majorities (75%) of the respondents are within the economically active age that favour processing activities. Meanwhile, the adopted processing technologies in the study area are primitive ones and modern processing technology is most profitable with gross margin of ₦9,850 and ₦1.34k as return on investment. Much earning flows in with the use of modern technology; thus, there should be an effort of private bodies, government, farmers and processors to increase output through the use of various modern technologies.

Introduction
Rice is a major staple food crop globally consumed by 3.5 billion people (over half of the world's population (West Africa Rice Development Agency, 2005). In Nigeria the domestic production for rice has never been able to meet its demand (Akinwunmi, 2011). FMARD (2011) noted that demand for rice in Nigeria is put at about 5 million metric tons a year out of which about 3.2 million metric tons are produced locally, this could only be averted with the introduction of modern post-harvest technologies.

The post-harvest sector is view within the context of functionality where the sector spans from "the field to the plate" with a series of activities such as harvesting, handling, storage, processing, packaging, transportation, distribution and marketing (GFAR, 2000). The post-harvest technology stimulates agricultural production, prevents post-harvest losses, improves nutrition and adds value to agricultural products thereby opening new markets opportunities and generating new jobs while stimulating growths of other related economic sectors.

Meanwhile, the major opportunities in expanding rice production depends on the intervention of private and public sectors in utilizing the advantage of modern post-harvest technology which is aims to improve processing standards, quality and domestic rice (Phan et al, 2002). However, rice production engulfed numbers of smallholder farmers who keep the sub-sector afloat against so many odds which includes amongst others inability to provide and use improved technologies in rice processing, production of poor quality and substandard domestic rice that is not competitively marketable.

Despite the fact that a high percentage number of Nigerian depend on rice intake for their daily calorie, little or no attention has been placed on the processing techniques in use, which has even brings a paucity problem for the researchers, and with this rice farmers are increasingly constrained to know the focus of the technologies which improve their production and their income respectively. This research therefore further explores the problems by identifying different technologies for the production of rice, determining the income in relation to the technology used in production and determining the relationship between the farm size and the technologies used in production.

Methodology
The study was carried out in Igbemo Ekiti being the major rice producing quarter of Ekiti State. Purposive and snowball sampling techniques were used to select eighty (80) rice farmers. Structured questionnaires were administered on the rice farmers. Responses were analyzed using descriptive statistics, budgetary techniques and correlation coefficient.

Model Specification
The gross margin analysis involves the cost and return analysis of different processing technology of rice in the study area. The gross margin formula is explicitly stated below:

GM = ∑(P$_{ij}$Q$_{ij}$ – r$_{ij}$X$_{ij}$)
GM = Gross Margin (#/tonne)
P$_{ij}$ = Price of processed rice in i[th] processing technology for j[th] respondent (#/tonne).
Q$_{ij}$ = Quantity of processed rice in i[th] processing technology for j[th] respondent (tonne).
r$_{ij}$ = Price of variable inputs in i[th] processing technology for j[th] respondent (#/tonne).
X$_{ij}$ = Quantity of variable inputs in i[th] processing technology for j[th] respondent (tonne).
i   = 1 …………….. m i.e. processing technologies
j   = 1 …………….. n i.e. rice processors
m   = types of processing technologies
n   = total number of respondents

Results and Discussion
Table 1 shows the distribution of rice farmers' socioeconomic characteristics. Majority (75%) of the respondents was between the age range of 31 and above 50 years, implying that most of the farmers in the study areas were in their economically active age that favour processing activities in the study area. Males are more (55%) prominent in processing showing a manifestation of the gender inequality. This calls for concerted effort in mobilizing and empowering women for effective participation in rice production, with a view to enhancing their economic empowerment. This result aligns with the output of the study by Coker and Ninalowo (2005), Adewumi (2008), Ojo, Mohamed and Adeleye (2008) who reported male dominance in food crop production in Nigeria. The ensuing development may not be unconnected to the socio-religious coloration in some parts of the study area where women are restricted to mainly household chores in line with religious tenets, while the male gender supports the economic needs of the household. This is however without prejudice to women participation in complementary farming roles, especially those involving downstream operations such as threshing, winnowing, among others. Majority (71.3%) of respondents in the study area have only basic education, having spent between 0 and 6 years in school. About 87.5% of the respondents had household size of 1 10, implying that most of the respondents have low family size. This might also mean less supply of farm labour by family members, with the assumption that members of the household worked on the farm supplemented with labourers, all things being equal.

Table 1: Socio-economic Characteristics of Respondents

Variable	Frequency	Percentage (%)
Age		
21 – 30	6	7.5
31 – 40	22	27.5
41 – 50	20	25
> 50	32	40
Sex		
Male	44	55
Female	36	45
Years Spent in School		
0 – 6	57	71.3
7 – 12	20	25
> 12	3	3.8
Household Size		
0 – 5	38	48.75
6 – 10	31	38.75
11 – 15	11	13.75

Source: Field Survey 2017

Table 2 shows the description of various technologies used for rice processing in the study area. The result shows that 93.75% of the respondents still uses knife to harvest, above average (53.75%0 uses vehicle in the transportation of their produce, majority of the respondents (83.75%) uses pestle beating for threshing, 92.5% uses iron drum for parboiling, almost all the respondents 993.75%) adopt sun-drying technique, and 87.5% and 93.75% adopt lister operated miller and sack packers respectively while almost all the respondents (98.75%) prefer storing at home. This is an indication that processing activities in the study area are still very much more a primitive.

Table 2: Description of Various Technologies Used for Rice Processing

Variable	Category	Frequency	Percentage
Harvesting	Harvesting Knife	75	93.75
	Combine Harvester	-	-
	Panicle Reaper	5	6.25
	Reaper Binder	-	-
Transportation	Human	9	11.25
	Bicycle	12	15.00
	Motorcycle	16	20.00
	Tricycle	-	-
	Wheel barrow	-	-
	Vehicle	43	53.75
Threshing	Leg Trampling	10	12.5
	Pestle Beating	67	83.75
	Pedal Operated	3	3.75
Parboiling	Iron Drum	74	92.5
	Iron Pot	6	7.5
	Others	-	-
Drying	Sun Drying	75	93.75
	Manual	Dryer	-
	Others	5	6.25
Milling	Manual Miller	9	11.25
	Lister Operated	70	87.5
	Electricity Operated	1	1.25
Packaging	Sack	75	93.75
	Bow	5	6.25
Storage	At Home	79	98.75
	On farm	-	-
	Bamboo Built	-	-
	Others	1	1.25

Source: Field Survey 2017

From Table 3 the gross margin for no technology, local technology, semi-technology and modern technology are ₦2,614.57/ton, ₦3,943.96, ₦5,724.90 and ₦9,850 respectively. This is an indication that rice processing using modern technology is most profitable, follow by semi-modern, local and no technology respectively. it can also be observed that selling the rice unprocessed is not profitable as selling it after processed. The result reveals that 0.17, 0.28, 0.47 and 1.34 are return on investment for the four categories of processing technologies adopted in the study area. This implies that for every ₦1.00 spent, 17k, 28k, 47k and ₦1.34k is gained using no technology, local technology, semi-modern technology and modern technology respectively.

Table 3: Cost and Return Analysis for Rice Processing Using Different Technology

Variables	No Technology	Local Technology	Semi Modern Technology	Modern Technology
Selling Price	17,833.33	17,789.82	18,000	17,200
Production Cost	14,416.67	12,566.15	11,147.68	6,000
Transportation Cost	10.42	83.46	67.51	-
Packaging Cost	791.67	945.6	831.22	1200
Labour Cost	-	49.33	39.66	-
Parboiling Cost	-	201.29	189.03	150
Total Variable Cost	15,218.76	13644.57	12275.10	7350
Gross Margin	2614.57	3943.96	5724.90	9850
Return on Investment	0.17	0.28	0.47	1.34

Source: Field Survey 2017

Conclusion and Recommendation

There is no doubt that rice industries in Nigeria is an important but underdeveloped venture for increasing the nation economic potentials through the provision of gainful employment and increasing income generation for hundreds and thousands of people. It is realized however that except for the young enterprising ones most farmers in the study area produce only for the aim of feeding their households and profit making is a secondary

aims. From the foregoing, it can be clearly seen that a lot has to be done if production must increase and a sustainable agriculture is to be achieved. The increase in the population processing their produces will have to come from a breakthrough in building viable modern processing unit, provision of capital for the existing one and increase farm-size especially for rice production.

It is highly expected that the percentage of the population using modern technology in rice processing activities should attract policy attention since it is widely consumed staple food for both man and his animal. Therefore, with respect to the higher return on the modern technology among others, government, private bodies and organizations should team up in other to erect a viable modern processing centre which will change the low level of turnout to processing activities and better enhance return on investment. Government should also made provision for policy that will enable farmers to improve on their processing activities. Moreso, an appraisal of the extension services in the state is suggested so as to discover and improve on weak areas or better modify the plan of operation.

REFERENCES

Adewunmi O.I, (2008). Economics of Poultry Production in Egba Division of Ogun State Agric. J. 3(1):10-13

Akinwunmi AA, (2011). Presidential Brief on Agricultural Transformation Agenda. We will Grow Nigeria's Agriculture Sector. Presentation made by the Honourable Minister of Agriculture to the Economic Management Team. Abuja, Nigeria Dante BP, 2005.Post-harvest handling in Asia 1. Unpublished report submitted to the National Post Harvest Institute for Research and Extension.

Global Forum on Agricultural Research, (2000). A synthesis of the highlights of five regional workshops on post-harvest in collaboration with FAO united state.

Ojo MA, Mohammed US, Ojo AO, Olaleye RS (2009). Returns to Scale and Determinants of Farm level Technical Inefficiency among Small Scale Yam Based Farmers in Niger State, Nigeria: Implications for Food Security. International J. Agric. Econ. Rural Deve. 1(2): 43-51.

Phan K., (2002). Study on the impact of improvement productivities on post-harvest operations. Final report, F.A.O

Coker A.A and Ninalowo S.O., (2015). Effect of post-harvest losses on rice farmers' income in Subsaharan Africa: a case of Niger state, Journal of Agricultural Science and Food Technology Vol. 2 (3), pp. 27-34.