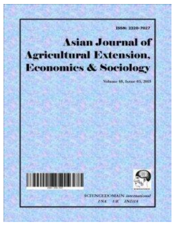

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Efficiency Evaluation of Small Holders Palm Oil Production in Edo State, Nigeria

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Authors' contributions

This work was carried out in collaboration between all authors. All authors read and approved the final manuscript.

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ABSTRACT

This study evaluates the efficiency of palm oil production in the Edo State of Nigeria. Primary data were collected using a set of structured questionnaire from one hundred and ten (110) smallholders' palm oil producers which were selected using multistage sampling techniques. The stochastic frontier production and cost functions model were used to predict the firm level technical and economic efficiencies respectively. The results of the Stochastic Frontier Production Function analysis indicated that the major factors that influenced the output of palm oil production in the study area were quantity of Fresh Fruit Bunch, labour and water. From the result of the inefficiency model, the major factors which influenced the technical efficiency of the respondents were; gender, level of education and years of experience. The return to scale (RTS) yields 0.188 which indicates a positive decreasing return to scale and that the palm oil production in the study area was in stage II of the production.The technical efficiency of palm oil producers ranges from 0.65 to 0.95 with a mean

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efficiency of 0.86, with majority of the respondents (63.3%) having technical efficiency above 0.94. The economic efficiency analysis of palm oil producers revealed that there was presence of cost inefficiency effect in palm oil production as confirmed by the significance gamma value of 1.000. The mean technical, allocative and economic efficiency of 0.855 0.883 and 0.753 respectively were obtained from the data analysis, indicating that the palm oil producers were relatively efficient in allocating their limited resources. The palm oil producers are yet to achieve their best. This had been confirmed by the presence of technical inefficiency in the estimated models. It is therefore, evident from this study that technical efficiency (TE) of the producer could be improved substantially.

Keywords: Efficiency; technical; allocative; economic; inefficiency; palm oil.

1. INTRODUCTION

The contribution of oil palm to Nigeria economy is favourable in that many farmers engage in farming at subsistence level. Despite lack of modern farm implements which undermined the potential for large-scale production, Nigeria emerged in the first decade of her independence as a leading exporter of many major agricultural commodities. Nigeria was a leading exporter of palm kernel, and largest producer and exporter of palm oil [1].

However, in recent times, its production has drastically downsized (Partnership Initiatives in the Niger Delta, 2011) (PIND) [2]. This situation has been brought about by a number of socio-economic and political factors along with the low technological know-how in the industry. The study has revealed that increased demand for palm oil resulting from an increase in population growth, relative to the low productivity of the oil palm sector, has made Nigeria a net importer of the palm oil [2,3].

Palm oil processing is one of the main sources of income and employment to a large proportion of the poor rural population in Nigeria especially in the south-south geopolitical zone of the country. Palm oil retains a viable potential in enhancing Nigeria agricultural sector, given the divers use of palm oil which ranges from household consumption to international trading. The Palm oil is generally the cheapest and easily refined vegetable oil produced in largest amount, taking the lead over soybean oil since 2004/2005 production season. Its availability and relatively low cost accord it an important component of the increased intake of oils and fats in the developing world [4]. The importance of palm oil to economic development of any country, especially cultivation of oil palm cannot be overemphasized. According to Onoh and Peter-Onoh [5], palm oil earned the nation about 22 percent of the foreign exchange up to the beginning of the civil war. Small scale holders have been relevant and remain significant in the development of the palm oil sector. Their participation have been either in land development schemes, as independent gowers [6] or selling of palm oil products on small scale in the rural or urban markets to meet their immediate needs in the family. In recognition of palm oil contribution to economic development, reports have shown that globally almost 3 million smallholder families are involved in palm oil sector [7]. For instance, Dimelu and Anyaiwe [8] asserted that about 80 percent of palm oil production in Nigeria is from dispersed million smallholders who are spread over an estimated area of 1.65 million hectares in the Southern part of Nigeria. They harvest semi-wild oil palm and employ manual processing techniques. Hence, smallholder palm oil producers have been making a significant contribution to palm oil production.

Nigeria is experiencing supply shortage of all grades of vegetable oil, especially palm oil [9]. Local market prices are currently more than double the international price. Palm oil is marketed in the country throughout the year and majority of the population keep demanding for it [10]. Studies also reveal that the method used in palm oil processing has remained rudimentary and undeveloped; and this has led to decline in palm oil production output [11]. Therefore, this study was to evaluate efficiencies of smallholder palm oil production in Edo State, Nigeria. The specific objectives were to examine the technical, allocative and economic efficiencies of the smallholder palm oil production. This study will help palm oil producers and policymakers on how to increase palm oil production by determining the level to which it is possible to raise technical, allocative and economic efficiency of palm oil production with the existing resource and available technology.

2. METHODOLOGY

2.1 The Study Area, Data Collection and Sampling Procedure

The research was carried out in Edo State, Nigeria. It lies approximately between Latitude 05°44¹N and 07°34¹N of the Equator and between Longitude 06°04¹E and 06°43¹E of the Greenwich Meridian. The average annual rainfall is 250 cm near the coastal areas and 150 cm in the extreme northern part of the State. The temperature ranges from 22°C–36°C. The soil type in the State is generally the reddish yellow kind of ferrasols.

Primary data were collected using a set of structured validated questionnaire. A multi-stage sampling technique was used in the selection of 120 respondents (palm oil producers) in the study area. The first stage involves a purposive selection of five (5) Local Government Areas (LGAs) based on predominance in palm oil production in the area which includes Ovia North East, Ikpoba-Okha, Ovia South-West, Orhionmwon and Egor. The second stage involves the use of simple random sampling technique to select three (3) communities from each LGA. Lastly eight (8) palm oil producers were selected through a simple random sampling technique from each community. This gave a total sample size of 120 palm oil producers. However, only 110 respondents completed their copies of questionnaire and valid for the analysis of this study.

2.2 Stochastic Frontier Production Model

Ojo [12] reported that the stochastic frontier models are better estimated using either the Cobb-Douglas or Translog functional form.

The stochastic frontier production function model of the palm oil producers was specified by the Cobb-Douglas production function specified as follows:

$$\ln Y_i = \beta o + \beta_1 \ln X_{1i} + \beta_2 \ln X_{2i} + \beta_3 \ln X_{3i} + \beta_4 \ln X_{4i} + \beta_5 \ln X_{5i} + \beta_6 \ln X_{6i} + \beta_7 \ln X_{7i} + \beta_8 \ln X_{8i} + Vi - Ui \quad (1)$$

Where;

Yi = Quantity of Palm Oil Produced by producers (measured in metric tonnes);
X_1 = Age of producers (year)
X_2 = Household size (Numbers)
X_3 = Quantity of FFB processed (Metric tonnes)
X_4= Labour (mandays);
X_5 = Depreciation on fixed asset (Naira)
X_6= Transport cost (Naira);
X_7= Diesel(Litre)
X_8= Water(Litre)

Vi = A random error term with normal distribution, that is, random variability in production that cannot be influenced by the producers (random errors).

Ui = A non-negative random variable called technical inefficiency effects associated with the technical inefficiency production of producers involved. That is, deviation from maximum potential output attributable to technical inefficiency

Ln = natural logarithm

$\beta_0 - \beta_6$ = Production function parameters to be estimated

Technical efficiency is defined in terms of the observed output (Y_i) to the frontier output (Y_i*). The Y_i* is the maximum output achievable given existing technology and assuming 100% efficiency. It is denoted as;

$$Y^* = f(Xi\ \beta) + e \quad (2)$$

That is,

$$TE = Yi / Yi^* \quad (3)$$

Where, $0 \leq TE \leq 1$

2.3 Stochastic Frontier Cost Function Model

The Cobb-Douglas cost frontier function for the palm oil producers is specified as:

$$\ln Ci = \alpha_0 + \alpha_1 \ln Y_i + \alpha_2 \ln P_{2i} + \alpha_3 \ln P_{3i} + \alpha_4 \ln P_{4i} + \alpha_5 \ln P_{5i} + \alpha_6 \ln P_{6i} + \alpha_7 \ln P_{7i} + V_i + U_i \quad (4)$$

where:

Ci = Total input cost of the ith palm oil producers (Naira)
Yi = Palm Oil (Metric tonnes)
P_2 = Cost of Labour (naira)
P_3 = Cost of diesel (naira)
P_4 = Cost of water (naira)
P_5 = Depreciation cost on fixed input (naira)
P_6 = Transportation cost (naira)
P_7 = Cost of FFB (naira)

The cost efficiency of individual producers is defined in terms of the ratio of observed total cost (C_i) to the corresponding frontier minimum total cost (C_i*).

The cost efficiency of the producer is expressed as:

$$CE=C_i/C_i^* \quad (5)$$

Where Ci is the observed total cost and C_i* is the frontier cost. The CE ranges from 1 to ∞ i.e 1≤CE≥∞

2.4 The Technical Inefficiency Effects

The technical inefficiency effects, Ui is defined as:

$$Ui =\sigma_0 + \sigma_1 Z_1 + \sigma_2 Z_2 +\sigma_3 Z_3 \quad (6)$$

where,

U_I : Inefficiency effect
Z_1 : Sex (dummy: male =1 and Female = 0)
Z_2 : Educational level of processor (years)
Z_3 : Experience (years)

2.5 Cost Inefficiency Effects

Cost inefficiency effects, Ui is defined as:

$$Ui =\sigma_0 + \sigma_1 Z_1 + \sigma_2 Z_2 +\sigma_3 Z_3 \quad (7)$$

where,

U_I : Inefficiency effect
Z_1 : Sex (dummy: male =1 and Female = 0)
Z_2 : Educational level of processor (years)
Z_3 : Experience (years)

The $\sigma_0$and$\sigma_i$coefficients are unknown parameters to be estimated along with the variance parameters σ^2 and γ. The variances of the random errors, σ_v^2 and that of the technical and cost inefficiency effects σ_u^2 and overall variance of the model σ^2 are related. Thus $\sigma^2 = \sigma_v^2 +\sigma_u^2$. The σ^2 indicates the goodness of fit and the correctness of the distributional form assumed for the composite error term. The ratio $\gamma =\sigma_u^2/ \sigma^2$, measures the total variation of output from the frontier which can be attributed to technical or cost inefficiency. The sigma square (σ^2) and the gamma (γ) coefficients are the diagnostic statistics that indicate the relevance of the use of the stochastic production frontier function and the correctness of the assumption made on the distribution form of the error term.

2.6 Economic Efficiency Estimation

Economic efficiency is the product of technical efficiency and allocative efficiency

$$EE = TE \times AE \quad (8)$$

The economic efficiency (EE) was estimated as the inverse of cost efficiency. i.e

$$EE_i=1/CE_i \quad (9)$$

Where, the EE also has values in the range of 0 and 1

2.7 Allocative Efficiency Estimation

The allocative efficiency was obtained from technical and economic efficiencies estimated as follows:

$$AE= EE/TE \quad (10)$$

This implies that 0≤AE≤1.

3. RESULTS AND DISCUSSION

3.1 Stochastic Frontier Production and Cost Functions Analyses

3.1.1 Summary statistics of production variables

Table 1 presented the average total palm oil production output of 12.36 mt. The mean age was about 50 years. This implies that most of the palm oil producers are in their active age and have the capacity to produce efficiently. The mean household size was 7 members per house; this might have an implication on the family labour requirement in palm oil production business in the area [13]. FFB is the major input in palm oil production, the average quantity processed in the study area was 6,246.2 mt while the firm with the least production was 400 mt. The average man-days of labour used in the study area were 140.2 man-days with the maximum of 1536mandays. The average quantities of diesel used and the water were 937.17litre and 262.95litre respectively. The mean year of experience was about 9 years which means that producers had fairly high level of experience that could help them stay in the business and as well sustain the business. The average amount spent on transportation was ₦12,555 which means that the transportation cost incurred in production is on the high side.

3.2 Stochastic Frontier Production Function Analysis

The estimates of parameters of stochastic frontier production function model of smallholder palm oil producers were presented in Table 2. The Table presents the Ordinary Least Square (OLS) and Maximum Likelihood estimates (MLE) of the production parameters. The OLS function provides estimate of average production function while MLE model yields estimates of stochastic frontier production model.

The value of the sigma squared ($Ϭs^2$) is 0.500 and is statistically significant at 1% level. This indicates a good fit and correctness of the distributional form assumed for the composite error term in the model. The variance ratio (gamma (ɣ)) of 0.741 measures the ratio of the variance of firm specific palm oil output to the total variance. This implies that 74.1% of the variation in palm oil output of the respondents was due to differences in their technical efficiencies.

Table 2 revealed that the major factors that influenced the output of palm oil production in this area were quantity of FFB, quantity of labour, and water and they were positive and significant statistically to affect palm oil output. The quantity of FFB was positive and significant at 1%. This implies that increase in palm oil output can be achieved by increasing the quantity of FFB used. The coefficient of water was also positive and significant at 1%. This indicates that the

Table 1. Summary statistics of the variables for the stochastic frontier production

Variables	Minimum	Maximum	Mean	Std. deviation
Production function variables				
Palm oil produced (mt)	0.80	264.33	12.36	31.83
Age(year)	31.00	68.00	49.72	2.24
Household (number)	1.00	15.00	6.59	2.24
Quantity of FFB(mt)	400.00	124,000.00	6,246.20	133,391.38
Labour(manday)	10.00	1536.00	140.20	188.65
Depreciation cost(N)	667.13	60,642.95	14,027.00	10,669.02
Transportation cost (N)	898.88	64,205.46	12,555.00	9,485.52
Diesel(litre)	249.69	2,397.00	937.17	465.12
Water(litre)	76	1,385.08	262.95	201.49
year of processing experience	2.00	24.00	8.78	4.32

Source: Field survey, 2016

Table 2. Estimates of stochastic frontier production function of palm oil production

Variables	Model 1 (OLS)	Model 2 (MLE)	t- values
General model			
Constant	7.720(1.483)***	7.364(1.051)	7.009
Age	0.124 (0.286)	-0.052(0.226)	-0.232
Household	-0.045 (0.108)	-0.02 (0.103)	-0.191
Quantity of FFB	0.436 (0.072)***	0.539(0.086)***	6.274
Labour	-0.332 (0.089)***	0.273(0.070)***	3.886
Depreciation	-0.425 (0.067)***	-0.387(0.059)***	-6.513
Transportation cost	-0.226(0.066)	0.0002(0.058)	0.004
Diesel	-0.286(0.117)**	-0.294(0.108)***	-2.732
Water	-0.159(0.044)***	0.134(0.42)***	3.218
Inefficiency model			
Constant	0	1.908(0.671)***	2.846
Sex	0	-0.036(0.477)	-0.075
Level of education	0	-0.616(0.279)**	-2.206
Years of experience	0	-0.261(0.155)	-1.685
Variance parameter			
Sigma squared	0.222	0.500(0.191)**	2.615
Gamma		0.741(0.139)***	5.349
Log-likelihood	-68.658	-60.549	

*Source: Field survey, 2016 ***1% **5%*

relevance of water to output as important input for processing the palm fruit. Therefore, as quantity of FFB increased water required for palm oil production increases which in turn increases the quantity of output of palm oil obtained. The coefficient of labour was positive and significant at 1%. Thus, an increase in labour input results in increasing output. However, the coefficient of age and household were negative and not significant. Table 2 further revealed that the cost of capital equipment and diesel used had a negative effect on the quantity of palm oil produced in the study area. The estimated coefficients of the two variables were found to be significant at 1%. This indicates the relevance of these inputs in palm oil production.

The results of the technical inefficiency effects showed that sex, level of education and year of experience reduces technical inefficiency of the palm oil producers. The technical efficiency analysis of palm oil production revealed that technical inefficiency effect existed in palm oil production in the study area as confirmed by the gamma value of 0.741, this is less than the result (γ= 0.85) obtained in a study by Ojo [14]. The gamma (γ) ratio indicates the relative magnitude of the variance σ^2, associated with technical inefficiency effect. Hence, 0.741 implies that about 74 percent variation in the output of palm oil producers was due to differences in their technical efficiencies.

3.3 Elasticity of Production and Return to Scale (RTS)

Table 3 showed the return to scale (RTS) computed as the sum of variables elasticities of production. The return to scale computed was 0.188. This suggests that if the quantity of the variables is jointly increased by 1%, the quantity of palm oil produced will increase by 0.188%.This finding is less than the RTS value of 0.771 obtained in a previous study in Ondo State by Iwala et al. [15]. This result indicates that palm oil production was in the stage of positive decreasing return to scale, i.e., stage II of the production function. Where an increase in the input will lead to an increase in output but at a decreasing rate until an optimum level is attained. At this stage, resources and production are said to be efficient. Hence, producers are advised to maintain production at this level where maximum output is obtained from a certain level of input utilization.

Table 3. Elasticity of production and return to scale

Variables	Elasticity
Age	-0.052
Household	-0.02
Quantity of FFB	0.54
Labour	0.27
Depreciation	-0.39
Transportation	0.0002
Diesel	-0.294
Water	0.134
RTS	0.188

Source: Field Survey, 2016

3.4 Technical Efficiency (TE) Analysis

Table 4 presented the technical efficiency index, which ranges from 0.65 to 0.95 with mean technical efficiency of 0.855 and standard deviation of 0.061. The average TE of 0.855 suggested that the palm oil production could be increased by approximately 14% through the improved use of available resources in a technically efficient manner, given the current state of technology. In the Table, the result further indicated that many (53%) producers had technical efficiencies 0.81 to 0.90. This implies that the producers are fairly efficient. That is, the farmers are fairly efficient in deriving the maximum output from input, given the available resources.

Table 4. Decile distribution of the estimated technical efficiency

Ranges	Frequency	Percent
0.60 -0.7	6	5.5
0.71 - 0.8	22	20.0
0.81 - 0.9	58	52.7
0.91 - 1.0	24	21.8
Total	110	100.0
Mean		0.855
S.D		0.061
Minimum		0.65
Maximum		0.95

Source: Field Survey, 2016

3.5 Summary Statistics of Cost Function

The summary statistics of variables for estimation of stochastic frontier cost function model was presented in the Table 5. The mean total cost of production was ₦177, 750/mt with standard deviation of ₦48,159.79. An average wage of labour per metric ton of palm oil produced was ₦21,114, this is due to the fact that there is a reduction in the number of the household participation in firm operation since most producers send their children to city for better education. Hence, producers depend on hired labour to do most of the operations, thus justify the high cost expended on hired labour. The average cost of diesel was ₦937.17/mt, an indication that little amount of diesel is required to run the machines. The mean cost of FFB per metric ton was ₦127,130 which account for major cost of production; this explained the fact that FFB is an essential, indispensable and unsubstitutable input in palm oil production. The average cost of transportation was ₦12, 555/mt which is on the high side according to Lawal et al. [16], transportation is one of the problems confronting palm oil producers. Mean depreciation per metric ton was ₦14,027.

3.6 Stochastic Frontier Cost Function Analysis

The estimates of parameters of stochastic frontier cost model of sampled smallholder palm oil producers were presented in the Table 6. The Table presents ordinary least square (OLS) and maximum likelihood (MLE) estimates of the cost parameters. The OLS function provides estimate of average cost function while MLE model yields estimates of stochastic frontier cost model.

The entire estimated coefficients for MLE have positive coefficients. Cost of labour, depreciation cost on fixed items, transportation and cost of FFB were significant at 1%. This implies that a naira increase in cost of labour, transportation, depreciation costs on fixed items and FFB cost

Table 5. Summary statistics of the variables of stochastic frontier cost models

Variables	Minimum	Maximum	Mean	Std. deviation
Cost function variables				
Total cost/ mt	74,290.36	339,000.00	177,750.00	48,159.79
Labour cost/mt	2,921.35	65,372.83	21,114.00	13,966.41
Diesel cost/mt	249.69	2,397.00	937.17	465.12
Water/mt	0.76	1,385.08	262.95	201.49
FFB cost/ mt	49,937.58	216,000.00	127,130.00	31,274.12
Transport cost/ mt	898.88	64,205.46	12,555.00	9,485.52
Depreciation costs on fixed item/mt	667.13	6,0642.95	14,027.00	10,669.02

Source: Field Survey, 2016

Table 6. Estimates of stochastic frontier cost function of palm oil production

Variables	Model 1 (OLS)	Model 2 (MLE)	t- value
General model			
Constant	2.390 (0.340)	0.122(0.252)	4.849
Palm oil (mt)	-0.014(0.011)	0.001(0.015)	0.075
Cost of labour	0.091(0.011)***	0.115(0.012)***	9.471
Cost of diesel	0.006(0.018)	0.000(0.007)	0.009
Cost of water	0.008(0.007)	0.007(0.005)	1.372
Depreciation	0.086(0.010)***	0.082(0.009)***	8.902
Transportation cost	0.067(0.009)***	0.074(0.006)***	11.776
Cost of FFB	0.623(0.031)***	0.698(0.013)***	53.195
Inefficiency model			
Constant		-0.226(0.010)**	-2.270
Sex		0.066(0.056)	1.143
Level of education		0.032(0.016)**	1.970
Years of experience		-0.004(0.005)	-0.768
Variance parameter			
Sigma squared	0.004	0.010(0.003)	3.387
Gamma		1.000(0.000)	265750
Log-likelihood	156.492	210.062	
Return-to-scale	0.188		

*Source: Field survey, 2016; ***;** means significant at 1% and 5% levels respectively* will lead to their respective coefficient value increase in cost incurred in producing palm oil. The estimated coefficient of the quantity of palm oil processed indicates that a metric ton increase in quantity of palm oil produced will lead to 1kobo increase in total cost incurred, however, this effect is not significant.

3.7 Economic Efficiency (EE) Analysis

Table 7 presents the computed economic efficiency index which ranges from 0.60 to 0.80 with mean of 0.753 and standard deviation of 0.048. The value obtained is less than 0.95 recorded in a study in Thailand [17], meaning that there is a need for significant improvement in palm oil economic efficiency in Nigeria. This finding, therefore, suggests that, palm oil production could be increased by approximately 25% through the improved use of available resources in a technically efficient manner and cost minimizing way given the current state of technology.

The predicted economic efficiencies (EE) estimated as an inverse of cost efficiencies differs substantially among the producers, 0.60 to 0.80 with a mean EE of 0.753 as presented in Table 7. This means that if the average producer in the sample area were to reach the EE level of its most efficient counterpart, then the average farmer could experience a cost saving of 5.88 percent. The same computation for the most economically inefficient farmer suggests a gain in economic efficiency of 25 percent [i.e. 1-(0.60/0.80 x100]. And to give a better indication of the distribution of the economic efficiencies, a frequency distribution of the predicted economic efficiencies is presented in Table 7.The frequencies of occurrence of the predicted economic efficiencies in deciles range indicate that the about 66 percent of the producers had economic efficiencies between 0.76to 0.80, while 84 percent of the respondents had EE of 0.71 and above which is an indication that farmers are fairly efficient. That is, the farmers are fairly efficient in producing a predetermined quantity of palm oil at a minimum cost for a given level of technology.

3.8 Allocative Efficiency (AE)

The AE for this study is presented in Table 8. The index ranges between 0.73 to 0.99 with mean value of 0.883 and standard deviation of 0.060. The implication of this is that, palm oil production could be increased by approximately 12% through improved use of available resources in a cost minimizing way, given the current state of technology. Again, to give a better indication of the distribution of the allocative efficiencies, a frequency distribution of the predicted allocative efficiencies is presented in Table 8. The Table revealed a clustering of allocative efficiencies in the region which ranges from 0.81 to 0.99. This implies that the producers are fairly efficient. That is, the producers are fairly efficient in producing palm oil at a given level of output using the cost minimizing input ratio as about 90 percent of the respondents have AE of 0.81 and above.

Table 7. Economic efficiency index/decile range

	Frequency	Percentage
0.6-0.65	9	8.2
0.66-0.7	9	8.2
0.71-0.75	20	18.2
0.76-0.8	72	65.5
Total	110	100.0
Mean		0.753
S.D		0.0478
Minimum		0.60
Maximum		0.80

Table 8. Allocative efficiency index and decile range

Ranges	Frequency	Percent
0.7-0.8	11	10.0
0.81-.0.9	53	48.2
0.9-.99	46	41.8
Total	110	100.0
Mean		0.883
S.D		0.0602
Minimum		0.73
Maximum		0.99

4. CONCLUSION AND RECOMMENDATIONS

The study established that palm oil production was profitable in the study area. Depreciation and quantity of water used exhibited a negative relationship to profitability, however, it increases with producers' age and acquisition of more academic qualification. The general conclusion of the finding in this research is that palm oil producers are yet to achieve their best. This had been confirmed by the presence of technical inefficiency in the estimated models. It is therefore, evident from this study that, technical efficiency (TE) of the producer could be improved substantially and their economic inefficiency constitutes a more serious problem judging from the average efficiencies recorded in the study area. In addition, the significant contribution of sex, level of education and year of experience to the technical efficiency should be exploited as variables of policy concern to decrease the technical inefficiency observe from the study area.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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