ANALYSIS OF LABOUR-USE EFFICIENCY: THE CASE OF YAM FARMERS IN EKITI STATE, NIGERIA

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ABSTRACT

Labour is a highly critical input in Nigeria's agricultural production and human labour is about the only main source of labour available to small-holder farmers. As human labour is becoming scarce in the rural arrears, the efficient management of available labour is therefore inevitable. This study therefore determined the labour use efficiency and estimated the factors affecting labour use efficiency among yam farmers in Ekiti State with a view to improving yam farmers' productivity. Data was collected from 108 respondents (although 99 were valid) using a multistage sampling technique. The data collected was analysed using descriptive statistics and a stochastic frontier labour-use model. Results showed that the sampled farmers had a mean of 6 household members, used an average of 200 man-days of hired labour for all the yam production activities, cultivated a mean of 0.51 hectares of land and produced a mean of 10037.8 kilograms of yam in the study area. Results also showed that while farm size and seed yam had a positive relationship with the amount of labour used, education, farming experience and off-farm income had a positive influence on the labour use inefficiency of the farmers in the study. The mean labour use efficiency of the sampled farmers of 87 per cent indicated that farmers were relatively efficient in the use of labour, although there is still room for efficiency improvement of 13 per cent. It was concluded that although farmers were efficient in the use of labour, there still exists an opportunity to improve productivity through labour use improvement in the study area. It was, therefore, recommended that farmers with higher levels of education, higher levels of experience, small household sizes, lower off-farm income and those who do not have access to credit should be targeted for improved productivity.

Keywords: ***efficiency, farmers, labour-use, yam***

INTRODUCTION

Nigeria is the world's largest producer of yam *Dioscorea sp.* (Aighewi et al., 2020) accounting for 67.34 % of the total world annual production estimated at 74.32 million metric tons (FAO, 2019) and yam farming is major source of livelihood and food security in Ekiti State (Oluwasusi and Tijani, 2013). Yam belongs to the genus "*Dioscorea*" and family "Dioscoreaceae". There are over 600 species of yam worldwide but six species can be considered as the edible ones in the tropics. These are white yam (*Dioscorea rotundata*) yellow yam (*D. cayenensis*), water yam (*D. alata*), trifoliate yam (*D. dumentorum*), aerial yam (*D. bulbifera*) and Chinese yam (*D. esculenta*). Out of all these, white yam is the most planted species in Ekiti State. Babaleye (2003) observed that yam contributes more than 200 dietary calories per capita daily for more than 150 million people in West Africa while serving as an important source of income to the people. It is one of the major staple food in Nigeria and has the potential for livestock feed and industrial starch production (Ayanwuyi *et. al*., 2011).

The role played by yam in the food economy of most West African countries cannot be over-emphasised. It plays an important role in people's nutritional, social, cultural, and economic lives. It provides multiple opportunities for poverty reduction and nourishment of poor people (IITA& EIARD, 2013). Ekpo *et al.* (2000) reported that yam tuber contains pharmacologically active substances such as dioscorine, saponin and sapogenin. Dioscorine which is the major alkaloid in yam is medicinally a heart stimulant while saponin has bioactivities and therapeutic uses. Saponin has been used as an adjuvant in vaccines and together with immunotoxins as a cure for leukaemia, lymphoma and other cancers. It is also used in the preparation of traditional medicine. Also, yam tuber is a good source of energy mainly from its carbohydrate contents since it is low in fat and protein. However, yams tend to be higher in protein and minerals like phosphorus and potassium when compared with sweet potatoes though the latter are richer in vitamins A and C (Consultative Group on International Agricultural Research Technical Advisory Committee, 2000). Also, it has been reported that yam is a good source of industrial starch whose quality varies with species.

Yam is one of the principal tuber crops in the Nigerian economy, in terms of land under cultivation and in the volume and value of production (Bamire and Amujoyegbe, 2005). Interestingly, yam is categorized as chief among the major staple foods of Nigerians on account of its indispensability. Yam is part of the religious heritage of several tribes in Nigeria and often plays a key role in religious ceremonies (Sanusi and Salimonu, 2006). Worthy of note is the fact that many important cultural values are attached to yam, especially during weddings and other social ceremonies. In many farm communities in Nigeria, the size of the yam enterprise that one has is a reflection of the person's social stature (Izekor and Olumese, 2010). Yam can also be processed into flour which can be mixed with hot water to form a paste (called 'Amala' among the Yoruba ethnic group).

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Unlike cassava and other root and tuber crops, one can store yam tubers for periods of up to 4 or even 6 months at ambient temperatures. This characteristic contributes to the sustainability of the food supply, especially in the difficult period at the start of the wet season.

Although there has been an increase in the output of yam in Nigeria over time, this is largely due to farmland expansion rather than input intensification (FAOSTAT, 2009). Human labour requirement in the yam production process, especially among the smallholder farming communities, constitutes a large proportion of all farm input required and as such critical input in yam production (FAO, 2015 and Osei-Adu *et al.,* 2016). Also, IITA (2009) highlighted the importance of labour in yam production, in that it accounts for about 40% of the total yam production costs. Despite the importance of labour in yam production, a significant proportion of the required labour has become increasingly difficult to mobilize particularly at peak periods especially in Ekiti State of Nigeria. The inadequacy of labour in the production of yam has been linked to ageing farmers, rural-urban labour migration, and persistent drift of rural labour to non-farm and other off-farm activities which potentially offer higher wages (Migap and Audu, 2012; Anyiro *et al,* 2013; Kar *et al,* 2020). These denied the yam farmers the much-needed human labour, weakened the production capacity and reduced income levels of yam farmers in this area (Ogwumike and Aromolaran, 2000; Oluyole *et al*., 2011). The difficulty in availability and timeliness of labour has also impacted negatively on planting precision, weed control, timely harvesting and crop processing (Oluyole *et al*., 2011).

Given the above problems in the study area, the natural endowments (land, weather and other agro-ecological endowments) that support yam production, and the fact that the population and demand of yam are increasing, the intensification of production inputs has become necessary. The efficient use of the available labour is a way of improving the productivity and returns to farmers (Ajijola *et al.,* 2014). Whether the available labour in yam production is efficiently or inefficiently utilized has not been empirically established especially in the study area. Hence, this study determined the labour-use efficiency and factors affecting labour-use efficiency with a view to improving yam farmers' productivity in Ekiti State, Nigeria.

MATERIALS AND METHODS

Description of the Study Area Ekiti State is situated in the Southwestern geopolitical zone of Nigeria. It lies within latitude $7^0 30^1$N and $8^0 15^1$N and Longitude $4^0 47^1$E and $5^0 40^1$E. It shares boundaries with Kwara State in the North, Kogi State in the East, Ondo State in the South and Osun State in the West. It covers a total land area of about 6,353 square kilometres with a population of 2, 384, 212 people (NPC, 2006). The State is mainly an upland zone located in the rainforest agro-ecological zone with two distinct seasons namely: wet and dry seasons. The Wet season is characterised by rainfall, is between April and October while the dry season is between November and March. The mean annual rainfall ranges between 1,000mm and 1,500mm while the mean temperature is 30^0C. Farming is the major occupation of the people. They cultivate tree crops such as cocoa and food crops such as yam, cocoyam, cassava, rice, maize and vegetables.

Sampling and Data Collection Methods A multistage sampling technique was used to select a total of 108 respondents for the study out of which 99 were valid for analysis. The study area was stratified into three zones following the three existing zones established by the Ekiti State Agricultural Development Program (ADP). In the second stage, two Local Government Areas (LGAs) were purposively selected from each zone based on the predominance of yam production within the zone. In the third stage, three villages were randomly selected from each of the LGAs and in the last stage, six yam farmers were selected at random within each village.

Primary data were collected from the sampled farmers using a structured questionnaire. Data were collected on farmers' socioeconomic characteristics (such as gender, age, years of experience, and educational status), inputs (labour, land, and other capital items) and yam output.

Empirical Model

Labour-use frontier model was used to estimate the efficiency of labour use. The model was formulated using the stochastic frontier model and estimated in a single-stage maximum likelihood estimation procedure using the Computer Software Frontier version 4.1 (Coelli, 1996) as follows. This is a development of the stochastic frontier model, originally proposed by Aigner, Lovell and Schmidt (1977) and Meeusen and van den Broeck (1977), to account for random errors, in addition to the non-negative technical inefficiency effects. Most applications of the frontier models have involved production functions, in which the inefficiency effect is subtracted, because observed outputs are no larger than their corresponding stochastic frontier outputs, because of technical inefficiency of production. The model of equations (1) and (5) is an input-requirement counterpart of the stochastic frontier production function model, proposed by Battese and Coelli (1995).

$L_i = f(X_{ij}Y_{ij}: \beta) + (V_i + U_i)$…............. (1)

$L_i * = f(X_{ij}Y_{ij}: \beta) + V_i$……..................... (2)

The efficiency of Labour-use is the ratio of the actual labour use (L_i) to the optimal labour used (L_i $*$) that is: $\frac{L_i}{L_i*}$ ……………………………………….(3)

The explicit form of equation (1) adopted in this model is the Cobb-Douglas functional form stated as:

$lnL_i = ln\beta_0 + \sum \beta_k lnX_{ij} + \beta_l lnY_{ij} + (V_i + U_i)$………………………………………..(4)

Where Li = Labour-use of ith farmer (manday), X_1 = farm size (hectare), X_2 = seed yam (kg), X_3 = depreciation on capital items (₦); Yi = Yam output (kg) from ith farmer; Vi = random variability in the production that cannot be influenced by the ith farmer also known as uncertainty; Ui = deviation from potential labour requirement attributable to labour-use inefficiency. B_0 = intercept; B_k = vector of input parameters to be estimated; B_l = vector of output parameter to be estimated; $i = 1,2,3…n$ *farmers*; $j = 1,2,3…n$ *inputs*

The technical efficiency of labour use for the ith farmer, given the yam output and quasifixed inputs, is defined by the ratio of the stochastic frontier labour use to the observed labour use. The stochastic frontier labour use is defined by the value of labour use if the technical inefficiency effect, U_{it}, was zero (i.e. the farmer was fully efficient in the use of available labour). Given the specifications of the Cobb-Douglas stochastic labour use function in equation (4), the efficiency of labour use is defined by

$Efficiency\ of\ Labour\ use = \frac{f(X_{ij}Y_{ij}:\beta)+V_i+U_i}{f(X_{ij}Y_{ij}:\beta)+V_i} = \exp(U_i)$ …................. (5)

Which indicates that the technical efficiency is no greater than one. The reciprocal of this quantity is exp (U_{it}), which can be interpreted as a measure of the technical inefficiency of labour use.

The second part of the model is the inefficiency effect model and is stated as:

$U_i = \beta_0 + \beta_1 Z_1 + \beta_2 Z_2 + \beta_3 Z_3 + \beta_4 Z_4 + \beta_5 Z_5$……………….……….(6)

U_i= Labour-use inefficiency, Z_1= Educational Status (years); Z_2= Household size (numbers);

Z_3= Farming experience (years); Z_4= Offfarm income (Naira); Z_5= Access to Credit (Yes=1, No=0); $b_0, b_1, b_2,…,b_5$ are the parameters to be estimated. We used the generalized likelihood function, to test for the presence of labour-use inefficiency defined by equation (6):

$$\lambda = -2\ln\left(\frac{H_o}{H_a}\right) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(7)$$

Where, H_0 is the value of the likelihood function for the unrestricted frontier (OLS) while H_a is the value of the likelihood function for the restricted Cobb-Douglas frontier model. Thus, if the calculated ChiSquare is greater than the tabulated ChiSquare at a 5 % degree of freedom, then the null hypothesis is rejected in favour of the alternative hypothesis. The alternative hypothesis has approximately a mixed ChiSquare distribution with a degree of freedom equal to the number of parameters omitted in the unrestricted model if the null hypothesis is true. The parameters of the stochastic frontier labour use model defined by equations (4) and (6) above are simultaneously estimated by the maximum likelihood estimation method using the Computer Programme Frontier 4.1. written by Coelli (1996).

RESULTS AND DISCUSSION

Description of labour use pattern by respondents

Table 1 shows the labour use pattern per hectare by respondents. It shows that 194 man-days of hired labour (i.e., 49.36% of the total labour) were used for yam production Anyiro *et al.,* (2012), who reported that activities. Land preparation required an labour was engaged in land preparation and average of 49 man-days of hired labour weeding compared to other activities. (12.47% of the total) and 31 man-days of Planting Staking and mulching required 65 family labour (7.89% of the total). A total of man-days of hired labour (16.54%) and 86 80 man-days of labour (20.36% of total man-days of family labour (21.88%) labour) was used for land preparation. Also, resulting in 151 man-days of labour (38.42% 35 man-days of hired labour (8.91% of total of total labour). The table also reveals that labour) and 48 man-days of family labour overall, yam farmers used 194 man-days of (12.21% of total labour) resulting in a total of hired labour (49.36%) and 203 family labour 83 (21.12% of total labour) were used for (51.65%) for yam production in the study weeding. Furthermore, 45 man-days of hired area. This implied that an equal proportion of labour (11.45%) and 34 man-days of family family labour and hired labour were required labour (8.65%) resulting in 79 man-days of for yam production among the sampled labour (20.10%) were used for harvesting. farmers. It also reveals that family child The above implied that about a quarter of the labour of 72 man-days (18.32%) and hired available labour is required during each of child labour of 31 man-days (7.89%) making land preparation, weeding and harvesting a total of 103 man-days (26.21% of total activities. This agrees with the findings of labour) were used by the sampled farmers.

Table 1: Description of labour use pattern per hectare by respondents

		Land Preparation	Plantin g	Mulching	Staking	Weeding	Harvesting	Total
Hired labour (Manday)	**Men**	34 (10.3)	12 (9.6)	15 (9.1)	15 (8.6)	30 (19.0)	24 (1.5)	130 (47.8)
	Women	7 (0.0)	3 (0.3)	3 (0.3)	5 (0.3)	2 (0.0)	13 (1.0)	33 (1.9)
	Children	8 (3.4)	3 (0.6)	3 (0.8)	6 (0.9)	3 (0.0)	8 (5.0)	31 (7.3)
	Total	49 (13.7)	18 (10.5)	21 (10.2)	26 (9.8)	35 (19.0)	45 (7.5)	194 (57.0)

Family labour (Manday)	**Men**	12 (9.2)	6 (4.9)	7 (5.8)	10 (6.7)	24 (0.3)	14 (9.1)	73 (26.8)
	Women	9 (8.1)	7 (1.9)	10 (1.3)	5 (0.7)	12 (9.0)	11 (8.3)	54 (21.2)
	Children	10 (5.5)	9 (1.8)	14 (2.5)	18 (3.2)	12 (1.8)	9 (3.0)	72 (12.3)
	Total	31 (22.8)	22 (8.6)	31 (9.6)	33 (10.6)	48 (11.1)	34 (20.4)	199 (60.3)
Total Labour (Manday)	**Men**	46 (19.5)	18 (14.5)	22 (14.9)	25 (15.3)	54 (38.0)	38 (10.6)	203 (93.3)
	Women	16 (8.1)	10 (2.2)	13 (1.6)	10 (1.0)	14 (9.0)	24 (9.3)	87 (23.1)
	Children	18 (8.9)	12 (2.4)	17 (3.3)	24 (4.1)	15 (1.8)	17 (8.0)	103 (19.6)
	Total	80 (36.5)	40 (19.1)	52 (19.8)	59 (20.4)	83 (30.1)	79 (27.9)	393 (117.3)

Note: The figures in parenthesis are the standard deviation.

The reliance of the farmers on child labour of men and women) is inadequately available in 26% is an indication that adult labour (adult the study area. This is in agreement with the

findings of Enete and Amusa (2010) who reported that commercial motorcycle riding has become a more profitable venture for young men in Nigeria these days than farming even in the rural areas of Ekiti State, therefore making labour inadequate for the farmers.

Summary statistics for variables used to determine the Labour use requirement frontier

Table 2 shows the description of the variables used in the estimation of the labour use requirement frontier. It was revealed that an average farmer was in his economic active age (46 years), as recommended by FAO, with the capacity to achieve labour productivity. It also shows that an average farmer had 7.4 years of education. This implies that on average yam farmers in the study are educated enough to be able to receive capacity-building training that can help in efficiency improvement. The household size (six members) of an average farmer implies that there is only limited opportunity for an average farmer to rely on family labour hence hired labour may be needed to complement family labour. Furthermore, average farming experience of 17.74 years indicated that farmers have sufficient experience in yam production to be able to efficiently manage available labour. Farmers who have access to credit and offfarm income are expected to be able to utilise the credit and off-farm income in a way that will improve their labour use efficiency compared to those who don't have access. The table also shows that an average yam farmer had a farm size of 0.51 hectares, planted seed yam of an average of 3497.2 kilograms, employed labour of an average of 200 man-days, capital of an average of 111,159.49 nairas, and produced a yam output of an average of 10037.8 kilograms.

Table 2: Summary statistics for variables used in the labour requirement frontier model

Variables	Mean	Standard Deviation	Minimum	Maximum
Land (Hectares)	0.51	(0.171	0.25	0.90
Seedyam (Kilograms)	3497.20	1119.35	2000	6200
Yam output (Kilograms)	10037.8	3940.92	2200	24000
Capital (Naira)	111159.49	35422.88	66000	210000
Labour (Man-day)	199.62	82.94	100	493
Age (Years)	46	10.36	28	75
Education (Years)	7.4	4.9	0	15
Household size (Number)	6	2.0	1	20
Farming experience (Years)	17.74	9.8	5	46
Off-farm income (Naira)	125701.4	128625.2	5000	720000
Access to credit (1= Have Access, otherwise, 0)				
Extension visits (Number)	3	(5.53)	0	10

Labour requirement frontier and its efficiency

Table 3 shows the significant variables that influenced labour requirements are farm size and seed yam while labour inefficiency is affected by education, household size, farming experience, off-far income and access to credit as evidenced by the plausibility of their respective parameter estimates.

Farm size had a positive effect on the amount of labour used. The positive significance of the farm size was probably due to the fact that labour saving technologies were not available in yam production process in the study area. Hence, the utilization of high labour quantity as most of these farmers also lack economic capital that can substitute for labour. Therefore, high quantity of manual labour is deployed in production. One per cent increase in the farm size led to about 3.87 per cent increase in the amount of labour used for yam production among the sampled farmers. This is in agreement with Sadiq et. al., (2022), Anyiro et al. (2012) and Ezedinma et al. (2000) who also found that farm size influenced labour use positively.

The positive significant effect of seed yam on labour use is probably because high labour was required during the pre-nursery, nursery and actual planting activities in carrying the seed yam (which are usually heavy) and in carrying out daily maintenance activities on seedyam planted until harvesting. The quantity of seedyam planted had a positive influence on the labour used for yam production. One per cent increase in the quantity of seed yam planted led to about 0.79 per cent increase in the amount of labour used. This also agrees with *a prior* expectation because farmers depend on labour to plant.

Table 3: **Estimated labour-use requirement frontier function for Yam production**

Variables	Parameters	Coefficient	Standard-error	T-ratio
Constant	β_0	25.24	3.05	8.27
Farm size	β_1	3.87**	0.82	4.73
Seedyam	β_2	0.79*	0.39	2.04
Yam Output	β_3	-0.12	0.25	-0.50
Capital	β_4	-0.18	0.13	-1.41
Labour-use Inefficiency Model				
Constant	Z_0	7.80	4.28	1.82
Age	Z_1	0.54	0.38	1.44
Education	Z_2	1.19*	0.43	2.78
Household size	Z_3	-2.21*	0.85	-2.61
Farming experience	Z_4	0.88*	0.25	3.57
Off-farm income	Z_5	-0.01**	0.00	-10.91
Access to credit	Z_6	-9.81*	3.18	-3.09
Extension visit	Z_7	-0.03	0.02	1.62
Sigma-squared	σ^2	270.24***	4.27	63.27
Gamma	Γ	0.34***	0.01	37.77
Log-likelihood function			-406.71	
LR test			21.20	

Source: Data Analysis, 2015. *significant at 5%, **significant at 1%, ***significant at 0.1%

The negative insignificant effect of capital shows that capital was not employed in sufficient quantity by the sampled farmers probably because they lack economic capital, labour labour-saving technologies and they were also able to substitute available labour for capital in the production of yam.
Furthermore, the negative insignificant influence of the output coefficient depicts diseconomies of size which did not come as a surprise because most of the farmers cultivated yam on a small-scale basis, and there are not many post-harvest activities in yam production that require much labour use. Thus, an increase in output leads to a decrease in labour requirements.

Moreover, the table revealed that education had a positive effect on labour use inefficiency probably because farmers with higher education had better opportunities to diversify into non-farm activities in order to improve livelihood and hence had less time to monitor available labour to ensure efficiency in yam production. A year increase in the education of the farmers will lead to a 1.19 % increase in labour use inefficiency. This is in agreement with the findings of Anyiro *et al.*, (2012), who reported that yam farmers make more use of unskilled labour and that an increase in education level did not imply an increase in acquisition of skill in yam production. They also reported that the acquisition of higher education simply produced labour for whitecollar jobs hence, the prevalent rural-tourban drift and loss of farmhands led to an increase in costs and a decrease in labour use efficiency in yam farming.

The negative significant influence of the household size coefficient implied that either farmers with higher household sizes were able to mobilise more of the able-bodied household members into the yam farm operation, or that the able-bodied household members who take to non-farm work send remittances to the farmers to pay for hired labour out of the large members and that the weak or young household members were released to do some others off-farm jobs thus affecting farmers' labour inefficiency negatively, unlike their counterpart with lower household sizes who have lower household labour and hence had to include both able-bodied and less able members of their household into farm operations and therefore leading to higher labour inefficiency as their household members increase. Therefore, an increase in a farmer's household by one member will lead to a decrease of 2.2 % in labour inefficiency. However, there is exploitation of dependent household members such as children in the study area. This conforms to the studies of Anyiro (2012) in which household size had a positive impact on labour use efficiency.

The positive significance of the farming experience coefficient probably implied that longevity in yam farming makes experienced farmers to develop complacency to innovative labour-saving technologies, thus affecting their labour efficiency negatively. Therefore, an increase in the farmers' farming experience by one year will lead to an increase in labour inefficiency by 0.9 %. The coefficient of off-farm income had a negative influence on labour use inefficiency. This could be because farmers are able to use the off-farm income to advance labour use and hence efficiency in production. A naira increase in the off-farm income will lead to a 0.01 % decline in the labour use inefficiency of the yam farmers.

Access to credit played a crucial role in decreasing labour use inefficiency probably farmers who had access to credit were able to actually use it to employ labour in the production of yam and not for some other frivolous use thereby increasing labour efficiency. Access to credit will decrease labour inefficiency by 9.8 %. This conforms to the *apriori* expectation that an increase in farmer's access to credit will enhance farmers' labour use efficiency and is in consonance with the study of Simonyan and Obiakor (2012).

Distribution of the Labour use inefficiency of Yam farmers

Table 4 shows that on average, the mean labour efficiency of the sampled farmers is 0.87, implying that an average farmer achieved a labour efficiency of 87 % which is below the defined frontier level of 99 % (Table 4). Besides, an average farmer's labour efficiency fell below the maximum defined efficiency frontier level by 12 %. Thus, it can be inferred that an average farmer lost a potential labour use of 12 % in the production of yam. In other words, 12 % of labour man-days utilized in yam production by average farmers were wasted relative to the best-practised farms facing the same technology and producing the same output. Furthermore, the frequencies of occurrences of the predicted labour efficiency above the average score represent 85 % of the sampled farmers (i.e approximately 84 % of the sampled farmers had labour efficiency of 87 % and above, indicating that an average farmer lost 13 % of his potential labour input to inefficiency), thus implying that most of the farmers (84 %) are fairly efficient in labour utilization at a given level of output using available technology at their disposal while only very few of them (16 %) are fairly inefficient. Also approximately 16 % of the sampled farmers had their efficiency in the range of 4% and 83 %, indicating that at least 17 % of their potential labour input is lost to inefficiency. The best and the worst-practiced farmers achieved inefficiency scores of 0.01 and 0.96 respectively. Therefore, it can be inferred that the best and worst practised farmers lost potential labour inputs of 1 and 96% in yam output due to factors that are within their control. For the best, average and worstpracticed farmers to be on the frontier level they need to increase their labour use efficiency by 1.0, 13.0 and 96 % respectively.

However, for the worst and averagepracticed farmers to be on the same level as the best-practiced farmers, they need to increase their labour efficiencies by 95.96 % {[1-(0.04/0.99)]*100} and 12.12 % {[1(0.87/0.99)]*100} respectively. Generally, most of the farmers (83.8%) were relatively efficient but there still exists an opportunity for them to improve their labour use efficiency (by at least 13%) so as to optimize the allocation of labour resources in yam production.

since farm size and seed yam positively influenced the amount of labour used among yam farmers in the study area and capital can be substituted (to some level) for labour, laboursaving technologies and capital can be deployed. This will relieve the reliance on labour, especially child labour. Therefore, there is a need to provide labour-saving technologies and capital to the farmers in order to substitute for labour in yam production. Also, since the labour-use inefficiency of the farmers in the study area

Table 4: Distribution of the Labour use efficiency of the respondents.

Labour use efficiency range	Frequency	Per centage
0.04 - 0.51	4	4.0404
0.52 – 0.59	6	6.0606
0.60 – 0.67	2	2.0202
0.68 – 0.75	1	1.0101
0.75 – 0.83	3	3.0303
0.84 – 0.91	74	74.7474
≥ 0.92	9	9.0909
Total	99	100
Mean Labour use efficiency	0.87	
Minimum Labour use efficiency	0.04	
Maximum Labour use efficiency	0.99	

CONCLUSION AND RECOMMENDATIONS

The study concluded that although the labour-use efficiency of the sampled farmers ranged from 1 per cent to 96 per cent with a mean of 87 per cent, there is still an opportunity for an average yam farmer to increase labour-use efficiency by 13 per cent. The study, therefore, recommended that

was positively influenced by education and farming experience, It is recommended that farmers with higher levels of education and experience should be targeted for laboursaving technologies rather than allowing them to rely on their experiences and education for improved efficiency.

Furthermore, since the household size, offfarm income and access to credit had a negative influence on labour-use inefficiency, it is recommended that laboursaving technologies should be made available to the farmers with small household sizes, those who have lower off-farm income and those who do not have access to credit.

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