Palm Oil Production as a Poverty Alleviation Strategy among Small-scale Farmers in Ekiti State, Nigeria

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Abstract Palm oil is one of the commodities produced in rural Nigeria whose consumption daily in the human diet and use as an industrial raw material have increased its potentials for income generation and poverty alleviation. This study examined the contribution of palm oil production to income generation among 120 small-scale farmers selected from the farming communities in Ekiti State, Nigeria. Responses to a structured interview schedule were analyzed using frequency counts and percentages while profitability was determined with data provided on costs and revenue. Palm oil producers were mainly middle-aged married females with low literacy level and operated on small-scale farms (< 2 ha) grown mainly to Dura variety of oil palm. Most farmers used modern processing methods (motorized hydraulic pressers and combined hydraulic pressers and nut crackers) and incurred ₦3,000 transportation cost and ₦5,000-10,000 labour cost per processing session. The Gross Margin averaged ₦69,600 between 2008 and 2012 while processing cost was ₦0.57 for every ₦1.00 return. The major challenges are labour shortage and yield variation due to climate change while high costs of labour and processing equipment affected profitability. Farmers should form cooperatives to: pool resources and acquire modern equipment so as to increase scale of operations, reduce extraction cost and enhance revenue; access credit; benefit from training on the use of modern processing machines and education on adaptation to climate change.

Keywords: palm oil processing, profitability, climate change, poverty alleviation, Nigeria

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1. Introduction

Nigeria ranked sixth among the poorest countries in the world with over 70% of the population living below poverty line in 2007 (Central Intelligence Agency, 2012) while 46% lived below $1.25 daily in 2010 (World Bank, 2014). Okonjo-Iweala (2014) noted that Nigeria is one of the five countries in which two-thirds of the world's extreme poor are concentrated; the others are India, China, Bangladesh, and the Democratic Republic of Congo. The poverty in Nigeria is largely rural (poverties.org, 2013) where the effects of macro-economic shocks in terms of fiscal adjustment and monetary policy reforms are felt much more. Thus, whereas poverty is expected to decline by 40% in the urban centers, it would increase by 7% in rural areas which inhabit almost 80% of the population living below the poverty line and depend on agriculture for food and income (International Fund for Agricultural Development, IFAD, 2009). Consistent economic growth and prosperity are central to poverty alleviation and the oil palm industry has been identified as one effective avenue for rural income generation, especially among the women who process and sell palm oil in local and national markets, food security and economic stability (Partnership Initiatives in the Niger Delta, PIND, 2011).

A huge percentage of farmers in Nigeria are small scale farmers. Small-scale farming involves growing crops, at least in part, to be used by an individual family, with farming being a significant source of their livelihoods (Lininger, nd.)Small Scale farming is usually characterized by intensive labour and in most cases, animal traction, limited use of agrochemicals and supply to the local or surrounding markets. Unlike large-scale commercial agriculture, it plays a dual role of being a source of household food security as well as income from sale of surplus. Although some claim small-scale agriculture is less efficient in output as compared to commercial agriculture (Kirsten & Van Zyl, 1998), it is ecologically friendly in that less land is cleared for cultivation, there are less emissions due to less use of fuel-driven machinery and the market is usually local implying less carbon miles (Kutya, 2012).

The oil palm (*Elaeis guineensis*) is the dominant source of vegetable oil consumed in the world (USDA, 2006), in the form of palmoil (mesocarp oil) and kernel oil (seed oil). Palm oil is the main edible vegetable oil produced and consumed in Nigeria where the oil palm tree features regularly in the natural vegetation of the lowland humid to sub-humid areas in a belt that covers almost 24 million

hectares (ha) (Opeke, 2003). Dispersed smallholders harvest fruits from the wild/semi-wild palms and process them to produce 80% of the palm oil output and through which Nigeria accounted for 43% of global palm oil production up till the mid-1960s. The performance has declined such that the annual output at 850,000 metric tonnes (MT) leaves an overall supply gap of 0.5 million MT currently met through imports (Omoti, 2001).

Palm oil production starts with the oil palm trees whose cultivation has formed the farming culture and a means of livelihood for millions of families in the rural landscape. Palm oil production is a major vocation which has played significant roles in poverty alleviation in some countries, especially in Malaysia and Indonesia (BusinessDay, 2013). The huge potentials for generating rural income and providing employment have enabled the poor to be part of the solution to the scourge of widespread poverty.

Ekiti State which lies 5th on the poverty rating in Nigeria is also one of the 24 palm oil-producing states. This implies that the potentials in palm oil production to transform the lives of the small-scale farmers in the rural sector of Ekiti State need to be harnessed. This study was carried out to evaluate the contribution of the palm oil industry to the economic development of the rural inhabitants of Ekiti State. The specific objectives were to

- obtain information on the socio-economic characteristics of palm oil producers and the production techniques,
- Determine the profitability of the palm oil production operations and the effects on livelihood activities.

The study is relevance for policy makers because several efforts made to reduce poverty among women farmers have not yield appreciable result. It is hoped that the strategies to enhance women's income and improve their livelihoods will emerge from the study.

The materials and methods used in the study will be discussed in the next section. This will be followed by the discussion of results as well as the summary, conclusion and recommendations for policy interventions.

2. Materials and Methods

The study was a survey carried out in Ekiti State located in the south-western geo-political zone of Nigeria. Ekiti State (longitudes 4°45'-5°45'E and latitudes 7°15'-8°05' N) has a land mass of 5,434 km^2 that lies south of Kwara and Kogi States, east of Osun State and has eastern and southern boundaries with Ondo State. The population of 2.38 million according to the 2006 census (NPC, 2006) is distributed unevenly in 16 Local Government Areas (LGAs). The state experiences tropical climate with two distinct seasons: rainy season in March/April-October/November and dry season in November-March when the moist south-westerly monsoon winds and dry north-east continental winds blow across Nigeria respectively. Mean annual rainfall varies from 1,250-1,700 mm while the temperature range is 21-28°C. The humid and sub-humid conditions impose natural vegetation that consists of rainforests in the plains and low hills in the southern and central portions and derived savannah and guinea savannah in the northern portion.

The sample for the study was selected through a multi-stage random sampling technique. The first stage involved the purposive sampling of six (6) LGAs renowned for palm oil production: Ekiti South-west, Gbonyin, Ado, Ekiti West, Ikole and Ijero. The second stage involved the random sampling of two (2) communities from each LGA and the final stage was the random sampling of 10 palm oil processors from each community. Thus, a total of 120 respondents were sources of primary data collected with the aid of a structured interview schedule and focus group discussions. Descriptive statistics were used to analyze the socio-economic characteristic of respondents such as age, marital status, level of education, religion, position in class, position in the family etc. Profitability analysis was determined using the following equation:

NFI =GFI [PQ. (Q) –TC (VC +FC)]

where:

NFI - Net Farm Income
GFI- Gross Farm Income
PQ – Price per unit of output
Q- Total Output
TC- Total Cost of production
VC- Variable Cost
FC- Fixed Cost

The net farm income is used in calculating the profitability of palm oil processing because it provides an annual measure of income returned to the farmers from the palm oil processing.

It accounts only relate to the farm business and hence exclude any income that farm operators or their families may receive from other sources (wages and salaries, investment income, etc.). Derivatives of Net Farm Income are used to assess the state of the agricultural industry and to form the basis of various policy options.

3. Results and Discussion

3.1. Socio-economic Characteristics of the respondents

Table 1 shows the social features of the palm oil producers in Ekiti State. Most of the respondents were 41-56 years old and in the United Nation's middle age category which is considered still active and so expected to make substantial contributions to enhance family livelihoods. Women dominated the palm oil processing industry at 70.8%. Akangbe *et al*. (2011) and Adamu *et al.* (2012)had observed that women were more prominent in palm oil extraction activities in Afijio Local Government Area, Oyo State. Similar observations of women's dominance in the production of gaari from cassava in Imo State, Nigeria (Adesope *et al*., 2010), cassava, yam and plantain flour (IITA, 2011), iru from locust bean (*Parkia biglobosa*) Adekunle *et al.* (2014)reinforce the views that decision-making in agro-processing is within the exclusive domain of women. The palm oil producers were mostly married (80%) and the gross earnings in palm oil production were enough incentive to influence and encourage women's choice and devotion to palm oil processing as a vocation with the capacity to boost the welfare of the family. PIND (2011) noted that palm oil production generates personal income for the women who process oil palm fruits into red palm oil for sale in local and national markets. Apart from oil processing, additional occupation was farming (80%) while 15 and

5% preferred petty trading and artisanship respectively. This narrow choice is probably a reflection of the rural environment that offers little prospects except in the utilization of existing natural resources for primary production. Since palm oil production is seasonal, the preference for farming during the off-season would be to cultivate crops, other than oil palm, needed for family subsistence. However, the fairly old women who are naturally weaker and may not have enough agility and strength would be less efficient and productive in farming and palm oil production. The respondents had low literacy level as 57.2% had less than secondary education which would limit opportunities and negatively affect their ability to adopt modern processing techniques that could enhance their productivity.

Table 1. Social characteristics of palm oil producers in Ekiti State

Variable	Frequency	Percentages
Age		
<41 years	22	18.3
41-45	16	13.3
46-50	35	29.2
51-56	35	29.2
>56 years	12	10.0
Gender		
Male	35	29.2
Female	85	70.8
Marital status		
Single	14	11.7
Married	96	80.0
Widowed	10	8.3
Educational status		
No formal Education	15	12.5
Primary Education	54	45.0
Secondary Education	28	23.3
Tertiary Education	23	19.2
Primary occupation		
Farming	96	80.0
Trading	18	15.0
Artisan	06	5.0

Source: Data Analysis, 2014

3.2. Characteristics of the farms and methods of palm oil production in Ekiti State

Figure 1 shows that 33.3, 52.5 and 14.2% of the palm oil processors had household sizes of 3-5, 6-9 and 10 and above respectively. Similar observation was made by Adebo (2014) of farmers producing yam, cassava, maize and rice in Kwara state, Nigeria. Thus, the households of most of the palm oil producers in Ekiti State are large and so are sources of family labour which would reduce the cost of processing palm oil and the additional farming activities during the off-season. However, a large family labour would also imply huge expenditure on basic needs of the family and the inability to meet these exacerbates the household poverty level.
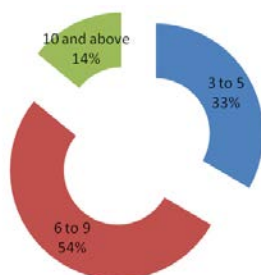

Figure 1. Household size of palm oil producers in Ekiti State Source: Data Analysis, 2014

Male-headed families constituted 79.2% of the respondents (Figure 2). The proportion of female-headed households (20.8%) is sizeable and worth noting as the target of poverty alleviation. IFAD (1999) observed that development initiatives have often tried to direct resources and services to female-headed households on the assumption that they were poorer than men-headed households, suffer more in getting production resources (land and credit facilities) and less able to improve their situation without special help.
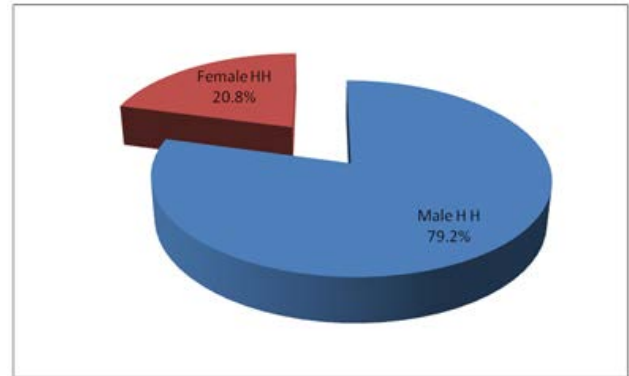

Figure 2. Proportion of palm oil producer households headed by males and females

Source: Data Analysis, 2014

Table 2. Characteristics of the farms and methods of palm oil production in Ekiti State

Variable	Frequency	Percentages
Types of land use/Sources of Fruits		
Owned lands	26	21.7
Husband's farms	56	46.6
Rented farms	38	31.7
Farm size		
< 2 hectares	109	90.8
2-5 hectares	11	9.2
Farming experiences		
1-5 years	16	13.3
6-10years	62	51.7
10-15 years	38	31.7
>15 years	04	3.3
Types of labour utilized		
Family	90	75.0
Hired	15	12.5
Both family and hired labour	15	12.5
Varieties of Oil palm planted		
Dura	74	61.7
Tenera	31	25.8
Pisifera	15	12.5
Production techniques utilized		
Local method	42	35.0
Modern method	34	28.3
Both local and modern methods	44	36.7
Types of machines utilized		
Lacerator/ bunch thresher	20	16.7
Motorized hydraulic press	50	41.6
Palm nut cracker	42	35.0
Mortar and Pestle	10	8.3
Combined digester	44	36.7

Source: Data Analysis, 2014

The characteristics of the palm oil production systems in Ekiti State are shown in Table 2. Oil palm farms were owned by 21.7% of the respondents, 46.7% harvested oil palm fruits from their husbands' farms and 31.7% paid annual rents on the oil palm trees existing on the farms. The high proportion obtaining palm fruits from husband's farms and on rented palms confirms the division of the roles of the sexes that consign the cultivation of oil palm

trees to men. Enete and Amusa (2010) had noted the fewer roles of women in decision-making in male-dominated cash crop environments like cacao- kola-oil palm agroforestry households. The traditional rights of land ownership and inheritance favour the male children who allocate the tree cash crops to the best lands. Thus, women lack access to resources and property rights and so would be unable and unwilling to expand oil palm farm sizes and increase output. This is unlike the cultivation of short-duration arable crops where their numerical strength has ensured substantial presence (von Braun *et al*., 2004). These crops are not too soil-exacting and can be grown in farms of various sizes and in mixtures with the tree cash crops, especially oil palm.

The palm oil producers operated on small-scale farms with 90.8 and 9.2% owning <2 and 2-5 ha respectively. Ibitoye *et al*. (2011) reported that 77% of oil palms were cultivated on <10 ha holdings in Ondo State. These are part of the atomistic producers whose operations cover 2.4-3.0 million ha of wild and semi-wild groves with scattered and low-density oil palms but which account for 80% of palm oil output in Nigeria (PIND, 2011). Dura variety was the dominant oil palm found in the multi-storey cropping systems with arable and tree cash crops or as part of the natural forest vegetation re-growth during the ensuing fallow. The improved Tenera variety had limited planting (25.8%) despite being promoted for good qualities which include short stature and high fruit yield (Food and Agriculture Organization, FAO, 2002). Even then, the palms were probably grown in the existing traditional arable and tree crop production systems and not strictly in oil palm plantations. Besides, they were not planted to replace the existing local Dura variety which the farmer would be reluctant to cut down as has been observed in the non-adoption of the recommended cut-and-burn practice to control of cocoa swollen shoot virus (Opeke, 2003). Since 86.7% had more than 6 years' farming experience and about half of this was for over 10 years, it is expected that the years of involvement would translate to improved practices and palm oil productivity to the extent allowed by the low educational status.

The use of traditional practices in palm oil production (35%) was more than improved methods (28.3%) but 36.7% combined both methods. There are no large oil mills with modern and advanced technology in which the production process is automated but the components of improved palm oil processing: motorized hydraulic press, palm nut cracker and combined digesters were used by 41.6, 35.0 and 36.7% of the respondents respectively. These are improved version of the traditional practices which Adamu *et al.* (2012) referred to as intermediate technology that consisted of the use of some machines and extraction of oil with hydraulic presses. Akangbe *et al*. (2011) outlined nine steps in palm oil production and observed that oil extraction involved predominantly traditional practices except where digesters were used. These indigenous extraction methods are crude, labour-intensive and inefficient and so give low yields and quality *(*Oke, 2002).

3.3. Estimate expenditure and revenue from palm oil production for five years

Estimated expenditure in the last five years (Table 3) shows that Annual Total Costs (ATC) increased from ₦124.000 in 2008 to ₦172,000 in 2011 but reduced to ₦109,000 in 2012. Annual Total Revenue (ATR) also increased from 2008 to 2011 and declined in 2012 such that the Gross Margin (GM) was ₦51,000, 65,000, 43,000, 103,000 and 86,000 respectively in 2008, 2009, 2010, 2011, and 2012 respectively (Table 3). The cost of family labour is included in the total variable cost, and this is based on the average cost paid for hired labour in the study area. It should be noted that the majority of the palm oil processors derived their palm oil from inherited land or their husbands farm, while those that rented farmland Thus, the production of palm oil was profitable every year but the profit margin derived from a unit of palm oil produced varied probably due to changes in climate witnessed in the study area.

Table 3. Estimate expenditure and revenue from palm oil production for five years

Average	2008	2009	2010	2011	2012
ATR	175,000	195,000	205,000	275,000	195,000
ATC	124,000	130,000	162,000	172,000	109,000
GM	51,000	65,000	43,000	103,000	86,000

ATR= Annual Total Revenue
ATC= Annual Total Costs
GM= Gross Margin = Profit = ATR-ATC
Source: Data Analysis, 2014

Adebo and Sekumade (2013) had observed the features of climate change asunusual and erratic rainfall and earlier cessation of rainswhile the alterations in the cropping calendar and unprecedented planting pose challenges of pest and disease outbreak, crop failure and low yields with attendant hunger, food insecurity and reduced farm income among farmers in Ekiti State.

3.4. Profitability Analysis of Palm Oil Processing

Table 4. Returns on output in palm oil production by smallholder operators in Ekiti State

OUTPUT Palm oil	VALUE ((₦)
Quantity Q(=480 cans of 25 liter each)	1,920,000.00
Price (PQ)= ₦4,000)	
Palm kernel (un-cracked)	18,600.00
Palm kernel (cracked)	23,500.00
Sludge	2,300.00
Total Gross Farm Income	1,964,400.00

Source: Data Analysis, 2014

The profitability analysis of palm oil processing is shown in Table 4. The total quantity of palm oil produced by the 120 processors was estimated at 480 cans of 25 liters each, selling at the rate of ₦4,000 per can. Therefore, from the equation of profitability:

Q = 480 cans/25liters and PQ = ₦4,000 and giving NFI = GFI-TC,

NFI = ₦1,964,400.00 -1,127,864.41 = ₦836,535.59

Net return =₦836,535.59.

Return per Naira =NFI÷TC

Return per Naira =₦ 836,535.59/₦1,127,869.41

Return per Naira =0.742 = 74.2%

Gross Ratio (GR) = TC/GFI

GR =₦1,127,864.41/₦1,964,400.00=0.57

This implies that from every ₦1.00 return to palm oil processing ₦0.57 is being spent. This shows that palm oil

processing is profitable in Ekiti state. Ibitoye (2014) also affirms the profitability of palm oil marketing in Dekina Local Government of Kogi state, Nigeria. The study confirms the ability of palm oil processing to alleviate poverty among small scale farmers in Nigeria. The implication of this is that poverty alleviation strategies designed for rural women farmers by Government, NGO or Private Organizations should focus on improving palm oil processing techniques to enhance women's livelihoods.

3.5. Benefits Derived from Palm oil Production

Table 5 shows the benefits derived from palm oil production. All the respondents indicated that they generate income from palm oil production; 95.8% were gainfully employed through palm oil production; 75.0% were able to improve their standard of living while 66.7% indicated ability to meet basic needs. It could be said that palm oil processing has brought about improvement in the income and standards of living of the respondents.

The implication of the findings is that if more women are encouraged to process palm oil, their income and standard of living will be enhanced, thus serving as one of the strategies for poverty reduction among the rural women farmers. This corroborated the assertions of Fapojuwo (2010) Adekunle *et al.,* (2014) that cassava and locust bean processing contribute significantly to women's income and standard of living.

Table 5. Distribution of Benefit Derived by the Respondents

Benefit Derived	Frequency	Percentage*
Income Generation	120	100
Employment	115	95.83
Improve Standard of living	90	75.0
Meeting basic Needs	80	66.67

*Multiple responses
Source: Data Analysis, 2014

4. Summary, Conclusions and Recommendation

The study was carried out to assess the significance of palm oil production to poverty alleviation among small scale farmers in Ekiti State, Nigeria. The data collected from 120 respondents to a structured questionnaire were analyzed as frequency counts and percentages while profit margin was determined. Findings show the dominance of married women who were relatively young and with low educational standard in palm oil production. The households were large in size which probably ensured availability and utilization of family labour for operations on the small-sized farms (<2 ha) that contained Dura variety of oil palm. Palm oil production involved use of components of the modern processing method which consisted of motorized hydraulic pressers and combined hydraulic pressers and nut crackers but combined the local and modern methods of processing. There are no large oil mills with modern and advanced technology in which the production process is automated. The Gross Margin (GM) from palm oil processing averaged ₦69,600.00 between 2008 and 2012 but was highest in 2011 (₦196,000.00). Profitmargin from a unit of palm oil produced varied and showed that ₦0.57 was spent for every ₦1.00 return to palm oil processing. Benefits derived from palm oil production include increased income, employment generation, improved standard of living and ability to meet the basic needs of the farmers. Thus, palm oil production is highly profitable and has the ability to improve the standard of living of the farmers, thus bailing them out of poverty

The following recommendations are made:

- farmers should be encouraged to increase their scale of production through the adoption of modern processing techniques
- The use of large oil mills with modern and advanced technology in which the production process is automated should be by the Government agencies, NGOs and private interventions. This should be accompanied by training programmes on its effective utilization.
- Poverty alleviation strategies designed for rural women farmers by Government, NGO or Private Organizations should focus more on improving palm oil processing among women farmers

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