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Poverty Profiles and Technical Efficiency Nexus: A Case Study of Women Entrepreneurs in Oyo State, Nigeria

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ABSTRACT

The study determined the poverty profiles and technical efficiency of women entrepreneurs in cassava processing in Oyo State, Nigeria. Data were obtained from primary source using a set of structured questionnaire assisted with interview schedule. The multistage sampling technique was used. Data were analyzed using: descriptive statistics, Foster – Greer Thorbecke (FGT) and Stochastic Frontier Production Function Analysis (SFPF). Farm level survey data were collected from 105 women cassava processors. The results revealed that 64.8 percent of the women entrepreneurs in the study area were poor and would need 16.1 percent of 1US Dollar (₦160) per day to escape poverty. It was also revealed that poverty incidence was noticed among women entrepreneurs between age ranges 40 – 49, most of them (61%) had a large household size with 4 – 6 members and (95.2%) had low educational level. Results further showed that cassava processing enterprise was in the stage of inefficient production (stage I) as shown by the Returns to Scale (RTS) of 1.264. The variables such as cost of raw material, operating expenses and energy were effectively allocated and used, as confirmed by each variable having estimated coefficient value between 0 and 1. The Technical Efficiencies of the women entrepreneurs varied between 0.637 and 0.994 with a mean of 0.888. The analysis of the inefficiency model revealed that poverty level, method of processing and source of raw material were positive indicating that all these factors led to decrease in technical efficiency of cassava processing enterprise in the study area. The study recommends that to increase the efficiency of the women cassava processors, policies that would promote poverty alleviation, improve education and boost income should be adopted.

Keywords: Cassava Processing, Poverty Profiles, Women Entrepreneurs, Technical Efficiency.

INTRODUCTION

Poverty can be chronic or transitory depending on how long poverty is experienced by an individual or a community. Poverty is the situation of lack of access to resources needed to obtain the minimum necessities required to maintain physical efficiency. Relative poverty, on the other hand, is the inability to maintain a given minimum contemporary standard of living (Okunmadewa *et al*., 2005).

Poverty has been persistent in Nigeria (Ajakaiye and Adeyeye, 2001) and it is one of the most serious manifestations of human deprivation and is inextricably linked to human development. Again it is a plague afflicting people all over the world and it is considered one of the symptoms or manifestation of underdevelopment (Akerele and Adewuyi, 2011).

Recently, Food and Agriculture Organization, FAO (2010) reported that nearly 870 million people were suffering from chronic undernourishment between 2010 and 2012 in which majority are living in developing countries. These global statistics of hunger and undernourishment is alarming, as such eradication of hunger remains the major global challenge facing both developed and developing countries, but the task is enormous in later. The major task facing the world today is the feeding of ever-increasing population of over 7 billion people subject to climate change and natural resource constraints (FAO, 2010).

Nigeria has one of the world's highest economic growth rates, averaging 7.4 percent over the last decade (a developing economy with plenty of natural and human resources), yet it retains a high level of poverty with about 63 percent living on below $1 daily (African Development Bank (ADB), 1999).

In Nigeria, the incidence of poverty has been on the increase, the poverty rate stood at 69 percent and about 112.5 million Nigerians live in relative poverty conditions (National Bureau of Statistics (NBS), 2010).

The relationship between technical efficiency and poverty in Sub – Saharan Africa has been well established in the literature (Spencer, 2002). It is revealed that while the proportion of the population living in poverty in smallholder farming is on the decrease in Asia, the proportion has increased in Sub – Saharan Africa in which Nigeria is inclusive mostly especially among women (Apata *et al*., 2009).

Women entrepreneurship has been recognized as an important untapped source of economic growth. Women entrepreneurs create jobs for themselves and others and by being different also provide society with different solutions to management, organization and business problems as well as the exploitation of entrepreneurial opportunities (Organization for Economic Co –operation and Development (OECD), 2000).

Estimate of the economic impact of women entrepreneurship shows that there are more than 821,000 women entrepreneurs in Canada and they contribute to an excess of $18 109 billion (Canadian dollar) to the economy annually. Between 1981 and 2001, the number of women entrepreneurs increased 208 percent compared with a 38 percent increase for men (Harper, 2003). In Nigeria, women see cassava processing as a business and means of generating income to meet end means. The issue of poverty situation, that is, the socio – economic characteristics of the women entrepreneurs will provide insight to some information as regards poverty. Therefore, this study critically looked into the poverty profiles as well as technical efficiency of women entrepreneurs in cassava processing enterprise in Oyo state, Nigeria with the view to providing recommendations for policy formulation that could help alleviate poverty hence improve their standard of living.

LITERATURE REVIEW

Women Entrepreneurship, Poverty and Productivity

Women entrepreneurship

Entrepreneurship is an idea or vision which a woman can explore and optimize for profit in business. This would also help her to create new jobs and economic empowerment among her fellow beings. Across the globe, generations of women from different backgrounds show very encouraging sign of entrepreneurial spirit. It is believed that at all levels; there is the need to provide an environment in which this spirit may flourish (Kumar *et al*., 2013). Over 200 million women are employed across all industrial sectors, with half of this number in developing countries (Gem report, 2007).Women entrepreneurs are forced to take entrepreneurship in the absence of any other means of contributing to family income (Delmar, 2000). Most times, family support and encouragements are the highest facilitating factors which help women to aspire entrepreneurship (Pillai and Anna, 1990). Women's reasons for starting business are not always driven by positive factors, but also driven by negative circumstances such as low family income, poverty, lack of employment opportunities and dissatisfaction with a current job or the need for a flexible work (Robinson, 2001). These factors tend to be most predominant among women within developing economies (Dhaliwal, 1998). The number of female entrepreneurs is increasing as is their importance in society. This is true around the world that is undergoing transition economies, where it has resulted in reflective and dramatic economic, political and social changes (Aidis *et al*., 2007; Ramadani *et al*., 2013). Tambunan (2009) opined that in Asian developing countries SMEs are gaining overwhelming importance; more than 95% of all firms in all sectors on average per country. The study also depicted the fact that representation of women entrepreneurs in this region is relatively low due to factors like low level of education, lack of capital and cultural or religious constraints; whereas women comprise half of human resources. They have been identified as key agents of sustainable development and women's equality is as central to a more holistic approach towards establishing new patterns and process of development that are sustainable. Lipi (2009) also found out that the contribution of women and their role in the family as well as in the economic development and social transformation are pivotal. Women constitute 90 per cent of total marginal workers in India. Rural women who are engaged in agriculture form 78 percent of all women in regular work (Prabha, 2009). Women who are mostly rural based, play a vital role in farm and home system; thereby contributing substantially in the physical aspect of farming, livestock management, post-harvest and allied activities.

Poverty

The definition of poverty vary with its targets, be it individual, community, a country or region. Odusola (1997) identifies causes of poverty in developing countries as less attention being paid to social welfare programmes; lack of access to physical assets such as land and credit to the poor and rural areas are poorly developed while the urban areas are well developed. Various poverty alleviation programmes have been introduced at all levels of Government (Federal, State and Local) such as National Directorate of Employment (NDE), Small and Medium Enterprises Developing Agency of Nigeria (SMEDAN), National Poverty Eradication Programme (NAPEP). Through this programme both rural and urban poor communities are targeted and assisted with the provision of credit and other productive assets so as to improve their standard of living. All these life changing programmes put in place by the Government were aimed at alleviating poverty and changing the status quo of such a community. The extent of poverty in a country or region can be measured using absolute or relative indicators.

Poverty in Nigeria means that an estimated 64% of the population lives on less than US$1 per day: as such, poverty reduction and productivity is a key issue. The vast majority of Nigerians (73%) rely on agriculture as the source of their livelihood, particularly in rural areas. Women run their own enterprises but their socio – economic contributions remain unrecognized. They operate in informal, micro – size industries, low productivity coupled with high poverty rate (Organization for Economic Cooperation and Development, 2012).

Fisher and Weber (2005) use the Panel Study of Income Dynamics to develop measures of asset poverty for metro and non - metro areas. They found out that residents of central metropolitan counties are more likely to be poor in terms of net worth, but that non - metropolitan residents are more likely to be poor in terms of liquid assets. Rural people tend to have non-liquid assets, such as homes that they may not be able to convert to cash in times of economic hardship. Urban people, on the other hand, do not appear to be as able to accumulate non-liquid assets, but may be better in withstanding short-term economic disruptions. Streeten (1989) showed that in measurement of poverty, counting the number of people that fall below the poverty line and finding the ratio of these to the total population give what is regarded as the headcount ratio. This ratio does not indicate how far the poor are below the poverty line and how poverty is distributed among them. In addition to headcount ratio, income gap measure called income gap ratio was introduced to show the difference between the poverty line and the mean income of the poor, expressed as a ratio of the poverty line. The measure shows the amount of money it would take to raise the income of the average poor person up to the poverty line. This measure fails to capture concern for the poorest of the poor. It shows the depth of poverty. In order to supplement the head count ratio with measures that are sensitive to the depth and intensity of poverty, a set of indices was developed. Foster, Greer and Thorbeeke (1984) introduced the set of indices called FGT class of measures which took into consideration the depth and intensity of poverty. FGT class of measures overcomes several limitation of other measure.

Productivity

Performance is one of the key goals of the business operations of all firms. Performance includes the different meanings of efficiency and effectiveness. Efficiency measures the level of achieving goals. The greater calculable quantity and value from production and service are, the better the efficiency is, without considering the consumption of resources. However, efficiency is measured by the concept of relative investment and production. Efficiency refers to the minimization of resource costs to achieve specific business operational goals, with the maximization of output using optimal resource allocation. Productivity analysis can be used to assess profit and nonprofit business performances. The application of the concept in Agricultural businesses can assess the sector's productivity. The measurement and analysis of the productivity of an agricultural firm lie in measuring resource use efficiency, assessing the developmental plan implementation efficiency of the firm, confirming the growth sources of the firm as well as using productivity analysis to create production plans for Agricultural business. Lee& Fan (2010) discussed the business performance of Taiwan's banking industry from 2004 to 2008 using the technical efficiency and productivity indicators proposed by Luenberger. The empirical results suggested that the inefficiency value of Taiwan's banking industry tended to gradually decline over the years, along with the fading dual-card banking crisis; however, the changes in productivity were mainly deterioration. Ojo *et al.* (2006) using stochastic frontier production function examined the profitability and technical efficiency of artisanal fisheries production in Nigeria. The study showed that production and productivity were low and the scale of returns was in the inefficient stage of the production surface. There was technical inefficiency effects in the production that accounted for about 82.7 percent of the variation in the output of the fish caught.

Women Entrepreneurship, Poverty and Productivity Nexus

Female entrepreneurship can be divided into two categories: the traditional generation of entrepreneurial women, concentrated around businesses involving agricultural products, processing and marketing which require skills and experience to operate their enterprises; while, the modern generation more actively involved in businesses are more oriented towards making profit and creating new markets as well as result oriented (Gawel, 2013). Women entrepreneurship is becoming gradually popular across the globe. The participation of women is progressively being observed as one of the major contributors in economic growth. Regardless of their involvement in small or medium scale enterprises or in the informal or formal sectors, their contribution to output and value addition is considerable (Singh and Belwal, 2008). Women entrepreneurship is not only necessary for their economic survival but also for strengthening the social system, value addition, poverty reduction and productivity (Singh and Belwal, 2008).

RESEARCH METHODS

The study area is Oyo State, Nigeria. The study area has a tropical wet and dry climate. The wet season runs from March through October. The mean total rainfall is 1420.06mm, mean maximum temperature is 26.46^{o}C and relative humidity is 74.55%. The city is a major Centre for trade of cassava, cocoa, cotton and palm oil. It has a

land area of 10,986 mi² (28,454 km²) with total population of 5.592 million (NBS, 2010). It coordinates 7°23'47'N 3°55'0'E. The people are the Yorubas and have very rich cultural heritages.

The study was based on cross sectional data collected from women entrepreneurs in cassava processing from Oyo State using a multistage sampling technique. The first stage was the purposive selection of the State because of the preponderance of cassava farmers, products and processors in the state. The second stage was the random selection of three Local Government Areas (LGAs) and the selection of two villages per LGA and finally, a simple random technique was used to select twenty women entrepreneurs in cassava processing per community. The sample size was 120 but only 105 respondents presented analyzable data.

Analytical Techniques

The data collected were analyzed using descriptive statistics such as frequency distribution and percentages to examine the socio – economic characteristics of the respondents, Foster – Greer Thorbecke (FGT) was used to analyze the extent and level of poverty among women entrepreneurs in cassava processing and stochastic frontier production function analysis to analyze productivity and the technical efficiency of cassava processing enterprise in the study area.

Model Specification*:*

(a) The FGT poverty index is given by: $P\alpha\ (y,z) = \frac{1}{n}\sum_{i=1}^{q}\left(\frac{z-y_i}{z}\right)\alpha$

where:

Pα = Foster Greer and Thorbecke index ($0 \leq P\alpha \leq 1$)
n = the total number of women entrepreneurs in cassava processing
y = Annual per capita expenditure of women entrepreneurs
z = The poverty line (1 US Dollar per day (₦160)~365USD per annum (₦58,103)
α = the degree of concern for the depth of poverty (value of 0, 1 and 2)

(i) When α = 0, it measures poverty incidence or headcount, that is, the proportion of the population that is poor or those that fall below the poverty line

$$P_o\left(\frac{1}{n}\right) q = \frac{1}{n}$$

(ii) when α = 1, it measures the depth of poverty or poverty gap, that is, the proportion of the poverty line that an individual below the poverty line requires to attain the poverty line.

$$P_1 = \frac{1}{n} Ð \frac{(z-y)}{z}$$

(iii) When α = 2, it measures the severity of poverty; that is how severe poverty is.

For this study, the widely used 1 USD (₦160) per day which is equivalent to $365 per annum was used as the poverty line.

$$P_2 = \frac{1}{n} Ð \frac{(z-y)^2}{z}$$

(b) The stochastic frontier production function model is specified as:

$$Yi = f\ (Xa; \beta j\ ) + (\ Vi - Ui)$$

Where Y is output (₦), Xa denotes the actual input vector, β is the vector of production function parameters and εi is the error term that is decomposed into two V and U. V is normally and identically distributed with mean zero and constant variance (σ_v^2). It captures the white noise in the production, which is due to factors that are not within the influence of the producers. It is independent of U. The U is a non- negative one sided truncation at zero with the normal distribution (Battese and Coelli, 1996). It measures the technical inefficiency relative to the frontier production function, which is attributed to controllable factors (technical inefficiency). It is half normally, identically and independently distributed with zero mean and constant variance (σ^2).$_u$ The variances of the random errors ($\sigma^2 v$) and that of the technical inefficiency effects (σ_u^2) and overall model variance (σ^2) is related thus: $\sigma^2 = \sigma_u^2 + \sigma_v^2$ and the ratio, $\sigma^2 v = \sigma_u^2 / \sigma^2$ is called gamma. It measures the total variation of output from the frontier, which can be attributed to technical inefficiency (Aigner *et al*, 1992). The Technical Efficiency (TE) of an

individual firm is defined in terms of the observed output (Yi) to the corresponding frontier output (Yi*). The Y* is maximum output achievable given the existing technology and assuming 100% efficiency. It is denoted as:

$$Yi^* = f(Xib) + Vi, \text{ that is,}$$

$$TE = Yi \ / \ Yi^*$$

$$TE = \frac{f(Xib) + Vi - Ui}{f(Xib) + Vi}$$

and that $0 \leq TE \leq 1$.

Model specification: The production technology of the women entrepreneurs in cassava processing was assumed to be specified by the Cobb – Douglas frontier production function (Tadesse and Krishnamoorthy, 1997) which is defined by:

$$\ln Yi = \beta o + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \beta_5 \ln X_5 + \beta_6 \ln X_6 + Vi - Ui$$

Where Y = Revenue from cassava processing in naira
X_1 = Cost of Raw material
X_2 = Depreciation
X_3 = Labour (Man – days)
X_4 = Operating expenses (naira)
X_5 = Energy (naira)
X_6 = Age (years)
V_i = random error assumed to be independent of U_i. Identical and normally distributed with zero mean and constant variable N $(0, \sigma v^2)$.
U_i = Technical inefficiency effect which is assumed to be independent of V_i, they are non – negative truncation at zero or half normal distribution with N $(0, \sigma u^2)$
$\beta_j = \sigma v, \sigma u, \sigma$ are unknown scalar parameters to be estimated

The inefficiency model (U_i) is defined by:

$$Ui = \delta o + \delta_1 Z_1 + \delta_2 Z_2 + \delta_3 Z_3 + \delta_4 Z_4 + \delta_5 Z_5 + \delta_6 Z_6$$

Where Z_1, Z_2, Z_3, Z_4, Z_5, and Z_6 represent education (years spent in school), experience (years), poverty level (poor = 1non – poor = 0), membership to cooperative, processing method (local = 0 modern = 1) and source of raw material (farmers = 0 otherwise = 1) respectively. These socio – economic variables were included in the model to indicate their possible influence on the technical efficiencies of the women entrepreneurs in cassava processing. The βs and δs are scalar parameters to be estimated.

The estimates for all the parameters of the stochastic frontier production function and the inefficiency model are simultaneously obtained using the program FRONTIER VERSION 4.1c (Coelli, 1995).

RESULTS AND DISCUSSION

Socio – economic Characteristics of Women Entrepreneurs in Cassava Processing

Table 1 reveals the socio – economic characteristics of the sampled women entrepreneurs. The results revealed that over 75 percent of the women entrepreneurs in cassava processing were under 50 years old and that the average age was 42 years, while majority of them (36.0%) were in the age bracket 40 – 49 years. This implies that the women entrepreneurs in cassava processing were relatively young who were still within the economically active age. This is in line with the findings of Suleman (2012) on factors influencing adoption of improved cassava processing technologies by women processors in Edo State. (78.1%) of the women entrepreneurs were married; indicating that most of the respondents were matured and able to take care of their households. The average years of experience in cassava processing was 11 years which revealed that they were highly experienced. The average number of years spent in school was five years; while about 95.2 percent of the women entrepreneurs in cassava processing had less than secondary school education. This indicates that the level of education by the women entrepreneurs was low and this could have implication for adoption of modern technologies of cassava processing which is agreed on. The study also revealed that, the respondents processed cassava into various products, these were; Gari, Starch, Fufu, lafu and Pupuru as well as combined production. This is seen as a way

of generating more income as a means of alleviating poverty which is in line with (Ruben and Vanden-Berg, 2001) on Non – farm employment and poverty alleviation of rural farm households in Honduras.

Table 1: Socio – economic characteristics of women entrepreneurs in cassava processing

Processors Characteristics	Frequency	Percentage
Marital Status		
Single	5	4.8
Married	82	78.1
Widowed/divorced	18	17.1
Age (years)		
< 30	10	9.7
30 – 39	30	29.0
40 – 49	38	36.0
50 – 59	20	19.3
above 60	7	6.0
Education (years)		
No formal Education	17	16.1
Incomplete Primary Education	26	24.8
Complete primary Education	31	29.5
Incomplete Secondary Education	26	24.8
Complete Secondary Education	5	4.8
Household Size		
1 – 3	10	9.6
4 – 6	64	60.9
7 – 9	29	27.6
10 and above	2	1.9
Processing experience (years)		
1 – 5	23	22.0
6 – 10	50	47.5
11 – 15	12	11.5
16 and above	20	19.0

Source: Computed from field survey, 2013

Poverty Line

Poverty line is the level by which poor is differentiated from non – poor households in relation to their level of welfare. Lipton (1983) and Levy (1991) used expenditure approach method to determine the poverty line while Yunez – Nuade and Taylor (2001) used income approach. This study used the expenditure approach method to set the poverty line based on 1 US dollar per day equivalent to ₦160 per day or 365USD (₦58, 103) per annum. Out of one hundred and five women entrepreneurs 36 percent were non – poor.

Level of Poverty among Women Entrepreneurs in Cassava Processing in the Study Area

The result of the poverty profile of the women entrepreneurs by socio – economic characteristics in the study area is presented in Table 2. On the aggregate, the head count ratio that is, poverty incidence was 0.6476. This means that 64.8 percent of the women entrepreneurs covered by the study in Oyo state area were poor based on the poverty line definition. It revealed that poverty incidence was most noticed among women entrepreneurs who were between age ranges 40 – 49, those married, household size with 7 to 9 members; the situation might be worse if there are more dependents who do not contribute to the household income. The ability of household members to be financially independent and earn income is essential to poverty reduction. Also, poverty incidence was noticed among those that have processing experience between 1 – 5 , the educational level of the women entrepreneurs reveals poverty reduces with improved educational level. The role of capacity building and human capital development in eradicating poverty cannot be over emphasis. Education equips the people with information and new technologies that are necessary for enhancing economic activities (Oniang'o and Makudi, 2002).

The value P_1 (poverty depth) of the socio economic characteristics of the women entrepreneurs in cassava processing was 0.1608, implying that the poor women entrepreneurs required 16.1 percent of the poverty line to get out of poverty. Also, the poverty depth was noticed among poor women cassava processors

that were married, within the age ranges of 40 – 49; having household size of 4 – 6 members with 1 – 5 years of cassava experience and could not complete their primary education having 0.136, 0.058, 0.107, 0.101 and 0.048 respectively of the poverty line to get out of poverty.

The P_2 (poverty severity) across the sampled entrepreneurs was 0.0537, indicating that the poverty severity of poor women entrepreneurs in cassava processing was 5.4 percent. The result was lower than what Igbalajobi *et al.* (2013) found out in their study carried out among rural farmers in Ondo State, Nigeria that poverty severity was 16.3%. From the findings, it could be inferred that there is the existence of poverty among the women entrepreneurs in the study area and it is time solution is proffered to alleviate poverty among those in cassava processing.

Table 2: Poverty profile among women entrepreneurs by Socio – economic characteristics in Oyo state, Nigeria

Socio economic characteristics	P_o – Poverty incidence	P_1 – Poverty depth	P_2 – Poverty severity
Age (Yrs)			
< 30	0.029	0.003	0.001
30 – 39	0.191	0.050	0.017
40 – 49	0.248	0.058	0.019
50 – 59	0.171	0.044	0.014
60 and above	0.010	0.006	0.004
Household size			
1 – 3	0.017	0.014	0.006
4 – 6	0.180	0.107	0.025
7 – 9	0.318	0.009	0.003
10 and above	0.133	0.031	0.019
Experience (Yrs)			
1 – 5	0.381	0.101	0.032
6 – 10	0.152	0.032	0.011
11 – 15	0.071	0.016	0.005
16 and above	0.043	0.013	0.006
Marital status			
Single	0.009	0.001	0.000
Married	0.524	0.136	0.047
Widow/Divorced	0.114	0.024	0.007
Education (Yrs)			
No formal	0.114	0.033	0.013
Incomplete Primary	0.191	0.048	0.015
Complete primary	0.133	0.037	0.012
Incomplete secondar.	0.191	0.039	0.012
Complete secondary	0.019	0.004	0.002

Source: Computed from field survey, 2013

Summary Statistics of Variables of Stochastic Frontier Model

The summary statistics of variables used in the stochastic frontier production function estimation is presented in Table 3. The study revealed that, the mean revenue of cassava processing was ₦739614.8 which when compared to the mean cost of raw material ₦25617.54 showed that cassava processing was profitable in the study area. The women entrepreneurs were relatively young with mean age of about 43 years and with 10 years standard deviation. They were highly experienced with 10 years of processing experience. This showed that the women entrepreneurs have been in the enterprise for a long time and know the technicalities of the enterprise. This finding is in line with Ojo (2005) on productivity and technical efficiency of palm oil extraction mills in Nigeria that the average age of the mill owners was 47 years, large household size and average of seven years of experience in operating the mills.

Table 3: Summary statistics of variables of stochastic frontier model.

Variables	Mean	Standard deviation
Raw material	25617.54	32885.26
Depreciation	2109.90	663.67
Labour	151.09	84.01
Operating Exp	17284.57	9137.65
Energy	11075.43	5126.97
Age	42.81	9.69
Experience	10.64	6.20
Revenue	739614.81	737211.9

Source: Computed from field survey, 2013

Stochastic Production Function Analysis

The estimates of the stochastic frontier production function for women entrepreneurs in cassava processing in Oyo State, Nigeria are presented in Table 4. There was presence of technical inefficiency effects in cassava processing in the study as confirmed by a test of hypothesis using the generalized likelihood ratio test. The chi – square computed is 4.554 while the critical value of the chi – square at 95% confidence level and 6 degree of freedom, X^2 was (0.95, 6) = 2.733. The null hypothesis of no inefficiency effects in cassava processing, □ = 0, was strongly rejected indicating that model 1 was not an adequate representation of the data. The estimated gamma (γ) parameter of model 2 of 0.15 indicates that about 15% of the variation in cassava output among the women entrepreneurs was due to differences in their technical efficiencies. The estimates of the parameters of the Stochastic Frontier Production Function of cassava processing are presented in Table 4 and the lead equation is model 2 because of the presence of technical inefficiency effects in cassava processing in the study area. It meaning that model 1 was not an adequate representation of the data hence model 2 was preferred for further economic analysis. The estimated elasticities of production of the explanatory variables of the general model (Table 5) showed that raw material, labour, operating expenses, energy and age were positive decreasing functions to the output, indicating that the variables' allocation and use were in the stage of economic relevance of the production function (stage II). While the depreciation of equipment used had a negative decreasing function, indicating that the variable was over used and in stage III. This is in line with a study carried on the analysis of technical efficiency of cassava processing methods among small scale processors in South – West, Nigeria that a direct relationship was between output and each of the variable input and the inputs were in the stage of efficient allocation (Ehinmowo and Ojo, 2014). The return to scale (RTS) was 1.264 indicating that cassava processing was in the stage of inefficient production (stage I), therefore, the economic decision is that inputs use in cassava processing by the women entrepreneurs should continue until stage II is reached. The estimated elasticity of cost of raw material was statistically significant at 5% level, implying that processing of cassava depends mainly on the raw material.

Table 4: Estimates of the stochastic frontier model of Cassava Processing

Explanatory variable	Model 1 Coefficient (standard deviation)	Model 2 Coefficient (standard deviation)
General model		
Constant	-3.115 (1.472)	-2.907* (1.021)
Depreciation	-0.077(-0.109)	-0.100(0.107)
Raw material	1.084(0.071)	1.068* (0.088)
Labour	0.163(0.098)	0.199 (0.111)
Operating expenses	0.124(0.079)	0.113 (0.076)
Energy	0.072(0.091)	0.079(0.085)
Age	0.116(0.185)	0.151 (0.239)
Inefficiency model		
Constant	0	0.202(0.767)
Education	0	-0.056(-0.054)
Experience	0	-0.007(-0.014)
Method of processing	0	0.202(0.767)
Poverty level	0	0.060(0.257)
Membership to coop.	0	-0.226(-0.219)
Source of raw material	0	0.069(0.253)
Sigma squared	0.178	0.159 (0.023)
Gamma	0	0.15(0.072)
Log likelihood function	-54.76	-52.48
Min. TE 0.637		
Max. TE 0.994		
Mean TE 0.888		

Note:* means significant at 5% level

Table 5: Elasticity of production ($\square_p$) and return to scale (RTS)

Variable	Elasticity($\square_p$)
Depreciation	-0.100
Raw material	0.107
Labour	0.199
Operating expenses	0.113
Energy	0.794
Age	0.151
RTS	1.264

Source: Computed from field survey, 2014

Technical Efficiency Analysis

The technical efficiencies (TE) ranged between 0.61 and 1.00 with a mean of 0.888. The decile range of the frequency distribution of the TE is presented in Table 6. It showed that about 96.2% of the women entrepreneurs had TE exceeding 0.71 and 3.8% had TE ranging between 0.61 and 0.70.

Table 6: Deciles range of frequency distribution of TE of women entrepreneurs

Decile Range of TE	Frequency	Percentage
0.61 – 0.70	4	3.8
0.71 – 0.80	19	18.1
0.81 – 0.90	26	24.8
0.91 – 1.00	56	53.3
Total	105	100.0

Technical Inefficiency Analysis

The analysis of the inefficiency model (Table 4) shows that the signs and significance of the estimated coefficients in the inefficiency model have important implications on the TE of the women entrepreneurs. The coefficients of years spent in school, experience and membership to cooperative were negative indicating that all these factors led to decrease in technical inefficiency or increase the technical efficiency of cassava processing enterprise in the study area. In order words, the higher the years of experience as well as education of the respondents, the less their technical inefficiency. This corroborates with Ojo (2014) on the years of experience and education of the palm oil millers which were negative indicating that the higher the years of experience and education, the less the technical inefficiency. That TE increases with education is due to the fact that educated women are more readily adapted to changes in their business environment. Also, increase in the years of processing experience increases TE. The average experience of the women cassava processors was ten years; implying that doing the same routine would have been part of them to have positive influence on their TE. As member of cooperative, easy accessibility to loan would increase the processing operation thereby influence the TE while poverty level, method of processing and source of raw material were positive indicating that all these factors led to decrease in technical efficiency of cassava processing enterprise in the study area. In order words, the higher the likelihood of being poor the higher the technical inefficiency.

SUMMARY AND RECOMMENDATION

The study revealed that 64.8 percent of the women entrepreneurs were poor based on the poverty line; those within the age range 40 – 49, married and having house size with 7 – 9 members were poor. It further revealed that an average poor woman entrepreneur would need 16.1 percent of the poverty line to get out of poverty. Also, raw material was the most significant variable in cassava processing and increasing its use would lead to increase in output. The TE analysis showed the existence of technical inefficiency effects in processing of cassava. The TE varied between 0.61 and 1.00 with a mean of 0.888 indicating a relatively high TE. The technical inefficiency analysis showed that education, experience andmembership to cooperative led to decrease in technical inefficiency. The study thus concluded that cassava processing among the women entrepreneurs was technically efficient; albeit efficient they were poor and to reduce poverty, policies that would promote educational level as well as increase their income are recommended in the study area.

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