GENDER INEQUALITIES AND ECONOMIC GROWTH: NEW EVIDENCE FROM CASSAVA-BASED FARM HOLDINGS IN RURAL SOUTH-WESTERN NIGERIA

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Abstract
It is a widely accepted fact that persistent inequality between men and women constraints a society's productivity and ultimately slows its rate of economic growth. The economy pays for this inequality in reduced labour productivity today and diminished national output tomorrow. Motivated by this the study aim is to assess the possibilities of enhancing productivity gains by improving the efficiency of small-scale agriculture through gender-responsive intra-household allocation of resources in South-Western Nigeria. It adopts a stochastic parametric decomposition method which yields efficiency measures that are not distorted by statistical noise to estimate the efficiency level of resource allocation by small-scale cassava producers. The results indicate that average overall productive efficiency in the sample was 75.78 per cent implying that small scale cassava farmers in the sample could reduce total variable cost by 24.22 per cent if they reduce labour, fertilizer, land and capital applications to levels observed in the changing input mix (technical efficiency) and then obtain optimal input mix for the given input prices and technology (allocative efficiency). The average technical efficiency and allocative efficiency indexes for the sample were 82.2 per cent and 92.2 per cent respectively. Also, evidence from empirical analysis of data from the male respondents showed that the average economic, technical and allocative efficiency indexes were 88.06 per cent, 89.34 per cent and 78.67 per cent respectively while the same computed for the female sample were 94.9 per cent 74.85 per cent and 71.03 per cent respectively. Labour was the most limiting factor in cassava production suggesting that the technologies that enhance the productivity of labour are likely to achieve significant positive effects on cassava production. The paper shares the notion that producers control over the means of production and impact of development are related and has influence on the economic efficiency and growth of society. Again, technical inefficiency constituted a more serious problem than allocative inefficiency thus most cost savings will accrue to improvement in technical efficiency.

Key words: Gender inequalities, efficiency, economic growth, Stochastic Parametric Frontiers

Introduction

The paper starts with the premise that gender inequality would lead to inefficient allocation of resources and may reduce economic growth. Several studies report that in many countries it is more difficult for females to have access to human capital, land, and financial or other assets that allow them to be entrepreneurs (Blackden and Bhanu (1999), International Labour Organization (1995). If disparities between men's and women's status, access to resources, control of assets and decision-making powers persist, these will undermine sustainable and equitable development (Word Bank, 1995). After all development policymakers are interested not only in economic growth per se but also in the distribution of the proceeds of that growth, especially to the poor, majority of who are women.

Against this backdrop, the article investigates gender inequality and its implications on economic growth, not only because it is one of the most pervasive forms of inequality but also because it is present in most societies and cuts across other forms of inequality. This is important to the extent that rising income and falling poverty levels tend to reduce gender disparities in education, health, and access to productivity augmenting resources. Similarly, efficient allocation of resources, higher productivity and new job opportunities often reduce gender inequalities in employment. It is also assumed that the origins of women's poverty and inequality with men are attributable to their lack of access to productivity augmenting opportunities like education, extension contact, land, capital and credit.

Be that as it may, gender inequality may have a myriad of other important consequences, including psychological, sociological, and religious, these are not discussed in this paper. However, the study shares the notion that effective economic development strategy depends critically on promoting productivity and output growth in the agricultural sector, particularly among small-scale producers. Moreover, if farmers are not making efficient use of existing technology, then efforts designed to improve efficiency would be more cost-effective than introducing new technologies as a means of increasing agricultural output (Belbase and Grabowski 1985).

In the light of the above, it is argued that efficiency measurement is very important because it is a factor for productivity growth. It helps benefit economies by determining the extent to which it is possible to raise productivity by improving the neglected sources, in other words efficiency with the existing resource base and available technology. Thus, identification of the inefficient producers is very important, especially for government policy designed to promote efficient allocation of resources. Bailey et al (1987) noted that management ability, inventories, asset portfolio and outside resources may all contribute to a farmer's ability to succeed financially, grow, or be efficient. It would also aid policy makers in creating improved efficiency- enhancing policies and in judging the efficiency of past efforts. Even though an extensive literature tries and assesses the equity implications of gender inequality not much has been said about the efficiency costs of this inequality, Esteve-Volart (2004) particularly in Nigeria.

If this is the case, then empirical measures of efficiency are necessary in order to determine the magnitude of the gains that could be obtained by improving performance in agricultural production with a given technology (Bravo-Ureta and Pinheiro 1997). To this end, a study of farm level efficiency would be a useful guide to policy makers in ascertaining pro-poor agricultural initiatives which will help farms to operate efficiently and therefore able to prosper and generate higher income.

Success of development initiatives in Nigeria hinge largely on the productive activities of small holder farmers because it is the main source of employment for the majority of the rural population. Beyond this, Africa has a female farming per excellence (Staudt, 1982). Women play pivotal role in African Agriculture. They act as producers, processors, storers and marketers. Despite these activities, women continue to have systematically poorer command over a range of productive resources, including education, land, information, and financial resources. For instance Udele (1981) remarked that in Isoko Local Government Area of Bendel State, Nigeria, 14.28 per cent of the women who planted cassava in their husband farm did not have access to the income later realised from the product. This is to say that when they used their labour and probably their money to tend the crop to maturity they hardly have control over the revenue realized. The point to make is that promoting gender equality is an important part of a development strategy that seeks to enable *all people*—women and men alike—to escape poverty and improve their standard of living. From policy point of view, gender blindness could lead to errant policies and inappropriate identification of farms most in need of interventions. Thus, more than ever before there is an urgent need to assess the state of gender inequalities in Nigerian agriculture with the view of improving efficiency of resource use and allocation. In this regard, the study attempts to assess the possibilities of enhancing productivity gains by improving the efficiency of small-scale agriculture, through gender-responsive intra-household allocation of resources in South-Western Nigeria.

Further, in the recent time in Nigeria, it is hard not to be encouraged by new and rapid changes in the production and marketing environment of Agricultural commodities, particularly cassava, due to market liberalization, new technologies and government incentive policies on the promotion of cassava products for export.

Cassava, *Manihot esculenta Crantz* (Euphorbeacea) a perennial shrub, is often characterised as women crop (Adekanye 1983), because women are often the principal grower of food. Women do 70 to 80 per cent of the planting, weeding, and harvesting and 100 per cent of the processing of cassava, a root crop critical in times of food scarcity (Martin 1987). Famine is rare in areas where cassava is widely grown, since it provides a stable base to the food production system and has the potential for bridging the food gap. Cassava is usually the cheapest source of food energy available especially, the processed forms.

In the light of the above, first, the study attempts to determine the extent to which gender differential in access to productive resources affect the levels of economic efficiency across cassava farms. Second, estimate the percentage of output lost due to the apparent misallocation of input across farms controlled by men and women.

The model and Measures of Ineficiency

Traditional household models assume that a farm household function as single unit for productivity and consumption that a consensus exists among household members on the allocation of resources and benefits and that all-household member's interest and problems are identified (Cloud 1987).

Contrary to the household economics, the concept of gender goes further to provide evidence for the fact that, adoption and productivity in the farm household is determined mainly by intra-household differences. Differences in the roles, incentives and constraints of men and women in the household. Household members are likely to have conflicting preferences in regard to the intra-household distribution of effort and reward.

In these societies men and women allocate the resource under their control to activities that best enable them to fulfill their obligations rather than to activities that are most productive from an aggregate household perspective. A very clear example of this is the case of polygamous households in which household income generally is not pooled and each wife has clear and distinct responsibilities for herself and her children. In such cases, rather than viewing the household as single maximizing small firms, we should view it as a composite of small firms, with resources allocated according to separate utility functions.

This is to say that an increase in household income may benefit some households but leave others unaffected or worse-off. The outcome depends on a member's ability to exercise control over resources both inside and outside the household, and it cannot be assumed that individual well-being increase as household income rises. This collective household model helps explain why gender inequalities persist even though household incomes increase over time. The choice of collective model matters, because certain types of interventions are effective, only under certain types of model regime. Also the efficacy of interventions might be heavily dependent on the type of intervention chosen.

Going one step further, a necessary (but not sufficient) condition for the efficiency of the allocation of factors of production across the various activities of the household is that within any one agricultural activity (for example cultivation of cassava) factors of production are allocated efficiently across the various plots on which it occurs. It is this final condition that is examined in this study. We are testing for first-best production efficiency, based on the null hypothesis that no information asymmetries or cultural constraints on the allocation of resources between men and women farmers.

Agricultural productivity by farm households in our area of study provides opportune environment in which to test this assumption. The opportunity is provided by the fact that, within many African households' agricultural production is simultaneously carried out on many plots controlled by different members of the household. In Nigeria, it is often the case that different members of this household simultaneously cultivate the same crop on different plots. Pareto efficiency in production implies that yields should be the same on all plots planted to the same crop within a household in a given year.

This study adopts a collective household framework to explain how those inequalities exact cost in foregone productivity, reduced welfare for individuals and household and ultimately slower economic growth. The study employs a stochastic parametric decomposition and neoclassical duality model to measure technical, allocative and economic efficiency of cassava based farmers. The model is consistent with that of Schmidt and Lovell (1979) and some agricultural production efficiency studies (e.g Bravo-Ureta and Evenson, 1994, Kumbhaka, 1994, Parikh and Shah, 1994). There are also some conceptual advantages to using a stochastic approach, as it allows for statistical noise rather than attributing all deviations to efficiency differences. The Cobb-Douglas functional form also meets the requirement of being self-dual, allowing an examination of economic efficiency.

We start with the assumption that each farmer seeks to minimize the cost of producing its desired rate of output, subject to a stochastic production frontier constraint. If the farmer is technically inefficient it operates beneath its stochastic production frontier. This results in an equiproportinonate over utilization of all inputs. Also if the firm is allocativelly inefficient it operates off its least cost expansion path, in the sense that the marginal revenue product of an input might not be equal to the marginal cost of that input. Schmidt and Lovell (1979) pointed out that one serious limitation of a stochastic production frontier is that it can only detect one of these sources of inefficiencies in production.

Since estimation of production frontier is carried out with observations on output and input only, such an exercise cannot provide evidence bearing on the matter of allocative inefficiency and hence cannot be used to draw inferences about total or economic efficiency. Let us briefly summarize this.

Assume that the firm's production technology is characterized by a Cobb-Douglas function of the form:

$$Y = a\prod_{i=1}^{n} X_i^{\alpha i}\ell^{\varepsilon} \qquad (1)$$

which linearly becomes

$$Y_i = \alpha + \sum_{i=1}^{n} \alpha_i X_{ij} + \varepsilon_i \text{ where} \qquad (2)$$

$Yi = \ln (Y_i)$, $X_{ij} = \ln (x_{ij})$, $\alpha = \ln a$,

Where Y_i is output, X_j are observable inputs, ε is an error term and a and α_s are parameters. Following Kopp and Diewert (1982), Bravo-Ureta and Rieger, (1991), we assume that the production frontier is self – dual, then the corresponding cost frontier, derived analytically, can be written in general for as

$C = h(P, Y)$,

Where C is the minimum cost associated with the production of output Y, and P is a vector of input prices. Following Aigner et al (1977) and Meeusen and Van den Broeck (1977), the error term takes the form:

$\varepsilon = V – U$

Here, V is assumed to be identically and independently distributed as $N(0, \sigma_v^2)$. It permits random variation in output due to factors outside the control of the farm like weather, disease and so on. On the other hand, U is a non-positive disturbance, reflecting technical inefficiency. Then equation (2) in the log-linear form is

$$\ln y = \alpha + \sum_{i=1}^{n} \alpha_i \ln X_{ij} + (V - U)$$

Note that lnY is bounded from above by the stochastic production frontier

$$\alpha + \sum_{i=1}^{n} \alpha_i \ln X_{ij} + V$$

with technical efficiency relative to the frontier given by U per cent.

We assume that each farmer may both be technically inefficient and allocatively inefficient by permitting him/her to operate off its least cost expansion path. Allocative inefficiency is modeled by permitting the cost minimizing conditions, which defines the least cost expansion path in implicit form to fail to hold exactly. Errors in choosing cost minimizing factors proportions then correspond to disturbances from the exact satisfaction of the first-order conditions for cost minimization (Schmidt and Lovell, 1979).

The estimation method proposed by ALS is maximum likelihood (MLE). Starting from the density function of the addition of a symmetrical normal and a half-normal variable, and supposing that the production function is linear, they elaborate the likelihood function that must be maximized.

The density function of ε = v + u is

$$f(\varepsilon) = \frac{2}{\sigma} f^*(\frac{\varepsilon}{\sigma})$$

$$X\left[1 - F^*(\varepsilon\lambda\sigma^{-1})\right], -\infty \leq \varepsilon \leq \infty$$

$$where\, \sigma^2 = \sigma_u^2, \lambda = \sigma_u / \sigma_v$$

and f^* and F* are, respectively, the standard normal density and distribution functions. The log likelihood function if there are N observations can be written as:

$$\ln L(Y \mid \alpha, \lambda, \sigma^2)$$
$$= N \ln \frac{\sqrt{2}}{\sqrt{\pi}} + N \ln \sigma^{-1}$$
$$+ \sum_{i=1}^{N} \ln\left[1 - F^*(\varepsilon_i \lambda \sigma^{-1})\right] - \frac{1}{2\sigma^2} \sum_{i=1}^{N} \varepsilon_i^2$$

Once λ and σ are obtained, σ_u and σ_v can be calculated.

Given the assumptions on the distribution of V and U, Jondro et al. show that the conditional mean of U and given ε is equal to

$$E(u \mid \varepsilon) = \sigma^* \left(\frac{f^*(\lambda\varepsilon/\sigma)}{1 - F^*(\lambda\varepsilon/\sigma} - \frac{\lambda\varepsilon}{\sigma}\right), \qquad (3)$$

where f^* and F* are, respectively, the standard normal density and distribution functions, evaluated at λε/σ, and $\sigma_*^2 = \sigma_*^2 \, \sigma_v^2 / \sigma^2$,

Equations (7) and (8) provide estimates for u and v after replacing ε, σ*, and λ by their estimates. LIMDEP software is used to analyze the data using maximum likelihood method.

Methodology

Data collection

This study used primary data collected through well-structured questionnaire administered to characterize the production of cassava by the respondents. The sample was spread over two states, (Ondo and Ogun) which are geographically contiguous. A two-stage stratified random sampling of villages and households was used. This was followed by the purposive sampling of the ultimate respondents. The list of villages as compiled by the Monitoring and Evaluation Units of Agricultural Development Programme in each state were used as sampling frame. In all, 287 small-scale cassava farmers were selected. Farm units, which cultivate 5 or more hectares, were excluded. The researchers administered a well-structured questionnaire to capture farmer's production activities. Data collection methods include; direct observation, field measurement and personal interview.

Input costs were measured in terms of prices paid by each farmer for each input. Output was measured in physical units of weight harvested. The yield plot method was adopted in the measurement of the output variable. This consisted of marking out a portion of the farm and measuring the area so marked out. Farmers harvested the crops within the marked area in the presence of the author who weighed the output. With the output of the marked area known, the estimated total output of the entire farm was calculated. Other information obtained include, the farm inventory of tools and equipment - for instance, value and cost of cutlasses, knives, hoes, baskets, head-pans etc.

The frontier total cost function contains six variables: total cost, prices of labour, capital, fertilizer, land and output. Labour expenses include both hired labour and farmer's unpaid labour. Output was measured in physical units of weight harvested.

Results and discussions

Technical efficiency

Following Farrell, (1957) in a cost-minimizing framework output is treated as exogenous hence appropriate measure of technical efficiency is input-saving which gives the maximum rate at which use of all the inputs can be reduced without reducing output. It defines the total variation of output from the frontier which can be attributed to technical efficiency. The Maximum Likelihood, estimates of the parameters are found in Tables 1, 2, and 3. A stochastic production frontier was estimated, and measures of efficiency were calculated. All parameter estimates are statistically significant at the 1% level and the ratio of the standard error of U to that of V, λ, exceeds one in value which implies that the one sided error term U dominates the symmetry error V, indicating a good fit and correctness of the specified distributional assumption (Tadesse and Moorthy, 1997). Based on λ we can derive gamma (γ) which measures the effect of technical efficiency in the variation of observed output.

$$\gamma = \lambda^2 / [1 + \lambda^2] = \sigma_u^2 / \sigma_\varepsilon^2$$

Battese and Corra (1977) defined γ as the total variation of output from the frontier, which can be attributed to technical efficiency.

Expectedly, Table 1 shows that all the four inputs have a positive and significant impact on output for both male and female farmers. However, labour has the largest coefficient. This indicates that the largest impacts on output, on average, would be experienced if labour could be made available and affordable to farmers. It also emphasizes the importance of human capital development for higher productivity and growth. In a situation where the farmers do not have means to hire labour or have access to family labour the level of productivity could be reduced. It is also evident from the results that infusion of science and technology in cassava production in Nigeria is still very low, given the little contribution of capital and fertilizer to the total output of cassava. The results reveal that assess to land seems to have very significant impact on the output of cassava in Nigeria. The discrepancy between observed production and frontier production which is due to technical inefficiency is as large as 5.1% for both male and female cassava producers.

Table 1. Maximum likelihood estimates of the stochastic frontier production function for small scale male and female cassava producers

Variables	Coefficient	Standard error	Z = b/S.e
Constant	5.3893	2.2043	2.445
Quantity of fertilizer in Kg	0.15392E-01	0.12217	0.126
Land	0.17104	0.11636	1.470
Capital	0.78973E-01	0.34168E-01	2.311
Labour	0.18375	0.18608	0.987
$\sigma u/\sigma v$	4.0756	2.0159	2.022
$\sqrt{\sigma^2 v + \sigma^2 u}$	0.82322	0.68880E-01	11.952
Variance components	$\sigma^2(v) = 0.03848$		
	$\sigma^2(u) = 0.63920$		
	$\gamma = 0.822$		
Log likelihood function	= -46.07488		
Iteration completed	13		

Source: Field Survey 2004

Table 2. Maximum likelihood estimates of the stochastic frontier production function for small scale female cassava producers

Variable	Coefficient	Standard error	Z = b/S.e
Constant	2.5200	0.33787	7.458
Quantity of fertilizer in Kg	-0.016156	0.052228	-0.309
Land	0.082027	0.10293	7.970
Capital	0.036820	0.051832	0.710
Labour	0.11849	0.097640	1.214
$\sigma u/\sigma v$	4.2972	2.6816	1.602
$\sqrt{\sigma^2 v + \sigma^2 u}$	o.44273	0.019026	23.269
Variance components	$\sigma^2(v) = 0.01007$		
	$\sigma^2(u) = 0.18594$		
	$\gamma = 0.949$		
Log likelihood function	= -4.314973		
Iteration completed	13		

Source: Field Survey 2004

Table 3. Maximum likelihood estimates of the stochastic frontier production function for small scale male cassava producers

Variables	Coefficient	Standard error	Z = b/S.e
Constant	8.4194	1.5869	5.306
Quantity of fertilizer in Kg	-0.16957E-01	0.64748E-01	-0.262
Land	0.13347	0.71973E-01	1.855
Capital	0.41398-01	0.29631E-01	1.397
Labour	-0.63582E-01	0.14922	-0.426
σu/σv	2.7159	0.87107	3.118
$\sqrt{\sigma^2 v + \sigma^2 u}$	0.80399	0.76137E-01	10.560
Variance components	$\sigma^2(v)$ = 0.07717		
	$\sigma^2(u)$ = 0.56924		
	γ = 0.8806		
Log likelihood function	= -117.9418		
Iteration completed	10		

Source: Field Survey 2004

Allocative Efficiency from Stochastic Frontier Cost Function

As mentioned earlier, the concept of allocative efficiency is related to the ability of a firm to choose its input in a cost minimizing way. It reflects whether a technically efficient firm produces at the least possible cost. Table 4 shows the maximum likelihood estimates of the stochastic frontier cost function for all the respondents while Tables 5 and 6 show the same results for both male and female small scale cassava producers respectively. The ratio of the standard error of U (σ^u) to the standard error of V (σ^v), λ, are 3.4347, 2.8951 and 1.7251 for all the respondents, male and female farmers respectively. They are greater than one which indicates good fit and appropriateness of the distributional assumption. Estimated γ for both male and female cassava producers is 0.922 which implies that 7.8 per cent of the cost incurred by cassava producers can be avoided without any loss in total output. The negative sign on the coefficient of labour suggests that it could be a serious limiting factor in cassava production. The prevalence of high cost of hired labour in Nigeria could partly responsible for this. Tables 5 and 6 show that estimated γ are 0.8934 and 0.7485 for male and female small scale cassava farmers respectively. To put it differently, on the average 10.66% of the cost incurred by male cassava farmers can be avoided without any loss in the output while up to 25.15% can be avoided by their female counterparts. It is good to note that male cassava producers seem to be less technically efficient but are more cost effective and efficient than their female counterparts. We share the notion that male and female farmers employs inputs of various quality levels in different proportions to undertake their activities. This in relation to gender inequalities implies that male and female farmers may face different prices due to transaction costs and/or market imperfections which are known to skew in favour of male farmers in Nigeria. In addition, the commodities may not be of homogeneous quality. In this case, male and female farmers may face different prices because they purchase inputs or sell outputs of different quality. Contrary to a priori expectation, coefficients of labour and fertilizer for male farmers carry negative signs which suggest that given the market prices of these inputs male cassava producers are not employing them at a cost minimizing and profitable level. Thus, given the prices of these factors, losses will be minimized if expenditures on them are reduced. It is not surprising to see the negative impact of rent, although marginal. Since as a result of gender discrimination, women are often precluded from the cheapest and easiest way to have access and control over land through inheritance, they often incurred high cost on the use of land for crop cultivation. Staudt (1986) remarked that when women and men separately a given crop, women's yields often lower than men's because women are allocated inferior land.

Table 4 Maximum likelihood estimates of the stochastic frontier cost function for small scale female and male cassava producers

Variables	Coefficient	Standard error	Z = b/S.e
Constant	7.3832	0.64010	11.535
Cost of fertilizer	0.063325	0.063102	1.004
Land rent	0.10652	0.06322	1.709
Capital in Naira value	0.054173	0.033207	1.631
Labour Wage	-0.010865	0.045011	-0.241
$\sigma u/\sigma v$	3.4347	1.1498	2.987
$\sqrt{\sigma^2 v + \sigma^2 u}$	0.8494	0.065933	12.883
Variance components	$\sigma^2(v) = 0.05638$		
	$\sigma^2(u) = 0.66510$		
	$\gamma = 0.922$		
Log likelihood function	= -112.9395		
Iteration completed	12		

Source: Field Survey 2004

Table 5 Maximum likelihood estimates of the stochastic frontier cost function for small scale male cassava producers

Variables	Coefficient	Standard error	Z = b/S.e
Constant	7.8813	1.7170	4.590
Cost of fertilizer	-0.50196E-03	0.72569E-01	-0.007
Land rent	0.24407	0.11200	2.177
Capital in Naira value	0.11148	0.76797E-01	1.415
Labour Wage	-0.69144E-01	0.15518	-0.446
$\sigma u/\sigma v$	2.8951	1.5128	1.914
$\sqrt{\sigma^2 v + \sigma^2 u}$	0.80174	0.13539	3.922
Variance components	$\sigma^2(v) = 0.06851$		
	$\sigma^2(u) = 0.57427$		
	$\gamma = 0.89342$		
Log likelihood function	= -60.82956		
Iteration completed	13		

Table 6 Maximum likelihood estimates of the stochastic frontier cost function for small scale female cassava producers

Variables	Coefficient	Standard error	Z = b/S.e
Constant	-2.3316	3.6315	-0.642
Cost of fertilizer	0.14928	0.76090E-01	1.962
Land rent	-0.19731E-01	0.88502E-01	-0.223
Capital in Naira value	0.10480	0.48046E-01	2.181
Labour Wage	0.76287	0.32629	2.338
$\sigma u/\sigma v$	1.7251	0.77628	2.222
$\sqrt{\sigma^2 v + \sigma^2 u}$	0.81969	0.10007	8.191
Variance components	$\sigma^2(v) = 0.16898$		
	$\sigma^2(u) = 0.50291$		
	$\gamma = 0.7485$		
Log likelihood function	= -123.8228		
Iteration completed	10		

Source: Field Survey 2004

Economic Efficiency

Arising from the foregoing analysis is economic efficiency (EE) indes which is the product of the two indexes, technical efficiency (TE) and allocative efficiency (AE). Empirical results in Table 7 show that EE of male cassava producers is .7867 which indicates that if an average male cassava producer in the sample was to reach the EE level of his most efficient counterpart, then he could experience a cost savings of 21.33%. On the other hand if an average female small scale cassava producer in the sample was to achieve the EE level of her most efficient counterpart, then she could realize 28.97% cost saving. However, for both male and female small scale cassava producers in our sample the estimated EE is 0.7578 which indicates that if the average farmer in the sample were to reach the EE level of his/her most efficient counterpart then the average farmer could experience a cost savings of 24.22%. In sum, it is evident from these results that EE could be improved substantially and that technical inefficiency constitutes a more serious problem than allocative inefficiency. Thus, more cost savings will accrue to improvement in TE.

Table 7

	TE	AE	EE
MALE	88.06	89.34	78.67
FEMALE	94.9	74.85	71.03
ALL	82.2	92.2	75.78

Conclusion

This paper used a stochastic framework to analyze efficiency in cassava production. The results show that a considerable amount of inefficiency (technical and allocative) exists in cassava production in Nigeria. It is evident from this study that agricultural productivity for a given level of inputs may not be affected by the farmer's gender. The difference may come in the level of inputs that are actually used. It is because of women less access to household resources and other productivity augmenting resources, they seem to use fewer resources on their plots than their men counterpart. It is clear that these unequal allocations of productive resources by gender are inefficient. The results lend credence to the fact that large gender differences in yield do not mean that women are less efficient cultivators than men. The differences in yield might reflect differences in access to inputs and thus to the intensity which inputs are applied on men's and women's plots. So, total household production and income could be increased by shifting over some resources from those plots that are managed by men to those plots that are managed by women.

The economics of this is that, the level of inputs being used on female farmers' plots is lower, so the marginal productivity of additional inputs is higher. Productivity and development effectiveness can therefore be increased by improving women's access to productive resources. The evidence suggests further that such gains in productivity and income at the household and farm levels would translate into higher growth rates in Nigeria.

Recognizing the source of the yield difference is a necessary step in the determination of an appropriate policy intervention. The significant constraint labour may constitute underscores the need for policies toward the design of gender-sensitive appropriate technology. Further, policies should be geared towards improvement in input markets to alleviate some of the internal allocation inefficiency as individuals; particularly women would then purchase inputs up to optimal levels regardless of what levels men allocate to their own farm. This is to say that gender factors have a proper place on the agenda of strategic policy packages and investment priorities if economic growth and efficiency are really intended. Whether the policy objective is to achieve more efficient and sustainable use of resources or to promote equity and greater local participation and control, systematic power differences between men and women merit attention. It is clear that raising agricultural productivity holds the key to encouraging a stable rate of transition to an industrialized economy, improving income distribution and reducing the propensity to consume imported goods, in other words, stimulating a vicious cycle of growth and development.

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