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GENDER AND RELATIVE PRODUCTION EFFICIENCY IN FOOD CROP FARMING IN ABIA STATE OF NIGERIA

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ABSTRACT

In this study, food crop farmers in Abia State of Nigeria were disaggregated based on sex, their production efficiencies and returns to scale derived and compared. Primary data generated from a random sample of 87 food crop farmers consisting of 40 females and 47 males were used. The additive multiplicative dummy variable approach was used to compare the technical efficiencies between the farmer groups. Separate production functions were fitted for each group in order to derive their respective allocative efficiencies and returns to scale. Results from this study show that both farmer groups are characterised by factor biased or different production functions. None of the farmer groups achieved absolute allocative efficiency in the use of any of the resources. The female farmers achieved a lower level of technical efficiency, over utilised fertilizer and under utilised other farm inputs, labour, farmland and capital. The male farmers over utilised labour and fertilizer and under utilised other farm inputs, capital and farmland. It was concluded that redistributing available scarce resources in favour of the female gender would be uneconomical. Rather agricultural policies and programmes that could enable both farmer groups optimise their current levels of resource endowments should be implemented.

INTRODUCTION

In response to evolving socioeconomic circumstances, particularly growing population pressure on a fast deteriorating land, the rural menfolk is migrating out in search of more remunerative employment elsewhere, especially in the urban areas.

As a result, the gender specific nature of farming seems to be disappearing fast. These evolving circumstances have changed the role of women in farming. They are increasingly taking over farm tasks and entreprises, which belong to men traditionally.

Boserup (1987) contends that nearly all the tasks connected with food production or the so-called agro-industry are performed by rural women, with the exception of tree cutting and other heavy land preparation which are performed by men. They carry out such farm activities as planting, transplanting, storing, preserving and marketing of farm produce (Dionco-Adetayo, 2000). He further contended that almost all food processing entreprises like palm oil and palm kernel oil processing, cassava and yam processing, among others are being operated by women especially in the Southern part of Nigeria while women in the Northern part are engaged in the processing of dairy products.

Therefore, the gospel of women empowerment has been accepted and profusely preached by Nigerian researchers, policy makers and rural development practitioners. Unfortunately, according to Saito (1993), there is a definite limit to the time and energy that women farmers can

apply. Moreover, they are more limited than men in their access to critical farm resources and services such as farmland, credit and improved inputs due to cultural, traditional and sociological factors (Tanko, 1994). This picture becomes more disturbing when it is considered that women are actively involved in farming, providing 60 to 80 percent of the agricultural labour force and are reported to produce up to 80 percent of the food for family consumption (Ngur, 1987; Mgbada, 2001). Dianco-Adetayo (2000) observed that apart from these contributions to agricultural production, women spend four hours per day fetching fuel wood and water and on childcare.

Yet, the income of women is very low by any standard within the country irrespective of location and their growth is very low (Makinwa-Adebusoye, 1991). Dionco-Adetayo (2000) confirmed this in his report that none of the women rural entrepreneurs he studied made an income higher than ₦2,500, a performance which he considered much lower than the current minimum wage of ₦6,500 per month. It has been strongly posited that closing the gap between the actual productivity levels of women farmers and their potential productivity levels presents one of the most effective means of promoting agricultural productivity, eliminating rural poverty and enhancing the overall economic development of Nigeria.

In this study, food crop farmers in Abia State of Nigeria were disaggregated based on sex and their production efficiencies and returns to scale were derived and compared.

LITERATURE REVIEW

Okonjo (1991) posited that agriculture is the single most important occupation among women in the rural sector of Southern Nigeria, where most of them are engaged in the production of food crops. He observed that women in Nigeria form over half of the rural population and 54 percent of all women over the age of 15 years in the rural areas are economically active. He concluded that of this lot, 70.3 percent are engaged in agriculture, 3.0 percent in services including commerce while 0.4 percent are engaged in industries.

On crop enterprises to be produced, men make major decisions although women decide on what crops to grow on their fields (Okorji, 1991). Women now make decisions on daily management of their farms and households (Saito, 1993). Okorji (1991) further argued that the average contribution of women to household decision making increases with increase in women's income and vice versa. These have a lot of implications for women's access to and control over farm resources. The control over resources of their own is leading to important shifts in resource use and production in some households (Morna, 1990). These socioeconomic changes are leading to a breakdown of existing traditional ties and values, growing family conflicts and problems of childcare (Chukwuma, 1986; Mamman, 1994). Therefore, effective and sustainable agricultural transformation in Nigeria would require the recognition and understanding of the intricate phenomenon of gender issues to determine and enhance the role, status and participation of women in this process.

Savanne (1986) studied the effects of social and economic changes on the role and status of women in Sub-Saharan Africa. His findings demonstrated that certain demands such as women's ownership of land or access to credit are still "wishful thinking" for most women who cannot give adequate guarantees either in money or through their husbands. He further reported that despite the profound changes that are affecting the structures of production and social relations, it must be said that the status of women in Africa remains basically unchanged. According to him, women are still illiterate or barely schooled, constrained by innumerable traditions and destined to bear many children because of their ignorance of modern contraceptive methods.

Ogbimi and Williams (2000) assessed the availability of productive resources to women in agricultural production. They stressed the problems associated with the timely availability of productive assets such as farmland, credit facilities, improved farm inputs/farm practices, extension services, transportation and storage facilities. Their result indicates that 80 percent of the respondents have access to farmland through inheritance and through their spouses whereas 55 percent and 53 percent do not have access to

credit facilities and improved farm inputs/practices respectively. Most of them reported the lack of adequate transport system and storage facilities as serious problems, which have contributed to selling perishable agricultural products at give-away prices. The time use study of the respondents revealed that only 31.7 percent of their time was devoted to their income generating activities while the remaining 68.3 percent of their time was devoted to household chores and childcare, socials and sleeping. They recommended capacity building as urgent steps to freeing these women from unnecessary drudgery in their economic endeavours.

Fawole and Olowu (1997) studied the coverage of women's agricultural activities in Nigerian daily newspapers between 1970 and 1990. A total of 6408 editions of 10 daily newspapers were randomly selected for the 21-year period. Data from this sample were analysed for types of women activities reported and prominence and direction of the reported activities. Although the results indicated only 2.88 percent of all agricultural news were on women, there was a steady increase in the frequency of women's agricultural activities reported from zero percent between 1970 and 1972 to 1.06 percent in 1990.

Apart from food production activities, women also dominate small scale food processing, the bulk of which are carried out at the household level either for subsistence or to generate supplementary cash income for the family (Adewoye, 2001). The studies of Adeyokunmi (1997) on the contributions of women to processing operation indicate that women spend more time in processing activities than men. The study concluded that women in many parts of Nigeria exclusively handled farm produce processing activities like threshing, winnowing grinding, pounding, smoking, salting and drying amongst others.

RESEARCH METHODOLOGY

Data collection: Abia State was stratified into two agricultural zones in the state- Aba and Umuahia. From each stratum, a Local Government Area (LGA) was randomly selected. From each chosen L.G.A, three villages were selected randomly. The lists of female and male food crop farmers in each chosen village formed the frames from which samples of female farmers and male farmers were chosen using simple random sampling procedure. Thus, a total of 87 farmers, comprising of 40 female farmers and 47 male farmers were selected for a detailed study. Using well-structured questionnaires, relevant data were sought from the selected farmers.

Data analysis: Production efficiency has two basic components: technical efficiency and allocative efficiency.

(i) **Technical efficiency:** Technical efficiency refers to the ability of a given set of entrepreneurs to employ the best practice in an industry so that not more than the necessary account of a given set of resources is used in producing the "best" level of output. The main objective here is to establish whether any distinct group of farmers under consideration is characterised by neutral production function, factor biased production function or the same production function. Neutral production function implies that the two production functions differ only in the intercept while the slope coefficients are the same in each function. Factor biased or non-neutral production function differ significantly in one or more of the slop coefficients, whether or not the intercept terms are the same in both production functions. If there are no significant differences in both the intercepts and slope shift coefficients for the two groups of farmers, it is concluded that both farmer groups face the same production function.

In this analysis, the additive multiplicative dummy variable approach was used rather than the traditional method of fitting separate models and testing the equality of coefficients between them. Implicitly, the model (Baggi, 1981; Banwo, 1986 Onyenwaku, 1994) is

$$Y = f(X_1, X_2, X_3, X_4, X_5, D, X_1D, X_2D, X_3D, X_4D, X_5D, e_i) \quad (1)$$

Explicitly, the log linear Cobb-Douglas functional form is

$$\ln Y = \ln A_0 + B_0D + A_1\ln X_1 + B_1D\ln X_1 + A_2\ln X_2 + B_2D\ln X_2 + A_3\ln X_3 + B_3D\ln X_3 + A_4\ln X_4 + B_4D\ln X_4 + A_5\ln X_5 + B_5D\ln X_5 + e_i \quad (2)$$

Where, in equations (1) and (2),

ln = the natural logarithm

Y = value of all output (₦)

A_0 = the intercept or constant term

B_0 = coefficient of the intercept shift dummy or neutral technical efficiency parameter.

D = dummy variable which takes the value of unity for female farmers and zero otherwise. X_1D, X_2D, X_3D, X_4D, X_5D are the slope shift dummies for labour, fertilizer, other production inputs, capital and farmland.

X_1 = labour outlay (Mandays)

$X_{2=}$ = value of fertilizer used (₦)

X_3 = value of other production inputs like seeds, nursery charges agro-chemicals and other miscellaneous expenses (₦)

X_4 = value of capital services from farm machinery, implements and tools, depreciation charges, interest, repairs and operating expenses (₦)

X_5 = size of cultivated farmland (ha)

$A_{i\ (i\ =\ 1,2,.....5,)}$ = coefficient of the ith variable.

e_i = stochastic error term assumed to fulfill all the assumptions of the classical linear regression model.

Four functional forms of equation (1) were estimated by the method of ordinary least squares and the best fit chosen as the lead equation. If the coefficient of the dummy variable, D (in the additive form) is positive and significant, this implies that the production function for female farmers has larger intercept term denoting a higher level of technical efficiency and vice-versa. If $B_0 = 0$ and all $B_{i(i\ =\ 1,2,.....5)} = 0$, then the two groups of farmers are represented by the same production function. If $B_{i(i\ 1,2,.....5)} = 0$ but $B_0 \neq 0$, the two groups of farmers face neutral production functions. If, at least, one $B_{i(i\ =\ 1,2,.....5)} \neq 0$, the two groups of farmers are facing factor biased or non-neutral production function.

Allocative efficiency: a rigorous comparison of the allocative efficiency of any two groups of farms requires that they are characterised by a constant return to scale, the same of neutral production function and the same configuration of input and output prices (Onyenwaku, 1994). In order to examine the allocative efficiencies of the two groups of farmers, the

following implicit production function was estimated for each group

$$Y = f(X_1, X_2, X_3, X_4, X_5, e_i) \qquad (3)$$

Where, all variables are as previously defined in equation (2). Four functional forms of equation (3) linear, exponential, double log and semi-log were tried for each data set and the best fit was chosen as the lead equation. Allocative efficiency is determined by equating the marginal value product (MVP) of the ith input to its price or marginal factor cost (MFC)

That is $MVP_{xi} = PXi \qquad (4)$

or $P_y f_i = P_{Xi} \qquad (5)$

Where, in equations (4) and (5),

$MVP_{xi(i\ =\ 1,2,....,5)}$ = the marginal value product of the ith input. $P_y f_i$

$P_{Xi(i\ =1,2,\ .....5)}$ = Unit price or marginal factor cost of the ith input.

$f_i = \frac{dY}{dX_i}$ = marginal physical product (MPP) of the ith input.

P_y = unit output price.

For all the resources measured in physical units, the allocative efficiency index, Wij, for each farmer type is given as:

$$\frac{MVP_{Xi}}{P_{Xi}} = \frac{P_y f_i}{P_{xi}} = Wij \qquad (6)$$

where i is a particular resource, j is the farmer type and all other variables are as previously defined. For any resource that is measured in monetary terms equation (6) translates to

$$MVP_{xi} = Pyfi = Wij \qquad (7)$$

In this study, the dependent variable, Y, which is the gross farm output, is measured in Naira terms see equation 3). The marginal product (MP) is in monetary terms. Therefore, the output price, P_y becomes irrelevant and equations (6) and (7) become

$$\frac{MVP_{Xi}}{P_{Xi}} = \frac{f_i}{P_{xi}} = Wij \qquad (8)$$

$$MVP_{Xi}\ f_i = Wij \qquad (9)$$

Maximum or absolute allocative efficiency for a particular group of farmers is confirmed with respect to a given resource if Wij = 1. The resource is over-utilised if Wij < 1 and under-utilised if Wij > 1. The two groups of farmers would have achieved equal allocative efficiency if Wi_1 = Wi2. To show the extent to which a particular resource should be increased or decreased from the current level of use in order to achieve maximum allocative efficiency, evaluate the following formula

$$Kij = (1 - Wij)\,100 \qquad (10)$$

where Kij is the percentage by which the level of use of a particular resource should be increased or decreased to achieve the objective of maximum allocative efficiency. A negative Kij implies that an increased employment of the resource is required and vice-versa. If Kij is zero, then absolute allocative efficiency has been achieved.

RESULTS AND DISCUSSIONS

This section contains the results of the estimated production function from which the technical and allocative efficiency indices and returns to scale were derived and analysed.

(i) Technical efficiency

The results of fitting numerical data to equations (1) and (2) are summarised and presented in table 1. Based on statistical and econometric reasons, the double log functional form was chosen as the lead equation. The R^2 is 0.4836, which implies that the explanatory variables accounted for only 48.36 percent of the change in the dependent variable. The intercept and five variables labour, capital, farmland, intercept dummy and the intercept shift dummy for capital, are statistically significant at 5 percent.

The primary objective here is to find out whether any defined group of farmers is characterised by neutral, factor-biased or the same production function. Therefore, attention is focused on the slope and intercept shift dummies. The intercept shift dummy is statistically significant at 10 percent implying that a shift in technology exists between the male and female farmers. Moreover, the intercept shift dummy has a negative coefficient. This implies that there is a shift in neutral technical efficiency parameter to a lower level for the women farmers. The female farmers achieved a lower level of output per unit of input. Thus, they have lower technical efficiency that the male farmers.

The slope shift dummy for capital is statistically significant at 5 percent, indicating that the male and female farmers are characterised by factor biased or non-neutral production functions. This means that both groups of farmers have different functions. Furthermore, the slope shift dummies for labour and farmland are negative suggesting a lower level of use intensities for these resources by the female farmers. The slope shift dummy for capital is positive, which implies a higher level of use intensity for this resource by the female farmers.

Table 1: Estimated production functions for the male and female food crop farmers

Variables	Double log	Semi log	Exponential	Linear
Intercept	9.489**	-68764.843	11.056**	190717.095*
	(4.316)	(-0.086)	(32.060)	(1.842)
Labour	0.470**	98145.849	0.001**	130.619
	(2.234)	(1.286)	(2.032)	(0.982)
Fertilizer	0.063	6126.700	1.129E-05	-2.097
	(0.036)	(0.096)	(0.360)	(-0.223)
Other inputs	0.196	2232.997	3.420E-06	-1.351
	(1.116)	(0.036)	(0.160)	(-0.210)
Capital	-0.474**	-61947.135	-0.001	-5.515
	(-3.208)	(-1.154)	(-1.311)	(-0.525)
Farmland	0.508**	135017.911**	0.012	3466.195
	(2.772)	(2.028)	(0.450)	(0.433)
Intercept dummy	-5.030*	-1327687.300	-1.047**	-260880.093*
(D)	(-1.690)	(-1.229)	(-2.288)	(-1.897)

(labour) D	-0.084	18428.987*	0.004	757.015**
	(-0.274)	(1.658)	(0.680)	(4.338)
(Fertilizer) D	0.046	-92925.089	-5.796E-06	2.081
	(0.200)	(-1.106)	(-0.165)	(0.198)
(Others inputs) D	0.218	-51915.512	0.001**	11.494
	(0.705)	(-0.462)	(2.431)	(0.782)
(Capital) D	0.492**	227925.266**	0.001	25.444**
	(2.033)	(2.592)	(1.036)	(10.806)
(Farmland) D	-0.215	-26193.651	-0.097*	-43998.404**
	(-0.634)	(-0.212)	(-1.684)	(-2.537)
R^2	0.4836	0.3198	0.354	0.4790
R^2	0.3996	0.2200	0.260	0.4020
F-ratio	5.011**	3.205**	3.742**	6.258**

Source: computed from survey data, 2001 ( ) t-statistic computed.
* Statistically significant at 5 percent * Statistically significant at 10 percent

(ii) Allocative efficiency

The results of fitting data to equation (3) are summarised and presented in tables 2 (for male farmers) and 3 (for female farmers). Following statistical and econometric reasons, the double log function was chosen as lead equation for the male farmers while the linear function was chosen for the female farmers.

Table 2: Estimated production functions for male food crop farmers

Variables	Double log	Semi log	Exponential	Linear
Intercept	9.559**	-68764.840	11.056**	190717.095*
	(4.330)	(-0.114)	(29.259)	(1.915)
Labour	0.470**	98145.852*	0.001*	130.619
	(2.241)	(1.699)	(1.854)	(1.021)
Fertilizer	0.063	6126.700	$1.129x10^{-5}$	-2.097
	(0.360)	(0.126)	(0.329)	(-0.232)
Other inputs	0.196	2233.00	$3.420x10^{-4}$	-1.351
	(0.119)	(0.046)	(0.146)	(-0.219
Capital	-0.474**	-61947.140	-0.001	-15.515
	(-3.218)	(-1.525)	(-1.197)	(-0.546)
Farmland	0.508**	135017.910**	0.012	3466.195
	(2.781)	(2.679)	(0.411)	(0.451)
R^2	0.5847	0.2232	0.1674	0.0390
R^2	0.4097	0.1285	0.0659	-0.0078
F-ratio	5.128**	2.357*	1.649*	0.334

Source: computed from survey data 2001. ( ) t-statistic computed.
** Statistically significant at 5 percent * Statistically significant at 10 percent

Tests of allocative efficiency should be preceded by an examination of the configuration of the output and input prices facing the farmers. However, in this study, such an examination was considered unnecessary since the data were cross sectional and collected from the same geographical area.

Also, there should be an examination of the returns to scale. For farms to be allocatively efficient they should be characterized by constant returns to scale, which implies that they are operating in region two of the production function, which is the feasible region.

Table 4 contains the geometric means of outputs and inputs for the defined farmer groups. These means are taken together with the coefficients from the lead equations in tables 2 and 3 for the computation of the marginal value products

(MVP) and subsequently the allocative efficiency indices from equation (7).

Table 3: Estimated production functions for female food crop farmers.

Variables	Double log	Semi log	Exponential	Linear
Intercept	4.458**	-1396452.140	10.008**	-70162.998
	(2.218)	(-1.558)	(38.144)	(-0.742)
Labour	0.386*	282427.830**	0.001**	887.634**
	(1.727)	(2.840)	(3.956)	(7.523)
Fertilizer	0.120	-86798.388	$5.497x10^{-6}$	-0.016
	(0.727)	(-1.295)	(0.403)	(-0.003)
Other inputs	0.414	-49682.516	0.001**	10.143
	(1.617)	(-0.436)	(3.194)	(0.735)
Capital	0.018	165978.131*	$-1.987x10^{-5}$	9.929
	(0.094)	(1.935)	(-0.608)	(0.844)
Farmland	0.293	108824.260	-0.085*	-40532.209**
	(1.021)	(0.852)	(-1.912)	(-2.522)
R^2	0.4527	0.3559	0.5387	0.6445
$\bar{R}^2$	0.3723	0.2612	0.4708	0.5922
F-ratio	5.626**	3.758**	7.940**	12.328**

Source: computed from survey data, 2001 () t-statistic computed.
** Statistically significant at 5 percent * Statistically significant at 10 percent

The MVP for the male farmers, given the lead equation as the double log, is

$MVPxi = Ai (\bar{X}i / \bar{Y})$ (11).

The MVP for the female farmers, given the lead equation as the linear is $MVPxi = Ai$ (12)

Where all the terms in equations (11) and (12) are as previously defined.

Table 4 reveals that none of the defined farmer groups achieved absolute allocative efficiency in the use of any farm production resource. They are inefficient in the allocation of farm production resources. On the whole, the female farmers achieved better allocative efficiency than male farmers (with allocative effieiency indices closer to unity) in the use of fertilizer and capital while the male farmers performed better in the use of labour, other production inputs and farmland.

The male farmers over-utilised labour and under-utilised other production inputs, fertilizer, capital and farmland. The female farmers over-utilised fertilizer and under-utilised other production inputs, labour, farmland and capital. To achieve absolute allocative efficiency and hence maximum profit, policies and programmes that would enable the male farmers increase their use of other production inputs, fertilizer, capital and farmland by 341.90 percent, 45.10 percent, 3781.60 percent and 1327.80 percent respectively and reduce their use of labour by 29.10 percent should be put in place. Such policies and programmes should also enable the female farmers to reduce their use of fertilizer by 98.40 percent and increase their use of labour, other production inputs, capital and farmland by 343.80 percent, 914.30 percent, 892.90 percent and 2602.10 percent respectively.

(iii) Returns to scale

Returns to scale are derived through the summation of the elasticities of production (E_p) for the various resources. With the double-log function as the lead equation for the male farmers, the regression coefficients are the direct elasticities of production. For the women farmers given the lead equation as linear function, E_p is A_i ($\bar{X}_i$ / $\bar{Y}$). Thus, the elasticities of production are derived and presented in table 5.

Table 4: Allocative efficiency indices for the farmer groups

Farmer Group	Male	Female
Geometric means of inputs and outputs		
Output (N)	79196.66	59042.63
Labour (mandays)	262.14	166.37
Fertilizer (N)	3461.56	3240.59
Other inputs (N)	3509.13	3410.75
Capital (N)	967.52	1547.01
Farmland (ha)	1.88	1.77
Marginal Value Products		
Labour	141.874	887.634
Fertilizer	1.451	0.016
Other inputs	4.419	10.143
Capital	38.816	9.929
Farmland	21416.799	40532.209
Marginal factor cost		
Labour	200.00	200.00
Fertilizer	26.07	26.07
Other inputs	1.14	1.14
Capital	1.14	1.14
Farmland	1500.00	1500.00
Allocative efficiency indices (Wij)		
Labour	0.709	4.438
Fertilizer	1.451	0.016
Other inputs	4.419	10.143
Capital	38.816	9.929
Farmland	14.278	27.022
Required change in Wij (Kij)		
Labour	0.291	-3.438
Fertilizer	-0.451	0.984
Other inputs	-3.419	-9.143
Capital	-37.816	-8.929
Farmland	-13.278	-26.022

Source: computed from survey data, 2001

Table 5 shows that none of the defined groups of farmers is operating at constant returns to scale. The male farmers are operating at decreasing returns to scale ($\sum E_p < 1$) which, implies they are operating in region three of the production function which is an irrational region. The female farmers operated at increasing returns to scale, suggesting that this group is operating in region one of the production function, which is also an irrational region. The overall implication of this result is that the female farmers can improve on their productivity by employing more resources while the male farmers can only improve theirs by reducing their current level of resource employment.

Table 5: Elasticity of production (E_p)

Variable	Male	Females
Labour	0.4696	1.4532
Fertilizer	0.0634	-0.0008
Other inputs	0.1958	0.2916
Capital	-0.4742	0.1494
Farmland	0.584	-0.5804
$\sum E_p$	0.7630	1.3130

Source: computed from survey data, 2001

SUMMARY AND CONCLUSIONS

Cross-sectional data were used in this study, which examined the resource use efficiency of female food crop producers and compared this with that of their male counterparts. Data were analysed using multiple regression analysis. The additive multiplicative dummy variable approach was used to compare technical efficiency between the two farmer groups. Separate production functions were estimated for each farmer group and the coefficients of the lead equations used to derive the allocative efficiency indices and the returns to scale. In each case, four functional forms, linear, exponential, semi log and double log were tried and the equation of best fit chosen as the lead equation.

Analysis of data revealed that the female farmers achieved a lower level of technical efficiency than the male farmers in the use of farm resources. Both farmer groups are characterised by factor biased or non-neutral production functions. In other words, both groups of farmers are characterised by different production functions. The results further revealed that none of the farmer groups achieved absolute allocative efficiency in the use of any resource. The female farmers over utilised fertilizer and under utilised other farm inputs, labour, farmland and capital. The male farmers over utilised labour and fertilizer and under utilised other farm inputs, capital and farmland. Thus, with respect to the two most critical resources in farming, land and labour (Nwaru and Iheke, 2002), the male farmers allocated these resources better than the female farmers.

The coefficient of returns to scale for the male farmers is 0.76 and for the female farmers is 1.31. This implies that on a general note, the female farmers can improve on their productivity by employing more resources while the male farmers can only improve on theirs by reducing their current level of resource employment. Therefore, appropriate policies and programmes geared towards realising these will tend to enable both gender groups to exhibit higher levels of entrepreneurial capabilities and efficiency leading to higher farm output.

However, since the female farmers achieved a lower level of technical efficiency and allocated the most critical farm resources, land and labour more inefficiently than their male counterparts, it would appear uneconomical to redistribute available scarce resources in their favour.

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