EFFECTS OF IMPROVED TECHNOLOGIES ON GENDER PRODUCTIVITY IN CASSAVA PRODUCTION

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ABSTRACT

The main objective of this paper is to find out the effect of improved technologies on gender productivity in cassava production. Data on 80 farmers selected through a multistage random sampling and made of 40 males and 40 females were collected from four communities in Owerri West Local Government of Imo State and analysed using the ordinary least squares multiple regression fitted into linear , semi-log, double-log and exponential forms. The result for the models used for the analysis revealed that the linear form provided the best fit and the selected technologies accounted for 58 percent variations in male cassava output and 67 percent for female cassava output. The result also showed that the three selected technologies i.e. fertilizer, grinding machine and improved variety of cassava had positive effect on the male and female farm output. Improved agricultural technologies are important in improving cassava output. Research should be geared towards introducing simple, less expensive and appropriate technologies to serve farmers particularly for increased cassava production.

INTRODUCTION

In Nigeria, primary producers especially farmers constitute the single most important occupational group in the country. According to the 1952/53 population census, about 78 percent of adult population was engaged in agriculture, forestry and fishery. Hence the development of the sectors of the economy depend on the release of labour from the agricultural sector. Traditional farming system is related to division of farm labour and gender. Agricultural technology is geared towards improving and increasing both farming activities and output. But there is the problem of inefficient, inappropriate or even inadequate use of these technologies by both male and female farmers. This has resulted into low agricultural production. However, some technological inventions in agriculture have also neglected gender discrepancies.

In general technology connotes mechanical, electrical, electronic and other such scientific impressions. But for the present purpose however, agricultural technology consists of the nature and types of available input such as seed, fertilizer, chemicals, tools, machines and their combinations to yield optimal output (Odii, 1998). Hence technology can improve efficiency of agricultural production processes. This could be achieved by substituting better methods of production, directly expanding output, and creating new opportunities for production, but for farmers to adopt these technologies, they must be appropriate.

An appropriate agricultural technology should relate first to the development objectives of the sector, and also to the production problem of the farmers. The acid test of an appropriate technology is based on six criteria; ecological considerations, socio-cultural considerations, simplicity, labour intensity, divisibility and riskness (Ayoola 1987, Galan 1987, Newton 1995, Okeke 1988, Morna 1992).

Agricultural technology must not only be appropriate, but it must also be sustainable within the context of the existing institutional arrangements. Since Government serves as the primary mover of technological process, including its creation through research and transfer primarily through agricultural extension, then its organizational actions and inactions must determine the sustainability of the level of technology attained. According to Idachaba (1987), sustainability in general agricultural development refers to the ability of keep production and distribution going continuously without falling.

The major problems facing Nigeria today are the needs to transform her agricultural industry from one depending on traditional input into improved technological methods which will enable her to meet the increasing food demand of her people (Rogombe 1985). Hence the technological improved methods should be adaptable. As observed by Olayide and Heady (1982) the amount of labour input will decrease with improvement in modernization of peasant agriculture. This will increase

productivity of labour other things remaining constant. Increased agricultural productivity calls for a reduction of these heavy chores through the use of herbicides, motorized hand weeders, harvesters, motorized ploughs, implements for stumping, etc. All these imply drastic changes in the input in order to raise productivity of agriculture (UN 1977).

In this study therefore, an attempt was made to determine the difference between male and female farmers efficiency in the use of improve technologies so as to increase agricultural production.

The objective of this study is to examine the types of agricultural technologies available to both male and female cassava farmers for agricultural production with a view to determining the effect of selected technologies on male and female cassava output and suggest possible measures to resolving any production problem so identified. The major hypothesis is that there is no significant difference on the effect of selected technologies on both male and female cassava output.

METHODOLOGY

This study was conducted in Owerri West Local Government Areas of Imo State. The area is made up of farmers from four rural communities, which were randomly selected. They include Obinze, Nekede, Eziobodo and Ihiagwa. These areas were selected because very high proportion of the inhabitants practice farming. Also the communities were close to one

another, thus enabling the researcher to cover the whole selected villages within a short period.

In each of the communities a village was randomly selected and twenty (20) cassava farmers were interviewed. Ten male and female each were selected from each community giving a total of eighty randomly selected cassava farmers for the study.

A structured questionnaire was used to interview respondents that were involved in the study. Face to face interview technique was also used to elicit information from the respondents during the field survey.

Data on number of extension contact made per year, types and quantities of improved technologies used were collected and analyzed using a production function model and multiple regression technique as specified below.

The selected improved technologies include cassava grinding machine, fertilizer and improved cassava stems.

Thus a production function was formulated and the model specified as follows

$$G_0 = f(X_1, X_2, X_3, e)$$

Where

G_o = gender cassava output (kg).
X_1 = fertilizer input (kg)
X_2 = cassava grinding machine (₦)
X_3 = improved cassava stem (kg)
e = error term

This model was also fitted separately for both male and female farmers, such that we now have the following production functions:

a) $G_m = f(X_1, X_2, X_3, e)$

where

G_m = male cassava output (kg)
X_1 = fertilizer input used by male (kg)
X_2 = cassava grinding machine used by male (₦)
X_3 = improved cassava stem used by male (kg)
e = error term

b) $G_f = f(X_1, X_2, X_3, e)$

where

G_f = female cassava output (kg)
X_1 = fertilizer input used by female (kg)
X_2 = cassava grinding machine used by female farmers (₦)
X_3 = improved cassava stem used by female farmers (kg)
e = error term

The selected improved technologies were chosen because they are used by both male and female in the production of cassava which is their major crop in the area.

RESULTS AND DISCUSSIONS

Regression results on the effect of improved cassava technologies on gender productivity in cassava

production. The lead equation for the analysis of the effect of improved cassava technologies on gender cassava output is shown on Table 1

Table 1. Regression Equation on the Effect of Selected Technologies on Gender Cassava Output.

Parameter	Linear . Form Male	Linear Form Female
Constant	15129.444	8659.091
R^2	0.583	0.675
F Ratio	16.784	24.962
X_1	2.916 (4.302)***	5.552 (4.555)***
X_2	1.790 (0.792)	3.818 (1.059)
X_3	3.833 (1.128)	14.454 (6.959)***
S.E	7318.651	4278.065

Figures in parenthesis represent t – ratio

*** = Significant at 1%

Source: Computed from survey data 2000.

Out of the four functional forms namely linear, semi-log , double-log and exponential , the linear functional form provided the lead equation for both male and female farmers regression equations and was therefore used for the discussion. The result shows that use of fertilizer, grinding machine and improved variety of cassava

account for 58 percent variation in the output of male farmers. Also 67 percent variation in female cassava output is explained by these three selected technologies. The result shows that only fertilizer input is significant in the male farmers regression while fertilizer and improved variety of cassava inputs are significant in the female farmers regression equation.

From the table, it can be observed that all the coefficient of the selected technologies have same sign in both the male and female regressions. In determining their differences in male and female productivities among cassava farmers, the marginal products were calculated and presented on Table 2.

Again since the lead equation is the linear form, their marginal product is equal to the coefficient of each independent variable X_1, X_2, and X_3.

Table 2 Marginal Productivities of Male and Female Cassava Producers

Parameter	*Gender*	
	Male	Female
MP_1	2.916	5.552
MP_2	1.790	3.818
MP_3	3.833	14.454

Thus, it can be observed that the marginal product of fertilizer is 2.916 for the male farmers. This means that a unit change in use of fertilizer input will result to an approximate 3 units in the output of male farmers. The

marginal product of the female regression with respect to fertilizer application is 5.552. This implies that a unit change in the use of fertilizer by the female farmers will result to an approximate change of 6 units in their output. Therefore comparing the male and the female farmers use of fertilizer as a technology the female farmers would produce more cassava than the male farmers per unit, *ceteris paribus*. This could be attributed to the fact that the female farmers use fertilizer input more than the male farmers in a more efficient manner. Hence fertilizer as a technology has more positive effect on the female farmers cassava production.

Comparing the marginal product of cassava grinding machine input X_2, the MP for the male farmers is 1.79. This means that a unit change in the input usage will result to an approximate 2 units change in the male farmers' output. The MP for the female is 3.818. This implies that a unit change in the use of the grinding machine will result to an approximate change of 4 units in the female cassava output. Therefore with respect to the grinding machine as a technology, the female farmers would have a greater cassava output than the male farmers. This could be attributed to the fact that the female farmers make more efficient use of the grinding machine than the male farmers. Thus grinding machine as a technology has more positive effect on the female cassava farmers than the male cassava farmers.

Also comparing the marginal product of improved variety of cassava as a technology, the marginal product

of the male farmers is 3.833 which means that a unit change in the use of improved variety will result to an approximate 4 unit change in male farmers output. While for the female farmers, the marginal product is 14.454 which implies that a unit change in the use of improved variety will result approximately 15 units of cassava outputs by female farmers. Use of improved variety of cassava as a technology by female farmers would therefore produce more output than the male farmers. This could be attributed to the fact that the female carry out the planting operation most often than the males. They make use of improved variety more efficient than the male farmers. Hence improved variety of cassava as a technology has more positive effect on the female farmers agricultural output than the male farmers.

From the above analyses, a positive increase in the use of these technologies namely fertilizer, grinding machine and improved variety of cassava would result to an increase in the cassava output of both male and female. However a greater increase in the output of female cassava farmers was observed. This could be generally attributed to the fact that though both male and female cassava farmers were efficient use of the technologies, female cassava farmers were more efficient use of these technologies.

POLICY IMPLICATIONS AND CONCLUSIONS

Improved agricultural technologies are seen as important resources in improving cassava output as well as

improving farming activities as shown in this study. For greater increase percent in the use of these inputs, the following are hereby recommended: there should be massive campaign towards the provision of those inputs in view of the vital role played by the female in their use for cassava production.

Adequate extension programme and adult education should be promoted towards educating the farmers so as to improve their adoption of these improved technologies as they have been found to increate gender productivity in cassava production.

Improved farm technologies have positive effect on gender farm output particularly for both male and female cassava farmers. However, inputs had more positive effect on the female cassava farmers than the male cassava farmers. Greater quantities of cassava could be produced if female farmers are encouraged to use fertilizer, grinding machine and improved varieties of cassava.

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