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## Resource Use Efficiency in Cassava Production in South East Nigeria

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### Authors' contributions

*This work was carried out in collaboration between all authors. Author UCI designed the study, and wrote the first draft of the manuscript. Author AHU managed the literature searches, author JSO analysed the results and the references, author ECN discussed the results, author ECO wrote the abstract and conclusion while author NMCM handled the recommendations. All authors read and approved the final manuscript.*

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### ABSTRACT

The study investigated resource use efficiency and productivity in cassava production in Owerri west local government area of Imo state, Southeast Nigeria. The multi-stage sampling technique was used in selecting the respondents. A total of 56 respondents were randomly selected and interviewed with the aid of questionnaire. Data were analyzed using simple descriptive statistical tools and ordinary least square multiple regression model. Results of the analysis showed that most of the farmers are small scale farmers and who are young and well experienced by the number of years of farming. The results on productivity showed that such inputs as fertilizer, labour cost, capital and other inputs were over-utilized. Farmers should reduce the rate of input use for efficiency to be enhanced.

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## **1. INTRODUCTION**

In most developing countries, farmers very well know the need to allocate given resources and the technologies at their disposal so as to maximize profit and achieve the greatest economic efficiency. Yet the food production has continued to dwindle and food demand as well as high population growth continues to skyrocket. The annual rate of population has been as high as 2.9% [1]. Persistently, the gap between food production rate and food demand has continued to widen [2] irrespective of the various programmes by government to increase food production and at the same time reduce hunger and poverty. Consequently, Nigeria is being enlisted as one of the most food insecure countries [3]. For instance, cassava demand outweighs the supply [4] supporting the fact that Nigeria has not been able to attain self sufficiency in food production over the years, especially with regards to cassava production despite increasing land area and resources put into food production annually.

Cassava is a widely grown crop in most countries in the tropical regions of Africa, Latin America and Asia; and ranks as one of the main crops in the tropical countries [5]. It is a cheap and reliable source of food for more than 700 million people in the developing world as well as an alternative to maize in livestock feed [6]. Cassava is widely cultivated in Nigeria where it plays vital role in the food security of the rural economy because of its capacity to yield under marginal soil conditions and its tolerant of drought [7]. The crop is a major source of calories for two out of every five Nigerians [8]. These and other features endowed it with a special capacity to bridge the gap in food security, poverty alleviation and environmental protection [9]. The low productivity of cassava is attributed to the fact that it is mainly cultivated by small scale, low resource farmers who can hardly afford farm inputs [10], the inefficiency of farmers in the use of various farm resources [11] and the fact that farm inputs are insufficiently allocated and utilized by the small farmers. This leads to unprofitable production. If this is the case, then empirical measures of efficiency is necessary to determine the magnitude of the gains that could be obtained by improving performance in cassava production with a given technology. This led to the idea of investigating the resource use and efficiency in cassava production in Owerri west Local Government Area with a view to analysing the socio-economic features of the cassava farmers, ascertain the productivity as well as the production function of the respondents in the area.

## **2. MATERIALS AND METHODS**

The study was carried out in Owerri west local government area, Imo state. A multi-stage random sampling technique was employed in sample selection. Owerri West Local government area was chosen due to the high number of cassava farmers in the area. In the first stage, eight (8) communities were randomly selected. In the second stage, seven (7) farmers were randomly selected from the list of cassava farmers in each selected community, making a sample size of fifty-six (56) farmers in the area.

Data for the study were collected from both primary and secondary sources. The primary data were obtained using a set of questionnaire as well as oral interviews. The secondary sources were obtained from textbooks, journals, internet and other relevant literature.

Simple descriptive statistical tools such as mean, frequency distribution and percentages and ordinary least square multiple regression technique were employed in the data analysis.

The multiple regression models are expressed as:

$$Y = f ( X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, U )$$

Y = Value of the production of the farmers (naira)

X<sub>1</sub> = Age of farmer (years)

X<sub>2</sub> = Farm Size (hectares)

X<sub>3</sub> = Farming Experience (years)

X<sub>4</sub> = Household Size (number)

X<sub>5</sub> = Fertilizer (Kilograms)

X<sub>6</sub> = Capital (naira)

X<sub>7</sub> = Cost of labour (naira)

X<sub>8</sub> = Other inputs (naira)

U = Error term

### 3. RESULTS AND DISCUSSION

#### 3.1 Socio-economic Characteristics of Farmers in Owerri West LGA

Table 1 shows that the mean age of the farmers was 47 years. This is an indication that cassava farming is dominated by young people who are active and within the productive age group. This finding is similar to that of [12] who reported that this age group constitute the major productive work force since they are young. The farmers are well experienced in cassava production; this is evident in their mean years of experience of (12.7) as cassava farmers. The mean farm size was 2.6 hectares, this shows that cassava farming is dominated by small scale farmers in the area. This limits their cassava production potentials [4]. Moreover, the mean household size of 6 persons was observed. This shows that the farmers had probably reasonable farm hands that could help in cassava production. This is consistent with [13]. This implies that most of the farm hands (labour force) can be sourced within the household.

Table 2 shows that none of the inputs was efficiently utilized in cassava production by farmers in Owerri west Local Government Area of Imo State. The ratio of marginal value product of the input to input price of less than one indicates that the variable was highly over-utilised. This indicates that production may be enhanced by reducing the number of inputs. The values of X<sub>5</sub>, X<sub>6</sub>, X<sub>8</sub> and X<sub>9</sub> and the other inputs are also less than one, suggesting that the quantity of inputs used are high and over-utilized. This is consistent with [14]. Therefore, since none of the inputs used had its MVP/Px equal to one, it indicates that these resources were not optimally allocated in the study area. For increase in cassava production, there is need to decrease the quantity of inputs used by the amount of their deviations.

**Table 1. Socio-economic characteristics of the respondents in Owerri West LGA**

<b>Variables</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Age</b>		
25-39	8	14.29
40-54	32	57.14
55-69	12	21.43
70 and above	4	7.14
Mean	47years	
<b>Educational level</b>		
0	6	10.71
1-6	13	23.21
7-12	29	51.79
13 and above	8	14.29
Mean	6.7years	
<b>Sex</b>		
Male	14	25.00
Female	42	75.00
<b>Farming experience</b>		
1-5	3	5.36
6-11	5	8.93
12-17	28	50.00
18-23	12	21.43
24 and above	8	14.29
Mean	12.7years	
<b>Farm size (Ha)</b>		
>1	15	26.79
1.1- 1.9	30	53.57
2.0- 2.9	7	12.50
3 and above	4	7.14
Mean	2.6	
<b>Household Size</b>		
1 – 4	15	26.78
5 – 8	28	50.00
9 – 12	9	16.07
13 and above	4	7.14
Mean	6	
<b>Total</b>	<b>56</b>	<b>100</b>

**Table 2. Computation of allocative efficiency (price), Marginal Value Product and Mean input prices**

Input	MVP	Mean input price (px1)	Allocative efficiency index( $E=MVP/Px1$ )	Deviation from optimality( $1-E$ ) X 100 (%)
X <sub>1</sub> (Age)	-0.036	1	-0.036	96.4
X <sub>2</sub> (Farm Size)	0.871	2.6	0.335	66.5
X <sub>3</sub> (Farm Exp)	-0.029	1	0.029	97.1
X <sub>4</sub> (HH Size)	-0.02	1	0.02	98
X <sub>5</sub> (Fertilizer)	0.121	575.0893	0.00021	99.9
X <sub>6</sub> (Capital)	0.22	2248.93	0.0000957	99.9
X <sub>7</sub> (Labour)	0.015	1420	0.0000154	99.9
X <sub>8</sub> (Cost of bund)	0.077	9052.3214	0.000085	99.9
X <sub>9</sub> (Other inputs)	-0.033	603.2142	0.0000547	99.9

#### 4. CONCLUSION

The efficiency ratio of these inputs shows that none of the inputs within the limits of statistical error was efficiently allocated. The socio-economic characteristics show that cassava farming is dominated by young people who are well experienced in cassava production, though on small farms.

#### RECOMMENDATION

Farmers in the area should decrease their rate of use of inputs such as fertilizer, cost of labour, capital and other input, since all the inputs in the analysis are over-utilized.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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