

# Analysis of Gender Differences in Resource Utilization: Empirical Evidence from Cowpea Farmers in Kogi State, Nigeria

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## Abstract

This study focused on the analysis of gender differences in resource utilization: empirical evidence from cowpea farmers in Kogi State, Nigeria, using Dekina Local Government as a case study. A multi-stage sampling technique was used to collect data from 80 male and 80 female cowpea farmers with the aid of a well-structured questionnaire and personal interview. Cobb-Douglas production function, marginal analysis and descriptive statistics were used for data analysis. Results showed that 86% and 95% of variations in cowpea output were explained by the independent variables for male and female farmers respectively. The major factors affecting cowpea output by male farmers were labour and herbicide while farm size, labour, herbicide and pesticide significantly affect the output of the female farmers. The result of the marginal analysis revealed that all the resources used in the study were under-utilized by male farmers while land, seed, herbicide and pesticide were over-utilized by female farmers. Labour was found to be under-utilized by female cowpea farmers. The outcome of the study further showed that the problems of pests and diseases, inadequate capital, and inadequate extension services were common to both male and female farmers. However, inadequate transportation facilities were peculiar to male farmers while female cowpea farmers experienced difficulty in land acquisition. This study advocates for gender equality in the access to and use of productive resources by conscious efforts of government, non-governmental organization, community based organization and women themselves.

## Keywords

Cowpea, Cobb-Douglas, Gender, Efficiency, Marginal Analysis, Resources

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## 1. Introduction

Gender studies in agricultural production focus on the relationship between men and women with regards to their roles, access to and control of resources, division of labour and needs [1]. In conventional agricultural and economic analysis, women have been discovered to be often systemically marginalized and their efforts under valued [2]. However, women make significant contribution to food production and processing in developing countries like Nigeria. Their contributions in meeting the challenges of agricultural development in Nigeria cannot be taken for granted [3]. Women provide between 60-80% of agricultural

labour and are responsible for 80% of food production in Nigeria [4-5]. They produce between 60-80% of the food in most part of the sub Saharan African countries and are responsible for half of the world's food production [6]. They also produce and process food and use diverse coping strategies for ensuring food security for their households [7].

Despite women's economic and active participation in agriculture, they are still faced with various challenges. These challenges range from socio-economic to cultural. Women are often burdened with the major responsibility of carrying out both farm production and domestic work which negatively affect their labour productivity in farm production [3]. Lack of access to adequate farm land, labour, credit and

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other inputs often constrains women agricultural activities [8]. This has led to women having more depressed productivity than men [9].

Cowpea (*Vigna unguiculata*) is a very important food leguminous grain in the dry savannah of tropical Africa for both rural and urban dwellers [10]. Even though cowpea is grown in the semi arid zone of Nigeria, it has gained significant economic importance all over Nigeria [11]. Cowpea is a relatively cheap and readily available source of plant protein which can conveniently argue for protein from animal sources which are more expensive. The fodders serve as a good source of feed for livestock. This has led to an increased demand of cowpea by the ever increasing population without a corresponding increase in production. Local production has been in the hands of small scale farmers who obtain yield of 200-350kg/ha and in some cases zero yield due to the lack of use of the improved technologies available [12]. Efficient resource utilization emphasizes the use of available resources to maximize output and consequently profit. This is a very important aspect of agricultural production if food security, employment and income generation is to be achieved. It is in the quest to revise this prevailing trend in cowpea production that this study focuses on resource utilization in cowpea production along gender lines in the study area. The specific objectives of this study are to:

- i. estimate the factors affecting the output of male and female cowpea farmers
- ii. determine the resource-use efficiency in cowpea production among male and female farmers
- iii. describe the problems affecting cowpea production in the study area

## 2. Methodology

### 2.1. Study Area

This study was conducted in Dekina Local Government Area of Kogi State. Dekina Local Government council was created on the 28th August, 1976. It is located at the eastern part of Kogi State with a land mass of 2461km<sup>2</sup> and a population of about 260,312. The area has common boundaries with Omala to the north, Ofu to the south, Ankpa to the east and Bassa to the west; it lies between latitudes 6.30°N and 7.30°N and longitudes 7.00°E and 8.00°E. The local government area experience two major climate conditions which are caused by different trade wind: south-westerly trade wind which is characterized by hamattan in the dry season from December to March. Rainfall occurs from late March to the ending of October with an annual rainfall of 120-150mm. The soil type is sandy loam with alluvial clay found in scanty areas [13].

The major occupation of the people is agriculture; supplemented with other economic activities like trading, weaving, blacksmithing and local construction. Crops grown are mainly cereals, root and tubers, legumes, while cash crops are oil palm, cashew, etc.

### 2.2. Sampling Procedure and Data Collection Technique

The data for this study was collected in 2014 through a multi-stage sampling technique. The first stage involved random selection of eight (8) wards from the twelve (12) existing wards in the study area. This was closely followed by the random selection of two (2) communities from each of the eight (8) wards making a total of sixteen (16) communities in all. The next stage made use of purposive sampling procedure to select male and female cowpea farmers from each of the selected communities. The final stage comprised the random selection of five (5) male and five (5) female cowpea farmers from each of the sixteen (16) communities making a total of eighty (80) male and eighty (80) female cowpea farmers to whom copies of structured questionnaire were administered. These summed up to a total of one hundred and sixty (160) respondents which were used for analysis.

### 2.3. Method of Data Analysis

The estimation of the factors affecting the output of male and female cowpea farmers were analyzed using the production function analysis. Three functional forms were tried, these are explicitly specified as:

Linear form:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + e$$

Semi log form:

$$Y = \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \beta_5 \ln X_5 + \beta_6 \ln X_6 + e$$

Double log form:

$$\ln Y = \ln \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \beta_5 \ln X_5 + \beta_6 \ln X_6 + e$$

Y = Total output (kg), X<sub>1</sub> = Farm size (ha), X<sub>2</sub> = Labour (man/days), X<sub>3</sub> = Seed (kg), X<sub>4</sub> = Pesticides (litres), X<sub>5</sub> = Herbicides (litres), e = Error term.

In addition, the resource use efficiency of male and female cowpea farmers in the study area was analyzed by the use of marginal analysis.

Marginal analysis:

$$MPP = dY/dX_i = b_i \cdot y/X_i$$

Where MPP = marginal physical product

y = mean of output

$X_i$  = arithmetic mean value of input

Therefore, resource use efficiency of cowpea production can be expressed as follows:

$$MP_{X_i} \times P_y = MVP$$

Since  $MP_{X_i} \times P_y = MVP$  (marginal value product) and

$P_{X_i} = MFC =$  marginal factor cost (current price per unit input)

Efficiency measure (R) = MVP/MFC

#### Decision rule

The decision rule is as follows:

$R = 1$  indicates that the variable input concerned is been efficiently utilized.

$R > 1$  indicates that the variable input concerned is under-utilized.

$R < 1$  indicates that the variable input concerned is over-utilized.

## 3. Results and Discussion

### 3.1. Factors Affecting the Output of Male and Female Cowpea Farmers

**Table 1.** Estimates of Cobb-Douglas Production Function for Male and Female Cowpea Farmers.

Variables	male		female	
	Coefficient	t-value	Coefficient	t-value
Farm size	0.205	1.312	0.324	6.254***
Labour	0.688	7.828***	0.131	3.251***
Seed	-0.157	-0.715	-0.110	-1.126
Herbicide	-0.027	-0.337	-0.598	-6.056***
Pesticide	0.203	2.993***	0.294	7.174***
Constant	4.564	19.731***	5.607	37.727***
$R^2 = 0.86$	$R^2 = 0.95$			

Source: field survey, 2014. \*\*\* represent significant @ 1%

The Cobb-Douglas Production Function was chosen as the lead equation based on certain econometric criteria such as values of  $R^2$ , Signs of coefficient and t-values. Table 1 showed that the  $R^2$  for male and female cowpea farmers were 0.86 and 0.95 respectively. These imply that 86% and 95% of variation in the output of male and female cowpea farmers were explained by the independent variable. Table 1 also indicated that labour and herbicide significantly affects the output of male farmers. These were significant at 1% level of probability and were positively signed, implying that an increase in land and labour will increase the output of male farmers. On the female side the results on table 1 revealed that farm size, labour, herbicide and pesticide significantly affect the output of female cowpea farmers at 1% level of probability. Farm size, labour, and pesticide has positive effect on the output of the farmers, this implies that an increase in any of the said

variables will increase the output of female farmers. Herbicide is negatively related to the output of the female farmers, this implies that an increase in the quantity of herbicide will lead to a corresponding increase in output.

### 3.2. Resource-Use Efficiency by Male and Female Cowpea Farmers

**Table 2.** Marginal analysis of resource use efficiency in cowpea production.

Variables	Male			Female	
	MFC	MVP	R	MVP	R
Land	8000	12,579.66	1.57	12156.27	2.52
Labour	1450	5408.70	3.73	835.08	0.58
Seed	160	4050.02	25.31	1832.82	11.45
Herbicide	375	1605.20	4.28	76040.42	202.77
Pesticide	270	10298.75	38.14	13175.55	48.79

Source: field survey, 2014.

From the result presented on table 2, all the resources used in the study were under-utilized by male farmers as indicated by R value greater than 1 while land, seed, herbicide and pesticide with R values less than 1 were over-utilized by the female farmers. Labour was found to be under-utilized by female cowpea farmers. In order to attain efficiency and increased profit, all resources used by male cowpea farmers should be reduced while all resources used by female farmers except labour should be increased. Labour used by female farmers was found to be under-utilized hence a reduction in the use of labour is required to attain efficiency in resource allocation. This result revealed that there is inefficiency in the use of resources by both male and female cowpea farmers in the study area. This result is in tandem with the works of [14-16] which established that agricultural production in Nigeria is characterized by inefficiencies in resource utilization. Marginal value products for all the input used across gender line were positive, implying that resources were actually used within the economically rational stage of production even though not optimally utilized. These results are in line with of [17] who found out that even though rice farmers in Mada, Malaysia did not utilize resources optimally, they still use resources within the economic rational range as a result of the positive MVP<sub>s</sub> obtained for all the input used.

### 3.3. Problems Affecting Cowpea Farmers

**Table 3.** Problems affecting cowpea production in the study area.

Problems	Male (n=80)	Female (n=80)
	Frequency	Frequency
Pests and diseases	79(98.75)	78(97.50)
Inadequate transportation facilities	42(52.50)	28(35.00)
Inadequate capital	62(77.50)	50(62.50)
Inadequate extension services	47(58.75)	53(66.25)
Difficulty in land acquisition	12(15.00)	55(68.75)
Inadequate supply of labour	35(43.75)	51(63.75)

Source: field survey, 2014. Multiple response Figures in parenthesis represent percentage values.

The study also assessed the major problems affecting cowpea production across gender lines in the study area using multiple responses. The result on table 3 indicated that the problems of pests and diseases, inadequate capital, and inadequate extension services were common to both male and female farmers. However, inadequate transportation facilities were peculiar to male farmers while female cowpea farmers experienced difficulty in land acquisition. Difficulty in land acquisition did not constitute a source of problem to male farmers because land tenure system customarily favours men due to inheritance. This is in line with Fapohunda [8] who found out that male farmers have access to more farm land than their female counterparts.

## 4. Conclusion and Recommendations

The study considered resource utilization in cowpea production across gender lines. The importance of cowpea as a major source of plant protein among the ever increasing population of Nigeria cannot be over emphasized. In order to increase output, resources should be efficiently utilized by both male and female farmers in the study area. This study concludes that both male and female farmers were inefficient in their allocation of resources, therefore it is important to increase the use of over-utilized resources and reduce the use of under-utilized resources in order to optimally use resources to increase output and profit. Though most of the problems considered in the study were common to both male and female farmers, however these barriers should be mitigated especially the difficulty of women to access agricultural land. This study finally advocates for gender equality in the access to and use of productive resources by conscious efforts of government, non-governmental organization, community based organization and women themselves.

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