

# FARMERS' CHOICE FOR CULTIVATION OF COWPEA VARIETIES IN KWARA STATE, NIGERIA.



# OMOTESHO O. A.<sup>1</sup>, ADENUGA A. H.<sup>1,3</sup>, OMOTESHO K. F.<sup>2</sup> AND OLONIYO L. A.<sup>1</sup>

<sup>1</sup>Department of Agricultural Economics and Farm Management, University of Ilorin,

P.M.B. 1515, Ilorin, Nigeria.

<sup>2</sup>Department of Agricultural Extension and Rural Development, University of Ilorin,

# P.M.B. 1515, Ilorin, Nigeria.

<sup>3</sup>Gibson Institute for Land Food and Environment, School of Biological Sciences,

## Queen's University Belfast, United Kingdom.

**Corresponding Author: adenugahenry@gmail.com** Article received: 21<sup>st</sup> April, 2015; Article accepted: 28<sup>th</sup> June, 2015.

## ABSTRACT

This study examined farmers' preference for cultivation of cowpea varieties in Kwara state, Nigeria. A well structured questionnaire was used to elicit data from a total of 130 randomly selected cowpea farmers. The data were analyzed using descriptive statistics, 5 Point Likert-Type scale and Gross Margin analysis. Results showed that 52.0% of the farmers were cultivating local varieties of cowpea on a total of 64.5ha of land, 25.2% of the farmers were cultivating improved varieties of cowpea on a total of 57.99ha of land. The result of the study revealed that though the cultivation of improved variety was more profitable than the local variety, combining both was more profitable. High cost of production was perceived as the main factor militating against the cultivation of improved cowpea varieties. In line with the findings of the study, it was recommended that farmers should be provided with adequate information on the need to adopt improved cowpea varieties to increase productivity and consequently reduce the cost of production.

Keywords: Adoption; Gross Margin; Improved Varieties; Local Varieties; Legumes; TVX

## INTRODUCTION

Cowpea, (Vigna unguiculata [L.] Walp) is the most cultivated and the most consumed grain among legumes, especially in Asia and in tropical Africa (1). Its world annual production is estimated at 5,249,571 tonnes of dried grains of which over 64% are produced in Africa (2). On the African continent, West Africa represents the largest production zone (3). Estimated worldwide production of cowpea grain in 2007 was 5.4 million tonnes from 11.3 million hectares out of which Nigeria produced 3.15 million tonnes of grain from about 4.5 million hectares, representing 58.3% of the world production (4). Nigeria, which is the largest producer of cowpeas also, has the highest level of consumption and the domestic demand for cowpea far outstrips the supply leading to a deficit which is largely met by importation from neighbouring countries (5, 6).

Cowpea is of major importance to livelihoods of millions of relatively poor people in less developed countries of the tropics (7). From the crop, rural families derive food, animal feeds and cash together with spill over benefits to their farm lands. There is a big market for cowpea grain and fodder in West

Africa. It is a cheap source of plant protein to many who cannot afford enough of the expensive animal source protein. Its popularity stems from variety of dishes that are made from it. The crop is of considerable nutritional and health value to man and livestock (8). According to (9) daily consumption of 100-135gm of dry beans reduces serum cholesterol level by 20% thereby, reducing the risk of coronary heart diseases by 40%. Besides its health related benefits. beans are relatively inexpensive, considerably cheaper than rice or any other dietary fibre (10).

As one of the first crops to be harvested each season, it contributes to household food security during the pre-harvest period when food reserves are low. Sale of cowpea also provides a source of income, not only for household needs but also to enable farmers pay for inputs and labour for the maintenance and harvest of other late-maturing crops.

In spite of its numerous benefits, low yields are a significant attribute of cowpea production in the country (11). The major reasons for low productivity include heavy biotic pressures, particularly from insects and other pests which often affect the plant

throughout its life cycle and during storage, suboptimal planting dates, low plant population, poor weed control, mixed cropping and low soil fertility status. In response to the factors causing low productivity in cowpea, there have been developments of improved cowpea varieties. Cowpea Collaborative Research Support Program (CRSP) and Purdue University, in collaboration with national, regional and international institutions, have developed through a conventional breeding approach, high yielding grain type and dual purpose cowpea varieties combining resistance to major diseases, insect pests and Striga.

The Agricultural Extension Services of the Institute for Agricultural Research (IAR) and the States' Agricultural Development Programmes (ADPs) incharge of disseminating agricultural information to farmers on a nation-wide basis, have since 1988 been disseminating research findings on innovations to cowpea farmers. The rate at which the newly improved varieties of rice, cowpea, and maize are spread among farmers in Nigeria is significantly lower than expected (6).

Despite the comparative advantages offered by the cultivation of the improved cowpea varieties most Nigerian farmers still prefer planting the local varieties. This study was therefore carried out to analyse farmers' preference for the cultivation of local and improved cowpea varieties. The result of the study will be of immense importance to policy makers as well as researchers. It will also help breeders to know what to do in order to meet farmers' requirements on improved varieties, which will increase productivity and invariably reduce food insecurity in the country. Without research to understand farmers' preference for cultivation of cowpea varieties, it is possible that new varieties of cowpea may not meet farmers' requirements making adoption to remain low. Specifically, the objectives of the study were to:

- i. describe the socioeconomic characteristics of the cowpea farmers in the study area
- ii. estimate the proportion of farmers planting local and improved varieties of cowpea;
- iii. examine the perception of farmers on the cultivation of the preferred varieties;
- iv. estimate costs and returns accruable to producing local and improved varieties of cowpea

## METHODOLOGY

## Area of Study

The study was carried out in three local government areas of Kwara state. The state is bounded in the North by Niger state, in the south by Osun and Ondo states, in the east by Kogi state and in the west by

Oyo state. It shares international boundary with Benin Republic along the North- western part of the state in Baruten local government area. The state has a total land area of about 32,500 square kilometres. According to 2006 census, the population figure for Kwara state by National Population Commission was 2.3 million. The population is made up of Yoruba, Nupe and Baruba. Kwara state experience both dry and wet seasons, with an intervening cold and dry harmattan from December to January. The annual rainfall ranges between 1,000 to 1,500mm, while average temperature ranges between 30°c to 35°c maximally and 21.1°c to 25°c minimally. Though produced as a minor crop in the state, cowpea is produced in every of the sixteen local government areas of the state with higher production in the Savannah ecological zone where it is traditionally grown as sole crop (12,13). The climate and vegetation pattern coupled with sizeable expanse of arable fertile land make the state well suited for the production of a wide varieties of cowpea and other crops.

## Sampling Procedure and Sample Size

Data for the study were collected through the use of well structured questionnaire. The study employed three-stage proportional random sampling in selecting respondents for the study. The first stage was the purposive selection of three local government areas (Kaiama, Moro and Ilorin-east) from the sixteen local government areas in the state. These local government areas were selected because they have the highest population of cowpea farmers in the 130 respondents areas. A total of were proportionately selected, based on the sizes of the local government areas. 30 were selected from 5 villages in Ilorin-east (Agbevangi, Apado, Apaola, Iporin and Oke ose), 60 were selected from 5 villages in Kaiama (Baani, Degeji, Gwara, Kaiama and Tugan Aboki) and 40 were selected from 4 villages in Moro local government area (Bode Saadu, Egberiomo, Ejidongari and Oloru). However, only 127 of the questionnaires retrieved from the respondents were found suitable for analysis.

## Data and Methods of data Collection

The study made use of primary data collected through the use of well-structured questionnaire to suit the purpose of the study. Data were collected by trained enumerators on the socioeconomic characteristics of the farmers, farmers' perception of cowpea varieties cultivated and costs and returns from cowpea production.

## Analytical Technique

Descriptive statistics, 5 point likert-type scale and gross margin analysis were the major analytical tools employed for the study. Descriptive statistics was employed to describe the socioeconomic characteristics of the while the 5 Point Likert scale was used to analyse farmers' preference for improved and local cowpea varieties. Gross margin analysis was used to estimate the income from improved and local cowpea varieties for the purpose of comparison.

#### **Gross Margin Analysis**

Gross Margin Analysis was used to assess the returns accruable to producing cowpea in the study area. This methodology is justified by the fact that farmers made use of traditional farm implements like hoes, cutlasses such that fixed cost component was negligible. Also, farmers may cultivated solely local varieties of cowpea, solely improved varieties of cowpea or planted both local and improved varieties on different piece of land in the study area.

Gross margin is the difference between revenue and cost before accounting for certain other costs. Generally, it is calculated as the selling price of an item, less the cost of goods sold (production or acquisition costs, essentially). It is used under the assumption that fixed cost component is negligible.

 $GM = \sum Q_y P_y - \sum X_i P_{xi}....(1)$ 

Where:

GM = gross margin (N/ha); $Q_v =$ output of crop (kg);  $P_y =$  unit price of the output;  $Q_v P_v =$  total revenue from the crop ( $\frac{W}{kg}$ );

 $X_i$  = quantity of the input used (Kg/ha);

 $P_{xi}$  = price per kg of the input used ( $\frac{W}{kg}$ );

 $X_i P_{xi}$  = total cost associated with the input per hectare i. e. variable

cost;  $\sum$  = summation sign.

# RESULTS AND DISCUSSION

Socio-economic Characteristics of Cowpea Producers

Table 1 gives a summary of the socioeconomic characteristics of the cowpea farmers. The result shows that 23% of the respondents were female while 77% were male. This is an indication that cowpea production in the study area is male dominated. This may be due to high energy requirement for agricultural production in the study area as the farmers still make crude implements. Similar result was obtained by (14) in their study of profitability of sole cowpea production, in Adamawa state, Nigeria. (15) also obtained similar result.

Characteristics	Frequency	Percentage
Gender		
Male	98	77.2
Female	29	22.8
Total	127	100
Age		
≤ 25.00	5	3.9
26 - 35	33	26.0
36 - 45	67	52.8
46 - 55	19	15.0
56-65	2	1.6
$\geq 66.00$	1	0.8
Total	127	100
Educational Level		
No formal education	13	10.2
Quranic education	5	3.9
Primary education	27	21.3
Adult education	7	5.5
Secondary Education	53	41.7
Tertiary education	22	17.3
Total	127	100
Household size		
< 1	6	4.7
2 - 6	45	35.4
7 - 11	58	45.7
≥ 12	18	14.2
Total	127	100
Farming experience		
$\leq$ 2.00	3	2.4
3.00 - 12.00	97	76.4
13.00 - 22.00	21	16.5
$\geq$ 23.00	6	4.7
Total	127	100
Extension ontact		
No contact	19	15.0
1	84	66.1
2	15	11.8
$\geq$ 3	9	7.1
Total	127	100

Access to credit		
Yes	2	1.6
No	125	98.4
Total	127	100
Access to improved seed		
Yes	63	49.6
No	64	50.4
Total	127	100

Source: Field survey, 2014

The average age of the farmers was 40 years old and the modal age was 36 - 45 years. This represents the active age group in agricultural production and it clearly shows that the cowpea farmers are in the middle age class. Seventy nine percent (79%) of the respondents were married and as much as 10% of them had no formal education. The average household size was 7 persons per household. The relatively large household size may be connected to the need for family labour. The farmers had farming experience ranging from 2 to 50 years with an average of 12 years. This shows that the farmers are quite experienced in cowpea production. The study showed that 15% of the farmers had no contact with agricultural extension agents while 66.1% had only one contact with extension agents. Most of the contacts were made with agents from Ministry of Agriculture/Agricultural Development Projects while minor contacts were made with Research Institutions and Non-Governmental Organizations (NGOs). (14) also obtained similar result. Only about 2% of the farmers had access to credit as most of them got their capital from personal savings and only 49.6% of the farmers had access to improved cowpea varieties.

## Distribution of farmers Based on the Type of Cowpea Variety Cultivated

Table 2 gives a summary of the distribution of farmers based on the type of cowpea variety cultivated.

## **Table 2: Cowpea Varieties Planted**

Varieties planted	Frequency	Percentage	Total area of land used
			(ha)
Local varieties	66	52.0	64.5
Improved varieties	32	25.2	32.2
Combined	29	22.8	57.99
Total	127	100	154.69

Source: Field survey, 2014

The result of the analysis showed that 52% of the farmers planted local varieties of cowpea on a total land area of 64.5 hectares while, 25% of the farmers planted improved varieties of cowpea on total land area of 32.2 hectares and 22.8% of the farmers planted both local and improved varieties of cowpea on total land area of 57.99 hectares. This result showed that a greater percentage of the cowpea farmers cultivated the local varieties of cowpea.

#### **Types of Local Varieties of Cowpea Cultivated**

As shown in Table 3, Local varieties of cowpea cultivated in the study area were: Bewehe, Gbokogbala and Erijo. The most cultivated of the local variety of cowpea was Bewehe which was cultivated by 94% of the farmers. Only 4.5% and 1.5% of the farmers cultivated Erijo and Gbokogbala respectively.

Local varieties	Frequency	Percentage
Bewehe	62	94.0
Gbokogbala	1	1.5
Erijo	3	4.5
Total	66	100

Source: Field survey, 2014

## **Types of Improved Varieties of Cowpea Cultivated**

The types of improved varieties cultivated by the farmers are presented in table 4. If brown, Ife bimpe, TVX, IAR-48 and Samaru-40 were the main types of improved cowpea varieties cultivated by the farmers. About 41% of farmers cultivated Ife brown whereas about 38% cultivated TVX solely.

Improved varieties	Frequency	Percentage
Ife brown	13	40.6
Ife bimpe	4	12.5
TVX	12	37.5
IAR - 48	2	6.3
Samaru – 40	1	3.1
Total	32	100

**Table 4: Types of Improved Varieties of Cowpea Planted** 

Source: Field survey, 2014

Table 5 shows the frequency and percentage of farmers planting both local and improved varieties of cowpea (combined).

Table 5. Complianting of both improved and both varies of compea cultivated	Table 5:	Combination	of both Im	proved and Loca	al Varieties of	Cowpea cultivated
---	----------	-------------	------------	-----------------	-----------------	-------------------

Combined	Frequency	Percentage
TVX and Gbogbala	1	3.5
Bewehe and Ife bimpe	5	17.2
Bewehe and TVX	5	17.2
Bewehe and Ife brown	9	31.0
Bewehe and IAR-48	4	13.8
Bewehe and Samaru-40	3	10.3
Gbokogbala and Ife brown	1	3.5
TVX and Erijo	1	3.5
Total	29	100

Source: Field survey, 2014

The most combined varieties were Bewehe and Ife brown cultivated by 31% of the farmers. 17.2% of the farmers cultivated Bewehe and Ife bimpe, 17.2% cultivated Bewehe and TVX, 3.5% cultivated TVX and Gbokogbala, 13.8% cultivated Bewehe and IAR-48, 10.3% cultivated Bewehe and Samaru-40 while 3.5% cultivated Gbokogbala and Ife brown as well as TVX and Erijo.

The characteristics whose mean are greater than or equal to three are highly perceived by the farmers as being in line. The characteristics were ranked first to eight based on their mean score and it was deduced from these rankings that farmers continue to cultivate the local varieties of cowpea because they perceive that cultivating the improved variety is more expensive, and do not have the capital. This is because producing improved varieties of cowpea require spraying with insecticide at least three times for it to attain its maximum potential unlike the local varieties that does not require much spraying before

they can get an average harvest. The farmers perceived that improved cowpea varieties have a better fodder yield than local varieties which is one reason that makes them cultivates hence it was ranked second. They claimed that it is very useful as livestock feed. The farmers also claimed that improved varieties have higher yield than local varieties if well managed. The fact that improved varieties takes less time to cook is another characteristic which farmers ranked as good. There is more market for improved varieties and it also has a higher rate of return, these characteristics were ranked sixth and seventh respectively. The farmers do not agree that the local varieties taste better than the improved varieties as it was ranked eight scoring less than three points.

#### **Gross Margin Analysis**

A summary of the gross margin analysis for the cowpea varieties is presented in table 7.

Characteristics	Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree (5)	Std dev.	Mean	Rank
Improved variety has higher yield	14 (11.0)	14 (11.0)	9 (7.1)	24 (18.9)	66 (52.0)	1.42	3.89	3 <sup>rd</sup>
More market for improved variety	16 (12.6)	22 (17.3)	28 (22.0)	33 (26.0)	28 (22.0)	1.32	3.27	6 <sup>th</sup>
Higher cost of producing improved variety	0 (0)	0 (0)	0 (0)	73 (57.5)	54 (42.5)	0.49	4.42	1 <sup>st</sup>
Higher return on improved variety	21 (16.5)	33 (26.0)	10 (7.9)	30 (23.6)	33 (26.0)	1.47	3.16	$7^{\rm th}$
Improved variety cooks faster	2 (1.6)	1 (0.8)	38 (29.9)	60 (47.2)	26 (20.5)	0.81	3.84	4 <sup>th</sup>
Improved variety have bigger grains	4 (3.1)	7 (5.5)	24 (18.9)	73 (57.5)	19 (15.0)	0.88	3.75	5 <sup>th</sup>
Local variety taste better	46 (36.2)	6 (4.7)	2 (1.6)	62 (48.8)	11 (8.7)	1.52	2.88	8 <sup>th</sup>
Improved variety have higher fodder yield	6 (4.7)	0 (0)	0 (0)	104 (81.9)	17 (13.4)	0.75	3.99	2 <sup>nd</sup>

Perception -	of Farmers of	on the	Cultivation of	the Preferre	d Varieties
--------------	---------------	--------	----------------	--------------	-------------

Table 6 gives a summary of the farmers' perception of the type of cowpea varieties cultivated.

 Table 6: Perception of Farmers on the Cultivation of the Preferred Varieties

Figures in parenthesis are standard error.

Source: Field survey, Data analysis, 2014

The return on combination of both improved and local varieties of cowpea was \$373390/ha, the return on improved varieties of cowpea was \$367237/ha and that of local varieties was \$217974/ha. While the price of the local variety of cowpea was \$ 388 per kg, that of improved variety was \$ 319 per kg. The lower price of the improved cowpea varieties may be as a result of its better yield and hence more sale is easily made by the farmers. This indicates that cultivation of improved varieties. However, farmers that cultivated both varieties made more profit. The result is in line with that of (16), in which they concluded that cowpea enterprise is a profitable venture.

### CONCLUSIONAND RECOMMENDATIONS

It can be inferred from this study that a higher percentage of farmers were cultivating local varieties of cowpea as a result of its low cost of production when compared to improved varieties. Moreover, the study has revealed that inaccessibility of farmers to improved seeds, high cost of improved seeds,

unavailability of credit to farmers and inadequate extension services were the factors that influenced cultivation of local varieties of cowpea by the farmers. Based on the findings of this study, it is recommended that farmers should be provided with adequate information on the need to adopt improved cowpea varieties to increase productivity and consequently reduce the cost of production. Improved seeds should be made available at agricultural stores at the right time and at affordable prices. Farmers should also be given access to credit in other to operate at economic of scale. Plant breeders should increase the tolerance of improved varieties of cowpea to pests and diseases to encourage increased adoption by farmers. Improved seeds should be made available at agricultural stores at the right time and at affordable prices and farmers should be given access to credit in other to operate at optimal scale. There is also the need for extension agents and other agricultural development stakeholders to improve their services in sensitizing cowpea farmers about improved varieties of cowpea.

#### Farmers' Choice for Cultivation of Cowpea Varieties in Kwara State, Nigeria.

	Local Varieties	Improved Varieties	Combined
Yield(Kg/ha)	657.61	1307.81	921
Average farm size(ha)	0.97	1.0	1.99
Variable Costs			
Seeds	1137	2491	1744
Herbicides	2162	2932	2395
Insecticides	1774	3332	2035
Fertilizer	5500	15000	8250
Labour	26647	25933	30318
Total variable cost(TVC)	37220	49688	44742
Revenue	255194	416925	418132
Gross margin (Revenue – TVC)	217974	367237	373390

Table 7: Costs and Returns Analysis (N/ha)

Source: Data analysis, 2014

#### REFERENCES

- Diouf, D., Recent advances in cowpea (Vigna unguiculata (L.) Walp.) research for genetic improvement, African Journal of Biotechnology, 10(15): 2803-2810, 2010.
- Konan K. and Harold R. M., Diversité génétique des varieties traditionnelles de niébé au Sénégal *Plant genetic Ressources Newsletter*, 52:33-34 2007.
- Pottorff, M., Ehlers J. D., Fatokun C., Philip A. and Close R. T. J., Leaf morphology incowpea [*Vigna unguiculata* (L.)Walp]: QTL analysis, physical mapping and identifying a candidate gene using synteny with model legume species *Genomics*, 13:234, 2012.
- FAO-STAT., Food and Agriculture Organization Statistical Database 2009. http://www.fao.org/faostat Retrieved 15th may, 2014.
- Coulibaly, O. and Lowenberg-Deboer, J., The economics of cowpea in West Africa. Pp. 351-366, 2002. In: Fatokun, C.A., S.A. Tarawali, B.B. Singh, P.M. Komawa, andM. Tamo (ed) Challenges and opportunities for enhancing sustainable cowpea production. Proceedings of the World Cowpea Conference III held at the International Institute of Tropical Agriculture (IITA), Ibadan, Nigeria, 4-8<sup>th</sup> September 2000. IITA, Ibadan, Nigeria.
- Ayinde, O. E, Adenuga, A.H., Omotesho K.F. and Babatunde A., Consumer preference for

cowpea in Kwara State, Nigeria, *Global Approaches to Extension Practice* 8(1): 1-9, 2012.

- Food and Agricultural Orgaisation (FAO)., World Agriculture: towards 2015/2030. Summary report, Rome, 2002.
- Agbogidi, O.M., Response of six cultivars of cowpea (Vigna unguiculata (L.)Walp.) to spent engine oil. *African Journal of Food Science* and Technology 1(6):139-142, 2010.
- Adeniji, A. O. and Potter, N. N., Production and quality of canned moin-moin. Journal of Food Science 45, 1359–1362, 1980.
- Ayenlere, A. E., Mohammed, A. B., Dutse, F., Abdullahi, M. and Mohammad-Lawal, A., An assessment of the economics of maizecowpea cropping system in Ogun area of Kwara State, Nigeria *Biological and Environmental Sciences Journal for the Tropics* 9(1): 39-43, 2012.
- Abayomi Y. A., Ajibade T. V. Samuel O. F. and Sa'adudeen B. F., Growth and Yield Responses of cowpea (Vigna unguiculata [L.] Walp) genotypes to nitrogen fertilizer (NPK) application in the southern guinea savannah zone of Nigeria. Asian Journal of Plant Science 7(2):170-176, 2008.
- Kwara State Agricultural Development Project (KWADP)., Agronomic Survey Report 2010
- Olanrewaju R. M. and Tunde A. M., Climate effects on cowpea production in the derived savannah ecological zone of Nigeria: A

comparative study of two agricultural zones in Kwara State. Proceedings of the National conference of the Nigeria Meteorological Society, Ilorin, Nigeria. Pp.205-2010, 2010.

- Isah, H., Adebayo, E. F., Bala, M. and Gwandi O., Profitability of sole cowpea production in Gombi zone of Adamawa State Agricultural Development Programme, Nigeria. *American Journal of Advanced Agricultural Research* 1(1):41-52, 2013.
- Musa, Y.H., Vosanka, I.P., Inuwa, A and Mohammed, S (2010). Economic Analysis of Cowpea Production in Donga Local

Government Area of Taraba State Nigeria. Journal of Sciences and Multidisciplinary Research, 2:9-16, 2010.

Segun-Olasanmi A. O. and Bamire A. S., Analysis of costs and returns to maize-cowpea intercrop production in Oyo state, Nigeria. Poster presented at the Joint 3<sup>rd</sup> African Association of Agricultural Economists (AAAE) and 48<sup>th</sup> Agricultural Economists Association of South Africa (AEASA) Conference, Cape Town, South Africa, September 19-23, 2010.