

Introduction of improved variety of cowpea at dadin kowa community of yamaltu-deba local government area of gombe state, Nigeria

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Abstract: The research was conducted during the 2021 rainy season at Yamaltu-Deba Local Government Area of Gombe State. The project focused on Dadin Kowa community in an attempt to introduce IITA99K-573-1-1, an improved variety of cowpea (with early maturity, diseased resistance and high yielding I.e. IITA99K-573-1-1) so as to boost the income earning capacity and improve the economic development as well as food security of Yamaltu-Deba Local Government area of Gombe State. The Nation. Four farmers group were used for this research which included Hinna grain processors, Dakun, Jangargare and Dadin Kowa multipurpose cooperative societies. Demonstration plot was established and improved agronomic practices were demonstrated. Comparison between the improved (IITA99K-573-1-1) and local variety (Knannado) was made. The cost of production of improved variety was ₦35,700 producing yield of ₦90,000 (450kg) at harvest period, while that of local variety was ₦24,100 producing yield of ₦32,000 (200kg). The gross margin of improved variety was ₦54,300, while that of local variety was ₦7,900. The farmers' perceptions (100%) of improved variety was higher than that of the local variety this is because, the gross margin of improved variety was positive, indicating higher profit margin, for the same size of plot devoted.

Keywords: Cowpea Variety, Food Security, IITA99K-573-1-1.

1. Introduction

Cowpea (*Vigna unguiculata* L. Walp.) is a grain legume that is widely grown in the tropics and subtropics. It is native to Central Africa and is a member of the Fabaceae family (Cobley, 1956). It is eaten in the form of grain, green pods, and leaves (Adejumo, 2012). In Sudan and Ethiopia, the roots are eaten, and the peduncles and stems are used as fibres in Nigeria (Cobley, 1956). Cowpea is referred to as vegetable meat because it contains a high amount of protein and has a higher biological value on a dry weight basis. The protein content is 26.61 percent, the lipid content is 3.99 percent, the carbohydrates are 56.24 percent, the moisture content is 8.60 percent, the ash content is 3.84 percent, the crude fibre content is 1.38 percent, the gross energy content is 1.51 percent, and the nitrogen free extract is 54.85 percent (Awolabi, et al., 2012). It is typically grown as a companion crop with sorghum, corn, and millet (Asiwe, 2006). Cowpea is favoured by farmers due to its ability

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to increase soil fertility through nitrogen-fixation (Blade, 1997) and produce nutrient-rich fodder for livestock. Under sole cropping, the potential grain yield is high (1.5 to 3.0 t ha⁻¹) when insecticides are used. However, actual yields obtained by South African farmers are significantly lower, averaging less than 500 kg ha⁻¹ (Asiwe et al, 2009). This is largely attributed to insect pests, whose attacks can result in a 90 to 100 percent yield reduction (Jjackai, 1986).

Cowpea is primarily cultivated in tropical and subtropical regions for food and grain, and to a lesser extent as a forage crop. It is one of the most versatile pulse crops due to its smothering nature, drought-resistance, soil-replenishing properties, and multipurpose applications. More than 11 million hectares of the crop are harvested worldwide, with Africa accounting for 97 percent of the harvest. Nigeria cultivates 4.5 million hectares annually, which accounts for over sixty percent of the world's agricultural output. The crop can be harvested at three different stages: when the pods are young and green, when they are mature and green, and when they are dry. The yield of grain from cowpea in Nigeria is 700 kg/ha (FAO.STAT, 2011). Northern Nigerian states have the highest production of cowpea (about 1.7 million tonnes from 4 million hectares). Farmers generate income from the sale of cowpea seeds and feed.

Farmers in Nigeria who harvest and store cowpea fodder for sale during the height of the dry season have been found to earn up to 25 percent of their annual income through this method. Cowpea is also crucial in supplying soil nitrogen to cereal crops (such as maize, millet, and sorghum) grown after cowpea cropping (FAO.STAT, 2011).

2. Problem Statement

The major obstacles to cowpea production in West Africa are insect pests. If not managed, insect pests of cowpea can cause 80 to 100 percent damage (Dugje, et al., 2009). The crop is severely attacked at each growth stage by a multitude of insects, necessitating the use of tolerant varieties and insecticide sprays. Several measures have been implemented to combat cowpea insect pest problems. This includes the use of chemical agents like DDT and Lindane, as well as fumigants. These measures, on the other hand, are becoming increasingly expensive and less accessible to peasant farmers. Though synthetic insecticides have proven to be very effective in controlling these beetles, issues such as insect resistance, pest resurgence, health hazards, residual toxicity, rising application costs, and widespread environmental hazards have prompted the need for effective, biodegradable pesticides (Elhag, 2000).

2.1. Objective of the study

The main objective of this Research is was to introduce an improved, disease resistant and early maturing variety of cowpea to the farmers in the study area.

2.2. Specific objectives

- To compare profitability of improved and local variety of cowpea in the study area.
- To describe the techniques used in modern cowpea production/management, in-terms of spacing, Spraying method, planting date etc.
- To create awareness on the use of improved variety by method and result demonstration.
- To compare the vegetative performance and yield of improved and local variety in the study area.
- To describe the socio-economic characteristics of cowpea producers in the study area.

3. Material and Methods

The project was conducted during the rainy season of the year 2021 at Dadin Kowa community of Yamaltu Deba local Government, Gombe Sstate. The site is located in northern guinea savannah zone of Nigeria between lat. 10 24`17.56` north and long. 10 24`32.40` east (Compass, Nigeria 2009). People living in the area 75 – 85% are farmers and business men. The major tribes of Dadin Kowa community are Fulani and Hausa and who practicing Islam as their religion. Dadin Kowa lies in the interior of the country and has a climatic zone typical of guinea savannah with a single rainy season in the year and moderate to high temperature. The mean annual temperature of the area is about 24°C with mean annual rainfall of 1500 mm; of about 60% of the rainfall occur in the month of July and August, while the mean annual rainfall in Gombe region is about 1600 mm (Brink, 2006). The dry season starts from November to April while the rainy season starts from May to October. The rainy season crops grown in the area include cowpea, g/nut, maize, millet, sorghum, Bambara nut, and sesame.

3.1. Sampling Procedure

Dadin Kowa grain processors, Moube jango, Kautal hore, Multipurpose, and Nasara Matasa farmers co-operative societies as well as volunteer sampling were used to select farmers who show their interest in the project by attending meeting after been being aware of the project for method and result demonstration.

3.2. Data Source and Collection

The primary data were generated through personal interview with farmers to enable SEP`S student obtained relevant information. Questionnaires also were also administered to collect relevant information for the subsequent analysis. Secondary data were also obtained through relevant text books and journals.

3.3. Source of Improved Variety (IT99K – 573-1-1)

The improved variety of Cowpea (IT99K -573 -1 -1) was obtained from the International Institute for of Tropical Agriculture (IITA), Kano, while the office and local one variety were also purchased at the open market in Dadin Kowa, of Yamaltu Deba Local Government, Gombe State.

3.4. Analytical Techniques

The analytical technique used was simple descriptive statistics which include frequency and net farm income in analyzing the data.

4. Result and Discussion

4.1. Socio-Economic Characteristics of Farmers

The socio- economic characteristics of respondents comprising age, sex, marital status, educational level, household size, source of seed, farmers' involvement in cooperative society, means of land acquisition, farmers adoptability, farm size holding of farmers, crop type cultivated, their farming system as well as constraints, militating against cowpea production are presented in the table as follows:

4.1.1 Age Distribution of Farmers

Table 4.1 shows that, majority of farmers (30%) are within the age bracket of 35-40 years, 22% fall within the age range of 25-30 which can make positive impact when adequately equipped. This indicated that, majority of farmers in the project area are young which can make meaningful impact when adequately motivated with needed capital. It also implies that, the farmers are within the active age group which indicates that, the production of IITA99K-573-1-1 will be sustained in more years to come.

Table 1. Age distribution of the Farmers

Variable (years)	Frequency	Percentage
15-20	5	6
20-25	6	10
25-30	13	22
30-35	7	14
35-40	18	30
40 above	11	18
Total	60	100

Sources: field survey 2021

4.1.2 Educational level of the Farmers

Educational the educational level of respondents shows that 46.67% of farmers had secondary education, followed by tertiary and vocational with 20% each. This result implies that, the majority of farmers in the project area are literate. The level of skills and knowledge or experience acquired from the school has enabled them in adopting such innovation. The implication of this result shows that, the literacy level among the farmers in the project area is at a moderate level. This result is in line with Lawi Aamos (2004) which who reported that, the majority of farmers (51.67%) had secondary education which plays and an important role in the adoption of an innovation.

Table 2. presents Educational level of farmers

Variable	Frequency	Percentage
Tertiary	12	20.00
Secondary	28	46.67
Primary	6	10.00
Vocational	12	20.00
Never been to school	2	3.33
Total	60	100

Sources: field survey 2021

4.1.3 Farmers Farmers' farming system

The results clearly show that 86.7% of the farmers practice a mixed cropping system while only 13.3% that practice a sole cropping system. Baker (1978) also reported that, mixed cropping of cereals with legumes result results in better return returns which are obtained by alternating two rows of cowpea with one row of maize, millet, or sorghum. Also, Kummenda et al. (1996) added that there is potential to integrate more legumes into the current cropping system as intercrops because small-scale farmers have rejected the cultivation of a single crop due to labour and land constraints.

Table 3. presents Farming system of the farmers

Variable	Frequency	Percentage
Sole cropping	8	13.3
Mixed cropping	52	86.7
Total	60	100

Sources: Fieldfield survey 2021

Table 4. Average yield of improved and local variety with their days of maturity.

Variables	Yield	Days of maturity
Improved	450kg	160-70
Local variety	200kg	100-130
Total	60	100

Source: Fieldfield survey 2021

Table 5. Production cost for improved and local variety

Activities	Improved variety (IITA99K-573-1-1)	Local variety (Kanamnado)
Land clearing and preparation	2500	2500
Seed cost (5 kg)	3750	1500
Cost of planting	2400	1200
First and second weeding	9500	6500
Chemical (pesticide/insecticide)	4000	6000
Pesticide/insecticide application (labour)	600	2100
Harvesting	7500	2000
Threshing and winnowing	3500	1400
Cost of empty bag	750	300
Transportation cost	1200	600
Total	35700	24100

- Total cost of farm operation for IITA99K-573-1-1 = N35700

- Total output in bag and kg for IITA99K-573-1-1 = 4.5bag (450kg)
- Market value of IITA99K-573-1-1 = N20,000 per bag at harvest time = 20,000 X 4.5 = 90,000
- Total cost of farm operation for Kananado = 24,100
- Total output in bag and Kg for Kanannado = 2bag (200kg)
- Market value was 16000 per bag at harvest = 16,000 X 2 = 32,000

4.2.1 Cost and benefit analysis

i. Gross margin: GM is the differences between the gross farm income and the total variable cost which present the profit or loss.

$$GM = TR - TVC$$

Where

GM = Gross Margin

TR = Total Revenue (farm income)

TVC = Total variable cost

ii. Improved variety. (IITA99K-573-1-1) = 900,00 - 35700 = 54300

Gross margin = N54300

Therefore, the GM for the improved variety was positive indicating a higher profit margin of N54300=00

iii. Local variety. (kanannado) = 32000 - 24100 = 7900

Gross margin = N7900

Therefore, the GM of the farmers farmers' own variety (Kanannado) was also positive but with a lower profit margin of N7900 compare to that of improved variety.

5. Conclusion and Recommendations

The study being active research found that the participatory group teaching method is an essential task in the transfer of innovation. The improved variety (IITA99K-573-1-1) could fit into rural development schemes where its agronomic practices are not new to cowpea producers and its benefit will improve farmers' income and lifting lift up their living standard standard of living. The gross margin analysis showed that IITA improved variety was more profitable and therefore it stands in a good position to provide food security and increase farmers farmers' overall livelihood.

- Since there was 0% awareness on of improved varieties (IITA99K-573-1-1) before the introduction, a need to have higher awareness creation and mobilization of farmers through intensive extension activities to keep farmers abreast on of its benefit is imperative.
- The production of IITA99K-573-1-1 should be fully integrated into the agricultural production system in Nigeria most especially where insect pest or rain shortage is seriously affecting cowpea production.
- The use of participatory group teaching methodologies is effective and should be adopted and encouraged by policy makers policymakers, government, extension personnel, and NGOs, because farmers' participation is viewed as an effective instrument for boosting the impact of agricultural research.
- Given that IITA99-573-1-1 was more profitable than farmers farmers' varieties, researchers and seed companies should hasten the production of its seeds in commercial quantity to make them easily available and at affordable prices.
- More research should be carried out on the performance and adoption of improved varieties (IITA99K-573-1-1) for its sustainability.

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