

Effects of Adoption of Improved Cassava Variety TME 419 on Farmers Livelihood in Ekiti State, Nigeria

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Abstract- The study examines the effect of adoption of improved cassava variety TME 419 on farmers' livelihood in Ekiti State. A multistage random sampling technique was used to select 192 respondents for the study. Data were obtained with validated and structured questionnaire while analysis was done through descriptive statistics, Pearson moment correction and T-test. The result showed that the average yield of cassava TME 419 with the mean of 1.73 tones before adoption but increased to tones 3.17 after adoption. The average income of the farmer increased with the mean of ₦30, 000 before adoption to ₦ 75000 monthly after adoption of cassava TME 419 variety. The livelihood of the farmer has been increased by the improved cassava variety TME 419 in order to produce Garri, cassava, fufu, flour, cassava starch, cassava chips, cassava bread, and sales of cassava peeling. A paired t-test shows that there was a significant difference between farmer's livelihood before and after adoption of cassava variety TME 419 as ($t=4.02$) while the result of Pearson moment correlation review that there was relationship between the adoption of cassava TME 419 variety and the livelihood of farmers in the state as $r= 0.54$. These paper review that adoption programme increased the farmers output, income and improved their livelihood.

Keywords—Adoption, Livelihood, Cassava TME419.

I. INTRODUCTION

Cassava (*Manihot esculenta*) is reported to have originated from Brazil belonging to a group with 160 species that have demonstrated many beneficial qualities such as dormancy, drought resistance and good crop yield [5, 10]. It represents a staple food for nearly a billion people in 105 countries from Asia, Tropical Africa and Latin America provides a dependable source of livelihood for millions of farmers and many processors and traders worldwide. Cassava is known for its high carbohydrate content, is the fourth largest staple food after wheat, maize and rice consumed in the developing countries, with

over 200 million people in sub-Saharan Africa relying on the crop for over half of their daily food energy [13].

Nigerian cassava production figures from 2012 to 2014 stands at 51.0, 47.4 and 54.8 million tons in 2012, 2013 and 2014 respectively and is by far the largest in the world. A third more than the production in Brazil, and almost double the production of Indonesia and Thailand. In Nigeria, it is one of the most important food crops; it is the most widely cultivated crop that provides food and income to over 30 million farmers and large numbers of processors and traders with small holders accounting for 80% of cassava production in Nigeria [3, 16]. It is an important source of carbohydrate and provides food for over 60 million people in Nigeria [1]. Cassava's popularity stems from the ease of cultivation and the wide variety of products such as *garri*, *lafu*, *akpu*, chips, and flour.

According to [14], 80% of Nigerians in the rural areas eat cassava meal at least once a week and majority eats cassava at least once a day even as [7] claimed that it is virtually impossible that an average household in Nigeria will not consume cassava product in a day. Hence it plays a major role in the country's food security. The cassava TME 419 variety locally called *Idileruwa* is known for its high resilience and adaptability to a wide range of agro-ecological conditions and its ability to produce reasonable, dependable yields where most crops like maize cannot thrive.

The cassava variety TME 419 has a field yield range of 10.69-23.45 t/ha and has a dry content of cassava estimated as percentage (DM) of total fresh root weight ranging from 30.68 to 31.26%, the level of Cyanaide in the root (CNP- Cyanogenic Potential) is 6.33ppm. This variety is mainly composed of starch but with a very low percentage of protein. The quantity of starch contained by percentage in this variety ranges from 63.08 to 73.93% while the quantity of protein by percentage ranges from 0.80 to 1.52% [13]. The local varieties of cassava such as; Antiotia (MS-6), Odongbo (MS-3), Okoiyawo (TME-7) that farmers have been planting over years gives lower yield in tonnes of output; the starch contents for industries to use are also very low. The market

(commercial/small holder farmers) requirements are quite different. The commercial market requirements of cassava include varieties with higher starch contents for industries.

Majority of cassava farmers are small holder farmers and plant for the small markets which expectedly, can only bring lower returns on investment. The markets on the other hand are in search of cassava of higher starch contents which can be used in the industries. This results to a conflict of supply and demand as farmers complain of access to markets while the commercial markets are always complaining of lack of raw materials for processing. Bridging this gap, IITA came up with a variety that has higher starch contents for industries and can therefore increase the output of farmers. The TME 419 variety is needed in great demand by cassava related industries due to its high starch content and is also of good quality in the local consumption.

Cassava production serves as a major agricultural crop for sustainability in the lives of rural dwellers in Ekiti state for both the domestic and industrial market. It is thus important to investigate how well it has positively affected the lives of the farmers. It is in view of the foregoing that this study sought to examine the effect of cultivating the TME 419 variety on the farmers output and also examine the effect of the adoption of the improved variety on the livelihood of the farmers in the study area. The hypotheses of the study, stated in the form were:

- i. There is no significant difference between the farmers' livelihood before and after adoption of cassava variety TME 419.
- ii. There is no significant relationship between the adoption of cassava variety TME 419 and the livelihood of the farmers.

II. METHODOLOGY

The study was carried out in Ekiti State. It lies between 7° 15' and 8° 7' north of the equator and longitude 4° 47' and 5° 45' east of the Greenwich meridian. Ekiti state has a mean annual rainfall of about 1400mm and a mean annual temperature of about 27°C. The vegetation ranges from rain forest in the south to guinea savannah in the north. Made up of sixteen (16) Local Government Areas (LGAs), the population of Ekiti state from the 2006 census was 2,384,212 people. The predominant occupation of the people is farming of food crops like yam, maize, cassava, and cash crops such as cocoa, kola nut, cashew, and oil palm with reasonable percentage of the people engaging in other forms of occupation such as trading, weaving and handcraft. Hence, Ekiti state is predominantly agrarian in nature.

The population of the study comprised all TME 419 cassava farmers in Ekiti-State. The list was collected from Agricultural Development Programme (ADP). A multistage sampling technique was used in selecting respondents for this study. Ekiti State ADP

has three zones which are Aramoko (zone 1), Ikere (zone 2) and Isan-Ekiti (zone 3) with the ADP headquarters located at Ikole. The three zones were purposively selected for this study. Random sampling technique was used to select three blocks out of five (5) blocks each from zones one and two; and two blocks out of six (6) blocks from zone three because of the size making a total of eight (8) blocks. Each block consist of six to seven (6-7) cells out of which three (3) cells in each blocks were randomly selected making a total of twenty-four (24) cells. List of farmers from each cell was obtained from Ekiti State Agricultural Development Programme (ESADP); eight (8) farmers who adopted cassava TME 419 were purposively selected from each cell because they adopted and had also been planting local varieties. Hence, the number of farmers (8) eight and the number of cells (24) twenty-four making a total of 192 respondents.

III. RESULTS AND DISCUSSION

A. Socio-Economic Characteristics of Respondents

Results as presented in Table 1 showed that the male respondents constituted larger percent (85.4%) of the population while female accounted for (14.6%). This implies that females are not fully involved in the cultivation of cassava as a result of physical energy involved. However, the female play key role in the processing and marketing aspect of the cassava as reported by [17] that male are predominant in cassava farming in Nigeria.

Age distribution of the respondents shows that majority (75.4%) of the respondents were above 51 years, 16.7% are within the age group of 41-50, 3.7% are within the age group of 31-40 years, while (4.2%) are within the age group of 21-30 years. The mean age of the respondents was 60 years. This indicates that able bodied young men and women are not fully involved in planting cassava. This could be attributed to the assumption that farming is difficult and there is low price for produce. This contradicts the report that farming is dominated by young farmers especially those who are between ages of 31-40. However, the study agrees that able bodied young men and women are no longer interested in planting cassava.

The household size of the respondents revealed that (78.1%) of the respondents consist of 1-5 persons per household, (17.7%) 6-10 person household while (4.2%) have the highest household size of 11-15 persons. The mean household size is approximately 5 persons per household. The implication of this is that family labour will be readily available for farmers in their productive activities. This is in line with the report of [6] that household size is an important socio-economic indicator of labour.

The study further revealed that 63.5% of the respondents were married, indicating a sense of responsibility, (21.4%) widowed, (7.8%) cohabiting,

(4.2%) single, (2.6%) divorced and (0.5%) separated. The high percent of the respondents being married implies that marriage is highly cherished in the society while the low percentage of divorcee and separated couples is in compliance with the African tradition that frowns at divorce and sees the divorcees as being irresponsible [4]. Marriage has contributed to the number of labour used in the farm.

The highest educational level attained by the respondents as presented in Table 1 shows that 22.9% of the respondents completed secondary education, (20.9%) completed tertiary education, (18.2%) non-formal education, (14.1%) adult literacy while only (10.4%) completed primary school education. This means that majority of the farmers are literate with one form of education or the other. Thus, government programmes and incentives as disseminated by the extension agents are well understood and embraced by the farmers. It was reported by Cock [8] that the level of farmers' education determines to a large extent the knowledge of cassava improved variety.

The average farm size of the respondents is 2.5 hectares. The highest (54.7%) farm size of the respondents is 1-3 hectares, 20.3% had less than one hectare, 10.9% had between 4-6 hectares, 8.9% had between 7-9 hectares while 5.2% had 10 hectares and above. This shows that majority of the farmers cultivate cassava in a large quantity in order to meet their daily needs and improve on their livelihood.

Result in Table 1 further revealed that majority (87.5%) of the respondents acquired land for farming through inheritance, 6.3% rent, 3.6% gift and 2.6% was through purchase. This implies that most of the farmers have permanent ownership thereby spent little or no cost in the acquisition of land for farming. The few (6.3% & 2.6%) that rented and purchased land for farming paid above 500,000 Naira. This means that the cost of farm land may constrain interested farmers to plant cassava. However, majority of these farmers inherited the land, thus making farming easy for them. This is in line with the report of Ezedinma [11].

Table 1: Socio-Economic Characteristics of the Respondents

Variable	Frequency	Percentage (%)	Mean
SEX			
Male	164	85.4	
Female	28	14.6	
AGE			
21-30	8	4.2	
31-40	7	3.7	
41-50	32	16.7	60
51-60	90	46.9	
61 and above	55	28.5	
MARITAL STATUS			
Single	8	4.2	
Married	122	63.5	
Divorced	5	2.6	
Widowed	41	21.4	
Separated	1	0.5	
Cohabiting	15	7.8	
HOUSEHOLD SIZE			
1-5	150	78.1	
6-10	34	17.7	5
11-15	08	4.2	
16 and above	00	0.0	
HIGHEST LEVEL OF EDUCATION			
No formal education	29	32.2	
Adult literacy	16	17.8	
Attempted primary school	1	1.1	
Completed primary school	13	14.4	
Attempted secondary school	5	5.6	
Completed secondary school	17	18.9	
FARM SIZE (Ha)			
< 1	39	20.3	
1-3	105	54.7	
4-6	21	10.9	2.5
7-9	17	8.9	
10 and above	10	5.2	
LAND ACQUISITION			
Inheritance	168	87.5	
Rent	12	6.3	
Gift	07	3.6	
Purchase	04	2.6	

Source: Field Survey, 2016

B. Effects of Improved Cassava Variety TME 419 on Farm Output

Yields from cassava farms of the respondents before and after adoption of TME 419 variety presented in Table 2 reveals that just 5% of the respondents recorded a yield of 0.1-5 tons after adoption as against 35% that had same yield before adoption the improved variety. Although about 60% of the respondents indicated they had yield of 5.1-10 tons before adoption and 15% recorded same yield after adoption, 54% of the respondents revealed they had a yield of 10.1-15 tons after adoption while just 3% recorded same yield before the adoption of TME 419 variety. This suggests that a good number of the farmers had a significant yield increase from 5.1-10

tons to 10.1 to 15 tons. To further proof this, none of the respondents had their yield greater than 20 tons before adoption, whereas, 16% of the farmers revealed they recorded yield above 20 tons after adoption. This is in tandem with the submission that farmers in the South South and South East Nigeria recorded increased yield from 11ton/hectare to 25 ton/hectare because of use of improved varieties. The average cassava yield was 1.73 tons before adoption but increased to 3.17 after adoption of TME 419 variety.

This implies that the adoption of improved cassava variety TME 419 has contributed to increase in farmers' output in cassava cultivation. The income level of the farmers was also presented in Table 2. It was revealed that 22% of the farmers made less than ₦10,000 per annum before they adopted TME 419 cassava variety; after adoption however, none of the farmers had their income less than ₦10,000. Also, before adoption, none of the farmers recorded greater than ₦100,000 per annum, 46% of the farmers however reported they made ₦100,000 from cultivation of TME 419 variety. The average income of the farmers increased from ₦30,000 before adoption to ₦75,000 after adoption of TME 419 variety. Thus, the adoption of the improved cassava TME 419 variety introduced by the Ekiti State ADP extension services have led to increase in the output and consequently income of the farmers.

C. Effects of Improved Cassava Variety TME 419 on Farmers' Livelihood

The result of the effect of improved variety on farmers' livelihood as revealed in Table 3 revealed that 49.5% of the respondents strongly agreed and 32.8% agreed that garri production has improve the livelihood of farmers. The farmers are able to pay their children school fees since they have started the adoption of cassava TME 419 while 17.7 disagreed. The respondents (48.4% and 17.7%) strongly agreed and agreed respectively with that statement in that table that cassava fufu flour production has improve my livelihood by acquiring more properties since they have been adopting cassava TME 419. Also, 15.6% of the respondents strongly agreed and 69.8% agreed that cassava starch production improve their livelihood because paying taxes (Rate) becomes easy since they have adopted cassava TME 419. Cassava TME 419 has improved cassava chips production which improves farmers' livelihood as young and unemployed youths have started the cultivation as 64.1% strongly agreed and 18.2% agreed. It was asserted by [12] that cassava is a major solution to food security and that it will positively influence the level of employment.

Majority of the respondents (64.1%) strongly agreed with the statement that cassava bread production has improve my livelihood due to training children in vocational work since they adopted cassava TME 419 and sales of cassava peelings has improved their livelihood because they can cater for

their basic needs of life since the adoption of cassava TME 419. [15] stated that cassava and its products are very important staple foods for most household in Nigeria and can enhance food security. It therefore implies that farmers can favorably acquire necessary materials needful for the up keep of their family through the cultivation of TME 419.

Table 2: Effect of Improved Cassava Variety TME on Farm Output

Yields (tons)	Before-Adoption		After-Adopted TME 419			
	Frequency	%	\bar{X}	Frequency	%	\bar{X}
0.1 – 5	67	34.9		10	5.2	
5.1 – 10	114	59.4	1.73	28	14.6	3.17
10.1 – 15	6	3.1		103	53.7	
15.1 – 20	5	2.6		21	10.9	
> 20	0	0.0		30	15.6	
Annual Income (Naira)						
<10,000	43	22.4		0	0.0	
10,000 – 50,000	127	66.2	₦30,000	27	14.1	₦75,000
50,001 – 100,000	22	11.4		76	39.6	
>100,000	0	0.0		89	46.3	

Source: Field Survey, 2016

D. Difference in the Farmers' Livelihood before and after Adoption of Cassava Variety TME 419

The result of paired t-test analysis presented in Table 4 shows that there was significant difference the farmers' livelihood before and after adoption of cassava variety TME 419 (t= 4.02). This result suggests that adoption of variety had positive effects on the livelihood of farmers. This implies that the livelihood activities of farmers increased after the adoption of TME 419. This result agrees with the finding of [9] that the introduction of TME 419 has provided the livelihood of up to 500 million farmers and countless processors and trader around the world.

Table 3: Effects of Improved Cassava Variety on Farmers' Livelihood

Effects of TME 419 on Livelihood	SA	A	D	S	\bar{X}
Garri Production has improved livelihood by paying my children school fees since I adopted cassava TME 419	95 (49.5)	63 (32.8)	34 (17.7)	0 (0.0)	3.31*
Cassava Fufu flour production has improved livelihood by acquiring more properties since I adopted cassava TME 419	93 (48.4)	34 (17.7)	35 (18.2)	30 (15.7)	2.98*
Cassava starch production improved livelihood because paying taxes (Rate) becomes easy since I adopted cassava TME 419	30 (15.6)	134 (69.8)	0 (0.0)	28 (14.6)	2.86*
Cassava chips production has improved livelihood because young and unemployed people have started cultivating cassava TME 419	123 (64.1)	35 (18.2)	34 (17.7)	0 (0.0)	3.46*
Cassava bread production has improved livelihood due to training children in vocational work since I adopted cassava TME 419	123 (64.1)	34 (17.7)	35 (18.2)	0 (0.0)	3.45*
Sales of Cassava peelings has improved livelihood because I can cater for my basic needs of life since I adopted cassava TME 419	28 (14.6)	100 (52.1)	64 (33.3)	0 (0.0)	2.81*

Source: Field Survey, 2016

E. Relationship between the Adoption of Cassava Variety TME 419 and Livelihood of Farmer

Pearson Product Moment Correlation results as presented in Table 5 revealed a positive and significant relationship between the adoption of cassava TME 419 variety ($r = 0.80$, $p < 0.05$) and the livelihood of the farmers. This implies that the adoption of cassava TME 419 variety has a statistically significant positive impact on the livelihood of the farmers in Ekiti State.

Table 4: t-test Analysis of Difference in the Farmers' Livelihood before and after Adoption of Cassava Variety TME 419

Variables	N	Mean	Standard Deviation	Mean Difference	t-value	P-Value	Decision
Before Adoption	96	1.69	0.76				
After Adoption	96	2.18	1.20	0.49	4.02	0.00	Sig.

Source: Field Survey, 2016

Table 5: Pearson Correlation Coefficient for Relationship between the Farmers' Livelihood before and after Adoption of Cassava Variety TME 419

Parameters	r – value	P – value	Decision
Adoption	1		Sig.
Livelihood of Farmers	0.80	0.00	Sig.

Source: Field Survey, 2016

IV. CONCLUSION

The study concludes that the adoption of TME 419 variety has increased the farmers output and income, thus improving their livelihood, enhanced access to acquire production for cultivation and improved economic status in the community. It recommends that ADPs and other related NGOs also farmers groups should work in collaboration to create awareness of cassava variety TME 419 for farmers in the rural areas. There is also a need to promote cassava value chain to maximize adoption of the new varieties. NGOs should assist in the provision of more cassava variety TME 419, provide more farm land for cultivation and establish guaranteed markets for the sales of farmers' farm produce in order to reduce wastage from glut of cassava in the market and low income experienced by the farmers from sourcing for markets themselves.

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