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Original Research Article

Impact of credit use on profitability among cassava smallholder farmers in Southwest, Nigeria

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Abstract

Nigeria has large economic potential with high profitability but profitability is not increasing, and agricultural production is poor. This is hinged on the understanding of the impact of credit use on profitability, however, the influence of credit use on cassava production remains poorly understood, consequently affecting the profitability of cassava farmers. Thus, this study assessed the impact of credit use on the profitability of cassava farmers among smallholders in southwest Nigeria. Multi-stage sampling procedure was used to select 210 smallholder cassava farmers for the study. A structured questionnaire was used to collect data on the socio-economic characteristics and profitability of cassava farmers. Data were analysed with descriptive statistics, budgetary analysis, ordinary least squares (OLS), and *t*-test statistics. Results show that 60.0% of the farmers were male, 81.0% were married, 33.3% had secondary education, 70.5% had no contact with extension agents, 71.9% were members of a cooperative society, 61.9% had savings and 49.5% had access to credit. Furthermore, the mean age, farming experience, farm size, and household size of the sampled cassava farmers were 43 years, 19 years, 3.1 hectares, and 6 persons, respectively.

Budgetary analysis shows that mean revenue per hectare from cassava production was ₦131,917.8 ($369.4)/ha for credit users with gross margin of ₦85,138.7 ($238.4)/ha and return on investment of 1.54, whereas ₦117,602.5 ($329.3)/ha for non-users with gross margin of ₦71,923.4 ($201.4)/ha and return on investment of 1.31, implicating that cassava production is a profitable and viable enterprise and that credit users are more profitable than non-users. Farm size ($p < 0.01$), membership in cooperative society ($p < 0.10$), and credit ($p < 0.01$) significantly influenced the profitability of the cassava farmers. The test of the mean difference in revenue and net farm income was significant at 1%. The study concluded that credit had a positive significant influence on cassava farmers' profitability. Hence, credits should be made available by relevant stakeholders like government and non-governmental organisations, to cassava farmers in the study area.

Keywords: Cassava; credit; Ogun State; profitability; smallholder farmers

INTRODUCTION

Nigeria economy, although quite diversified, relies more heavily on the petroleum and agricultural sectors (Siewe, 2015). Ogundari and Ojo (2007) noted that Nigeria is a great country, blessed with both human and abundant natural resources with the potential to have a triumphing economy, able and efficient to satisfy the needs of her people and to contend emulously with other countries ahead. This ambitious resource base, if it was accurately wielded, could support a vibrant

agriculture sector large enough to ensure the supply of raw materials for the industrial sector as well as provide beneficial employment for the teeming society. Ajibefun (2002) was of the opinion that Nigeria's rich human and material wealth would have granted her the privilege to become Africa's biggest economy and a major rival in the global economy but when compared with other African and Asian countries, economic advancement in Nigeria has been dissatisfying, having a Gross Domestic Product around 45 billion, 32.953 billion, and 55.5 billion dollars in 2001, 2002 and 2003, respectively, and *per capita* income of about $300 per year, making Nigeria to be among the poorest countries in the world (CBN, 2003). Having acquired about $300 billion from oil exports between the mid-1970s and 2000, her *per capita* income was discouragingly 20 percent lower than that of 1975 (Ogundari and Ojo, 2007). The agricultural sector in Nigeria has over time become an important sector of the economy (Akinola et al., 2020). According to the Food and Agricultural Organization (FAO, 2023), the agricultural sector's share of GDP was 22.35% by 2021, and over 70% of Nigerians were involved in the agriculture sector which makes agriculture very relevant in the Nigerian economic sector. Cassava plays a special part in the agriculture of a rising economy in Nigeria (Olumayowa et al., 2020). According to the Food and Agricultural Organization (FAO, 2023), Nigeria is the world's highest producer of cassava with about 59 million metric tonnes and it is classified next after yam in the extent of production among the root and tuber crops of economic value in Nigeria. However, Nigeria's production of cassava has not increased at a rate that can keep pace with the ever-increasing human population. Low cassava production has made Nigeria spend a lot on foreign exchange, importing starch and wheat flour (Dzever et al., 2016). Despite its contribution to the economy, Nigeria's agricultural sector faces many challenges that affect its profitability (FAO, 2023).

According to Balogun et al. (2012), years ago Nigeria instituted various agricultural programs (such as National Fadama Development Project II) and policies that were meant to improve farms' profitability, consequently the standard of living of the farmers, however, only a few states were able to utilise the assistance given by the program. Some of the Policies included were the compulsory substitution of 10% wheat flour with high-quality cassava flour in the baking industry (Dzever et al., 2016), and the blending of 10% ethanol in fuel to increase the ethanol that is produced from cassava, hence, increasing cassava production (Awoyinka, 2009).

For farmers to survive they depend on the return they get back from farming (Olumayowa et al., 2020). Profitability measures how well a farmer utilises his resources towards the generation of profit (Fridson and Alvarez, 2002). According to Parvutoiu et al. (2010), profitability shows the ratio between profit and different types of utilised resources. As the profit rate increases, the profitability rate also increases (Parvutoiu et al., 2010). Parvutoiu et al. (2010) continue further that the aim of financial analysis is to show the capability of the farmer to generate profit in terms of profit margin, which shows the amount of profit a farmer produces on its farm sales at the different stages of revenue made from the farm. Samson and Obademi (2018) indicate cases of credit insufficiency among rural farmers in Nigeria, whereas Awotide et al. (2015), and Ibrahim and Yusuf (2017), also noted that in rural areas of developing countries, credit constraints have significant adverse effects on farm profitability. This, therefore, brings credit into the picture.

The review of factors that affect technology adoption carried out by Cornejo and McBride (2002), highlighted access to credit as a key determinant. It was observed that access to credit stimulates the adoption of risky agricultural technologies through the easiness of the liquidity constraint as well as through the improvement of a household's risk-enduring ability which in turn, promotes the profitability of production (Cornejo and McBride, 2002). Many studies (such as Bolarinwa and Oyeyinka, 2009), have noted the negative impacts of inadequate credit to farmers. Bolarinwa and Oyeyinka (2009), in their study, opined that limited credit provision has minimised agriculture profitability drastically to the extent that food importation has been escalating in later years. They further pointed out that agricultural activities in Nigeria and other growing countries were predominantly dominated by small-scale farmers, who are faced with several constraints limiting their overall farming activities and outputs, thus, ultimately affecting agricultural profitability negatively.

According to the Food and Agricultural Organization (FAO, 2023), the government has implemented several initiatives and programs to address the situation: such program includes the Agriculture Promotion Policy (APP), Nigeria-Africa Trade and Investment Promotion Program, Presidential Economic Diversification Initiative, among many others.

Other programs also involved were the Presidential Initiative on Cassava in 2003 and the Cassava Transformation Agenda in 2011, which was an initiative to increase the profitability of cassava for small-scale farmers. All these efforts are directed to increase

profitability, however, it is still low (Dzever et al., 2016; FAO, 2023).

Various credit schemes were established by the federal government of Nigeria to ensure farmers' access to agricultural credit, some of the schemes were the Agricultural Credit Guarantee Scheme (ACGS) and the Rural Banking Programme in 1977, the Sectoral Allocation of Credits with a concessionary interest rate in the early 1980s. However, this is noted to be exclusively in favour of large-scale farming as smallholder farmers seldom obtain credit from formal credit sources leading to non-profitable enterprises (Awotide et al., 2015).

Despite different studies emphasising the profitability of cassava farming, questions on the profitability of cassava farming keep re-occurring (Okoh, 2016; Nwike et al., 2017). This might be due to the low yield being experienced when compared with profitability from other parts of the world (Eze and Nwibo, 2014; Dzever et al., 2016; FAO, 2023). Farmers, governments and other stakeholders were sometimes discouraged due to the low profitability which always affects the level of production, prompting reasons for more study on the profitability of cassava farmers. According to Adesope et al. (2006), agricultural development has been constrained by the marketing of commodities and financial funds. Therefore, there is a need to examine the profitability of cassava tuber, a major staple crop in Nigeria taking credit as one of the major factors. Nigeria has large economic potential with high profitability but profitability is not increasing because agricultural production is poor (FAO, 2023). Akerele (2016) noted that cassava farmers are often constrained due to their economic status and lack of accessibility to credit and other relevant inputs which would have facilitated the increase in cassava profitability and production. Ogisi et al. (2013) noted that the financial attractiveness of an enterprise is, however, paramount to attracting new investors. This is hinged on the understanding of the impact of credit on the profitability of cassava farmers in the study area. However, the influence of credit on cassava production remains poorly understood. This consequently affects the profitability of cassava farmers in the study area (Omonona, 2003; Ersado et al, 2004).

Therefore, this study intended to answer the following research questions, i) What were the socio-economic characteristics of cassava farmers in the study area? ii) What was the profitability of cassava production in the study area? iii) What factors (including credit use) affect the profitability of cassava farming in the study area?

Thus, this study examines the impact of credit use on profitability among cassava smallholder farmers in the study area.

Hypotheses of the study

The hypotheses tested in this study are:

1. Ho_1: There is no significant difference in the mean revenue of credit non-users and credit users. That is, $RU_1 \neq RU_2$

Ha_1: There is a significant difference in the mean revenue of credit non-users and credit users. That is, $RU_1 = RU_2$

2. Ho_2: There is no significant difference in the profitability level of credit non-users and credit users. That is, $PU_1 \neq PU_2$

Ha_2: There is a significant difference in the profitability level of credit non-users and credit users. That is, $PU_1 = PU_2$

MATERIALS AND METHODS

The study area

This study was conducted in southwest Nigeria. It comprised 6 states, namely Ondo, Osun, Oyo, Ekiti, Lagos, and Ogun. It lies between latitudes 5° and 9° north and longitudes 2° and 8° east of the Greenwich meridian. It is bounded in the south by the Atlantic Ocean, in the north by Kogi and Kwara States, in the south by Edo State, and in the west by the Republic of Benin. It has a land area of about 114,270 square kilometers equating to about 12% of the country's total farmable land (Aderinto et al., 2017).

The area has a tropical climate with dry and rainy seasons as the two major seasons. The rainy season occurs between March/April to October/November each year, whereas the dry season begins in October/November and lasts till March/April. However, in recent times, minor changes have been noticeable in rainfall regimes due to global climate change. The average daily temperature ranges between 25 °C (77.0 °F) and 35 °C (95.0 °F), whereas the annual rainfall ranges between 150 mm and 3000 mm.

Agriculture is the basis of the economy contributing the crucial single occupation for the people especially those in the rural areas. Arable crops like maize, rice, groundnut, kola-nuts, cassava, yam, cocoyam, oranges, and sugar cane are produced in the 6 states. Southwest is one of the major producers of cassava and kola nuts in the country (IITA, 2004). The natural resource endowment of the area includes land, water, mineral, forest, and agricultural resources, through which a wide range of agricultural and forest products, are

obtained. Mineral resources include limestone, chalk, phosphates, silica sand, gypsum, and clay (Southwest Investment Exhibition and Summit, 2016).

Sampling procedure

Multi-stage sampling procedure was used for this study; the first stage was a purposive selection of three states, namely Ondo, Oyo, and Ogun in the southwest region based on cassava production, processing, and marketing activities in the states (IITA, 2004). The second stage involved the purposive selection of a major cassava-producing zone from each state. The third stage was a purposive selection of the highest cassava-producing block from each selected zone. In the fourth stage, the highest cassava-producing cell was purposively selected from each of the sampled blocks. In the fifth stage, 96 farmers were randomly sampled from each of the selected cells adopting Israel's (1992) sample selection formulae as follows:

$$n_o = \frac{Z^2 pq}{e^2} \quad (1)$$

where:
n_o = sample size,
Z^2 = abscissa of the normal curve,
e = precision level,
p = estimated proportion of character present in the population (that is, smallholder cassava farming),
q = 1 – p.

$$\therefore n_o = \frac{(1.96)^2(0.5)(0.5)}{(0.1)^2}$$

$$\Rightarrow n_o = 96.04 \approx 96$$

Primary data were used for this study. Data on socio-economic characteristics and production were collected using a questionnaire. We have 288 farmers altogether as shown in Table 1. However, 59 farmers declined participation, whereas the remaining 229 consented. Albeit, 210 out of 229 responses were found useful for data analysis given a response rate of 91.7%.

Analytical techniques

The tools of analysis used to achieve the objectives of this study were descriptive statistics, budgetary analysis, ordinary least squares (OLS), and Student *t*-test statistics.

Descriptive Statistics

Descriptive statistics were used to describe the socio-economic characteristics of the respondents such as age, gender, farming experience, household size, marital status, educational status, and credit.

Budgetary Analysis

This was used to evaluate the costs and returns of cassava production among smallholder cassava farmers in the study areas. The Equation is indicated as Equation 2:

$$GM = TR - TVC = \Sigma P_i Q_i - \Sigma C_{ij} X_{ij} \quad (2)$$

i = 1,2,3,……210.
j = 1,2,…,5.
TR = Total value of cassava output (tonnes/ha)
TVC = Total variable cost (₦/ha)
P_i = Unit price of cassava produce (₦)
Q_i = Quantity of cassava produce of i^{th} farmer (tonnes/ha)
C_{ij} = Unit price of j^{th} input used by i^{th} farmer (₦)
X_{ij} = Quantity of j^{th} input used by i^{th} farmer
The Net revenue is given by:

$$NR = TR - TCT \quad (3)$$

TC = TVC + TFC
where:
NR = Net revenue (₦)
TVC = as defined previously
TFC = Total fixed cost (₦)
TC = Total cost of production (₦)
TR = as defined previously

Table 1. Sampling procedure

Stages	Selection	Procedure	Size	Selection Method	Criteria
1	Southwest State	Ondo, Ogun and Oyo	3 states	Purposive Sampling	Highest producer
2	ADP Zone	1 zone × selected state	3 zones	Purposive Sampling	Highest producer
3	ADP blocks	1 block × selected zone	3 blocks	Purposive Sampling	Highest producer
4	ADP cells	1 cell × selected block	3 cells	Purposive Sampling	Highest producer
5	96 farmers	96 farmers × selected cells	288 farmers	Random Sampling (without replacement)	Small holders
Total				**288 farmers**	

Profitability Index

$$ROI\ (\%) = \frac{NR}{TC} \quad (4)$$

where:
ROI = Rate of return on investment
NR and TC = as defined previously

Ordinary Least Squares (OLS)

Following Otunaiya (2007), Bolarinwa and Odugbemi (2016), and Ibrahim and Yusuf (2017), the Ordinary Least Squares (OLS) method of analysis was used to analyse objective three which is examining the factors influencing the profitability of cassava farmers in the study area.
The regression model is specified as follows:
The implicit form of the regression model was presented as:

$$R_i = f(ß_i x_i \mu_i) \quad (5)$$

This is explicitly expressed as:

$$R = ß_0 + ß_1X_1 + ß_2X_2 + - - - + ß_{11}X_{11} + e \quad (6)$$

where:
R = Cassava Profitability (Rate of Return on investment)
X_1 = Age (years)
X_2 = Sex (1 if male, 0 otherwise)
X_3 = Marital Status (1 if married, 0 otherwise)
X_4 = Farming Experience (years)
X_5 = Education Level (years of formal schooling)
X_6 = Farm size (hectares)
X_7 = Cooperative society (Yes = 1, No = 0)
X_8 = Savings (Yes = 1, No = 0)
X_9 = Extension contact (number of extension visit)
X_{10} = Household size (number of person)
X_{11} = Amount of credit use (₦)
μ = disturbance or random error term.

RESULTS AND DISCUSSION

Socio-economic characteristics of respondents

The result revealed that 30% of cassava farmers were aged 31 and 40 years as shown in Table 2. The agility and productivity of a farmer are highly dependent on his/her age (Akerele, 2016). It is a general belief that the older a farmer becomes, the less productive such an individual is likely to be, which will invariably affect the income-generating ability of that individual (Akerele, 2016). The mean age of the cassava farmers was 42 years which is almost the same value reported by Okoh (2016) who got 46 years as the mean age of cassava farmers. The implication of this result is that most of the cassava farmers are still within their productive age. That is, they are still young, energetic, and vibrant and this may have a positive influence on their productivity, income as well as credit availability. This confirms the argument of Akerele (2016), who said that age influences the level of physical work and the willingness to take risks.

The study further revealed that 60% of the cassava farmers were male and 40% were female. The implication of this result is that male-dominated cassava farming and the dominance of males over females in the enterprise may be because cassava farming is tedious and requires a lot of energy which females might not be able to provide. The gender of the farmer determines the level of income that comes to the farmer, this is in alignment with the results given by Oladejo (2016), Okoh (2016), and Owusu (2017).

The majority (81%) of the cassava farmers were married, 12.9%, 3.8%, 0.5%, and 1.9% of the cassava farmers were single, widowed, divorced, and separated, respectively. Marital status prompts commitment to business because of the family needs that must be met and this will invariably enhance productivity. The implication of this result is that the majority of the cassava farmers were mature enough and responsible to cater to their households as well as have a clear knowledge of their wellbeing. This also supports previous findings as revealed by Iyanda et al. (2014) and Dzever et al. (2016).

About 33.3% of the cassava farmers had secondary education, whereas 17.6%, 32.9%, and 16.2% had no formal education, and had primary and tertiary education, respectively. The adoption capacity of a farmer about technology requires that the farmer is well-exposed and educated (Eze and Nwibo, 2014). The implication of this result is that most of the cassava farmers were educated and this will have a positive influence on their ability to adopt innovative practices in cassava production and invariably increase their efficiency and income (Eze and Nwibo, 2014). This also affirms the finding of Okoh (2016), that education is needed to enhance output among farming households and that a high literacy level will enhance profitability.

The result also revealed that the majority (50.7%) of the cassava farmers had between 6 and 10 persons in their households. Household size is an important factor to consider in describing households' pursuit of economic activities and the welfare of the households, and this factor affects the availability of labour for farming activities (Eze and Nwibo, 2014). The mean size of the household was approximately 6 persons which is visually the same as the result given by Dzever et al. (2016). The implication of the result is that

the households had a fairly large size and they could employ farm labours (Dzever et al, 2016).

About 34.4% of the cassava farmers had between 11 and 20 years of farming experience, with a mean of 20 years. The number of years spent by farmer is an indication of the practical knowledge such farmer had gained on how to cope with production, and when experience is properly channeled it can lead to higher productivity, higher profitability, and higher income and can translate to improved standard of living (Okoh, 2016). The implication of this result is that most of the cassava farmers in the sampled three states are well experienced in problems facing them in cassava production, which may have a positive influence on their output and income generated according to Akerele (2016).

In addition, most (40%) of the cassava farmers had less than one hectare of land; the mean farm size was 3 hectares. The implication of this result is that the majority of the cassava farmers were smallholders. Majorities (70.5%) of the cassava farmers had no extension contacts and were members of cooperatives (71.9%). Most (61.9%) of the cassava farmers were involved in savings.

Table 2. Socio-economic characteristics of cassava farmers

Variable	Frequency	Percentage
Age (years)		
≤30	44	21
31–40	63	30
41–50	44	21
51–60	31	15
≥61	28	13
Total	**210**	**100**
Mean	**42.71**	
Std. Deviation	**16.47**	
Sex		
Female	84	40
Male	126	60
Total	**210**	**100**
Marital status		
Single	27	12.9
Married	170	81
Divorced	1	0.5
Widowed	8	3.8
Separated	4	1.9
Total	**210**	**100**
Educational level		
Non–formal	37	17.6
Primary	69	32.9
Secondary	70	33.3
Tertiary	34	16.2
Others	0	0
Total	**210**	**100**
Household size (persons)		
1–5	98	46.9
6–10	106	50.7
11–15	5	1.9
16–20	1	0.5
Mean	**5.81**	
Std. Deviation	**2.44**	
Farming Experience (years)		
1–10	66	31.6
11–20	72	34.4
21–30	40	19.1
31–40	21	10.0
>40	11	4.9
Mean	**19.49**	
Std. Deviation	**12.60**	
Farm Size		
≤1	84	40.0
1.01–2	31	14.8
2.01–3	28	13.3
3.01–4	22	10.5
4.01–5	12	5.7
>5	33	15.7
Mean	3.10	
Std. Deviation	3.28	
Extension contact		
No	148	70.5
Yes	62	29.5
Total	210	100.0
Cooperative society		
No	59	28.1
Yes	151	71.9
Total	210	100.0
Savings		
No	80	38.1
Yes	130	61.9
Total	210	100.0
Credit		
Credit non–user	106	50.50
Credit user	104	49.50
Total	210	100.00

Source: Field Survey, 2019

Table 3. Cost and return structure per hectare of cassava production[1]

	Credit non-users (Cost)			Credit users (Cost)			Pooled (Cost)		
Variable	**Naira (₦)**	**Dollar ($)**	**% Cost**	**Naira (₦)**	**Dollar ($)**	**% Cost**	**Naira (₦)**	**Dollar ($)**	**% Cost**
Total Revenue	117,602.53	329.29		131,917.79	369.37		124,101.04	347.48	
Fixed Cost									
Rent on land	5,142.33	14.40	10.12	5,219.99	14.62	10.04	5,180.79	14.51	10.08
Total Fixed Cost	5,142.33	14.40	10.12	5,219.99	14.62	10.04	5,180.79	14.51	10.08
Variable Cost									
Stem cuttings	14,162.43	39.65	27.89	16,216.43	45.41	31.19	15,179.65	42.50	29.53
Fertiliser	655.83	1.84	1.29	1,914.41	5.36	3.68	1,279.13	3.58	2.49
Herbicide	3,248.49	9.10	6.39	4,066.10	11.39	7.82	3,653.40	10.23	7.11
Labour	27,612.37	77.31	54.33	24,582.19	68.83	47.27	26,111.71	73.11	50.79
Total Variable Cost	45,679.13	127.90	89.88	46,779.13	130.98	89.96	46,223.89	129.43	89.92
Total Cost	50,821.45	142.30	100.0	51,999.12	145.60	100.0	51,404.68	143.93	100.0
Gross Margin	71,923.40	201.39		85,138.66	238.39		77,877.15	218.06	
Net Revenue	66,781.08	186.99		79,918.68	223.77		72,696.36	203.55	
Return on Investment	1.31			1.54			1.41		

Source: Field Survey, 2019
[1]USD equivalent of ₦1 is 0.0028USD, Euro equivalent of ₦1 is 0.0025EUR, while Pound equivalent of ₦1 is 0.0022GBP.

An average (49.5%) of the cassava farmers had access to credit as shown in Table 2. The implication of this result is that there is the likelihood that some farmers are more productive than their counterparts as a result of their access to credit and this credit may likely increase their scale of production and profitability (Iyanda et al., 2014; Awotide et al., 2015; Owusu, 2017).

Profitability of cassava production

The pooled estimated cost and return per hectare of cassava farmers

The result as shown in Table 3 revealed that the revenue realised from cassava farming was ₦124,101.04 ($347.48)/ha, the total fixed cost incurred was ₦5,180.79 ($14.51)/ha and this represented 10.1% of the total production cost, the total variable cost incurred was ₦46,223.89 ($129.43)/ha and this represented 89.9% of the total production cost of ₦51,404.68 ($143.93)/ha. Depreciation on land contributed 10.1% to the total production cost, whereas stem cutting, fertilisers, herbicides and labour contributed 29.5%, 2.5%, 7.1% and 50.79%, respectively, to the total production cost. The gross margin from cassava production was ₦77,877.15 ($218.06)/ha, whereas the profit or net farm income from cassava production was ₦72,696.36 ($203.55)/ha. This implies that cassava production is a profitable and viable enterprise (Oduntan et al., 2021). The rate of return was 1.41 which implies that for every ₦1 ($0.0028) spent on the enterprise ₦1.41k ($0.0039) would be returned as profit.

Estimated cost and return per hectare of credit non-user cassava farmers

The result as shown in Table 3 revealed that the revenue realised from cassava farming was ₦117,602.53 ($329.29)/ha, the total fixed cost incurred was ₦5,142.33 ($14.40)/ha and this represented 10.1% of the total production cost. The total variable cost incurred was ₦45,679.13 ($127.90)/ha and this represented 89.9% of the total production cost. The total production cost was ₦50,821.45 ($142.30)/ha. Depreciation on land contributed 10.1% to the total production cost, whereas stem cutting, fertilisers, herbicides and labour contributed 27.9%, 1.3%, 6.4%, and 54.3%, respectively, to the total production cost. The gross margin from cassava production was ₦71,923.40 ($201.39)/ha, whereas the profit or net farm income was ₦66,781.08 ($186.99)/ha. This implies that cassava production is a profitable and viable enterprise. The rate of return was 1.31 which implies that for every ₦1 ($0.0028) spent on the enterprise ₦1.31k ($0.0037) would be returned as profit. This shows that cassava production is viable, and profitable in concord with Oladejo (2016).

Estimated cost and return per hectare of credit user cassava farmers

The result as shown in Table 3 revealed that the revenue realised from cassava farming was ₦131,917.79 ($369.37)/ha, the total fixed cost incurred was ₦5,219.99 ($14.62)/ha and this represented 10.0% of the total production cost, the total variable cost incurred was ₦46,779.13 ($130.98)/ha and this represented 90.0%

Table 4. Multiple regression estimates of determinants of profitability

Variable	Coefficient	Standard Error	P-value
Constant	43980.11***	10939.87	0.000
Age	183.4387	171.1629	0.285
Sex	2226.783	4491.595	0.621
Household Size	1389.345	932.7156	0.138
Marital status	4698.697	6221.881	0.451
Farming experience	106.1494	231.1729	0.647
Educational level	-1683.211	2274.253	0.460
Farm size	-3884.515***	751.5813	0.000
Cooperative society	-8389.079*	4830.244	0.084
Savings	4160.767	5217.17	0.426
Extension contact	2633.244	2258.224	0.245
Amount of credit use	12003.47***	4470.815	0.008
Diagnostic Statistics			
R squared	0.2250		
F (12, 197)	4.60		
Prob of F	0.0000		

*** Significant at 1%
** Significant at 5%
* Significant at 10%
Source: Field Survey, 2019

of the total production cost of ₦51,999.12($145.60)/ha. Depreciation on land contributed 10.0% of the total production cost, whereas stem cutting, fertilisers, herbicides and labour contributed 31.2%, 3.7%, 7.8%, and 47.3%, respectively, to the total production cost. The gross margin from cassava production was ₦85,138.66 ($238.39)/ha. The profit or net farm income from cassava production was ₦79,918.68 ($223.77)/ha, this implies that cassava production is a profitable and viable enterprise. The rate of return was 1.54 which implies that for every ₦1 ($0.0028) spent on the enterprise ₦1.54k ($0.0043) would be returned as profit. This finding is consistent with that of Oladejo (2016), although, it is 0.11 less when compared with the 1.43 the author obtained and also with that of Okoh (2016). This shows that cassava production is profitable in the study area.

Effect of credit use on the profitability of cassava farmers

Multiple regression analysis was used to determine the effect of the amount of credit used on the profitability of the cassava farmers. The R-squared revealed that a 22.5% variation in profitability of the cassava farmers was jointly explained by the explanatory variables, the F-statistics showed that the model is fit at 1% ($p < 0.01$). The result as shown in Table 4 revealed that Farm size ($\beta = -3884.515$, $p < 0.01$), membership in a cooperative society ($\beta = -8389.079$, $p < 0.10$), and amount of credit use ($\beta = 12003.47$, $p < 0.01$) significantly influence the profitability of the cassava farmers. The coefficient of farm size revealed that if the size of farmland cultivated increases by one hectare the profitability of the farmers will decrease by ₦3884.52 (Awotide et al., 2015); the coefficient cooperative society revealed that the profitability of cassava farmers that belong to a cooperative society decreases, the coefficient of amount of credit use revealed that increase in the amount of credit use increases the profitability of the cassava farmers (Eze and Nwibo, 2014; Ekunwe et al., 2015).

The test of the mean difference between credit users and credit non-users

The result of the first hypothesis (that is, there is no significant difference in the mean revenue of credit non-users and credit users) presented in Table 5 revealed that there is a significant difference between the revenue realised by credit users and non-users at 1% with a mean difference of 14,315.26. The implication is that the revenue realised by cassava farmers who make use of credit differs from those who do not make use of credit. This result conforms to the findings of Ashaolu et al. (2011).

The result of the second hypothesis (that is, there is no significant difference in the profit level of credit non-users and credit users) presented in Table 5 revealed that there is a significant difference between the profit level realised by credit users and credit

Table 5. The Test of Mean Difference between credit users and credit non-users

Hypothesis	Std. Error	Df	Mean Difference	P-value	T-value	Decision
Total Revenue	5,318.976	208	14,315.264	0.008***	2.691	Reject the Null Hypothesis
Profitability	4,577.261	208	13,137.602	0.005***	2.870	Reject the Null Hypothesis

Source: Field Survey, 2019

non-users at 1% with a mean difference of 13,137.60. The implication is that the profit level realised by cassava farmers who make use of credit differs from those that did not make use of credit. This result conforms to the findings of Ashaolu et al. (2011).

CONCLUSIONS AND RECOMMENDATIONS

The study was carried out to assess the impact of credit use on profitability among cassava smallholder farmers in the study area. The study concluded that cassava production is a productive enterprise in the southwest and that the amount of credit used had a significant influence on the profitability of the farmers.

Based on the findings of this study, the following recommendations were made to improve the profitability of cassava production in the study area; 1) Credit should be made available to the cassava farmers by stakeholders like government and non-governmental organisations, to increase their profitability. 2) Farmers come together to form a cooperative society as this gives them more access to credit.

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COMPETING INTERESTS

The authors have declared that no competing interests exist.

AUTHORS' CONTRIBUTIONS

Author A did the research work under the strict supervision of other authors. All authors read and approved the final manuscript.

CONSENT (WHERE EVER APPLICABLE)

Not applicable

CONFLICT OF INTEREST

The authors declared no conflicts of interest with respect to the research, authorship, and publication of this article.

ETHICAL COMPLIANCE

The authors have followed ethical standards in conducting the research and preparing the manuscript.

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