

FINANCIAL PERFORMANCE OF SOYBEAN FARMERS IN VANDEIKYA LOCAL GOVERNMENT AREA OF BENUE STATE, NIGERIA

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ABSTRACT

Soybeans is versatile in usage but the yield is low. To sustain and improve its production, its financial performance, given the resource-poor status of rural farmers, is greatly important. Credit access is sine qua non in this direction. Hence, the study assessed credit access and financial performance of soybeans farmers in Vandeikya Local Government Area of Benue State, Nigeria. Stratified sampling technique was used to select 119 farmers who either had or did not have credit access. This reflects a quasi-experimental design where the treatment and control groups comprised farmers with and without credit access, respectively. Primary data were obtained with structured questionnaire and analysed with frequency distribution and financial ratios such as gross margin, operating ratio and return on investment. Independent samples t-test was used to ensure that any observed difference was due to error of randomization. Findings show that majority of the farmers lacked credit access (60.50%). The mean gross margin per hectare was significantly ($p < 0.01$) higher for the treatment group ($\text{₦}264,753.90 \pm 12,597.15$) than the control group ($\text{₦}152,412.60 \pm 4,773.53$). The mean return on investment per hectare was also significantly ($p < 0.01$) higher for the treatment group (3.06 ± 0.29) than the control group (2.13 ± 0.10). Therefore, soybean production was adjudged to be profitable and significantly influenced by credit access. It was recommended that financial institutions and the export promotion council should make credit available to soybeans farmers.

Keywords: Soybeans, credit access, gross margin, operating ratio, return on investment

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INTRODUCTION

Soybeans (*Glycine max* (L) Merrill), which originated in China, is a member of the family *leguminosae*, in the subfamily of *papilionaceae*. It is an annual food legume and an important for food, feed, oil, milk production and cash generation (FAO, 2005; Udeh, Ogbanje & Ayopo, 2018; Pagano & Miransari, 2022). Soybean is one of the major industrial and food crops that can be cultivated in several continents (Omoigui *et al.*, 2020) but more suitable in tropical,

subtropical and temperate climates (Wilson, 2015). The crop can be successfully grown in many States in Nigeria (Ugbabe, Abdoulaye, Kamara, Mbaval, and Oyinbo, 2017). Its amenability to low agricultural input and production has facilitated its expansion (Iwuchukwu & Beeior, 2018; Omoigui *et al.*, 2020; Vanger, Usman and Mohammed, 2021). The expansion is also due to its nutritive, economic importance and diverse domestic uses (Omoigui *et al.*, 2020). Moreover, the high demand for soybean products has been attributed to the presence to its inherent food supplements in and the subsequent rising utilization (Siamabele, 2021).

According to Udeh *et al.* (2018), soybeans provides a cheaper and high protein-rich alternative to animal protein, noting that animal protein is becoming unaffordable to average Nigerians. In Bangladesh, soybean provides the richest source of protein of any crop and is able to serve as the core protein supplement to human diets (Islam *et al.*, 2022). Lal (2005) and Karlen *et al.* (2009) stated that soybean is a soil restorative crop whose residue can also be used as a climate-smart agricultural practice. Biam & Tsue (2013) listed the local uses to include soybean oil, soybean milk, soybean “fufu”, soybean “*dadawa*”, livestock feed, soya sauce. Benthem (2013) added that about 50% of all planted biotechnology crops is soybean. Osman *et al.* (2018) and Iticha (2020) indicated that soybean is a high value and profitable crop with the potential of poverty reduction. Meade *et al.* (2016) stressed that soybeans is among the top five most important agricultural exports in terms of global export value. Tamimie (2017) affirmed that soybeans is a potential source of income for smallholder farming communities. Williams, Shumway and Love (2014) noted that soybeans producers could realize large additional benefits from a substantial increase in their investments.

Preliminary analysis of data from the website of the Food and Agriculture Organization reveals that average soybeans production in Nigeria between 2000 and 2019 was 11,567,662 mt. This output came from 12,802,809 ha. These figures produce about 0.90 mt/ha as the yield. This is lower than the optimum yield of about 2.4 mt/ha. An obvious reason for this low productivity, given that soybeans tolerates low soil fertility, could be credit accessibility.

Credit supplements the prevalent capital inadequacy of farmers in developing countries, including Nigeria (Abdallah, 2016; Awotide, Abdoulaye, Alene and Manyong, 2015). Credit enables farmers to take production decisions in good time Degefa, Jaleta and Legesse (2017) as *Journal of the Faculty of Agriculture, Imo State University, Owerri*
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well as timely purchase of relevant equipment and inputs (Ali & Awade, 2019). Conversely, its inaccessibility constitutes impedance to the procurement of critical production inputs (Abdallah, 2016). This can adversely affect the adoption of innovations by farmers. Osabohien, Afolabi and Godwin (2018), Osabohien *et al.*, 2019) and Osabohien, Mordi and Ogundipe (2022) emphasized that there is little that farmers can do in the absence of the credit market. This position supposes that the financial inclusion policy of the government is not yielding the desired impact of ameliorating credit constraints among farmers.

In spite of the preponderant evidence of the impact of credit on farm production, farmers are still contending with lack of credit access. For instance, Silong & Gadanakis (2020) indicated that credit access is low among Nigerian farmers. Ebukiba, Anthony and Adamu (2020) added that low credit access contributes to food production constraints through the path of sub-optimal inputs supply.

The foregoing suggests that credit constraint can affect the profiles of production and profitability indicators among soybeans farmers, giving that, according to Gawęda, Nowak, Haliniarz and Woźniak (2020), soybeans is vulnerable to environmental stress. (Goldsmith, 2019) reported that low yield of soybeans among farmers in Sub-Saharan Africa is due to the poor management of inputs, a consequence of credit constraint. For Benue State in particular, Upev, Haruna and Giroh (2016) raised concerns about inadequate resource management among soybean farmers.

Low or absence of credit access leads to low soybean yield, which in turn has implications for the financial performance of soybean production as well as its migration from subsistence to commercial scale. Common measures of financial performance among small to medium-scale farmers include gross margin, operating ratio and return on investment. The gross margin is a technique that determines the difference between cost and returns of an investment, with the assumption that fixed cost of production is negligible (Lawal, Ogbanje and Nenker, 2011; Akpan, Udo and Akpan, 2019; Bitrus, Yakubu, Patrick and Stephen, 2021). As a measure of the difference between revenue and cost of sales, gross profit margin is the most commonly used index that can evaluate the profitability of an enterprise's basic business performance (Shi, Huang, Wu and Jin, 2021). In addition, profitability measures the performance of management

(Zamfir, Manea and Ionescu, 2016), in this case, the farmer who leads the farm management team. While a positive gross margin indicates that the farm can over the entire variable cost of production, a negative gross margin shows that the farm cannot cover the variable cost (Afouda, Tama, Akpo and Yabi, 2019).

The operating ratio measures the ability of a firm to generate enough profit that would cover fixed costs, if any, and other operating costs. Measured on a scale of 0 to 1, the ratio suggests the remaining balance that is needed to cover the cost of production or goods sold. Khaddafi & Khaddafi (2020), a high ratio indicates unfavorable conditions. This means that every naira of sales absorbed in costs is also high, leading to small profits. However, a high ratio may not only be caused by internal factors which are often controllable by management, but also external factors that are difficult to control by management. The external factors include input prices and credit conditions, among others.

The success of an investment is measured by the attainment of its predetermined goals. In production, the goals include maximization of output, maximization of profit, minimization of cost, increasing market share, customer satisfaction and sustainability. Since the capital for investment is more often not associated with a cost, the return to this capital is of utmost importance to investors. Hence, the return on investment (ROI) was designed to measure return on invested capital. According to Esker & Conley (2012) and Zamfir *et al.* (2016), the ROI is an indicator that shows to which extent a specific business produce gain from the use of capital. It shows the extent to which the amount invested in a particular action returns as profit or loss. Thus, it enables efficiency assessment of an amount invested in a concern. Andru & Botchkarev (2011) asserted that ROI, which facilitates the process of taking informed decisions, is a tool for evaluating the efficiency of an investment. They also noted that ROI can be used to compare the efficiency of a number of investments or an investment from different perspectives.

Few studies have attempted to assess the profitability of soybeans production. For instance, Biam & Tsue (2013) assessed the costs and returns in soybeans production among small-scale farmers in Central Agricultural Zone of Nigeria. Also, Biam, Okorie and Nwibo (2016) employed the Cobb-Douglas stochastic frontier cost function to measure the level of economic efficiency and its determinants in small scale soybeans production in Central Agricultural Zone of Nigeria. In *Journal of the Faculty of Agriculture, Imo State University, Owerri*
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addition, Udeh *et al.* (2018) conducted economic analysis of soybeans marketing in Benue State, Nigeria. Udeh, Ogbanje, & Ayopo (2018) also examined the marketing margin of soybeans marketers in Benue State, Nigeria. Furthermore, Ugbabe *et al.* (2017) assessed the profitability and technical efficiency of soybeans production in Northern Nigeria. Upev *et al.* (2016) examined the efficiency of resource use in soybean production in Gboko Local Government Area of Benue State, Nigeria. Finally, Samuel & Idris (2021) analyzed the economics of soybean production in Taraba State, Nigeria; and Sani (2018) assessed the costs and returns in soybean production among small-scale farmers in Zamfara State of Nigeria.

Most of these studies did not capture operating ratio and return on investment of soybean production. As a matter of fact, none of the studies, including those that were done in Benue State, disaggregated the respondents and findings along the line of credit access. These are the voids which the current study was designed to fill. It is expected that the findings of the study would be useful to soybean farmers, investors and consumers, financial institutions and the Nigerian Export Promotion Council. Consequently, the general objective of the study was to assess credit access and financial performance of soybeans farmers in Vandeikya Local Government Area of Benue State, Nigeria. The specific objectives of this paper were to analyse credit access among soybeans farmers in the study area; determine the gross margin, operating ratio and return on investment of the soybean farmers. It was hypothesized that there is no significant difference in gross margin, operating ratio and return on investment between farmers who had access to credit and those who did not have.

MATERIALS AND METHODS

The study area was Vandeikya Local Government Area (LGA). It is one of the 23 LGAs in Benue State. Vandeikya Local Government Area is located between latitude 7°5' and 7°15' north of the Equator and Longitude 9° and 9°6' east of Greenwich. It has a landmass of 183,939 square metres (0.7 sq miles) with a population of well over 80,288. Vandeikya is in the South Eastern part of Benue State and shares boundaries with Obudu and Bekwara in Cross River State to the East, Ushongo to the North and Konshisha LGA to the West. There are twelve administrative council wards.

Vandeikya LGA was carved out of Gboko LGA in 1976. The indigenous community is the Tiv people who speak the Tiv language. The Vandeikya people are a hospitable group and are predominantly Christians with a few traditionalists. Vandeikya Local Government area is dominated by undulating terrain with much of the area being below 183 m (600 ft) above the sea level. Surface drainage is generally good with almost all the rivers being seasonal, notably river Aya and river Be. This can promote soybean production.

The climate is tropical sub humid with the mean annual rainfall of between 1,200 and 2,000 mm (47" and 79") averaging seven months in the year, while the mean annual temperature is 32.5 °C (90 °F). The wet season is from April to October or November while the dry season is November to March. Agriculture is the mainstay of the people; with arable land for sheep, goats and cattle rearing. Over 80% of the population are directly engaged in the peasant farming of virtually all major food crops, with concentration on rice, sweet potatoes, cassava, sorghum, citrus, spices, pepper, groundnut, soybean and bambara nuts. The LGA is endowed with mineral deposits such as barites, kaoline and iron ores. Like most parts of the State, the soil is loose and well-drained loam with less clay fractions. According to Omoigui *et al.* (2020) and Vanger *et al.* (2021), this type of soil is suitable for soybean production.

Being principally farmers, the major commercial engagements of the people in the area revolve around agricultural products. There are many small-scale cottage industries like rice milling, block making and furniture works and others. There are also several savings scheme, locally called “*Adashi*” which advance loan to soybeans farmers on a short-tenure basis.

The population for the study comprised all registered soybean farmers in the LGA, numbering 170. This was obtained through a reconnaissance survey. This number comprised 67 and 102 farmers with and without credit access, respectively. Stratified random sampling was used to select 47 and 72 farmers with and without credit access, respectively for the study. Following the examples of Ahakiri (2018), Oluwatoyin, Olufunke and Salome (2018), Udeh *et al.* (2018), Olaoye & Malomo (2019) and Ogbanje & Oraka (2021), Taro Yamane formula for sample size determination and Bourley’s proportional allocation formula were appropriately utilized.

Primary data for the study were obtained with the use of structured questionnaire. The data were analysed using STATA 16 with such statistical tools as frequency distribution and financial

ratios. The hypotheses were tested with the aid of independent samples test of means difference (t-test). The models for financial ratios and t-test were specified as follow:

Gross margin

$$GM = \sum p_i q_i - \sum r_j x_j \quad (1)$$

where,

GM = Gross margin

TR = Total revenue

TVC = Total variable cost

Operating ratio

Total cost/total revenue

$$OPR = \frac{tvcpha}{nspha} \quad (2)$$

where,

OPR = operating ratio

tvcpha = total variable cost per hectare

nspha = net sales per hectare

Return on investment

$$ROI = \frac{FVI - ICI}{ICI} \times 100 \quad (3)$$

where,

ROI = return on investment, expressed in percentage

FVI = final value of investment

ICI = initial cost of investment

Independent samples test of means difference (t-test)

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{SX_1^2}{NX_1} + \frac{SX_2^2}{NX_2}}} \quad (4)$$

where,

$t = t - statistic$

gm = gross margin

opr = operating ratio

roi = return on investment

$\bar{X}_1 = mean\ gm/opr/roi\ of\ farmers\ with\ credit\ access$

$\bar{X}_2 = mean\ gm/opr/roi\ of\ farmers\ without\ credit\ access$

$SX_1^2 = standard\ deviation\ of\ mean\ gm/opr/roi\ of\ farmers\ with\ credit\ access$

$SX_2^2 = standard\ deviation\ of\ mean\ gm/opr/roi\ of\ farmers\ without\ credit\ access$

$NX_1 = sample\ size\ of\ farmers\ with\ credit\ access$

$NX_2 = sample\ size\ of\ farmers\ without\ credit\ access$

RESULTS AND DISCUSSION

Credit access of soybean farmers in the study area

The results of the analyses of credit access are presented in Table 1. The results show that majority (60.5%) of the farmers lacked access to credit. This result is of typical of farm production in Nigeria where most farmers are unable to access credit facilities. Lack of access to credit can worsen the existing resource-poor status of farmers. The situation can reduce their capacity to acquire productive inputs at all or in right quantities at the right time and prices. According to Osabohien *et al.* (2020), lack of credit assistance can impose long-term hardship on farm households and impose restrictions on the purchase of critical inputs.

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This finding is in line with Ogbanje *et al.* (2019) that most cassava farmers in Benue State lacked access to credit. Abdallah (2016) and Awotide *et al.* (2015) also reported low level of access to credit among farmers in Ghana and Nigeria, respectively. Furthermore, Osabohien *et al.* (2020) found that lack of access to credit among farmers cuts across the six geopolitical zones of Nigeria. In addition, Biam *et al.* (2016) found that majority (71.8%) of small-scale soybean farmers had no access to credit in Nigeria's central agricultural zone. However, the result is contrary to Akinbode (2013) who found that majority of rice farmers in Niger State had access to credit. Also, Akerele & Adekunmbi (2018) found that most farmers who were members of cooperative thrift had access to credit facilities. Similarly, Silong & Gadanakis (2020) found that most livestock farmers in Nasarawa State had access to credit.

Yield and Gross margin of Soybean farmers

The result of the analysis of yield and gross margin among the respondents is presented in Table 2. The result shows that the farmers with credit access had higher mean yield, number of bags harvested, sales per bag, total variable cost and revenue per hectare than those who had no credit. These statistics depict the relevance of capital to farming in the area. Regardless of available natural resources like land and family labour, soybeans production requires capital in all the key operations that lead to the financial performance of enterprise.

For instance, farmers incurred more expenditure per hectare because they could supplement equity capital with debt capital. Studies have shown that equity capital is often inadequate for meaning production and investment, thereby underscoring the relevance of credit to production. Larger capital outlay among the farmers with credit access led to their relatively higher yield (1.08mt/ha) than those without credit access (0.82 mt/ha). Nevertheless, both categories obtained lower yield than the optimum of 2.46 mt/ha. The shortfall can be attributed to the inadequate credit and the fact that credit access does not always produce optimum result.

Mean revenue per bag was higher for farmers with credit access than those without credit access. This could be as a result of the ability of the former to wait and sell their produce whenever the price appreciates (the lean period) rather than the latter who often sell at harvest. Those who sell at harvest are vulnerable to lower prices which are caused by increased supply of the produce.

All these culminated in the higher gross margin per hectare for farmers with credit access those who lack access to credit. It is important to stress that the difference in gross margin (₦112,341.30) between the samples was larger than the mean total variable cost per hectare for both groups (₦91,497.36). Should the farmers with credit access decide to plough this profit into the capital base for the next cropping season, the gap between them and their counterparts would further widen. From another perspective, the mean gross margin (₦264,753.90) of farmers with credit access was large enough to offset the mean credit that was obtained (₦247,553.20). The implication, however, is that they would need more credit to continue in the next season should they be compelled to repay their credit at sale. This is a pointer to the prevailing agricultural credit policies where the payback period is tied to the gestation period of the commodity.

The overall result of the gross margin presents a good picture for soybean production in the study. This assertion is based on the empirical evidence that the ratio of the overall gross margin (₦196,782.70) to the overall total variable cost (₦91,497.36) is 2.15. This means that the farmers can double their level of production in the next cropping. Hence, soybeans production is not only profitable but can be easily expanded with retained capital policy. Government's policy on import restriction and support for local content would have had remarkable effect on this result.

The gross margin per hectare of farmers with credit access (₦264,753.90) was higher than ₦168,908.6 that was found for soybean farmers in Taraba State by Samuel & Idris (2021), whereas those of farmers without credit (₦152,412.60) was lower. A similar pattern was observed for average revenue per hectare, where Samuel & Idris (2021) found ₦304,750.0 as against the ₦373,173.40 and ₦232,863.60 for farmers with and without credit, respectively in the current study. Also, the gross margin (242.38 Dollar/ha) in Afouda *et al.* (2019) was less than that of the farmers with credit access but higher than that of farmers without credit.

Furthermore, the combined gross in this study represents substantial increase from 2011 where Biam & Tsue (2013) found gross margin of ₦77,478.66/ha for Benue State. The finding of this study is also higher than (₦146, 221.1) for soybeans farmers who participated in Zamfara Comprehensive Agricultural Revolution Programme as found by Sani (2018). The result was also higher than Ugbabe *et al.* (2017) who found ₦178,613.0/ha for soybean producers in Dawakin-Tofa LGA of Kano State. Ayalew, Bekele and Mazengia (2018) also found that

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soybean production was profitable as the mean gross margin per hectare was Ethiopian *birr* 2025.36 per hectare.

Operating ratio of the Soybean farmers

The analysis of the operating ratio of soybean farmers is presented in Table 3. The result shows that farmers with credit access had lower operating ratio than those without credit access. This implies that the presence of credit induced more spending. Nevertheless, spending less than optimum can lead to lower financial performance of soybeans production as some operations require mandatory financial expenditure. Furthermore, a high ratio signifies an unfavourable financial position. According to Khaddafi & Khaddafi (2020), a high operating ratio means that every naira of sales absorbed in costs is also high, leading to small profits. This suggests that farmers without credit access had most of returns absorbed in cost of production.

Return on Investment of the Soybean Farmers

The result of the analysis of soybean farmers is presented in Table 4. The result shows that farmers with credit access had higher return on investment (3.06) than those without credit access (2.13). These results imply that every of ₦1 spent on soybeans production yielded ₦3.06 and ₦2.13 respectively among farmers with and without credit access. The combined result shows that every ₦1 spent on soybeans production yielded ₦2.49, implying more double the amount invested in the enterprise. This further shows that soybeans production is profitable in the study area. The findings in this study were higher than Ugbabe *et al.* (2017) who found 1.75 for soybean producers in Dawakin-Tofa LGA of Kano State. Also, the combined return on investment in this study was higher than Ayalew *et al.* (2018) who found 1.45 for soybeans farmers in North Western Ethiopia.

Hypothesis One: Difference in Gross Margin between farmers with and without credit access

The result in Table 5 shows that farmers with credit access had higher mean gross margin per hectare (₦264,753.90 ± 12,597.15) those who were without credit access (₦152,412.60 ± 4,773.53). The t-ratio (9.5587) of the test was statistically significant ($p < 0.01$). Consequently,

the study failed to accept the null hypothesis. The implication is that there is significant difference in gross margin between farmers with credit access and those without credit access.

Hypothesis Two: Difference in Operating Ratio between Farmers with and without Credit Access

The result in Table 6 shows that farmers with credit access had lower mean operating ratio per hectare (0.30 ± 0.02) those who were without credit access (0.35 ± 0.01). The t-ratio (-1.9410) of the test was not statistically significant even at 5%. Consequently, the study failed to reject the null hypothesis. The implication is that there is no significant difference in operating ratio between farmers with credit access and those without credit access.

Hypothesis Three: Difference in Return on Investment between Farmers with and without Credit Access

The result in Table 7 shows that farmers with credit access had higher mean return on investment per hectare (3.06 ± 0.29) those who were without credit access (2.13 ± 0.10). The t-ratio (3.53) of the test was statistically significant ($p < 0.01$). Consequently, the study failed to accept the null hypothesis. The implication is that there is significant difference in return on investment between farmers with credit access and those without credit access.

CONCLUSION AND RECOMMENDATIONS

The study underscored the relevance of credit in agricultural production, given the widespread importance of the commodity like soybeans. Most farmers had no credit access. This lack of access to credit placed them lower on credit production and profitability statistics such as yield, gross margin and return on investment. The major advantages that credit access confer on farmers includes; the ability to procure critical production inputs, and the patience to sell produce at the lean period when agricultural commodities command higher prices.

Consequently, the study recommends that credit should be made available to soybeans farmers to increase their yield towards optimum level so as to increase export potentials of the country, conserve foreign reserve that hitherto goes into importation and improve the battered balance of trade for the country.

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APPENDICES

Table 1: Credit Access (n=119)

Credit access	Frequency	Percentage (%)
Had accessed	47	39.5
Lacked access	72	60.5

Source: Field Data Analysis, 2022

Table 2: Yield and Gross Margin of Soybean Farmers

Credit access	Mean Total variable cost per ha	Mean Yield	Mean Number of bags per ha	Mean Revenue per bag	Mean Total revenue per ha	Mean Gross margin per ha
Had access	108,419.50	1.08	10.81	34,500.00	373,173.40	264,753.90
Lacked access	80,450.97	0.82	8.26	28,541.67	232,863.60	152,412.60
Combined	91,497.36	0.92	9.27	30,894.96	288,280.10	196,782.70

Source: Field Data Analysis, 2022

Table 3: Operating ratio of soybean farmers

Credit access	Mean
Had access	0.30
Lacked access	0.35
Combined	0.33

Source: Field Data Analysis, 2022

Table 4: Return on Investment of the Soybean Farmers

Credit access	Mean
Had access	3.06
Lacked access	2.13
Combined	2.49

Source: Field Data Analysis, 2022

Table 5: Difference in Gross Margin between farmers with and without credit access

Group	Obs	Mean	Std. Err	Std. Dev.	[95% Conf. Interval]	
Had access	47	264,753.90	12,597.15	86,361.68	239,397.20	290,110.70
Lacked access	72	152,412.60	4,773.53	40,504.73	142,894.40	161,930.70
combined	119	196,782.70	7,634.56	83,283.25	181,664.20	211,901.20

diff = mean(Had acce) - mean(Lacked a) t = 9.5587
 Ho: diff = 0 degrees of freedom = 117
 Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
 Pr(T < t) = 1.0000 Pr(|T| > |t|) = 0.0000 Pr(T > t) = 0.0000

Source: Field Data Analysis, 2022

Table 6: Difference in Operating Ratio between Farmers with and without Credit Access

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Had access	47	0.30	0.02	0.13	0.27	0.34
Lacked access	72	0.35	0.01	0.12	0.32	0.38
combined	119	0.33	0.01	0.13	0.31	0.35

diff = mean(Had acce) - mean(Lacked a) t = -1.9410
 Ho: diff = 0 degrees of freedom = 117
 Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
 Pr(T < t) = 0.0273 Pr(|T| > |t|) = 0.0547 Pr(T > t) = 0.9727

Source: Field Data Analysis, 2022

Table 7: Difference in Return on Investment between Farmers with and without Credit Access

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Had access	47	3.056218	0.287223	1.969099	2.478069	3.634367
Lacked access	72	2.126494	0.101096	0.857826	1.924915	2.328074
combined	119	2.493696	0.134807	1.470573	2.226741	2.760651

Source: Field data analysis, 2022

diff = mean (Had access) - mean(Lacked access); t = 3.5315; degrees of freedom = 117
 Ho: diff = 0
 Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
 Pr(T < t) = 0.9997 Pr(|T| > |t|) = 0.0006 Pr(T > t) = 0.0003

Source: Field Data Analysis, 2022