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Research Paper

Comparative Performance Analysis of Beneficiaries and Non-Beneficiaries of the Anchor Borrowers' Programme among Smallholder Rice Farmers in South-East Nigeria

F. Obilor[1]; S. U. O Onyeagocha[2]; F.O. Nwosu [1]; C.S. Onyemauwa[2]; K.H. Anyiam[1], O.C. Korie[1]; N.C. Ehirim[1]; U.C. Ibekwe[1]; O.B. Ibeagwa[1]; N.N.O.Oguoma[1]; I.J. Ughuegbulem[2]

[1]Department of Agricultural Economics, Federal University of Technology Owerri, Imo State, Nigeria
[2]Department of Agribusiness, Federal University of Technology Owerri, Imo State, Nigeria

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Corresponding Author:
K. H. Anyiam

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ABSTRACT

This study presents a comparative performance analysis of beneficiaries and non-beneficiaries of the Anchor Borrowers' Programme (ABP) among smallholder rice farmers in South-East Nigeria. Initiated by the Central Bank of Nigeria, the ABP was designed to mitigate capital constraints facing smallholder farmers by providing inputs both in-kind and in cash, to enhance productivity and reduce rice importation. A multi-stage stratified sampling technique was employed to select 720 rice farmers—comprising 360 beneficiaries and 360 non-beneficiaries, from Abia, Anambra, and Ebonyi States. Primary data were collected through structured questionnaires and analyzed using descriptive statistics, budgetary techniques, Z-statistics, and the Seemingly Unrelated Regression (SUR) model.Results revealed that ABP beneficiaries significantly outperformed non-beneficiaries in terms of operational efficiency and profitability. Beneficiaries recorded an average net farm income of ₦317,662.62, a net profit margin of 0.49, and a return on investment (ROI) of 0.97. In contrast, non-beneficiaries earned ₦168,581.52, with a margin of 0.43 and ROI of 0.75. Even after normalizing farm size to 0.38 hectares, performance differentials remained statistically significant ($p < 0.01$). Key determinants of net farm income included years of farming experience, farm size, value of paddy output, and access to extension services, with stronger effects observed among ABP participants. The study concludes that the ABP has a positive and significant impact on the performance of smallholder rice farmers. However, high input costs and policy inconsistencies continue to limit broader success. It is therefore recommended that the government expand the ABP to reach more farmers, implement price control or input subsidy policies to reduce production costs, and strengthen extension services to improve farmers' capacity in credit utilization and farm management. These measures would enhance the programme's sustainability and maximize its developmental impact.

1. Introduction

Agriculture remains the mainstay of the Nigerian economy, yet the sector has persistently underperformed due to numerous structural and financial constraints. A particularly critical issue is the lack of investment capital, which has continued to hamper agricultural productivity, especially among smallholder farmers. The rice subsector is no exception. Despite Nigeria's ecological potential to produce rice in large quantities, billions of naira are spent annually on rice importation, draining foreign reserves and fueling dependency on international markets (Emefiele, 2016). Rice, as a staple crop, is central to the nation's food security. Nevertheless, Nigeria remains a net importer of rice, even though the country has the natural and human resources to meet its demand and potentially export surplus (Akinwumi, 2013). According to CBN (2016), the allocation of foreign exchange to the importation of rice, wheat, fish, and other staples has not only

[1]Corresponding Author can be contacted at: kelechihenry20@gmail.com ORCID (0000-0003-3775-4714)
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worsened the trade balance but also hindered local production efforts. This challenge persists despite the Government's embargo on rice imports via land borders, an effort meant to redirect demand toward local production (CBN, 2016). The agricultural sector is still largely dominated by smallholder farmers who operate with limited inputs, outdated technology, and minimal access to credit facilities (IITA, 2017). This low-input, low-output system results in chronic underproduction. Factors such as poor access to improved seeds, fertilizers, mechanization, and credit have all contributed to suboptimal performance (Liverpool-Tasie, Kuku &Ajibola, 2011; Oseni& Winter, 2009).To address these challenges, the Federal Government of Nigeria launched the Anchor Borrowers' Programme (ABP) in 2015 through the Central Bank of Nigeria. The ABP was designed to link smallholder farmers with anchor processors by providing inputs in kind and cash (for labor), and guaranteeing off-take at harvest. The core objective is to boost agricultural productivity, stabilize input supply chains, and reduce the country's food import bill (CBN, 2016). Despite this initiative, rice production still falls short of national demand, with a persistent gap between potential and actual output (Akinniran&Faleye, 2020). This raises questions about the effectiveness and performance outcomes of beneficiaries versus non-beneficiaries of the programme.

Nigeria's estimated annual national demand for rice is 5.2 million metric tons. In comparison, local production lags at 3.3 million metric tons, leaving a demand gap of nearly 1.9 million metric tons, which is bridged through importation (Gyimah-Brempong*et al*., 2012; Ogunforwora, 2007). Ironically, this deficit exists alongside improved rice production technologies and techniques, and an abundance of arable land suitable for rice farming. The underperformance of local producers, particularly smallholder rice farmers, is therefore a pressing paradox. Access to finance remains a critical constraint in Nigerian agriculture. Smallholder farmers, who make up over 80% of paddy rice producers, often lack the collateral and creditworthiness demanded by commercial banks (Ehirim&Oguoma, 2013). As a result, these farmers operate below capacity, using inadequate quantities of fertilizers and agrochemicals, and rarely adopting improved technologies. While the ABP was introduced to tackle these issues, little is empirically known about its impact on the farm-level performance metrics, such as output, income, and profitability. Compounding the problem is the persistence of loan defaults, diversion of funds (credit fungibility), policy inconsistency, and market access challenges (Oboh&Ekpebu, 2011; Ayinde*et al*., 2018). It is also unclear whether beneficiaries of ABP significantly outperform non-beneficiaries in measurable agricultural and socioeconomic outcomes. Although many studies have examined credit access in Nigerian agriculture, very few have specifically, compared the performance of ABP beneficiaries and non-beneficiaries in rice farming, investigated the operational efficiency of both farmer categories in the South-East region of Nigeria, identified socioeconomic drivers of profitability for each group, and assessed the actual constraints faced by ABP participants that may affect the programme's success. Furthermore, no study has thoroughly analyzed how the ABP addresses the credit constraints in relation to farm-level productivity, income generation, and profitability in a comparative context. This study seeks to bridge that critical gap.

The following specific objectives are to:

i. determine and compare the operational efficiency of beneficiaries and non-beneficiaries of the programme.
ii. factors Influencing the Net Farm Income of smallholder rice farmer Beneficiaries and Non-Beneficiariesin the study area.

2. Materials and methods

The study was conducted in the South-East of Nigeria. The region is located between latitudes 4047′ 35′′N and longitudes 8027′10′′E (Olumba et al., 2021). The southeast geopolitical zone is made up of five states, namely, Abia, Anambra, Ebonyi, Enugu, and Imo States, with eighty-five (85) Local Government Areas (LGAs). The region had a population of 16,395,555 people according to the 2006 census (National Population Commission, NPC, 2006), and an estimated population of 22,012,828 people (NPC, 2021). The region has a total land area of 33,664 km2 (National Bureau of Statistics, NBS, 2019). The zone is bounded by the River Niger on the West, the riverine Niger Delta on the South, the flat North Central to the North, and the Cross River on the East. The region is predominantly agrarian, with agriculture serving as the primary livelihood source, particularly among rural households. It also serves as a hub for commercial activity, with widespread engagement in micro, small, and medium-scale enterprises, including agro-processing and trade. The agro-ecological conditions of the zone are favourable to the cultivation of food crops such as yam, cassava, rice, cocoyam, and maize, and cash crops including oil palm, rubber, cocoa, banana, and various fruits. A multi-stage stratified sampling technique was employed to select respondents for the study. The sampling process involved three key stages: Stage 1 involved the stratification and selection of Ebonyi, Abia, and Anambra purposively from the selected five States in the zone based on their active participation in the Anchor Borrowers' Programme (ABP) and their prominence in rice production. Each selected State was treated as a stratum. Stage 2 involved the selection of ABP Beneficiary Farmers. A list of ABP-participating rice farmers was obtained from the Development Finance Offices of the Central Bank of Nigeria (CBN) in the selected States. From this list, a proportionate random sampling method was used to select 70% of registered rice farmers across the participating LGAs in each state. A total of 360 ABP beneficiaries were selected and distributed as follows: Abia State (84 farmers), Anambra State (109 farmers), Ebonyi State (167 farmers). Stage 3 involved the selection of 360 Non-Beneficiary Farmers using the same procedures for the beneficiary to ensure comparability, and an equivalent number of non-beneficiary rice farmers were selected from the lists of non-beneficiary farmers obtained from the Agricultural Development Programmes (ADPs) and Rice Farmers Association of Nigeria (RIFFAN) representatives in each State. Using the same sampling proportions, 360 non-beneficiaries were randomly selected: Abia State (84 farmers), Anambra State (109 farmers), and Ebonyi State (167 farmers), making a total sample size of 720 rice farmers. The study used both Primary and secondary data. Primary data were collected through a structured questionnaire administered to the 720

sampled rice farmers. Secondary data were obtained from official records of the Central Bank of Nigeria, ADPs, and RIFFAN, particularly lists of registered ABP participants, disbursed input records, and repayment performance data. Data collected were analyzed using a combination of descriptive and econometric models.

2.1 Model Specification

Descriptive statistics (frequency count, mean, and percentage), relative net profit (net farm income), net profit margin, and return on investment (ROI) using the budgetary analytical tools, and principal component analysis were employed for this study.

Gm = T R – TVC …… eqn. (1)

Where

Gm = Gross margin (Naira/ha)

TR = Total Revenue (Naira)

TVC = Total Variable Cost (cost incurred in the use of variable inputs)

GM = Σ P_i Q_i – Σ R_iX_j …… eqn.(2)

Pi = price of i^{th}crop in Naira

Qi = Total sales of i^{th} crop in Naira.

Profit (NFI) = GM – TFC or TR – TC ……eqn. (3)

Where,

TFC = Total fixed cost

TC = Total cost

NFI = Net Farm Income

$$\text{Return on Investment (ROI)} = \frac{Profit}{Total\ investment} \quad \text{……eqn(4)}$$

$$\text{Return on every Naira spent} = \frac{Net\ Profit}{total\ cost\ of\ project} \quad \text{……eqn(5)}$$

Comparison of net farm income, Net Profit Margin and Return on Investment

The comparison was done using the Z-statistics, stated as:

$$Z = \frac{\overline{m_1} - \overline{m_2}}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}} \text{(Ohajianya and Onyeweaku, 2003)} \ldots\ldots\ldots\ldots\ldots \text{eqn. (6)}$$

Where,

Z = Value to be tested

$\overline{m_1}$ = Mean of each operational efficiency value of beneficiaries (naira)

$\overline{m_2}$= Mean of each operational efficiency value of non-beneficiaries (naira)

S_1^2= Variance of the operational efficiency value of beneficiaries

S_2^2 = Variance of the operational efficiency value of beneficiaries

n_1 = Number of observations of beneficiaries

n_2 = Number of observations of non-beneficiaries

The factors influencing the net farm income of rice farmer beneficiaries and non-beneficiaries was determined using Seemingly Unrelated Regression model, stated as (Greene, 2012):

$$\begin{matrix} Y_{1i} \\ Y_{2i} \end{matrix} = \begin{cases} f(x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, x_{10}, x_{11}, x_{12}, x_{13}, x_{14}, x_{15} + e) \\ f(x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, x_{10}, x_{11}, x_{12}, x_{13}, x_{14}, x_{15} + e) \end{cases} \text{eqn(3.13)}$$

Where,

Y_{1i} = Net farm income of the ith beneficiary of anchor borrowers' programme (Naira)

Y_{2i} = Net farm income of the ith non-beneficiary of anchor borrowers' programme (Naira)

X_1= Age (years)

X_2= gender (male = 1, female = 0)

X_3= Educational attainment (years)

X_4= Household size (number)

X_5= farming experience (years)

X_6= Membership of cooperative organization (Member = 1, otherwise =0)

X_7= Farm size (hectares)

X_8= value of rice paddy (naira)

X_9 = Contact with extension agents (yes =1, otherwise =0)

X_{10} = cost of rice seeds/seedlings (naira)

X_{11}= Cost of agrochemicals (naira)

X_{12}= Cost of labour (naira)

X_{13} = Production systems (1=lowland, upland =0)

X_{14}= Number of farming hours (Hours)

X_{15}= Major occupation (farming = 1, otherwise = 0)

e=Error term

3. Results and discussion

Comparison of the operational Efficiency of smallholder Rice Farmer Beneficiaries and non-beneficiaries of the Anchor Borrowers' Programme and the Factors Influencing Net Farm income

Table 1: Estimated Net Farm Income (net profit) of smallholder rice farmer beneficiaries of Anchor Borrowers' Programme in the area for a production year. *Source: Field Survey Data (2024*)

Items	Mean Quantity	Mean Unit Price (Naira)	Mean Amount (Naira)
REVENUE			
Paddy rice (per 100kg bag)	34.60	18,644.03	645,083.44
Total Revenue			**645,083.44**
VARIABLE COSTS			
Rice Seeds (kg)	16.40	400	6560
Fertilizer (special blend) and Urea			23549.4
Herbicides (pre and post emergence)			6600
Organic fertilizer			5457.38
Pesticides			1555.62
Aggregation and fees			5000
Empty bags	41	150	6150
Ploughing			16855.50
Harrowing			10528.34
Labour (man-days) for bedding, nursery/transplanting, agrochemical applications, quelea bird control, harvesting			138543.47
Threshing, winnowing and bagging			12463.55
Transportation (delivery to farm storage house)			15824.43
Total Variable Costs			**249,087.7**
FIXED ASSETS			
Rent			48,452.56
Anchor Borrowers' Programme Interest charges			5763.89
Depreciation (3 inches water pumping machine, hose intake/discharge, knapsack sprayer, sickle, machetes, basins, drums)			24,116.67
Total Fixed Costs			**78,333.12**
Total Costs			**327,420.82**
Net farm income (Net profit)			**317,662.62**
Net Profit Margin			**0.49**
Return on Investment (ROI)			**0.97**

Table 2: Estimated Net Farm Income (net profit) of smallholder rice farmers non-beneficiaries of the Anchor Borrowers' Programme in the area for a production year *Source: Field Survey Data (2024)*

Items	Mean Quantity	Mean Unit Price (Naira)	Mean Amount (Naira)
REVENUE			
Paddy rice (per 100kg bag)	21.34	18,451.39	393,752.66
Total Revenue			**393,752.66**
VARIABLE COSTS			
Rice Seeds (kg)	11.17	400	4468
Fertilizer			14958.23
Herbicides (pre and post emergence)			3645.89
Organic fertilizer			3284.62

Pesticides			1389.56
Empty bags	13	191	2483
Ploughing and harrowing			21357.40
Labour (man-days) for bedding, nursery/transplanting, agrochemical applications, bird control, harvesting			84241.82
Threshing, winnowing and bagging			10054.78
Transportation (delivery to farm storage house)			9489.34
Total Variable Costs			**155,372.6**
FIXED ASSETS			
Rent			52834.82
Depreciation (3 inches water pumping machine, hose intake/discharge, knapsack sprayer, sickle, machetes, basins, drums)			16963.72
Total Fixed Costs			**69,798.54**
Total Costs			**225,171.14**
Net farm income (Net profit)			**168,581.52**
Net Profit Margin			**0.43**
Return on Investment (ROI)			**0.75**

Tables 1 and 2 display the estimated net farm income (net profits) of smallholder rice farmer beneficiaries and non-beneficiaries of the Anchor Borrowers' Programme in the area. Results revealed that the rice farmer beneficiaries incurred a total cost of ₦327,420.82, whereas non-beneficiaries incurred a total cost of ₦225,171.14 to produce their paddy rice. The beneficiaries generated a total revenue of N645,083.44 from selling 34.60 bags of paddy rice and achieved a net farm income of ₦317,662.62. Conversely, non-beneficiaries of the Anchor Borrowers' Programme earned a total revenue of ₦393,752.66 from selling 11.17 bags of paddy rice and realised a net farm income (net profit) of ₦168,581.52. Furthermore, results indicated that the profit margin of rice farmer beneficiaries was 0.49, meaning that for every naira earned, the beneficiaries made 49 Kobo in profit, while the profit margin for non-beneficiaries was 0.43, meaning they made 43 Kobo per naira earned. The return on each naira spent by beneficiaries was 0.97, signifying that for every one naira invested, the beneficiaries earned approximately 97 Kobo in return, whereas their counterparts' ROI was 0.75, indicating that non-beneficiaries earned about 75 Kobo per naira invested. This suggests that paddy rice farming is a profitable venture, with beneficiaries earning higher returns than those who did not benefit from the programme. These high returns could be linked to differences in mean farm sizes, as beneficiaries cultivated about 0.51 hectares, while non-beneficiaries cultivated a mean of 0.38 hectares. Comparing these figures directly would be inaccurate, and therefore, normalizing to 0.38 hectares for both farmer categories (as shown in Table 4.5.3) is necessary, considering the existing farming practices and technologies employed by both beneficiaries and non-beneficiaries of the Anchor Borrowers' Programme in Southeast Nigeria.

Comparison of the Operational Efficiency of Smallholder Rice Farmer Beneficiaries and Non-Beneficiaries of Anchor Borrowers' Programme

Table 3: Comparison of the operational efficiency of smallholder rice farmer beneficiaries and non-beneficiaries of Anchor Borrowers' Programme in the area. *Source: Computed from Field Survey Data, 2024*

Items	Beneficiaries	Non-Beneficiaries	Normalized Values for Beneficiaries based on 0.38 ha	Z-test Values
Farm size (Ha)	0.51	0.38	0.38	-
Total Cost (₦)	327,420.82	225,171.14	243,960.61	4.04*
Total Revenue (₦)	645,083.44	393,752.66	480,650.41	4.35*
Net Farm Income (₦)	317,662.62	168,581.52	236,689.80	16.22*
Net Profit Margin	0.49	0.43	0.49	2.97*
Return on Investment	0.97	0.75	0.97	7.055*

**significant at 1%, **significant at 5%, and ***significant at 10% levels*.

Table 3 presents a comparison of the operational efficiency between smallholder rice farmer beneficiaries and non-beneficiaries of the Anchor Borrowers' Programme. The operational figures for beneficiaries were standardised to 0.38

hectares using a direct proportionality/variation method, based on the 0.38 hectares of rice fields cultivated by non-beneficiaries, to ensure comparability. Following normalization, results indicated that beneficiaries would incur a total cost of ₦ 243, 960. 61, generate a total revenue of ₦ 480, 650. 41, and achieve a net farm income of ₦ 236, 689. 80 per 0. 38 hectares, given the current farming practices and technologies used. Further analysis showed that beneficiaries would maintain the same net profit margin (₦ 0. 49 k) and return on investment (₦ 0. 97 k) per 0. 38 hectares after normalization. This suggests that rice farmers participating in the Anchor Borrowers' Programme, under existing practices and technologies, would still earn 49 Kobo for every Naira of revenue generated and 97 Kobo for every Naira invested in their rice farming operations. This indicates that the farming practices and technologies employed by beneficiaries of the Programme contribute to higher net profit margins and return on investment compared to non- beneficiaries (0. 43 and 0. 75, respectively), after normalization to the same land area.

Furthermore, the study examined whether significant differences existed in total cost, revenue, net farm income, net profit margin, and return on investment between beneficiaries and non- beneficiaries after normalization to equal hectares of rice fields. The calculated z- test values for total cost (4. 04), revenue (4. 35), net farm income (16. 16.22), net profit margin (2. 97), and return on investment (7. 06) were significant at the 1% level. Consequently, the null hypothesis (iii) that there is no significant difference between the net farm income of rice farmer beneficiaries and non- beneficiaries was rejected. The study accepted the alternative hypothesis and concluded that a significant difference exists in the net farm income of rice farmer beneficiaries and non- beneficiaries of the programme in Southeast Nigeria. This further affirms that people involved in the programme achieve higher returns and operational efficiency. It also indicates that the Anchor Borrowers' Programme effectively improved the operational efficiency and profitability of smallholder rice farmers in Southeast Nigeria.

Factors Influencing the Net Farm Income of Smallholder Rice Farmer Beneficiaries and Non-Beneficiaries

Table 4 Estimated SUR results of the factors influencing the net farm income of smallholder rice farmer beneficiaries and non-beneficiaries of Anchor Borrowers' Programme. *Source: Computed from Field Survey Data, 2024*

Variables	Beneficiaries	Non-Beneficiaries
Age (years)	9.9029 (1223.21)	16.389 (41.535)
Gender	10844.51(23067.9)	511.389 (827.111)
Education	3117.75 (2566.864)	189.627 (95.224)**
Household size	5578.21(5676.975)	116.248 (199.1996)
Years of experience	3409.32 (1776.084)***	114.197 (58.933)***
Cooperative membership	20555.47 (53076.07)	-304.308 (3099.89)
Farm size	63993.92 (32045.34)**	2520.67 (1281.21)**
Value of paddy rice	0.3833 (.0892037)*	0.00593 (0.00202)*
Extension contact	59987.07 (29343.96)**	5910.34 (2820.04)**
Cost of seeds (Naira)	-3.463 (6.117736)	-45.193 (0.28789)*
Cost of agrochemicals	-3.1557 (1.007571)*	0.02676 (0.042694)
Cost of labour	-2.0996 (0.09021)*	0.000429 (0.00716)
Production systems	35828.49 (16829.25)**	3135.065 (2809.78)
Number of farming hours	-3501.797 (7216.988)	538.58 (288.24)***
Major occupation	28120.03 (52043.38)	-1877.72 (3077.959)
Constant	278593.8 (117016.3)**	-34634.85 (3539.76)*
R-squared	**0.6305**	**0.9858**
Chi-square	**615.94***	**25070.00***

Figures in parentheses are standard errors.
**significant at 1%, **significant at 5%, and ***significant at 10% levels.*
Source: Computer Results of the Field Survey Data (2024) using STATA

Table 4. shows the estimated Seemingly Unrelated Regression (SUR) results of the factors influencing the net farm income of smallholder rice farmer beneficiaries and non-beneficiaries of Anchor Borrowers' Programme. Results showed that the model performed well, with R-squared (R^2) values of 0.6305 for the beneficiaries' equation and 0.9858 for non-beneficiaries' equation. This implies 63.05% of the variation in net farm income among beneficiaries is explained by the independent variables, while 98.58% of the variation in net farm income among non-beneficiaries is explained by the independent variables. The beneficiaries' net farm income is moderately well-explained by the independent variables, while non-beneficiaries' net farm income is extremely well-explained by the independent variables. This indicates a good fit for this group. Results also showed the Chi-squared (χ^2) test values for beneficiaries (615.94) and non-beneficiaries (25070.00), which were significant for both models at 1% level. This implies that the factors specified in both models jointly explain net farm income among beneficiaries and non-beneficiaries at a 1% significance level. Therefore, the null hypothesis (iv) that the socioeconomic and resource use factors have no significant influence on the net profit (net farm income) of rice farmer beneficiaries and non-beneficiaries of the programme was rejected. The study accepted the alternative and concluded that the socioeconomic and resource use factors have significant influence on the net profit (net farm income) of rice farmer beneficiaries and non-beneficiaries of the programme in the area. Results showed that the coefficients of years of experience for beneficiaries (3,409.32) and non-beneficiaries (114.197) were positive and

statistically significant at 10% levels, respectively. This implies that an increase in years of experience in rice farming by one year increases the net farm income by N3,409.32 for beneficiaries and by N114.197 for non-beneficiaries. This is an indication that more experienced smallholder rice farmers earn higher net farm income, with beneficiaries gaining higher net farm income of N3,409.32 than non-beneficiaries who gained about N114.20 per additional year. This highlights the value of expertise in the paddy rice industry. The coefficients of farm size for beneficiaries (63993.92) and non-beneficiaries (2520.67) were positive and statistically significant at 5% levels, respectively. This implies that a one per cent increase in hectares of rice field increases the net farm income of beneficiaries by ₦63,993.92, and that of non-beneficiaries by ₦2,520.67. Larger farm sizes lead to higher net farm income, with beneficiaries earning N63,993.92 and non-beneficiaries earning N2,520.67 per additional hectare. Larger farms lead to higher incomes, suggesting economies of scale. This aligns with Chidiebere-Mark(2017), who observed that farm size was statistically significant and positively affected profitability/net income.

The coefficients of value of paddy rice for beneficiaries (0.3833) and non-beneficiaries (0.00593) were positive and statistically significant at 1% levels, respectively. This implies that an increase in the value of paddy rice by one naira increases the net farm income of beneficiaries by 38 kobo and that of non-beneficiaries by 0.006 kobo. This is an indication that the increased value of paddy rice positively impacts net farm income for both groups. This conforms to the work done by Max Nur and Efendy (2017), who discovered that the value of paddy/price has a direct effect on rice farming income. The coefficients of extension contact for beneficiaries (59,987.07) and non-beneficiaries (5,910.34) were positive and statistically significant at 5% levels, respectively. This implies that an increase in the number of extension contacts with rice farmers by one farm visit increases the net farm income of beneficiaries by N59,987.07 and that of non-beneficiaries by N5,910.34. This shows that extension contact significantly improves net farm income, as beneficiaries gain higher net farm income of N59,987.07 from extension services than their counterparts who gain N5,910.34. This is an indication that access to expert advice and guidance enhances agricultural productivity and hence the net farm income in the Southeast, Nigeria. This is in conformity with work done by Ibekwe, (2001) and Nwaru, (2004), Tahima et.al.,(2019) which observed that extension contact is statistically significant and has positive effect on farmers net income. This also suggests that farmers experience higher rice output /income as more contacts are made with extension agents, Emmanuel and Mundia, (2019). The coefficient of educational attainment for beneficiaries was not significant, but that for non-beneficiaries (189.63) was positive and statistically significant at 5% level. This implies that an increase in educational attainment by one year increases the net farm income of non-beneficiaries by N189.63. This implies that education positively impacts the net farm income of non-beneficiaries. This shows that investing in education increases net farm income, emphasizing the importance of human capital in agricultural productivity. The coefficient of cost of seeds for beneficiaries was not significant, but that for non-beneficiaries (-45.19) was negative and statistically significant at 1% level. This implies that an increase in the cost of seeds by one naira decreases the net farm income of non-beneficiaries by N45.19. This is an indication that high seed costs hinder agricultural productivity, and decrease net farm income in the Southeast Region. This may also be attributed to the expensive use of certified seeds. Studies have it that certified seeds contribute to farm income, Izuogu et.al (2024).

The coefficient of cost of agrochemicals for non-beneficiaries was not significant, but that for beneficiaries (-3.16) was negative and statistically significant at 1% level. This implies that an increase in the cost of agrochemicals by one naira decreases the net farm income of beneficiaries by N3.16. This is an indication that higher agrochemical costs decrease net farm income in the area. This is under work done by Karmini(2013), as he discovered that the cost of raw materials such as agrochemicals had a negative effect on paddy farm income. The coefficient of cost of labour for non-beneficiaries was not significant, but that for beneficiaries (-2.10) was negative and statistically significant at 1% level. This implies that an increase in the cost of labour by one naira decreases the net farm income of beneficiaries by N2.10. This is an indication that higher labour costs decrease the net farm income of rice farmer beneficiaries of the Anchor Borrowers' Programme in the area. This result aligns with work done by Karmini(2013), who discovered that labour cost was significantly negative among other factors affecting paddy farm income. In this case, exploring labour-saving technologies and efficient farm management would improve the net farm income of beneficiaries of the Anchor Borrowers' Programme in the area.

The coefficient of production systems for non-beneficiaries was not significant, but that for beneficiaries (35828.49) was positive and statistically significant at 5% level. This implies that an increase in lowland production systems on additional hectares of rice field increases the net farm income of beneficiaries by ₦35828.49. This implies that the rice farmer beneficiaries of the Anchor Borrowers' Programme earn more net farm income from the lowland production system than from employing the upland production system. The coefficient for the number of farming hours for beneficiaries was not significant, but that for non-beneficiaries (538.58) was positive and statistically significant at the 10% level. This indicates that an increase of one hour in farming hours raises the net farm income of non-beneficiaries by N538.58. This demonstrates that the amount of farming hours positively influences the net farm income of non-beneficiaries. This could be linked to the additional hours spent scaring birds during the flowering and grain-filling stages. These findings are consistent with Nasir &Kotu(2014), who determined the effect of working hours on farmers' welfare (income level) and found that working hours have a significant positive coefficient.

4. Conclusion

The study provides compelling evidence that participation in the Anchor Borrowers' Programme significantly improved the performance of smallholder rice farmers in South-East Nigeria. Beneficiaries of the programme experienced higher returns on investment, profit margins, and net farm income compared to non-beneficiaries. Socioeconomic and resource-use variables such as farm size, years of farming experience, and extension contact were key determinants of profitability, particularly for beneficiaries. The programme's design, which combines financial input with support services, appears effective. However, challenges such as rising input costs, labour expenses, and institutional inefficiencies persist. Addressing these issues could boost the programme's impact and help bridge the rice supply-demand gap in Nigeria.

5. Recommendations

1. The government should expand the ABP to cover more farmers across additional regions, especially those with strong rice production potential, ensuring transparency and consistency in implementation.
2. High costs of inputs such as seeds, fertilizers, agrochemicals, and labour significantly reduce profitability. Policymakers should provide subsidies or implement price control mechanisms to enhance affordability.
3. Increased access to timely and accurate information through extension services should be prioritized. This will improve farmers' capacity to manage production efficiently and utilize credit effectively.

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