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IMPACT ASSESSMENT OF PARTICIPATION IN ANCHOR BORROWERS' PROGRAMME ON THE LIVELIHOOD OF SMALLHOLDER RICE FARMERS IN KADUNA STATE, NIGERIA

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Abstract
The study assessed the impact of participation in Anchor Borrowers' Programme on the livelihood of smallholder rice farmers in Kaduna State, Nigeria. A multistage sampling procedure was employed to select a total sample size of 810 respondents. Primary data were collected using structured questionnaire as well as checklist for Focus Group Discussions. Data collected were analysed using descriptive statistics and Propensity Score Matching. The results revealed that the average ages were 43 and 39 years for participants and non-participants, respectively. Most of the participants (35.40%) and non-participants (37.28%) had secondary education. The access to extension services among the participants and non-participants was 51.85% and 35.31%, respectively and majority (90.86%) of the participants had access to credit. The results of Propensity Score Matching showed that participation in the activities of ABP had positive and significant (P<0.01) impact on the yield of the farmers with an increase ranging from 568.4 kg - 686.15kg compared to that of the non-participants; there was also a significant impact (P<0.01) on the income of the participating farmers with an increase from ₦12,587.84 - ₦206,000 and a significant impact (P<0.05) on the standard of living of the participating farmers from ₦21,047.96 - ₦123,000. In conclusion, participation in ABP had positive and significant impact on the yield, income and standard of living of the participants. It was therefore, recommended that Government should ensure scaling up agricultural development programmes, which should be sustained by effective policies to enhance positive impact of ABP in the study area.

Keywords: *Impact assessment, Anchor Borrowers' Programme, Participation, Smallholder rice farmers, Livelihood*

1.0 Introduction

1.1 Background to the Study

Nigeria is the largest consumer of rice in West Africa, with a growing demand, driven by population growth and urbanization (USAID, 2022). Despite being the largest producer of rice in West Africa, Nigeria still imports a significant quantity of rice to meet domestic demand (CBN, 2020), leading to heavy reliance on international markets and substantial foreign exchange expenditures (Kumar & Kumar, 2022). In order to boost agricultural production, ensure food security and uplift livelihoods of the smallholder farmers, the Anchor Borrowers' Programme (ABP) was launched by the Central Bank of Nigeria (CBN) in 2015 (CBN, 2020). The programme was designed to alleviate farmers' challenges through provision of necessary agricultural inputs.

The ABP primarily targeted smallholder farmers. These farmers are agricultural producers who manage small plots of land, typically less than 2 hectares, and rely heavily on family labour (IFAD, 2022). These farmers produce a significant proportion of the world's food, including staples like maize, rice and wheat (GRAIN, 2020).

The Programme adopted participatory approach to empower smallholder farmers in Nigeria. The approach acknowledges farmers' expertise, promotes ownership and fosters sustainable solutions (IFAD, 2020).

The livelihood of smallholder farmers is complex and influenced by various factors, including socioeconomic, environmental and institutional factors (Chambers, 2020). Understanding the livelihood strategies and challenges of smallholder farmers is essential for developing effective policies and programmes that promote sustainable agricultural development and improve the well-being of these farmers.

The Programme has shown promising results in some regions, making positive impact on rice production, but most of the impact studies on rice production carried out in Kaduna State targeted only the youths as the programme's beneficiaries, leaving out the older men and women. Also, most of the impact studies conducted in the State made more emphasis on farmers' output, with little findings on their income and standard of living, hence, there is a need to fill this research gap.

2.0 Objectives of the Study

The broad objective of the study was to assess impact of ABP on the livelihood of small holder rice farmers in Kaduna State.

The specific objectives were to:

i. describe the socioeconomic characteristics of rice farmers in the study area
ii. determine impact of participation in ABP on farmers' rice yield
iii. determine impact of participation in ABP on rice farmers' income and
iv. determine impact of participation in ABP on rice farmers' standard of living.

3.0 Methodology

The research was conducted in Kaduna State, which is located in the North-western part of Nigeria. It shares borders with other Nigerian States such as Kano, Katsina, Zamfara, Niger, Kogi, Plateau and the Federal Capital Territory (FCT), Abuja. The State is subdivided into twenty-three (23) Local Government Areas (LGAs), distributed under four (4) Agricultural zones: Maigana, Lere, Zango Kataf, and Birni Gwari zones (KADA, 2018) and has a population of approximately 10,400,000 people (NPC, 2020). The State's agro-ecological zones support cultivation of various crops, like maize, millet, rice, sorghum, cowpea, groundnut, and soybean.

A multistage sampling procedure was employed for this study to select a total sample size of 810 respondents. In the first stage, two Local Government Areas from each of the four agricultural zones in Kaduna State were purposively selected due to their high participation rate in the Anchor Borrowers' Programme to give a total of 8 Local Government Areas. In the second stage, a random selection of 30% of the villages from each of the Local Government Areas were also selected randomly through balloting system. The last stage involved simple random selection of 5% of the sampling frame, which is a total of 405 participating smallholder rice farmers using the card method. Furthermore, equal number (405) of non-participants were purposively selected from the same villages and were used as a control group. Therefore, a total of 810 respondents were used for the study.

The study relied on primary data with the use of structured questionnaire and checklist for Focus Group Discussions (FGD) to gather the information. Descriptive statistics was used to analyse objective i and Propensity Score Matching was used to analyse objectives

ii, iii and iv.

4.0 Results and Discussion

4.1 Socio-economic characteristics of the rice farmers

Table 1 shows that the average ages were 43 and 39 years for participants and non-participants, respectively. This indicates that rice farmers in the study area were still young and active for agricultural activities. This finding is similar to the report of Offor *et al.* (2020), who stated in their report that rice farmers were in their active ages and they can cope with the rigorous activities involved in rice production. Majority of the participants (88.59%) and non-participants (82.18%) were males. The domination by male rice farmers could be attributed to unequal access to productive resources (Onyinyechukwu, 2023). Among the participants, majority (95.31 %) of the rice farmers were married and for the non-participants, the married rice farmers were 88.40%. Mairabo (2021), stated that married people dominated farming activities around the Nigerian environment and perhaps seen as a source of family labour to the farmers. Table 1 further revealed that 35.40% of participants and 37.28% of non-participants had secondary education. According to Ashraf & Qasim (2019), education empowers farmers by raising their confidence, improving their livelihood and their involvement in processes of economic and social change. The average household sizes were 9 and 11 for participants and non-participants, respectively. The average farming experiences were 6 and 7 years for participants and non-participants, respectively. Okuneye (2019) posited that participation in agricultural activities is influenced by farming experience, which enables farmers to develop the skills and expertise needed to participate effectively. The average farm sizes were 1.58 hectare and 1.24 hectares for participants and non-participants, respectively. This result indicates that rice farmers in the study area were smallholder farmers. (Offor *et al*. 2020).

Table1: Distribution of Respondents Based on their Socioeconomic Characteristics (n=810)

Variables	Participants		Non-participants	
	Frequency	Percentage	Frequency	Percentage
Age (Years)				
21-30	67	16.54	92	22.73
31-40	124	30.62	159	39.26
41-50	130	32.10	118	29.13
51-60	77	19.01	23	5.68
>60	7	1.73	13	3.21
Average	43		39	
Sex				
Male	357	88.59	332	82.18
Female	48	11.85	73	18.02
Marital status				
Married	386	95.31	358	88.40
Single	8	1.98	30	7.41
Divorced	5	1.23	8	1.98
Widowed	6	1.48	9	2.22
Education				
Arabic education	63	15.59	65	16.05
Non- formal education	24	5.94	29	7.16
Primary education	69	17.08	89	21.98
Secondary education	143	35.40	151	37.28
Tertiary education	105	25.99	71	17.53
Household size (number)				
1-5	111	27.41	159	39.26
6-10	155	38.27	165	40.74
11-15	88	21.73	57	14.07
>15	51	12.59	5	5.92
Average	9		11	
Farming experience (Year)				
1-10	314	77.53	238	83.45
11-20	84	20.74	51	12.59
>20	7	1.73	16	3.95
Average	6		7.49	
Farm size (hectare)				
0.1-1.0	205	50.62	305	75.31
1.1-2.0	144	35.56	59	14.57
2.1-3.0	43	10.62	20	4.94
>3.0	13	3.21	21	5.19
Average	1.58		1.24	

Source: Field Survey, (2023).

4.2 Institutional Characteristics of the Rice Farmers

Table 2 reveals that majority (65.19%) of the participants belonged to cooperative society and only 36.30% of the non-participants rice farmers belonged to cooperative society. Adebayo & Okuneye (2022) stated that cooperative societies provide smallholder farmers with access to credit, enabling them to purchase inputs, equipment and technology necessary for agricultural production. The result of access to extension services among the participants and non-participants revealed that 51.85% and 35.31% had extension contact, respectively. Majority (90.86%) of the participants had access to credit, while non-participants had limited access to credit. Ojo *et al. (*2020) stated that a shortfall of 80% in the required credit by a rice farmer reduced rice yield.

Table 2: Distribution of Rice Farmers Based on their Institutional Profile (n=810)

Variables	Participants		Non-participants	
	Frequency	Percentage	Frequency	Percentage
Membership of cooperative				
Members	264	65.19	147	36.30
Non-Members	141	34.81	258	63.70
Extension contact				
Had Contact	210	51.85	143	35.31
No Contact	195	48.15	262	64.69
Number of contact				
1-3	69	32.86	68	47.55
4-6	96	45.71	56	39.16
7-9	20	9.52	9	6.29
>9	25	11.90	10	6.99
Access to credit				
Had access	368	90.86	27	6.67
No access	37	9.14	378	93.33
Total	**405**	**100.00**	**405**	**100**

Source: Field Survey (2023).

4.3 Impact of Participation in ABP on Yield, Income and standard of Living under the Programme;

Table 3 shows the density distribution of the estimated propensity scores for participants and non-participants of the Anchor Borrowers' Programme. The assumption of common support in difference-in-differences score matching analysis indicates that for all the estimated propensity scores, the value should not be greater than one. The

result revealed that the analysis of propensity score matching fulfilled the assumption of common support since the values were from the acceptable range of 0.0895 - 0.8714. The estimated propensity score in region of common support is presented in percentile in which at 1%, the score is 0.0895 up to the largest score of 0.8714 at 99%. The level of skewness of the data is 0.0076. The value of Kurtosis is 1.966. This value is within the range of +3 +0 -3. This implied that the data is normally distributed and can be used for inferential test (Sulaimana *et al.*, 2021).

Table 3 Distribution of the Estimated Propensity Score in Region of Common Support (n=810)

Estimated Propensity score				
Percentile		**Smallest**		
1%	0.0895	0.0510		
5%	0.2537	0.0701		
10%	0.2719	0.0701	Obs	764
25%	0.3222	0.0750	Sum of Wgt	764
50%	0.5228		Mean	0.5004
		Largest	Std. Dev.	0.1913
75%	0.6597	0.9087		
90%	0.74188	0.9087	Variance	0.0366
95%	0.7903	0.9991	Skewness	0.0076
99%	0.8714	0.9991	Kurtosis	1.9661

Source: Field survey (2023)

4.4 Impact of Participation in ABP on Farmers' Yield

Table 4 shows the impact of participating in ABP on the yield of the farmers. Propensity Score Matching was used to compute the Average Treatment Effect on the Treated (ATT), using Difference- in- Differences (DiD) between participants and non-participants. The observable heterogeneity was considered between the treated and the control group when matching algorithm. In this study, the matching methods include nearest neighbour, radius, stratification, local linear and kernel. The results showed that participation in the activities of ABP had positive and significant ($P<0.01$) impact on the

yield of the farmers. The yield was increased by 568.4kg to 686.15kg as shown by the estimation methods. This result is similar to the previous findings on the impact of Anchor Borrrowers' Programme on farmers' output (Olanrewaju *et al*., 2021). He reported that participation of youths in the ABP led to an increase in yield by about 42.46%, which shows the effectiveness of the ABP in Northern Nigeria. Onoja *et al.* (2024) in their work on Effect of Anchor Borrowers' Programme on Rice Yield in North-Central, Nigeria stated that the ABP positively impacted on rice production as 70 beneficiaries had an additional yield of 105.82kg/ha over non-beneficiaries.

Table 4: Matching Estimation Result of the Impact of Participation in ABP on Farmers' Yield

Estimation method	Difference-in-Differences result	Std Error	t-value	p-value
Nearest Neighbour Matching	636.352	339.145	1.88*	P<0.10
Radius Matching	519.564	223.964	2.32**	P<0.05
Stratification Matching	686.151	243.137	2.82***	P<0.01
Local Linear Matching	568.40	209.24	2.72***	P<0.01
Kernel Matching	595.297	-	-	-

Source: Field Survey (2023).

4.5 Impact of Participation in ABP on Farmers' Income

Table 5 shows impact of ABP on the income of the farmers. The estimated t-values of 1.99, 2.49 and 2.98 for nearest neighbor, radius and stratification matching methods respectively were positive and significant at 1% and 5% level of probability. This showed that ABP had significant and positive impact on the income of the participating farmers. The income of the farmers under ABP significantly increased between the ranges of ₦12,587.84 to ₦206,000 compared to non-participating farmers. IFAD (2022) opined that irrespective of the criticism, the Anchor Borrowers' Programme has been instrumental in increasing agricultural productivity, improving farmers' income and enhancing food security in Nigeria. Also, Bello *et al.* (2022)

reported in their study that there was a general improvement in the income of the farmers as a result of the Anchor Borrowers' Scheme.

Table 5 Matching Estimation Result of the Impact of Participation in ABP on Farmers' Income

Estimation method	Difference in Differences result	Std Error	t-value	p-value
Nearest Neighbour Matching	1.92e+05	96090.370	1.99	P<0.05
Radius Matching	1.59e+05	63625.095	2.491	P<0.01
Stratification Matching	2.06e+05	69010.096	2.98	P<0.01
Local Linear Matching	12587.84	61087.56	0.21	NS
Kernel Matching	1.80e+05	-	-	-

Source: Field Survey (2023).

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Radius Matching	1.59e+05	63625.095	2.491	P<0.01
Stratification Matching	2.06e+05	69010.096	2.98	P<0.01
Local Linear Matching	12587.84	61087.56	0.21	NS
Kernel Matching	1.80e+05	-	-	-

Source: Field Survey (2023).

4.6 Impact of Participation in ABP on Farmers' Level of Living

Table 6 showed the impact of ABP on farmers' standard of living. It was revealed that ABP increased the standard of living among the participating farmers. However, it was only stratification matching method with t-value of 2.38 that showed a significant difference between the level of living of participants and non-participants. The increased value ranged between ₦21,047.96 - ₦68,118.436. In the FGD, the participating farmers responded that as a result of the programme, they were able to purchase motor cycles, roofing sheets, pay children's school fees and purchase food items through increased productivity and income. This finding is consistent with the study of Badejo & Adekeye (2018) where it was reported that Anchor Borrowers Programme (ABP) has a positive and significant impact on poverty alleviation among the farmers. It also increased food supply, employment generation, improved standard of living and income generation.

Table 6 : Matching Estimation Result of the Impact of Participation in ABP on Farmers' Level of Living

Estimation method	Difference -in - Differences result	Std Error	t-value	p-value
Nearest Neighbour Matching	68118.436	1.23e+05	0.55	NS
Radius Matching	21047.964	66090.197	0.32	NS
Stratification Matching	1.04e+05	43722.236	2.38	P<0.05
Local Linear Matching	50527.47	59955.44	0.84	NS
Kernel Matching	50242.544	-	-	-

Source: Field Survey (2023).

5.0 Conclusion and Recommendations

The study revealed that the activities of ABP with the inclusion of older men and women had positive and significant impact on the yield, income and standard of living of the rice farmers. This showed that ABP is a programme that is capable of boosting agricultural production and improving livelihood of farmers. Based on the outcome of this study; it was recommended that the Government should ensure that scaling up agricultural development programme should be sustained by effective policies and support to enhance positive impact of ABP in the study areag.

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