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Modern farming techniques in enhancing rice production: Insights from the anchor borrowers' programme in Ebonyi state, Nigeria

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Abstract: This work centres on the contribution of the Nigerian government's Anchor Borrowers' Programmes on rice production in the country. This study employs quantitative methodology and with a primary objective to dissect the efficacy of modern farming techniques facilitated by the Anchor Borrowers' Programmes (ABP), evaluates the advantages and disadvantages inherent in rice production under this programme. Conducted within the agricultural landscape of Ebonyi State, Nigeria, this study adopts a cross-sectional survey approach to gauge the symbiotic relationship between rice production and the ABP. Targeting a cohort of rice smallholder farmers who have directly benefited from the program, the work employs stratified random sampling and purposeful selection techniques to guarantee comprehensive representation within a population of 400 respondents. This study utilizes the mixed-methods approach to data collection, including structured questionnaires administered to rice farmers in Ebonyi State, Nigeria. This research tests hypotheses by utilising statistical tools such as regression analysis. The outcome of this study underscores the imperative for continued support and refinement of the Anchor Borrowers' Programme. Moreover, it elucidates the pivotal role of financial institutions and agricultural lending agencies in equipping farmers with the requisite skills and resources. Ultimately, this study affirms the crucial role of modern farming methodologies in propelling rice production within Ebonyi State, Nigeria. It recommends that young school leavers, especially those in the rural areas should also be encouraged to venture into agriculture through schemes such as the ABP, bank financing and innovative financing so as to help the Federal Government achieve its economic diversification drive.

Keywords: government policy; rice production; Ebonyi state; Nigeria

1. Introduction

In many parts of Africa, a major challenge is food availability as the continent's food system fails to provide a large portion of its population with secure, safe, inexpensive and healthy diets (Adesina, 2022). Hunger has become a way of life for many people on the continent as it is estimated that one in five people faced hunger in 2020, just as the number of those who go to bed without meals continues to rise (Joshi, 2019). African nations have been delaying the expenditures required to offer their citizens sustainable, wholesome food for far too long. The production of both crops and animals in Nigeria continue to be below potential, much like in many other African nations as a result of scarcity of seeds, inadequate uptake of high-quality seeds, low fertilizer use, and poor production methods (Saheed et al., 2018). As stated previously, Nigeria's food security challenge was compounded by the COVID-19, activities of bandits, kidnappers, terrorists and its effects on food production in the country. Oyelami et al. (2023) note that challenges facing societies which include population

growth, urban expansion, income and agricultural productivity, largely affect food security across the world. The COVID-19 severely disrupted the nation's already precarious value chains, which included the citizens' capacity to cultivate and effectively allocate food (Chidozie et al., 2024). Agricultural activities and market instability affect the living standard of the citizens, especially most disadvantaged families (United States Agency for International Development, 2021). Also, the absence of adequate agricultural technology and the prevalence of unskilled human labour retarded Nigeria's farmers' desire to expand their level of food crop production in recent times.

Unfortunately, the agricultural sector in Nigeria that was to support food security had been abandoned for years as a result of poor land tenure system, climate change and land degradation, and high post-harvest losses (Falayi, 2019) and after that was faced with challenges created by the ongoing Russia-Ukraine war, COVID-19 and insurgency in the northern part of Nigeria. Rising incidence of ethno-religious conflict, herdsmen and farmers' clashes, and banditry added to food-supply constraints, further pushed up costs and worsened food security concerns in the country as inflation continues to rise (Alake, 2021).

The herdsmen-farmers conflict in Nigeria, which intensified between 2015 and 2023, even in the south-east remains a source of concern to many (Osimen et al., 2024).

The herdsmen were alleged to be engaged in robbing, killing, maiming, and raping women, while destroying farmlands. Thousands of people were forced from their various areas of residence in the south-east states of Abia, Anambra, Ebonyi, Enugu and Imo states, respectively, due to this perennial conflict. The issues of food insecurity in the south-east and Nigeria were exacerbated by this, as the volume and value of food supply decreased due to displacement of persons, massacres, non-cultivation of farmlands, and burning of farm produce (Egodike et al., 2020).

The two agricultural occupational groups always argue when animals destroy crops and lands. As a result, communities in some parts of the Southeast live in constant terror of engaging in farming operations due to herdsmen's forced acquisition of large amounts of community farmlands for grazing purposes and settlement. Food security is still at risk due to this development, which has decreased peaceful coexistence in the impacted communities (Egodike et al., 2020).

Timipa et al. (2023) point out that in addition to the loss of wealth and human resources, banditry and farmer-herder conflicts have resulted in significant societal costs in the form of humanitarian crises. This is because victims frequently escape from hotspots, the growing number of internally displaced people (IDPS) and refugees has become cause for concern. According to Luqman (2021), smallholder farmers are disproportionately affected by this problem since it has an impact on their means of subsistence. Eighty percent of Nigeria's farmers are smallholders. Besides the ongoing confrontations with herders, these farmers deal with pests, disease outbreaks, drought, erratic rainfall, and climate change. These reduce its yield, which leads to minimal profitability. A lot of farmers are now switching from food crops to cash crops because of the poor returns on their investments. The operations of armed bandits and the constant attacks by Fulani herdsmen made their situation even worse (Luqman, 2021).

As part of efforts to address these challenges and support its quest for food

security, Nigeria's Federal Government unveiled the Anchor Borrowers' Programme (ABP). The government viewed agriculture and rural development as indispensable in propelling economic growth in Nigeria and also as a tool to address the country's high youth unemployment. Therefore, this work explores rice production in Ebonyi State and how it has impacted positively on food security in Nigeria. Ebonyi State was selected as the area of this study because it is one of the leading producers and marketers of rice in the country. Ebonyi is situated in the south-eastern part of Nigeria. This study assesses how the ABP has impacted on the production of rice in Nigeria and centres on the activities of small scale rice farmers in Ebonyi.

The objectives of this study are to: Ascertain how import substitution has contributed to rice production in Ebonyi State; examine the extent to which modern farming has impacted rice production in Ebonyi State; and investigate the extent to which local farmers have contributed to rice production through financial support of ABP.

This study seeks to address these hypotheses: Import substitution does not have major contribution to rice production in Ebonyi State; and Modern farming technique does not have any significant contribution to rice production in Ebonyi State, Nigeria; There is no significant relationship between access to financial support through the ABP by local farmers and rice production in Ebonyi State.

2. Literature review

2.1. Food security

Over the years, food and nutrition have been the focus of policymakers across the world. From the World Food Conference held from the 1960s up till 1974, which was a period of a global food crisis, the focus has been the availability of food at inexpensive prices globally, with priority accorded to food availability. Food security extends beyond mere cultivation, accessibility, and consumption of food; it encompasses the critical dimension of food quality and nutritional value. Particularly alarming is the plight of women and children, including adolescent girls, who often receive inadequate food compared to their male counterparts within the same households (Sasson, 2012). Escalating food prices is a poignant indicator of the pervasive food crisis and insecurity gripping communities worldwide.

A nation can be said to have attained food security, "when there is access to food in adequate and acceptable quality and quantity, consistent with decent existence at all times for the majority of the population" (Davies, 2009) cited in Etim et al. (2017). Therefore, a nation, community, or family is said to have attained food security when issues of hunger or fear of going all day without meals have been adequately addressed (Egbulonu et al., 2020). From the foregoing, the definition of food security has different four related elements. These are availability, safety, distribution and utilization. They are also referred to as the four main parts of food security which are:

- 1) Availability of Food: This pertains to food production, allocation and exchange;
- 2) Access to Food: It has to do with low cost and is a reflection of the level of your income and wealth, delivery and preferences;
- 3) Utilization of Food: This is linked with important elements that involves

nutritional value, balanced diet and food safety. A two-tiered system of food security explored by Rosegrant et al. (1995) found economies that are on the path of sustained growth normally have better food availability while less developed and low-income countries face the challenge of food shortage and malnutrition;

- 4) Sustainability: This underscores another crucial facet of food security: The imperative for sustained food production to meet the needs of future generations. However, empirical evidence reveals a concerning trend wherein the average annual growth rate of rice output worldwide has decreased from 2.42 percent from 1974 to 1982 to 1.78 percent from 1982 to 1990 (Rosegrant et al., 1995).

The World Food Programme forecasted that over 345 million persons were at risk of high levels of food insecurity in 2023. The number is far higher than its prediction in 2020 and a significant increase of 200 million people compared to the estimate before the pandemic hit the world in 2020 (Chukwudi et al., 2024). Among persons that are majorly hit are those who reside in rural areas and rely on agriculture to meet their basic needs every day and also for their sustenance. In the context of this study, food security implies all the processes of producing adequate quantities of all food products that Nigeria needs to feed its population and have sufficient seeds and seedlings for the next agricultural season. Oghuvbu et al. (2022) stress that achieving food security remains essential for the global economy. Yaya and Adeleke (2023) note that the impact of the pandemic led to disruptions at borders and other restrictive measures deeply affected the agricultural process, from input supply to cultivation, allocation, and food intake, thereby worsening concerns of food insecurity, starvation, and undernourishment. This severely affected all aspects of food availability, access, utilization, and stability, worsened malnutrition, and also exacerbated criminality and insecurity in some parts of Africa, including Nigeria.

Adinnu (2023) notes that in Nigeria, a significant impact of the petrol subsidy removal and the unification of the exchange rate by the federal government led to the astronomical rise in transportation costs, which directly affected agricultural production and elevated concerns of food insecurity in Nigeria as citizens find it difficult to buy food at higher prices. Furthermore, removing fuel subsidies and the exchange rate unification expanded income inequality and poverty in the West African country.

2.2. Import substitution contribution and rice production in Ebonyi state

Agriculture as “a development issue remains a core challenge for Nigeria” (Nwajiuba, 2012). As stated by Olaoye (2014), Utilizing a country’s agricultural resources proactively could help it grow economically (Daudu et al., 2023). It could result in an increase in the Gross Domestic Product (GDP), give people access to food and jobs, and reduce poverty. Without paying adequate attention to agriculture, no country can advance. Unfortunately, while having immense potential for agricultural development, many emerging nations, particularly Nigeria, are not making the most of their opportunities. The favorable weather and huge cultivable lands, a significant portion of which is grossly underutilized, serve as evidence of this. Rice, which is a staple food in the country and is largely cultivated at the subsistent level by small-scale farmers is inadequate due to low crop yield. Thus, inadequate to meet the rice

needs of Nigerians, which is supplemented by heavy importation of the product. Rice farming has not been able to attain its potential in Nigeria due to traditional methods of farming, misuse of modern agricultural technology and low availability of credit to rice farmers in Nigeria, including Ebonyi State.

To boost rice production in Ebonyi State, the government has taken several steps to boost production and incentivize farmers. Some of these include the procurement and distribution of mechanized equipment to farmers. The State government also introduced irrigation farming.

According to Felix (2023), as part of measures to maximize the comparative advantage in rice, and cassava production, Ebonyi State Governor, Francis Nwifuru, approved the release of N100 million counterpart fund for the International Fund for African Development (IFAD) Value Chain Development Programme on rice and cassava production in the State. The Value Chain Development Programme is a project of the Federal Government, sponsored by IFAD to enhance rice and cassava production for sustainable economy and food security.

The participating local government areas in Ebonyi are Ikwo, Izzi, Ohaukwu, Ezza North, Ishielu, Ohaozara, Ivo and Afikpo South otherwise known as Edda local government area (Felix, 2023).

Also, in a bid to encourage wet season farming and reduce the high cost of food in the country, the Ebonyi State Governor, Francis Nwifuru, flagged off the distribution of fertilizers and high-yield rice seeds to rural farmers in the State (AIT, 2024). The Governor also distributed 13 bags of fertilizers, and high-yield seeds in the first batch and expressed determination to introduce modern farming technologies that would increase production, boost yields, ensure food security, and create jobs for the youths (AIT, 2024).

Clement (2024) listed some impediments to rice production in Ebonyi including importation of foreign rice into the country, lack of irrigation facilities to make it an all-year-round affair, multiple taxation, inconsistency in government policy on rice, prevalence of flood, natural disasters, ecological problems, and failure of banks to grant credit facilities to farmers.

Besides, the issue of milling rice has remained a great challenge, resulting in the imbalance between capacity and supply of parboiled rice. This has posed the question of how to increase parboiling capacity to meet the needs of small and medium milling enterprises, to raise the utilization of mills in their installed capacities (Clement, 2024).

Finance is the life-blood of any business and generally plays a crucial role in the agricultural sector's growth and development and also enhances the contribution of agriculture to the country's GDP and foreign exchange earnings. Therefore, as Nigeria's population grows at an uneven rate with its food production capacity, the possibility of an impending food crisis remains inevitable unless agricultural output is improved to equal population growth.

To expand agricultural production so as to ensure food security in Nigeria, a country's whose population had been estimated to be ranked one of the top three in the world by 2050, with population forecasted to be 300 million (United Nations, 2017), the Central Bank of Nigeria (CBN) as part of its development finance function introduced the ABP in 2015, with the intention to partner with firms, especially small-scale formers that are into production and processing of some essential crops. The

initiative aims to enable rural farmers raise cultivation and availability of feedback to the processors, drastically decrease imports and preserve the country's external reserves. Rice consumption is about 70% import based in spite of the country's ability to produce the commodity to satisfy its domestic demand and also have enough to sell to other countries. That is why fixing the challenges at each level of the cultivation process, not just in processing, but also in distribution and also sales of the rice produced in the country will increase the level of production in the country. It will also improve the general supply of rice in Nigeria, reduce its reliance of fluctuations of prices in the international market and increase supply of rice to city dwellers who are heavy consumers of the staple food. Ebonyi State and Nigeria will benefit immensely by significantly focusing on domestic processing and marketing (import substitution) instead of food importation as it will help preserve scarce foreign exchange and create jobs for its teeming population. Due to the aforesaid, this study looked at the impact of food security on rice production in Ebonyi State since the introduction of the Anchor Borrowers' Programme. Ebonyi was selected because of its position when it comes to rice processing and marketing. This work examined how the ABP has impacted rice production in Nigeria, with more attention on small-scale rice farmers in Ebonyi State Nigeria.

To encourage more youths in farming, initiatives such as the Anchor Borrowers' Programme must be encouraged in all sectors. This will greatly be vital to increasing youth's involvement in the agricultural sector, and ultimately addressing the untapped potential of the country's sizeable and growing demographic.

Besides this, the youth cohort's participation in agriculture should also be encouraged to tackle widespread rural poverty reduction. Additionally, there is a need to increase agriculture education, introduce modern farming techniques, make the land management system for agricultural entrepreneurs less cumbersome, and introduce single-digit financing for farmers.

2.3. Modern farming techniques and promotion of rice production in Ebonyi state

The Federal Government introduced the Anchor Borrowers' Programme (ABP) for the agriculture and rural development sector as a tool for national development. The ABP initiative was started to accelerate agricultural growth and attain food self-reliance in Nigeria. According to Chioma (2016), the initiative of the Central Bank of Nigeria is part of efforts to support the diversification of the Nigerian economy and establish a vibrant and sustainable agricultural base that has viable value chains, support food security, reduce imports, and raise the level of productivity. The objective of the initiative is to support the Federal Government of Nigeria in its drive for self-sufficiency in the production of food; to halt the projected N3.96 trillion annual import bill on rice and other farm products in Nigeria and to halt the unrestrained expenditure of foreign exchange (Central Bank of Nigeria, 2021).

Edefe et al. (2023) note that the ABP aims to allow small-holder farmers raise their productivity, lower the level of importation and preserve the country's external reserves.

The ABP initiative also intends to support the drive to broaden the source of

revenue for Nigeria's economy away from oil and unlock opportunities in other non-oil industries like agriculture, manufacturing, and services. The programme's main goals are to build an ecosystem connecting out-growers to integrated millers, increase domestic rice production through modern farming techniques (use of portable mechanical tools and application of fertilizers), to replace imported rice, increase integrated rice mills' operating capacity, increase bank financing for the rice industry, increase smallholder farmers' capacity, and focus on commodities for which the nation has comparative advantages (Central Bank of Nigeria, 2016). The scheme was introduced by the CBN in line with its developmental function aimed at stimulating output in order to curb the adverse effects of food importation on the nation's foreign reserves. It includes the making available inputs in kind and cash to smallholder farmers as a means of encouraging local production of rice, to enhance capacity utilization of integrated mills, guarantee inputs supply to processors of agricultural products and help reverse Nigeria's negative balance of payment on food. At harvest, the small-holder farmers present their farm outputs to the agro-processor (the anchor) who in turn offers the cost of the produce to the smallholder farmers.

Rice was the pilot crop for the ABP. The increase in rice production in some states has been linked to the ABP. Being the primary food source for more than 50% of the global population, especially in India, China, and some other nations in Asia and Africa, rice (*Oryza sativa*) is arguably the most significant food crop in the world (Food and Agricultural Organization, 1996). According to Casinilo et al. (2023), rice productivity depends on the demographic and socio-economic profile and constraints of farmers. Since the 1970s, Nigerians' demand for it has grown at a far quicker rate than that of any other African nation as a result of its growing impact on the per capita calorie consumption of Nigerians (West Africa Rice Development Association, 2001). Rice can be said to be part of an everyday diet for many in Nigeria. Ebonyi State is one of the states in Nigeria where rice is produced majorly by smallholder farmers. The use of modern agriculture tools with sufficient access to finance for small-scale farmers will positively impact productivity. According to Singbo (2012), improved productivity, especially in rice production can be attained with the availability of finance because small-scale producers are poor and often affected by lack of credit to boost their activities, especially in a State like Ebonyi.

Farmers with a lack of farming information about innovative technologies in agriculture hinder the production level. Hence, it is necessary to investigate to progress of the farmers' knowledge that affects their practices (Casinilo et al., 2023).

Rice production in Nigeria has seen some significant developments over the years. With rice now a major part of meals in Nigeria and its importation contributing a significant part of the country's import bill over the years, there have been deliberate policies aimed at increasing local rice production. Rice cultivation in Nigeria traces back to around 1500BC, initially centered on the indigenous low-yield red grain species "*Oryza glaberima stued*", predominantly produced in the Niger Delta region (Ogundele and Okoruwa, 2006). However, introducing the high-yield species *Oryza sativa* in the 1980s marked a significant advancement in rice cultivation practices. Rice farming is widespread across various agro-ecological zones in Nigeria, albeit predominantly on a small scale.

Research by Imolehin (1991) indicates a substantial increase in paddy rice

production, with output rising from 13,400 to 344,000 tonnes between 1970 and the present. During this period, the cultivated area expanded from 156,000 to 255,000 hectares. The most remarkable growth in planted area, output, and productivity in paddy rice production has occurred in almost 20 years, reaching 666,000 hectares, 1.09 million tons, and 2.07 tons per hectare, respectively. By 1980, Nigeria emerged as the biggest manufacturer of rice in West Africa and the third on the continent, trailing behind Egypt and Madagascar (West Africa Rice Development Association, 1996).

Production theory is adopted as its theoretical framework of analysis. It explains and establishes the correlation between output and factors of production, focusing on the supply side of product price. It aims to explain how a company determines the best combination of factors to maximize output or reduce production costs. According to Edwin (2015), James Mill was the first to analyze the production, dedicating a chapter to the idea in his book “Elements of Political Economy”. Production theory applies to an economy’s entire structure or specific economic sectors. Underdeveloped nations often rely heavily on immigration from developed nations, which can damage their economies. Zimbabwe’s dire economic conditions illustrate the disastrous effects of this (Keyamo and Emmanuel, 2021). Since Nigeria’s independence, governments have worked to increase productive capacity across all sectors, focusing on service and agricultural sectors to shift the source of revenue for the economy away from oil. However, the oil boom era shifted the focus from agriculture to the oil industry, leading to a mono-cultural economy. The federal government’s efforts to diversify the economy and restore the non-oil sector’s position as its backbone were unsuccessful, leading to initiatives like the Anchor Borrowers’ Programme (Opue et al., 2018).

3. Methodology

The methodology employed in this study encompasses a cross-sectional survey research design aimed at evaluating food security and effectiveness of the Anchor Borrowers’ Programme (ABP) in Ebonyi State, Nigeria, with a specific concentration on small-scale rice farmers that benefitted from the ABP, addressing pertinent issues as identified by Chidiebere-Mark et al. (2019). Participant selection utilized multistage sampling techniques, leveraging the amalgamation of two or more probability sampling methods for optimal efficacy, termed sampling within the sample (Alvi, 2016). Stratified random sampling was employed to delineate strata among rice-producing farmers in the state, while random sampling facilitated the random selection of respondents from each stratum. The study was conducted across Nigeria’s Ivo, Onicha, and Abakaliki local government areas, incorporating both structured questionnaires and in-depth oral interviews. Data collection encompassed a spectrum of factors, including personal bio-data, research inquiries, food security, employment enhancement, poverty alleviation, and the transition of rural smallholder farmers from peasant to large scale rice production.

3.1. Data presentation

Table 1. Demographic characteristics of respondents.

		Frequency	Percentage	Cumulative Percent
Gender	Male	263	65.8	65.8
	Female	137	34.3	100.0
	Total	400	100.0	
Age	18–25	142	35.5	18.8
	26–35	107	26.8	56.8
	36–45	98	24.5	97.0
	46–55	25	6.3	99.5
	56 and Above	28	7.0	100.0
	Total	400	100.0	
Marital Status	Single	112	28.0	28.0
	Married	242	60.5	88.5
	Divorced	39	9.8	98.3
	Widowed	7	1.8	100.0
	Total	400	100.0	
Education Qualification	SSCE	75	18.8	18.8
	OND	152	38.0	56.8
	HND	161	40.3	97.0
	BSc	10	2.5	99.5
	Masters or Doctoral	2	0.5	100.0
	Total	400	100.0	
Beneficiary of ABP	Yes	64	16.0	16.0
	No	336	84.0	100.0
	Total	400	100.0	
Period of benefits from ABP	0–1 year	52	13.0	1.3
	2–3 years	115	28.8	2.5
	4 years & above	167	41.8	6.3
	Not Applicable	66	16.5	42.5
	Total	400	100.0	100.0

As explicitly shown in **Table 1** above and **Figure 1** below, Respondents between ages 18–25 are 142 (35.5%), ages between 26–35 was 107 (26.8%), ages between 36–45 are 98 (24.5%), ages between 45–55 are 25 (6.3%), and ages between 56 and above are 28 (7.0%).

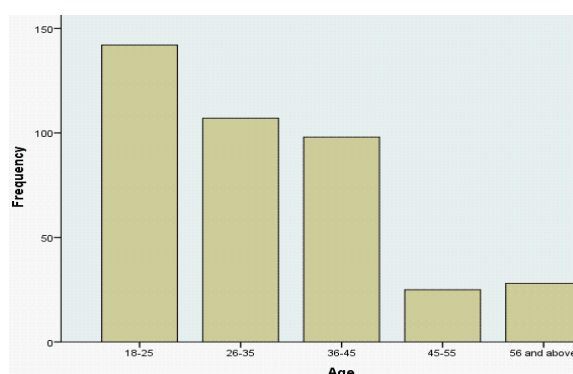


Figure 1. Age of respondents.

From **Table 1** and **Figure 2**, the amount of male respondents is 263 (65.8%), and female respondents are 137 (34.3%).

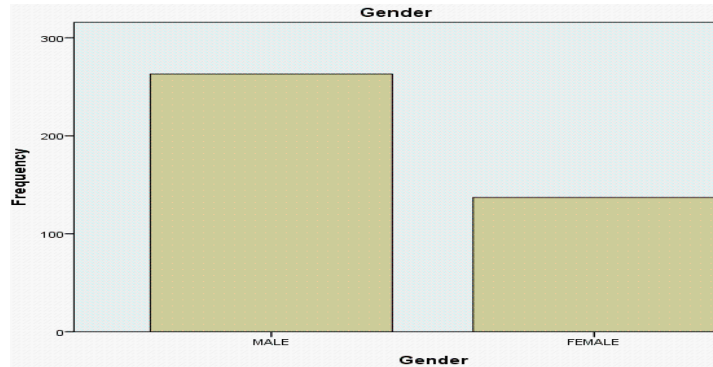


Figure 2. Gender of respondents.

It can be observed from **Table 1** and **Figure 3** that 112 (28%) are single, 242 (60.5%) are married, 39 (9.8%) are divorced, and 7 (1.8%) are widowed.

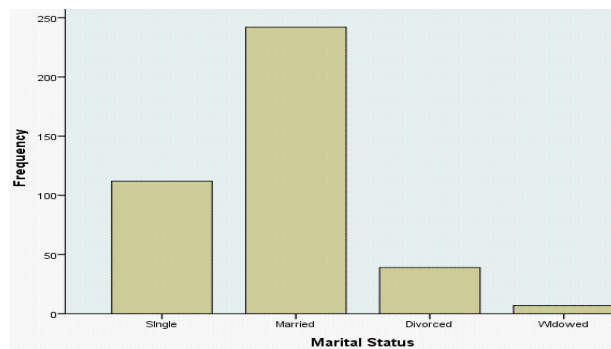


Figure 3. Marital status of respondents.

From **Figure 4** and **Table 1**, respondents with Senior Secondary School Certificate are 75 (18.8%), OND are 152 (38%), HND are 161 (40.3%), BSc are 10 (2.5%) and Postgraduates are 2 (0.5%).

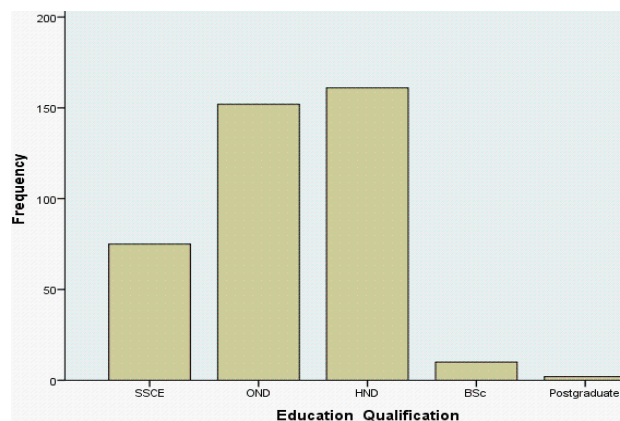


Figure 4. Education qualification of respondents.

The number of non-beneficiaries as shown in **Figure 5**, is 64 (16%), and the

number of beneficiaries is 336 (84%).

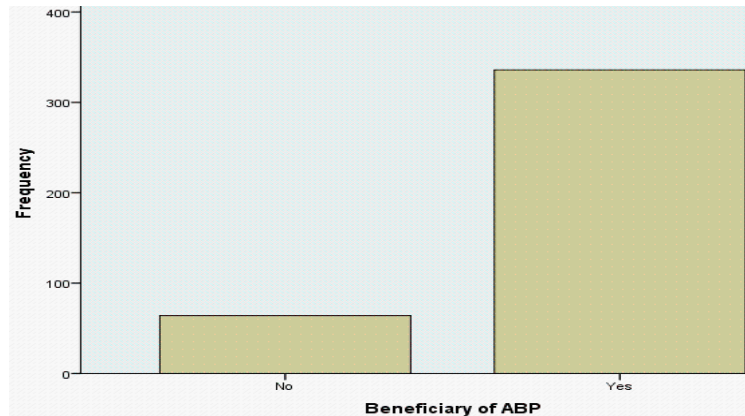


Figure 5. Beneficiary of ABP.

Farmers that benefit from ABP as shown in **Figure 6** for 0–1 year are 52 (13%), 2–3 years are 115 (28.8%), 4 years are 167 (41.8%) while 66 (16.5%) not applicable.

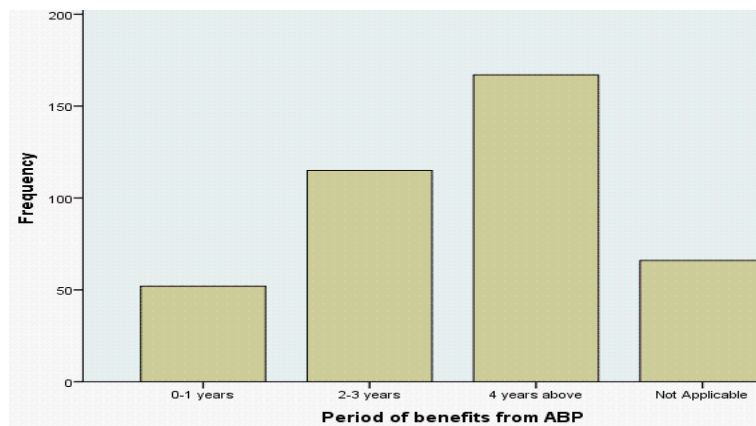


Figure 6. Period of benefit from ABP.

3.2. Test of the hypotheses

H_1 : Import substitution does not have significant impact on rice production in Ebonyi State To test the first hypothesis, we use linear regression analysis presented in **Table 2**.

Table 2. Results of the regression analysis for the second hypothesis.

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	T	Sig.
(Constant)	0.503	0.115		4.384	0.000
Import substitution	0.497	0.040	0.525	12.334	0.000

Dependent variable: Food security.

From **Table 2**, the relationship between import substitution and food security can be expressed as: $RP = 0.503 + 0.497 \times IS$

The findings reveal that as import substitution program intensifies in Ebonyi state, the effect on rice production is positive by a factor of 0.497.

The model performance reveals that the $R = 0.805$, R-squared is 0.649, which means that 64.9% of the predictor is explained by the response variable Anchor Borrowers' Programme, and adjusted R-squared is 0.647.

The hypothesis was rejected at $(F 2397) = 366.37$, p -value of $0.000 < 0.01$. Since the null hypothesis was rejected at a 1% level of significance, it shows positive evidence that import substitution has promoted production in Ebonyi State.

H2: Modern farming does not have any significant contribution to rice production in Ebonyi State, Nigeria.

To test this hypothesis, we use the Pearson product-moment correlation coefficient. And the result is presented in **Table 3**.

Table 3. Correlations between innovative financing and rice production.

		Modern Farming	Food security
Modern Farming	Pearson Correlation	1	0.634**
	Sig. (2-tailed)		0.000
	N		400
Rice production	Pearson Correlation	0.634**	1
	Sig. (2-tailed)	0.000	
	N	400	400

The result in **Table 3** shows that there is a positive relationship between modern farming and rice production in Ebonyi state, Nigeria with Pearson product moment correlation coefficient of 0.634, and p -value = $0.000 < 0.01$. Therefore, the hypothesis that modern farming does not have any contribution to rice production in Ebonyi State, Nigeria, is rejected. We conclude that modern farming (which is the use of portable mechanical tools and application of fertilizer and farm inputs), positively contributed to rice production in Ebonyi State, Nigeria.

4. Analysis

The results revealed that three hundred and forty-seven (347) youths between the ages of 18–45 out of four hundred participants were sampled in the survey. The beneficiaries of the Anchor Borrowers' Programme are fairly educated, showing that 280 out of 336 have been to a higher institution with at least an ordinary diploma up to postgraduate studies, as shown in chapter four of this study. A comprehensive interview was also conducted and transcribed accordingly. The hypothesis was subjected to regression analysis, and the results showed strong evidence that the import substitution contributed to rice production in Ebonyi State and below are the highlighted review:

4.1. Import substitution and rice production in Ebonyi state

For the country to achieve food security and poverty reduction, the agricultural sector is essential as over 70 per cent of its labour force operate in the sector and import substitution can be recognized as one active means to support food security (Egbulonu et al., 2020). Therefore, this study examined how import substitution affected rice production in Ebonyi State. It, however, showed that import substitution positively

affected rice production in Ebonyi State ($F(2397) = 366.37$, p -value of $0.000 < 0.01$). Results precisely shows that there are policies/strategies that are implementable that can be introduced to boost rice production and import substitution provided a platform for restoring food security in the State; that local production of food products has been stimulated through restrictive policies that discourage importation of foods, even as it revealed that the State Government has not properly introduced measures to boost import substitution strategies in Ebonyi. Thus, the study reveals that import substitution has been of significant benefit in terms of rice production in Ebonyi state.

In the same vein, Umeh and Adejo (2019) study on ABP also uncovers some benefits associated with the programme such as: employment creation and increase in income. Furthermore, Umeh and Adejo (2019) in their study on assessment of CBN's Anchor Borrowers' Programme effects on rice farmers in Kebbi State, Nigeria. They found that the Programme does not only provide credit for farmers but also educates famers on improved cultural practices through training and extension visit. These improvements in practices have enhanced the entrepreneurship skills and abilities of the farmers. Saheed et al. (2018) also found that ABP shows that positive and statistically significant impact on improvement generation in the agricultural sector. Chioma (2016), also acknowledge the fact that the ABP programme has boosted the production of rice which broadly seems to be what is contributing to the major part of the country's importation. It has indeed enhanced agricultural development most especially the production of rice in the country. The CBN report of 2016 also attested to it that the Programme resulted in the stoppage of an estimated N3.96 trillion yearly bill on importation of rice and other farm produce in Nigeria. The ABP programme has provided farm inputs in kind and cash for farm labour to smallholder farmers which encouraged local production of rice (Wijaya et al., 2020) to enhance capacity utilization of integrated mills, guarantee inputs supply to Agro-Processors and address the country's negative balance of payment on food. Small-holder farmers deliver their harvest to the agro-processor (the anchor), who then credits the farmer's account with the monetary equivalent.

4.2. Modern farming technique and rice production in Ebonyi state

Modern farming could be found helpful to enhance farmers' access to funds to facilitate their farming activities, which will enhance rice production. This study therefore investigated the extent to which modern farming contributes to financial inclusion in Ebonyi state, Nigeria. This research reveals that modern farming contributes to rice production in Ebonyi State, Nigeria ($r = 0.634$, and p -value= $0.000 < 0.01$). Result shows that a lot of smallholder farmers in Ebonyi State have expanded their production capacity with the help of modern farming tools and farm inputs; the state of rice production in Ebonyi State today is better than before due to innovative financing. Umeh and Adejo (2019) study also shows that the innovative financing contributes to rice production and improvement on the living standard of the rice farmers, which corroborates with the results of the study.

5. Limitations of the study

The following are the limitations of this study: The study has a limited

geographical scope because it was limited to Ebonyi State. It is not appropriate to generalise from the study's findings because there are other states in the country where the ABP has also been implemented and the challenges they face might be different.

This work is also limited to the sample size of the respondents from rice farmers in Ebonyi State because the number of rice farmers in the entire Ebonyi State is far larger than the number. Although the study has undoubtedly contributed to a better understanding of the ABP, rice production and food security in Ebonyi State, Nigeria, it should be considered preliminary until future studies replicate it with samples from a larger population of rice farmers in the state. However, this study becomes the origin and framework for future investigations into the ABP, rice production and food security in Ebonyi state, Nigeria.

6. Suggestions for further studies

This work recommends that future studies of this kind should be undertaken to include other states from the South East of Nigeria to give deeper insights into the programme.

The study also suggested that further empirical work should be conducted on a larger sample using farmers from the six geo-political zones of Nigeria.

7. Concluding remarks

Through the ABP, the CBN has facilitated the development of an ecosystem that promotes value chain financing through lending in-kind to small-holder farmers and providing market assurance. The ABP has contributed to the creation of millions of direct and indirect jobs in Ebonyi State. However, evidence from the literature reviewed and interviews conducted showed that challenges such as underdeveloped agricultural infrastructure to encourage mechanization; poor irrigation facilities to guarantee year-round production; ineffective extension services to facilitate the dissemination of best practices; absence of an effective commodity exchange and warehouse receipt financing system to facilitate efficient price discovery and minimize commodity hoarding and post-harvest losses; and the inability and deliberate unwillingness of some of the beneficiaries to repay the loans are some of the challenges hindering the food security objective of the programme. Consequently, the government needs to develop effective policies on loan repayment so as to ensure that the programme continues to benefit entrepreneurs and farmers. Young school leavers should also be encouraged to venture into the agriculture sector through schemes such as the ABP, bank financing and innovative financing so as to help the Federal Government achieve its economic diversification drive. This can be achieved by designing aggressive public enlightenment schemes so as to create more awareness about the ABP and financing options available for farmers generally. In conclusion, in order to improve outcome, the CBN need to make sure that the process of choosing beneficiaries is transparent and devoid of nepotism.

From the findings of this work, the study put forward the following recommendations:

- 1) The anchor borrowers' programme, banks and other lending agencies/programmes should train farmers before giving out loans to avoid

diversion funds and experience difficulty in paying back loan since loan repayment was designed to be from their profits.

- 2) Sanctions should be intensified on defaulters so as to further increase loan repayment rate.

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