

JOURNAL OF AGRIPRENEURSHIP AND SUSTAINABLE DEVELOPMENT

Volume 7, Number 4, December, 2024

(JASD)

ISSN (Print): 2651-6144; ISSN (Online): 2651-6365 Website: http://www.jasd.daee.atbu.edu.ng

EFFECT OF AGRICULTURAL TRANSFORMATION AGENDA SUPPORT PROGRAM ON POVERTY STATUS OF RICE FARMERS IN NIGER AND KEBBI

STATE, NIGERIA

Yisa, J., Baba, K. M., Ibrahim, F. D. and Yisa, E. S.

Department of Agricultural Economics and Farm Management, Federal University of Technology,

Minna

GSM: +2347035341672

ABSTRACT

The study assessed the effect of the agricultural transformation agenda support program (ATASP-1) on the poverty status of rice farmers in Niger and Kebbi State, Nigeria. Using the Foster-Greer Thorbecke (FGT) model and Propensity Score Marching (PSM) and the Average Treatment Effect on the Treated (ATT) Model. A multi-stage sampling technique was employed to select 710, consisting of 355 participants and non-participants of ATASP-1 rice farmers in Niger and Kebbi States, respectively. Data were analyzed using the FGT model and then the propensity score marching method. Results showed that among ATASP-1 participant farmers, 31.55% were classified as moderately poor, 5.07% were extremely poor, and 63.38% were non-poor. The poverty line was estimated to be 0.3243, 0.3693, and 0.3520 for the participants, non-participants, and in the pooled result, respectively. The poverty severity we found to be 0.1052 for the participants, 0.1364 for the non-participants, and 0.1239 in the pooled result. The study found that various factors, including crop output, age, marital status, household size, credit received, extension visits, and farmer's group membership, significantly influenced participantion in ATASP-1. The Agricultural Transformation Agenda Support program positively impacted participants' poverty status, suggesting the need for wider coverage.

Keywords: Agenda, Agriculture, Program, Support and Transformation

Corresponding Author's E-mail: joky4sure@gmail.com

INTRODUCTION

Poverty is one of the gravest challenges facing the world today, with a staggering 40% of the world's population living with the reality of the threat of extreme poverty, and 25% living in a state of poverty so abject that it threatens survival (Kadir and Amalia, 2017). Globally, extreme poverty continues to be more prevalent in the rural areas. For instance, it is reported that out of the world's 1.2 billion extremely poor people, 75% live in rural areas and, they largely depend on agriculture, forestry, fisheries and related activities for survival (Kadir and Amalia, 2017). According to the National Bureau of Statistics' recent report on poverty and inequality in Nigeria, 40% of the total population or almost 83 million people, live below the country's poverty line of \mathbb{N} 137,430 (\$381.75) per year. Furthermore, it reported that 52% of the poor live in rural areas compared to only 18 % in urban areas (Eze *et al.*, 2019). Therefore, poverty is more prevalent in rural areas than the urban areas. And majority of the rural dwellers in Nigeria depend on farming and agriculture related activities for their incomes and livelihood. Therefore, it appears that the high rate of poverty in such areas may be due to low returns in agriculture. This implies that agriculture and poverty are closely linked.

It is striking that rural agriculture in Nigeria is dominated by small-scale resource-poor farmers who use low levels of improved inputs and technologies and are characterized by low level of productivity. For instance, Anthony *et al.* (2021) reported that most rice farmers (90%) in Nigeria are smallholders, applying low input strategy to agriculture, resulting to low output. Hence, Nigerian rice farmers' productivity is among the lowest within sub-Saharan Africa, with average yield of 1.51 tonne/ha as compared to Bukina Faso, Tanzania, Uganda, Mali, Kenya, Ghana and

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Volume 7, Number 4, December, 2024

ISSN (Print): 2651-6144; ISSN (Online): 2651-6365 Website: http://www.jasd.daee.atbu.edu.ng Ethopia's average yields of 2.14t/ha, 2.77t/ha, 2.66t/ha, 3.39t/ha, 4.66t/ha, 2.85t/ha and 2.85t/ha respectively (FAOSTAT 2022).

Hence, poverty could, in turn, be attributed to the low productivity and income in agriculture. Apparently recognizing the association of farming with rural poverty. Nigerian governments over the years have implemented several projects and programmes aimed at increasing productivity and income, thereby reducing poverty. One of such recent programmes is the Agricultural Transformation Agenda (ATA) which was introduced in 2012 and later metamorphosed into Agricultural Transformation Agenda Support Program Phase–1 (ATASP – 1) by 2016. The program is expected to promote agribusiness, attract private sector investment in agriculture, reduce post-harvest losses, add value to local agricultural produce, develop rural infrastructure and enhance access of farmers to financial services and markets. Its specific objective is to increase, on a sustainable basis, the income of smallholder farmers and rural entrepreneurs that are engaged in the production, processing, storage and marketing of the priority commodity value chains (ATASP-1 PIM). In short, ATASP–1 aims to improve agricultural productivity as a means of reducing poverty.

Agricultural Transformation Agenda Support Program Phase-1 has three mutually reinforcing and complementary components: Infrastructure development, value chain development, and Program Management. It is funded by African Development Bank (AfDB) and implemented by Federal Ministry of Agriculture and Rural Development in four Staple Crops Processing Zones (SCPZs) of Adani-Omor, Bida-Badeggi, Kano-Jigawa, Kebbi-Sokoto covering 21 LGAs in seven States. The program adopted a value chain development approach to achieve its objectives of increasing agricultural production and productivity with the outcome of reducing poverty along the value chain of priority crops of rice, sorghum and cassava. The study will provide empirical information to government and the donor (African Development Bank) on whether or not ATASP-1 is achieving its objectives, particularly with respect to poverty reduction, given the huge resources that have been committed to the program. Based on this, the study was carried to assess the effect of agricultural transformation agenda support program on poverty status of rice farmers in Niger and Kebbi States respectively.

MATERIALS AND METHODS

The Study Area

The study was conducted in Niger and Kebbi States, Nigeria. Niger State is located in the Southern Guinea Savanna agro ecological zone of Nigeria. The State lies within latitudes $3^0 20' - 7^0 40'$ N and longitudes $8^0 11' - 11^0 2'$ E. It is bordered in the north by Zamfara State, on the northeast by Kebbi State and the Federal Capital Territory borders the State in both north- east and south east, respectively. About 85 % of the State population is farmers, but some of them also engage in the rearing of livestock which are marketed in order to supplement the revenue from cultivation of crops.

According to the 2006 Census, the State has a population of 3, 950,249 (Yisa *et al.*, 2020) which is projected to be increasing at an annual growth rate of 2.38 %. Given this projected growth rate, the population of the State in 2023 was 5,962,478. It covers an estimated land area of 76,363km². The mean annual rainfall ranges between 1100mm in the north and 1600 mm in the south. The average annual number of raining days ranges between 187 and 220 days. The rain starts in late April and ends in October with the peak being in August. The average minimum temperature is about 26 °C while the average maximum temperature is about 36 °C. The mean humidity ranges between 60 % (January to February) and 80 % (June to September). The

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vegetation of the State supports the cultivation of both food and cash crops, root crops and grains, such as Sorghum, Maize, rice, Groundnut, Cassava, Yam, Sweet potato Soya-bean, Sugarcane, Melon, Cotton and Vegetables.

Kebbi State on the other hand, is located in the north-western part of Nigeria. The State is situated within latitudes $10^{\circ} 8' - 13^{\circ} 15'$ N, and longitudes $3^{\circ} 30' - 6^{\circ} 02'$ E. It is bordered by Sokoto and Zamfara States in the east, Niger State to the south, Benin Republic to the west and the Niger Republic to the north. The population of the State was 4,440,000 in 2016 (Azaki et al., 2020) and projected at 3.1 % growth rate to be 5,650,666 in 2023. The State occupies an area of about 37,201km². Kebbi State falls within the dry savannah agro-ecological zone of Nigeria. The average annual rainfall in Kebbi State is 1020 mm, the State experiences peak rainfall between July and August while harmattan (cold season) is usually from November to February and is characterized by strong winds. The mean annual temperature of about 27°C is recorded in all locations, but temperature is generally high (Ayanlade et al., 2019). However, during the harmattan season, the lowest temperature is 21°C. Temperatures can go up to 40°C during the months of April to June. The average relative humidity during the wet season is 80 %, but it is generally low (40 %) for most of the year. The variation in relative humidity explains the hot, dry environment which is in sharp contrast to a hot, humid environment in the southern parts of Nigeria.

Sampling technique

Multi-stage sampling procedure was used to select rice farmers for this study. Niger and Kebbi States have seven local government areas each participating in Agricultural Transformation Agenda Support Program. So, the seven LGAs were purposively selected in the first stage. Second stage involved random selection of four LGAs each from the states, amounting to eight LGAs. These Local Government Areas have three communities each participating in the program's rice farming activities, therefore the third stage involved random selection of sixteen communities (two each from the selected LGAs). The final stage involved random selection of 710, consisting of 355 participants and non-participants of ATASP-1 rice farmers in Niger and Kebbi States, respectively. Method of data collection and analysis

The primary data were collected with the aid of kobo toolbox. Data were analyzed using FGT model and then propensity score marching method.

RESULTS AND DISCUSSION

Effects of ATASP on the Poverty Status of Rice Farmers

The poverty status of farmers was analyzed using the FGT index, and the results are illustrated in Figure 4.10. The poverty line was determined by calculating 2/3 of the mean monthly household per capita expenditure of the farmers, which was estimated to be \$23.627.41. Foster *et* al. (1988) asserted that households with per capita expenditure/income below the poverty line are categorized as poor, and vice versa. This criterion was employed to categorize farmers into poor and non-poor status. Additionally, among the poor, the study determined the proportion of those who are extremely poor. This was achieved by calculating proportion of those whose per capita expenditure is below 1/3 of the mean monthly household per capita expenditure of the farmers.

The results indicate that among ATASP-1 participant farmers, 31.55% were classified as moderately poor, 5.07% were extremely poor, while 63.38% were non-poor. In contrast, for nonparticipants, 39.72% of farmers were moderately poor, 18.87% were extremely poor, with only 41.41% classified as non-poor. This finding is consistent with the poverty incidence of 31.56% reported by Mohammed et al. (2019) for farming households in Kaduna State but exceeds the 24.8% reported by Adisa et al. (2019) for the farming populace in Kogi State, Nigeria. These

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Volume 7, Number 4, December, 2024

ISSN (Print): 2651-6144; ISSN (Online): 2651-6365 Website: http://www.jasd.daee.atbu.edu.ng results suggest that participation in the ATASP-1 program may contribute to reducing poverty levels among farmers, as evidenced by a lower proportion of moderately poor and extremely poor

levels among farmers, as evidenced by a lower proportion of moderately poor and extremely poor individuals among participants compared to non-participants.

In the pooled result, 35.63% of the farmers were recorded as moderately poor and 11.97% were extremely poor. These results imply that there is still a significant incidence of poverty among farmers in the study area, regardless of whether they were ATASP-1 participants or not. However, the results also suggest that the incidence of poverty is relatively lower among the participants compared to their non-participant counterparts. This further implies that the ATASP-1 intervention has contributed to poverty alleviation among the participant farmers.

The implications of these findings are multifaceted. Firstly, they underscore the persistent challenge of poverty among farmers in the study area, indicating a need for targeted interventions. Secondly, the comparison between ATASP-1 participants and non-participants suggests that the intervention has had a positive impact on reducing poverty levels among the former group. This implies that similar interventions or expanded efforts could potentially contribute to broader poverty alleviation in the study area.



Figure 1: Distribution of farmers according to poverty status

Additionally, the poverty headcount or incidence (P_0) , poverty gap or depth (P_1) , and poverty severity (P_2) among the farmers were calculated, and the results are detailed in Table 4.1. The poverty headcount (P_0) for the participants, non-participants, and the pooled result were 0.3662, 0.5859, and 0.4761, respectively.

The poverty depth index (P₁), often referred to as the gap of an average poor person from the poverty line, was estimated to be 0.3243, 0.3693, and 0.3520 for the participants, nonparticipants, and in the pooled result, respectively. This implies that 32.43%, 36.93%, and 35.20% of the poverty lines, i.e., N7,662.37, N8,725.60, and N8,316.85 per capita expenditure, were required to bring an average poor person to the poverty line among the participants, nonparticipants, and in the pooled result. This represents the minimum cost of eliminating poverty (relative to the poverty line) and indicates the amount that could be transferred to the poor to bring their consumption up to the poverty line. These poverty depth estimates closely align with the 37%

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and 46.75% reported by Yisa *et al.* (2020) for farming households surveyed in Niger State based on the income-poverty line measure.

Table 1: Estimated FGT indices

Poverty profile	FGT indices			
	Participants	Non-participants	Pooled result	
Incidence	0.3662 (36.62%)	0.5859 (58.59%)	0.4761 (47.61%)	
Depth/Gap	0.3243 (32.43%)	0.3693 (36.93%)	0.3520 (35.20%)	
Severity	0.1052 (10.52%)	0.1364 (13.64%)	0.1239 (12.39%)	
Poverty line	₩23,627.41			

Computed from Author's Field Survey Data, 2023.

The poverty severity (P_2), which measures the distance of each poor person to another, was found to be 0.1052 for the participants, 0.1364 for the non-participants, and 0.1239 in the pooled result. This means that among the poor farmers, 10.52% of the participants, 13.64% of the non-participants, and 12.39% in the pooled result, respectively, were severely poor. This indicates that the poor farmers among the participants and non-participants were not equally poor but varied in their degree of poverty.

These findings carry important implications for understanding the nature of poverty among farmers. The poverty headcount, depth, and severity indices provide a comprehensive view of the distribution and intensity of poverty within the studied farming community. The relatively lower poverty headcount among participants suggests that the ATASP-1 intervention has made a positive impact in reducing the overall incidence of poverty among this group. However, the varying degrees of poverty depth and severity underscore the need for targeted interventions tailored to the specific needs of different groups of poor farmers. Policymakers and development practitioners should take these distinctions into consideration when designing poverty alleviation programs to ensure more effective and equitable outcomes.

Effects of ATASP on the Poverty Status of Rice Farmers

The result of the propensity score matching carried out to determine the effects of ATASP on the poverty status of participant farmers is presented in Table 2 and 3. Probit regression and four different matching methods such as one-to-one, nearest neighbour, radius and kernel were employed to identify suitable matching technique and ensure robustness of the analysis. The results from the non-linear probit estimation of the propensity scores were displayed in Table 2. The results showed that variables such as crop output with z-value of 3.50, age (4.28), marital status (2.87), household size (-5.56), amount of credit received (6.16), extension visits (5.18) and membership of farmers' groups (13.26) were more likely to influence participation in ATASP-1 in the study area. As expected, output from rice production could influence the poverty status of the farmers as unit increase in output is likely to reduce the poverty situation of the farmers. More so, amount of credit received, extension contacts and cooperative membership have high probability to influence participation in agricultural projects and alleviate poverty status of the farmers. This finding is in line with the study of Owolabi (2019) who reported that utilization of technologies intervention had significant influence on the food security of the farmers in his study area. This means that the propensity score estimation satisfied the balancing assumption of the matching methods implying that the observable characteristics included in the propensity score estimation, the treatment and control groups were similar. For the treatment effects, only respondents whose propensity score fell within the common support region were included, since a substantial overlap in covariates is required between farmers who participated in ATASP-1 during the 2023 agricultural season and farmers who did not.

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Cable 2: Effect of ATASP-1 on poverty status of farmers					
Variables	Coefficient	z-value			
Crop output	0.0003	3.50***			
Income	-0.0002	-0.92			
Age	0.0414	4.28***			
Sex	-0.2878	-1.26			
Marital Status	0.5694	2.87***			
Household size	-0.1204	-5.56***			
Education level	0.0034	0.78			
Credit Amount received	0.0002	6.16***			
Extension	0.0524	5.18***			
Membership to farmers Group	2.4103	13.26***			
Constant	-3.6737	-8.44***			
Diagnostic statistics					
LR Chi-square	519.97***				

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Computed from Author's Field Survey Data, 2023.

The results for the propensity score matching was displayed in Table 3. The average treatment effect on the treated (ATT) effects ranges between about 0.33 and 0.34 which were consistently significant at 1% level of probability irrespective of the matching methods. This implies that the average treatment effect on the treated (participants) (ATT) revealed positive and significant treatment effects of ATASP-1 on poverty status of the farmers. Similarly, the results from the radius matching method have the highest treatment effect (t = 9.38, p<0.01) and it is supported by the most robust results regarding the presence of unobservable characteristics that could affect participation in ATASP-1. This finding is in agreement with Liverpool-Tasie et al. (2015) who reported positive and significant effects of Urea Deep Placement (UDP) adoption on the yield of rice farmers in Niger State. The author further reported radius matching method to have the highest treatment effects.

The statistically significant of ATT value obtained highlights the effectiveness of the ATASP-1 in reducing poverty status of participant farmers. The positive treatment effect implies that the ATASP-1 intervention had led to improved resource utilization, increased efficiency, yield and overall income among participants. This is in corroboration with the study by by Danso-Abbeam *et al.* (2018) who reported that agricultural programmes help increase farm productivity, revenue, reduce poverty and food insecurity.

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Matching method	ATT	t-value			
One to one	.332394366	2.50**			
Nearest neighbour matching	.336901408	3.17*			
Radius matching	.329577465	9.38*			
Kernel matching	.342472418	3.33*			

Table 3: Estimated effect of ATASP on the poverty of participants

Note: ATT = average treatment effect on the treated (participants) ** and * implies significance at 0.05 and 0.01 probability levels respectively.

Computed from Author's Field Survey Data, 2023.

CONCLUSION AND RECOMMENDATIONS

The study concludes that Agricultural Transformation Agenda Support program had positive and significant effect on the poverty status of the participants. The participants are better off than the non - participants as poverty is not as severe amongst the participants as compared to the non-participant counterparts and that ATASP has a strong significant effect in alleviating poverty of the participants. Given the substantial positive effect of ATASP-1 on profitability,



ISSN (Print): 2651-6144; ISSN (Online): 2651-6365 Website: http://www.jasd.daee.atbu.edu.ng

policymakers should consider expanding the program's coverage to reach a wider spectrum of rice farming households. This expansion should prioritize regions with similar agricultural characteristics and potential for growth. However, to sustain and amplify the profitability gains observed, ATASP-1 should continue investing in comprehensive training programs for rice farmers. These programs should focus on modern agricultural practices, improved technologies, and efficient resource management, empowering farmers to optimize their productivity and profitability.

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