



Impact of Agricultural Transformation Agenda Support Program Phase One (ATASP-1) on Rice Production in Anambra State, Nigeria

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Abstract

Rice production plays a critical role in food security and income generation in Nigeria, yet domestic output has consistently lagged behind demand. To address this gap, the Agricultural Transformation Agenda Support Programme Phase One (ATASP-1) was introduced to improve productivity, strengthen value chains, and enhance farmers' livelihoods. This study assessed the impact of ATASP-1 on rice production in Anambra State, Nigeria. Using a sample of 180 rice farmers, the study employed descriptive statistics, paired t-test, and regression analysis to evaluate changes in output, perceived benefits, and income effects. The results showed a substantial improvement in rice production following programme participation. Mean output increased from 2.31 tons before the intervention to 4.93 tons after participation, representing a 53.10% increase. This difference was statistically significant, with a t-value of 20.38 at the 1% level. In addition, 68.9% of farmers reported improved market access, 66.7% reported better farming knowledge, and 58.9% indicated increased productivity. About 50.6% of respondents experienced a direct increase in income. Regression results further confirmed that participation had a positive and significant effect on farmers' income, with the model explaining approximately 62% of the variation in income ($R^2 = 0.634$). The study concludes that ATASP-1 had a strong positive impact on rice production and farmers' livelihoods in Anambra State. However, uneven access to credit and extension services limited the distribution of benefits. Strengthening these components, alongside market and post-harvest support, is essential for improving the effectiveness of future interventions.

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1. Introduction

Rice (*Oryza sativa*) is widely cultivated across Nigeria, including Anambra State, and has become a major staple food due to population growth, urbanisation, and changing consumption preferences. Demand for rice has risen rapidly, making it one of the fastest-growing commodities in Nigeria's food basket (Obianefo *et al.*, 2022; Onugu *et al.*, 2019) ^[23, 31]. Despite the increasing demand, most rice production is carried out by smallholder farmers operating on limited land holdings, typically between 0.5 and 3 hectares, which constrains productivity and contributes to the persistent gap between domestic supply and national demand (Obianefo *et al.*, 2022) ^[23].

Nigeria continues to face a significant demand–supply deficit in rice production. While national demand has been estimated at about 7 million tonnes of milled rice annually, local production falls short, necessitating substantial importation (Foyeku & RIMIDAN, 2019) ^[14]. Although government interventions such as the Anchor Borrowers' Programme and other agricultural initiatives have increased output over time (Ogbeh, 2018) ^[25], productivity remains below potential due to poor access to inputs, inadequate infrastructure, low mechanisation, and weak extension services (IFAD, 2016; Obianefo *et al.*, 2021) ^[35, 22].

These constraints are also evident in Anambra State, where favourable ecological conditions exist but yields remain significantly lower than achievable levels under improved technologies (NBS, 2021) ^[15].

In response, several policy interventions have been introduced, including the Agricultural Transformation Agenda Support Programme Phase One (ATASP-1), launched in 2015. The programme aims to revitalise agriculture by enhancing infrastructure, strengthening value chains, and improving farmer productivity, particularly for priority crops such as rice (Obi *et al.*, 2021) ^[21]. Implemented across Staple Crop Processing Zones such as the Adani-Omor zone in Anambra State, ATASP-1 seeks to increase smallholder farmers' income, promote food security, and reduce dependence on imports. However, concerns remain regarding the effectiveness and sustainability of such interventions, given the continued production gaps and rising food prices in the state (Otaokpukpu, 2021; Anigbogu *et al.*, 2015) ^[33, 35]. Due to this background, the study hopes to specifically;

1. compare the output of rice farmers before and after intervention by ATASP-1,
2. assess the perceived benefits of rice farmers participated in ATASP-1 program,
3. examine the effect of ATASP-1 on the income of rice producers in Anambra State.

Material and Method

Area of the Study

Anambra state is located in the South-Eastern part of Nigeria, and comprises of 21 Local Government Areas which includes; Aguata, Awka North, Awka South, Anambra East, Anambra West, Anaocha, Ayamelum, Dunukofia, Ekwusigo, Idemili North, Idemili South, Ihiala, Njikoka, Nnewi North, Nnewi South, Ogbaru, Onitsha North, Onitsha South, Orumba North, Orumba South and Oyi". The state is subdivided into four agricultural zones which consists of; Aguata agricultural zone, Anambra agricultural zone, Awka agricultural zone and Onitsha agricultural zone to aid

planning and rural development. Its name is an anglicized version of the original Omambala, "the Igbo name of the Anambra River". The state administrative capital is Awka. "The state is bounded with Delta State to the West, Imo State and Rivers State to the South, Enugu State to the East, and Kogi State to the North". The indigenous ethnic groups in Anambra state comprised of 98% Igbo and 2% Igala mainly living in the North-Western part of the state (NCP, 2006) ^[17]. Anambra State is situated between Latitudes 5° 32' and 6°45' N and Longitude 6°43' and 7° 22 'E respectively. The state has an estimated land area of 4,865sqkm (Nigerian Investment Promotion Commission, 2024). Anambra State has a tropical climate with average temperatures ranging between 26-27oC, high humidity levels of 65-80% and an annual rainfall between 1,520-2,020mm following a bimodal pattern with a wet season from March to October and a dry season from November to February (NIMET, 2022; World Bank, 2021) ^[18, 35]. The state features tropical rainforest and savannah vegetation with topography that includes wetlands, lowlands plains, and undulating terrain (Nwaiwu *et al.*, 2023) ^[20]. Major crops grown include cassava, yam, rice, maize and oil palm. While minor crops like potatoes are cultivated in some specific areas (Anambra State ADP, 2021; FAO, 2020) ^[4, 12]. The predominant occupation is smallholder farming, supported by secondary activities such as fishing, trading, livestock rearing and food processing (NBS, 2022) ^[16]. Ayamelum, Ogbaru, Orumba South and Orumba North play a host community to the Agricultural Transformation Agenda Support Programme due to their comparative advantage in the rice and cassava production.

Population of Study

Rice farmers participating in ATASP-1 Anambra State according to the information supplied by the Programme Zonal Monitoring and Evaluation Officer, includes 1465 males and 1688 females in the 3 benefiting Local Government Area (Ayamelum, Ogbaru, Orumba-North) making it a total of 3153 rice farmers. Orumba-South focused solely on cassava processing.

Table 1: Distribution of Anambra State ATASP-1 Rice Farmers.

Sn	Local Government Area	Male	Female	Total
1	Ayamelum	1212	1372	2584
2	Ogbaru	92	92	184
3	Orumba North	161	224	385
Total		1465	1688	3153

Source: Agricultural Transformation Agenda Support Program Anambra State (ATASP-1), April 2024

Sample Size and Sampling Technique

Multi-stage sampling technique will be employed for the selection of the study representatives. The first stage involves purposive selection of Ayamelum, Ogbaru and Orumba-North as the three LGA'S under ATASP-1. Ayamelum is made up of eight communities, with 6 working under ATASP-1 namely: Omor, Omasi, Anaku, Umumbo, Ifite Ogwari, and Umuerum. Ogbaru is made up of 16 communities, with 5 working under ATASP-1 namely: Atani, Odekpe, Ossomalla, Amiyi, and Ogbakugba. Orumba North is made up of 16 communities, with 5 working under ATASP-1 namely: Awa, Ufuma, Awgbu, Ndiowu, and Omogho. Second stage involves the purposive selection of two communities each from Ayamelum LGA (Omor and Ifite Ogwari) and Ogbaru LGA (Atani and Odekpe) and one community from Orumba North LGA (Omogho). This is

because in Orumba North, Omogho is the only rice producing community working under ATASP-1. Thus, making a total of five communities from the 3 LGA's working under ATASP-1. The third stage involves random selection of 36 rice farmers (respondents) from each of the 5 communities to ensure an unbiased sample. This gives a total of 180 respondents from the three LGA's which will form the sample size.

Data Analysis

Data was analyzed using a descriptive statistic such as mean, percentages, frequency and regression analysis technique. The objectives i and ii were achieved using descriptive statistics. Objective iii was achieved with ordinary least square regression model

Model Specification

descriptive statistics for objectives i and ii were mathematically stated thus;

$$\bar{X} = \frac{\sum FX}{n}$$

Where; \bar{X} = mean, X = variable outcome, n = sample size, and F = frequency

B). The ordinary least square regression for objective iii was explicitly defined as;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \dots + \beta_7 X_7 + e_i$$

Where; Y = income (N), X_1 = participation (dummy: 1 = yes, 0 = no), X_2 = sex (dummy: 1 = male, 0 = female), X_3 = age (year), X_4 = marital status (0 = single, 1 = separated/divorced, 2 = widow/widower, 3 = married), X_5 = level of education (years of formal schooling), X_6 = farming experience (year), X_7 = household size, β_0 = intercept, $\beta_1 \dots \beta_7$ = the parameter of estimate, e = error term.

Results and Discussions

Comparison of the Output of Rice Farmers Before and After Intervention

Table 2 presents a direct comparison of rice output before and after the ATASP-1 intervention. This comparison is central to the study because it provided quantitative evidence on whether participation in ATASP-1 is associated with measurable changes in rice production levels among farmers in Anambra State.

Output levels before the intervention: Prior to ATASP-1, rice output was generally low across the sample. A very large majority of farmers, 92.8%, produced between 0.43 and 3.82 tons, indicating that most farmers were operating at a subsistence or low commercial scale. Only 5.6% produced between 3.83 and 7.62 tons, while very few farmers fell into higher output categories, with 1.1% producing between 7.23 and 10.62 tons and just 0.6% producing between 10.63 and 14.02 tons respectively. The minimum output recorded was 0.43 tons, while the maximum was 13.9 tons. The mean output of 2.31 tons, combined with a standard deviation of 1.294, reinforces the picture of generally low production with relatively limited dispersion. This pattern closely agrees with FAO (2020) and NBS (2021) ^[12, 15], who reported that average rice yields among smallholder farmers in Nigeria, including Anambra State, were commonly below 2.5 tons per hectare before major interventions, largely due to limited access to improved inputs, irrigation, and mechanisation. Similar low pre-intervention output levels were also reported by Nwachukwu and Ifejika (2021) and Oboh and Eze (2022) ^[19, 24] for rice farmers in Anambra State prior to ATASP-1 support, confirming that the baseline production conditions observed in this study are consistent with the wider literature.

After the ATASP-1 intervention: the distribution of output shifted upward. Although a large proportion of farmers, 91.7%, still produced between 0.95 and 6.24 tons, the lower bound of this category increased substantially compared to

the pre-intervention period. Importantly, higher output categories became more populated. Farmers producing between 6.25 and 11.64 tons accounted for 5.6%, those producing between 11.65 and 16.94 tons increased to 1.7%, and those in the highest category of 16.95 to 22.34 tons represented 1.1% of the sample. The minimum output rose from 0.43 tons before the intervention to 0.95 tons after, while the maximum output increased markedly from 13.9 tons to 22.24 tons. The mean output more than doubled to 4.93 tons, and the standard deviation increased to 2.629, indicating not only higher average production but also greater variation in outcomes among farmers. This post-intervention improvement aligned strongly with Adesina *et al.* (2023) ^[3], who reported that ATASP-1 participants recorded increases in rice output from around 2.1 tons to over 3.5 tons per hectare due to access to improved seeds, fertiliser, training, and irrigation support. It also agrees with Nwachukwu and Ifejika (2021) ^[19], who found yield increases of between 35% and 50% among ATASP-1 rice farmers in Anambra State. The increase in mean output from 2.31 tons before the intervention to 4.93 tons after the intervention represents a substantial improvement in rice production, this result aligned with the 4.82 tons/ha reported in Obianefo *et al.* (2022) ^[23]. The reported difference-in-difference of 53.10% captures this relative increase and suggests that, on average, farmers experienced more than a fifty percent rise in output following ATASP-1 participation. This magnitude of change is consistent with the combined effects of improved seed access, fertiliser use, agrochemical application, irrigation support, and market incentives discussed earlier. Similar magnitudes of output change were documented by Arigor *et al.* (2023) ^[5] under the Fadama III programme, where rice output increased by about 45.1%, and by Adebayo and Yusuf (2021) ^[1], who reported yield improvements from approximately 2.5 to 4.5 tons per hectare following targeted rice interventions. These converging findings suggest that well-designed, multi-component agricultural programmes can produce sizeable productivity gains among smallholder rice farmers.

However, the paired comparison using a t-test yielded a value of 20.38***, which was significant at the 1% level of probability. This high level of statistical significance provides strong evidence that the observed increase in rice output is unlikely to be due to random variation alone. Instead, it supports the inference that the ATASP-1 intervention is associated with a real and systematic improvement in rice production among participating farmers. This statistical evidence is consistent with the findings of Chukwuemeka and Ibrahim (2021) and Yisa *et al.* (2024) ^[9, 36], who also reported statistically significant output and welfare differences between programme participants and non-participants under ATASP-1 and related value chain interventions. At the same time, the increased post-intervention variability reflected in the higher standard deviation supports observations by Eze and Ogunyemi (2023) ^[10] that programme benefits are not uniform, with stronger gains among farmers who accessed multiple support components such as inputs, training, irrigation, and market linkage.

Table 2: Comparison of the output of rice farmers before and after intervention

Output before	Frequency	Percentage (%)
0.43 - 3.82 tons	167	92.8
3.83 - 7.62 tons	10	5.6
7.23 - 10.62 tons	2	1.1
10.63 - 14.02 tons	1	0.6
Minimum	0.43	
Maximum	13.9	
Mean	2.31	
Std. Deviation	1.294	
Output After		
0.95 - 6.24 tons	165	91.7
6.25 - 11.64 tons	10	5.6
11.65 - 16.94 tons	3	1.7
16.95 - 22.34 tons	2	1.1
Minimum	0.95	
Maximum	22.24	
Mean	4.93	
Std. Deviation	2.629	
t-test	20.38***	
Difference in difference	53.10%	

Source: Field Survey, 2025. Significant at 1% (***) level of probability.

Perceived Benefits of Rice Farmers' Participation in ATASP-1 Program

Table 3 presents farmers' own assessment of the benefits they derived from participating in ATASP-1. This perspective is important because it complements the quantitative output analysis by showing how farmers interpret changes in their production systems, income opportunities, and overall livelihood outcomes following the intervention.

A majority of farmers reported benefits directly linked to production capacity and learning. Increased productivity was reported by 58.9% of respondents, indicating that more than half of the farmers experienced noticeable improvements in output levels or production efficiency. This perception aligned closely with the empirical increase in mean rice output observed after the intervention. Similar perceptions of productivity gains were reported by Nwachukwu and Ifejika (2021) and Oboh and Eze (2022) [19, 24], who found that rice farmers in Anambra State associated ATASP-1 participation with higher yields due to improved seeds, fertilizer use, and better agronomic practices. The convergence between perceived productivity gains and measured output increases in this study strengthens the credibility of the impact pathway from programme support to production outcomes.

Improved farming knowledge was reported by 66.7% of respondents, making it one of the most frequently cited benefits. This suggests that ATASP-1 played a significant role in strengthening farmers' understanding of improved agronomic practices, input use, crop management, and possibly post-harvest handling. This finding agrees with Ogunleye and Adeyemo (2023) and Okonkwo *et al.* (2021) [26, 29], who reported high adoption of Good Agricultural Practices among farmers trained under ATASP-1, and observed that trained farmers were more efficient in land preparation, planting density, and pest management. Improved knowledge is a foundational benefit because it supports sustained productivity gains beyond the immediate programme period, particularly when farmers continue to apply acquired skills across multiple seasons.

Better access to markets was the most frequently cited benefit, reported by 68.9% of respondents. This reinforces earlier findings that market linkage was one of the most widely provided supports under ATASP-1. Market access is

critical because it determines whether increased production translates into improved income and livelihood outcomes. This result is consistent with Eze *et al.* (2023) and Chukwu *et al.* (2022) [11, 8], who found that structured market linkages under ATASP-1 reduced marketing risks and improved price outcomes for rice farmers. The prominence of market access as a perceived benefit suggests that farmers clearly recognised the value of downstream support in strengthening the economic returns to production.

Access to extension services was reported by 42.2% of respondents, while access to credit was reported by 48.9%. Although these figures are lower than those for productivity, knowledge, and market access, they remain significant. This pattern supports Okeke and Chukwu (2021) and Umeh *et al.* (2022) [27, 34], who noted that extension coverage and credit access under ATASP-1 were uneven across communities. Limited extension contact can weaken the effectiveness of input and training support, while constrained access to credit can limit farmers' ability to scale up production or manage seasonal cash flow. These limitations help explain why productivity and income gains were not uniform across all participants.

Increased income was reported by 50.6% of respondents, suggesting that about half of the farmers perceived a direct financial benefit from participating in ATASP-1. This finding is broadly consistent with Onyebinama *et al.* (2023) and Adepoju and Oladimeji (2022) [32, 2], who reported significant income improvements among ATASP-1 beneficiaries, although not all participants experienced the same level of gain. The result highlights the important distinction between production gains and income gains, as higher output does not automatically translate into higher net income unless supported by efficient marketing, cost control, and post-harvest management.

Other perceived benefits were reported by 69 respondents, indicating that farmers experienced additional outcomes beyond the core categories listed. Although these benefits are not specified, similar studies such as Okonkwo *et al.* (2022) and Adesina *et al.* (2023) [28, 3] have documented broader social and institutional benefits of ATASP-1, including improved networking among farmers, stronger cooperative engagement, and enhanced confidence in farming as a

business. These broader effects suggest that the programme's impact extends beyond measurable production indicators. When farmers were asked to rate the overall benefit of ATASP-1, 7.2% rated it as excellent, 40.6% as good, and 39.4% as moderate, meaning that 87.2% expressed at least a moderate positive assessment of the programme. Only 12.8% rated it as poor or very poor. This pattern is consistent with

the ATASP-1 M&E Report (2021) [6], which found generally positive beneficiary perceptions alongside concerns about uneven support delivery. Overall, these perceptions suggest that while ATASP-1 delivered meaningful benefits to most farmers, the scale and intensity of impact varied, reflecting differences in access to programme components such as credit, extension services, and post-harvest support.

Table 3: Perceived benefits of rice farmers' participation in ATASP-1 program

Perceived Benefits of ATASP-1	Frequency	Percentage (%)
Increased productivity	106	58.9
Improved farming knowledge	120	66.7
Better access to market	124	68.9
Access to extension services	76	42.2
Access to credit	88	48.9
Increased Income	91	50.6
Others (specify)	50%	69
Overall benefit:		
Excellent	13	7.2
Good	73	40.6
Moderate	71	39.4
Poor	10	5.6
Very poor	13	7.2

Source: Field Survey, 2025.

Effect of ATASP-1 Participation on the Income of Rice Producers in Anambra State

Table 4 revealed the regressive effect of participation on the income of farmers after participation in the programme activities. The exponential model where the natural log of income was taken recorded an R-Square of 0.634 and an Adjusted R Square of 0.619, indicating that approximately 62% of the variations in farmers' income were explained by the included explanatory variables. The F statistic of 42.50*** further confirmed that the model is statistically significant and well fitted for the analysis.

The coefficient for participation in ATASP-1 was positive and significant at the 5% level, with a value of 0.019. This implied that involvement in the programme increased the income of rice producers relative to non-participants. The result suggests that the intervention enhanced access to improved inputs, technical knowledge, and market opportunities, which translated into better economic outcomes for beneficiary farmers (Iwuchukwu *et al.*, 2017; FAO, 2022) [35, 12].

Among the control variables, age showed a positive and significant relationship with income at the 5% level. The coefficient value of 0.001 implied that older farmers appeared to earn more, possibly due to accumulated experience and better understanding of production practices. This finding about age is in agreement with Omolehim *et al.* (2019) [30]

who reported that age positively influenced farm income. Level of education was also positive and significant at the 5% level of probability, indicating that educated farmers were better able to adopt innovations and manage resources efficiently. Advancement in education increase income by 0.9%. Farming experience recorded a strong positive effect at the 1% level, reinforcing the importance of practical knowledge in rice production. This result suggests that experience increased income by 0.6%. This result is in agreement with Arigor *et al.* (2023) [5] who noted that farming experience positively influence farm income gain.

Household size, however, had a negative and highly significant coefficient. Larger households may place pressure on farm income through higher consumption needs and limited reinvestment capacity. This result suggests that increase in household size reduces farm income by 2.7%. This finding aligned with Yisa *et al.* (2024) [36] who observed a negative relationship between income and household size in their study.

However, the findings demonstrate that participation in ATASP-1 made a meaningful contribution to improving the livelihoods of rice producers. The programme can therefore be regarded as an effective policy instrument for raising farm income in the study area, provided that complementary factors such as education and experience are strengthened.

Table 4: Effect of ATASP-1 Participation on the Income of Farmer in Anambra State

Parameters	Coefficients	Standard Error	t Stat	P-value
Intercept	0.155	0.034	4.52	0.002
Participation in ATASP1	0.019	0.009	2.13**	0.052
Sex	-0.010	0.007	-1.33	0.473
Age	0.001	0.000	2.16**	0.048
Marital Status	0.007	0.004	1.92	0.105
Level of education	0.009	0.004	2.18**	0.034
Farming experience	0.006	0.001	5.37***	0.004
Household size	-0.027	0.002	-15.42***	0.001
R Square	0.634			
Adjusted R Square	0.619			
F-stat.	42.501			
Obs.	180			

Source: Field Survey, 2025. Significant at 1% (***), and 5% (**) level of probability.

Conclusion

The findings of this study provide clear evidence that the ATASP-1 intervention made a meaningful difference in rice production among participating farmers in Anambra State. The comparison of output before and after the programme showed a substantial increase in production levels, supported by strong statistical significance. This confirms that the programme did not only introduce support measures but translated them into real productivity gains. The rise in mean output and the expansion into higher production categories indicate that farmers moved beyond subsistence levels towards more commercially viable production. At the same time, the variation in outcomes suggests that not all farmers benefited equally, pointing to differences in access to programme components such as inputs, irrigation, and extension services.

Again, beyond production level, the study also established that ATASP-1 positively influenced farmers' income and overall farming experience. A large proportion of farmers reported improvements in productivity, knowledge, and market access, while about half experienced increased income. The regression results further confirmed that participation had a positive and significant effect on income, even after accounting for other factors. However, the uneven access to credit and extension services highlights gaps in programme delivery. These findings suggest that while ATASP-1 has been effective, its full potential has not yet been realised, especially in ensuring that all participants benefit consistently from its interventions.

Due to the strong evidence for an increased output, and improved income, the study recommends for the continuation and expansion of the ATASP program into a second phase to consolidate its gain in Southeast Nigeria.

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