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Determinants of Smallholder Farmers' Contribution to Rice Production in Ogun State, Nigeria

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Abstract

This study assessed the determinants of smallholder farmers' contribution to rice production in Ogun State, Nigeria. A multistage sampling proceudure was used to select 124 farmers from three major rice-producing local government areas in the State. The study collected data using a structured questionnaire and analysed them using *percentages, mean scores, and Chi-Square. All the rice farmers cultivated the Ofada variety, and 66.9% operated on 0.5-2.0 hectares. Mean yield was 1.8 tons per hectare, below the national average of 3 tons, reflecting low productivity. Production was strongly motivated by ready market access* (1.9 ± 0.26) and profit (1.8 ± 0.37)*. Key constraints included pests* (2.0 ± 0.00)*, climate-related challenges* (1.8 ± 0.26*) and inadequate finance (*1.8 ± 0.45*). Level of education* (χ^2=14.055, p=0.007) *had a significant relationship with the level of farmers contribution to rice production. The study concludes that smallholder farmers' contribution remains low and highlights the need to strengthen farmer cooperatives and institutional linkages to improve access to inputs, credit, and extension services to enhance productivity.*

Keywords: Smallholder farmers, determinants, rice production.

Introduction

Rice (*Oryza sativa* L.) is one of the most important staple food crops globally. It provides about 20% of the world's dietary energy and serves as the primary source of calories for more than half of the world population (Bin Rahman & Zhang, 2023). It is important to note that increasing population, rapid urbanisation, and changing dietary preferences in every household have continued to increase global rice demand. Also, the world population is projected to reach 10.6 billion by 2050 and rice consumption has grown from 502 million tonnes in 2020/21 to 522 million tonnes in 2023/24. While production increased only marginally from 509 million tonnes to 520 million tonnes, it create a widening consumption–production gap (Rezvi et al., 2023; Obayelu et al., 2025). Beyond food security, rice production is a major source of income and employment for millions of smallholder farmers worldwide (Mohidem et al., 2022).

In Africa however, rice has evolved from a minor subsistence crop into one of the continent's most important staple foods and was largely driven by population growth and urbanisation (Arouna et al., 2021). Rice consumption in sub-Saharan Africa increased by 81% between 2008 and 2018 and the demand is projected to grow by about 6% annually which has made the region a major contributor to future global rice demand (Yuan et al., 2024). Although rice production has expanded substantially over the decades, domestic output remains insufficient to meet consumption needs. In 2020, sub-Saharan Africa produced only about 48% of its rice requirement, which necessitate imports of approximately 15.6 million tonnes to bridge the supply deficit (Senthilkumar et al., 2023).

Notably, Nigeria occupies a strategic position in Africa's rice sector as both the continent's largest rice producer by cultivated area and one of its largest rice consumers (FAO, 2024). The country harvested about 4.2 million hectares of rice and produced approximately 5.2 million metric tonnes of milled rice in 2023 (FAO, 2024). However, increasing consumer preference for rice across rural and urban households has caused demand to outpace domestic production, resulting in a persistent demand–supply gap and continued dependence on imports despite substantial local production efforts (Obayelu et al., 2025).

Previous studies on rice demand and national grain outlooks suggest that domestic production is still exposed to price, market and productivity pressures (Obayelu et al., 2022; United States Department of Agriculture [USDA], 2025). Although Nigeria has considerable potential for rice production, smallholder yields remain uneven across ecological zones, and domestic supply is still affected by high input costs, weak mechanisation, insecurity in some production belts and periodic climate shocks (Gao et al., 2023; USDA, 2025).

Smallholder rice farmers are the primary actors in the local food supply. However, their production capacity is constrained by limited credit, inadequate collateral, low access to improved inputs and weak rural infrastructure. Balana and Oyeyemi (2022) showed that credit constraints affect the use of improved seed, fertiliser, agrochemicals and mechanisation among Nigerian smallholders. These financial and institutional limitations are particularly important for rice because timely land preparation, water management, pest control and harvesting operations are sensitive to capital availability.

In Ogun State, Ofada rice has both cultural and market significance. The variety is a blend that typically contains Oryza glaberrima (African rice) alongside Oryza sativa (Asian rice), with its distinct aroma, texture, and nutritional properties making it increasingly sought after by health-conscious Nigerian consumers. The exclusive preference for the Ofada variety reflects its strong market demand and premium pricing. However, the declining yield trend associated with climate change and flooding presents a serious threat to continued Ofada rice cultivation. Ogundapo (2024) reported that many Ofada rice farmers in Ogun State have abandoned production over the past five years due to flood damage, with the production and circulation of Ofada rice is noticeably declining across South-western Nigeria. This indicates the critical need for flood-resilient agronomic practices, improved drainage infrastructure, and variety development to safeguard Ofada rice production.

Previous studies have investigated several aspects of rice production in Nigeria, including technical efficiency (Obianefo et al., 2021), profitability and production efficiency among Ofada rice farmers in Ogun State (Ogunnaike et al., 2024), and farmers' compliance with recommended production practices (Akinola et al., 2025). Nevertheless, there remains a gap in comprehensive empirical evidence that simultaneously profiles the socio-economic characteristics of smallholder rice farmers, quantifies their actual production contributions relative to national benchmarks, and explores the interconnected factors that motivate or constrain those contributions. This study therefore, assesses the determinants of smallholder farmers' contribution to rice production in Ogun State, Nigeria, with a view to informing practical and context-specific interventions that can enhance smallholder rice farmers' contributions to rice sufficiency and food security in Nigeria. Specifically, the study

i. determined the level of smallholder farmers' contributions to rice production;
ii. identified the factors determining smallholder rice farmers' contributions to rice production: and
iii. identified the challenges militating against smallholder rice farmers' contributions to rice production..

Ho: There is no significant relationship between rice smallholder farmers' socio-economic characteristics and their contributions to rice production.

Methodology

The study was conducted in Ogun State, South-western Nigeria. Ogun State is located between latitudes 6°12′N and 7°59′N and longitudes 2°45′E and 5°00′E. The state covers approximately 16,980 km².The target population comprised smallholder rice farmers. A multistage sampling procedure was adopted. First, three of the six major rice-producing local government areas (Yewa North, Obafemi-Owode, and Ewekoro) were selected. Secondly, two communities were randomly selected (Ijako and Iboro in Yewa North, Moloko Asipa and Lufoko in Obafemi Owode and Odeda-Oko and Ijumo-Ologbomi in Ewekoro) in each selected local government area, giving six communities. Thirdly, out of the identified rice farmers, nineteen (19) out of thirty-two (32) in Ijako, eighteen (18) out of thirty (30) in Iboro, eighteen (18) out of thirty (30) in Moloko Asipa, twelve (12) out of twenty (20) in Lufoko, thirty (30) out of fifty-one (51) in Odeda-Oko and twenty-seven (27) out of forty-five (45) in Ijumo-Ologbomi were sampled. A total of 124 smallholder rice farmers were interviewed.

Primary data were collected with a structured interview schedule. The dependent variable was the level of smallholder farmers' contribution to rice production. Respondents stated their farm size and total output, from which yield per hectare was estimated. Farmers with yield below the 3.0 t/ha benchmark adopted for the study were categorised as low contributors, while those with yield at or above the benchmark were categorised as high contributors. Factors determining contribution were measured as a great extent (2), a minimal extent (1) and no extent (0). Constraints were measured as major constraint (2), minor constraint (1) and not a constraint (0). Data were analysed using percentages and mean scores. The hypothesis was tested using the chi-square at the 5% level of significance.

Results and Discussion

Factors Determining Smallholder Rice Farmers' Contributions to Rice Production

Table 3 shows that the ready market (1.9 ± 0.26) and profit (1.8 ± 0.37) were the strongest motivating factors. Membership of associations ($\bar{x}$ = 1.3 ± 0.64), family experience (1.2 ± 0.58) and government policy ($\bar{x}$ = 1.1 ± 0.65) also received relatively high motivation scores. In contrast, access to credit, extension services, improved production technology, improved seed varieties, agro-input support and participation in rice development programmes had low scores. This suggests that farmers are market-oriented and are motivated by market demand and the profitability of rice farming. Also, the role of association membership can be a great factor in enhancing farmer's productivity through cooperative/cluster farming. The motivating role of farmer associations found in this study aligns with Ugwuoti et al. (2026), who established that participation in cluster farming among smallholder rice farmers enhances access to improved technologies, inputs, and training, although it is constrained by limited information flow and conflict of interest among members. Regarding the primacy of market access and profitability as motivating factors, Oyawole et al. (2024) opined that the profitability of rice farming in northern Nigeria depends heavily on access to markets, mechanisation, and improved inputs. However, farmers do not seem to be receiving sufficient institutional and technical support to convert market incentives into higher productivity. The result is consistent with the affirmation that credit constraints and weak access to inputs can limit smallholder adoption of improved technologies (Balana and Oyeyemi, 2022; Ojo et al., 2023).

Table 1: Factors determining smallholder rice farmers' contribution to rice production

Motivating factor	Mean($\bar{X}$)	SD
Membership of association	1.3	0.64
Family experience	1.2	0.58
Agro-input support	0.7	0.75
Participation in rice development programme	0.6	0.71
Government policy	1.1	0.65
Extension services	0.6	0.69
Improved production technology	0.5	0.64
Improved rice seed varieties	0.4	0.62
Ready market	1.9	0.26
Access to credit facilities	0.6	0.71
Family needs	0.9	0.78
Profit	1.8	0.37
Average mean	**1.0**	

Source: Field survey, 2025.

Level of Smallholder Rice Farmers' Contributions to Rice Production

Table 2 shows that 95.2% of the respondents had yields ranging from 1.0-2.99t/ha, which is below the 3.0 t/ha benchmark used for classification in the study, while only

4.8% reached the high-contribution (3.0-5.0t/ha) category, as the mean yield was 1.8 t/ha. This result suggests that smallholder farmers in the study area are contributing to rice supply but at a productivity level that remains below the study benchmark. However, the low yield performance recorded in this study reflects the broader systemic underperformance of Nigerian smallholder rice farmers, as documented by Chiaka et al. (2022), who confirmed that smallholder rice contributions in Nigeria remain below FAO national supply estimates and are constrained by a persistent yield gap and limited access to productivity-enhancing resources (USDA, 2025).

Table 2: Level of contribution to rice production

Yield category (t/ha)	Percentage (%)	Mean ($\bar{X}$)	SD
1.0-2.99	95.2	1.7	
3.0-5.0	4.8	3.9	
Total	**100.0**	**1.8**	**0.46**

Source: Field survey, 2025.

Constraints Militating Against Smallholder Rice Farmers' Contributions to Rice Production

As shown in Table 3, pest and predator problems (2.0 ± 0.00) were reported as a major constraint by all respondents. Other major constraints were inadequate finance (1.8 ± 0.45), climate and weather-related issues (1.8 ± 0.26), access to credit facilities (1.8 ± 0.46) and government policies (1.5 ± 0.57). These constraints indicate that rice production in Ogun State is affected by both farm-level and institutional risks. Climate-related stress is particularly important for Ofada rice because lowland and flood-prone production environments can be damaged by excessive rainfall. The climate-related risks constraining rice production in the study area highlight the critical role of extension in building adaptive capacity. Osuji et al. (2025) demonstrated that agricultural extension and climate information delivery significantly enhanced the adaptive capacity of smallholder farmers in Nigeria, underscoring the need for climate-responsive extension programming in rice-producing communities. Similarly, recent studies on rice farmers in Nigeria indicate that climate variability and limited access to climate-smart practices affect productivity and food security (Agou et al., 2025; Kehinde et al., 2024; Oyediran et al., 2022). The financial constraints reported by farmers also require attention. Inadequate finance and weak access to credit may reduce the timely acquisition of labour, fertiliser, herbicides, improved seed and mechanised services. This aligns with evidence that smallholder credit constraints in Nigeria affect technology adoption and productivity, and that interventions should address collateral, risk perception, information asymmetry and transaction costs (Balana and Oyeyemi, 2022).

Table 3: Constraints encountered by smallholder rice farmers

Constraint	Mean $(\bar{x})$	SD
Access to agro-service inputs	1.1	0.64
Inadequate finance	1.8	0.45
High cost of rice-related agro-inputs	1.2	0.66
Technical knowledge for rice production	0.7	0.62
Lack of knowledge of rice varieties	0.7	0.59
Access to improved technology	1.2	0.63
Access to credit facilities	1.8	0.46
Access to improved seeds	0.7	0.54
Accessing extension services	0.9	0.58
Access to storage facilities	1.1	0.65
Access to new technology information	0.8	0.58
Transportation system	0.9	0.60
Ready market	0.5	0.86†
Cost of rice processing	0.9	0.44
Profitability	0.5	0.61
Government policies	1.5	0.57
Climate and weather-related issues	1.8	0.46
Pest and predator issues	2.0	0.00
Average mean	1.1	

Source: Field survey, 2025.

Relationship between Socio-economic Characteristics and the Level of Contribution to Rice Production

Results in Table 4 show that education level (χ^2=14.055, p=0.007), had a significant relationship with the level of contribution to rice production. The significance of education may improve farmers' ability to interpret production information and adopt improved practices. Similarly, education is a key predictor of farmers' ability to adopt technologies and practices capable of enhancing productivity (Ojo et al., 2023).

Table 4: Relationship between socio-economic characteristics and the level of contribution to rice production

Variable	χ^2	Df	p-value
Sex	0.210	1	0.647
Marital status	0.321	1	0.571
Religion	0.217	2	0.897
Education level	14.055*	4	0.007

P≤0.05.Source: Field survey, 2025.

Conclusion and Recommendations

The study concludes that smallholder rice farmers in the sampled areas of Ogun State contribute to rice production and their contribution remains low when measured against the 3.0 t/ha benchmark adopted for the study. The farmers are strongly motivated by ready markets and profit, yet their productivity appears to be constrained by pest pressure, climate-related risks, inadequate finance, weak credit access and limited use of improved technologies and formal extension services.

The study recommends that extension agencies and development partners should work through farmers' associations/cooperatives to deliver timely information on pest management, climate-risk reduction, input use and post-harvest handling. Group-based credit, cooperative input procurement and market linkage arrangements should be strengthened to reduce production costs and improve access to improved seed, agrochemicals and mechanised services. Programmes targeted at Rice should also prioritise drainage improvements, flood-tolerant practices, and youth inclusion to enhance the long-term sustainability of rice production in Ogun State.

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