Research Article
(Araştırma Makalesi)

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Smallholder commercialization: What drives the household welfare of smallholder rice farmers?

Küçük ölçekli ticarileştirme: Küçük ölçekli pirinç çiftçilerinin hane refahını neler etkiliyor?

ABSTRACT

Objective: The objective of this study was to evaluate the socio-economic and institutional determinants of smallholder rice farmers' household welfare in Nigeria, one of the countries with extreme cases of multidimensional poverty in the world.

Material and Methods: Multistage sampling techniques were used in the selection of 288 smallholder rice farmers. Primary data was collected from the respondents with a semi-structured questionnaire. The market participation index and ordinary least square regression were the models used to realize the objectives.

Results: It was revealed that the smallholder rice farmers were semi-commercialized with a market participation index of 0.73. The educational level of the household head, household size, access to fertilizer, rice output, the quantity of rice sold, cooperative membership and distance to an established market were identified as the key drivers of smallholder rice farmers' welfare.

Conclusion: Engagement in the output market impacted positively on the farm income and per capita consumption expenditure, especially among educated smallholder rice farmers who had access to fertilizer and belonged to cooperatives.

ÖZ

Amaç: Bu çalışmanın amacı, dünyada çok boyutlu yoksulluğun en uç örneklerine sahip ülkelerden biri olan Nijerya'daki küçük çiftçi pirinç çiftçilerinin hane refahının sosyoekonomik ve kurumsal belirleyicilerini değerlendirmektir.

Materyal ve Yöntem: 288 küçük ölçekli pirinç çiftçisini seçmek için çok aşamalı örnekleme teknikleri kullanıldı. Katılımcılardan birincil veriler yarı yapılandırılmış bir anket aracılığıyla toplanmıştır. Hedeflere ulaşmak için piyasa katılım endeksi ve sıradan en küçük kareler regresyonu modelleri kullanılmıştır.

Araştırma Bulguları: Küçük ölçekli pirinç çiftçilerinin 0,73 pazar katılım endeksiyle yarı ticarileştiği ortaya çıktı. Hane reisinin eğitim düzeyi, hane büyüklüğü, gübreye erişim, pirinç üretimi, satılan pirinç miktarı, kooperatif üyeliği ve yerleşik bir pazara uzaklık, küçük ölçekli pirinç çiftçilerinin refahının temel etkenleri olarak belirlendi.

Sonuç: Üretim piyasasına katılım, özellikle gübreye erişimi olan ve kooperatiflere üye olan eğitimli küçük ölçekli pirinç çiftçileri arasında, çiftlik geliri ve kişi başına tüketim harcamaları üzerinde olumlu etki yaptı.

INTRODUCTION

Agricultural transformation anchored on smallholder commercialization is one of the potent ways of achieving economic welfare (Ouedraogo, 2019). Smallholder commercialization is underscored by the need to uplift rural incomes through a departure from prevalent semi-subsistence, low-input, low-productivity farming systems characterizing much of Sub-Saharan Africa (SSA) (Olwande et al., 2015; Anthony et al., 2021). Smallholders are farmers with a low asset base and operate less than two hectares of farmland; The International Fund for Agricultural Development (IFAD) (2011) defined smallholders as farmers with small landholdings and associated characteristics, including dependence mostly on household labour for production and low use of technology. The majority of the smallholder farmers are poor, food insecure and have limited access to markets (Otekunrin et al., 2019; FAO, 2015); they focus on a subsistence level of production in which they produce only for self-consumption (Abdullah et al., 2019). Smallholder farming, predominant in developing countries, not only plays a pivotal role in global food security (Abdullah et al., 2019) but also acts as a catalyst for stimulating economic growth and ensuring household welfare through poverty reduction, especially in SSA (Hoang, 2020). Currently, with over 550 million smallholder farms worldwide, supporting the livelihoods of over 2 billion people and contributing to over 80% of the food consumed in Asia and SSA (Lowder et al., 2021). However, with the increasing population and urbanization, globalization and the devastating effects of climate change, there is an urgent need for transformation in smallholder agriculture in the region (Abdullah et al., 2019). A viable strategy to achieve this transformation involves the adoption of market-oriented production practices over subsistence-level approaches, as proposed by Barrett et al. (2012), Chiemela et al. (2022) and Ukwuaba et al. (2024).

Agricultural commercialization, particularly smallholder transformation, has become an integral policy tool for reducing food insecurity, reduction in poverty, and employment creation in Africa (Aromolaran et al., 2020). The Nigerian government, recognizing the importance of commercialization, has implemented various schemes and policies aimed at increasing self-sufficiency and welfare for farmers, particularly through measures like import bans and tariffs, and improved access to fertilizers and seeds (Mani et al., 2019). Despite these efforts, the progress of smallholder commercialization in Nigeria has not met expectations.

The global demand for rice presents a significant opportunity for smallholder farmers to actively participate in the market. Increased allocation of resources toward the production of marketable commodities, especially rice, is anticipated to enhance market participation among smallholders. However, addressing the intertwined issues of productivity, market orientation, and market participation is crucial for realizing agricultural commercialization among smallholders (Martey et al., 2017). The nexus between market-oriented production and increased income for smallholder farmers is evident in studies by Camara (2017) and Hoq et al. (2021) emphasizing the significance of market-oriented smallholder farming in income generation and welfare improvement. Policymakers advocate for market-oriented production, with optimism that it could elevate household farm income, reduce poverty, and enhance rural food access (Ntakyo & van den Berg, 2019).

Rice, a major staple in Nigeria, has witnessed a surge in demand due to shifting consumer preferences, population growth, increased income levels, and rapid urbanization (Kamai et al., 2020). Over 60% of Nigeria's rice is produced by small-scale farmers, contributing significantly to employment and income, especially in rural areas (PricewaterhouseCoopers [PwC], 2020). However, despite the government's efforts to stimulate local production through initiatives like the Agricultural Transformation Agenda and anchor borrowers' program, the welfare impact on a large number of small-scale farmers remains limited due to market inefficiencies, poor remuneration, and farmers' inability to actively participate in the output market. Consequently, Ogundari (2016) poor farm-level analysis of market orientation and participation decisions among smallholders have been identified as a contributing factor (Ogundari, 2016).

Efforts to identify the factors influencing the household welfare of smallholder rice farmers in Southeast Nigeria have not received significant attention. Previous studies on smallholder commercialization, such as Olanrewaju et al. (2016), Mafimisebi & Ikuerowo (2018), Mani et al. (2019), Aromolaran et al. (2020), and Opata et al. (2020) centered on the determinants of market participation only, without exploring the drivers of the welfare of market participation. Though Awotide et al. (2013) examined the welfare effect of market participation among rural farming households in Nigeria, the Southeast was conspicuously omitted from the study. This study thus, seeks to fill this gap by analyzing the socio-economic determinants of smallholder rice farmers' welfare in Southeast Nigeria. In addition, most of the literature in Nigeria, especially in the Southeast region, such as Onubuogu & Onyeneke (2012), Ukeje et al. (2017) and Okoye et al. (2019) has largely been on root and tuber crops. However, few studies on market orientation and participation were carried out on cereal crops in Nigeria such as Mafimisebi & Ikuerowo (2018) and Mani et al. (2019). To the knowledge of the researcher, the driver of the welfare of smallholder rice farmers, especially in Southeast Nigeria, has not been explored. Thus, this work tends to fill the gap. The study aims to determine the degree of market participation among smallholder rice farmers and to evaluate the socio-economic and institutional drivers of household welfare of smallholder rice farming households in Southeast Nigeria.

MATERIALS and METHODS

The study was conducted in the Southeast region of Nigeria, comprising five states: Abia, Anambra, Ebonyi, Enugu and Imo (Figure 1). The southeast is situated between Latitude 4° 30' and 7° 00' North and Longitude 5° 30' and 9° 30' East. The land area of about 28,987km^2 (2,898,700 ha) (National Bureau of Statistics, 2010) with an estimated population of 24,067,008 million people (Worldometer, 2021), and spread across 95 local government areas (LGAs) with 19 agricultural zones. The predominant soil type in the area is sandy loam, and the climate is characterized by rainy and dry seasons (Okere, 2020). Smallholder agriculture dominates the major economic activities, especially in rural areas. Rice is one of the most valuable staple foods cultivated and marketed in the study area, especially the popular Abakiliki and Adani rice. It is mainly grown at the subsistence level, though a few farmers operate at the commercial level.
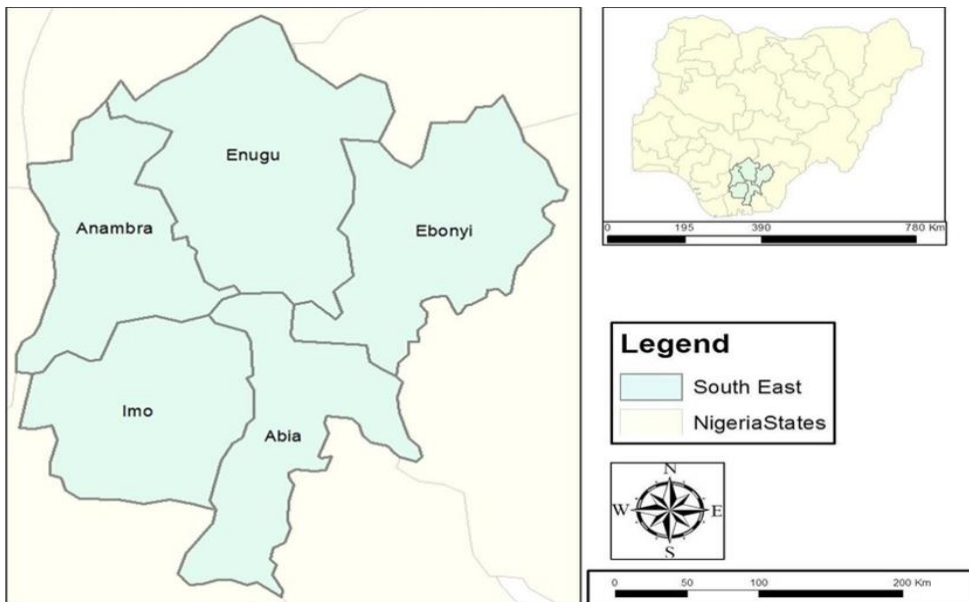

Figure 1. Map of Southeast Nigeria.

Şekil 1. Güneydoğu Nijerya haritası

A multistage sampling technique was used in the selection of the respondents. In stage one, Anambra, Ebonyi and Enugu states were purposively selected based on the high concentration of rice farmers (Mba et al., 2021). In stage two, three agricultural zones were purposively selected from each of the states selected based on the preponderance of rice farming in the areas. In stage three, three LGAs (Anambra state: Ayamelum, Ogbaru, and Orumba; Ebonyi State: Ezza, Ikwo, and Izzi and Enugu State: Awgu, Isi-Uzo, and Uzo-Uwani) where rice is mostly produced in the study area were purposively selected from each state. Stage four involved a purposive selection of three communities from each of the nine LGAs selected based on a large number of rice farming households. Finally, a proportionate random sampling technique was used to select a sample of 288 respondents, comprising 84, 108, and 96 smallholder rice farmers from Anambra, Ebonyi, and Enugu states respectively, using Yamane's (1967) formula at a 95% confidence level with a precision level of 7% to estimate the true population. The formula is stated as follows: $n = N/1+N(e^2)$. Where n = sample size, N = total population (number of smallholder rice farmers), and e = level of precision or error margin allowed (7%). A list of rice farming households, obtained from ADP offices in the three states, served as the sampling frame. Primary data, collected with the aid of a semi-structured questionnaire, personal observations/interviews and focus group discussion from respondents were used in the study. The market participation index and Heckman's two-stage model were used to realize the objectives.

Market participation index

The household crop output market participation index was computed as the proportion of the value of rice sold to the total value of rice produced. It was expressed mathematically as follows:

$$\frac{\sum_{k=1}^{k} \acute{P}_K \, S_{ik}}{\sum_{k=1}^{k} \acute{P}_K \, Q_{ik}} \tag{1}$$

Where S_{ik} denotes the quantity of rice (k) sold in the market by household i, $\acute{P}_k$ represents mean community level price, while Q_{ik} denotes the total quantity of rice k A produced by household i. The index values of 0 indicate a high subsistence orientation while that of 1 is an indication of a high commercial-oriented smallholder rice farmer.

Ordinary least square regression

The OLS regression was employed in the estimation of factors influencing the household welfare of smallholder rice farmers who participated in the rice market. The household welfare was proxied by per capita consumption expenditure and was regressed against some socio-economic and institutional independent variables. Based on the nature of the data, the linear, semi-log and double-log forms of OLS were used to test for the best estimates. The OLS regression model was specified as follows:

Linear function

$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + \beta_{12} X_{12} + \beta_{13} X_{13} + \beta_{14} X_{14} + \beta_{15} X_{15} + \beta_{16} X_{16} + e$ \hfill (2)

Semi-log function

$Y = \beta_0 + \beta_1 \log X_1 + \beta_2 \log X_2 + \beta_3 \log X_3 + \beta_4 \log X_4 + \beta_5 \log X_5 + \beta_6 \log X_6 + \beta_7 \log X_7 + \beta_8 \log X_8 + \beta_9 \log X_9 + \beta_{10} \log X_{10} + \beta_{11} \log X_{11} + \beta_{12} \log X_{12} + \beta_{13} \log X_{13} + \beta_{14} \log X_{14} + \beta_{15} \log X_{15} + \beta_{16} \log X_{16} + e$ \hfill (3)

Double-log function

$\text{Log } Y = \beta_0 + \beta_1 \log X_1 + \beta_2 \log X_2 + \beta_3 \log X_3 + \beta_4 \log X_4 + \beta_5 \log X_5 + \beta_6 \log X_6 + \beta_7 \log X_7 + \beta_8 \log X_8 + \beta_9 \log X_9 + \beta_{10} \log X_{10} + \beta_{11} \log X_{11} + \beta_{12} \log X_{12} + \beta_{13} \log X_{13} + \beta_{14} \log X_{14} + \beta_{15} \log X_{15} + \beta_{16} \log X_{16} + e$ \hfill (4)

Where:

Y = Per capita consumption expenditure

β_0 = intercept of Y

X_1 = Age (years)

X_2 = Education (Years spent in Education)

X_3 = Household size

X_4 = Access to fertilizer (Access =1, Otherwise, 0)

X_5 = Access to Extension (Access =1, Otherwise, 0)

X_6 = Access to Credit (Access =1, Otherwise, 0)

X_7 = Distance to established Market (km)

X_8 = Size of rice farm (Ha)

X_9 = Distance to Asphalted Road (Km)

X_{10} = Rice yield (kg)

X_{11} = Market Information (Access =1, Otherwise 0)

X_{12} = Off-farm Income (Naira)

X_{13} = Income from Rice (Naira)

X_{14} = Quantity of rice sold (Kg)

X_{15} = Ownership of transport facility (Ownership = Yes, otherwise, 0)

X_{16} = Cooperative Membership (Access =1, otherwise, 0)

e = Error term

RESULTS and DISCUSSION

Market participation index

The result of market participation by smallholder rice farmers in the study area shows that the total rice produced by the respondents in the 2022 farming season was 233,615 kg; with 2,500 and 150 kg being the maximum and minimum production, respectively (Table 1). The Table also indicates that out of the 233,615 kg of rice produced, 170,342 kg were sold in the market. The maximum quantity of rice sold was 2,100.1 kg while the minimum sold was 25 kg. The result in Table 1 further showed a mean market-participation index of 0.73 among smallholder rice farmers in the study area. The result implies that on average, 73% of the total rice produced was sold to the market by smallholder rice farmers in southeast, Nigeria. The result suggests that smallholder rice farmers in southeast Nigeria were semi-commercialized as the quantity of rice sold was far greater than the quantity consumed and/or gifted to friends, neighbors and relations. This could be attributed to the increased market-oriented production through the allocation of more farmland to rice production, as well as increased use of purchased inputs among the smallholder rice farmers in southeast Nigeria. Thus, the majority of the smallholder rice farmers in the study area participated in the market; therefore, high transactional costs due to poor infrastructure and weak institutions were not strong enough to hinder smallholders' access to the output market.

The result is consistent with Aromolaran et al. (2020) which reported a moderate market participation index of 0.46 among smallholder rice farmers in Ogun and Kaduna states, Nigeria. The result also agrees

with Kondo (2018), Ochieng and Hepelwa (2018), Mekie et al. (2019), Ogundele (2020) and Ayele et al. (2021), which found the smallholder cereal farmer's level of market participation indices to be moderately commercialized or semi-commercialized with market participation indices of 0.48, 0.66, 0.57, 0.52, and 0.53, respectively. However, the result disagrees with Mpombo (2018) which reported a low market participation index of 0.27 among smallholder rice farmers in Tanzania. The result is also at variance with Ayele et al. (2018), Abate et al. (2021) and Manda et al. (2021) which reported low market participation indices of 0.10, 0.20 and 0.39, respectively.

Table 1. Market participation index of the respondents

***Çizelge 1.** Katılımcıların pazar katılım endeksi*

Indicators (Kg)	Total	Min.	Max.	Mean	Std. Dev.	Index
Quantity of Rice Produced	233615.00	150.00	2500.00	811.16	455.86	
Quantity of Rice Sold	170342.00	25.00	2100.00	591.47	437.01	
Total Quantity of Rice Consumed	43065.00	50.00	450.00	149.53	80.56	
Total Quantity of Rice Gifted	20283.00	0.00	250.00	70.43	49.33	
Market Participation Index						**0.73**

Field Survey, 2023

Socio-economic and institutional determinants of smallholder rice farmers' welfare

The result of the Ordinary Least Square regression model of factors influencing smallholder rice farmers' welfare is presented in Table 2. The per capita consumption expenditure was proxied for household welfare and was regressed against some explanatory variables. The double log form was chosen as the best-fit equation as it has a better diagnostic test statistic than the other two functional forms. Specifically, the double log form has the highest number of significant variables that are consistent with the apriori expectations; the highest coefficient of multiple determination (R^2) and significant Fischer's value, as well as the lowest mean squared error of regression. The F-statistic value of 15.6 was significant at a 1% ($p > 0.01$) level of probability; this indicates that the data were suitable for the model and fit the model and that the specified variables adequately accounted for the variations in household welfare. The coefficient of determination (R^2) value of 0.576 suggests that about 57.6% of variations in the household welfare of the smallholder rice farmers in Southeast Nigeria were explained by the independent variables specified in the model.

The coefficient of education (0.024) was positive and significant at a 1% ($p > 0.01$) level of probability. The result is consistent with the apriori expectation and implies that the welfare of a smallholder rice farming household increases with the increasing level of education of the household head. Specifically, a unit increase in education will lead to a 0.024 rise in household welfare. Smallholder farmers are often confronted with challenges of low income, agricultural productivity, food security, and standard of living. However, education can be instrumental in improving the household welfare of smallholder rice farmers. With improved education, a smallholder rice farmer can easily understand market dynamics and strategies with which the farmer can access better markets and negotiate better prices for the farm produce. Education also promotes the adoption of modern farming technologies capable of increasing productivity, higher yields and increased income. The increased income will impact positively on food security, improved standard of living and general household welfare. The result corroborates the findings of Amankwah and Quagrainie (2018), Purnamadewi & Firdaus (2018), Issahaku & Abdulai (2020), Mukaila et al. (2021), Oduniyi & Tekana (2021).

Table 2. Ordinary least square result of the socio-economic and institutional factors influencing smallholder rice framers' welfare

Çizelge 2. Küçük çiftçi pirinç üreticilerinin refahını etkileyen sosyo-ekonomik ve kurumsal faktörlerin alışılmış en küçük kareler sonucu

Variables	Linear	Semi-Log	Double-Log
Age	299.720 (0.343)	4.827*** (41.448)	0.080 (0.557)
Education	13192.391*** (8.949)	0.001 (0.605)	0.024*** (11.180)
Household size	-13321.271*** (-3.833)	0.024*** (10.753)	-0.018*** (-3.403)
Fertilizer Access	157710.785*** (3.176)	-0.019*** (-3.619)	0.288*** (3.712)
Extension Access	-4545.741 (-0.333)	0.280*** (3.786)	-0.008 (-0.412)
Credit Access	9349.729 (0.517)	-0.010 (-0.493)	0.005 (0.197)
Distance to Established Market	-1095.382 (-1.404)	0.005 (0.192)	-0.002** (-1.913)
Size of rice farmland	23392.279* (1.663)	-0.002** (-2.002)	0.022 (1.003)
Distance to asphalted road	1071.344 (0.291)	0.034 (1.632)	0.003 (0.470)
Rice yield	-185.109** (-2.035)	0.002 (0.374)	0.612*** (2.619)
Market Information Access	6761.581 (0.305)	0.000*** (-2.490)	0.016 (0.469)
Off-farm income	26499.593 (0.952)	0.012 (0.349)	0.042 (1.041)
Farm Income	0.042 (0.448)	0.049 (1.179)	0.040 (0.219)
Quantity of rice Sold	197.351** (2.024)	5.659E-8 (0.401)	0.573*** (2.936)
Ownership of Transport facility	-9270.403 (-0.548)	0.000*** (2.611)	0.006 (0.243)
Cooperative Membership	42153.971** (2.352)	0.002 (0.095)	0.048* (1.820)
(Constant)	-28262.482 (-0.362)	0.045* (1.677)	4.674*** (9.020)
R-Squared	0.511	0.567	0.576
Adjusted R-Squared	0.468	0.529	0.539
S.E of Regression	84296	0.12565	0.12424
F-Statistic	12.003	15.040	15.644
Sig.	0.000	0.000	0.000

Source: Field Survey, 2023 ***,**&* 1%,5% & 10% significance, respectively [+] Lead Equation

The coefficient of household size (-0.018) was negative and significant at a 1% (p>0.01) probability level. The result is in tandem with the apriori expectation and implies that the welfare of smallholder rice farming households decreases with increasing household size in the study area. Large family size is a strain on the household income; with a large household size, there is increased competition for limited household resources. This can lead to lower per capita income and reduced access to education, healthcare, and other essential services; and as a consequence, limits their ability to access better employment opportunities and improve their standard of living. The result disagrees with that of Ochieng and Hepelwa (2018) and Hoq et al. (2021) that the number of household members positively impacted

the household per capita consumption expenditure of smallholder farmers in Bangladesh and Tanzania, respectively.

Access to fertilizer (0.288) was positive and significant at a 1% (p<0.01) risk level. The sign of the coefficient of the variable conforms with the a priori expectation and the result suggests that a unit increase in access to fertilizer increases household welfare by 0.288 units. Little or no access to fertilizer is a major obstacle to smallholder commercialization in developing countries; it impacts negatively on crop production and consequently reduces the quantity and quality of rice available for the market. However, smallholder farmers with improved access to inorganic fertilizers have better rice outputs and thus, earn higher farm income which translates to an improved standard of living. The result affirms Habtemariam et al. (2019) that the adoption of fertilizer improves net farm income and reduces food insecurity and poverty reduction.

The distance to an established market (-0.002) was also found to be negative and significant at a 5% (p<0.05) level of probability. The result indicates that an indirect relationship exists between household welfare and distance to an established and competitive market. The result also shows that for every one-unit increment in the distance to an established and competitive market, the household welfare decreases by 0.002 units. The farther a smallholder farm is from a market, the higher the transportation costs. Transporting agricultural products over long distances reduces the profit margins for farmers. The bad road network also adds to the increasing transaction cost and impacts negatively on the farm income and household consumption expenditure of the smallholder rice farmers. The result is similar to Kyaw et al. (2018) and Aromolaran et al. (2020).

The quantity of rice produced or rice yield (0.612) was positive and significant at a 1% (p<0.01) risk level. The result connotes a direct relationship between the rice produced by smallholder rice farmers and household welfare. The result suggests that as the quantity of rice produced by smallholder farmers' increases, the household per capita consumption expenditure rises. Specifically, a unit increase in the quantity of rice output leads to an increase in the household welfare of smallholder rice farmers by 0.612 units. Increased output from smallholder farmers creates a ripple effect such as improved market engagement, income generation, economies of scale and access to credit, among others. Specifically, with increased production, farmers can generate more income. The additional income can be reinvested in the farm and improving the farming practice, leading to the adoption of improved technologies, and enhanced standard of living among the smallholder rice farmers in the study area. Also, higher productivity and higher income increase the creditworthiness of smallholder farmers and, this further enhances their access to more credit. The improved access to credit also enhances smallholder commercialization, poverty reduction and improved standard of living. The result aligns with Abdullah et al. (2019) which observed that rice output was among the important factors that positively influenced the welfare of smallholder rice farmers in Pakistan. The quantity of rice sold (0.573) was positively significant at a 1% (p<0.01) level of probability. The result indicates the existence of a direct relationship between household welfare and the quantity of rice sold. The result suggests that the more a smallholder farmer participates in an output market, the more the welfare of the household is enhanced. Furthermore, the OLS result indicates that a unit increase in the quantity of rice sold leads to a 0.573 unit increase in the welfare of smallholder rice farmers. Poverty is often linked to insufficient income, and by increased market involvement, smallholder farmers can improve their standard of living. Thus, higher quantities of rice sold contribute to poverty reduction among smallholder farmers. With increased income due to increased market participation, household basic needs are easily met. Therefore, market participation provides a financial cushion and improves the overall economic well-being of smallholder farmers. The result is similar to the findings of Camara (2017), Ochieng and Hepelwa (2018), Abdullah et al. (2019) and Ogutu et al. (2020).

Cooperative membership (0.048) was positive and significant at a 10% (p<0.1) risk level. The result suggests the existence of a direct relationship between cooperative membership and the household welfare of smallholder rice farmers in southeast Nigeria. The result is not surprising as cooperatives often provide smallholder farmers with improved access to markets by establishing direct links with buyers, reducing the dependence on middlemen and ensuring fairer prices for smallholder farmers. Cooperative membership also enhances smallholder farmers' bargaining power, access to resources, and ability to manage risks collectively. This, in turn, positively impacts household welfare by reducing production costs and improving income and poverty reduction. This result corroborates the studies by Cafer & Rikoon (2018), Hao et al. (2018), Sellare et al. (2020) and Sarkar et al. (2022) which identified cooperatives as a major tool for achieving and ensuring improved living conditions for smallholder farmers.

CONCLUSION

Smallholder commercialization is a vital strategy for transforming the agricultural sector and promoting economic growth in developing countries. By transitioning from subsistence to commercial farming, smallholders can increase their incomes, improve their livelihoods, and contribute to national food security. The commercialization efforts of smallholder rice farmers in Southeast Nigeria have not been fully optimized; however, the efforts are beginning to yield the desirable outcome. The farmers have gradually shifted from the traditional subsistence system to semi-commercialization despite the challenging environment. Engagement in the output market impacted positively on the farm income and per capita consumption expenditure which translates to household welfare. The educational status of the household head, access to fertilizer, the quantity of rice produced and sold as well as membership of cooperatives were the major socio-economic and institutional factors impacting positively on the household welfare of smallholder rice farmers. However, the level of household welfare of the farmers was limited by the distance to an established market and large household size in southeast Nigeria. Therefore, any policy aimed at improving the standard of living and poverty reduction among smallholder farmers must be anchored on these key factors. The push factors, such as support systems and incentives, need to be strengthened, while the pull factors, like challenges and barriers, should be mitigated or minimized. Targeted policies, programs, and investments can help enhance their access to markets and market information, inputs, credit, and technology. In addition, access to training and capacity building, as well as infrastructure and logistics, are crucial. Thus, by supporting smallholders' transition to commercial farming, governments and stakeholders can unlock the full potential of the agricultural sector and promote a more food-secure, prosperous, and resilient future. Besides government intervention, smallholder rice farmers should form cooperatives to enhance the bargaining power of smallholder farmers in the market. The cooperative should also facilitate the establishment of direct market linkages between smallholder farmers and buyers, processors, or retailers to enhance participation in the market and turn, increase the household welfare. Collectively, these stakeholders can create a robust ecosystem that supports smallholder commercialization, and economic growth, ultimately reducing poverty and improving livelihoods in southeast, Nigeria.

Data Availability

Data will be made available upon reasonable request.

Author Contributions

Conception and design of the study: ICU, CJA, BCO; sample collection: ICU, CJA, BCO; analysis and interpretation of data: ICU, CJA, BCO; statistical analysis: ICU, CJA, BCO; visualization: ICU, CJA, BCO; writing manuscript: ICU, CJA, BCO.

Conflict of Interest

There is no conflict of interest between the authors in this study.

Ethical Statement

This research was approved by the ethics committee of University of Nigeria Nsukka, Faculty of Agriculture, Department of Agricultural Economics with document number dated February 12, 2024.

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