



Challenges faced by paddy smallholder farmers in Ayamelum Local Government Area of Anambra State, Nigeria

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ABSTRACT

Rice is a major cereal crop produced and consumed across the globe. In Nigeria, it is a staple food consumed in various forms. However, present-day domestic supply is unable to meet local demand due to various forms of challenges confronting rice producers, many of whom are smallholder farmers. The study combined an in-depth review of literature and empirical analysis framework to identify challenges in rice production among smallholder paddy farmers in Ayamelum Local Government Area of Anambra State. Specifically, the study identified the farmers' socioeconomic characteristics, ascertained the distribution of improved technology usage among them and identified the challenges facing the farmers. Data were collected through multistage sampling technique from 90 paddy farmers and were analysed by descriptive statistics. Results showed an equal proportion of men and women engaged in the survey with majority of them being married. The farmers were in their active middle-ages and on average, had been farming for 12 years. Main findings included: rice cultivation in the area was dependent on fertilizers, extension services were rarely available and improved seeds and needed machineries were not readily available due to their high costs. The study highlighted the need to increase access to required farm inputs through various means including government agencies and farmers' associations to help paddy smallholder farmers sustain their productions and livelihoods.

Keywords: Agriculture; cereal; challenges; farmers; paddy

INTRODUCTION

Rice is a staple for over half of the world's population (Fukagawa & Ziska, 2019). It is an important cereal crop, ranking third after wheat and maize on a global production level and second in terms of area under cultivation (FAO, 2023). Rice is one of the fastest-growing food commodities in Nigeria with potential for continued growth; its increasing demand is associated with observed rapid growth in population and urbanisation (KPMG, 2019). Rice cultivation is a source of income and food to a large and diverse population of Nigerians. Rice is cultivated in almost all the agro-ecological zones of the country (Mohammad *et al.*, 2013); grown in rain-fed upland, rain-fed lowland, irrigated lowland, deep water floating and

mangrove swamp (Kadiri *et al.*, 2014). Basically, rice cultivation covers both the uplands and the swamps, depending on the variety (KNARDA, 2017). Many local dishes are prepared with rice because of the relative ease in its storage and preparation. Rice offers many nutritional benefits. Its protein contains high lysine and amino acid, it is used in producing beer, rice-wine, and vinegar. Rice oil extracted from the bran is rich in vitamin E (Egbodion & Ahmadu, 2015).

Given its growing importance and prominent role among staple food crops in the country, rice was one of the priority crops considered under the Federal Government of Nigeria's Agricultural Transformation Agenda, a federal government policy programme initiated in 2015 to overhaul the agriculture sector towards enhancing food production, job creation and diversification of the economy (Osabuohien *et al.*, 2018). The need for a sustainable increase in rice production cannot be over-emphasised as a steady increase in the demand for rice consumption has been observed over the years (FAO, 2017). Rice demand in Nigeria has been increasing annually at about 10% since the mid 1970's (Onyeneke *et al.*, 2020). Although, rice production has increased in recent years, Nigeria as a country is yet to attain self-sufficiency in rice production (Nkwazema, 2016). Reports showed that production increased from 4.5 million metric tonnes in 2017 to 5.2 million metric tonnes in 2023 (USDA, 2023). However, average rice yields per unit area in the country remains low, ranging between 2.0 and 3.0 t/ha in contrast to yields of 6–8 metric tonnes per hectare that are reported on research plots (Kamai *et al.*, 2020). Nigeria has experienced declining yield of rice and many studies have reported that the problems hindering the country from meeting local demand were among others, low productivity, inadequate infrastructural facilities, inefficiency in resource allocation, limited access to improved varieties, and production being mostly done by small-scale farmers who rely heavily on traditional technology (Oluwadamilola, 2018). In addition, farmers are faced with challenges arising from cost of agrochemicals, insufficient knowledge and information on practices. These challenges have been well pronounced over the years and have until the rice importation ban in 2016, inevitably led to the huge bill on rice importation from foreign countries in the bid to supplement domestic rice supply (Abbas *et al.*, 2018). As part of efforts to address the nation's rice demand-supply gap, the Nigeria's government has often intervened in the rice subsector through tariff on imports and provision of new cultivars for adoption. Nonetheless, public policy has neither been consistent and as such, domestic production has continued to lag behind demand (Ajala & Gana, 2015). Various programmes and policies that have been initiated, though well intentioned, have been dogged with implementation flaws and instability. More than half (65.4%) of the population in the study area (Ayamelum LGA of Anambra State) are reportedly poor subsistent farmers (Ejike-Alieji *et al.*, 2021). Previous studies (Ajala & Gana, 2015) noted that most rice farmers in the study area operate on a small scale, using traditional method of production and processing of rice that often result in poor returns to scale. As such, there is need to improve farmers' knowledge of efficient methods of production for better productivity. Consequently, the broad objective of the study is to identify the challenges in rice production among paddy farmers in Ayamelum LGA of Anambra State, Nigeria. Specifically, the study described the socioeconomic characteristics of the paddy farmers, ascertained the technology used in cultivation of rice, established the challenges faced by the farmers and identified the paddy production practices of the farmers. The study contributes to policy discourse on domestic rice production in Nigeria and particularly, Anambra State. The information gathered in the study will be useful to relevant agricultural agencies and actors along the rice value chain for improved performance.

Rice is the third most consumed staple food in Nigeria after maize and cassava and has become a food security crop due to its increased significance in the country (KPMG, 2019). Evidently, there is a growing demand for rice in Nigeria as a result of increasing population size, consumer preferences, increasing incomes and rising urban population among others (Osabuohien *et al.*, 2018). According to the KPMG (2019), rice is cultivated in all of Nigeria agro ecological zones, however the North-West zone accounts for a huge share (72%) of the country's total rice production. In Nigeria, rice consumption far exceeds production with a yearly average production deficit of over 3 million metric tonnes (Kamai *et al.*, 2020) and in order to meet the deficit due to insufficient local production, rice is imported from several exporting countries. Nigeria until the rice importation ban of 2016, imports most of its rice from Thailand, India and USA, incurring a bill of about ₦300 million annually in foreign reserves (Osabuohien *et al.*, 2018). The banning of rice importation was to encourage production and consumption of local rice, with simultaneous effect of raising the price of local rice (Obianefo *et al.*, 2021).

Historically, in Anambra State, rice is grown on 5% of land cultivated but represents only 1.6% of the total value of agricultural production (BII, 2020). Paddy yields in Anambra are low at 2.1 metric tonnes per hectare and which is 27% lower than the average across West Africa. More so, the yield gap (difference between the potential and actual yield) in Anambra is 14% higher than the West Africa average (BII, 2020). Improving rice yield in Nigeria means addressing some key issues or challenges that include fluctuation in climatic variables, water access, soils, poor management of pests and diseases (including iron toxicity), weeds, floods, seeds, fertilizer, irrigation, technological know-how, mechanization, lack of extension service provision, credit availability, storage facilities and market access (IFPRI, 2016; Osabuohien *et al.*, 2018).

Decreasing rainfall coupled with intermittent drought is a common feature in the tropical and sub-tropical savannah (Mohammad *et al.*, 2013). It has been estimated that 25% of the fields used for upland crop production are prone to yield reductions as a result of drought. Fertilizer availability has been a pressing issue for a long time, most especially in Nigeria, where the prices keep skyrocketing despite government interventions. The inability of farmers to afford required fertilizers can lead to a decline in the production of rice (Mohammad *et al.*, 2013). In addition, most of the local varieties of rice are vulnerable to pest and diseases. Also, research has shown that the farming sub-sector in Nigeria is highly constrained by low level of mechanization (Lamidi & Akande, 2013). Furthermore, land availability is an important factor to consider in paddy production despite the fact that rice can be cultivated in shallow water. Land is needed for large scale commercial production in increasing the quantity of rice production as well as sustaining it (Osabuohien *et al.*, 2018). Apparently, Nigeria has recorded a significant increase in land area used for the cultivation of rice in the period between 2014 and 2021, from about 2.9 million ha to 3.6 million ha (USDA, 2023).

According to the IRRI (2015), rice production irrespective of the location can be improved if farmers were to keep to some general farming practices as established by the research institution. In this regard, farming practices designed to enable better output from rice farms include the use of crop calendar which depicts the picture of a typical growing season of rice beginning from fallow, preparation of land, planting and harvest to storage. Also, planting a variety and the best quality seed suitable for a particular location, planting early within the planting season helps the crop to compete better with weeds, avoid some pests and grow fast with high yields. Furthermore, rice yield can be improved by the use of good quality water devoid of salt toxicity, balanced use of fertilizers, weed management and reduction of pest and diseases incidences by cleaning

equipment before use, using clean seeds and resistance varieties, planting same time or within a two weeks' window as neighboring farms to reduce disease, insects, rats and birds pressure on one's field (IRRI, 2015).

METHODOLOGY

The Study Area

The study was conducted at Ayamelum L.G.A of Anambra State. Anambra state is located in the south-eastern part of Nigeria. Anambra State is situated between Latitudes 5⁰32' and 6⁰45' N and Longitude 6⁰43' and 7⁰22' E. The state is sub-divided into four agricultural zones (Onitsha, Aguata, Awka and Anambra) to aid planning and rural development. The state administrative head quarter is in Awka (Obianefo *et al.*, 2019). 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. Anambra East, West and Ayamelum (Anambra zone), Orumba North (Aguata zone) and Awka North (Awka zone) play host communities to value development programmes due to their comparative advantage in rice and cassava production (Federal Ministry of Agriculture and Rural Development (FMARD), 2016). The State is made up of tropical climate, with significant rainfall most months of the year and short dry season. The major occupation in the State is farming and majorly grown crops include rice, cassava, yam, maize, okra and cocoyam (Nwalieji *et al.*, 2014). Ayamelum L.G.A. is a major producer of rice in Anambra State (Ejike-Alieji *et al.*, 2021).

Sampling Procedure and Sample Size

A multi-stage sampling procedure was used to select the respondents for this study. The first stage involved a purposive selection of three towns where rice was mostly produced out of the eight towns that make up the LGA. The second stage involved a random selection of three villages from each of the 3 towns namely, Akanator, Amikwe, and Aturia from Omor: Umura, UmuezeAgu, and Ikenga from Anaku and then Ayigo, Umuodu/Umuoli and Otu – oyibo from Umuerum. In the third stage, using a given list of rice farmers from the State Ministry of Agriculture as a sampling frame, ten rice farmers were randomly selected from each of the nine villages to give a total sample size of 90 rice farmers.

Data Collection and Analysis

A structured questionnaire was used to obtain information from the rice farmers alongside personal interviews. Descriptive statistics such as frequency distribution, percentage, mean and cross tabulation (chi square) were employed in analysing the data.

RESULTS AND DISCUSSION

Socio-economic Characteristics of the Rice Farmers

Result of the socio-economic characteristics of the rice farmers is presented in Table 1. The results show an equal proportion of male and female were surveyed and is also an indication that rice farming cuts across both sexes. Most of the respondents were married.

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The implication of this is the financial obligation that comes with raising a family is fully felt by such individuals. The average age of the farmers was 41 years as majority were in their active and youthful years. Most of the surveyed rice farmers were literate, implying they were capable of grasping basic concepts of rice farming as well as adopting innovations if and when taught by a competent extension agent. According to Uwagboe *et al.* (2010), farmer's level of education could enhance their farming activities, level of awareness and level of receptivity of improved technologies.

Table 1: Socio-economic characteristics of rice farmers in Ayamelum L.G.A of Anambra state, Nigeria (n = 90)

Variable	Frequency (N)	Percent
Gender		
Male	45	50.0
Female	45	50.0
Marital status		
Married	80	88.9
Not married	10	11.1
Age (in years; mean = 40.7)		
≤ 30	11	12.2
31 – 45	57	63.3
46 – 60	22	24.4
Level of education		
No formal education	6	12.2
Primary education	33	36.7
Secondary education	42	46.7
Tertiary education	9	10.0
Household size (in numbers; mean = 6 persons)		
1 – 8	69	76.7
9 – 16	20	22.2
17 – 24	1	1.1
Farming experience (in years; mean = 11.8yrs)		
≤ 14	61	67.8
15 – 28	25	27.8
29 – 42	4	4.4
Farm size (in hectare; mean = 0.22ha)		
≤ 0.41	80	87.9
0.42 – 0.78	8	8.8
0.79 – 1.15	2	2.2
Output (in kg; mean = 1478.70kg)		
≤ 2772.56	83	91.2
2772.57 – 5237.07	5	5.5
5237.08 -7701.58	2	2.2

The average household size among the rice farmers was made up of six persons. A larger share of the farmers had 10-15 years of farming experience. This is an indication that the farmers have had significant experience in rice farming. Furthermore, the study established that the rice producers were smallholder farmers operating on very small

farmlands. The observation on household size, age and years of experience are similar though slightly varying to the findings of Kadiri *et al.* (2014) study that reported a mean age of 49 years for paddy rice farmers, average of 17 years farming experience and a mean household size of 6.

Technology Usage among Surveyed Farmers

Distribution of technology usage among the surveyed farmers is presented in Table 2 and the results show that the majority of the farmers preferred chemical weed control (97.8%). Improved seeds were mostly cultivated by majority of the farmers encountered while others depended on local seed inputs. Manual harvesting was the go-to method of collecting mature plants. Threshing machines were often used for the processing of paddy. The results also showed that the rice farmers were familiar with transplanting and broadcasting propagation methods as majority of them used both methods.

Table 2: Distribution of technology usage among farmers in the study area

Variable description	Frequency (N)	Percent
Weed control		
Manual weeding	2	2.2
Use of chemicals	88	97.8
Types of seeds		
Local variety	17	18.9
Improved seeds	73	81.1
Method of harvesting		
Manual	63	70.0
Harvester	26	29.9
Paddy processing method		
Pounding	11	12.2
Threshing	79	87.8
Adopted propagation method		
Broadcasting	12	13.3
Transplanting	5	5.6
Broadcasting and transplanting	73	81.1
Method of Irrigation		
Mechanical	28	31.1
Manual	15	16.7
Use of fertilizer		
Unable to access fertilizer	1	1.1
Used fertiliser	89	98.9

According to Iizumi and Ramankutty (2015), the agronomic technology available to farmers can influence how climate affects production such that for instance, direct seeding, which is more time- and labour-saving planting methods than transplanting can be used to compensate for climate-related delayed planting. Majority of the rice farmers as shown in the Table 2 reported using fertilizers despite occasional sharp rise in the prices of fertilizers. Fertilizer application is necessary to increase yield. Fertilizers have the ability to improve the physical conditions of the soil although it is subject to the soil type, the condition of the crop,

the season, efficiency of application and weather conditions. For instance, the application of high amount of fertilizer to local varieties is discouraged as it can cause lodging (IRRI, 2015).

Further analysis was done to examine if there were gender differentials in the data. It is shown in Table 3 that all the female rice farmers had at least one form of education unlike their male counterparts some of which have had no formal education. A greater share of the females had secondary and tertiary education. This result is contrary to previous studies that have shown that women in Nigeria are less likely to go to university than males and more so, observed gender disparity in fields of study has contributed to limiting female enrolment in agriculture (Adeyemi & Akpotu, 2004). A higher share of the unmarried were females (20%) and nearly all of the female respondents noted that men were the heads of their households while 10% of the male respondents stated that women were the heads of their households. Furthermore, all the male farmers had other sources of income in contrast to 84.4% of the females who had other sources.

Table 3: Cross tabulations of differences in socio-economic variables among the rice farmers by gender

Variable	Gender			
	Female		Male	
	Frequency	Percent	Frequency	Percent
Education				
No formal education	0	0	6	13.3
Primary education	13	28.9	20	44.4
Secondary education	26	57.8	16	35.6
Tertiary education	6	13.3	3	6.7
Total	45	100	45	100
Marital status				
Married	36	80.0	44	97.8
Not married	9	20.0	1	2.2
Total	45	100	45	100
Household headship				
Male	44	97.8	35	77.8
Female	1	2.2	10	22.2
Total	45	100	45	100
Other source of income				
No other source of income	7	15.6	0	0.0
Had other jobs	38	84.4	45	100
Total	45	100	45	100
Perception of rice production cost				
Moderate	7	15.6	1	2.2
High	20	44.4	25	55.6
Very high	18	40.0	19	42.2
Total	45	100	45	100

Note: The Pearson chi-square test was 0.012, 0.007, 0.004, 0.006 and 0.08 for education, marital status, household headship, having other source of income and cost of production perception, respectively among the farmers characterized by their gender.

With regards to perception of production cost, a greater share (97.8%) of male respondents perceived the cost of production to be high more than the share of women

(84.4%). High-cost inputs is a commonly identified challenge besetting most African farmers (Amusa *et al.*, 2011). In addition, this may partly be explained by the result showing that all of the male respondents except for one were married and most likely having families and being the heads of their households, which might put pressure on their finances and as such expected to view production cost differently from women who are mostly not the heads of their households.

The differences across gender were tested with a chi-square statistic and with the observed Pearson chi square values, it was deduced that the differences in the respondents across gender with respect to education, marital status, household headship, having other source of income and perception of cost were real and not due to chance. These significant differences in the variables may explain differences in output or farm income among the farmers.

Challenges Faced by Paddy Farmers

Distribution of respondents according to challenges faced is presented in Table 4.

Table 4: Challenges faced by paddy farmers in the study area

Variable	Frequency (N0)	Proportion (%)
Irrigation practice		
Irrigated	47	52.2
Non-irrigated	43	47.8
Credit facility		
No access to credit	12	13.3
Accessed credit	78	86.7
Access to extension services		
Yes	32	35.6
No	58	64.4
Cost of production		
Moderate	8	8.9
High	45	50.0
Very high	37	41.1
Perceived level of returns on rice production		
Very poor	3	3.3
Poor	21	23.3
Good	63	70.0
Very Good	3	3.3
Other challenges		
Bad road	22	24.4
Flooding	34	37.8
Lack of funds	13	14.4
Inadequate farm size	86	95.6

The result presented in Table 4 indicated that a larger share of the farmers had access to credit facilities. This is contrary to the literature that smallholder farmers in Nigeria often face limited access to credit facilities and which is partly responsible for their low productivity (Mgbenka & Mbah, 2016). As noted in Balana and Oyeyemi (2022), the magnitude of the

impact of credit on agricultural investment and rural livelihood outcomes are higher for smallholders whose production decisions are effectively constrained by credit than for large commercial farms that are less credit constrained. In addition, the result showed that extension services were rarely available to the farmers, and which could partly explain for some of the reliance on traditional practices of rice cultivation. As noted in Osabuohien *et al.* (2018), technological advancement in the production and harvesting stages helps to promote commercialization and profitability of rice production. Also, majority of the farmers reported high cost of cultivating improved varieties of rice as a constraint. More so, lack of funds, flooding, bad road network and inadequate farm size were identified as challenges faced by rice producers in Ayamelum L.G.A of Anambra State, Nigeria.

CONCLUSION

Nigeria has a good agroecology and market that favours the production and sale of rice. Therefore, the need to improve production cannot be overemphasized. Results from the study showed that rice cultivation in the study area was carried out with fertilizer and improved seeds. Machineries were not readily available to the farmers, mostly due to high cost of purchasing them. Gender disparity was observed in education, having other sources of income and perception of production cost. Results also indicated that bad roads, flooding and lack of funds to cope with the increasing prices of inputs, were challenges paddy farmers faced in Ayamelum L.G.A. Therefore, government should mainstream gender into needed interventions when organising agricultural development programmes by providing tailored gender-based support to farmers in identified areas of needs. There is need for supply side policy initiatives that enhances farmers' access to or ability to invest in farm machineries such as irrigation facilities needed for optimum yields and less dependence on rainfall. In this regard government should support agricultural input suppliers (e.g. subsidised sales of fertilizers, improved seeds and hiring of farm machinery), to enable them meet farmers' needs at minimal cost and less hassles. Farmers could also form cooperatives or groups to pool their resources and enhance their capacity for bulk purchase that allows for cheaper cost and also to have improved access to facilities from agencies or funders. In addition, good road network and drainage structures should be put in place to address the problem of flooding as these would help improve the farmers' incomes and their standard of living.

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