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Rice Farmers' Perceptions of the Lower Niger River-Basin Irrigation Scheme's Use in Kogi and Kwara States, Nigeria

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Abstract

The study examined the perception of rice farmers towards utilization of irrigation in Kogi and Kwara States, Nigeria. The study employed a multi-stage sampling process to choose two hundred and forty respondents. In order to assess the data gathered for this study, descriptive statistics such as mean, percentage, and frequency were used. With a higher number of participants having some kind of education, the participants were still in their peak working and active years. By using irrigation technologies, farmers were able to increase their capacity building, increase food security, and boost agricultural investment. The survey found that respondents' perceptions of the use of irrigation systems were generally positive. The primary obstacles impeding the use of irrigation in the research regions were the high expense of hiring labor and the difficulties in securing loans.

Keywords: *perception, Rice farmers, irrigation,Utilization.*

Introduction: According to Mrindoko (2022), rice is one of the cereal crops that has attained cash crop status in Nigeria because of its substantial contribution to the agricultural sector and the activities that take place along the distribution chains from production to consumption. This is because it gives the local population up to 80% of the work in the producing areas. The public's demand for rice has not yet been met by local supplies, despite a steady increase in consumption in recent years. The growing demand for rice is attributed to a number of factors, such as population growth, economic levels, and rural-urban migration (Samson & Obademi, 2018). Nigeria has a very strong domestic production/supply and consumption trend. In 2016, it was estimated that the country's rice supply would be 2.3 million tonnes, while the demand was expected to be 6.3 million tonnes (Nakano, Tsusaka, Aida and Pede, 2018; Jegede, Sennuga and Olorunniyi. 2021). Even though rice is farmed in almost every ecological zone in Nigeria, according to statistics, its contribution to human nutrition is still quite small because of the growing global population. In terms of food security and food values globally, rice has emerged as a staple crop. To improve the quantity and quality of rice produced in Nigeria, the government should enact policies and conditions that provide opportunities for the country's rice sector to grow, such as zero tariffs on agricultural machinery and equipment, a large domestic market for rice products, and government subsidies on fertilizer and agrochemicals, among other things (Chandio Jiang, Rehman, Twumasi, Pathan, and Mohsin, 2020).The World Bank, through its Nigeria Sustainable Rural Water Supply and Sanitation Project, has been focusing on improving access to irrigation technologies in rural areas of Nigeria. The project aims to enhance agricultural productivity and promote sustainable water management practices to alleviate poverty and boost economic growth (World Bank, 2019). According to Ugbo (2020), irrigation technologies in Nigeria is a necessity to combat the negative impacts of climate change because drought and unpredictable rainfall patterns are becoming more prevalent, making irrigation crucial for ensuring a stable food supply. Therefore, research on irrigated rice production and how farmers perceived irrigation utilization is essential to the advancement of agriculture and the nation's economic prosperity. In this context, the following are the objectives of the study:; ascertain the socio-economic characteristics of rice farmers in the study area;; examine the perceptions of the farmers toward irrigation utilization; and; examine the constraints encountered by the participating farmers in utilizing irrigation.

Materials and Methods: The study was carried out in Kogi and Kwara States.

Kogi State is located in the North Central region of Nigeria (Kogi State, Government, 2022; Omole, 2022). It shares borders with the states of Ekiti and Kwara to the west, the Federal Capital Territory to the north, Nasarawa State to the northeast, Niger State to the northwest, Edo and Ondo States to the southwest, Anambra and Enugu States to the southeast, and Benue State to the east. Kogi State's economy is mostly dependent on agriculture, particularly the production of yam, coffee, cashew, groundnut, cocoa, and oil palm. The extraction of crude oil and the rearing of sheep, goats, and cattle are two more important enterprises (Akanbi, 2021). Kogi has the nation's 23rd-highest GDP and Human Development Index. Indices of Human Development, 2021). Kwara State was established on May 27, 1967, when General Yakubu Gowon's Federal Military Government divided the four regions that made up the Federation of Nigeria into 12 states, according to the Kwara State Association of Nigeria, 2021. Agriculture is the state's main source of income. Shonga Farms is located in Kwara State and is the result of the then state government administration's Back-to-Farm initiative, which was started by one of the state's former administrators. Shonga Farms consists of thirteen commercial farmers. The state's mineral resources include granite, quartz, feldspar, limestone, marble, kaolin, petroleum, gold, and clay,Atulegwu (2020).

Population of the Study: Under the Lower Niger River-Basin Development Authority, rice farmers who use irrigation technologies were the target demographic. The Lower Niger River-Basin Development Authority office provided the list of farmers.

Sampling Procedure and Sample Size: For this investigation, a multi-phase sampling process was employed. Due to their allocation under the lower Niger-River Basin Development Authority, Kogi and Kwara States were purposefully selected in the first stage. Within each of the two states chosen, two (2) Local Government Areas (LGAs) were purposively chosen for the second stage because the LGAs had the most active irrigation scheme in the States. Three (3) communities from each of the two (2) Local Government Areas with high number of rice farmers were chosen purposively in the third stage, making a total of six (6) communities in each state and twelve communities in all. Ten (10) LNRBDA participating farmers (PFs) were randomly selected for the fourth stage in each of the twelve selected villages; hence, 60 participating farmers were selected in each state, for a total of 120 participating farmers selected for interviews in the two states.

Instrument of Data Collection: An interview schedule was used to collect relevant information from the respondents with a well-designed questionnaire for the study.

Source of Data: Primary data was used for this study.

Method of Data Analysis: In order to analyze the data that was gathered for this study, descriptive statistics including frequency distribution, mean values, and percentages were used.

Results and Discussion: Socio-economic Characteristics of Respondents

In this section, the socio-economic characteristics of respondents were provided. These include age, marital status, sex, household size, farming experience, rice farm size, rice output and monthly income.

Age: As shown in Table 4.1, 7.5 % and 5.% of the participating farmers (PFs) and Non-participating farmers (NPFs) were within the age of 30-39 years respectively, those (PFs and NPFs) that were 40-49 years old constituted 60.8% and 25.8% respectively. Also, 18.3% of the PF and 67.5% of the NPFs were within the age of 50 and 59 while 13.3% and 1.7% were within 60-69 years. The mean age of PFs was 47.3years while that of NPFs was 49.9 years. This implies that majority of respondents were still within a productive and active working age range, hence their ability to produce to earn some income from farming and non-farming activities. This finding concurred with the assertion of Bzugu, Gwary and Idrisa (2005) that productive and active persons participate more in agricultural and community development activities, such as, Jibia irrigation project.

Farming Experience: It was found that 19.2% and 26.7% of the PFs and NPFs had 15-24 years of experience respectively, 5.0 and 62.5% had 25-34 years of experience respectively, 72.5% and 6.7% had 35-44 years of experience respectively while 3.3% and 4.2% had more than 44 years of experience respectively. The mean farming experience for PFs was 31.5 years while that of NPFs was 24.1years. This result showed that most of the respondents had long years of farming experience, implying that such farmers are likely to make decisions that would increase their output and income. Farming experience is used as a measure of management ability, the more experience the farmer is, the more his ability to make farm decision (Sulaiman, 2016).

Sex: The result in Table 1 shows that majority (90.0%) of the participating farmers were male while 10.0% were female and that 95.8% of the Non-Participating Farmers were male while 4.2% were female. This suggests that males are more engaged in farming activity more than the females in the study area. Oluwatayo, Sekunmade and Adesoji (2008) opined that men are mostly engaged in livelihood activities. Yahaya and Aina, (2007) observed that it is generally believed that men are often more energetic and could readily avail themselves for energy demanding tasks such as farming activities.

Marital Status: Results from Table 1 also revealed that majority (85.0%) of the participating farmers were married, 5.8% were divorced and 9.2% were widowed, while 80.8% of the NPF were married, 14.2% were divorced and 5.0 were widowed. This implies that majority of the respondents were married. Marital status may influence the size of households and married farmers may have larger household sizes which may encourage them to participate in agricultural projects in order to raise their income and level of living. The significance of marital status to agricultural production and livelihood activities can be explained in terms of the supply of agricultural family labour. It is expected that family labour would be more available where the household heads are married (Amaza, Abdoulaye, Kwaghe and Tegbam, 2009).

Household Size: The result in Table 1 further revealed that 25.0% of the PF and 37.5% of the NPF had household size between 1 and 5 persons respectively, while 75.0% of the PFs and 62.5% of the NPFs had a household size of between 6 and 10 respectively. The mean household size was six

persons for all the respondents. This indicates that the respondents had a fairly large or moderate household size. This implies that the fairly large household size may likely enhance the family labour supply on the farms, hence supporting favorably, productive capacities of the farmers already enhanced by their age. This corroborate with the findings of Adegbite, Momoh and Alalade (2007) that the larger the household size, the higher the likelihood of sustainable labour efficiency on farmers‟ farm, given the constant labour supply. However, Ahmed (2011) argued that large household size is associated with increased household consumption expenditure which reduces the money that could be used for production purposes.

Rice Farm Size: Table 1 shows that 55.0% of the PFs and 51.7% of the NPFs cultivated between 0.1 and 1.0hecatres, 33.3% of the PFs and 26.7% of the NPFs cultivated between 1.1 and 2.0 hectares while 11.7% of the PFs and 21.7% of the NPFs cultivated more than two hectares. The mean farm size for both PFs and NPFs was 1.39 and 1.50 hectares respectively. This implies that the respondents were small-scale rice farmers. It is to be noted that LNRBDA agency allocated same size of farmland to rice farmers in the study area per area office, hence this ensures that farmers were given access to LNRBDA irrigation technologies used for rice cultivation. This was done to ensure easier comparison of the output of the farmers and to reveal the level of expertise of the farmers on the use of irrigation technologies made available to them.

Perception of Farmers towards Irrigation Technology Utilization: According to the result in Table 2, the PFs strongly confirmed the opinion that “knowing when and how to apply fertilizer, as taught by LNRBDA was interesting” ($\bar{x}$ =4.85). This suggests that there was a good relationship between the staff of the organization and the farmers. Knowing when and how to apply fertilizer is crucial so as to ensure that the nutrients are available when the plants require them most, maximizing uptake and minimizing waste. Also, the way fertilizer is applied influences its effectiveness, therefore, choosing the right methods ensures that nutrients are delivered to the plant efficiently. More so, the PFs strongly agreed that “safe use of agro-chemicals as taught by LNRBDA is beneficial to health” ($\bar{x}$ =4.57). It is important that farmers were taught safe use of agro-chemicals in order to avoid inhaling or ingesting small, even minute quantities of agro-chemicals, because of their harmful effects on health, such as headache, skin rashes, dizziness, nausea, eye irritation and even blockage of some hormonal tracts in the body. It was also strongly agreed by the PFs that “the practice of safe harvesting of rice by LNRBDA was very good” ($\bar{x}$ =4.51). This is important because careful and safe harvesting of rice could help to reduce grains breakage, thereby, fetching better prices in the market for the farmers. Also, it was strongly confirmed by the PFs that LNRBDA irrigation technologies contributed positively to rice yield ($\bar{x}$ =4.53). This suggests that when used efficiently, by ensuring adequate water supply and improving water use efficiency, irrigation technologies could lead to significant increase in rice yield.

Moreover, it was strongly agreed by the respondents that “the use of LNRBDA irrigation technologies contributed positively to rice yield” ($\bar{x}$ =4.53). This indicates that irrigation technologies help ensure a consistent water supply for rice plants, allowing them to grow and develop more efficiently, which leads to higher yields. It was further strongly acknowledged by the PFs that “LNRBDA’ irrigation saves time” ($\bar{x}$ =4.60). This suggests a decrease in the need for manual labour in watering and managing crops, thereby allowing farmers to focus on other tasks.

In addition, the PFs agreed that “the technologies were easy to implement” ($\bar{x}$ =3.87), this suggests that the respondents were able to utilize the technologies to effectively irrigate their rice plants. The PFs agreed that “the irrigation technologies were economical methods to employ” ($\bar{x}$ =3.83). This suggests that despite potentially higher initial cost, improved water efficiency, reduced labour costs and increased yield can offset the initial investments.

Constraints Militating against Respondents’ Utilization of Irrigation

Technologies: The results in Table 3 shows that the PFs indicated that they had difficulty in obtaining loan for irrigation farming ($\bar{x}$ =2.93). Smallholder farmers often face limited access to credit and financing, making it difficult to invest largely in irrigation technologies. More so, high cost of labour ($\bar{x}$ =2.29) was another major constraints militating against irrigation technologies’ utilization. This implies that the cost of hiring labour is very high in the study areas. It suggests that high labour cost directly increase the overall expenses of rice farming, potentially squeezing or reducing the profit margins and making it harder for farmers to cover other costs and also making the farmers less inclined to use irrigation technologies more extensively. This agrees with the assertion of Adetarami (2017), that farmers depend on their personal savings to manage their farms while they augment with other sources of income.

Conclusion: The revelations from the findings of this study led to the conclusion that the respondents were in their active and working years. It was also concluded that the PFs had higher income than the NPFs due to irrigation technologies utilization. Furthermore, it was concluded that the perception of majority of the PFs towards irrigation utilization was favourable. Conclusively, difficulty in obtaining loan and high cost of labour were the major constraints to irrigation utilization in the study area.

Recommendations: Based on the study's overall conclusions, the following suggestions were made. The purpose of these suggestions was to encourage and maintain the LNRBDA irrigation project, increase rice production productivity, and enhance the living conditions of rice farmers in the research region and throughout Nigeria.

1. The use of family labor should be promoted among farmers in order to lower labor costs.
2. In order to free up men's time for other pursuits and increase household output, women should be encouraged to engage in irrigation rice farming more. This could also improve their general well-being.

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Table 1: Respondents Socio-Economic Characteristics

Variable	Participating Farmers (PF) (n=120) Frequency (%)	Non-Participating Farmers (n=120) Frequency(%)
Age (Years)		
30-39	9(7.6)	6(5.0)
40-49	73(60.8)	31(25.8)
50-59	22(18.3)	81(67.5)
60-69	16(13.3)	2(1.7)
Mean	47.3	49.9
Farming Experience (Years)		
15-24	23(19.2)	32(26.6)
25-34	6(5.0)	75(62.5)
35-44	87(72.5)	8(6.7)
45-54	4(3.3)	5(4.2)
Mean	31.5	24.1
Sex		
Male	108 (90.0)	115(95.8)
Female	12(10.0)	5(4.2)
Marital Status		
Married	102(85.0)	97(80.8)
Divorced	7(5.8)	17(14.2)
Widowed	11(9.2)	6(5.0)

Source: Field Survey, 2024

Table 2: Perception of Farmers towards LNRBDA' Irrigation Utilization

S/N	STATEMENT	SA	A	U	D	SD	Mean
1	Knowing when and how to apply fertilizer as taught by LNRBDA is interesting	102(85.0)	18(15.0)	-	-	-	4.85
2	Safe use of agro-chemicals as taught by LNRBDA is beneficial to health	75 (62.5)	42(35.0)	-	3(2.5)	-	4.57
3*	It involves high initial cost	36(30.0)	65(54.2)	-	12(10.0)	7(5.8)	2.07
4	Practice of safe harvesting of rice by LNRBDA is very good	68(56.7)	49(40.8)	-	3(2.5)	-	4.51
5	LNRBDA irrigation technologies contributed positively to rice yield	64(53.3)	56(46.7)	-	-	-	4.53
6*	It can cause difficulty in the application of fertilizers and pesticides	12(10.0)	6(5.0)	3(2.5)	34(28.3)	65(54.2)	4.11
7*	I cannot recommend LNRBDA' irrigation technologies to others.	-	-	-	82(68.3)	38(31.7)	4.31
8	Easy to implement	38(31.7)	56(46.7)	-	25(20.8)	1(0.8)	3.87
9	An economical method to employ	21(17.5)	183(69.2)	-	7(5.8)	9(7.5)	3.83
10*	The quality of water supplied for irrigation is not satisfactory	-	-	-	95(79.2)	25(20.8)	4.05
11	It saves time, effort and energy	86(71.7)	27(22.5)	-	7(5.8)	-	4.60
12*	I do not receive personal satisfaction from utilizing LNRBDA' irrigation technologies.	-	2(1.7)	-	44(36.7)	74(61.7)	4.58
*13	Using LNRBDA' irrigation technologies do not have positive effects on my farm's productivity.	3(2.5)	-	-	83(69.2)	34(28.3)	4.21
*14	I usually find it difficult to use the LNRBDA' irrigation technologies	-	7(5.8)	-	93(77.5)	20(16.7)	3.66

Source: Field Survey, 2024. Grand mean=3.0. For positive statements: Strongly Agree=≥4.5; Agree=3.5-4.49;Undecided=2.5-3.49; Disagree=1.5-2.49; Strongly Disagree=≤1.5.
For negative statements: Strongly Agree=≤1.5; Agree=1.5-2.49; Undecided=2.5-3.49; Disagree=3.5-4.49; Strongly Disagree=≥4.5. Note: SA=Strongly Agree, A=Agree, U=Undecided, D=Disagree, SD=Strongly Disagree *=Negative statement

Table 3: Constraints Militating against Respondents' Utilization of Irrigation Technologies

S/N	Constraints	Major constraint	Minor constraint	Not a constraint	Mean
1	Difficulty in obtaining loan for irrigation farming	112 (93.3)	8(6.7)	-	2.93
2	High cost of labour	55(45.8)	45(37.5)	20(16.7)	2.29
3	Ineffective water distribution and water shortage during dry season	24(20.0)	40(33.3)	56(46.7)	1.73
4	Inability to procure planting materials	2 (1.7)	9(7.5)	109(90.8)	1.11
5	Limited access to market	19(15.8)	5(4.2)	96(80.0)	1.36
6	Shortage of safe storage facilities	2(1.7)	31(25.8)	87(72.5)	1.29
7	Difficult planting operations	8(6.6)	11(9.2)	101(84.2)	1.22
8	Lack of prompt maintenance and repair	3(2.5)	16(13.3)	101(84.2)	1.18
9	Diseases outbreak	43.3)	6(5.0)	110(91.7)	1.18
10	Inadequate skills and knowledge	4(3.3)	7(5.9)	109 (90.8)	1.12

Source: Field Survey, 2024.

Grand Mean= 2.0. 1.0-1.49= Not a constraint, 1.50-1.99= minor constraint, ≥2.0=Major constraint.