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Effects of Micro-Credit Scheme on Rice Production among Smallholder Farmers in Kwali Area Council, Abuja

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ABSTRACT

This study examined the effects of microcredit schemes on rice production among smallholder farmers in Kwali area council Abuja, FCT. A survey research design was employed in the study. A total of 100 respondents were used in the study and they were sampled using a multi-stage sampling technique. Primary data was used for the study, and these were collected using well–structured questionnaires Regression analysis based on Cobb-Douglas model was conducted to check how micro-credit influences productivity. Based on the findings, it was discovered that 60% of the respondents were male, 52% were married with an average household size of 5 persons. Results further revealed that 70% of the respondents had 5-15 years of farming experience, and 45% of the respondents had secondary education. The main source of credit accessed by the smallholder farmers is the cooperative society. The study revealed as follows; educational level, household size, farming experience and access to credit were the significant variables that increased rice production among smallholder farmers. This study recommends that commercial banks should ensure that agricultural loan is giving priority, especially to smallholder farmers, as this will enhance the increase in quantity and quality of rice production.

Keywords: Microcredit, Smallholder, Farmers, Rice Production.

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I. Introduction

Apart from contributing about 40% to the Gross Domestic Product (GDP) of Nigeria, the agricultural sector is the leading foreign exchange earner for the country (Dossou, *et al.* 2020). However, agricultural workers are underpaid and reside in rural sections of the nation Adeoye & Ugalahi, (2017). According to Balana & Oyeyemi (2022), one of the main causes of rural poverty is a lack of access to agricultural loans. This is due to the fact that these low-income households lack the necessary collateral to obtain loans from lenders. Agricultural households frequently offer non-durable and perishable collateral as security. Providing financial services to rural areas will significantly boost productivity and, as a result, lower poverty. Agriculture credit has a strong positive impact on agricultural production, according to a study by Ogundele & Okoruwa (2018) that examined how it affects farmers' output and yield. This results from the possibility that having access to finance will allow farmers to buy the necessary inputs, such as better seeds, fertilizer, and labor, to increase their own output (Ojo *et al.* 2021).

Rice is one of the most valuable cereal crops cultivated and consumed all over the world. It is a staple food in several African nations and constitutes a large portion of the diet on a regular basis (Silong & Gadanakis, 2019; Sennuga, *et al.* 2021). According to Mrindoko (2022), due to its significant contribution to the agricultural sector and the activities that occur along the distribution chains from production to consumption, rice is one of the cereal crops that has achieved cash crop status in Nigeria. This is because it provides up to 80% of the jobs in the producing areas for the local population. Although rice consumption has risen steadily in

recent years, local supply has not yet kept up with public demand. Factors including a rise in population, economic levels, and rural-urban movement are blamed for the rising demand for rice (Samson & Obademi, 2018; Jah, 2017). The trend in domestic production/supply and consumption in Nigeria is very high. In 2016, the national supply of rice was predicted to be 2.3 million tonnes, compared to the 6.3 million tonnes of demand (Nakano, *et al.* 2018; Jegede, *et al.* 2021).

Statistics reveal that rice is grown in practically all of Nigeria's ecological zones, but despite this, its contribution to human nourishment is still relatively minor due to the world's rising population. Rice has become a global staple crop in the areas of food security and food values around the world. The government should implement policies and conditions that offer opportunities for developing the rice sector in the country, including zero tariffs on agricultural machinery and equipment, a sizable domestic market for rice products, and government subsidies on fertilizer and agrochemicals among other things. These will increase the quantity and quality of rice produced in Nigeria (Chandio, *et al.* 2020). The current administration of President Buhari on rice importation banned in 2015 in Nigeria was a clear indicator and a major booster to rice farmers in Nigeria, especially the smallholder farmers in rice production. But despite the various policies and measures to increase crop production; domestic rice production has not been increased enough to meet the rising population of the country. Rice is largely cultivated by small farmers in less than one hectare. Despite the domination and crucial role that smallholder farmers play in the production of rice, they nevertheless face production obstacles, such as a shortage of high-quality seeds, limited extension services, inadequate financing facilities, inadequate irrigation infrastructure, low fertilizer use (Agbodji & Johnson 2019; Sennuga, *et al.* 2020). Due to the ineffective input mix, smallholder farmers encounter difficulties that have decreased their output.

The national demand/supply mismatch has been closed by importing foreign rice to supplement locally produced rice. Between 1981 and 2016, the amount of rice imported climbed from 600,000 tonnes to over 1 million tonnes, and in 2011, Nigeria was the greatest rice importer in the world, with an estimated 3.4 million tonnes imported (Chandio, *et al.* 2020; Alam, *et al*. 2020). Scaling up local production using productivity-enhancing technology, such as the utilization of enhanced varieties, is one of the safest ways to close the gap in home supply (Egboduku *et al.* 2021; Lai-Solarin *et al.* 2021). The utilization of farm innovations to increase domestic rice production in Nigeria has thus been a topic that has dominated research and policy landscapes. However, it is worthy to note that Nigeria is the largest producer of rice (paddy) in Africa with an average production volume of 8 million metric tons. As of 2019, Nigeria ranked as the 14th largest producer of rice in the world with China being the top producing country. Same 2019, Africa had a total production volume of 14.6 million, Nigeria produced about 55% and Egypt produced about 30% of the production volume (Samuel, 2020; Anas *et al.* 2022).

Access to rural credit has the capacity to raise the level of the national income distribution of the country (Bahinipatim, 2020). It must be admitted that micro-credit has increased the financial choices of millions of rural smallholders who were perennially trapped by usurious loans from informal money lenders (Kiros & Meshesha, 2022). Smallholder farmers who have access to financing can buy new equipment, better seed fertilizer, and other essential inputs to increase the size of production (Masaood & Keshav, 2021). Similarly, Assogba, *et al.* (2017) asserts that smallholder farmers are able to acquire the necessary storage facilities in addition to being able to buy farm equipment, agricultural supplies, contemporary technology, and irrigation systems. Access to credit gives rural households the chance to improve their social well-being, particularly in the areas of health and education, in addition to an increase in production and income (Abubakar, 2019; Alfa *et al.* 2022). The expansion of microcredit has also increased predatory financial capitalism's influence in rural areas at the same time (Aliero & Yusuf, 2017). With peasant agriculture's lengthy gestation period, extreme seasonality, dependence on the environment, and high volatility, the specific accumulation model of microcredit programs is incompatible. It is based on door-to-door loan delivery, flat weekly installments, relatively higher interest rates than conventional banks due to high transaction costs and small loan sizes, strict enforcement mechanisms to ensure timely repayment, and an insatiable desire to enlist new members.

Credit is often the missing link for low-income families that try to make a living by operating small microenterprises. Agricultural productivity depends heavily on credit, but farmers do not have easy access to it because of bureaucracy, difficult application processes, and restrictions imposed by official lending institutions (Adeyongo *et al.* 2022). However, one potential strategy to reduce poverty is to increase access to microcredit. On the other hand, there is considerable disagreement over whether microcredit improves the standard of living for poor households. According to prior research using randomized controlled trials (RCT), microcredit has a beneficial effect on the investment made by small and medium-sized businesses but has little to no effect on their income (Wossen, *et al.* 2017; Osabohien, *et al.* 2020; Oparinde, 2017). However, lenders' inclination to lend to the impoverished is constrained by the perception that doing so is extremely risky, incurs large operating expenses, and has low payback rates. In Sub-Saharan Africa (SSA), rural areas are home to the bulk of the region's poor people, who primarily work in agriculture. Microfinance institutions (MFIs) have been extending their reach into rural areas where the majority of their clientele are smallholder farmers in recent years. There aren't many randomized studies analyzing the effects of microcredit, specifically created for agricultural households, despite the fact that the impact of microcredit on investment in non-farm industries has been widely studied. Adjognon *et al.* (2017) and Alfa & Abdulfatah (2019) are two examples of those studies, which discovered that microcredit boosts the usage of agricultural inputs and adoption of contemporary varieties without increasing household income or crop revenues (Abenga *et al*. 2022).

Credit plays a significant role in financial services and is essential to all forms of production, including agriculture. The link between agricultural productivity and the financial choices made by farm households has sparked an increase in

study interest in an effort to comprehend this interplay (Barry & Robinson, 2001). A substantial body of work (Kajenthini & Thayaparan., 2017; Ojo, *et al.* 2019; Moses & Zangue, 2017; Tarchiani *et al.* 2017; Abdallah, 2016) emphasizes the crucial role that credit plays in agricultural productivity. These studies highlight the crucial part that agricultural financing plays in farm households' technical proficiency and output. Aravindakshan, *et al.* (2018) witness to the importance of credit in increasing both the technical and allocative efficiency of agricultural production. Farm households require finance to buy outside inputs, hire wage labor, buy food and nonfood products, invest in education, and other things (Awotide, *et al.* 2015). Farmers that have access to loans might also use more capital-intensive production techniques to increase their technical efficiency (Chandio, *et al.* 2017). Additionally, Luan & Bauer (2016) and Saqib, *et al.* (2017) point out that resource restrictions, such as finance restrictions, may hinder farmers' ability to embrace new agricultural technology.

Farm production is impacted by credit both directly and indirectly. Directly, credit gives producers the means to make long-term investments and buy necessary production materials. Contrarily, credit has an indirect impact on production due to its influence on farmers' risk-taking behavior (Adeoye & Ugalahi, 2017). For instance, farmers with limited credit are more likely to invest in less risky and less productive industries. According to Saqib, *et al.* (2016), this risky behavior may influence farmers' decisions about the adoption of new technology, which may have an impact on the producers' technical efficacy. In order to invest in production inputs and technologies that increase productivity, as well as to reduce vulnerability within the household, lack of credit might act as a binding constraint (Meren, *et al.* 2017). From the aforementioned, it is clear that farm households' output productivity and efficiency may be significantly hampered by a shortage of credit.

II. Agricultural Credit Demand In Nigeria

The agricultural sector has a significant contribution to boost economic growth of Nigeria. Rural population of Nigeria is residing directly and indirectly involved in farming associated activities. Therefore, a rise in agriculture is crucial for Nigeria's economic development as well as a key source of income for the rural people (Nakano, *et al.* 2018). Nigeria's agriculture industry is struggling with a number of issues, such as a lack of water and energy as well as rising input costs.

III. Objectives of the Study

The broad objective of the study is to examine the effects of micro credit scheme on rice production among smallholder farmers in Kwali Area Council, Abuja. The specific objectives of the study are to:

i. describe the socio-economic characteristics of smallholder farmers in the study area
ii. examine how micro-credit institution provides support to the smallholder farmers in rice production
iii. find out the impact of micro-credit in rice production among the smallholder farmers
iv. identify constraints facing the smallholder farmers in rice production in the study area

IV. Materials and Method

A. Study Area

The study was conducted in Kwali Area Council of the Federal Capital Territory, Abuja. Kwali is a local government in Abuja (FCT). Kwali Area Council has a total land mass of about 1,700 square kilometers. In the southwest corner of the FCT is where the Area Council is located. It is located between longitude 7.01^0 east and latitude 8.87^O north. With a 1,206km2 area, the population was 85,837 as of the 2006 census. It is the rural residence of Dr. Ladi Kwali, a well-known potter whose likeness currently graces the 20 Naira currency. The residents of Kwali Area Council, which includes 10 wards named Ashara, Dafa, Kilankwa, Kundu, Kwali, Gumbo, Pai, Wako, Yangoji, and Yebu, also engage in other occupations like farming, hunting, and commerce. A Councilor is in charge of each ward. The Federal Government College, the National Mathematical Center Sheda Kwali, and the Sheda Science and Technology Complex are just a few of the significant landmarks that can be found in Kwali Area Council, Nigeria National Petroleum Corporation (NNPC) pump station Awawa and many more.

B. Sampling procedure and sample size

The population of the study includes all smallholder farmers in the study area, a multi-stage sampling technique was adopted while questionnaires were used for data collection. In the first stage, four wards (Ashara, Dafa, Pai, Yangoji) were purposively selected out of ten (10) because they were farming communities. In the second stage, five (5) communities were randomly selected from each of the four (4) wards giving a total of 20 communities. From each of the 20 communities (third stage) 24 farmers were randomly selected and giving a total of 480 respondents. That is, 120 questionnaires per each ward. Using a semi-structured questionnaire, primary data were collected from the respondents. Data obtained were analyzed and inferences drawn.

V. Theoretical Model Specification

Credit has been a major factor in the agriculture sector's growth. The agricultural development demand for agricultural finance exhibits a variety of characteristics when traditional agriculture is transformed into modern agriculture. Credit demand is primarily influenced by the stage of agricultural growth, the marketization of agriculture, and the production and management practices of farmer households. Demand for credit is correlated with consumer willingness to spend money on goods and services. The cost of financial facilities as well as other aspects of the borrower's income and associated expenses, including other charges, have an impact on demand. Financial institutions are therefore worried about the interest rate that is assessed for credit. The claim that financial institutions charge exorbitant interest rates is

supported by trustworthy evidence. various socioeconomic variables have a positive linkage with credit demand including income, level of education and household size.

A. Regression Analysis

This was carried the impact of micro-credit in rice production among the smallholder farmers, especially the critical ones, this will have on the output of individual farmers in each category of respondent. Cobb-Douglas production functional form was chosen for this analysis because of its wide use/acceptance, theoretical fitness, manageability and suitability when dealing with small farms (Zahri *et al.,* 2018; Chenaa, *et al.* 2018). Its general form is specified as (1).

$$Qi = \alpha\, X1i\, \beta 1\, X2i\, \beta 2\, \ldots X4i\, \beta 4;\, ei \qquad (1)$$

which when the line arise becomes (2).

$$LnQi = \alpha + \beta ILnXli + \beta 2LnX2i + \ldots + \beta 4LnX4i + ei \qquad (2)$$

where:

X_1 = Farm size (ha)
X_2 = Labour wage (₦)
X_3 = Fertilizer or Manure (Kg)
X_4 = Planting materials (₦)
X_5 = Fixed inputs (₦)
X_6 = Agro-chemicals (liters)
ei = Error term
α & β are parameters that were estimated.

VI. Results and Discussion

A. Socio Economic Characteristics of the Respondents

Data in Table 1 shows the socio–economic characteristics of farmers involved in rice production in the study area. The table reveals that 60% of the respondents are male while 40% are females, this indicated that majority of rice farmers are males. While 45% of the respondents are between the ages of 31–40 years and this age brackets are the highest involved in rice production in the study area, while 25% are of the ages between 18-30 years which form second highest. Respondents between the ages of 41–50 years constitute 20% and very few respondents within the ages of 51 and above are just within 10%. The active ages of the respondents as revealed in the study for the production of rice is 31–40. This age brackets are usually active, ingenious, result orientated in the area of farming activities. The results of the study further shown that 52% of the respondents are married and 23% were single, 10% of the respondents are widow, while 15% of the respondents are widower. The result further revealed that 40% of respondents have only one wife, while 35% of respondents have two wives and 25% respondents have three wives and above.

The result also shown that 50% represents household size from 6-10 and 30% represents household size from 1–5, while 20% represents household size of 11 and above. It is evident that the expansion of the family occurs through marriage, marital status which had a significant impact on household size and household labor availability. This is in line with the assertions of Ololade, *et al.* (2018).

Response on the level of academic qualification as shown in Table I, indicates that majority of the respondents had a secondary education with the study revealing 45%, while those with non-formal education rated second highest with 25%. However, 20% respondents had primary education. The last among the respondents had tertiary education with 10%. The results revealed that majority rice farmers were literate. The high literacy level in the area would enhance their involvement in rice production in the area. This is in line with the findings of Samson & Obademi (2018). They reported that 57.9% of smallholder farmers spent 7–12 years in formal education, thus implying that the rate of adoption of innovation is expected to be high in the area of study. Respondents on the land acquisition shown that 55% respondents inherited land for the production of rice, while 20% respondents purchased their land; it was further revealed that 15% respondents rented the land, and 10% respondents went for land least.

TABLE I: Socio-Economic Characteristics Of The Respondents In The Study Area

Socio-economic variables	Percent (%)
Gender	
Male	60.0
Female	40.0
Age	
18 – 30 years	25.0
31 – 40 years	45.0
41 – 50 years	20.0
51 & above	10.0
Marital Status	
Married	52.0
Single	23.0
Widow	10.0
Widower	15.0
No of Wives	
1	40.0
2	35.0
3 & above	25.0
Household size	
1 – 5	30.0
6 – 10	50.0
11 and above	20.0
Academic qualification	
Primary School	20.0
Secondary School	45.0
Tertiary Education	10.0
Non – formal Education	25.0
Land acquisition	
Inheritance	55.0
Rent	15.0
Purchase	20.0
Least	10.0
Rice Farming Experience	
< 5	20.0
5 – 15	70.0
> 15	10.0
Size of Farm	
1-2ha	15.0
3 - 4ha	20.0
5ha above	65.0

Source: Field Survey, (2021)

On farming experience, majority 70% of the respondents had 5–15 years farming experience, 20% had below 5 years of farming experience. While only 10% of the respondents had above 16 years of farming experience. The average farming experience of the respondents is 13 years. This implies that the respondents have been into rice production for a long time. However, it is expected that with increasing years of farming respondents would gain experiences in farming to the advantage of increasing agricultural productivity. This agrees with the findings of Edet, *et al.* (2019), they reported that the average farming experience of the respondents was high (17 years); the high level of experience may contribute to their ability to use resources more efficiently in their production. 65% majority of the rice farmers had farm size of 3 - 4ha, 20% had farm size of 1- 2ha. While 15% had farm size of 5ha and above, the average farm size is 3ha. This implies that most of the farmers were not into small-scale rice production due to the large farm size.

B. Examine How Micro-Credit Institutions Provide Support to Smallholder Farmers in Rice Production

Fig. 1 examines how micro-credit institutions provide support to smallholder farmers in rice production. The result reveals that the main source of credit accessed by the rice farmers is the cooperative society; about 85% of the rice farmers obtained their take-off credit and fund for the expansion from the cooperative society.

This was followed by a loan from a microfinance bank 10%. While on the other hand an insignificant proportion 5% of the rice farmers obtained credit facilities from commercial banks. The high proportion of respondents, who source credit from cooperative society may be attributed to the fact that most of the respondents were members of the association, therefore enhancing their access to credit. This result is in line with the findings of Silong and Gadanakis (2019), who reported that a cooperative society is a veritable tool for capital formation and agricultural development.

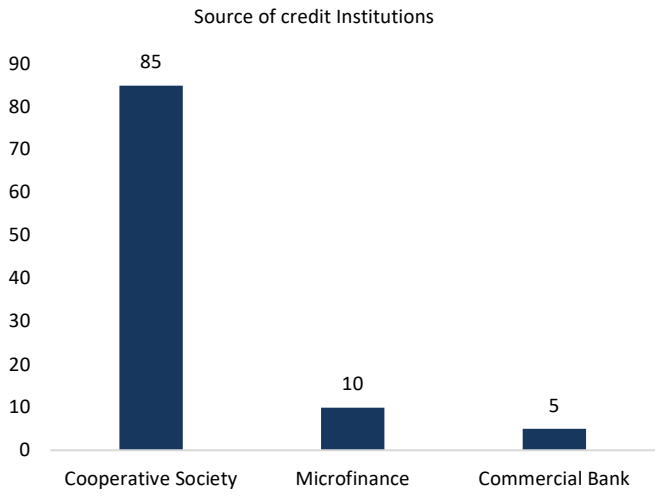

Fig. 1. Distribution of respondents according to micro-credit institutions provide support to smallholder farmers.
Source: Field Survey (2021)

C. Impact Of Micro Credit on Rice Production Among Smallholder Farmers

The result in Fig. 2 shows the impact of micro credit on rice production among smallholder farmers. The result revealed that in 2018, 38% of the respondents produced 21 – 50 bags of rice, while in 2019, 40% of the respondents produced 51–80 bags. Result further revealed that in 2020, 22 % of the respondents produced 22 bags and below of rice. Based on the study, it was discovered that there was a progressive trend from 2018 to 2019; however, there was a sharp declined in 2020 due to the coronavirus which impacted negatively in rice production coupled with federal government policy on restriction of movement. From the study, 85% of the respondents had access to credit through the cooperative society in the study area. It is evident that credit granted to smallholder farmers impacted positively in area of yield and output in rice production for the past three years.

D. Identify Constraints Facing by Smallholder Farmers in Rice Production in The Study Area

The results in Fig. 3 identify constraints faced by smallholder farmers in rice production. Based on the findings, it was evident that 65% of the rice farmers in the study area are facing high level of pest attack in rice production and if this trend continues it will lead to a low yield of rice production in the study area. This study further revealed that 50% of the respondents facing high level of drought being another major constraint to rice production in the study area as a matter of fact rice requires about 1200 mm to 1600 mm of rainfall evenly distributed throughout its growing period for optimum growth and yield. From the study, it was further shown that 50% of the farmers are facing very high poor soil fertility study area and based on the study, soil fertility in Northern parts of Nigeria has progressively declined due to increased pressure on land resources arising from rapid population expansion, which is forcing farmers to adopt continuous cropping. Study also revealed that, 75% of the respondents do not have access to credit with commercial banks due to high-interest rate, collateral problem, and high risks of loan repayment by the farmers among several others. Based on the study, it was discovered that commercial banks don't belief in granting loan to farmers; hence they believe granting loan to farmers is a huge loss to the institution, especially in the area of loan recover. It was further investigated in the study that commercial banks grant loans to those who have steady income or collateral in place, so as repayment of loan will never be in doubt.

Table II shows the regression result by explaining how micro credit influences farmers' productivity in rice farming. The three models mentioned in the methodology are covered by the analysis. With the exception of fertilizer application, all variables in the first model are positive and significant at the 1% level of significance, according to the results. Despite numerous barriers to accessing microcredits by farmers and their inability to locate some of their outlets in many rural areas, it has still had an impact on the productivity of the few opportunistic among them, which is inconsistent with the study of Dossou, *et al.* (2020). An increase in access to credit increases rice production by 0.46. According to the study by Mrindoko (2022), land size contributes 0.16, meaning that the more hectares of land used for rice cultivation, the more rice is collected.

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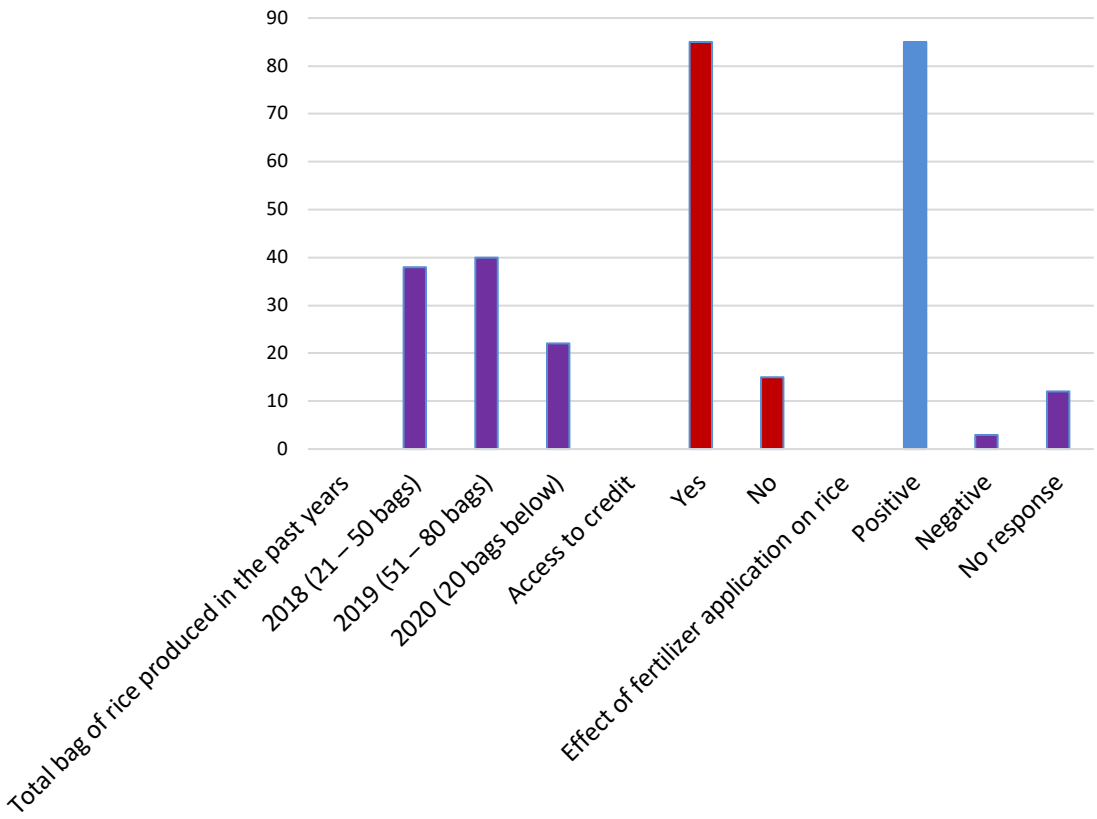

Fig. 2. Impact of micro credit on rice production among smallholder farmers.
Source: Field Survey (2021)

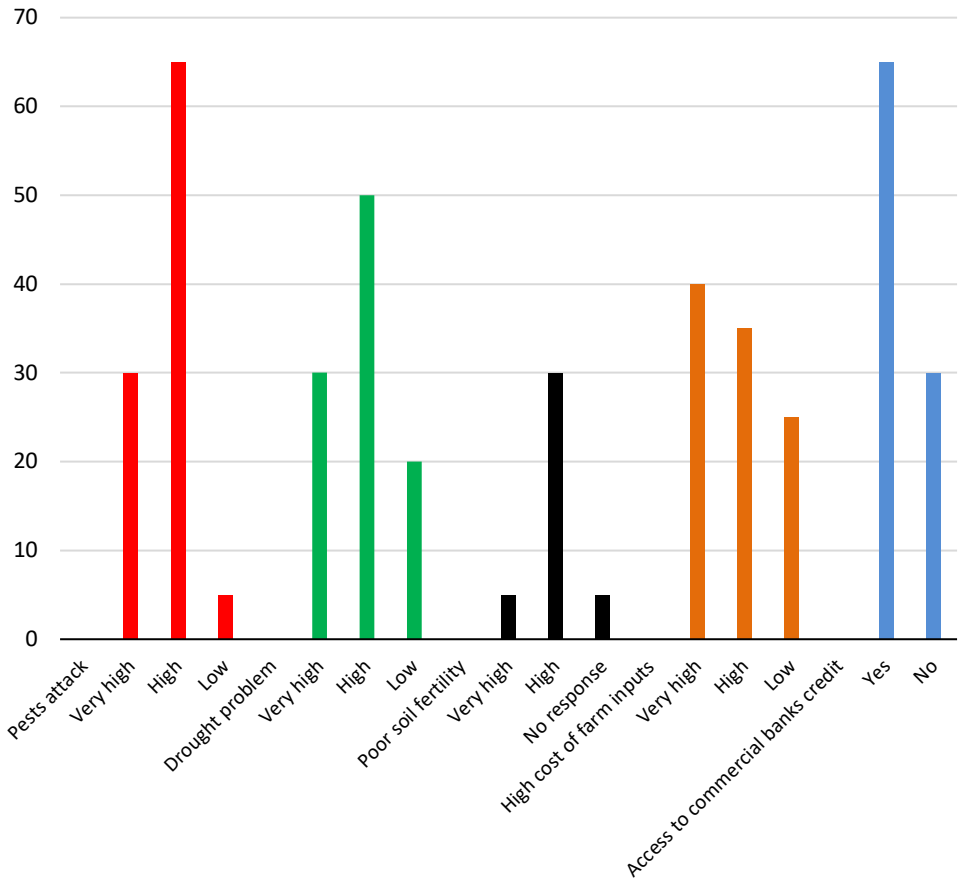

Fig. 3. Constraints facing by smallholder farmers in rice production
Source: Field Survey (2021)

The use of enhanced rice seeds has been facilitated by the proximity of a research center. This has a 0.46 contribution to rice productivity and is significant at the 1% level. The cost of using technology in the process of growing rice is beneficial and considerable at 1%, with an influence value of 0.86. Farmers who engage in large-scale production typically suffer costs, particularly for land clearing and water management. The second model was regressed on the characteristics of the farmers, and the results show that age and gender are significant and positive factors. An increase in farmers' age results in a 1.04 increase in rice productivity, which may be explained by the fact that more experience is gained in the production of rice with each passing year, Given the strength and extensive time commitment primarily attributed to male rice farmers in comparison to their counterpart, this finding suggests that higher output can be influenced by the gender of the farmer. Few female farmers are involved in large-scale farming, and the majority of them are older and have experience inheriting some land. The majority of them have some degree of primary education, which has contributed to some level of literacy in rice production, as indicated by the fact that education is positive but not significantly correlated with rice productivity. On the other side, the occupation has a negative and substantial degree of significance at 1%, showing that having a skilled job prevents one from being fully engaged in rice growing.

Most farmers choose to sell it for a profit rather than use it on their farms after receiving government subsidies for it. In addition, some farmers continue to the traditional methods of developing their lands, such as bush fallowing and the use of local manure, since they fear that using fertilizers to increase productivity will lower the quality of their rice.

When farmers' education is taken into account, the costs of labor, seeds, and technology are favorable and considerable. Farmers are able to avoid making undue financial commitments because the cost of these inputs is dependent on their financial capacity.

TABLE II: REGRESSION RESULT BY EXPLAINING HOW MICRO CREDIT INFLUENCES FARMERS' PRODUCTIVITY IN RICE FARMING

Variable	Model 1	Model 2	Model 3	Robust
Age	-	1.0421***	-	0.4529***
	-	(0.1356)	-	(0.0776)
Gender	-	0.7398***	-	0.1732***
	-	(0.1429)	-	(0.0726)
Education	-	0.1152	-	0.0244
	-	(0.0648)	-	(0.0521)
Occupation	-	-0.4331***	-	-0.0472
	-	(0.1203)	-	(0.0632)
Access to Credit	0.4377***	-	0.1778***	0.4576***
	(0.0629)	-	(0.0248)	(0.0737)
Land Size	0.1726***	-	0.0746***	0.0272***
	(0.0372)	-	(0.0164)	(0.0082)
Fertilizer	0.0079	-	-0.0315***	0.0083***
	(0.0058)	-	(0.0026)	(0.0069)
Labour	0.0711***	-	0.0211**	0.05178***
	(0.4521)	-	(0.0240)	(0.0114)
Seed	0.4725***	-	0.0734***	0.0551***
	(0.0577)	-	(0.0245)	(0.0422)
Technology Cost	0.9436***	-	0.2632***	0.6684***
-	(0.0748)	-	(0.0607)	(0.0751)

Notes: Robust standard errors are in parentheses, P values: significance *10%; **5%; ***1%.
Source: Field Survey 2021

A robust study was conducted in order to validate the regression analysis and confirm the earlier findings in models 1, 2, and 3. Age and gender are relevant, as the outcome of model 2 previously indicated. As observed in model 2, education is not significant, but occupation is negative and not significant, which contrasts with the previous model 2 finding. When compared to models 1 and 3, the robust results for access to financing, land size, labor, seed, and technical cost remain favorable and substantial. But when it comes to fertilizer, the robust result is different from model 3 and identical to model 1.

VII. CONCLUSION

The aim of this study is to examine the effects of micro credit scheme on rice production among smallholder farmers. From the study, it was evident that majority of the farmers involved in rice production were male. Most of the farmers were married; this implies that married individuals dominated the sampled rice farmers. The results also showed that most of the farmers involved in rice production had secondary education with 45%. Educational level of the individual is one of the most essential factors to receive and utilize new innovation and productive approach to be more efficient and effective. Moreover, it represents the level of formal schooling completed by the smallholder farmers at the time of this study. In this case, education exposes rice farmers to more information on micro-credit scheme and enables them to accumulate knowledge. The study further revealed that the main source of credit accessed by the rice farmers is the cooperative society with 85%; this indicates that cooperative society is a veritable tool for capital creation and agricultural development. Based on the findings, it was revealed that most of the rice farmers in the study area are facing high level of pests attack in rice production and they need financial assistance to deal with it.

VIII. RECOMMENDATIONS

Based on the findings of the study, the following recommendations were made:

1. Commercial banks should ensure agricultural loan is giving a priority especially to the smallholder farmers, as this will enhance increase in quantity and quality of rice production.
2. There is a need for the government to formulate policies aimed at promoting education as a means of enhancing efficiency in rice production, as this will enable the farmers to use available resources efficiently
3. Government and private sectors should come to the aid of farmers in the area of subsidizing agricultural inputs, as this will encourage more farmers' involvement in rice production and increased in production.
4. Rice resistant varieties that fall within early and medium periods should be considered, as a means of tolerance to or the capacity to avoid drought and pests attack.

REFERENCES

Abdallah, A. H. (2016). Agricultural Credit and Technical Efficiency in Ghana: Is There a Nexus? *Agricultural Finance Review,* 76(2), 309-324.

Abenga, J. K, Alabuja, F. O., Bako, H., Ajayi, A. H. and Sennuga S.O. (2022): Barriers to Effective Extension Agents and Smallholder Farmer Communication in Gwagwalada Area Council, Abuja, Nigeria, *Agricultural Extension Journal*, 6(3):101-108

Abubakar, S., (2019). Trader moni micro-credit scheme and poverty reduction in Nigeria, *International Journal of Political Science.* 1(2): 38–42.

Adeoye, S. O., & Ugalahi, U. B. (2017). Smallholder food crop farmers' participation in Bank of Agriculture (BOA) loan scheme in Ogun State, Nigeria. *Agrosearch*, 17(2), 51-66.

Adeyongo, I. L., Chibuike, F., Sennuga, S. O. & Alabuja, F. O. (2022): Adoption of Agricultural Innovations among Rice Farmers in Federal Capital Territory, Nigeria. *International Journal of Agriculture Extension and Social Development.* 10(6): 12-19.

Adjognon, S.G., Liverpool-Tasie, L., & Reardon, T. (2017). Agricultural input credit in Sub-Saharan Africa: telling myth from facts, Food Policy 67; 93–105.

Agbodji, A. E. & Johnson, A. A. (2019), "Agricultural credit and its impact on the productivity of certain cereals in Togo", *Emerging Markets Finance and Trade*. 1-17.

Alam, A.S., Begum H, Masud, M.M, Al-Amin, A.Q, & Leal Filho, W (2020) 'Agriculture insurance for disaster risk reduction: a case study of Malaysia', *International Journal of Disaster Risk Reduction*. *Elsevier* 47:10-26.

Alfa, A. B. & Abdulfatah, H. (2019). Impact Of Micro Credit Facility on Productivity of Rice Farmers' In Katcha Local Communities Of Niger State, *Lapai International Journal Of Management and Social Sciences.* 11 (2): 288-296.

Alfa, M. K., Sennuga S. O, Barnabas, T. M., Alabuja, F. O. & Ebhohon, A. (2022). Effects of Information and Communication Technology on Youths Participation in Sesame Seed Production in Kwali Area Council, Abuja, Nigeria, *Journal of Media & Management*, 169 4(04), 1-6.

Aliero, I. H., & Yusuf, M. M. (2017). Analysis of constraints to credit access for SMES in Sokoto Metropolis, *Asian Journal of Economics Model.* 5(2): 167–174.

Anas, H. A., Sennuga S. O., Barnabas, T. M., Alabuja, F. O. & Okpala, E. F. (2022). Smallholder Women's Perceptions on the Barriers to Promoting and Processing Local Rice in Gwagwalada Area Council, Abuja, Nigeria, *International Journal of Current Research & Academic Review*, 10(6), 27-36.

Aravindakshan, S., Rossi, F., Amjath-Babu, T. S., Veettil, P. C. & Krupnik, T. J. (2018). Application of a Bias Corrected Meta-frontier Approach and an Endogenous Switching Regression to Analyze the Technical Efficiency of Conservation Tillage for Wheat in South Asia, *Journal of Productivity Analysis*, 49(2-3), 153-171.

Assogba, P. N., Kokoye, S. E. H., Yegbemey, R. N., Djenontin, J. A., Tassou, Z., Pardoe, J., & Yabi, J. A. (2017). Determinants of credit access by smallholder farmers in North-East Benin. *Journal of Development and Agricultural Economics*, 9(8), 210–216.

Awotide, B. A., Karimov, A. A. & Diagne, A. (2016). Agricultural Technology Adoption, Commercialization and Smallholder Rice Farmers' Welfare in Rural Nigeria, *Agricultural and Food Economics*, 4(1), 1-24

Bahinipatim, C. S. (2020) Assessing the costs of droughts in rural India: a comparison of economic and non-economic loss and damage. *Curriculum Science* 118(11):1832–1841.

Balana, B. B. & Oyeyemi, M. A. (2022). Agricultural credit constraints in smallholder farming in developing countries: Evidence from Nigeria, *World Development Sustainability,* 1(2): 1-12.

Chandio, A. A., Jiang, Y., Rehman, A., Twumasi, M. A., Pathan, A. G. & Mohsin, M. (2020) Determinants of demand for credit by smallholder farmers': a farm level analysis based on survey in Sindh, Pakistan *International Journal of Agriculture,* 2(1): 1-14.

Chandio, A. A., Jiang, Y., Wei, F., Rehman, A. and Liu, D. (2017b), "Famers' access to credit: does collateral matter or cash flow matter? evidence from Sindh, Pakistan", Cogent Economics and Finance, 5, 13 - 23.

Chandio, A. A., Magsi, H., Rehman, A. & Sahito, J. G. M. (2017). Types, Sources and Importance of Agricultural Credits in Pakistan, *Journal of Applied Environmental and Biological Sciences*, 7(3), 144-149.

Chenaa, T., Maria, A., & Nkiemboupoh, M. (2018). Determinants of Access to Credit and Performance of Smallholder Farmers in Kumba Municipality, South West Region of Cameroon. *Asian Journal of Agricultural Extension, Economics & Sociology*, 25(1), 1–12.

Dossou, S. A. R., Aoudji, A. K., Houessou, A. M. and Kaki, R. S. (2020). Microfinance services for smallholder farmers: an assessment from rice farmers' expectations in Central Benin, *Agricultural and Food Economics*, 8(20): 1-15.

Edet, O. G., Agbachom E. E. & Uwah, E. D. (2019). The Effect of Microcredit on Technical Efficiency of smallholder Rice Farmers in Ikot Ekpene Agricultural Zone, Akwa Ibom State, Nigeria, *Global Journal of Agricultural Sciences,* 18(1): 73-85.

Egboduku, C. O, Sennuga S. O. and Okpala E. F. (2021) Factors influencing the interest of youths towards career in agriculture: A case study of Bwari Area Council, Abuja, Nigeria, *International Journal of Advance Agricultural Research*, 9 (2021) 61-6.

Jan, I., Khan, S., Khan, N.P. and Ashfaq, M. (2017), "Effects of micro-credit programme of Khushali Bank Limited on agricultural productivity in District Mardan, Pakistan", *Sarhad Journal of Agriculture,* 33(4): 688-693.

Jegede, M. E, Sennuga S. O. & Olorunniyi A. A. (2021): Factors Influencing the Effectiveness of Improved Soil Management Practices among Rice Farmers in Abuja. *Journal Food Science & Nutrition*, pp 1-6.

Julien, H., Kossi, A., & Aklésso, E. (2021). Analysis of factors influencing access to credit for vegetable farmers in the Gulf Prefecture of Togo. *American Journal of Industrial and Business Management,* 11, 392–415.

Kajenthini, A. & Thayaparan, A. (2017). Impact of Microfinance Loans on Paddy Production among Small Holder Farmers in Sri Lanka, *Global Journal of Management and Business Research,* 17(4): 1-7.

Kiros, S. & Meshesha, G. B. (2022). Factors affecting farmers' access to formal financial credit in Basona Worana District, North Showa Zone, Amhara Regional State, Ethiopia, *Cogent Economics & Finance*, 10(1): 1-22.

Lai-Solarin W. I., Adeoye, W. A., & Sennuga, S. O. (2021). Technology Adoption Capabilities of Small Farm Dairy Cattle Holders in Gwagwalada, Abuja: Effects of Asymmetric Information and Extension Approaches, *International Journal of Agricultural Economics*. 6(6): 315-323.

Luan, D. X. & Bauer, S. (2016). Does Credit Access Affect Household Income Homogeneously across Different Groups of Credit Recipients? Evidence from Rural Vietnam, *Journal of Rural Studies*, (47), 186-203.

Masaood, M. & Keshav, L. (2020). Factors affecting farmers' access to formal and informal credit: Evidence from rural Afghanistan. *Journal of Sustainability*, 12(1): 1–16.

Meren E. C., Twumasi, Y., Wesley, J., Isokpehi, P., Shenge, M., Fageir,S., Crisler, M., Romorno, C., Hines, A., Hirse, G., Ochai, S., Leggett, S., & Nwagboso, E. (2017) Analyzing Rice production issues in the Niger State Area of Nigeria's middle Belt. *Food and Public Health,* 7(1): 7-22.

Moses, A. O. & Zangue, N. J. (2017) Financial performances of microfinance institutions in cameroon: Case of CamCCUL Ltd. *Int J Econ Finance* 9(4):207–224

Mrindoko, A. (2022). Impact of Village Community Bank Loans on Smallholder Farmers' Household Income in Kiteto District, Tanzania. *African Journal of Applied Research*, *8*(1).: 1-14

Nakano, Y., Tsusaka, T. W., Aida, T., & Pede, V. O. (2018). Is farmer-to-farmer extension effective? The impact of training on technology adoption and rice farming productivity in Tanzania. *World Development*, 105, 336-351.

Ogundele, E. I. & Okoruwa, T. O. (2018). Effects of Micro-Credit Acquisition on Rice Technologies Adoption in South East Nigeria, *American-Eurasian Journal. Agric. & Environ. Science.,* 16 (10): 1656-1661

Ojo, T. O., Baiyegunhi, L. J. S. & Salami, A. O. (2019). Impact of Credit Demand on the Productivity of Rice Farmers in South West Nigeria, *Journal of Economics and Behavioral Studies*, 11(1): 166-180

Ojo, I. H., Sennuga, S. O., Kagbu, J. H. & Omokore, D. F. (2021) Assessment of Women Farmers' Sources of Information on Adoption of Improve Cassava Production Technology in Mopamuro Local Government Area, Kogi State, Nigeria. *Journal of Agricultural Economics, Extension & Social Sciences*, 4(1): 78-85

Ololade, R. A., Olagunju, F. O., Adejumo, T. J., & Okegbade, A. I. (2018). Econometric Analysis of Accessibility and Repayment Ability of Agricultural Credit among Rural Root and Tuber Crops Farmers in Oyo State Nigeria. *Global Journal of Management and Business Research*.

Oparinde, L.O. Amos, T.T. Adeseluka, M. (2017). Influence of agricultural credit guarantee scheme fund (ACGSF) on fishery development in Nigeria. Scientific Papers Series Management, Econ*omic Eng. Agriculture Rural Development.* 17 (1) 323–332.

Osabohien, R, E. Osuagwu, E., E. Osabuohien, E., Ekhator-Mobayode, U. E., Matthew, O. Gershon, O. (2020). Household access to agricultural credit and agricultural production in Nigeria: a propensity score

matching model, *South Africa Journal of Economic Management. Science*. 23 (1):1–11.

Paresys, L., Saito, K., Dogliotti, S., Malézieux, E., Huat, J., Kropff, M. J., & Rossing, W. A. (2018). Feeding the world while reducing farmer poverty? Analysis of rice relative yield and labour productivity gaps in two Beninese villages. *European Journal of Agronomy*, 93, 95-112.

Samson, A. & Obademi, O. (2018). The determinants and impact of access to agricultural credit on productivity by farmers in Nigeria; Evidence from Oyo state, Nigeria. *Advances in Social Sciences Research Journal*, 5(3), 252–265.

Samson, A., & Obademi, O. (2018). The determinants and impact of access to agricultural credit on productivity by farmers in Nigeria; Evidence from Oyo State, Nigeria. *Advances in Social Sciences Research Journal,* 5(3).

Samuel, S. (2020). Determinants of access to formal credit in rural areas of Ethiopia: Case study of smallholder households in Boloso Bombbe district, Wolaita zone, Ethiopia. *Journal of Economics*, 9(2), 40–48.

Sapkal, S., Kamble, B. H., Kumar, P., Kar, A., & Jha, G. K. (2019). Impact of laser land levelling in rice-wheat systems of the North-Eastern indo-gangetic plains of India. Journal of Pharmacognosy and Phytochemistry, 8(1), 764-769.

Saqib, S. E., Kuwornu, J. K. M., Panezia, S. & Ali, U. (2017). Factors Determining Subsistence Farmers' Access to Agricultural Credit in Flood-Prone Areas of Pakistan, Kasetsart *Journal of Social Sciences*, (30), 1-7.

Saqib, S., Ahmad, M. M., Panezai, S. & Ali, U. (2016). Factors Influencing Farmers' Adoption of Agricultural Credit as a Risk Management Strategy: The Case of Pakistan, *International Journal of Disaster Risk Reduction,* (17), 67-76.

Sennuga, S. O., Adeniran B. T. & Olorunniyi A. A. (2021): Assessment of the Constraints Associated with the Processing of Paddy Rice: A Case Study of Smallholder Farmers in Gwagwalada, Abuja. *Journal of Current Trends in Agriculture, Environment and Sustainability,* 2(1), 1-7.

Sennuga, S. O., Baines, R.N., Conway, J.S. & Angba, C.W. (2020): Awareness and Adoption of Good Agricultural Practices among Smallholder Farmers in relation to the Adopted Villages programme: The Case Study of Northern Nigeria, *International Journal of Biology, Agriculture and Healthcare,* 10(6), 34-49.

Silong, A. K. F. & Gadanakis, Y. (2019), "Credit sources, access and factors influencing credit demand among rural livestock farmers in Nigeria", *Agricultural Finance Review,* 80(1): 68-90.

Tarchiani V, Rossi F, Camacho J, Stefanski R, Mian KA, Pokperlaar DS, Coulibaly H, &Adamou A.S. (2017) Smalholder farmers facing climate change in West Africa: decision-making between innovation and tradition. *Journal of Innovation Econ Managemen*t, 1(1): 1-24

Tiwasing, P., Dawson, P., & Garrod, G. (2018). Food security of rice-farming households in Thailand: a logit analysis. *The Journal of Developing Areas, 52*(1), 85-98.

Wossen, T., Abdoulaye, T., Alene, A., Haile, M.G., Feleke, S., Olanrewaju, A., & Manyong, V (2017) Impacts of extension access and cooperative membership on technology adoption and household welfare, *Journal of Rural Studies* 54(2): 223–233.

Zahri, I., Adriani, D., Wildayana, E., Kadir, S., & Umar, H. (2018). Comparing rice farming apperance of different agroecosystem in South Sumatra, Indonesia. *Bulgarian Journal of Agricultural Science,* 24(2), 189-198.