# Utilization of Nerica Rice Technologies Among Farmers in Obafemi Owode Local Government Area in Ogun State

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## Abstract

*This study assessed utilization of NERICA rice technologies among farmers in Obafemi Owode Local Government area of Ogun State, Nigeria. Data were collected from one hundred and thirty six NERICA rice farmers through interview schedule administered in February, 2021. Data collected were subjected to descriptive and inferential statistics at p≤0.05 level of significance. Results show that over half (61.8%) of the NERICA rice farmers were male while 63.2 percent of the respondents were 50 years or below. Majority of the respondents adopted NERICA land preparation (81.6%), pests and disease management (72.1%), recommended NERICA spacing and planting methods (78.7%) and showed preference for fertilizer application over organic manure (64%). Inadequate finance (100%) ranked first among the list of constraints. Significant relationship existed between utilization of NERICA rice technology practices and sex, marital status, age, level of education, source of income and poor access to finance. Majority (66.9%) had high level of utilization of NERICA rice technology. Conclusively, inadequate funding affected utilization of NERICA rice technology. It was therefore recommended that there is need to provide credit facilities and financial support for improved utilization of NERICA rice technologies among farmers in the study area.*

**Keyword:** NERICA Rice, Technology, Utilization and Constraints

**JEL Classification:** Q12, Q16, O13

## Introduction

New Rice for Africa (NERICA) was produced by West Africa Rice Development Association (WARDA) scientists after successful crossing *Oryza glaberrima* and *Oryza sativa* to obtain improved rice varieties (WARDA, 2005; Kijima *et al.,* 2006; Daigne *et al.,* 2010, Yeqing *et al.,* 2013). NERICA rice varieties are better than traditional upland rice varieties as well as some improved varieties being used by rice farmers. NERICA rice has traits such as early maturity, resistance to pests and diseases, ability to compete with weeds, high yield than the traditional varieties, intermediate to tall stature and lodging resistance, resistance to drought and tolerant to acidic soil, good taste and high protein content (Yeqing *et al.*, 2013).

Rice farmers living in rural areas are the predominant producers of food in Nigeria. They rely on traditional technology characterized by low productivity due to limited access to farm machines, fertilizer and improved seeds. Analysis of the relative increase in crop yields in developing countries indicate that Nigeria crop yields have the lowest growth rate of 0.2 percent from 1968-2008 as against 1.2 percent for China, 2.3 percent for Indonesia and three percent for Malaysia.

The wide disparity in yield is partly due to incomplete adoption of the technology package which is associated with stepwise adoption pattern of farmers, risk consideration and funds paucity.

This necessitated the development of improved agricultural production technologies and establishment of extension services across the nation to aid farmers in the production of food crops and to facilitate the attainment of food self-sufficiency.

Self-sufficiency in rice production has been a major focus of food policy goal of successive Nigerian Government in the last two decades due to deficit in rice production (Oteh *et al.,* 2018) which has cost a substantial amount of foreign exchange to import rice into the country (Adebayo *et al.,* 2009). In Nigeria, increasing caput consumption is evident in growing demand for rice and consequently the insufficient domestic production had to be complimented with imported

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rice (Yusuf *et al.,* 2020). Nigeria is the second largest importer of rice in the world with spending of ₦356 billion per two million metric tonnes of imported milled rice. This suggests that approximately 1billion Naira is spent on rice daily. The policy makers in the agricultural sector are keen to reverse the trend as there exists in the country the potential to raise local production to meet the demand for consumption of the commodity thereby saving foreign exchange and creating job opportunities especially among rural dwellers.

Improved rice production technology has been widely recognized as a critical factor for increased rice production in the country. In view of this, efforts have been made by the Government of Nigeria to ensure that farmers across the country access improved production technology through extension services. Moreover, rice farmers are being encouraged to utilize rice technology and increased income (Paul *et al.*, 2011) through better access to extension services and critical farm inputs. This is based on the premise that when rice farmers are exposed to new technologies, they perform better and invariably this brings about increased productivity. Despite the introduction of NERICA rice varieties, low level of rice production persists. This suggests poor access and utilization of the technology package among farmers. In view of this, the study provided answers to the following research questions; Firstly, what are the socio-economic characteristics of NERICA rice farmers in the study area? Secondly, what is the extent of utilization of NERICA rice technologies in the study area? Thirdly, what are the sources of information on utilization of NERICA rice technologies in the study area? Fourthly, what are the constraints militating against utilization of NERICA rice technologies in the study area? For the purpose of this study, the following hypotheses were tested; $HO_1$: There is no significant relationship between utilization of NERICA rice technologies and farmers' socio- economic characteristics and $HO_2$: there is no significant relationship between utilization of NERICA rice technologies and it's constraints.

## Data Sources and Methodology

This study was conducted in Obafemi Owode local government area of Ogun state, Southwest, Nigeria. The local government is situated in the tropics and has mass area of 1,410 square kilometers with estimated population of about 0.23 million people. It can be described as the food basket of Ogun State, because of its vast rural agrarian communities. Many arable crops like cassava, melon, maize, rice, banana, yam, and sweet potato are being cultivated in this local government. Obafemi Owode is specifically known for the cultivation of an indigenous rice variety known as "ofada" which is popular throughout the south west, Nigeria for it peculiar taste and aroma. There are different varieties of NERICA rice namely; NERICA1, NERICA2, NERICA3, NERICA7, NERICA8 and upland variety and low land varieties.

The target population of the study comprised farmers in Obafemi Owode Area of Ogun State.

A two stage sampling procedure was used in selecting the sampling size for the study. First, 50 per cent of eleven (11) wards in obafemi owode local government produces six wards namely Egbeda, Mokoloki, Moloko-asipa, Oba, Onidundu and Owode. Secondly 25 per cent of 543 rice farmers in selected wards produced 136 NERICA rice farmers which constituted sample size for the study.

## Results and Discussion

### Socio-economic characteristics of NERICA rice farmers

Table 1 presents socio-economic characteristics of NERICA rice farmers. As shown in the table, NERICA rice farmers were dominated by male farmers (61.8%). This implied that gender sensitivity of NERICA rice farmers inclined towards men than women such that more men were involved in NERICA rice farming. This was in consonance with the studies of Ndahitsa (2008). Results in Table 1 shows that the mean age of farmers was 50years. It was observed that majority (63.3%) were 50 years and below. This implies that these farmers were within the active working age bracket.

The study found that 44.1 per cent of the respondents were married. Marriage provides family labour, makes it more available where married couples work together to achieve common goal. This is in line with Ekong (2003) who found out that married couples work collectively in any innovation adoption that involved activities from planting to harvesting and processing. Married farmers adopted improved technologies more than single farmers.

It was found that majority (64%) of the respondents had primary, 14.7 per cent had secondary education while 7.4 per cent were with tertiary education (Table 1). This implies that majority (86.1%) of the respondent had formal education. The finding is in consonance with Banmeke (1997), who discovered that majority (67%) of farmers had formal education but at low level. It was found that the level of education determines the level of opportunities, use of improved livelihood strategies, improved technologies, enhanced food security, and reduced poverty level.

It was found that 39.7 per cent of the respondents had farming experience of 31years and above; 25 per cent had 11-20 years, and 21.1 per cent had 1-10 years and 13.2 per cent had 21-30 years of experience (Table 1). The table shows that respondents had an average of 26 years of farming experience. Thus farmers with high farming experience were more likely to adopt more components of NERICA rice agronomic practices than those with low experience.

It was found that 72.1 per cent of the respondents belonged to cooperative group while 27.9 per cent were not part of cooperative group. Membership of cooperative societies helps farmers to have access to farm inputs, loan

**Table 1. Distribution of socio- economics characteristics of NERICA rice farmers**

| Variable | Frequency | Percentage |
|---|---|---|
| **Age** | | |
| 25-30 | 25 | 18.4 |
| 31-40 | 28 | 20.6 |
| 41-50 | 33 | 24.3 |
| 50 and Above | 50 | 36.8 |
| **Gender** | | |
| Male | 84 | 61.8 |
| Female | 52 | 38.2 |
| **Marital status** | | |
| Married | 60 | 44.1 |
| Single | 20 | 14.7 |
| Divorce | 26 | 19.1 |
| Widow | 30 | 22.1 |
| **Level of education** | | |
| No formal education | 19 | 14.0 |
| Primary education | 87 | 64.0 |
| Secondary education | 20 | 14.7 |
| Tertiary education | 10 | 7.4 |
| **Religion** | | |
| Christianity | 65 | 47.8 |
| Islamic | 71 | 52.2 |
| **Native of state** | | |
| Native | 97 | 71.3 |
| Non native | 39 | 28.7 |
| **Farming experience** | | |
| 1-20  years | 39 | 28.7 |
| 21-40 years | 43 | 31.6 |
| 41-60 years | 54 | 39.7 |
| **Primary source of income** | | |
| Arable crops | | |
| Poultry production | 28 | 20.6 |
| Civil service | 38 | 27.9 |
| **Size of NERICA rice** | | |
| 1-10 hecta | 55 | 40.4 |
| 11-20 hecta | 36 | 26.5 |
| 21-30 hecta | 45 | 33.1 |
| **Years of NERICA rice** | | |
| 1-10 years | 30 | 22.1 |
| 11-20 years | 34 | 25.0 |
| 21-30 years | 18 | 13.2 |
| 31 and above | 54 | 39.7 |
| **Corporative group** | | |
| Yes | 98 | 72.1 |
| No | 38 | 27.9 |
| **Access to land** | | |
| Family inheritance | 62 | 45.6 |
| Friends | 40 | 29.4 |
| Personal owned | 24 | 17.6 |
| Government  program | 10 | 7.4 |
| **Total** | **136** | **100.0** |

*Source: Field Survey, 2021*

**Table 2. Extent of use of NERICA rice technologies**

| Variable | Very High f(%) | High f(%) | Low f(%) |
|---|---|---|---|
| Seeds | 98(72.1) | 38(27.9) | - |
| Land preparation | 100(73.5) | 34(25.0) | 2(1.5) |
| Spacing | 42(30.9) | 70(51.5) | 24(17.6) |
| Priming | 70(51.5) | 27(19.9) | 39 (28.7) |
| Fertilizer application | 91(66.9) | 10(7.4) | 35(25.7) |
| Pests and disease management | 86(63.2) | 50(36.8) | - |
| Planting method | 100(73.5) | 31(22.8) | 5(3.7) |
| Seed treatment | 81(59.6) | 26(19.1) | 29(21.3) |
| Weeding | 109(80.1) | 18(13.2) | 9(6.6) |
| Timely harvesting | 130(95.6) | 6(4.4) | - |

*Source: Field Survey, 2021. Note: Figures in parenthesis are in percentage*

and other resources that enhanced level of productivity.

Results from the study showed that average farm size was 3.6ha. The findings also show that majority (66.4%) of the respondents possessed 0.5-3ha. This indicates that rice production was dominated by small scale farmers. Farm size may influence the extent to which a given crop could be cultivated, in view of the problem posed by supply of land in Nigeria agriculture. This is expected to influence technology adoption positively.

**Utilization of NERICA Rice Technology**

Table 2 reveals the extent of use of NERICA rice technology practices in the area. The study indicated that over half (>50%) of the respondents had very high level of utilization of NERICA rice agronomic practices in the study area. the table shows that timely harvesting (95.6%) was the most utilized followed by weeding (80.1%), NERICA land preparation (73.5%), planting method (73.5%), NERICA seeds (72.1%), fertilizer application (66.9%), pests and

**Table 3. Level of utilization of NERICA rice technologies**

| Utilization of NERICA rice | Frequency | Percent |
|---|---|---|
| Low utilization | 45 | 33.1 |
| High utilization | 91 | 66.9 |
| Total | 136 | 100.0 |

*Source: Field Survey, 2021*

**Table 4. Sources of information on use of NERICA rice technologies in the study area,**

| Source of Information | Yes f(%) | No f(%) |
|---|---|---|
| Relatives/ friends | 99(72.8) | 37(27.2) |
| News paper | 103(75.7) | 33(24.3) |
| Social media | 87(64.0) | 49(36.0) |
| Extension agent | 50(36.8) | 86(63.2) |
| Radio | 120(88.2) | 16(11.8) |
| Television | 81(59.6) | 55(40.4) |
| Farmers association/ cooperatives | 132(97.1) | 4(2.9) |
| Community leaders | 98(72.1) | 38(27.9) |

*Source: Field Survey, 2021 Note: Figures in parenthesis are in percentage*

**Table 5. Constraints militating against utilization of NERICA rice technologies**

| Constraint | Very severe f(%) | Severe f(%) | Rank f(%) |
|---|---|---|---|
| Inadequate/ poor finance | 136(100.0) | | 1st |
| Poor handling or lack of technological know- how | 130(95.6) | 6(4.4) | 2nd |
| Unavailability of NERICA rice varieties | 128(94.1) | 8(5.9) | 3rd |
| Poor marketing access and marketing inefficiency of farm outputs | 127(93.4) | 9(6.6) | 4th |
| Land tenure system | 125(91.9) | 11(8.1) | 5th |
| Land degradation. | 100(73.5) | 36(26.5) | 6th |

*Source: Field Survey, 2021 Note: Figures in parenthesis are in percentage*

**Table 6. Chi-square analysis of Utilization of NERICA rice technologies and farmers socio- economic characteristics**

| Variables | Utilization of NERICA rice | | $\chi^2$ Value | Df | p value | Remark |
|---|---|---|---|---|---|---|
| | Low (%) | High (%) | | | | |
| **Gender** | | | 108.64 | 1 | 0.000 | |
| Male | 0(0.0) | 84(92.3) | | | | Significant |
| Female | 45(100) | 7(7.7) | | | | |
| **Marital status** | | | 107.34 | 3 | 0. 000 | |
| Married | 0(0.0) | 60(65.9) | | | | Significant |
| Single | 0(0.0) | 20(22.0) | | | | |
| Divorce | 15(33.3) | 11(12.1) | | | | |
| Widow | 30(66.7) | 0(0.0) | | | | |
| **Age** | | | 115.68 | 3 | 0.0000 | Significant |
| 25-30 | 0(0.0) | 25(27.5) | | | | |
| 31-40 | 0(0.0) | 28(30.8) | | | | |
| 41-50 | 0(0.0) | 33(36.3) | | | | |
| >50 | 45(100) | 5(5.5) | | | | |
| **Level of Education** | | | 79.93 | 3 | 0.000 | |
| No formal education | 0(0.0) | 19(20.9) | | | | |
| Primary school | 15(33.3) | 72(79.1) | | | | Significant |
| Secondary school | 20(44.4) | 0(0.0) | | | | |
| Tertiary | 10(22.2) | 0(0.0) | | | | |
| Religion | | | 61.57 | 1 | 0.000 | |
| Christian | 0(0.0) | 65(71.4) | | | | Significant |
| Islam | 45(100) | 26(28.6) | | | | |
| **Source of income** | | | 112.29 | 2 | 0.000 | |
| Arable  crops | 0(0.0) | 70(76.9) | | | | Significant |
| Poultry production | 10(32.3) | 21(23.1) | | | | |
| Civil service | 38(84.4) | 0(0.0) | | | | |
| Total | 45(100.0) | 91(100.0) | | | | |

*Source: Field Survey, 2021 Note: Figures in parenthesis are in percentage*

**Table 7. Correlation (spearman rho) analysis of the utilization of NERICA rice technologies and its constraints**

| Constraints | r | p value | Remark |
|---|---|---|---|
| Inadequate Finance | 0.238** | .005 | Significant |
| Poor Handling | 0.362** | .000 | Significant |
| Unavailability of NERICA rice | 0.415** | .000 | Significant |
| Poor marketing access | 0.440** | .000 | Significant |
| Land tenure system | 0.473** | .000 | Significant |
| Land degradation | 0.060 | .484 | Not significant |

*Source: Field Survey, 2021*

disease management (63.2%), seed treatment (59.6%) and NERICA priming (51.5%). Table 3 revealed that majority (66.9%) had high level of utilization of NERICA rice on technology practices while 33.1% had low level utilization of NERICA rice on technology practices.

## Sources of Information on Use of NERICA Rice Technologies

Farmers' association/cooperative was first among information sources (97.1%). This was followed by radio as good source of information (88.2%). Many researchers and practitioners have acknowledged radio as the most widely used information dissemination medium in rural areas because of its affordability and ease of use. Also other sources of information are new paper (75.7%), friends and relatives (72.8%). More than half (72.1%) sourced information from the community leaders. Social media (64.0%), television (59.6%) and extension agents (36.8%) were ranked in that order based on information sourcing among respondents.

## Constraints militating against utilization of NERICA rice technologies

Results in Table 5 indicate that the inadequate/poor finance (100%) ranked first among the list of constraints. This implies respondents' total lack or poor access to external fund. Also, 94.1 percent of the respondents revealed that lack of technological know-how ranked second followed by unavailability of NERICA rice varieties (94.1%). Accordingly, poor marketing access/marketing inefficiency and land tenure system (93.4%) were reported as major constraints facing the utilization of NERICA rice technology.

## Hypotheses of the study

$Ho_1$: There is no significant relationship between utilization of NERICA rice technologies and farmers' socio-economic characteristics.

Results as revealed in Table 6 indicates that there is significant relationship between utilization of NERICA rice technologies and farmers' socio- economic characteristics such as sex ($\chi^2$=108.639), marital status ($\chi^2$=107.336), age ($\chi^2$=115.675), level of education ($\chi^2$=79.930), religion ($\chi^2$=61.569) and source of income ($\chi^2$=112.287). This implies that utilization of NERICA rice technologies depends on sex, marital status, age, level of education, religion and source of income.

$H0_2$: there is no significant relationship between utilization of NERICA rice technologies and its constraints.

Table 7 revealed the correlation analysis of the level utilization of NERICA rice technologies and its constraints. The table shows that there is significant relationship between utilization of NERICA rice technologies and inadequate finance (r=-0.238), poor handling (r=-0.362), unavailability of NERICA rice (r=-0.415), poor marketing access (r=-0.440), and land tenure system (r=-0.473). This indicates that inadequate finance, poor handling, unavailability of NERICA rice, poor marketing access, and land tenure system have a great influence on the utilization of NERICA rice technologies. Negative r-values imply inverse relationship between dependent and independent variables. This means an increase in all the constraint will decrease or slow down utilization level of NERICA rice technologies.

## Conclusions and Policy Implications

From empirical evidence of the research study, it was concluded that utilization of NERICA rice technologies depends on sex, marital status, age of the respondents, level of education, religion, source of income, inadequate finance, poor handling, unavailability of NERICA rice varieties, poor marketing access and land tenure system. This indicates that farmers' socio-economic characteristics and identified constraints influenced level of utilization of NERICA rice technologies in the study area. Based on conclusions of the study, it is recommended that the farmers should be encouraged to join cooperatives for easy access to agricultural information, credit facilities and extension services for increased utilization of improved technologies and secondly,utilization of NERICA rice production technologies may be scaled up by rice farmers through government and private intervention in terms of agricultural financing and provision of marketing opportunities in the study area.

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