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## Factors Influencing Adoption of the New Rice for Africa Technologies by Smallholder Farmers in Selected Chiefdoms in Sierra Leone

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## Abstract

*The study examined factors influencing adoption of NERICA rice production and post-harvest technologies by smallholder farmers in Magbema and Kaiyamba chiefdoms in Sierra Leone. The data were purposively obtained from 150 smallholder NERICA farmers through a multi-stage sampling procedure from NERICA farmers in both chiefdoms. A structured questionnaire was used to collect data, analyzed with the aid of percentage and logistic regression. Demographic and socioeconomic characteristics of the farmers*

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*significantly influenced the adoption of recommended NERICA production technologies. For the post-harvest technologies, the  $R^2$  of 0.26 suggests that only the socioeconomic characteristics of the farmers significantly influenced the adoption of the recommended NERICA post-harvest technologies. Contact with extension agents, promotion of a literacy drive to raise technological awareness among farmers, and timely input delivery to attract and sustain the farmers' interest to adopt NERICA rice production and post-harvest technologies.*

**Keywords:** NERICA farmers, NERICA varieites, Northern region, Southern region.

## Introduction

The population of Sierra Leone is 7.9 million ("Status Digit. Agric. 47 Sub-Saharan African Ctries.," 2022) and nearly all households consume rice as their staple food. It is as a result of this development that the New Rice for Africa (NERICA) was introduced in the country by the West Africa Rice Development Association (WARDA) to improve rice productivity. The New Rice for Africa (NERICA) had spread rapidly in the Sub-Saharan Africa (SSA) regions since the initial seeds of this high yielding rice varieties were first introduced in 1996 (Yokouchi & Saito, 2017). Introducing new and high-yielding varieties of rice like NERICA to farmers is not a new practice in Sierra Leone, as many such varieties have been introduced over the years by government and non-governmental agencies. The problem has been the slow adoption rate of such varieties by farmers and the resulting low yields on farmers' farms. Mabaya et al., (2021) opined that the current estimates on NERICA production in Sierra Leone suggest that only 2.0% of farmers use NERICA varieties.

Many factors may have major influences on the extent of adoption of technologies such as characteristics of farm practice, the adopters, the change agents (extension worker, professional, etc.) and the socioeconomic, biological, and physical environment in which the technology is adopted (Fadeyi, Ariyawardana, & Aziz, 2022). In the early 2000s, NERICA cultivars with improved agronomic qualities were engineered and introduced in several African nations including West, Central, East, and Southern Africa (Britwum, & Demont, 2020). Even with this dissemination of NERICA varieties, the adoption of the NERICA technologies had not made any significant impact in the study areas which suggests that the majority of the NERICA farmers are still using their traditional rice cultivation methods. A study conducted on NERICA by Mohapatra (2019) in Cote d'Ivoire and Nigeria noted the following traits of NERICA for adoption by farmers: high tillering ability, long and heavy panicles, white grain, high yield potential, many grains/panicle, early maturing practice among the farmers.

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In a separate study on varietal qualities such as ease of cooking/milling taste, threshing and swelling, the quantity of head rice, grain length and shape, chalkiness, and amylose content were deemed as the most important grain quality traits that can influence farmers' decision to adopt rice (Graham-Acquaah, Mauromoustakos, Cuevas & Manful, 2020). In Sierra Leone, smallholder farmers replace older varieties with new ones which they think will provide more net benefits or advantages. In addition, their perceptions of the attributes of rice varieties were shown to be the major factors determining adoption and use intensities in the country (Graham-Acquaah et al., 2020). Furthermore, (Zakaria & Azumah, 2022) noted that one great constraint to the successive adoption of improved varieties is the non-availability of healthy and improved seeds and access to markets. Having access to NERICA seeds is, however, a necessary condition for improved seed adoption (Onyeneke, 2017) and the adoption of improved seeds is an important factor in agricultural productivity, food security, and sustainable economic growth.

A study in Nigeria revealed that though smallholder farmers who have access and have adopted NERICA varieties were deriving higher yields and income, those without regular access to improved seeds have abandoned NERICA lines in favor of low-yielding local varieties (Yokouchi & Saito, 2017). Palatability investigations such as the pasting properties, texture, amylose content, etc. showed that one of the major requirements in the rice food industry is to have rice varieties with good physicochemical properties for their eating quality to satisfy consumers (Zohoun et al., 2018).

Nonetheless, Elia (2018) argued that the "adoption gap" could be explained by the "knowledge gap," or the extent to which farmers are still unaware of the varieties. Hence, the need for further extension services to disseminate knowledge about NERICA to potential farmers.

The study assessed the factors that influence the adoption of NERICA technologies in the study areas. The specific objectives were to ascertain the socioeconomic characteristics of smallholder NERICA farmers and to determine their socio-demographic characteristics that influence their ability to adopt NERICA production and post-harvest technologies.

## Methodology

The study areas were Magbema chiefdom (Latitude. 9.049° or 9° 2' 57" north; Longitude 12.8835° or 12° 53' 1" west) in the Kambia district in the Northern Region and the Kaiyamba chiefdom (Latitude 8.1191° or 8° 7' 9" north Longitude -12.3954° or 12° 23' 44" west) in the Moyamba District in the Southern Region of Sierra Leone. Magbema chiefdom is located in the Kambia district which borders the Republic of Guinea to the North, Port Loko district to the South, and Bombali district to the East. The chiefdom has a total population of 92,165 (SSL, 2015) including smallholder NERICA farmers and its

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principal town is Kambia. The chiefdom offers an important trade route to Freetown and Conakry.

The dependent variables used in the study were the recommended NERICA adoption technologies. These were grouped into two categories:

- i. *Production technologies*  
Planting time: Plant in the upland May – June,  
Transplanting: Transplant 1-2 seedlings per hill at 3-4 weeks after planting at 20cmx20cm plant spacing,  
Weeding: Weed at 3 weeks after planting,  
Fertilizer application: Apply 100 kg/acre NPK 15: 15: 15 at 3 weeks after planting.
- ii. *Post-harvest technologies*  
Threshing: Use of threshing machines,  
Processing methods: Parboiling rice, use of a milling machine, and  
Storage: Store in concrete buildings and floors.

**Table 1: Variables used in the study**

Variable	Definition
Sex	1 = Male farmer and 2 = Female farmer
Age	Chronological age of smallholder NERICA farmer in years
Marital status	1 = smallholder NERICA farmer is married and 0 = Never married;
Educational status	1 = smallholder NERICA farmer has formal education and 0 = never acquired any form of formal education.
Household size	1 = Household size $\geq 7$ and 0 = household $< 7$
Land ownership	1 = smallholder NERICA farmer owns the land and 0 = Others (leased, bought, inherited, etc.)
A major source of income	1 = farming and 0 = otherwise
Access to fertilizer	1 = smallholder NERICA farmer has access to fertilizer and 0 = otherwise
Access to processing machines	1 = smallholder NERICA farmer has access to processing machines and 0 = No access to processing machines
Access to credit facilities	1 = smallholder NERICA farmer has access to credit facilities and 0 = Has no access to credit facilities
Farmer Based Organization membership	1 = smallholder NERICA farmer is a member of an FBO and 0 = Is not a member of any FBO
Contact with an extension agent	1 = smallholder NERICA farmer has contact with extension agent and 0 = has no contact with extension agent.

The population of the study comprised smallholder NERICA farmers from two chiefdoms namely Magbema in Kambia district drawn from a total chiefdom inhabitants population

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of 92,165 and 25,749 persons, and in Kaiyamba chiefdom, Moyamba district (SSL, 2015). Information on the sample frame on smallholder NERICA farmers was not accessible for this study.

A non-experimental research design was used for this study, which exclusively targeted smallholder NERICA farmers. Non-experimental research design surveys do not involve a manipulation of the situation, circumstances, or experience of the participating smallholder NERICA farmers. It also lacks manipulation of the independent variables by the researcher. This means that the researcher studied what naturally occurs or had already occurred, as well as the interrelationship of the variables (Cherry, 2020). The sampling was purposively done by determining and selecting samples through a multi-stage random sampling technique for this study.

A total sample size of one hundred and fifty (150) respondents was purposively drawn from a population of smallholder NERICA farmers in both chiefdoms. In the Magbema chiefdom in the Kambia district, ninety (90) smallholder NERICA farmers, and sixty (60) from the Kaiyamba chiefdom in Moyamba district were involved in the study.

Percentage was used to analyse the socio-demographic characteristics of the NERICA farmers. The socio-economic factors of the NERICA farmers that influenced the adoption of at least 1 recommended NERICA technology was determined by the use of Logistic regression. The logistic procedure of SA 9.4 was used to analyse the Hosmer and Lemeshow goodness-of-fit test and display the generalized R Square respectively.

## Results and Discussion

### Socio-demographic Characteristics of NERICA farmers

The study reveals that the majority of the farmers (44.0%) had Islamic literacy followed by 40.7% that were found to be illiterate. This, therefore, implies that 84.7% of the respondents would not read and write in English and only 15.3% were literate in English. Essentially, the adoption of some very complex technologies requires a high reasonable quality of education for farmers such that education can be a major driver in the adoption process of that technology. In a similar study conducted by IFAD (2020), it was revealed that the educational level of smallholder NERICA farmers in Sierra Leone was relatively low. Lastly, the average household size of the NERICA respondents ranges between 7 to 11 persons.

The Socioeconomic characteristics of NERICA farmers show that 92.7% of the respondents considered crop production as their main occupation. Employment was a major occupation for 4.0% of the respondents, while commerce was the main activity for only 2.7% of the respondents. The majority of the respondents (64.8%) considered rice

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as the major crop they grow and 19.8% grow tuber crops. The findings further reveal that 45.0% and 35.4% of farmers cultivate NERICA on upland and inland valley swamps respectively, 16.0% cultivate on Boliland ecology while 3.4% did so on mangrove ecology. As regards land ownership systems, 61.3% of the respondents carry out their farming activities on family land whilst 21.0% do so on their own land. Lastly, 82.7% of the respondents have farming as their main source of income. Only 8.7% practice commerce and 6.0% depend on family members as their main source of income respectively.

**Table 2: Socio-demographic characteristics of NERICA farmers**

Characteristics	Levels	Percentage
Educational level	Illiteracy	40.7
	Islamic literacy	44.0
	Primary school	10.0
	Junior Secondary School	5.30
Size of household	2-6	18.0
	7-11	46.0
	12-16	20.0
	17-21	14.0
	22-26	2.0
Main occupation	Crop production	92.7
	Animal production	0.7
	Commerce	2.7
Major crop/s grown	Employment	4.9
	Rice	92.7
	Other cereals	2.6
	Tuber crops	19.8
	vegetables	8.8
	Legumes	4.0
Farming ecology	Upland	45.5
	Inland valley swamp	35.4
	Mangrove	3.4
Land Ownership Type	Boliland	15.7
	Personal land	21.3
	Family land	61.3
	Rented land	14.0
The main source of income	Leased land	3.3
	Family	6.0
	Farming	82.7
	Commerce	8.7
	Employment	2.7

## Socio-demographic Characteristics that Influence the Adoption of Technologies

The explanatory variables used in the model were collectively able to explain the farmers' decision regarding the adoption of recommended NERICA production technologies in

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Sierra Leone (R-square of 0.38, likelihood ratio, chi-square of 70.8266 ( $P < 0.0001$ ), and Wald (chi-square) of 39.7034, ( $P < 0.0001$ )). The results suggest that both demographic and socioeconomic characteristics significantly influenced the adoption of recommended NERICA production technologies.

The demographic factors that significantly influenced the probability of adopting a recommended production technology were the age and marital status of the farmer. Holding all other variables constant, the probability of adopting a recommended NERICA variety by a farmer who is one year older and married is 4.2% and 135.9% respectively. The socioeconomic factors that significantly influenced the probability of adopting a recommended NERICA production technology were; access to processing machines, access to credits, membership in farmer-based organizations, and contact with extension an agent. Holding all other factors constant, the probability for NERICA farmer to adopt a NERICA variety through FBOs is 181.4%, no access to farm machines (154.2%, credits (149.4), and contact with an extension agent (145.9%).

Findings about the age of farmers as their demographic characteristic are similar to that of Lydia Olufunmilola, Ogunya, Bamire, and Ogunleye (2017) in Nigeria which shows that the age of farmers was shown to be significant and inversely associated with the extent of NERICA rice adoption in the research area. As farmers advance in age, their chances of becoming full adopters reduce by 0.32 %. This means that older farmers were inefficient in their cost-cutting tactics in terms of input price differentials and resource allocation.

The socio-economic findings from this study further support those of Bilaliib Udimal, Jincal, Mensah, & Caesar (2017), who found that owning a tractor boosts the likelihood of adopting NERICA rice production technologies by 95% in their study on factors influencing agricultural technology adoption in Ghana. Findings on credit are also consistent with that of Bilaliib Udimal, et al., (2017) which suggest that farmers who have access to credits and farm machines are much more likely than those without to adopt the NERICA rice production technologies. Credit to farmers allows them to acquire the needed inputs for production, which has an impact on the adoption of NERICA rice production technologies by farmers.

**Table 3: Factors that influence the adoption of recommended NERICA production technologies**

Parameter	Estimate	Standard Error	Wald X <sup>2</sup>	Pr > X <sup>2</sup>
<b>Demographic</b>				
Sex (Male)	-0.6937	0.7176	0.9346	0.3337
Age (Number of years)	0.0425	0.0249	2.9062	0.0882 *
Marital status (Married)	1.3586	0.7299	3.4644	0.0627 *
Educational status (Formal)	0.3817	0.5218	0.5351	0.4645
Household size (> 7 persons)	-0.5734	0.4934	1.3503	0.2452
<b>Socioeconomic</b>				
Land Ownership (Inheritance)	-0.7562	0.4792	2.4904	0.1145
The major source of income (Farming)	0.1513	0.5844	0.0670	0.7958
Access to fertilizer (Yes)	0.4891	0.5558	0.7744	0.3789
Access to processing machines (Yes)	-1.5417	0.8626	3.1942	0.0739 *
Access to credit (Yes)	1.4938	0.8045	3.4475	0.0633 *
Membership in FBO (Yes)	1.8142	0.6032	9.0451	0.0026 ***
Contact with extension agent (Yes)	1.4587	0.5547	6.9156	0.0085 ***
Number of observations = 150				
$r^2 = 0.3764$				
LR: $X^2(12) = 70.8266$ ; $P < 0.0001$				
Wald: $X^2(12) = 39.7034$ ; $P > 0.0001$				

\*\*\*, \*\*, and \* denotes significance at 1%, 5% and 10% respectively; LR: Likelihood ratio;  $r^2$ : regression coefficient;  $X^2$ : chi square.

### Factors that Influence the Adoption of NERICA Post-harvest Technologies

The explanatory variables used in the model were collectively able to explain the farmers' decision regarding the adoption of NERICA post-harvest technologies in Sierra Leone (R-square of 0.26, likelihood ratio chi-square of 40.8076 ( $P < 0.0001$ ), and Wald (chi-square of 31.2647, ( $P < 0.0001$ )). The results suggest that only the socio-economic characteristics significantly influenced the adoption of recommended NERICA post-harvest technologies.

The socioeconomic factors that significantly influenced the probability to adopt NERICA post-harvest technologies were: farming as a major source of income, access to processing machines, and access to credit. Holding all other factors constant, the probability that NERICA farmers whose major source of income is not farming, access to

processing machines, and access to credit would adopt 1 recommended NERICA variety is 151.3%, 153.3.4%, and 113.7% respectively.

Similar to the production technologies, Bilaliib Udimal, Jincai, Mensah, and Caesar (2017) discovered that having processing machines increases the possibility of adopting NERICA rice production methods by 95%. Findings on credits are also similar to those of Bilaliib Udimal et al. (2017), who imply that farmers who have access to credit and farm machinery are substantially more likely to adopt a technology than those who do not employ NERICA production technology.

**Table 4: Factors that influence the adoption of recommended NERICA post-harvest technologies**

Parameter	Estimate	Standard Error	Wald X <sup>2</sup>	Pr > X <sup>2</sup>
<b>Demographic</b>				
Gender (Male)	-0.3960	0.6424	0.3800	0.5376
Age (Number of years)	0.0262	0.0228	1.3146	0.2516
Marital status (Married)	0.1911	0.6713	0.0810	0.7759
Educational status (Formal)	-0.3517	0.4799	0.5372	0.4636
Household size (> 7 persons)	0.1146	0.4220	0.0737	0.7860
<b>Socioeconomic</b>				
Land Ownership (Inheritance)	-0.2054	0.4429	0.2152	0.6427
A major source of income (Farming)	-1.5133	0.5256	8.2892	0.0040 ***
Access to fertilizer (Yes)	0.1648	0.5472	0.0907	0.7633
Access to processing machines (Yes)	1.5336	0.6406	5.7304	0.0167 **
Access to credit (Yes)	1.1367	0.6327	3.2275	0.0724 *
Membership in FBO (Yes)	-0.1629	0.5875	0.0769	0.7816
Contact with extension agent (Yes)	-0.1070	0.5823	0.0337	0.8543
Number of observations = 150				
r <sup>2</sup> = 0.2608				
Model characteristics				
LR: X <sup>2</sup> (12) = 40.8076; P > X <sup>2</sup> < 0.0001				
Wald: X <sup>2</sup> (12) = 31.2647, P > chi square = 0.0018				

\*\*\*, \*\*, and \* denotes significance at 1%, 5% and 10% respectively; LR: Likelihood ratio; r<sup>2</sup>: regression coefficient; X<sup>2</sup>: chi square.

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## Conclusion and Recommendations

Both the demographic and socioeconomic characteristics of smallholder NERICA farmers significantly influenced the adoption of recommended NERICA production technologies. However, only the socioeconomic characteristics of the respondents were seen to have significantly influenced the adoption of the recommended NERICA post-harvest technologies. Much attention need to be given to the socio-demographic characteristic needs of the smallholder farmers by the state actors and other support groups if they (farmers) are to improve on their ability to adopt most of the recommended NERICA production and post-harvest technologies. These needs will include access to processing machines, credit facilities, FBOs, and contact with extension agents at both production and post-harvest levels on NERICA varieties.

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## Conflict of Interests

The authors declare that no conflict of interests existed for this study.

## Authors' Contributions

**PJK** (40%): conceptualized the research idea, developed the methodology, collected research data, and wrote the original draft of the reasesch manuscript.

**EJMM** (30%): supervised the research process and the MPhil thesis.

**MVM** (15%): proofread the research manuscript.

**KMY** (15%): analysed the research data.

## References

- Bilaliib Udimal, T., Jincal, Z., Mensah, O. S., & Caesar, A. E. (2017). Factors Influencing the Agricultural Technology Adoption: The Case of Improved Rice Varieties (Nerica) in the Northern Region, Ghana. *Issn*, 8(8), 2222–1700. [www.iiste.org](http://www.iiste.org)
- Britwum, K., Owusu, E. S., & Demont, M. (2020). Confronting genetic gains with markets: Retrospective lessons from New Rice for Africa (NERICA) in Uganda. *Outlook on Agriculture*, 49(4), 298–310. <https://doi.org/10.1177/0030727020948967>
- Cherry, J. D. (2020). The role of face protection for respiratory viral infections: a historical perspective. *Journal of the Pediatric Infectious Diseases Society*, 9(4), 411-412.
- Elia, E. (2018). D, Disseminating Agricultural Research Information: A case study of farmers in Mloloupalama and Wenda villages in Iringa district, Tanzania. *University of Dar Es Salaam Library Journal*, 12(2), 80–97.
- Fadeyi, O. A., Ariyawardana, A., & Aziz, A. A. (2022). Factors influencing technology adoption among smallholder farmers: a systematic review in Africa. *Journal of*

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---

- Agriculture and Rural Development in the Tropics and Subtropics*, 123(1), 13–30. <https://doi.org/10.17170/kobra-202201195569>
- Graham-Acquaah, S., Mauromoustakos, A., Cuevas, R. P., & Manful, J. T. (2020). Differences in physicochemical properties of commercial rice from urban markets in West Africa. *Journal of Food Science and Technology*, 57(4), 1505–1516. <https://doi.org/10.1007/s13197-019-04186-7>
- Lydia Olufunmilola, O. (2017). Factors Influencing Levels and Intensity of Adoption of New Rice for Africa (Nerica) Among Rice Farmers in Ogun State, Nigeria. *International Journal of Agricultural Economics*, 2(3), 84. <https://doi.org/10.11648/j.ijae.20170203.15>
- International Fund for Agricultural Development. IFAD (2020). Investing in rural people. Republic of Sierra Leone. Country Strategy and Programme Evaluation. [https://www.ifad.org/documents/38714182/41120203/cspe\\_sierraleone\\_approach.pdf/1c816677-4cd8-7a98-007c-c0d0dc8050f9](https://www.ifad.org/documents/38714182/41120203/cspe_sierraleone_approach.pdf/1c816677-4cd8-7a98-007c-c0d0dc8050f9)
- Mabaya, E., Bararyenya, A., Vyizigiro, E., Waithaka, M., Mugoya, M., Kanyenji, G., & Tihanyi, K. (2021). Burundi Country Report 2021 (No. 2424-2022-131).
- Mohapatra, S. (2019). Nerica – tailor-made innovation for Africa’s rainfed rice ecology. *Rural 21: The International Journal for Rural Development*, 19–21. <https://www.rural21.com/francais/actualites/detail/article/nerica-tailor-made-innovation-for-africas-rainfed-rice-ecology-00003304/>
- Onyeneke, R. U. (2017). Determinants of adoption of improved technologies in rice production in Imo State, Nigeria. *African Journal of Agricultural Research*, 12(11), 888-896.
- Statistics Sierra Leone (SSL) (2015). Population and Housing Census Summary of Final Results. 1–190. Retrieved from <http://www.statistics.sl>
- Status of digital agriculture in 47 sub-Saharan African countries. (2022). In *Status of digital agriculture in 47 sub-Saharan African countries*. <https://doi.org/10.4060/cb7943en>
- Yokouchi, T., & Saito, K. (2017). Why did farmers stop cultivating NERICA upland rice varieties in central Benin? *International Journal of Agricultural Sustainability*, 15(6), 724–734. <https://doi.org/10.1080/14735903.2017.1400712>
- Zakaria, A., & Azumah, S. B. (2022). THE EFFECT OF ADOPTION OF IMPROVED VARIETIES ON RICE PRODUCTIVITY. XXV(1), 42–54. <https://doi.org/10.15414/raae.2022.25.01.42-54>
- Zohoun, E. V., Tang, E. N., Soumanou, M. M., Manful, J., Akissoe, N. H., Bigoga, J., Futakuchi, K., & Ndindeng, S. A. (2018). Physicochemical and nutritional properties of rice as affected by parboiling steaming time at atmospheric pressure and variety. *Food Science and Nutrition*, 6(3), 638–652. <https://doi.org/10.1002/fsn3.600>