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## Agricultural Technology Disadoption: Why Rural Farmers Abandon Improved Rice Varieties

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### Abstract

The New Rice for Africa (NERICA) is an agricultural technology innovation comprised of high yielding rice varieties introduced to increase food security and reduce poverty in Nigeria and 28 other sub-Saharan African (SSA) countries. These NERICA varieties have performed below expectation, with more than 50% adopters abandoning them after only two years of cultivation in Uganda and Benin Republic. Despite over 60 improved varieties released between 1960–2013, Nigeria is still the largest rice importer in SSA and we have found no previous study investigating why Nigerian rural farmers disadopt improved rice varieties.

Quantitative data analysis confirm qualitative findings and three reasons are adduced for high rates of NERICA disadoption. Firstly, up to 100% government subsidy for certified seeds, chemicals and inorganic fertilisers lowered entry costs during seed dissemination project; but the withdrawal of these subsidies decreased continued NERICA profitability. Secondly, nationwide dissemination of NERICA in locations with low and unreliable rainfall resulted in high yield losses due to drought. Thirdly, farmers updated their information about NERICA. Without government subsidies, NERICAs were labour-intensive and more susceptible to bird pest damages resulting in higher opportunity costs. Combined, these three reasons reduced the relative advantage of NERICA over other existing rice varieties.

Furthermore, while agronomic traits (e.g. yield and tillering ability) of improved varieties determine yield, consumption traits (e.g. whiteness, taste and cooking ability) determine marketability and relative profitability which influence farmers' decision to continue adoption in subsequent season(s).

We conclude that to reduce disadoption rates of future improved varieties and enhance agricultural sustainability, rice breeders should prioritise varieties with desirable consumption traits. Dissemination of improved varieties should be guided by ecological suitability and not political sentiments for increased impact. Furthermore, access to credit, effective extension services and stable policy environment that facilitate availability and affordability of complementary inputs should also be enhanced.

**Keywords:** Disadoption, improved rice variety, NERICA, Nigeria, sub-Saharan Africa, technology adoption