Use of Modern Inputs and Complementary Farm Practices in the Nigeria Rice Value Chain: Implications for Policy

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Research Overview

In the last few years, the Nigeria rice sector has experienced policy changes in a bid to improve competitiveness and attain self-sufficiency. Past reforms in Nigeria have focused on improving domestic rice production by increasing acreage for rice cultivation. The justification has been the high annual demand in Nigeria (approximately 6 million MT[1]) outstripping domestic supply (about 4 million MT) (FAOSTAT, 2016). Interventions including the growth enhancement support scheme (GES) and the anchor borrowers' programme have been prominent strategies to bridge this demand-supply gap. Despite these interventions, for policy recommendations, little is known of what practices farmers are specifically engaged in and how these practices affect rice yield, the quality of processed rice and therefore farm-level profitability.

Using data obtained from farm households in five agro-ecological zones in Nigeria, this study shows that while modern technology of production increased yield, it tended to reduce input costs such as labor cost for weeding and seeding. In terms of processing, the study found that higher degrees of sophistication of the rice milling processes (and the type of technology employed by processors) is associated with higher quality of processed rice[2] in Nigeria and the premium on prices received.

Background

Nigeria, the third largest producer of rice in Africa (after Egypt and Madagascar), is the leading rice producer in West Africa (WARDA, 1996). Local demand determined by average rice consumption figures in Nigeria has witnessed remarkable increase (Figure 1), from just 2 million MT in the early 1990s to almost 4 million MT between 2010 and 2014 (FAOSTAT, 2016). The current estimate for 2017 is

Key Findings

- Significant share of rice farmers and processors in Nigeria still use technologies that do not allow for substantial improvement in average yield and on the quality of rice processed.
- Adoption of modern technology does not only improve rice yield; it also significantly lowers the overall cost of production.
- Improvement in rice yield and reduction in input cost tend to occur irrespective of the type of agro-ecological zone.
- Disparities in the price of domestic rice across Nigeria tend to be a function of the quality of rice sold which is largely determined by the type of processing technology employed.

over 6 million MT with higher projections as population and urbanization increase (USDA, 2018). While this points to the growing importance of rice in the Nigerian diet, domestic production has not kept pace with increasing demand.

Despite this rapid rise in rice demand across Nigeria and numerous opportunities to increase domestic production (via policies and programs), increasing rice production remains a major challenge. Adoption of modern practices is also limited further down the rice value chain.

Farm-level productivity is a function of adequate use of complementary farm inputs combined with good agronomic practices (Liverpool-Tasie et al., 2017). In rice production and processing, it is increasingly a major challenge for farmers to increase paddy yield and processors

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[1] MT is Metric Tons

[2] A detailed discussion of this study can be found in a forthcoming research article titled: "Cost Analysis of Domestic Rice Value Chain in Nigeria"

to improve the quality of processed paddy due to the perennial use of poor technology. Together, these challenges may make it difficult for Nigeria to attain the goal of rice self-sufficiency by 2019.

Figure 1: Rice production and consumption in Nigeria
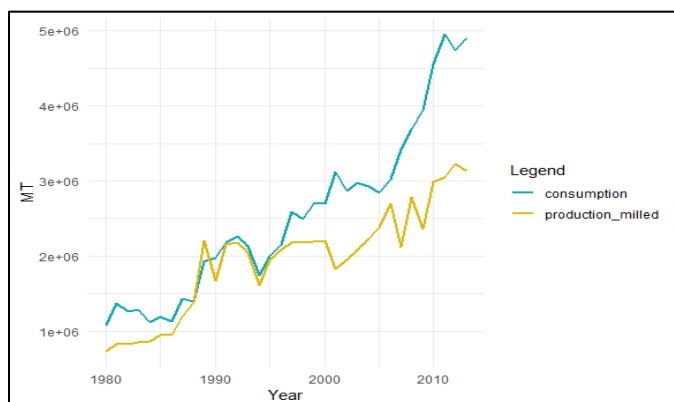
Research Approach and Results

The study used dataset from rice farm households collected from five agro-ecological zones in Nigeria – Sudan savannah (SS), Northern guinea savannah (NGS), Southern guinea savannah (SGS), Derived savannah (DS) and Humid forest (HF) zones represented by Kebbi, Kaduna, Niger, Nasarawa and Ebonyi States, respectively. A random sample of rice farming and processing households from each of these States (chosen based on the preponderance of rice farming and processing activities) were used for the analysis.

Table 1: Share of farmers using modern inputs, complementary farm practices and average yield
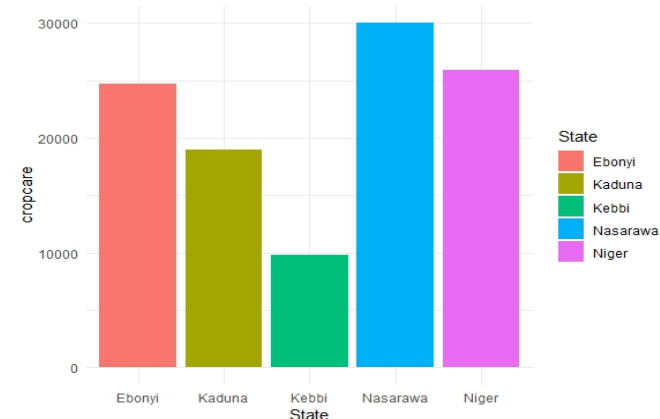
Share of farmers using:	Agro-ecological Zone (%)				
	Kebbi	Kaduna	Niger	Nasarawa	Ebonyi
Improved seed	87.10	33.33	86.67	83.33	89.29
NPK fertilizer	96.77	56.67	96.67	53.33	92.86
Herbicides	80.65	100.0	96.67	100.0	100.0%
Pesticides	67.74	13.33	63.33	56.67	92.86%
Irrigation	22.58	6.67	3.33	-	-
Tractor services	38.71	10.0	16.67	13.33	-
Nursery beds	58.06	13.33	30.0	33.33	25.0%
Average yield (tons)	*4.36*	*2.51*	*3.83*	*2.61*	*2.77*

Source: Authors' calculation from field survey

Table 1 summarizes the share of farmers using modern rice production inputs and their complementary counterparts and the corresponding average yield across the diverse agro-ecological zones in Nigeria.

Table 1 suggests that in general, in agro-ecological zones where there is an increasing use of modern inputs complemented by modern agronomic practices, average paddy yields tend to be higher. For example, Average paddy yield in SS was almost double yields in NGS, DS and HF zones. This may be connected with the larger share of farmers in SS who used modern technologies such as improved seeds and fertilizer on their rice fields (87.10% and 96.77%, respectively) compared to Kaduna where the corresponding use rates were only about 33.33% and 56.67%. Interestingly, results in Figure2 showed that farmers employing larger share of modern inputs and complementary farm practices tend to have lower labor costs per hectare for crop care (this includes labor cost for seeding, weeding and bird scaring).
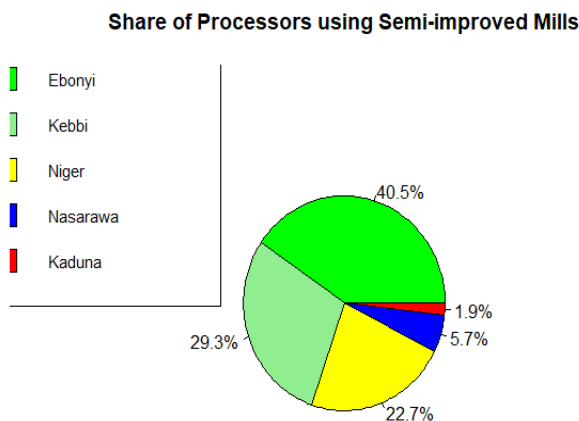
Figure 2: Labor cost among rice farmers in Nigeria

Labor costs of processing paddy per ton are second only to the initial cost of buying the paddy. With paddy processing done with different levels of sophistication, the quality of processed paddy is largely dependent on the type of milling machine used and the nature of the pre-milling activities employed. Domestic rice at the local market that is of low quality (in terms of large presence of stones and broken grains, or poor texture) attracts low price. Over 70% and 50% of rice millers in Ebonyi and Kebbi States respectively use semi-improved mills for rice processing. In general, these figures represent 40.5% (Ebonyi) and 29.3% (Kebbi)

across the five zones in our sample (Figure3). Whilst this type of technology tends to contribute to the quality of final processed paddy, the method and nature of how rice millers carry out the precursor activities also affect the final processed rice output.

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Figure 3: Share of farmers using semi-improved mills

The price of rice at the local market is determined in part by the quality of rice. Consumers tend to be willing to pay premium prices for rice that is of high quality and in particular, those that are free of stones and broken grains and are of good texture. To this end, the price of at the local market varies across the different agro-ecological zones. Zones with higher prices also tend to have better quality rice at the local market.

Conclusion

Nigeria can significantly improve rice paddy and the quality of the processed paddy by focusing on structural changes at the different nodes of the value chain. First, rice farmers should be encouraged to use complementary modern farm inputs along with modern farm practices so as to sustainably increase yield. Rice processors have to be given the necessary incentives to upgrade rice processing and milling activities so as to process paddy that is of high quality and that can meet consumers' taste and preferences. This is vital to achieving the goal of rice self-sufficiency and competitiveness of the rice sector in Nigeria.

References

1. FAOSTAT (2016) Food and Agriculture Organization of the United Nations. www.faostat3.fao.org, Accessed February, 2016.
2. Liverpool-Tasie, L.S.O., Jayne, T. Muyanga, M. and Sanou, A. (2017) Are African Farmers Experiencing Improved Incentives to Use Fertilizer? *Feed the Future Innovation Lab for Food Security Policy Research Paper 78.*
3. USDA (2018) Rice Outlook. Economic Research Service, United State Department of Agriculture, RCS-18A. Available at: http://usda.mannlib.cornell.edu/usda/ers/RCS//2010s/2018/RCS-01-17-2018.pdf
4. WARDA (1996). West Africa Rice Development Association Annual Report 1996, West Africa Rice Development Association (WARDA).

About the Author

Osayanmon Wellington Osawe is a PhD Candidate in the Department of Agricultural Economics at the University of Ibadan, Ibadan, Nigeria. This policy brief was written by Mr. Osawe at Michigan State University as part of his activities as a Project Scholar of the Feed the Future Nigeria Agricultural Policy Project. The analysis was done using R software and the policy brief was done under the supervision of Dr. Saweda O. Liverpool-Tasie

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