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Synopsis: Cost and policy determinants of features of tractor markets in Nigeria: Case studies of tractor sellers in Kaduna state and tractor owners in Benue state

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RESEARCH OVERVIEW

In the 2018 Malabo Montpellier Panel report on mechanization use in agriculture in Africa, Nigeria is identified as having an agricultural sector characterized by both low productivity growth and low machinery growth relative to other African countries. Use of mechanization throughout agricultural value chains is associated with enhanced productivity.[1] Thus, there is a need to undertake more thorough assessments of relevant agricultural machinery markets to determine why machine usage by farmers is potentially lower than it would be under ideal market conditions.

Our study focuses on four-wheel tractors. Information and data on tractor market structure, conduct, and performance in Africa is sparse. To partly fill this gap, we implemented a qualitative review of two tractor markets in Nigeria – survey-based assessments of the business characteristics of tractor sellers in Kaduna state and of tractor owners in Benue state.[2] Detailed characterizations of the vertical and geographic distribution of these businesses and identification of principal revenue sources and costs were obtained through the surveys.

BACKGROUND

Since tractors are bulky and expensive items and virtually all tractors and parts used in Nigeria are imported, sellers of new tractors incur substantial transactions costs in acquiring the tractors they sell. These include, but are not limited to, obtaining foreign exchange, importation documentation, and acquiring knowledge of potential buyers. Economic theory suggests that in businesses in which high transactions costs are faced, the market is likely to be concentrated vertically, such that a few firms dominate the market, and also spatially, since firms cluster together in an effort to lower costs, e.g., to share information for hiring knowledgeable labor.

However, sellers of used tractors in Nigeria face lower transactions costs with a different market structure than is seen among new tractor sellers. In consequence, there is a segmented tractor market, where the market for new tractors has few firms and a used tractor market that is more competitive with many domestic firms. Moreover, firms participating in the new tractor market generally do not participate in the used tractor market, and vice versa.

The Federal Ministry of Agriculture and Rural Development (FMARD) in Nigeria and state Ministries of Agriculture have provided new tractors through subsidized distribution. Such programs are viewed as supporting agricultural productivity growth goals as, for example, proposed in the FMARD agricultural development strategy, the Agriculture Promotion Policy.

Data and information obtained from FMARD and the state Ministries of Agriculture in Kaduna and Benue states show that public programs for tractor acquisition remain common but are varied in design. The programs of FMARD and Kaduna state have become more private sector-oriented over time, while that of Benue state involves the Ministry directly acquiring the tractors. The change in degree of public sector involvement in these programs is consistent with general trends in sectoral development, such that the private tractor

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[1] Malabo Montpellier Panel (2018), *Mechanized: Transforming Africa's Agriculture Value Chains*. https://www.mamopanel.org/media/uploads/files/MaMo2018_Mechanized_Transforming_Africas_Agriculture_Value_Chains.pdf.

[2] A detailed discussion of this research can be found in NSSP Working Paper 55, *Cost and policy determinants of features of tractor markets in Nigeria: Case studies of tractor sellers in Kaduna state and tractor owners in Benue state.* http://ebrary.ifpri.org/cdm/singleitem/collection/p15738coll2/id/132873/rec/1

market in Kaduna is much more advanced than what is seen in Benue. Indeed, our initial intention of implementing a tractor seller survey in both Kaduna and Benue states proved not to be possible since there were so few tractor sellers in Benue. Like the segmented nature of the tractor sales market, we expected that farmers in Benue would acquire their tractors, either new or used, from both the private market and government. The surveys of tractor sellers in Kaduna and tractor owners in Benue were designed to identify the extent to which our expectations are consistent with conditions on the ground.

SURVEYS AND RESULTS

The survey of tractor sellers focused on operation costs, sales, seasonality of sales, and entry motivations. That for tractor owner was focused on the relative profitability of market-sourced versus government-sourced tractor owners.

Kaduna tractor sellers

Table 1 shows the sales volumes and shares for the four largest and the 15 smallest tractor seller firms for 2018. The top four firms accounted for a market share of nearly 80 percent, demonstrating vertical concentration in the Kaduna tractor market that plausibly is related to the high costs of tractor acquisition. However, that there are 19 firms with tractor sales operations implies that barriers to entry are not prohibitive. This especially applies to used tractors, for which acquisition costs are lower on both the supply and demand side.

Table 1. Quantity of tractors sold in 2018 and market shares for top and bottom market segments

Market segment	Number of tractors sold	Market share, %
4 firms with largest sales volumes	295	78
15 firms with lower sales volumes	81	22

Source: Authors' calculation, Kaduna tractor seller survey 2018.

Tractor sellers in Kaduna also are clustered geographically. All new tractor sellers are based in Kaduna city, while used tractor sellers are clustered in towns along an agriculturally productive corridor that extends from Funtua, in bordering Katsina state, across the north-central part of Kaduna state through Zaria to Saminaka in the east.

Benue tractor owners

Table 2 shows the relative profitability of market-sourced and government-sourced tractor owners respectively. Mean and median total revenue values are not statistically significantly different between the two types of tractor owners, but the market-sourced tractor owners had statistically significantly lower costs, especially regarding expenditures on fuel and operators. These results imply that the market-sourced owners are, on average, more efficient than government-sourced tractor owners.

Table 2. Annual profitability comparison for tractor owners who purchased their tractor from government and from private (market) sources

	Government-sourced tractor owners, median		Market-sourced tractor owners, median	
Cost categories	**Naira, '000s**	**USD**	**Naira, '000s**	**USD**
Fuel/oil	429	1,192	163	452*
Operator	360	1,000	150	417
Repair or maintenance	13	37	37	102
Total costs	**1,209**	**3,359**	**440**	**1,222***
Total revenues [a]	1,635	4,543	1,410	3,917
Net revenues	283	787	558	1,551*
Observations	*23*		*31*	

Source: Authors' calculation, Benue tractor owner survey 2018.
Statistically significant difference from government-sourced tractor owners based on non-parametric tests for difference of median: *** 1%; ** 5%; * 10%.
USD figures are based on USD 1.00 = Naira 360
[a] Includes imputed value for own-farm use

CONCLUSIONS

- The market for new and used tractors in Kaduna state is characterized by vertical concentration and geographic clustering.
- Policy efforts to enhance access to and availability of tractors for a broad range of users will require accounting for the natural tendency toward spatially uneven distribution of supply.
- Tractor owners and service-providers in the informal market should be mobilized to raise overall tractor-hiring service efficiency.

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