



# RSM2SNF

Research Supporting African MSMEs  
To Provide Safe and Nutritious Food

## Governance and Service Provision in Nigeria's Wholesale Markets: Implications for Food Safety

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## **About Research Supporting African MSMEs to Provide Safe and Nutrition Food (RSM2SNF)**

The Research Supporting African MSMEs to Provide Safe and Nutritious Food (RSM2SNF) is funded by the Bill and Melinda Gates Foundation. RSM2SNF dives deep into the wholesale, logistics, processing, and retail segments of the value chains of several products, such as fish, tomato, and green leafy vegetables. The goal is to understand the midstream of these food value chains with a focus on Micro, Small and Medium Enterprises (MSMEs), and to inform policies and interventions to support MSMEs in providing safe and nutritious foods at affordable prices. This five-year project (2022–2026) is led by Michigan State University (MSU) working with partners in Nigeria and Tanzania.

## **Contents**

<b>Abstract</b>	<b>2</b>
<b>List of Tables</b>	<b>3</b>
<b>List of Figures</b>	<b>3</b>
<b>List of Acronyms</b>	<b>3</b>
<b>FCT – Federal Capital Territory</b>	<b>3</b>
<b>LGA – Local Government Areas</b>	<b>3</b>
<b>1. Introduction</b>	<b>4</b>
<b>2. The Case of Nigeria</b>	<b>5</b>
<b>3. Governance of Informal Markets</b>	<b>6</b>
<b>4. Data Collection and Descriptive Statistics</b>	<b>7</b>
<i>Market services</i> .....	7
<i>Governance structures</i> .....	8
<b>5. Analytical Findings: Accountability and Authority</b>	<b>10</b>
<b>6. Conclusions</b>	<b>12</b>
<b>References</b>	<b>13</b>

## **Abstract**

How does governance affect service provision in Nigeria's wholesale markets? Sufficient services, such as water, waste collection, and toilet access, are essential for enhancing the safety of healthy and nutritious foods, such as vegetables and fish. However, these are often substandard in many informal markets, exposing the poor who rely on such markets for food access to higher levels of foodborne hazards and undermining the efficacy of other food safety interventions, such as improved regulation and food safety training programs. Using data from 299 wholesale markets across eight states of Nigeria, this paper examines how mechanisms of accountability and authority are associated with five services: waste collection, market cleaning, flush toilet access, water provision, and electricity provision. We find that having an elected chairperson positively influences waste collection and market cleaning, which are two responsibilities seen as mandates of the market authority. By contrast, larger infrastructure investments, such as toilets and electricity, tend to be better provided in markets where the LGA has an office, potentially suggesting the advantages of LGA oversight for investment areas outside the scope of the market authorities. Markets located in LGAs under appointed rather than elected governments are associated with worse performance across all services. The paper has implications for identifying the range of stakeholders who need to be sensitized about food safety and indicates different mechanisms through which market governance structures can impact service provision.

## List of Tables

Table 1: Services distributed by State	8
Table 2: Market Leadership by State	9
Table 3: Taxation and Representation by State	9
Table 4: Market Governance and Service Provision	12

## List of Figures

<b>Figure 1: Sample States in Nigerian Survey</b>	7
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## List of Acronyms

FCT – Federal Capital Territory

LGA - Local Government Areas

LMICs – Low and middle-income countries

SIECs - State Electoral Commissions

SWAs – State Water Authorities

# **Governance and Service Provision in Nigeria's Wholesale Markets: Implications for Food Safety**

## **1. Introduction**

Traditional food markets play a crucial role in the food value chain across both rural and urban areas of many low- and middle-income countries (LMICs). For instance, over 65% of fresh food is distributed through traditional markets, while slightly over 10% is sold through modern retail channels in LMICs (Haddad et al. 2016). Wholesale food markets serve as essential hubs where professional vendors and buyers trade fresh produce such as fruits, vegetables, meat, fish, and dairy, linking farmers to consumers and ensuring efficient food supply chains (Tefft et al. 2017). These markets are crucial for the agri-food value chain, offering services to farmers and providing fair prices for their produce. Informal food markets, often in open-air settings, also are important for creating significant livelihood opportunities, particularly for low-income women and young people (Mwango et al. 2019) and are critical for enhancing the dietary diversity of low-income populations.

However, informal food outlets, ranging from wholesale and retail markets to street vending, are vulnerable to a number of food safety hazards (Alimi 2016; Resnick 2017; Wallace et al. 2022; WHO 2006). These food safety hazards are often most pronounced for fresh foods and animal-sourced proteins (Grace 2015; S. Hoffmann et al. 2017). Moreover, oversight of such hazards is greater for domestic consumers in LMICs since products destined for overseas export markets frequently are subjected to much greater food safety standards. There are many interventions typically aimed at mitigating food safety hazards, ranging from behavioral change campaigns to greater regulation and enforcement (V. Hoffmann, Moser, and Saak 2019). However, one of the direct sources of such hazards is linked to market infrastructure and service provision, including sanitation facilities, safe water supplies, and proper waste management (WHO 2006). If these are not addressed in wholesale market settings, then there is a greater likelihood that foodborne hazards are replicated and expanded in retail settings.

How do governance structures impact service delivery outcomes in traditional markets that sell healthy and nutritious foods? We address this question by specifically focusing on 299 vegetable and fish wholesale markets in Nigeria. We specifically examine how different aspects of governance, including the mode of leadership selection, oversight by local government authorities (LGAs), and tax compliance, influence the range of services that are critical for food safety. These services include water, toilets, waste collection, electricity availability, and market cleanliness.

While many studies that focus on poor food safety in markets delve into the lack of regulatory enforcement of food safety laws or insufficient knowledge by traders, we show how variations in governance structures might be a critical factor that affects food safety via their proximate impact on service provision. In particular, we examine whether mechanisms of accountability,

including elections of market leaders and paying taxes to local authorities, or official government oversight is associated with greater service provision. We find that government oversight through the presence of a Local Governance Area (LGA) office in the market tends to be more consequential for large-scale infrastructure provision while elected leaders are more important for market cleanliness and waste collection. Tax payments to the LGAs, however, are not associated with improved services across the markets. This largely reflects observations of those elsewhere that revenues generated from market fees rarely are reinvested in the upkeep or expansion of improved services (FAO and FLAMA 2022).

The following section justifies our focus on Nigeria and provides some context about food safety hazards in the country's markets. Subsequently, we discuss the importance of market governance and delineate between mechanisms of accountability and authority that might impact service provision. This is followed by a discussion of the data collected for the analysis and a review of several descriptive statistics. Our main analytical discussion follows, showing how different governance metrics are associated with five different types of services that are key for food safety. The final section offers some brief conclusions.

## **2. The Case of Nigeria**

With rapid population growth and rising food price inflation, the importance of increasing access to affordable, healthy foods is critical in Nigeria. For many of the poorest consumers, access to foods such as fish and vegetables is predominantly through informal markets, including both wholesale and retail markets (Resnick et al. 2019). However, these markets often lack sufficient infrastructure, including access to clean water, proper sanitation, and adequate food storage facilities (Cortese et al. 2016; Muyanja et al. 2011), which increases the risk of consuming contaminated food. Several studies have uncovered dangerous bacteria and toxins in a majority of raw vegetables and smoked fish in Nigerian markets (Grace, Dipeolu, and Alonso 2019; Nordhagen et al. 2023). In addition to the health consequences of such food safety hazards, there are also economic costs. For instance, Nigeria's economic burden of food borne diseases, measured by the costs of mortality and morbidity, is estimated at over USD 6 billion—the fourth highest in the world (Jaffee et al. 2019).

Like many other LMICs, Nigeria's approach to food safety in the informal sector primarily emphasizes regulation and awareness. Research assessing the effectiveness of the regulatory framework for ensuring safe street food vending practices in Nigeria has yielded mixed results (Festus Okechukwu Ukwueze 2019; Mwamakamba et al. 2012). While food safety policies exist, their implementation is hindered by confusion regarding roles and mandates, suggesting that decentralizing policy execution could enhance effectiveness (Okoruwa & Onuigbo-Chatta 2021). Additionally, awareness and knowledge of food safety practices among vendors are limited. Survey evidence from traditional markets reveals that food is often uncovered, handled with bare hands, and perishable items are stored at room temperature, with minimal handwashing or sanitizing observed (GAIN 2022).

However, both knowledge about food safety practices and enforcement of food safety regulation are not effective when there is a lack of critical infrastructure to make such activities realistic for market vendors (V. Hoffmann, Moser, and Saak 2019). A systematic review focusing on Nigeria found significant gaps in food safety practices, such as inadequate handwashing, handling money with food, and unsanitary waste disposal among vendors, along with a lack of essential infrastructure like running water and functional toilets at markets (Nordhagen 2022). Other



studies have found that insufficient market infrastructure was a major complaint by Nigerian food vendors (Resnick et al. 2019).

### **3. Governance of Informal Markets**

While infrastructure and service provision are recognized as critical for food safety in informal market settings, there is less understanding of why services vary across markets. In this study, we focus on the how market governance shapes such investments. Most informal markets in LMICs are characterized by very complex governance structures that vary across space and product categories. Typically, there are multiple stakeholders, including federal, state, and local governments, market authorities, traders' associations, private service providers, and civil society (Smit 2016). In most cases, local government authorities play a primary role in market governance since markets are one of their major sources of revenue generation. However, even within local governments, responsibilities may be very fragmented, with different departments responsible for collecting revenues, upgrading services, and providing food safety licenses (Resnick 2020). Market associations also play a key role in aggregating and articulating traders' concerns to relevant decisionmakers and sometimes promote pro-trade policies (Grossman 2020).

We focus here on the dimensions of governance that are relevant for service provision: accountability and authority. Typical mechanisms of accountability include elections and tax payments. Through voting, constituents select representatives who they believe will respond to their concerns, and as such, re-election of representatives is contingent on delivering on those concerns (Ashworth 2012; Warren 2014). Taxation has long been an important linchpin of accountability between state actors and citizens with the assumption that by paying various fees and charges, citizens should receive a set of services in return or at least feel justified in demanding to know how their money was spent (Devarajan and Do 2021; Dom et al. 2023; Martin 2023; Moore 2015).

In contrast to accountability, which implies an interactive relationship with the public, authority refers to the functional mandate to exert control in a particular public policy arena. Sometimes this authority is formally expressed through legal or constitutional provisions while in other settings, such as in conflict and fragile settings, authority may be derived from an informal set of norms and networks that accord legitimacy to certain entities to govern. Importantly, those who have accountability might not always have authority to deliver certain services, and those who have authority might not face any pressure to be accountable for their service delivery performance.

In Nigeria, the LGA is constitutionally mandated to oversee markets and to collect taxes from traders, and in fact, market management is one of their few official functions (Grossman 2020). These LGAs, however, are not always accountable to their constituents for several reasons. First, in some cases, state governors remove elected LGAs and appoint caretaker LGAs that align with the governor's prerogatives (Page, Matthew and Wando, Abdul 2022). There are currently 21 states where the LGAs are under caretaker committees (Akasike and Tolu-Kolawole 2024). Second, even for those elected LGAs, there are not consistent term limits, which means that LGAs can continue serving even after they have become unpopular with the public (Itodo 2024). Moreover, LGA elections are run by State Electoral Commissions (SIECs), which are

frequently interfered with by governors to ensure their preferred outcome (Itodo 2024). Kyburz (2017) found that elected rather than caretaker LGAs in Nigeria demonstrate a greater provision of public goods.

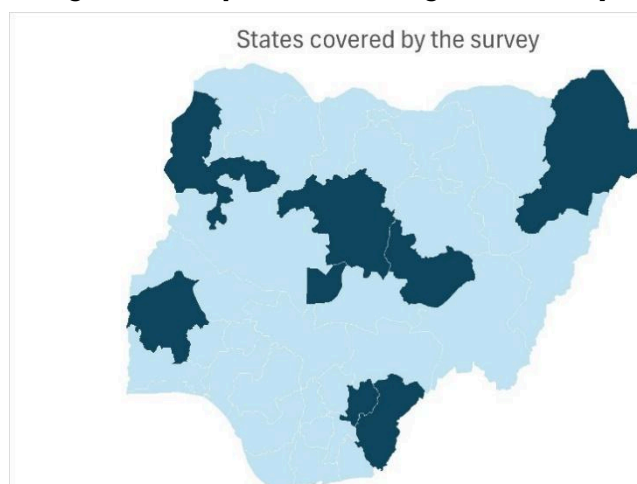
In addition to the LGAs, market authorities and associations play an important role in helping oversee the day-to-day management of wholesale markets. These market authorities may be elected by their fellow traders, or they may be appointed by the LGA or other entities, such as local traditional authorities. Even if they are elected, there is no guarantee that they uphold their accountability to traders due to information asymmetries. For instance, Grossman (2020) observes instances when elected market leaders engage in various rent-seeking activities, including underreporting the number of traders to authorities so that they can pocket additional money that they have collected from traders for services.

#### 4. Data Collection and Descriptive Statistics

To examine the impacts of governance on service provision in Nigeria's wholesale markets, a survey was implemented across all wholesale markets where fish, tomatoes, or green leafy vegetables (GLVs) are sold across seven Nigerian states (Borno, Cross River, Ebonyi, Kaduna, Kebbi, Oyo, Plateau) and Abuja, the Federal Capital Territory (FCT) (Figure 1). The survey instrument was administered between July 2023 and February 2024 in a focus group format to market leaders and traders who are familiar with the market operations in the 299 wholesale markets in those states. The focus groups were composed of a wide range of stakeholders from market level chairpeople to product-specific leaders and traders. Furthermore, the states were selected to cover a range of socio-economic and agricultural diversity across Nigeria. They also encompass political diversity as two states, Cross River and Plateau, are under caretaker governments (Akasike and Tolu-Kolawole 2024).

The questionnaire gathered comprehensive data on market-level characteristics, including available infrastructure such as functional taps and toilets, the number of traders and businesses, market location (rural or urban), and its proximity to towns. It also collected information on market governance, such as who oversees daily operations, how they are selected, and the type of land ownership structure for the market.

**Figure 1: Sample States in Nigerian Survey**



### Market services

To assess service provision in markets, we focused on five outcomes of interest. These include availability of a dependable source of water (piped water or boreholes), access to toilets that flush, to a sewer, tank or pit, access to electricity from the grid, daily waste collection, and daily market cleaning. Access to safe water is critical for handwashing and for cleaning products while the provision of flush toilets provides greater sanitation than alternative human waste disposal methods that can contaminate market soils and trading spaces. Electricity is pivotal for cold storage to ensure longevity for perishable vegetable and fish products. Daily waste collection and cleaning is critical to avoid attracting vermin and pests that can carry vector borne diseases. Each of these variables were coded as a dummy, and an equally weighted service index was constructed using these five services to rate markets on a scale from 0 to 1.

Table 1 below highlights the shares of these five services for the markets overall and within each state. There are some important state variations. For instance, markets in FCT have much better access to services followed by those in Oyo and Ebonyi. In general, access to toilets is low for all states except FCT where about 70% of the markets have sufficient access to flush toilets. Ebonyi, Kebbi, and Plateau significantly lag in terms of daily waste collection and, overall, markets in Plateau perform the worst on the service index.

**Table 1: Services distributed by State**

	<i>Borno</i>	<i>Cross River</i>	<i>Ebonyi</i>	<i>FCT</i>	<i>Kaduna</i>	<i>Kebbi</i>	<i>Oyo</i>	<i>Plateau</i>	<i>Overall</i>
Access to pipe-borne/borehole water (%)	0.19	0.36	0.61	0.80	0.33	0.27	0.72	0.23	0.40
Access to electricity from the grid (%)	0.14	0.20	0.61	0.60	0.25	0.23	0.48	0.15	0.29
Access to flush toilets in the market	0.05	0.28	0.26	0.70	0.24	0.41	0.39	0.15	0.27
Waste is removed from the market daily (%)	0.33	0.20	0.04	0.70	0.38	0.09	0.22	0.09	0.24
Markets are cleaned daily (%)	0.38	0.28	0.22	1.00	0.45	0.14	0.35	0.11	0.32
Service index on a scale of 0-1	0.22	0.26	0.35	0.76	0.33	0.23	0.43	0.15	0.31
Number of Markets (n)	21	50	23	10	80	22	46	47	299

### Governance structures

To understand the interplay between factors related to governance and service provision in markets, we first need to look at the variation in the governance structures at the market level. Out of 299 markets, 262 reported that market authorities or associations manage their daily operations. The leadership of these entities typically consists of a chairperson, vice chair, secretary (different for different products traded in some cases), financial secretary, and treasurer. Some markets also have a leader for women's affairs ("Iya Loja"), an auditor, and a public relations officer (PRO). On average, 23% of market leaders are female, with Cross River and Ebonyi having approximately half of their leadership composed of women. However, only 7% of the chairpeople across all states are women (see Table 2).

Market leaders are chosen either through direct elections by traders or appointed by various groups, including traders, management, traditional leaders, or through political appointments. Sometimes the leadership roles are also filled on a voluntary (non-competitive) basis. On average, 39% of market leadership is elected, 48% is appointed by various bodies, and 9% hold positions on a voluntary basis. However, this distribution differs by state. For example, in Plateau, approximately 80% of market leaders are elected, while in Oyo, only 10% are elected.

**Table 2: Market Leadership by State**

	<i>Borno</i>	<i>Cross River</i>	<i>Ebonyi</i>	<i>FCT</i>	<i>Kaduna</i>	<i>Kebbi</i>	<i>Oyo</i>	<i>Plateau</i>	<i>Overall</i>
Average number of leaders (n)	4.14	3.60	4.90	5.00	3.47	3.91	5.13	6.83	4.52
Average share of female leaders (%)	0.07	0.37	0.18	0.22	0.05	0.01	0.28	0.13	0.16
Average share of chair people that are female (%)	0.00	0.27	0.05	0.00	0.00	0.00	0.11	0.01	0.07
Share of markets with elected chair people (%)	0.67	0.25	0.55	0.70	0.28	0.18	0.11	0.70	0.37
Average share of elected leaders (%)	0.67	0.31	0.56	0.68	0.28	0.19	0.09	0.79	0.39
Average share of volunteer leaders (%)	0.05	0.14	0.00	0.00	0.11	0.05	0.13	0.06	0.09
Average share of appointed leaders (all appointment types) (%)	0.29	0.49	0.17	0.32	0.6	0.76	0.78	0.09	0.48
Average share of politically appointed leaders (%)	0.29	0.50	0.14	0.10	0.00	0.58	0.07	0.03	0.18
Average share of leaders appointed by traditional leaders (%)	0.00	0.00	0.06	0.00	0.37	0.02	0.11	0.06	0.13
Average share of leaders appointed by traders (%)	0.00	0.00	0.00	0.10	0.09	0.02	0.60	0.00	0.12
Average share of leaders appointed by market management (%)	0.00	0.01	0.00	0.12	0.15	0.16	0.00	0.00	0.06
Average share of leaders selected by other ways (%)	0.00	0.05	0.24	0.00	0.00	0.00	0.00	0.06	0.03
Number of Markets (N)	21	50	23	10	80	22	46	47	299

\* Data on market leaders is available for 293/299 markets.

We also examined additional variations in how market authorities interact with the government. For example, about 36% of market authorities report paying a fee to the LGA, with significant differences across states. In FCT, none of the markets pay a fee, while in Cross River, 80% of the markets do. LGAs also have their offices in around 37% of the markets. Markets also differ in terms of the ownership of the land they occupy. Nearly half of the markets are situated on land primarily owned by the government, while 40% are located on land where the community holds the majority ownership.<sup>1</sup> Again, however, Table 3 shows that the variation across states is sizeable. Moreover, while just over 60% of the markets where the LGA has offices are located on land that predominantly belongs to the government, 38% of the markets in our sample have

<sup>1</sup> Primary land ownership defined as more than 50% of land owned by that entity.

LGA offices even though the land is owned by the community or the private sector. In addition, 43% of the markets on government land do not have an LGA office. In other words, the presence of an LGA office is not necessarily correlated with land ownership.<sup>2</sup>

**Table 3: Taxation and Representation by State**

	<i>Borno</i>	<i>Cross River</i>	<i>Ebonyi</i>	<i>FCT</i>	<i>Kaduna</i>	<i>Kebbi</i>	<i>Oyo</i>	<i>Plateau</i>	<i>Overall</i>
Market authority pays fees to LGA (%)	0.14	0.80	0.52	0.00	0.29	0.09	0.24	0.34	0.36
LGA has office in market (%)	0.19	0.56	0.48	0.80	0.31	0.36	0.24	0.36	0.38
Market's interests represented at the state level (%)	0.10	0.36	0.30	0.60	0.50	0.41	0.89	0.51	0.49
Market's interests represented at the national level (%)	0.00	0.00	0.13	0.50	0.43	0.09	0.46	0.23	0.25
Majority of land is government-owned (%)	0.71	0.40	0.09	0.90	0.58	0.96	0.20	0.62	0.51
Number of Markets (N)	21	50	23	10	80	22	46	47	299

## 5. Analytical Findings: Accountability and Authority

To examine the relationship between governance and service provision, several logit models were estimated that account for each of the separate services discussed in the previous section. To determine the explanatory influence of accountability as a motivator for service delivery outcomes, we consider two measures based on the discussion in section 3. First, we include whether the market chairperson was elected or not. Although we use this metric instead of the share of overall elected leaders in the market, there is a very strong correlation (0.94) between the two. Second, we include whether the market authority—and by extension the traders operating within it—are paying fees to the LGA as a proxy for taxation as a mechanism for accountability. To examine the role of authority, we include the presence of an LGA office in the market. This assumes that when such offices exist, the state is more likely to gain information about problems in the market and act on its functional mandate to invest in the markets accordingly.

Several sets of controls are included in our analysis at both the market and LGA level. These include whether the market is on predominantly government land as opposed to predominantly community or private land. In addition, we control for whether the market is in a rural versus urban location, assuming that rural areas are likely to generally be less endowed with resources for reinvestment in market infrastructure and services. Another control includes the age of the market given that service provision is likely to be better in more modern markets. The range of market age is very wide, with more than 20 markets established over 100 years ago. Therefore, instead of including the mean age, which would be very skewed, we included a dummy for whether the market was established in the last thirty years.

<sup>2</sup> In fact, the correlation is only 0.19 between LGA offices and government land ownership.

Two additional controls are included at the LGA level.<sup>3</sup> The first is whether the market is located in an LGA that is under the control of a caretaker government. As noted earlier, such governments tend to be less invested in service provision (Kyburz 2017), even if their representatives are present in market offices. These caretaker governments are in Cross River and Plateau states and encompass 97 markets in our sample. A second control variable is the average fatalities per incident of conflict experienced in the LGA where a market is located during the 30-month period (January 2021 to June 2023) preceding the survey. This informed was obtained from the Armed Conflict Location and Event Data (ACLED) database. Given that conflict may lead to uncertainty about investment decisions, controlling for the extent to which a market is in a higher conflict area might be an important factor influencing service provision.

Table 4 presents the logit model results for all five individual services as well as a fractional logit for the overall service index, which ranges from 0 to 1. Standard robust errors are in parentheses. The findings highlight that the mode of governance that matters varies across the service of interest. Where there are elections for market chairperson, there is a greater likelihood of daily waste collection and market cleaning. In fact, in terms of odds ratios, a market that has an elected chairperson is three times more likely to have waste collected on a daily basis than in a market where the chairperson is appointed or run by volunteers. This is likely because in the survey, a plurality of survey respondents (48%) noted that waste collection either was the responsibility of the market authority or of the individual traders. Consequently, if the chairperson is concerned with re-election and retaining credibility with the market traders, then s/he has an incentive to ensure this responsibility is upheld or that the traders themselves remove their waste. A similar argument applies to market cleaning; 42% of respondents claim the market authority is responsible for hiring people to clean the market, a share that is much higher than for private enterprise or the government.

Yet, for major infrastructure provision, having an elected chairperson makes little difference. Instead, the presence of the LGA office in the market is associated with a higher likelihood of having flush toilets and electricity from the grid. Of the 81 markets that have a flush toilet, approximately half of respondents noted that the government was responsible for building them, following by the private sector/individual investor (31 %). As such, this is not a service for which the market authorities exercise a mandate. Similarly, the electricity grid is managed by the government and market authorities could not easily on their own extend electricity connections. In both cases, having an LGA office in the market can enable the government to monitor where there are infrastructure gaps and serve as the main liaison for construction workers and service providers.

Almost across the board, service provision is worse in rural areas and in markets where the LGA is under a caretaker government. The latter finding may reflect that in such contexts, there is little incentive for the LGA to respond to market needs and also, as argued by Kyburz (2017) and Page and Wando (2022), such settings are more vulnerable to the extortion of LGA revenue by the state. Markets are likely to suffer the most since that is the main functional mandate of the LGAs. Notably, whether the market authority pays fees to the LGA does not appear to influence service provision. This perhaps reflects perceptions that there is little transparency in how the money is used. Newer markets surprisingly are not associated with better infrastructure, but they are associated with better waste collection and cleaning.

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<sup>3</sup> We do not include LGA fixed effects because we are interested what aspects of LGA variation might affect service provision rather than wanting to hold that variation constant.

Water provision is not explained by either dynamic, and this likely reflects that insufficient water access is a more structural challenge in Nigeria. As of 2018, approximately 47 million Nigerian lacked improved drinking water and 150 million did not have access to a basic handwashing facility. These figures are worse in rural areas (World Bank 2019). Instead, there is an increase in self-supply through informal water sources, including vendors selling water sachets and bottles that nonetheless have also been shown to have high sources of unsafe contaminants (Ajala et al. 2020). Water management is generally overseen by the State Water Agencies (SWAs), which were established in 1997. In addition, each state can decide on the institutional arrangement for delivering services, and governors often have a great deal of autonomy in choosing the contractors for water projects, which often leads to corruption (World Bank 2017). Overall, the country's SWAs are among the worst performing utility agencies in Africa (World Bank 2017). Consequently, this is not a service in the markets for which either the market authorities or the LGAs exert much influence and is likely to be shaped by entities at the state level.

**Table 4: Market Governance and Service Provision**

Independent variables	Logit					Fractional logit
	<i>Daily waste collection</i>	<i>Daily market cleaning</i>	<i>Flush toilets</i>	<i>Electricity from grid</i>	<i>Piped or borehole water</i>	<i>Service index</i>
Chairperson elected	1.314*** (0.34)	0.871** (0.31)	-0.179 (0.33)	0.115 (0.31)	-0.092 (0.29)	0.349* (0.162)
LGA office in market	0.114 (0.35)	0.457 (0.32)	1.015** (0.33)	0.775* (0.32)	0.473 (0.29)	0.520** (0.167)
Fees paid to LGA	0.219 (0.35)	-0.008 (0.32)	0.629 (0.35)	0.309 (0.33)	0.045 (0.30)	0.184 (0.167)
Majority govt land	0.876* (0.35)	0.23 (0.30)	0.498 (0.33)	-0.584 (0.31)	-0.376 (0.28)	0.079 (0.157)
Rural location	-0.05 (0.35)	-1.028** (0.32)	-1.911*** (0.39)	-1.267*** (0.33)	-0.619* (0.28)	-0.863*** (0.160)
Market is 30 years or newer	1.166** (0.37)	0.745* (0.34)	0.15 (0.38)	-0.414 (0.36)	-0.402 (0.32)	0.240 (0.181)
LGA caretaker govt	-0.971* (0.39)	-1.004** (0.35)	-0.995** (0.39)	-1.231*** (0.37)	-0.764* (0.31)	-0.834*** (0.171)
Average fatalities in LGA	-0.084 (0.07)	-0.107 (0.07)	0.02 (0.06)	-0.103 (0.07)	-0.082 (0.06)	-0.046 (0.025)
Number of Markets (N)	253	253	253	253	253	253

Finally, the service index, which represents an average of all the five services for each market, largely aligns with the individual service results.

## 6. Conclusions

Better regulation and increased training campaigns are necessary but not sufficient to address food safety in wholesale markets. Indeed, such interventions are only successful when complemented with the requisite infrastructure and services known to be important for safe handling and distribution of food. Drawing on a unique survey of all wholesale markets across 8 states, this paper is one of the few existing contributions that examines how governance within markets may be associated with such services.

We found that for services where market authorities were perceived as responsible, including waste collection and daily cleaning, markets with elected chairpeople are tied to better outcomes. Accountability appears relevant at the LGA level as well since markets in LGAs under appointed rather than elected governments are associated with poorer outcomes on all service delivery outcomes. For those markets where infrastructure investments are needed, those with an LGA office inside them were linked to the provision of flush toilets and connection to the electricity grid. We suspect this is because in such cases, the LGAs not only have authority to act but also by having offices in the markets, they can overcome information asymmetries.

The results suggest that to address food safety for fresh vegetables and fish at the wholesale market level, it is important to consider incorporating stakeholders who hold both accountability and authority in the marketplace since these different mechanisms may play a more important role for some services than for others.

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