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An Assessment of Fertilizer Quality Regulation in Nigeria

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THE NIGERIA STRATEGY SUPPORT PROGRAM (NSSP)

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The Nigeria Strategy Support Program (NSSP) of the International Food Policy Research Institute (IFPRI) aims to strengthen evidence-based policymaking in Nigeria in the areas of rural and agricultural development. In collaboration with the Federal Ministry of Agriculture and Water Resources, NSSP supports the implementation of Nigeria's national development plans by strengthening agricultural-sector policies and strategies through:

- Enhanced knowledge, information, data, and tools for the analysis, design, and implementation of pro-poor, gender-sensitive, and environmentally sustainable agricultural and rural development polices and strategies in Nigeria;

- Strengthened capacity for government agencies, research institutions, and other stakeholders to carry out and use applied research that directly informs agricultural and rural polices and strategies; and

- Improved communication linkages and consultations between policymakers, policy analysts, and policy beneficiaries on agricultural and rural development policy issues.

ABOUT THESE REPORTS

The Nigeria Strategy Support Program (NSSP) reports either contain preliminary results or support ongoing research. They are circulated in order to stimulate discussion and critical comment.

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Abstract

Despite a multifaceted fertilizer quality regulatory process with numerous and diverse participants, fertilizer quality remains a challenge in Nigeria. Fake, adulterated, and misbranded fertilizers, as well as underweight fertilizer bags are prevalent in the Nigerian market (FGN 2006). Not only have fertilizer quality issues been identified as a major constraint to fertilizer use in Nigeria, but farmers have indicated interest in higher fertilizer use, despite the cost, if they were assured of improved quality (Nagy and Edun 2002; Chude 2006). Though currently absent, the importance of access to affordable, timely, and good quality fertilizer for increased agricultural productivity and food security in Nigeria is clear. Consequently, this study examines fertilizer quality regulation in Nigeria. Using primary data collected from state officials in charge of fertilizer and from fertilizer production and blending plants, we explore the extent to which the Nigerian fertilizer sector is effectively regulated to ensure the quality of fertilizers delivered to farmers. The study found that the nature and sources of fertilizer quality challenges in Nigeria are well known, cutting across all fertilizer products in the market. Though there are bodies mandated to monitor fertilizer quality, the regulatory system for fertilizer quality in Nigeria is not clearly defined and well developed. The study results indicate that addressing fertilizer quality challenges in Nigeria is imperative requiring a holistic approach to the regulation of fertilizer production and distribution in the country. A clear assignment of monitoring and regulatory roles is needed at every stage of fertilizer production (blending) and distribution with a broader reach to peri-urban and rural markets.

Abbreviations

ABU	Ahmadu Bello University
ADP	Agricultural Development Program
AISD	Agriculture Input Services Department
FCT	Federal Capital Territory
FFD	Federal Fertilizer Department
FFPD	Federal Fertilizer Procurement and Distribution Division
FGN	Federal Government of Nigeria
FMSP	Federal Market Stabilization Program
FMWAR	Federal Ministry of Agriculture and Water Resources
FSFC	Federal Superphosphate Fertilizer Company
IFDC	International Center for Soil Fertility and Development
MANCAP	Mandatory Conformity Assessment Program
MSDS	Material Safety Data Sheets
NAFDAC	National Food and Drugs Administration and Control
NAFRAC	National Agency for Fertilizer Regulation and Control
NFDC	National Fertilizer Development Centre (NFDC)
NFTC	National Fertilizer Technical Committee
NIS	Nigerian Industrial Standards
NPK	Nitrogen-Phosphorous-Potassium
SDI	state direct imports
SMA	States Ministries of Agriculture
SON	Standards Organization of Nigeria
SONCAP	Standards Organization of Nigeria Conformity Assessment Program
SONCO	Local SON Country Offices
SSP	Superphosphate Fertilizer

Introduction

A typical regulatory framework for fertilizer, usually backed by legislation, generally makes provision for compulsory registration of fertilizer manufacturers, importers, and dealers; specification of all fertilizers manufactured/imported and sold in the country; guidelines on manufacture of fertilizer mixtures, packing and labeling on the fertilizer bags; appointment of enforcement agencies; setting up of quality control laboratories; prohibition on manufacture/import and sale of non-standard/spurious/adulterated fertilizers; and standardization of qualifications of all fertilizer manufacturers, importers, and dealers in the country. The framework also has provision for cancellation of authorization/registration certificates of dealers and mixture manufacturers as well as the proposed punishment for offenders as applicable.

The types of fertilizer commonly produced and used in Nigeria include urea, Nitrogen-Phosphorous-Potassium (NPK), and Superphosphate (SSP). The most common NPK blends are: 15-15-15, 20-10-10, 12-12-17+2Mg0, and 25-10-10. NPK fertilizers are further formulated to be site and crop specific. In order to ensure effective procurement and distribution of fertilizer, the federal government, at various times, has put in place guidelines for the production, procurement, and distribution of the product. The government seeks to ensure national self–sufficiency through local fertilizer production, supplemented by importation to ensure adequate and timely fertilizer supply to all farmers. The government also offers a subsidy on the market price of fertilizer so as to make fertilizer affordable to smallholder farmers (Ayoola et al. 2002).

During 1976-1995, the main statute in force was the National Fertilizer Board Act of 1977 which provided for the establishment of, “a corporate body to be charged with the responsibility for purchasing and distributing fertilizer to State Governments at such subsidized prices as may be determined by the Federal Government.” In addition, the Fertilizer (Control) Decree of 1992 has provisions to punish any person who, without permission of the appropriate authority, deals in, sells or distributes fertilizer in a place not designated for the purpose of sale or distribution of fertilizer. A significant weakness in the existing framework is the lack of legislation on the required qualifications for manufacturers, blenders, and importers of fertilizer or on the procedures for enforcing these qualifications.

The Federal Government regulates the fertilizer sector through the National Fertilizer Technical Committee (NFTC) which acts as an advisory body of experts for constantly reviewing and recommending formulations to farmers, as well as new products based on the results of agronomic trials. In this regard, the National Fertilizer Development Centre (NFDC) was established to undertake laboratory analysis of fertilizer products and formulations. Reform of the regulatory system for fertilizer is presently under consideration in view of the limited attention paid by existing mandate regulatory bodies such as the Standards Organization of Nigeria (SON) and the National Food and Drugs Administration and Control (NAFDAC).

This study describes the nature and mechanisms of fertilizer quality regulation in Nigeria in an effort to understand how farmer access to good quality fertilizer can be improved. Using primary data collected from state officials in charge of fertilizer and from fertilizer production and blending plants, the study explores the extent to which the Nigerian fertilizer sector is effectively regulated to ensure the quality of fertilizers delivered to farmers.

This report is organized as follows. Section 2 provides an overview of institutions in fertilizer quality regulation in Nigeria while section 3 describes the major fertilizer quality challenges in

the country. The data and methodology are presented in section 4 and section 5 discusses the survey results. Section 6 summarizes the key findings and concludes.

Overview of Institutions in Fertilizer Quality Regulation in Nigeria

Government regulation of fertilizer in Nigeria dates back to 1971 when the Standards Organization of Nigeria (SON) was established. SON is a statutory body with a core mandate to produce and periodically review standards relating to products, measurements, and material processes in Nigeria. It promotes the standards developed at national and regional levels and is meant to certify industrial products (SON 2008). Within SON, fertilizer control is coordinated by the Quality Assurance and Laboratory Service Directorates. They undertake quality control inspection visits to factories to monitor compliance with the various pre-determined quality control practices and to obtain fertilizer samples from production lines for laboratory analysis (Ayoola et al. 2002). SON has offices or allied agencies in various locations across the world, where its imports originate. It also has zonal offices located in Enugu, Ibadan, Jos, Kaduna, Kano, Lagos, Minna, Port Harcourt, Uyo, Benin, and Yola. While all offices engage in inspection visits, physical and chemical tests are conducted in the food and chemical laboratory in Lagos. The National Fertilizer Technical Committee (NFTC) was established in 1983 by the Federal Ministry of Agriculture and Water Resources (FMAWR) as an internal mechanism to regulate fertilizer standards in Nigeria. However, in 1992, FMAWR had to hire the services of a private laboratory, Rotas Soil Lab Nig. Ltd, to inspect imported fertilizer shipments at the port. Still in 2002, the fertilizer control decree was issued, empowering the federal government to establish quality standards on technical contents, packaging materials, and fertilizer sample testing, as well as to control and supervise fertilizer quality. The Decree was to be implemented by the Federal Fertilizer Procurement and Distribution Division (FPDD).

Soon after, in 1993, the National Agency for Food and Drug Administration and Control (NAFDAC) was also established with mandate to regulate and control quality standards of foods, drugs, and chemicals imported or manufactured locally and distributed in Nigeria. It was meant to regulate and control quality standards made by the SON, thus serving as quality regulator and control agency for the importation, local production, and marketing of fertilizers (FFD 2007). NAFDAC issues permits for importation of chemical products (such as agrochemicals). It requires foreign manufacturers to submit Material Safety Data Sheets (MSDS) and produces specification for products including fertilizer. Fertilizer samples are collected from the ports and sent to the laboratory for analysis. Fertilizer is only released to an importer when tested samples confirm that the fertilizer being imported conforms with the claims of the manufacturer. NAFDAC also inspects warehouses where fertilizers are stored (NAFDAC Inspectorate Division 2010).

Despite FPDD and NAFDAC's existence, when the deregulation of the fertilizer sector was complete in 1997, the National Fertilizer Technical Committee was mandated to create quality control guidelines (including specifications, labeling, and packaging standards, as well as a legal framework). The committee reviewed previous fertilizer programs and found the 1992 Fertilizer Control Decree to be inadequate, not comprehensive, and out of tune with the new policy of deregulation. They also found that some specifications being used by the FPDD were inaccurate given changes in fertilizer use between 1990 and 1997. Consequently, a call for the revision and update of the existing specifications undertaken by the National Fertilizer Technical Committee in conjunction with SON was made.

In 1998, NFTC recommended the establishment of a National Fertilizer Development Board with appropriate legal powers to address quality control and other fertilizer related issues. Pending the establishment of the National Fertilizer Development Board, the name of Fertilizer Procurement and Distribution Division (FPDD) was changed to Federal Fertilizer Department (FFD) and charged with carrying out routine monitoring of fertilizer activities together with SON. In 2003, the need for proper fertilizer regulation was still unmet and the National Council on Agriculture (NCA) approved the establishment of a fertilizer regulatory body named the National Agency for Fertilizer Regulation and Control (NAFRAC). However the requisite laws to get it to function have not been passed, so it is still not being implemented, seven years later.

The proposed NAFRAC is to be created by an Act to have the full mandate and responsibility for the administration, enforcement, and regulation of fertilizer in Nigeria. The Agency is to be headed by a Director General and will be comprised of three departments, Administration and Finance, the Inspectorate, and Analytical Services. It has a clearly defined fertilizer regulatory system that will guide the routine operations of the agency. These include registering fertilizer companies, inspecting their operations as well as the activities of other actors in the subsector, conducting sampling, analysis, enforcement of proper product labels and other requirements, and collection of inspection fees. Regulatory offences and punishments are clearly outlined in the proposed NAFRAC to ensure quality assurance practices are properly done by the various stakeholders involved in the production and marketing of fertilizers all the way to the end user (IFDC 2003).

In 2005, SON issued a new process called Standards Organization of Nigeria Conformity Assessment Program (SONCAP). This program has two mandatory processes of product quality certification. First, product Certification must be gotten at point of export then SONCAP Certification is determined on a shipment by shipment basis. SONCAP Certification became a mandatory customs clearance document issued by Local SON Country Offices (SONCO) located in the countries of fertilizer product origin in December of 2005. This was followed in 2006 by the issuance of another program by SON called the Mandatory Conformity Assessment Program (MANCAP). This program, for quality assurance verification and compliance, operates once fertilizer gets into the country or for locally produced fertilizer. Local SON offices issue MANCAP NIS LOGO Certification to those in compliance.

As of 2010, fertilizer quality control in relation to importation, local production, marketing, and handling of fertilizers are under the ambit of SON, NAFDAC, Federal Fertilizer Department of Ministry of Agriculture (FFD), States Ministries of Agriculture (SMAs), and Agricultural Research Institutes under the national University system. The system still awaits the passing of legislation establishing NAFRAC. In the meantime, the sole two fertilizer manufacturing plants in the country, NOTORE Chemical Industries Ltd. and Federal Superphosphate Fertilizer Company (FSFC), have their own internal quality control laboratories and the Federal Fertilizer Department (FFD) approves independent laboratories for quality control checks that can be used by local manufacturers and blending plants. Concurrently FFD, now called Agriculture Input Services Department (AISD), is also charged to ensure that the quality of inorganic and organic fertilizers locally produced or imported meets required quality standards. It is meant to liaise with NFDC, SON, and Agricultural Research Institutes on fertilizer quality and specification issues. AISD collects and tests fertilizer samples at the ports, manufacturing and bulk blending plants, as should also be done by SON and NAFDAC.

AISD collects and analyses samples of fertilizer under the Fertilizer Market Stabilization Program to ensure quality standards are met before the fertilizer is delivered to the States. In

addition to lab tests, AISD conducts field trials on new fertilizer technology and products, verifying quality and efficacy prior to its introduction into the market. National Fertilizer Development Center (NFDC) is one of the four divisions under AISD that perform various fertilizer regulatory functions. Though NFDC does not conduct market surveillance, it has a laboratory equipped for soil analysis that serves public and private needs. It is one of the four approved laboratories for fertilizer analysis. NFDC also provides capacity building programs, workshops, and seminars on fertilizer quality control assurance for stakeholders.

This brief description reveals a duplication of activities and roles across agencies charged with fertilizer regulation in Nigeria. While this level of regulation (if executed as described) would be expected to significantly reduce fertilizer quality problems in the country, the system does not constitute a holistic approach to fertilizer quality regulation. It does not address the different quality issues experienced across the various links of the fertilizer supply chain. While numerous agencies are charged to check the quality of fertilizer being imported and or produced, no clear regulatory responsibility has been allocated at lower levels of the chain, closer to the final consumers, the farmers who largely reside in rural areas. Furthermore, none of the aforementioned agencies responsible for quality regulation appears to have the legal powers to punish violators, limiting their quality enforcement capabilities.

Fertilizer Quality Challenges in Nigeria

Despite the numerous and diverse participants charged with fertilizer quality regulation in Nigeria, fertilizer quality issues remain a challenge. Fake, adulterated, and misbranded fertilizers exist alongside underweight fertilizer bags in the Nigerian market (FGN 2006). Quality issues have been identified as a major supply constraint to fertilizer use in Nigeria and farmers have indicated interest in fertilizer despite the cost, if they were assured of improved quality (Nagy and Edun 2002; Chude 2006).

Adulteration, which usually involves fertilizer being mixed with products like sand and crop or weed seeds, changes the appearance and potency of the product. This could be damaging to plants if extraneous substances mixed in are chemicals and in sufficient quantity to affect crop growth and development (Visker et al.1996). The rise of fertilizer adulteration in Nigeria is often associated with the deregulation of the fertilizer subsector in the mid to late 1990's. Deregulation meant higher prices (when the government stopped setting prices) and larger urea imports and market liberalization. Since this deregulation was not accompanied by a strong regulatory system, there was an increase in the number of "fake producers" (Ayoola et al. 2002). The period saw an increase in product misspecification where fertilizer mixtures (often deficient in Phosphorus (K) and potassium (P)) composed of Urea were mixed with other substances and put in the regular bags of established manufacturers (Ayoola et al. 2002).

Underweight bags and nutrient deficiency of fertilizer samples subjected to laboratory tests have also been confirmed across the country (Ayoola et al. 2002; IFDC 2001). In addition to the use of substandard raw materials, nutrient deficiency is largely attributed to poor process control in production plants or poor product mixing in the case of blending plants (Ayoola et al. 2002). Underweight bags, used to increase profit margins, occur during multiple levels of re-bagging that takes place in Nigeria, often in the absence of proper scales. Other fertilizer quality issues include poor quality bags and storage facilities, inadequate warehouse ventilation, poor product handling and misbranding, fake, misleading or absent labels, and specifications claiming nutrient content different from reality (Ayoola et al. 2002).

Farmers and a majority of those involved in fertilizer procurement (wholesalers, retailers, and agro-dealers) are not well trained on fertilizer specifications, labeling requirements, nutrient deficiency, adulteration, misbranding, etc. Thus, they cannot make informed decisions when purchasing their fertilizer stock but must trust that the nation's fertilizer quality regulatory system has successfully accomplished its responsibility to guarantee that only good quality product enters and exists in the market. Similarly, personnel involved in distribution, handling, and storage of fertilizers are not trained in good housekeeping practices like ventilation, stacking, etc. Blending plants often use poor quality raw materials and are unaware of special handling precautions necessary to reduce the number of deficient products found in the market (IFDC 2001). This indicates the need for a fertilizer regulatory system that not only properly regulates the type and quality of fertilizer that is sold in markets but ensures that all participants in the fertilizer supply chain can make informed decisions in the production or blending of the product as well as in its purchase and sale.

Data and Methodology

Nigeria's, approximately 150 million, populace is distributed across 36 states (the second administrative tier of government, below the federal government) and Abuja, the Federal Capital Territory (FCT). Since 1999 (except in 2000), under the Federal Market Stabilization Program (FMSP), the federal government has procured fertilizer for sale to states at a subsidy of 25 percent. This is often augmented by state government subsidies with several states also procuring fertilizer directly, outside of the FMSP (Banful et al. 2010). Each state has a ministry of agriculture and an Agricultural Development Program (ADP) through which the state extension service operates.

A survey was conducted to use the perceptions of fertilizer experts (state desk officers and ADP staff) and producers (manufacturers and blending plants) to understand the structure and dynamics of the fertilizer quality regulatory system in Nigeria. A second goal, of the survey, was to understand the nature and source of fertilizer quality challenges across states. The third goal was to elicit the perception of the fertilizer producers and experts on the effectiveness of the current regulatory system and the necessary strategies to improve the efficiency of fertilizer quality regulation in Nigeria.

Questionnaires were administered to desk officers in each Nigerian state's Ministry of Agriculture or Agricultural Development Project Office, where appropriate, as well as to the internal quality control officers of all 12 operational blending plants and to the 2 manufacturing plants in the country. State level desk officers and local producers were surveyed because of their expected knowledge of the regulatory system in the country as well as their representation of different interests in the fertilizer sector. As administrative officers in the ministry of agriculture, a key player in fertilizer procurement and distribution, desk officers should know the nature and efficiency of the regulatory system. Furthermore as local producers subject to the requirements of the fertilizer regulatory system and with an incentive to prevent their product's adulteration, local manufacturing and blending plants are also expected to be knowledgeable about the nature and efficiency of fertilizer quality regulation in Nigeria. Both groups were also expected to be familiar with the key fertilizer challenges in their states.

Respondents were asked about the organizations and agencies responsible for fertilizer regulation in their states, the nature of fertilizer quality problems in their state, and the regulatory process for fertilizer quality. The survey instruments (Annex1 and 2) were mailed via courier to each respondent between July and August 2010. Twenty one of the 36 fertilizer desk officers

and 11 of the 12 operational blending plants responded to the survey and one of the two fertilizer manufacturing companies in Nigeria responded. The distribution of state desk officer surveys and responses can be found in table 1 below. The highest response rate (about 90 percent) was recorded in the North-West zone and the lowest response rate (about 30%) was observed in the North-East zone. Response from the South-East was also high at the rate of 80 percent.

Table 1: Survey respondents by region

	Number of states	Number of responses	Response rate (%)	Location of blending plants in each zone
South-West	6	3	50.00	Lagos State
South-East	5	4	80.00	Ebonyi State
South-South	6	3	50.00	Edo state, Rivers State
North-Central	7	4	57.14	Plateau State, Nassarawa State (2 plants), Benue State
North-East	6	2	33.33	Gombe, Bauchi , Borno, Yobe
North-West	7	6	85.70	Kaduna State (2 plants), Kano State (3 plants), Katsina State, Zamfara State, Sokoto State, Kebbi State
Total	**37**	**22**	**59.45**	

Source: Generated by authors from quality regulation of fertilizer survey.

Discussion

Who Is Responsible for Fertilizer Quality Regulation in Nigeria?

The first of three main sources of fertilizer in Nigeria is the Federal Market Stabilization program (FMSP), where the federal government buys fertilizer and sells to states at a 25 percent discount. The second source is direct procurement by state governments from importers or local producers and the third through private dealers. Under the FMSP, the FFD is responsible for the procurement and delivery of the fertilizer to the states. The SMAs then distribute the fertilizer to the farmers either directly through various distribution committees at local government and ward levels, farm groups or farm service centers, or indirectly through state agricultural input supply companies and farmer service centers. This is the same mechanism for distributing fertilizer procured directly by states.

Survey results indicate that the agencies largely perceived to be responsible for regulating the quality of fertilizer imported and distributed under the FMSP are the FFD and the State Ministries of Agriculture (SMA). Almost 60 percent (12/21) of state desk officers mentioned the SMA as the agency responsible for monitoring the quality of fertilizers. Furthermore, only 1 desk officer did not cite FFD as a major regulatory body for FMSP fertilizer. However, for fertilizer directly procured by states, the SMAs are primarily considered responsible for monitoring quality. Ninety four percent (15/16) of respondents in states that directly imported fertilizer cited the SMA as the key organization responsible for monitoring fertilizer directly imported by the state. These results indicate that the quality monitoring role is largely considered the responsibility of the level of government associated with the procurement of fertilizer.

This is confirmed by the perceived response for fertilizer sold by private dealers. There appeared to be limited knowledge of whose regulatory domain they fall under. There was a wide range of agencies considered responsible, with 20 percent who did not know. This uncertainty

reflects the unclear allocation of responsibility regarding fertilizer quality regulation at lower levels of the fertilizer supply chain discussed earlier.

Fertilizer Quality Issues, their Nature and Sources

The presence and nature of fertilizer quality problems is generally acknowledged and consistent across state desk officers and local producers surveyed. About 45 percent (9/21) of desk officers and 33 percent (4/11) of local producers indicated that their state had fertilizer quality problems. About fifty percent (11/21) of desk officers claimed fertilizer quality was not a problem while 33 percent (4/11) said the quality of fertilizer in their state was fine. The lower confidence rates among local producers is informative, as this group has more of an incentive to hide such information but are also more likely to be knowledgeable about the actual content of the product and more capable of identifying adulterated and substandard products.

The sources of information about fertilizer quality challenges are common to both desk officers and local producers. They include open market checks, personal observations, lab sample analysis, and complaints from the farmers and or extension workers. Similarly both groups of respondents identified the same nature of fertilizer quality challenges including: inferior products manufactured abroad and imported into the country, adulteration, chemical content different from that advertised, underweight bags, poor packing material, misbranded and fake fertilizers, and poorly labeled fertilizers, which confirms the findings from consulted literature.

State desk officers were asked if there were quality problems with fertilizer produced and/or used in their states. Table 2 shows that no state desk officer in a state that produced (manufactured or blended) fertilizer complained of quality problems with the fertilizer produced while half (4 out of 8) of them complained about quality of fertilizer used indicating that they perceived fertilizer quality problems to be more prevalent among fertilizer products imported into the state from other states or countries. However, when asked separately about the nature of quality problems in their states and the products such issues were commonly associated with, both desk officers and local producers acknowledge that fertilizer quality problems cut across all categories of fertilizer including: subsidized FMSP fertilizer, locally produced and blended product, products imported directly by states, and non subsidized fertilizers sold in the open market.

Table 2: Problems with locally produced fertilizer versus fertilizer from other sources

State	State has problems with the fertilizer produced	State has problems with fertilizer used	Blending/Manufacturing plant
Yobe State	No	No	Yes
Edo State	Do not know	No	Yes
Anambra State	NA	Yes	No
Ogun State	NA	No	No
Enugu State	NA	No	No
Ekiti State	NA	Yes	No
River State	No	No	Yes
Imo	NA	No	No
Taraba State	Yes	Yes	No
Delta	NA	_	No
Abuja	No	No	No

Table 2: Continuation

State	State has problems with the fertilizer produced	State has problems with fertilizer used	Blending/Manufacturing plant
Kogi	NA	No	No
Benue State	NA	Yes	Yes
Zamfara State	No	Yes	Yes
Jigawa	NA	No	No
Abia State	NA	Yes	No
Sokoto State	NA	No	Yes
Kano	NA	Yes	Yes
Abbia	NA	Yes	No
Ondo	NA	No	No
Kaduna	No	Yes	Yes

Source: Generated by authors from fertilizer quality survey

However, certain quality issues were particular to certain products. For example, both local producers and state desk officers considered fake products and adulteration to be largely associated with fertilizer products in the open market, though locally produced fertilizer and fertilizer under the FMSP were also mentioned. Wrong chemical composition is also cited as a problem largely associated with locally produced fertilizer by both categories. Their opinions differ on underweight bags and poor packaging. State desk officers highly associate both of these problems with fertilizer under the FMSP, while local producers associated underweight bags and poor packaging with open market fertilizer and state direct imports (SDI), in addition to locally produced fertilizer. The response similarities indicate a prevalence of adulteration and fake products in the open market while the seeming diversity of emphasis on the FMSP might reflect quality problems with the product identified by desk officers (at the state ministry that is actively involved in its distribution) but the limited interaction of local producers with FMSP fertilizer.

Table 3. Product quality challenges across Nigerian states

	Local producers					**State desk officers**				
	OM	**Local**	**FMSP**	**SDI**	***SUM***	**OM**	**Local**	**FMSP**	**SDI**	***SUM***
Adulteration	**3**	1	1	0	***5***	**3**	2	1	0	***6***
Underweight bags	2	0	0	2	***4***	3	3	**6**	0	***12***
Wrong chemical	1	**4**	1	0	***6***	1	**2**	1	0	***4***
Poor packaging	1	**2**	0	1	***4***	1	1	**8**	1	***11***
Fake products	**3**	0	0	0	***3***	**3**	2	0	0	***5***
Bad labeling	1	1	0	1	***3***	1	**4**	1	1	***7***

Note: OM=Open market, Local=locally produced and/or blended, FMSP=Federal market stabilization program, SDI=state direct imports and SUM=number of respondents who answered that question.

Though farmer complaints, sample analysis, and farmer field observations have provided information on fertilizer quality problems across states, desk officers do not consider fertilizer quality problems to be a deterrent to fertilizer use amongst farmers in their state. Only 5 desk officers (about 20 percent) considered poor quality fertilizer to be a deterrent to fertilizer use in their state. This opinion was also held by local producers where 75% did not feel that fertilizer

quality was a deterrent to farmer use of the product. Unfortunately, the most commonly cited reasons for the limited deterring effect of poor quality fertilizer relate to the limited ability of farmers to distinguish poor quality products and their limited options for securing the product. Farmers are defenseless against the vices of the producers and marketers of substandard products and must depend upon the government and allied agencies responsible for guaranteeing the quality of the product they purchase.

The similarity in the source of information on the nature of fertilizer quality challenges for local producers and desk officers (such as weight cross checks in the markets and at fertilizer supply receiving points and analysis of collected fertilizer samples from the markets and at receiving points) imply the occurrence of these activities across states as there is no other apparent reason why these responses would be similar.

Activities of Fertilizer Regulatory Agencies

Perspective of State Representatives

Fertilizer quality testing appears to occur across states in Nigeria at least yearly (or when procurement is done) but not very frequently within the year. Eighty percent (17/21) of state desk officers stated that the organization responsible for quality monitoring collects fertilizer samples for testing from stores and open markets and over 70 percent of respondents indicated that this had been done in their state in the 18 months prior to the survey (June/July 2010). Thirty-five percent said the sample collection occurred yearly, 30 percent said it occurred more frequently than yearly, and about 70 percent of the respondents said samples had been collected in their states between May 2009 and May 2010.

There are only 2 manufacturing plants in Nigeria, one in Kaduna and one in Rivers State. Surprisingly, desk officers in both states did not know if the regulatory agencies (largely SMA and FFD) visited the manufacturing companies to take samples of their fertilizer products for testing and quality verification. One would expect the monitoring activities of the various regulatory agencies to be clear and evident in these states that actually engage in fertilizer production.

Going further away from the central government structure, regulation is also less certain. Only about 50 percent of the responding desk officers (11/21) said the main regulatory agency tested fertilizer arriving at the SMA and this reduced to 7 (about 30 percent) for fertilizer reaching ADP offices. ADPs are often the extension service delivery mechanisms in states with closer association with farmers, but over half of the desk officers either did not know or responded negatively to sample tests being done at that level. Though sample tests in 6 of the 7 states where tests were done at the ADP offices level had been done in either 2009 or 2010, the apparently limited quality verification at this level indicates high probability for problems like adulteration to occur unchecked at this level and lower on the supply chain.

Perspective of Local Producers

Fertilizer quality monitoring among blending plants in Nigeria largely occurs at production and packaging stages with additional checks conducted in the open market. The process for production checks usually involves a physical and chemical analysis of fertilizer raw materials and final product. Through analysis the chemical composition of raw materials used in production and or blending are checked, the compatibility of blending products confirmed, and the proper blending ratios for various inputs are verified. Packaging checks largely involve

weight checks and bag strength verification, while open market checks are random checks for adulteration and other vices.

The National Fertilizer Policy in Nigeria requires all local fertilizer producers to establish an internal quality control mechanism (Africa Fertilizer Summit 2006) Only 6 (50 percent) of the 12 blending and manufacturing companies surveyed responded affirmatively to having internal quality control facilities. However, all local producers still subjected their products to sample tests. Only one plant conducted its sample tests in-house. The remaining eleven plants had their tests done externally at government laboratories, agricultural research institutes or soil science departments in Universities, probably due to limited technical capacity within firms. The majority of local blending and manufacturing plants (8/11) patronized the services of the Ahmadu Bello University (ABU) laboratory in Zaria, Kaduna state.

Though sample tests generally appear to be conducted, three blending plants had not had a sample test done since July 2008. All plants stated that they regularly subjected the raw materials used in production (blending) to chemical lab tests prior to production and primarily at the ABU Zaria laboratory.

After production most plants weigh to verify the weight of their products and drop bags from heights to check strength. Random open market checks of fertilizer quality were quite common in our sample. Nine plants (out of 12) indicated that they conduct random checks of their products in the open market. While the extent of their verification in terms of proximity to the plant office was not stated, these checks were said to be done frequently with the longest interval for any plant being every quarter. All plants that produced fertilizer in 2010 stated they had done some random open market check in the 3 months prior to the survey (June/July 2010).

Consequences of Producing and Trading Poor Quality Fertilizer and the Way Forward

Legislation is a necessary but not sufficient condition for societal stability and development. The effectiveness of legislation requires well thought out laws backed by the ability and willingness to enforce them. Despite the varied agencies in Nigeria mandated to set and enforce quality standards in the country and the numerous quality control activities said to occur along the fertilizer supply chain, only eight out of 21 desk officers considered the current regulatory system to be satisfactory. Desk officers largely attributed the ineffectiveness of fertilizer quality regulation in the country to poor enforcement of unclear regulatory legislation and an inadequate reach of monitoring activities in terms of frequency and scope. Violators of quality legislation (producers and sellers of substandard products) are not punished and substandard products are not removed from the market. Violators are not punished because of the weak enforcement mechanism. Fertilizer regulatory agencies do not have legal authority to punish offenders and the ineffectiveness of the police and court system prevent the successful conviction and punishment of violators. The prevalence of substandard products in the market reflects the inadequate reach of the regulatory system. Adulteration, typically takes place at the “retail” outlets/markets where fertilizer is sold directly to farmers often from open bags in small quantities (Rutland et al. 2005). According to Ayoola et al. (2002), producers of adulterated fertilizers often operate near major rural markets to ensure that they can easily dispose of their product and avoid police raids common in larger cities or during transportation over long distances.

The prescriptions of desk officers indicate that in addition to enforcement problems, the current national requirements and the strategies claimed by the state agriculture experts and local producers for fertilizer quality regulation are either not being followed or are insufficient. Most desk officers still prescribed more frequent monitoring and sampling of fertilizer products at various levels of the supply chain alongside the empowerment of regulatory agencies to improve fertilizer quality in Nigeria. When asked which key players needed to improve their performance, only two desk officers mentioned fertilizer marketers. Most respondents mentioned local producers and the government, largely via the FFD and SMAs but also through SON, NAFDAC, and the customs agency.

Local manufacturers and blenders claimed to be more satisfied with fertilizer quality regulation and enforcement as only four out of 11 respondents felt these systems were inadequate. However, five of the seven local producers that claimed to be satisfied with current regulation and enforcement of fertilizer quality still prescribed strategies for improving fertilizer quality that were related to regulation and enforcement. These prescriptions were: more frequent monitoring of fertilizer products, proper registration of fertilizer dealers, and use of good quality raw materials for production and blending, thus indicating their acknowledgement of the outstanding challenges of the current regulatory system. While the role of marketers was more evident in the responses of local producers, the key players to improve their performance, according to local producers, were also the government and its agencies. Desk officers and local manufacturers also recommended better product testing, requiring more testing laboratories with adequate technical capacity, and proper equipment (tools and chemicals) for testing of fertilizer samples.

Summary and Conclusions

This study examined the structure and effectiveness of fertilizer quality regulation in Nigeria. Using primary data collected from state administrative officials in charge of fertilizer and from fertilizer production and blending plants, we explored the nature of fertilizer quality regulation in Nigeria and the extent to which the fertilizer subsector is effectively regulated to ensure the quality of fertilizers delivered to farmers.

The results indicate that though there are bodies rendering skeletal monitoring services on fertilizer quality in Nigeria, the regulatory system for fertilizer quality in Nigeria is not clearly defined and well developed. There are organizations and agencies with the mandate to monitor fertilizer quality but their execution of this mandate is inadequate. Though requirements are laid out, actual execution and enforcement are limited. Besides, the regulatory system is disparate, which limits its effectiveness. Where fertilizer is one among many products under the mandate of a regulatory body, it tends to be overlooked. For example, by statutory provision, NAFDAC should regulate all chemicals including fertilizer. Currently, NAFDAC activities are limited to the importation and production stage with limited activities at the distribution stage where most of the product dilution occurs. While NAFDAC engages in the registration of fertilizer producing and importing companies, it does not engage in market surveillance. The SON is meant to set standards in Nigeria but they also extend some services to enforce the standards, for example, SONCAP and MANCAP. Both programs are laid out to enforce quality standards of imported and locally produced merchandise. However, their enforcement is hardly evident in the fertilizer sector. While MANCAP logos can be sighted on the packaging of many products, they are not typically found on fertilizer bags. Major stakeholders like the government and local blenders focus on the portions of the supply chain most relevant to their activity, leaving crucial links at lower levels of the chain open to violation.

The study finds that the nature and sources of fertilizer quality challenges are well known, cutting across all fertilizer products in the market. Adulteration and fake products are largely associated with fertilizer in the open market, as one would expect if adulteration occurs at the retail level. Underweight bags and poor bagging appear to be common with FSMP fertilizer and wrongful chemical composition is largely associated with locally produced and largely blended fertilizer. The study also finds that though the proper procedures, to guarantee that substandard fertilizer is not found in the market, are well known, the proper execution and regulation of these procedures remains wanting. While numerous activities exist to guarantee the quality of fertilizer imported into the country, this intensity of activities dwindles as one gets down to the ADP offices level and rural markets. Results show that fertilizer sample tests are frequently conducted at importation and production stages but are less evident at lower levels. Fertilizer experts at state ministries and local producers both consider legal authority to punish producers and distributors of substandard fertilizer to be lacking and a major reason for the ineffectiveness of the fertilizer quality regulatory mechanism. They also cite more frequent and extensive sample tests in well equipped and efficient labs as an issue to be addressed.

The study results indicate that addressing fertilizer quality challenges in Nigeria requires a holistic approach to the regulation of fertilizer production and distribution in the country. A clear assignment of monitoring and regulatory roles is needed at every stage of fertilizer production (blending) and distribution with a broader reach to peri-urban and rural markets. Such roles need to be backed by legislation and accompanied by punitive powers to ensure that violators of set regulations can be duly prosecuted and punished. Further training of manpower for fertilizer testing across the nation is necessary. Opportunities for farmers and local agro dealers to voluntarily bring their products for testing to their ADP offices require ADP office staff capable of conducting such tests. This requires adequate trainings, as well as adequate provision of the machines and chemicals needed to conduct such tests.

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Annex I

Questionnaire for State Ministry of Agriculture on Quality Regulation of Fertilizer in Nigeria

The Federal Fertilizer Department and the International Food Policy Research Institute are collaborating to examine regulation of quality of fertilizer products in Nigeria. Please find below a short questionnaire to provide data for this study. We appreciate your cooperation in providing answers.

1) Respondents' Given Name: _____ Surname: _____

2) Name of organization: _____

3) Location of organization (LGA, State): _____

4) Designation in the organization: _____

5) Contact information

Email:_____ Phone numbers:_____

Address:_____

_____

6) Provide information on the organization(s) that is(are) responsible for monitoring the quality of fertilizers from each of the sources identified below in _____*(insert state name)* State. Place an X in the box for all relevant institutions. E.g. [X]

a. Fertilizer indented under the Federal Market Stabilization Program (subsidized fertilizer)

1. State Ministry of Agriculture	[ ]
2. Federal Fertilizer Department	[ ]
3. Private fertilizer producers	[ ]
4. Private fertilizer importer	[ ]
5. Standards Organization of Nigeria (national office)	[ ]
6. Standards Organization of Nigeria (local office)	[ ]
7. Others (please specify)	[ ]

b. Fertilizer imported directly by the state

1. State Ministry of Agriculture [ ]
2. Federal Fertilizer Department [ ]
3. Private fertilizer producers [ ]
4. Private fertilizer importer [ ]
5. Standards Organization of Nigeria (national office) [ ]
6. Standards Organization of Nigeria (local office) [ ]
7. Others (please specify) [ ]

_____

c. Fertilizer sold by private dealers

1. State Ministry of Agriculture [ ]
2. Federal Fertilizer Department [ ]
3. Private fertilizer producers [ ]
4. Private fertilizer importer [ ]
5. Standards Organization of Nigeria (national office) [ ]
6. Standards Organization of Nigeria (local office) [ ]
7. Others (please specify) [ ]

_____

7) This section asks you to describe the activities of the organization that monitors fertilizer quality in _____ *(insert state name)* State.

a) Does the organization collect fertilizer samples for testing from stores and open markets in the state?

1. [ ] Yes 2. [ ] No 3. [ ] Don't know

b) If yes, how often? _____

c) When was the last collection (month/ year)? _____

d) Does the organization **visit fertilizer manufacturers** located in _____ *(insert state name)* State to monitor their activities and products?

1, [ ] Yes 2. [ ] No 3. [ ] Don't know

e) If yes, how often? _____

f) When was the last visit (month/ year)?

_____

g) Does the organization **visit fertilizer blenders** located in _____ *(insert state name)* State to monitor their activities and products?

1. [ ] Yes 2. [ ] No 3. [ ] Don't know

h) If so, how often? _____

i) When was the last visit (month/ year)? _____

j) Does the organization **test samples of fertilizer that arrive** at _____ *(insert state name)* **State Ministry of Agriculture**?

1. [ ] Yes 2. [ ] No 3. [ ] Don't know

k) If so, how often?

_____

l) When was the last test (month/ year)? _____

m) Does the organization **test samples of fertilizer that arrive** at _____*(insert state name)* **State ADP**?

1. [ ] Yes 2. [ ] No 3. [ ] Don't know

n) When was the last test (month/ year)? _____

Quality questions:

8) Is there a problem with the quality of fertilizer being **produced** in _____ *(insert state name)* State. If yes, go to question 9. If no, go to question 10

(1) [ ] Yes 2. [ ] No 3. [ ] Don't know 4. [ ] Not applicable

9) If yes, what was your source of information that a quality problem exists, or how did you form your views? Some of the examples of the sources of this information include, but are not limited to: personal observation; complaints from farmers; newspaper articles. Please write your answer below.

10) Is there a problem with the quality of fertilizer being **used** in _____ *(insert state name)* State. If yes, go to question 11, if no, go to 12.

(1) [ ] Yes 2. [ ] No 3. [ ] Don't know

11) If yes, what was your source of information that a quality problem exists, or how did you form your views? Some of the examples of the sources of this information include, but are not limited to: personal observation; complaints from farmers; newspaper articles. Please write your answer below.

12) a. Is low fertilizer quality a major reason why farmers do not use fertilizers in _____ *(insert state name)* State? If yes, go to question 13, else go to 14.

1. [ ] Yes 2. [ ] No 3. [ ] Don't know

13) If yes, how was this knowledge obtained? What were your sources, or how did you form your views?

14) In this section, we ask that you indicate some of the fertilizer quality problems in _____ *(insert state name)* State. For each problem description, write the corresponding letter of the categories of fertilizer in which the problem is identified. Also describe how you became aware of these quality problems, that is, the sources of your information or views.

Problem Description	Typically observed in fertilizer from which sources (e.g. A = FMSP fertilizer (Federally subsidized fertilizer), B = Fertilizer imported directly by state ie outside of the FMSP C = Fertilizer sold in the open market D = Locally blended fertilizer E = Locally produced fertilizer F = Other (please provide description of this other category)	
	Relevant letter	Describe how you know about this problem
Adulteration with other materials		

Under weight bags		
Chemical contents different from that advertised		
Problem Description	Typically observed in fertilizer from which sources (e.g. A = FMSP fertilizer (Federally subsidized fertilizer), B = Fertilizer imported directly by state i.e. outside of the FMSP C = Fertilizer sold in the open market D = Locally blended fertilizer E = Locally produced fertilizer F = Other (please provide description of this other category)	
	Relevant letter	Describe how you know about this problem
Poor packaging material		
Misbranded and fake fertilizers		

Poorly labeled fertilizers		
Please write any other quality problem you are aware of		
Please write any other quality problem you are aware of		

15) What are the consequences for individuals or Companies who are found to be selling poor quality or adulterated fertilizers? Please write your answer below.

16) What are the consequences for individuals or Companies who are found to be producing poor quality or adulterated fertilizers? Please write your answer below.

17) a. In your view, is the regulation for maintaining the quality of fertilizer satisfactory?

1. [ ] Yes 2. [ ] No

b. If not satisfactory, please explain below.

18) a. In your view, is the enforcement mechanism for maintaining the quality of fertilizers at the factory satisfactory?

1. [ ] Yes 2. [ ] No

b. If not satisfactory, please explain below.

19) Which actions could be taken to improve fertilizer quality in _____*(insert state name),* Please write your answer below.

20) If fertilizer quality needs to be improved in _____*(insert state name),* which players need to improve their performance? Please write your answer below.

21) How many operational fertilizer producers, blending plants are there in _____ *(insert state name)* State. Please provide an estimate if not aware of actual number.

Number of fertilizer manufacturers	
Number of fertilizer blenders	

Operating Fertilizer Manufacturer		Operating Blending Plants	
Name of company	Location of company (LGA)	Name of company	Location of company (LGA)

Thank you for your time.

Please return this questionnaire in the self addressed envelope that was enclosed and deposit with the nearest FEDEX office.

Annex 2:

Questionnaire for Fertilizer Manufacturers and Blending Plants on Quality Regulation of Fertilizer in Nigeria

The Federal Fertilizer Department and the International Food Policy Research Institute are collaborating to examine regulation of quality of fertilizer products in Nigeria. Please find below a short questionnaire to provide data for this study. We appreciate your cooperation in providing answers. **(Note: Respondent should be individual at Fertilizer Manufacturing/ Blending Plants with full knowledge of operations)**

1) Given Name: _____ Surname: _____

2) Name of Fertilizer Plant: _____

3) Location of fertilizer plant (LGA and State) : _____

4) Designation of interviewee in the Company: _____

5) Contact information

Email: _____ Phone numbers: _____

Address: _____

_____

6) Does your Company have internal quality control facilities to monitor the quality of fertilizers it produces and/or blends?

1. [ ] Yes 2. [ ] No 3. [ ] Don't know

7) a. What does the process of monitoring quality control include? Please write your answer below

b. Laboratory tests of samples?

1. [ ] Yes 2. [ ] No 3. [ ] Don't know

c. If yes, where are the samples tested? Place a check in the relevant box [X]

a. in-house at company laboratory [ ]
b. government lab_____ (name of lab) [ ]
c. external private lab_____ (name of lab) [ ]
d. other (specify) _____ (name of lab) [ ]

d. How often is the quality tested? _____

e. When was the last time the quality was tested? _____

f. Describe the procedure for checking the quality of packaging material. Please write below

g. How often is the quality of packaging checked? _____

h. When was the last time it was checked? _____

i. Does the company perform random checks of its fertilizer products in the open market? Please write below

j. If so, how often? _____

k. When was the last check? _____

9. a. If a bulk blender, does your Company test or analyze its raw materials (DAP, MAP, Urea, MOP and Filler) before production?

1. [ ] Yes 2. [ ] No 3. [ ] Don't know

b. If yes, where?

1. in-house at company laboratory [ ]
2. government lab_____ (name of lab) [ ]
3. external private lab_____ (name of lab) [ ]
4. other (specify) _____ (name of lab) [ ]

c. How often is it checked? _____

d. When was the last time it was checked? _____

e. Describe the process. Please write below

10. a. Is the quality of fertilizer a problem in the State you operate?

(1) [ ] Yes 2. [ ] No 3. [ ] Don't know

b. If yes, what was your source of information that a quality problem exists, or how did you form your views? Some of the examples of the sources of this information include, but are not limited to: personal observation; complaints from farmers; newspaper articles. Please write your answer below.

11. If yes, in your opinion, does the poor quality of fertilizer deter farmers from using it?

1. [ ] Yes 2. [ ] No 3. [ ] Don't know

12. In this section, we ask that you indicate some of the fertilizer quality problems in _____ *(insert state name)* State. For each problem description, write the corresponding letter of the categories of fertilizer in which the problem is identified. Also describe how you became aware of these quality problems, that is, the sources of your information or views.

Problem Description	Typically observed in fertilizer from which sources (e.g.) A = FMSP fertilizer (Federally subsidized fertilizer), B = Fertilizer imported directly by state i.e. outside of the FMSP C = Fertilizer sold in the open market D = Locally blended fertilizer E = Locally produced fertilizer F = Other (please provide description of this other category)	
	Relevant letter	Describe how you know about this problem
Adulteration with other materials		
Under weight bags		
Chemical contents different from that advertised		
Problem Description	Typically observed in fertilizer from which sources (eg	
	Relevant	Describe how you know about this problem
Poor packaging material		
Misbranded and fake fertilizers		

Poorly labeled fertilizers		
Please write any other quality problem you are aware of		
Please write any other quality problem you are aware of		

13. What are the consequences for companies or individuals who are found to have adulterated your or other Companies products? Please write your answer below.

14. Has your company taken any actions against people or companies that adulterated your product?

    1. [ ] Yes 2. [ ] No 3. [ ] Don't know

15. If yes, describe the actions your company took. Please write your answer below.

16. What are the consequences for individuals or Companies who are found to be selling poor quality or adulterated fertilizers? Please write your answer below.

17. What are the consequences for Companies who are found to be producing poor quality or adulterated fertilizers? Please write your answer below.

18. a. In your view, is the **regulatory mechanism** for maintaining the quality of fertilizer satisfactory?

    1. [ ] Yes 2. [ ] No 3. [ ] Don't know
    2.

    b. If not satisfactory, please explain. Please write your answer below.

19. a. In your view, is the **enforcement mechanism** for maintaining the quality of fertilizer satisfactory?

    1. [ ] Yes 2. [ ] No 3. [ ] Don't know

    b. If not satisfactory, please explain. Please write your answer below.

20) Which actions could be taken to improve fertilizer quality in _____*(insert state name) State?,* Please write your answer below.

21) If fertilizer quality needs to be improve in _____*(insert state name),* which players need to improve their performance? Please write your answer below.

22) How many operational fertilizer producers, blending plants are there in _____ *(insert state name)* State? Please provide an estimate if not aware of actual number.

Number of fertilizer manufacturers	
Number of fertilizer blenders	

Operating Fertilizer Manufacturer		Operating Blending Plants	
Name of company	Location of company (LGA)	Name of company	Location of company (LGA)

23) a. Are any of the blending plants unlicensed to your knowledge e.g. small scale, unsupervised back yard operations? Are you aware of this information?

1. [ ] Yes 2. [ ] No 3. [ ] Don't know

b. If yes, please explain how you are aware of this information:

Thank you for your time.

Please return this questionnaire in the self addressed envelope that was enclosed and deposit with the nearest FEDEX office.