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Bridging Nigeria's Fertilizer Supply-Demand Gap for Agricultural Transformation

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Abstract

Nigeria's fertilizer sector exhibits a persistent disconnect between national supply and farm-level use. Despite rapid growth in domestic production and increased private-sector participation, fertilizer adoption among smallholder farmers remains among the lowest in sub-Saharan Africa. This paper examines the key drivers of Nigeria's fertilizer supply–demand imbalance and its implications for agricultural transformation. Using national statistics, market data, and policy reviews, it identifies persistent barriers – including high distribution costs, inconsistent government policies, weak extension systems, limited credit access, and poor product quality – that constrain effective fertilizer use. It also assesses how export-oriented incentives and underdeveloped domestic markets influence local availability and pricing. The findings show that expanding production alone is insufficient to achieve meaningful agricultural change. Coordinated market reforms, stronger regulatory enforcement, improved delivery mechanisms, and targeted support to smallholder farmers are needed to improve affordability, access, and agronomic efficiency. The paper concludes with policy recommendations aimed at better aligning the fertilizer sector with Nigeria's long-term goals for productivity growth and food system resilience.

1. Introduction

Agriculture remains a central pillar of Nigeria's economy, contributing roughly 28.65 percent of GDP in Q3 2024 (NBS, 2024) and employing nearly 70 percent of the labor force, particularly in rural areas (FAO, 2017; World Bank, 2022; Amare, 2023; Oyelayo, 2025). Despite its potential and increasing budget allocations, the sector continues to be underfunded, with public investment falling far short of the 10 percent commitment set by the Maputo Declaration (KPMG, 2025). Consequently, agricultural productivity has remained low, contributing to persistent poverty and underdevelopment (Jayne et al., 2021). Productivity growth in Nigeria and much of sub-Saharan Africa lags behind global trends and remains insufficient to meet national food security and poverty reduction targets (Vibeke et al., 2020).

Structural challenges, including limited mechanization, weak input markets, and restricted access to finance, further constrain yields and undermine economic growth (Abe, 2025; Abraham, 2025). Soil fertility continues to decline due to continuous cultivation without adequate nutrient replenishment, reflecting poor soil management practices (Wanyama et al., 2009). To close these gaps, the adoption of improved agricultural technologies, particularly fertilizer, is essential (Liverpool-Tasie, 2017; Atata, 2020; Akpan et al., 2019).

Fertilizer is widely recognized as one of the most effective technologies for raising crop yields and transforming agricultural productivity in sub-Saharan Africa (Akpan et al., 2012b; Tonny & Swaibu, 2019). However, Nigeria's fertilizer use intensity remains far below global and regional benchmarks. In 2018, fertilizer application averaged only 19.74 kg/ha—below levels in Ghana (29.4 kg/ha), South Africa (72.8 kg/ha), Morocco (74.9 kg/ha), China (393.2 kg/ha), and Brazil (304.7 kg/ha) (FAO, 2020). Nigeria also falls short of the Abuja Declaration target of 50 kg/ha and the FAO recommendation of 200 kg/ha for sub-Saharan Africa. Between 2015 and 2019, Africa accounted for only 3.5 percent of global nitrogen and phosphorus fertilizer consumption and slightly above 2 percent of potassium use, with sub-Saharan Africa contributing less than 1 percent (FAO, 2020).

Successive Nigerian governments have implemented policies aimed at improving fertilizer availability and affordability – ranging from subsidies to import-substitution, privatization, and commercialization (Olomola, 2015; Gisaor & Gisaor, 2018). Yet these interventions, including the Growth Enhancement Support Scheme (GESS), have often produced limited and unsustainable results (Ayoola & Ayoola, 2016; Alabi & Adams, 2020). Crop output growth has remained slow and inconsistent, contributing to food deficits and rising imports. While fertilizer is essential for productivity gains, it must be complemented with improved agronomic practices; nevertheless, Nigeria's fertilizer use remains far below the threshold required to drive transformative and sustained productivity increases (FAO, 2021).

Multiple factors underpin this persistent gap. The issue extends beyond fertilizer quantities and prices to include regulatory weaknesses, institutional failures, and unequal access across the value chain. Although the Presidential Fertilizer Initiative (PFI) and related reforms have expanded domestic blending capacity and improved national availability, mixed incentives from past subsidy and procurement programs have shaped market behavior in ways that either crowd in or crowd out private-sector participation (Takeshima, 2012; IFDC, 2024). Regulatory and quality control challenges further complicate the landscape, with evidence of misbranded, adulterated, or under-weighted products undermining farmer trust and limiting the effective benefits of increased supply (Liverpool-Tasie, 2010; IFDC, 2013).

Given these dynamics, a comprehensive reassessment of Nigeria's fertilizer sector is needed to identify actionable pathways toward sustainable intensification and inclusive agricultural growth. This paper aims to inform evidence-based policy reforms that balance government intervention with market-oriented approaches, enhance efficiency across the fertilizer value chain, and improve smallholder farmers' access to affordable, high-quality inputs.

2. Fertilizer Demand and Supply in Nigeria

The dynamics of fertilizer demand and supply in Nigeria are central to national agricultural productivity and food security. Although Nigeria has significantly improved its domestic fertilizer production, a complex array of economic, structural, and informational barriers continues to limit effective demand.

Understanding these interactions is essential for designing policies that bridge the gap between potential and actual fertilizer use and enable the agricultural sector to reach its full potential.

2.1 Demand

The National Agricultural Sample Survey conducted by the National Bureau of Statistics (NBS) in 2022 estimates that Nigeria has approximately 40.2 million farming households. Given the scale of this agricultural population, one would expect a substantial and growing demand for fertilizer to enhance soil nutrients and increase crop yields. This expectation underscores the strategic importance of revitalizing fertilizer, blending plants and expanding domestic urea production capacity.

Field observations show that fertilizer demand in Nigeria is highly price-sensitive and depends heavily on smallholder farmers' ability to earn a profit from their outputs. A key question is: how do fertilizer prices compare to crop prices? When fertilizer becomes too expensive relative to crop output values, its use becomes unprofitable (Timmer, 1986). In such cases, farmers cut back or stop using fertilizer, often opting to cultivate more land rather than increase yields per unit of land. This pattern keeps yields and incomes low and erodes future purchasing power (Liverpool-Tasie, 2017).

Although Nigeria consumed about 1.64 million metric tons of fertilizer in 2023, the average application rate was only 19.74 kg/ha. This indicates highly fragmented demand and suggests that large farms capture a disproportionate share of fertilizer use, while smallholders are unable to afford adequate quantities (IFDC, 2024). However, price alone does not fully explain weak demand. Even when farmers can purchase fertilizer, perceived profitability is often low. Poor soil fertility, limited access to improved seeds and irrigation, and irregular rainfall all reduce yield response to fertilizer (Liverpool-Tasie et al., 2017).

Credit and liquidity constraints are also critical. Many farmers lack the cash or financing to purchase fertilizer at planting time. Weak agricultural extension services and limited access to soil testing further exacerbate this problem. Without reliable information on the appropriate type, quantity, and timing of fertilizer applications, farmers face high uncertainty and risk. These combined constraints lead to inefficient fertilizer use, suboptimal outcomes, and reduced willingness to invest in subsequent seasons.

Policy design and market trust strongly influence fertilizer use. The Growth Enhancement Support (GES) scheme demonstrated that well-designed subsidies could increase fertilizer uptake by about 16 percent (Takeshima, 2013; Alabi, 2020). However, uneven implementation, such as targeting errors, delivery delays, and administrative disruptions, has often reduced effectiveness and discouraged private-sector participation. Widespread concerns about fertilizer quality, including fake or diluted products, further undermine trust and reduce demand even when fertilizers are physically available.

Fertilizer consumption trends from 2010 to 2024 reflect structural changes in Nigeria's fertilizer market. Total use more than doubled, from 893,000 MT in 2010 to 1.86 million MT in 2024. Growth has been volatile, with a peak in 2021, a decline in 2022, and new highs thereafter. Consumption has increasingly shifted from finished fertilizers to raw materials for local blending. Urea has remained the dominant product, with annual consumption exceeding one million MT since 2020. Raw materials for NPK blends – including Diammonium Phosphate (DAP) and Muriate of Potash (MOP) – reached 179,244 MT and 191,184 MT in 2024, reflecting the deepening of investment in the Presidential Fertilizer Initiative (PFI). Ammonium sulfate also increased substantially to 388,778 MT in 2024, becoming a key nitrogen source in NPK production.

Fertilizer use varies significantly across regions, shaped by differences in farming systems, agricultural intensity, and market access. The North West consistently accounts for the largest share of national demand, rising from roughly 300,000 MT in 2017 to more than 520,000 MT in 2024, supported partly by increased adoption of compound blends enriched with micronutrients. In contrast, the South West, which is characterized by commercialized farming and high-value crops, peaked at 250,000 MT in 2021 before stabilizing around 140,000–160,000 MT in later years. The North Central and South South regions recorded moderate and variable patterns of use, while the North East and South East reported the lowest usage, though both regions experienced occasional surges. The increase in the North East in 2024 may reflect localized intensification or improved distribution systems.

2.2 Supply

While Nigeria's supply infrastructure has expanded significantly, persistent demand constraints and market inefficiencies continue to limit the impact on agricultural productivity. The revitalization of blending plants and improved access to raw materials, including imports of DAP and MOP, have increased fertilizer availability across the country and helped reduce seasonal shortages. These developments, if sustained, could stabilize input markets and make fertilizers more reliably accessible to farmers.

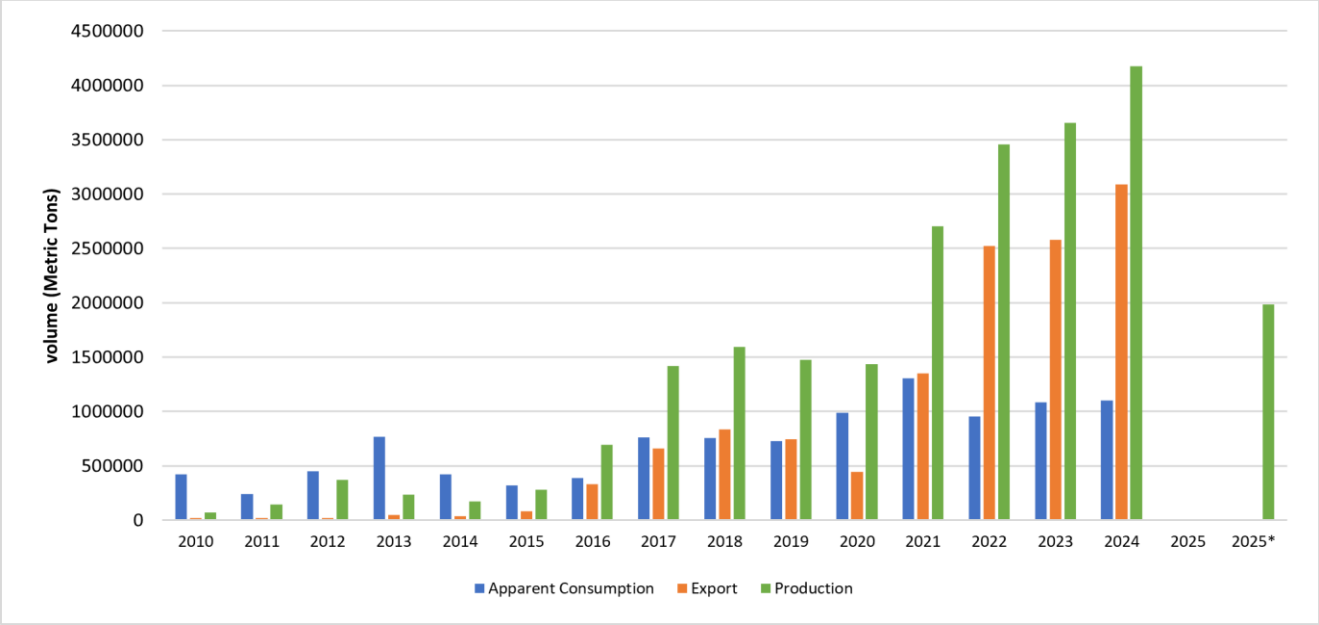

Figure 1: Nigeria Urea Production, Consumption, and Exports (2010 to 2025)

Source: Authors' creation using data from AfricaFertilizer

However, expanded supply alone is insufficient to stimulate proportional growth in fertilizer use. High fertilizer costs, driven by fluctuations in foreign exchange rates and reliance on imported raw materials, prevent supply improvements from translating into affordable retail prices. Past subsidy programs, notably the Fertilizer and Input Subsidy Programme, created market distortions and inefficiencies. Studies show that such programs sometimes displaced commercial fertilizer demand and encouraged rent-seeking (Takeshima, 2014). The PFI represents an effort to reduce distortions by combining public support with private sector participation, yet the long-term sustainability of this model still depends on maintaining market incentives, ensuring raw material availability, and stabilizing prices.

Nigeria's urea production capacity has increased dramatically and consistently. Production rose from 69,561 MT in 2010 to 4.18 million MT in 2024, an exponential, sixty-fold increase driven by major investments in urea manufacturing. This growth has transformed Nigeria from a net importer to a major global exporter of urea. Export volumes, negligible before 2016, surpassed 3 million MT in 2024. This clearly reflects a production strategy oriented toward external markets, leveraging Nigeria's gas resources to generate foreign exchange earnings.

Domestic consumption, meanwhile, has grown far more slowly and has fluctuated significantly from year to year. Consumption rose from 420,526 MT in 2010 to more than one million MT in 2024 but has not kept pace with production. The widening gap between production and consumption underscores that the domestic market is no longer the primary driver of the industry. Instead, the sector's sustainability increasingly depends on global demand and export markets.

A notable feature of the supply–consumption–export relationship is that since 2017, urea production has consistently exceeded the combined total of domestic consumption and exports. Export volumes closely track production, indicating that export markets, not domestic agriculture, are driving production expansion. Although domestic consumption is rising, it represents a declining share of total output. This dynamic positions Nigeria as a significant global player in the urea market, but also exposes the sector to international price volatility, logistical disruptions, and external demand shocks. For the domestic agricultural sector, the challenge has shifted from ensuring national availability to ensuring affordability, reliability, and timely access for farmers.

2.3 Interplay Between Demand and Supply

Nigeria's fertilizer production system operates through two major types of facilities. The first consists of large industrial urea manufacturing plants, including the Dangote Fertilizer Complex (3.0 million tonnes per annum), Indorama's Eleme facility (2.8 million tonnes per annum), and Notore's Onne plant (approximately 0.5 million tonnes per annum) (Dangote, 2025; IFDC, 2022; IFDC, 2025; Ornella, 2024). These three companies account for over 90 percent of Nigeria's urea production capacity, with Dangote and Indorama dominating the market and Notore contributing roughly 8 percent. Collectively, they provide a combined capacity of about 6.5 million tonnes per year, equivalent to approximately 737.79 metric tons per hour under continuous operation (IFDC, 2025). Total urea production reached 3.66 million tons in 2023, reflecting a 6 percent increase compared to 2022. Sustaining this output is heavily dependent on reliable gas supply, stable power, and efficient infrastructure, underscoring the vulnerability of Nigeria's urea industry to feedstock availability and logistical constraints (Peter, 2025).

The second category of production consists of a network of blending plants that mix raw materials to produce NPK (nitrogen–phosphorus–potassium) fertilizers and other compound blends tailored to crop and soil requirements. These blending plants have a combined rated capacity of 4,737 tons per hour and are distributed across Nigeria's six geopolitical zones (NSIA, 2016). The Presidential Fertilizer Initiative (PFI) played a pivotal role in rehabilitating these facilities, enabling them to produce NPK blends close to farm communities and reduce distribution costs. However, blending plants operate at widely varying scales. Many are small or medium-sized and produce only tens or hundreds of tons per day, depending on raw material availability and local demand. IFDC reports that these blending plants produced

674,863.40 tons of fertilizer in 2023, representing a 21.9 percent increase from 553,639 tons in 2022 (IFDC, 2018; NSIA, 2024).

Organic and biofertilizer production is expanding but remains far less organized than the urea and NPK sub-sectors. Numerous small enterprises produce compost and biofertilizers across the country, but production is highly fragmented. Policy documents consistently recommend integrating organic materials into national fertilizer strategies to improve soil health, reduce long-term acidity, and strengthen nutrient recycling. However, most organic fertilizer production remains limited to small-scale facilities, pilot initiatives, and niche markets. Achieving large-scale substitution of mineral fertilizers with organic alternatives would require substantial investment, improved quality control, and more structured value chains (Oviasogie, 2013; Alhassan, 2021).

3 Fertilizer Production in Nigeria

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4 Fertilizer Blending: Presidential Fertilizer Initiative (PFI)

The Presidential Fertilizer Initiative (PFI), established in 2016, was designed to address deep-seated bottlenecks within Nigeria's fertilizer sector. Its core objective was to transition from an import-dependent, subsidy-heavy system toward a domestically rooted model centered on local blending, improved distribution efficiency, and reduced fiscal risk. The PFI sought to resolve longstanding constraints that included high retail prices, seasonal shortages, rampant adulteration, weak private-sector engagement, and the inefficiencies associated with blanket subsidy programs.

According to the Nigerian Sovereign Investment Authority (NSIA), the PFI significantly expanded and rehabilitated domestic blending plants, improved access to raw materials through centralized procurement, and increased the distribution of locally blended NPK fertilizers. Between 2016 and 2025, more than 128 million bags of NPK were delivered to farmers under the program (NSIA, 2025). These achievements represent important supply-side gains with the potential to enhance agricultural productivity, stabilize food production, and strengthen national food security (NSIA, 2024).

Government involvement was central to the design and implementation of the PFI. Through a presidential mandate, the program was coordinated by NSIA, which managed financing arrangements, negotiated government-to-government supply agreements—particularly with Morocco's OCP Group—and oversaw raw material procurement. Federal ministries and regulatory agencies provided logistical support, facilitated quality control, and helped revive blending plants nationwide. Government also set uniform prices and supported blending facilities, enabling fertilizers to be produced and distributed at standardized, affordable rates. Although PFI is not a direct subsidy, it subsidizes key locally sourced components such as urea (36 percent) and limestone granules (27 percent). Imported components, including DAP from Morocco and MOP from Europe, account for 21 and 16 percent of NPK blends respectively (GON, 2017).

In contrast, most developed fertilizer markets rely on private-sector leadership, with governments focusing on regulation, environmental compliance, and market oversight rather than direct involvement in production and distribution (IFA, 2002; Fuglie, 2011). Historical evaluations of Nigeria's fertilizer programs show that government-driven distribution often displaces commercial markets. Takeshima et al. (2014) found that each kilogram of subsidized fertilizer distributed under the Federal Market Stabilization Program reduced commercial fertilizer demand by 0.19–0.35 kg.

Evidence from the GES e-voucher program highlights the importance of subsidy design. Wossen et al. (2017) report that the e-voucher system increased fertilizer use, raised maize yields by 26–30 percent, and improved household welfare. However, Kijima (2022), examining rice-producing households, found no significant increase in fertilizer use or income under a similar model, partly due to crowding-out effects in commercially active regions. These contrasting findings show that fertilizer impacts depend on context, market conditions, and program design.

PFI's supply-side success is clear, but its long-term impact on fertilizer use intensity remains uncertain. Most evidence comes from administrative reports rather than independent evaluations. Price reductions alone cannot guarantee increased adoption, especially given liquidity constraints, limited knowledge of effective use, and soil conditions that affect agronomic returns (Jimi, 2019). Studies also show that fertilizer price volatility can reduce application rates and shrink cultivated areas (Nomau & A., 2017), underscoring the need for stable and predictable market conditions.

PFI also faces sustainability challenges. Despite increasing domestic production, the sector remains heavily dependent on imported raw materials such as phosphate and potash. With rising exchange-rate instability and global fertilizer price spikes – especially after COVID-19 and the Russia–Ukraine conflict – local affordability remains vulnerable. Research on fertilizer market liberalization in Africa emphasizes this vulnerability and the need for shock-absorbing mechanisms within PFI's design (Itoandon & Iruwansi, 2024).

5 Fertilizer Imports and Exports in Nigeria.

5.1 Exports

Nigeria's fertilizer export landscape has undergone dramatic transformation since 2017, primarily driven by soaring domestic urea production and increasing global demand. Data from AfricaFertilizer indicate that between 2017 and 2024, Nigeria exported a cumulative 12.2 million MT of urea. Annual exports rose from 659,603 MT in 2017 to more than 3.08 million MT in 2024. This expansion reflects large-scale investments in manufacturing capacity, improved access to natural gas, and supportive policy frameworks that enabled Nigeria to emerge as a competitive global supplier. Export performance shows some volatility, including a drop to 446,850 MT in 2020, attributed to pandemic disruptions. However, exports rebounded to 1.35 million MT in 2021 and surpassed 2.5 million MT annually from 2022 onward. By 2024, urea accounted for more than 99.9 percent of total fertilizer exports, confirming the dominance of nitrogen-based products in Nigeria's export portfolio. While exports of NPK, MOP, and organic fertilizers remain limited, their presence suggests initial efforts toward diversification.

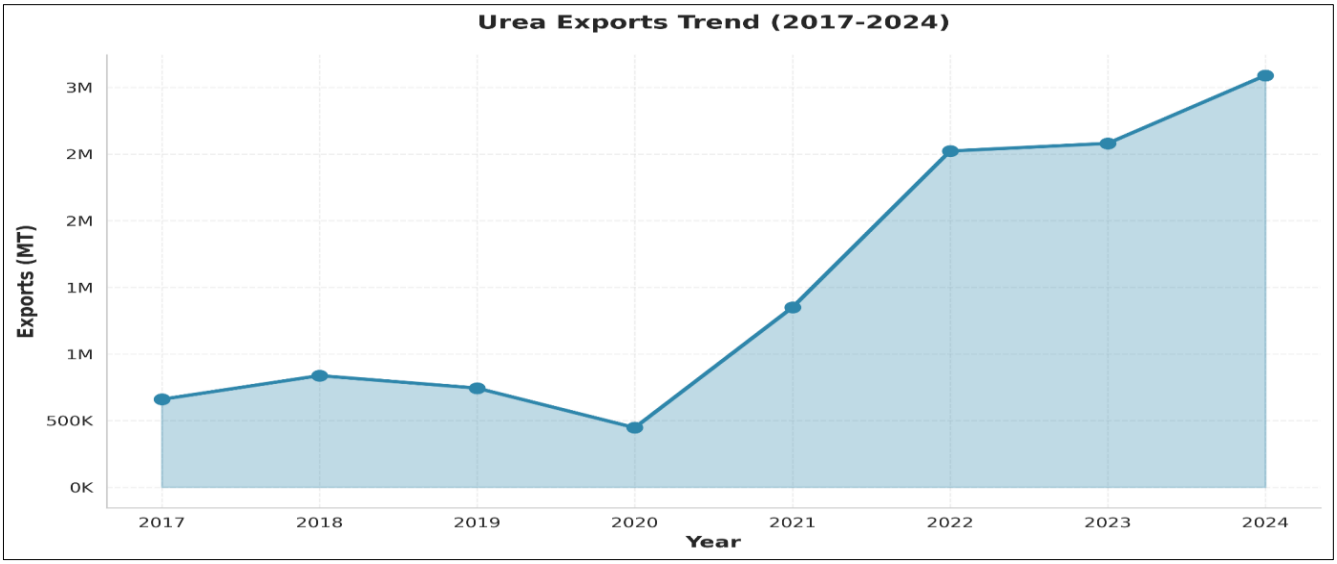

Figure 2: Urea Exports Trends from 2017 – 2024

Source: Authors' creation using data from AfricaFertilizer

Nigeria's fertilizer exports serve a wide range of global destinations. Mozambique and Brazil are the largest importers, receiving 2.42 million MT and 1.64 million MT respectively. Other key destinations include the United States (454,945 MT), Argentina (188,970 MT), and South Africa (157,661 MT). Regionally, Nigerian urea supports agricultural systems across West and Central Africa, with notable exports to Senegal, Benin, Sierra Leone, Angola, Gabon, and Ethiopia. Smaller volumes reach Europe

and Latin America, demonstrating Nigeria's expanding global footprint. These export patterns highlight Nigeria's growing importance in global fertilizer markets and its role in supporting agricultural productivity across multiple regions.

5.2 Imports

Nigeria's fertilizer import profile between 2010 and 2024 shows intense volatility rather than steady growth. Fertilizer imports fell sharply in 2011 from 693,641 MT in the previous year and then surged to nearly one million MT in 2013. This peak was followed by a notable decline by 2015, reflecting policy changes, shifts in domestic demand, and market restructuring. Imports stabilized between 2016 and 2018 at an average of roughly 704,000 MT, only to collapse dramatically in 2019, falling by nearly 80 percent to 131,437 MT. This collapse coincided with the government's border closures aimed at reducing smuggling, as well as the strengthening of the PFI, which prioritized local blending.

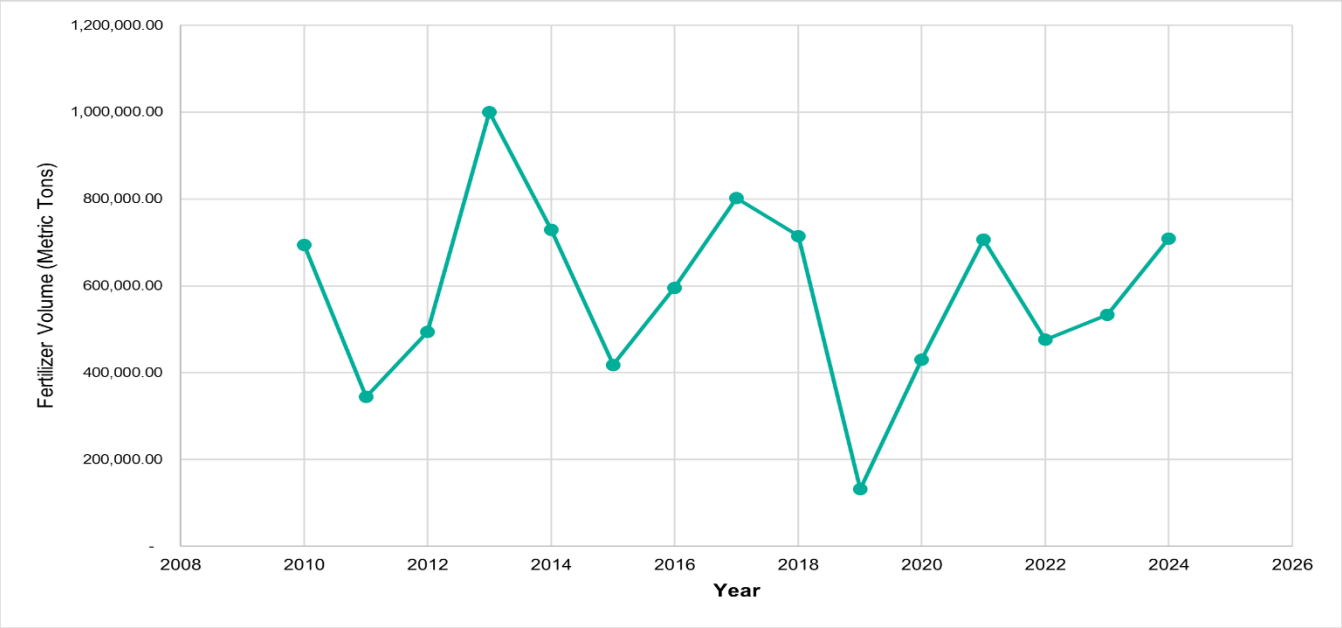

Figure 3: Total Fertilizer Imports from 2010 - 2024 in Metric Tons

Source: Authors' creation using data from AfricaFertilizer

The period from 2020 to 2024 shows a volatile recovery, with import volumes fluctuating but gradually returning to pre-2019 levels. By 2021 and 2024, imports rose to around 707,000 and 709,000 MT respectively. These data indicate that despite local production and blending capacity expansions, Nigeria still depends considerably on imported raw materials and finished fertilizers. Persistent import demand underscores ongoing structural gaps in domestic fertilizer supply chains.

Import volatility translates directly into domestic market instability, often contributing to unpredictable availability, sharp retail price increases, and reduced fertilizer affordability for farmers. These fluctuations undermine agricultural planning, increase production risks, and threaten food security. The evidence points to the need for more coherent and predictable policies to ensure stable fertilizer availability and reduce reliance on volatile international markets.

6 Fertilizer Price Trends

Between 2010 and 2019, fertilizer prices in Nigeria remained relatively stable, enabling farmers to plan input purchases with some degree of predictability. This stability was supported by import-driven supply chains, targeted subsidies (including the e-wallet system), and the expansion of domestic blending capacity under the PFI. Numerous evaluations of the GES program and historical analyses of fertilizer policies highlight how these interventions improved affordability even while seasonal and regional disparities persisted (Alabi, 2020; Balana, 2022).

Beginning in 2019–2020, however, fertilizer price stability deteriorated sharply. Global supply chain disruptions triggered by the COVID-19 pandemic reduced import reliability, increased transportation costs, and introduced significant market volatility. Research widely documents how pandemic-related restrictions affected fertilizer supply chains worldwide (Ilinova, 2021; Hanyabui, 2021).

The situation worsened in 2022 with the Russia–Ukraine war. Both countries are major exporters of nitrogen, phosphate, and potash fertilizers, and the conflict triggered sanctions, export restrictions, and a surge in natural gas and energy prices. Since natural gas is a primary feedstock for synthetic nitrogen fertilizers, global fertilizer prices soared to historic highs in 2022. Studies confirm rapid price transmission from global markets to import-dependent countries, worsening food security concerns (Arndt, 2023; Mishra, 2024).

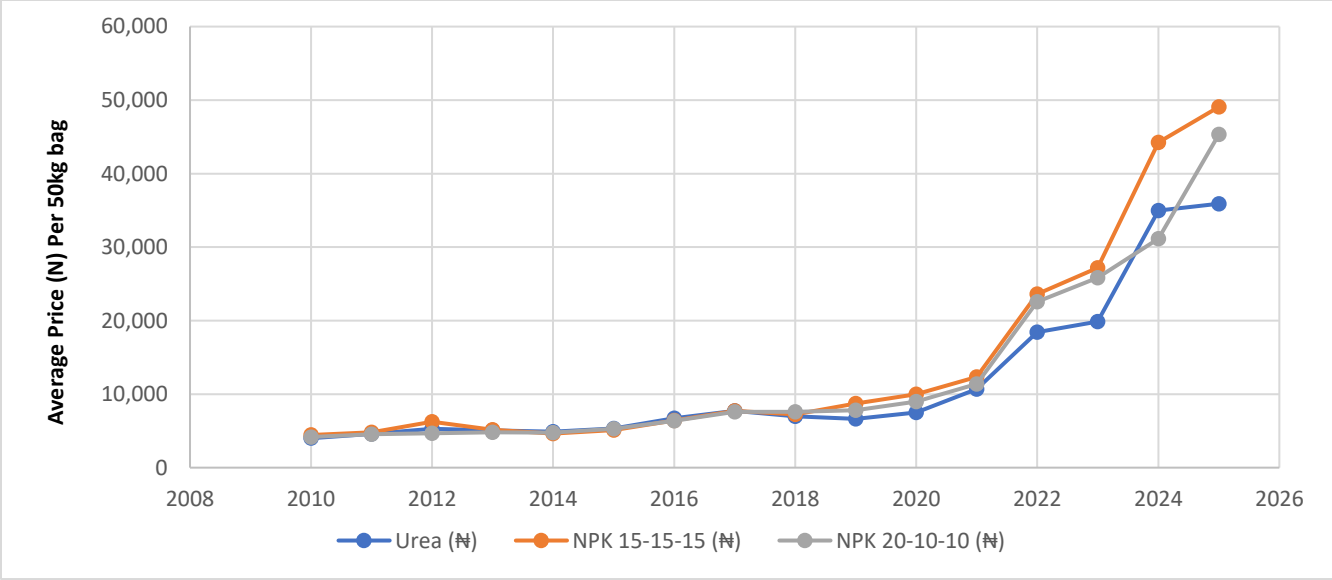

Figure 4: Fertilizer prices Trend (2010-2025).

Source: Authors' creation using data from AfricaFertilizer and Quantitative Engineering Design

These shocks were fully reflected in Nigerian retail markets. Prices for common fertilizer types such as urea, NPK 15-15-15, and NPK 20-10-10 more than doubled between 2021 and 2022. Prices moderated somewhat in 2023–2024 as global supply chains stabilized and PFI interventions increased domestic blending, yet retail prices and fertilizer-to-crop price ratios remain significantly higher than pre-pandemic levels. Exchange-rate depreciation, dependence on imported raw materials, and domestic logistics challenges continue to exert upward pressure on prices (IFDC, 2018; PFI).

Higher fertilizer prices have had direct consequences on farmer behavior. Surveys and market assessments show that farmers responded by reducing application rates, delaying purchases until late in the planting season, or shifting to less input-intensive production practices. These responses, while rational under constrained conditions, raise concerns about crop yields, food production, and overall agricultural resilience. Targeted subsidies and PFI interventions have offered partial relief but have not fully shielded farmers from global shocks (Mishra, 2024; Tikon, 2025).

7 Fertilizer Use Paradox in Nigeria

Despite the substantial expansion in domestic fertilizer production and blending capacity, fertilizer use among smallholder farmers in Nigeria remains persistently low. This paradox reflects a deep disconnect between national supply and farm-level demand. On the demand side, fertilizers remain financially out of reach for many rural households due to high prices, liquidity constraints, and limited access to formal credit markets (Palacios-López & Barrett, 2017). Even when fertilizers are physically available, poor rural infrastructure, rising transportation costs, and multiple market intermediaries inflate retail prices beyond levels that farmers perceive as profitable (Jayne, Mather, & Mason, 2016). Weak extension systems and limited dissemination of site-specific recommendations further reduce expected returns, discouraging adoption (Morris et al., 2007).

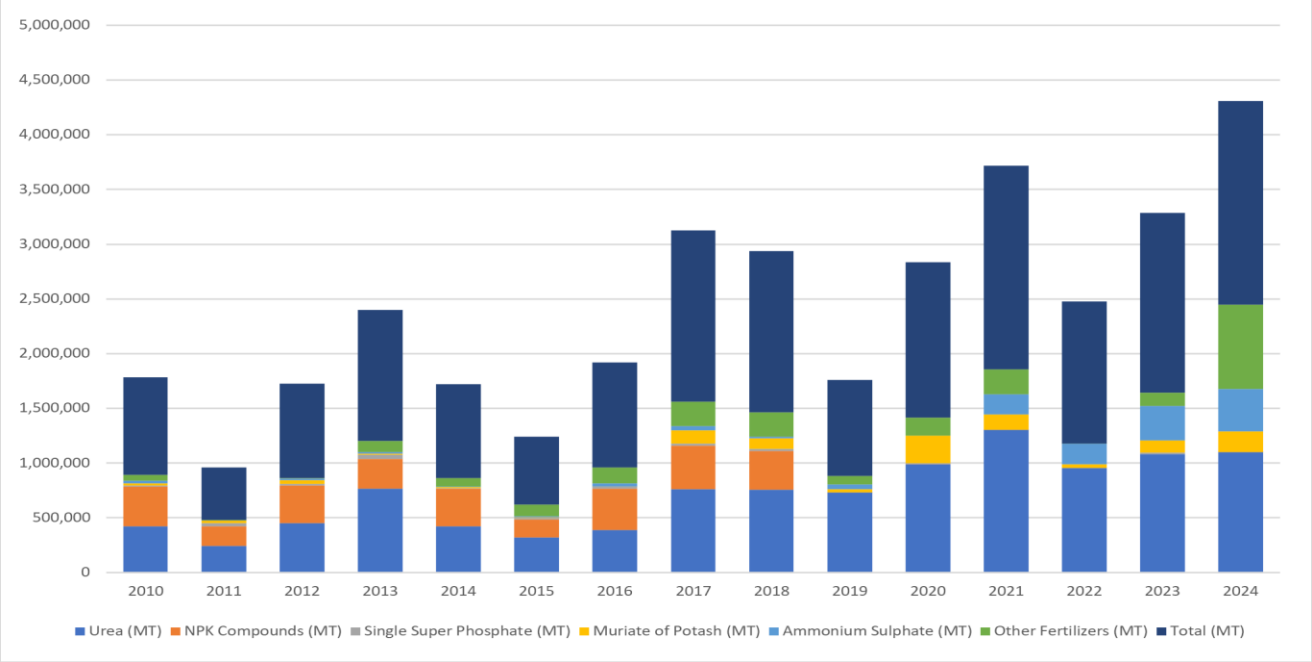

Figure 5: Fertilizer Consumption in Nigeria from 2010 – 2025

Source: Authors' creation using data from AfricaFertilizer

On the supply side, increases in domestic urea production and the revitalization of blending plants have not translated into timely, predictable, and farmer-responsive distribution. Market distortions, policy inconsistencies, and irregular government interventions continue to weaken private-sector incentives and disrupt supply chain efficiency (Takeshima, Nin-Pratt, & Diao, 2017). As a result, fertilizers remain both high-cost and high-risk for most farmers, limiting effective demand despite abundant national supply (Druilhe & Takeshima, 2013).

Nigeria's low fertilizer use has profound implications for agricultural productivity. Soil nutrient depletion remains one of the most binding constraints, particularly in the highly weathered Ultisols and Oxisols of southern Nigeria. With average fertilizer use around 20 kg/ha—one-tenth of FAO's recommended 200 kg/ha for sub-Saharan Africa—most farmers are unable to replenish soil nutrients lost through continuous cultivation. As a result, cereal yields rarely exceed 2.0 t/ha without fertilizer, compared to potential yields of 5–6 t/ha under adequate nutrient management. Poor nutrient-use efficiency, driven by soil acidity, phosphorus fixation, and imbalanced fertilizer application, further limits the effectiveness of fertilizers (Sheahan & Barrett, 2017).

Government interventions such as SURE-P and the National Fertilizer Quality Control (NFQC) Act were designed to address systemic inefficiencies, including corruption, distribution bottlenecks, and product adulteration. While the NFQC Act represents an important regulatory milestone, structural challenges persist. Farmers continue to rely heavily on blanket fertilizer formulations such as urea (46-0-0) and generic NPK blends (15-15-15), which do not reflect the diverse nutrient deficiencies across Nigeria's agroecological zones. Emerging evidence highlights the growing importance of micronutrients such as zinc, boron, and sulfur, particularly in intensively cultivated areas. Ignoring these deficiencies leads to nutrient imbalances, declining fertilizer efficiency, and, in some cases, negative environmental effects such as nitrate leaching (Druilhe & Barreiro-Hurlé, 2012).

Empirical studies underscore the advantages of tailored fertilizer formulations. Site-specific NPK blends consistently outperform generic formulations in raising maize and other staple crop yields. Integrated Soil Fertility Management (ISFM), combining mineral fertilizers with organic amendments, enhances soil organic carbon, improves nutrient cycling, and increases yields relative to either input alone. These findings highlight the need for a more nuanced, soil-responsive approach to fertilizer policy and practice (Morris et al., 2007; Jayne et al., 2016).

8 Conclusion and Policy Implications and Reform Priorities

Nigeria's fertilizer sector stands at a critical turning point. While the country has achieved remarkable supply-side growth – most notably a sixty-fold expansion in urea production since 2010 and a revitalization of domestic blending capacity – these achievements have not produced proportionate gains in farm-level fertilizer use or agricultural productivity. Production has increasingly oriented toward export markets, with more than 3 million MT of urea exported in 2024, while domestic consumption accounted for only 26 percent of total output.

The fundamental issue is a persistent misalignment between national production priorities and the needs of smallholder farmers, who constitute the backbone of Nigeria's food system. Exchange-rate volatility, dependence on imported raw materials, and fragmented distribution systems continue to constrain affordability and accessibility. Regulatory lapses and product adulteration undermine farmer confidence, while weak extension systems fail to provide site-specific agronomic guidance. Reliance on blanket fertilizer formulations further limits yield response and threatens long-term soil health.

Price shocks since 2020—driven by pandemic disruptions and the Russia–Ukraine conflict—have exacerbated existing constraints, pushing many farmers to reduce application rates or shift away from input-intensive practices. As a result, Nigeria's cereal yields remain between 2–3 times below achievable potential, and fertilizer use intensity remains one-tenth of recommended levels.

These findings make clear that supply-side expansion alone cannot deliver agricultural transformation. Achieving meaningful progress requires integrated reforms that address institutional weaknesses, improve market functionality, strengthen agronomic support systems, and prioritize affordability and quality for smallholder farmers. Without such reforms, Nigeria's fertilizer sector will continue to generate export revenue while failing to fulfill its essential role in driving sustainable, inclusive agricultural growth.

The analysis highlights several structural and market challenges that continue to constrain fertilizer use and limit Nigeria's agricultural productivity. Addressing these issues requires a set of coordinated policy reforms aimed at improving market efficiency, strengthening regulatory systems, and ensuring that fertilizer production and distribution effectively serve the needs of smallholder farmers. The following recommendations outline priority actions for realigning the fertilizer sector with national agricultural transformation goals

1. Rebalance production orientation toward domestic agricultural intensification: Nigeria must rebalance production incentives toward domestic agricultural intensification. Current industrial and trade policies largely favor export-oriented urea manufacturing, which limits the availability and affordability of fertilizers for smallholder farmers who drive national food production. To align sector performance with agricultural transformation goals, government should establish clear domestic supply targets and introduce mechanisms that guarantee minimum national allocations during periods of global price volatility. Industrial strategy must be recalibrated so that expanding urea capacity supports domestic productivity growth rather than export maximization alone.

2. Shift from blanket formulations to soil- and crop-specific nutrient management: Another priority is the transition from blanket fertilizer formulations to soil- and crop-specific nutrient management. The continued reliance on generic NPK blends across diverse agroecological zones reduces nutrient-use efficiency, depresses yield response, and contributes to long-term soil degradation. Strengthening the fertilizer value chain therefore requires expanding soil testing infrastructure, subsidizing farmer access to diagnostic services, and promoting region-specific fertilizer recommendations that incorporate emerging micronutrient deficiencies such as zinc, boron, and sulfur. Extension systems must also be equipped to deliver site-specific nutrient management advice, while blending plants should be incentivized to diversify production and supply tailored formulations rather than uniform blends.

3. Strengthen fertilizer quality assurance and regulatory enforcement: Enhancing fertilizer quality assurance and regulatory enforcement is equally essential. Persistent adulteration, mislabeling, and underweight bags undermine farmer confidence and significantly reduce the effective benefits of fertilizer use. Effective implementation of the National Fertilizer Quality Control (NFQC) Act demands strengthened laboratory and field inspection capacity, digital traceability systems connecting blending plants with distribution networks, and stringent penalties that deter fraudulent practices. Expanding farmer-friendly quality verification options—such as mobile testing and local inspection points—will further reinforce trust and promote responsible input use.

4. Develop robust mechanisms to manage fertilizer price and supply volatility: Nigeria must also develop more robust mechanisms to manage fertilizer price and supply volatility. Heavy dependence on imported raw materials, combined with exchange-rate fluctuations, exposes the sector to severe global shocks. Strategic reserves of key raw materials diversified long-term procurement agreements, and exploration of domestic phosphate resources are essential to improving supply stability. Complementary financial instruments, including hedging tools and forward contracts, can help protect both blenders and farmers from extreme price swings and ensure more predictable planning for agricultural production.

5. Reform subsidy frameworks to improve targeting, efficiency, and market sustainability: Subsidy policy must be reformed to balance affordability with long-term market sustainability. Historical evidence shows that poorly designed subsidy programs distort markets and crowd out private-sector participation. A more effective approach involves replacing blanket subsidies with targeted, digital voucher systems that strengthen private agro-dealer networks. Support should focus on resource-poor farmers using transparent digital identification systems and should be linked to complementary services such as soil testing, extension support, and access to credit. Clear sunset clauses and phased exit strategies are needed to ensure that subsidies enhance productivity without undermining the development of a competitive commercial fertilizer market

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