

From Donor Dependency to Local Ownership: Policy Options for Building a Sustainable Health Commodity Supply Chain in Nigeria

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Abstract

Sustainable access to essential medicines and health commodities remains a defining factor in the resilience, equity, and responsiveness of health systems worldwide. Low- and middle-income countries have historically depended on donor-funded procurement and parallel supply chains to address gaps in financing, forecasting, and last-mile distribution. While these arrangements have supported major public health gains, they also create structural vulnerabilities, including fragmented procurement processes, limited government stewardship, and inadequate long-term investment in national logistics capacities. Nigeria exemplifies this challenge, with donor agencies still accounting for a significant share of financing for commodities such as vaccines, antimalarials, HIV medications, and family-planning supplies. As donor contributions plateau and the national burden of disease evolves, Nigeria faces a critical need to transition from donor dependency to a system anchored in local ownership, domestic financing, and institutional accountability. This paper examines policy pathways for building a self-sustaining, country-led health commodity supply chain in Nigeria. It highlights strategic priorities including strengthening federal and state-level supply chain governance, implementing pooled procurement mechanisms, expanding use of digital logistics management systems, and fostering public-private partnerships for cold-chain and last-mile delivery. The analysis further emphasizes the need for predictable domestic funding streams through budget reforms, insurance expansion, and improved fiscal transparency. To support long-term sustainability, the paper proposes investments in local pharmaceutical manufacturing, workforce development, and integrated monitoring frameworks that link commodity availability to service-delivery outcomes. By outlining these actionable options, the study provides a roadmap for Nigeria to achieve greater autonomy, reduce supply disruptions, and build a resilient health commodity ecosystem capable of meeting population needs without overreliance on external donors.

Keywords: Health supply chain; Local ownership; Donor transition; Nigeria health policy; Commodity security; Health system sustainability

1. Introduction

1.1. Global evolution of donor-supported health commodity supply chains

Donor-supported health commodity supply chains have evolved from fragmented, disease-specific procurement efforts into coordinated global mechanisms that stabilize medicine and diagnostic availability across low- and middle-income countries [3]. Early donor initiatives were often reactive, addressing gaps in malaria, HIV, and vaccine access through parallel distribution channels that operated separately from national systems [1]. Over time, multilateral organizations introduced pooled procurement, structured financing, and standardized quality assurance measures, improving consistency and reducing costs across regions [7]. Technical support programs also expanded, equipping countries with

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forecasting and last-mile management tools that enhanced supply reliability [5]. However, despite these advancements, donor systems frequently centralized decision-making and funding outside beneficiary governments, limiting opportunities for long-term national ownership [8]. This created mixed outcomes where countries benefited from reliable supplies but struggled to integrate donor mechanisms into broader health logistics frameworks [4].

1.2. Nigeria's historical reliance on donor financing and procurement

Nigeria's access to essential health commodities has long depended on substantial donor financing, particularly for HIV, tuberculosis, malaria, reproductive health, and immunization programs [6]. Donors often covered full procurement pipelines from quantification to delivery compensating for domestic funding gaps within the national system [4]. Parallel supply chains funded and managed by external partners frequently operated with greater efficiency and predictability than state-led arrangements, reinforcing their central role in national commodity security [9]. While this support reduced immediate fiscal pressure, it also entrenched structural dependency as domestic financing failed to scale proportionately [2]. Nigeria's hybrid procurement environment, combining donor-managed pipelines with government purchases, produced fragmentation, inconsistencies in quality control, and limited institutional control over supply planning [3]. Over time, these dynamics shaped a system in which external mechanisms remained essential for maintaining stable commodity availability across public health programs [7].

1.3. Emerging pressures: declining donor funding, rising disease burden, population growth

Multiple pressures are challenging the sustainability of Nigeria's donor-supported supply chains. Declining growth in global health financing is constraining external allocations for key disease programs, creating uncertainty for countries dependent on such support [8]. Meanwhile, Nigeria faces a rising burden of communicable and noncommunicable diseases, expanding demand for medicines and diagnostics beyond what donor budgets can accommodate [1]. Rapid population growth further amplifies consumption needs, intensifying pressure on already strained supply chain systems [4]. Together, these dynamics highlight the urgent need for Nigeria to enhance domestic financing and governance capacity to ensure long-term commodity stability [6].

1.4. Study objectives, scope, and article structure

This study examines policy options for transitioning Nigeria from donor dependency toward sustainable, locally owned health commodity supply chains. It assesses financial, regulatory, operational, and institutional determinants of transition readiness while drawing on relevant international models for adaptation [5]. The scope covers procurement reforms, financing mechanisms, logistics architecture, and governance frameworks influencing nationwide commodity availability [2]. The article is structured to flow from conceptual foundations to comparative insights, diagnostic analysis, proposed reforms, and implementation pathways, ensuring coherence and clarity [9]. This approach provides a practical, evidence-based roadmap for strengthening national autonomy and long-term supply chain resilience [7].

2. Conceptual framework and analytical model

2.1. Defining local ownership in health commodity systems

Local ownership in health commodity systems refers to the capacity of national institutions to independently finance, govern, and manage all stages of commodity procurement, distribution, and quality assurance [10]. It emphasizes domestic decision-making authority, predictable national funding, and strong institutional structures capable of sustaining health supply chains without overreliance on external partners [7]. In practice, local ownership requires alignment between national policies, institutional mandates, and operational frameworks across federal, state, and facility levels, ensuring that supply chain activities operate under coherent national leadership [14]. It also implies a shift from donor-driven parallel systems toward integrated, country-led mechanisms that embed accountability, transparency, and long-term sustainability [9]. Achieving this requires robust regulatory oversight, skilled supply chain personnel, efficient data use, and the ability to negotiate pricing, manage market risks, and maintain adequate reserves of essential commodities [15]. Ultimately, local ownership is not simply a funding transition; it represents a broader institutional shift toward strategic autonomy, where national systems can forecast needs, procure efficiently, oversee quality, and deliver commodities reliably under routine and emergency conditions [13].

2.2. The donor-to-local transition continuum: finance, governance, operations

The donor-to-local transition is a progressive continuum involving financial, governance, and operational shifts that collectively determine a country's readiness for autonomy [12]. Financial transition entails gradually increasing domestic funding for priority commodities while reducing reliance on external grants, requiring budget reforms, improved fiscal predictability, and sustainable health financing mechanisms [8]. Governance transition shifts authority

for planning, procurement, monitoring, and accountability to national institutions, ensuring policies reflect local priorities rather than donor-driven agendas [16]. Operational transition focuses on strengthening domestic supply chain systems including forecasting, warehousing, logistics, and last-mile delivery to maintain reliability once donor-supported parallel systems diminish [7]. Movement along this continuum is rarely linear; countries often progress in one dimension while lagging in others due to political, economic, or institutional constraints [11]. Successful transition requires coordination between government ministries, donor agencies, private sector actors, and regulatory bodies to prevent gaps in commodity availability during the shift toward local stewardship [9]. By viewing transition as a phased continuum rather than a binary shift, policymakers can identify strategic entry points and prioritize investments aligned with Nigeria's evolving system capacity [15].

2.3. Analytical framework for assessing transition readiness

Assessing transition readiness requires an analytical framework that evaluates a country's institutional, financial, and operational capacity to manage health commodity systems independently [10]. The framework typically examines four pillars: governance effectiveness, financing adequacy, supply chain performance, and regulatory strength [14]. Governance assessment focuses on institutional clarity, coordination mechanisms, and the extent of national leadership in decision-making [7]. Financing assessment evaluates the predictability and sufficiency of domestic budgets, alongside the presence of innovative mechanisms capable of replacing donor funding [13]. Supply chain performance is reviewed through indicators such as forecasting accuracy, procurement efficiency, warehousing quality, and distribution stability [12]. Regulatory assessment considers quality assurance systems, pharmacovigilance capacity, and compliance enforcement. Together, these dimensions provide a holistic understanding of whether Nigeria can absorb increasing responsibility without compromising commodity security or disrupting essential health services [15].

2.4. Key indicators: financial sustainability, supply reliability, institutional autonomy

Key indicators guide measurement of progress toward local ownership. Financial sustainability indicators assess domestic budget allocation, funding predictability, and the proportion of commodities financed locally, revealing how well Nigeria can withstand donor reductions [16]. Supply reliability indicators examine stockout rates, procurement timeliness, and distribution performance, highlighting the system's resilience during demand fluctuations [8]. Institutional autonomy indicators evaluate governance leadership, regulatory authority, and the extent of national control over procurement decisions, ensuring alignment with country priorities rather than external agendas [11]. Combined, these indicators help policymakers identify strengths, gaps, and targeted reforms necessary for a seamless donor-to-local transition [9].

3. Overview of Nigeria's current health commodity supply chain

3.1. Architecture of Nigeria's supply chain (national to last mile)

Nigeria's health commodity supply chain operates through a multilayered architecture beginning at the national level, where policy, procurement, and central warehousing functions are coordinated by federal institutions [19]. At this level, quantification, financing decisions, and procurement planning occur, supported in many cases by donor-implemented technical programs [15]. Commodities procured nationally are routed through central medical stores and zonal hubs responsible for bulk storage and inter-state distribution [20]. States then manage secondary warehouses that aggregate supplies for onward distribution to local government areas and primary health facilities. This middle tier serves as the operational link between national procurement systems and frontline service delivery points [16]. The last-mile network consists of a mix of public hospitals, primary health centers, and private facilities, each relying on periodic distribution cycles or facility-led requisition systems depending on state arrangements [22]. Parallel supply routes created by donor programs often operate alongside government channels, offering reliability for specific diseases but contributing to structural fragmentation [14]. This multi-level configuration shapes how commodities flow, how decisions are made, and where bottlenecks emerge across the national system.

3.2. Commodity categories heavily funded by donors (HIV, TB, malaria, RMNCAH)

Donor funding in Nigeria remains concentrated in key high-burden disease areas, particularly HIV, tuberculosis, and malaria programs, where external partners account for the majority of commodity costs [18]. Antiretroviral medicines, HIV test kits, and viral load commodities are primarily financed and procured through donor-led mechanisms, reflecting long-standing global investments in epidemic control [21]. Similarly, TB programs rely heavily on externally funded diagnostics, medicines, and programmatic support that ensure nationwide access to treatment services [15]. Malaria programs are supported through donor procurement of rapid diagnostic tests, artemisinin-based combination therapies, and preventive commodities such as insecticide-treated nets [19]. Reproductive, maternal, newborn, child,

and adolescent health (RMNCAH) programs benefit from targeted donor financing for contraceptives, essential maternal medicines, and selected vaccines, supplementing limited domestic allocations [17]. While these investments significantly improve access to essential commodities, they reinforce dependence in areas where domestic financing has not increased proportionately [14].

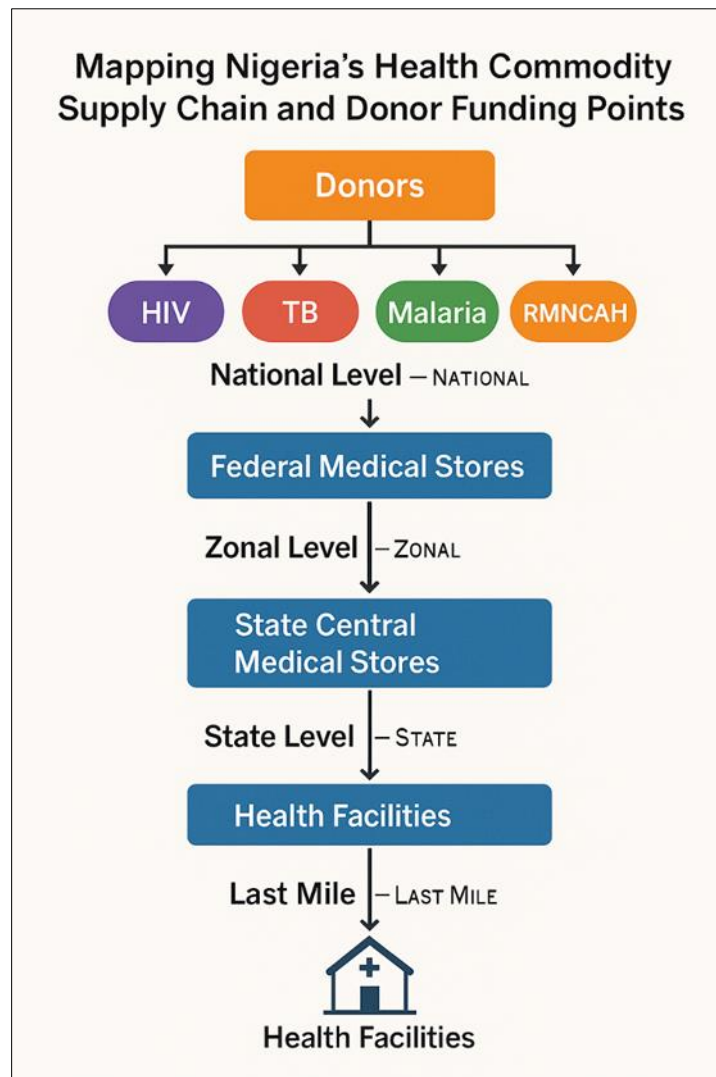


Figure 1 Mapping Nigeria's Health Commodity Supply Chain and Donor Funding Points.

3.3. Institutional roles: government, donors, private sector, NGOs

Nigeria's health commodity system involves multiple institutions whose roles shape the effectiveness, coordination, and sustainability of supply chain operations [20]. The federal government provides overall policy direction, sets procurement rules, and manages central-level quantification and financing decisions through key agencies responsible for health planning and logistics oversight [16]. State governments manage secondary storage and distribution structures, serving as intermediaries between national procurement flows and facility-level operations [22]. Donors and development partners contribute substantial financial resources, technical expertise, and parallel procurement systems that enhance reliability for specific disease programs but may reduce incentives for domestic investment [14]. International NGOs and implementing partners operationalize donor-funded programs by offering warehousing, distribution, and capacity-building support, often filling gaps in government-managed systems [18]. The private sector comprising manufacturers, distributors, logistics providers, and retail pharmacies plays a growing role in commodity production and last-mile delivery for both essential medicines and over-the-counter products [21]. However, limited regulatory enforcement and variable quality management practices challenge integration between public and private channels. Collectively, these actors form an interdependent ecosystem whose alignment determines the resilience and sustainability of national supply chains [19].

3.4. Current vulnerabilities and fragmentation

Nigeria's supply chain faces persistent vulnerabilities stemming from fragmented governance, parallel donor systems, and uneven capacity across federal, state, and facility levels [22]. Reliance on donor-funded commodities skews budgeting incentives, weakening efforts to expand domestic procurement responsibility [17]. Poor data visibility and inconsistent forecasting practices create supply imbalances that lead to stockouts or overstocks across regions [20]. Infrastructure limitations and variable state-level management further disrupt distribution reliability [14]. These vulnerabilities collectively undermine system cohesion and highlight the need for stronger alignment between donor mechanisms and national structures to support a sustainable path toward local ownership [16].

4. Drivers of donor dependency and transition barriers

4.1. Financial dependency and weak domestic health budgets

Nigeria's sustained dependence on donor financing is deeply rooted in chronic underinvestment in the national health sector, where public spending remains significantly below international benchmarks [24]. Limited fiscal space, competing national priorities, and structural budget rigidities reduce the government's ability to allocate predictable resources for essential medicines and diagnostics [20]. Donors often fill these gaps by covering a substantial portion of procurement costs for high-burden disease programs, creating a cycle where external funds become the de facto financing mechanism for critical commodity categories [27]. Domestic budget allocations frequently fluctuate, with delayed releases and off-budget expenditures further constraining continuity of supply planning [22]. The inability to mobilize stable domestic revenue streams whether through health insurance expansion, earmarked taxes, or pooled financing reinforces this dependency, as national systems struggle to sustain commodity pipelines independently [29]. Consequently, financial vulnerabilities remain a central barrier to transition, weakening national autonomy and limiting the government's capacity to shape procurement priorities, negotiate market prices, or develop long-term investment strategies for supply chain strengthening [26].

4.2. Limited procurement autonomy and fragmented financing pools

Fragmented financing arrangements undermine Nigeria's procurement autonomy, as disease-specific donor grants operate through parallel systems with distinct planning, budgeting, and reporting cycles [23]. These separate pools limit the government's control over how resources are allocated and weaken harmonization across programs [20]. Donor-managed procurement structures often demonstrate higher efficiency and reliability, which inadvertently disincentivizes federal investment in strengthening national procurement capacity [25]. The coexistence of multiple financing channels public budgets, donor grants, vertical program funds, and ad hoc state allocations creates misalignment in quantification, forecasting, and supply planning. As a result, Nigeria's national institutions struggle to coordinate procurement schedules, consolidate demand, or leverage economies of scale, perpetuating long-term reliance on external systems [28].

4.3. Infrastructure deficits: warehousing, cold chain, last-mile delivery

Table 1 Major Drivers of Donor Dependency and Corresponding Systemic Weaknesses in Nigeria

Major Drivers of Donor Dependency	Corresponding Systemic Weaknesses in Nigeria
Chronic underfunding of the health sector	Insufficient domestic budgets for essential medicines; unpredictable funding flows; delayed budget releases.
High donor financing for HIV, TB, malaria, and RMNCAH programs	Limited fiscal responsibility for priority commodities; weak national prioritization of long-term financing.
Fragmented procurement and parallel donor systems	Inconsistent quantification, duplication of efforts, poor coordination between federal and state levels.
Weak regulatory oversight and quality assurance capacity	Dependence on donor-led QA systems; limited laboratory capacity; risk of substandard or falsified products.
Inadequate infrastructure for storage, cold chain, and last-mile delivery	Commodity spoilage, stockouts, high distribution costs, limited system resilience.
Shortage of skilled supply chain professionals	Reliance on donor-funded technical assistance; inconsistent operational performance across regions.

Poor data visibility and weak digital systems	Ineffective forecasting, inventory inaccuracies, lack of evidence-based planning.
Limited local pharmaceutical manufacturing and API production	High import dependency; vulnerability to global supply shocks and currency fluctuations.
Governance and coordination gaps across ministries and agencies	Overlapping mandates, weak accountability, and fragmented leadership in commodity management.

Infrastructure limitations across Nigeria's supply chain constrain the system's ability to manage commodities without external support. Many central and state warehouses face inadequate storage capacity, outdated equipment, and insufficient environmental controls, all of which degrade commodity integrity and increase operational inefficiencies [22]. Cold-chain systems essential for vaccines and temperature-sensitive medicines suffer from inconsistent power supply, maintenance gaps, and uneven coverage across regions [24]. Last-mile delivery is often hindered by poor road networks, limited transport vehicles, and inconsistent logistics funding, creating bottlenecks that donors frequently address through parallel distribution mechanisms [21]. These deficiencies increase operational dependence, as donor programs provide modern warehouses, outsourced logistics, and dedicated last-mile delivery support to maintain reliability [29].

4.4. Weak regulatory capacity and inconsistent quality assurance

Regulatory capacity remains uneven across the Nigerian health commodity landscape, affecting oversight of procurement, manufacturing quality, and supply chain integrity [20]. Weak enforcement mechanisms and limited laboratory testing capacity reduce the ability of national regulators to ensure the quality of imported and locally produced commodities, prompting donors to implement their own quality assurance systems [27]. This parallel approach strengthens product reliability but sidelines domestic institutions, slowing progress toward regulatory autonomy [23]. Furthermore, inconsistent inspection routines, inadequate pharmacovigilance reporting, and limited post-market surveillance contribute to the persistence of substandard products in circulation [28]. As donors continue to apply rigorous quality requirements, national regulators struggle to match these standards without substantial technical and financial support [26].

4.5. Human resource and institutional governance constraints

Human resource shortages and fragmented governance structures significantly hinder Nigeria's ability to manage health commodity systems independently. Supply chain personnel often work without standardized training, clear career pathways, or dedicated operational budgets, limiting the technical capacity required for forecasting, quantification, and distribution management [22]. Institutional governance challenges such as overlapping mandates, weak coordination between ministries, and inconsistent state–federal alignment further complicate effective system oversight [25]. Donor programs frequently fill these gaps by embedding technical advisors, seconded staff, and implementing partners who support daily operations, inadvertently reinforcing long-term dependency [21]. Limited investment in leadership development, organizational reform, and retention strategies continues to constrain the emergence of a strong national stewardship structure capable of driving system-wide improvements [29].

5. Comparative insights: transition strategies from other countries

5.1. Country example 1: Rwanda – progressive government-led financing transition

Rwanda represents one of Africa's most successful examples of transitioning from donor-led support toward government-driven financing of essential health commodities [29]. The country pursued a deliberate strategy that combined strong political commitment with incremental expansion of domestic health budgets, allowing for predictable increases in government procurement over time [26]. Rwanda's pooling of funds through the national health insurance scheme and earmarked taxes strengthened fiscal sustainability, gradually reducing reliance on external partners for essential medicines and vaccines [31]. Centralized procurement reforms improved demand consolidation and reduced duplication, enabling the government to negotiate better pricing and long-term supplier agreements [25]. The country also invested heavily in logistics capabilities, professionalizing its supply chain workforce and improving data visibility, which further enhanced operational autonomy [33]. Donors continued to play complementary roles, but with the government retaining strategic leadership over planning and resource allocation rather than depending on parallel distribution structures [28]. Rwanda's experience demonstrates that sustained political ownership, financial discipline, and institutional coordination can collectively accelerate progress toward self-reliant health commodity systems [34].

5.2. Country example 2: Ethiopia – integrated procurement reforms and local manufacturing

Ethiopia's transition efforts have centered on strengthening its national procurement and supply systems while simultaneously expanding local pharmaceutical manufacturing capacity [30]. The establishment of the Pharmaceutical Supply Agency (PSA) created a unified national procurement authority with centralized forecasting, purchasing, and distribution responsibilities, replacing previously fragmented structures [27]. This reform improved supply reliability and enabled more transparent coordination with donors, ensuring that external support complemented national priorities rather than operating independently [25]. Ethiopia also implemented aggressive strategies to expand local manufacturing, including incentives for technology transfer, tax exemptions, and regulatory reforms to encourage domestic production of essential medicines [32]. These initiatives reduced import dependency and improved price stability, particularly for high-volume commodities. In parallel, the government strengthened inventory management, upgraded warehousing infrastructure, and adopted digital tools to improve data accuracy and reduce operational losses [35]. Donors supported these reforms through targeted technical assistance, but the Ethiopian government maintained leadership over strategic planning and procurement governance [28]. Ethiopia's model demonstrates how integrated procurement reforms combined with local production can significantly enhance system resilience.

5.3. Country example 3: Ghana – National Health Insurance role in commodity financing

Ghana offers another relevant example through its use of the National Health Insurance Scheme (NHIS) as a mechanism for expanding domestic financing of essential health commodities [33]. By using pooled contributions, the NHIS created a stable source of funds that reduced the country's reliance on donor-supported procurement for medicines on the national essential list [26]. The system allowed facilities to purchase commodities using reimbursed funds, improving local decision-making flexibility and reducing delays associated with centralized budget disbursements [29]. Ghana further strengthened its procurement and supply chain governance by implementing framework contracting, enhancing quality assurance, and increasing regulatory oversight of both public and private suppliers [27]. Donor-funded programs remained active in vertical disease areas, but the NHIS played a critical role in broadening the proportion of commodities financed domestically, thereby laying the groundwork for future transition [31]. The alignment between insurance reimbursement mechanisms and facility-level procurement autonomy supported efficiency and improved commodity availability, while also fostering accountability through structured monitoring systems [34].

Comparative Transition Strategies and Their Outcomes in Selected African Countries		
Transition Strategy		Outcomes
	Progressive Government-led Financing Transition	Increased domestic health budget allocation and reduced donor dependence [27]
	Integrated Procurement Reforms and Local Manufacturing	Diversified procurement channels and strengthened domestic production capacity [28]
	National Health Insurance Role in Commodity Financing	Improved financial protection and stable funding for essential medicines [26]

Figure 2 Comparative Transition Strategies and Their Outcomes in Selected African Countries [26].

5.4. Lessons applicable to Nigeria

Lessons from Rwanda, Ethiopia, and Ghana reveal several principles directly relevant to Nigeria's pursuit of sustainable, locally owned health commodity systems [35]. First, strong political commitment and consistent domestic financing seen in Rwanda demonstrate the importance of predictable government allocations to gradually reduce donor dependency [28]. Second, Ethiopia's experience shows that centralizing procurement and strengthening regulatory

authority can significantly improve price leverage and reduce fragmentation across states and programs [30]. Third, Ghana's use of national health insurance illustrates how pooled financing can enhance purchasing power, create fiscal stability, and support facility-level autonomy in commodity management [33]. Across all three countries, coordinated donor engagement was critical, with external partners aligning their roles to reinforce not replace national leadership [25]. For Nigeria, adopting these principles would require harmonizing procurement systems, expanding fiscal space for essential commodities, strengthening regulatory oversight, and enhancing human resource capacity at all supply chain levels [29]. These comparative insights provide a roadmap for translating international lessons into feasible, context-specific reforms for Nigeria's transition.

6. Policy options for building a sustainable local supply chain

6.1. Domestic financing strategies

6.1.1. Increasing budgetary allocation efficiently

Nigeria's transition toward locally financed health commodity systems depends heavily on the government's ability to expand and efficiently manage domestic health budgets [33]. Historically low public spending has restricted fiscal space for procuring essential medicines and diagnostics, reinforcing long-term reliance on donor support [36]. Increasing budgetary allocation must therefore be paired with reforms that improve expenditure efficiency, reduce leakages, and promote transparent prioritization of commodities with the greatest population-level impact [32]. Strengthening medium-term expenditure frameworks can stabilize funding flows and support predictable procurement planning across national programs [37]. In addition, aligning budget releases with supply planning cycles reduces delays that frequently disrupt quantification, tendering, and distribution activities. Improved fiduciary oversight is also essential to ensure that expanded allocations translate into measurable improvements in availability and affordability of essential commodities [39]. Together, these measures support a more sustainable platform for domestic commodity financing.

6.1.2. Innovative financing: health tax, insurance, pooled procurement

Table 2 Policy Options and Expected Impact on Supply Chain Sustainability in Nigeria

Policy Option	Expected Impact on Supply Chain Sustainability
Increase domestic budget allocation for essential medicines	Enhances financial predictability; reduces commodity stockouts; builds long-term autonomy from donor financing.
Implement innovative financing (health taxes, insurance expansion, pooled procurement)	Diversifies revenue streams; strengthens fiscal resilience; improves purchasing power and price negotiation.
Centralize and harmonize national procurement systems	Reduces duplication and fragmentation; improves efficiency, transparency, and supplier performance.
Strengthen regulatory capacity (NAFDAC, quality control labs, post-market surveillance)	Ensures quality assurance; reduces dependence on donor-led QA systems; protects supply integrity.
Expand local pharmaceutical manufacturing and API production	Lowers import reliance; stabilizes commodity availability; supports industrial development and economic resilience.
Digitize logistics management (e-LMIS, inventory dashboards, real-time monitoring)	Improves visibility, forecasting accuracy, and accountability; reduces wastage and data gaps.
Rehabilitate and modernize warehousing and cold chain infrastructure	Protects commodity quality; enhances system reliability and readiness for transition.
Professionalize the supply chain workforce (training, certification, structured career paths)	Strengthens operational consistency; reduces reliance on donor technical assistance; builds long-term institutional capacity.
Strengthen public-private partnerships for logistics and last-mile delivery	Expands distribution coverage; improves last-mile reliability; leverages private sector efficiency.
Establish transition risk mitigation measures (buffer stocks, contingency contracts)	Protects against supply disruptions during donor withdrawal; enhances system resilience.

Innovative financing mechanisms can supplement government budgets and diversify Nigeria's commodity funding base. Health-focused taxes such as levies on tobacco, alcohol, or telecommunications offer predictable revenue streams that several African countries have leveraged to strengthen pharmaceutical procurement [38]. Expanding the national health insurance scheme can further pool financial risk and mobilize resources for essential medicines through structured reimbursement channels [33]. Pooled procurement across states and tertiary institutions can reduce duplication, consolidate demand, and increase price negotiation power, leading to more efficient use of limited resources [35]. Leveraging public-private financing models for targeted commodity categories may also introduce new capital sources while maintaining public stewardship [32]. These mechanisms collectively enhance financial resilience and reduce exposure to fluctuations in donor contributions.

6.2. Strengthening national procurement and supply governance

Reforming procurement and supply governance is essential for reducing fragmentation and improving Nigeria's transition readiness. Centralizing procurement functions while maintaining strategic engagement with states can streamline planning, consolidate demand, and eliminate inefficiencies caused by parallel purchasing mechanisms [34]. Strengthened governance structures should include clearer role delineation across federal and state actors, standardized operating procedures, and stronger regulatory oversight to ensure adherence to quality and transparency requirements [32]. Implementing framework agreements and multi-year supplier contracts can enhance price stability, reduce tendering delays, and improve supplier performance monitoring [39]. Enhancing professionalization of the supply chain workforce through competency-based training and structured career paths supports more consistent operational performance across all levels of the system [36]. Furthermore, harmonizing donor and government procurement cycles improves coordination, enabling external partners to reinforce national priorities rather than operating through siloed systems [40]. Effective governance reforms therefore serve as an anchor for sustainable local ownership.

6.3. Enhancing local pharmaceutical manufacturing and APIs

Strengthening Nigeria's pharmaceutical manufacturing sector is critical for reducing import dependency and improving supply chain resilience. Expanded investment in local production of finished pharmaceutical products and active pharmaceutical ingredients (APIs) can help stabilize national supply, reduce foreign exchange pressures, and strengthen regional competitiveness [32]. Achieving this requires targeted policy reforms, including tax incentives, subsidized credit lines, and regulatory fast-tracking for quality-assured local manufacturers that meet Good Manufacturing Practice (GMP) standards [37]. Furthermore, partnerships with international firms can facilitate technology transfer and enhance the technical capacity of domestic producers [35]. Upgrading national quality control laboratories and increasing post-market surveillance also ensure that local products meet safety and efficacy standards comparable to imported alternatives [38]. Donor engagement may continue to support technical quality initiatives, but leadership must shift increasingly toward national institutions. A robust local manufacturing ecosystem, supported by a stable regulatory environment and fiscally responsible procurement processes, provides a long-term buffer against external supply shocks [40].

6.4. Digitizing logistics management systems for visibility and accountability

Digital transformation of Nigeria's logistics management systems is crucial for improving visibility, accountability, and forecasting accuracy across the supply chain [33]. Electronic logistics management information systems (e-LMIS) allow real-time monitoring of stock levels, consumption patterns, and distribution performance across facilities, enabling rapid response to emerging shortages [36]. Integrating digital tools with procurement platforms improves quantification accuracy and reduces wastage by aligning orders with verified facility needs [32]. Data-driven dashboards also strengthen accountability by providing transparent performance indicators at state and federal levels, supporting more consistent oversight [39]. In addition, mobile-based reporting systems enhance last-mile data capture, improving the reliability of information feeding national planning processes [35]. These technologies collectively create a more adaptive and resilient supply chain.

6.5. Fostering public-private partnerships for cold chain and last-mile delivery

Public-private partnerships (PPPs) offer strategic opportunities to strengthen Nigeria's cold chain capacity and last-mile delivery systems. Private logistics providers possess established distribution networks, refrigerated transport fleets, and advanced tracking technologies that can complement public-sector operations [34]. Structured PPPs can help fill gaps in vaccine cold chain infrastructure, enable more reliable delivery schedules, and reduce losses from temperature excursions [32]. Outsourced last-mile delivery models have shown success in other African settings, improving coverage and operational efficiency by leveraging commercial delivery expertise [38]. Such models require strong regulatory frameworks and performance-based contracting systems to ensure accountability and quality

compliance [40]. By combining government stewardship with private-sector capabilities, PPPs can significantly enhance distribution reliability and reduce donor dependence.

7. Institutional and operational readiness for transition

7.1. Strengthening national institutions (NPHCDA, NAFDAC, State Ministries)

Strengthening Nigeria's national health commodity institutions is central to achieving sustainable local ownership. The National Primary Health Care Development Agency (NPHCDA) plays a pivotal role in vaccine logistics, last-mile coordination, and primary care commodity distribution, yet requires greater operational autonomy, modernized infrastructure, and improved data systems to manage expanding responsibilities effectively [41]. Similarly, the National Agency for Food and Drug Administration and Control (NAFDAC) must enhance regulatory oversight, pharmacovigilance capacity, and quality control infrastructure to ensure consistent standards for both imported and locally manufactured commodities [38]. Strengthened regulatory capacity also reduces reliance on donor-driven quality assurance systems, reinforcing national stewardship [44]. State Ministries of Health serve as operational hubs for warehousing, distribution planning, and facility supervision, but often face coordination gaps and limited budget authority that constrain systemwide alignment [36]. Clearer role delineation, harmonized procedures, and stronger intergovernmental collaboration are needed to address fragmentation. Together, these institutions form the backbone of Nigeria's transition pathway, and reinforcing their capabilities is essential for translating policy reforms into durable, system-level improvements [43].

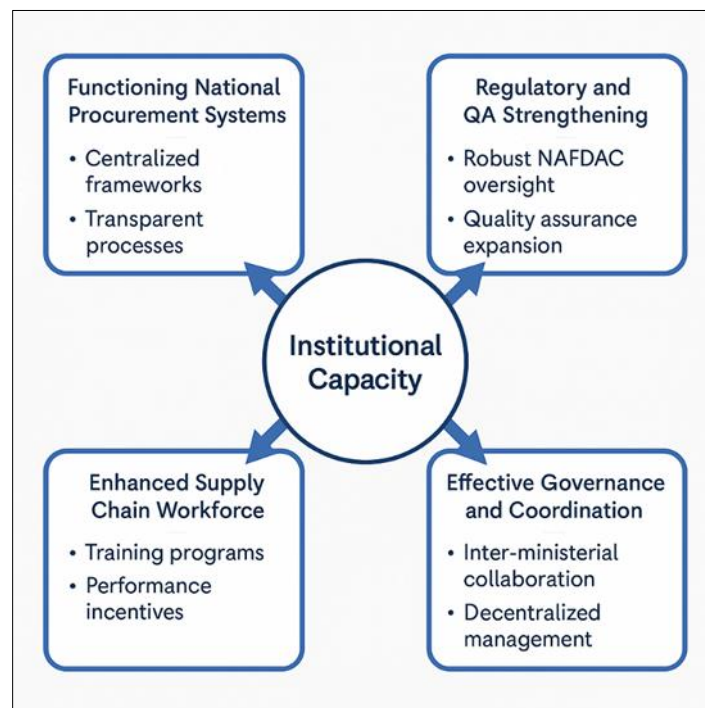


Figure 3 Institutional Capacity Requirements for Transition to Local Ownership.

7.2. Workforce development and professionalization of supply chain personnel

A competent and professional supply chain workforce is essential for reducing dependency on donor-supported technical capacity. Many logistics roles within Nigeria's health sector lack standardized job descriptions, structured training curricula, and defined career progression pathways, resulting in variable performance across levels of the system [40]. Developing a national competency framework for supply chain professionals can standardize skills in forecasting, procurement, warehousing, distribution, and data management, improving operational consistency nationwide [37]. Establishing dedicated training programs through universities, technical institutes, and professional associations can also help institutionalize supply chain education and reduce reliance on donor-funded training [42]. In-service mentorship, certification programs, and continuing professional development strengthen workforce retention and build long-term expertise [36]. Furthermore, embedding supply chain leadership positions within federal and state institutions reinforces accountability and ensures decision-making is grounded in technical knowledge rather

than ad hoc administrative arrangements [45]. A strong human resource base ultimately enhances national autonomy and supports sustainable local ownership.

7.3. Operational standardization: forecasting, quantification, inventory management

Operational standardization is critical for achieving efficient, resilient health commodity systems. Nigeria's forecasting and quantification processes remain inconsistent across states and programs, often relying on donor-supported tools and parallel reporting systems [41]. Establishing unified national guidelines for demand estimation, procurement planning, and inventory management can reduce duplication and improve coordination across vertical programs [36]. Integrated logistics management information systems further support standardization by consolidating data streams and improving visibility of stock levels and consumption trends [39]. Standardizing inventory controls at warehouses and health facilities including safety stock rules, reorder thresholds, and supervision protocols enhances reliability and minimizes wastage [38]. These measures contribute to a more predictable supply chain capable of functioning independently of donor operational frameworks [43].

7.4. Risk mitigation for transition shocks

As donor support declines, Nigeria faces risks including funding gaps, stockouts, procurement delays, and regulatory lapses. Effective transition planning must therefore incorporate mitigation strategies such as multi-year budgeting, emergency buffer stocks, and flexible contracting arrangements to manage supply volatility [42]. Strengthening regulatory oversight reduces exposure to substandard products, while integrated monitoring systems enable early detection of operational bottlenecks [36]. Transition risk assessments should be conducted regularly to identify vulnerabilities and ensure corrective actions are implemented promptly [44]. These measures help safeguard supply continuity during the shift toward full national ownership [40].

8. Political economy and stakeholder dynamics

8.1. Political incentives and leadership priorities

Political leadership plays a defining role in transitioning Nigeria toward locally owned health commodity systems. Sustained commitment from federal and state governments is necessary to increase domestic financing, strengthen regulatory institutions, and align sector priorities with long-term national goals [42]. Political incentives often shape whether reforms receive adequate attention, particularly when competing priorities influence budget negotiations or institutional restructuring [41]. High-level leadership is also essential for coordinating inter-ministerial actions that support procurement governance and supply chain modernization [44]. Without consistent political will, technical reforms risk stagnation, and donor dependency may persist despite available policy pathways [40].

8.2. Role of donors, private sector actors, and civil society

Donors, private sector organizations, and civil society remain influential stakeholders whose engagement shapes Nigeria's transition dynamics. Donors provide financial resources, quality oversight mechanisms, and technical expertise that continue to support critical commodity areas while national systems strengthen internal capacity [45]. Private sector actors including manufacturers, logistics firms, and distributors offer infrastructure, innovation, and service delivery capabilities that can complement government-led reforms [43]. Civil society organizations, meanwhile, contribute accountability, public advocacy, and community-level oversight, ensuring transparency in financing and procurement processes [42]. Coordinated engagement among these stakeholders reinforces national leadership while minimizing operational fragmentation [40].

8.3. Managing resistance and building consensus for transition

Transitioning from donor dependency requires managing institutional resistance and building broad-based consensus across stakeholders. Resistance may arise from concerns over funding gaps, shifts in procurement authority, or potential disruptions during early transition phases [44]. Effective change management strategies including transparent communication, stakeholder mapping, and joint planning help align expectations and reduce uncertainty [41]. Creating participatory decision-making forums enables state governments, implementing partners, and civil society groups to shape transition milestones collaboratively [45]. Gradual implementation, supported by risk mitigation and capacity-building measures, increases stakeholder confidence and reduces operational disruptions. Consensus-building ultimately strengthens national ownership and ensures reform sustainability [40].

9. Implementation roadmap for transition

9.1. Short-term (1–2 years): quick wins

Short-term actions should prioritize achievable reforms that stabilize Nigeria's health commodity system and reduce immediate vulnerabilities. Key measures include aligning federal and state forecasting cycles, improving budget release timeliness, and enhancing data visibility through rapid digital upgrades in logistics management systems [37]. Quick wins may also involve consolidating procurement plans for high-volume commodities and implementing framework contracts to reduce delays and improve price consistency [34]. Strengthening existing warehouses through targeted rehabilitation can improve storage reliability without major capital investments [39]. These early efforts create foundational momentum and demonstrate government leadership in reducing donor-driven operational dependencies [33].

9.2. Medium-term (3–5 years): systems strengthening

Medium-term priorities focus on institutionalizing reforms that enhance national resilience. Central to this phase is the expansion of domestic financing for essential medicines, supported by improved fiscal planning and diversified revenue mechanisms such as insurance pooling and earmarked levies [35]. Strengthening regulatory capacity, particularly quality assurance and pharmacovigilance, ensures safer procurement pathways and reduces reliance on donor oversight [38]. Workforce professionalization through training, certification, and structured career progression supports sustained improvements in procurement, warehousing, and distribution operations [36]. Expanding public-private partnerships for cold chain and last-mile delivery improves efficiency and enhances the system's overall reliability [40].

9.3. Long-term (5–10 years): sustainable autonomy

Long-term reforms aim to achieve full national ownership of Nigeria's health commodity supply chain. This includes establishing a predictable, predominantly domestic financing model capable of supporting all major commodity categories independent of external grants [33]. Developing a mature pharmaceutical manufacturing ecosystem with robust API production and internationally accredited quality standards further reduces import dependency [39]. Strengthened governance structures must ensure transparent procurement practices, integrated data systems, and harmonized operations across federal and state levels [34]. A resilient regulatory authority with strong enforcement capabilities safeguards product quality and supports export potential [37]. These long-term milestones anchor Nigeria's transition to sustainable autonomy [40].

10. Conclusion

Summary of findings

This article examined Nigeria's dependence on donor-funded health commodity supply chains and identified the structural, financial, and institutional factors that sustain this reliance. The analysis showed that although donor investments have ensured consistent availability of key commodities for HIV, tuberculosis, malaria, and RMNCAH programs, they have also reinforced parallel systems that limit national ownership. Persistent weaknesses including fragmented procurement processes, inadequate financing, regulatory gaps, insufficient workforce capacity, and infrastructure deficits continue to hinder Nigeria's ability to manage commodity systems independently. Comparative insights from Rwanda, Ethiopia, and Ghana demonstrated that deliberate political leadership, stable domestic financing, centralized procurement reforms, and expanded local manufacturing are crucial for a successful transition. To strengthen readiness for autonomy, Nigeria must pursue coordinated reforms that integrate financing, governance, operational efficiency, and technological modernization. Collectively, these findings highlight the urgent need for a long-term, system-wide strategy that shifts the country from donor dependency toward sustainable, locally led supply chain management.

Strategic implications for Nigeria's health sovereignty

Achieving health sovereignty requires Nigeria to reposition its commodity supply chain as a national strategic priority rather than a donor-driven agenda. Strengthening domestic financing mechanisms through budget reforms, insurance expansion, and innovative taxes remains essential for ensuring predictable funding for essential medicines. Improved regulatory authority, professionalized supply chain leadership, and harmonized procurement structures are equally critical for reducing fragmentation and enforcing consistent quality standards. Investments in local pharmaceutical manufacturing and digital supply chain systems will further enhance resilience, reduce import dependence, and support

national economic development. Politically, sustained commitment from federal and state leaders is required to drive implementation, manage transition risks, and align stakeholders around a unified vision. By advancing these strategic pathways, Nigeria can build a self-reliant, high-performing health commodity system capable of ensuring equitable access, protecting against global supply shocks, and reinforcing the country's broader health security and development goals.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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