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REVITALIZING NIGERIA'S EXTENSION SYSTEM FOR EQUITABLE, LOCALLY LED ADAPTATION

African Technology Policy Studies Network (ATPS)
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Revitalizing Nigeria's Extension System for Equitable, Locally Led Adaptation

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About the SCALE Project

The Strengthening the Capacity of the Extension System to use Proven Knowledge and Technologies to Sustain Equitable Locally Led Adaptation Among Smallholder Farmers (SCALE) project (2023–2027), led by the African Technology Policy Studies Network (ATPS) with partners in Nigeria and Senegal, employs a three-work-package technical approach to strengthen agricultural extension systems for climate resilience. The first work package conducts situational analyses and needs assessments to map key actors, their roles, and linkages within national extension systems across major agroecological zones. The second work package focuses on co-development, co-design, and co-delivery of customized training programmes and technical support interventions for extension agents, contact farmers, and other knowledge brokers. The third work package establishes platforms for knowledge sharing, networking, and collaboration, including the development of an Interactive Collaborative Environment (ICE) digital platform to facilitate continuous exchange among researchers, extension workers, and smallholder farmers.

Key technical deliverables include comprehensive mapping and analysis of extension system actors and their linkages, detailed needs assessments of knowledge brokers, and an audited repository of proven locally led adaptation (LLA) initiatives that support Gender Equality and Social Inclusion (GESI). The project will produce co-designed training curricula, customized technical support frameworks, and a functional ICE digital platform serving as a one-stop-shop for non-discriminatory knowledge exchange. Additional deliverables include documentation of GESI-responsive LLA knowledge and technologies, two policy dialogue workshops in Nigeria and Senegal, international collaboration and learning visits, and strengthened networks among extension system actors. These outputs aim to enhance the co-generation, co-transfer, and utilization of proven knowledge and technologies, ultimately improving alignment of extension activities with farmer priorities and accelerating adoption of equitable, inclusive climate adaptation practices among smallholder farming communities.

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The African Technology Policy Studies Network (ATPS) is a transdisciplinary network of researchers, policymakers, private sector actors, and civil society actors that promote the generation, dissemination, use, and mastery of Science, Technology, and Innovation (STI) for African development, environmental sustainability, and global inclusion. The ATPS has over 5,000 members and 5,000 stakeholders across more than 51 countries on 5 continents, with institutional partnerships worldwide. We implement our programs through members in national chapters established in 33 countries (29 in Africa and 4 Diaspora chapters in Australia, the United States of America, Switzerland, and the United Kingdom). In collaboration with like-minded institutions, the ATPS provides platforms for regional and international research and knowledge sharing to build Africa's capabilities in STI policy research, policymaking, and implementation for sustainable development.

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Key Messages

- Nigeria's agricultural extension system is in a state of institutional distress, characterised by the lowest Extension Agent–to–farmer ratio in Africa (1:5,000), persistent underfunding, and severe logistical breakdowns that constrain effective service delivery.

- The extension system operates within a pronounced climate finance vacuum, with no reported access to climate finance by either farmers or extension agents, reflecting the absence of budgetary allocations and systemic gender-related barriers to access to finance.

- The scaling of proven Locally-led Adaptation (LLA)/Ecosystem-based Adaptation (EbA) practices remains structurally constrained, due to weak research–extension linkages, limited knowledge brokering capacity, inadequate skills among extension agents, and poor documentation of validated local and indigenous knowledge.

- Public investment and policy coherence around LLA remain fragmented, with limited integration of digital extension infrastructure and insufficient mainstreaming of Gender Equality and Social Inclusion (GESI) considerations within extension service delivery.

- Monitoring, evaluation, and learning systems for LLA interventions remain underdeveloped, limiting accountability, adaptive management, and the generation of credible evidence to support systematic scaling.

1. Introduction

Nigeria, as Africa's most populous nation with over 232 million people, faces a compounding climate crisis that critically threatens its national food security and economic stability (World Bank, 2024). The country faces a convergence of socioeconomic and environmental pressures, including rising temperatures, variable rainfall patterns, and recurrent, destructive flooding, with the agricultural sector bearing a disproportionate share of these impacts. Under a business-as-usual scenario, these stressors are projected to reduce agricultural productivity by 10%-25% by 2080, a catastrophic trajectory for a nation that relies heavily on rain-fed farming (UNEP-GRID, 2021). This looming decline is exacerbated by a fragile economic context. Recent assessments indicate that despite fluctuating unemployment figures, "working poverty" remains pervasive; approximately 54% of Nigerians were projected to live in poverty in 2024, with rural poverty rates soaring as high as 75% (World Bank, 2025). Consequently, urgently repositioning Nigeria's agriculture and food systems is not merely a policy option but an imperative for survival. The brunt of these shocks falls upon smallholder farmers, who constitute the backbone of the food system. Within this group, women and youth are particularly marginalized, often characterized by limited access to land, low decision-making power, and exclusion from climate adaptation policy processes (Propcom+, 2024). Nigeria's National Climate Change Policy (2021-2030) aligns with global Locally-led Adaptation (LLA) principles under the Paris Agreement and the SDGs (e.g., SDG 13 on climate action and SDG 5 on gender equality), yet implementation gaps at the subnational level, particularly in vulnerable states such as Enugu and Ebonyi, hinder progress. Addressing these requires integrating international commitments with local actions.

In this volatile landscape, the Agricultural Extension System is indispensable. It serves as the vital knowledge broker—the "bridge"—connecting upstream research with rural farming communities. Theoretically, this system transfers a hybrid of indigenous knowledge and scientific innovation to farmers while simultaneously operating a feedback loop that relays field challenges back to researchers for analysis. However, this bridge is currently broken. Evidence indicates that Nigeria's extension system is severely weakened, plagued by funding deficits and an abysmal agent-to-farmer ratio, leaving millions without advisory support (Danso-Abbeam et al., 2021).

This policy brief is based on the diagnostic phase of the Strengthening the Capacity of the Extension System to Use Proven Knowledge and Technologies

(SCALE) project. It specifically targets Enugu and Ebonyi States—regions that are significant contributors to the national staple food supply yet remain highly vulnerable to climate-induced irregularities, such as flooding and soil degradation. By synthesizing findings on the structural, financial, and capacity gaps within these states, this brief sets the stage for the project's subsequent phases, including the creation of an Interactive Collaborative Environment (ICE) designed to foster sustained, locally led adaptation.

2. Rationale for Strengthening the Extension System to support LLA

The SCALE project assessment highlights a critical breakdown in Nigeria's agricultural extension system, identifying it not merely as inadequate but as suffering from a systemic collapse that exacerbates vulnerability to climate change in the Agriculture and Food Security (AFS) sector. This failure to manage risk, ensure equity, and coordinate innovation has led to severe national consequences. For instance, the system's inability to provide timely early warning information contributed significantly to the devastation caused by the 2022 floods, which resulted in over 600 deaths, displaced 1.3 million people, loss of over 700 billion naira, and destroyed approximately 266,000 acres of farmland (National Agricultural Extension and Research Liaison Services [NAERLS], 2023). An effective extension service could have mitigated these losses, yet the current organizational structure is paralyzed by a severe shortage of personnel. Nigeria currently operates with an extremely low ratio of Extension Agents (EAs) to farmers, averaging 1:5,000—a stark contrast to the 1:400 ratio observed in Europe (Davis et al., 2019). This deficit is further compounded by poor remuneration and declining interest among youth in the profession, as well as logistical crises that prevent agents from reaching remote farmers due to insufficient funding and mobility infrastructure. Policy stagnation and financial exclusion further deepen this crisis. Efforts to reform the sector, such as the 2017 National Extension Policy, have struggled to gain state-level adoption due to a disconnect from local contexts. More critically, there is a profound "climate finance vacuum" at the grassroots level. Smallholder farmers and extension agents alike lack awareness of, or access to, climate finance mechanisms that could support LLA.

Research indicates that institutional barriers, including the hijacking of funds by political actors and insufficient of budgetary allocation, leave most farmers without the necessary financial support (Olanipekun et al., 2025). Furthermore, gender inequity significantly multiplies this vulnerability. Social and cultural barriers that prevent women from inheriting land severely limit the bargaining power of female farmers and EAs with financial institutions, thereby restricting their ability to secure loans for adaptation (Ume et al., 2025). Addressing this gender bias is essential, as approximately half of female farmers report it as a primary obstacle to their resilience. To reverse this collapse, integrating an equitable, inclusive, and demand-driven LLA strategy into the extension system offers a viable pathway to sustainability. Given the critical shortage of extension agents, a pluralistic

"farmer-to-farmer" model is proposed to create a multiplier effect; by training a core group of 300 EAs and 200 Community Facilitators (CFs), the system could effectively reach over 100,000 farmers in a single year. This approach prioritizes the co-design of solutions that blend indigenous knowledge—such as the use of Neem and agroforestry—with scientific research. Additionally, leveraging digital technologies and mobile applications such as LandPKS and APWEN FARM offers a cost-effective way to bridge the physical gap between agents and farmers, ensuring the timely delivery of climatic data and boosting overall productivity (Mhlanga & Ndhlovu, 2023).

3. Methodology

The findings presented in this brief are synthesized from the foundational diagnostic phase of the SCALE project, specifically the Capacity Needs Assessment and Proven Technology Documentation. This phase established a baseline understanding of the structural and capacity requirements for revitalizing Nigeria's extension services.

3.1 Study Design

The research employed a post-test-only design utilizing convergent parallel mixed methods to capture a comprehensive view of the extension system's complex realities. By collecting quantitative and qualitative data concurrently, the study ensured a holistic evaluation of the sector. The assessment was strategically implemented within the agroecological zones of Enugu and Ebonyi States, regions chosen for their representative climate change scenarios and distinct adaptation characteristics.

3.2 Data Collection and Analysis

Information was gathered through a multifaceted approach that included structured questionnaires, Key Informant Interviews (KIIs), and Focus Group Discussions (FGDs) with a diverse sample of stakeholders. This sample included 150 smallholder farmers, 60 extension agents, and 40 researchers, as well as contributions from policymakers, civil society organizations, and non-governmental organizations. To ensure the integration of Gender Equality and Social Inclusion (GESI) principles, FGDs were disaggregated by gender, allowing for the specific identification of marginalized perspectives. These discussions were critical for prioritizing extension needs and auditing proven GESI-aligned LLA knowledge. Furthermore, validation workshops were conducted to co-create interventions in priority areas, ensuring that capacity-building support and collaborations are directly informed by the needs of local actors.

The analysis of these data used descriptive statistics (percentages and means) for quantitative survey results, whereas thematic analysis was applied to qualitative data to identify core organizational constraints, knowledge deficits, and policy requirements. All research activities adhered to rigorous ethical standards, including the acquisition of informed consent and the strict maintenance of participant confidentiality.

4. Major Findings

4.1 Institutional and Policy Context for Equitable Adaptation

The Nigerian extension system is currently facing an organizational crisis, defined primarily by an extremely low agent-to-farmer ratio of 1:5,000. This personnel shortage is exacerbated by a lack of interest among the youth in entering the profession and a severe lack of mobility and logistics support, which prevents existing agents from reaching remote farm sites. Beyond these personnel challenges, there is a significant policy gap regarding LLA. Institutional stakeholders indicated that climate adaptation lacks dedicated budgetary allocations and that the existing funding programs are often compromised by political interference. Furthermore, the link between research, extension, and the farm is notably weak. Current academic promotion structures prioritize theoretical publications over practical community outreach, leaving a void in effective knowledge brokering.

4.2 Capacity Gaps and Documentation of Proven LLA

Smallholder farmers in Enugu and Ebonyi States already utilize a variety of proven LLA and EbA practices, including agroforestry, mixed cropping, and mulching. These farmers also rely on indigenous knowledge for pest control—such as Neem solutions—and rainfall prediction based on animal and plant behaviour. However, the extension system is ill-equipped to scale these practices. Extension agents demonstrate limited proficiency with digital tools and lack knowledge of modern technologies, often due to poor network connectivity and insufficient training in climate-smart agriculture. This has resulted in significant knowledge gaps among farmers, particularly in procuring improved crop varieties and animal breeds, as well as in the technical skills required to source resources for adaptation.

4.3 Challenges and Barriers to Equitable LLA Finance

A “climate finance vacuum” exists at the grassroots level, with data showing that none of the smallholder farmers surveyed had access to financial resources for climate change adaptation. Extension agents are similarly disconnected, with most reporting a total lack of awareness regarding available climate finance opportunities. For farmers, the primary non-financial barrier is a lack of awareness of available funds, while female farmers face the added burdens of gender bias and a lack of land inheritance rights, which prevent them from securing necessary loans. Even within the research community, funding is a critical constraint. Researchers are predominantly self-funded and report a lack of skills in writing competitive grant proposals, underscoring an urgent need for long-term funding and targeted support for knowledge-dissemination projects. Table 1 summarizes the key structural barriers identified in the analysis.

Table 1: Structural Barriers to Effective Knowledge Brokering and Equitable Climate Adaptation in Nigeria's Agricultural Extension System

Barrier Type	Nature of the Constraint	Evidence from SCALE Findings (Enugu & Ebonyi)	Economic and Development Implications
Organizational	Severe coverage crisis and institutional undercapacity within the extension system.	Extension Agent–to–farmer ratio of 1:5,000 (lowest in Africa); poor funding; weak mobility/ logistics; low youth interest in extension careers; weak state-level implementation of extension reforms.	Limited farmer access to climate advisories and early warning systems; reduced adaptive capacity; 10–20% productivity losses in the short–medium term; estimated annual agricultural losses of ₦500–700 billion; heightened vulnerability to shocks such as the 2022 floods.
Financial	Grassroots "climate finance vacuum" and systemic exclusion from adaptation funding.	No surveyed farmers or Extension Agents reported access to climate finance; absence of dedicated LLA budget lines at the subnational level; gender bias in loan access due to land inheritance constraints; low awareness of financing windows.	Missed opportunities for at least 15% yield gains through funded adaptation (improved seeds, irrigation, soil restoration); entrenched rural poverty; widening gender inequality; underinvestment in climate resilience with long-term macroeconomic costs.
Knowledge	Breakdown of Research–Extension–Farmer–Input Linkage System (REFILS) and weak knowledge documentation.	Limited documentation and scaling of proven indigenous practices (e.g., agroforestry, Neem-based pest control); weak research–extension coordination; limited digital skills among EAs; inadequate climate-smart agriculture training.	Stagnant innovation diffusion; slow scaling of locally led adaptation (LLA); inefficient blending of indigenous and scientific knowledge; exacerbation of projected 25% agricultural productivity decline by 2080; reduced national competitiveness in climate-smart agriculture.

5. Conclusion

In the face of Nigeria's escalating climate crisis, the SCALE project's diagnostic reveals a stark reality: a resilient cadre of smallholder farmers, armed with time-tested, LLA practices such as agroforestry and indigenous pest control, is being undermined by a crumbling agricultural extension system. With an agent-to-farmer ratio of 1:5,000—the lowest in Africa—a climate finance vacuum that leaves zero access for grassroots actors, and entrenched gender biases that disenfranchise women and youth, the nation risks a 10-25% plunge in agricultural productivity by 2080. This not only threatens food security for over 240 million Nigerians but also perpetuates rural poverty at 75%, costing billions in flood damages and lost livelihoods, as seen in the N700 billion devastation of 2022. Yet, this is not an inevitable fate. By revitalizing the extension system through equitable, demand-driven strategies—integrating GESI, bolstering research-extension linkages, and deploying digital tools like LandPKS—we can unlock transformative potential. Evidence from Ethiopia and Tanzania shows such investments yield 15-20% productivity gains, restore degraded lands, and create green jobs, aligning Nigeria with SDGs and the Paris Agreement. The SCALE project will train 300 EAs and 200 CFs via the ICE platform, offering a blueprint for scaling these solutions nationwide.

Call to Action: Policymakers must move decisively to legislate compulsory budgetary provision for LLA, restructure the extension workforce for digital competency, and dismantle the financial barriers facing women and youth to foster sustainable development.

6. Policy Recommendations

Recommendation 1: Promote equitable LLA through the integration of gender equality and social inclusion (GESI): There should be deliberate and intentional policy actions to address structural biases and ensure equitable participation across the agricultural system. The government should enact laws that mandate social inclusion criteria for all agricultural programs and prohibit discrimination on the basis of sex, social status, or disability in access to services and resources. Furthermore, policies must be enacted to ensure that women have equitable access to inherit and control land resources, thereby improving their bargaining power in financing and investing in LLA. Mandatory GESI training must be provided for extension staff to ensure gender-responsive service delivery.

Recommendation 2: Strengthen the implementation of equitable EbA through institutional restructuring and investment to improve knowledge transfer and address the coverage crisis: The government must fund the establishment of formal Research-Extension-Farmer-Input-Linkage Systems (REFILS) and prioritize On-Farm Adaptive Research (OFAR) to co-design and validate EbA/LLA practices. A 5-year plan must be implemented to recruit and equip extension agents (EAs) with reliable transportation and digital toolkits (e.g., LandPKS app knowledge) to address the coverage and dissemination crisis. Finally, the formal documentation of proven LLA knowledge must be a funded national priority to facilitate effective communication and scaling.

Recommendation 3: Improve access to appropriate and equitable finance for locally led solutions: Financial commitment is non-negotiable for LLA sustainability. The government must pass and implement strong legislation mandating a compulsory budgetary provision for smallholder farmers' LLA, securing a dedicated, decentralized fund managed transparently. To ensure these funds reach the target, investment in training for Farmer Organizations (FOs), Civil Society Organizations (CSOs), and Extension Agents on grant-winning proposal writing and resource mobilization is essential to bridge the knowledge gap that prevents access to existing climate finance opportunities. This must be accompanied by measures to simplify access procedures and increase public awareness of available financial sources.

Recommendation 4: Institutionalize Multi-Stakeholder Partnerships and a Results-Based Monitoring Framework: The government should establish a structured multi-stakeholder coordination mechanism that brings

together the private sector, development partners, academia, and farmer organizations to advance digital infrastructure and strengthen REFILS. Clear roles and responsibilities should be defined to leverage private investment, technical expertise, and research capacity. In parallel, a results-based monitoring and evaluation framework should be instituted with measurable indicators, annual targets, and mandatory yearly reviews to track progress, ensure accountability, and enable timely policy adjustments based on evidence and stakeholder feedback.

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