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Public–Private Partnerships in Agricultural Extension and Rural Development in Nigeria: A Critical Review of Collaborative Models, Governance and Livelihood Outcomes

[1]Hamma'adama A. T., [2]Madu A. U., [3]Khalid, B., and [4]Wadzu J. A.
[1,3,4] Department of Agricultural Economics and Extension, Adamawa State University, Mubi, Adamawa State, Nigeria
[2] Department of Agricultural Economics and Extension, Modibbo Adama University, Yola Adamawa State, Nigeria
Email addresses: [1]ahmedtukur82@gmail.com | [2]umaradamu1968@gmail.com | [3]khalidbello10@gmail.com

Abstract

There are limited funding, inadequate staffing, uneven coverage and limited responsiveness to the needs of a wide range of farmers in public extension systems in Nigeria and other sub-Saharan African (SSA) countries. Policy attention has thus been directed towards public-private partnerships (PPPs) and broader pluralistic combinations of public mandates and private investment, non-governmental organisation (NGO) capacity, research expertise and farmer organisations. This article critically examines the nature and implications of collaborative models in agricultural extension in Nigeria with a particular focus on mobilisation of resources, dissemination of knowledge and rural livelihoods. It adopts a narrative-integrative approach, drawing on the latest literature on new institutional economics, principal-agent theory, innovation systems thinking and the resource-based view, as well as policy documents and peer-reviewed literature, including the National Agricultural Extension Policy (NAEP) 2023 in Nigeria. Findings show that partnerships can increase coverage, combine complementary resources, enhance value chain integration and accelerate access to digital and climate data, and that partnerships do not guarantee performance. The outcomes are dependent on governance quality, transparent contracting, public oversight, predictable financing and safeguards for farmers' needs that are not commercially viable. Poor producers may be excluded from fee-based services, while donor-dependent programs may terminate upon the expiration of funding. The article calls for a pluralistic system that is publicly stewarded and farmer-centred that does not reduce the role of private and non-state actors to supplanting public responsibilities but complementing them and outlines a conceptual framework and eight policy actions for Nigeria.

Keywords: Agricultural extension; Public–private partnerships; Pluralistic extension; Smallholder farmers; Rural livelihoods; Nigeria

1.0 Introduction

Agricultural extension links farmers and other stakeholders to agricultural research, technologies, markets, public programmes and other sources of knowledge. Its function has expanded from delivering production recommendations to facilitating farmer organisations, entrepreneurship and to fostering relationships between actors in agricultural innovation systems (AIS) (Birner et al., 2009; Food and Agriculture Organization of the United Nations [FAO], 2022). Public agencies have often been subjected to constraints on finances, staffing, and central decision-making, while information has had public good properties that justify government provision – and the dispersed nature of smallholders' access to services, which made government more appropriate for providing information (Anderson & Feder, 2004). In response, pluralistic extension arose, in which public agencies and private companies – alongside non-governmental organisations (NGOs), farmer-based organisations, cooperatives, universities, input suppliers, processors and digital service providers (Birner et al., 2009) – operate alongside each other. One type of cooperation in this broader framework is through public–private partnerships (PPPs).

It is based on the complementary capacities that support collaboration. The government sets the policy direction, infrastructure and regulation and has a duty to protect vulnerable groups; the private sector has investment, special knowledge, logistics and market information; NGOs have community-level relationships and participatory experience. Across states in Nigeria, agroecological and institutional differences imply that there is no one-size-fits-all solution to the farmers' diversified advisory needs. While pluralistic provision is recognised in the National Agricultural Extension Policy (NAEP) 2023, a recent review shows that this policy has not yet been translated into legislation, and that legislation is required to ensure engagement of plural providers in steering committees, resourcing and coordination of plural providers (Koyenikan et al., 2026).

The fact that policy interests partnerships does not mean that they are successful. A partnership can have greater training and participation in the program but fail to achieve greater adoption, productivity, income and resilience and does not necessarily serve value chains that would be commercially attractive, though it may leave remote or subsistence producers underserved. The evidence from Cross River State reveals limited access to extension and reports that public–private collaboration and provider standards that are coordinated and diversified in their funding are conditions for sustainable extension services (Ogunniyi et al. 2020). This paper critically reviews the collaborative approach to agricultural extension in Nigeria and presents evidence from sub-Saharan Africa. It examines the role partnerships play in the mobilisation of resources, sharing of knowledge, and livelihoods of women, youth and other marginalised populations; examines institutional constraints; and recommends policy interventions for enhancing partnership cooperation.

2.0 Conceptual and Theoretical Foundations

2.1 Public–Private Partnerships and Pluralistic Extension

PPP is not a single institutional structure. There are different arrangements, such as long-term contracts, where a private party is responsible for delivering a defined service for public funding, as well as other forms of co-financing, joint training, research, shared infrastructure, and value chain coordination. They are part of a larger system: pluralistic extension, in which many different groups of organisations provide advisory services, which are consumed and funded by farmers and their informal networks and various public and private extension agents, agro-dealers, lead farmers, radio, mobile platforms, cooperatives, etc. (Birner et al., 2009). Pluralism has the potential to increase choice and responsiveness, but it can also lead to a fragmentation of messages, uneven quality and a lack of accountability. Partnership is also a departure from privatisation, in which the provision or ownership is moved to private organisations, as partners have different institutional identities. This is because the potential for full fee-for-service extension is higher in high value/export agriculture than in low-margin staple production, explaining the uneven uptake of private involvement in sub-Saharan agriculture (Nwafor et al., 2021).

2.2 Theoretical Lenses

The analysis is organised into four lenses, outlined in Table I. Institutional economics and agency theory focus on contracting and accountability, innovation systems thinking on the production and use of knowledge, and the resource-based view on what the partners bring and how they control it.

Table I: Theoretical lenses for analysing partnerships in agricultural extension

Lens	Core proposition	Implication for extension partnerships
New institutional economics (North, 1990; Williamson, 2000)	Institutions, rules and transaction costs shape economic performance.	Pooling networks and infrastructure can lower search, coordination and monitoring costs, but clear roles and enforceable rules are needed to prevent duplication and shirking.
Principal–agent theory (Eisenhardt, 1989)	Delegation under information asymmetry creates risks of weak effort or poor service quality.	Contracts should specify beneficiaries, coverage, standards, indicators and grievance procedures, with independent verification and payment linked to verified quality rather than activity counts.
Agricultural innovation systems (World Bank, 2006)	Innovation arises from interaction among researchers, advisers, farmers, firms and policymakers, not from linear technology transfer.	Partnerships should provide platforms for joint problem identification, adaptive research and two-way feedback, giving farmers real influence over research priorities and service design.
Resource-based view (Barney, 1991; Teece et al., 1997)	Advantage derives from valuable resources and the capability to combine and reconfigure them.	Partner contributions should be complementary and matched to needs; agreements must settle ownership, access and portability of data, technologies and knowledge products.

There are two cross-cutting points that follow: Partnerships may create additional transaction costs as organisations have to negotiate with other organisations and monitor multiple providers, and enforcement of the contract is weak if partners pass responsibilities on. There is also an unequal bargaining position: a platform with a monopoly over a platform, proprietary data or a key input

chain can dominate, and farmer organisations and public institutions must be able to defend public interests and farmer data.

3.0 Review Approach

This article adopts a narrative-integrative review design. It synthesises purposively selected scholarly and policy sources: foundational work on institutions, agency relationships and organisational resources; reviews of extension reform and pluralistic advisory services; literature on private-sector participation and farmer networks in sub-Saharan Africa; and Nigerian policy documents, notably the NAEP 2023. The material is organised around three questions. First, what resources and capabilities do different partners contribute, and when are they allocated efficiently? Second, through which channels do collaborative arrangements generate, adapt and disseminate knowledge? Third, what livelihood outcomes are plausibly associated with improved extension, and under what conditions are they durable and equitably distributed?

The approach has limitations. It is not a systematic review: no database search protocol, screening log or formal quality appraisal was applied, and the evidence is heterogeneous in design, geography and outcome measurement. Much Nigerian evidence is descriptive or programme-level, so the conclusions are presented as analytical propositions and policy-relevant inferences rather than estimates of effect.

4.0 Evolution and Models of Collaborative Extension

Traditional public methods, like Training and Visit, were characterised by regular meetings involving structured visits and staff training and standardised messages; while they helped to encourage better technology in some cases, they were difficult to sustain and prone to budget reductions (Anderson & Feder, 2004). Pluralism does not mean that the state gives up; it means that the state becomes a steward, a regulator, a funding agent, a guarantor of public access--and it is important because information also has private and public benefits (Birner et al., 2009). Private involvement is not uniform across countries and value chains, with fee-for-service private services provided to commercially oriented farmers and sectors with established buyers, and public or donor-funded services provided to farmers cultivating staple crops and remote communities (Nwafor et al., 2021).

The main models relevant to Nigeria are summarised in Table II. That they are effective isn't so much about the label but about who pays, who decides, who is accountable, and who is reached. Farmer organisations can make a significant contribution to each model by consolidating demand and increasing their bargaining power, only where their governance is representative; where their leadership is held by better-resourced members, women, and young farmers, alongside tenants and poorer households, who have limited influence. No single model seems to be adequate, and they should be used together in a complementary manner (Habanyati & Paramasivam, 2025).

Table II: Collaborative models in agricultural extension: Strengths, risks and safeguards

Model	Principal strengths	Principal risks	Key safeguards
Contracted service delivery	Clear deliverables; access to specialised skills; public funds linked to results.	Weak verification; payment for activity counts; provider exit when contracts end.	Transparent selection; quality and outcome indicators; independent verification; grievance procedures.
Co-financed extension	Financial leverage; lower public outlay; shared facilities and demonstration plots.	Dependence on one supplier; product promotion; unclear cost shares.	Published cost-sharing rules; disclosure of commercial interests; neutral technical content.
Value-chain partnerships	Market-linked advice; lower information and transaction costs; quality incentives.	Coverage confined to profitable chains and places; exclusion of poorer farmers; unequal bargaining power.	Public support for non-commercial crops and areas; contract transparency; farmer representation.
Digital and ICT partnerships	Scale and timeliness of weather, price and pest information; lower unit cost (Aker, 2011).	Digital exclusion; generic advice; data ownership and platform lock-in.	Validated content; interoperability and data-protection rules; local-language audio; face-to-face back-up.
Participatory and community-based models	Experiential learning; local adaptation; trust and peer learning.	Elite capture; limited scale; dependence on donor funding.	Inclusive selection; facilitator training; recurrent funding.

5.0 Resource Mobilisation and Allocation

One of the main reasons for the use of PPPs is to mobilise resources. Private companies and NGO's may contribute funding, equipment, technical staff, logistics, and commercial networks, while public agencies may not have the funds for field operations; transport; communications; staff training; and demonstrations. The benefit of pooling is the reduction in duplication (Birner et al., 2009). Human resources are as important as finances: private agronomists, veterinarians and even digital specialists can complement public staff; NGOs and universities can provide facilitation skills and adaptive trials, as long as agreements are established to specify the three roles of recruitment, training, supervision and payment of personnel. The livestock sector is another good example of linkages between research, extension, farmers and input suppliers, often being a precondition for the productivity of smallholder farmers (Mapiye & Dzama, 2024).

There is a need to distinguish public goods from private goods in order to allocate resources efficiently. The use of advice leads to direct commercial gains, while the provision of pest surveillance, environmental management, climate-risk information and food-security support yield broader benefits that are difficult to easily monetise and place a cost upon (Anderson & Feder, 2004). Unless such services are provided by private providers and funded by private investors, they will be underinvested. Allocation should also be needs-based and equity sensitive. Women, the young producers, farmers with disabilities, pastoralists and the marginalised and remote communities are restricted in their mobility, insecure access to land, limited access to phones, language barriers and exclusion from farmer organisations, which (tacitly) mask a lack of participation.

The main focus is sustainability. Donor funding, short project cycles and corporate social responsibility budgets are the reasons that many initiatives succeed, and services can contract due to the expiration of funding opportunities and/or changes in corporate strategy. Costing and recurrent financing of decentralised funding, farmers' associations, contracting out and embedding advisory services in other contracts have been suggested for Nigeria, but all must be realistic in order to be implemented (Ogunniyi et al., 2020). The efficiency of PPPs needs to be evaluated in relation to transaction costs, quality of services, coverage and durability: a partnership that is successful at attracting investment, but is not able to improve the profitability of the services, is not a successful partnership for rural development.

6.0 Knowledge Generation and Dissemination

Advisory systems need to be more than a one-way flow of technology; farmers require timely, credible and locally relevant information (World Bank 2006). Partnerships may link research institutions, public agencies, private technology providers and farmer organisations to create, modify and disseminate knowledge: research institutions and public agencies provide locally adapted technology; technology providers provide information on inputs and market standards; NGOs and farmer organisations could interpret messages into local languages and find out what makes people not adopt; extension services may interpret messages for local contexts.

Digital technologies have increased the reach of advisory services. Information on weather, pests, prices, availability of inputs and recommended practices (Aker, 2011) can be provided through SMS, interactive voice response, radio-linked platforms, mobile applications and remote sensing applications. Platforms can be developed by private companies, content validated by public agencies and/or research institutes, and digital literacy supported by NGOs. Despite this, digital exclusion is still a significant danger: device availability, connectivity, electricity and skills differ by place, income, gender, and age, and algorithmic suggestions do not necessarily account for soils, varieties, and household constraints. Digital services should, therefore, work alongside, not instead of, face-to-face extension.

Farmer networks are also channels for information dissemination: a systematic literature review of 84 farmer network studies in sub-Saharan Africa highlights their role in information sharing, resource sharing, empowerment and behaviour change and concerns about information quality and integration with formal extension (Ogisi, 2025). Where performance relies on management, timing and local ecology, participatory approaches like Farmer Field Schools and adaptive trials/demonstration plots provide an opportunity for producers to learn about and compare technologies.

The quality and neutrality of knowledge are of particular importance in private firms' advice. Suppliers have a great deal of knowledge and business interests that can influence recommendations; there must be disclosure provisions, technical requirements and credible methods to verify claims. Coordinated standards help to avoid giving conflicting advice that can weaken the innovation system, with the NAEP 2023 placing a focus on pluralistic extension, synergy

among stakeholders, farmer learning platforms and extension coordination across levels of government (Federal Ministry of Agriculture and Food Security, 2023).

7.0 Implications for Rural Livelihoods

Enhancing the knowledge base can increase input use efficiency, decrease losses and facilitate uptake of improved varieties. Partnerships may help income generation by bridging the information gap and transaction costs between producers and markets, as well as providing input supply, aggregation, processing and finance (Aker, 2011). Another possible result is increased food security, but increased output is not guaranteed to increase food security, as access, use and distribution within the household are also important. A related pathway is climate resilience, in which public research institutions can help to validate climate recommendations, companies can provide technologies and insurance, and NGOs and farmer communities can help local communities learn and adapt.

Livelihood effects are keyed to social inclusion and empowerment. Women and young people benefit from programmes which tackle constraints on access to land, finance, technology, training, and leadership – and extension can boost their confidence, engagement, negotiating power and ability to take informed decisions. Farmer networks are also a source of access to learning, with benefits contingent on who is in it (Ogisi, 2025). Diversification into processing and trading represents another diversification option available to households as a means of coping with risks and requires finance, infrastructure, skills, and demand, and can be supported by extension.

One of the key challenges of analysis is attribution. Various factors affect livelihood outcomes, including rainfall, prices, security, roads, land tenure and public transfers, and improvements should not be attributed to just a PPP working in parallel with other programmes. Evaluations should set baselines, have comparison groups if possible, observe repeatedly and collect qualitative evidence.

8.0 Constraints and Risks in PPP Implementation

One of the key constraints is governance, along with coordination. Partners have varying requirements, planning periods and measures for success, with governments focusing on public access and food security, firms on profitability, NGOs on inclusion and donors on fixed product outputs over project periods. The current review identified a lack of legislation for the NAEP in Nigeria, which undermines the legislative framework to guide resourcing and coordination (Koyenikan et al., 2026). Power imbalances add to the issue - big companies can influence technologies, selection of geographical areas, indicators, etc while smallholders are unable to negotiate conditions of service and receive poor advice, with transparency in decisions, farmer representation and independent facilitation required.

Equity and sustainability are urgent issues. Poor, subsistence, and remote households may be left out of knowledge to take advantage of agricultural gains because commercial providers will not invest in them if they cannot pay and the value chain is unpredictable. Donor funds can be exhausted when the grant period ends, private funding for services can be discontinued if the price

drops and public funding for the counterpart can be deferred, so sustainability planning needs to start at the design stage. The policy intent of the NAEP will also need to be translated into operational regulations, provider accreditation and monitoring, particularly when public agencies do not have the capacity to do so, and inconsistent advice can put health, crops and the environment at risk.

There are other worries with digital partnerships. Farmer records, farmer locations and transaction history have commercial value; agreements need to consider data ownership, access, consent, retention and portability, and public agencies should not be locked into proprietary systems. Lastly, weak roads, electricity and network coverage and insecurity increase delivery costs in parts of Nigeria and can do so just where public capacity is the weakest, thus necessitating partnerships with local risk assessments and flexibility in delivery.

9.0 Towards a Partnership Framework for Nigeria

PPPs are most commonly thought of as a way of structuring and coordinating complementary contributions in a pluralistic system that is publicly managed. The analysis is summarised in Figure 1, where the partner contributions become extension processes and livelihood outcomes as a result of the governance conditions, while monitoring and learning underpin the process with feedback.

The first step in a practical model is to have a clear segregation of roles. Policy, regulation, quality assurance, public good services and targeted support to underserved farmers should continue to be the responsibility of the government; commercial services should be offered by private firms and should be disclosed and subject to technical standards; governments and NGOs should augment their public services with mobilisation, inclusion and facilitation; and universities and research institutes should enhance their capacity for evidence generation and adaptive research. To implement NAEP, focus should be given to functional steering committees, provider mapping, consistent standards and consistent funding.

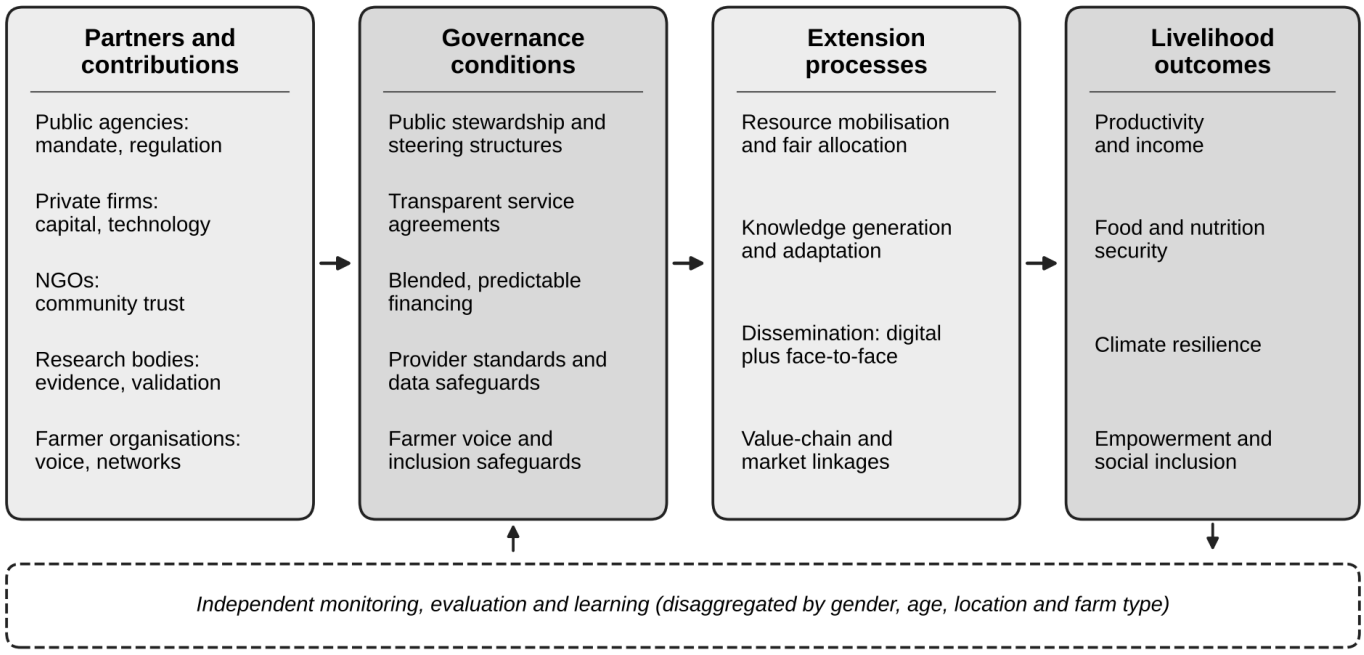

Figure 1: Conceptual Framework for a Publicly Stewarded Pluralistic Extension System

There should be a clear service agreement defining target groups, areas of service, partners' contributions, technical standards, data sharing, financing, risk sharing and dispute resolution (Eisenhardt, 1989), with metrics or targets for the number and profile of farmers served, quality of the service offered, farmer satisfaction, adoption and continuity. Funding should be based on the public- and private-good attributes of each service: commercial value-chain advice can be funded by firms, affordable farmer contributions or public funding; public-good functions should be publicly funded; and blended finance is appropriate for services that have both public and private good attributes, with public subsidies clearly identified and their duration limited.

A farmer-centred approach translates into farmers having a say in local needs assessment, participatory planning, feedback committees and easy access to grievance mechanisms; women, youth and marginalised groups are included, and barriers to participation are removed. Digital systems should be an integral component of an integrated system where public agencies establish content parameters as well as interoperability and data protection rules; private companies provide the tools and technologies; and information is disseminated to farmers via local language audio, radio, SMS, call centres and on-site support. Monitoring, evaluation and learning should be integrated from the beginning and baseline, disaggregated indicators and, if possible, credible counterfactual designs should be complemented with qualitative evidence.

10.0 Research Gaps and Future Directions

There are five points of weakness. First, there is insufficient causal evidence of the impact of PPPs in Nigerian extension, and there is a need for comparative evaluations of public, private, NGO-led and hybrid models across agroecological zones and value chains. Secondly, distributional effects need to be considered – who is served by services, who is included in decisions, and who is gaining benefits. Third, the impact of the termination of donor support and withdrawal of firms should be analysed in the longer term, including the institutional costs of coordination, contracting and monitoring. Fourth, digital partnerships require research about data governance, data interoperability and exclusion between stand-alone and hybrid partnerships. Fifth, the pathways between short-term yield and short-term adoption and between advisory services and climate resilience, livelihood diversification and household wellbeing should be tracked through mixed-method and longitudinal studies.

11.0 Conclusion and Policy Recommendations

PPP can provide opportunities to enhance agricultural extension through public mandates and private investment, NGO capabilities, research expertise and farmer networks. The review found there is potential for collaborative models to release additional resources, bring together knowledge providers, facilitate digital and participatory learning, and link farmers with markets, provided that governance is strong, public stewardship is effective, and farmers who are not desirable for commercial providers are effectively protected. The focus should be on developing effective institutional structures, funding, and measurable service quality for NAEP 2023 for Nigeria, keeping government as a steward of the system to avoid commercialisation taking precedence over public goals. The following actions are recommended:

1. Operationalise and legislate coordination structures at federal, state and local levels, and maintain an updated register of public and non-state extension providers.

2. Adopt standard partnership agreements covering roles, financing, performance, technical quality, data protection and dispute resolution.

3. Establish blended financing that combines public funding for public-good services with private investment and affordable farmer contributions where commercial returns are demonstrable.

4. Introduce provider accreditation, technical standards and disclosure rules for commercial interests, and strengthen public regulatory capacity to enforce them.

5. Create explicit inclusion safeguards, including targeted public support for women, youth, remote and other marginalised farmers whom commercial providers are unlikely to serve.

6. Integrate digital services with face-to-face advisory systems, and invest in connectivity, local-language content, digital literacy and interoperable, data-protected platforms.

7. Institutionalise farmer participation and disaggregated monitoring so that women, youth and marginalised producers influence service design and benefit from delivery.

8. Require independent monitoring and periodic evaluation of service quality, cost-effectiveness, adoption, productivity, income, food security and resilience.

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