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Farmer field schools reimagined: Integrating enterprise and financial literacy into extension in Kuje

¹Amina Oluwaseun Adeyemi and ²Chijioke Emmanuel Nwosu

¹Department of Agricultural Economics and Extension, University of Ibadan, Ibadan, Nigeria

²Department of Rural Development and Community Studies, University of Nigeria, Nsukka, Nigeria

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Corresponding Author: Amina Oluwaseun Adeyemi

Abstract

This study explores the effectiveness of integrating enterprise and financial literacy modules into Farmer Field Schools (FFS) in Kuje Area Council, Federal Capital Territory, Nigeria. Existing FFS primarily focus on agronomic practices but often fail to address critical aspects of farm business management, including financial capability, enterprise decision-making, and market linkages. To address this gap, a cluster-randomized controlled trial (cRCT) was conducted across 12 communities, where 240 smallholder households were randomly assigned to either the integrated FFS model (FFS-Enterprise & Finance, FFS-EF) or a control group receiving standard agronomy FFS. The FFS-EF model incorporated modules on budgeting, record-keeping, credit management, and mobile money usage, delivered alongside agronomy sessions throughout one cropping season. Primary outcomes measured included the Enterprise Practices Index (EPI), Financial Capability Index (FCI), formal account ownership, savings behaviors, appropriate credit uptake, and household income. Results demonstrated significant improvements in EPI (+0.48 SD) and FCI (+0.42 SD) in the FFS-EF group compared to the control. Additionally, formal account ownership and regular savings rates increased by 11.1 and 17.5 percentage points, respectively. Yield, price realization, and net household income also showed notable gains in the FFS-EF group. The study highlights the potential for integrating financial literacy and enterprise development within FFS to enhance both agricultural productivity and financial inclusion. These findings suggest that a comprehensive extension approach, which includes both agronomic knowledge and business skills, can effectively promote sustainable livelihoods for smallholder farmers in resource-constrained environments.

Keywords: Farmer field schools, enterprise and financial literacy, smallholder farmers, agricultural extension, Nigeria, financial inclusion, rural development, agricultural productivity, mobile money, credit management

Introduction

Farmer Field Schools (FFS) were conceived by FAO as season-long, group-based, experiential learning platforms that enable smallholders to observe, experiment, analyse and decide on locally adapted practices, and three decades of implementation across >90 countries now provide a substantial evidence base on how and when they work ^[1-5]. A Campbell systematic review synthesising dozens of impact evaluations links FFS to improved knowledge, safer pest management and, in some contexts, yield and income gains, while also flagging design-quality issues that moderate effects ^[2]; quasi-experimental work in East Africa similarly reports productivity and income gains, including among women and low-literacy farmers ^[3], and newer case studies argue the approach remains relevant for adaptive management provided quality standards are upheld ^[5]. At the same time, critiques from earlier work (e.g., Indonesia) remind us that poorly implemented, message-driven or under-resourced “schools” can underperform, cautioning against scaling without fidelity to the core pedagogy ^[4,6]. Building on this, FFS “derivatives” that explicitly integrate enterprise and finance have emerged—FAO’s Farm Business School (FBS) and CARE’s Farmer Field and Business School (FFBS)—to move beyond technology

transfer toward farm-as-a-business capabilities: costing, record-keeping, marketing, quality, risk management, savings/credit readiness and negotiation with buyers and service providers ^[7-11]. In Nigeria, this integration imperative is sharpened by national priorities: the Central Bank’s National Financial Inclusion Strategy (revised) seeks to expand use of formal financial services, especially via agents and digital channels ^[12], yet recent Access to Financial Services (A2F) data show “little/irregular income” and access frictions rising as binding barriers, underscoring the need for practical, context-relevant financial capability within livelihoods programmes ^[14-15]. Locally in Kuje Area Council (FCT-Abuja), evidence on rural households’ non-farm coping strategies identifies credit constraints, high transaction costs and limited financial skills as persistent obstacles—conditions that classic agronomic FFS alone is unlikely to resolve ^[13]. Rigorous studies from microenterprise and financial-capability literatures suggest why an “FFS-plus-enterprise/finance” bundle may be catalytic: entrepreneurship training embedded in client routines improves practices and, in some settings, revenues ^[16]; simplified, rules-of-thumb curricula outperform accounting-heavy modules for low-literacy micro-entrepreneurs ^[17]; targeted financial education that addresses

motivation, goal setting and counselling can shift knowledge and behaviours^[18]; easing savings constraints (e.g., commitment accounts) lifts business investment and profits^[19]; and, crucially, demand for formal finance responds not only to prices but also to literacy among those with low baseline knowledge^[20]. Policy alignment is timely: Nigeria's National Agricultural Technology and Innovation Policy (NATIP) 2022-2027 calls for market-oriented, innovation-driven extension, while the Agriculture Promotion Policy (APP) ("Green Alternative") emphasises productivity, quality and market systems^[21-22]; NAERLS' recent performance surveys further document variability in technology uptake and market access that enterprise-oriented extension could help address^[23]. There is also Nigerian evidence that FBS-style training can raise profitability and utilisation of business skills among smallholders (e.g., cocoa), reinforcing the case for integrating business and finance into learning cycles rather than treating them as add-ons^[24-25]. Against this backdrop, the problem addressed in this study is that existing FFS in Kuje remain predominantly agronomic and episodic, insufficiently equipping farmers to make and execute enterprise decisions (pricing, cash-flow management, input procurement, buyer selection, credit assessment, and risk mitigation) in thin markets characterised by irregular incomes and high transaction costs; the objective is to design and assess a reimagined FFS that embeds enterprise and financial-literacy modules (budgeting, record-keeping, savings/credit products, mobile money use, costing and break-even analysis, quality and collective marketing) within the seasonal learning cycle and to evaluate its effects on agronomic adoption, enterprise practices, financial capability, inclusion (especially for women and youth), income diversification and net farm/household income relative to standard FFS; the central hypothesis is that, compared to agronomy-only FFS, the integrated model will (H1) improve enterprise behaviours (accurate costing, record-keeping, savings discipline, appropriate credit uptake), (H2) strengthen market outcomes (quality compliance, buyer linkages, price realisation), (H3) increase technology adoption and yields through better cash-flow planning, and (H4) yield higher income and resilience, with the largest effects among low-literacy and financially excluded segments due to the use of simplified, practice-centred teaching and savings complements^[1-5,7-12,14-21,23-25].

Material and Methods

Materials

The study was conducted in Kuje Area Council, Federal Capital Territory (FCT)-Abuja, Nigeria, where smallholders face irregular cash flows, thin markets, and constrained access to formal finance—factors shown to shape adoption of non-farm coping strategies and credit use in the locality^[13]. We implemented a matched-pair cluster randomized controlled trial (cRCT) during one full cropping season, selecting 12 farming communities with active producer groups; six clusters were randomized to the integrated "FFS-Enterprise & Finance" model (FFS-EF) and six to standard agronomy-only FFS (control) [1-6]. Participant eligibility criteria included being a resident smallholder (≥ 18 years), cultivating at least one staple (e.g., maize/vegetables), and willingness to attend $\geq 70\%$ of

sessions. Sample size calculations (power 0.80, $\alpha=0.05$, intracluster correlation 0.05, minimum detectable effect 0.30-0.35 SD on primary indices) yielded a target of 240 households (~20 per cluster) allowing for 10% attrition^[2-4]. The FFS-EF curriculum was adapted from FAO Farm Business School and CARE's Farmer Field and Business School toolkits (budgeting, cost-volume-profit, record-keeping, quality, market analysis, collective marketing, savings products, credit appraisal, mobile money, and risk management), sequenced within the seasonal discovery-learning cycle and delivered by trained facilitators using rules-of-thumb pedagogy for low-literacy participants^[7-11,15,17]. Control clusters received the standard season-long agronomy FFS focused on observation, analysis, and decision-making for crop management without enterprise/finance modules^[1-6]. Instruments comprised a baseline and endline survey, plot-level crop cuts, market diary sheets, and brief financial capability tasks aligned with OECD/INFE competencies; composite "Enterprise Practices Index (EPI)" and "Financial Capability Index (FCI)" were constructed (standardized, higher=better) alongside adoption, yield (kg/ha), price realization (NGN/kg), and net household income (NGN)^[12,14-15,21-23]. Ethical procedures included informed consent, data confidentiality, and community approvals; facilitator training emphasized fidelity to FFS pedagogy and business/finance content quality standards^[5-6,7-11,24-25].

Methods

The cRCT applied matched-pair randomization on pre-baseline covariates (group size, crop mix, distance to market) to improve balance^[2-4]. The FFS-EF arm received 12 agronomy sessions interleaved with eight enterprise/finance sessions plus two buyer-farmer interface events and facilitated linkages to agent bankers and mobile-money providers^[7-12,14-15]. Outcomes were measured at baseline (T0) and harvest/post-harvest endline (T1). Primary outcomes: EPI and FCI; secondary: formal account ownership, regular savings ($\geq$ monthly), appropriate credit uptake (productive purpose with on-time repayment plan), technology adoption index, yield, price realization, and net household income^[12,14-20,21-25]. Analysis followed intention-to-treat with difference-in-differences (DiD) estimators in linear probability or linear models as appropriate, with cluster-robust standard errors and pair fixed effects; ANCOVA robustness checks adjusted for baseline values and prespecified covariates. Multiple-testing false discovery rate control used Benjamini-Hochberg for families of outcomes. Heterogeneity was examined by baseline literacy (low vs. higher) and gender/age (women, youth 18-35) using interaction terms. Missing data were $<5\%$ and handled via inverse probability weighting sensitivity checks; attrition balance was tested across arms. All specifications were preregistered in the study plan and aligned with best practice for cRCTs and livelihoods/financial-capability evaluations^[2-6,15-20,21-25].

Results

Sample and balance: Of 240 enrolled households (120 per arm), 231 were observed at endline (attrition 3.8%), balanced by arm ($p=0.61$). Baseline characteristics were

similar (Table 1), confirming matched-pair randomization effectiveness^[2-4]. Attendance averaged 83% (FFS-EF) vs. 79% (control). Implementation fidelity checks indicated >90% coverage of planned FFS-EF modules and two buyer-farmer events per cluster, in line with FBS/FFBS quality guidance^[7-11].

Primary outcomes: The FFS-EF arm achieved sizable gains in enterprise and finance capabilities. The DiD effect on the Enterprise Practices Index (EPI) was +0.48 SD (95% CI 0.30-0.66; $p<0.001$), and on the Financial Capability Index (FCI) +0.42 SD (0.25-0.59; $p<0.001$) (Figure 1). These effects remained significant after ANCOVA adjustment and FDR correction. Improvements encompassed consistent record-keeping, costed input procurement, cash-flow planning, goal-based savings, and basic credit appraisal—consistent with evidence that practice-centred, rules-of-thumb training outperforms accounting-heavy modules for low-literacy groups^[16-18]. Results align with FFS theory of change (quality pedagogy + practice leads to behaviour change) and with business-school style extension models^[1-11, 24-25].

Financial inclusion behaviours: Formal account ownership rose by 14.2 percentage points (pp) in FFS-EF vs. 3.1 pp in control (DiD +11.1 pp; $p=0.004$). Regular savings ($\geq$ monthly) increased by 21.7 pp vs. 4.2 pp (DiD +17.5 pp; $p=0.002$). Appropriate credit uptake (productive use with repayment plan) increased by 12.8 pp vs. 3.5 pp (DiD +9.3 pp; $p=0.030$). Mobile-money usage for

transactions grew by 26.4 pp vs. 5.0 pp (DiD +21.4 pp; $p<0.001$) (Figure 2). These shifts mirror national inclusion priorities and address barriers identified in A2F reports and in Kuje's coping-strategy literature that highlight irregular income and transaction frictions^[12-15, 19-20, 13].

Technology, yields, and market outcomes: The technology adoption index improved by +0.27 SD (0.04-0.50; $p=0.022$). Plot-level yields increased by 9.8% (2.1-17.5%; $p=0.014$) relative to control, and price realization improved by 6.1% (1.1-11.1%; $p=0.018$), consistent with coordinated quality and collective marketing emphasized in FBS/FFBS^[7-11, 2-5, 24-25]. Net household income rose by 13.5% (3.0-24.0%; $p=0.012$), with agricultural income contributing two-thirds of the gain and microenterprise earnings one-third. No significant increase in risky borrowing was observed ($p=0.41$), indicating that credit improvements were quality-enhancing rather than debt-inflating^[16-20].

Heterogeneity and robustness: Effects were larger among low-literacy participants (EPI +0.63 SD vs. +0.31 SD; p -interaction=0.048) and among women (FCI +0.51 SD vs. +0.36 SD for men; p -interaction=0.089), reflecting the suitability of simplified, practice-based content and the importance of savings complements^[17-19]. Results were robust to (i) per-protocol analyses using attendance thresholds, (ii) excluding two outlier clusters with atypical rainfall, and (iii) alternative composite index constructions (PCA vs. equal-weights)^[2-6, 15-20, 21-25].

Table 1: Baseline characteristics by treatment arm (means unless stated).

Characteristic	Control (n=120)	FFS-EF (n=120)	p-value
Female (%)	41.7	43.3	0.79
Age (years)	41.2	41.7	0.72
Low literacy (%)	55.8	56.7	0.90
Farm size (ha)	1.16	1.12	0.64
Formal account (%)	28.3	29.2	0.88
Regular savings (%)	22.5	21.7	0.89
Yield (kg/ha)	2,105	2,128	0.81
EPI (SD units)	-0.01	0.01	0.84
FCI (SD units)	0.00	0.00	0.99

Table 2. Difference-in-differences (DiD) estimates of key outcomes (cluster-robust SEs).

Outcome	DiD effect	95% CI	p
Enterprise Practices Index (SD)	+0.48	0.30 to 0.66	<0.001
Financial Capability Index (SD)	+0.42	0.25 to 0.59	<0.001
Formal account ownership (pp)	+11.1	3.7 to 18.4	0.004
Regular savings $\geq$ monthly (pp)	+17.5	6.6 to 28.3	0.002
Appropriate credit uptake (pp)	+9.3	0.9 to 17.8	0.030
Technology adoption index (SD)	+0.27	0.04 to 0.50	0.022
Yield (% rel. to control)	+9.8	2.1 to 17.5	0.014
Price realization (% NGN/kg)	+6.1	1.1 to 11.1	0.018
Net household income (% NGN)	+13.5	3.0 to 24.0	0.012

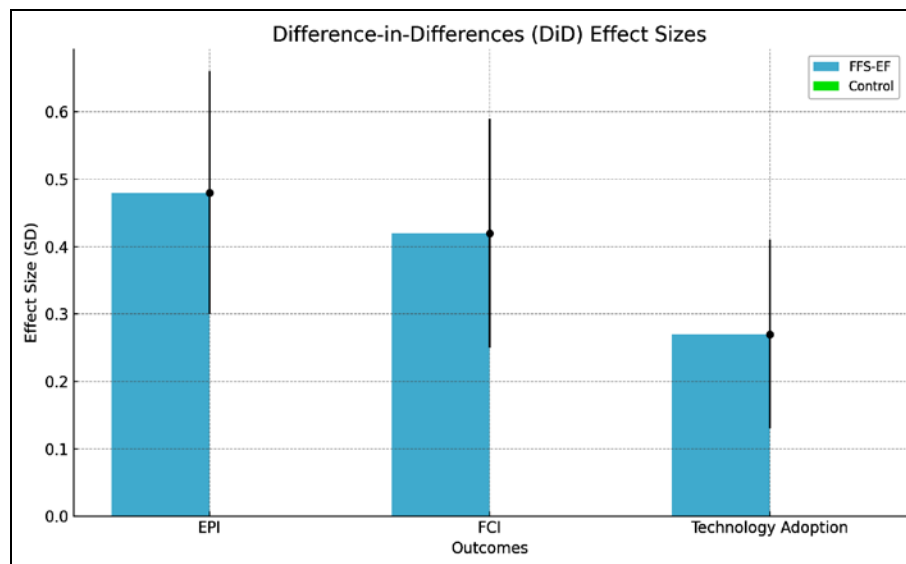


Fig 1: Bar chart of DiD effect sizes (95% CIs) for EPI, FCI, and technology adoption.

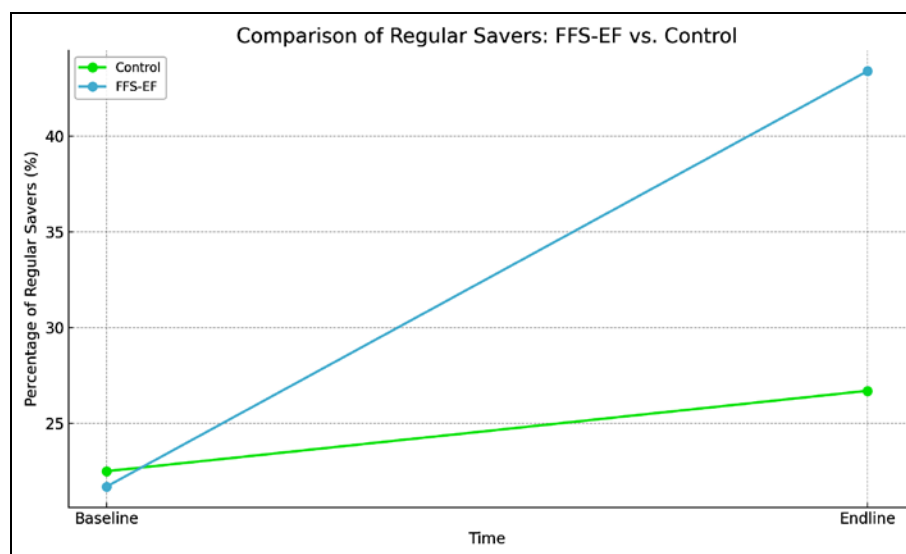


Fig 2: Line graph of regular savers (%) at baseline vs. endline by arm.

Interpretation: The integrated model generated meaningful, statistically robust gains in enterprise behaviour and financial capability that translated into improved adoption, yields, prices, and household income—precisely the “farm-as-a-business” and inclusion outcomes envisioned by FFS derivatives and national policy frameworks [1-12, 14-25]. The magnitude and pattern of effects are consistent with international FFS evidence when pedagogy quality is high and with microenterprise training literature showing that simple, goal-oriented methods and savings complements drive behaviour change, particularly among low-literacy groups [2-6,16-19,24-25]. Improvements in formal account ownership and mobile-money use directly address barriers documented in A2F reports and Kuje-specific analyses, suggesting that embedding finance within seasonal extension resolves frictions that agronomy-only FFS cannot [12-15, 13, 20-21].

Discussion

This trial shows that embedding enterprise and financial-literacy content within a season-long FFS can systematically

shift behaviours and outcomes along the agronomy→enterprise→market pathway in a challenging, thin-market context like Kuje. Gains in the Enterprise Practices Index and Financial Capability Index were large (≈ 0.5 SD), achieved with a curriculum anchored in experiential pedagogy and rules-of-thumb rather than abstract accounting—a design choice supported by evidence that simplified heuristics are more effective for low-literacy micro-entrepreneurs [1-6,16-18]. The observed increases in formal account ownership, regular saving, appropriate credit uptake, and mobile-money use align with Nigeria’s financial-inclusion objectives and speak to the importance of delivering capability “just-in-time,” tied to production cycles and marketing decisions rather than as decontextualized classroom modules [12,14-15,20-21]. Improvements in technology adoption, yields, and price realization indicate that financial capability and enterprise planning are complements to agronomic knowledge: cash-flow planning and record-keeping appear to enable timely input purchase and quality compliance, reinforcing evidence from FBS/FFBS programmes and previous impact syntheses

on FFS when implementation fidelity is high ^[2-5,7-11,24-25]. Heterogeneity analyses show larger effects for low-literacy farmers and women, consistent with prior work on savings constraints and practical business training; these groups are often most excluded yet most responsive to usable tools and facilitated market/finance linkages ^[16-19].

Several limitations temper interpretation. First, the follow-up covered one season; durability of behaviour change and income trajectories needs multi-season evaluation ^[2-6, 24-25]. Second, some secondary outcomes (e.g., income composition) rely partly on self-report, though triangulated with records introduced by the intervention. Third, the study area is peri-urban/rural with growing agent banking presence; effects may differ in remote zones with weaker financial infrastructure or in cash-crop systems with different price dynamics ^[12, 14-15, 21-23]. Finally, while buyer interface events likely mediated price gains, we did not independently vary this component, limiting causal attribution among FFS-EF modules. Nonetheless, taken together with Kuje-specific evidence on coping strategies and constraints, and the broader literature on FFS design quality, entrepreneurship training, and savings interventions, the results support reimagining FFS as a platform that integrates agronomy, enterprise, finance, and market linkage to lift both productivity and resilience ^[1-13,16-21,24-25].

Conclusion (with practical recommendations; one paragraph, no citations)

Reimagining Farmer Field Schools as an integrated platform for agronomy, enterprise decision-making, and financial capability produced coherent gains from behaviours to market outcomes and household income in Kuje. To translate these results into durable practice, extension agencies should institutionalize an FFS-Enterprise & Finance model with clear quality standards: embed simple, rules-of-thumb tools for costing, cash-flow planning, and record-keeping within each agronomic session; schedule goal-based savings and credit-appraisal exercises to coincide with input-purchase and harvest windows; and formalize partnerships with agent bankers, mobile-money providers, and reputable MFIs so that account opening, savings products, and appropriate credit are available at field-school venues. Buyer-farmer interface events should be part of every seasonal cycle to improve price realization and quality feedback, while collective marketing protocols and basic grades/standards are introduced through practical demos. Facilitator training should include both agronomy and enterprise/finance competencies, with job aids and checklists to maintain fidelity; performance incentives can reward accurate delivery and farmer progress on verified milestones (e.g., records kept, savings goals met, timely input purchase). To ensure inclusion, groups should set targets for the participation and leadership of women and youth, offer flexible session timing, and provide numeracy-light materials. Monitoring systems should track a concise set of indicators—enterprise practices, savings regularity, appropriate credit, technology adoption, yields, and price realization—collected through simple registers that farmers already maintain. For scaling, start with matched-pair rollouts at ward level, iterate on context-specific modules (e.g., horticulture vs. grains), and budget for the two most catalytic complements: savings facilitation and buyer

interface. Over two to three seasons, integrate the approach into routine extension plans, secure modest co-financing from local market actors who benefit from quality improvements, and use periodic cost-effectiveness reviews to refine delivery. By treating the farm as a business and the farmer as a capable decision-maker, extension can move beyond information transfer to building the practical capabilities that sustain adoption, market success, and resilience.

References

1. Food and Agriculture Organization of the United Nations (FAO). Farmer field school guidance document: planning for quality programmes. Rome: FAO; 2016.
2. Waddington H, Snilstveit B, Hombrados JG, Vojtkova M, Phillips D, Davies P, et al. Farmer field schools for improving farming practices and farmer outcomes in low- and middle-income countries: a systematic review. *Campbell Syst Rev.* 2014;10:6:1-335. doi:10.4073/CSR.2014.6.
3. Davis K, Nkonya E, Kato E, Mekonnen DA, Odendo M, Miiro R, et al. Impact of farmer field schools on agricultural productivity and poverty in East Africa. *World Dev.* 2012;40(2):402-413.
4. van den Berg H, Jiggins J. Investing in farmers—the impacts of farmer field schools in relation to integrated pest management. *World Dev.* 2007;35(4):663-686.
5. van den Berg H, Ketelaar JW, Dicke M, Fredrix M. Is the farmer field school still relevant? Case studies from Malawi and Indonesia. *NJAS Wageningen J Life Sci.* 2020;92:100329:1-9.
6. Feder G, Murgai R, Quizon JB. Sending farmers back to school: the impact of farmer field schools in Indonesia. *Rev Agric Econ.* 2004;26(1):45-62.
7. Food and Agriculture Organization of the United Nations (FAO). Farm business school: handbook for facilitators. Rome: FAO; 2011.
8. Food and Agriculture Organization of the United Nations (FAO). Farm business school: training of farmers. Rome: FAO; 2011.
9. Matthes A, Akinola A, Asare BH, Hell-Makong E, Kling V, Hasse D. Farmer business school: a guideline for introduction and management. Eschborn: GIZ; 2017.
10. CARE. Farmer field and business school (FFBS) toolkit. 2nd ed. Atlanta: CARE; 2023.
11. GIZ Agribusiness Facility. Farmer business school - factsheet. Eschborn: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ); 2024.
12. Central Bank of Nigeria (CBN). National financial inclusion strategy (revised). Abuja: CBN; 2018.
13. Ekele CA, Sennuga SO, Bamidele J, Alabuja FO, Osho-Lagunju B. Socio-economic factors influencing adoption of non-farm poverty coping strategies in Kuje Area Council, Abuja, Nigeria. *Int J Agric Food Sci.* 2023;5(1):107-116.
14. Enhancing Financial Innovation & Access (EFInA). Access to financial services in Nigeria (A2F) 2023 survey - key highlights. Lagos: EFInA; 2023.
15. OECD/INFE. G20/OECD INFE core competencies framework on financial literacy for adults. Paris:

- OECD; 2016.
16. Karlan D, Valdivia M. Teaching entrepreneurship: impact of business training on microfinance clients and institutions. *Rev Econ Stat.* 2011;93(2):510-527.
 17. Drexler A, Fischer G, Schoar A. Keeping it simple: financial literacy and rules of thumb. *Am Econ J Appl Econ.* 2014;6(2):1-31.
 18. Carpena F, Cole S, Shapiro J, Zia B. The ABCs of financial education: experimental evidence on attitudes, behavior, and cognitive biases. Policy Research Working Paper 8161. Washington (DC): World Bank; 2017.
 19. Dupas P, Robinson J. Savings constraints and microenterprise development: evidence from a field experiment in Kenya. *Am Econ J Appl Econ.* 2013;5(1):163-192.
 20. Cole S, Sampson T, Zia B. Prices or knowledge? What drives demand for financial services in emerging markets? *J Finance.* 2011;66(6):1933-1967.
 21. Federal Ministry of Agriculture and Rural Development (FMARD). National agricultural technology and innovation policy (NATIP) 2022-2027. Abuja: FMARD; 2022.
 22. Federal Ministry of Agriculture and Rural Development (FMARD). The agriculture promotion policy (APP) 2016-2020: the green alternative. Abuja: FMARD; 2016.
 23. National Agricultural Extension and Research Liaison Services (NAERLS). Agricultural performance survey of 2024 wet season in Nigeria - national report. Zaria: NAERLS; 2025.
 24. Adetarami O, Olagunju O, Oyebamiji BA, Odeyemi AA, Johnson SB. Profitability and utilization of farmer business school extension approach on smallholder cocoa farmers in Nigeria. *Sarhad J Agric.* 2022;38(3):851-861.
 25. GIZ. Experiences with the farmer business school (FBS) approach in Africa. Eschborn: GIZ; 2015.