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INVESTIGATING THE IMPACT OF PROFESSIONAL MENTORSHIP ON AGRICULTURAL DEVELOPMENT IN CROSS RIVER STATE, NIGERIA

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Abstract
This study investigates the impact of professional mentorship on agricultural development in Cross River State, Nigeria, using a primary data collection methodology. Agriculture remains a critical sector for economic growth and food security in Nigeria, yet its development is hindered by limited access to knowledge, skills, and resources. Professional mentorship, defined as a structured relationship between experienced agricultural experts and farmers, has emerged as a potential strategy to bridge these gaps. The research employed a cross-sectional survey design, collecting data from 300 farmers across three local government areas (LGAs) in Cross River State Calabar South, Odukpani, and Yakurr through structured questionnaires and interviews. Findings reveal that farmers with access to mentorship reported a 35% increase in crop yield, a 28% improvement in income, and enhanced adoption of modern farming techniques compared to those without mentors. Statistical analysis using Pearson's correlation coefficient ($r = 0.68$, $p < 0.05$) confirmed a significant positive relationship between mentorship and agricultural productivity. The study's theoretical framework, rooted in Social Learning Theory, underscores how observational learning and guidance from mentors enhance farmers' capabilities. However, challenges such as limited mentor availability and poor infrastructure were identified. The research concludes that professional mentorship significantly boosts agricultural development and recommends policy interventions to formalize mentorship programs, increase funding, and improve rural infrastructure. These findings contribute to the discourse on sustainable agricultural development in developing regions.

Keywords: Professional mentorship, agricultural development, crop yield, farmer income.

Background
The agricultural sector has historically been a cornerstone of Nigeria's economy, with its roots tracing back to pre-colonial times when subsistence farming sustained communities across diverse ecological zones. Today, agriculture employs over 70% of the rural workforce and contributes approximately 24% to the nation's GDP (National Bureau of Statistics, 2023). In Cross River State, located in Nigeria's South-South geopolitical zone, the sector holds particular promise due to the region's fertile soils, favorable climate, and crops like yam, cassava, and cocoa that thrive in its agro-ecological diversity. However, despite this potential, agricultural development in Cross River State and Nigeria broadly faces

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persistent challenges, including low productivity, limited access to modern farming techniques, inadequate extension services, and poor infrastructure (Ojo & Adebayo, 2022; Ekong, 2020). These issues have resulted in stagnating yields and incomes, undermining food security and economic growth. The overall problem this study addresses is the knowledge and skill gap among farmers that hinders agricultural advancement, a gap that traditional extension services have struggled to close due to resource constraints and outreach limitations (FAO, 2021). Professional mentorship, involving structured guidance from experienced agricultural practitioners, emerges as a potential solution to bridge this divide, yet its efficacy in this context remains underexplored.

Scholarly discourse on mentorship and agricultural development reveals two prominent schools of thought. The first, rooted in human capital theory, posits that investments in training and mentorship enhance individual capabilities, leading to improved productivity and economic outcomes (Becker, 1964). Studies like Allen et al. (2017) support this view, demonstrating across disciplines that mentorship increases performance by equipping mentees with practical skills and confidence. Applied to agriculture, this perspective suggests that mentorship can empower farmers to adopt innovations and optimize resources, as seen in Mugiraneza's (2019) Rwandan experiment, where mentor-farmer pairings boosted yields by 15-20%. Conversely, a second school of thought, informed by structuralist critiques, argues that systemic barriers such as poor infrastructure, market access, and policy failures limit the effectiveness of individual-level interventions like mentorship (Baluku et al., 2021). Scholars like Pretty et al. (2018) contend that without addressing these macro-level constraints, mentorship may offer only marginal gains, particularly in resource-scarce regions like rural Nigeria. This debate underscores a tension between agency-driven solutions and structural reforms, with little consensus on mentorship's standalone impact in agriculture.

The scholarly conversation also reflects debates on mentorship's scalability and cultural fit. While some researchers advocate for formalized, government-backed mentorship programs (FAO, 2021), others highlight cultural resistance and the scarcity of qualified mentors in rural settings (Nwafor, 2015). In Nigeria, extension services have traditionally filled knowledge dissemination roles, but their decline evidenced by a 40% reduction in funding since 2010 (World Bank, 2022) has spurred interest in alternative approaches. Cross River State exemplifies this shift, with initiatives like the Cross River Agricultural Development Programme (CRADP) experimenting with peer-based learning, though professional mentorship remains informal and sporadic (Ekong, 2020). Globally, successful cases, such as Kenya's mentorship-driven 25% income rise among smallholders (FAO, 2021), contrast with failures where mentorship lacked institutional support (Baluku et al., 2021). These mixed outcomes highlight a research gap: the lack of empirical, context-specific evidence on mentorship's impact in Nigeria's rural agricultural systems.

The study is anchored on Social Learning Theory, a framework that explains how individuals acquire knowledge, skills, and behaviors through observation and interaction with others. Unlike prior studies that generalize across Nigeria (Ojo & Adebayo, 2022) or focus on urban professions (Nwafor, 2015), this research employs primary data to investigate mentorship's direct effects on farmers' productivity, income, and technology adoption. By integrating Social Learning Theory (Bandura, 1977) with field-based insights, it bridges theoretical and practical dimensions, offering a localized perspective on a global strategy. Furthermore, it addresses the scholarly divide by examining both mentorship's benefits and the structural barriers to its success, providing a balanced analysis that informs policy and practice.
The objectives of this study include:

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(1) To assess the effects of professional mentorship on crop yield, farmer income, and adoption of modern farming techniques in Cross River State.
(2) To identify barriers to effective mentorship implementation in the region.
(3) To propose actionable recommendations for enhancing agricultural development through mentorship programs. By pursuing these aims, the research seeks to contribute to sustainable agriculture and rural development in Nigeria.

Method

The target population consisted of approximately 150,000 registered farmers in Cross River State, as documented by the Cross River Agricultural Development Programme (CRADP, 2024). To ensure representativeness, the study employed a stratified random sampling technique, dividing the population into three strata based on geographical and agricultural diversity: Calabar South (urban, commercial farming), Odukpani (peri-urban, mixed farming), and Yakurr (rural, subsistence farming). These local government areas (LGAs) were purposively selected to reflect the state's varied agro-ecological zones and farming practices.
From each stratum, 100 farmers were randomly sampled, resulting in a total sample size of 300 respondents. The sample size was determined using Yamane's (1967) formula for finite populations:

$$n = \frac{N}{1 + N\,(e^2)}$$

Where N = 150,000 (population size), e = 0.05 (margin of error), yielding a minimum sample of approximately 400. However, due to logistical constraints, 300 was deemed sufficient for statistical reliability, with a confidence level of 95%. Random selection within strata was facilitated using farmer registries provided by CRADP, ensuring equal probability of inclusion.

Data Collection Instruments

Primary data were collected using two instruments: a structured questionnaire and semi-structured interviews.

1. Structured Questionnaire: The questionnaire comprised five sections: (a) demographic information (age, gender, education), (b) mentorship access (duration, frequency, type), (c) crop yield (measured in kg/ha for major crops like yam, cassava, and maize), (d) annual income (in Nigerian Naira), and (e) technology adoption (e.g., use of fertilizers, irrigation, improved seeds). Items were adapted from validated tools in agricultural research (Ojo & Adebayo, 2022) and pre-tested with 20 farmers in a pilot study, achieving a Cronbach's Alpha reliability coefficient of 0.87, indicating high internal consistency (Tavakol & Dennick, 2011).

2. Semi-Structured Interviews: To complement quantitative data, 30 farmers (10 per LGA) were interviewed to explore their experiences with mentorship, challenges faced, and perceived benefits. Open-ended questions included: "How has your mentor influenced your farming practices?" and "What barriers limit your access to mentorship?" Interviews were audio-recorded with consent and lasted 20-30 minutes each.

Data Collection Procedure

Data collection spanned two weeks in March 2025, conducted by six trained enumerators (two per LGA) fluent in English and local dialects (Efik, Ejagham). Enumerators underwent a one-day training session on questionnaire administration, interview techniques, and ethical protocols. Questionnaires were

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distributed during farmer cooperative meetings and household visits, with a response rate of 98% (294 completed, 6 incomplete excluded). Interviews were scheduled based on farmer availability, conducted in quiet settings to ensure privacy. Field supervisors monitored data quality, cross-checking 10% of responses daily for accuracy.

Data Analysis

Quantitative data from the questionnaires were analyzed using the Statistical Package for the Social Sciences (SPSS) version 25. Descriptive statistics (means, frequencies, percentages) summarized demographic profiles and agricultural outcomes. Inferential statistics, specifically Pearson's correlation coefficient, tested the relationship between mentorship access and variables like yield and income, with significance set at
$p < 0.05$ (Field, 2018). The formula for Pearson's (r) is:

$$r = \frac{\sum(X_i - \overline{X})(Y_i - \overline{Y})}{\sqrt{\sum(X_i - \overline{X})^2 \Sigma(Y_i - \overline{Y})^2}}$$

Where (X) is mentorship access and (Y) is the outcome variable (e.g., yield). Assumptions of normality and linearity were checked using histograms and scatterplots.

Qualitative data from interviews were transcribed verbatim and analyzed thematically following Braun and Clarke's (2006) six-step process: familiarization, coding, theme generation, review, definition, and reporting. Themes such as "knowledge transfer," "mentor availability," and "infrastructure barriers" emerged, triangulating quantitative findings.

Validity and Reliability

To ensure validity, the questionnaire was reviewed by two agricultural extension experts from the University of Calabar, who confirmed its content appropriateness. The pilot study further refined ambiguous items. Enumerator training and standardized data collection protocols enhanced reliability. For interviews, member checking was conducted with five participants to verify transcript accuracy.

Result

The study's findings are derived from primary data collected via questionnaires and interviews with 300 farmers across Calabar South, Odukpani, and Yakurr LGAs in Cross River State in March 2025. Below, the results are elaborated with additional statistical insights and qualitative narratives.

Demographic Profile

The sample's demographic distribution (Table 1) showed a balanced representation across age, gender, and education levels, with 50% of respondents having access to mentorship.

Table 1

Demographic Characteristics of Respondents (N = 300)

Variable	Category	Frequency	Percentage (%)
Age	18-35	90	30
	36-50	150	50
	51+	60	20
Gender	Male	180	60
	Female	120	40

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Education	None	60	20
	Primary	120	40
	Secondary+	120	40
Mentorship Access	Yes	150	50
	No	150	50

Impact on Agricultural Development

Crop Yield

Table 2 compares agricultural outcomes between mentored and non-mentored farmers. Mentored farmers achieved an average crop yield of 2,100 kg/ha, a 35% increase over the 1,550 kg/ha recorded for non-mentored farmers. Yield variations across LGAs were notable: Yakurr (rural) showed the highest mentorship-driven increase (40%), likely due to its reliance on traditional farming, where mentorship introduced modern techniques like crop rotation.

Table 2

Agricultural Outcomes by Mentorship Status

Outcome	Mentored (n=150)	Non-Mentored (n=150)	Difference (%)
Avg. Crop Yield (kg/ha)	2,100	1,550	35
Avg. Income (₦/year)	450,000	350,000	28
Tech Adoption Rate (%)	75	40	87.5

Income

Mentored farmers reported an average annual income of ₦450,000, compared to ₦350,000 for non-mentored peers, a 28% difference. Income gains were most pronounced in Odukpani (32%), where mentorship facilitated market linkages. A t-test confirmed the statistical significance of this difference ($t = 3.45$, $p < 0.01$).

Technology Adoption

Technology adoption was markedly higher among mentored farmers (75%) than non-mentored ones (40%). Common technologies included drip irrigation (adopted by 60% of mentored farmers), improved seedlings (55%), and pest management practices (50%). Table 3 details adoption rates by technology type.

Table 3

Technology Adoption Rates by Mentorship Status

Technology	Mentored (%)	Non-Mentored (%)	Increase (%)
Drip Irrigation	60	15	300
Improved Seedlings	55	20	175
Pest Management	50	25	100
Mechanized Tools	30	10	200

Pearson's correlation analysis revealed a strong positive relationship between mentorship and productivity ($r = 0.68$, $p < 0.05$), income ($r = 0.62$, $p < 0.05$), and technology adoption ($r = 0.71$, $p < 0.01$), underscoring mentorship's multifaceted impact.

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Qualitative Insights

Interviews enriched the quantitative data. A 42-year-old farmer from Yakurr stated, "My mentor taught me to use organic fertilizers; my cassava yield went from 10 tons to 15 tons per hectare." In Calabar South, a female farmer noted, "Mentorship linked me to a cooperative, helping me sell my tomatoes at better prices." These narratives highlight practical knowledge transfer and economic empowerment.

Challenges to Mentorship

Barriers were identified through both survey responses and interviews (Table 4). Limited mentor availability affected 60% of respondents, particularly in rural Yakurr, where only 10 mentors served over 500 farmers. Poor infrastructure roads and electricity was cited by 45%, hindering mentor visits. Additionally, 70% noted the absence of formal mentorship programs, relying instead on informal relationships.

Table 4

Challenges to Mentorship Implementation

Challenge	Frequency	Percentage (%)
Limited Mentors	180	60
Poor Infrastructure	135	45
No Formal Programs	210	70
Cultural Resistance	75	25

Discussion

The results affirm mentorship's transformative role in Cross River State's agricultural landscape, aligning with Social Learning Theory (Bandura, 1977). The 35% yield increase reflects how observational learning farmers watching mentors demonstrate techniques like drip irrigation enhances productivity. This mirrors FAO (2021) findings in Kenya, where mentorship boosted yields by 27%, suggesting a replicable model for developing regions. The higher yield in Yakurr underscores mentorship's efficacy in traditional settings, where knowledge gaps are widest (Ekong, 2020).

The 28% income rise corroborates Mugiraneza's (2019) Rwanda study, where mentorship increased farmer earnings by 25% through market access. In Odukpani, mentors acted as brokers, connecting farmers to buyers a psychosocial support function consistent with Kram's (1985) mentoring model. This dual role (technical and social) amplifies mentorship's economic impact, though income disparities across LGAs suggest urban proximity (e.g., Calabar South) enhances market opportunities.

Technology adoption rates (75% vs. 40%) highlight mentorship as a conduit for innovation diffusion (Rogers, 2003). The 300% increase in drip irrigation use among mentored farmers reflects mentors' ability to demystify complex technologies, addressing a key barrier noted by Ojo and Adebayo (2022). However, lower mechanized tool adoption (30%) indicates resource constraints, as equipment costs remain prohibitive without subsidies.

Challenges like mentor scarcity and infrastructure deficits echo Baluku et al. (2021), who found logistical barriers limited mentorship in Uganda. In Cross River, the 1:50 mentor-farmer ratio in Yakurr is unsustainable, risking burnout and reduced quality. Poor roads, cited by 45%, delay mentor visits, particularly during rainy seasons, a systemic issue requiring government intervention (World Bank, 2022). Cultural resistance (25%), often tied to traditional farming preferences, suggests a need for

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mentor training in community engagement, aligning with Nwafor's (2015) emphasis on context-specific mentoring.

Comparatively, mentorship's impact here exceeds extension services' 20% yield gains in Oyo State (Ojo & Adebayo, 2022), likely due to its personalized approach. However, without formalization, its scalability is limited—a gap also noted in Kenya (FAO, 2021). Gender dynamics showed female farmers benefiting significantly (40% of mentored were women), supporting Allen et al.'s (2017) finding that mentorship empowers underrepresented groups, though male dominance (60%) suggests outreach gaps.
Theoretically, Social Learning Theory explains these outcomes: attention to mentor demonstrations, retention of techniques, and motivation from higher yields drive change. Yet, reproduction (skill application) falters where resources like electricity are absent, highlighting structural limits to learning. Future studies should explore longitudinal impacts and mentor training efficacy, addressing this study's cross-sectional limitation.

Conclusion

This study has demonstrated that professional mentorship serves as a transformative mechanism for agricultural development in Cross River State, Nigeria, with significant positive impacts on crop yield, farmer income, and the adoption of modern farming technologies. The empirical evidence, derived from primary data collected across Calabar South, Odukpani, and Yakurr Local Government Areas, underscores mentorship's role in bridging knowledge and skill gaps that have long hindered agricultural productivity in the region. The 35% increase in crop yield and 28% rise in income among mentored farmers compared to their non-mentored counterparts highlight mentorship's capacity to enhance both economic and food security outcomes, aligning with national agricultural goals outlined in Nigeria's Vision 2030 (National Bureau of Statistics, 2023). Furthermore, the strong correlation ($r = 0.68$, $p < 0.05$) between mentorship and productivity validates the theoretical underpinnings of Social Learning Theory, which posits that learning through observation and guidance is a powerful driver of behavioral change (Bandura, 1977).
Beyond quantitative gains, qualitative insights reveal that mentorship fosters confidence, innovation, and resilience among farmers, enabling them to adapt to challenges such as climate variability and market fluctuations. For instance, the adoption of techniques like drip irrigation and integrated pest management, as reported by interviewees, reflects mentorship's role in promoting sustainable practices. However, the study also uncovered critical barriers, including the limited availability of trained mentors, inadequate rural infrastructure, and the absence of formalized mentorship programs. These constraints suggest that while mentorship holds immense potential, its scalability and sustainability depend on systemic support from government and stakeholders.
In the broader context, this research contributes to the growing body of evidence on mentorship's applicability beyond traditional sectors like education and business, positioning it as a viable strategy for rural development in agrarian economies. The findings resonate with global studies, such as those by the FAO (2021) in Kenya, yet highlight the need for context-specific adaptations in Cross River State, where cultural, logistical, and economic factors shape agricultural dynamics. Ultimately, professional mentorship emerges not only as a tool for immediate agricultural improvement but also as a long-term investment in human capital development, with ripple effects on poverty reduction, community empowerment, and regional stability. Addressing the identified challenges through targeted interventions could unlock even greater potential, making mentorship a cornerstone of agricultural transformation in Cross River State and beyond.

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Recommendations

Based on the study's findings, the following expanded recommendations are proposed to maximize the impact of professional mentorship on agricultural development in Cross River State:

1. The Cross River Agricultural Development Programme (CRADP) should initiate a structured mentorship framework by 2026, recruiting and training at least 500 experienced farmers and agricultural experts as mentors.

2. Government and private stakeholders should allocate a dedicated budget estimated at ₦500 million annually to support mentorship initiatives.

3. Poor road networks and lack of electricity, cited by 45% of respondents, undermine mentorship delivery. The state government should prioritize infrastructure upgrades, including all-weather roads and solar-powered hubs in rural LGAs to facilitate mentor-farmer interactions and technology dissemination.

4. Agricultural extension agents should be retrained as mentor facilitators, leveraging their existing networks to reach young and female farmers, who constitute 30% and 40% of the sample, respectively.

5. Collaborate with agribusinesses and NGOs to co-fund mentorship programs, providing resources like fertilizers and market linkages.

6. Given the demographic findings, tailored mentorship schemes for farmers aged 18-35 and women should be prioritized to harness their potential as change agents. Scholarships or grants for mentees completing mentorship cycles could incentivize participation, addressing the 20% illiteracy rate and boosting long-term capacity.

7. Establish a monitoring and evaluation unit within CRADP to track mentorship outcomes using indicators like yield per hectare, income growth, and adoption rates.

These recommendations, if implemented, could institutionalize mentorship as a sustainable driver of agricultural development, positioning Cross River State as a model for other Nigerian regions. They address both immediate needs and long-term goals, balancing practicality with ambition to achieve transformative change.

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