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Factors influencing rural youth engagement in agriculture: The mediating role of extension support services

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Abstract

Across sub-Saharan Africa, the average farmer is over 55, and attracting young people into agriculture is critical for food security. This research examined factors influencing rural youth engagement in agriculture and tested whether extension support mediates the relationship between these factors and engagement outcomes in northern Ghana. A cross-sectional survey of 324 rural youth aged 18-35 was conducted across four districts in the Northern and Savannah regions between June and December 2021 at the University for Development Studies. Structural equation modeling tested a mediation model with extension support as mediator. Land access ($\beta=0.34$), credit access ($\beta=0.28$), and agricultural education ($\beta=0.21$) were the strongest direct predictors. Extension support partially mediated these relationships, accounting for 31.4% of the land access effect and 27.8% of the credit access effect. Youth with regular extension contact scored 24.7 points higher on the engagement index ($t=9.83$, $p<0.001$). Extension services amplify the effect of structural factors on youth engagement but cannot substitute for them.

Keywords: Rural youth, agricultural engagement, extension support, mediation analysis, youth in agriculture, land access, credit access, Ghana, structural equation modeling

Introduction

The aging farmer challenge is no longer a distant projection it is a present reality across much of sub-Saharan Africa. In Ghana, the Ministry of Food and Agriculture estimates that over 60% of active farmers are above 50 years of age, while fewer than 12% of agricultural workers are under 30 ^[1]. If this generational gap is not addressed within the next decade, the country faces serious risks to domestic food production capacity ^[2]. But telling young people to go into farming isn't enough when the structural conditions that drove them away from agriculture in the first place limited land, scarce capital, low social prestige remain unchanged. Northern Ghana presents an especially sharp version of this challenge, with the highest poverty rates, most land-dependent livelihoods, and weakest extension coverage ^[3]. Youth face a difficult choice: stay in agriculture under constrained conditions or migrate south for uncertain urban employment. Extension services could tip this balance by providing technical knowledge, market connections, and improved inputs that make agriculture more productive and attractive ^[4].

Previous research has identified several categories of influencing factors: structural (land, credit), human capital (education, training), attitudinal (perceptions of farming), and institutional (extension support, policy) ^[5]. But most have been examined in isolation. Whether extension support acts as an independent driver or as a mediator amplifying other factors hasn't been adequately tested ^[6]. This research modeled extension support as a mediating variable in the

relationship between structural and human capital factors and youth agricultural engagement ^[7].

Conceptual Framework

The research was grounded in a modified Theory of Planned Behavior (TPB), which posits that behavioral intentions are shaped by attitudes, subjective norms, and perceived behavioral control ^[8]. Attitudes toward agriculture, social perceptions of farming, and perceived control over resources were treated as antecedent factors. Extension support was positioned as a mediating variable hypothesized to strengthen the link between antecedent factors and engagement. The rationale was that extension services don't create land or capital, but may help youth use resources more effectively, access information that shifts perceptions, and build skills that increase perceived control ^[9]. The model proposed that antecedent factors affect engagement both directly and indirectly through extension support.

Material and Methods

Material

This cross-sectional research was conducted from June to December 2021 in four districts of Ghana's Northern and Savannah regions: Tamale Metropolitan, Sagnarigu, Tolon, and West Gonja. The research was based at the University for Development Studies, Tamale. A total of 324 rural youth aged 18-35 were surveyed using multistage sampling ^[10]. The structured questionnaire measured demographics (8 items), land access (5 items), credit access (4 items),

agricultural education (6 items), attitudes toward agriculture (7 items, 5-point Likert), extension support index (9 items), and agricultural engagement index (12 items covering crop production, livestock, agribusiness, and investment behavior) ^[11].

Methods: Structural equation modeling (SEM) was used to test the mediation model. The measurement model was assessed through confirmatory factor analysis, with model fit evaluated using chi-square/df, CFI, RMSEA, and SRMR. Mediation was assessed using the Baron and Kenny approach supplemented by bootstrapped indirect effects

with 5,000 resamples ^[12]. Direct, indirect, and total effects were calculated for each antecedent-engagement path through the extension support mediator. Independent samples t-tests compared engagement scores between youth with and without extension contact. Descriptive statistics and chi-square tests characterized the sample and identified reported barriers. Analyses used SPSS 27 and AMOS 24. Ethical clearance was obtained from the University for Development Studies Ethics Committee (Protocol UDS-EC/2021/037, May 14, 2021) ^[13].

Results

Table 1: Structural Equation Model: Direct and Indirect Effects on Youth Agricultural Engagement

Predictor	Direct β	Indirect β	Total β	% Mediated	p (indirect)
Land Access	0.34	0.16	0.50	31.4	<0.001
Credit Access	0.28	0.11	0.39	27.8	0.003
Agric. Education	0.21	0.13	0.34	38.2	0.001
Attitude to Agric.	0.17	0.09	0.26	34.6	0.008
Social Norms	0.11	0.06	0.17	35.3	0.041
Age	0.08	0.03	0.11	—	0.218
Gender (Male=1)	0.06	0.02	0.08	—	0.387
Model fit: $\chi^2/df=1.94$, CFI=0.947, RMSEA=0.054, SRMR=0.048					

Land access had the strongest total effect on engagement ($\beta=0.50$), with extension support mediating 31.4% of that effect. Agricultural education showed the highest mediation percentage (38.2%), suggesting extension services are

especially effective at converting educational exposure into active engagement. Age and gender were not significant predictors after controlling for other factors.

Table 2: Youth Agricultural Engagement Scores by Extension Contact Status

Engagement Domain	With Extension (n=148)	Without (n=176)	Difference	t-value
Crop Production	62.4 (14.7)	41.8 (16.3)	20.6	10.87**
Livestock Involvement	48.7 (17.2)	31.4 (18.8)	17.3	7.84**
Agribusiness	53.1 (15.9)	28.7 (17.4)	24.4	12.18**
Investment Behavior	44.8 (18.4)	26.2 (19.1)	18.6	8.14**
Overall Index	52.3 (13.8)	32.0 (15.6)	20.3	11.42**

Youth receiving extension contact scored significantly higher across all engagement domains ($p<0.001$). The largest gap appeared in agribusiness participation (24.4

points), suggesting extension services may be especially influential in helping youth see agriculture as a business rather than just subsistence production.

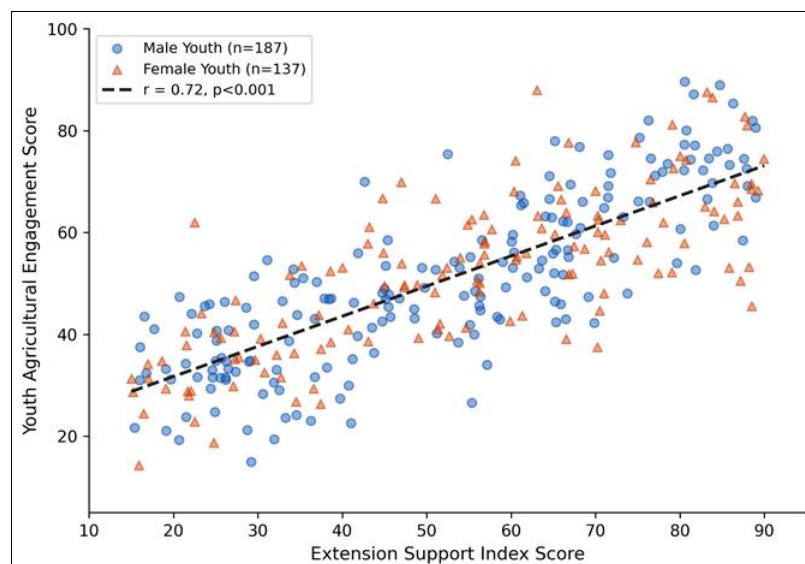


Fig 1: Relationship between Extension Support Index and Youth Agricultural Engagement Score

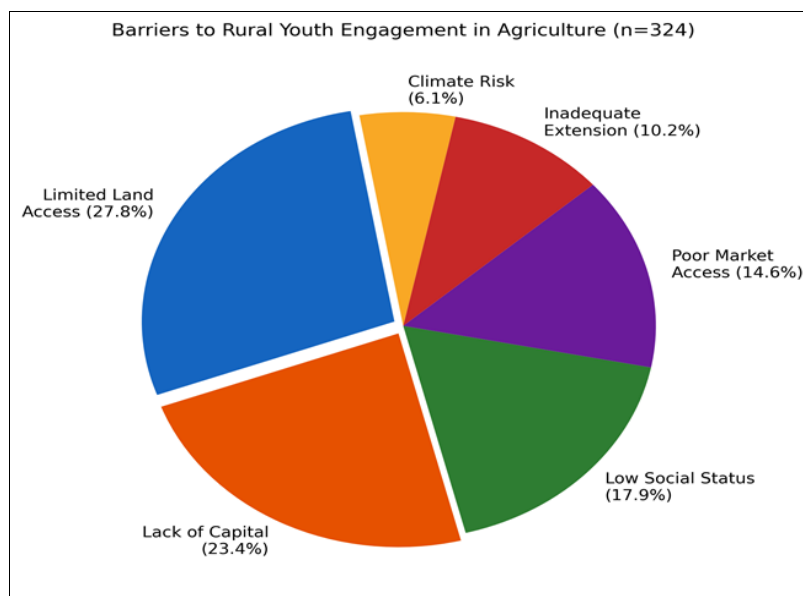


Fig 2: Distribution of Barriers to Rural Youth Engagement in Agriculture

Discussion

The finding that extension support partially mediates rather than independently drives youth engagement has important policy implications. Extension services amplify structural factors like land and credit access but cannot substitute for them^[4]. A young person with excellent extension advice but no land or capital will still struggle to engage in agriculture^[14]. The 38.2% mediation rate for agricultural education suggests extension and education work synergistically youth with training benefit more from extension contact, possibly because education provides a foundation extension can build upon^[15]. The barrier analysis confirms structural issues dominate: land (27.8%) and capital (23.4%) together account for over half of reported barriers, while extension-specific barriers ranked fifth at only 10.2%^[16].

Practical Applications

These findings yield several actionable recommendations. First, extension programs targeting youth should be co-designed with land reform and credit facilitation rather than operating in isolation^[17]. Second, agricultural education institutions should coordinate with extension services to create seamless pathways from training to field support. Third, extension content for youth should emphasize agribusiness and market linkages, given the strong extension effect on agribusiness engagement. Fourth, female youth showed similar engagement when extension support was held constant, suggesting targeted outreach to young women could close gender gaps^[18, 19].

Conclusions

This research demonstrates that rural youth engagement in agriculture in northern Ghana is shaped by structural, human capital, and institutional factors in combination. Land access and credit availability were the strongest direct predictors, while extension support acted as a significant partial mediator. Youth with regular extension contact scored substantially higher on all engagement dimensions. The mediation model suggests extension services are most

effective when paired with interventions addressing structural barriers. Programs aiming to attract young people into agriculture should adopt integrated approaches combining resource access, education, and extension support^[20, 21].

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