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Assessing the role of extension education in promoting Agri-entrepreneurship among youth

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Abstract

Agricultural entrepreneurship among rural youth represents a promising pathway for addressing unemployment while revitalizing farming communities. This research assessed how extension education interventions influence youth engagement in agri-entrepreneurship across four districts during 2018-2019. A cross-sectional survey design was employed with 425 rural youth (aged 18-35) who had participated in various extension programs. Data collection encompassed extension exposure assessment, entrepreneurial competency evaluation, and enterprise performance documentation. Results indicated strong positive correlation between extension education exposure and entrepreneurial success ($r = 0.784$, $p < 0.001$). Youth who received comprehensive extension support showed 67.4% enterprise initiation rates compared to 23.8% among those with minimal exposure. Agro-processing (28.4%) and input supply businesses (22.6%) emerged as dominant enterprise sectors. Training programs demonstrated highest knowledge gains (74.6%), while business incubation showed strongest impact on enterprise establishment (67.4%) and income generation (56.8%). Education level significantly moderated extension effectiveness, with graduates showing steeper improvement trajectories. The findings support integrated extension approaches combining technical training, business mentorship, and financial literacy for maximizing youth agri-entrepreneurship outcomes.

Keywords: Agri-entrepreneurship, extension education, rural youth, skill development, enterprise development, agricultural training, youth employment, business incubation

1. Introduction

Can extension education transform unemployed rural youth into successful agricultural entrepreneurs? This question has gained urgency as conventional farming becomes less attractive to younger generations while agricultural value chains offer expanding business opportunities ^[1]. Youth unemployment in rural areas exceeds 20% in many developing regions, even as labor shortages threaten agricultural productivity and food security ^[2].

Agri-entrepreneurship the creation and development of agricultural enterprises offers dual benefits: providing livelihood opportunities for youth while addressing critical gaps in input supply, processing, marketing, and service provision within farming systems ^[3]. Unlike traditional farming, agri-enterprises can generate attractive returns without requiring large landholdings, making them accessible to landless and land-poor youth who might otherwise migrate to urban areas ^[4].

Extension education traditionally focused on technology transfer to farmers, but contemporary extension increasingly emphasizes entrepreneurial capacity building ^[5]. This shift reflects recognition that agricultural transformation requires not only productive technologies but also functional market linkages, business skills, and support services that entrepreneur-oriented extension can cultivate ^[6]. However, empirical evidence regarding extension effectiveness for youth entrepreneurship development remains limited.

This research assessed extension education's role in promoting agri-entrepreneurship among rural youth through three objectives: evaluating relationships between extension exposure and entrepreneurial outcomes; comparing effectiveness across different intervention modalities; and identifying factors influencing youth enterprise success to inform extension program design ^[7].

Material and Methods

Material

The research was conducted across four districts representing diverse agricultural systems including irrigated cereals, rainfed pulses, horticultural crops, and dairy-dominated mixed farming. The target population comprised rural youth aged 18-35 years who had participated in at least one extension-organized entrepreneurship development activity within the preceding three years. Stratified random sampling yielded 425 respondents distributed across districts and enterprise types^[8].

Implementation Details

Extension interventions evaluated included: entrepreneurship development programs (EDP) providing foundational business concepts (n=138 participants); technical skill workshops covering specific enterprise domains (n=112); business incubation support offering mentorship and workspace access (n=86); financial literacy training addressing credit access and money management (n=52); and integrated programs combining multiple components (n=37). Intervention exposure was quantified through a composite index incorporating participation frequency, duration, and intensity measures^[9].

Entrepreneurial success was assessed using a multi-dimensional index comprising: enterprise establishment (operational business initiated); business sustainability (continuous operation for minimum 12 months); income

generation (monthly net income exceeding baseline); employment creation (hired workers beyond family labor); and growth trajectory (business expansion indicators). Scores were aggregated into an Entrepreneurial Success Index (ESI) ranging from 0-100^[10].

Methods

Data collection employed structured interview schedules administered through face-to-face interactions during December 2018 through March 2019. Instruments captured: respondent demographics and educational background; extension program participation history; entrepreneurial competencies using standardized scales; enterprise characteristics and performance metrics; and perceived barriers and enablers. Statistical analysis employed correlation analysis for relationship assessment, ANOVA for group comparisons, and multiple regression for examining determinants of entrepreneurial success^[11].

Results

Correlation analysis revealed strong positive relationships between extension education exposure and entrepreneurial success ($r = 0.784, p < 0.001$). Youth in the highest exposure quartile achieved mean ESI scores of 68.4 compared to 31.2 among those in the lowest quartile, representing 119% improvement associated with intensive extension engagement.

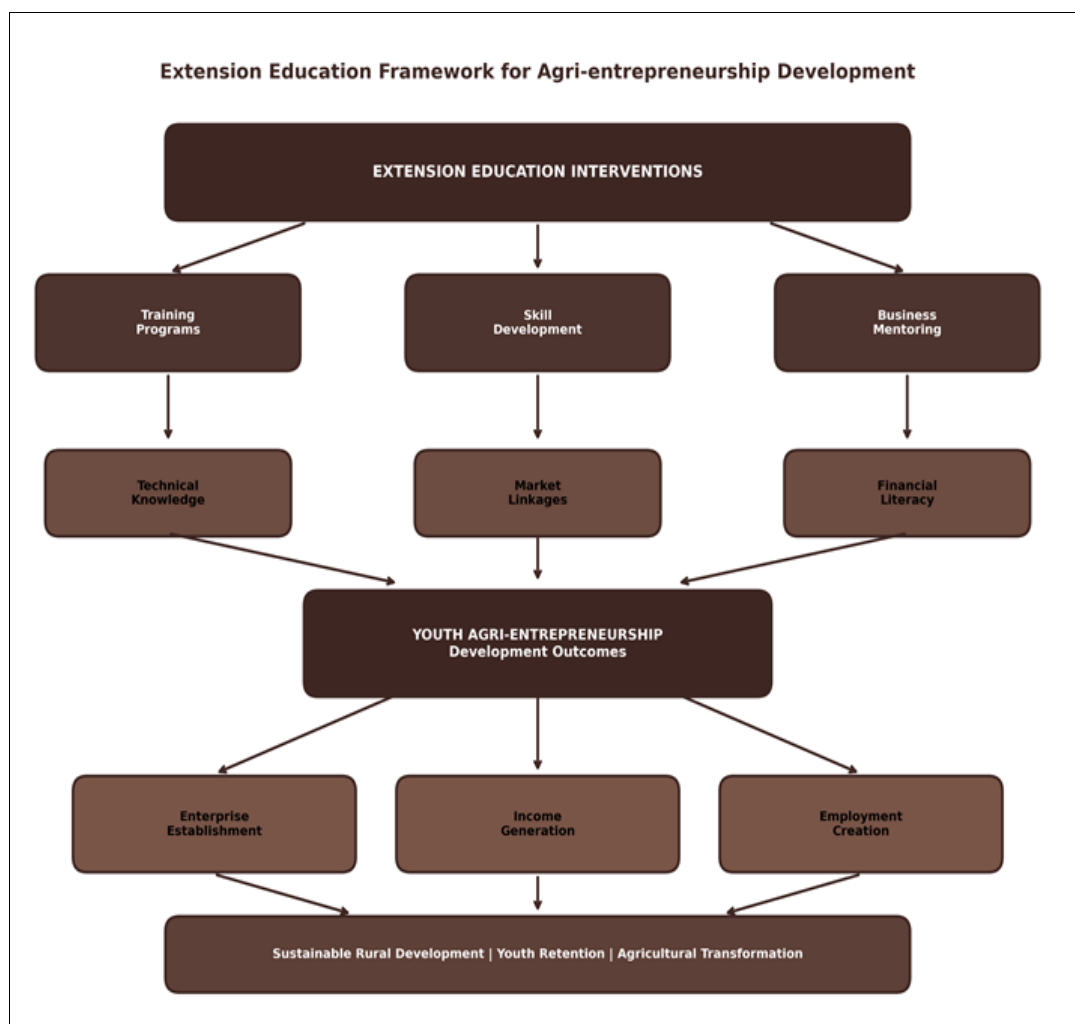


Fig 1: Conceptual framework illustrating extension education pathways supporting youth Agri-entrepreneurship development and associated outcomes

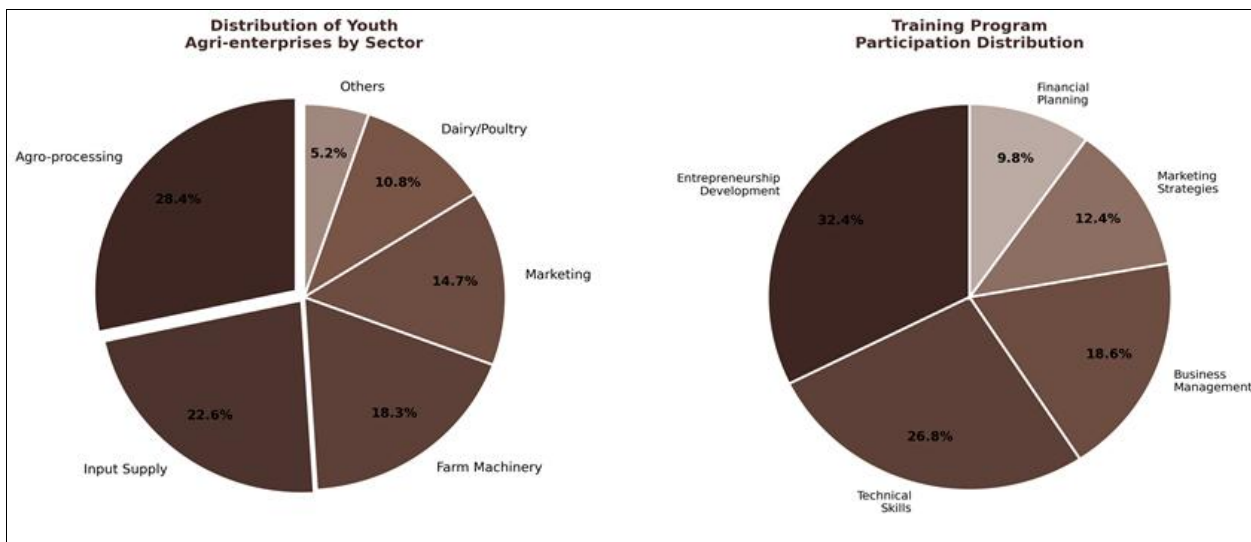


Fig 2: Distribution of youth agri-enterprises by sector (left) and training program participation patterns (right) among surveyed respondents

Table 1: Youth agri-enterprise distribution by sector and gender

Enterprise Sector	Male (%)	Female (%)	Total (%)
Agro-processing	24.6	36.8	28.4
Input Supply	26.8	14.2	22.6
Farm Machinery Services	22.4	8.6	18.3
Marketing/Trading	14.2	15.8	14.7
Dairy/Poultry	8.4	16.4	10.8
Others	3.6	8.2	5.2

Chi-square analysis indicated significant gender differences in sector distribution ($\chi^2 = 28.47$, $p < 0.001$).

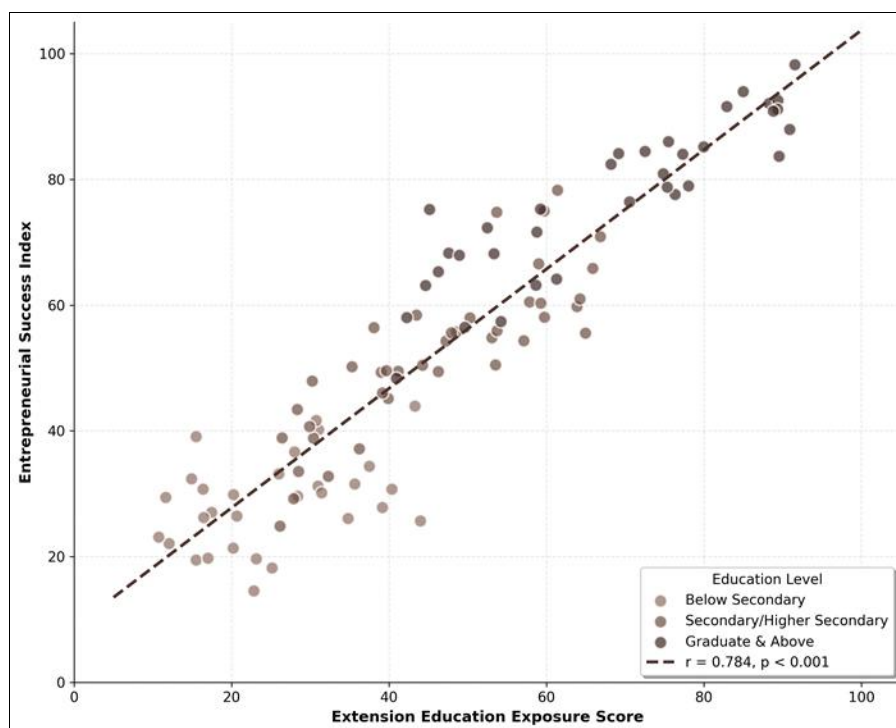
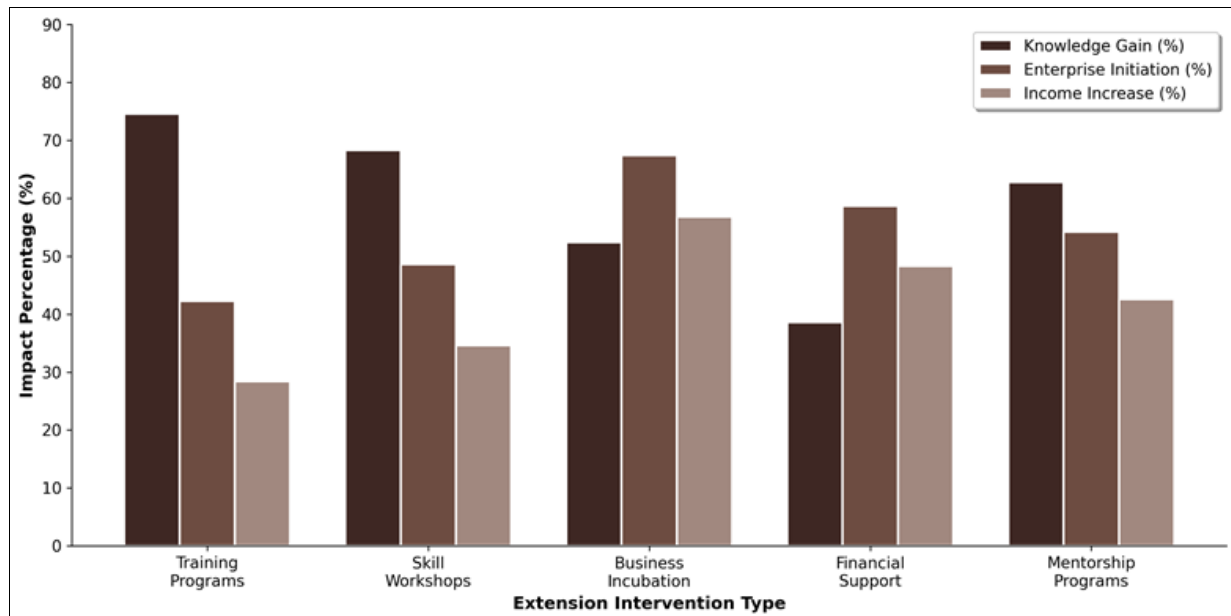


Fig 3: Scatter plot showing relationship between extension education exposure scores and entrepreneurial success index across education levels, demonstrating strong positive correlation ($r = 0.784$)

Table 2: Impact of extension intervention types on youth entrepreneurship outcomes

Intervention Type	Knowledge Gain (%)	Enterprise Start (%)	Income Increase (%)
Training Programs	74.6	42.3	28.4
Skill Workshops	68.3	48.6	34.6
Business Incubation	52.4	67.4	56.8
Financial Support	38.6	58.7	48.3
Mentorship Programs	62.8	54.2	42.6

Business incubation showed highest combined impact across enterprise establishment and income generation metrics.

**Fig 4:** Grouped bar chart comparing knowledge gain, enterprise initiation, and income increase across extension intervention types

Performance Evaluation

Multiple regression analysis identified significant predictors of entrepreneurial success. Extension exposure emerged as the strongest predictor ($\beta = 0.42$, $p < 0.001$), followed by education level ($\beta = 0.28$, $p < 0.001$), prior business experience ($\beta = 0.18$, $p < 0.01$), and access to credit ($\beta = 0.14$, $p < 0.05$). The model explained 58.4% of variance in entrepreneurial success scores. Interaction analysis revealed that education level significantly moderated extension effects, with graduates showing steeper improvement trajectories per unit of extension exposure compared to those with lower education [12].

Economic assessment of youth enterprises revealed mean monthly net income of Rs. 12,840 among successful entrepreneurs, representing 2.4-fold improvement over pre-enterprise income levels. Employment generation averaged 1.8 workers per enterprise beyond family labor. Return on investment calculations showed positive returns across all enterprise sectors, with agro-processing demonstrating highest ROI (3.2:1) followed by input supply (2.8:1) and marketing (2.4:1).

Discussion

The strong correlation between extension exposure and entrepreneurial success ($r = 0.784$) provides empirical support for extension education's role in youth agri-entrepreneurship development [1, 2]. The 119% improvement in success indices between lowest and highest exposure quartiles suggests substantial returns to extension investment, though causation cannot be established from cross-sectional data alone.

Differential effectiveness across intervention types indicates

that training programs excel at knowledge transfer while business incubation better translates learning into enterprise action [3, 4]. This complementarity suggests integrated approaches combining foundational training with hands-on incubation support would maximize outcomes. The finding that business incubation achieved 67.4% enterprise initiation compared to 42.3% for training alone supports resource allocation toward more intensive, practical interventions [5]. Education level's moderating effect on extension effectiveness raises equity considerations [6]. While extension benefits all education levels, greater returns among graduates may widen rather than narrow disparities unless programs specifically address lower-education youth needs through adapted pedagogies and enhanced support [7].

Practical Applications

Extension agencies should design integrated entrepreneurship programs combining classroom training, practical skill development, business incubation, and mentorship components rather than relying on isolated interventions. Program duration should extend beyond single events toward sustained engagement over 6-12 months to support full enterprise development cycles. Targeting should balance efficiency gains from graduate-focused programs against equity objectives requiring enhanced support for lower-education youth [8].

Enterprise sector guidance should consider gender preferences, directing women toward agro-processing and dairy where they show stronger participation while supporting interested women entering male-dominated sectors like machinery services. Credit linkage facilitation should accompany technical training given financial access's

significant contribution to success. Alumni networks connecting successful youth entrepreneurs with new participants can extend mentorship reach and demonstrate achievable outcomes ^[9].

Conclusion

This research demonstrates that extension education significantly promotes youth agri-entrepreneurship, with strong positive correlation ($r = 0.784$) between extension exposure and entrepreneurial success. Youth receiving intensive extension support achieved 67.4% enterprise initiation rates and 119% higher success index scores compared to minimally exposed peers, providing empirical justification for extension investment in youth entrepreneurship development.

Intervention modality comparisons revealed that training programs maximize knowledge gains (74.6%) while business incubation drives enterprise establishment (67.4%) and income generation (56.8%), suggesting complementary roles requiring integrated programming. Enterprise sector distribution showed agro-processing (28.4%) and input supply (22.6%) as dominant choices, with significant gender variation warranting gender-sensitive program design.

The findings support reorienting extension systems toward entrepreneurship facilitation alongside traditional technology transfer, with specific recommendations for integrated program design, sustained engagement duration, equity-conscious targeting, and credit linkage facilitation. As agricultural transformation increasingly depends on functional value chains and service provision, extension education's role in cultivating youth entrepreneurs becomes essential for sustainable rural development.

Future research should employ longitudinal designs tracking youth enterprise trajectories over time, examine social learning processes through which successful entrepreneurs influence peers, and evaluate cost-effectiveness across intervention modalities to guide resource allocation decisions.

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