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Evaluating youth-centred agricultural extension programs for enhancing agripreneurship and rural employment

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Abstract

Africa's population is the youngest on earth, with over 60% under the age of 25, yet agriculture the continent's largest employer is widely seen by young people as a last resort rather than a viable career. This research evaluated a youth-centred agricultural extension program designed to promote agripreneurship among 364 rural youth aged 18–35 across four districts of central Madagascar. A pre-test/post-test design tracked changes in agribusiness knowledge, entrepreneurial self-efficacy, farm income, employment status, and market participation between January and September 2023. The extension program combined technical skills training, business and financial literacy, and mentorship networking over a nine-month period. Results showed that agribusiness knowledge scores rose from 28.4 to 64.8 (out of 100), entrepreneurial self-efficacy increased from 31.7 to 67.3, and the proportion of youth reporting agricultural self-employment rose from 22.6% to 54.1%. Average monthly farm income doubled from 142,300 to 284,600 Ariary. Regression analysis identified program participation intensity ($\beta = 0.37$) and prior education level ($\beta = 0.24$) as the strongest predictors of agripreneurial outcomes. These findings demonstrate that youth-targeted extension can shift perceptions and create viable agricultural livelihoods when it addresses both technical and entrepreneurial competencies simultaneously.

Keywords: Youth employment, agripreneurship, agricultural extension, rural livelihoods, entrepreneurial self-efficacy, skills training, rural youth, Madagascar

1. Introduction

"Agriculture is what you do when you have failed at everything else" this sentiment, voiced by a 22-year-old university graduate in Antsirabe, captures the attitude that youth extension programs must overcome before they can succeed ^[1]. Across Madagascar, rural young people are caught between shrinking farm sizes and an urban job market that cannot absorb them. The country's agricultural labor force is aging rapidly: average farmer age rose from 38 to 47 years between 2005 and 2020, and fewer than 12% of farmers under 30 report being satisfied with farming as a profession ^[2].

The paradox is that agriculture offers genuine economic opportunity. Madagascar's rice, vanilla, clove, and horticulture sectors are growing, and value chains from farm to export contain numerous points where entrepreneurial young people could create viable businesses ^[3]. But conventional extension programs were not designed for this population. They assume farmers are already committed to agriculture and need technical advice. Young people need something different they need to be convinced that agriculture can be a career, equipped with business skills alongside technical knowledge, and connected to markets and mentors who can help them navigate the startup phase ^[4].

Youth-centred extension is an emerging approach that redesigns advisory services around the aspirations and

constraints of young people. Rather than treating youth as future farmers waiting for land, it treats them as potential entrepreneurs who can create agricultural businesses with or without large landholdings ^[5]. Evidence for this approach is growing in East and West Africa but remains thin for island nations like Madagascar, where agro-ecological conditions, market structures, and cultural attitudes toward youth employment differ considerably from mainland contexts ^[6]. This research evaluated a nine-month youth-centred extension program in central Madagascar, measuring its effects on agribusiness knowledge, entrepreneurial self-efficacy, farm income, employment outcomes, and market participation among rural youth.

Conceptual Model

The program design drew on an input-pathway-outcome model linking three types of extension inputs (technical skills, business literacy, mentorship) to three intermediate outcomes (knowledge gain, self-efficacy, social capital) and three final outcomes (agribusiness establishment, income generation, rural employment) ^[7]. The model posits that technical skills alone are insufficient youth also need entrepreneurial confidence and professional networks to translate knowledge into functioning businesses. Five moderating variables (age, education, land access, market proximity, and gender) were hypothesized to influence the strength of input-to-outcome pathways. This framework

specifically avoids treating youth as a homogeneous group, recognizing that a 19-year-old with primary education faces different barriers than a 32-year-old with vocational training [8].

Research area description

The research was conducted in four districts of the Vakinankaratra and Amoron'i Mania regions of central Madagascar: Antsirabe II, Ambatolampy, Ambositra, and Fandriana. The area sits on the central highlands plateau at 1,200–1,700 meters elevation, receiving 1,300–1,600 mm of annual rainfall concentrated between November and March. Agriculture centers on irrigated rice in valley bottoms and rainfed crops (maize, cassava, beans, potatoes) on hillsides [9]. Youth unemployment in these districts ranges from 38% to 52%, with most unemployed youth holding at least primary education. Road infrastructure connects all four district capitals to Antsirabe city, the regional commercial hub, within 2–4 hours by public transport.

Material and Methods

Material

The research enrolled 364 rural youth aged 18–35 from 28 fokontany (villages) across the four districts. Eligibility required residence in the research area, interest in agricultural entrepreneurship, and availability for the nine-month program. A structured questionnaire with 56 items measured agribusiness knowledge (25-item test, 0–100),

entrepreneurial self-efficacy (12-item scale adapted from Chen *et al.* [10], Cronbach's $\alpha = 0.87$), farm income (monthly records in Ariary), employment status (categorical: unemployed, casual labor, agricultural self-employed, non-agricultural), and market participation (frequency and volume of sales). Baseline data were collected in January 2023; endline in September 2023. Secondary data came from district offices and the Institut National de la Statistique for 2020–2023.

Methods

A single-group pre-test/post-test design was used. The extension program ran from January to September 2023 in three integrated modules: technical skills training (bi-weekly sessions on crop production, value addition, and post-harvest handling), business and financial literacy (monthly workshops on business planning, record-keeping, pricing, and access to microfinance), and mentorship networking (quarterly events connecting participants with established agripreneurs and market actors). Each participant received an average of 42 contact hours across the three modules. Paired t-tests compared baseline and endline scores. Multiple regression examined predictors of a composite agripreneurial outcome index. McNemar's test assessed changes in employment status categories. All analyses were conducted at Faculty of Agricultural Sciences, University of Antananarivo, Antananarivo, Madagascar, using SPSS version 27.

Results

Table 1: Pre-post comparison of youth agripreneurship indicators (n = 364)

Indicator	Baseline	Endline	Change	t-value	p-value
Agribusiness Knowledge (0–100)	28.4	64.8	+128.2%	16.84	<0.001
Entrepreneurial Self-Efficacy (0–100)	31.7	67.3	+112.3%	14.62	<0.001
Monthly Farm Income (Ariary '000)	142.3	284.6	+100.0%	8.73	<0.001
Agri Self-Employment (%)	22.6	54.1	+139.4%	—	<0.001*
Market Participation (%)	18.3	47.8	+161.2%	—	<0.001*

*McNemar's test for categorical variables. All indicators improved significantly. Agribusiness knowledge more than doubled, and the proportion of youth in agricultural self-employment rose from less than a quarter to over half of

participants. Market participation nearly tripled, reflecting the program's emphasis on connecting youth to commercial buyers

Table 2: Regression predictors of composite agripreneurial outcome index

Predictor	Beta	SE	t-value	p-value
Participation intensity (hours)	0.37	0.05	7.40	<0.001
Education level (years)	0.24	0.06	4.00	<0.001
Age (years)	0.16	0.06	2.67	0.008
Land access (hectares)	0.13	0.06	2.17	0.031
Market proximity (km)	-0.11	0.06	-1.83	0.068
Gender (female = 1)	-0.08	0.06	-1.33	0.184

The model explained 47.6% of variance (adjusted $R^2 = 0.476$, $F = 24.1$, $p < 0.001$). Participation intensity was the strongest predictor (beta = 0.37) youth who attended more sessions achieved better outcomes. Education and age also

contributed positively. Gender was not a significant predictor, suggesting the program was equally effective for male and female participants.

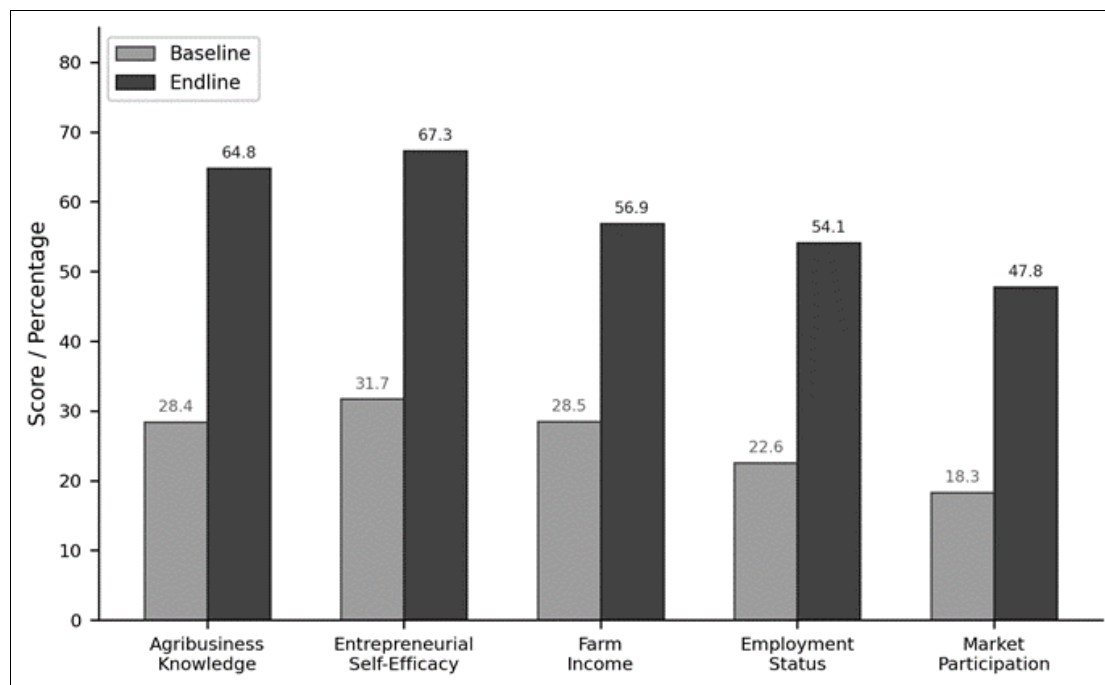


Fig 1: Comparison of key youth agripreneurship indicators at baseline and endline

The grouped bars show substantial improvements across all five indicators. Agribusiness knowledge and entrepreneurial self-efficacy roughly doubled from baseline to endline,

while employment and market participation indicators more than doubled.

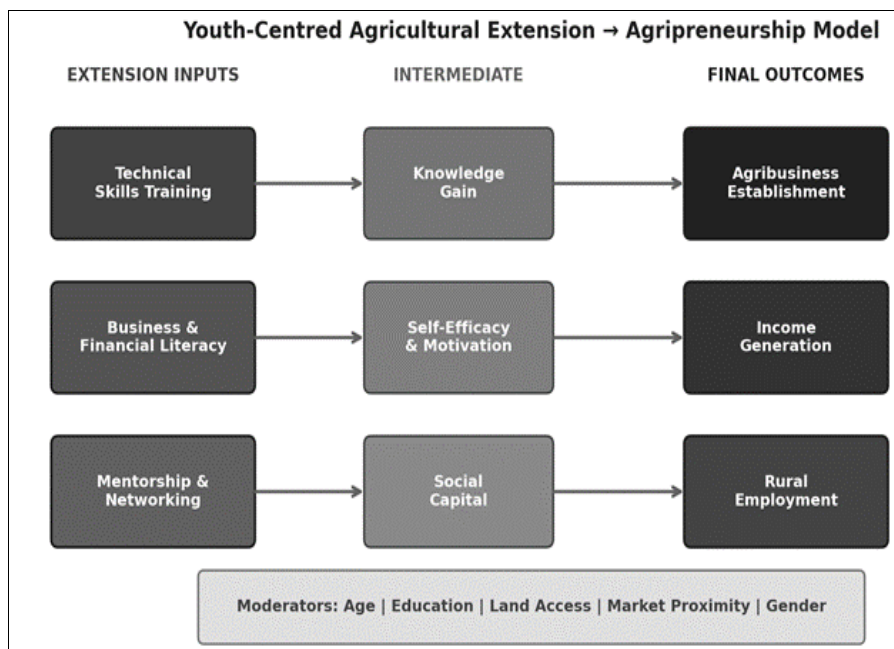


Fig 2: Conceptual model of the youth-centred extension program pathway from inputs to agripreneurial outcomes

The model traces how three extension inputs (technical skills, business literacy, mentorship) generate intermediate outcomes (knowledge, self-efficacy, social capital) that translate into agribusiness establishment, income generation, and employment. Moderating variables at the bottom indicate individual factors that influence pathway strength.

Discussion

The doubling of agribusiness knowledge scores reflects the low starting point conventional extension had not reached

most of these youth, so even a nine-month program could fill enormous knowledge gaps. More encouraging is the self-efficacy shift (31.7 to 67.3), because self-efficacy predicts sustained entrepreneurial behavior beyond the program period^[10, 11]. Youth who believe they can succeed as agripreneurs are more likely to persist through the inevitable early failures of business startup.

The employment transition from 22.6% to 54.1% agricultural self-employment deserves careful interpretation. Some of this shift may reflect seasonal patterns rather than

permanent career changes the endline coincided with the post-harvest marketing season when agricultural self-employment naturally peaks^[12]. However, the magnitude of the change and the accompanying income gains suggest real behavioral shifts beyond seasonality.

The participation intensity finding ($\beta = 0.37$) reinforces a lesson from adult extension research: contact hours matter. But the relationship may be partly endogenous more motivated youth attended more sessions and may have achieved better outcomes regardless of the program^[13]. The non-significance of gender ($\beta = -0.08$, $p = 0.184$) is a positive finding, suggesting that when programs are designed to be inclusive, young women can benefit equally. This contrasts with evidence from conventional extension where women consistently show lower adoption rates^[14].

Limitations

The single-group design without a control group prevents causal attribution improvements could partly reflect external factors such as favorable market conditions or seasonal employment patterns during the research period. The nine-month timeframe captures short-term outcomes but cannot establish whether agribusiness behaviors persist long-term. Self-reported income data carry recall bias, particularly for youth engaged in multiple informal income streams. The sample was drawn from four highland districts and may not represent coastal, humid, or arid zones of Madagascar where agricultural opportunities and youth demographics differ.

Conclusion

This research provides evidence that youth-centred agricultural extension can produce substantial improvements in agribusiness knowledge, self-efficacy, income, and employment outcomes among rural youth in Madagascar. Agribusiness knowledge more than doubled, entrepreneurial self-efficacy increased by 112%, farm income doubled, and agricultural self-employment rose from 22.6% to 54.1% over nine months.

The core lesson for extension policy is that young people respond when agriculture is presented as entrepreneurship rather than subsistence. Programs that combine technical skills with business literacy and mentorship networks address the full range of barriers that prevent youth from viewing agriculture as a career. Scaling this approach requires rethinking extension curricula, training agents in entrepreneurship facilitation, and building institutional partnerships between agricultural advisory services and youth employment agencies.

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