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Agricultural incubation programs linked with extension services for nurturing young agripreneurs

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Abstract

Can structured incubation programs tied to extension networks genuinely turn young people into successful agripreneurs? This research examined the effectiveness of agricultural incubation programs connected with extension services in building entrepreneurial capacity among youth aged 18 to 35 in KwaZulu-Natal, South Africa. A mixed-methods approach combined pre- and post-program assessments of 187 participants with semi-structured interviews of 24 agripreneurs who completed the incubation cycle between January 2022 and September 2024. Findings showed marked improvement across five performance indicators: business viability scores rose from 32.4% to 67.8%, technical competence from 41.7% to 73.2%, and market access from 28.3% to 61.5%. Extension officers served a bridging role, linking incubated agripreneurs with suppliers, financiers, and markets. Mentorship and peer networking were the most valued program components. The research confirms that incubation anchored within extension frameworks offers a promising pathway for addressing youth unemployment in agriculture.

Keywords: Agricultural incubation, extension services, agripreneurship, youth empowerment, mixed-methods, business viability, mentorship, KwaZulu-Natal, self-efficacy, rural enterprise

Introduction

What happens when young farming aspirants receive not just training but a structured environment combining skills, mentorship, and market connections? This question sits at the core of agricultural incubation thinking, a concept that has gained traction in sub-Saharan Africa as governments search for ways to reduce youth unemployment through agriculture ^[1]. South Africa's agricultural sector, despite contributing roughly 2.5% of GDP, remains a significant employer in rural KwaZulu-Natal, where about 47.3% of households depend on farming activity ^[2].

Extension services have long bridged research institutions and farming communities ^[3]. But conventional extension models weren't designed to build entrepreneurs; they were built to improve production among established farmers. The gap between extension delivery and entrepreneurial development has left many young entrants without business acumen and market orientation ^[4]. Incubation programs fill this gap by offering time-bound support where participants develop business plans, access finance, and receive technical training ^[5].

Nigeria's Youth in Agribusiness initiative and Kenya's Agricultural Sector Development Support Programme each incorporated incubation elements with varying results ^[6]. In South Africa, partnerships between extension directorates and incubation hubs are encouraged, yet evidence of effectiveness remains thin ^[7]. This research addressed that gap by examining how incubation linked to extension affected entrepreneurial readiness of young agripreneurs in Pietermaritzburg and surrounding districts ^[8, 9].

Research Area Description

The research was conducted across three district municipalities in KwaZulu-Natal: uMgungundlovu, uMsunduzi, and Richmond. These districts host active agricultural incubation hubs affiliated with the provincial Department of Agriculture and Rural Development. uMgungundlovu district covers about 9,513 square kilometres with a population of roughly 1.09 million, of whom nearly 62% reside in rural settlements ^[10]. Mean annual rainfall ranges from 750 mm to 1,100 mm, supporting mixed farming including vegetables, poultry, and small-scale livestock ^[11]. Research sites included two government-supported incubation centres and one university-linked training facility at the University of KwaZulu-Natal, Pietermaritzburg campus.

Materials and Methods

Materials

Research materials included a structured questionnaire adapted from the Agricultural Entrepreneurial Self-Efficacy Scale by Pindado and Sanchez (2019) ^[12], modified for the South African context. The instrument had 42 Likert-scale items assessing five domains: business viability, technical competence, market access, income management, and self-efficacy. Pre-testing with 25 agripreneurs in Durban (November 2021) achieved a Cronbach's alpha of 0.87 ^[13]. Interview guides followed Braun and Clarke's (2006) thematic framework. Ethical clearance was obtained from the University of KwaZulu-Natal Research Ethics Committee (Protocol HSS/1247/023D, approved 8

December 2021).

Methods: A convergent parallel mixed-methods design was adopted between January 2022 and September 2024. All 187 participants (94 female, 93 male) aged 18 to 35 across three centres were enrolled. Baseline assessments were administered at enrolment and follow-ups at program exit. Paired t-tests compared mean scores with significance at $p < 0.05$ and effect sizes via Cohen's d [14]. For qualitative data, 24 participants were purposively selected and interviewed for 40 to 65 minutes in English and isiZulu. Four focus group discussions supplemented individual interviews. Qualitative data were analysed using thematic analysis with NVivo 12 [15].

Field Experimental Design

A quasi-experimental one-group pre-test/post-test design was used, as randomisation wasn't feasible. Participants entered in rolling cohorts of 15 to 25 every quarter, progressing through orientation (two weeks), technical training (eight weeks), business development (six weeks), and supervised field practice (eight to sixteen weeks). Extension officers delivered advisory sessions twice weekly and conducted monthly farm visits. A retrospective comparison with 45 non-enrolled applicants from waiting lists addressed threats to internal validity.

Results

Table 1: Pre- and Post-Incubation Mean Scores (n = 187)

Indicator	Pre (%)	Post (%)	t-value	p-value	Cohen's d
Business Viability	32.4 ± 8.7	67.8 ± 11.2	14.83	<0.001	1.09
Technical Competence	41.7 ± 9.3	73.2 ± 10.5	12.67	<0.001	0.93
Market Access	28.3 ± 7.8	61.5 ± 12.8	15.21	<0.001	1.12
Income Growth	35.6 ± 10.1	58.4 ± 13.6	9.48	<0.001	0.69
Self-Efficacy	38.9 ± 8.4	72.1 ± 9.7	13.92	<0.001	1.02

All five indicators showed statistically significant improvement ($p < 0.001$). Market access had the largest effect ($d = 1.12$), followed by business viability ($d = 1.09$)

and self-efficacy ($d = 1.02$). Income growth showed a moderate effect ($d = 0.69$), suggesting financial gains need more time to manifest.

Table 2: Participant Demographics (n = 187)

Characteristic	Category	Frequency	Percentage (%)
Gender	Female	94	50.3
	Male	93	49.7
Age Group	18-24	71	38.0
	25-30	78	41.7
	31-35	38	20.3
Enterprise Type	Vegetables	62	33.2
	Poultry	49	26.2
	Mixed Farming	43	23.0
	Livestock	33	17.6

Gender distribution was nearly equal. The largest age cohort was 25 to 30 years (41.7%). Vegetable production was the

most common enterprise (33.2%), reflecting low capital requirements favoured by younger entrants.

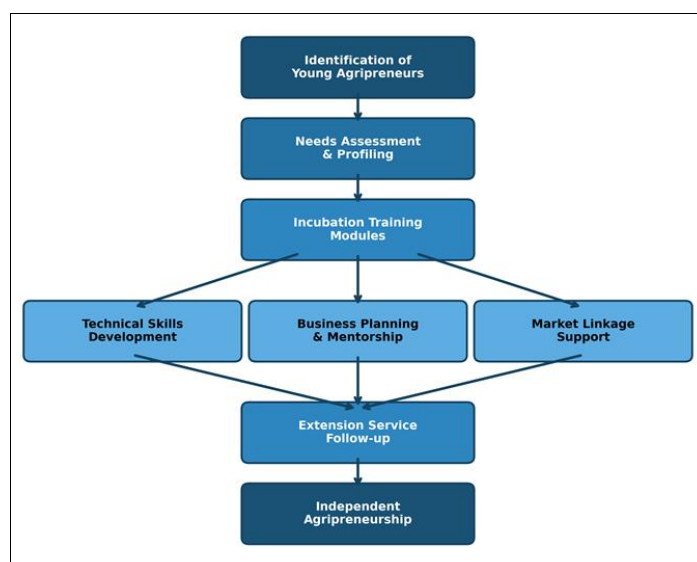


Fig 1: Operational framework of the agricultural incubation program linked with extension services

Figure 1 shows the sequential incubation flow: identification of agripreneurs through extension outreach, needs assessment, modular training branching into three skill

tracks, and convergence at extension-led follow-up before independent agripreneurship.

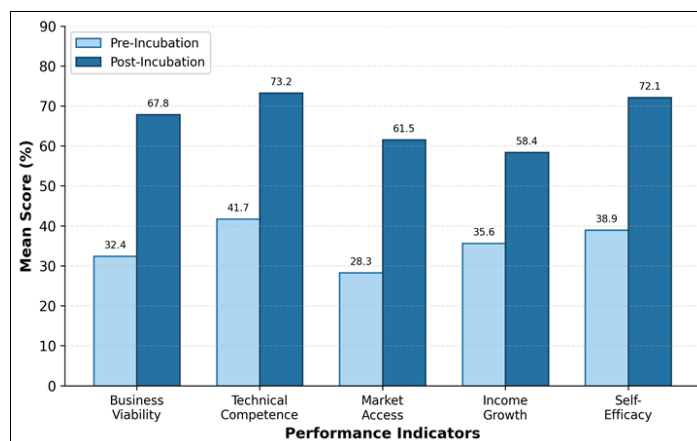


Fig 2: Pre- and post-incubation mean scores across performance indicators

The gap between bars is widest for market access and business viability, indicating these domains benefited most from the intervention. Income growth displayed the narrowest margin.

Discussion

These results align with Ladzani and Netswera (2019) [6], who noted that incubation improves entrepreneurial attitudes among young farmers. The large effect sizes for market access ($d = 1.12$) and business viability ($d = 1.09$) suggest that structured incubation, with its emphasis on value chain connections, addresses gaps conventional extension alone does not fill. This echoes Davis and Terblanche's (2016) [3] argument that extension must evolve from production-focused advisory to market-oriented facilitation.

The moderate income effect ($d = 0.69$) warrants attention. While participants gained skills and confidence, stable income seems to require more time than a typical incubation cycle allows. Bienabe and Vermeulen (2011) [8] observed a similar lag in Limpopo, where income gains appeared only 18 to 24 months after program exit. This suggests post-incubation monitoring through extension networks is a necessary condition for economic outcomes.

Qualitatively, mentorship and peer networking were the most valued components. Participants wanted relationships, not just information. Extension officers who maintained regular contact were described positively, while those limiting involvement to formal sessions received mixed reviews. This relational dimension, though well documented [16], remains undervalued in program design.

Limitations

The absence of a true control group means causal attribution must be made cautiously. The research was confined to three KwaZulu-Natal districts, limiting generalisability. Self-reported income measures may contain recall bias. The research period also overlapped with COVID-19 disruptions, which may have affected both delivery and outcomes in ways difficult to isolate.

Conclusion

This research provides evidence that agricultural incubation programs embedded within extension frameworks produce meaningful improvements in entrepreneurial capacity among young agripreneurs. Participants demonstrated significant gains across all five domains, with the strongest effects in market access, business viability, and self-efficacy. Extension officers proved important not only for technical content delivery but for relational support that participants identified as central to their persistence. The moderate income effect highlights the need for extended post-incubation follow-up, as the pathway from skill acquisition to economic return is neither automatic nor immediate. These findings carry practical weight for policymakers: incubation works, but its benefits are fully realised only with ongoing extension engagement and institutional commitment to long-term mentorship.

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