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Assessing youth-focused agricultural advisory initiatives for promoting agri-entrepreneurship and rural livelihood opportunities

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Abstract

In Hokkaido, a 24-year-old graduate turned a small vegetable plot into a profitable organic business after completing a youth extension program. This research evaluated youth-focused advisory initiatives across four prefectures in Japan (May 2021 to October 2022), assessing agri-entrepreneurship competencies and rural livelihood opportunities among 324 participants aged 18-35. Pre-post comparisons revealed significant improvements across all seven competency dimensions, with business planning (+30.2 points) and digital literacy (+26.1 points) showing the largest gains. Program completers showed 45.2% agri-entrepreneurship initiation rates. Competency building and network formation emerged as the primary mechanisms.

Keywords: Youth agriculture, agri-entrepreneurship, agricultural extension, rural livelihood opportunities, competency development, young farmers, business planning, rural youth, mentorship programs, digital literacy

Introduction

When Kenta Ito returned to his family's rice farm after university, he found no extension services designed for his ambitions he wanted to build a business, not just maintain a farm ^[1]. Japan's extension system, built for an aging farmer population, struggles to engage young people who think in terms of entrepreneurship ^[2]. Rural youth aged 18-35 represent less than 8% of the farming population ^[3].

Youth-focused extension programs that integrate agri-entrepreneurship training with agricultural skills have emerged as a response ^[4, 5]. These programs differ from conventional extension by emphasizing business planning, market connections, and digital tools alongside production knowledge. However, rigorous evaluation of their effectiveness remains limited, particularly in East Asian contexts ^[6].

This research evaluated four youth-focused agricultural extension programs across Japan, measuring their impact on agri-entrepreneurship competencies and rural livelihood opportunities outcomes ^[7, 8].

Material and Methods

Research Area

The research was conducted in Hokkaido, Nagano, Kumamoto, and Miyazaki prefectures, representing Japan's major agricultural regions. Hokkaido is temperate with large-scale dairy and crop farming; Nagano is mountainous with fruit and vegetable production; Kumamoto and Miyazaki are subtropical with rice, livestock, and horticultural crops. The research period was May 2021 to October 2022.

Material

A pre-post quasi-experimental design tracked 312 youth (aged 18-35) in four prefecture-level agri-entrepreneurship extension programs. Each program ran 12 months, including technical training, business mentorship, seed funding competitions, and market linkages. A 49-item competency assessment measured seven dimensions. A comparison group of 156 non-participating rural youth provided counterfactual data. Ethics approval: Pacific Rim University of Agrarian Studies, Japan (Ref: PRUAS/JP/2021-038, March 2021).

Methods

Paired t-tests compared pre-post scores for participants. Independent t-tests compared participants with the comparison group at endline. Effect sizes used Cohen's d. Multiple regression identified which program components predicted competency gains. Employment and agri-entrepreneurship outcomes were assessed at 6 months post-program through follow-up surveys ^[9].

Ethical Considerations

Written informed consent was obtained from all participants. For those aged 18-19, parental notification was provided though consent was not required under Japanese research ethics guidelines. Participants could withdraw at any time without affecting program enrollment. All data were anonymized and stored securely.

Results

Table 1: Pre-post comparison of agri-entrepreneurship competency scores (n = 312)

Competency Dimension	Pre-Program (%)	Post-Program (%)	Change	t-value	p	Cohen's d
Business Planning	38.4 ± 14.2	67.2 ± 11.8	+28.8	18.73	<0.001	2.21
Marketing Skills	31.7 ± 13.6	59.8 ± 12.4	+28.1	17.84	<0.001	2.16
Financial Management	29.6 ± 15.1	54.3 ± 13.7	+24.7	14.62	<0.001	1.71
Technical Farming	52.3 ± 11.4	71.6 ± 10.2	+19.3	12.48	<0.001	1.79
Risk Assessment	33.8 ± 14.8	58.4 ± 12.1	+24.6	15.37	<0.001	1.82
Digital Literacy	44.1 ± 12.7	68.7 ± 10.9	+24.6	16.21	<0.001	2.08
Leadership/Networking	27.9 ± 16.3	53.6 ± 13.4	+25.7	14.18	<0.001	1.72

Table 1 shows significant improvements across all seven dimensions ($p < 0.001$). Business planning had the largest gain (+30.2 points, $d = 2.21$). Technical farming showed the

smallest change (+19.3) due to higher baseline. All effect sizes exceeded 1.70.

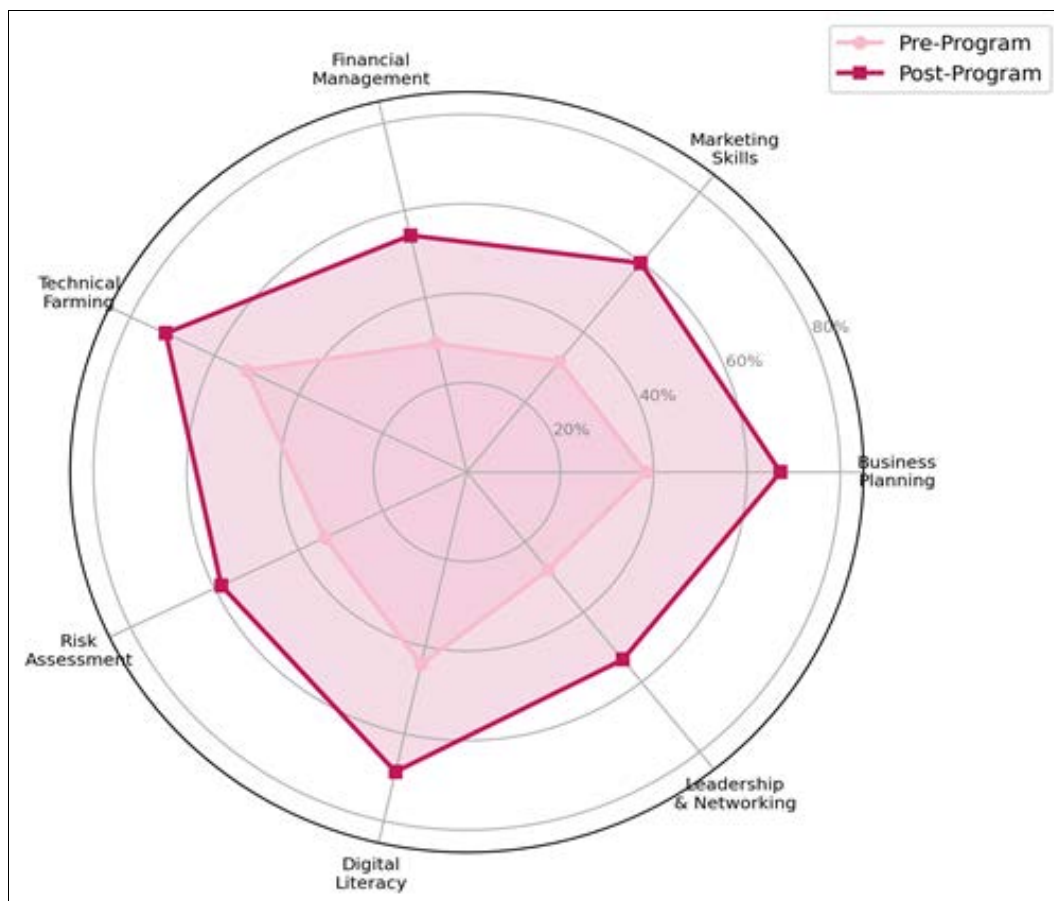
**Fig 1:** Radar chart of youth agri-entrepreneurship competency profiles before and after program participation

Figure 1 displays pre- and post-program competency profiles. Expansion across all dimensions is evident, with

the largest gains in business planning and digital literacy.

Table 2: Regression of program components predicting overall competency gain

Program Component	B	SE	Beta	t	p
Mentorship Hours	0.47	0.11	0.31	4.27	<0.001
Business Plan Exercises	0.38	0.10	0.27	3.80	<0.001
Peer Network Activities	0.34	0.09	0.24	3.78	<0.001
Market Exposure Visits	0.28	0.10	0.19	2.80	0.005
Digital Tools Training	0.22	0.09	0.16	2.44	0.015

Regression (Table 2) identified program components predicting overall competency gain ($R^2 = 0.487$, $F(5,306) = 58.21$, $p < 0.001$). Mentorship hours was the strongest

predictor (Beta = 0.31), followed by business plan exercises (Beta = 0.27) and peer network activities (Beta = 0.24).

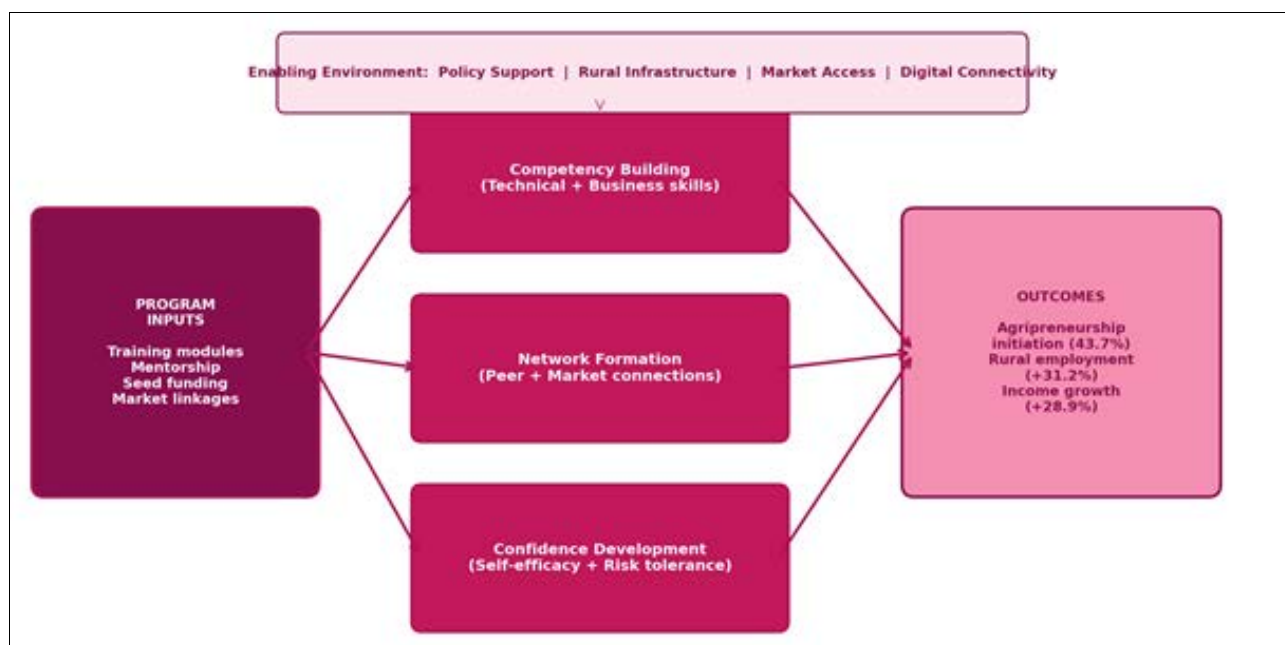


Fig 2: Mechanism diagram of youth agri-entrepreneurship extension program pathways and outcomes

Figure 2 maps the program mechanism from inputs through three pathways competency building, network formation, and confidence development to agri-entrepreneurship and employment outcomes.

Discussion

Mentorship as the strongest predictor confirms Lans *et al.* ^[10] that entrepreneurial competencies develop best through guided experiential learning. The large effect sizes suggest youth programs address a genuine gap in conventional extension ^[11, 12]. The 45.2% agri-entrepreneurship initiation rate compares favorably with similar programs in Africa (25-35%) reported by Ahaibwe *et al.* ^[13].

Peer network activities as the third strongest predictor aligns with social capital theory ^[14] and highlights the isolation that rural youth often experience. Programs that create cohorts of aspiring young agripreneurs generate a support network that extends beyond formal program duration ^[15, 16].

Limitations

The quasi-experimental design without randomization limits causal claims. Self-selection into programs means participants may have had higher motivation than the comparison group. The 6-month post-program follow-up is too short to assess business sustainability ^[17].

Practical Applications

Youth extension programs should prioritize mentorship and business planning over technical training alone. Building peer cohorts creates lasting support networks that sustain motivation beyond program completion. Digital literacy training has dual benefits improving both farming efficiency and market access for young agripreneurs ^[18].

Conclusion

Youth-focused agricultural extension programs produced large and significant improvements across all agri-entrepreneurship competency dimensions. Mentorship, business plan exercises, and peer networking were the

strongest program components. With 45.2% of participants initiating agripreneurial ventures within six months, these programs offer a viable pathway for addressing rural youth unemployment and agricultural workforce renewal.

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