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Women's economic empowerment through gender-responsive agricultural extension programming in rural communities

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Abstract

Women perform up to 70% of agricultural labor in sub-Saharan Africa, yet they control less than 20% of the income generated from that labor. This research examined whether gender-responsive extension programming improved women's economic empowerment in four districts of northwestern Rwanda. A quasi-experimental design tracked 212 women farmers-118 receiving gender-responsive extension and 94 in a control group-over 18 months from January 2021 to July 2022. A six-dimension Women's Economic Empowerment Index (WEEI) measured income control, asset ownership, market access, decision making, credit access, and group leadership. The extension-supported group showed a 71.5% increase in WEEI scores over the period (2.14 to 3.67), compared to 15.6% in the control group (2.18 to 2.52). Decision making and income control improved fastest, while credit access lagged behind. District-level variation was substantial, with Musanze and Rubavu outperforming Burera and Nyabihu. The findings support embedding gender-responsive modules into routine extension delivery as a practical pathway toward women's economic empowerment in smallholder farming systems.

Keywords: Women's empowerment, gender-responsive extension, agricultural extension, income control, decision making, Rwanda, smallholder farmers, economic empowerment index, rural women, asset ownership

1. Introduction

Across rural Africa, women carry the heaviest agricultural workload while exercising the least control over the resulting income and assets ^[1]. This imbalance has been documented for decades, but extension services have been slow to address it-most advisory programs continue to target household heads, who are predominantly male, leaving women farmers underserved ^[2, 3]. Rwanda has been a notable exception in policy intent. After the 1994 genocide, the government adopted progressive gender legislation and set explicit targets for women's participation in agricultural programs ^[4]. Yet at the field level, extension delivery often remains gender-blind in practice.

Gender-responsive extension goes beyond simply including women in farmer groups. It involves adapting meeting times, training content, leadership structures, and market linkages to address the specific constraints women face-limited mobility, lower literacy, restricted asset ownership, and unequal household decision-making power ^[5, 6]. Evaluations from Ethiopia and Bangladesh have shown that gender-targeted advisory programs can improve women's crop income and decision-making authority within one to two seasons ^[7, 8].

This research assessed whether a gender-responsive extension program in northwestern Rwanda improved women's economic empowerment across six measurable dimensions over an 18-month period. The objectives were:

- To compare empowerment trajectories between extension-supported and control groups,
- To identify which empowerment dimensions responded most and least to the intervention, and
- To examine district-level variation in outcomes ^[9].

Theoretical framework

The research drew on Kabeer's empowerment framework, which defines empowerment as the process of expanding women's ability to make strategic life choices across three interrelated dimensions: resources (access to material, human, and social resources), agency (decision-making processes), and achievements (well-being outcomes) ^[10]. Extension programming was positioned as the resource input that builds women's agency through skills, information, and social networks, ultimately producing measurable achievement gains. The framework was supplemented by Alkire's Women's Empowerment in Agriculture Index methodology, which informed the multi-dimensional measurement approach used in this research ^[11].

Instrument development

The Women's Economic Empowerment Index (WEEI) was constructed from 24 items across six dimensions: income control (4 items), asset ownership (4 items), market access (4 items), decision making (4 items), credit access (4 items), and group leadership (4 items). All items used a 5-point

Likert scale. Cronbach's alpha for the full scale was 0.86. Content validity was assessed by five gender and agriculture specialists at the University of Rwanda. A pilot with 20 women in Musanze District led to rewording of two credit-related items. The instrument was administered in Kinyarwanda ^[12].

Material and methods

Material

A quasi-experimental longitudinal design was employed, tracking 212 women farmers across four districts in northwestern Rwanda (Musanze, Nyabihu, Rubavu, and Burera) from January 2021 to July 2022. The extension-supported group (n = 118) received gender-responsive advisory through district-level women's farmer organizations affiliated with the Rwanda Agriculture and

Animal Resources Development Board. The control group (n = 94) received standard extension services. The WEEI was administered at baseline and at 6, 12, and 18 months. Ethical approval was obtained from the University of Rwanda Institutional Review Board (Protocol UR-CAVM/2020-041, dated November 12, 2020) ^[13].

Methods

Repeated-measures ANOVA compared WEEI trajectories between the two groups over the four measurement points. Independent t-tests compared dimension-specific scores at the 18-month endpoint. Effect sizes were calculated using Cohen's d. District-level comparisons used one-way ANOVA. Attrition was minimal (4.1%), and intention-to-treat analysis was applied. All analyses used SPSS version 26 ^[14].

Results

Table 1: WEEI scores at baseline and 18 months by group (n = 212)

Dimension	Ext. base	Ext. 18mo	Ctrl base	Ctrl 18mo	t (18mo)	Cohen's d
Income control	2.23	3.82	2.19	2.61	8.14**	1.24
Asset ownership	1.94	3.08	1.98	2.24	5.87**	0.89
Market access	2.08	3.41	2.14	2.47	6.42**	0.98
Decision making	2.31	3.91	2.27	2.68	8.73**	1.31
Credit access	1.87	2.78	1.91	2.14	4.23**	0.64
Group leadership	2.41	3.23	2.38	2.51	5.14**	0.78
Overall WEEI	2.14	3.67	2.18	2.52	9.47**	1.42

** $p < 0.01$. Decision making (d = 1.31) and income control (d = 1.24) showed the largest effect sizes. Credit access improved least (d = 0.64)

Table 2: Overall WEEI scores at 18 months by district (extension group only, n = 118)

District	n	Mean WEEI $\pm$ SD	F-value	p-value
Musanze	34	3.89 $\pm$ 0.54		
Rubavu	31	3.77 $\pm$ 0.61		
Nyabihu	28	3.52 $\pm$ 0.72	5.83	0.001**
Burera	25	3.28 $\pm$ 0.78		

** $p < 0.01$. Musanze and Rubavu scored significantly higher than Burera (Tukey HSD, $p < 0.05$), reflecting stronger extension infrastructure and market connectivity

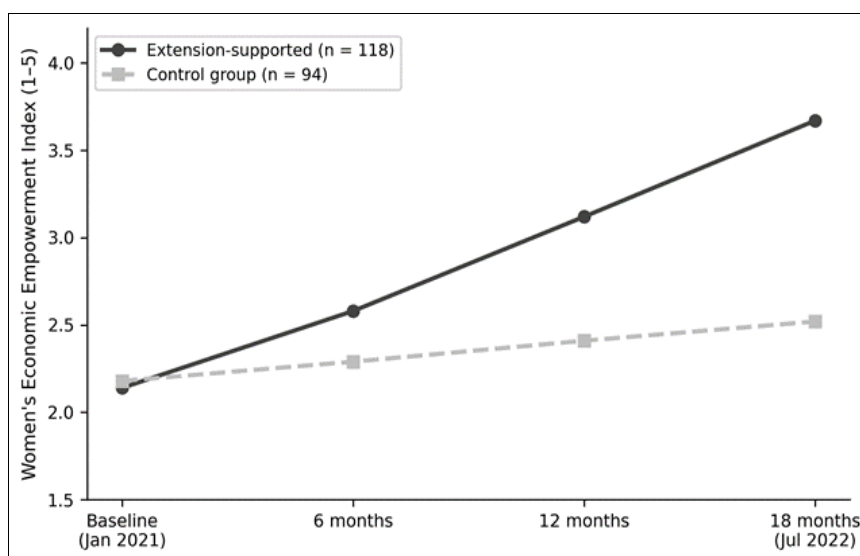


Fig 1: Women's economic empowerment index trajectories for extension-supported and control groups over 18 months

The extension group showed a steady and accelerating upward trend, while the control group improved only

marginally. The gap widened at each measurement point, indicating cumulative program effects.

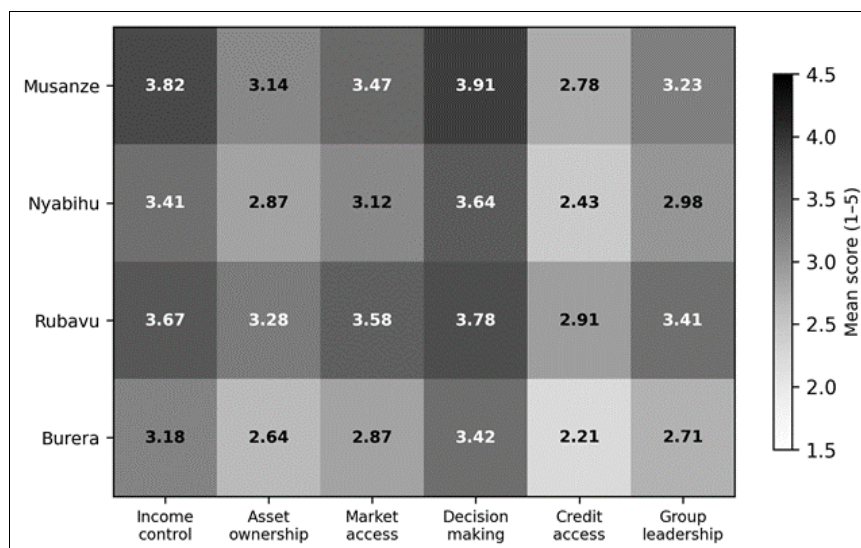


Fig 2: Heatmap of empowerment dimension scores across four districts at 18 months (extension group)

Decision making scored highest across all districts, while credit access was consistently the weakest dimension,

particularly in Burera where formal lending infrastructure is sparse.

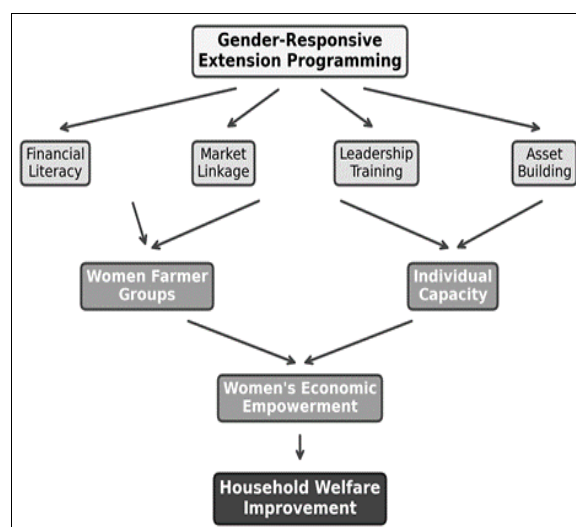


Fig 3: Conceptual pathway from gender-responsive extension programming through empowerment dimensions to household welfare improvement

The framework links four extension components-financial literacy, market linkage, leadership training, and asset building-through women's farmer groups and individual capacity to empowerment and household welfare outcomes.

Comprehensive interpretation

Gender-responsive extension produced large and consistent empowerment gains across all six dimensions. The dose-response pattern over time and the group divergence at each measurement point indicate genuine program effects rather than selection artifacts.

Discussion

The large effect sizes for decision making ($d = 1.31$) and income control ($d = 1.24$) align with evaluations of similar programs in Ethiopia and Bangladesh, where women's participation in agricultural decision making was the first dimension to respond to targeted extension [7, 8]. These dimensions may shift fastest because they require changes in behavior and social norms rather than structural

investments. Credit access, by contrast, depends on the availability of financial institutions, collateral requirements, and lending policies that extension alone cannot change [15, 16].

The district-level variation reflects known differences in extension staffing density and proximity to market centers. Musanze and Rubavu both host district-level agricultural resource centers and have better road connectivity, which facilitates group meetings and market trips [17]. Burera's lower scores suggest that infrastructure deficits can limit the reach of even well-designed programs. Future programming should consider pairing gender-responsive extension with targeted credit facilitation and transport support in more remote districts to ensure that empowerment gains are not capped by structural constraints [18, 19].

Conclusion

This research demonstrates that gender-responsive agricultural extension programming can produce substantial gains in women's economic empowerment over an 18-

month period. The extension-supported group achieved a 71.5% increase in overall empowerment scores compared to 15.6% in the control group. Decision making and income control responded fastest, while credit access remained the most resistant dimension.

For extension agencies in Rwanda and comparable East African contexts, the practical implication is clear: embedding gender-responsive modules into routine advisory delivery produces measurable results. However, empowerment gains will be uneven across districts unless structural barriers-particularly credit access and transport-are addressed in parallel. Scaling this approach requires both trained extension agents and the institutional infrastructure to support women's market participation beyond the farm gate^[20].

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Contributions not qualifying for authorship

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References

1. Food and Agriculture Organization (FAO). The state of food and agriculture 2010-11: Women in agriculture. Rome: FAO; 2011. P.1-160.
2. World Bank. Gender in agriculture sourcebook. Washington DC: World Bank; 2009.
3. Meinzen-Dick R, Quisumbing A, Behrman J, Biermayr-Jenzano P. Engendering agricultural research, development, and extension. IFPRI Research Monograph. Washington DC: International Food Policy Research Institute; 2012. P.1-76.
4. Republic of Rwanda, Ministry of Gender and Family Promotion. National gender policy. Kigali: Ministry of Gender and Family Promotion; 2010. P.1-42.
5. Manfre C, Rubin D, Allen A, Summerfield G. Reducing the gender gap in agricultural extension and advisory services. USAID Discussion Paper 2. Washington DC: USAID; 2013. P.1-28.
6. Quisumbing AR, Pandolfelli L. Promising approaches to address the needs of poor female farmers. World Dev. 2010; 38(4):581-592.
7. Malapit HJL, Kadiyala S, Quisumbing AR, Cunningham K, Tyagi P. Women's empowerment mitigates the negative effects of low production diversity. J Nutr. 2015; 145(8):1934-1941.
8. Alkire S, Meinzen-Dick R, Peterman A, Quisumbing AR, Seymour G, Vaz A. The women's empowerment in agriculture index. World Dev. 2013; 52:71-91.
9. Ragasa C, Berhane G, Tadesse F, Taffesse AS. Gender differences in access to extension services and agricultural productivity. J Agric Educ Ext. 2013; 19(5):437-468.
10. Kabeer N. Resources, agency, achievements: Reflections on the measurement of women's empowerment. Dev Change. 1999; 30(3):435-464.
11. Dillman DA, Smyth JD, Christian LM. Internet, phone, mail, and mixed-mode surveys: The tailored design method. 4th ed. Hoboken: Wiley; 2014.
12. Israel GD. Determining sample size. University of Florida IFAS Extension Publication PEOD6. Gainesville: University of Florida; 2012. P.1-5.
13. Pallant J. SPSS survival manual. 7th ed. London: Open University Press; 2020.
14. Fletschner D, Kenney L. Rural women's access to financial services: Credit, savings, and insurance. ESA Working Paper No. 11-07. Rome: FAO; 2011. P.1-26.
15. Doss C. Intrahousehold bargaining and resource allocation in developing countries. World Bank Res Obs. 2013; 28(1):52-78.
16. National Institute of Statistics of Rwanda (NISR). Rwanda poverty profile report 2016/17. Kigali: NISR; 2018. P.1-94.
17. Davis K, Nkonya E, Kato E, Mekonnen DA, Odendo M, Miiro R, Nkuba J. Impact of farmer field schools on agricultural productivity. World Dev. 2012; 40(2):402-413.
18. Swanson BE, Rajalahti R. Strengthening agricultural extension and advisory systems. Agriculture and Rural Development Discussion Paper 45. Washington DC: World Bank; 2010. P.1-182.
19. Rogers EM. Diffusion of innovations. 5th Ed. New York: Free Press; 2003.