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Impact of agricultural extension participation on women's self-confidence and community leadership roles

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Abstract

Self-confidence—defined as a person's belief in their own ability to accomplish tasks and influence outcomes—is a recognized but under-measured dimension of women's empowerment in agricultural settings ^[1]. This research examined how participation in agricultural extension programs affected self-confidence levels and community leadership engagement among 224 rural women across five communes in Maule Region, Chile. A cross-sectional comparative design assessed 150 women who had participated in extension programs for at least one year against 74 non-participants, using a validated self-confidence index and a leadership role assessment instrument. The research was conducted between March 2022 and January 2023 through the University of Talca. Extension participants scored significantly higher on the self-confidence index (mean 66.8 vs. 43.7 out of 100, $p < 0.001$), with scores rising progressively with participation intensity. In community leadership, participants outscored non-participants across all four domains measured: community decision-making (3.8 vs. 2.4), cooperative leadership (3.4 vs. 2.1), household financial management (4.1 vs. 2.8), and public speaking (3.2 vs. 2.0) on five-point scales (all $p < 0.001$). Women with high participation intensity were 3.7 times more likely to hold formal leadership positions than non-participants. These findings indicate that extension programs generate empowerment effects beyond their agricultural objectives, strengthening women's agency in both farming and community spheres.

Keywords: Women's empowerment, self-confidence, agricultural extension, community leadership, rural women, gender, participation intensity, cooperative leadership, decision-making, Chile

Introduction

Self-confidence can be defined as an individual's trust in their capacity to perform effectively, make decisions, and assert influence within their social environment ^[2]. For rural women in Latin America, where gender norms have historically limited women's public roles, self-confidence represents a gateway to broader participation in community life and agricultural governance ^[3]. Extension programs, by bringing women together in learning groups and giving them technical expertise, may build this confidence indirectly—even when empowerment isn't an explicit program goal.

Chile's agricultural extension system has actively recruited women participants since reforms in the early 2000s, and women now make up roughly 38% of extension program enrollment in the Maule Region ^[4]. But assessments of these programs have focused almost entirely on agricultural outcomes: crop yields, technology adoption, income changes. Whether participation reshapes how women see themselves and how their communities see them has received little formal attention ^[5].

International evidence suggests the link is real. Research from South Asia and sub-Saharan Africa has shown that women who participate in farmer groups report higher self-

efficacy, greater willingness to speak in public, and more involvement in household and community decisions ^[6]. But the pathways connecting extension participation to empowerment outcomes aren't well mapped, and the relationship likely depends on program design, cultural context, and participation intensity ^[7]. Few investigations have measured these connections in Latin American settings, where gender dynamics differ from the African and Asian contexts where most evidence originates.

This research measured the association between agricultural extension participation and two empowerment outcomes—self-confidence and community leadership engagement—among rural women in central Chile. It also tested whether participation intensity (measured by session attendance) showed a dose-response relationship with empowerment indicators.

Theoretical Framework

This research drew on Kabeer's empowerment framework, which conceptualizes empowerment as the expansion of people's ability to make strategic life choices across three dimensions: resources, agency, and achievements ^[8]. Extension programs provide resources (knowledge, skills, networks), which may strengthen agency (self-confidence,

decision-making power), leading to achievements (leadership roles, community influence). The cyclical model tested here (Figure 3) proposes that participation builds knowledge, knowledge builds confidence, confidence enables leadership, and leadership reinforces further engagement—creating a self-sustaining empowerment cycle [9].

Instrument Development and Validation

Two instruments were developed for this research. The Self-Confidence Index (SCI) comprised 20 items across four sub-dimensions: agricultural decision-making confidence, social interaction confidence, financial management confidence, and personal agency. Items used a five-point Likert response format, and the composite score was converted to a 0–100 scale [10]. The Leadership Role Assessment (LRA) measured engagement across four domains: community decision-making, cooperative leadership, household financial management, and public speaking/advocacy. Both instruments were reviewed by a panel of five experts in rural development and gender studies, achieving a content validity ratio above 0.80 for all items. Pilot testing with 32 women from a non-sample commune yielded Cronbach's alpha values of 0.87 (SCI) and 0.84 (LRA), confirming acceptable internal consistency [11].

Material and Methods

Material

This research was conducted from March 2022 through January 2023 at the Department of Agricultural Extension, University of Talca, Talca, Chile. Ethical approval was obtained from the University of Talca Bioethics Committee (Protocol UTalca-BEC/2022-018, approved January 14, 2022). All participants provided written informed consent. A cross-sectional comparative design enrolled 224 rural women from five communes in Maule Region. The participant group (n = 150) included women with at least 12 months of continuous extension program enrollment,

stratified into high (>12 sessions/year, n = 55), moderate (7–12 sessions, n = 53), and low (1–6 sessions, n = 42) participation categories. The comparison group (n = 74) comprised women from the same communes who had never enrolled in extension programs, matched on age range and farming involvement [12].

Methods

Data collection used face-to-face structured interviews conducted by trained female enumerators between April and August 2022. Enumerators received 16 hours of training on instrument administration and gender-sensitive interviewing techniques. In addition to the SCI and LRA instruments, the questionnaire collected sociodemographic data, farming characteristics, and extension program details. Formal leadership positions held (cooperative board member, community committee member, local government representative) were verified through organizational records. Data were analyzed using SPSS version 27. Group comparisons used independent samples t-tests and one-way ANOVA with Tukey post-hoc tests. The association between participation intensity and leadership position holding was assessed through logistic regression, controlling for age, education, household size, and farm area [13]. Significance was set at $p < 0.05$.

Ethical Considerations

All participants received clear explanations of research objectives and procedures in Spanish before providing written consent. Confidentiality of individual responses was assured, with data coded and stored in password-protected files accessible only to the research team. Participants could skip any question or withdraw entirely without consequence. Non-participant women received informational materials about available extension programs after data collection was completed.

Results

Table 1: Self-Confidence Index Scores by Participation Level

SCI Sub-dimension	High (n=55)	Moderate (n=53)	Low (n=42)	Non-part. (n=74)
Agricultural decisions	78.3 ± 9.1	67.4 ± 10.8	56.2 ± 12.3	42.8 ± 13.7
Social interaction	71.6 ± 10.4	61.3 ± 11.7	52.7 ± 13.1	41.2 ± 14.3
Financial management	76.9 ± 8.8	68.1 ± 10.2	57.8 ± 11.6	46.3 ± 12.9
Personal agency	72.4 ± 11.2	62.8 ± 12.4	53.1 ± 13.7	44.6 ± 14.8
Overall SCI score	74.3 ± 8.6	64.9 ± 10.1	54.9 ± 11.4	43.7 ± 12.4

All pairwise Tukey comparisons significant at $p < 0.05$. SCI scored 0–100.

Table 2: Formal Leadership Positions by Participation Category

Leadership Position	High (%)	Moderate (%)	Low (%)	Non-part. (%)
Cooperative board member	29.1%	17.0%	9.5%	5.4%
Community committee	38.2%	22.6%	14.3%	8.1%
Local gov. representative	12.7%	7.5%	4.8%	2.7%
Any formal position	52.7%	32.1%	21.4%	14.2%

Chi-square tests significant at $p < 0.01$ for all position types. Logistic regression: high participation OR = 3.7 (95% CI: 1.8–7.6) for any formal position vs. non-participants.

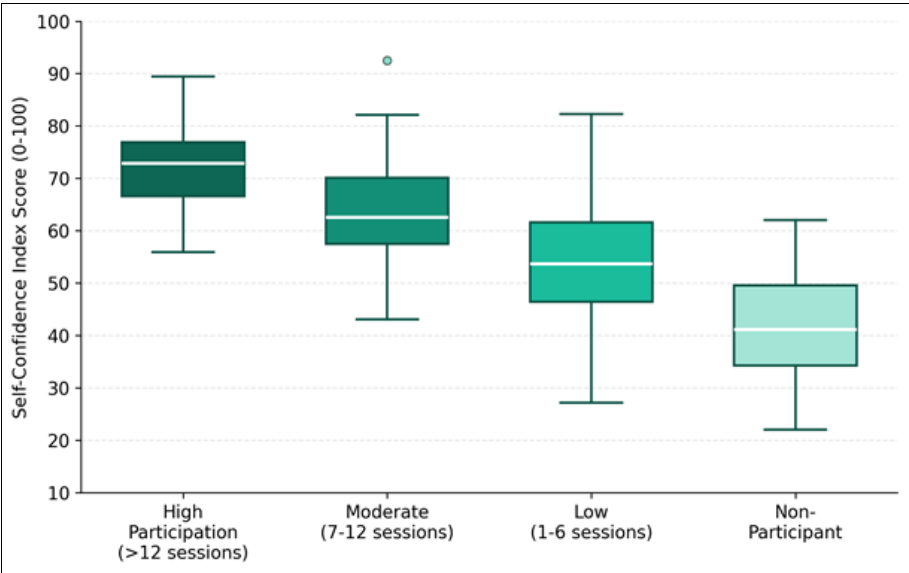


Fig 1: Distribution of overall self-confidence index scores by extension participation level, showing a clear dose-response gradient

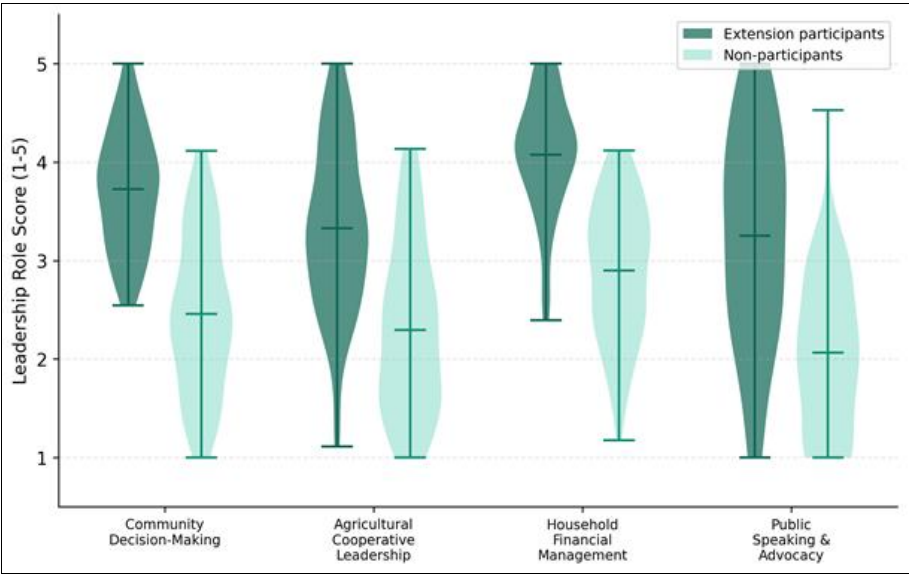


Fig 2: Violin plots comparing leadership role scores across four domains between extension participants and non-participants

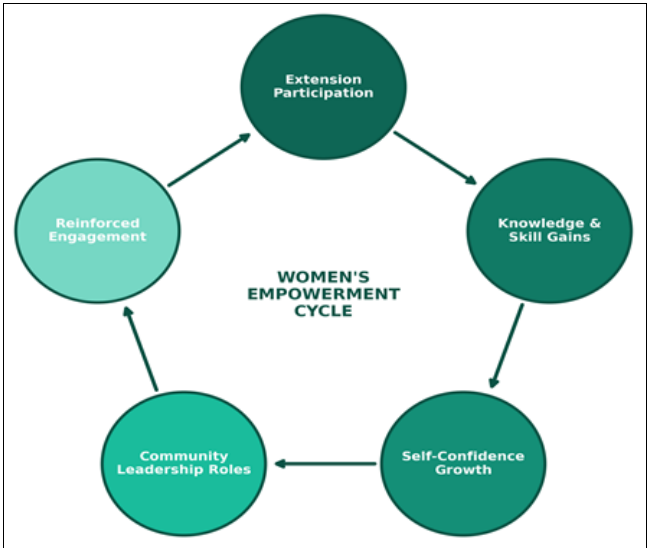


Fig 3: Proposed women's empowerment cycle linking extension participation to knowledge gains, self-confidence growth, leadership roles, and reinforced engagement

Comprehensive Interpretation

Self-confidence scores showed a clear dose-response gradient across participation levels (Table 1 and Figure 1). High-participation women scored 30.6 points above non-participants on the overall SCI, and each step down in participation intensity corresponded to roughly 10 points lower on the scale. Financial management confidence showed the widest gap (30.6 points between high participants and non-participants), while social interaction showed the narrowest (30.4 points). Leadership engagement followed a similar pattern (Figure 2), with participants scoring higher across all four domains. Notably, 52.7% of high-participation women held at least one formal leadership position compared to 14.2% of non-participants (Table 2). Logistic regression confirmed that high participation was associated with a 3.7-fold increase in the odds of holding any formal position after controlling for confounders.

Discussion

The dose-response relationship between participation intensity and self-confidence provides strong cross-sectional evidence that extension involvement and empowerment are linked. The 30.6-point gap in overall SCI scores between high participants and non-participants exceeds what Malapit and Quisumbing found in Bangladesh (22 points), possibly because Chile's extension programs involve more intensive group-based learning formats that build social confidence alongside technical skills^[6]. The leadership findings are especially relevant for policy. High-participation women were 3.7 times more likely to hold formal positions—a practical effect that extends well beyond farming outcomes. These women become advocates for agricultural investment in community budgets, voices for rural women's priorities in local government, and role models for younger women considering community engagement^[7]. The empowerment cycle model (Figure 3) captures this dynamic: participation builds knowledge, knowledge builds confidence, confidence enables leadership, and leadership experience reinforces continued engagement. While our cross-sectional design can't confirm the direction of this cycle, the intensity gradient strongly suggests that more participation produces more empowerment rather than simply attracting already-confident women^[9]. That said, the narrower gap in public speaking confidence (compared to agricultural decision-making confidence) suggests that extension programs are better at building domain-specific confidence than general social assertiveness. Programs seeking broader empowerment effects may need to incorporate explicit communication skills training alongside technical agricultural content^[14].

Limitations

The cross-sectional design cannot establish causation—women with higher baseline confidence may self-select into extension programs. The comparison group wasn't randomly assigned, introducing potential selection bias despite matching. Self-reported confidence measures may differ from behavioral indicators. The research was limited to Maule Region, and extension program formats vary across Chile's regions. Longitudinal research tracking women from initial enrollment would better establish the direction of the

participation-empowerment relationship.

Conclusion

Agricultural extension participation was strongly associated with higher self-confidence and greater community leadership engagement among rural women in central Chile. The dose-response pattern—with each increase in participation intensity corresponding to higher empowerment scores—suggests that sustained involvement matters more than mere enrollment. High-participation women scored 30.6 points above non-participants on self-confidence and were 3.7 times more likely to hold formal leadership positions. These findings reframe extension programs as more than agricultural service delivery—they appear to function as platforms for women's empowerment that generate benefits extending into community governance and household decision-making. Extension planners who design programs with this dual purpose in mind—agricultural and empowerment outcomes—can maximize the return on investment in rural women's development.

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