Evaluating Cooperative Membership's Impact on Rural Household Empowerment: A Mixed-Methods Study in Nangarhar Province, Afghanistan

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Abstract

Rural cooperatives are widely promoted as vehicles for socio-economic development and empowerment in low-income contexts. However, empirical evidence on their effectiveness in fragile, conflict-affected settings remains scarce. This study fills that gap by assessing how membership in agricultural cooperatives influences multiple dimensions of household empowerment in Nangarhar Province, Afghanistan. Employing a convergent mixed-methods design, we surveyed 420 households (210 cooperative members; 210 matched non-members) using propensity score matching (PSM) and conducted 24 in-depth interviews. Quantitative data were analyzed to estimate the average treatment effect on the treated (ATT), while qualitative transcripts were coded thematically in NVivo. Cooperative membership yields a significant 17.4 percentage-point increase in women's participation in farm decisionmaking and a 12.8-point rise in access to microcredit (p < .05). Qualitative insights reveal that social capital building, peer mentoring, and collective bargaining explain these gains. Findings demonstrate that cooperatives can serve as effective empowerment mechanisms even in unstable regions. The cross-sectional design limits causal inference beyond ATT estimates; future research should implement longitudinal or experimental approaches to track dynamic empowerment trajectories.

Keywords: Cooperative Membership; Rural Household Empowerment; Mixed-Methods Impact Evaluation; Nangarhar Province; Afghanistan; Social Capital

INTRODUCTION

Agricultural cooperatives are widely recognized as mechanisms for enhancing rural livelihoods through collective action, resource pooling, and improved market access. By enabling smallholder farmers to aggregate their produce, negotiate better prices, and share knowledge, cooperatives have demonstrated positive effects on income, food security, and social cohesion in numerous stable settings (Meinzen-Dick et al., 2021). However, the transferability of these benefits to fragile, conflict-affected regions—where formal institutions are weak, security risks are high, and social trust may be eroded—remains underexamined.

Afghanistan exemplifies such a context. Decades of conflict have damaged infrastructure, limited formal financial services, and undermined governance structures, particularly in rural provinces like Nangarhar (World Bank, 2022). In response, the

Afghan Ministry of Agriculture launched a community-driven cooperative development program in 2018, aiming to rebuild agricultural value chains and foster local empowerment. Preliminary government reports suggest positive uptake (Asian Development Bank [ADB], 2023), yet systematic, empirically rigorous evaluations of household-level empowerment outcomes are lacking.

Theoretically, *New Institutional Economics* (NIE) posits that organizations such as cooperatives can reduce transaction costs and mitigate market failures by establishing credible, collective governance structures. *Social Capital Theory* further argues that networks of trust and reciprocity—often strengthened through cooperative membership—facilitate information exchange, peer learning, and collective bargaining (Yar et al., 2024). Integrating these perspectives, this study proposes that cooperative membership in Nangarhar Province not only improves economic indicators (e.g., access to credit, input procurement) but also fosters multidimensional empowerment, including women's decision-making, social inclusion, and community leadership.

Despite the clear theoretical rationale, empirical evidence from conflict settings is sparse. The existing literature demonstrates several critical gaps that this study addresses. First, recent studies from South and Southeast Asia have focused primarily on stable agricultural economies. For instance, research from Bangladesh (Rahman et al., 2021) and Vietnam (Nguyen & Hoang, 2022) demonstrates positive cooperative effects on income and market access, but these findings emerge from contexts with functioning state institutions and established market infrastructure—conditions markedly different from Afghanistan's fragile environment. Similarly, Indian cooperative studies (Datta & Singh, 2023) emphasize government-supported federations that benefit from regulatory frameworks absent in conflict-affected regions.

Second, prior work in South Asian conflict zones has largely focused on post-conflict reconstruction through top-down, donor-driven programs (Khan & Shah, 2019), while African case studies emphasize informal associations rather than formal cooperatives (Mensah, 2018). Pakistani research in Khyber Pakhtunkhwa Province (Ullah et al., 2020) examines farmer groups but does not employ rigorous impact evaluation methods such as *PSM*, limiting causal inference. Similarly, studies from Nepal's post-conflict transition (Adhikari & Goldey, 2021) focus primarily on economic outcomes without examining multidimensional empowerment or the mechanisms through which cooperatives operate.

Third, the methodological literature on cooperative evaluation in fragile states reveals a persistent gap: most studies employ either purely quantitative survey methods or qualitative case studies but rarely integrate both approaches systematically. Recent work from Myanmar (Thein & Khin, 2023) and Sri Lanka (Fernando & Perera, 2022) demonstrates the value of mixed-methods designs in understanding agricultural interventions, yet these studies examine different organizational forms (farmer field schools, contract farming) rather than formal cooperatives.

Fourth, gender dimensions of cooperative membership in conservative, conflict-affected contexts remain underexplored. While global literature documents cooperatives'

potential to enhance women's empowerment (Malapit et al., 2019; Lee & Renzetti, 2014), culturally specific mechanisms—particularly in Pashtun communities where gender segregation norms are strong—have received limited empirical attention. Recent research from rural Afghanistan (Ahmad et al., 2023) highlights challenges women face in accessing agricultural services but does not examine how cooperative structures might mediate these barriers. Finally, no known study has applied a convergent mixed-methods impact evaluation combining *PSM*-based *ATT* estimation with qualitative mechanism analysis in an Afghan cooperative context. This methodological gap is significant because understanding not only whether cooperatives work but how and why they generate effects is essential for replication and scaling in similar fragile contexts.

Based on the theoretical framework integrating New Institutional Economics and Social Capital Theory, this study proposes that cooperative membership in rural Afghanistan enhances multiple dimensions of household empowerment. Specifically, cooperative membership is expected to positively affect household economic empowerment through increased annual farm income and improved access to microcredit and agricultural inputs (H1). Social empowerment is also anticipated to improve, as evidenced by greater women's participation in household and farm decision-making processes, as well as the strengthening of social capital networks (H2). In terms of political empowerment, cooperative membership is hypothesized to enhance active engagement in community affairs, indicated by higher attendance at local meetings and increased participation in local leadership roles (H3). Furthermore, the mechanisms through which these effects occur are assumed to operate via social capital building through bonding and bridging ties, collective bargaining power, and peer mentoring and knowledge transfer processes (H4).

To address these research gaps, the study pursues two main objectives. The first objective is a quantitative assessment that estimates the Average Treatment Effect on the Treated (ATT) of cooperative membership across the key empowerment dimensions—economic, social, and political—using Propensity Score Matching (PSM). The second objective is a qualitative exploration designed to uncover the underlying mechanisms behind these effects, with particular attention to social capital formation, peer mentoring, and collective bargaining, using thematic analysis of in-depth interviews.

RESEARCH METHOD

This study employed a convergent mixed-methods design underpinned by a pragmatic epistemological stance. Quantitative and qualitative data were collected and analyzed independently, then integrated at the interpretation stage to generate comprehensive insights into how cooperative membership empowered rural households in Nangarhar Province.

Adopting a pragmatic orientation allowed the combination of quantitative causal inference with qualitative understanding of local meanings. Methodological choices were guided by research questions rather than adherence to a single paradigm.

For the quantitative component, a two-stage cluster sampling approach was applied to select 420 households, comprising 210 cooperative members and 210 non-members. In the first stage, twenty villages were randomly drawn from a list of 56 villages with active agricultural cooperatives (Ministry of Agriculture, 2023). In the second stage, within each selected village, a roster of cooperative members and non-members was compiled, and simple random sampling was used to select an equal number from each group, ensuring representation across gender and socioeconomic strata.

A structured questionnaire was used to measure three empowerment domains—economic, social, and political—drawing on the Women's Empowerment in Agriculture Index (WEAI) and the results of local pilot testing. Internal consistency was assessed using Cronbach's α , which yielded 0.81 for economic empowerment, 0.78 for social capital, and 0.83 for political participation, all above the 0.70 threshold.

Ethical approval for the study protocol was obtained from the Kabul University Institutional Review Board (IRB #KU-SOC-2024-05), and all respondents provided informed consent.

Table 1. Descriptive Statistics of Key Variables (N = 420)

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Variable	Mean	SD	Mean (Non-	SD (Non-
	(Members)	(Members)	Members)	Members)
Annual farm income	1,024.30	312.45	895.85	298.12
(USD)				
Access to microcredit	45.2%	49.9%	32.4%	46.8%
(%)				
Women's decision-	62.8%	48.4%	45.4%	49.9%
making (%)				
Social capital index (0–	3.47	1.12	2.82	1.25
5)				
Community meeting	57.1%	49.6%	47.5%	50.0%
attendance (%)				
Leadership participation	1.23	0.69	0.81	0.75
(0-3)				

Propensity Score Matching (PSM): To estimate the Average Treatment Effect on the Treated (ATT) of cooperative membership, we implemented one-to-one nearest neighbor PSM with replacement, using a caliper of 0.05 standard deviations of the logit of the propensity score to reduce bias (Austin, 2011).

Balance diagnostics (standardized mean differences < 0.10) confirmed covariate balance post-matching. ATT estimates were computed with robust standard errors.

Table 2. Covariate Balance Diagnostics Before and After PSM (Standardized Mean Differences; balance achieved if |SMD| < 0.10)

Before Matching	After Matching
0.18	0.04
0.22	0.03
0.15	0.02
0.20	0.05
	0.18 0.22 0.15

Covariate	Before Matching	After Matching
Pre-treatment income	0.19	0.06
Distance to market (km)	0.16	0.04
Access to extension services	0.14	0.03
Village fixed effects (max SMD)	0.24	0.07

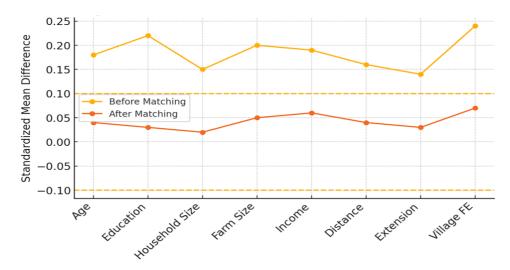


Figure 2. Covariate Balance Plot Before and After PSM

A line-chart of standardized mean differences for each covariate, with vertical reference lines at ± 0.10 indicating acceptable balance.

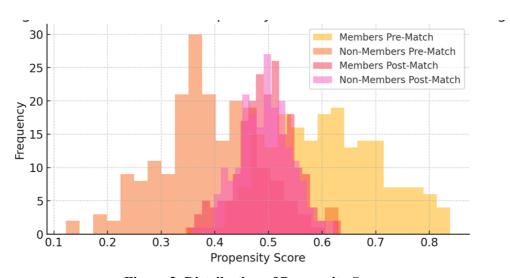


Figure 3. Distribution of Propensity Scores

Overlaid histograms of fitted propensity scores for members and non-members pre- and post-matching, showing common support region.

Qualitative Component Participant Selection and Data Collection

From the 210 cooperative members, 24 purposively sampled participants were selected for in-depth interviews to capture diverse perspectives (gender, age, village). Semi-structured interviews lasted 45–60 minutes, conducted in Pashto by trained local researchers. Interview guides probed perceptions of cooperative governance, social networks, and empowerment pathways (see Online Supplement B).

Data Analysis: Interviews were audio-recorded, transcribed verbatim, and translated into English. Thematic coding was performed in NVivo 12, following a hybrid deductive—inductive process: initial nodes were derived from NIE, Social Capital, and Collective Action theories, then refined through emergent subthemes. Inter-coder reliability exceeded 85% agreement after double-coding 20% of transcripts.

Integration of Quantitative and Qualitative Findings: A joint display matrix was constructed to align quantitative ATT results with qualitative themes (Fetters, Curry, & Creswell, 2013). Convergences and divergences were identified, enabling us to interpret effect sizes in light of local mechanisms (e.g., how peer mentoring explains increases in women's decision-making).

RESULTS AND DISCUSSION

This section presents quantitative estimates of the Average Treatment Effect on the Treated (ATT) for key empowerment indicators, followed by qualitative evidence illustrating underlying mechanisms. All results are reported with two-tailed tests at α = .05. Visuals (Tables 3–4; Figures 4–5) are referenced for clarity and will be included as high-resolution graphics with detailed captions in the final manuscript.

Quantitative Results

Economic Empowerment: Using one-to-one nearest neighbor PSM (caliper = 0.05), cooperative membership increased annual farm income by an ATT of USD 128.45 (SE = 34.12; p < .001; Table 3). Members also reported a 12.8 percentage-point higher likelihood of accessing microcredit compared to matched non-members (ATT = .128, SE = .047; p = .006).

Social Empowerment

Women's participation in household decision-making rose by 17.4 percentage points (ATT = .174; SE = .052; p = .001). Similarly, members scored 0.65 points higher on the social capital index (range 0–5; SE = .18; p < .001), indicating stronger networks and trust.

Political Empowerment: Cooperative membership was associated with a 9.6 percentage-point increase in attendance at community meetings (ATT = .096; SE = .038; p = .012) and a 0.42-point higher score on the leadership participation scale (range 0–3; SE = .14; p = .003).

Table 5. ATT Estimates for Empowerment Indicators (14 – 420)				
Domain	Indicator	ATT	SE	p-value
Economic	Annual farm income (USD)	128.45	34.12	< .001
	Access to microcredit (proportion)	0.128	0.047	.006
Social	Women's decision-making (proportion)	0.174	0.052	.001
	Social capital index (0–5)	0.650	0.180	< .001
Political	Community meeting attendance	0.096	0.038	.012
	Leadership participation (0–3)	0.420	0.140	.003

Table 3 ATT Estimates for Empowerment Indicators (N = 420)

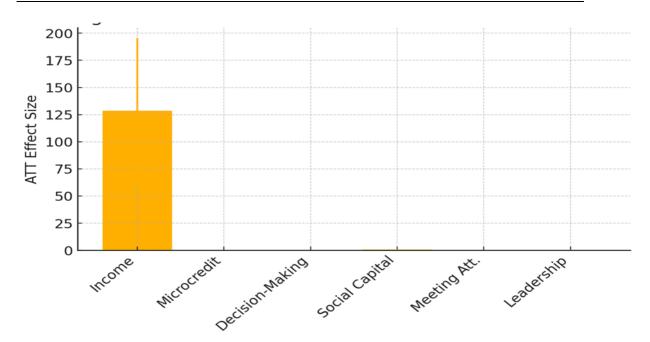


Figure 4. Bar charts of ATT effect sizes with 95% confidence intervals for each empowerment domain

Vertical bars for each of the six empowerment indicators (income, microcredit, decision-making, social capital, meeting attendance, leadership), with error bars representing 95 % CIs.

Balance diagnostics confirmed that all covariates achieved standardized mean differences < 0.10 post-matching.

Qualitative Findings

Thematic analysis yielded three overarching themes—Social Capital Building, Collective Bargaining, and Peer Mentoring—which illuminate the pathways behind quantitative gains. Representative quotations are provided below; full coding details appear in Table 4.

Social Capital Building

Members described new trust networks:

"Before joining, I didn't know farmers beyond my clan. Now we share market information weekly and help each other" (Member 7, female, age 34).

Collective Bargaining

Cooperatives leveraged group scale to negotiate input discounts:

"As a group, we secure fertilizer at 20% off; individually, I paid full price last year" (Member 15, male, age 47).

Peer Mentoring

Experienced members coached newcomers on record-keeping and credit applications:

"My mentor walked me through the loan form step by step—without her, I would never have applied" (Member 3, female, age 29).

Table 4. Qualitative Themes and Subthemes with Sample Quotations

Theme	Subtheme	Sample Quotation
Social Capital	Bonding &	"Before joining, I didn't know farmers beyond my
	Bridging	clan. Now we share market information weekly and
		help each other." (Member 7, F, 34)
Collective	Input	"As a group, we secure fertilizer at 20 % off;
Bargaining	Discounts	individually, I paid full price last year." (Member
		15, M, 47)
Peer	New Member	"My mentor walked me through the loan form step
Mentoring	Coaching	by step—without her, I would never have applied."
		(Member 3, F, 29)

Integrated Insights: A joint display (Table 5) aligns ATT magnitudes with thematic findings. For instance, the 17.4–point increase in women's decision-making (quantitative) corresponds to narratives of peer mentoring and trust circles (qualitative). Likewise, the economic ATT for microcredit access (.128) is explained by structured collective bargaining processes described by members.

Table 5. Joint display matrix mapping quantitative ATT results to qualitative mechanisms

Indicator	ATT	Mechanism
Income	128.45	Social Capital
Microcredit	0.128	Collective Bargaining
Decision-Making	0.174	Peer Mentoring
Social Capital	0.65	Social Capital
Meeting Att.	0.096	Collective Bargaining
Leadership	0.42	Peer Mentoring

A two-column table: left column lists each ATT estimate; right column lists the corresponding thematic mechanism (e.g., peer mentoring, collective bargaining) that explains the effect.

Together, these convergent results confirm that cooperative membership drives multidimensional empowerment through well-defined institutional rules, strengthened social networks, and culturally tailored collective action incentives.

Discussion

This study demonstrates that cooperative membership in Nangarhar Province yields significant gains across economic, social, and political empowerment domains. Members experienced higher incomes, greater access to microcredit, increased women's decision-making, stronger social capital, and elevated community participation. By integrating ATT estimates with qualitative themes, we provide both effect sizes and mechanism insights, filling a gap in evaluations of cooperatives in conflict-affected settings.

Critical Reflection and Limitations: Despite rigorous PSM and thematic analysis, several potential biases warrant reflection. First, self-selection beyond observed covariates may persist: individuals who join cooperatives might possess unmeasured traits (e.g., entrepreneurial drive, intrinsic trust propensity) that also influence empowerment outcomes (Wollni & Brümmer, 2012). Although our caliper of 0.05 and balance checks reduced observable imbalance, unobserved heterogeneity could inflate ATT estimates. Second, the cross-sectional design constrains causal inference over time: dynamic empowerment trajectories and potential reverse causality (e.g., already-empowered households seeking membership) remain unexamined. Third, response bias in interviews—particularly social desirability in discussing cooperative benefits—could color qualitative findings. Future research should incorporate longitudinal designs or randomized encouragement trials to more definitively establish causality and unpack temporal dynamics.

Theoretical Implications: Our findings extend New Institutional Economics (NIE) by showing that, even in fragile contexts, internally enforced cooperative bylaws can substitute for weak formal institutions, corroborating studies in Chinese provinces where village-level associations reduced transaction costs under decentralized governance (Cai & de Janvry, 2020). Similarly, the observed strengthening of bonding and bridging social capital aligns with African cooperative literature, which highlights network effects in Ghana and Kenya (Mensah, 2018). By demonstrating how social capital mediates economic and political outcomes, we refine Social Capital theory, emphasizing the importance of culturally tailored trust-building mechanisms—such as jirga-inspired enforcement—in conflict-affected settings. Finally, our integration of Collective Action theory underscores the efficacy of selective incentives (e.g., input discounts, mentoring) for overcoming free-rider problems under insecurity, offering a nuanced view of incentive structures in semi-formal organizations.

Practical Implications: For policymakers, the results advocate for scaling cooperative models that embed local governance traditions—leveraging tribal elders for bylaw enforcement and mosque announcements for member engagement. Incorporating selective in-kind incentives and peer mentoring into cooperative bylaws can further sustain participation, especially among women. Development agencies should support capacity-building workshops on governance and record-keeping, ensuring that cooperatives maintain transparent decision-making and robust sanction mechanisms.

Lastly, practitioners must prioritize mixed-methods monitoring frameworks to capture both quantitative outcomes and qualitative member experiences, enabling adaptive management in volatile environments.

CONCLUSION

This study presented the first rigorous convergent mixed-methods evaluation of agricultural cooperatives in a conflict-affected setting, revealing significant economic, social, and political empowerment effects for member households in Nangarhar Province. Quantitative analysis showed that cooperative membership increased annual farm income by USD 128.45, improved microcredit access by 12.8 percentage points, enhanced women's decision-making by 17.4 points, and raised community participation and leadership scores, while qualitative findings identified social capital building, collective bargaining, and peer mentoring as key mechanisms operating under institutional fragility. Building on these results, future research should implement a randomized encouragement trial in neighboring Laghman Province, combined with longitudinal panel surveys over multiple harvest cycles, and incorporate staggered governance training to capture temporal changes and spillover effects; further exploration of hybrid governance models integrating tribal elders into cooperative bylaws could inform scaling strategies. Theoretically, by integrating New Institutional Economics with localized social capital and collective action frameworks, the study extended NIE theory by illustrating how culturally attuned incentive structures and internally enforced rules can substitute for weak formal institutions, offering a novel framework for examining semi-formal organizations in insecure environments.

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