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Collaborative Learning Networks for Farmer Economic Empowerment: A Literature Review

A. Hasdiansyah[1*], Ihwan Ridwan[2], Nur Ida[3], Salmia Salama[4]
[1,2,3,4]Universitas Muhammadiyah Parepare, Indonesia
Jend. Ahmad Yani Street No.Km. 6, Bukit Harapan, Kec. Soreang, Kota Parepare, Sulawesi Selatan 91112
Author Correspondence. Email: ahasdiansyah@gmail.com, Phone: +6285242059545

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Abstract: This article examines the role of Collaborative Learning Networks (CLN) in empowering smallholder farmers economically in developing countries through a narrative literature review. CLN models, such as Farmer Field Schools (FFS), Farmer-to-Farmer Extension (F2FE), and Agricultural Cooperatives, offer solutions to address challenges like poverty, low productivity, limited market access, and vulnerability to economic-climatic shocks. The analysis reveals that CLN models contribute to enhancing technical knowledge, adopting sustainable technologies, and improving market access through multi-stakeholder collaboration. Agricultural Cooperatives are effective in strengthening farmers' bargaining power and income stability, while FFS focuses on building technical capacity. However, CLN efficacy depends on inclusive design, equitable network governance, and integration with structural reforms (e.g., land access, credit, and infrastructure). Challenges such as power imbalances, elite dominance, and hierarchical cultural norms may hinder empowerment outcomes. Policy recommendations include multidimensional programs combining technical training with institutional strengthening, gender quotas for women's participation, and multi-stakeholder collaboration. CLN holds potential as catalysts for sustainable rural development if supported by holistic and context-sensitive approaches.
Keywords: collaborative learning networks, farmer economic empowerment, collaborative learning models, agricultural cooperatives, rural development

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INTRODUCTION

Smallholder farmers in developing countries frequently face significant challenges that hinder their economic and social progress. These challenges include persistent poverty, low agricultural productivity, limited market access, and vulnerability to climate and market shocks (Meemken & Bellemare, 2020). Given the agricultural sector's crucial role in poverty alleviation and overall rural development, farmer empowerment has emerged as a key strategy for achieving sustainable development (Yar & Musadiq, 2024).

Farmer empowerment constitutes a multidimensional concept that extends beyond mere income enhancement. It encompasses the strengthening of agency (capacity to act), knowledge, skills, access to resources (including financial capital), decision-making power, and resilience to shocks (Yar & Musadiq, 2024). This literature review focuses on the economic

dimensions of empowerment, which entail income growth, productivity improvements, enhanced market participation, and financial stability as critical outcomes (Singh et al., 2024).

However, it is crucial to recognize that economic empowerment cannot be divorced from other dimensions of empowerment—such as social and political agency—or from the broader goals of sustainable rural development. Neglecting rural development risks exacerbating urban challenges, including unemployment, overcrowding, and urban poverty, thereby positioning rural empowerment as vital to national stability and balanced growth (Yar & Musadiq, 2024). Effective empowerment strategies not only boost agricultural productivity but also reinforce social bonds, foster trust, and enhance communities' capacity to innovate and leverage local resources (Hasdiansyah, 2021). Thus, economic progress is often both a driver and a product of broader social and individual capacity-building processes within communities. Economic gains provide the means, while empowerment furnishes the agency and resilience necessary for sustainable change (Pentury et al., 2017).

The concept of networks as vehicles for information exchange and collective learning is not novel; the historical evolution of agriculture itself demonstrates how collective networks, albeit initially small-scale, enabled the accumulation and dissemination of knowledge (Brunori et al., 2013). Agriculture facilitated the formation of larger, denser communities, which in turn expanded the scale and diversity of idea-exchange networks. The size and diversity of these networks have proven critical in accelerating collaborative learning and innovation (Ochieng et al., 2022).

In modern agricultural contexts, Collaborative Learning Networks (CLN) can be defined as structured or semi-structured arrangements in which farmers (Chavez-Miguel et al., 2022), and other stakeholders (e.g., researchers, agricultural extension officers, market actors, government officials) interact to share knowledge, experiment with new practices, collectively solve problems, and build individual and communal capacity (Siebrecht, 2020). This approach signifies a shift from traditional top-down extension models toward more participatory, farmer-centered methodologies. Various CLN models, including Farmer Field Schools (FFS), Farmer-to-Farmer Extension (F2FE), and Agricultural Cooperatives, have emerged and will be critically examined in this review (Denee, 2024).

To understand modern CLN, insights can be drawn from historical network dynamics. While larger, more diverse networks drive innovation, they may also concentrate information and power within specific nodes, perpetuating inequalities (Koutsouris & Zarokosta, 2022). Although modern CLNs are designed for empowerment, they operate within similar social dynamics. Therefore, CLN analysis must extend beyond knowledge exchange to consider how network structures—such as size, diversity, and actor centrality—shape access to information, benefit distribution, and power dynamics within groups, potentially replicating or challenging historical inequities (Ochago et al., 2024).

This literature review aims to critically analyze and synthesize existing scholarship on the role and efficacy of diverse CLN models in promoting the economic empowerment of smallholder farmers in developing countries. The innovations we offer are, first, a collective learning network approach positioned not simply as a forum for information exchange but as an instrument for economic empowerment based on farmers' social capital. Second, integrating economic and social dimensions into the farmer learning process empowers individuals to develop not only technical skills but also to strengthen collective solidarity and independence. Third, local contextualization, which places farmers' experiences, wisdom, and specific needs as the starting point in developing an empowerment model, differs from the top-down approach dominant in previous literature.

The scope of this review includes: (1) Comparative analysis of CLN models (FFS, F2FE, Agricultural Cooperatives), (2) Exploration of theoretical frameworks underpinning CLN (e.g., social learning theory, participatory development), (3) Implementation factors, including facilitation quality and contextual influences (e.g., cultural, institutional), (4) Methodological

critiques and identification of research gaps in CLN evaluation, (5) Policy and practice implications for sustainable rural development. The scope of this study is based on the argument that there is still very little empirical evidence regarding the extent to which collective learning networks increase farmers' income, productivity, or economic resilience. Furthermore, there is a lack of research on the long-term sustainability of learning networks, particularly regarding member regeneration and adaptation to market and technological changes. While CLNs hold significant potential for farmer economic empowerment through enhanced knowledge sharing, innovation adoption, and collective action, their effectiveness hinges on design integrity, facilitation quality, contextual adaptability, and the ability to address inherent challenges related to scalability, inclusivity, and long-term sustainability.

RESEARCH METHOD

Review Type

This literature review employs a comprehensive narrative review methodology with systematic search elements. This approach was selected to enable an in-depth synthesis of diverse qualitative and quantitative studies spanning multiple CLN models, theoretical frameworks, and implementation contexts, while maintaining rigorous focus on the primary research question: How do CLN contribute to the economic empowerment of smallholder farmers in developing countries?

Search Strategy

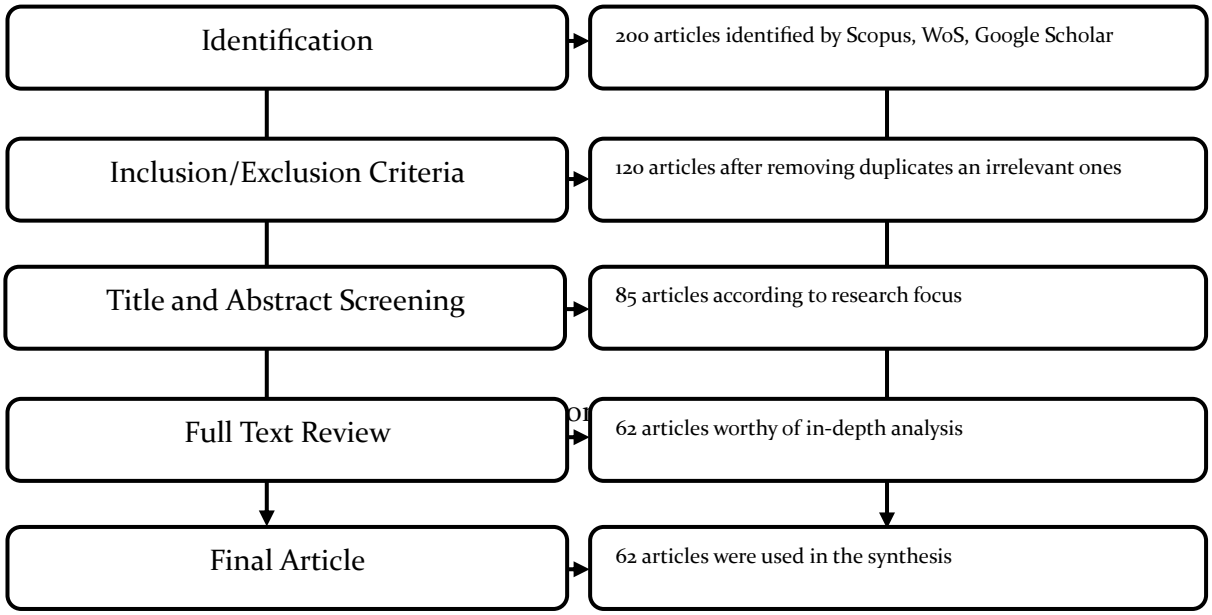
A systematic literature search was conducted across major academic databases, including Scopus, Web of Science, and Google Scholar, prioritizing peer-reviewed articles, books, and policy reports published between 2020 and 2024 to capture recent advancements in participatory agricultural extension approaches. The search strategy utilized the following key terms and Boolean combinations: "collective learning networks," "farmer field schools," "farmer to farmer extention," "agricultural cooperatives," "social learning," "network governance," "community-based economics," "farmer empowerment," "economic empowerment," "smallholder income," "agricultural productivity," "rural development," "developing countries".

Inclusion/Exclusion Criteria

The following criteria were applied to screen studies for relevance and rigor:

1. Publication Type: Peer-reviewed journal articles, Systematic reviews, meta-analyses, and scoping reviews, Reputable gray literature (e.g., reports by FAO, World Bank), Book chapters addressing participatory agricultural networks.
2. Language: Studies published in English or Indonesian (with official translations for non-English texts).
3. Geographic Focus: Low and middle-income countries in regions such as Sub-Saharan Africa, South Asia, and Southeast Asia.
4. Subject Focus: Explicit analysis of CLN or specific models (e.g., FFS, F2FE, Agricultural Cooperatives).
5. Exclusion: Purely theoretical studies with no empirical basis (except basic theory), studies in high-income countries unless they provide transferable insights, studies that do not focus on agriculture or farmers, opinion articles without evidence.

From the initial search results of 200 articles, a selection was conducted based on inclusion-exclusion criteria, title and abstract screening, and full-text review. After going through all selection stages, the final number of articles subjected to in-depth review was 62. This selection process is visualized in a flowchart (PRISMA) to transparently demonstrate the literature screening stages.



Data Extraction and Synthesis

The data extraction process involved collating key information from selected studies, including research objectives, CLN model types, contextual settings, methodologies, sample sizes, primary findings on economic/empowerment outcomes, and reported limitations. Synthesis was conducted through narrative synthesis and thematic analysis, supported by an informal quality assessment that evaluated study designs, methodological rigor, and authors' self-reported limitations. Significant methodological diversity was observed across the literature, particularly in impact evaluation approaches (Hellin et al., 2008). For instance, studies on Farmer Field Schools (FFS) frequently exhibited high risks of bias (e.g., selection bias, self-reporting inaccuracies) and a predominant focus on short-term outcomes, such as technology adoption within single growing seasons (Waddington et al., 2014a). Acknowledging this variability in evidence quality was critical to maintaining the review's credibility and enabling nuanced interpretation of findings.

RESULTS

This section presents relevant conceptual frameworks, outlines various CLN models, synthesizes empirical evidence on their impacts on farmer economic empowerment, and critically discusses the findings.

Social Learning Theory

Albert Bandura's social learning theory posits that human learning occurs not only through direct experience but also via observational learning—imitating others' behaviors and their consequences (Apetrei et al., 2024; Qiao et al., 2023; Slijper et al., 2022). In CLN, farmers acquire new practices (e.g., sustainable farming techniques) by observing peers, lead farmers, or demonstration plots. This process fosters imitation of practical actions and cultivates self-efficacy—the belief in one's ability to achieve goals—through group support (Apetrei et al., 2024; Qiao et al., 2023). CLN creates a social environment conducive to knowledge exchange, innovative behavior modeling, and confidence-building (Duan et al., 2023). Integrating visual media (e.g., instructional videos) with hands-on approaches (e.g., field demonstrations) enhances learning efficacy by providing concrete examples and enabling sustained reinforcement (Baul et al., 2024; Karubanga et al., 2024).

Network Governance

Network governance theory delineates a coordination mechanism among autonomous actors (individuals or organizations) distinct from hierarchical (top-down directives) or market-based (price-driven transactions) systems (Albornoz & Glückler, 2020). It involves structured, persistent networks of autonomous actors collaborating to create products or services through implicit contracts, adaptability to environmental changes, and coordinated resource exchanges (Albornoz & Glückler, 2020; Gava et al., 2025). This framework synthesizes transaction cost theory and social network theory, emphasizing coordination grounded in trust, shared interests, social norms, and informal agreements (Valujeva et al., 2023). In the context of CLN, network governance explains how diverse stakeholders—farmers, researchers, traders, and policymakers—align actions, share resources, and negotiate collective goals despite divergent interests (Albornoz & Glückler, 2020; Shin, 2020; Utter et al., 2021). Effective coordination relies on Structural embeddedness, which is the architecture of relationships (e.g., formal/informal linkages) that ensure resource and information flow. Relational embeddedness: Personal ties and reputational mechanisms (e.g., collective sanctions for non-compliance) fostering accountability (Albornoz & Glückler, 2020).

Community Economics

Community economy, or community economic development, is an approach that focuses on empowering local communities to take control of their own economic development, to utilize local resources for local benefit, and to sustainably improve social conditions (Martadwiprani & Rahmawati, 2014). Its core principles include community participation, the building of local wealth and capacity, self-reliance, the enhancement of quality of life, and the redress of structural inequalities (Kumar et al., 2022; Pentury et al., 2017). This approach links social and economic development (Lopera-Arbeláez & Richter, 2024; Rahe et al., 2025). Collaborative learning networks—especially farmer groups organized as cooperatives or as informal community associations—can serve as vehicles for community economies (Ajates, 2021; Wulandhari et al., 2021). They facilitate collective action, the mobilization of local resources (including indigenous knowledge), joint enterprise development, and the improvement of livelihoods, thereby empowering communities from the bottom up (Ahmad & Islam, 2024; Parthiban et al., 2024; Zhang et al., 2022). Efforts to empower the economic capacities of farming communities often involve motivation, mentorship, provision of capital or infrastructure support, skills development, and institutional strengthening (Hasdiansyah, 2021; Hasdiansyah et al., 2020, 2021; Ngarawula & Wahyudi, 2023).

Collaborative Learning Network Model

This collaborative learning network is built upon four main pillars: relational structure, coordination mechanisms, learning practices, and external support (Ammirato et al., 2021; White et al., 2023). First, the relational structure refers to the architecture of relationships among members—farmers, extension agents, researchers, and traders—organized as nodes and links. These links may be formal (e.g., cooperative or farmer-group membership) or informal (e.g., friendships or kinship), creating structural embeddedness that ensures the flow of information and resources (Ammirato et al., 2021; Zurba, 2022). Second, coordination mechanisms are grounded in trust and social norms. Through relational embeddedness, individual reputations are forged by repeated interactions and collective feedback. Implicit contracts—such as commitments to share harvest yields or take turns leading field demonstrations—supersede the need for formal regulation, while social sanctions (e.g., group admonishments or exclusion from discussion forums) maintain compliance (Ament et al., 2022). Third, the learning practices comprise three phases: (1) joint consolidation—face-to-face meetings to identify problems and determine action plans (Hasdiansyah et al., 2021); (2)

integrated demonstration—a combination of instructional videos, field visits, and thematic workshops to model best practices (Kanlı & Yavaş, 2021); (3) reflection and replication—collective evaluation sessions to capture lessons learned, refine techniques, and broaden adoption (André et al., 2023). This cycle is continuous, enabling adaptive learning in response to evolving environmental conditions and market needs. Fourth, external support from extension services, universities, and NGOs strengthens the network by providing research data, new technologies, and access to financing. Digital channels—such as social-media groups or simple e-learning platforms—facilitate rapid exchange, especially during pandemics or mobility constraints (Qi, 2024).

Table 1. Comparison of Collaborative Learning Network Models

Feature	Farmer Field School (FFS)	Farmer-to-Farmer Extension	Agricultural Cooperative
Definition	Intensive, participatory, discovery-based learning group spanning one cropping season (Waddington et al., 2014b)	Provision of training by selected farmers (farmer facilitators) to their peers (Lukuyu et al., 2012)	Member-owned enterprise managed democratically for shared economic and social benefit (Kareska, 2025)
Principles/Philosophy	Experiential learning, farmer empowerment, local problem-solving (Waddington et al., 2014c)	Community-based, farmer-centered, low-cost, leveraging local knowledge (Lukuyu et al., 2012)	Cooperation, mutual assistance, collective ownership, democratic control, shared benefit (Chaddad & Iliopoulos, 2013)
Structure/Actors	Group of 20–30 farmers plus a trained facilitator (Waddington et al., 2014c)	Network of lead farmers and beneficiary farmers, supported by development agents (government/NGOs) (Martini et al., 2023)	Farmer members, elected board, and professional management (where applicable) (Tran et al., 2025)
Facilitation	Experiential agroecosystem analysis, group discussions, on-farm experiments (Pienaah et al., 2024)	Direct training, demonstrations, and field visits conducted by farmer facilitators (Martini et al., 2023)	Peer-to-peer knowledge exchange, formal/informal training sessions, and learning through collective enterprise activities (Koib & Simamora, 2022)
Learning Mechanisms	Experiential agroecosystem analysis, group discussions, on-farm experiments (Bakker et al., 2021)	Direct training, demonstrations, and field visits conducted by farmer facilitators (Jeremy Levinson et al., 2024)	Peer-to-peer knowledge exchange, formal/informal training sessions, and learning through collective enterprise activities (Dower & Gaddis, 2021)
Main Focus	Developing specific technical skills, local problem-solving, and empowerment (Tikum & Ahmad, 2024)	Broad dissemination of agricultural practices or technologies—general and specialized—with broad outreach (Siraj Shekmohammed et al., 2023)	Delivering economic benefits (improved bargaining power, market access, cost efficiencies), member services, and advocacy (Kareska, 2025)

Empirical Evidence of CLN Impact

The literature presents a variety of evidence regarding the impact of CLNs on multiple aspects of farmers' lives, albeit with varying degrees of methodological rigor.

1. Knowledge and Adoption

Studies have shown that farmers' involvement in CLN, particularly through group-based programs such as field schools or peer-to-peer training, consistently enhances their understanding of sustainable agricultural practices (Nelson et al., 2023; Oluwakemi Betty Arowosegbe et al., 2024). Participation in these programs also drives the adoption of new technologies and techniques, such as the use of improved crop varieties or integrated pest management methods (Morepje et al., 2024). A meta-analysis of field school programs revealed significant gains in farmers' knowledge, underscoring the impact of participatory learning approaches (Bakker et al., 2021; Bonilla et al., 2024; Charatsari et al., 2018; Mariyono et al., 2021; Mdiya et al., 2024; Pienaah et al., 2024; Waddington et al., 2014c). Programs focused on pesticide reduction, for example, successfully reduced farmers' reliance on synthetic chemicals (Goeb & Lupi, 2021). Moreover, the lead-farmer model has proven effective in spreading innovation, as other farmers adopt practices demonstrated by their more experienced peers (Silvano & Jespersen, 2025). These findings highlight that social interaction and observational learning are key drivers in transforming agricultural practices.

2. Market Access and Value Chains

Several collaborative learning network models—particularly within cooperatives—are specifically designed to strengthen farmers' bargaining power and expand their market access (Hussein Nowfal et al., 2025; Padhiary & Roy, 2024). Through collective marketing systems, cooperatives reduce reliance on intermediaries and secure fairer prices (Luzuriaga-Amador et al., 2025). At the same time, they forge direct links between farmers and various market actors, opening up new market opportunities or enhancing farmers' participation in existing value chains (Grabs et al., 2024; Qorri & Felföldi, 2024). Numerous studies have documented how farmer cooperatives successfully facilitate mutually beneficial market relationships for all stakeholders (Cao et al., 2025; Gurmessa et al., 2022; Oduro-Owusu et al., 2024).

3. Empowerment

Although this review centers on economic empowerment, studies demonstrate broader effects on individual and community empowerment. Participants in farmer field schools report heightened self-confidence (Bakker et al., 2021; Charatsari et al., 2018; Pienaah et al., 2024). Cooperatives and farmer groups also contribute to strengthening social capital and community cohesion (Kareska, 2025; Metereau, 2020; Morrow et al., 2017; Qorri & Felföldi, 2024). The participatory methods employed in collaborative networks help to enhance problem-solving skills, self-confidence, and engagement in decision-making processes (Hasdiansyah et al., 2020, 2021; Oduro-Owusu et al., 2024; Samaddar et al., 2021). Moreover, involvement in collective savings and loan groups has been shown to advance women's empowerment (Eseza et al., 2025).

DISCUSSION

Collaborative Learning Networks and Economic Empowerment

The effectiveness of various CLN models in fostering the economic empowerment of smallholder farmers exhibits significant variation, contingent on institutional design and intervention focus (Goeb & Lupi, 2021; Misanya et al., 2023; Morrison et al., 2025; Nelson et al., 2023; Sumani et al., 2023). Agricultural Cooperatives, for instance, excel in enhancing market bargaining power and income stability through value-chain integration—such as collective marketing and direct buyer access—which reduces reliance on intermediaries (Kareska, 2025). However, this success is predicated on the cooperative's capacity to establish democratic collective ownership structures, wherein farmers retain control over enterprise decisions (Kareska, 2025). In contrast, FFS demonstrate greater efficacy in improving technical

knowledge and the adoption of sustainable technologies (Mdiya et al., 2024; Pienaah et al., 2024), yet their impact on income remains limited due to weak market-system integration. FFS interventions often prioritize short-term productivity gains over the development of sustainable economic infrastructure (Mariyono et al., 2021; Siraj Shekmohammed et al., 2023). Meanwhile, F2FE leverages informal networks to reach farmers cost-effectively at scale (Lukuyu et al., 2012). Nevertheless, its scalability is constrained by reliance on lead farmers' capacities and insufficient institutional support (Goeb & Lupi, 2021; Ochieng et al., 2022). These findings underscore that economic empowerment necessitates a dual approach: technical capacity-building (as exemplified by FFS) and systemic economic strengthening (as seen in cooperatives). Without holistic design, CLNs risk becoming isolated interventions that fail to address structural inequities in resource and market access. Thus, CLN efficacy depends not only on the chosen model but also on bridging technical learning with inclusive economic transformation.

Farmer Learning Network Governance and Power Disparities

Network governance structures play a pivotal role in determining power distribution and benefit allocation within CLN. Despite their design for inclusivity, evidence reveals that centralizing information and resources within specific nodes—such as lead farmers, external facilitators, or local elites—can reinforce existing hierarchies, thereby replicating historical inequities (Charatsari et al., 2018; Koutsouris & Zarokosta, 2022). For instance, in F2FE models, reliance on a limited cohort of "lead farmers" often creates knowledge monopolies, where only select actors are perceived as authoritative sources, while marginalized farmers remain excluded (Martini et al., 2023). This contradicts the principles of network governance, which emphasize horizontal relations grounded in trust and social accountability (Albornoz & Glückler, 2020). However, cooperatives employing rotational leadership structures and participatory decision-making mechanisms mitigate such risks by equitably distributing key roles (Tran et al., 2025). Conversely, FFS that are reliant on external facilitators remain vulnerable to power imbalances unless counterbalanced by active farmer engagement in program design (Pienaah et al., 2024). Professional facilitation serves as a critical mediator in these dynamics, such as through deliberative democracy approaches in discussion forums, ensuring marginalized voices are amplified (Utter et al., 2021). Thus, responsive governance must integrate checks and balances—such as participatory audits or anonymous feedback systems—to prevent power concentration and ensure CLN function as genuine empowerment vehicles rather than reproducing inequities in new forms.

Convergence of Social Learning Theory and Contextual Realities

Social learning theory and community economics provide robust conceptual frameworks for understanding the potential of CLN in fostering farmer empowerment. However, field implementation reveals critical discrepancies between theoretical principles and the socio-economic complexities faced by smallholder farmers. Bandura's social learning theory posits that imitation and self-efficacy drive innovation adoption (Apetrei et al., 2024). Empirical evidence supports this: farmers participating in FFS or F2FE programs exhibit enhanced technical knowledge and confidence in adopting practices such as pesticide reduction or improved seed varieties (Bakker et al., 2021). Nevertheless, the theory often neglects structural barriers that impede the translation of knowledge into sustained economic empowerment. For instance, farmers may adopt water-efficient techniques, yet persistent inequities in irrigation access or land tenure can render such innovations economically inconsequential (Ochago et al., 2024).

Community economics, conversely, emphasizes local resource control and collective action (Kumar et al., 2022). Agricultural cooperatives, as embodiments of this principle, enhance market bargaining power through collective marketing (Grabs et al., 2024). However, in practice, cooperatives frequently struggle to address internal inequities, such as elite dominance in decision-making or the marginalization of women farmers (Koutsouris &

Zarokosta, 2022). While CLN participation cultivates self-efficacy, without parallel agrarian reforms or credit access, heightened confidence rarely translates into economic autonomy. Furthermore, participatory CLN approaches—such as group discussions in FFS—are often distorted by hierarchical cultural norms. In some contexts, youth or women farmers hesitate to voice ideas due to entrenched social pressures (Hasdiansyah et al., 2021). Thus, the ostensibly inclusive ideals of social learning and community economics clash with systemic power imbalances and patriarchal structures.

CLN Impacts: Beyond Economic Empowerment

The economic empowerment of farmers through CLN is inextricably linked to broader social, political, and cultural outcomes. While this review focuses on economic dimensions, empirical findings underscore CLN's role as a multidimensional catalysts that strengthen community cohesion, self-confidence, and participation among marginalized groups—particularly women. For instance, involvement in cooperatives or collective savings groups not only boosts income but also creates opportunities for women to engage in household and public decision-making (Eseza et al., 2025). A Ugandan study reveals that women in CLN report enhanced self-efficacy and negotiation power within familial dynamics, despite persistent patriarchal barriers (Ambler et al., 2021) . However, income gains alone do not guarantee increased agency without concurrent shifts in gender norms or affirmative policies.

CLN also contributes to social capital accumulation through repeated interactions that build trust among members. In Indonesia, farmer groups adopting FFS demonstrate heightened solidarity in responding to climate shocks such as floods or droughts (Mariyono et al., 2021). This social capital underpins long-term collective action, including land rights advocacy or village-level financial institution formation. However, these impacts are uneven. In communities with rigid social hierarchies, CLN risk reinforcing local elites' control over information and resources, perpetuating the marginalization of vulnerable groups (Koutsouris & Zarokosta, 2022).

Furthermore, CLN can serve as a political learning platform for farmers. Participation in cooperative or FFS discussion forums cultivates deliberative skills—such as articulating arguments, reconciling divergent perspectives, and formulating collective demands (Samaddar et al., 2021). In Brazil, farmers engaged in CLN have become active in regional agricultural organizations, even driving reforms in subsidy policies (Grabs et al., 2024). However, such holistic impacts depend on inclusive CLN design. Programs overly focused on technical aspects (e.g., FFS) often neglect political dimensions, whereas cooperatives with democratic structures more effectively integrate civic education. Thus, CLN transcend mere economic tools, functioning as micro-democracy laboratories capable of transforming community power relations—provided they are managed with critical awareness of local contexts.

CONCLUSION

The findings of this review highlight the importance of adopting holistic and context-sensitive policy approaches to maximize the impact of Community Learning Networks (CLNs). First, CLN design should be integrated by combining multidimensional programming that strengthens both technical capacity—such as Farmer Field Schools (FFS) and Farmer-to-Farmer Extension (F2FE)—and institutional development through agricultural cooperatives. For example, collective marketing modules could be embedded in FFS curricula, while cooperatives provide ongoing technical training. Equally important is the incorporation of gender-responsive frameworks by mandating quotas for women's leadership in CLNs and tailoring programs to address cultural barriers, such as providing childcare support during training sessions. Second, professional facilitation and equity mechanisms are essential. Facilitators should be equipped with skills in conflict mediation, gender-sensitive pedagogy, and digital tool adoption to bridge power asymmetries and expand outreach. To prevent elite capture, mechanisms such as rotating leadership roles in cooperatives and anonymous

grievance reporting systems should be institutionalized. Third, structural policy reforms must be advanced by expanding credit access through low-interest loan schemes targeted at women and marginalized groups, and by accelerating land certification programs to secure tenure rights. Evidence from the Philippines shows that pairing CLNs with land titling has improved farmers' competitiveness in global markets. Additionally, investment in market infrastructure—such as rural storage facilities, transport networks, and digital platforms—remains crucial to reducing post-harvest losses. Finally, multi-stakeholder collaboration is vital, particularly through public–private–academic partnerships that bring together governments, universities, NGOs, and agribusinesses. In Kenya, for instance, cooperatives have partnered with agritech firms to integrate e-learning platforms into supply chains, thereby enhancing price transparency and strengthening farmer networks.

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