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PARTICIPATION AND EMPOWERMENT OF FARMER BENEFICIARIES IN NIA-ASSISTED IRRIGATION SYSTEM: A SYSTEMATIC REVIEW OF LITERATURE

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ABSTRACT
This systematic review evaluates literature on the participation and empowerment of farmer beneficiaries in irrigation systems, offering insights applicable to NIA-assisted systems in the Davao Region. Using the PRISMA framework, 16 peer-reviewed studies published between 2013 and 2025 were selected from an initial pool of 376 records. The review identified five key themes: determinants of participation, governance and institutional support, empowerment mechanisms, gender and equity considerations, and system performance and sustainability. Findings reveal that active farmer involvement in irrigation planning, management, and evaluation significantly enhances empowerment outcomes, including improved decision-making capacity, leadership skills, and organizational strength. Participation is influenced by factors such as land ownership, access to credit, institutional trust, and proximity to irrigation infrastructure. Empowerment is further facilitated through gender-responsive policies, capacity-building initiatives, and strong institutional frameworks. The review concludes that sustainable and equitable irrigation governance requires participatory models that prioritize inclusivity, local decision-making, and continuous capacity development.

Keywords:
Farmer participation, empowerment, irrigation governance, NIA, Davao Region

INTRODUCTION

Efficient irrigation systems are fundamental to agricultural productivity, rural livelihoods, and food security, particularly in regions highly dependent on water for crop production, such as the Davao Region. In the Philippines, the National Irrigation Administration (NIA) plays a crucial role in managing and assisting irrigation systems. However, challenges such as low farmer engagement, limited institutional support, and gender disparities continue to hinder the full potential of irrigation development (Ahmad & Tarman, 2024; Asthana, 2022; Delos Reyes & Schultz, 2021; Tesafa et al., 2025). In this context, farmer participation and empowerment emerge as key levers for improving the performance, sustainability, and inclusivity of irrigation governance.

Farmer participation refers to the active involvement of beneficiaries in the planning, decision-making, and maintenance of irrigation systems, while empowerment involves enhancing their capacity to influence decisions, access resources, and take collective action. Numerous studies across Asia and Africa have shown that these two dimensions are mutually reinforcing and essential for sustainable irrigation management. Nevertheless, in the Davao Region, evidence on the effectiveness of participatory and empowerment strategies within NIA-assisted systems remains fragmented.

This study addresses this gap through a systematic review of recent literature, focusing on the determinants, processes, and outcomes of farmer participation and empowerment. By synthesizing findings from 16 studies

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conducted between 2013 and 2025, this review aims to inform institutional reforms and policy frameworks to strengthen participatory irrigation governance in the region.

OBJECTIVES

To systematically examine and synthesize existing literature on farmer participation and empowerment within irrigation systems relevant to the Philippine context, to identify key determinants, processes, and governance strategies that promote more sustainable and community-driven irrigation systems.

METHODOLOGY

This study employed a systematic review method, using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to ensure a thorough and organized process. The objective was to identify, evaluate, and synthesize peer-reviewed literature that examined farmer participation and empowerment within irrigation systems relevant to the Philippine context.

To ensure the quality and relevance of the review, only studies that met specific inclusion criteria were considered. These studies had to be published between 2013 and 2025 and must have focused on farmer participation and/or empowerment within the context of irrigation systems. The research methods used in the studies could be qualitative, quantitative, or mixed-method, as long as they offered rigorous and valuable insights. Additionally, only studies that appeared in peer-reviewed journals or credible institutional repositories were included. To maintain contextual relevance, the studies also needed to provide empirical data or theoretical perspectives that applied to the Davao Region or similar agricultural communities.

A comprehensive literature search for relevant studies was carried out using academic databases such as ScienceDirect, SpringerLink, Google Scholar, ResearchGate, and Google Books/Springer. The search made use of keywords like: “farmer participation,” “empowerment,” “irrigation governance,” “Irrigators’ Association,” “NIA,” “Philippines,” “Participatory Irrigation Management,” and “irrigation.”

Following PRISMA guidelines, an initial total of 376 articles were identified. After removing duplicates and excluding studies that did not meet the review’s scope, 96 full-text articles were screened. Of these, 34 were assessed for eligibility, and 16 studies were ultimately selected for in-depth analysis based on their relevance to the review’s objectives. The article selection process is illustrated in Figure 1.

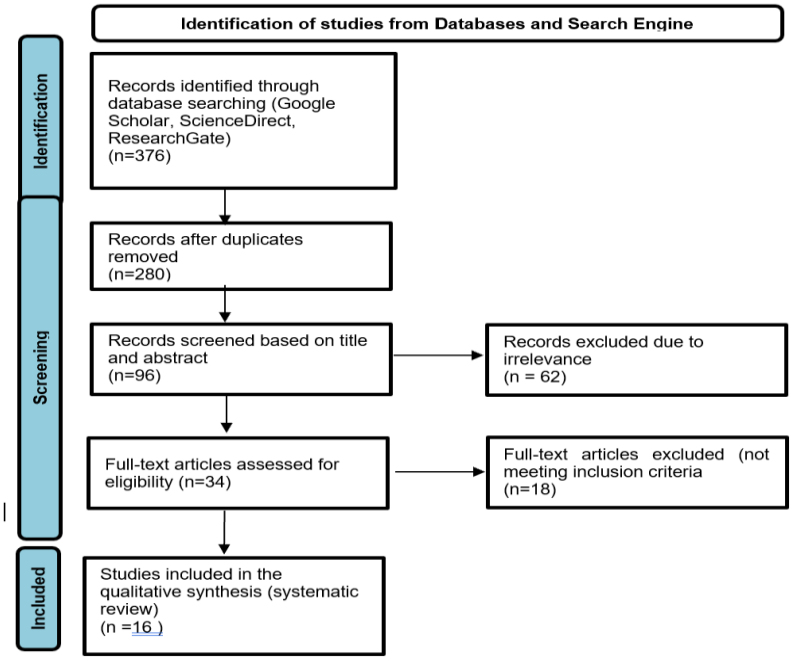

Figure 1. Contextualized PRISMA Model Used in the Study

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For each of the sixteen selected studies, key details were systematically documented, including the authors, year of publication, geographic focus, research methodology, central topics, and main findings. This information was compiled into a data extraction matrix to enable consistent comparison across studies. Thematic analysis was then used to identify and group recurring patterns and insights. As shown in Table 1, these themes included: (1) the determinants of participation, (2) governance and institutional support, (3) empowerment mechanisms, (4) gender and equity considerations, and (5) system performance and sustainability. To ensure the reliability and relevance of the findings, these themes were cross-validated and contextualized by comparing them with existing literature on irrigation governance in Southeast Asia.

Despite efforts to ensure a comprehensive review, certain limitations remain. Few studies focused specifically on the Davao Region, which limited the depth of localized insights. While government reports and non-academic sources provided useful context, variations in format and detail made synthesis more challenging. Nonetheless, this systematic review offers a strong foundation for understanding how farmer participation and empowerment influence the effectiveness and sustainability of irrigation systems.

Table 1. Summary Distribution of Studies in Peer-Reviewed Journals and Databases

Source/Database	Number of Studies	Key Themes
ScienceDirect	8	Determinants of participation, governance and institutional support, empowerment mechanisms
SpringerLink	3	Determinants of participation, governance and institutional support, system performance and sustainability, gender and equity considerations
Google Scholar	2	Determinants of participation, empowerment mechanisms
ReaserchGate	2	Determinants of participation, governance and institutional support, empowerment mechanisms, gender and equity considerations, system performance and sustainability
Google Books / Springer	1	Gender and equity considerations
Total	**16**	

Table 1 presents the distribution of 16 peer-reviewed studies across academic databases and the themes they address. ScienceDirect contributed the highest number of studies (n=8), primarily covering themes related to participation, governance, and empowerment. SpringerLink (n=3) provided broader thematic coverage, including sustainability and gender equity. Google Scholar and ResearchGate (n=2 each) also explored participation and empowerment, with ResearchGate addressing all five key themes. One study from Google Books/Springer focused exclusively on gender and equity considerations.

Overall, the most frequently explored topics were determinants of participation and empowerment mechanisms, highlighting the critical role of inclusive and participatory governance in irrigation systems. This thematic distribution supports a well-rounded understanding of both global and localized perspectives on how farmer participation and empowerment contribute to more sustainable and community-driven irrigation systems.

RESULTS AND DISCUSSION

This systematic review synthesized 16 peer-reviewed studies focused on the participation and empowerment of farmer beneficiaries in irrigation systems, offering insights applicable to NIA-assisted systems in the Davao

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Region. The analysis of selected literature revealed five interrelated themes relevant to farmer participation and empowerment in irrigation systems, each supported by empirical evidence:

Determinants of Participation

The reviewed literature reveals that farmer participation in irrigation systems is influenced by a range of demographic, socio-economic, and institutional factors. Key determinants include age, gender, landholding size, and access to credit, all of which significantly affect a farmer's engagement in irrigation-related activities (Idahe & Solomon, 2024; Sharaunga & Mudhara, 2018; Nahayo et al., 2017). Additionally, proximity to irrigation facilities plays a crucial role, with households located nearer to canals being more likely to participate in water management and infrastructure maintenance (Sithole, Lagat, & Masuku, 2014; Tran, 2020). The role of social capital—particularly trust, shared norms, and strong community networks—has also been highlighted as a vital driver of active engagement in irrigation governance (Mahaarcha & Sirisunhirun, 2023). Institutional membership, especially in cooperatives and water user associations, further enhances participation by facilitating information sharing and promoting collective action (Asthana, 2022; Gholamrezai & Sepahvand, 2017). These findings underscore the importance of increasing accessibility, strengthening social cohesion, and promoting institutional linkages to enhance farmer engagement in NIA-assisted irrigation systems in the Davao Region.

Governance and Institutional Support

Effective irrigation governance depends on the establishment of strong institutional frameworks that uphold transparency, inclusiveness, and responsiveness. The literature indicates that a decentralized and participatory policy environment fosters local ownership and builds trust in water management institutions (Ahmad & Tarman, 2024; Islam, Kashem, Momtaz, & Hasan, 2023). Social capital across governance levels plays a key role in enhancing cooperation, accountability, and adaptability within multi-actor irrigation systems, reinforcing the importance of strong relational ties and community engagement in institutional processes (Mahaarcha & Sirisunhirun, 2023). Moreover, collaboration among various stakeholders—including local government units (LGUs), non-governmental organizations (NGOs), and community-based organizations (CBOs)—enhances shared responsibility and promotes the long-term sustainability of irrigation systems (Rasool, Saeed, Ahmad, Iqbal, & Ali, 2024; Pascual, Dizon, Quimbo, Querijero, & Corales, 2014). CBOs, in particular, serve as critical intermediaries between government agencies and farmer groups, enabling meaningful participation in planning, monitoring, and decision-making. These insights highlight the importance of adopting bottom-up governance mechanisms, investing in social capital, and expanding institutional support within NIA-assisted irrigation systems in the Davao Region.

Empowerment Mechanisms

Empowerment of farmer beneficiaries emerges through a combination of structural support and opportunities for active participation in irrigation governance. Several studies identified key mechanisms that contribute to this empowerment. First, training and capacity-building initiatives—such as leadership development, technical skills enhancement, and cooperative management—significantly boost farmers' confidence and effectiveness in irrigation-related tasks (Delos Reyes & Schultz, 2021; Pascual et al., 2013). Second, equitable access to critical resources, including secure land tenure, agricultural input subsidies, and financing options, enables farmers to make independent and informed decisions that improve their productivity and self-reliance (Nazir & Ashraf, 2025). Third, farmers who are meaningfully involved in decision-making processes, particularly in monitoring and evaluation activities, report a greater sense of ownership and influence over irrigation projects (Tran, 2020). To enhance empowerment in the Davao Region, it is essential to institutionalize ongoing training programs, establish inclusive feedback mechanisms, and ensure that access to irrigation-related inputs and resources is distributed equitably.

Gender and Equity Considerations

Gender disparities remain a persistent barrier to achieving equitable participation and empowerment within irrigation governance systems. Women are frequently constrained by heavy household workloads and cultural norms that marginalize them from leadership and decision-making roles in water user associations and irrigation committees (Tesafa, Mulugeta, & Tsehay, 2025). These systemic limitations not only hinder their involvement but also affect the overall inclusivity and effectiveness of irrigation governance. Studies have emphasized the

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importance of implementing gender-responsive policies within irrigation management frameworks, which have been shown to improve both participation outcomes and food security at the community level (Pascual et al., 2013; Rachmad, 2022). In order for NIA-assisted irrigation systems to become more inclusive, targeted interventions are necessary. These should focus on empowering women through access to education and training, increased representation in leadership roles, and equitable access to productive resources such as land, credit, and irrigation infrastructure.

System Performance and Sustainability

Active participation and the empowerment of farmer beneficiaries are closely linked to improved irrigation system outcomes. Studies show that when farmers are actively engaged, systems tend to function more efficiently, with enhanced water allocation, infrastructure maintenance, and overall reliability (Asthana, 2022; Tran, 2020). Empowered farmer groups also exhibit stronger organizational capabilities, which contribute to the long-term sustainability of irrigation activities and foster productive partnerships with external stakeholders (Pascual et al., 2013). Additionally, community-led feedback mechanisms, such as participatory monitoring and evaluation, enable irrigation systems to adapt more effectively to changing conditions and needs, increasing their resilience (Islam et al., 2023). These insights underscore the importance of fostering a collaborative relationship between farmer beneficiaries and the National Irrigation Administration (NIA), grounded in inclusive and participatory governance models, to achieve sustainable irrigation outcomes in the Davao Region.

CONCLUSION

This systematic review confirms that farmer participation and empowerment are deeply interconnected and mutually reinforcing. Evidence from multiple countries highlights that when farmers are actively engaged in irrigation governance, system performance, equity, and sustainability all improve. However, participation should extend beyond mere symbolic involvement. Real empowerment requires inclusive frameworks, capacity-building programs, gender-sensitive policies, and sustained institutional support. In the context of NIA-assisted irrigation systems in the Davao Region, addressing structural constraints and promoting participatory governance are essential for long-term irrigation success.

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