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RESEARCH

Gender Dynamics in Collective Efficacy Beliefs for Conservation Practices in Rural Tank Cascade Systems in Sri Lanka

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ABSTRACT

Understanding how gender dynamics influence collective efficacy beliefs is crucial for crafting effective and enduring conservation strategies to ensure the sustainability of common natural resource pools in agrarian regions of the developing world. This study explores the influence of gender on perceptions of collective action in the *Mahakanumulla* Tank Cascade System, offering unique insights into the socio-cultural aspects that shape conservation behavior in human-curated natural landscapes. A cross-sectional survey was conducted to collect data from 463 households dispersed across six village divisions. The survey focused on three dimensions of collective efficacy: individual self-efficacy, group efficacy in executing collective action, and the efficacy of collaboration in accomplishing shared goals. The study could reveal significant disparities between men and women in their perceptions of a community's potential to sustain collective action. Female respondents assessed their community's capacity to coordinate collective action as comparatively less adequate than their male counterparts. Moreover, there was a strong correlation ($p<0.05$) between land ownership and collective efficacy, as those who owned land demonstrated higher levels of confidence in their collective endeavors. These findings highlight the importance of adopting more gender-responsive solutions to effectively manage natural resource pools in traditional societies.

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INTRODUCTION

According to Bandura (1997), collective efficacy refers to the shared belief among community members that they must accomplish a shared objective effectively. Understanding this concept is essential for effectively administering conservation strategies for natural resources (Bandura, 1997). Furthermore, collective efficacy substantially impacts how individuals collectively consume, interact, and manage their resources. Prior studies have emphasized the beneficial influence of collective efficacy on active engagement in collective action, successful collaboration within the community to carry out tasks, and the effective application of conservation measures (Bandura, 2000; Bodin, 2017). The continued effectiveness of a natural resource system depends directly on the perception of communal efficacy in actively managing water resources, maintaining infrastructure, and addressing environmental challenges (Kekulandala, 2021). This highlights the substantial influence that collective efficacy beliefs could exhibit on a tank cascade system, not just as a theoretical framework but also as an effective functional strategy. The traditional farming systems in the Dry Zone of Sri Lanka are intricately linked to historic tank cascade systems through efficient and sustainable conservation practices of natural resources. A Tank Cascade System consists of a sequence of irrigation tanks and channels. The maintenance of these components of the system is crucial for both agriculture and biodiversity (Panabokke et al., 2002)

However, the impacts of collective efficacy on rural communities can vary inconsistently due to factors such as gender and other socio-demographic differences (Bailey, 2016). In rural Sri Lanka, there is a distinct disparity in the allocation of tasks, responsibilities, and levels of involvement in conservation operations between men and women. This could lead to diverse perspectives and contributions to collaborative conservation initiatives (Pandolfelli et al., 2017). Generally, women in families are primarily responsible for duties like weeding, cleaning bunds, and watering plants. In contrast, men in households are mostly involved in constructing and maintaining the irrigation infrastructure of the tank cascade system (Mencher, 2013). These jobs and obligations are flexible but interconnected with agreed norms over an extended period (Williams, 2001). The variations in engagement with conservation practices result in varying knowledge and skills and impact when making conservation decisions. Consequently, this impacts how men and women view and contribute to collective conservation efforts (James et al., 2023). Therefore, there is a significant possibility that gender diversification can substantially impact the effective practice and implementation of shared beliefs and the overall success of conservation activities (Agarwal, 2001).

Therefore, it is evident that the impact of gender differences on the perception of collective effectiveness beliefs is vital for the establishment and execution of sustainable conservation practices and policies. Meinzen-Dick et al. (2014) and Leisher et al. (2016) have found that conservation outcomes are improved when women actively participate in resource management. One possible explanation of this finding is that women frequently bring distinct viewpoints and objectives that enhance those of males (Meinzen-Dick et al., 2014; Leisher et al., 2016). However, achieving these objectives relies entirely on creating a favorable environment where both men and women may actively engage in decision-making processes concerning the conservation and management of resources. To foster the engagement of both men and women, it is essential to actively address the limits identified and cultivate a feeling of shared effectiveness. This requires the active involvement of both males and females (ESCAP, 2017).

To address gender dynamics in collective efficacy, this study focuses on the *Mahakanumulla* Tank Cascade System (MTC). A comprehensive examination of the gender dynamics in collective efficacy within the framework of conservation activities in MTC will yield valuable insights into the

capacities and constraints experienced by both men and women. Therefore, the objective of this study is to gain insight into and determine the influence of gender on collective efficacy beliefs in conservation measures, specifically focusing on agrarian communities in MTC. The results of this study would be beneficial for policymakers, practitioners, and other individuals who aim to enhance community participation and the sustainability of conservation programs by implementing gender-responsive practices (Agarwal, 2010; Caine, 2014). This research is highly relevant to the present circumstances as it addresses the increasing environmental difficulties rural communities face in Sri Lanka, including socio-economic advancements that threaten the sustainability of traditional conservation practices (Wickramasinghe et al., 2008).

METHODOLOGY

Study area

The research was conducted in the MTC, located within the Thirappane Divisional Secretariat in the Anuradhapura district (Figure 1). The MTC is a prominent tank cascade system that demonstrates how the residents of the tank cascade system interact with natural resources for water management through their conservation practices while also developing resilience within the system. Residents' engagement in conservation techniques associated with the cascade system improves agricultural yield and living standards which demonstrates the connection between the administration and conservation of natural resources and the community welfare that utilizes them (Perera, 2017; Sirimanna and Prasada, 2021).

Data were collected through simple random sampling from a sample of 463 households across six villages (GN) Grama Niladari divisions within the cascade: *Wellamudawa, Mahakanumulla, Sembukulama, Paindikulama, Walagambahuwa*, and *Indigahawewa*. The six GN divisions were purposively selected to represent the diverse socio-ecological conditions within the cascade system. Furthermore, the criteria used to choose these GN divisions were based on their proximity to the *Mahakanumulla* tank (The main tank within the MTC) and their involvement in the administration of communal water resources. The objective was to include divisions that differed in size, population, and reliance on the tank cascade system to gain a thorough understanding of collective efficacy beliefs across different community contexts.

The data collection approach involved a cross-sectional survey targeting adult participants within the selected GN divisions. The 463 surveyed households represented over 50% of the households in the six GN divisions (Table 1).

Informed consent was obtained from each respondent, ensuring they were fully aware of the study's purpose, procedures, and rights before participating. This process involved clearly explaining how their data would be used and securing their agreement to participate voluntarily. The sampling technique was designed to guarantee sufficient inclusion of male and female viewpoints in each division. The gender composition of the sample was meticulously recorded to enable a thorough examination of gender dynamics in collective efficacy beliefs.

Survey Instrument

The survey was designed to gather data on several facets of collective efficacy, specifically on beliefs about the communal administration of shared resources. These resources usually include water reservoirs, agricultural lands, and other essential infrastructure supporting the local population's livelihoods. The psychometric survey instrument was designed using knowledge from prior studies on collective efficacy, firsthand observations, and conversations with community members during the fieldwork phase (Table 2).

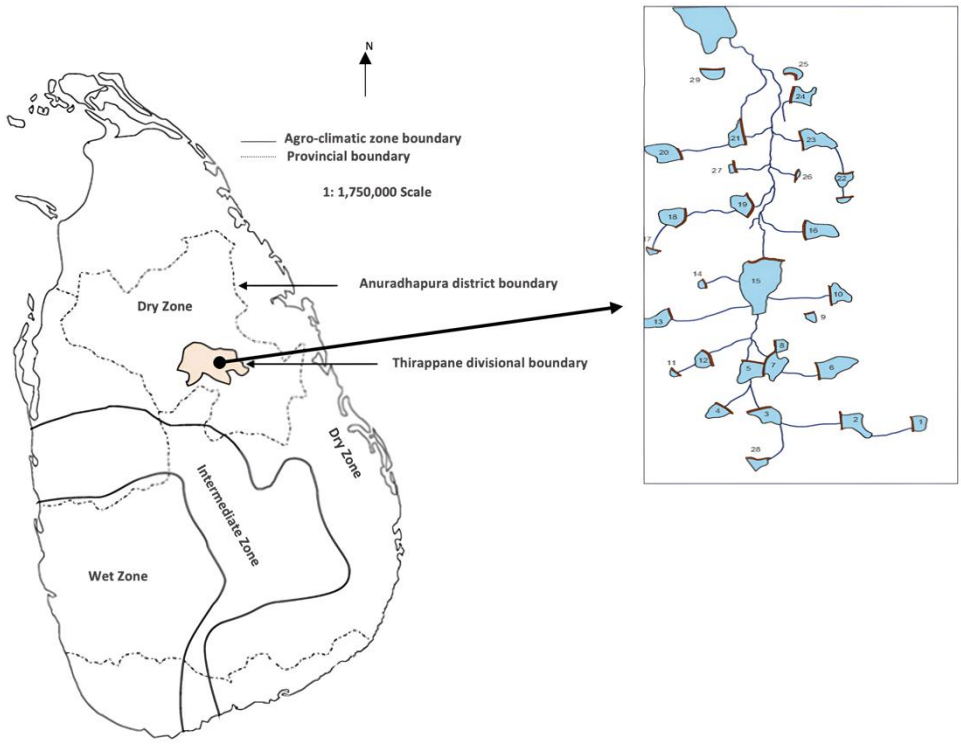

Figure 1: Location of the *Mahakanumulla* Cascade System (*Wijesundara* et al., 2014)[2]

Table 1: Gender composition in the sample

GN division	Distribution of households	Sample composition		
		Number of males	Number of females	Total
Wellamudawa	266	33	55	88
Mahakanumulla	156	22	30	52
Sembukulama	307	43	60	103
Indigahawewa	179	17	50	67
Paindikulama	263	34	59	93
Walagambahuwa	188	26	34	60

Survey Instrument

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The survey instrument had several components specifically formulated to evaluate the collective efficacy perceptions of community members. Each item represented a distinct belief associated with the collective management of shared resources within the concerned GN divisions. Participants were instructed to assess their degree of concurrence with each statement using a 5-point Likert scale from 1 (indicating strong disagreement) to 5 (indicating strong agreement).

[2] The map on the left shows the geographical positioning of the Mahakanumulla Tank Cascade System within the Anuradhapura District in Sri Lanka's Dry Zone. The larger inset map on the right provides a detailed view of the cascade system, indicating the arrangement of interconnected irrigation tanks (numbered 1 to 29) and associated waterways. Each numbered tank represents a distinct reservoir within the cascade, functioning as part of the traditional irrigation network used for agriculture and water management in the area. The arrows and flow paths indicate water connections between the tanks.

Table 2: Constructs of the collective efficacy beliefs scale

Construct item	Source
1. I can find enough time to be involved in common collective activities.	Bandura (1997, 2000), Roger et al. *(*2014)
2. I have a keenness and desire to participate in common collective activities.	
3. I receive support and encouragement from my family to participate in common collective activities.	
4. My neighbours, relatives, and friends (or those close to our family) push and encourage me to participate in common collective activities.	
5. I can make my own decisions to take part in common collective activities.	
6. Since I have prior experience involved in collective action, it is not difficult for me to participate in common cooperative activities.	
7. My community (group) members expect my participation in common collective activities.	Bandura (2000), Carrol et al. (2005), Riggs and knight (1994), Sampson et al. (1997), Zaccaro et al. (1995)
8. There is a good level of mutual trust among the members of my community to implement common collective activities.	
9. There are members in our community who can provide leadership to implement common collective activities.	
10. We have enough workforce in our community to accomplish common collective activities.	
11. We can collaborate for common collective activities by ignoring personal disagreements with each other in the community.	
12. By participating in common collective activities, we will be able to do agricultural activities better.	Carrol et al. (2005), Riggs and knight (1994), Sampson et al. (1997), Zaccaro et al. (1995)
13. My participation in common collective activities will strengthen my relationship with the other members of my community.	
14. Common collective activities will help my community to achieve significant economic development.	
15. Common collective activities will promote and enhance harmony within the community.	
16. By participating in common collective activities, I will create a suitable environment for my children and for other children in my community to live in.	

Data analysis

The data analysis was performed using IBM SPSS version 19 and IBM AMOS version 26. The descriptive statistics were generated to comprehend the overall distribution of responses and the demographic attributes of the sample. Initially, an Exploratory Factor Analysis (EFA) was employed to determine the underlying factor structure of the collective efficacy items. EFA helped identify the latent constructs representing different dimensions of collective efficacy beliefs and provided insights into the dimensionality within the study population.

The factor extraction was performed using principal axis factoring with varimax rotation, a technique selected to optimize the comprehensibility of the factor loadings. The criteria for factor retention consisted of eigenvalues exceeding one and the scree plot, supported by theoretical considerations regarding the nature of collective efficacy in the study context. Items with low factor loadings or significant cross-loadings were carefully examined to determine whether they should be removed or modified.

Upon performing the Exploratory Factor Analysis (EFA), a Confirmatory Factor Analysis (CFA) was performed using maximum likelihood estimation. The objective of the CFA was to confirm the factor structure established in the EFA and evaluate the suitability of the measurement model for the data. Key fit indices, including the Comparative Fit Index (CFI), Goodness of Fit indices (GOF), and Root Mean Square Error of Approximation (RMSEA), were employed to assess the adequacy of the model.

Given that the primary aim was to examine the relationship between gender and the identified constructs of collective efficacy, the study did not extend to a full Structural Equation Modeling (SEM) path analysis, as SEM is typically used for testing complex models with multiple interrelated constructs. Instead, logistic regression modeling was undertaken to investigate gender dynamics in collective efficacy views. The analyses investigated the correlation between gender and several aspects of collective efficacy. The study also considered potential confounding variables, including age, education level, ownership and extent of farming lands, and household size. This approach examined whether gender was significantly associated with different aspects of collective efficacy while controlling for these covariates.
Aside from the regression analysis, independent sample t-tests were utilized to identify noteworthy disparities in collective efficacy views between male and female participants. This method facilitated a direct evaluation of average scores across different gender categories, aiding in identifying certain domains where gender disparities were most prominent.

RESULTS AND DISCUSSION

Demographic characteristics

According to the study, the majority of respondents (62.2%) were female. This gender distribution reflects the daytime survey schedule, as many males were absent due to work obligations. Including female respondents is particularly important, as women in these areas play significant roles in family decision-making and irrigation management. Their involvement aligns with existing literature, emphasizing women's substantial impact in community-based resource management (Agarwal, 2001; Meinzen-Dick et al., 2014).

The age distribution varied significantly across genders (Table 3). On average, male respondents were older (50.1 ± 14.5 years) compared to females (47.4 ± 14.7 years), with the majority (52% of men) aged between 46-65 years, while a higher proportion of women (41.7%) were aged between 25-45 years. This age variance may influence engagement in conservation activities, as older individuals may face physical limitations, whereas younger women could be more actively involved in community activities.

Regarding household structure, both male and female respondents reported similar family sizes, with an average of approximately 3.5 members per household. However, female households often showed different dynamics; for example, widows and unmarried women comprised female-headed households, which may affect participation in communal roles and decision-making processes.

Education levels varied between genders, with 44% of males and 40.6% of females completing the General Certificate of Education Ordinary Level (GCE O/L). Women were more likely to have higher levels of education (21.9% vs. 14.3% for GCE A/L), which aligns with findings that indicate the significance of education in enhancing women's perceived self-efficacy and involvement in community management (Chhetri et al., 2016; Pham et al., 2019).

Occupational data showed that 57.1% of male respondents were involved in farming, while 51.4% of female respondents reported no formal occupation despite their significant roles in household farming. This disparity suggests that the informal labor contributions by women may be underreported or undervalued, impacting how their roles in resource management are perceived. Literature on gender and labor indicates that women’s work in rural areas often goes unrecognized, leading to an underestimation of their economic roles and influence in

natural resource management (Cleaver, 2018; Lastarria-Cornhiel, 2006). Recognizing informal labor contributions is crucial for developing gender-inclusive policies supporting women's active roles in community resource management.

Land ownership was higher among males, with an average landholding of 2.8 ha compared to 2.1 ha for females. Male respondents also tended to own larger parcels of land (>5 ha), whereas women were more likely to be small landholders (<2 ha). This difference in land ownership can influence engagement in collective activities, as those with larger landholdings may have a stronger vested interest in resource management initiatives (Ostrom, 1990).

Efforts were made to ensure that participants actively involved in conservation activities were surveyed, but the sample did include some retired individuals or those not actively participating in conservation practices. Their inclusion provides a broader perspective on community beliefs about collective efficacy but may also affect the generalization of findings related to active engagement.

Collective efficacy beliefs

The study assessed collective efficacy using three separate constructs: individual self-efficacy in collective action, the group's efficacy in conducting collective action, and the efficacy of cooperation in attaining common objectives. All three latent constructs in the measuring model had Cronbach's alpha values that surpassed the threshold of 0.7. The pooled Confirmatory Factor Analysis findings confirmed the validity and reliability of the hypothesized measurement model. All standardized factor loadings were above 0.65 and were statistically significant, indicating that they surpassed the threshold level of 0.5 (Wolfinbarger and Gilly, 2003). The values used to estimate the model's Construct Reliability (CR) were above the threshold level of 0.7, as defined by Nunnally and Bernstein (1994). The AVE value estimates above the threshold level of 0.5 (Hair et al., 2010) proved the convergent validity (Table 4).

Table 3: Sample characteristics of the respondents

Variable	Category	Percentage %		
		Male	**Female**	**All**
Level of education	0 – 5 years	5.1	6.3	5.8
	5 – 10 years	33.1	29.5	30.9
	G.C.E O/L	44.0	40.6	41.9
	G.C.E A/L	14.3	21.9	19
	Diploma/Degree	3.4	1.9	2.4
Main occupation	None	12.6	51.4	36.7
	Farming	57.1	36.1	44.1
	Government sector	9.7	2.4	5.2
	Private sector	6.9	2.4	4.1
	Self-employing (Entrepreneur)	13.7	7.6	9.9
Age distribution	Age below 25 years	13.1	11.5	12.1
	Age between 25-45 years	29.1	41.7	36.9
	Age between 46-65 years	52.0	41.3	45.4
	Age above 65 years	5.7	5.6	5.6
Household size	< 5 members	24.6	20.8	22.8
	> 5 members	75.4	79.2	78.2
Farming land Size	Small landholders (<2 ha)	60.0	41.7	45.1
	Medium landholders (2 – 5 ha)	0.0	0.0	48.6
	Larger landholders (>5 ha)	40.0	58.3	51.4

Table 4: Construct validity and reliability of the measurement model[3]

Construct ***Scale item***	**λ**	**Item mean**	**SD**
Iindividual self-efficacy in collective action			
CM: 3.989 (SD: 0.093), α: 0.887, CR: 0.888, AVE: 0.570			
1. I can find enough time to involve in common collective activities.	0.697***	3.97	0.946
2. I have keenness and desire to participate in common collective activities.	0.762***	4.17	0.781
3. I receive support and encouragement from my family to participate in common collective activities.	0.732***	3.97	0.870
4. My neighbours, relations and friends (or those who are close to our family) push and encourage me to take part in common collective activities.	0.777***	3.95	0.798
5. Since I have prior experience involved in collective action, It is not difficult for me to take part in common collective activities.	0.761***	3.97	0.859
6. My community (group) members expect my participation in common collective activities.	0.798***	3.90	0.957
Group's efficacy in conducting collective action			
CM: 4.089 (SD: 0.061), α: 0.796, CR: 0.797, AVE: 0.567			
1. There is a good level of mutual trust among the members of my community to implement common collective activities.	0.728***	4.05	0.753
2. There are members in our community who can provide leadership to implement common collective activities.	0.785***	4.06	0.824
3. We have enough manpower in our community to accomplish common collective activities.	0.833***	4.16	0.775
Efficacy of cooperation in attaining common objectives			
CM: 4.232 (SD: 0.015), α: 0.895, CR: 0.895, AVE: 0.681			
1. My participation in common collective activities will strengthen my relationship with the other members of my community.	0.784***	4.22	0.742
2. Common collective activities will help my community to achieve a significant economic development.	0.848***	4.22	0.778
3. Common collective activities will promote and enhance harmony within the community.	0.833***	4.25	0.752
4. By participating in common collective activities, I will be able to contribute in creating a good environment for my children and for other's children in my community to live in.	0.835***	4.24	0.804

The model's Discriminant Validity was determined using the methodology of Fornell and Larcker (1981). The square root of the average values (AVE) exhibited higher magnitudes than the inter-factor correlations (Table 5). The model met the requirements for goodness of fit (GOF) indices, with an RMSEA value of 0.06 and a CFI value of 0.96. The psychometric scale created to assess collective efficacy beliefs successfully fulfilled all the validity criteria.

[3] λ: factor loadings (***significant at p=0.001 because these variables were set to 1.0 to control construct variance, p values were not calculated), CM: construct mean, α: Cronbach's alpha, CR: composite reliability, AVE: average variance extracted

The average score of individual self-efficacy in collective action was 3.989±0.093, indicating that respondents usually had a high confidence level in their capacity to contribute to collective activities. This moderately high degree of self-efficacy indicates individuals' inclination to manage shared resources actively. Bandura's (1986) research highlights the significant impact of self-efficacy on an individual's motivation and persistence in collaborative endeavors, especially in group contexts where success relies on properly coordinated action. Furthermore, empirical research conducted in comparable community-based resource management settings emphasizes the significance of self-efficacy in forecasting active involvement. An investigation conducted in Nepal on community forestry revealed a favorable correlation between increased levels of self-efficacy among villagers and higher rates of involvement in forest management activities (Chhetri et al., 2016). Pham et al. (2019) found similar results in irrigation systems, highlighting the importance of individual views of self-efficacy in coordinated water resource management.

The respondents strongly believed in the group's efficacy to be involved in collective action, as shown by a mean score of 4.089±0.061. This finding demonstrates significant trust and unity within the social group. The high level of organizational efficacy also indicates that the community has a firmly formed social structure that facilitates coordinated endeavors. The sustainable management of shared water resources in the traditional irrigation systems of Tamil Nadu, India, is significantly influenced by collective efficacy, especially when the community has well-defined leadership and common objectives (Sakurai and Palanisami, 2001). Within the *Mahakanumulla* tank cascade system, local governance structures like Vel Vidane and local farmer organizations (FOs) have effectively integrated irrigation and conservation initiatives. In addition to facilitating resource allocation, these institutions also create trust, promoting high levels of collective efficacy. Furthermore, Jayasuriya et al. *(2017*) emphasize that communities with a well-established tradition of collective water management generally exhibit greater organizational effectiveness, especially when confronted with environmental stressors. The respondents' trust in their collective activity in the Mahakanumulla system is probably derived from shared previous experiences, such as collaborative endeavors in tank restoration and seasonal water distribution planning.

The mean score of 4.232±0.015 indicates a strong belief in the efficacy of collaboration in achieving shared goals. The high conviction in the results of collaborative endeavors is a promising sign for the long-term viability of resource management techniques in the MTCs. The statement implies that previous achievements in group efforts have strengthened the community's belief in collaborating towards shared goals. This is consistent with the results of earlier research, which have shown that when collective activities are successful, they result in increased community involvement and the adoption of more sustainable resource management strategies (Wade, 1988; Ostrom, 1990).

Table 5: Discriminant validity index summary[4]

Collective efficacy construct	**(1)**	**(2)**	**(3)**
Group's efficacy in conducting collective action **(1)**	***0.753***		
Efficacy of cooperation in attaining common objectives **(2)**	0.714	***0.825***	
Individual self-efficacy in collective action **(3)**	0.710	0.704	***0.755***

[4] The diagonal values (in italics) are the square root of AVE of each respective construct, and the other values are the correlation between the respective constructs.

Gender and collective efficacy in conservation practices

A t-test was conducted to compare the collective efficacy scores of male and female respondents. The t-test results for the group's efficacy in performing collective action showed a statistically significant difference in mean scores between males and females ($p<0.05$). In contrast, individual self-efficacy in collective action ($p=0.06$) and the efficacy of cooperation in attaining common objectives ($p=0.48$) were not significantly different ($p<0.05$). Male participants achieved considerably higher scores than female participants, with a mean difference of 0.334 ($p<0.05$). This outcome is consistent with the regression analysis, highlighting that gender disparities are especially noticeable in perceptions of the group's effectiveness in the community ($p<0.05$).

The findings suggest that male respondents tend to have a more positive perception of their community's ability to organize collective action than female respondents ($p<0.05$). The gender discrepancy may result from broader societal roles and conventions that impact women's engagement and how they perceive their participation in communal endeavors (Lind, 1997). The prevailing gender conventions often limit women to the household, therefore constraining their participation in decision-making processes at the community level (Cleaver, 2000; Cornwall, 2003). Furthermore, women may encounter structural obstacles, such as time limitations caused by household responsibilities, restricted availability of essential resources, and reduced mobility, which impact their perceived effectiveness in engaging in collective action (Meinzen-Dick et al., 2014; Westermann et al., 2005). Research indicates that the contributions made by women to the administration of community resources are often underestimated, which can lead to a less favorable view of their involvement in these activities (Molinas, 1998; Agarwal, 2010). The underrepresentation of women in leadership roles can further perpetuate the perception that collective efforts are male-dominated, thus reinforcing gender inequalities within community resource management (Colfer and Minarchek, 2013).

Resolving these disparities in perception is essential for enhancing the inclusiveness and effectiveness of communal resource management initiatives. Facilitating equal chances for women to engage and acknowledging their contributions can enhance local initiatives' effectiveness and long-term viability (Coleman and Mwangi, 2013; Arora-Jonsson, 2014). Studies suggest actively involving women in leadership roles within community-based natural resource management improves governance outcomes and enhances resource use's sustainability (Agarwal, 2001; Meinzen-Dick et al., 1997).

Logistic regression modeling was employed to investigate the association between gender and each of the three collective efficacy dimensions (Table 6) ($p<0.05$). The results indicate that gender slightly impacted individual self-efficacy in collective action ($B=1.628$, $p=0.069$). Women reported a greater perception of their ability to contribute to collective action than males; however, this effect was not statistically significant. Nevertheless, the correlation between gender and education substantially influenced individual self-efficacy ($B = 0.335$, $p = 0.005$), indicating that education enhances women's perceived self-efficacy compared to males ($p<0.05$). The results are consistent with previous research indicating that higher levels of education enable women to confidently and effectively participate in decision-making processes (Agarwal, 2001). Women who have attained higher levels of education may experience greater empowerment in their ability to participate in collective action. This is because education increases their understanding of social structures and resource management practices (McDougall et al., 2013). Research on community forestry has shown that educated women are more likely to participate in group decision-making and resource management, thus increasing their perceived self-efficacy (Chhetri et al., 2016; Pham et al., 2019). The correlation between gender and education highlights the crucial influence of education on the formation of personal self-perceptions of effectiveness, especially for women residing in rural areas.

Table 6: Gender and other moderate variables affecting the collective efficacy of conservation practices[5]

Variable		Individual self-efficacy in collective action				Group's efficacy in conducting collective action				Efficacy of cooperation in attaining common objectives			
		B	Exp (B)	Wald	Sig.	B	Exp (B)	Wald	Sig.	B	Exp (B)	Wald	Sig.
Gender		1.628	5.094	5.537	0.069	-0.659	1.933	0.915	0.039	-0.681	0.506	0.946	0.331
Age		-0.003	0.997	0.079	0.779	-0.004	0.996	0.097	0.756	-0.001	1.002	0.066	0.958
Education level		-0.482	0.618	6.055	0.014	0.180	1.197	0.848	0.357	0.518	1.679	6.818	0.009
Occupation		-0.151	0.860	1.276	0.259	-0.175	0.839	1.722	0.189	-0.125	0.882	0.851	0.356
Number of family members		-0.002	0.998	0.000	0.986	0.039	1.040	0.106	0.745	0.115	1.122	0.893	0.345
Household income level		0.025	1.025	0.66	0.417	0.000	1.000	0.229	0.632	0.000	1.000	1.237	0.266
Gender*age		0.004	1.004	0.26	0.61	0.004	1.004	0.316	0.574	0.002	1.002	0.066	0.798
Gender*education		0.335	1.398	7.941	0.005	-0.061	0.941	0.269	0.604	0.272	1.313	5.134	0.023
Gender*occupation		0.136	1.146	2.862	0.091	0.120	1.127	2.233	0.135	0.098	1.103	1.442	0.230
Gender* income		0.000	1.000	0.027	0.869	0.001	1.001	0.180	0.672	0.000	1.000	0.935	0.334
Model Summaries	Significant	0.007				0.349				0.141			
	df	16				16				16			
	Chi-Square	33.264				17.582				22.060			
	Predicting percentage	78%				60.7%				60%			
	-2 Log likelihood	597.660				606.058				616.834			
	n	463				463				463			

[5] Results were interpreted using a significance level of $p < 0.05$.

Perceptions of the group's effectiveness in carrying out collective action are strongly influenced by gender (B=-0.659, p=0.039). The opinion of women regarding the group's collective action capacity is notably lower than that of men, suggesting that gender dynamics within these communities may limit women's participation in, or their experiences of, group-based activities ($p<0.05$). This discovery corroborates previous studies suggesting that women in patriarchal rural areas often have restricted opportunities to assume leadership positions within collective action organizations, impacting their views of the group's effectiveness (Westermann et al., 2005). Kabeer (1999) emphasizes that social norms prioritizing male leadership can marginalize women, diminishing their perceived efficacy in collective endeavors.

The presence of gender hierarchies and social norms in these societies can impede women's involvement in decision-making processes and influence their diminished assessment of group effectiveness. It is essential to tackle these inequalities to promote more inclusive and efficient community-led conservation initiatives. Addressing gender disparities through policies that promote women's participation in decision-making and leadership can improve the sustainability of community-based natural resource management (Agarwal, 2009; Leisher et al., 2016).

Although gender did not significantly correlate ($p<0.05$) with the effectiveness of cooperation in achieving shared goals (B=-0.681, p=0.331), the potential interaction between gender and education was statistically significant (B=0.272, p=0.023). These findings indicate that although women may not have a fundamentally different impression of cooperation effectiveness compared to males, greater education moderates women's views of the group's collaborative endeavors. This phenomenon may be attributed to higher education's enhanced availability of resources and social connections, empowering women to participate more actively in cooperative endeavors (Agarwal, 2009). Educated women likely experience greater empowerment to actively engage in and make valuable contributions towards attaining shared objectives. This highlights the significance of educational opportunities in cultivating favorable attitudes towards collaboration in conservation activities. The findings are consistent with Bandura's (2000) hypothesis, highlighting that those with greater self-efficacy are more inclined to view cooperative endeavors as successful. Therefore, improving educational opportunities for women could serve as a crucial means to enhance their expectations and involvement in joint conservation operations. This is supported by findings from other community-based settings, where higher education levels among women are associated with increased participation in cooperative activities and improved conservation outcomes (Giri and Darnhofer, 2010; Nilsson et al., 2016).

CONCLUSION

This study has yielded significant insights into the gender dynamics that impact collective efficacy beliefs in the *Mahakanumulla* Tank Cascade System (MTC) in rural Sri Lanka. The study emphasizes the pivotal influence of gender in defining the way people recognize collective activity, especially in the context of conservation practices. The results suggest that male and female participants typically have strong views of collective efficacy. However, notable gender variations are observed, particularly in the group's collective action efficacy.

The findings indicate that female participants generally perceive their community's capacity to coordinate collective endeavors less positively than their male counterparts. This implies that adherence to traditional gender roles and societal standards may restrict women's ability to actively engage and exert influence inside community frameworks, ultimately impacting their self-assurance in the group's overall effectiveness. Furthermore, the study emphasizes the key role of education in regulating gender disparities in collective efficacy views. Higher levels of education among women were associated with increased confidence in their capacity to engage in collective action and a perception of collaboration as more efficacious in attaining common objectives.

These findings emphasize the need to establish educational and capacity-building opportunities for women to increase their involvement in conservation activities. Providing skills and confidence to women enables their active involvement in collective conservation endeavors, facilitating more equitable and efficient management of natural resources within communities.

It is crucial to tackle these gender gaps to ensure the success of conservation projects and the sustainable management of natural resources. The study emphasizes the necessity of implementing gender-responsive techniques that actively engage males and females in decision-making processes and community activities. Communities can improve the effectiveness and sustainability of their conservation practices by creating an inclusive atmosphere that allows both genders to engage equally and benefit from collaborative initiatives. Given the substantial gender differences seen in evaluations of group effectiveness, policymakers must establish opportunities for women to engage in community leadership positions. Advancement of gender-inclusive governance frameworks can improve the efficiency of collective action, as demonstrated in various community-based resource management contexts.

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