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ORIGINAL RESEARCH ARTICLE



Determinants and perceptions of women's participation in community forest management: Evidence from Western Nepal

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ABSTRACT

Community forestry in Nepal has significantly contributed to forest restoration, livelihood enhancement, and local governance since its initiation in the late 1970s. Despite policy mandates for gender inclusion, women's effective participation in community forest management remains limited. This study examined the demographic and socio-economic determinants of women's participation and their perceptions of community forest management in Manakamana Community Forest of Western Nepal. Data were collected from 82 randomly selected women community forest users using household surveys, supplemented by key informant interviews and focus group discussions. Binary logistic regression was employed to identify predictors of participation, while perceptions were assessed using a Likert scale. Results revealed that out of 10 independent predictors studied age, years of schooling, executive committee membership, and proximity to the Community Forest Office were significant predictors of participation, explaining 53.4% of the variance. Education had the strongest effect, with the probability of participation increasing from less than 5% among uneducated women to more than 90% among those with secondary education or higher. Similarly, old-aged women and women from households with executive committee representation were nearly twice as likely to participate compared to others, while distance to the community forest office posed a strong spatial barrier. Perception analysis showed that women were highly involved in labor-intensive tasks such as plantation programs and forest product collection but were excluded from strategic roles including operational plan preparation, fund mobilization, and monitoring. The study highlights a persistent gap between women's representation and actual influence in community forestry governance.

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INTRODUCTION

Community forestry (CF) refers to institutional arrangements in which local communities hold partial or full authority to manage, utilize, and benefit from nearby forest resources. It is rooted in the premise that communities living closest to forests possess strong incentives, experiences, and contextual knowledge to manage resources sustainably when they have secure rights and decision-making power (Charnley & Poe, 2007; Baynes *et al.*,

2015; Oli *et al.*, 2016). Emerging largely as a response to the shortcomings of centralized, state-led forest governance during the 1970s and 1980s, CF has increasingly evolved into a critical strategy for improving forest conditions, strengthening livelihoods, and enhancing local institutions (Gilmour, 2016). Globally, CF has become a significant model for forest governance. FAO's FRA 2025 reports that total global forest area is 4.14 billion ha of which more than 732 million ha of forest (occupying about 28% of the world's forest area), across 62

countries are now under some form of community-based management (FAO, 2016, 2025; Maraseni *et al.*, 2019). In developing nations alone, over half a billion people rely on community-managed forests for subsistence, income, and cultural identity (FAO, 2016; Aryal *et al.*, 2020). As a result, expanding the scale and effectiveness of CF remains an essential element of international restoration and climate strategies, particularly in Asia, Africa, and Latin America. Evidence from around the world demonstrates that CF can provide multiple ecological, economic, and social benefits. Ecologically, CF has been shown to improve forest condition, reduce deforestation rates, support biodiversity, and contribute to landscape restoration, often performing equal to or better than protected forest regimes (Aryal *et al.*, 2020; Sapkota *et al.*, 2020). CF institutions facilitate active protection, controlled extraction, and local monitoring, which collectively enhance forest biomass and ecosystem health (Maraseni *et al.*, 2019).

Economically and socially, CF helps diversify rural livelihoods through forest-based enterprises, non-timber forest product (NTFP) harvesting, employment, and market participation. It reduces reliance on external timber and fuelwood sources, stabilizes rural incomes, and strengthens community institutions and local governance systems (Charnley & Poe, 2007; Pokharel *et al.*, 2007). CF is also credited with promoting democratic participation by enabling local people to engage in rule-making, leadership selection, oversight of benefit distribution, and resolution of disputes. As such, it helps increase transparency, accountability, and social equity (Pokharel *et al.*, 2007; Wagle *et al.*, 2017). More recently, community forestry has been embraced as a means to address broader global challenges including poverty reduction, gender and social inclusion, climate change mitigation, and the Sustainable Development Goals (SDGs) (FAO, 2016; Oli *et al.*, 2016; Aryal *et al.*, 2020). With global initiatives such as REDD+ and ecosystem-based adaptation strategies, CF has become a key approach to aligning local livelihood aspirations with national and global environmental objectives.

Community forestry (CF) in Nepal has been a cornerstone of forest management since the late 1970s, empowering local communities to protect, utilize, and manage forest resources. As of 2021, more than 1.7 million hectares of forest are under community management (MoFE, 2021). In total, 2,490,194 ha of forest has managed by 23,682 Community Forest User Groups (CFUGs) involving 30,88,259, households (MoFE, 2021). CF has been credited with improving forest conditions, enhancing rural livelihoods, and strengthening local institutions (Pokharel *et al.*, 2007; Baral *et al.*, 2019; Ojha *et al.*, 2023; Magar *et al.*, 2025). However, despite of success of community forestry being built on community participation, women's involvement in decision-making within CF has consistently remained limited (Chhetri *et al.*, 2013; Wagle *et al.*, 2017). Women are the primary collectors of fuelwood, fodder, and non-timber forest products (Shiva, 1989; Agarwal, 2009; Devkota *et al.*, 2025) and thus hold critical experiential knowledge about forest resources. Studies across South Asia affirm this importance, noting that women's knowledge and labor contributions are indispensable to forest

use and management (Agarwal, 2009; Mai *et al.*, 2011; Dahal *et al.*, 2025). Yet, their contributions remain undervalued, and their participation in governance and decision-making is often constrained by patriarchal norms, limited access to information, unequal literacy, and rigid gender roles (Agarwal, 2001; Subedi & Timilsina, 2016; Ghimire *et al.*, 2022).

Nepal's community forestry policies explicitly promote gender equity and social inclusion, mandating proportional representation of women in CFUG executive committees and encouraging their involvement in decision-making processes. The Community Forestry Development Guidelines (2014) require at least 50% of executive committee members to be women, with either the chairperson or secretary position held by a woman (MoFE, 2014). The Forest Act (2019) and the Forest Sector Gender and Social Inclusion Strategy (2012) further emphasize enhancing women's leadership, access to information, and decision-making authority (MFSC, 2012). These provisions align with Nepal's constitutional commitments to equality and with international frameworks such as Principle 20 of the Rio Declaration (1992) and Sustainable Development Goals 5 and 15, which advocate for gender equality and sustainable forest management (UNCED, 2015). Despite these progressive policy commitments, women's participation particularly in strategic decision-making and operational activities remains limited (Chhetri *et al.*, 2013; Wagle *et al.*, 2017; Sapkota *et al.*, 2020). Even with legal quotas, women often lack confidence, training, and mobility to assert their views (Baral *et al.*, 2024). The lack of recognized role of women in public forums, limited access to information and norms of silence results in the exclusion of women's participation (Agarwal, 2009). Even when women hold executive committee positions, they are taken as "token representatives", without real authority despite their physical presence in the decision-making bodies of CFUGs (Agarwal, 2001; Buchy & Subba, 2003; Lama *et al.*, 2017).

In South Asia, men and women's roles are socially, culturally, and biologically defined within specific tasks and boundaries. Lama *et al.* (2017) found that although women often hold executive positions, their roles are frequently symbolic, with men retaining control over major decisions. Wagle *et al.* (2017) likewise noted that institutional arrangements perpetuate male dominance, while Subedi & Timilsina (2016) showed that factors such as education and age influence women's involvement, highlighting persistent structural barriers to effective participation. Similar patterns of limited effective women's participation have been documented in other South Asian countries. In India, Agarwal (2009) found women's attendance at forest user group meetings rarely led to decision-making roles, limited by social norms, gendered labor divisions, and male-dominated leadership. In Bangladesh, Salam *et al.* (2005) reported women's participation was largely confined to labor tasks, with men controlling management decisions. In Sri Lanka, Ekanayake *et al.* (2021) noted that despite gender equality commitments, women's influence over resource use was hindered by inadequate training, restricted mobility, and underrepresentation in key committees. These studies indicate that structural barriers ranging from cultural

norms to institutional biases continue to limit women's influence in decision-making, even where their numerical representation is high.

Although several studies have examined women's roles in CF management, much of the existing work is descriptive, focusing on attendance rates or nominal representation rather than identifying the specific demographic and socio-economic determinants of active women's participation (Subedi & Timilsina, 2016; Khadka et al., 2021). Few have employed inferential statistical models to quantify how predictor variables such as age, education, household resources, or proximity to the forest influence women's engagement in both operational and decision-making activities. This lack of analytical depth limits the ability to design evidence-based strategies to address gender disparities in CF governance. The study addresses this gap by investigating the factors influencing women's involvement in the CFUG decision making and operational activities as well as their perceptions of specific management practices. By identifying both determinants and women's perspectives on CF management, this research aims to inform targeted interventions such as capacity-building programs, inclusive governance mechanisms, and improved access to resources that can strengthen women's roles in community forest management (MFSC, 2012; MoFE, 2014). By providing empirical evidence, this study seeks to deepen understanding of gender dynamics in community forestry and to support the development of policies that promote both equitable participation and sustainable forest governance in Nepal (UNCED, 1992).

MATERIALS AND METHODS

Study area

This study was conducted in the Manakamana Community Forest, located in wards 6 and 7 of Kawasoti Municipality, Nawalparasi (East of Bardaghat Susta), Nepal. According to CBS (2021), the municipality covers 108.3 km² and had a population of 86,821, of which 53.3% (40,523) were female. The literacy rate was 84.8% (male: 90.6%, female: 79.66%). The Manakamana CF was established in 2052 B.S. (1995 A.D) and covers 97.76 ha area with 903 household users, 455 of whom are women. The total CF population was 4,847 (2,470 females and 2,377 male). The executive committee comprised 11 members (6 women, 5 men). Manakamana CF was purposively selected for its relatively high proportion of women in the executive committee (6 of 11), offering a unique case to examine the gap between representation and actual influence. Preliminary discussions with local stakeholders revealed that women's voices in decision-making remain limited despite this representation. The CF's long management history since 2052 B.S., socio-cultural diversity, and accessible location with reliable member records further made it suitable for assessing how demographic and social factors shape women's participation.

Data collection

Fieldwork for this study was conducted between June and July

2023 using both primary and secondary data sources. Primary data were gathered through structured household surveys aimed at collecting information on respondents' socio-demographic and economic characteristics, their roles in various community forestry activities, and their perceptions of participation. Key informant interviews with CFUG leaders and DFO officials were conducted to gain deeper insights into governance structures, decision-making processes, and the barriers faced by women. Group discussions were also used to validate survey findings and capture diverse perspectives. Secondary data, including membership records, operational plans, and relevant reports, were obtained from the CFUG office, DFO, and published literature to provide contextual background and verify primary data. A two-stage sampling method was applied. In the first stage, Manakamana CF was purposively selected and in the second stage, simple random sampling was conducted using the list of 455 registered women members as the sampling frame. The required sample size was calculated using Yamane's formula (Yamane, 1973) with a 10% margin of error, resulting in 82 respondents. For analysis, women's participation in CF management was measured as a binary variable, with "active participation" (coded as 1) defined as engagement in at least one decision-making activity (operational plan preparation, rulemaking, monitoring, or fund allocation) or one operational activity (plantation programs, silvicultural operations, or forest product collection). Respondents who reported no involvement in these activities were classified as "non-participating" (coded as 0).

Data analysis

Descriptive statistics (mean, standard deviation, frequency, percentage) were first used to summarize the socio-demographic and economic characteristics of respondents, as well as their perceptions of participation in community forestry management activities. To identify the demographic and socio-economic determinants of women's participation, binary logistic regression was employed. A binary logistic regression model was estimated because it is appropriate for dichotomous outcomes and can handle both continuous and categorical predictors (Gujarati, 2004; Hosmer et al., 2013). The dependent variable was participation status (1 = active participation in at least one decision-making or operational activity; 0 = no participation), while independent variables included age, years of schooling, caste, livestock holdings (converted to LSU following Otte & Chilonda, 2002), landholding size, primary occupation, household income, household size, executive committee membership, and distance from home to the CF office. Model fit was assessed using the likelihood ratio chi-square test and Pseudo R² (McFadden, 1974). Statistical significance was evaluated at the 1%, 5%, and 10% levels. To aid interpretation of significant predictors, average marginal effects were computed and plotted to show changes in the predicted probability of participation across values of key explanatory variables. Marginal effect plots were generated in Stata 14.2, with 95% confidence intervals displayed.

Table 1. Description of the independent predictors used in the study.

Variable name	Description	Type	Literature source	Expected relationship*
Age	Respondent's age in years	Continuous	Subedi & Timilsina (2016)	+
Years of schooling	Total years of formal education completed	Continuous	Engida & Mengistu (2013)	+
Caste	Caste category (1 = Brahmin, 0 = others)	Binary	Chhetri et al. (2013)	±
Livestock unit total (LSU)	Total livestock owned, standardized to LSU**	Continuous	Lise (2000)	+
Landholding (katha)	Total land owned by household	Continuous	Salam et al. (2005)	-
Primary occupation	Primary income source (1 = agriculture, 0 = other)	Binary	Khadka et al. (2021)	+
Household income	Total annual household income (NPR in lakhs)	Continuous	Subedi & Timilsina (2016)	±
Household size	Total number of household members	Continuous	Osei-Fosu (2017)	-
Executive committee membership	Whether any household member is on the CFUG executive committee (1 = yes, 0 = no)	Binary	Lama et al. (2017)	+
Distance to CF office	Distance in kilometers	Continuous	Alhassan (2010)	-

*Expected relationship (+, - or ±) based on prior literature; **Livestock units converted following Otte & Chilonda (2002): 1 LSU = 1 buffalo = 1.2 cows = 4 goats = 5 sheep = 4 pigs = 2 calves.

Description of independent predictors

Previous studies in Nepal and other South Asian contexts have shown that demographic and socio-economic characteristics like household size, education level, age, caste, livestock ownership, landholding, occupation, income, and proximity to forest resources can significantly influence participation in community forest (CF) management activities. Drawing from those literatures, the present study included ten independent variables to examine their relationship with women's participation in CF management with expected signs for each relationship based on theoretical and empirical evidence. These variables captured both demographic attributes (age, education, caste) and household-level characteristics (e.g., landholding, income, household size) as well as institutional and geographic factors (executive committee membership, distance to CF office) (Table 1).

Perception of women in CF management

In addition to socio-demographic and economic variables, women's perceptions of their involvement in community forest (CF) management were assessed through a five-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). Respondents were asked to rate their level of participation across six key CF management activities: (i) Operational Plan Preparation, (ii) Silvicultural Operations (thinning, pruning, weeding), (iii) Plantation Programs, (iv) Forest Product Collection (fuelwood, fodder, NTFPs), (v) Fund Mobilization, and (vi) Monitoring of CF Activities. This variable was included to capture subjective perceptions of participation, complementing the objective socio-economic predictors.

RESULTS AND DISCUSSION

Socio-demographic characteristics

The mean age of respondent women members was 43.78 ± 7.92 years (range 29–78), and respondents had, on average, 8.45 ± 2.95 years of schooling, indicating that on average female members have completed at least basic education. Each household owned an average of 1.27 LSU and 6.84 kattha of land (≈ 0.23 ha), with a mean annual income of 5.82 ± 2.93 lakh NPR. Household size averaged 5.1 members that is comparable to the national average of 4.9 person per household (CBS, 2021), most of whom were in the economically active age range (15–59 years). As shown in Figure 1, agriculture was the main occupation (43.9%), followed by foreign employment (29.27%) and small businesses (10.98%). Sampled women members were predominantly Brahmin (51.21%) and Janajati (39.02%) by ethnicity, and mainly Hindu (74.39%) by religion, with smaller proportions identifying as Buddhist (21.95%) and Christian (3.65%).

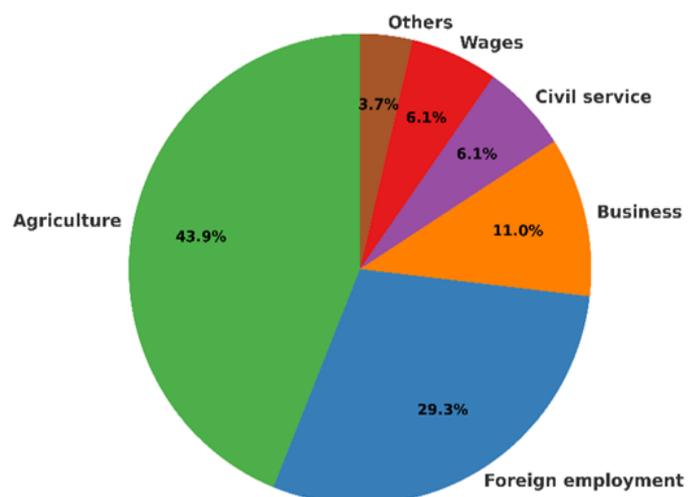


Figure 1. Distribution of primary occupations among women respondents.

Table 2. Binary logistic regression results for factors influencing women's participation in community forest management in Manakamana CF, Nepal.

Independent variables	Odds ratio	Standard Error	P value
Age	1.23	0.05423	0.01***
Years of schooling	2.36	0.15442	0.001***
Caste	0.72	0.5451	0.666
LSU	1.08	0.22648	0.696
Land holding (katha)	0.86	0.09485	0.192
Primary occupation	1.13	0.85044	0.865
Household income	0.91	0.11461	0.459
Household size	0.75	0.16268	0.187
EC membership	3.34	0.46328	0.04**
Distance to CF office	-2.76	0.14159	0.001***
Constant	2248.42	9037.12	0.055

$$\text{Prob} > \chi^2 = 0.0099$$

$$\text{Pseudo } R^2 = 0.534$$

Reported values are odds ratios (OR) with standard errors. OR > 1 indicates a positive association and OR < 1 indicates a negative association. Significance levels: *** p < 0.01; ** p < 0.05.

Determinants of women's participation in forest management

Binary logistic regression was employed to identify the demographic and socio-economic factors influencing women's participation in community forest (CF) management (Table 2). Participation was coded as a binary variable (1 = active participation in at least one decision-making or operational activity, 0 = no participation), while ten predictors were included in the model (Table 1). The overall model was statistically significant (Prob > $\chi^2 = 0.0099$), with a Pseudo R^2 of 0.534, indicating that 53.4% of the variation in women's participation was explained by the included predictors.

Significant predictors

Age: The mean age of respondents was 43.78 ± 7.92 years. Age was positively and significantly associated with participation (OR = 1.23, p = 0.01). Each additional year of age increased the odds of participation by 23%. The marginal-effect curve showed that predicted probability of active women's participation in forest management rose gradually from about 30% at age of 30 to over 90% by age 50 (Figure 2a). The positive relationship between age and women's participation suggests that older women are more likely to engage actively in CF management. This is because older women often hold greater social capital and decision-making authority in households and community groups, enabling them to participate more confidently (Subedi & Timilsina, 2016). Older women also face fewer childcare responsibilities and enjoy greater recognition in community forums, enabling them to participate more confidently. Similar patterns were reported by Pandey & Pokhrel (2021), Baral et al. (2024) and Begum (2024) in Nepal, Engida & Mengistu (2013) in Ethiopia and Agarwal (2009) in India, where age correlates with greater bargaining power, leadership and legitimacy in community institutions including Forest User Groups. From a theoretical standpoint, this aligns with social role theory, which argues that authority and influence often increase with age. Therefore, the positive age effect reflects not only individual confidence but also cultural norms valuing elder participation in community decision-making.

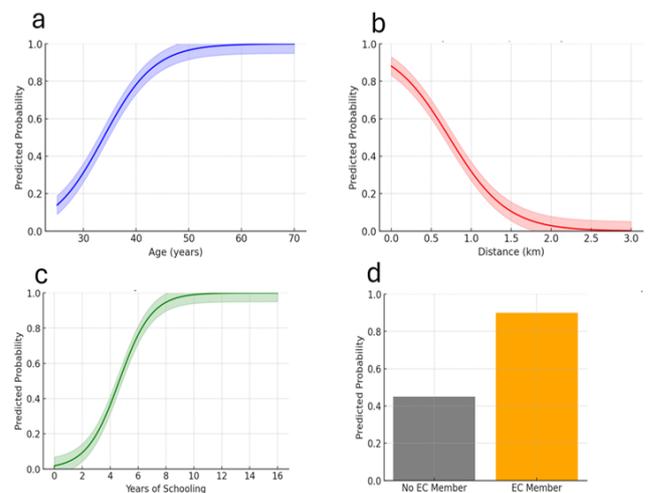


Figure 2. Marginal effect plots of significant predictors of women's participation in community forest management: (a) age, (b) distance to CF office, (c) years of schooling, and (d) Executive Committee membership. Shaded areas indicate 95% confidence.

Education (Years of schooling): Respondents had an average of 8.45 ± 2.95 years of schooling. Education exhibited the strongest positive effect on participation in forest management (OR = 2.36, p = 0.001). Each extra year of schooling more than doubled the likelihood of active involvement in CF management. Marginal effects plots indicated that predicted women's participation in forest management probability increased sharply from below 5% for women with no formal schooling to above 90% among women with secondary education and higher (Figure 2c). Education enhances environmental awareness, confidence, and communication skills, all of which are critical for engaging in CF decision-making. Educated women are more likely to recognize the ecological and economic importance of forests, communicate effectively in public forums, and Our finding is consistent with studies by Jumbe & Angelsen (2007), Engida & Mengistu (2013), Subedi & Timilsina (2016), Bocci & Mishra (2021), Ota et al. (2024), Thakuri et al. (2024) found that education improved women's ability to interpret forest policies, express views, and challenge gender stereotypes. This result can also be explained

by empowerment theory, which posits that literacy and knowledge increase self-efficacy, awareness of rights, and capacity to participate in governance. The sharp rise in predicted participation with secondary-level education further indicates that formal schooling can serve as a threshold for meaningful inclusion. The empowerment theory supports this result: literacy strengthens self-efficacy and the perception of entitlement to participate in public decision-making (Murer & Piccoli, 2022). Furthermore, global syntheses indicate that formal education acts as a threshold condition for meaningful participation in natural resource governance (Atmadja et al., 2023; Cadman et al., 2023).

Executive Committee (EC) membership: Having at least one household member on the CFUG executive committee significantly improved forest management participation outcomes (OR = 3.34, $p = 0.04$). Marginal-effects analysis showed that the predicted probability of women's participation in forest management was only about 45% among households with no executive committee member while otherwise was nearly 90% for households with at least an executive committee member (Figure 2d). EC membership provides institutional access, information channels, and legitimacy within the CFUG. This reduces structural barriers faced by women who are otherwise excluded from strategic decision-making. Studies in Nepal show that reserved seats for women in CFUGs have improved attendance and confidence, even if decision power remains unequal (Murer & Piccoli, 2022; Baral et al., 2024). Recent analyses (Ota et al., 2024; Charmakar, 2024) emphasize that inclusive governance structures yield higher collective efficacy. Although earlier work cautioned about symbolic participation (Lama et al., 2017; Wagle et al., 2017), newer evidence shows that women's involvement in ECs fosters transparency and equitable forest-benefit sharing (Thakuri et al., 2024). This resonates with participatory governance theory, which emphasizes that institutional inclusion is critical for fostering genuine participation and equity in common-pool resource management.

Distance to CF Office: Distance to the CF office had a strong negative effect on women's participation (OR = -2.76, $p = 0.001$). The marginal-effects showed a steep decline in predicted probability, from around 90% for women living adjacent to CF office to below 5% for those residing more than 2 km away (Figure 2b). Longer distances increase time and opportunity costs, especially for women with heavy domestic workloads. Geographic inaccessibility reduces exposure to meetings, information, and decision events. This result is supported by Gautam (2023), Alhassan (2010) and Lise (2000), who found that spatial proximity significantly influenced women's attendance in forest-related activities. Recent gender analyses have re-emphasized mobility constraints as a persistent structural barrier (Ota et al., 2024; Begum, 2024). The effect aligns with access theory, which posits that participation depends not only on willingness but also on the ability to reach institutional spaces.

Insignificant predictors

In contrast to the significant predictors, other socio-economic predictors included in the model; caste, LSU, household income, household size, and primary occupation - did not show statistically significant associations with women's participation in community forest management (Table 2).

Caste: Belonging to Brahmin or other caste categories did not significantly influence participation (OR = 0.72, $p = 0.666$). Although descriptive statistics indicated that Brahmin women were slightly more engaged, the regression model suggests that caste identity alone was not a decisive factor once other variables were controlled for. This suggests institutional and educational mediation dominates over caste hierarchy (Pandey & Pokhrel, 2021; Baral et al., 2024).

Livestock holdings (LSU): LSU showed a weak positive association with participation (OR = 1.08, $p = 0.696$). This implies that households with larger herds may have a higher incentive to participate, possibly due to fodder needs, but the effect was not statistically significant.

Landholding size: Land size was negatively related to participation (OR = 0.86, $p = 0.192$), suggesting that households with larger holdings were somewhat less likely to engage actively in forest management, possibly because they relied less on community forest resources. However, the effect did not meet conventional significance thresholds. This finding is contradicted by the study by Osei-Fosu (2017) in Ghana which found significant effect on participation due to household size. Also the recent work by Charmakar (2024) and Begum (2024) indicates that modernization and off-farm income diversification weaken this link.

Household income: Annual income was negative but insignificantly associated with participation (OR = 0.91, $p = 0.459$). Wealthier households rely less on forest resources, yet remittance-based income often correlates with absenteeism from CF meetings (Laudari et al., 2020).

Household size: Larger households tended to have lower odds of participation (OR = 0.75, $p = 0.187$), indicating that greater domestic responsibilities or reliance on specific family members may limit involvement. Still, the effect remained statistically weak.

Primary occupation: Having agriculture as the primary occupation (vs. other livelihoods) did not significantly predict participation (OR = 1.13, $p = 0.865$). Although agricultural households depend heavily on forest products such as fuelwood and fodder, occupation type did not independently shape women's engagement in forest management activities. Overall, these findings indicate that while the direction of effects was generally consistent with expectations (for example: larger landholdings reducing reliance on CF, higher livestock units increasing dependence), the magnitudes were not sufficient to establish statistical significance.

Perception of women in forest managements

Women's perceptions toward different CF management activities varied considerably (Table 3). Most respondents disagreed with their involvement in operational plan preparation (\bar{X} = 2.12), suggesting that strategic decision-making processes remain largely inaccessible to women. A similar trend was observed for fund mobilization (\bar{X} = 1.80) and monitoring of CF activities (\bar{X} = 1.96), where women strongly felt excluded. In contrast, women expressed strong agreement regarding their participation in plantation programs (\bar{X} = 4.49) and forest product collection (\bar{X} = 4.27), which are operational and labor-intensive activities. Perceptions on silvicultural operations (\bar{X} = 3.37) were mixed, with many women remaining neutral, indicating partial but inconsistent involvement. Overall, the results indicate that women's participation is concentrated in routine operational tasks (plantation, product collection), while their engagement in decision-making and financial management aspects of CF remains limited. The analysis of women's perceptions highlights a clear division between their active participation in labor-intensive forest operational tasks and their marginalization in decision-making and financial governance.

Operational and routine tasks

Women's strong agreement regarding their involvement in plantation programs and product collection reflects their traditional role as primary collectors of fuelwood, fodder, and non-timber forest products in rural Nepal (Shiva, 1989; Agarwal, 2009). These activities remain aligned with gendered divisions of labor, where women's physical work is recognized but their strategic input is undervalued. Earlier regional studies (Salam et al., 2005) and contemporary analyses (Ekanayake et al., 2021; Thakuri et al., 2024; Baral et al., 2024) similarly report women's dominance in routine forest operations but exclusion from governance. Recent global syntheses reaffirm this pattern: women's labor is often confined to subsistence activities, while decision-making authority is retained by men (Bocci & Mishra, 2021; Ota et al., 2024). This "participation without power" dynamic persists even under gender-inclusive policies, suggesting that formal membership does not automatically lead to transformative involvement (Murer & Piccoli, 2022). From a social-role and empowerment perspective, women's operational participation provides economic value but seldom challenges existing hierarchies. It represents instrumental inclusion is important for forest productivity but not for voice and agency (Atmadja et al., 2023).

Strategic, financial, and supervisory functions

Low scores for operational-plan preparation, fund mobilization, and monitoring reveal ongoing institutional and structural exclusion. Although policy reforms have mandated women's representation in Community Forest User Groups (CFUGs), genuine influence in strategic or financial decisions remains limited. Similar evidence across Baral et al. (2024) in Nepal and Begum (2024) in Bangladesh indicates that women's participation often remains nominal or "symbolic." Lama et al. (2017) described women EC members as token representatives—present in meetings but rarely shaping outcomes while Baral et al. (2024) showed that patriarchal norms, unequal literacy, and meeting logistics reinforce these asymmetries. Khadka et al. (2023) further emphasized the absence of technical capacity-building, which limits women's confidence to engage in silvicultural or monitoring decisions. This explains the neutral perception regarding silvicultural operations in our study.

The underlying causes of women's uneven participation in community forest management appear to stem from three interconnected mechanisms: structural barriers and gender norms, capacity and information gaps, and institutional tokenism. Deeply embedded cultural expectations surrounding women's domestic roles continue to restrict their mobility, decision-making authority, and availability to attend community meetings (Gautam, 2023; Hilda Chia et al., 2025). Limited access to technical training, leadership opportunities, and forest-management information further constrains their confidence and ability to engage meaningfully in high-level decision-making processes (Murer & Piccoli, 2022; Thakuri et al., 2024). Moreover, institutional reforms that emphasize numerical representation without transferring actual influence have produced what recent governance literature terms a "participation paradox," where women are present in committees but rarely empowered to shape policy or management outcomes (Atmadja et al., 2023; Ota et al., 2024). Collectively, these mechanisms reinforce Agarwal (2001) assertion that participation in natural-resource governance is mediated by invisible household and community power relations. While women's high involvement in operational and labor-intensive tasks demonstrates compliance with traditional social expectations, their limited participation in strategic and financial decisions underscores persistent gender hierarchies that hinder equitable governance. To achieve genuine inclusion, current research advocates a threefold approach: first, implementing targeted leadership and technical-training programs to

Table 3. Women's perceptions of their participation in different community forest management activities in Manakamana CF, Nepal.

Statement	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)	Mean Score	Interpretation
Operational Plan Preparation (OPP)	33	23	12	11	3	2.12	Disagree
Silvicultural Operations (SO)	12	10	11	34	15	3.37	Neutral
Plantation Programs (PP)	3	2	4	16	57	4.49	Strongly Agree
Forest Product Collection (FPC)	3	3	2	35	39	4.27	Strongly Agree
Fund Mobilization (FM)	43	22	10	4	3	1.8	Strongly Disagree
Monitoring of CF Activities (MCFA)	39	20	13	7	3	1.96	Disagree

Reported values are based on a five-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree).

enhance women's decision-making capacity (Thakuri et al., 2024); second, instituting reforms that link representation quotas to real authority and agenda-setting power (Murer & Piccoli, 2022); and third, introducing practical measures such as rotating meeting venues, providing childcare support, and scheduling meetings at more accessible times to mitigate mobility and time constraints (Atmadja et al., 2023; Baral et al., 2024). Together, these measures can help transform women's participation from symbolic to substantive, paving the way toward more inclusive and gender-equitable community forestry in Nepal.

Policy implications: The findings of this study highlight that while Nepal's community forestry policies mandate gender inclusion, women's participation remains concentrated in labor-intensive activities, with limited involvement in decision-making and financial governance. To translate policy into practice, strengthening women's leadership through targeted training, ensuring meaningful roles within executive committees, and improving accessibility by decentralizing meetings or providing flexible arrangements can enhance their effective engagement. Policymakers should prioritize integrating gender-sensitive approaches into CFUG operations, with specific support for women from marginalized or less-educated backgrounds, to translate policy mandates into genuine participation and equitable forest governance.

Limitations: The study is limited by its focus on a single community forest, which restricts the generalizability of the findings across Nepal's diverse socio-cultural and ecological contexts. Its cross-sectional design captures participation at one point in time, making it difficult to assess how women's roles evolve over longer periods. In addition, reliance on self-reported perceptions may be subject to recall or social desirability bias. Future research should employ longitudinal, comparative, and multi-site approaches to provide a broader and more nuanced understanding of the determinants of women's participation in community forestry.

Conclusion

This study examined the determinants of women's participation in community forestry (CF) management in Nepal by combining statistical analysis with perception-based evidence. The results clearly demonstrate that women's participation is shaped primarily by individual capacity and institutional accessibility rather than household wealth or social status. Specifically, age, education, executive committee membership, and proximity to the CF office were found to significantly influence participation. Older and more educated women, as well as those serving on executive committees, were considerably more likely to engage actively in both decision-making and operational activities. Conversely, greater distance to the CF office reduced women's likelihood of participation, underscoring the importance of spatial accessibility. In contrast, household-level variables such as caste, landholding size, livestock ownership, and income were not statisti-

cally significant, indicating that economic endowment alone does not determine engagement. Instead, institutional inclusion and personal capacity-building are stronger predictors of active involvement in CF governance. Perception analysis revealed a distinct disparity between practical and strategic participation. Women reported high levels of engagement in routine and labor-intensive tasks—such as plantation, forest product collection, and silvicultural operations—but low involvement in decision-making, fund mobilization, and monitoring activities. This indicates that, despite policy efforts mandating gender representation in CF executive bodies, women's roles remain largely instrumental rather than influential. Overall, the study highlights that numerical representation has not yet translated into substantive participation. Strengthening gender inclusion in community forestry therefore requires going beyond policy mandates toward practical measures that enhance women's leadership capacity, literacy, and institutional presence. Initiatives such as targeted training, awareness programs, flexible meeting schedules, and improved accessibility of CF offices can empower women to take on more meaningful decision-making roles. By empirically identifying both structural and perceptual barriers to women's engagement, this research provides evidence-based insights for designing more effective gender-responsive interventions. Enhancing women's decision-making authority within CFUGs is not only a matter of equity but also a pathway to more inclusive, transparent, and sustainable forest governance in Nepal.

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