

People's Perceptions on Forest Management Sustainability in Far-Western Nepal

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Public perception of community forests (CFs) is crucial for their sustainability and for addressing future challenges in forest resource management. This study, based on descriptive and explanatory field research, examines community roles in forest management, perceptions of sustainability, and key challenges facing community forest management over the next decade. Taking into account diverse socioeconomic and geographic contexts, surveys were conducted with 368 households from 19 Community Forest User Groups (CFUGs) across four districts. The findings indicate strong community support for the community forest model but reveal significant gender disparities in management roles, with men more likely to see themselves as managers and women as users. Statistical tests confirm these gender differences in community forest management roles. While most respondents perceive their forests as sustainable, invasive species, forest fires, climate change, governance issues, and resource-sharing conflicts remain major threats for the coming decade. Addressing these challenges requires urgent management attention and the development of comprehensive resource management plans to ensure the long-term sustainability of forest management.

Keywords: Challenges, Community forest program, Far-western, Gender disparities, Public perception, Sustainability

Forest management is essential for maintaining environmental balance, conserving biodiversity, and supporting sustainable development globally (Poudyal et al., 2020). In Far-West Nepal, now renamed Sudurpaschim Province following the adoption of federalism, effective forest resource management is crucial not only for sustaining local livelihoods but also for preserving ecosystem health (Gautam et al., 2024). This province is rich in biodiversity, with extensive forested areas that host a wide variety of plants and animal species (Acharya et al., 2004). These forests provide vital ecosystem services, including carbon sequestration, water regulation, and habitats for many species. They are also a key source of livelihood for local communities, supplying fuelwood, timber, and non-timber forest products as well as grazing land.

In the context of community forestry, public perception refers to the collective opinions, beliefs, attitudes, and understanding of community members regarding forest management practices. These perceptions are shaped by various factors, such as

personal experiences, cultural norms, social practices, local media, education levels, and communication skills. They generally involve how individuals and communities perceive their roles within forest governance, the benefits derived, the sustainability of forest resources, and the challenges associated with community forest management practices.

Public perception can significantly influence decision-making, policy implementation, and the overall success of programs or initiatives (Khadka et al., 2023). It directly affects community members' willingness to participate in and support collective actions aimed at addressing the long-term challenges of community forestry. Investigating how public perceptions and community roles influence the sustainability of community forest (CF) is essential for identifying local needs and developing actionable strategies that promote inclusivity and long-term adaptation of the CF model. This process ultimately plays a critical role in ensuring the success and sustainability of the community forest management (Thoms, 2008).

Despite their importance, forests in Far-West Nepal face numerous challenges, including illegal logging, deforestation, habitat loss, and the growing impacts of climate change, all of which pose substantial threats to forest ecosystems in the region (Gao et al., 2023). Additional obstacles, such as land disputes, weak policy enforcement, and limited resources, further hinder sustainable forest management (Pant, 2017). Pant (2021) provides valuable insights into forest governance in the Far-Western Terai region of Nepal, offering recommendations for improving governance by addressing issues of discrimination. Ghimire and Lamichhane (2020) have also highlighted organizational and policy-related challenges in the implementation of the community forest model. According to Lund et al. (2014) and Rosen (2020), a lack of awareness regarding policy provision, structural system, and poor access to information about Community Forest User Group (CFUG) decisions often prevent marginalized groups, such as women and lower castes, from fully participating in community forestry and equitably sharing its benefits.

Despite these challenges, there are significant opportunities to strengthen forest management. Community-based forest management initiatives have shown promise in improving forest conservation and local livelihoods. Capacity building programs can equip communities with the skills and knowledge necessary for sustainable resource use and forest conservation. Moreover, integrating traditional knowledge with contemporary management approaches can enhance forest management practices and support biodiversity conservation through the reform of forest governance systems (Adhikari et al., 2016).

A study by Joshi et al. (2018) shows that engaging local communities in decision-making processes enhances participation and fosters a sense of ownership and responsibility toward forest resources. Similarly, public awareness and a willingness to participate in forest conservation are crucial for fostering ownership and responsibility towards forest resources (Handberg, 2018). Incorporating public views and preferences into forest management policies can promote more inclusive and sustainable outcomes.

In Nepal's Far-Western Province, community forest (CF) management plays a vital role in biodiversity conservation, environmental protection, and the socioeconomic well-being of local communities (Thoms, 2008). However, the effectiveness of these initiatives depends on the active participation

and meaningful engagement of all community members, who are the primary stakeholders. In this region, where the majority of communities live in close connection with their natural surroundings, sustainable forest management is both an ecological concern and a socioeconomic necessity. The province is characterized by diverse ecological zones, each requiring context-specific management strategies that consider local opportunities and challenges (Acharya et al., 2020).

Despite the recognized importance of community involvement in community forest (CF) management, local public attitudes, perceptions of roles and responsibilities in forest conservation, willingness to participate in forest conservation, and sustainable resource use remain poorly understood and insufficiently addressed. Such study gaps in planning and understanding can hinder the effective implementation of forest management strategies that align with the needs and aspirations of local communities. Moreover, if public attitudes, perceptions, and willingness to participate in forest conservation initiatives are not adequately recognized and addressed, the effectiveness and long-term sustainability of these efforts may be significantly constrained (Tesfaye et al., 2012).

The primary objective of this study is to identify and analyze public perceptions regarding their role in Community Forest (CF) management in Far-Western Province, Nepal. Specifically, the study aims to investigate the public perception towards the CF model, the role of the community in CF management, the sustainability of CF, and the major threats to their CF in the coming decades. By comprehensively understanding these public perspectives, stakeholders can develop informed strategies and interventions that cater to the needs and aspirations of local communities while safeguarding the ecological integrity of these vital natural resources.

Analyzing public opinion is crucial for identifying potential participation barriers and possibilities to improve community engagement, as public perception plays a critical role in the effectiveness of Community Forest (CF) management. By doing so, stakeholders can develop well-informed strategies and initiatives that not only safeguard the ecological integrity of forest ecosystems but also promote the well-being of local populations who depend on them. Therefore, the purpose of this study is to address a significant knowledge gap concerning public perceptions of CF management in Far-Western Nepal. Through this analysis, the research seeks to provide

insights that will support more inclusive and efficient forest management practices, ensure the long-term preservation of these priceless natural resources, and help prepare for future challenges.

Materials and methods

Study area

The study was conducted across various communities in the Kailali, Kanchanpur, Dadeldhura, and Baitadi districts of Far-western Nepal (Figure 1). This province is geographically diverse, comprising three distinct regions - the mountain region covering 7,932.8 Km² (40.6%), the hill region covering 6,748.8 Km² (34.54%), and the terai region covering 4,857.4 Km² (24.86%). Far-Western Nepal is a unique blend of natural beauty, wildlife, and cultural richness, extending from the tropical Terai plains of Kailali and Kanchanpur districts to the Middle Hills and further into the towering peaks of Mount Api (7,132 m).

The study districts were purposively selected due to their extensive implementation of the Community Forest (CF) program over a span of more than twenty-five years. The CF program involves local communities in the management of forest resources,

aiming to promote sustainability and community empowerment. Within these districts, Community Forest User Groups (CFUGs) were chosen based on specific criteria from different local communities.

Research design

The research design for this study adopts both descriptive and explanatory field-based research approaches, focusing on the Community Forest User Groups (CFUGs) in the selected districts. The household was considered the basic sampling unit to assess the impact of the Community The household was considered the basic sampling unit to assess the impact of the Community Forest (CF) program on local communities and to explore people's perception regarding forest management and sustainability. To ensure statistical rigor, a mathematical formula was employed with a ninety-five percent level of confidence to calculate the appropriate sample size. Given the heterogeneity of the communities and the need for inclusive representation, a stratified random sampling method was employed. Stratification was based on geographical location, ethnicity, caste, and dependency on forest products as indicators of economic well-being. From the nineteen selected CFUGs, a total of 368 households were sampled,

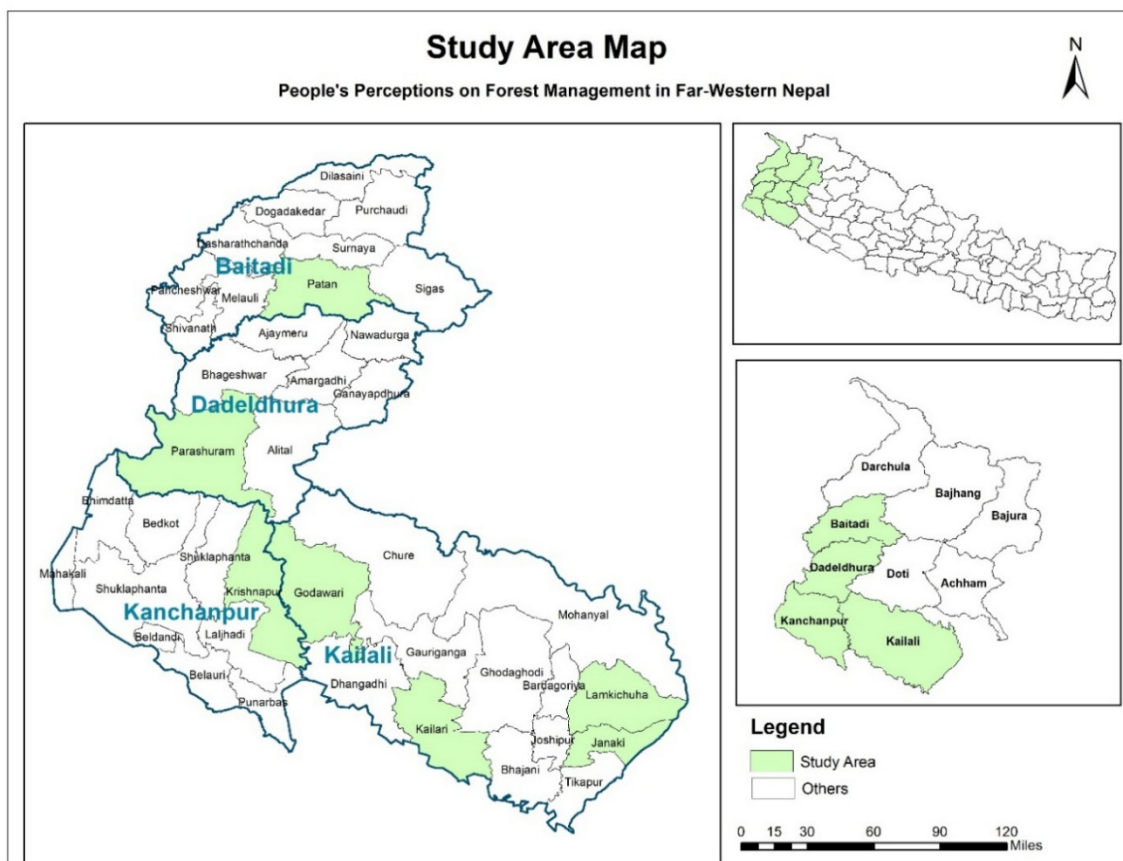


Figure 1: Location of the sample area in the map of Nepal

ensuring representation across diverse demographic and socio-economic groups.

Additionally, twelve key informants were identified and interviewed to provide deeper insights into CF management and its implications. These key informants included the chairpersons of CFUGs, local schoolteachers, community leaders, and senior citizens with extensive experience in CF management (Ojha et al., 2010). Before the household survey, a test-retest method was applied to assess the reliability and relevance of the data collection instruments, thereby minimizing errors and ensuring data validity. Data were collected between 14 January and 11 March 2024. To address potential seasonal biases in the responses, follow-up verification was conducted in August 2024 by revisiting the same respondents. Both quantitative and qualitative data were collected using semi-structured questionnaires, allowing for a comprehensive understanding of the CF program's effects on local communities. Qualitative data provided rich contextual information and insights into community perceptions and experiences. Overall, the research design employed in this study aims to provide a thorough and nuanced assessment of the implementation and outcomes of the CF program, contributing to a deeper understanding of community-based natural resource management in the Far-Western region of Nepal.

Sample size determination and data collection

The formula used for sample size determination from a known population was derived following Arkin and Colton (1963), which is as follows:

where,

n = required sample size,

z^2 = value (e.g., 1.96 for 95% confidence level),

$$n = \frac{z^2 \times N \times p(1 - p)}{Nd^2 + z^2 \times p(1 - p)}$$

N = the population size,

p = the population proportion (assumed to be 0.50 since this would provide the maximum sample size),

d = the degree of accuracy expressed as a proportion (.05).

Here $N=8276$, $z= 1.96$, $p=0.5$, $d=0.05$ Then,

$$n = \frac{1.96^2 \times 8276 \times 0.5 \times 0.5}{0.05^2 \times 8275 + 1.96^2 \times 0.5 \times 0.5}$$

$$n = 367.14$$

Rounded to the nearest whole number, the required sample size (n) is approximately 368.

So, with a 95% confidence level and a known population size of 8276, a sample size of approximately 368 would be sufficient. The calculated sample size was distributed to each household of the selected community forestry, as shown in Annex 1.

Data collection

Data collection for this research incorporated both primary and secondary methods to ensure a comprehensive understanding of community forestry (CF) practices and their impact on forest resource conservation. Primary data were gathered through face-to-face interviews conducted during household surveys in March 2024, with a total of 368 interviews conducted with household heads. Random sampling techniques were employed to ensure representative coverage of the surveyed population. Additionally, twelve key information interviews were conducted with relevant stakeholders. Semi-structured questionnaires to guide discussions and capture specialized insights. While the primary focus was on interviewing household heads, in cases where they were unavailable, other knowledgeable household members involved in CF activities were selected as interviewees. To ensure clarity and accuracy, the questionnaires were initially prepared in English and then translated into the Nepali language before data collection. Furthermore, to enhance the reliability of household information, pretesting of the questionnaire was conducted in a nearby area before the formal household survey, ensuring the effectiveness of data collection instruments.

In parallel, secondary data were collected through the examination of various documents from the Ministry of Forests and Environment, Government of Nepal, documents of CFUGs, including forest management operational plans, constitutions of CFUGs, meeting minutes, and annual audit report records of CF User Groups (CFUGs) (Ministry of Forests and Environment, 2024, March 3). These sources provided baseline information regarding forest resource conservation efforts and contributed to the contextual understanding of the research.

Data analysis

By employing both thematic analysis for qualitative data and statistical analysis for quantitative data, this study gained a comprehensive understanding of the research topic. Thematic analysis provides depth and context, revealing the richness of participants' experiences, beliefs, and behaviors. A chi-square test for independence was conducted to test the hypothesis.

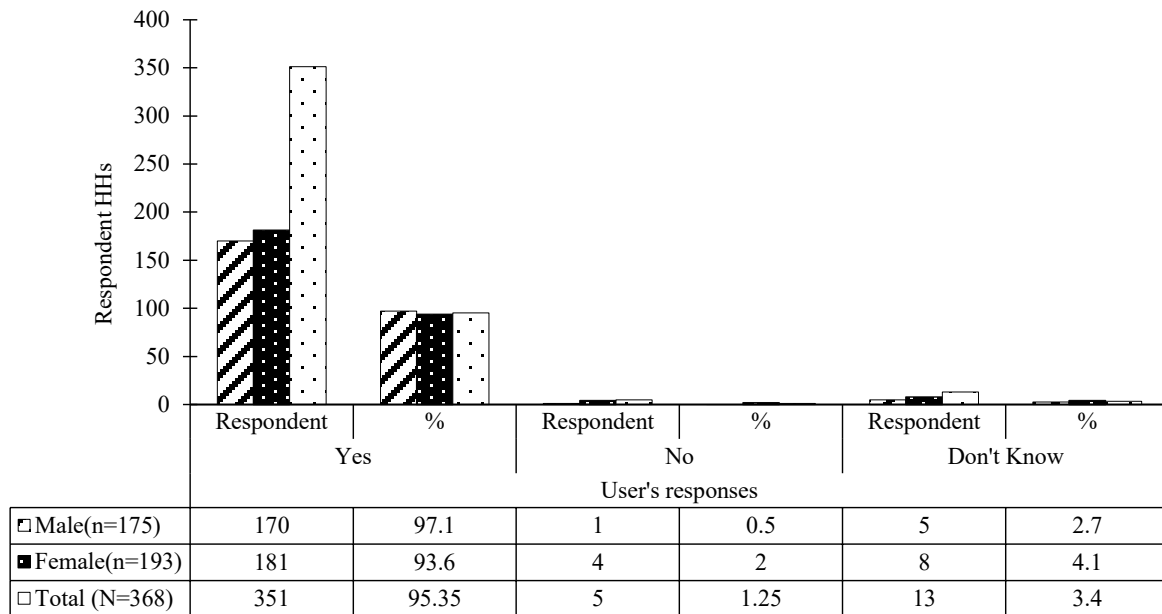


Figure 2: Response of people to the performance of the CF model

This test was allowed to determine whether there is a significant association between gender (male or female) and their perceptions or roles in CF management. Integrating these approaches, findings were triangulated, corroborated by insights from multiple sources, and enhanced the validity and reliability of the study's conclusions. Bar graphs, tables, and descriptions were used to present the results.

Results

Public perception regarding the Community Forest (CF) model was analyzed through a structured household survey. Participants were asked the question, "Do you agree that the CF model for forest management is the best approach for forest management?" Responses were recorded and categorized into three options - **Yes**, **No**, and **Don't Know** to reflect the level of agreement or uncertainty among community members toward the effectiveness of the CF model. A "**Yes**" response indicated agreement that the CF model is the best approach for forest management. "**No**" Indicated disagreement, and "**Don't Know**" indicated respondents are unsure about whether the CF model is the best approach for forest management. The findings of the study on

public perception about the Community Forest (CF) model in Far-Western Nepal, as shown in Figure 2, reveal strong support for the CF model among both male and female respondents.

Public perceptions of individuals' roles within the Community Forest were tested through a study question. The findings of the study showed mixed results. The data provided reflects the public perception regarding individuals' roles within Community Forest (CF) management, categorized into three main groups: Managers, Users, and both managers and users. Similarly, to understand the public perception of the sustainability of community forests in Far-Western Nepal, this study examined how people in Far-Western Nepal perceive the sustainability of Community Forests (CF). Participants were asked whether they believe these forests are sustainable, and their responses were grouped into three categories: "Yes," indicating they think the forests are sustainable; "No," indicating they do not think the forests are sustainable; and "Don't Know," indicating they are unsure about the sustainability of the forests. The distribution of responses regarding roles in CF management is presented in Table 1.

Table 1: Respondents' views about their role in their CF

Respondents	Categorized themselves as					
	Manager		User		Both (manager and user)	
	Respondent	%	Respondent	%	Respondent	%
Male(n=175)	63	36	91	52	21	12
Female (n=193)	21	11	160	83	12	6
Total (N=368)	84	23	251	68	33	9

Table 2: Response of people about the Sustainability of Community Forests

Respondents	User's responses					
	Yes Respondent	%	No Respondent	%	Don't Know Respondent	%
Male(n=175)	96	54.9	66	37.7	13	7.4
Female(n=193)	128	66.3	41	21.2	24	12.5
Total (N=368)	224	60.6	107	29.5	37	9.9

Table 3: Responses of people regarding the five significant challenges for CF in the next decade

SN	Name of Challenges	Respondents number		Ranked
		Number	Percentage (%)	
1	Invasion of alien species	343	93%	1
2	Forest fires	341	93%	2
3	Climate change and biodiversity loss	320	87%	3
4	Governance issues within user groups	298	81%	4
5	Conflicts over natural resource sharing	294	80%	5

The results presented in Table 1 show the approach used to assess the level of awareness and confidence among the local population regarding the long-term sustainability and viability of their community-managed forests.

To gather insights on the anticipated challenges for community forestry in the coming decade, respondents were asked the open-ended question as “*What are the five major challenges that you expect your community forestry will face in the next decade?*” This question aims to identify the primary concerns and obstacles that community forestry initiatives might encounter in the foreseeable future. The findings, ranked by the order of significance based on respondents’ feedback, are detailed in Table 3.

Besides the top five challenges for community forestry in the coming decade, additional concerns of respondents include migration and elite influence, excessive demand for forest products, diseases in timber products, encroachment, and natural disasters.

Discussion

The primary objective of this study was to explore and assess public perceptions of participation in Community Forest (CF) management in Nepal’s Far-Western Province. The study specifically sought to examine how the CF model is seen, the roles played by the community in managing CF, the sustainability of CFs, and the main risks to their long-term survival. The explanation that follows clearly links the results to each of these goals.

Public perception towards the CF model

The Community Forest (CF) model is widely supported in Far-Western Nepal, according to

survey results, with 97% of men and 94% of women expressing approval. This strong consensus and acceptance reflect the community’s perception of CF as an empowering approach that fosters ownership and strengthens social cohesion through collective decision-making in Community Forest User Groups (CFUGs) and Committees (CFUCs). These research findings reveal good public impressions of the CF model and highlight its role in promoting local participation and livelihood support. These results with the first research objective show that communities generally view the CF model positively as a means to improve participation and livelihood support.

Perceptions of individual and community roles in CF management

Public perception regarding individuals’ roles within community forest management revealed that most respondents see themselves as users rather than managers or both, with this trend being more pronounced among women (83%) compared to men (52%). This mismatch between the CF approach envisions individuals as both managers and users. Moreover, actual practice suggests limited awareness and participation, especially among women. This indicates a disconnection between the CF model, which envisions individuals as both managers and users. This clearly pointed out that more awareness and effective participation are required to develop ownership towards community forestry.

The chi-square test further confirms significant gender differences, with men more likely to perceive themselves as managers. The computed chi-square statistic ($\chi^2 = 40.20$) is substantially higher than the critical value of 5.99 at the 50üP = 0.05 level with 2 degrees of freedom. This indicates a

statistically significant difference in how male and female members of Community Forest User Groups (CFUGs) perceive their roles in forest management. Specifically, a substantially higher proportion of men identify as managers, whereas women more often identify as users. These results suggest that gender does indeed play a significant role in shaping perceptions of forest management within community forestry, reflecting broader gendered divisions of labor and responsibility.

Potential causes of this disparity may include traditional gender roles in rural Nepalese communities, where women are more involved in family and subsistence tasks while men more frequently occupy leadership and decision-making roles. Socioeconomic factors may also hinder women's participation in management roles, such as their limited access to resources, education, and training. To align community perceptions with the dual roles needed for effective CF management, there is a need for increased education and meaningful participation. These findings are consistent with previous studies, such as Baral et al. (2024), which emphasize the critical role of women and public involvement in sustainable forest management.

Perceptions of sustainability in CFs

The survey revealed that 66% of women and 55% of men perceive their Community Forests (CFs) as sustainable, citing regular harvesting, frequent planting, and conservation activities as key factors for sustainability. However, 22% of women and 38% of men express concerns about sustainability, mentioning problems like invasive species, resource scarcity, elite influence, and climate change.

The chi-square analysis indicates a statistically significant association between gender perceptions of the sustainability of Community Forests (CFs) in Far-Western Nepal. The results reveal that women tend to show greater optimism regarding sustainability, whereas men express more concern. This suggests that male and female members of CFUGs have different perceptions of sustainability, with a higher proportion of women believing that their CFs are sustainable, while more men perceive sustainability challenges. These disparities may arise from gendered interactions with forests, wherein women primarily emphasize immediate household benefits to address daily subsistence needs, while men may be more conscious of long-term management challenges. Differences in levels of education and understanding may also affect the views of women

and men about sustainability, as women in rural areas are often less formally educated than men. These results resonate with the findings of Dahal and Cao (2017), who emphasized the significance of raising community awareness and inclusive participation to promote sustainable forest management.

Perceptions of major threats to CFs in the coming decades

This study identified several major obstacles anticipated over the next decade, including the spread of invasive species, forest fires, biodiversity loss due to climate change, governance issues, and conflicts over natural resource sharing. Among these, forest fires and invasive species were mentioned as the primary concerns by 93% of respondents. Other worries included migration, caste-based discrimination in hilly areas, elite influence in decision-making, and natural catastrophes. These results are consistent with those of Roy et al. (2024) and Gyawali et al. (2024), indicating that community forests (CFs) in Nepal face multiple socio-ecological challenges that demand comprehensive and adaptive management strategies.

By directly linking these results to the study's objectives, the research demonstrates that although the CF model is widely accepted, socioeconomic barriers and gender roles lead to differences in participation and role recognition. Men and women tend to emphasize different aspects of forest management, reflecting how lived experiences influence views of sustainability and hazards. To ensure the long-term sustainability of CFs in Far-Western Nepal, it is essential to address these gaps through inclusive engagement, awareness-raising, and adaptable measures.

Conclusion

This study confirms that the Community Forest (CF) model is widely supported and accepted by communities, with 97% of men and 94% of women. The findings reveal that most respondents identify themselves primarily as users rather than managers or both, with women significantly underrepresented in managerial roles. A statistically significant difference exists between men's tendency to see themselves as managers and women's tendency to view themselves as users in forest management. While most respondents believe that their Community Forests (CFs) are sustainable. However, the spread of invasive species, forest fires, biodiversity loss due

to climate change, governance issues, and resource conflicts threaten the sustainability of CFs in the future. Addressing these challenges requires urgent management attention and the development of comprehensive resource management plans to ensure the long-term sustainability of forest management.

Conflict of interest

The author declares no conflict of interest.

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Annex 1: Sample size of selected communities/CFUGs with sampled households

SN	Name of Forest	Area(ha)	Location	Total (HHs)	Selected (HHs)
1	Narmada CFUG	47	Lamkichuwa-5 Kailali	205	14
2	Chetana CFUG	489	Lamkichuwa-1 Kailali	720	29
3	MahilaJagaran CFUG	87	Lamkichuwa-1 Kailali	400	18
4	Martibhumi CFUG	93	Lamkichuwa-1 Kailali	497	20
5	Jankalyan CFUG	422	Lamkichuwa-1,5 Kailali	1498	55
6	Kopila CFUG	208	Lamkichuwa-3 & Janaki-7 Kailali	754	30
7	Sahara CFUG	50.09	Kailari-07 Kailali	103	8
8	Mohana CFUG	28.55	Kailari-07 Kailali	65	5
9	Baskota CFUG	650	Godavari-4 Kailali	750	31
10	Bishal CFUG	197.44	Krishnapur-1 Kanchanpur	323	15
11	BirendraAdarsh CFUG	128.5	Krishnapur-2 Kanchanpur	392	17
12	Hariyali CFUG	195	Krishnapur-4 Kanchanpur	597	24
13	Samaiji CFUG	198	Krishnapur-4 Kanchanpur	936	37
14	Mahakali CFUG	156.23	Krishnapur-7 Kanchanpur	132	11
15	Salani CFUG	120	Patan 10 Baitadi	220	10
16	Kalekhaya CFUG	200	Patan 10 Baitadi	197	12
17	Danshera CFUG	246.0	Parshuram-6 Dadeldhura	275	18
18	Dharampani CFUG	50.31	Parshuram-10 Dadeldhura	109	9
19	Tilkhola CFUGs	149.0	Parshuram-10 Dadeldhura	103	5
Total		3715.12		8276	368