

Examining forest transition and collective action in Nepal's community forestry

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ABSTRACT

Nepal is going through a major socio-economic transition in rural areas and hence in forest management practices, leading to changes in and evolution of new forest-people relationships. Community forests are experiencing an ecological transition resulting a new pattern of growth, regeneration and diversity in forest composition. The ecological transition of forest corresponds to the shifting local collective actions in community forestry which are emerging from the new socio-economic dynamics in rural areas such as income-diversification, declining subsistence utilization of forest resources and outmigration of the rural population. However, these changes are highly differentiated and variable. The hilly areas are experiencing remarkable forest cover changes than in the lowlands of Terai. In this paper, we examine the evolving intersection between new forest transition and community collective action in Nepal. We draw our analysis on the comparative case study of four villages from three different ecological regions. Our findings show that the forest transition is not static, but a dynamic process shaped by diverse local and external factors. Further, declining utilization of forests for subsistence uses has led to a new dynamic in community collective action which has played a central role in driving forest transition. Community participation in forest management is also declining. Hence, we call for reconceptualizing local collective action in this changed context which can help revise forest policies and reimagine forest institutions that can better respond to the socio-economic changes of the mountain landscape and revitalize local collective actions.

1. Introduction

Since the early 2000, Nepal Himalaya has experienced a rapid transformation in both everyday socio-economic situations of rural communities and associated forest management practices. These transformations have resulted into multiple changes in the forest and people interactions, which are increasingly shifting away from the traditional closely knitted and subsistence-focused interrelationships. Historically, rural households that primarily relied on subsistence agriculture for their livelihoods have continued forestry practices to meet their subsistence needs such as collecting fuelwood, fodder and timber among others (Gilmour, 1997; Mahat, 1987). Community forestry program,

initiated in the 1970 s, was one of the successful policy interventions in forestry, which supported, rejuvenated, strengthened and institutionalized these subsistence livelihood practices throughout the region (Shrestha and Fisher, 2017). However, in the post-conflict¹ and socio-economically transforming Nepal such traditional bonds between forests and subsistence livelihoods are gradually loosening as rural people are increasingly relying on non-farm activities such as labor migration and commercial agriculture (Sunam et al., 2021; Chhetri et al., 2021; KC et al., 2021). Along with these shifts in rural livelihoods, there has been notable progress in forest regrowth and changes in forest compositions. As these changes are noticed widely, questions such as how these evolving transformations i.e. forest transition and

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¹ Nepal has gone through a decade long (1996–2006) armed conflict between Maoist insurgence group and the state followed by about a decade of transition in the process of making new constitution.

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socio-economic changes are dealt with in everyday practices of forest management and what does the changing forest-people relations mean for local collective action are becoming highly important.

In Nepal, there is a growing body of literature that has documented how changes in rural livelihood systems have led to forest transition (ecological changes) and changes in farming practices and the implications of this shift in broader socio-economic transformations (Ojha et al., 2017; Shrestha and Fisher, 2017; Jaquet et al., 2015; Marquardt et al., 2020; Chhetri et al., 2021; KC et al., 2021; Pain et al., 2021; Sunam et al., 2021). However, the government policies and programs of the forestry sector in general and community forestry (CF) in particular, have not responded to such changes at practical as well as conceptual levels (Ojha et al., 2017; Chhetri et al., 2021; KC et al., 2021). Even though there are various indications of a forest transition (Chhetri et al., 2021) explained in the current literature, it does not explain the dynamic relations between forest transition and changing rural livelihoods and what these changing relations mean for the future of community forestry in Nepal and elsewhere. This analysis is important to understand the everyday dynamics of changing forest management practices and it will also allow us to reimagine operational modalities of local collective action.

Understanding the shifting practices and priorities of forest management and their outcomes in forest management modalities in Nepal is a priority and for this understanding, our analysis draws on the concepts of community collective actions (Agrawal et al., 2008; Shrestha and Fisher, 2017) and forest transition (Mather and Needle, 1998; Meyfroidt and Lambin, 2011; Rudel et al., 2005). The concept of collective action allows us to think about a process of reinvigorating community strengths in the context of changing forest-people relations shaped by the broader socio-economic changes. These changes are primarily informed by increased mobility, shifting policy processes, rapidly developing infrastructures and everyday interactions and interrelationships among various forestry actors (Poteete and Ostrom, 2008; Olson, 2009). Whereas the forest transition is a concept that allows us to explore the dynamics of forest changes due to the increased diversity and growth of forest species and associated perceptions of the people. This intersection of the two concepts of collective actions and forest transition provides a framework that comprehensively explores the current transformative processes of change happening in Nepal's community forestry as new forest and people interactions are developing, leading to different kinds of collective actions.

Empirically, the paper is based on comparative case studies from four different villages in Dolakha, Ramechhap and Sindhuli districts of Nepal, representing the higher mountain, mid-hills and the Tarai region respectively. As the paper examines changes in management and uses of community forest areas and what role the forest can play in future rural livelihoods, we specifically asked about the current status of forest uses and management in the study areas, how these relate to changing socio-economic conditions and the livelihood implications of new forest management practices. As a pioneer country of community forestry and with a history of close linkages between farms, forests and rural livelihoods, the case from Nepal can help explore the changing role of forests in rural livelihoods and the future of collective forest management modalities in the Himalayas and globally.

2. Explaining forest transition and collective action in Nepal

Changing forest management practices and evolving new forest-people relationships are already recognized in Nepal (KC et al., 2021; Sunam et al., 2021; Chhetri et al., 2021; Pain et al., 2021). Increasingly, researchers have shown that Nepal is experiencing a growing tree coverage, especially in the mountain regions (Gautam et al., 2004b; Oldekop et al., 2018), a diverse forest composition and its impacts on wildlife (Bista and Song, 2021; Andersson and Hansson, 2022), newly emerging forestry needs and priorities of local communities (Chhetri et al., 2021) and the overall shifts in livelihood strategies and their

connections to the forest management practices (Fox, 2018; Chhetri et al., 2021). So far, these changes and evolving transitions are explained in four main ways.

First, a thread of literature uses the biophysical indicators in documenting the changes occurring in the forests by explaining the increased forest cover and density, and these changes are frequently attributed to the community forestry policies that fostered community collective action through forest user groups (Adhikari et al., 2007; Gautam et al., 2003; Oldekop et al., 2018). It has shown how the forest areas received protection, plantation and other care that allowed for better rejuvenation and growth of different forest species. Second, some scholars have argued that changes in forest management practices and hence the forest transition are the result of changing socio-economic conditions (Sunam et al., 2021; KC and Race, 2019; Chhetri et al., 2021). In this strand, studies document the relationships between the key processes of socio-economic changes such as labor migration and economic development activities in rural areas and changes in evolving livelihood strategies and explain how such shifting practices have determined the use patterns of the forests.

Third, some studies have shown that there are drastic changes in local forest product utilization patterns in the last decade. They have demonstrated declining subsistence uses of fuelwood, fodder, and timber for household-level consumption. This shifting away from subsistence is creating a particular form of forest transition in Nepal. For example, KC et al. (2021) have suggested that the sharp decline in the subsistence use of forest products has a huge implication in setting management priorities. Fourth, there is another emerging body of work that documents the growing trend of abandonment (sometimes named as underutilization) of farmland (KC et al., 2021; Sunam et al., 2021; Bista and Song, 2021). Due to small land holdings and the availability of non-farm opportunities, rural people move to urban areas. This has resulted in a declined farm labor availability so that a part of (or all) the farmland is left uncultivated. These fields are then gradually converted into forests and contribute towards an increasingly forested landscape.

These are important contributions to understand why and how forest management practices are shifting towards more commercial and non-subsistence production relationships. However, existing literature focuses more on linear changes indicated by the shifting priorities of forest product utilization and evolving forest compositions. What is required is to explore more comprehensive and interconnected pathways of forest changes (transition) and their implications in local collective action on the management of forests. In other words, understanding the relations between forest transitions (driven by socio-economic changes and local collective action) and likely implications of these changing dynamics toward reinvigorated community collective action and the future of community forestry practices. We argue that changes in community forestry practices are the result of several changes in the modalities and priorities of collective action at the community level. Therefore, a framework that combines both forest transition and community collective action can better explain the pathways of changes in community forest management practices. By using the conceptual lenses of forest transition and community collective action together we generate a framework that allows us to explain why and how Nepal's community forest management practices are changing and what implications this has for the future of the forests and community livelihoods in rural areas. When analyzing evolving biophysical processes in the forest in relation to shifting livelihood strategies and everyday practices of collective action in community forestry, different pathways of forest transition are emerging.

The concept of forest transition explains the trajectory of land use changes in relation to the socio-economic changes in the specific context. Mather and Needle (1998) explained the dynamics of changes in forest cover in Europe where forest cover declined with the beginning of industrial development followed by a recovery as countries underwent economic development. As it evolved, the forest transition theory explores the drivers of change in forest conditions, composition and the

socio-economical dynamics of deforestation, forest regrowth, reforestation and afforestation and it highlights how forest recovery can be the result of various processes affecting the use and management of forest resources. Forest transition scholars have primarily identified economic development and forest scarcity as the main drivers of forest recovery to happen and they have named these as different forest transition 'pathways' (Rudel et al., 2005). The economic development pathway is associated with industrial development and society's increased need for natural resources and the shift of rural people moving into urban areas as industrial labors. In that way the economic development pathway seeks to explain the changes in the use of forest products and an increasing commercial and industrial utilization of forests. The scarcity pathways on the other hand examine the regrowth of the forest as a result of a growing rural population and a need to guarantee the access to forest products under an increasing livelihood pressure (Rudel et al., 2005). In recent years, further drivers and pathways of forest transition have been put forward. For example, Meyfroidt and Lambin (2011) suggested globalization, state forest policy and smallholder tree-based land use changes as additional drivers of forest transition. The role of migration in tropical forest recovery has been emphasized by Hetch et al. (2015).

Many scholars have argued that the first phase of Nepal's forest transition happened according to the scarcity pathway as the community forestry policy was initiated in response to a situation of forest scarcity and it has been attributed to the forest recovery (Birch et al., 2014; Paudel et al., 2014). However, the more recent recovery of the forest seems to be associated with changes in the role of forest in rural livelihoods and shifts in the community institutional priorities as land uses are changing, outmigration of household members increases and there is a growing commodification of rural lives (Hecht, 2010; Meyfroidt and Lambin, 2011). Some recent studies such as Chhetri et al. (2021) and Fox (2018) have analyzed the initial processes of forest transition by identifying some key elements associated with forest transition theory as explained above for the Nepal context. For instance, these papers indicate that processes such as labor migration, changes in forest policies (community forestry and other land use policies) and modification of smallholder land use practices i.e., uncultivated farmland being converted into forest vegetation are key elements of the notable forest recovery.

Similarly, the concept of community collective action, and within this, the role played by community forestry institutions is useful to understand how the processes of forest recovery unfold in practice (Ojha et al., 2009; Oldekop et al., 2018; Agrawal and Chhatre, 2006). The collective action theories generally claim that collective action among communities, often organized into local institutions, can overcome the problems associated with the depletion of common pool resources such as forests (Ostrom 1990). Following Ostrom's (1990) design principles of common property resources scholars who focus on institutional development (Varughese and Ostrom 2001; Agrawal and Ostrom, 2001) further emphasize the role of robust and well-functioning community institutions in governing the commons such as the forests. In collective action theory, local communities, through institutional mechanisms devised at the local level, define the priorities and practices of management and uses of forests and these acts result in better forest resurgence (Gilmour and Fischer, 1992; Agrawal and Ostrom 2001). The collective action theory and Ostrom's work on common property resource management institutions have provided a sound conceptual basis for designing community forestry policies and institutions in Nepal (Gautam and Shivakoti, 2005) leading to positive ecological (Gautam et al., 2003; Niraula et al., 2013) and to some extent livelihood outcomes (Oldekop et al., 2018). As studies document, the time when community forestry institutions were first designed and implemented since the 1970 s, forests had central roles in supporting local livelihoods and hence local communities had huge interests and incentives to manage forests by themselves (Gilmour and Fischer, 1992). Despite the positive outcomes of community collective action through trust, autonomy in

resource access and self-governed resource management structures, materializing this theory in action is equally challenging, primarily due to benefits and costs associated with resource conditions and the institutional arrangements (Ostrom, 2010).

Some studies have indicated that when forest uses and the role of forest in local livelihoods are changed away from subsistence, the community-level collective action deteriorates and might even lead to questioning community forestry as a legitimate model of forest governance (KC and Race, 2020; Fox, 2018). However, how the form of local collective action has also changed alongside forest transition and other processes of socio-economic changes, and what this means for the future of local collective action remain relatively underexplored. Our framework constitutes three analytical themes guiding analysis and argument: i) processes and drivers of forest transition (improvement in forest cover and composition) and the role of changing community collective action in these processes; b) changing forest-people relations driven by socio-economic transformations happening in rural areas, and c) processes of reimagining community collective action in the changed context and the perceptions of local communities on the role of forests in local livelihoods.

3. Cases and methods

We used a comparative case study (CCS) approach to examine the dynamics and drivers of forest transition and interrelationship with local collective action in Nepal by examining four case study villages, representing three different ecological regions. As explained by Bartlett and Vavrus (2017), the CCS approach helps us examine changing social and cultural practices and relations with resources across spatial scales. In our case, the CCS approach has facilitated to examination of the processes of forest transition and changes in forest management and use across different landscapes (villages) representing different ecological regions of Nepal.

The case study villages include Kalang in the high-mountain, Khimti and Chyasku in the mid-hills and Jhunga in the lowland region (Fig. 1). The study sites were selected considering the history of community forest programs (community institutions), contrasting processes of socio-economic changes and dynamics of forest management practices and resources conditions. As presented in Table 1, the case villages vary in terms of the nature and conditions of forests, the history of settlements and establishment of community forests and institutional parameters.

Kalang, located in the high mountain region was connected by road in the 1980 s and thereby connected to an urban market earlier than other villages. Kalang has temperate forests comprising high-value medicinal plants. It has a longer history of CF establishment i.e. back in the 1990 s and forest uses were regulated since then. It has comparatively higher potential for commercial management of community forests (primarily non-timber forest products (NTFP) and timber from private land).

Khimti has the motorable road access since early 2000. Located in the tropical to subtropical region, it has relatively good quality forests with pine, hill-sal in the lower belt and mix forest including bamboo in the upper part. CFs were established around the late 1990 s and the community forest user groups (CFUGs) have regulated the access to the use and management of community forests. There is some potential for commercial management of forests (timber) but only to a limited extent.

Chyasku was connected by a seasonal road back in the mid-2000 and has not had a reliable means of transportation to an urban market until recently. The village is located in a dry region (rain shadow area) and access to water resources is a major constraint for the villagers. The Chyasku community forest was handed over to the community in the 1990 s in a very degraded condition. The community has recovered the forest by planting mainly pines and some broadleaf species. Forest use was regulated by CFUGs (six in the village) and there are trees growing (Alnus, bamboo and others) on the private land. Forests have recovered

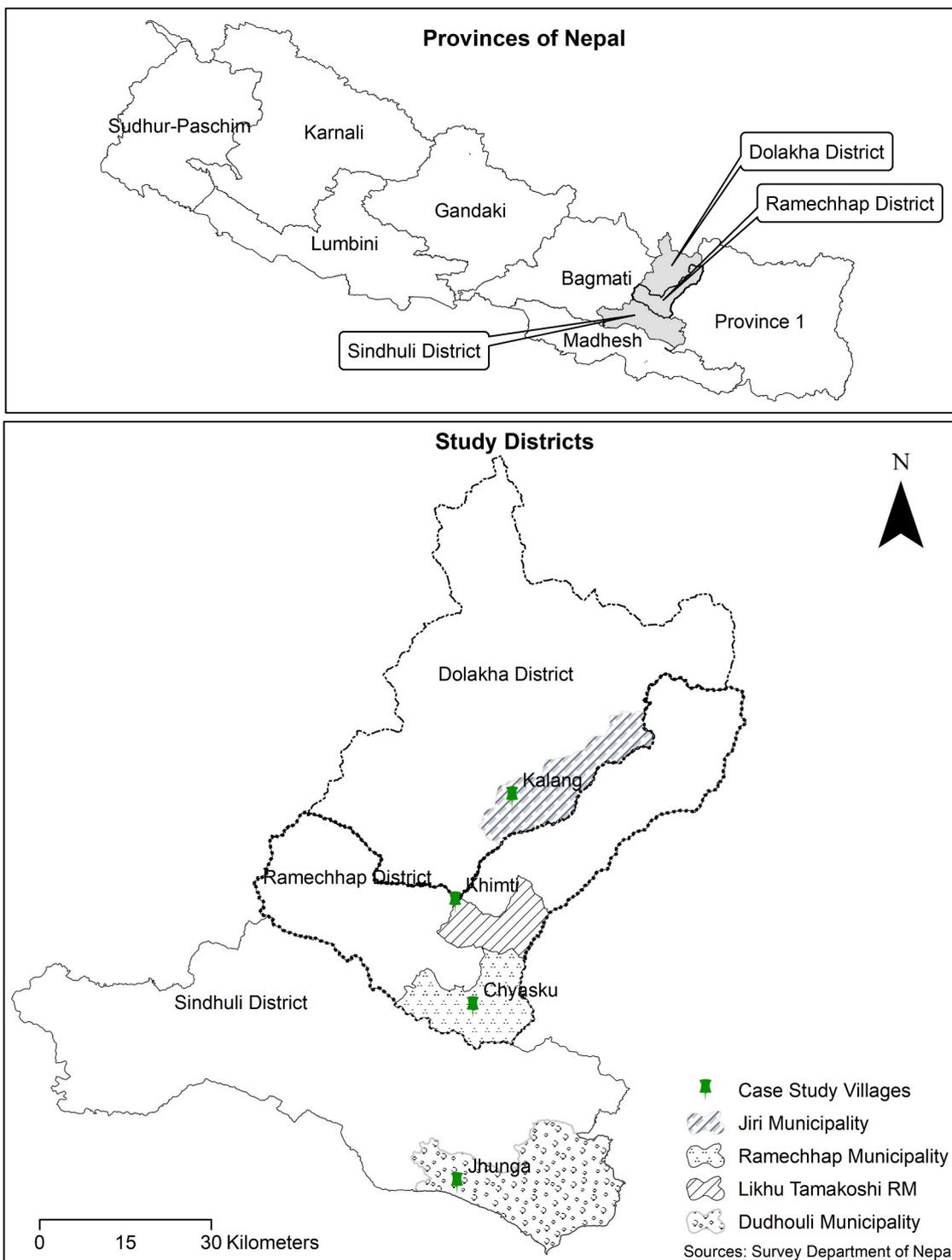


Fig. 1. Location map of the study site.

substantially compared to the past but have limited potential for commercial management and extraction of forests.

Jhunga has a comparatively contrasting history of settlement and development. It was sparsely populated until the 1960s and the population grew as mountain and mid-hill people migrated into the area. A regional highway led right through the village five years ago and since then it has rapidly started to urbanize with the growing market activities. The village is located in the Chure region (foothill of the mountain) with a tropical climate and has a dense forest with high-value timber species i.e., *Shorea robusta*. The village has a comparatively recent

history of CF i.e. community forest was established around 2010 and regulation of management and uses of forest has started recently.

We conducted repeated rounds of field works between 2019 and 2021. Data collection methods and approaches were discussed and finalized among the researchers in 2019 including the detailed checklists to be used for the different techniques. Such tools and approaches were revised based on the learning from the first set of fieldwork. Considering the nature of the study and the qualitative data required, all the data required for the study were collected in person utilizing the relaxed period of the COVID pandemic where the first two authors took

Table 1
Key features of the study sites.

Key features	Study Sites			
	Kalang	Khimti	Chyasku	Jhunga
Ecological range	High mountain (1000–3000 m)	Mid-hills (625–1500 m)	Mid-hills (1500–1900 m)	Chure (350 m)
Forest type and condition	Temperate and sub-alpine vegetation, well stocked natural broad-leaved forest and high value NTFPs with commercial potential	Tropical to sub-tropical vegetation, natural pine and Hill Sal but sparse and difficult terrain with limited commercial potential	Sub-tropical to temperate vegetation, predominantly planted pine and natural alnus, dry region with sparse forest and limited commercial potential	Tropical vegetation, well stocked natural Sal forest with high commercial potential
Priority use and value of forests	Grazing, fodder, timber and NTFPs	Timber and grasses	Grasses, timber, culture (religion)	Timber, grasses, fodder, soil and water protection
Dominant ethnic composition	Ethnic minorities (Jirel, Sherpa, Kshetri)	Mix (dominant ethnic groups Kshetri/ Brahmin, and ethnic minorities i.e., Newar, Majhi, Sunar and Magar)	Ethnic minorities (Tamang, Newar and Dalits)	Ethnic minorities and high caste groups (Danuwar, Majhi, Magar, Brahmin/ Chhetri, Dalits)
CF history	Villagers are managing forest as CF for more than 20 years.	CFs are handed over to communities for 20–25 years	Most of the forests were degraded, CF handed over before 20–25 years and villagers reforested the area afterwards	A well-stocked forest was handed over to communities only in 2011

the lead and the remaining co-authors visited the study sites at least once. We collected data using several qualitative methods including transect walks (18), in-depth household interviews (71), life history interviews (38), focus group discussions (26) and field observations.

Transect walks were conducted with the villagers to have a better knowledge of the landscape and the forest-farm practices. The key informant interviews were conducted with knowledgeable persons of the respective villages to explore the history of settlement, changes in livelihoods and the use and management of forests. The household interviews were conducted with selected respondents based on a set of criteria i.e., involvement in uses and management of forests, the experience of diverse livelihood activities, and representation from different hamlets and socio-economic groups (caste, gender and economic class). The focus group meetings/discussions were held with the forest user groups, ward representatives and farmer's groups to explore the changes in forests and their uses as well as the changing dynamics of local collective action. At least two researchers were engaged while commissioning each of these data collection techniques.

4. Processes and drivers of forest transition in Nepal

Forest regrowth in Nepal is happening in specific ways in different ecological regions and the dynamics and drivers of forest changes are contingent on the context of socio-economic changes and the biophysical nature of vegetation across different ecological regions. Earlier studies have documented different pathways of forest transition with particular focus on the mid-hill context (Chhetri et al., 2021; Fox, 2018). In this section, we will present how forest transition has unfolded in different ways in the four case villages and explain the drivers behind such variations.

In the mid-hill region, forests were handed over to local communities since the 1990 s and as we found in both Khimti and Chyasku, local communities worked collectively towards establishing forest plantations, protecting forests from open grazing and forest fires and, regulating forest uses. As communities reported during the field study, the conditions of their forests have improved remarkably over the last three decades. A man in Chyasku in his 30 s, recalls that 20 years ago the current densely forested area in his village used to be their "hide and seek place" as it was open land with very few scattered shrubby vegetation (CHHH5). In the higher mountain region of Kalang however, relatively better forests were handed over to local communities. As reported elsewhere (Gautam et al., 2003; Niraula et al., 2013; Chhetri et al., 2021), we found that the forest conditions have improved in both mid-hills and higher mountains. Along with the improvement in conditions of community-managed forests, the growth of trees in farmlands has also increased. In many cases, previously cultivated land has been converted into forest vegetation or shrub lands. For example, a woman

in Khimti (KH9) reported that she had managed to buy two *ropani* of land in 2002 with the remittance income which the couple had earned through employment in India. However, now that land is not actively farmed, instead, fodder trees have started to grow, and it looks like a forest. This meant that she did not need to go to the community forest to fetch forest products such as fuel-wood and fodder. In contrast, Jhunga (Chure) had a well-stocked forest handed over to the communities about a decade ago. Though there were some levels of timber harvesting happening prior to the establishment of community forestry, there has been no remarkable change in the forest cover over the past decade.

We identified three major drivers leading to forest transition and as we elaborate below, there are overlapping relations among these drivers (see Section 2 above for a summary overview of the key processes and drivers of forest transition in the mountain villages and lowlands). As the forest composition varies, between mountains (mid-hills and higher mountains) and the lowlands so do the uses and drivers of changes. Firstly, the use of forests is changing. In the past, the availability of forest resources was a key driver for subsistence farmers to migrate to an area such as Kalang, as it opens up possibilities to keep livestock (KL1). Now there is, however, a sharp decline in the use of forests for subsistence needs (i.e. fuelwood, fodder), particularly in the mountain regions (mid-hills and high mountain). About 85% of the respondents in three studied villages in the mountain region reported a declining frequency of forest product collection and use over the last decade. A committee member of Bhirkharka CF in Chyasku described that in Chyasku bazar until early 2000, there used to be a daily procession of villagers (sometimes more than 50) to collect fuelwood during the festival time in September–October. However, in recent years we can see only a few people make trips to the forests. Similar voices were echoed in Khimti and Kalang. Our findings on declining uses of forests for subsistence uses resonates with other recent studies (i.e. KC et al., 2021; Marquardt et al., 2020; Chhetri et al., 2021; Sunam et al., 2021).

Such decline in the use of forests for subsistence in the mountain villages of Kalang, Khimti and Chyasku was because of changes in local farming practices such as a sharp decline in the number of livestock. The village lives have moved from traditional practices of keeping livestock in large grazing herd to keeping fewer numbers of animals of improved breeds (Marquardt et al., 2016; Adhikari et al., 2007; Khatri et al., 2017). Further, the traditional practice of raising large-sized ruminants such as buffaloes and cattle is declining, and in the mountain villages, the communities prefer smaller monogastric animals such as poultry and pigs. This implies a shift in the quantity and type of fodder demand for people's livelihoods people derive fodder and other forest products from their own private land. In the past, the forest resources in Jhunga also attracted smallholders from other villages to move in as migrant settlers, but as we found the subsistence use of forests continues there. In Jhunga, cattle continue to be the preferred livestock and the collection of forest

products i.e. grass, fodder and fuelwood is a key livelihood activity. Further, the villagers in Jhunga do not have many trees in their private land and hence rely more on CF to meet their daily needs of forest resources such as grazing cattle and fodder and fuelwood collection.

Second, as earlier studies have also reported, we found that the socio-economic changes have an important role in driving forest transition (Fox, 2018; KC et al., 2021; Ojha et al., 2017; Sunam et al., 2021). Off-farm work is a growing phenomenon across all four study sites as there are increasing opportunities for wage labor in the construction sector locally and in cities. In recent years, remittance from international labor migration (e.g. to Gulf countries) has contributed significantly to the rural livelihoods that also changed the dynamics of utilization and management of community forests (Paudel et al., 2022; Sapkota et al., 2020). However, the level of outmigration and implications for local forest management and uses vary across our case study villages, particularly between mountain villages and lower altitude of Chure.

In the mountain villages of Chyasku, Khimti and Kalang the level of out-migration has generated a shortage of farm labour in most households and that engagement in farming is decreasing. The women, kids and/or elderly people staying in the village are less able to engage in forest management activities. Contrastingly, in Jhunga, though there is a significant level of out-migration, communities keep the level of engagement in forests. The local ethnic communities - *Danuvars* - have long traditions of working outside the village whereas their families continue to engage in animal husbandry in the village. So even if the men today work abroad has relatively little impact on the use and management of the forests and the daily harvesting of fodder and fuelwood.

The gradual shift to off-farm and cash-generating livelihood options has also implicated the ability of households to afford alternative sources of household energy which in turn leads to a decline in the uses of fuelwood. Many respondents in the mountain villages reported an increasing use of liquefied petroleum (LP) gas for cooking. Yet, in most cases, the households combined the use of LP gas for cooking with fuelwood used primarily to prepare animal feed (CH1, KH1, KH3). In Jhunga, we found relatively fewer households using LP gas and most villagers primarily depended on the nearby CFs for daily fuelwood collection. Yet, forests remain important resources to support the rural livelihoods of communities representing marginalized groups such as Dalit and ethnic minorities with relatively smaller landholding and those smallholder farmers who still rely on subsistence farming.

Third, the overall increase of forest cover in the mountain landscapes is linked to ongoing land use changes and particularly tree growth in private lands. The majority of households in the mountain villages have protected trees for fodder and other timber on their farming land. It can be on the borders of productive *bari* fields, on marginal *bari* fields that have been taken out of production, or on extensively used grassland (*pakho*). For instance, in Kalang, *bari* land is used for the promotion of *khasru* (a fodder tree) and *alnus* (a timber) tree whereas, in Chyasku, bamboo are promoted in such sites. However, in Jhunga dynamics of forest transition are different as most farmland is highly productive irrigated land, where no trees are allowed to generate or grow.

The Fig. 2 provides a glimpse of the dynamics of forest transition and the key drivers in three study regions of Nepal.

The differentiated nature of forest utilization in the three different ecological regions and the factors that drove changes in the everyday uses of forests are explained above and summarized in Fig. 2. While the Community Forestry policy has played an important role in the ongoing forest recovery in the mountains, there were also parallel processes of socio-economic changes leading to vegetation growth in private land. Further, decreasing needs for fuel and fodder in response to changing rural livelihood strategies have also contributed to forest transition. Changes in forest vegetation and the processes and drivers leading to such changes have important implications for forest management and use. The following section explains how local collective action has also changed alongside forest transition and changes in forest management

and utilization practices.

5. Implications of changing forest-people relations for community collective action

Nepal's forest transition and changes in forest management practices during the last decades are the outcomes of several decades of community forestry implementation and community collective action organized through community institutions of Community Forestry User Groups (CFUGs). In recent years, there have been new institutional and governance shifts within the CFUGs, and they are driven by two interactive processes. First, there are internal changes in patterns of uses of forests and shift in priorities of the communities in managing forest which are increasingly driven by entrepreneurial and commercial appropriation of forest resources. This institutional change has been determining new types of forestry goals and associated collective action at the community level. Community institutions, policies and everyday practices are gradually geared away from traditional subsistence patterns of forest management toward commercial endeavors (see also (Khatri et al., 2018; Paudel, 2016). Second, external changes driven by the market, new livelihood opportunities, land use changes, population dynamics and infrastructure development have led to rapid societal transformations in the villages and these shifts are reflected also in the institutional practices of community forestry user groups (Sapkota et al., 2020; KC et al., 2021; Chhetri et al., 2021). A combination of such shifting internal community dynamics and external societal processes are shaping forest transition generating new modes of community collective action and forest management practices in Nepal.

Evidence from four case study sites clearly demonstrate such patterns of institutional changes and new evolving community collective action in relation to forest management priorities and practices. However, variations across sites particularly between mountain landscapes and lowland region. Resources condition and the history of CF establishment also led to different patterns of changes in terms of forest management priorities and patterns of uses. The mountain and high-altitude areas have been practicing community forestry for a long period of time and they are experiencing more rapid transformation. Whereas community forestry institutions and everyday practices in the Churia region and lower altitude areas are still in an earlier stage of community forestry development, where protection, subsistence utilization and traditional resource connections are the main local interests alongside commercial extraction of timber. Other factors important to the differences between the regions are population dynamics and the quality and value of the forest species.

For decades, communities in the mountain villages have invested substantial amounts of time and resources to rehabilitate the denuded hills by planting trees (mainly pines) and then conserving their forests by protecting from misuse and controlling forest fires. A respondent from Chyasku community still remembers the hard labor he had to put in tree planting decades ago. He shares, "I transported seedlings from Ramechhap Bazar (two hours walk) on my back and dug the planting pits and planted seedlings voluntarily as most of the community members did at that time." The CFUG members used to actively participate in forest management activities including cleaning and thinning and in return would get firewood and timber occasionally. Guarding forests against theft and controlling grazing in plantation areas were the most common activities in the mountain CFs. During the initial years of CF establishment, the local communities in our mountain sites were voluntarily guarding their forests with the provision of the so-called *lauri palo*. In the *lauri palo* system, the villagers used to rotate the responsibility of guarding forest areas by passing a stick.

However, with the increased financial resources and external support, many mountain CFs started employing paid forest guards. This system continued for almost a decade. Such practices to guard forests appeared to have disappeared in the mountain study villages in recent years. Today, most mountain communities are experiencing

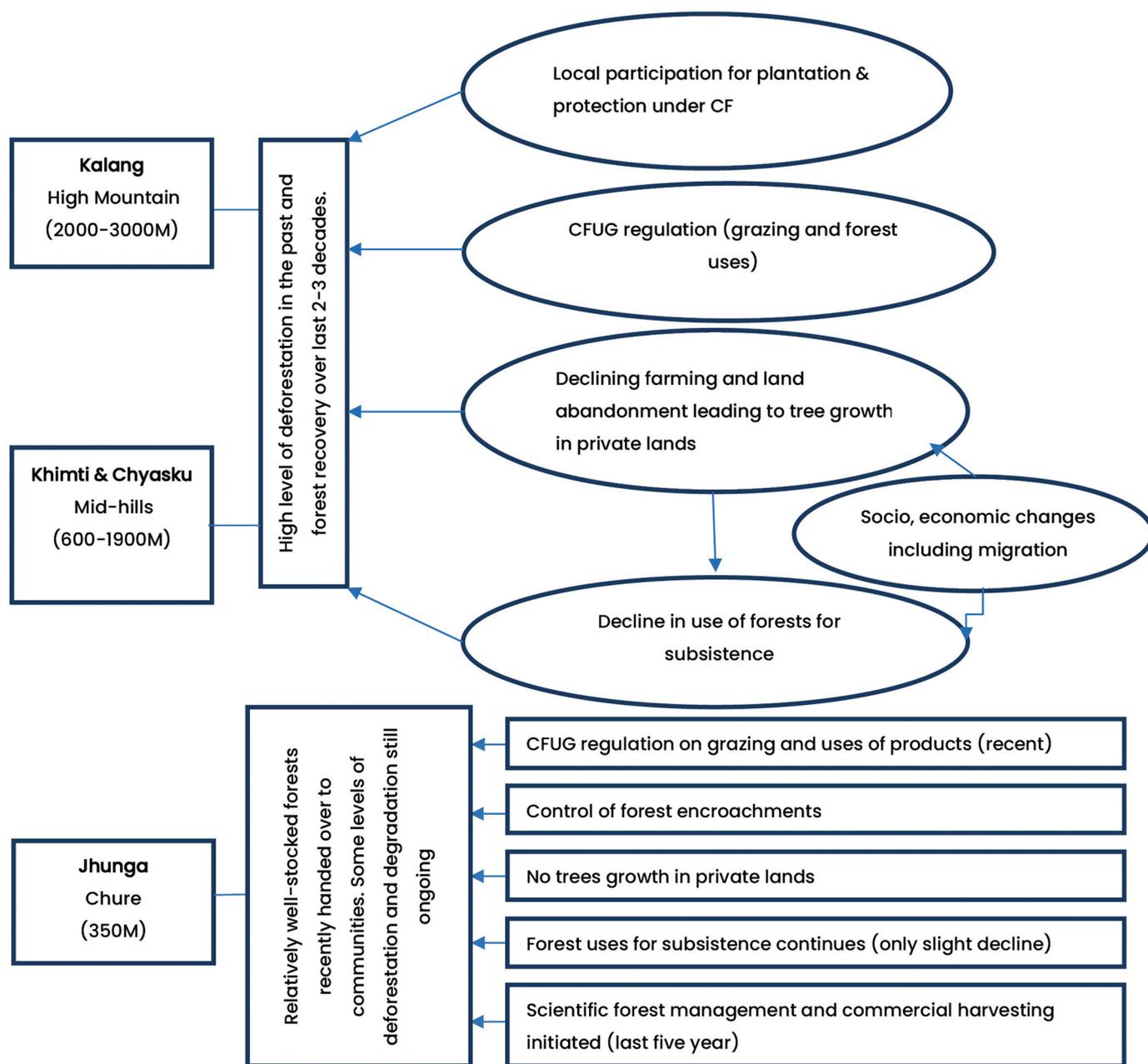


Fig. 2. Forest change dynamics in three ecological regions of Nepal.

depopulation due to outmigration, and the interconnected dynamics of farm-land abandonment (see Ojha et al., 2017) and increasing availability of tree resources in the private land has decreased the everyday use of the CFs (Marquardt et al., 2016). In these remote mountain villages, neither subsistence nor commercial extraction is a local priority for their pine-dominated community forests, which results in fading ties between communities and forests. For example, the respondents in these villages did not see the necessity of monitoring/guarding of CF as planted seedlings (in plantation sites) are already grown and they don't see much risk of illegal cutting of trees and collection of other forest products.

In the lower altitude region of Chure on the other hand there is a growing population pressure to extract higher-value timber resources needing protection measures. In Jhunga, households who originally immigrated from the mountains are raising buffaloes and goats and they have high demands for fodder and grasses. The communities still invest in forest guarding by paid forest watchers as they feel a high risk of

illegal extraction of high-value Sal timber as well as the problem of forest fire. Moreover, as part of the scientific forest management programs² (Khatri et al., 2022; Poudyal et al., 2020) protection of the harvested sites from fire and grazing appeared important and required by the forest authorities. Communities in the Chure region hence combine subsistence uses of forest and commercial extraction of high-value timber, and they are increasingly mobilizing multiple institutional policies to manage and govern their forests (Khatri et al., 2022).

The same pattern can be seen in local participation in forest management. Members of the CF executive committee in the mountain case

² The Government of Nepal began promoting "Scientific Forest Management" (SciFM) programme in 2014 defining it as "an application of appropriate silviculture system and forest principles through design of systematic compartments of fixed rotation age". The government has now suspended the programme due to increased contestations regarding its implementation.

villages described how users and the CF committee used to be active and collectively engaged in forest cleaning, thinning and construction of fire lines in the forests annually in the past. However, as we found, forest management activities have declined substantially in recent years. The CFUGs in mountain villages have not conducted any management activities i.e., thinning, cleaning and fire line construction for the last five years. This is not because the forests in the mountains do not need these activities but because the villages do not see what they will get out of the labour investment they make. Such a lack of incentive for forest management made it difficult to mobilize the community in active management and utilization of community forests. One of the respondents in Chyasku shared his observation that forest cleaning activities that used to happen in their CF every year have not taken place in the last 3–4 years (CH3). Therefore, the forest has now become denser turning into a bush and thereby has become more fire-prone. When asked about the declining community participation in forest management, the CF committee members pointed to the COVID-19 situation as a major reason during the last two years, but in general, the main explanation was linked to the reduced interest among communities to manage the forests. One of the executive members from Dhanamane CF in Khimti shared,

CF users used to pressurize and keep asking the management committees for forest management activities as they could get fuelwood from thinning and cleaning activities. Now no one asks for these products from CF and the executive committee members are also passive.

As we found in four mountain villages, community members are rather ready to pay fines as per the CF rule rather than physically attend community meetings or participate in forest management activities. Earlier, paying fines was very unusual. Similarly, fire line construction which was a common activity in the past is now completely abandoned. Although the community members said that they were still doing their best, when one of the CFs in Khimti caught forest fire during our data collection period, we noted that neither committee members nor any users showed up to control fire. In the Chure region, timber harvesting has become the main forestry operation and it is becoming a site for the active engagement of the community members. In Jhunga, the priorities of forest management are fuelwood, grasses and timber. The communities are active in forest fire control and preventive measures including fire line construction. We found that the initiation of scientific forest management activities for commercial use in Bishal CF has increased user's attention on forest management activities such as controlling fire and grazing and promoting regeneration.

One of the important challenges for community collective action in resource-poor CFs is maintaining the basic institutional functioning of the community. Keeping CF's constitution and operational plans updated, managing regular group meetings/interactions, and organizing annual general meetings regularly are key basic functions of a CFUG (Gautam et al., 2004a; Pokharel et al., 2007). In the mountain study sites, out of 12 CFs, only seven CFs had updated operational plans (OPs). Four CFs were in the process of OP revisions and one CF had yet to start the revision process despite the termination of the OP duration of five years. Among the updated OPs, Hanumante CF in Kalang just received a revised version after having it pending for two years in the Division Forest Office (DFO). Since the CF operational plan is the legal document that allows CF to carry out forest management activities, no renewal means no actions can be performed in the forests. In part, the cumbersome and costly bureaucratic procedure to be fulfilled in preparation and renewal of the CF operational plan led to such delays. Further, out of 12, seven CFUGs in the mountain areas have not conducted an annual general meeting (AGM), which is mandatory as per the CF management guidelines for the last four years. Three of the CFUGs had not conducted any meetings during the last five years. Although the FGD respondents pointed out the COVID-19 pandemic as the key reason, they also mentioned that no users even asked the executive committee for any reason. Likewise, the members of the executive committees too had not met for many months.

However, newly formed and actively engaged community forestry

groups such as in Jhunga in the Chure have been able to maintain regular institutional functioning activities as compared to the mountain study sites. Both of the CFUGs studied in Jhunga have conducted their AGMs regularly even at the time of COVID-19. The frequency of executive committee meetings in these CFs is also higher. However, among the two CFs in Jhunga, such meetings were regular in Bishal CFs during the time they implemented scientific forest management activities but not regular after the dismissal of the SciFM³ program last year.

It is important to highlight that CFs are not able to generate adequate income and provide financial incentives to the community members to facilitate active participation in management activities. Almost all the executive members have raised the concern that youths are primarily looking for cash income and they don't see forests as a viable source of income. But also, the interest and incentives for the older members are on the decline. Present executive committee members of the CFUGs conveyed that they are not interested in continuing their tenure as they are working on a voluntary basis with no financial incentives. As the external support for forest management in CF has declined upon termination of donor-funded initiatives, users have not attended or witnessed any capacity development activities conducted by CFUG in their respective CFs for the last three years.

These dynamics of changes in institutional functioning and local collective action are hugely influenced by the overall societal changes happening in rural areas. One consequence is a general decline in people's participation in forest management activities, particularly in the mountain areas. As needs and institutional practices are shifting, the new collective actions emerging within community forestry are primarily biased towards commercial activities rather than subsistence utilization of the forests.

6. Reimagining forest's role in rural livelihoods and community collective action

Our case studies show that along with the diversification of rural livelihood strategies, there are changes in the way communities see the value of their forests, management priorities and also their day-to-day involvement in forest management activities. These dynamics of change have led us to question on how people see the future role of forests in rural livelihoods and the future of community collective action. Respondents of the studied CFUGs see diverse and overlapping uses of forests in the future and their perception about the future uses of forests are associated with their changing livelihood strategies and past experiences of participation in community forest management.

First, as subsistence agriculture remains an important part of rural livelihoods in rural Nepal (also see [Khatri et al., 2022](#)), at least for some sections of the communities, a major portion of households still believe that forests play an important role in subsistence livelihoods. For instance, one of the members in Khimti, whose family is primarily dependent on subsistence agriculture, stated that the community forest is providing and will continue to provide key resources to support the livelihoods of his family in the future, especially of fuelwood and fodder. Similarly, a respondent in Jhunga said, "forest is still an essential resource for my family livelihoods as my husband is doing cattle herding (in the forest) and fuelwood is the only source of (cooking) energy in my house" (JH7). Respondents who are engaged in semi-commercial farming such as mushroom farming and off-season vegetables in Khimti saw the value of forests for the wood material and branches that are needed in these activities. Moreover, households living with relatively smaller holdings, people from minority groups such as Dalit and

³ Scientific Forest Management Programme (SciFM) was one of the priority programme of the Government of Nepal after 2015 guided by the Scientific Forest Management Guidelines, 2014. However, this guideline and the programme itself was dismissed by the Government in 2020 due to the governance issues and constation with the key stakeholders i.e. CFUGs.

ethnic communities rely more on forests to meet their daily needs. For instance, in Hudil of Chyasku where Dalit communities, raising cattle and goats and have limited private land have been using forests frequently for fodder and grasses.

Second, the households who are diversifying livelihood options with the move towards semi-commercial agriculture and off-farm activities were inclined towards the potential commercial uses of forest to generate cash income. In Jhunga, people saw the potential of commercial management of Sal timber and in Kalang for NTFPs and timber from private land. In contrast, people in Khimti and Chyasku are currently receiving negligible monetary benefits from their forests and therefore see limited potential for any commercial uses of forests at the moment. However, perception about the future potential of commercial uses of forests may change. A CFUG executive committee member in Khimti and Chyasku foresaw some potential of commercial benefits in the future. A majority of community members were of the view that out-migrated villagers would return to the village with new ideas to utilize the increasingly forested landscape for generating income. One of the respondents in Khimti (FGD) said,

I am hopeful that people who temporarily left the village for work will come back at some point with more innovative ideas of income generation and local resource management including forests. That may be the promotion of non-timber forest products, cultivation and trading of medicinal plants, or doing timber businesses.

NTFPs, bamboo and timber products were mentioned as possible income generators. Importantly, all villagers, who draw livelihood resources primarily from non-farm activities, continue keeping their CF membership even though they do not draw any direct benefits at present and they foresee some future benefits of forests in terms of commercial uses and potential for generating income. Further, many respondents across the study sites argued that the commercial potential of local forests could help to attract migrants to return and be active in forest management.

Third, the community forests also provide important cultural and other environmental services to rural people. In all sites, the villagers recognize the importance of forests for cultural practices such as sites for worship and cremation. For instance, there are temples in the Devasthan forest in Chyasku and Hanumante CF in Kalang. There are also cremation sites for Buddhist people in the Bhedikharka CF in Chyasku on the higher point on a ridge. As respondents reported, they are protecting and caring for these forests due to their religious and cultural attachment and hence showing interest to be members of CFUGs.

In recent years, communities also started to realize the significance of forests for other different environmental services related to trees, biodiversity soil and water. In the study sites, communities saw benefits such as watershed protection, flood control, water source conservation, soil-erosion and carbon sequestration. For instance, representatives from the CFUGs and the municipalities in Khimti and Chyasku talked about the benefits of the environment for future generations. The CF executive members in Kalang highlighted the protection of high-mountain biodiversity and conservation and the utilization of medicinal plants for the benefit of people. Similarly, almost all respondents from Jhunga stressed the need for forest conservation to control flash floods and protect their houses and land.

In summary, as rural communities are gradually combining subsistence production with other cash income-giving options, including international outmigration (Hecht et al., 2015; Jaquet et al., 2015; Chhetri et al., 2021; Sunam et al., 2021), future uses of forests could meet more diverse local needs than today. In other words, the role of forests to support rural livelihoods is more than just the subsistence uses such as fuelwood, fodder and grasses, and commercial uses can go beyond timber harvesting. There also started to emerge commercial livestock farming such as goats and some people saw the value of forests for commercial fodder production. For example, new commercial goat farmers in Khimti see the potential of forests in growing improved grasses and fodder. A commercial dairy farmer explained that his family

would be interested in leasing out some part of the CF for grass production or would be ready to purchase the grass from CF land if they produced an improved variety of grasses and fodder. The evidence indicates that while there will be continued uses of forests for subsistence, there will be increasing interest in commercial management and optimal utilization of ecosystem services functions of CF.

7. Emerging pathways of forest transition and collective action in Nepal

It is clear that there are variations in the patterns and drivers of forest use and recovery in the mountains and lowland area of Chure in Nepal. The mountain areas had gone through severe deforestation and degradation till the 1970 s creating a scarcity of forest products to meet daily subsistence needs (Mahat et al., 1987; Gilmour and Fischer, 1992; Guthman, 1997). Community forestry policy, which was initiated in the 1970 s, along with active community participation and leadership, created a conducive environment for a gradual improvement in forest cover and recovery of the once degraded mountain forests (Gilmour and Fischer 1991; Gautam et al., 2003). However, resource-rich lowland areas of the Terai were covered with dense tropical forests and were sparsely populated until the 1960 s. With the rapid population growth and increase of migrants from the mountain districts,⁴ there has been an increased pressure on forests resulting in gradual deforestation and degradation in recent decades (Bhattarai et al., 2021; Ghimire, 2017). With the handover of these forests to communities in the early 2000 s in the Chure and Terai regions, the rate of deforestation and forest degradation is declining but there remains pressure on forests to meet the daily forest product needs of the growing population (Bhattarai et al., 2021; DFRS, 2015). We can emphasize that the forest transition is not a static process, rather it is a dynamic one and shaped by a wide range of socio-economic drivers and local collective action.

Nepal's forest changes have followed variegated pathways (also see Pain et al., 2021, Fox, 2018). The dynamics of rapid deforestation and resource depletion of the 1970 s resonate with the forest scarcity pathway as suggested by (Rudel) et al. (2005). Forest recovery has happened in recent decades as a result of successful community forestry programs (Libois et al., 2022). As reported elsewhere widely based on the field study conducted in different mountain districts (Chhetri et al., 2021; KC and Race, 2020; Marquardt et al., 2016; Nuberg et al., 2019), we also found the changes in smallholder farming practices and tree growth in private lands (Nuberg et al., 2019). More importantly, we saw that the local collective action facilitated by the policy change towards decentralization and local participation under the CF program has played a major role in promoting forest recovery (Agrawal and Ostrom, 2001; Oldekop et al., 2019). Our findings show that the forest transition (ecological change) and socio-economic changes leading to a decline in use of forests resulted into a decline in local participation in forest management, posing negative challenges in generating local collective action in the changed context. There is a dynamic interplay between forest growth and local collective action. The pathways for forest recovery is contingent upon the local resource conditions, dynamics of collective action and local socio-economic changes. For example, the processes of forest transition in the resource-rich region of Chure (and Terai) differ significantly to that of the mountains. In the lowland region, population growth and pressure on the forest continue to grow and people continue to use forests for both subsistence and commercial uses. In the lowland areas, people are still actively participating in forest conservation and management. Financial incentive from timber harvesting has generated increased enthusiasm among the community

⁴ There was only 35% of the total population living in the flat region until late 1960 s and now the region hosts more than half (53.66%) of the country's population (Central Bureau of Statistics Nepal, 2022) <https://cbs.gov.np/wp-content/uploads/2022/08/Neapl-In-Figures-2022.pdf>

member in the lowland areas. Therefore understanding such interplay between forest transition and local collective action is important to explain the changing forest-people relations and future pathways of community collective action and community forest management in Nepal and beyond.

The distinction between subsistence and commercial uses of forests is not always useful with regard to exploring the future pathways of CF management. Rather, we argue, the subsistence and commercial uses will go in parallel, and the future of CF management should be able to balance these dual objectives (Paudel, 2016). The best strategy probably be to continue with the provisions of subsistence utilization and explore the potential of commercial extraction that might provide financial incentives to generate community collective action. This argument resonates with the literature that highlights the need for embracing poly-centric governance in common pool resources management (Rana and Chhatre, 2017; Andersson and Ostrom, 2008). The literature on a poly-centric or hybrid form of common pool resource governance stress that community alone may not be able to tackle the challenges of managing commons and hence there is a need for including wider sets of actions and thinking beyond the local needs (Ostrom, 2012; Bluffstone et al., 2020).

In Nepal, smallholder farming practices will continue to be an important part of rural livelihoods and there will be a remarkable number of rural populations relying on subsistence farming which will continue using the CF for subsistence utilization. Yet, forest management focusing on subsistence needs alone will not be able to generate financial incentives. So, CF management will have to embrace some forms of commercial objective either through timber and non-timber products or through the provisioning of ecosystem services. This arrangement, however, would require reimagining local participation and community collective action because the system of voluntary participation in forest management is fading away in the changed context. Therefore these potential dynamics of forest transition and local collective action have a broader relevance to Nepal's CF and to other countries that are going through similar transformation.

As indicated by other studies (Khatri et al., 2022; Poudel et al., 2022), rural livelihoods in Nepal will become a trans-local system that will combine subsistence farming, semi-commercial farming and off-farm employment together (Chhetri et al., 2021; Khatri et al., 2022). Therefore, future forest management should aim to meet both subsistence needs alongside growing interests in commercial benefits. Lowland areas will produce more high-value timber, whereas, in the mid-hills forests might only be managed for subsistence and other cultural and environmental benefits such as water regulation and carbon sequestration in mountain region (Paudyal et al., 2017; Chaudhary et al., 2018). How to mobilize and institutionalize local collective action in the commercial endeavor is still to be explored. Collective action theory, which evolved through an understanding of the relatively cohesive and subsistence-based farming communities (Lam, 1998; Ostrom, 2014) now needs to be revisited to provide a new framework of why and how people work together in the changed context.

Finally, forest transition with the expansion of forest in private land most of which was previously cultivated, has resulted in unintended consequences of growing wildlife problems in farming landscapes, negatively affecting rural farm-based livelihoods (Bista and Song, 2021; Baral et al., 2021). Such emerging challenges are likely to impact the nature of the future of collective action and CF pathways. This growing problem of wildlife is beyond local communities' capacity and hence needs higher-level policy attention.

8. Conclusion

In this paper, we examined the changing dynamics of community forest management in Nepal focusing on an interplay between forest transition (ecological changes) and community collective action. Our focus has been to show how the forest transition (forest cover change) is

shaped by the combined effects of CF policies, changing local collective actions and rapid socio-economic changes happening in rural Himalaya. We have demonstrated that there is a dynamic interrelationship between the shifting local collective action and evolving forest transition in Nepal and it has huge implications in the community forest management practices in the future. On one hand, community collective action has played a central role in driving forest transition in part of the country, and on the other hand, changing socio-economic context and increased access to trees in the landscape have impacted local collective action with a decline in community participation. Our findings also show how the forest cover changes in rural landscapes happen as a combination of intertwined local and external factors, subsistence farming, livelihood diversification and outmigration. Our analysis suggests the need to reimagine local collective action in the changed context and thinking about the role of forests in rural livelihoods in the future.

The future of community forestry as a model of forest governance depends on how and the extent to which the CF policies (and programs) can combine both the subsistence and commercial needs of rural communities. The traditional form of incentive mechanisms and voluntary participation in forest management directed toward subsistence uses alone are insufficient in generating incentives for collective action at the local level. The forest transition and resource generation has provided certain economic and environmental benefits including the provisioning of ecosystem services to local as well as global communities (such as water and carbon sequestration etc.). At the same time, such a transition has also created new challenges for smallholder farmers - growing damage of crops and livestock by wild animals. The future community forestry policies and institutions hence need to respond to the socio-economic changes and new challenges. We stress the need for research focusing on how the changing forest management is linked to such new problems and what policy and practical options are available in the process of forest transition and emerging new forms of collective action.

CRedit authorship contribution statement

Bishnu Hari Poudyal: Conceptualization, Data curation, Formal analysis, Methodology, Writing – original draft. **Dil Bahadur Khatri:** Conceptualization, Data curation, Formal analysis, Funding acquisition, Methodology, Project administration, Supervision, Investigation, Writing - original draft, Writing - review & editing. **Dinesh Paudel:** Conceptualization, Formal analysis, Writing – review & editing. **Kristina Marquardt:** Conceptualization, Data curation, Funding acquisition, Methodology, Project administration, Writing – review & editing. **Sanjaya Khatri:** Data curation, Methodology, Project administration, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data Availability

Data will be made available on request.

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