Reterritorialization of community forestry: Scientific forest management for commercialization in Nepal

Dil Bahadur Khatri[1]

Dinesh Paudel

Adam Pain

Kristina Marquardt

Sanjaya Khatri

Southasia Institute of Advanced Studies (SIAS), Nepal and Swedish University of Agricultural Sciences, Sweden

Appalachian State University, USA

Swedish University of Agricultural Sciences, Sweden

Swedish University of Agricultural Sciences, Sweden

Southasia Institute of Advanced Studies (SIAS), Nepal

Abstract

Nepal's community forestry is an example of a decentralized, participatory and autonomous development model. However, recent community forestry practices informed by the concept of scientific forestry in resource-rich and commercially lucrative Terai regions of Nepal have reversed community forestry gains. Scientific forestry, enforced through the Department of Forest has reproduced frontier power dynamics creating reterritorialization of community forestry through commercialization. Discouraging subsistence utilization and increasing commodification of high-value timber resources have been crucial in reconfiguring forest authority and territorial control. Moreover, the Scientific Forestry Programs have informally institutionalized rent-seeking practices at the local level. A local level, power nexus has developed among forest officials, contractors

---

[1] Dr. Dil Bahadur Khatri is the Executive Director, Southasia Institute of Advanced Studies (SIAS), Kathmandu, Nepal and Researcher at the Department of Urban and Rural Development, Swedish University of Agricultural Sciences, Uppsala, Sweden. Email: dil@sias-southasia.org. Dr. Dinesh Paudel is Associate Professor, Department of Sustainable Development, Appalachian State University, USA. Email: paudeld@appstate.edu. Dr. Adam Pain is Researcher, Department of Urban and Rural Development, Swedish University of Agricultural Sciences, Uppsala, Sweden. Email: adampain@gmail.com. Dr. Kristina Marquardt is Associate Professor, Department of Urban and Rural Development, Swedish University of Agricultural Sciences, Uppsala, Sweden. Email: kristina.marquardt@slu.se. Mr Sanjaya Khatri, Research Officer, Southasia Institute of Advanced Studies (SIAS), Kathmandu, Nepal. Email: sanjayakhatri52@gmail.com. The research on which this article is based was funded by the Swedish Research Council (Grant No. 348-2014-3778). This article benefited from the intellectual discussions with Dr Lila Sharma during the fieldwork in 2019, and comments from two referees.

and community elites that systematically undermine local participation, allocation of resources for subsistence livelihoods and local autonomy. In effect, scientific forestry is recentralizing forest authority by legitimizing territorial control and the elite accumulation of benefits.

Keywords: Community forestry, scientific forest management, commercialization, power nexus, resources frontier, reterritorialization, Nepal

Résumé

La foresterie communautaire du Népal est un exemple de modèle de développement décentralisé, participatif et autonome. Cependant, les récentes pratiques de foresterie communautaire inspirées du concept de foresterie scientifique dans les régions du Teraï du Népal, riches en ressources et commercialement lucratives, ont inversé les acquis de la foresterie communautaire. La foresterie scientifique, appliquée par le Département des Forêts, a reproduit la dynamique du pouvoir frontalier en créant une reterritorialisation de la foresterie communautaire par la commercialisation. Le fait de décourager l'utilisation de subsistance et d'accroître la marchandisation des ressources en bois de grande valeur a été crucial pour reconfigurer l'autorité forestière et le contrôle territorial. En outre, les programmes de foresterie scientifique ont institutionnalisé de manière informelle les pratiques de recherche de rente. Un lien de pouvoir s'est développé au niveau local entre les fonctionnaires forestiers, les entrepreneurs et les élites communautaires, qui mine systématiquement la participation locale, l'allocation de ressources pour les moyens de subsistance et l'autonomie locale. En effet, la foresterie scientifique recentralise l'autorité forestière en légitimant le contrôle territorial et l'accumulation des bénéfices par les élites.

Mots-clés: Forêt communautaire, gestion scientifique des forêts, commercialisation, lien de pouvoir, frontière des ressources, reterritorialisation, Népal

Resumen

La silvicultura comunitaria de Nepal es un ejemplo de modelo de desarrollo descentralizado, participativo y autónomo. Sin embargo, las recientes prácticas de silvicultura comunitaria basadas en el concepto de silvicultura científica en las regiones del Terai de Nepal, ricas en recursos y lucrativas desde el punto de vista comercial, han invertido los logros de la silvicultura comunitaria. La silvicultura científica, aplicada a través del Departamento de Bosques, ha reproducido la dinámica de poder fronterizo creando una reterritorialización de la silvicultura comunitaria, a través de la comercialización. Desalentar la silvicultura de subsistencia y aumentar la mercantilización de la madera de alto valor ha sido crucial para reconfigurar la autoridad y el control territorial. Además, los Programas de Silvicultura Científica han institucionalizado informalmente la búsqueda de rentas a nivel local. Se ha desarrollado un nexo de poder a nivel local entre los funcionarios forestales, los contratistas y las élites comunitarias que socava sistemáticamente la participación local, la asignación de recursos para los medios de subsistencia y la autonomía local. En efecto, la silvicultura científica está recentralizando la autoridad forestal al legitimar el control territorial y la acumulación de beneficios por parte de las élites.

Palabras clave: Silvicultura comunitaria, gestión forestal científica, comercialización, nexo de poder, frontera de los recursos, reterritorialización, Nepal

1. Introduction

Community forestry in Nepal has long been considered to be a pioneer in advancing successful decentralized participatory development. It has restored forest landscapes (Gautam *et al*., 2003), supporting local people's livelihood (Oldekop *et al*., 2019; Pokharel *et al*., 2007) by allowing certain territorial rights and decision-making autonomy. These successes have been attributed to robust community-level institutions, livelihood-centric approaches to resource utilization and the devolution of power to local communities that ensures grassroots level democratic practices (Pokharel *et al*., 2007; Agrawal and Ostrom, 2001). However, these successes have been confined to the hills where forest resources are not as valuable as in the plain areas of the Terai (Bampton *et al*., 2004; Sinha, 2011). When in the 1990s community forestry gained traction in the hills, the Terai region was not a priority for the forest officials and forests with high value *Sal* timber were not handed over to the communities. But unable to withstand community pressure and political movements, the Department of Forest started handing over community forestry even in the Terai. Since then, it has been looking

for opportunities to reclaim its authority, especially in making decisions about the utilization of timber species (Rutt *et al*., 2015; Baral *et al*., 2018; Nightingale and Ojha, 2013; Ojha, 2008). In this article we will argue that the recently introduced 'Scientific Forest Management' Program (SciFM) has provided distinct decision-making power to a techno-bureaucratic authority[2] of the Department of Forest via processes of commercialization and this has become the ultimate means of recentralizing and reterritorializing community forestry in the Terai. We will explain how these processes of recentralization emerged in everyday practices and why these power dynamics evolved in community forestry in the resource-rich region. This helps us understand the shifting relations between people and forest and emerging regimes of control in the forest sector.

The impacts of commercialization of community forestry on people's livelihood, increasing state control and the unequal distribution of benefits within the communities have been widely studied in Nepal and elsewhere (Paudel, 2016; Iversen *et al*., 2006; Ribot *et al*., 2006; Thoms, 2008; Nightingale and Ojha, 2013). It is clear that because of the economic interests of the Department of Forest and the timber contractors, Nepal's community forestry in the Terai region has been in a state of flux, reconfiguring authority and territorial control (Rasmussen & Lund, 2018). These processes of reconfiguration have gradually centralized power in the forest bureaucracy, exploiting the weak institutional capability of communities to manage high-value forests and the evolving informal power nexus among timber contractors, forest officials and community elites (Paudel, 2016). The commercialization of high-value timber resources has provided opportunities for these shifts and undermined local autonomy in decision-making about what the forests are to be used for, and how (Ojha, 2008; Nightingale and Ojha, 2013; Sunam *et al*., 2013). Equally, the bureaucratic imposition of the Scientific Forest Management (i.e., SciFM) has arguably reshaped the legibility and use of forests, creating new management regimes that provide loopholes for recentralization of power to forestry authorities (Basnyat *et al*., 2020; Paudel, 2016). However, these findings, drawn from the analysis of new forms of authority, power dynamics and policy processes, address the evolving relationships between the state and communities. What is needed, however, is to analyse how the everyday processes of these shifts are creating the possibility for a new resource frontier. On this frontier, access to and control over forests remain contested, allowing for the insertion of bureaucratic power and authority often in alliance with local elites.

The commercial shift in community forestry, especially after the arrival of scientific forestry programs in the Terai area, has altered the very foundations of community forestry, local rights and decision-making autonomy. The main question is how this shift in forestry regime has happened and what are its processes, power dynamics and consequences in these new forest-people relationships.

We use a conceptual framework that brings overlapping processes of power struggles, claim-making on resources, and the daily practices of commercialization into conversation with each other. The framework brings together concepts of frontier-making, reterritorialization and commodification and is used not only to provide an explanation of the everyday practices but also to demonstrate underlying causes and intricate linkages. For example, a continuous reproduction of new resource frontiers – as sites of struggles for control – is necessary in the high-value timber forest areas for the Department of Forest to gain control over them. These frontier-making practices then allow the introduction of state activities such as scientific forestry programs to reterritorialize community forestry, so that commercialization takes place as a natural next step in forest management. In this process, techno-bureaucratic power dynamics mobilize differentiated economic interests of various actors, and forge alliances to institutionalize these practices. This analysis provides a novel analytical lens for us to examine the reimagined forms of forest-people relations.

The following Section elaborates the theoretical angles of the dynamics of new resources frontiers, reterritorialization and accumulation through commercialization. After a brief outline of methods in Section 3, we present the contentious landing of community forestry in Terai with commercializing interests. We organize our findings (sections 5-7) into three strands: first the reproduction of resource frontier dynamics through commercialization and scientific framing, secondly the processes of reterritorialization and emergence of new forms of authority via the scientific forestry program, and thirdly the effects of territorialization on local rights

[2] As Ojha (2006) puts it, in Nepal's forest sector techno-bureaucratic authority emerges in the forest bureaucracy when the technical domain of forestry science combines with bureaucratic authority. This undermines the autonomy of local community groups.

and benefits. We conclude by discussing our findings and highlighting key policy and analytical implications of our analysis.

2. Reterritorialization and frontier making

The concepts of frontier-making and reterritorialization provide a comprehensive understanding of the evolving governance practices in community forestry, where scientific forestry is used to promote commercialization in areas dominated by high-value *Sal* timber forests. These two concepts explain how the reproduction of resource frontier dynamics is a necessary condition to establish a process of commercialization that generates and involves new forms of authorities. Both frontier-making and reterritorialization promote territorial effects, and reconfigure the resource access and decision-making processes to ultimately establish commercialization as a new form of forest governance.

The concept of resource frontiers is widely used to explain how commodification creates a collision of multiple forces that serve the dominant interests of the market, power holders, state agencies and various elements that emerge in the process of extending new power dynamics in controlling land and resources (Peluso, 2018; Cote and Korf, 2018; Lund and Rachman, 2018; Lund and Boone, 2013). Resource frontiers are "not sites where 'development' and 'progress' meet 'wilderness' or 'traditional lands and people'" (Peluso and Lund, 2011: 668). Rather, "frontiers are sites where authorities, sovereignties, and hegemonies of the recent past are challenged by "new enclosures, territorialisation, and property regimes" (*ibid*). The frontiers emerge when "new resources are identified, defined and become subject to extraction and commodification" (Rasmussen and Lund, 2018: 391). Consequently, the frontiers are linked to the process of land control and are actively created through social and political struggles (*ibid*).

In Nepal, community rights and authorities have been challenged and reworked in the Terai region, generating a new forest frontier and regime of forest commercialization (Khatri *et al*., 2018; Paudel, 2016). This involves a shift from the earlier conservation and subsistence management practices towards a production-oriented management and commercialization of timber and non-timber products (Paudel *et al*., 2010; Khatri, 2018; Paudel, 2016; Basnyat *et al*., 2018) and in recent years, carbon forestry (Khatri *et al*., 2018). The recent introduction of SciFM is the latest attempt to create frontiers driven by both state's interests in controlling valuable resources and individual rent seeking practices.

Similarly, the concept of territorialisation complements and expands the idea of frontier dynamics to explain how new forms of authority emerge and (re)establish territorial rights (or control) over resources, such as forests. Territorialization inserts state power over people and resources by controlling the landscape, expanding state governance and disciplining the public practices, widely known as 'governmentality' or 'environmentality' (Foucault, 2007, Moore, 2005; Agrawal, 2005). It particularly relates to claiming authority over territory and hence produces a bundle of power and mechanisms for governing access and allocation of resources (Ribot and Peluso, 2003). In the case of forest resources, the new claims are introduced, challenging and displacing the existing claims of subsistence local uses and generating unequal opportunities and benefits to forest-dependent communities (Peluso and Lund, 2011).

Various governmental techniques and instruments such as the reproduction of political authority, the assertion of bureaucratic control and often through the use of violence are used in the processes of (re)territorialization (Peluso and Vandergeest, 2020; Ramuseen and Lund, 2018). The means through which the reterritorialization is enabled are contingent upon the economic profitability of the resources in question and the history and trajectory of resource governance. In other words, territorialisation and reterritorialization are not monolithic unidirectional processes but rather they involve complex interactions and power dynamics among the actors involved and the interests of dominant groups across time and space (Peluso and Lund, 2011).

In Nepal's community forestry, a certain level of territorial rights of forest management were achieved by local communities for subsistence livelihoods. In the areas of high-value timber in the Terai region, government interests and forest management priorities have shifted from protection and subsistence uses towards commercialization. The scientific forest management scheme has provided a new instrument for that. This shift has implied a recentralization of forest governance through the increasing scientific framing (Paudel,

2016; Rutt *et al*., 2015) and bureaucratic control (Ojha, 2008; Nightingale and Ojha, 2013, Basnyat *et al*., 2020). In this sense, as Scott (1998) would say, the scientific forestry program mobilizes the act of measurement and planning to make the forest legible for commodification.

The combined effect of frontier-making and reterritorialization in community forestry has generated a condition of possibility to establish a commercial system of what we argue is a kind of resource appropriation. The commercial system introduced through scientific forestry brings together these three elements – frontier-making, reterritorialization and allocation of resources – merging informal practices of alliance-building with profit-sharing mechanisms (see Paudel, 2016). Frontier dynamics and reterritorialization are a continuous process and as a result, the constantly emerging practices limit the local rights to access and use certain resources and thereby undermine community level decision-making authorities. The ongoing processes of accumulation without dispossession (*ibid*) in community forestry are already gradually taking a shape of 'accumulation by reterritorialization' with the arrival of scientific forestry.

This framework allows us to examine how scientific forestry has become an instrument of creating new frontier dynamics in Nepal. We are concerned about how the new regimes of scientific forestry have been produced and rationalized (legitimized) and how the reterritorialization of frontier forests has unfolded. It also helps us explain how the implementation of SciFM has reproduced authority for resource control. Explaining the effects of the new regime on local resource use and the decision-making authority of local communities can have lasting impacts on community-based resource governance.

3. Methodology

This article draws on our tracking of the emergence of scientific framing in Nepal's community forestry and a detailed investigation on how the scientific forest management scheme has been implemented in the resource-rich region of southern plain[3] (see Figure 1). We reviewed the Scientific Forest Management Guideline (2014) endorsed by the Department of Forest (DoF, 2014) to understand how scientific forestry has been justified and what it means in terms of technical and bureaucratic processes. We also reviewed the Community Forest Products Collection and Sale Directives (MoFSC, 2014) to understand the bureaucratic requirements to harvest and sale timber in community forestry. In addition, we also examined other government policies such as Forest Sector Strategy 2014, Forest Policy 2015 and the updated Forest Policy 2019 to understand how scientific forestry has been rationalized and became a government's priority program. The field study covered five Community Forestry User Groups (CFUG) from Sindhuli and Kapilbastu districts (see Figure 1), that were selected based on the experience of SciFM implementation, CFUG 4 and CFUG 1 being one of the pioneer groups to implement the scheme in the respective districts and others started recently. These districts were the first districts to pilot the SciFM programs in 2010.

The case studies (see Table 1) focused on understanding the village-specific processes of SciFM implementation, including the role played by the key actors and the sharing of costs and benefits. In the case study CFUGs, we visited community forest sites to observe the forest dynamics and conducted group meetings with people involved in the SciFM implementation (active members from the CFUG executive committee). We focused on their experiences of implementing the scheme and how they dealt with forest bureaucracy and contractors in the process. We then conducted semi-structured interviews with about 2-3 households per CFUG (ten households in total) to explore how ordinary members of CFUGs experienced the implementation of SciFM.

In addition, we held key informant interviews (6) with the officials from the divisional and sub-divisional forest offices and timber contractors. We also had two group meetings with district units of the

[3] We focused our study on the resource-rich region of southern plan including Terai and Chure of Nepal (See Figure 1) where the government concentrated the implementation of the Scientific Forestry Program. In this article, we use Terai as both Terai and Chure, and they have largely common characteristics in terms of forest management and commercial exploitation of resources.

Federation of Community Forestry Users, Nepal (FECOFUN) to understand their perspective on the SciFM. Debriefing meetings among the research team from the very beginning of field work helped us to develop the analysis. All the interviews were recorded, transcribed and was coded later for analysis. We have anonymised the names of forest user groups and other respondents to maintain confidentiality.

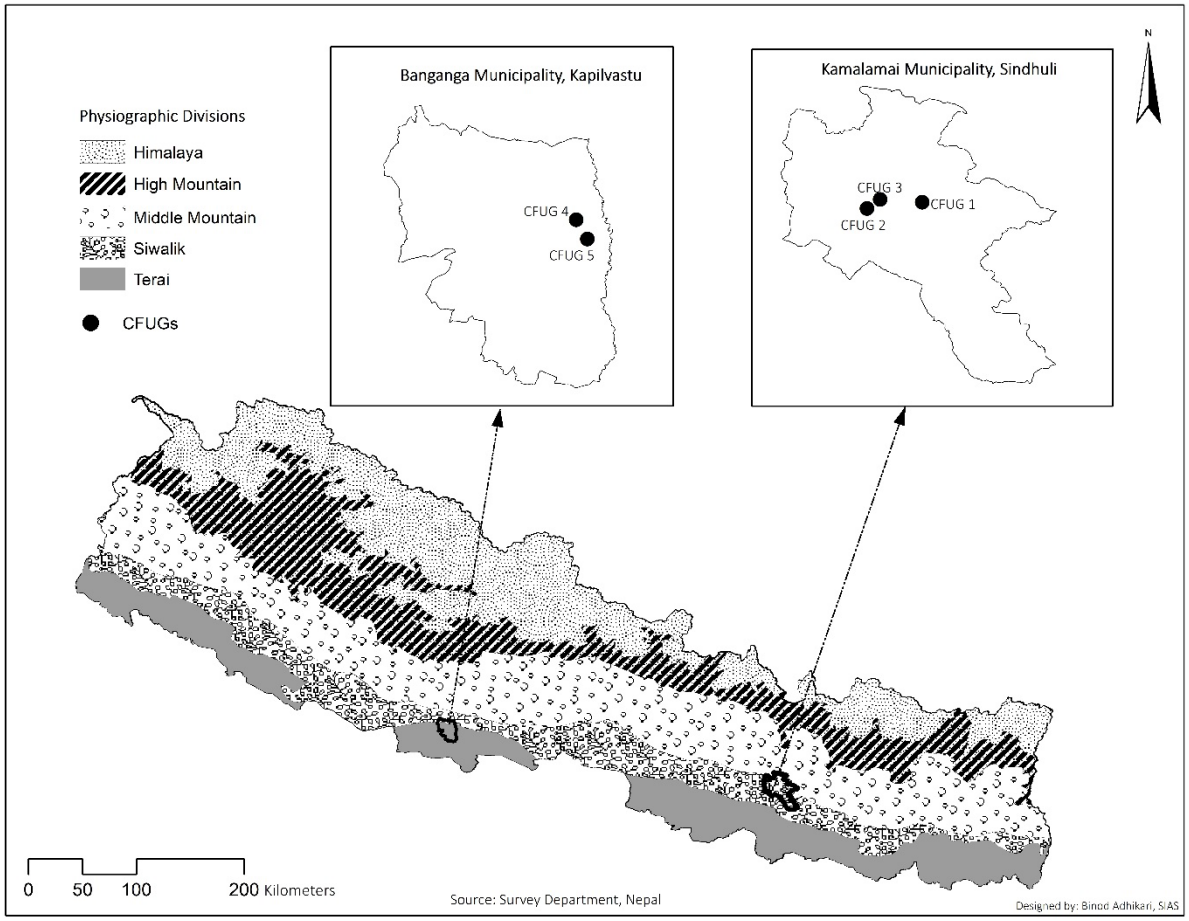

Figure 1: Case study sites.

CFM/CFUG	Number of Households	Forest Area (Ha)	Handover date	Years of SciFM implementation	Field study conducted
CFUG 1, Sindhuli	368	111	2055 (1998/99)	2068 (2011/12)	2017, 2019
CFUG 2, Sindhuli	203	399.28	2051 (1994/95)	2075 (2018/19)	2017, 2019
CFUG 3, Sindhuli	119	281.53	2051 (1994/95)	2074 (2017/18)	2019
CFUG 4, Kapilvastu	528	263.43	2066 (2009/10)	2074 (2017/18)	2019
CFUG 5, Kapilvastu	115	110.08	2066 (2009/10)	2071 (2014/15)	2015, 2019

Table 1: Description of the studied CFUGs. Source: Field study

4. The contentious landing of community forestry in the Terai

The decentralization of conservation and management of forests in Nepal was initiated in the mid 1970s with the primary objective of reversing the widespread deforestation and forest degradation caused by the failure of the centralization policy adopted in the 1950s and 1960s (Acharya, 2002; Guthman, 1997). The Master Plan for Forest Sector 1988 proposed a user group-based approach for community forestry, and established it as a priority program. It was implemented widely in the mid-hills with the primary objective of restoring the degraded forests and meeting subsistence forest product needs (Koirala *et al*., 2008; Pokharel *et al*., 2007; Acharya, 2002). This was achieved by restoring once degraded mountains and meeting people's forest products needs in the mid-hills (Gautam *et al*., 2003; Adhikari *et al*., 2007).

In the Terai area, the government was reluctant to implement community forestry because of the high-value timber forests. It was only initiated in the Terai in early 2000, and prioritising the commercial extraction of timber (Iversen *et al*., 2006). The Forest Act of 1993 and Forest regulation of 1995, which established the legal basis for forest user groups, made no distinction between the establishment of community forestry in the hills or the Terai. However, tactical resistance was offered by District Forest Officers (DFOs) by finding different reasons, such as land registration, to block or delay the community forest handover processes. One of the bureaucratic tactics used to delay the handover in Terai was the creation of the Operational Forest Management Plans.[4] These established various categories of protection and production forests, and those that could potentially be handed over as community forests. These potential community forestry areas were restricted to the degraded forestlands with low timber density, and the rate of formation of community groups was very low. In Rupandehi and Nawalparasi districts, for example, potential community forest areas amounted to some 20 and 11 percent respectively of the district forest area (Iversen *et al*., 2006).

However, following the democratic changes since 1990 and the mushrooming of networks of lobby groups including civil society institutions such as FECOFUN with a community forestry agenda, the Department of Forest (DoF) faced pressure from increasingly confident and assertive communities seeking their rights to gain access to community forests. By 2002, of the 11,586 CFUGs registered, 98% (11341) of them were located in the mid or upper hill areas and only 245 were handed over to communities in the Terai (Chhetry *et al*. 2003:51). However, the expansion of community forestry in the Terai not only initiated the scientific framing and commercialization of community forests, which we discuss later, but it also became a contentious issue and a topic for national debates.

There are particular features of the Terai forests, not least their high-value marketable timber that has made them particularly contentious arenas of struggle. Before the 1950s, the plain areas of Terai region was sparsely settled by indigenous communities and the forests were a primary source of revenue for the government. But the elimination of malaria in the 1950s led to major resettlement programs, and now more than half of Nepal's population lives in the Terai. This has had various consequences. First, most of the forest was cleared in the south of Terai leaving a narrow band of high-value forests in between the north of Terai and the Mahabarat and Churia foothills of the Himalayas. Second, the influx of migrants from the hills not only displaced many of the indigenous forest users from their traditional territory but also led to the creation of very mixed social groups in terms of caste, class and ethnicity. Hence, Terai communities are therefore markedly less homogenous than those in the mid-hills. One outcome of this is that, CFUGs particularly when they have command over high-value forests can often be divided, conflictive and unstable.

It is clear that though the CFUGs in Terai were able to establish certain territorial rights over their forests and the management of high-value resources led to new dynamics of resource control. With the move towards commercialization, not only were private interests in profit activated (Iversen *et al*., 2006; Paudel, 2016), but institutional interests of the Department of Forest to recentralize authority were promoted (Ojha, 2008). As we elaborate below, there gradually developed a new resource frontier where state interests to maintain bureaucratic control met with profit-making interests from high-value *Sal* timber using the CF as a vehicle.

[4] In early 1990, Nepal's forestry ministry developed a plan to promote productive forest management in the Terai called the Operational Forest Management Plan (OFMP) (1991-1995). The plan to implement silviculture-based management in government-controlled forests could not be implemented because of resistance from community forestry activists (see Bampton *et al*., 2007).

5. Frontier making: embedding commercialization and scientific framing in community forestry

The expansion of Community Forestry (CF) in the Terai during early 2000 marks a significant departure in terms of commercialization of CF and introduction of the scientific framing. Private interests for commercial exploitation of high-value *Sal* timber prevailed in the CF expansion process and timber contractors started to sponsor the process of CF handover by investing money and political connections (also see Paudel, 2016; Iversen *et al*., 2006). Some community leaders also mobilized their political connections and forged alliances with contractors so as to complete the technical requirements to undertake forest inventories and prepare management plan popularly known as the operational plan (OPs).[5] This was a step towards gaining access to large areas of forest.

The first step of such scientific framing in CF was the introduction of the mandatory forest inventory provision for the preparation of the OPs. The CFUGs were required to determine 'annual allowable harvest' (AAH) of major products such as timber, and explain the procedures in the operational plans. Though the rule was opposed by Federation of Community Forestry Users Nepal (the CFUG federation) and NGOs (Fischer, 2017; Ojha, 2009), the provision was enforced and the DFOs would not approve the OPs without the annual allowable harvests defined based on the prescribed guidelines.

As CFUG leaders (interviewed in April 2019) in our study sites reported, the communities struggled to meet the new requirements as the forest inventory demanded technical expertise and financial resources. In Sindhuli, the majority of CFUGs were established before the inventory requirements were introduced. However, the CFUGs were required to conduct an inventory during the subsequent revision of their OPs. As reported by the chairperson of CFUG 2 (interviewed in April 2019), the inventory was carried out by the district forest office staff but all the financial costs were borne by CFUGs. He estimated that with meeting daily allowances (NPR 300-500[6] i.e. US$2.5-4.2) and food for the technicians, in total a CFUG would spend about NPR 25,000 to 50,000 (US$208.3-416.7) for the development of an OP.

In contrast to Sindhuli, the studied CFUGs in Kapilvastu[7] were handed over in 2009/10. In the group interview conducted in CFUG 4 in April 2019, the participants reported that the group had generated funds by harvesting and selling of surplus timber even before the CF was formally handed over. These sales provided them the funds needed to pay the forest inventory costs and get the forest handed over. The CFUG 4 for instance invested about NPR 100,000 (US$833.3) for the forest inventory during the time of CF handover in 2012.

The initiation of commercial extraction of timber in CF also led to increased bureaucratic control. The Department of Forest started heavily regulating the harvest and sale of timber from CF by issuing a regulating decree (MoFSC, 2014), which required the DFO's involvement in several stages during harvesting and selling of timber (see Table 3). The decree also required the use of an iron hammer (*Tancha*)[8] from both the CFUG and DFO to harvest and sell timber. While the forest department claimed these processes were necessary measures to control illegal activities, such practices were seen by local communities and FECOFUN as an attempt by the Department of Forest to reassert control over valuable resources.

By 2010, competing and parallel discourses were established in the forestry sector which led to two different and contradictory policy outcomes and the implementation of opposing programs. First, the Ministry of Forests and Environment (then Ministry of Forest and Soil Conservation) initiated the Chure conservation programs which restricted the harvesting of timber in the region. Reinforcing the conservation logic, the government imposed a national ban on cutting down of healthy (green) trees across the country to mark the international year of forestry in 2011. However, as we found during the field study, such restrictions had

[5] Operational plan is the management plan of community forests, prepared jointly by the CFUG and DFO, and is approved by DFO. The plan is prepared for 5-10 years.

[6] $1 USD is equivalent to 120 NPR.

[7] Kapilvastu is a neighbouring district to Rupandehi which went through the similar struggle of CF establishment as Rupandehi.

[8] An iron hammer includes a unique code of issuing forest authority (DFO) that marks on the timber permission for felling and transportation. For the commercial harvesting and sale, the CFUGs are also required to own the hammer and use it alongside DFO hammer.

remained. The CFUGs in all study sites were not allowed to fell green trees but only dead and decayed trees, which was insufficient to meet their internal demands.

Second, as a response to the demand for productive forest management from some officials within the Department of Forest, the ministry introduced a new silviculture-based forest management scheme, naming it Scientific Forest Management (i.e., SciFM) to be implemented in the resource-rich region of the Terai. The logic for initiation of the SciFM program was established through a discourse of productive forest management and generating revenue. Around 2010-2011, Nepal's forest sector was engaged in a discussion concerning the sub-optimal use of community-based forest resources especially timber and the consequential shortfall in timber supply in domestic markets. There was a huge increase in the price of timber which increased the import of timber from Malaysia and other parts of the world (Banjade, 2013). Officials drove this discourse and started to advocate for more production-oriented management, particularly in Terai. A small group of officials then started piloting silviculture-based commercial forest management in a few community and collaborative forests[9] in Kapilvastu and Nawalparasi districts. In 2014, the Department of Forest developed guidelines for the implementation of SciFM scheme.

From 2014, the scientific forestry became the priority agenda of the Ministry of Forests and Environment (MOFE) which was reflected in the ministry's vision of 'forest for prosperity.' Since then, the SciFM has received greater attention from the ministry and has been bolstered by policy instruments. For example, the Forest Sector Strategy in 2014 and the Forest Policy 2015 have emphasized the need for productive forest management and increased revenue from the forest sector. The recent forest policy (2019) reinforces this emphasis on scientific forest management to meet the growing demand for forest products and contribute towards economic prosperity (GoN, 2019:3).

As of July 2020, the SciFM program has reached all seven provinces covering 58 districts out of 77 districts in Nepal. The program covered more than 750 community forests covering 177,321 hectares of forestlands and 15 collaborative forests of about 40,000 hectares. The government has also implemented the program in seven patches of government-managed forests covering 14,572 ha. However, the government of Nepal halted the program in late 2020 based on the recommendation of a high-level committee commissioned by the government to review the program and its implementation. Currently the government of Nepal has initiated a multi-stakeholder process to revisit the program and suggest ways forward. It is more likely that the program will be renewed with slight modifications to be implemented in a bigger scale.

In the Chure region, the implementation of SciFM contradicts the government's own logic of conservation. The SciFM scheme is used as an instrument for timber harvesting. As we found in the study sites, the felling of green trees was only allowed under the SciFM scheme. The CFUGs who implemented the scheme saw this as a tool that allowed them to harvest timber and generate income. The chairperson of a CFUG in Sindhuli interviewed in January 2017 reported:

> Felling trees has not been allowed in the region. There was a huge timber demand from users, and it has further increased after the 2015 earthquake. We had not been able to provide timber to members. We learned from the DFO that felling trees would be allowed if CFUG adopted the SciFM scheme and we became interested in it. The SciFM would also allow us to generate income for local development.

Other CFUGs studied in both districts shared a similar experience of harvesting restrictions. For all of them, the SciFM became a window of opportunity to harvest timber to meet local demands and sell the surplus timber. In summary, along with the expansion of CF in resources-rich region, there emerged a new dynamics of resources frontier where state interests to maintain resources control were embedded in commercial interests

[9] Collaborative forest management is one of the decentralized forest management arrangements in Nepal where management of relatively larger patches of forests (compared to the community forest areas) are collectively governed through a mechanism involving local community representatives, government bureaucracy and local government representatives.

to extract high-value timber resources. These new frontier dynamics provided a ground for the reterritorialization of CF in the region, the process of which we elaborate in the following section.

6. Reterritorialization of community forestry: The politics of implementing scientific forestry

The SciFM scheme was technically demanding in terms of preparing rigorous Operational Plans (OPs) and harvesting regimes. According to the government guidelines (DoF 2014), each community forest would be subjected to 80 years of crop rotation and each CF was divided into eight blocks and each block, in turn, divided into 10 sub-blocks (felling coups). In the first block, management activities were to be carried out for 10 years (one sub-block each year) and then were to move to another block. A detailed inventory of trees, saplings and regeneration was required in the first block, and a harvesting scheme is defined in the OP. The guidelines recommended using an irregular shelterwood system or selection system depending on the nature of the forests and the slope of the terrain (i.e., shelterwood for old-growth forests in plain areas and a selection system is suggested for mixed forests and in sloped terrain). The management objective was to remove the old growth and replace it with new regeneration which will mature for harvesting after 80 years (the rotation period). Further, the guidelines require that a CF must be larger than 100 hectares to implement SciFM, favouring natural *Sal* (*Shorea robusta*) forests in Terai but this excluded many of the small-sized CFUGs in the mid-hills.

The implementation of SciFM starts with the preparation of a technical OPs under bureaucratic control. In our study sites, such management plans were prepared either through the DFO budget or CFUG's fund. In Sindhuli, the DFO had a budget line to implement SciFM with the allocation of NPR 400,000-500,000 (US$3333.3-4166.7) per CFUG and it was used in preparing OPs. In contrast, though the DFO in Kapilvastu had an annual budget to support SciFM implementation, the CFUGs funds were utilized to implement SciFM.

In both cases, the technical task of preparing a management plan was outsourced to forestry consultants (individuals or firms) by the CFUGs. DFO officials prefer particular consultants, which means that the officials could influence the annual harvestable quantity and other details of the plans. In Kapilvastu, DFO rejected the OP prepared by CFUG 4 since they hired a consultant without consulting the DFO officials. The rejection was made on the ground that the departmental guidelines were not followed accurately in determining the number of mother trees to be retained, and the total annual harvest of timber. The CFUG had to prepare the OP a third time incurring a cost of NPR 1,400,000 (US$11,666.7), which was about three times higher than that would be required normally.

The preparation of the operational plan involves the key technical tasks of conducting a forest boundary survey using GPS (global positioning system), and then a division of blocks and compartments. A digital map of the forest is prepared with the layout of the blocks and compartments. A detailed inventory of the forest is then carried out to assess the forest cover, growing stock, and annual increment. As a forest officer reported (interviewed in April 2019) 'proudly', every individual tree in the forest is geo-referenced and all trees are numbered and marked with a blue tag. He added that the presence of DFO staff in the process is required to ensure that the departmental guidelines are strictly followed. The operational plan requires endorsement from CFUG general assembly and then approval from DFO. As it shows, not only is the scheme a top-down imposition, it also involved significant bureaucratic processes to get the OP prepared and approved by DFO.

Once the OP is approved, the CFUG can initiate annual timber harvesting operations which also involve bureaucratic regulation (see Table 3). The CFUG needs to apply for harvesting permission from the DFO enclosing the decisions of the CFUG general assembly, specifying the total amount of timber to be harvested. After the permission is granted by the DFO, the staff from the sub-division office visit the CFUG for marking all trees to be felled. After that, they require another permission from the DFO to carry out the actual felling. Finally, the trees are felled, also in the presence of staff from the sub-division office. The staff required in the

different stages do not only charge fees[10] (and expect good food) but often also expect a payment from both the CFUGs and the involved contractors.

There was a slight variation in terms of how the tree felling and logging were carried out in the two studied districts. In Kapilvastu, all the activities of felling and logging were outsourced to contractors[11] who owned power chainsaws. The cost for felling and transportation to the depot was fixed for the whole district and in Kapilvastu it was set at NRs140/cft (3.962m^3).[12] Ordinary CFUG members were not directly involved in the harvesting operation in Kapilvastu as they lacked the skill to operate the power chainsaw. In contrast, in Sindhuli only the specialized service related to tree felling and transportation was outsourced. For example, CFUGs hired people with power chainsaws to fell and log trees and tractors were hired for transportation. Other activities such as trimming logs, loading and unloading etc., were carried out by the CFUG members themselves. This means that the demanding technical requirements excluded ordinary people from participation in the forest management and harvesting, an issue we will deal with in the following Section.

As we found, carrying out the harvesting not only involves technical and bureaucratic surveillance from the DFO, but also involved costs to the CFUGs. These costs are associated with the timber harvesting (see Table 2) and transportation, and also paying the costs of involvement of government technicians. To meet these costs, some CFUGs borrow money from contractors in an advance. In Sindhuli, two CFUGs borrowed money for harvesting and transportation of timber. For example, CFUG-3 borrowed NRs 300,000 (US$2500) in 2018 to build an access road to the forest. The CFUGs in Kapilvastu did not report that they borrowed money from contractors. However, a representative of the CFUG federation during a group meeting in Kapilvastu reported that most of the CFUGs do borrow from the contractor to pay the cost for harvesting. The money was paid back after the timber was sold. As FECOFUN officials reported, the contractors are willing to invest to ensure that s/he gets tender to sell timber later.

Table 3 outlines the detailed steps involved in the process of SciFM implementation and it indicates a high degree of bureaucratic control. As we can see, the DFO staff are required to be involved in about 14 major steps throughout the process of planning and implementation of SciFM. Though many of these rules and bureaucratic requirements were already in place before SciFM was started, CFUGs in Sindhuli felt that the existing practices of timber distribution had been reworked when SciFM was initiated. For example, DFO requires the CFUGs to deposit the timber in an indicated depot before even distributing it to the CFUGs, something that has increased the costs or price of timber in the village, a matter we return to.

The departmental guideline requires that the CFUGs should sell the surplus timber through a tender process involving contractors (timber traders). The CFUG arranges the tender process but the involvement of DFO officials is required (see Table 3). However, mostly the tender process is a formality as the contractors who did prior investment in harvesting would secure the tender. In Kapilvastu, the contractors managed to buy timber for NRs 1400-1500/cft (39.62-42.45 m^3) which is nominally above the district rate (i.e., district rate for A-grade *Sal* log in Kapivastu was NRs 1400/cft i.e., US$11.7). As reported by a FECOFUN representative and also confirmed by one of the DFO officials, there were only a few instances where CFUGs got a competitive price of up to NPR 2500/cft (US$20.8).

[10] We were told by committee members of one of the CFUGs in Sindhuli that they pay NRs 1600 (US$13.3) per day for the officer, NRs. 1200 (US$10) for rangers, and NRs. 1000 (US$8.3) for forest guards.

[11] The contractors, the local timber entrepreneurs (mostly local residents and often CFUG members and the representatives of CFUG federation).

[12] 1 Cubic foot (cft) is equivalent to 0.0283 Cubic meter (m^3)

CFUG	OP preparation		Number of fellings	Timber extraction per year (cft, m^3)	Internal use (cft, m^3)	Sale (cft, m^3)	Total income from timber	Total expenditure on SciFM activities
	CFUG investment	DFO support						
CFUG 1	300,000 ($2500)	500,000 ($4166.7)	3	1,200 (34m^3)	1,200 (34 m^3)	NA	350,000 ($2,916.7)	250,000 ($2,083.3)
CFUG 2	225,000 ($1875)	500,000 ($4166.7)	2	7,500 (212.3m^3)	500 (14.2 m^3)	6,000 (169.8 m^3)	2,000,000 ($16,666.7)	1,700,000 ($14,166.7)
CFUG 3	700,000 ($5833.3)	Technical support	3	3,200 (90.7 m^3)	300 (8.5 m^3)	2,000 (56.6 m^3)	3,620,000 ($30,166.7)	3,006,000 ($ 25,050)
CFUG 4	660,000 ($5500)	NO support	2	14,000 (396.2 m^3)	6,000 (169.8 m^3)	5,600 (158.48 m^3)	18,400,000 ($153,333.3)	2,100,000 ($17,500)
CFUG 5	300,000 ($2500)	Technical support	4	9517 (269.3 m^3)	1400 (39.6 m^3)	6243 (176.7 m^3)	19,378,300 ($161,485.8)	18,404,000 ($153,366.7)

Table 2: Implementation of SciFM in the case study CFUGs. Note: The figures are for the fiscal year 2018/2019. Source: Field study

The tender outcomes confirmed the existence of timber syndicate fixing the tender process and this was seen as a major governance issue by both CFUGs and DFO staff. As reported by a forestry official (interviewed in April 2019), "there is no fair competition in the tender process, and CFUGs are not getting a good price for timber."

The process outlined above shows that an informal alliance of key actors such as forestry officials, contractors and community elites was key in driving SciFM implementation. As we observed, it was almost impossible for the CFUGs to get through the bureaucratic processes to conduct annual harvesting operations without the involvement of the contractors.

The Chairperson of one of the CFUGs in Sindhuli (interviewed in April 2019) reported in a group meeting that,

> We applied for felling permission in February this year (2019) and are still waiting for permission. The group requested the officer from the sub-division office a number of times but the officer had not prioritized a visit to the CF. We have been told that the sub-division office has limited staff and they could not prioritize. It is hard to believe the officer. Neighbouring CFUGs had got permission two months earlier, felled the trees, and are now planning to sell timber. I believe that if we [the CFUGs] had involved contractors in the harvesting operation, we would get permission on time.

The Chairperson added, "In case of other groups, the contractor plays an intermediary role between DFO staff and that involves payment of rent for getting things done. We are happy to cover the cost of food and daily allowances of the staff but we cannot meet their undue expectation." The secretary of the same group reinforced the point, "The forest officer tells us indirectly to consult other CFUGs regarding costs for their involvement. We learned from the neighbouring CFUGs who got felling permission that contractor dealt with the payment for officials, and they do not know the amount paid."

SN	Name of activity	Description of activity	Remarks
	Planning:		
1	Boundary survey and forest inventory	Forest boundary survey using GPS, mapping of blocks and compartments, and detailed inventory of forest resources	Additional requirement for SciFM
2	Operational Plan preparation and approval	OP preparation and approval from DFO.	Need a more detailed plan than earlier
	Harvesting and collection		
3	Preparation for SciFM implementation	Determining the number of mother trees jointly by DFO staff and consultants	Additional requirement
4	Felling permission	CFUG needs to submit an annual plan for DFO approval for tree felling	Existing rule
5	Chhapan/marking	Marking of trees (using the hammer of both CFUG and DFO staff)	Existing rule
6	Verification by DFO	Trees marked are verified by DFO and can be further checked by the regional forest directorate	Enhanced scrutiny by DFO under SciFM
7	Felling permission	CFUGs need to apply for felling permission	Existing rule
8	Felling operation	Tree felling and logging are done under the direct supervision of DFO staff	Enhanced scrutiny by the sub-division office
9	Marking of logs and grading (Muchan/Tancha)	Logs are marked with the hammer and graded before transportation to the depot.	Existing rule
10	Transportation and Ghatgaddi (stacking in the depot)	Sub-division office takes records of the logs in Ghatgaddi/depot.	Existing rule
	Distribution and selling		
11	DFO permission for tender	Need DFO permission for a tender process	Existing rules
12	Opening and approval of the tender	Tender documents are opened in the presence of a DFO representative	Existing rule
14	Chhod purji/Transport permission	The contractor needs DFO permission for transportation. DFO puts the final mark (hammer) for the transportation of logs outside of the district.	Existing rule

Table 3: DFO involvement in forest management and selling. Source: Field studies

Further, as we learned, the DFO and contractors often develop an alliance across the chain of timber extraction and sale. In an interview in April 2019, FECOFUN officials, the chairperson of CFUG 2 in Sindhuli (who also holds a position in the federation), picked up a phone and started to talk with the secretary of his CFUG. The conversation appeared to suggest that the DFO staff wanted to have a separate stack of timber to be allocated for selling outside of the group. Later, he reported to us that the contractors pursued the DFO staff to influence the CFUGs to allow better quality logs to be allocated for the tender process.

In summary, the implementation of the technically demanding SciFM scheme not only intensifies the bureaucratic control, but also reproduced a new form of authority through the nexus of powerful actors for controlling resources. In this process, not only the local forest use rights are undermined but also the existing regime of local participation and resource access was changed. Below we elaborate on the effects of reterritorialization.

7. Territorial effects: Consequences for local rights and benefits

The reterritorialization of CF through scientific forest management appeared to have reworked some rules and practices related to decision-making in the CFUGs and the allocation of resources. Below, we elaborate how the new regime of forest management has evolved with implications for local control over forest management and use.

First, the SciFM being a technically demanding scheme, has directly restricted the community participation in forest management-related activities and decision-making processes. As mentioned earlier, there was no direct involvement of local communities in forest harvesting activities in Kapilvastu. In Sindhuli, there was some level of direct involvement of local people but their role in decision-making has become limited (see Appendix, Table 4). Outsourcing harvesting and logging to contractors limited local participation in forest management. In some cases, local men with specialised skills such as operating chainsaws were involved in harvesting and logging activities as wage labour, and we found negligible involvement of women in such forest management-related activities in the study sites.

Second, though the CFUGs have certain rights to decide on forest management and use, it appeared that forestry officials and other technicians hired to develop OPs prevailed in making key forest management-related decisions i.e., deciding the felling regimes and annual harvest of timber. This meant that the implementation of SciFM is a joint action of CFUG and DFO. Within CFUGs, only the key position holders in the CFUG committee are involved in the process of preparing the OP and carrying out management operations. Those key position holders were mostly men, and women's role in decision making was found to be limited. Though the decision to implement SciFM needs to be made by CFUG general assembly, there was little awareness among the ordinary members of CFUG about SciFM and its consequences (see Appendix, Table 4), where key decisions are made by committee members and DFO staff.

These findings reinforce that the SciFM implementation is driven by a nexus of powerful actors, including those in the villages. A new form of authority has emerged from alliances of powerful actors driven by economic interests and has notable consequence on local communities' motivation for collective action (also see Paudel, 2016). While we found CFUG members were still willing to contribute towards the conservation of forests for future benefits i.e. key forest products such as timber, some CFUG members in Sindhuli indicated a declining motivation for such voluntary contributions.

Third, there are mixed perceptions about the local benefits of the SciFM implementation in the study sites, but we have consistent findings revealing that SciFM has intensified corruption and rent-seeking practices. In Kapilvastu, the CFUG members were happy to get timber for house construction again from their CF (see Table 4), something they had been denied for the last five years. They reasoned that this was thanks to the SciFM, as timber harvesting was not allowed before. Their timber price were NRs. 700-800 (US$5.8-6.7) per cubic feet for the A-grade *Sal* log which is slightly less than the revenue rate fixed by the government (which is NPR 1,000 i.e., US$8.33). Further, they valued that the CFUG had invested money in local development activities, most prominently the construction of a road and support to local schools. However, in Sindhuli, people were of a different view about the local benefit of the SciFM scheme and they complained about the increased timber price after SciFM implementation. Before the SFM scheme they could get a tree or log in the forest at the rate of NRs 250 (US$2.1) per cubic feet and they would manage to get timber home on their own through community labour exchange.

The commercialization of forest management involving scientific forestry in Terai has several visible effects in terms of CFUG governance and local access to resources. The processes of reterritorialization of CF has marginalized the local community, the possibility of ordinary CFUG members to participate in the forest management activities and decision-making processes. Instead of supporting the village needs, the scientific management has been merely used as a tool towards increasing commercialization of high value timber in CF, leading towards an accumulation by reterritorialization, something we will discuss below.

8. Conclusion

We have demonstrated the evolving dynamics of the implementation of scientific forestry programs in community forestry focusing on how the scientific framing and commercialization have created the conditions for frontiers making possibilities leading to a reterritorialization of community forests in the high-value timber areas of the Terai region in Nepal. We have shown how community forestry in the region evolved differently from that in the hills, and how scientific forestry and commercialization have effectively established a resource frontier and reterritorialization generating direct implications for the local level autonomy, decision-making rights and benefit distribution mechanisms. The analysis demonstrates that the expansion of CF in Terai became contentious not only because of the initial reluctance from the Department of Forest to hand over community forests to the communities but also due to the redefined objective of community forestry management shifting towards commercialization (also see Iversen *et al*., 2006; Paudel, 2016). In effect, community forestry in resources-rich regions has become an instrument for resource extraction and profit-making rather than a decentralized means of supporting livelihoods and ecologies. This process resonates with the creation of frontier dynamics in the context of commercially lucrative resources such as land (as well as for mining or commercial agriculture) (Lund and Boone; 2013; Wolford *et al*., 2013; Cote and Kort, 2018). In the case of Nepal's community forestry, the creation of such frontier dynamics has become a necessary condition to institutionalize commercialization of high-value timber resources as a natural next step in community forestry (Rutt *et al*., 2015; Basnyat, 2020, Paudel, 2016).

Such a move towards commercialization was driven by the dual forces of the state and the local elites (also see Paudel, 2016; Iversen *et al*., 2006; Basnyat, 2020); and the state's interest to re-establishing control over high value timber and private interest of making profit. In other words, the SciFM scheme was justified to serve the national agenda but it also involved the institutionalized corruption practices in the forest sector, promoting rent-seeking and profit for the middlemen (Basnyat, 2020; Paudel, 2016; Iversen *et al*., 2006). As a result, commercialization, intensified reterritorialization of community forests allowed the forestry authorities to become more powerful in making decisions.

The implementation of the SciFM scheme required the technology of modern forest management (see Scott 1998), such as geo-referencing every tree. Further, it favoured expert knowledge and bureaucratic surveillance questioning the competencies of local communities in managing forests as argued by Ribot *et al*. (2006). The implementation consequently involved powerful actors and through that nexus a new form of authority of resource control has emerged (see Paudel, 2016). These dynamics of reterritorialization of frontier resources have resonance with the argument made by Korf *et al*. (2016: 882) that "frontier dynamics have often been a state-driven process where state elites, capitalists and 'frontiersmen' have colluded in a rush to claim land and dispossess local inhabitants of the frontier." In the case of Nepal's community forestry, scientific forestry and commercialization have not only enhanced the state's control over forest management but have also led to accumulation by territorialization. In the process of such accumulation the new form of authorities and power dynamics have become institutionalized through a collusion of forces of the market, the state and local elites with the common interest of making profit.

We argue that reterritorialization involved intertwined process of capitalization and bureaucratic control. That process, pushed by the interests of the market and capital-centric decision making, has further reconfigured the existing institutional practices of forest-dependent communities, reorganized power relations between forestry authorities and local communities, and reshaped forest-people interactions. There has been some level of resistance against the growing scientific framing and state control over community forestry led by the leadership of the FECOFUN and other public intellectuals and researchers (also see Fischer, 2017; Ojha, 2013), yet the discourses of scientific forestry have become dominant in shaping everyday practices at the local level. In effect, the implementation of SciFM has reconfigured some of the forest use rules. By restricting the local access to timber for the local community and raising the timber price for the internal CFUG buyers, the forest benefits for local people have reduced, especially for the poor and marginalized populations. With the promoted recentralization of forest resources, power and authority seem to recede even further from the members of Nepal's community forestry user groups. These dynamics of resource control through a commodification of forest management resembles the implementation of the global carbon forestry program of REDD+ in Nepal (Khatri *et al*., 2018; Khatri, 2018) and elsewhere (Fairhead *et al*., 2012; Peluso and Lund,

2011; Beymer-Farris and Bassett, 2012; Osborne, 2013) where local rights and benefits are subjugated to meeting carbon sequestration results.

While earlier studies by political ecologists have adequately highlighted the increasing bureaucratic control (Ojha, 2006; Nightingale and Ojha, 2013) and recentralization tendency in community forestry (Sunam *et al*., 2013; Basnyat *et al*., 2020) through scientific framing and commercialization, our analysis provides novel insights in terms of how the frontier-making and reterritorialization happens in resource-rich regions and how this process makes 'accumulation by territorialization' possible in community-managed forests. This analysis has a clear and important policy message that attention to safeguarding local autonomy and benefits is needed when commercialization and scientific forestry are implemented in locally managed forests.

References

Acharya, K. P. (2002). Twenty-four years of community forestry in Nepal. *International Forestry Review*, *4*(2), 149-156. https://doi.org/10.1505/ifor.4.2.149.17447

Adhikari, B., Williams, F., & Lovett, J. C. (2007). Local benefits from community forests in the middle hills of Nepal. *Forest Policy and Economics*, *9*(5), 464-478. https://doi.org/http://dx.doi.org/10.1016/j.forpol.2005.11.002

Agrawal, A. (2005). *Environmentality: Technologies of government and the making of subjects*. Duke University Press.

Agrawal, A., & Ostrom, E. (2001). Collective action, property rights, and decentralization in resource use in India and Nepal. *Politics & Society*, *29*(4), 485-514. https://doi.org/10.1177/0032329201029004002

Bampton, J. F. R., Vickers, B., Rana, B., & Statz, J. (2004). Community Forestry in the Terai region of Nepal. In *Twenty five years of community forestry: Proceedings of the Fourth National Workshop on Community Forestry,* Kathmandu: Community Forestry Division, Department of Forest.

Bampton, J. F., Ebregt, A. and Banjade, M. R., (2007). Collaborative forest management in Nepal's Terai: policy, practice and contestation. *Journal of Forest and Livelihood*, *6*(2): 30-43.

Banjade, M. (2013). Discourse and discursive practices over timber in Nepal. *Journal of Forest and Livelihood*, 10(1): 58-73. https://doi.org/10.3126/jfl.v10i1.8601

Banjade, M. R., Paudel, N. S., Karki, R., Sunam, R., & Paudyal, B. R. (2011). Putting timber in the hot seat: discourse, policy and contestations over timber in Nepal. *Discussion Paper series* 11.2. Forest Action. Kathmandu. https://www.forestaction.org/app/webroot/vendor/tinymce/editor/plugins/filemanager/files/2.%20%202011_11.2_Jun_Discussion%20Paper%2011.2_Timber%20Discourse.pdf

Baral, S., Meilby, H., Khanal Chettri, B. B., Basnyat, B., Rayamajhi, S., & Awale, S. (2018). Politics of getting the numbers right: Community forest inventory of Nepal. *Forest Policy and Economics*, *91*, 19-26. https://doi.org/10.1016/j.forpol.2017.10.007

Basnyat, B. (2020). Commodifying the community forestry: a case from scientific forestry practices in Western Hills of Nepal. *Journal of Forest Research*, *25*(2), 69-75. https://doi.org/10.1080/13416979.2020.1743406

Basnyat, B., Treue, T., Pokharel, R. K., Baral, S., & Rumba, Y. B. (2020). Re-centralisation through fake scientificness: The case of community forestry in Nepal. *Forest Policy and Economics*, *115*, 102147. https://doi.org/10.1016/j.forpol.2020.102147

Basnyat, B., Treue, T., Pokharel, R. K., Lamsal, L. N., & Rayamajhi, S. (2018). Legal-sounding bureaucratic re-centralisation of community forestry in Nepal. *Forest Policy and Economics*, *91*, 5-18. https://doi.org/10.1016/j.forpol.2017.08.010

Beymer-Farris, B. A., & Bassett, T. J. (2012). The REDD menace: Resurgent protectionism in Tanzania's mangrove forests. *Global Environmental Change*, *22*(2), 332-341. https://doi.org/https://doi.org/10.1016/j.gloenvcha.2011.11.006

Chhetry, B., Francis, P., Gurung, M., Iverson, V., Kafle, G., Pain, A. & Seeley, J. (2003). *Social structure, livelihoods and the management of common pool resources in Nepal*. Working Paper. ODG, Norwich.

Côte, M., & Korf, B. (2018). Making Concessions: Extractive Enclaves, Entangled Capitalism and Regulative Pluralism at the Gold Mining Frontier in Burkina Faso. *World Development,* 101: 466-476. https://doi.org/10.1016/j.worlddev.2016.11.002

DOF (2014). Scientific Forest Management guideline. Department of Forests: Kathmandu, Nepal.

Fairhead, J., Leach, M., & Scoones, I. (2012). Green Grabbing: A new appropriation of nature? *The Journal of Peasant Studies*, *39*(2), 237-261. https://doi.org/10.1080/03066150.2012.671770

Fischer, F. (2017). *Climate crisis and the democratic prospect: Participatory governance in sustainable communities*. Oxford University Press.

Foucault, M. 2007 (2004). *Security, territory, population: Lectures at the College de France, 1977–78*. Picador.

Gautam, A. P., Webb, E. L., Shivakoti, G. P., & Zoebisch, M. A. (2003). Land use dynamics and landscape change pattern in a mountain watershed in Nepal. *Agriculture, Ecosystems & Environment*, *99*(1–3), 83-96. http://dx.doi.org/10.1016/S0167-8809(03)00148-8

GoN (2019). *National Forest Policy 2019*. Government of Nepal, Kathmandu.

Guthman, J. (1997). Representing crisis: The theory of Himalayan environmental degradation and the project of development in post-Rana Nepal. *Development and Change*, *28*(1), 45-69. https://doi.org/doi:10.1111/1467-7660.00034

Iversen, V., Chhetry, B., Francis, P., Gurung, M., Kafle, G., Pain, A., & Seeley, J. (2006). High value forests, hidden economies and elite capture: Evidence from forest user groups in Nepal's Terai. *Ecological Economics*, *58*(1), 93-107. http://dx.doi.org/10.1016/j.ecolecon.2005.05.021

Khatri, D. (2018). *Climate and development at the third pole: Dynamics of power and knowledge reshaping community forest governance in Nepal*. PhD dissertation, Swedish University of Agricultural Sciences, Sweden.

Khatri, D. B., Marquardt, K., Pain, A., & Ojha, H. (2018). Shifting regimes of management and uses of forests: What might REDD+ implementation mean for community forestry? Evidence from Nepal. *Forest Policy and Economics,* 92: 1-10. https://doi.org/10.1016/j.forpol.2018.03.005

Koirala, R., Giri, K., & Pokharel, B. K. (2008). *Development and status of Community Forestry governance in Nepal*. Conference paper, 2008 National Convention of Society of American Foresters, Reno-Tahoe, Nevada.

Korf, B., Hagmann, T., & Emmenegger, R. (2015). Re-spacing African drylands: Territorialization, sedentarization and indigenous commodification in the Ethiopian pastoral frontier. *The Journal of Peasant Studies*, *42*(5), 881-901. https://doi.org/10.1080/03066150.2015.1006628

Lund, C., & Boone, C. (2013). Introduction: Land politics in Africa–constituting authority over territory, property and persons. *Africa*, *83*(1), 1-13. https://doi.org/10.1017/S000197201200068X

Lund, C., & Rachman, N. F. (2018). Indirect recognition: Frontiers and territorialization around Mount Halimun-Salak National Park, Indonesia. *World Development,* 101: 417-428. https://doi.org/10.1016/j.worlddev.2017.04.003

MoFSC (2014). Community forest products collection and sale directives. Ministry of Forest and Soil Conservation, Nepal.

Moore, D. S., (2005). *Suffering for territory: Race, place, and power in Zimbabwe*. Duke University Press.

Nightingale, A. J., & Ojha, H. R. (2013). Rethinking power and authority: Symbolic violence and subjectivity in Nepal's Terai Forests. *Development and Change*, *44*(1), 29-51. https://doi.org/10.1111/dech.12004

Ojha, H. (2008). *Reframing governance: Understanding deliberative politics in Nepal's Terai forestry*. Adroit, New Delhi.

Ojha, H. (2013). Counteracting hegemonic powers in the policy process: critical action research on Nepal's forest governance. *Critical Policy Studies*, *7*(3), 242-262. https://doi.org/10.1080/19460171.2013.823879

Ojha, H. R. (2006). Techno-bureaucratic doxa and challenges for deliberative governance: The case of community forestry policy and practice in Nepal. *Policy and Society*, *25*(2), 131-175. https://doi.org/http://dx.doi.org/10.1016/S1449-4035(06)70077-7

Ojha, H. R. (2009). Civic engagement and deliberative governance: the case of Community Forest Users' Federation, Nepal. *Studies in Nepali History and Society, 14*(2): 303–334.

Oldekop, J. A., Sims, K. R. E., Karna, B. K., Whittingham, M. J., & Agrawal, A. (2019). Reductions in deforestation and poverty from decentralized forest management in Nepal. *Nature Sustainability*. https://doi.org/10.1038/s41893-019-0277-3

Osborne, T. M. (2011). Carbon forestry and agrarian change: access and land control in a Mexican rainforest. *The Journal of Peasant Studies*, *38*(4): 859-883, http://doi.org/10.1080/03066150.2011.611281

Paudel, D. (2016). Re-inventing the commons: community forestry as accumulation without dispossession in Nepal. *The Journal of Peasant Studies*, *43*(5), 989-1009. https://doi.org/10.1080/03066150.2015.1130700

Paudel, D., Khatri, D. B., & Paudel, G. (2010). Corpo-bureaucratizing community forestry: commercialization and the increased financial transaction in community forestry user groups in Nepal. *Journal of Forest and Livelihood, 9*(1): 1-15. https://doi.org/10.3126/jfl.v9i1.8587

Peluso, N. L. (2018). Entangled territories in small-scale gold mining frontiers: labor practices, property, and secrets in Indonesian gold country. *World Development,* 101: 400-416. https://doi.org/10.1016/j.worlddev.2016.11.003

Peluso, N. L., & Lund, C. (2011). New frontiers of land control: Introduction. *The Journal of Peasant Studies*, *38*(4), 667-681. https://doi.org/10.1080/03066150.2011.607692

Peluso, N. L., & Vandergeest, P. (2020). Writing political forests. *Antipode 52*(4), 1083-1103. doi: https://doi.org/10.1111/anti.12636

Pokharel, B. K., Branney, P., Nurse, M., & Malla., Y. B. (2007). Community forestry: Conserving forests, sustaining livelihoods and strengthening democracy. *Journal of Forest and Livelihood*, *6*, 8-19.

Rasmussen, M. B., & Lund, C. (2018). Reconfiguring frontier spaces: The territorialization of resource control. *World Development,* 101: 388-399. https://doi.org/10.1016/j.worlddev.2017.01.018

Ribot, J. C., & Peluso, N. L. (2003). A theory of access. *Rural sociology*, *68*(2), 153-181. https://doi.org/https://doi.org/10.1111/j.1549-0831.2003.tb00133.x

Ribot, J. C., Agrawal, A., & Larson, A. M. (2006). Recentralizing while decentralizing: how national governments reappropriate forest resources. *World Development*, *34*(11), 1864-1886. https://doi.org/https://doi.org/10.1016/j.worlddev.2005.11.020

Rutt, R. L., Chhetri, B. B. K., Pokharel, R., Rayamajhi, S., Tiwari, K., & Treue, T. (2015). 'The scientific framing of forestry decentralization in Nepal'. *Forest Policy and Economics,* 60: 50-61. doi:https://doi.org/10.1016/j.forpol.2014.06.005

Scott, J. C. (1998). *Seeing like a state: How certain schemes to improve the human condition have failed*. Yale University Press.

Sinha, D. R. (2011). Betrayal or 'Business as Usual'? Access to forest resources in the Nepal Terai. *Environment and History*, *17*(3), 433-460. https://doi.org/10.3197/096734011x13077054787226

Sunam, R. K., Paudel, N. S., & Paudel, G. (2013). Community forestry and the threat of recentralization in Nepal: Contesting the bureaucratic hegemony in policy process. *Society & Natural Resources*, *26*(12), 1407-1421. https://doi.org/10.1080/08941920.2013.799725

Wolford, W., Borras Jr., S. M., Hall, R., Scoones, I., & White, B. (2013). Governing global land deals: The role of the state in the rush for land. *Development and Change*, *44*(2), 189-210. https://doi.org/10.1111/dech.12017

Annex-1 (Table 4): Household perception on SciFM and its benefits

CFUGs	HHs	Perception about SciFM	Benefits	Participation in SciFM activities
CFUG 4	HH1	We get timber and CFUG generates money for development activities i.e. road.	Fuelwood, fodder, and litter. 22 cft timber in 2018.	Involved in thinning and clearing of the fire line.
CFUG 4	HH2	Do not know much about SciFM (but he seemed aware of the key activities).	20 cft timber in 2019.	Involved in thinning, pruning, and fire line clearing.
CFUG 4	HH3	Only committee members are involved, we don't know much.	The timber of NRs10,000. Timber price doubled compared to 5 years before.	Worked as wage labor during harvesting. Other HH members were involved in thinning and weeding.
CFUG 4	HH4	Don't know much about SciFM. Committee members are involved and I believe they are doing good.	Used timber from an old house and have not bought timber from CF. Learned from neighbors that the timber price is quite high.	Sometimes, members of my family go for fire control and clearing the fire line.
CFUG 4	HH5	We were told that SciFM is good. We are managing the forest and getting timber.	30 cft timber in 2017.	Involved as wage labour for boundary surveys and tree felling.
CFUG 3	HH6	We are felling trees and I fear if we can get similar-sized trees in the future.	SciFM is very expensive for us. We worked hard to protect forests but now need to pay a high price for timber.	We go for bush clearing and thinning and are paid i.e. NRs 2100 for 3 days.
CFUG 3	HH7 (Ex-chairperson)	Not sure if we can have a similar forest in the future but our committee is generating money from SciFM and doing some development i.e. support to school and roads.	Before, timber was cheaper. Now contractors buy timber and take it out.	People are not happy with the timber price. SciFM has become like share cropping (Adhiya)
CFUG 2	HH8 (EC member)	Some people are not happy and feel that the forest may not grow as before.	Timber price increased to NRs 700 per cft from 300 and hard for people to afford.	We go for bush clearing and fire line clearing and get food and some cash. Involved in harvesting, own power chain saw.

CFUG 1	HH9	We are doing management and it will be good.	Not bought timber	All households involved in cleaning and weeding and the committee provides snacks and cold drinks.
CFUG 1	HH10	I heard about SciFM but don't know much. What I know is that we will clean bushes and protect saplings.	Not bought timber	Go to the forest for clearing bushes and get snacks.

Source: Field study in April/May 2019