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## Pathways to forest wealth in Nepal

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### ABSTRACT

Nepal is one of the leading countries embracing community forestry with about 45% of households being members of community forest user groups. However, there has been a failure to deliver the full potential of forest wealth because of a lack of proper silvicultural management, a constraining policy environment and a complex socio-institutional context. Meanwhile, mid-hill agriculture has not kept pace with the changing economy and out-migration. Food insecurity is rife in a landscape of under-utilised forests and under-utilised land. Australian development assistance between 1978 and 2006 supported the establishment of 21 000 ha of community forests and significant contributions to community forest institutions. In the light of the under-performance of this sector, the Australian Centre for International Agricultural Research established the project Enhancing Food Security and Livelihoods through Agroforestry and Community Forestry in Nepal, locally known as EnLiFT, which ran from 2013 to 2018. This paper aims to explain Australia's contribution to Nepal's forestry, with a focus on more recent achievements supporting pathways to realise the potential wealth in Nepal's forests. It begins with an outline of the early Australian support and origins of community forestry in Nepal via the Nepal–Australia Forestry Project, and then the current status of community forestry. It then describes the research process of the EnLiFT project starting with new conceptual models and methods such as: (1) the Pathways Approach to link forest and food security; (2) the EnLiFT Bioeconomic Model of the Farm–Forest Interface; (3) the Silvo-Institutional Model for Scientific Forest Management; (4) Active and Equitable Forest Management; (5) Rapid Silvicultural Appraisal; (6) the Strategic and Inclusive Planning process and (7) EnLiFT Policy Labs. We also highlight many significant development impacts of EnLiFT. The demonstration and training of silvicultural methods released considerable forest wealth into the community. This occurred around the time of the 2015 earthquake when timber was in need for reconstruction. It was also associated with the re-vitalisation of a defunct sawmill by facilitation of community-private partnership. It was responsible for turning the public debate from resistance to acceptance of scientific forest management. It also developed inclusive planning processes for the revision of operational plans of community forests. On privately owned land, EnLiFT demonstrated: (1) the possibility for marked and rapid changes in livelihoods from relatively simple agroforestry interventions based on horticultural commodities and tree fodders; (2) an even greater potential for livelihood enhancement through private forestry and (3) articulated the current institutional and regulatory constraints on sale of trees from private land. We conclude by highlighting the contributions of EnLiFT in policy debate which led to policy outcomes that further the improvement of community forestry, agroforestry and bringing under-utilised land back into productive use.

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## Introduction

The practice of international support for forestry in developing countries is a long-term interdisciplinary endeavour. Two inescapable facts contribute to the complexity of this endeavour: (1) forest growth cycles span several decades while development funding cycles only a few years and (2) the biological growth of forest resources, and consequent economic and ecosystem benefits, is not only dependent on physiography and climate, but also on the cultural, institutional and political environment. While a forest is growing, so the society that depends on this forest is also growing and changing. Forestry is as much about people as it is about trees (Westoby 1987) and, regardless of how holistic and long term the vision of a forestry project is conceived, there are inevitably serious constraints on what can be achieved within any particular project. However, when there is a long-term commitment to support forestry development, remarkable results can be achieved as successive projects build legacy, good reputation and capacity for real impact. The Australian Government's

commitment to forestry development aid to Nepal is an excellent case study of this.

Nepal has received a wide range of international development support for forest management. Since 1966, the Australian Government has supported Nepal's forest sector; initially as development assistance from Australian International Development Assistance Bureau (AIDAB), then from AusAID. These investments included five phases of the Nepal–Australia Forestry Project (NAFP 1966–2003), the Nepal Australia Community Resource Management and Livelihoods Project (NACRMLP 2003–2006), and to a lesser extent, within four phases of the Micro Enterprise Development Program (1998–2018). Since 2012, new investment in research for development modality has occurred through the Australian Centre for International Agricultural Research (ACIAR). Apart from a gap of six years (2006–2012), this Australian support has been relatively unbroken. Despite this long contribution to Nepal's forestry sector, its impact and influence on the management of Nepal's forests is poorly documented.

This paper aims to explain Australia's contribution to Nepal's forestry, with a focus on more recent achievements supporting pathways to forest wealth in Nepal. The context, genesis and achievements of the NAFF, followed by a more detailed explanation of the interdisciplinary conceptual frameworks developed under the recent ACIAR-funded project 'Enhancing Livelihoods and Food Security through Agroforestry and Community Forestry in Nepal', known locally as EnLiFT, and summarise its key results.

### Early Australian support and the origins of community forestry in Nepal

In the 1970s there was a serious international concern about the state of Himalayan landuse, linked to Nepal's rapid population growth, farming on steep slopes and communities' dependence on forest products in their subsistence agricultural systems (Eckholm 1975). The prominent environmentalist, Dr. Norman Meyers, expressed a fear that deforestation and unregulated grazing and agricultural practice would lead to erosion of Himalayan soils into the Bay of Bengal (Myers 1986). Ives (1989) challenged this view and argued that the Himalayan subsistence farmers needed to be viewed as part of the solution rather than the cause of deforestation. In time this scenario was seen to be an overstatement and indeed declared a 'myth' (Fisher 1990; Satyal et al. 2017). As with all myths, it still held influence even in the light of evidence to the contrary (Ives 2012).

Nepal was one of the first countries to focus on community forestry as the primary national strategy of its forest policy. In 1978, Nepal enacted Ministerial directives (Panchayat Forest Rules, 1978 and Panchayat Protected Forest Rules, 1978), which provided the policy for government forests to be handed over to the local government for management and use. These directives deliberately emphasised the protection of forests, rather than using the forest to meet the needs of the local people. There followed a gradual realisation that community forestry can only be effective if local peoples' needs and participation are given a central position. The Seventh Five-Year Plan (1985–1990) explicitly prioritised the mobilisation of peoples' participation in afforestation and forest management to ensure that their subsistence needs were met. The *Decentralisation Act, 1987* introduced the concept of User Groups and a legislative structure for local administration of forests. In 1987, the First National Community Forestry Workshop was held which enabled the Department of Forests and projects, such as NAFF, to discuss experiences in implementing community forestry. The workshop participants convinced the policymakers that further devolution was necessary for the improved management of forests and to expand the scope and effectiveness of community forestry (Shrestha & Britt 1998).

In 1998, His Majesty's Government of Nepal, with support from Asian Development Bank (ADB)/Finnish International Development Agency (FINNIDA), finalised the development of Master Plan for the Forestry Sector, which signalled the intention for a phased handing over of all the accessible hill forests to the local communities, to the extent that they were able and willing to manage them, as well as allowing the users of these forests to receive all of the income derived from forest utilisation. Implementation of this policy required processes and guidelines (HMGN 1992) to identify and then register community forest user groups (CFUGs) as well as negotiate operational plans (OPs) for their forests (Bartlett 1992).

In the early 1990s, Nepal enacted legislation (*Forest Act, 1993* and *Forest Regulation, 1995*), that enabled government forest land to be categorised as community forest and for communities to manage these forests and utilise products under a management plan approved by the District Forest Office (Gautam et al. 2004; Bhattarai 2016). The underlying philosophy for community forestry in Nepal involves putting people at the centre of forestry rather than the technical forestry knowledge that usually resides with forestry staff (Gilmour & Fisher 1991). Community forest user groups have the devolved rights and responsibilities of management and sustainable utilisation of forest produces (Thoms 2008). While this philosophy continues, questions are raised on a range of issues including equity, livelihood benefits and the possibility of commercial use of forests (Gilmour 2016; Shrestha 2016; Thwaites et al. 2017).

### Nepal–Australia Forestry Project

Australian support was instrumental in the emergence of community forestry in Nepal. Australia was among many donor countries that offered technical forestry expertise in the 1970s and 1980s in response to soil erosion and land degradation in Nepal. During this time there was a transformation in the conceptual paradigms of development practitioners throughout the world from top-down technical interventions to bottom-up social mobilisation (Blaikie 1985). This also played out within the forestry sector in the emergence of community forestry approaches. The uptake of community forestry was particularly successful in Nepal, and the NAFF was a notably important contributor to this movement.

Australian support for Nepal's forest sector began in 1966, but it was not until January 1976 that the assistance became known as the 'Nepal–Australia Forestry Project' and activities were commenced in the Chautara Forest Division, which comprised Sindhu Palchok and Kabhre Palanchok Districts (Griffin 1988). Pioneering initiatives, led by the then Divisional Forest Officer and some visionary community leaders with the support of NAFF, saw local forest nurseries and plantations established with active community support and participation (Mahat et al. 1987b). By the mid-1980s, the importance of the remnant forests to the subsistence agricultural lifestyles was recognised as was the ongoing degradation of these remnant forests due to increasing population in these areas (Mahat et al. 1987a).

Between 1978 and 1985, the project facilitated the planting of nearly 5000 ha of forest lands with community support and, by the early period of NAFF3, about 2000 ha of new planting was occurring each year (Griffin 1988). Given the degraded nature of many of the planting sites, greater survival occurred when the hardy indigenous Chir pine (*Pinus roxburghii* Sarg.) was planted, but when these sites were protected from grazing many other indigenous broad-leaved species established naturally within a few years (Gilmour & Fisher 1991). By the end of the Australian assistance in 2006, about 21 000 ha of new community forests had been established and survived in the two project districts (Cribb 2006)—this being a truly remarkable achievement that left a legacy for future use by local communities.

In the late 1980s, evidence was emerging that local people were often very active in the management of local native forests and that these indigenous forest management systems, some of which had existed for decades, arose from community initiatives and involved both technical and social arrangements

(Fisher 1989; Bartlett & Malla 1992). Gilmour (1990) noted that, in some parts of the Middle Hills region, these indigenous systems for managing local forests arose because of forest products shortages, and the forests were managed extra-legally for local benefit even though the legal ownership of forest lands rested with the government. During this period, the NAFP shifted its primary focus from one of forest resource creation to one of facilitating management of existing forests with local community participation (Hobley 1987) and benefit sharing (Chhetri & Nurse 1992). In doing so, it played a key role along with some other donor-funded projects in assisting the Government of Nepal to develop appropriate processes for implementing community forestry. These included published (Gilmour & Fisher 1991; Bartlett & Nurse 1992) and various unpublished documents that influenced the development of the 1992 Operational Guidelines of the Community Forestry Programme and subsequently the 1993 Act and 1995 Regulation.

By the early 1990s, the project, which by then had become known as the Nepal–Australia Community Forestry Project (NACFP), was working with nearly 200 CFUGs and had assisted with the negotiation of nearly 100 OPs for community forests over a five-year period (Bartlett 1992). By early 1995, NACFP had facilitated the handing over of 8891 ha of forest to 281 CFUGs which collectively included 33 548 household members (Chhetri & Jackson 1995).

### **NAFP role in establishing Chaubas-Bhumlu community sawmill**

During the late 1970s and the 1980s, NAFP facilitated the establishment of about 400 ha of planted pine forest on highly degraded land around the village of Chaubas in Kabhre Palanchok district (hereafter referred to as Kavre). During the early 1990s, about 297 ha of these forests was handed over to four CFUGs to manage. Then, in early 1996, these four CFUGs jointly established the Chaubas-Bhumlu community sawmill, with the support of an interest-free loan from NACFP (Singh 2005). The sawmill had the capacity to process about 150 cbf of logs each day. Each CFUG was contracted to supply logs to the sawmill, which could supplement this supply with timber purchased from other CFUGs and private landowners. This community enterprise was governed by a management committee comprised of representatives from each CFUG, with 80% of the revenue generated from its operations to be distributed back to the four CFUGs. Between 1996 and 2004 the sawmill purchased over 62 000 cbf of logs and produced almost 30 000 cbf of sawn timber, most of which was sold into the Kathmandu market (Singh 2005). The sawmill continued to operate after Australian assistance concluded, though its operation was impacted by disputes within the CFUGs and also during the Maoist revolution. Under-performance of the sawmill and its eventual closure was due partly to the environment of mistrust among the member CFUGs and between the community leaders with competing interests to benefit from the timber trade, in addition to the government's new policies restricting logging and transportation of timber in 1999 and 2000.

### **Current status of community forestry in Nepal**

Currently, Nepal is one of the leading countries to embrace forest management programs that involve local communities (Gautam

et al. 2004; Pandit & Bevilacqua 2011; Thwaites et al. 2017). Under this program, 1 800 000 ha of accessible national forests were formally handed over to the locally organised CFUGs. Currently, there are 19 361 CFUGs engaging 2 400 000 households which is, according to the population census of 2011, about 45% of the total households in the country (DoF 2017).

Each CFUG prepares its own OP specifying the systems of forest management, development and utilisation (DoF 2014). Over time, forest policies have encouraged CFUGs to implement OPs that generate an expanded range of goods and services to benefit local communities and contribute to national development (MFSC 2015). Several studies and review reports have revealed the success of community forestry in halting deforestation and improving forest condition (Niraula et al. 2013; DFRS 2015; Gilmour 2016). However, it is argued that improved environmental resources are rarely concomitant with the increased flow of benefits to the local communities (Thoms 2008).

In the early 2000s, it was becoming increasingly recognised that many community forests were under-utilised and the benefit flow stagnated at sub-optimal levels due mainly to the passive management practices (Coleman 2009; Yadav et al. 2009). The Ratemate CFUG, located near Dhulikel in Kavre, provides a typical example. In 2012, the CFUG was composed of 500 households of which 350 were of low caste. Their 114 ha community forest, which is dominated by Chir Pine with some regenerating broadleaved species, had been established in the 1970s under NAFP and handed over to the CFUG in 1994. Despite having a current OP, the mature forest was being conservatively managed. The CFUG was generating annual revenue of about NRS 300 000 per year (approx. USD 2700), including NRS 100 000 from pine resin, NRS 120 000 from timber and firewood sales and NRS 80 000 from member fees and fines. This revenue equated to only USD 4.80 per CFUG household per year. The under-performance of community forests in contributing to improved livelihoods is a common problem and is partly a governance problem; there is a reluctance by government officials to approve the cutting of timber prescribed for harvesting in OP and a temporary ban on harvesting greenwood was imposed by the government in 2010 (Tamang et al. 2012).

The potential value of the timber in these forests has not been realised because of the lack of thinning to encourage better growth of remaining trees. This is partly due to lack of expertise and capacity, but also the dominant conservation ethos at all levels of society. There has been a widely held resistance to thinning of forests, regardless of the scientific merit of doing so. Indeed, even the term 'Scientific Forest Management' (SFM) used by the forest administration has met resistance from the media and civil society. Bear in mind that the English word 'scientific' will have its local interpretation by non-native English speakers. In this case, it was as if the word 'scientific' connotes industrial-scale felling and misappropriation of forest wealth by urban elites.

Furthermore, many forest-based enterprises struggle to survive because of ineffective value-chains for the products they produce. Nevertheless, many studies have documented the positive, although limited, contribution of community forestry to livelihoods (e.g. Shrestha 2016). There has also been a significant emphasis during the past decade on redressing social exclusion and reducing poverty, but questions remain on how the forests can be best managed to

deliver livelihood benefits (Ribot et al. 2010; Shrestha 2016; Thwaites et al. 2017).

Nationally, there is still a 51% gap between supply and demand for forest products in the Middle Hills (Hobley 2013). Access to these products is also inequitably distributed. Nepalese society has entrenched patterns of discrimination and disadvantage along lines of ethnicity, caste and gender. Intra-community equity in decision-making and benefit sharing remains skewed in favour of local elites (Shrestha 2009). Landholding size also varies greatly, with the poor and disadvantaged having limited access to land. Malla (2000) reported that, on average, the wealthiest households own more than four times as much land as the poorest ones. The so-called untouchable people (Dalits) are among the most marginalised people, both socially and economically. For example, 48% of people belonging to Dalit castes are below the poverty line, compared with 19% for the Brahmin/Chhetri castes (Malla 2000).

Half of Nepal's forest has prospects for active forest management and has the potential to generate around 1 000 000 full-time jobs and to generate 60 000 000–120 000 000 cbf/annum timber. Unfortunately, Nepal has not been effectively utilising its own timber resources and has been importing around 5 000 000 cbf timber due mainly to lack of proper silvicultural interventions, a constraining policy environment and complex socio-institutional context.

Against this background, ACIAR funded a Small Research Activity in 2012 to scope the research for a new forestry project in Nepal that facilitated the preparation of background papers and a workshop. The five papers prepared by Nepalese NGOs covered topics of: national policies and strategies (Karanjit et al. 2012); existing knowledge on agroforestry and community forestry (Pandit et al. 2014); drivers of agrarian transformation (Paudel et al. 2012); constraints and gaps in knowledge (Tamang et al. 2012) and mapping of institutions (Paudel 2012). These were later synthesised by Gilmour and others (2014). A three-day workshop held in Kathmandu was attended by 50 government, research and civil society stakeholders in agriculture and forestry. Many of the participants in the 2012 workshop had been involved in the NAFF. This workshop developed research questions that were reformulated for an ACIAR project called 'Enhancing livelihoods and food security from agroforestry and community forestry in Nepal' which was soon given the short title of EnLiFT.

## EnLiFT: Enhancing Food Security and Livelihoods through agroforestry and community forestry in Nepal

### Research process

EnLiFT was a five-year project over the period 2013–2018 (Nuberg et al. 2018). The project aimed to enhance livelihoods and food security from the improved implementation of agroforestry and community forestry systems in the Middle Hills of Nepal. It was a partnership between the University of Adelaide, University of New South Wales, the World Agroforestry Center (Bogor), the Government of Nepal's Department of Forests, non-government actors ForestAction Nepal, Nepal Agroforestry Foundation, International Union for Conservation of Nature, SEARCH-Nepal, Federation of Community Forest Users of Nepal (FECOFUN) and the Institute of Forestry. Whereas the NAFF operated in Kavre and Sindhupalchok

districts, in the central region of Nepal, EnLiFT operated in Kavre district and also in Lamjung district, located in the western region (see Fig. 1). Three villages in each district were focus sites, 300 farming households were targeted for agroforestry action research interventions, and 1200 households over 24 CFUGs were targeted to work as clusters for action research activities related to community forestry.

This project followed an adaptive action research approach with mixed quantitative and qualitative methods reflecting its interdisciplinary nature. This allowed triangulation within and across research themes for rigour and integration of the overall research activities. By mid-2015 there were seven streams of research activity, summarised in Table 1, and the outcomes of which are described in the section *Successes and learnings from EnLiFT*.

### New conceptual frameworks and methods

The disciplinary and contextual scope of EnLiFT was very broad: including biophysical aspects of forest and agroforestry management, markets, regulations, institutions affecting farm and forest, community planning, governance of community forests and overarching policies. It operated from the field-plot level, to household, community, local and national government. Such complexity demanded new conceptual frameworks and methods.

The successful frameworks that EnLiFT developed are explained below. Though developed specifically for the context of Nepal, they can be modified for other contexts where the livelihoods of rural people are closely connected to forests.

### Pathways approach to link forest and food security

The majority of the literature on food security discusses it in terms of: available calorific energy from smallholder crops; crop seasonality; the nutritive value of those crops and the equitable access to those commodities within communities and households. Food security is usually framed within the context of '... physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life' (FAO 1996).

In Nepal, 45 out of 75 districts are recognised as food insecure. Over 3 500 000 people are experiencing 'moderate to severe' shortages with insufficient food to stave off hunger, or obtain sufficient calories to work, and get through the day (ICIMOD 2018).

As the average farm size is only 0.66 ha (GoN 2013) it is highly unlikely that enough year-round nutrition could be produced for the average rural household size of 4.8 people (GoN 2017) regardless of what advances in plant breeding and agronomy could be imagined. However, trees on farms and in community forests can provide income that is used to purchase high-value food. In addition, rural households, in the middle-hills region at least, have access to an average of 0.7 ha of community forest (Hobley 2013). EnLiFT identified four distinct pathways through which community forests contribute to food security as a source of: (1) income and employment; (2) inputs to increase food security; (3) directly for food and (4) renewable energy for cooking (see Fig. 2; Karki et al. 2017).

Despite emerging pathways linking forest management to food systems at the local level, forestry policies and institutions have neither explicitly recognised nor strengthened the linkage between forest and food security. From the outset, EnLiFT

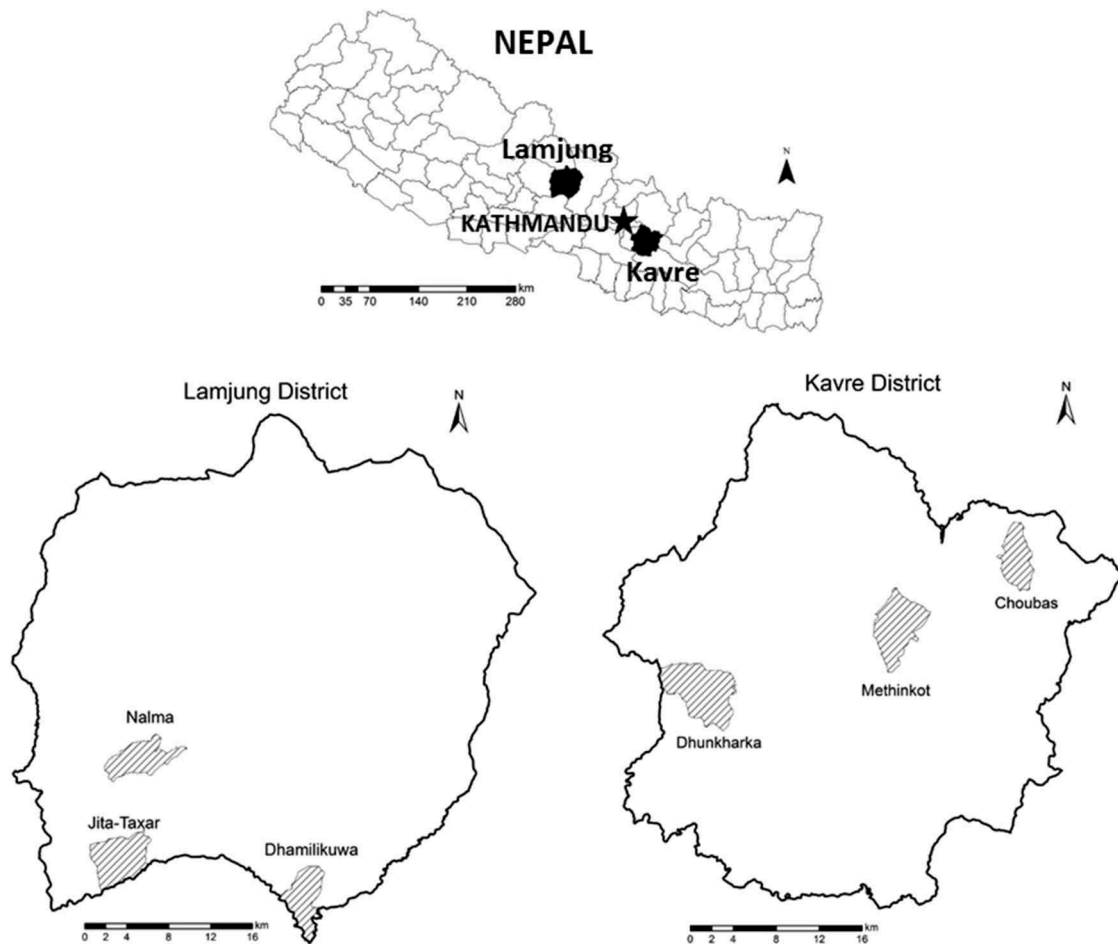


Figure 1. Kavre and Lamjung districts and research sites within the context of Nepal

held that there is a need for a fundamental shift in thinking from the conventional notion of 'forests for soil conservation' to 'sustainable forest management for food security'. This stance underpinned all project activities. At project commencement, Nepal's forests were administered by the Ministry of Forest and Soil Conservation (MoFSC). In 2018, this agency was re-configured as Ministry of Forest and Environment. EnLiFT was a vocal and influential participant in furthering MoFSC's goal of 'Forests for Prosperity'.

#### Forest-farm interface and the EnLiFT model

Agricultural livelihoods in Nepal are heavily reliant on tree products for subsistence and income generation. Trees are the major source of fodder constituting up to 70% of dry matter intake for a large part of the year (Degen et al. 2010). Those trees may come from privately held farmland within traditional and newer innovative agroforestry systems, or from trees in community forests. Community forests are also an essential domestic resource for timber, firewood and litter (animal bedding material). The systems framework presented in Figure 3 incorporates the main components, and researchable issues in italics, of the household farm system and community forestry system that contribute to subsistence and income-generating livelihoods, and thence food security.

This framework underpins the bioeconomic model that EnLiFT developed to assess the potential impacts of agroforestry and community forest interventions, reported in Cedamon and others (2017). The data populating this model were derived from surveys of over 600 households

which revealed a set of socio-economic indicators of well-being, including social status (caste/ethnicity), reliance on remittance income and landholding size; and from this six household types were determined (Cedamon et al. 2017b). It was found that farmers select tree species on output-based strategies (i.e. the trees products or functions) whereas they selected their crops based on input-based strategies (i.e. enabling or constraining conditions for crop cultivation; Subedi et al. 2018).

#### Silvo-institutional model for scientific forest management

In Nepal, silviculture-based forest management, often referred to as SFM, has been attempted since the 1990s in national and community forests in the Terai and foothills regions. It met serious opposition based on the grounds of inadequate consideration of institutional aspects (Sunam & Paudel 2012). At the national level, the public discourse is heavily influenced by protection-oriented forestry management and now SFM. At the district level, forest officials are reluctant to promote SFM because of increased media attention and perceived uncertainties by the Commission for the Investigation of Abuse of Authority. At the community level, CFUG members are conditioned not to fell trees, and there can be mistrust between different sub-groups within a CFUG. As a consequence of this inactivity in scientifically informed silviculture, there is very little willingness for silvicultural technical management of forests among foresters and local communities alike.

Against this background, EnLiFT developed the Silvo-Institutional Model (SIM) in which the technical aspects of resource assessment, demonstration plots, felling and timber

**Table 1.** Integrated streams of action research activity in EnLiFT

Action research stream	Core activities
Market-oriented agroforestry interventions	<ul style="list-style-type: none"> <li>To implement agroforestry interventions using participative processes, which include both growing systems and commodity markets, at the six priority sites</li> <li>To improve our understanding of the institutional environment affecting markets of agroforestry products</li> </ul>
Impact of agroforestry interventions	<ul style="list-style-type: none"> <li>To gather and analyse both quantitative and qualitative information to determine the impact of interventions in the farm-forest system, including the impact of interventions on women on the six research sites</li> <li>To develop a bioeconomic model of agroforestry production integrate biophysical and social information to estimate the potential impact of EnLiFT innovations further field in the Mid-Hills</li> </ul>
Inclusive community forest planning	<ul style="list-style-type: none"> <li>To explore the link between regulatory framework and community forest planning practices and understand the dynamics of inclusive forest management and local level planning in the changing contexts</li> </ul>
Active and equitable forest management	<ul style="list-style-type: none"> <li>To catalyse active and equitable forest management and silvicultural practices through the establishment of demonstration plots and contribute to participatory silvicultural technology by gathering data from community forest management trials</li> </ul>
Market-responsive community forest institutions	<ul style="list-style-type: none"> <li>To explore and catalyse market-responsive community forestry institutions by experimenting the collaboration between the private sector and community forest user groups</li> <li>To facilitate participatory market appraisal and business-readiness with CFUGs</li> </ul>
Understanding under-utilised land	<ul style="list-style-type: none"> <li>To determine and disseminate an understanding of drivers and dynamics of under-utilised land</li> </ul>
EnLiFT Policy lab	<ul style="list-style-type: none"> <li>To regularly engage with senior policymakers conveying evidence-based recommendations for forest policy. This was particularly important as part of response to the 2015 earthquakes</li> </ul>

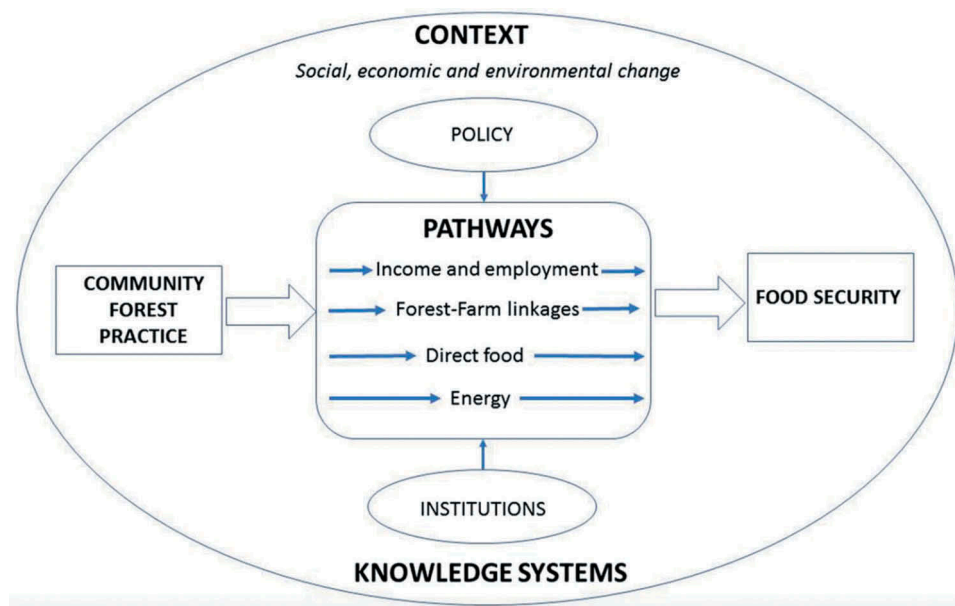
CFUG, Community Forest User Group; EnLiFT, Enhancing Food Security and Livelihoods.

distribution are combined with institutional aspects of consultation, developing governance safeguards and preparing the required documentation correctly (Cedamon et al. 2017a; Paudel et al. 2018). This approach built on earlier work on collaborative learning (McDougall et al. 2007) and deliberative scientific practice (Ojha et al. 2010). While this process was time-consuming and costly, it provided an effective process for implementing resource assessment and silviculture practices within community forests while creating a favourable institutional environment, and confidence and ownership of the process by official and community stakeholders. The way in which SIM played out in the adaptive action research of establishing silvicultural demonstration sites is illustrated in Table 2.

**Active and equitable forest management and rapid silvicultural appraisal**

The SIM provided the overarching framework to facilitate multilateral participation in institutional change that enabled greater implementation of appropriate silviculture in community forests. This on-ground silvicultural action became known as Active and Equitable Forest Management (AEFM) because it addressed challenges on two critical fronts: (1) how to manage forests actively beyond a subsistence focus and (2) how to make the forestry management process more equitable. The reasons for inactive and inequitable management include: inadequate silvicultural knowledge in communities and even forestry personnel; inequitable distribution of benefits favouring well-off households and local elites shaping management decisions that restrict access of poor and marginalised people.

The action research response to this situation was: (1) demonstration plots of a range of standard silvicultural treatments (e.g. shelterwood, negative and selective thinnings, etc.) determined in consultation with CFUG committees and (2) training CFUG members and local forest officials in the forest appraisal methods and how to select trees for felling to specific silvicultural treatments. The rationale of these demonstration plots is that ‘people don’t know what they



**Figure 2.** Four pathways for food security from forests (Karki et al. 2017)

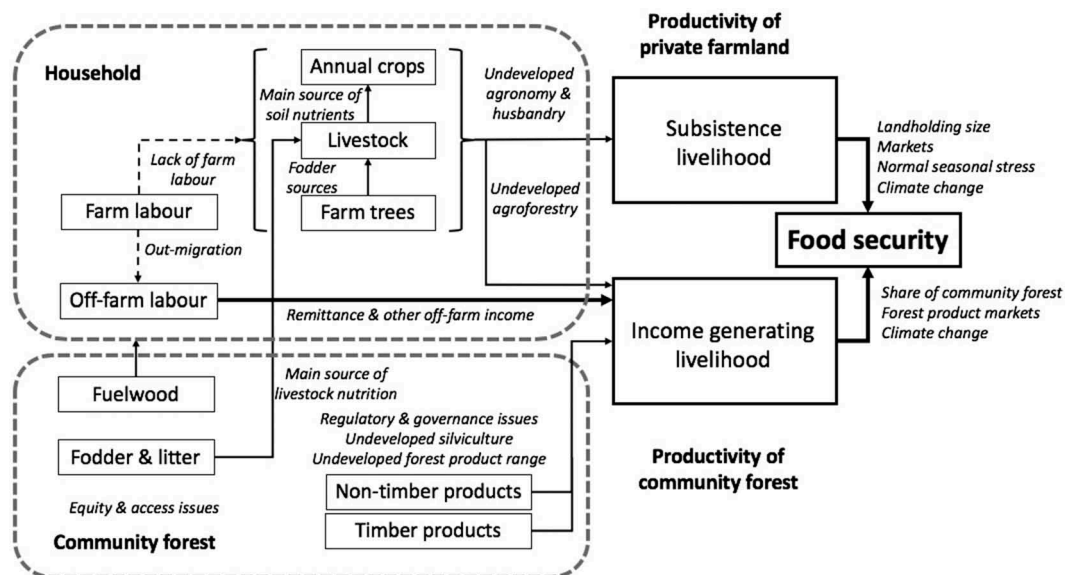


Figure 3. The farm-forest interface and food security in mid-hills of Nepal (Cedamon et al. 2018a)

Table 2. Steps in applying the silvo-institutional model to establishing silvicultural demonstrations

Step	Event
1	Stakeholder discussions with DoF senior officials, DFOs, FECOFUN, CFUGs
2	Rapid Silvicultural Appraisal of community forests
3	Prioritisation of silvicultural treatments by CFUGs
4	Memoranda of Understanding with CFUGs
5	Establishment of demonstration plots, tree measurements
6	Detailed plans for demo plots developed, written in form of additional section to Operational Plan
7	Endorsement of plan by CFUG general assemblies
8	Virtual felling field days
9	CFUG made requests to DFOs for felling
10	DFOs issued felling permits
11	DoF senior officials and media visit field sites
12	Harvesting and distribution to 2015 earthquake victims

CFUG, Community Forest User Group; DoF, Department of Forests; DFO, District Forest Office; FECOFUN, Federation of Community Forest Users of Nepal

want until they see it'. The 'active' component of AEFM is this relatively aggressive thinning of choked forests following procedures that ensure ecological integrity is maintained. The 'equitable' component of AEFM is partly that this silvicultural knowledge and capacity to manage forests is owned by all members of the community, not just forestry professionals. The other component of equitability here is that all CFUG members, including disadvantaged groups, can be engaged in the Strategic and Inclusive Planning (SIP) process of revising OPs.

At the initial phase of the silviculture trials and demonstrations, it became clear that we required information on the timber stock, forest structure and CFUGs' silviculture preferences. A rapid silviculture appraisal method (RSA) was developed and deployed to allow participation of forest users in the tree measurement, stand structure assessment, and ranking of silviculture system or practice that the CFUGs had tried. The steps of conducting the RSA are provided in Cedamon et al. (2017a). In addition to this, a guideline for single tree selection based on Q factor was also developed as a guide in the establishment of selection systems trial plots (Cedamon et al. 2018b).

A participatory process involving various stakeholders was adopted in order to facilitate forest management interventions

in the research sites. Apart from facilitating timber harvesting, the process was equally crucial in terms of supplying timber to the 2015 earthquake victims during reconstruction. Twelve demonstration plots were established in our sites with the objective to have a better learning on the various silvicultural prescriptions. Based on the learnings, silvicultural interventions were scaled out to other sites with prospects of implementing forest management activities.

### Strategic and inclusive planning process

Planning is at the heart of community forest governance and forest management that ultimately shapes multiple outcomes. As part of its adaptive action research, EnLiFT investigated the process of how CFUGs make (or renew) their OPs. As the OP has between five and ten-year currency, and the process of arriving at OPs was designed some 30 years ago, it was important to assess the extent to which the planning process is compatible with the new social, economic and political context in which AEFM operates. Concerns are raised about elite capture and social exclusion in Nepal's community forests (Malla 2000; Shrestha 2016), hence our focus being to investigate ways to ensure social inclusion in community forest planning. We investigated and identified the 'process' and 'mechanisms' of planning and decision-making that provide an opportunity for more inclusive decision-making in community forestry. This work not only examined how CFUGs planned and managed forest biomass, but also the contributions of community forestry to the well-being of the community. It examined the extent to which the planning process enhances or reduces social inclusion, and how to rectify this through adjustments to the planning process.

The OPs at the six project sites were analysed through a process involving key informant interviews, focus group discussions with socially excluded groups and observations at the CFUG general assemblies. The measure of success of an OP appeared to be the extent to which it reverses forest and environmental degradation, even though community forestry's contribution to livelihoods and food security is well below its potential. This is consistent with the literature (Thoms 2008; Sunam & McCarthy 2010).



The existing planning practice was found to be a technical tool employed in a highly political space in these communities, therefore compromising social inclusion in five major ways:

- (1) misrepresenting women and marginalised groups in local decision-making
- (2) creating a mismatch between those who make decisions and those who depend on forests
- (3) lacking strategic visioning due to low deliberation and engagement of stakeholders at multiple scales
- (4) mismatching between the need and focus of planning in the context of changing social and economic inequalities, political volatility and environmental change, and
- (5) creating a highly bureaucratic structure and control of the planning process, which often leads to the failure of frequent OP review and approval.

Overall, EnLiFT found that despite unprecedented changes in social, economic and political circumstances in Nepal, community forestry planning practice had maintained a status quo that focused on subsistence-based use and conservation of forests. In Nepal, community forestry had not effectively responded to issues of social inclusion. These issues of social inclusion and equity have been known for some time (Malla 2000; Agrawal 2001; Ribot 2003). They have become deeply entrenched in Nepal's community forestry with the unprecedented political change (Shrestha & Fisher 2018), with the continuation of participatory exclusion (Agarwal 2001) and creating dilemmas of justice (Shrestha 2016) for local communities, NGOs, donors and public authorities.

It is true that women and poorer groups are now represented in the executive committees of CFUGs, and they are presented with the opportunity to influence decision-making (Giri & Darnhofer 2010; Anderson et al. 2015). Yet, such opportunities are not effectively utilised by these groups because of limited resources and leadership capability. Sometimes, these groups are not able to utilise these opportunities because of the existing social and cultural structures, and economic and political interdependence (Agarwal 2001).

Accordingly, EnLiFT facilitated a process to assist several CFUGs revise their OPs which became known as the SIP process. This process resulted in measurable changes in the: participation and representation of women in the leadership positions; enhancement in income and increased participation of Dalits and poor in the meetings; integration of local level planning and CFUG planning (at least at the conceptual level and commitment for integration in the next planning process); and budget allocation for the poor and marginalised groups, among others. This final change was one of the major outcomes of this research stream.

The innovative change in SIP is that it calls for critical engagement with local elites and officials as local champions, not only to help enhance inclusive planning, but also help transform these actors in the long run. Rather than 'local elite capture' being the cause of community inequity, SIP engages in building the capacity of local elites to lead their communities in a more democratic and inclusive way. The SIP framework recognises that these elites should not be seen as problematic, but as progressive

individuals and groups having commitment, compassion, resources and networks for bringing about positive change in community forestry. After all, community forestry emerged and has since evolved with the effort and conviction of many 'social elites' in the community and forest bureaucracy. Now these elites can become the champions of community forestry because they have relevant knowledge, skill, resources and capacity to navigate through politics and the local political economy. By building their capacity, they are able to foster deliberation, mediate powerful interests, articulate the needs and voices of the weak and disadvantaged, and will often push against power structures that are continuing to marginalise these groups. They can play a vital role to bring about more inclusive and sustainable management of forests. Hence, the notion of 'elite' is not always appropriate. Instead, this is the local leadership and should be sufficiently recognised for more inclusive and sustainable forest management in Nepal (see Leftwich 2010).

At the conclusion of the first phase of EnLiFT (March 2018), Nepal was undergoing radical constitutional change with a process of federalism intended to devolve some forestry administration to the state and local government levels. The practice of community forestry champions and SIP will need to evolve in response to these institutional changes.

### *EnLiFT policy labs*

The EnLiFT Policy Lab (EPL) emerged as an innovative approach to strengthen science-policy interface where stakeholders engage in an inquiry to explore, identify and facilitate appropriate policy options for contemporary forest policy issues. The EPLs facilitated engagement in policy dialogue, largely concerning community forestry, but also including policy on agroforestry and under-utilised land (UUL). EnLiFT Policy Labs were formulated by blending the work conducted at Harvard and Stanford Universities as 'Policy Labs' and the recent experiments in Nepal around Ban Chautari, Policy Discussion Forums, Nepal Policy Research Network and also drawing on the personal experience of various researchers over the past three decades in Nepal policy processes (Spilsbury & Nasi 2006; Van Den Hove 2007; Ojha et al. 2012).

The main objectives of EPL were:

- (1) to systematically engage policy actors in the research process
- (2) to identify and generate policy-relevant data and evidence drawing on the rich experience of the policy actors
- (3) to generate rich descriptions of the ways in which key policy actors understand and interpret policy problems, including the contested views and interpretations of problems and solutions
- (4) to create opportunities for collaborative inquiry between researchers and policy actors, and
- (5) to identify potential policy solutions to the problems.

The EPL method was designed to follow these specific operational guidelines:

- (1) **actors:** representing at least three different perspectives covering government, civil society, private sector, researchers, development professionals, conservation agencies, political parties and the like

- (2) **number of participants:** minimum six and maximum ten (plus two researchers)
- (3) **duration:** 2–3 hours, and
- (4) **rules of participation:** moderated but open dialogue free from any perceived threat, every argument supported by concrete evidence, views will remain anonymous if taken for publication.

### Successes and lessons learnt from EnLiFT

The preceding section outlined six conceptual and methodological innovations of EnLiFT. Other methods of farming systems research, market and value-chain analysis, institutional and social analysis were employed but not highlighted because they were not specifically innovative. However, they did contribute to the results and impacts to which we now turn our attention.

#### Agroforestry and livelihood enhancement

EnLiFT facilitated the establishment of five improved agroforestry systems amongst 363 participating households. The nature of appropriate interventions was determined through market research and combined high-value horticultural commodities with enhanced fodder tree plantings, namely: (1) banana and fodder; (2) ginger and fodder; (3) tomato and fodder; (4) round chilli and fodder and (5) cardamom under *Alnus nepalensis* D.Don. A full description, including survey methods leading to the results shown below, is given in Pandit et al. (2018). A survey established levels of income, poverty and food security among a sample of 289 households in 2013, before the interventions, and in 2016, after the interventions. An important early observation was that the motivation to engage with the agroforestry interventions was influenced by the extent that a household already had some off-farm income. Among all off-farm sources, income from overseas remittances was most important.

#### Change in income and poverty level

Overall, the study found that the percentage of households below the poverty line had dropped from 48% to 34% three years after the implementation of enhanced agroforestry interventions. The highest level of poverty reduction was observed in Dhamilikuwa, which was from 62% to 28% (see Table 3). The overall reduction in poverty level is significant ( $P < 0.01$ ) over the three-year period. Improvement in household income was highest among those farmers using the banana-based, high-yielding fodder system followed by the alnus-cardamom system, tomato fodder,

ginger fodder and chilli fodder system. The overall reduction of poverty within the surveyed households was 14% (48–34%). The study also found that, across all six sites, the reliance on off-farm income decreased slightly from 63% to 54% during the study period.

#### Change in food security level

Changes in food security are more nuanced than poverty. The National Living Standards Survey (NLSS 2013) provides the datum line for the measure of food security, the assumption being that a household at the poverty line has just enough income to be food secure. However, there are tiers of food insecurity for households below the poverty line, depending on how many months of the year there are insufficient funds or subsistence production to meet household food needs. Before the introduction of the agroforestry interventions, across all six sites, 52% of surveyed households were considered to be food secure. After three years of piloting and experimentation EnLiFT found that household income was increased by 37–48% mostly due to agroforestry innovation, which can provide up to an additional six months of food to the poorest households. From this study, it is apparent that the implementation of appropriate market-focused agroforestry interventions could potentially lift the majority of households (63%) out of poverty with no danger of food shortage during the year.

#### Caveats on these results

The implication of this research is that farmers must diversify their production through agroforestry innovations and improve their livelihoods in order to escape the poverty that exists with subsistence farming systems. The 'bottom line' result of this research is that it is possible to reduce poverty and increase food security with low cost, locally appropriate, market-focussed agroforestry interventions on private land within a relatively short period of time. The caveat on this finding is that a level of direct financial incentive (e.g. conditional grants) it still required to get effective adoption by farmers. It also required training in fodder tree nursery management and business management.

Further to these caveats, the modelling work reported by Cedamon and others (2018b this issue) indicates: (1) that the benefits from the horticultural-agroforestry interventions will not accrue to all household types, especially the approximately 50% of households not receiving remittances or other significant off-farm income and (2) there is an even greater potential for improving food security, by using agroforestry systems involving a combination of market-oriented

**Table 3.** Poverty level 'before' and 'after' EnLiFT project (modified from Pandit et al. 2018)

District	Village	n = 289**	Poverty level before 2013		Poverty level after 2016		% change above poverty line
			Below poverty %	Above poverty %	Below poverty %	Above poverty %	
Lamjung	Jita Taxar	58	48	52	29	71	<b>19</b>
	Nalma	25	56	44	44	56	<b>12</b>
	Dhamilikuwa	53	62	38	28	72	<b>34</b>
Kavre	Mithinkot	48	31	69	29	71	<b>2</b>
	Dhungkharka	50	26	74	22	78	<b>4</b>
	Chaubas	55	67	33	53	47	<b>14</b>
	Total	289	48	52	34	66	<b>14% average</b>

\*\*t is significantly different at the 0.01 level.

EnLiFT, Enhancing Food Security and Livelihoods.

National Poverty Line is about USD 800 (NRS 92 777) per household (NLSS 2013).

timber production and intensive fodder production for goat husbandry.

### Facilitating forestry on private, under-utilised land

Other cross-related streams of EnLiFT research were that of understanding the drivers and dynamics of UUL (Ojha et al. 2017), and why it is difficult to establish tree-based enterprises on this land. In large parts of Nepal, significant tracts of agricultural land are being abandoned or under-utilised due to rural outmigration for international employment. This under-utilised private land is potentially the locus for the expansion of private forestry. EnLiFT sought to understand the restrictions on private forestry with a view to facilitating its expansion as a form of agroforestry.

Nearly 1 000 000 out of about 3 400 000 private agricultural holdings in Nepal have planted forest trees. Of these, about 166 000 holdings have compact plantations. Even though the area of private forest is almost five times less than other forests in Nepal, the volume of timber sale from private forests is almost double that from community forests and government forests (Pandit 2014). Despite this, very little of the final value of the timber delivered to the mill goes to the landholder, and the regulatory process for selling timber from private farms is so complicated and time-consuming that there is little incentive for farmers to participate (Amatya et al. 2016; Amatya et al. 2018).

Middle-men or contractors play a vital role in procuring timber from private forests in Nepal. Generally, mill owners contact the local supply contractor. It is the contractor who facilitates the process for landholders, who have no choice but be price-takers rather than price-makers.

There are many barriers for individual farmers or community groups to engage in the timber trade. The complexity of this process is illustrated in Figure 4. There are more than 14 steps that private tree owners have to take before they can harvest and sell trees planted on their registered private land. Cumbersome regulatory procedures, additional tax burden (to local bodies, and donations to various clubs en route to destination) and high transaction costs for harvesting and trade are considered the major constraints of private forestry development in Nepal.

In 2015, an amendment to the *Forest Regulations 2051 (BS)* (i.e. AD 1994) made the process more simple and private forest friendly. For the 23 tree species which are mostly grown on private land, farmers can directly harvest. It is now only necessary for individual farmer growing these species to visit the local forest office once, to register and endorse the stock and obtain the transportation permit.

However, other restrictions intended to preserve the ecological integrity of natural forests, constrain the planting of high-value tree species on private land. For example, the Government has banned harvest, transport and export of Chap (*Michelia champaka*), Sal (*Shorea robusta* Roth), Satisal (*Dalbergia latifolia* Roxb.) and Vijayasal (*Pterocarpus marsupium* Roxb.). Similarly, commercial transportation and export of two non-timber forest products such as Panchaule (*Dactylorhiza hatagiera* (D.Don) Soó) and Okhar (*Juglans regia* L.) has also been banned.

### Impact of active and equitable forest management

The impacts of the AEFM research stream are two-fold and both highly significant. It demonstrated the magnitude of forest wealth that can be released by SFM and it influenced the public debate by providing direct visual examples of what SFM can look like, and evidence that it does not damage forest ecological integrity.

### Realisation of forest wealth

Active silviculture of community forests resulted in an increase of volume of timber harvested creating substantial timber surplus. Table 4 shows harvest volumes under AEFM interventions in community forests associated with the Chaubas-Bhumlu sawmill in Kavre district. Harvest volumes increased from 9 to 16-fold under the AEFM interventions.

The range of economic benefits from marketable timber surplus (i.e. after local community needs were met) from these plantation pine forests was from NRS 129 000 (USD 1148) to NRS 1 700 000 (USD 15 130) per hectare. The total revenue from the 2016 timber sale was NRS 16 700 000 (USD 148 630) of which 20% was directly paid by the timber

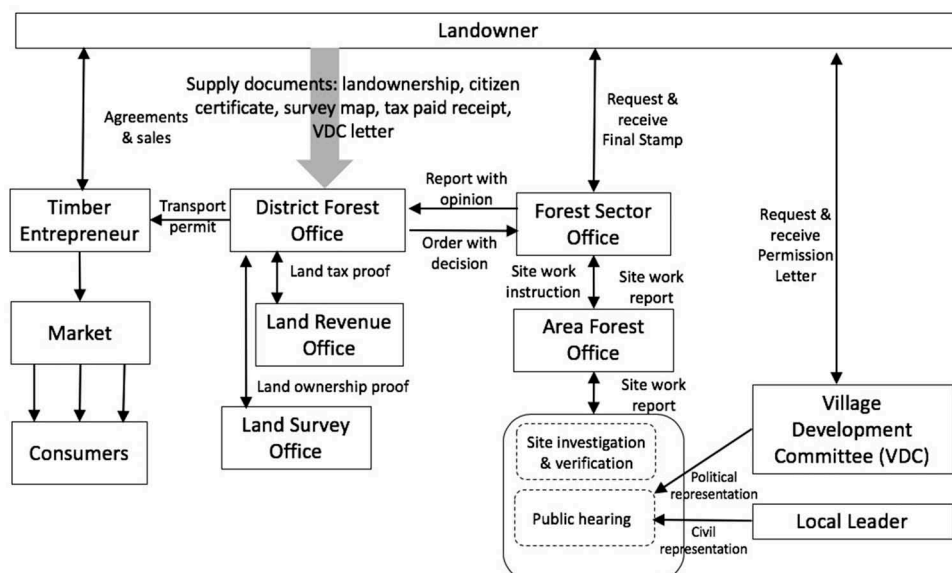


Figure 4. Complexity of the process in selling farm-grown timber (modified from Amatya et al. 2018)

**Table 4.** Comparison of annual timber harvest volume without Active and Equitable Forest Management (AEFM) intervention (2011–2015) with AEFM interventions in four Community Forest User Groups (CFUG) in Kavre District (Nuberg et al. 2018)

Community Forest User Group	Average annual timber harvest volume before AEFM intervention (2011–2015) (cft)	Harvested timber volume in 2016 with AEFM Intervention (cft)
Dharapani	457.8	7252
Chapanigadhi	629.4	9324
Rakchahama	848.8	13 050
Lakuri	622.4	5484

buyers to labourers for felling and 68% as CFUG income. Of this income, 35% was allocated to a pro-poor livelihood program in the form of soft loans. In addition to soft loans, individual CFUG member households benefitted from 25% of the CFUG revenue that was allocated for forest management operations, which are largely labour costs. This additional benefit ranged from NRS 5000 (USD 46) to NRS 16 000 (USD 142) for member households. This is a considerable benefit given that the average income of Chaubas households surveyed in 2013 ranged from NRS 97 515 (USD 868) to NRS 289 571 (USD 2577; Cedamon et al. 2017b).

If AEFM was to be scaled up to include the total 18 995 ha of community forest in Kavre District, it is likely to yield an annual revenue of NRS 2 200 000 000 to NRS 30 400 000 000 (ie. USD 19 600 000–270 600 000). This is a significant asset that has the potential to be value-added by better silvicultural management.

### Silvicultural demonstrations and changing perspectives on forest management

Following the AEFM harvests were six workshops with forestry officials, FECOFUN members, media and local political leaders to showcase and discuss these forest management interventions on the site. These visits developed into on-site policy dialogues where policy actors, researchers, practitioners, communities and their federations collectively discussed the problems and prospects of SFM. This was crucial for influencing the perceptions of those key stakeholders who may previously have been either non-committed or opposed to SFM.

In summary, the impacts of the AEFM activity were:

- (1) Enhanced awareness of silviculture techniques among participating forest users, particularly women and marginalised groups
- (2) The 2015 earthquake victims benefited through the supply of timber for reconstruction

- (3) Silviculture demonstration plots were the foundation for conducting a National Silvicultural Workshop (subsequently held in Kathmandu in February 2017)
- (4) Enhanced forest management ensured equitable sharing and distribution of natural resources among CFUGs, and
- (5) Transition from passive to active silviculture management led to increased timber production, revenue and generation of employment opportunities.

### Revival of Chaubas-Bhumlu sawmill

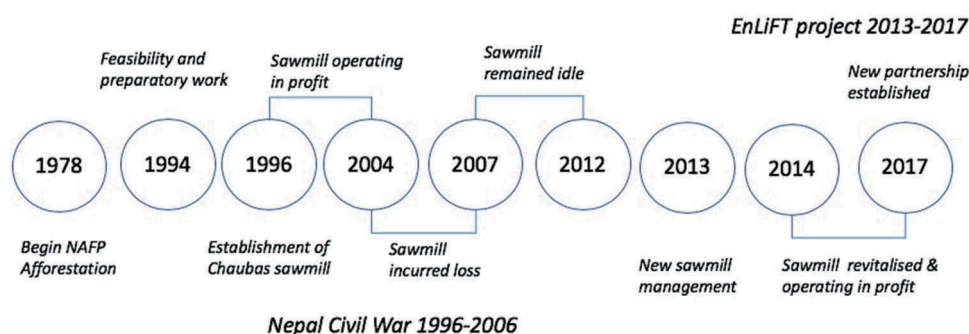
The Chaubas-Bhumlu sawmill is situated in one of the research sites in Kavre District. This mill was established as part of the NAFF and has had a difficult history as illustrated in Figure 5. The sawmill ceased to operate completely in 2012.

EnLiFT engaged in a process of action research with stakeholders (sawmill members, CFUG leaders, village development committee, political party representatives, private sector actors) which took a long time and many cycles of deliberation (see Table 5).

Initial cycles developed a collective and agreed understanding of the reasons behind the demise of the mill. In essence the closure of the mill is attributed to: (1) the Maoist insurgency (1996–2006) and associated extortion; (2) government policy not being supportive of community-based enterprises; (3) internal governance problems of the CFUGs; (4) the collective decision-making process was not fit for the institution and (5) corruption and embezzlement of financial resources (Paudel et al. 2014).

Later action research cycles facilitated the successful revival of the mill by building trust and confidence amongst stakeholders and brokering a viable partnership between the community and private sector. It was highly successful in that the once idle sawmill is now operating with profit. The profit is invested in improving the machinery and equipment and about 330 households in four CFUGs in Chaubas benefited with sawn timber for post-earthquake reconstruction. The magnitude of the benefit to the community was reported above under the section 'Realisation of forest wealth' and Table 4.

As a case study, the Chaubas-Bhumlu sawmill illustrates the need for a fundamental re-think on project implementation strategies for community forest enterprises (CFEs) in Nepal and elsewhere. It shows that CFEs do not necessarily become successful, despite good access to natural resources, reasonable business plans, and significant start-up capital and support from external stakeholders. The Chaubas CFE



**Figure 5.** Timeline of Chaubas-Bhumlu sawmill. NAFF, Nepal Australia Forestry Project

**Table 5.** Action research process to facilitate the revival of Chaubas sawmill (Nuberg et al. 2018)

Key steps	Rationale
Meeting with four community forests	Develop better understanding of the sawmill context and local expectations and identify potential areas for intervention
Diagnostic analysis of failure	Dig out the reasons for failure of sawmill, sketch the strengths and weaknesses of previous institutional options
Presentation and discussion with CFUGs	Share the findings of the diagnostic analysis, seek views of CFUG members on the type of partnership modality, build consensus among all members on engaging private actors as shareholders
Agreement on partnership modality	Agree on the partnership modality, finalise the shareholding between community and private
Presentation and endorsement at the general assemblies	Endorsing through the highest authority, build ownership and ensure compliance during the sawmill operation
Potential investors invited	Ensure transparency on investment, increase the scope for potential investors to invest in sawmill
Partnership re-negotiated and established	Possible alternative investment modality explored, flexible options to increase the chances of investment

CFUG, community forest user group.

struggled to sustain the enterprise in the face of changing government policies and politics, persistent conflictual community-level dynamics and the lack of local business capacity. The confidence of communities to engage in the business of natural resources is not well-founded, especially in the context of complex social, political and environmental realities that underpin business development and operation. The re-vitalisation of the sawmill depended on a lengthy process of facilitation that concluded with a strong commercial involvement with an external private sector party.

### Policy impacts

The EPLs led directly to two national conferences on UUL (NPC 2016) and silviculture (DoF 2017) with policy outputs which have been institutionalised within the government formal policy process.

The EnLiFT policy engagement process significantly contributed to the following policy outcomes:

- (1) It has stimulated silviculture-based sustainable forest management to achieve multiple objectives of forest management
- (2) The Government, especially the Ministry of Agriculture Development, introduced schemes that encouraged land utilisation through incentive structure, subsidies and stronger compliance of its rules
- (3) The Government relaxed the existing administrative requirements for harvesting and transporting timber during the post-earthquake reconstruction period
- (4) Activities related to the revitalisation of the Chaubas-Bhumlu sawmill contributed to the local level policy reforms at the CFUG level enabling new commercial opportunities through a partnership between communities and the private sector
- (5) Agroforestry and modelling work have informed forest product marketing policy discussion in Nepal.

Further to the last point on agroforestry; there is no separate policy for agroforestry in Nepal. There are conflicting sectoral and cross-sectoral policies, Acts and Regulations. Initial Environmental Examination or Environmental Impact Assessment based on several criteria has serious implications in developing private forestry in Nepal. The National Agroforestry Policy formulation process has been initiated in Nepal. EnLiFT's contribution was to provide the following policy recommendations to:

- (1) Develop simpler private tree registration guidelines
- (2) Formulate a simpler royalty system for forest-based and farm-based products
- (3) Simplify en-route checking and limit product verification at the site of origin
- (4) Amend environmental regulations for private forestry products
- (5) Remove land taxes for private forestry
- (6) Revise the differentiation of trees, shrubs and herbs in forest regulations.

### Conclusion

The opportunity for the research that EnLiFT undertook was predicated on the previous long-term Australian aid support; it created the forests that were used to trial AEFM; many of which were around 40 years old when the project commenced. However, while those NAFP plantations slowly grew, Nepalese society radically changed. The forests were not managed to enhance timber production, and while community forestry was widely promulgated, its intention of delivering community benefits has not been fully realised. Meanwhile, mid-hill agriculture has not kept pace with the changing economy and out-migration. Food insecurity is rife in a landscape of under-utilised forests and UUL.

EnLiFT has been effective research-for-development. Its outcomes include an extensive knowledge base to generally better informed rural development in Nepal, while at the same time delivering immediate development impacts to the study region.

The work with agroforestry interventions showed that relatively small changes in the farming system can result in marked changes in household livelihoods, and hence food security. However, our modelling work showed that these benefits may not accrue to all social groups, and intensive tree-fodder livestock production may offer better potential than horticultural commodities. Even greater benefits, and more widely distributed across the community, are to be found in releasing forest wealth from both private and community forests.

Unfortunately, in many parts of Nepal, there are still significant institutional, regulatory and policy barriers to the easy and equitable access to wealth from forest products on both private and community managed land. EnLiFT has very clearly articulated these barriers and developed mechanisms to overcome them in the form of inclusive community forest planning processes and ELPs.

Active and Equitable Forest Management is an effective and politically feasible path to realise forest wealth. The process of visibly improving forest condition, along with community participation and training, helped overcome the cultural resistance to the concept of SFM promoted by

the Government of Nepal. If AEFM is to be scaled up in the environment of the fundamental constitutional changes afoot in Nepal, parallel work on strategic and inclusive planning processes will be crucial to its success.

Further to this will be the need to better understand how to establish forest-based enterprises, both community and private, especially those favourable to disadvantaged groups. The market and value chain work in EnLiFT delivered a comprehensive foundational knowledge base, including evidence of the possibility of community-private partnerships. However, it did not deliver practical, widely implementable results as intended. This is still an area for further development.

EnLiFT showed that there are clear pathways to unlocking forest wealth from both private and community land. One of those pathways on private land could be finding ways to enable more productive use of UUL. Private forestry on UUL has great potential for forest wealth generation, is compatible with the shortage of rural labour and provides options for disadvantaged groups. For this pathway to be realised, it requires a multi-sectoral commitment to: educate and support youth to engage in agriculture; encourage investment of remittances into agriculture and tree growing and provide legal systems to provide confidence for landholders to invest in commercial agroforestry partnerships.

Unlocking forest wealth requires knowledge and institutional change at all stakeholder levels: household, community, local government and national policy. Despite concerted efforts to include women, EnLiFT found that women were still not fully engaged in decision-making and planning. EnLiFT articulated the problems with institutions, regulations and governance affecting forest products and has developed methodologies to further work with these at local, state and national level. It showed how facilitating stakeholder ownership of science through the EPLs is an effective pathway to change.

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