



# Scientific Forest Management Initiatives in Nepal

MSFP EXPERIENCES AND LESSONS LEARNT

MULTI STAKEHOLDER FORESTRY PROGRAMME  
KATHMANDU, NEPAL  
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**Front cover photo :** Timber harvesting in Barhaban Collaborative Forest in Kailali

**Back cover photo :** Scientific Forest Management in the mid-hills: tree numbering in Sallaghari Community Forest User Group, Ramechhap

## Abbreviations

AAC	Annual Allowable Cuts
AFEC	Agriculture, Forestry and Environment Committee
CBF/s	Collaborative Forest/s
CBFM	Community Based Forest Management
CF/s	Community Forest/s
CFM	Collaborative Forest Management
CFMG	Collaborative Forest Management Group
CFUG/s	Community Forest User Group/s
DFO/s	District Forest Office/s
DFRS	Department of Forest Research
DFSCC	District Forestry Steering Coordination Committee
DiSCO/s	District Soil Conservation Office/s
DoF	Department of Forests
FAO	Food and Agriculture Organization of the United Nations
FSS	Forestry Sector Strategy
GDP	Gross Domestic Product
GoN	Government of Nepal
GPS	Global Positioning System
hh/s	household/s
IA/s	Implementing Agency/s
LHF	Leasehold Forests
MoFSC	Ministry of Forests and Soil Conservation
MSFP	Multi Stakeholder Forestry Programme
NTFPs	Non-timber Forest Products
OFMP/s	Operational Forest Management Plan/s
OP/s	Operational Plan/s
REDD+	Reducing Emissions from Deforestation and Forest Degradation
RFD	Regional Forest Directorate
SFM	Sustainable or Scientific Forest Management

## Executive Summary

Nepal's forestry sector in one way or another supports the livelihoods of millions of rural households. However, it has a much broader scope to more significantly contribute to the national gross domestic product (GDP). Despite its economic, environmental, and socio-cultural potential, the forestry sector has been losing benefits mainly because of conservation-centered management practices. This has not only increased the demand-supply gap, enhanced market distortion, and increased the current drain on the national economy through imports of timber and its supplementary materials, but it has also been degrading the quality of the forests. Learning from previous experiences, the government has re-piloted the practice of scientific forest management (SFM) in Nepal especially in the natural sal (*Shorea robusta*) forests in the Terai. The Multi Stakeholder Forestry Programme (MSFP, 2014 to 2016) has been supporting and complementing the Government of Nepal's (GoN) initiatives on SFM endeavors, and providing assistance in expanding it to different management regimes irrespective of the ecological zone.

With the MSFP support, SFM has been re-started using intensive silvicultural operations in some 26,000 ha of forest, in both collaborative forests (CBF) and community forests (CF) in eight districts (Morang, Makwanpur, Chitwan, Nawalparasi, Kapulbastu, Rupendehi, Palpa, and Kailali).

Altogether, the MSFP provided support to the forestry sector in 23 core districts, where 729,036 ha of forests are being managed by 10,834 local forest groups (LFGs). Continuing the legacy from previous forestry programmes of the participatory approach and expansion of community-based governance in forest management, MSFP has supported the formation of 807 new LFG's, covering over 61,983 hectares of forest land, and involving 83,227 additional households in management responsibility and user rights. Similarly, operational plans (OPs) of 3,721 LFGs have been prepared and revised providing the legal status to initiate SFM in the future. Similarly, about 8,810 ha land has been afforested or reforested through direct support of MSFP and an additional 12,948 ha has been managed on SFM principles. Acknowledging

the encouraging results, the GoN has allocated NRs 630 million for fiscal year 2073/74 to continue and expand SFM in other Terai districts.

The MSFP intervention on SFM has demonstrated that LFGs are now in a position to lead the SFM initiatives, providing technical facilitation and support is ensured from the District Forest Office (DFO) and other key stakeholders. The Programme further established the ongoing understanding that mutual and close collaboration between the relevant GoN bodies, the local communities, and other relevant stakeholders is needed for the effective implementation of SFM. However, there are still some policy gaps and hurdles which could limit the potential of SFM to expand in all management regimes and ecological zones in the country.

However, the inadequately trained human resources within the GoN agencies and the capacity of LFGs in terms of the required technical knowhow pose major challenges to the expansion of SFM. In order to tap the optimum benefit from the forestry sector, future SFM endeavors should therefore focus on the necessary policy interventions, the capacity building of both the LFGs and GoN agencies, prior to the scaling out of SFM.

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# 1

## BACKGROUND ON NEPAL'S FORESTRY SECTOR

Forestry is an integral part of the rural livelihood of Nepal; about 76% of the nation's population is characterized as being forest dependent (Amatya, 2013), and some 64% of the population is still using fuelwood as the major source of domestic energy (CBS, 2014). In addition, non-timber forests products (NTFPs) have become an important alternative source of income for the rural poor especially in the hill and mountain regions. Moreover, the selling of different forest products and services, including timber, NTFPs, and ecotourism, has become a significant source of revenue for the GoN (Subedi et al., 2014). The forestry sector is therefore a key element in providing enhanced incomes for both the GoN and the rural communities.

Forests occupy 40.36% of the total area of the country with a stem volume of 982.33 million m<sup>3</sup> (164.76 m<sup>3</sup>/ha; DFRS, 2015); this is being managed in different regimes based on the various management objectives. For example, protected areas are more focused on biodiversity conservation, while participatory forest management regimes - such as community forests, leasehold forests, and collaborative forests - are focused on supplying forest products and environmental services to improve local livelihoods and development.

The forests have been contributing to the national economy, providing an average annual revenue of NRs 550 million (Subedi et al., 2014). The forestry sector's contribution to the GDP, was estimated to be 15% (MoFSC/FAO, 2009). Forests in Nepal have a total carbon stock of 1,054.97 million tonnes (176.95 t/ha; DFRS, 2015) which could further offer additional economic contribution through international carbon trading mechanisms through reducing emissions from deforestation and forests degradation (REDD+).

The forestry sector can further contribute to addressing the more recent global issues of climate change mitigation and adaptation – but Nepal has not yet succeeded in tapping the substantial potential benefits from the forestry sector in terms of timber and value added products which could remove dependency on imports.

Only about 113,000 m<sup>3</sup> of timber is being supplied to the market through formal channels, compared to the annual demand of about 3.37 million m<sup>3</sup> (Subedi et al., 2014) – this has distorted the market price, increased illegal logging, and encouraged the import of timber and timber products (eg. sheets and veneer). The private sector estimates that about NRs. 2 billion is being invested on importing timber and timber products, and indications are that this is on an increasing trend (Khatri et al, 2015).

However, there is little doubt that under proper management, production from Nepal's forests could be much higher, especially in the Terai. Some forest researchers have reported that the timber supply could be increased to at least 1.66 million m<sup>3</sup> annually just by employing a conservative harvesting scenario while it could go up to 9.18 million m<sup>3</sup> under a more optimistic scenario without over-exploitation and damaging the ecosystem (Subedi et al., 2014). Moreover, the forestry sector in Nepal could generate employment for about 100,000 person days (ERI, 2011), and could contribute about NRs. 49 billion to the national treasury even in a low increment scenario (Subedi, 2012). A very significant economic contribution to local economies as well as the national economy is also reported from NTFPs and other environmental services, including the potential for carbon trading.

Learning from different pilot attempts in the past, the GoN has been gradually focusing on the commercialization of forest management through scientific forest management (see section 2), especially in Terai. MSFP, a joint initiative of the GoN and three Development Partners (the Governments of Finland, Switzerland and the United Kingdom), has been assisting the Ministry of Forests and Soil Conservation (MoFSC) in promoting SFM in its working districts.



This document chronicles the initiatives of SFM in Nepal, the MSFP contribution and achievements, and the challenges and learnings from implementing this form of forest management, with the specific purpose of informing multiple stakeholders - including development partners, development specialists, planners, decision-makers, and practitioners – of good practices, challenges, and areas on which to focus in future SFM initiatives.

This booklet is divided into five sections – the following sections cover the concept of SFM in the Nepalese concept, and the shift in the forestry sector in terms of management practice; the support provided by MSFP and the achievements of the Programme in the period 2012 to 2016; SFM in practice focusing on a case study from the Terai; the major challenges faced and lessons learnt while implementing SFM; and a few recommendations to contribute to future initiatives in this field.

# 2

## THE CONCEPT OF SCIENTIFIC FOREST MANAGEMENT

The scientific forest management concept was initially focused on ‘sustainable timber production and meeting economic objectives’. However, the scope has now broadened to include aspects of social, cultural, and environmental values (FAO, 2016).

The terms ‘scientific forest management’ and ‘sustainable forest management’ have been used and understood interchangeably in the global forestry scenario in recent decades linking management activities to principles of sustainable development and focusing on the balance between three major pillars: ecological, economic, and socio-cultural.

There is an on-going debate amongst the different stakeholders of the Nepalese forestry sector on whether “SFM” describes ‘scientific’ or ‘sustainable’ forest management. All stakeholders, however agree that SFM, irrespective of definition, needs to ensure a partnership in forest management between government and local communities to achieve the intended management objectives (Shahi, 2016). The two terms are used interchangeably in this document.

The United Nations has described SFM as “a dynamic and evolving concept that aims to maintain and enhance the economic, social and environmental values of all types of forests, for the benefit of present and future generations” (FAO, 2016). This indicates that the major purpose of SFM is to maintain and ensure forest productivity and services in perpetuity.

FAO has further unpacked the concept of SFM in the following:

*“...the process of planning and implementing practices for the stewardship and use of forests and other wooded land to meet specific environmental, economic, social and cultural objectives. It deals with*

*the overall administrative, economic, legal, social, technical and scientific aspects related to natural and planted forests. It may involve varying degrees of deliberate human intervention, ranging from actions aimed at safeguarding and maintaining forest ecosystems and their functions, to those favouring specific socially or economically valuable species or groups of species for the improved production of forest goods and services...” (FAO, 2016)*

The global understanding on SFM considers that it is a multi-dimensional concept that integrates a wide array of commercial and non-commercial values, environmental considerations, community needs, even global environmental impact including climate change.

In the Nepalese context, SFM is perceived as a potential option for improving depleting forest quality and productivity, and for harnessing the true economic potential of the forest resources (MSFP, 2015).

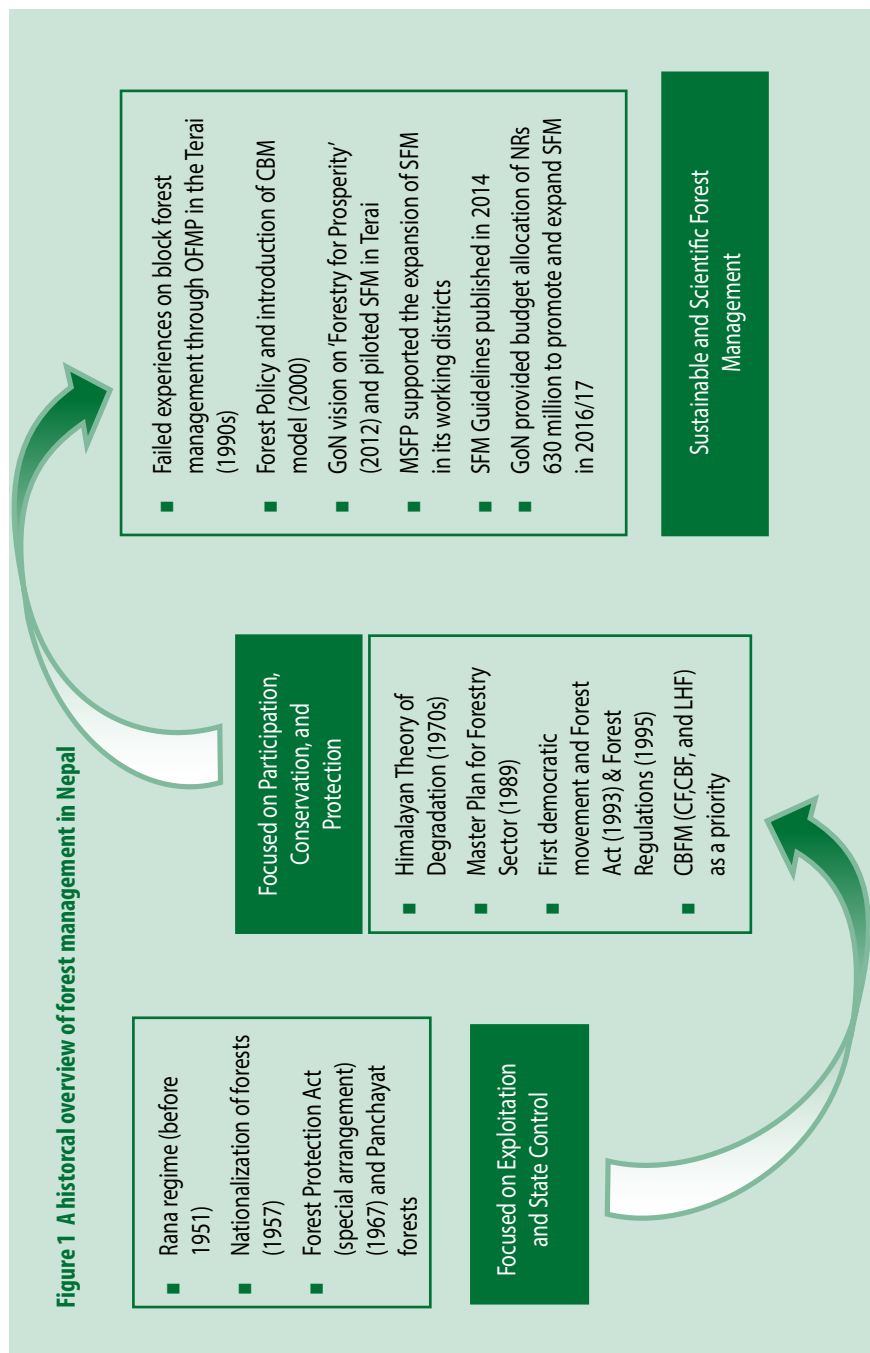
# 3

## AN OVERVIEW OF FOREST MANAGEMENT IN NEPAL

In the history of the Nepalese forestry sector, different periods have witnessed different practices – some of them verging on central exploitation of resources to raise revenue, while others are more concerned with protection of resources to supply basic forest products at the local level. The GoN has developed policies and institutional instruments to materialize the forest management strategies accordingly (Khatri et al, 2015; Bamton et al, 2007) –.

During the Rana Regime in Nepal (1846-1951), the forests were largely exploited and used for revenue generation and maximizing personal benefits of the ruling family and their allies (Gilmour and Fisher 1991). At that time, the state used to grant certain forest areas to local elites, but also promoted the conversion of forests into agricultural land. After the fall of the Rana Regime in 1951, and subsequent promulgation of the Forest Nationalization Act in 1957, the GoN nationalized the forests. This led to a state controlled and centralized forest management practice which had the unfortunate result of further accelerating the exploitation of forest resources, private forests being felled before they were taken over by the state, and further elite control over the forest resources. The elite control and exploitation could not be controlled even after providing the management authority to locally elected bodies, the panchayats, as provisioned in the Forest Protection Act of 1967 (Khatri et al, 2015).

Realizing the repeated failures of state controlled forest management, the master plan for forestry sector published in 1989 for the first time acknowledged the important role of local communities, and directed the GoN to initiate and expand community based forest management (CBFM). The CBFM, especially through the community forests (CFs), became the priority programme in the forestry sector after enacting of the Forest Act in 1993, and the Forest Regulations in 1995. The GoN introduced the collaborative forest management (CBFM) model in the Terai through the Forest



Policy of 2000, to meet the local demand of forest products by both nearby and distant users through promotion of government-community partnerships.

Major steps forward have been made since 2000, although there remain many challenges. For example, the CBFM model has been found to be quite protection orientated, through adopting basic silvi-cultural operations, and imposing very low allowable harvests even on the annual increment (AAC).

During the 1990s, the GoN made its first attempts to manage forests ‘scientifically’ in the Terai, developing operational forest management plans, but did not succeed due to various reasons and different circumstances (Bampton et al 2007), such as the absence of guidelines, and an innate fear of felling green trees. This failure has undermined the economic potential of the forestry sector as forest resources remained underutilized and the impact on overall productivity was negligible – the gap between demand and supply remains significant, especially in terms of timber. The GoN developed the vision of ‘forestry for prosperity’ in 2012, learning from past experiences and acknowledging the need for sustainable management of forest resources. The Vision encouraged the promotion of sustainable forest management initiatives especially in the high value timber species.

As a result, in 2012, and with later support from MSFP in 2013, the Department of Forests (DoF) re-piloted scientific forest management in the high value Sal (*Shorea robusta*) forest in Tilaurakot CBF in Kapilbastu, employing advanced silvicultural systems. The success of this piloting has opened up new avenues and opportunities, and has built momentum for further work on SFM.

Despite early concentration on collaborative forests in the Terai, SFM is now expanding to other potential areas in different forest management regimes and ecological zones. MSFP has been complementing these SFM expansion initiatives and efforts by the GoN through the provision of different kinds of support. This MSFP support and the achievements arising from it is described in the following sections.

# 4

## MSFP SUPPORT AND ACHIEVEMENTS

### 4.1 The MSFP approach and working modality on SFM

MSFP is the first national programme in Nepal's forestry sector which followed a multi-stakeholder process from the design stage through to implementation. It builds on the achievements of more than two decades of work undertaken by the GoN with the support of various development partners; this work focused on maximizing the contribution of Nepal's forestry sector to inclusive economic growth, poverty reduction, and tackling climate change. MSFP aims to complement the vision from the MoFSC 'Forestry for Prosperity' document through its four major outcomes:

- Outcome 1: Government and non-state actors jointly and effectively implement inclusive forest sector strategies, policies and plans.
- Outcome 2: Private sector (farmers, entrepreneurs, and financial institutions) increase investment and jobs in the forestry sector.
- Outcome 3: Rural communities, especially poor, disadvantaged and climate vulnerable people and households, benefit from local forest management and other investments.
- Outcome 4: Forest and trees sustainably managed and monitored by government, communities and private sector, and climate resilient.

The MSFP was operational in 43 districts including 23 core programme districts, and an additional 20 districts where different programme themes were prominent, see Map 1. It has implemented the programme through 5 major Non-Government Organizations (NGOs) Implementing Agencies (IAs) in the core districts, and with three IAs

in the thematic districts. The thematic activities related, especially to forest policy and forest management, was implemented through the MoFSC.

The MSFP budget was channeled both through the IAs, the GoN red book system, and directly through MSFP Service Support Unit (SSU) for other micro and innovative fund projects. Through MSFP, scientific forest management has been supported in two different tenure models with different legal arrangements:

- a) in collaborative forests in the 6 Terai districts, where the land remains under the ownership of the MoFSC, but collaborative management is undertaken between the MoFSC and the local community forestry group – forest products especially fuelwood and timber are shared 50:50 between the MoFSC and the CFMG;
- b) in community forests where the CFUGs have a range of rights enshrined in Forest Act (1993) and the Forest Regulations (1995)

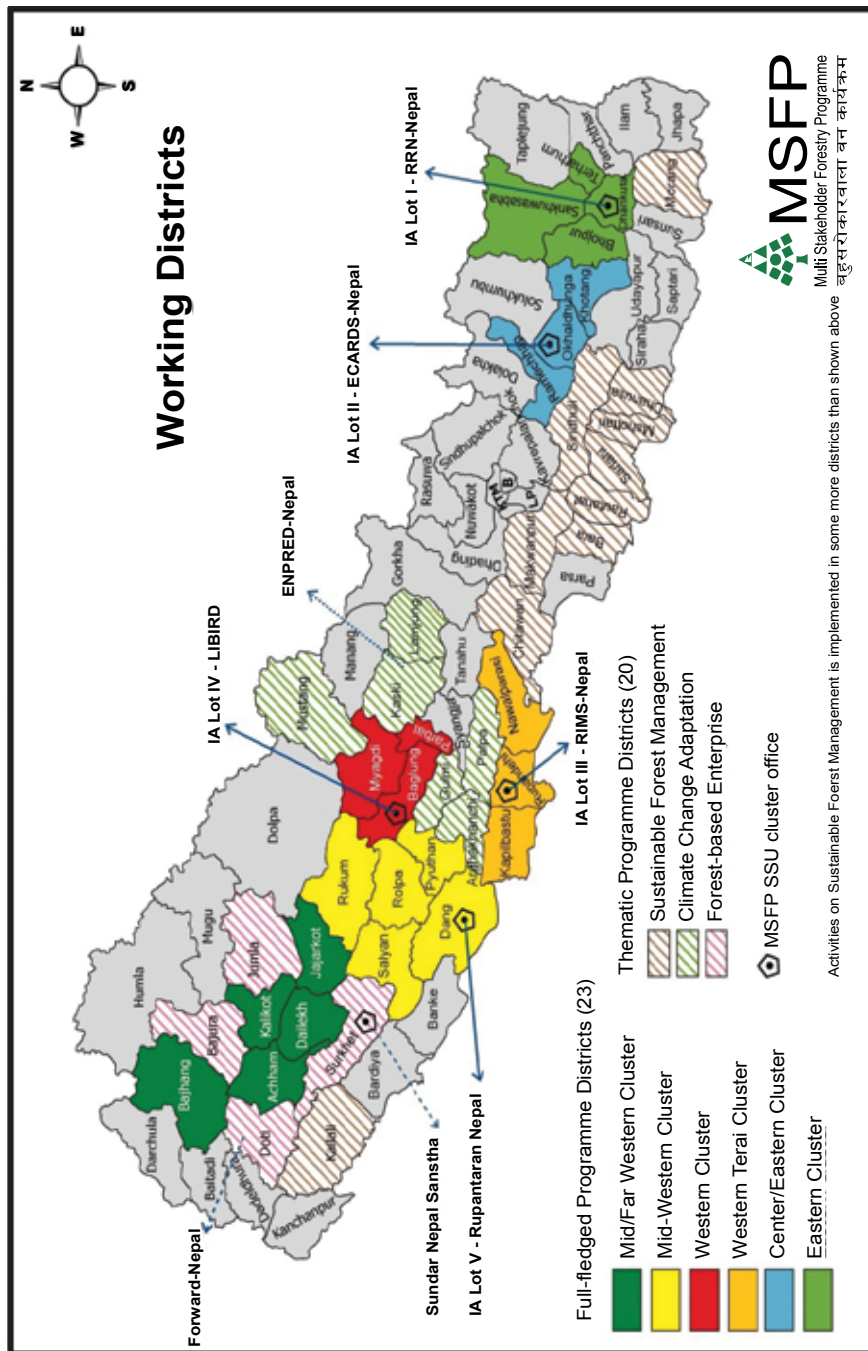
However, SFM, to varying degrees of intensity, has been practiced in all the MSFP working districts, mostly through the CFs and the CBFs.

The introduction of SFM operating proper and intensive silvicultural operations was focused in 6 Terai districts, especially in the high value natural Sal (*Shorea robusta*) and planted Teak (*Tectina grandis*) forests, where emphasis was on timber production. In addition, some piloting has been carried out in the hilly regions, especially in the planted pine (*Pinus* species) forests.

During programme duration, 2012 to 2016, MSFP has experienced many successes and challenges, and learnt many lessons regarding SFM – these are discussed in the following sections.



**Map 1: MSFP working districts in Nepal**



## 4.2 MSFP support and achievements

The SFM related activities have been implemented in different types of LFG through partnerships with both the IAs and the MoFSC. The IAs either directly implemented the prescribed activities or have sub-contracted to local partners, while the MoFSC utilized both the District Forest Offices (DFOs) and the District Soil Conservation Offices (DiSCOs), with close coordination being maintained between the IAs, DFOs, and DiSCOs. MSFP mainly supported the SFM programme on policy formation at the national level and on implementation at the local level, as described in Box 1.

### Box 1 MSFP supported activities under SFM

- Formation of LFGs
- Handing over of forest areas to LFGs
- Preparation and revision of operational plans (OPs)
- Intensive facilitation on OP implementation
- Nursery establishment and seedling production
- Plantation establishment
- Introducing and expanding SFM practices to other LFGs
- Capacity building and tools support for implementation of SFM

MSFP has recorded some significant achievements in its SFM endeavors. In total, through support provided to the 23 core districts by MSFP and previous projects, 729,036 ha of forests are now being managed by 10,834 LFGs. Continuing the legacy of the participatory approach and expansion of community-based governance, MSFP has supported:

- a) the formation of 807 new LFG's, covering over 61,983 hectares of forest land, and with 83,227 additional households receiving both management responsibility and user rights;
- b) the preparation or revision of OPs in 3,721 LFGs;
- c) the implementation of the OPs in 4,025 LFGs.

Some of the general achievements from MSFP interventions include the following;

- Scientific forest management of 12,948 ha has begun in both CBFs and in more than 12,948 ha of forest areas in both CBFs and CFs in 8 districts: Morang, Makwanpur, Chitwan, Nawalparasi, Kapilbastu, Rupendehi in the Terai, and Palpa and Kailali in the mid-hills.
- Some 22.3 million trees and NTFP seedlings have been planted, of which about 50% were produced through both community and privately managed nurseries, the remainder being purchased.
- About 8,810 ha land has been afforested or reforested with assistance from MSFP.
- 596 ha of barren, public land has been rehabilitated through tree plantations.
- About 729,036 ha of forest areas are being protected by LFGs with direct support from MSFP.
- The OPs of some LFGs include the piloting of SFM using intensive silvicultural operations in some hilly regions and in the Chure region – these include Baglung, Ramechhap (see photo) and Sindhuli.
- All of the 43 MSFP's working districts are now equipped with forest fire management knowledge and equipment.
- 652 LFGs have received intensive training on SFM skills.



At the policy level, the preparation of the Forestry Sector Strategy (2016-2025)

was fully supported by MSFP, and this includes clear acknowledgement of SFM as an avenue to maximize the economic potential of the forestry sector, to contribute to both local and national economies, and the need to continue to expand SFM in all modalities of LFG.

▲ SFM in the mid-hills - orientation in the field in Ramechhap

The MoFSC has also supported the development of the Scientific Forest Management Guideline (2014) to offer clarity at the operational level in the practice of SFM. A significant development, while MSFP was in its closing phase, was the announcement from the MoFSC that it had allocated NRs 630 million for fiscal year 2073/74, (2016/17) for continuing to expand SFM from 6 to 11 districts in the Terai, providing a clear indication that the Ministry was taking over the ownership of SFM and MSFP's initiatives in this field.

The process and practices involved in SFM are described in the following section, through case studies from the Terai.

# 5

## SFM IN PRACTICE: COLLABORATIVE FOREST MANAGEMENT IN THE TERAI

The SFM processes, practices and the subsequent extensive silvicultural operations in the field are described in this section with a focus on a collaborative forest management modality in the Terai, where natural Sal (*Shorea robusta*) and Teak (*Tectona grandis*) forests are dominant. Assuming previous establishment of the LFG, the process begins with the preparation of the scientific forest management plan; other key areas that are discussed below are the implementation, and the benefit sharing.

### 5.1 The preparation of the SFM operational plan

SFM plan preparation is the important initial step, on which is based the improved and sustainable management of LFG forests. It acts as the legal and guiding document for the LFGs to perform the planned SFM activities. 5 major steps have been followed in the MSFP working districts with the LFGs in the SFM OP preparation process – as presented in Figure 2.

- Step I: the SFM OP preparation process with the LFG starts with the identification of the potential forest area to be managed scientifically since all forest areas might not be equally suited to SFM. This identification process is usually carried out through joint discussion between DFO staff and the local community, based on local knowledge and other available information and data. In general, the natural Sal (*Shorea robusta*) forest areas were identified for SFM, excluding the areas important for water resources and biodiversity conservation.
- Step II: intensive discussion and consultation is then carried out with multiple stakeholders at the local level regarding the plan to implement SFM in their area. On the one hand, it keeps everyone informed and updates them on the upcoming plan, and on the other hand, it allows a wider audience to provide comment and feedback, ideas and concerns on the planning process and subsequent operational modality – thereby increasing ownership.

**Figure 2: Steps in the SFM OP preparation process**

<b>I. Identification of the Forest</b>	<ul style="list-style-type: none"> <li>■ Joint discussions with DFO and local communities based on available information and records,</li> <li>■ Endorse decision from DFSCC to proceed</li> </ul>
<b>II. Stakeholder Interaction</b>	<ul style="list-style-type: none"> <li>■ Conduct interaction meetings and engage local stakeholders on SFM OP preparation, the process to be followed, the necessary institutional arrangements, and the intended outcomes</li> </ul>
<b>III. Forest Survey</b>	<ul style="list-style-type: none"> <li>■ Conduct forest boundary survey and take GPS survey points</li> <li>■ Survey comprises 5 activities: boundary survey, surveying of existing features, dividing forest into blocks, blocks into compartments and sub-compartments, and final preparation of digital map</li> </ul>
<b>IV. Forest Inventory</b>	<ul style="list-style-type: none"> <li>■ Assess forest cover, growing stock, and annual increment</li> <li>■ Conduct regeneration survey to identify appropriate silvicultural interventions</li> </ul>
<b>V. Forest Management Planning &amp; Documentation</b>	<ul style="list-style-type: none"> <li>■ Set a long term vision, with 20-25 years to achieve the expected results</li> <li>■ Prepare a logframe and document the OP</li> <li>■ Take feed back from stakeholders</li> <li>■ Finalise the OP, and endorse from the LFG General Assembly</li> </ul>

Step III: the next step of the SFM OP preparation process involves the *forest survey*; this needs to record an update on the general state and composition of the forest vegetation, terrain, soil, regeneration of species, ground cover, soil erosion, leaf litter, evidence of removal and grazing – some of this data will have been recorded during the preparation of the original OP, but it is very important to update and embellish this information. As recorded in Figure 2, there are 5 key activities that need



▲ Discussions with the local community on SFM

measurement and documentation: boundary survey, surveying of existing features, dividing forest into blocks, division of blocks into compartments and then sub-compartments, and final preparation of the digital map.

GPS coordinates are taken while carrying out these surveys, primarily for the mapping exercise, for future records, and to avoid potential future disputes on boundary issues. The forest is divided into different blocks based on natural features, ensuring that the areas of the blocks are larger than that of at least one compartment. Generally, the number of sub-compartments needs to be equal in each compartment - for example, there should be 8 sub-compartments if the rotation period is 80 years. The digital map of the forest area is prepared using special software, with boundary, forest features, blocks, compartments, sub-compartments, and sample plots clearly marked.

- Step IV: *the forest inventory* is carried out after preparing the digital map; this step involves stock mapping to assess forest cover, growing stock, and annual increment. Sample plots are located, and tree and pole numbers, and the volumes, measured and recorded, following the CF Guidelines. A regeneration survey is also conducted to choose appropriate management interventions such as harvesting, thinning, natural/artificial regeneration, and cultural operations for each compartment and sub-compartment - the total stock of each compartment and sub-compartment is calculated separately.
- Step V: All information, both social and technical, are then compiled and documented in *the forest management plan*, which also sets the goal and objectives of the SFM in that particular LFG. The plan is then discussed and endorsed, incorporating comments from users and stakeholders, by the local forestry group. In the case of collaborative forest management groups, the SFM OP is prepared in the given format, incorporating feedback from the local users, and other stakeholders including the DFO – it is then approved by the DoF through the respective Regional Forest Directorate.

As SFM is a relatively new practice in Nepal, intensive technical backstopping support is needed in this process from the DFOs, and other technical stakeholders. The Community Forest Development Guidelines and the SFM Guidelines are the two major policy documents which constitute the key resources for those involved in preparation of the SFM OPs for the LFGs.

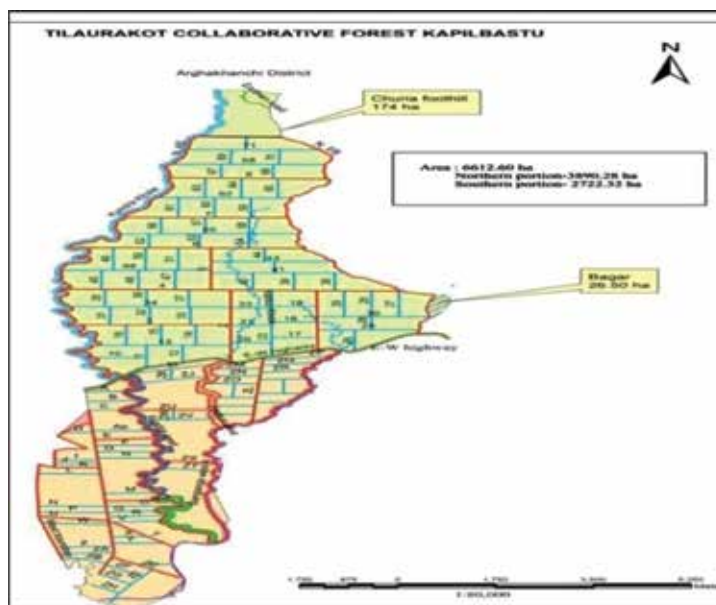
## 5.2 Implementation of the SFM Operational Plans

As practiced in the MSFP working districts, the implementation of the SFM OP includes a series of intensive field level step by step activities – as described below.

### a) Blocks, compartments and sub-compartments division

The forest area is divided into different blocks, compartments, and sub-compartments as outlined in the OP. GPS points of each compartment and sub-compartment within a block are taken, uploaded, and ideally marked on the digital map – see Map 2. However, a hand drawn paper map can be prepared if digital map technology is not available at the time. Compartments and sub-compartments are normally marked out on the ground in the first year of OP implementation since it demands much work and investment. The compartments are mostly separated by establishing fire lines of 6m width around the compartment; a shallow drainage ditch of 0.5 m width is usually positioned either side of the fire line between the compartments. Between the sub-compartments, 4m width fire lines are established, with or without a shallow drainage ditch depending on local conditions.

**Map 2: An example of block, compartment and sub-compartment divisions in an LFG**



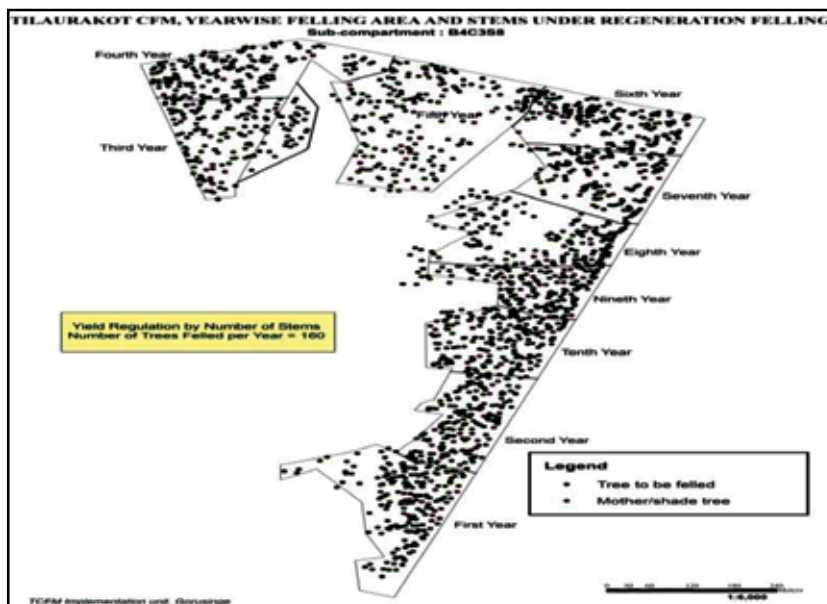


## b) Silvicultural operations

The silvicultural operations are initiated following the OP stipulations, after the division of blocks, compartments, and sub-compartments, and the establishment of the fire lines.

The first procedure in the implementation cycle is the *stem mapping* which is carried out after taking the measurement of diameter and height of the trees and poles in each sub-compartment selected for regeneration felling. A total valuation of timber and fuelwood from the planned annual felling is then carried out. The GPS points of each matured trees is also taken so that their location can be easily detected while harvesting. The *regeneration felling* is first carried out in one sub-compartment of a compartment where forest conditions are favorable, and then *thinning and improvement felling* is undertaken in other sub-compartments, as stipulated in the OP.

**Map 3: An example of stem mapping in LFGs**



The silvicultural operations are carried out extensively in the sub-compartments where felling has been completed, as documented in the OP. Mother trees are selected, field verified, and ring painted at breast height. Generally, 15 to 25 mother trees/ha have been selected in the natural Sal forests in Terai.

All trees in any sub-compartment are not removed in the same year. Yield regulation, undertaken for a regeneration period of 10 years, is done in such a way that an equal number of trees are harvested each year. The total number of trees to be harvested from each sub-compartment during regeneration felling is determined from the stem mapping.



▲ *SFM in the mid-hills - mother tree selection*

Starting at the sub-compartment level, the trees other than the selected mother trees are then felled minimizing damage to the mother trees and the prevailing regeneration, under the strict and direct supervision of a forest technician, following recognized technical standards. All the debris is then removed from the forest area to encourage natural regeneration, and to reduce the risk of pest attack and forest fire.



▲ *Change is observed - improved natural regeneration - after regeneration felling*

Different types of intervention are then carried out to encourage *coppicing and regeneration*. These interventions can include the following, if required and deemed appropriate: further protecting the forest from fire, fencing the regeneration areas to protect from grazing and encroachment, debris removal, soil preparatory works before the seed fall season, seed collection and sowing, and plantation.

Different types of silvicultural activity are carried out in other adjacent sub-compartments – these include cleaning, thinning, pruning, as well as protection measures such as patrolling, and fencing, and clearance and maintenance of fire lines.

The timber and fuelwood harvested from the regeneration felling areas are logged, and distributed to the planned beneficiaries – either user group members or the GoN-DFO, based on management modality, following the prevailing policy provisions and guidelines.

### 5.3 Benefit sharing

Two systems operate in terms of benefit sharing:

- a) as governed by the CF Guidelines and Forest Policy, community forests receive 100% of the benefits from sale of timber, firewood and other NTFPs harvested from the community forest; and –
- b) in the collaborative forestry system, 50% of the benefits from the SFM goes to the local community group, while 50% goes to the GoN treasury through the DFO – as stipulated in the Collaborative Forest Management Guideline (2012).

Generally, the DFO takes the timber and fuelwood and sells it through auction, whilst, as commonly practiced, the LFGs distribute its 50% share of the forest products amongst their users, charging a nominal price not less than the total cost incurred by the felling and transportation operations and the Government royalty rate (in case of CFMG). The final cost is endorsed by the LFG General Assembly, following discussions by the DFSCC; the system of price fixing varies from district to district.

The funds collected by the LFGs, whether through system a) or b) above, is utilized for forest management and local development, and administration and office management. In general, the following are the major areas of investment from the LFG funds:

- public forest and private forest development programmes in the core VDCs;
- establishment of nurseries to produce quality seedlings for plantation;
- conservation and management activities as outlined in the SFM OPs;
- support on income generating activities of identified poor households;
- collection of other forest products for group use or sale.

Investments by the LFGs are generally provided to the users in the case of community forests, and to the VDC level for local development activities in the case of the collaborative management groups.

## 5.4 Sustainability mechanism

The LFGs, being legal and locally owned organizations, are in a sound position to ensure the sustainability of the on-going SFM operations. It is clear that the implementation of an SFM OP demands significant financial investment as well as technical knowledge. However, the financial income received by LFGs through the sale of the forest products while implementing SFM provides the foundation for sustainability.

The local level multi-stakeholder mechanism, the Agriculture Forestry and Environment Committee (AFEC), functions under the umbrella of the VDC, and this ensures representation of all stakeholders, the local communities, and the local government. The AFEC is responsible for creating a collaborative milieu and for facilitating equitable benefit sharing. Similarly, at district level, the District Forest Sector Coordination Committee (DFSCC) has also acted as a multi-stakeholder mechanism for coordination of all forestry related activities including the SFM initiatives.

However, in terms of sustainability, it is the local communities that are fundamental – and as the great majority of them are convinced of the importance of SFM in contributing to both the local and national economy, sustainability is almost assured, providing they are provided with active and effective support from the DFOs. The GoN has also shown its commitment to continue and expand SFM with the allocation of NRs. 630 million in its budget for FY 2016-2017. Ultimately, sustainability may depend on the transformation of technical knowledge to the LFGs, and this requires significant further training and support especially for any new LFGs taking up SFM – and in turn, this also requires funding. Further challenges and issues are discussed in the following section, after the case study documented below in relation to SFM development in the Tilaurakot Collaborative Forest Management area, in Kapilbastu District.

## Case Study: Scientific Forest Management in Tilaurakot CFM, Kapilbastu

Tilaurakot CFM in Kapilbastu is a pioneer in practicing SFM in the western Tarai of Nepal. It covers 6,612 ha which are mainly dominated by natural Sal forests, and is managed by 22,622 hhs from 23 VDCs or municipalities. The CFMG prepared the SFM OP in 2012, and MSFP has provided support on implementation of the SFM OP since 2013 in 656 ha of forest.

With considerable and essential support from the DFO, the introduction of SFM in the CFM has already demonstrated both economic and ecological benefits after 4 years. The SFM practice has improved the total growing stock (see graph), forest health, and has significantly increased the natural regeneration (see photos). It is recorded that the natural regeneration has increased from 867 to 13,867 Sal seedlings after extensive silvicultural operations undertaken as part of SFM OP implementation.

The SFM intervention in 656 ha of Tilaurakot CFM has produced an average of 19,118 cft timber and 23,820 cft fuelwood - including production from a regeneration felling operation in 25 hectares each year as documented in the approved SFM OP, and the removal of dead, decaying, dying, and diseased trees from other areas outside the felling coupe. A total investment of NRs. 60.3 million was made over 4 years, and the total revenue generated over the same period was NRs. 118.5 million.

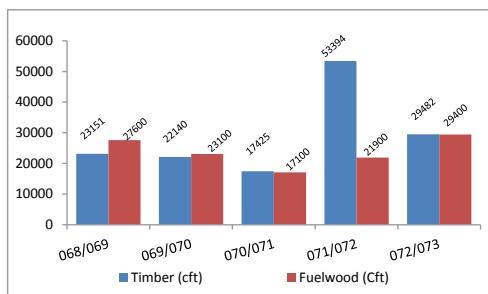
On the basis of the above findings, it is estimated that a CFM will reach breakeven point after 3 to 5 years of SFM OP implementation, depending on forest quality and the local situation. After this period of time, the SFM operations will fund themselves without the need for external funding support.

SFM practices have contributed not only to the betterment of ecosystem health and biodiversity, it also benefitted 5,965 hhs including the CFMG distant users who now have easy access to fuelwood, poles and timber. The introduction of SFM is also labour intensive work which generates great opportunities for local employment through seasonal and year round SFM activities. At Tilaurakot, 101,063 person days of employment have been generated – which is equivalent to a net worth of NRs. 29.4 million – see the table below.

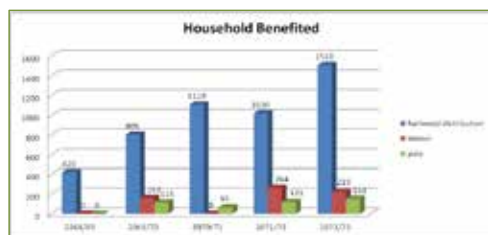
As documented in the OP, the harvested timber and fuelwood has been shared on a 50:50 basis between the CFMG and the GoN. The CFMG has distributed forest products to its members for a minimal charge (see graph), whilst the DFO has auctioned its share of the timber and fuelwood, with the income being contributed to the GoN treasury.

The table overleaf shows the sustained opportunity for employment generation that SFM provides to the members of the CFMG; the high figure in 2068/69 provides an indication of the need for much local labour for the forest survey, laying out of the blocks and compartments, and the establishment of the fire lines in the initial stages of SFM. The graph below records the steady increase in the ability of the CFMG to provide firewood, timber and poles to its members.

## SFM in Tilarakot CFM in Pictures and Graphs



Timber and fuelwood production in Tilarakot CFM, (Source DFO, Kapilbastu)



Households benefited from SFM interventions in Tilarakot CFM (Source: DFO, Kapilbastu)

FY	Person days	Worth (NRs)
2068/69	34,133	9,386,575
2069/70	16,559	4,553,725
2070/71	12,257	3,370,675
2071/72	18,753	5,625,900
2072/73	19,361	6,485,935
Total	101,063	29,422,810

Local employment generation from SFM interventions in Tilarakot CBF (Source: DFO, Kapilbastu)



▲ Before SFM intervention



▲ SFM intervention



▲ Changes in natural regeneration after SFM intervention in Tilarakot



## Employment Opportunities in Scientific Forest Management



▲ *Felling and debarking*



▲ *Transportation*



▲ *Stems to logs*



▲ *Benefits - both employment and forest products, even for distance users*

# 6

## CHALLENGES TO OUTSCALING SFM

Despite the significant achievements from the MSFP support for SFM, there were a number of challenges faced during implementing SFM, which are described below.

### **Policy gaps and focus area**

The Forestry Sector Strategy (FSS) (2016-2015) and the Forest Policy (2015) have clearly emphasized the promotion of SFM for maximization of both economic and environmental benefits from the forestry sector in Nepal. The DoF has also prepared the Scientific Forest Management Guideline (2014). However, the guideline has generalized SFM into a blanket approach irrespective of the ecological zone, forest conditions, and focused management objectives. This emphasis on “one glove fits all” could potentially limit the expansion of SFM to only a few districts in the Terai. Similarly, the current SFM practices with extensive silvicultural operations are focused on the high value natural Sal (*Shorea robusta*) and planted Teak (*Tectona grandis*) forests. Detailed plans and guidelines for other types of forests are yet to be developed, but must be in the near future in order to encourage SFM in other parts of the country, for example the mid-hills and the high hills. There are a few examples of small areas where MSFP has been supporting the MoFSC in piloting scientific forest management in the mid-hills – for example, in Ramechhap (pine), Baglung (pine) and Palpa (sal) districts. Implementation is at early stages, but initial results in relation to local engagement and forest productivity are encouraging.

### **Policy hurdles**

The Public Procurement Act and Regulations (2007) has mandated the hire of services costing more than NRs 200,000 through public tender. Since SFM is labour intensive and costly, especially in the first few years - due to many preparatory works, including the initial costs of block and compartment



establishment - funding required exceeds this prescribed ceiling, and the LFGs are forced to go through the public tendering process. This has not only added ambiguities to the process, but has significantly complicated and delayed the OP implementation.

### **Technical know-how and capacity of LFGs**

The current SFM practices require updated technical expertise to maintain higher accuracy in the planning procedure, the measurements, and effective implementation. However, such human resources are still inadequate within the MoFSC, and there is a lively and current debate as to whether the LFGs have the capacity to develop or the resources to hire sufficiently knowledgeable technical human resources. If an effective capacity building programme is not initiated in the near future for both MoFSC staff and individuals from the private forestry sector, this will further limit the expansion of SFM to further LFGs. Similarly, both the availability and knowledge of handling modern and efficient tools such as chainsaws, vertex device, tree density scanners, and GPS units, both amongst the DoF staff and LFG members, poses further challenges to SFM out-scaling and efficient mapping, quantification of resources, and management.

### **Common understanding among stakeholders**

As briefly discussed earlier, there is an ongoing lively debate amongst stakeholders as to whether to use the term ‘scientific’ or ‘sustainable’. A common understanding as to the terminology and subsequent acceptance and coordination among stakeholders is important to plan, implement, and expand SFM effectively on a wider scale. Further delay in building this common understanding among stakeholders will further push back an opportunity to grasp optimum benefits from SFM. It is here suggested that sustainable forest management might apply to a broader, more generic management modality which is more focused on environmental and biodiversity conservation, while scientific forest management applies to the more rigorous planning of a forest area for maximum economic potential. Both terms acknowledge the importance of the participation of the local forestry user groups in forest management, and balancing the 3 pillars of sound forestry development – social, economic, and ecological aspects.

### **Operational Plan backlog**

There is an increasing number of OPs, the main document providing legal authority to local communities to manage the forests, that are in need of

revision. The LFGs are still highly dependent on the DFOs to provide technical support in the preparation of their OPs. This dependency is further increased while preparing the OP for LFGs who have opted to practice SFM using extensive silvicultural practices. Expansion of SFM thus relies heavily on the capacity of the DFOs to assist; the MoFSC thus needs to take account of both staff numbers and staff capacity in terms of SFM knowledge – otherwise, the exiting backlog of OPs in need of revision could further increase, limiting the speed of SFM outscaling.

### **Process ambiguity**

It is mandatory for CFMGs to obtain approval from the office of the respective Regional Forest Directorate (RFD) when starting harvesting as part of the SFM OP implementation, and the RFD only provides harvesting permission after a field visit to verify the harvesting request. This can be time consuming for the CFMGs – a) to contact the RFD, b) to organize the verification field visits, c) to eventually receive permission to harvest. Although this can be a very rapid process, in some circumstances and seasons, this process can take up to 2 months. Such processes can even delay harvesting to a following season, which has implications on both proper implementation of the plan and on the expected economic benefit. This responsibility for providing harvesting permission should be given to the DFOs for both community forests and collaborative management forests – this would speed up the process, especially as the DFOs are involved in preparing the operational plans.

### **Benefit sharing at the local level**

Generally in the CFM system, 50% of the total benefit from timber and fuelwood from SFM operations is provided to the GoN-DFO, the forest products then being auctioned. This has limited the chance to obtain forest products at the local level to balance the demand and supply gap. As the CFM account is jointly managed by the DFO, an accountant, and the CFM coordinator, there is potential for granting access to timber and fuelwood products to ill-intentioned elites and private businessmen, rather than more deserving individuals from the CFMG, who, for example, may be attempting to start a private furniture or handicraft enterprise. Greater flexibility is required in the 50:50 modality.

# 7

## MAJOR LEARNINGS AND RECOMMENDATIONS

The MSFP intervention on SFM has also offered a number of learnings along with the challenges described in the previous section. With the help of a number of DFOs, it has been demonstrated that SFM has significant potential to contribute to the local economy, and is a good option to improve both the quality and productivity of over-mature forests. Field experiences have demonstrated that SFM is an effective approach for improved management and productivity which links economic, environmental, and socio-cultural aspects of development.

Other major learnings from the MSFP interventions on SFM are as follows.

- The MSFP-SFM intervention experience further emphasizes the need for mutual collaboration between government bodies, local communities, and other relevant stakeholders for effective implementation.
- LFGs are now in the position to lead the SFM if the technical facilitation is available from, and ensured by the DFOs and other stakeholders.
- Clear provisions are needed in policy and guidelines to expand SFM to different ecological zones, forest types, and with different management modalities – current policies and guidelines need amending to encourage this expansion, rather than imposing a blanket approach.
- Considering the economic potential of SFM, both political and bureaucratic commitment is crucial at all levels to achieve the anticipated results from SFM – at the grass roots VDC and AFEC level, through the district level, to the policy level at the Ministry.
- A common understanding and collaborative milieu among stakeholders is important on effective implementation and increased ownership to ensure the sustainability of SFM.

The following recommendations are made as a contribution to future projects on SFM endeavors.

### Policy issues:

- current policies and guidelines need amending to fill in the gaps and remove hurdles in order to encourage the expansion of SFM to different types of forest and to higher eco-regions;
- greater flexibility in the Public Procurement Act and Regulations (2064) is required specifically for SFM establishment as the funding required especially for the initial stages, exceeds the prescribed ceiling of NRs 2 lakhs, thus forcing the LFGs to go through public tender for specialist services that few private businesses can undertake.

### Scale out of SFM:

- before scaling out SFM can really take hold, many OPs, the main document providing legal authority to local communities to manage the forests, are in need of revision; currently there is a significant backlog, and the Ministry needs to put emphasis on reducing this bottleneck to encourage the expansion of SFM practices;
- effective collaboration between the LFGs and the GoN district forestry offices is essential to scale out the SFM programme – new projects supporting SFM need to focus on ensuring that the district offices have the skills, both social and technical, to ensure that LFGs fully understand the process and are fully on board;
- as the establishment of SFM in an LFG requires much capital, it is necessary to establish a loan mechanism that can be used specifically by LFGs for initiating SFM;
- despite the significant funding support from the GoN for SFM in FY 2073/74, further collaboration with development partners and with other relevant programmes should be forged to complement the national support for SFM expansion.

### Capacity building:

- there are inadequate human resources, within both public and private sectors, that have the necessary updated technical knowledge, and this is a

challenge to scaling out SFM. The Ministry must ensure that a significant proportion of future support for SFM funds capacity building of both GoN staff, the private sector, and selected LFG members so that there is the essential human resource to support expansion. This would further contribute in reducing the dependency of LFGs on the DFOs for technical backstopping on SFM OP preparation, revision, and implementation.

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## Timeline of SFM Development at Tilaurakot CBF, Kapilbastu

Time (Fiscal Year)	Major Activities
2063/2064 BS (2006 AD)	<b>The SFM concept emerges</b> <ul style="list-style-type: none"> <li>■ Southern people raise their voices demanding traditional and equitable use rights and access of the natural resource after the majority of accessible forest patches were handed over as community forest to people living in the vicinity of the available forests, providing distant users no access to resources because they live too far away from forest areas.</li> <li>■ There was a big dissatisfaction on the over emphasis on community forestry by those who had no or very little access to forest resources;</li> <li>■ The discussions were influenced by:               <ol style="list-style-type: none"> <li>a) the concept of collaborative forest management that had been initiated in the eastern region through the BISEPST project;</li> <li>b) the banning of collection of daily fodder, firewood, poles and timber needs from the GoN forest areas;</li> <li>c) in the forests under GoN control, the harvesting and extraction of timber was illegal as they were considered as a state property, with revenues generated for the government, but with no availability of forest products to nearby communities.</li> </ol> </li> </ul>
2065 BS (2007 AD)	<b>SFM OP preparation</b> <ul style="list-style-type: none"> <li>■ The new 5 year district forest plans included the provision of managing GoN forests as collaborative forests in four different locations</li> <li>■ LFP (DFID-UK) supported the preparation of the new CFM plans with NRs. 200,000/-.</li> </ul>
2067 BS (2009AD)	<b>SFM OP approval, budget allocation, and preparation:</b> <ul style="list-style-type: none"> <li>■ The new collaborative forest management plans were approved by the DoF.</li> <li>■ NRs. 10 lakh were provided through the GoN red book as support for the startup costs.</li> <li>■ The CFM practices were confined at this stage to more conventional management strategies – for example, collection of 3D (dead, diseased and dying) trees, cleaning, opening of forest paths, and fencing.</li> </ul>

Time (Fiscal Year)	Major Activities
2068/69 BS (2011 AD)	<b>SFM in practice:</b> <ul style="list-style-type: none"> <li>■ A budget of NRs. 60 lakh was allocated for CFM through the GoN red book.</li> <li>■ The implementation of SFM began, with Rs 200,000/- for operationalizing the Annual Allowable Cut (AAC) as stipulated in the Community Forest Guideline (Digdarshan), as there was no Collaborative Forest Management Guideline in place at this time.</li> <li>■ Initially, DFO staff felt scared to fell over-mature green trees.</li> <li>■ The demand for forest products was high from the users in the 23 VDCs covered by the Tilaarakot CFM – as a result, it was neither possible to promote regeneration in the forest area as was the objective of scientific management, nor fulfill the product demand of distant users by practicing conventional methods of 3D tree collection, cleaning, and harvesting trees under the AAC system.</li> <li>■ During this period, SFM initiatives focused on a) the purchase of required equipment such as GPS, vertex, linear tapes, and other tools, b) the opening of fire lines, and c) other preparatory work – such as survey and delineation of compartments and sub compartments, GPS location and tagging of each mature tree, the selection of mother trees and ring painting.</li> </ul>
2069/70 BS (2013 AD)	<b>MSFP support intensifies SFM in practice</b> <ul style="list-style-type: none"> <li>■ Financial support of NRs. 129 lakh (Rs 45 lakh for Tilaarakot CFM) was allocated by the Programme for scientific forest management in 4 CFMs (Tilaarakot, Kapilvastu, Gautam Budha and Mayadevi CFMs).</li> <li>■ The contractual process was started for regeneration felling.</li> <li>■ An interaction with all stakeholders was undertaken before the felling series began.</li> <li>■ After stock taking and approval from the Regional Directorate, SFM practice was initiated on the ground in 25 ha of each of the 4 supported CFMs, with the following activities: <ul style="list-style-type: none"> <li>■ regeneration felling,</li> <li>■ removal of brushwood and cleaning,</li> <li>■ fencing surrounding the felling coupe,</li> <li>■ establishment of 80 km of fire line,</li> <li>■ thinning in 2 hectares;</li> <li>■ ploughing the area where there was no mother trees, for promoting regeneration.</li> </ul> </li> </ul>
2071 BS to date (2014 AD to date)	<b>MSFP support, GoN commitment to continue SFM</b> <ul style="list-style-type: none"> <li>■ SFM activities continue in subsequent fiscal years following promising early results, and after closure of MSFP, GoN announce support of NRs. 630 million to continue and expand SFM in other Terai districts for FY 2073-2074.</li> </ul>











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