Phrumsengla National Park Management Plan July 2019 – June 2029

"Conservation to Ensure the Ecological and Environmental Foundations for Achieving Gross National Happiness"

July 2019
Phrumsengla National Park
Department of Forests and Park Services

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Management Plan
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Prepared by:

Yonten Norbu, Chief Forestry Officer
Ugyen Namgyel, Ex CFO
Jigme Sonam, Sr. Forestry Officer
Jangchuk Gyeltshen, Sr. Forest Ranger I
Pema, Sr. Forest Ranger II
Pema Tshewang, Sr. Forest Ranger II
Phuntsho Wangdi, Forest Ranger II
Kezang Dukpa, Park Ranger, Eastern Park Range, Phawan, Lhuentse
Ugyen Lhuendup, Park Ranger, Western Park Range, Ura, Bumthang
Pema Tobgay, Park Ranger, Central Park Range, Lingmithang, Mongar
Kezang Wangchuk, Accountant VI,
Kencho Lham, Adm Assistant

Citation:

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Phrumsengla National Park	Nature Conservation Division
Department of Forests and Park Services	Department of Forests and Park Services
Ura: Bumthang	Thimphu
Contact No: 77192125/77192123	Contact No. 02-325042
Email: admtnp@yahoo.com	
dofpstnp@gmail.com	

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Phuntsho Wangdi

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Royal Government of Bhutan
Ministry of Agriculture & Forests
Department of Forests & Park Services
Phrumsengla National Park
Ura: Bumthang
"Managing Bhutan's Natural Heritage"

Approval of the Royal Government of Bhutan

Conservation Management Plan of Phrumsengla National Park
(July 2019- June 2029)

"In accordance with and as per the provisions of the Forest and Nature Conservation Act of Bhutan, 1995"

Submitted for approval;

Chief Forestry Officer
Phrumsengla National Park

Chief Forestry Officer
Nature Conservation Division

Recommended for approval;

Director
Department of Forests and Park Services

Approved:

SECRETARY
Ministry of Agriculture and Forests

© Blood pheasant female, Phuntsho Wangdi

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Royal Government of Bhutan
Ministry of Agriculture and Forests
Department of Forests and Park Services
Thimphu

Foreword

The Phrumsengla National Park was declared as National Park in 1998 to specifically conserve and protect old fir forests in 1998. However, over the years the park came to be known for its rich biodiversity due to its landscape stretching from sub-tropical zone to alpine meadows and conservation activities were implemented successfully with the funding supports from RGoB and other donor agencies. Two management plans from 2000-2008 and 2008-2013 which was extended till 2018 due to lack of fund, focused in promoting conservation of rich biodiversity as well as to uplift the livelihood of communities living in and outside the park.

This is the third management plan (2019-2029) of Phrumsengla National Park and the need to address both conservation issues and issues related to socio-economic aspects of communities residing in and outside park were taken into account while formulating management plan. The third management plan has proposed various management prescriptions to promote species conservation, uplift socio-economic status of communities through eco-tourism in the park, establishment of forest based enterprise and to address human-wildlife conflict. Additional feature of third management plan is the inclusion of local forest management plan to meet the timber requirement of communities residing in and outside park.

With the committed fund from Royal Government of Bhutan and Bhutan for Life (BFL) to the protected areas of Bhutan, this management plan would serve as the guiding framework to implement all the prescribed activities for effective and efficient management of Phrumsengla National Park. I am hopeful that this will ultimately guide PNP to fulfil the vision of "A viable and thriving national park where people and biodiversity of Central and Eastern Bhutan co-exists".

Tashi Delek and Best Wishes!

(Lobzang Dorji)

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ROYAL GOVERNMENT OF BHUTAN
Ministry of Agriculture & Forests
Tashichhodzong, Thimphu : Bhutan

PREFACE

Phrumsengla National Park (PNP) has been implementing conservation activities for last one and a half decades. Much has been achieved and much has been learnt. The conservation is based on the five year periodic conservation management plan.

PNP with an area of $905km^2$ is a jewel within the protected area system of Bhutan. With some of the last remaining stands of old growth fir and cool temperate broadleaved forests in the entire Himalayas, it is home to endangered species as Tiger, Red panda, musk deer and the Rufous-Necked hornbills. The park also has some of the most stunning trekking routes in Bhutan and is known to have some of the best bird watching spots in Asia. Based on extensive field surveys and analysis of the past records and experiences, the current management plan (July 2019 -June 2029) aims to consolidate conservation landscapes and build resilient communities.

The plan focuses on five key areas : 1) Conserve and protect floral diversity with special emphasis on old growth fir forest and cool temperate broadleaf forests; 2) Conserve and protect faunal diversity with special focus on priority species such as red tiger, red panda, and musk deer; 3) Promote ecotourism centering the richness of bird diversity; 4) Enhance species resilience and adaptations to changing climate and land use, and 5) Ensure efficient forestry services delivery to the park residents and adjacent communities. A key salient feature of the plan is the requirement to develop an Annual Work Plan which will ensure that emerging challenges are addressed. The plan follows and adopts a framework approach; therefore it is not fully based on rigid prescription. The activities and budget specifications are provided to guide implementation.

I hope that the conservation management plan will contribute significantly towards consolidating conservation landscapes within and around the Park.

Tashi Delek and Best Wishes!

(Rinzin Dorji)

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ACRONYMS AND ABBREVIATIONS

1. B2C2:   Bhutan Biological Corridor Complex
2. BTFEC: Bhutan Trust Fund for Environmental Conservation
3. BWS: Bumdeling Wildlife Sanctuary
4. CCC: Chiwog Conservation Committee
5. CF: Community Forest
6. FNCA: Forest and Nature Conservation Act
7. FNCRR: Forest and Nature Conservation Rules and Regulations
8. FRMD: Forest Resources Management Division
9. GEF: Global Environmental Facility
10. IUCN: International Union for Conservation of Nature
11. JSWNP: Jigmi Singye Wangchuck National Park
12. MASl: Meters above sea level
13. NWF: National Work Force
14. PNP: Phrumsengla National Park PNP
15. PA: Protected Area
16. RNR: Renewable Natural Resources Center
17. RGoB: Royal Government of Bhutan
18. RMNP: Royal Manas National Park
19. SFED: Social Forestry and Extension Division
20. TNP: Thrumsengla National Park
21. WCNP: Wangchuck Centennial National Park
22. WWF: World Wildlife Fund

PART 1: BACKGROUND

1.1. Significance of Phrumsengla National Park

Phrumsengla National Park (PNP) was known as Thrumshingla National Park (TNP) ever since it was notified in 1993 with an area of 768 km². In 2000, the area of was extended towards north with inclusion of large track of suitable tiger habitats. The park was renamed as PNP in 2014 and the total area was revised to 905.05 km². However the physical features were not altered for a prime reason to signify and interlink the conservation paradigm with inherited local communities' culture.

The purpose of establishment of the park was to conserve the temperate ecosystem of central region in Bhutan's Protected Area (PA) landscape. The park was fully operationalized in 2000 with joint funding support from Royal Government of Bhutan (RGoB) and World Wildlife Bhutan Program. PNP is a 'linchpin' of Bhutan's Biological Corridor Complex (B2C2) landscape. The park is connected to Jigme Singye Wangchuck National Park (JSWNP), Royal Manas National Park (RMNP), Bumdeling Wildlife Sanctuary (BWS) and Wangchuck Centennial National Park (WCNP) through a string of Biological Corridors (Figure 1).
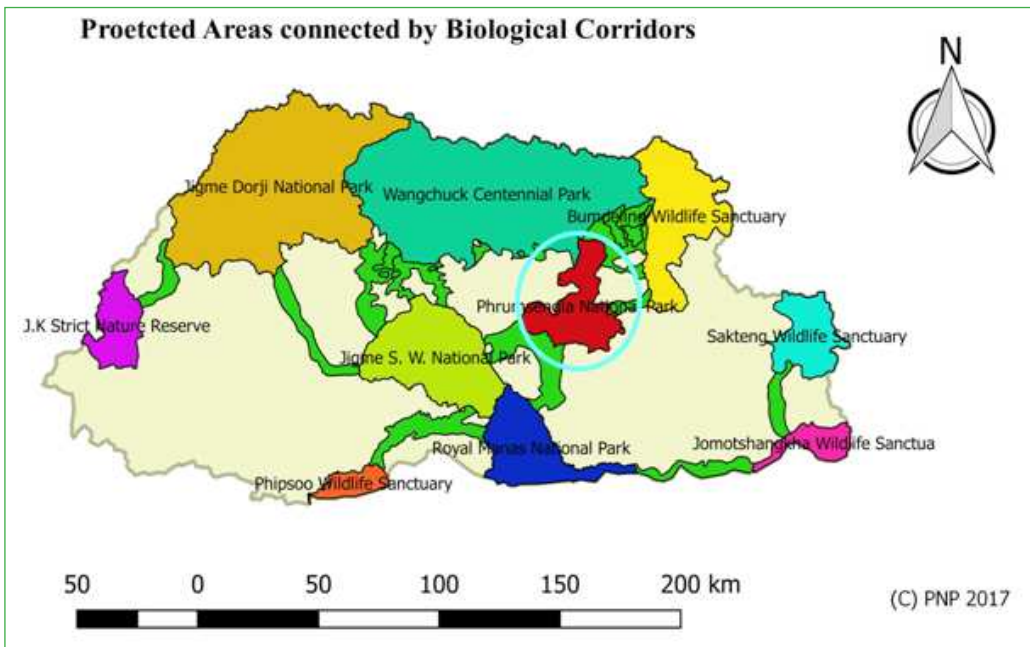

Figure 1: Protected areas interconnected by Biological Corridors

Vision: A viable and thriving national park where people and biodiversity of Central and Eastern Bhutan co-exists

Mission: To ensure socio-ecological benefits through landscape conservation for the species persistence in the east-central region of Bhutan

Goal

- Conserve and protect wild floral diversity with special emphasis on old growth fir forest and cool temperate broadleaf forests.
- Conserve and protect wild faunal diversity with special emphasis on priority species such as red panda, tiger, and musk deer.
- Promote ecotourism with special emphasis on the richness of bird diversity.
- Enhance species resilience and adaptations to changing climate and landuse.
- Ensure efficient forestry services delivery to the park residents and adjacent communities.

1.2. Salient Features of the Plan

The 'Phrumsengla National Park Plan of Management' consists of six parts:

Part I: Background of Phrumsengla National Park

Part II: A review of the achievements and impacts of the previous plan

Part III: A stock-taking of current and emerging issues and challenges

Part IV: Statutory of management plan

Part V: Specification of rationale, policy objectives, strategies and management prescriptions

Part VI: Specification of planned activities and budget requirement for the next 10 years (July 2019 – June 2029)

This management plan has taken into consideration as to ensure proposed strategies at the park level translate into contributions towards achieving conservation goals and economic aspirations under the purview of the national philosophy "Gross National Happiness'.

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Legal mandates of the plan are drawn from the Forest and Nature Conservation Act (FNCA) 1995, and Forest and Nature Conservation Rules and Regulations (FNCRR) 2017.

The plan reveals certain key elements on the ecological and socio-economic framework of the park. For more thorough treatment, readers are referred to the background documents: park zonation report, specific reports on plants, mammals, avifauna, and living PNP management plan which serve as a prelude to this management plan.

The plan is based on comprehensive rapid assessment of biodiversity (plants, mammals and birds) and socio-economic status of households within the administrative authority of the park. Both these assessments have enabled the compilation of relevant and measurable indicators to judge the success of the plan at the end of 10 years.

It leaves room for and stipulates the requirement of an annual assessment of the program and activities. This will enable replication and up-scaling of successful models. It calls on the manager to proactively pursue fund mobilization with interested and committed partners.

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PART 2: SYNOPTIC REVIEW OF THE PAST PLAN

The 2nd Management Plan (2008-2013) was extended because the park management could not secure the fund and therefore plan could not be implemented. Other than basic recurring cost almost all activities reflected in the plan was donor funding oriented. Therefore, the plan was extended for another five years (1st July 2013-30th June 2018).

Table 1: Breakdown of the various funding agencies

Fiscal year	RGOB		BTFEC		WWF		GEF	
	Current	Capital	Current	Capital	Current	Capital	Current	Capital
2013-14	16	4.755	0	0	0	0	0	0
2014-15	15.719	0.3	0.2	4.368	4.435	1.09	0	0
2015-16	15.697	0.05	1.368	6.293	5.668	8.296	0	0
2016-17	19.985	0	0.588	3	2.27	3.659	0	0
2017-18	18.355	0	0	0	0	0	0.781	0
Total (Nu. in millions)	**85.756**	**5.105**	**2.156**	**13.661**	**12.373**	**13.045**	**0.781**	**0**

2.1. Strengthening institutional capacity

In order to enhance effective public service delivery, Western Park Range Office was constructed. Restrooms, canopy, garbage pits were established along the east-west highway to provide basic amenities to the park visitors. To improve forestry service delivery and to avoid delaying official correspondents, installation of Wi-Fi at park head office and three Park Ranges Offices were completed. Further, to ease mobility and control illegal activities, a Toyota Hilux was purchased for the park head office.

Enhancement of staffs' capacity to effectively work towards conservation of biodiversity in the park, sending staffs' on study tours, short trainings and courses were found needful. Therefore, staffs from the head office and Park Range Offices were sent on study tours, trainings and short courses in the protected areas of Thailand and Philippines to get exposure to conservation works and share experience and knowledge.

2.2. Promoting Harmonious Coexistence

Community-based program; Chiwog Conservation Committee (CCC) were formed with the objective to compensate crop and livestock depredation by wild animals. The CCC (26 nos.) were provided Nu.100,000/- each from the park through Nature Conservation Division as seed money.

Solar electric fencing was one major activity of the program. A total stretch of 56.23 kms of fencing was carried out in six Gewogs covering an area of 480.046acres of agricultural land owned by 268 households. In addition, 16 electric cooking pots of capacity ranging from 60 to 120 liters were supplied to Ura Central School and three lhakhangs under Ura Gewog to reduce consumption of fuel wood.

Table 2: Electric fencing supply

Sl#	Dzongkhag	Gewog	Village	Households	Area in acre	Length in Km
1	Bumthang	Ura	1	32	137.89	14.758
		Chumey	1	6	17.45	2.617
2	Zhemgang	Shingkhar	3	52	33.504	3.317
3	Mongar	Tsamang	4	24	107	12.2
		Saleng	2	46	63	5.7
4	Lhuentse	Jaray	2	23	34.152	5.72
		Metsho	5	85	87.05	11.92
Total			**18**	**268**	**480.046**	**56.232**

2.3. Conservation Awareness

Continued efforts were put in environmental education program. To address littering along east-west national highway inside park, the park installed six numbers of signages in strategic locations. Two lavatories with water facilities were constructed at Gayzamchu and Namling. Waste bins with three compartments; plastic, tin and glass were set up. A total of ten signages on important mammals and avifauna were also erected along the national highway. Environmental education was imparted through community meetings, cleaning campaigns and supporting nature clubs in schools.

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2.4. Research, Information Generation and knowledge Management

To understand flora, fauna, natural and cultural features, build information base for the park, set direction and to provide basis of undertaking the activities in the park, the following researches were carried out over the time span of last five years:

I.   Habitat Assessment of Sambar deer in Chumey Geog under Phrumsengla National Park (Dorji, R. 2017)

II.   Participatory zonation report of Phrumsengla National Park, (PNP, 2017)

III.   Assessment of Important Biodiversity Conservation Areas along Chamkhar Chhu basin in Phrumsengla national Park (PNP, 2016)

IV.   Faunal Diversity of Phrumsengla National Park (PNP, 2016)

V.   A Pictorial Field Guide to the Flora of Phrumsengla National Park (PNP, 2016)

VI.   Field report on site visit to collect information on the presence of Podocarpus nerrifolius inside park core zone area (Wangchuk, R.2016)

VII.   Fish species diversity in Kurichu and its main tributaries under Central & Eastern Park Range in Phrumsengla National Park (Gyeltshen,J.2016)

VIII. Herpeto-fauna of Central Park Range, Lingmethang, Mongar (Gyeltshen,J.2016)

IX.   Understanding the status of vehicle movement in PNP (Gyeltshen,J.2016)

X.   Effectiveness of Solar Electric fencing at Nangar village under Mongar Dzongkhag (Gyeltshen, J.2016)

XI.   Regeneration and stand structure of *Pinus wallichiana* along elevation gradient at Chungphel-Tangsibi (Tshewang, P. 2015)

XII.   Ecological survey on *Paris polyphylla* in Sengor areas (Dorji,R.2015)

XIII. Influence of natural and anthropogenic disturbances on presence of Red Panda in Phrumsengla National Park (Dendup, P. 2014)

XIV.   Distribution ecology, habitat use and conservation of Chestnut-breasted Partridge in Phrumsengla National Park (Thesis, 2014).

2.5. Participatory zonation

To delineate zones for management, biodiversity and human impact values were considered. Biodiversity values; conservation significant species such as tiger, musk deer and Red panda etc. while, human impact considered were factors such as existing trails, roads, resource extraction sites, tsamdro, registered land and settlements inside the park.

2.6. Lessons learnt

1. A committed fund is essential to ensures effective implementation of conservation management plan.

2. In order to pursue effective conservation of priority species and resource allocation, proper zonation is necessary.

3. More researches are required to understand species conservation status and ecology to prescribe management interventions.

4. Need of science based intervention to address Human-Wildlife Conflict

5. Innovative model of community-based ecotourism is required to uplift livelihood of local communities and garner their support for conservation.

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@Jangchuk Gyeltshen,2016

PART 3: CURRENT STATUS

3.1. Landscape Characteristics

Heterogeneous geomorphology and wide range of elevation attribute to formation of special habitats for wildlife in PNP. Elevation ranges from 900 masl to about 4500 masl (Figure 2 a). Of this, the major portion, >78% of the total area is above 2500 masl. Slope classes are evenly distributed in terms of area coverage (Figure 2 b).
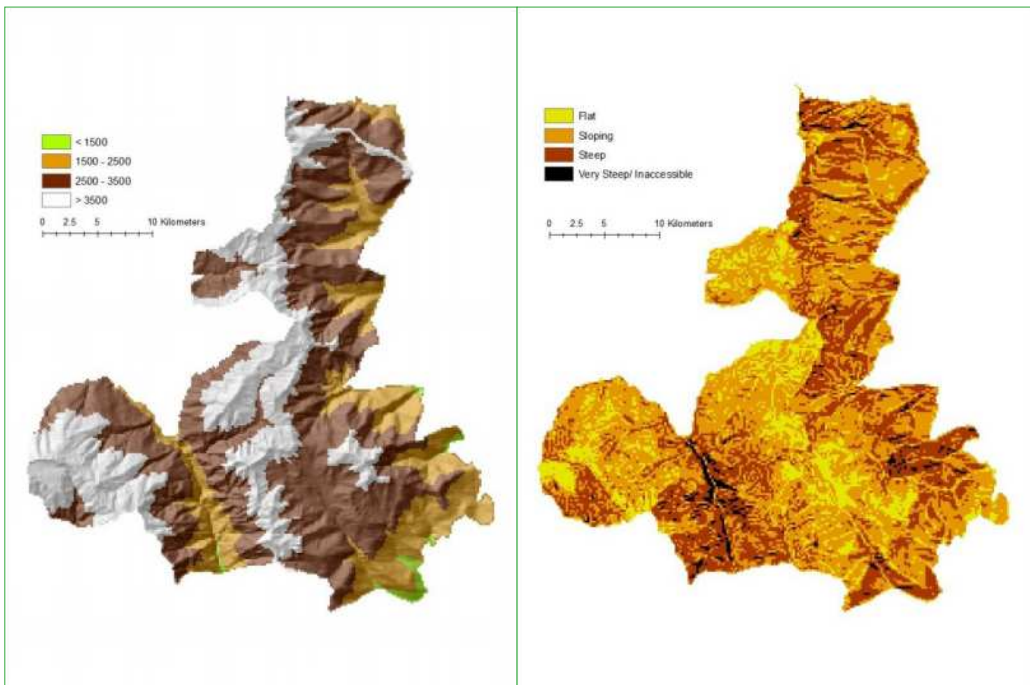
Figure 2: a. Elevation class and b. Slope class

3.2. Floral description

PNP stretches from sub-tropical broadleaved to the alpine ecosystem. It holds high conservation value and significance for about 1000 species of plants with over 161 species of trees, 274 of shrubs and 316 of herbs. The park is a significant repository of floral diversity (TNP, 2008) more than 154 species have been identified for having medicinal values, 21 species as endemic to Bhutan, and one species endemic to PNP (*Rubus sengorensis)*. The park is home to one globally threatened species (Vulnerable)*Rhododendron dalhousiae* var. *rhabdotun* and critically endangered species at local context

or in Bhutan; *Podocarpus neriifolius* (Dorji, Y.;2010). The park is fundamentally significant for conservation of its large tracts of old East Himalayan Silver Fir forest and extensive cover of pristine cool broadleaved forests in the central region of the country. Maximum area of PNP is comprised of fir forest with 267.16 km^2 followed by mixed conifer and broadleaf forests with 256.47 km^2 and 238.25km^2 respectively. Meadows and scrub with 27.43 km^{2}and 48.33 km^{2}also significantly contribute for several forms of life in the park. Therefore, PNP is a prime refuge for many threatened flora and fauna thriving across varied vegetation zones in central region of the country's protected area landscape (Table 3).

Table 3: Forest type

Forest type	Area in Km^2	Percentage
Mixed Conifer	256.47	28.34
Bluepine Forest	4.14	0.46
Broadleaf and Conifer Forest	48.13	5.32
Broadleaf Forest	238.25	26.32
Chirpine Forest	0.02	0.00
Fir Forest	267.16	29.52
Meadows	27.43	3.03
Scrub	48.33	5.43
Others (water bodies and cliffs)	15.12	1.67

3.3. Faunal description

More than 70 species of mammals, about 364 species of birds, and some 50 species of butterflies are recorded in the park. Camera trap picture of a male tiger was captured for the first time in Bhutan on 22nd May 2000 from the PNP in Peeme'. Other than tiger, there are several globally significant species as per IUCN Red List of Threatened Species, 2019.

1.   Tiger *Panthera tigris* (Endangered)
2.   Red Panda *Ailurus fulgens* (Endangered)
3.   Musk Deer *Moschus chrysogaster* (Endangered)
4.   Wild Dog *Cuon alpines*(Endangered)
5.   Takin *Budorcas taxicolor* (Vulnerable)
6.   Himalayan Black Bear *Ursus thibetanus lanigar* (Vulnerable)

7. Asian Small-clawed Otter *Aonyx cinereus*(Vulnerable)
8. Clouded Leopard *Neofelis nebulosa* (Vulnerable)
9. Asiatic Golden Cat *Catapuma temminckii* (Near Threatened)

Attributed by wide range of elevation and diverse vegetation, the park has rich diversity of birds. Of more than 364 avian species recorded, three are vulnerable, six near-threatened and eight are restricted range species. Significant avifauna species of conservation interest for Phrumsengla National Park are Chestnut-breasted partridge (*Arborophila mandellii*), Rufous-necked hornbill (*Aceros nipalensis*) and Beautiful nuthatch (*Sitta formosa*) listed vulnerable under IUCN list. PNP also records herpeto fauna, fish and butterfly species. There are 3 species of amphibians, 12 species of reptiles, 4 species of lizards, 7 species of fish and 55 species of butterflies.

3.4. People and livelihood

The park has about 6,000 inhabitants from 1,165 households living in 32 villages. Administratively, PNP spread across ten Gewogs viz Chumey, Ura and Tang Gewogs of Bumthang Dzongkhag, Saleng and Tsamang Gewogs under Mongar Dzongkhag, Jarey, Metsho and Gangzur Gewogs under Lhuentse Dzongkhag, and Shingkhar and Nangkhor Gewogs under Zhemgang Dzongkhag (Figure 3).

Figure 3: Gewogs enclaved inside PNP

3.5. Resource use

PNP administers full resources allocation in six Gewogs viz. Tsamang, Saleng , Metsho, Jarey, Ura and part of Chumey Gewogs(Figure 3). For the people residing outside park, the forest based resources are allocated from buffer zone depending on right over resource use under purview of FNCRR, 2017. For people dwelling inside the park (Sengor village under Saleng Geog, Bhim and Tharpaling villages under Chumey Geog), the park is obliged to allocate the resources from inside the park. People owning registered land inside the park are eligible for utilization of resources.

National Work Force (NWF) labour camps, schools, health and Rentable Natural Resources Centers (RNRC) in and around the park exert pressure on the park resources such as timber, firewood and other non-wood forest products. Similarly, demands for natural resources from outside park residents also exert additional pressure on the park's natural resources.
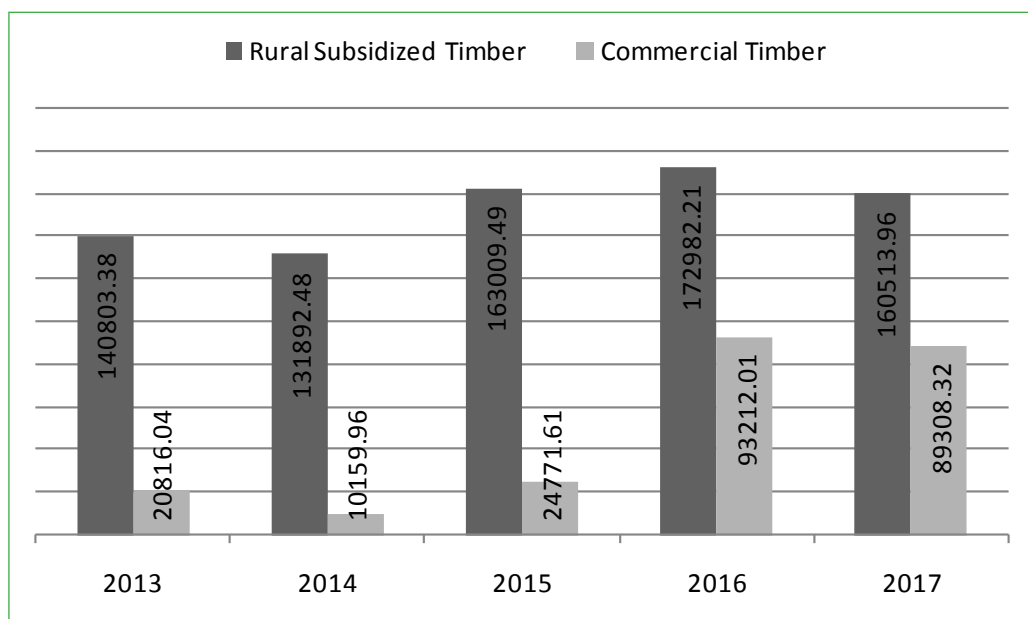
Figure 4: Timber supply (2013-2017)

Traditional practice of free range grazing in the forest exists in the park in spite of faster pace of economic development. Individuals and communities own registered range land prior to the declaration of the park in 1993. Over 75 percent of the park area is under registered grazing grounds. The area of Tsamdro and its use remain unchanged although there's a decreased in cattle

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population. The farmers practice livestock farming that involves migration to warmer region in winter and vice versa.

Most of cattle migratory routes are usual or traditional routes used in the past for communication across inter villages and intra and or inter regions. The migrations follow the rhythm of plant growth processes that vary between temperate and sub-tropical regions. The cattle are migrated to optimize foraging opportunities. Migratory cattle spend roughly about seven to eight months in the sub-tropical regions. Summer pastures in the temperate regions are grazed for shorter periods. In addition to the trans-boundary migration, there are also mini-migrations (short distances).

Considering 68% of the (615.4 km^2) park (Figure 5) would be accessible, 16.67% of the cattle population (1839 heads) is being herded in the forest. The cattle density is estimated at 2.99 /km^2.
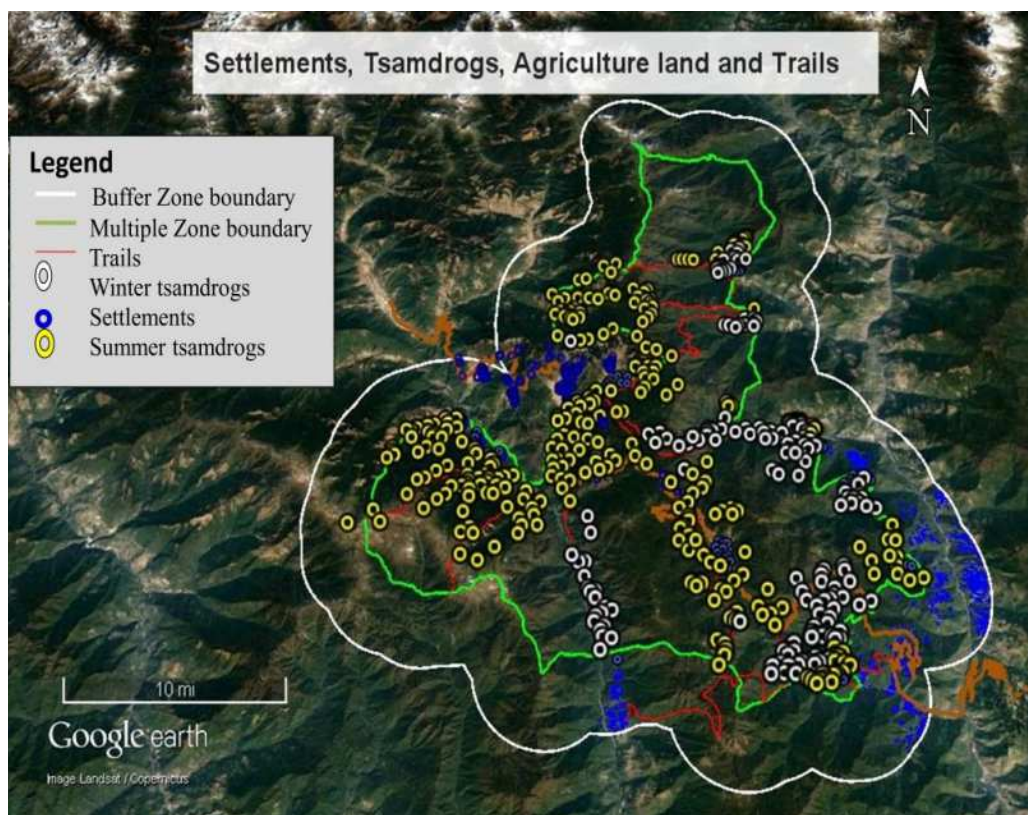
Figure 5: Tsamdro inside PNP

3.6. Administration, Service Delivery and Park Infrastructure

The park boundary intersects with ten Gewogs. However, the park administers resource allocation to only five Gewogs; Ura, Saleng, Tsamang, Jarey and Metsho. PNP also partially cater to one Chiwog of Chumey Gewog. Administration and service delivery are based on two parameters. 1. Major area of Gewog falling inside the park; and 2.Settlement inside park boundary and buffer zones. Few settlements on the buffer zone are omitted as they do not depend on forest resources from inside the park. Service delivery to Chumey and Shingkhar Gewogs are carried out by the nearest offices of the Divisional Forest; Bumthang Forest Division and Zhemgang Forest Division.

To ensure effective service delivery, in addition to the head office and a Range office at Ura, the park has a Range office at Lingmithang, Mongar and a Sub-Range office at Sengor and Tsamang under Mongar, one Range office at Phawan, Lhuentse and a Sub-Range office at Zangkhar, Lhuentse. The field range offices provide administrative services in support of the head office. The park is organized into three sections under the Park Manager/Chief Forestry Officer (Figure 6). At the moment, 27 technical staff and 7 administrative support staff manage the park.
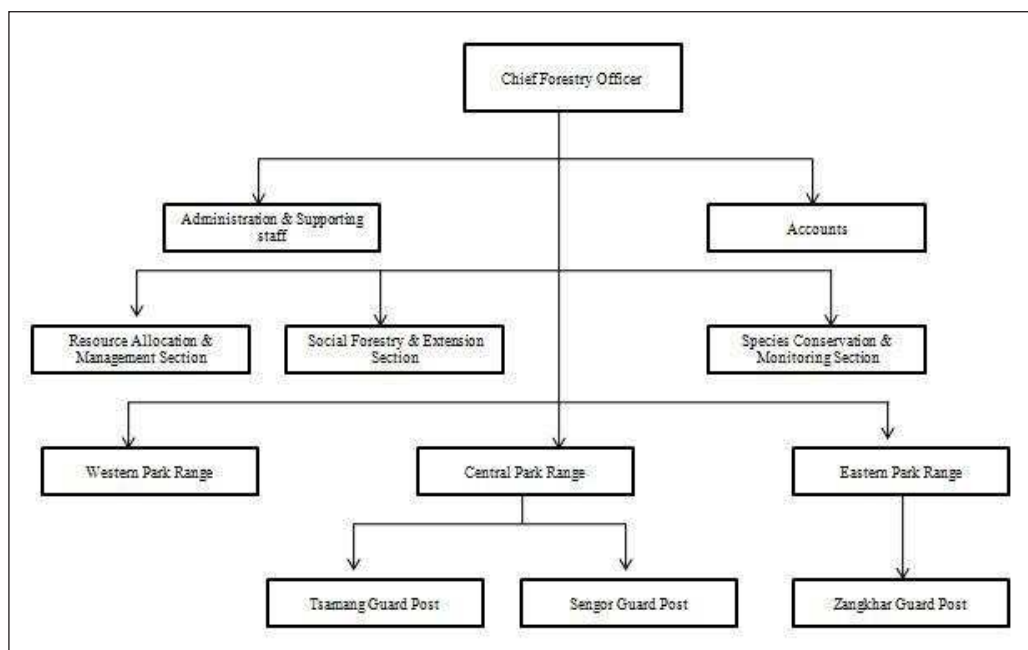
Figure 6: Figure 6: Organogram

3.7. Conservation threats

Human-wildlife conflict: Crop loss and livestock predation by wild animals is a growing issue. Free range grazing is a driving factor for loss of livestock to predations. Crop loss to wild animals is attributed by many factors. For the crop loss and damage by the wild animals, the only intervention adopted so far is solar-electric fencing.

Poaching: Poaching is a concern in the park. It possess threat to the survival of wild animals with high monetary value in the black market. The most immediate threatened species due to poaching are musk deer, tiger, pheasants, Satuwa and *Exidia* spp. etc. The only measure to curb poaching is to conduct regular anti-poaching patrolling in the identified habitats and suspected areas.

Forest degradation: Current status of forest degradation in the park is negligible. Dumping of excavated materials downhill while constructing east-west highway road and illegal felling are some of the factors contributing to slow sign of forest degradations in the park.

3.8. Management challenges:

Inadequate human resource: Besides providing forestry services to the local communities, the park covers vast areas of high commercial value flora and fauna which need protection. These flora and fauna are not brought under full conservation and protection due to inadequate human resources. Therefore, recruiting adequate human resource for conservation and management is a priority.

Infrastructure: Lack of adequate housing facilities, field gears and capacity building opportunities are incessant challenges. Without proper arrangement of such facilities, building of credible and effective institutions, and ensuring effective service delivery are seen not possible.

Financial: nadequate financial resource to implement the park management plan has been a serious challenge. A committed fund from the RGoB is only the cost of recurring expenses for the park. Basic fund for wildlife management including research activities are inadequately funded.

Equipment and field gears: Lack of equipment and field gears are also seen as a factor limiting the effective implementation of planned activities of the park. Therefore, it is deemed necessary to provide adequate equipment and field gears.

Lack of information and institutional memory: Considerable attention has been paid to data collection and setting up baseline information. While data has been gathered, the use, interpretation and subsequent channeling to influence decision making is minimal. An adaptive environment where information on experiences and lessons learnt are mainstreamed within the day to day management of the park is lacking. This supposedly contributes to significant loss in institutional memory creating serious gap hampering adaptive and effective management.

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PART 4: BASIS OF THE PLAN

4.1. Legislation and Policy

This management plan draws its legal mandates from the following legislative tools of the Royal Government of Bhutan.

1. Forest and Nature Conservation Act (1995)

2. Forest and Nature Conservation Rules and Regulations (2017)

3. Furthermore, mandates and functions for the park will also be drawn as per relevant sections of the following legislations:

    a. Land Act of Kingdom of Bhutan, 2007
    b. Biodiversity Act of Bhutan, 2003;
    c. National Environment Assessment Act, 2000;
    d. National Environment Protection Act, 2007
    e. Waste Management Rules and Regulations, 2015
    f. Water act of Bhutan 2011.

By default, the park management will be determined by subsequent changes in any of these above mentioned legislative tools.

4.2. Management Plan Implementation Principles

1. The park management will abide by the spirit of making this plan an adaptive document. Therefore, it is deemed necessary that prescribed activities be reviewed and revised on an annual basis.

2. Key lessons learnt during the course of implementation shall be used to guide, formulation of strategies and subsequent activities. Therefore, robust monitoring and evaluation protocols need to be adapted.

3. The threats, challenges and issues identified in this plan shall be referred for planning and implementing management interventions.

4. Based on the management prescriptions outlined in the subsequent sub-sections, annual work plan shall be prepared. This will help ensure the relevance of the plan to emerging challenges and shifting priorities over the course of plan implementation. Guidance can be drawn from the forecasted 10 year work plan and budget projections presented in Part VI of this plan.

4.3. Scope of the plan

This plan is specifically designed for PNP covering all management zones identified as per the zonation exercise. It covers complete or partial administrative jurisdiction of eleven Gewogs – Ura, Tang and Chumey under Bumthang Dzongkhag; Saleng and Tsamang under Mongar Dzongkhag; Metsho, Jarey and Gangzur under Lhuentse Dzongkhag; and Nangkhor and Shingkhar Gewogs under Zhemgang Dzongkhag.

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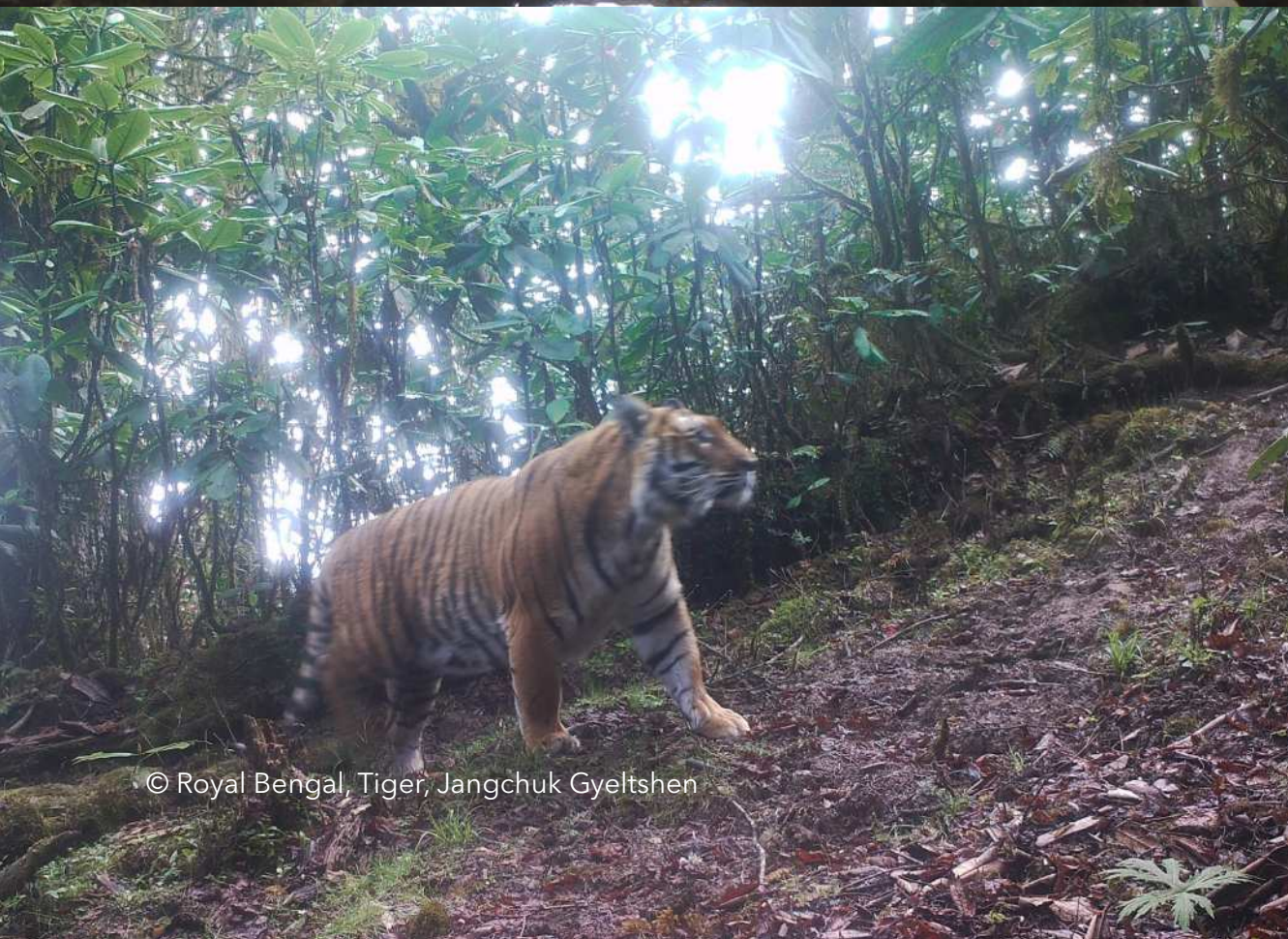
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PART 5: MANAGEMENT STRATEGY: *PROGRAM, RATIONALE, OBJECTIVES AND PRESCRIPTIONS*

In consistent to the mentioned threats, challenges and emerging issues in Part III under section 3.7 & 3.8, a set of management strategies has been drawn. These strategies are broken down into actions substantiated by basic implementation guidelines.

5.1. Program: *Enhanced understanding of landscape, species composition and abundance in the park*

Rationale

Understanding flora and fauna species composition in the landscape of is important to streamline the conservation programs. Successful conservation programs cannot be built without prior understanding of landscapes, species therein and the interactions between them. Critical to this mix is the need to comprehend existing and emerging threats engendered by both biotic and abiotic changes and influences. Increasingly, there is a need to justify conservation. Research targeted at understanding species-landscape interactions and quantifying ecosystem services which landscapes and species provide to humanity should therefore be accorded increasing priority.

Objectives

1. To accord species and landscape based research on priority species.
2. To initiate the quantification of ecosystem services provided by species and landscapes.
3. To use results obtained to guide management of varied zones within the park.
4. To use results to effect and influence conservation decisions and actions subsequently.

Management prescriptions

For next 10 year, research programs will be initiated to understand species, landscapes, and threats to conservation. This will ultimately enable to define appropriate management interventions.

1. Estimating populations and understanding habitat requirements for priority species of flora and fauna
   i. Tigers
   ii. Himalayan Musk Deer
   iii. Red panda
   iv. Asiatic Golden Cat
   v. Eurasian Otter
   vi. Clouded leopard
   vii. Wild dog
   viii. Rufous necked-hornbill
   ix. Palla's fish Eagle
   x. White-bellied Heron
   xi. Inventory on lesser known flora and fauna
2. Status and Distribution pattern of *Rubus sengorensis,* and *Podocarpus neriifolius*
3. Understanding and mapping of old growth fir stand
4. Understanding human-wildlife conflict and its driving factors to define mitigation measures.
5. Understanding grazing and initiating a long-term study on migratory herding.
6. Quantification of ecosystem services provided by our conservation landscapes and the impact of climate change on such services.
7. Using regular data collection and official reports to assess the status of species presence, resource use and extent of illegal activities in the park;
8. Photographic monitoring of land cover change and phenology in the key sites during different seasons every year.
9. Establish research plots for monitoring the impact of grazing in partnership with relevant institutions.
10. Identify and conserve wild relatives of agricultural and horticultural crops.
11. Define and demarcate areas (mapping) for significant species of Flora and Fauna.
12. Survey and documentation on terrestrial orchids
13. Distribution and diversity of herpetofauna

5.2. **Program:** *Wildlife habitat enrichment and species resilience in multiple-use and buffer zones*

Rationale

Some areas in the park are infested by invasive plants such as *Cannabis sativa*, *Ageratina adenophora, Chromolaena odorata and Lantana camara*. In addition, water scarcity is evident in the alpine areas spite of lush forest cover. Most of the perennial water sources are dying up due to unknown reason. Hence, it is perceived that scanty water may impact negatively on wildlife population.

Usually in winter, the ungulates (Sambar deer, Barking deer, Serow, etc.) are sighted at the roadside licking. It is because they are attracted by salt sprinkled to melt the ice on the road. This has given us an insight that inadequate natural mineral is one variable that is going to affect the viable ungulate population.

Objectives
1. To improve the wildlife habitats and maximize its use by wild ungulates.
2. Consistent to above, increase the tiger population in the park and other big cats and canids.

Management prescriptions
1. Identify and map the weed infested areas, wildlife habitats that has scanty perennial water bodies and minerals in different management zones;
2. Understand and determine the appropriate method to improve the wildlife habitat.
3. Manage invasive plant species and replace with native grass and herbaceous plant palatable to wild ungulates.
4. Map and maintain natural waterholes and saltlicks.
5. Establish artificial waterholes in water scanty wildlife habitats.
6. Monitoring of actions required for action number 3, 4, and 5.

5.3. **Program:** *Empowering local communities to ensure sustainable management and utilization of natural resources*

Rationale

About 6000 people of 11 Gewogs live in and around the park and depend on natural resources from different management zones. These communities, predominantly agrarian, are treated as part of the conservation landscape. Non-wood forest products such as cane, Satuwa, mushroom, bamboo and

ferns help to supplement diet and incomes. Additionally, almost 68% (615 km²) of the total area of the park is accessible to grazing. There is need to ensure that forests and landscapes therein are utilized sustainably.

In most Gewogs, timber and firewood demands are significant. While most resources are extracted from outside the park boundary, park faces continuing pressure to supply the resources from within the boundary.

Objectives
1. To ensure sustainable management and utilization of natural resources of the park.
2. To prevent State Reserved Forest land (SRF) encroachment in the park.
3. To engage local communities in conservation through formation of community based management groups.
4. To protect and conserve drinking water sources.

Management prescriptions
1. Facilitate CF/NWFPs formation and development of management plans in the areas outside the park boundary.
2. Review existing management plan for Community Forests and NWFPs Groups.
3. In collaboration with the Dzongkhags, SFED and FRMD, the Park will promote sustainable harvesting of NWFPs.
4. Encourage and support the formation of forest based enterprise and facilitate in marketing of timber and non-wood forest products in collaboration with relevant stakeholders.
5. Monitoring all such programs to ensure that management plan prescriptions are followed and sustainability of the resource base is secured.
6. Monitoring patrol to avoid SRF land encroachment and illegal collection of natural resources.
7. Apply appropriate silvicultural system while marking trees in benefit of targeted stakeholders.
8. Control the growing issue of pest and diseases in conifer forests. Activities such as sanitation felling, salvage operation, burning of debris and other measures.
9. Strengthen existing Forest Fire Management Committee in all Gewogs.
10. Purchase and supply of forest firefighting equipment and gears.
11. Identify and map forest fire prone zone in the park, construct fire lines and

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remove on ground fuel deposit wherever appropriate.

12. Yearly advocacy on forest fire prevention and management in all Gewogs.
13. Adopt post fire management activities such as removable of dead trees, reforestation, etc.
14. Feasibility study on payment for environment services (PES)- Community Forests
15. Identify and map degraded watershed to initiate community-based management.

5.4. Program: *Reduce Human-Wildlife Conflict and enhance communities livelihoods*

Rationale

Increasing demand and utilization of natural resources and encroachment into the habitats of wild animals lead to Human-Wildlife Conflicts (HWC) in the park. The situation is further accelerated due to expanding developmental activities such as farm roads, power transmission lines and rearing of livestock in the park. It is therefore imperative to come up with appropriate mitigation and prevention measures to address HWC.

Objectives

1. To minimize human-wildlife conflicts to improve food security and enhance conservation.
2. To provide alternative sources of livelihood to supplement household income for poverty alleviation.
3. To explore/innovate measures to mitigate human-wildlife conflict

Management prescriptions

1. Review existing crop protection measures. Initiate innovative crop loss mitigation strategies in pilot villages;
2. Establish forest based enterprise for employment and income generation.
3. Facilitate farmers' access to high yielding seeds, improved livestock breeds.
4. To initiate pasture management in collaboration with the local herders.
5. Reduce dependency on fuel wood through exploring other alternative source of energy (Biogas).
6. Promote sustainable use of timber and alternatives for roofing (CGI Sheet)
7. Promote alternative source of income through establishment of ecotourism products.

8. Encourage and support innovative measures and traditional practice for guarding crops against wildlife.
9. Evaluate the effectiveness of HWC mitigation measures.

5.5. Program: *Diversification and promotion of sustainable ecotourism and recreation avenues*

Rationale

Local communities, park visitors and park management have to collaboratively work towards achieving conservation goals. In this regard, construction and maintenance of existing infrastructure of ecotourism, diversifying and promoting the income of local communities, and developing and planning community-based ecotourism by the park management is crucial to gain conservation support from the beneficiaries. Such initiative is expected to contribute towards improvement of livelihoods of the local community and nation at large. Currently, 79km of national highway passes through the park area, 5 historic and culturally significant trekking routes are also present in the park. Owing to the richness of avian diversity, the park is one of the best bird watching areas (Hotspot) for the tourists and other interested birders in the country.

Objectives

1. To provide high quality and innovative nature and community based tourism packages within the park.
2. To contribute to the preservation and maintenance of sites of special significance both ecological and cultural.
3. To help spread tourism income to rural communities in the park.

Management prescriptions

1. Five trekking routes will be develop and promoted to enhance community-based ecotourism
2. Five community managed eco-campsites will be constructed to provide basic amenities.
3. Disseminate information on ecotourism facilities, services and fees to the park visitors.
4. Strengthen waste management initiatives at the designated camping sites.
5. Monitoring of all trekking routes and camping sites shall be conducted on regular basis.

6. Regular maintenance of tourist facilities will be carried out by concerned agencies/communities.

5.6. Program: *Strengthening institutional capacity*

Rationale

The park management emphasis high importance on institutional strengthening upon the premise that institutions need to be vibrant, self-sustaining and responsive to emerging challenges.

One of the key lessons learnt from the implementation of past plans is that human resources are critical to ensure successful implementation of any programs. The park as an institution should be structured in a way which facilitates the delivery of services and effective utilization of staff capacity. To this, primary facilities required by the park are adequate staff quarters in the office premises to enable provide instant action during the call for service of staff and communication (transportation and walkie-talkie). Further, proper, reliable and well maintained data base are pre-requisites for the formulation of appropriate conservation policies and strategies.

Objectives
1. To implement conservation activities and delivery of forestry services.
2. To provide basic infrastructure and communication facilities to staffs for effective service delivery.
3. To ensure effective information management to facilitate adaptive management and enhance institutional memory.
4. To ensure sustained capacity building for staffs and local communities that enhances wildlife conservation.

Management prescriptions
1. Construct Park Range Office and staff quarters to facilitate timely implementation of conservation programs and services.
2. The Visitor Center at park HQ (Annexure 8) shall maintain and update information on biodiversity, conservation activities and serve as information center for the visitors.
3. Regular maintenance of office buildings, residences and transit camp.
4. Strengthen the skills of park officials through regular trainings and refresher courses.

5. Provide field staff with adequate field gears and equipment.

5.7. Program: *Enhancing proper waste management and environmental education.*

Rationale

A stretch of 79 km of east-west national highway passes through the park. Along this stretch a Sengor village comprising of 26 households, Schools and BHU, 11 National Work Force (NWF) are located. A stop point at Sengor is very popular due to availability of restaurants and hotels. These various group of communities, apart from the commuters, are assumed to be a major source of garbage inside the park. Similarly, settlement in and around the park are source of garbage since they closely interact with the environment. Therefore, waste management has been a raising problem.

Objectives

1. To maintain clean environment.
2. To raise awareness on the waste management
3. To discourage open defecation inside the park.
4. To reach out conservation messages, FNCRR and other related Rules.

Management prescriptions

1. Develop and place signages along the roads and interpretation boards in VIC.
2. Update and publish brochure/leaflets/posters/booklets of the park.
3. Update the information and statistics of the park displayed in VIC.
4. Environmental education and awareness in the schools, road workers and local communities in and around the park.
5. Support school/monastery/lhakhang for compound greening and nature clubs inside the park;
6. Support and take advantage of religious body to disseminate message on waste management.
7. Strengthen community involvement for waste management and routine cleaning in their vicinity.
8. Conduct awareness on FNCRR and other related rules and regulations.

5.8. **Program:** *Strengthen institutional linkages, monitoring and evaluation*

Rationale

As it involves land, water, resources therein and communities; conservation is inherently a multi-sectoral task. Stakeholders range from national level authorities to regional and local authorities. The success of any conservation initiative hinges upon ensuring effective linkages and proactive engagement of all concerned stakeholders. Additionally, timely monitoring and evaluation of programs are essential for proper management.

Objectives

1. To coordinate and build partnership amongst stakeholders for effective implementation of park activities, secure and consolidate conservation.
2. To exchange information and experiences amongst stakeholders and partner organizations to help make implementation of conservation strategies more effective.
3. To ensure monitoring and evaluation to effectively address emerging challenges and changing issues.

Management prescriptions

1. Organize and hold annual coordination meetings with Dzongkhag Officials, Forest Divisions, the Department of Roads and other stakeholders. Such meetings should table common issues and provide way-forward strategies to address cross-cutting issues.
2. Regular and timely information shall be reported to the Forest Information Reporting and Monitoring System (FIRMS).
3. An evaluation of activities shall be carried out and come up with annual report to track progress of the park.
4. Mid-term evaluation shall be carried out to keep track of overall performance and meeting of targets reflected in park management plan.

5.9. **Program:** *preservation of forest encompassing cultural, religious or historical sites with significant ecological and cultural values*

Rationale

Large portion of the park is fully protected and brought under management regime for conservation of floral and faunal diversity. However, there are significant patches of forest which has religious, cultural, historical and ecological significance attached by local communities. Such areas also

harbours huge ecological values and are under increasing threats. Therefore, it is important to bring them under protection and conservation management regime.

Objectives
1. To protect and preserve forest ecosystems around monasteries, religious and spiritual sites, monuments, critical watersheds etc.
2. To serve as one of the models for conservation and management of natural resources by local community.

Management prescriptions
1. Identify and map forest of cultural, historical, religious and ecological significance, in consultation with local communities. Criteria developed by DoFPS shall be taken into account for site selection.
2. Inventory and drafting management plan to ensure preservation of the particular site. The socio-economic and ecological benefit of such establishment shall be documented.
3. Plantation of native species, forest fire management, waste management and pest and disease management shall be carried out where deemed necessary.
4. Monitoring of wildlife shall be carried out wherever possible. Camera trapping, sign survey and photographic monitoring of wildlife will be conducted.
5. Monitoring shall be carried out frequently.

5.10 Program: *Sustainable management and utilization of forest resources in vicinity of settlement in the park.*

Rationale
The park provides forestry services to six Gewogs of Bumthang, Mongar and Lhuentse Dzongkhags through three Park Range offices and three sub-range offices. The local communities are allotted forest resources like timber, fire wood, NWFPs etc. from multiple-use zone falling within the park. However, the nearby forests are not under any management which may result in unsustainable harvesting of forest resources. Therefore, it is found important to bring those forests under scientific management to ensure sustainable use of forest resources and improve overall health of forest ecosystem through development and implementation of Local Forest Management Plan (LFMP).

Objectives

1. To bring forest resources under sustainable management regime (management and utilization).
2. To supply forest resources to the local communities on sustainable basis.
3. To prescribe management intervention for improvement of natural resources within particular forest.

Management prescriptions

1. Carried out consultation with the local communities to identify resources used areas, resources availability and resource demand.
2. Design, planning and mapping to carry out resource inventory.
3. Data analysis, interpretation and drafting Local Forest Management Plan.
4. Carry out Management intervention like plantation; promote natural regeneration, forest fire management, pest and diseases control and waste management.
5. Monitoring and evaluation shall be conducted time to time to ensure sustainability and implementation of plan.

PART 6: FINANCIAL PLAN OUTLAY

6.1. Plan programs, outputs and budget

The management plan outputs and activities are aligned with 12th Five Year Plan and activities of Bhutan for Life projects for next 14 years, submitted to the Department of Forests and Park Services. Plan programs and expected outputs determine the required amount of budget for the next coming 10 years. In total there are ten programs and twenty eight outputs to be achieved. To achieve these programs, Annual Work Plan (AWP) and Individual Work Plan (IWP) of the staff will be taken into account by the management. Under these outputs there are numerous activities which are also cross-cutting across some programs. These activities are going to be implemented in accordance with the management prescriptions provided clearly under each program.

Table 4: Programs and output

Programs and Outputs	Capital
Program 1: Enhanced understanding of landscape and species composition and abundance in the park	
Output 01: Knowledge on floral and faunal diversity enhanced	25.8
Output 02: Ecosystem diversity and habitats contiguity maintained	15.8
Program 2. Wildlife habitat enrichment and species resilience in multiple-use and buffer zones	
Output 01: Adequate availability of minerals and water for mammals ensured	6.05
Output 02: Adequate availability of food and cover for wild animals ensured	29.9
Output 03: Key stone/flagship species resilience enhanced	19.1
Program 3: Empowering local communities to ensure sustainable management and utilization of natural resources	
Output 01: Technology on sustainable resource management and utilization of Non Wood Forest Products developed	13.45

Output 02: : Community participation in sustainable forest management and conservation increased	10.05
Output 03: Revenue and employment generation from forestry based enterprises ensured	6.71
Output 04: Incidences of forest fire reduced	15.1
Program 4: Reduce Human-Wildlife Conflict and enhance communities livelihood	
Output 01: Socio-economic well being of communities through integrated conservation and development programs enhanced	31.1
Output 02: HWC mitigation measures enhanced	14.9
Output 03: Agro-forestry activities enhanced	7.1
Program 5: Diversification and promotion of sustainable ecotourism and recreation avenues	
Output 01: Access and benefit from nature-based opportunities for local communities increased	25.6
Output 02: Tourism and conservation enhanced through festival and interpretation	26.65
Program 6: Strengthening institutional capacity	
Output 01: Protected Area management enhanced/strengthened	33.04
Output 02: Forest protection and enforcement enhanced	44.05
Output 03: Professional capacity enhanced	100.95
Program 7: Enhancing proper waste management and environmental education	
Output 01: Conservation education/awareness through conservation arts and specimens strengthened	33.9
Output 02: Waste management activities in the forest area promoted	7.7
Program 8: Strengthen institutional linkages, monitoring and evaluation	
Output 01: Institutional linkage with biodiversity conservation partner agencies enhanced	7.6

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Output 02: Systematic monitoring and evaluation of activities ensured	14.28
Program 9: Preservation of forest encompassing cultural, religious or historical sites with significant ecological and cultural values	
Output 01: Cultural, religious and historical sites maintained and preserved	0.25
Output 02: Ecosystem diversity and habitats contiguity maintained	0.9
Program 10: Sustainable management and utilization of forest resources in vicinity of settlement in the park.	
Output 01:Community participation in sustainable forest management and conservation increased	2.2
Output 02: Sustainable management and utilization of timber promoted	7.83
Grand Total	**500.01**

The plan has estimated budget of Nu. 777.05 million, out of which, major portion of the budget is going to be incurred in institutional capacity building that infrastructure and human resource development.

6.2. Financing the Plan

The fund required to implement activities reflected in the management plan will be supported by Royal Government of Bhutan and Bhutan for Life project. In the event that full financing for the plan is not going to cover by the RGoB and BFL, the park management will put proactive and sustained effort into engaging potential donors through proper channels to ensure funding for proposed activities on an annual basis for prioritized packages. In view of this, the park management will require to develop project proposal and submit to potential donors based on common thematic areas addressing key issues.

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Annexure 1: Output and Indicators

Program 1: Enhanced understanding of landscape and species composition and abundance in the park

Result Level (Output)	Indicators	Unit	Qty	Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Actual target	Total	Remarks
	Distribution pattern/Population estimate of important species reported: Asiatic golden cat, Takin, Himalayan Black Bear, Clouded leopard and Tiger	Nos	2	2018		1	1	1	1	1	1	1	1	1	9	11	On top of red panda and musk deer nine indicated species will be studied
	Conservation action plan developed for key species	Nos	0	2018		1		1		1		1		1	5	5	
Output 01: Knowledge on floral and faunal diversity enhanced	Status on lesser known and prey species reported	Nos	2	2018		`	1		1		1		1		4	6	Minimum of four species reported
	2nd edition of pictorial guide books of Flora and Fauna published	Nos	2	2018		1				1			1		3	7	A report each on flora and fauna will be published
	Study on dietary pattern and habitat utilization by wild pig conducted	Nos	0	2018			1					1			2	2	
	Diversity of orchids, fungi, grass and ferns reported	Nos	0	2018		1		1		1		1			4	4	Publish two combined reports each for orchid and fungi; and grass and ferns

Indicator	Unit	Baseline	2018											Remarks
Key high biodiversity areas mapped	Nos	1	2018				1			1		2	3	
Suitable habitat of Red panda and musk deer mapped	Nos	1	2018			1			1			2	3	Two maps for each species
Habitat Assessment of Pallas' fish eagle studied and mapped	Nos	0	2018				1			1		2	2	Within plan period conduct two times study
Habitat Assessment of White-bellied Heron studied and mapped	Nos	0	2018			1				1		2	2	Within plan period conduct two times study
Rufous-necked Hornbill nesting site identified and mapped	Nos	0	2018			1				1		2	2	
Output 02: Ecosystem diversity and habitats contiguity maintained														
Status and distribution of Eurasian Otter	Nos													
Landscape improvement in the park and semi-urban areas conducted (plantation and terracing)	Nos	2	2018	1	1	1	1	1	1	1	1	9	11	Supported schools in the village
Mountain ecosystem - flora and fauna diversity conducted	Nos	0	2018			1						1	1	
Grazing impacts on different ecological zone understood	Nos	1	2018	1			1					3	4	
Photographs monitoring of key sites in different seasons conducted	Nos	0	2018	1	1	1	1	1	1	1	1	10	10	

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Program 2: Wildlife habitat enrichment and species resilience in multiple-use and buffer zones

Result Level (Output)	Indicators	Baseline Unit	Baseline Qty	Baseline Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Actual target	Total	Remarks
Output 01: Adequate availability of water for mammals ensured	Map important natural water holes & sal licks	Nos	0	2018	1			1					1		3	3	Mapped in three occasions
	Artificial water holes created	Nos	0	2018	2		4		4		4		2		16	16	Different sites in different locations
	Degraded wetlands restored	Nos	0	2018	2		3		3		2		1		11	11	
	Area under invasive weeds mapped	Nos	0	2018	1					1				1	3	3	Three occasions
	Degraded forest land inventoried and native species planted	hectare	0	2018	2		2			2			2		8	8	Non-contiguous area
	Zonation review meeting with park residents conducted	Gewogs	0	2018	6					6					12	12	
Output 02: Adequate availability of food and cover for wild animals ensured	Exotic breed plant species uprooted and native palatable plant species planted	hectare	0	2018	1	1	1	1	1	1	1	1	1	1	10	10	Fragmented area
	Sanitary felling of trees and cleaning of forests to improve the wildlife habitats conducted	hectare	0.2	2018	1	1	1	1	1	1	1	1	1	1	10	10.2	Sporadic locations
	Forest fire prone area mapped	Nos	0	2018	1			1				1			3	3	3 occasions
	Wildlife habitat enrichment	hectare	0	2018	1	1	1	1	1	1	1	1	1	1	10	10	Plantation in fragmented area
	Field equipment, tents and extension kits procured	Nos	1	2018	1	1	1	1	1	1	1	1	1	1	10	11	Number of occasion for procurement

Result Level (Output)	Indicators	Unit	Baseline Qty	Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Actual target	Total	Remarks
	Critical biodiversity conservation areas identified and mapped	Nos	1	2018						1					3	4	Complete in one occasion
Output 03: Key stone / flag species resilience enhanced	Intensive anti-poaching patrol in suspected and prone areas for illegal harvest of forest produce conducted	Nos	20	2018	20	30	40	30	30	40	40	40	40	40	350	370	Number of occasion involved for patrol
	Periodic anti-poaching patrol in suspected and prone area for hunting conducted	Times	12	2018	10	10	10	10	10	10	10	10	10	10	100	112	Number of occasions
	Climate resilient wildlife health management interventions & sterilisation of dogs (wildlife diseases)	Nos	2	2018		2	2	2	2	2	2	2	2	2	20	20	Numbers of occasion for wildlife health management

Program 3: Empowering local communities to ensure sustainable management and utilization of natural resources

Result Level (Output)	Indicators	Unit	Baseline Qty	Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Actual target	Total	Remarks
Output 01: Technology on sustainable resource management and utilization of Non Wood Forest Products developed	Awareness on efficient use of timber by forest based industries conducted	Nos	0	2018	1	1	1	1	1	1	1	1	1	1	10	10	All six Gewogs
	Training for power chainsaw operator on harvesting of trees.	Nos	0	2018	1		1		1		1		1		5	5	Training in three occasions for park residents
	Climate smart energy efficient technology adopted.	No.HH	12	2018	10	10	10	10	10	10	10	10	10	10	50	62	

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Output	Activity	Unit	Baseline	2018										Cum.	Total	Remarks
Output 02: Community participation in sustainable forest resource management and conservation increased	New CF Management plans developed	Nos	16	2018		1		1							2	18	Metsho and Saleng Gewogs
	CF Networking & CFMG Annual meeting conducted	Nos	0	2018	2	1	1	2	1	1	1	1		13	13	
	New NWFPs management plan developed	Nos	3	2018		1		1		2		2		3	6	
	NWFPs nursery and domestication supported	Nos	1	2018	1	1	1	1	1	1	1	1	1	10	11	
	Study on impact of grazing in alpine meadows	Nos	1	2018	1		1	1		1			1	4	5	
	Survey and map drinking water sources and irrigation conducted	Nos	0	2018		1		1			1			3	3	Pursue study for three occasions in ten years
Output 03: To enhance revenue and employment generation investment in forestry based enterprises established	Employment through forestry based enterprise generated	Nos	0	2018		5		5		5			5	15	15	
	Income from forest based enterprise (NWFP, wood based industries) up-scaled	No. HH	1	2018	1	1	1	1	1	1	1	1	1	9	10	At least 9 households (HH)
Output 04: Incidences of forest fire reduced	Forest Fire Management Committee formed in all Gewogs	Gewogs	0	2018	6			6						12	12	Supply equipment in all six Gewogs
	Forest fire-fighting equipment procured	Ranges	0	2018		3		3						6	6	

| | | Baseline | | | Annual Plan Target | | | | | | | | | | Actual | | |
Result Level (Output)	Indicators	Unit	Qty	Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	target	Total	Remarks
	Forest fire prone zone in the park identified, forest fire line wherever appropriate developed	Ranges	0	2018		3	3	3	3	3	3	3	3	3	27	27	
	Yearly advocacy on forest fire prevention convened	Gewogs	6	2018	6	6	6	6	6	6	6	6	6	6	60	66	Target all six Gewogs every year

Program 4: Reduce wildlife conflict and enhance community livelihood

| | | Baseline | | | Annual Plan Target | | | | | | | | | | Actual | | |
Result Level (Output)	Indicators	Unit	Qty	Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	target	Total	Remarks
Output 01: Socio-economic well-being of communities through integrated development programs and management of forest resources enhanced	NWFP product diversification studied	Nos	0	2018	1				1			1			3	3	Study in three occasions
	NWFPs processing equipment procured and supplied	Nos	0	2018		1	1	1			1		1		5	5	Supply in five occasions for piloted community (min 3 NWFPs enterprises)
	Support on NWFPs product marketing strengthened	Nos	0	2018		1		1		1		1		1	5	5	
	Advance technology on NWFP and economically valuable tree species adopted	Nos	0	2018		1			1				1		3	3	Piloted in three villages
	Alternative income source established through support of agriculture and livestock intensification program scaled	Nos. Gewogs	6	2018		3	3	3	3	3	3	3	3	3	27	33	Three Gewogs every year
	ICDP activities and wildlife management interventions reviewed and reported	Nos. Gewogs	6	2018			6				6			6	18	24	

Output	Indicator	Unit	Baseline	Baseline Year										Remarks
	Human wildlife conflict hotspots mapped	Nos	6	2018	6	6	6	6	6	6	6	18	24	Six Gewogs every year
Output 02: HWC mitigation measures enhanced	Innovative and cost effective HWC mitigation measures implemented	Nos	6	2018	6	6	6	6	6	6	6	60	66	Six Gewogs every year
	Wildlife Rescue and rehabilitation Unit operationalized	Nos	0	2018			1	1	1	1	1	7	7	Construct in Lingmithang
	Rapid response team operationalized	Nos	6	2018	6	6	6	6	6	6	6	60	66	Six Gewogs every year
	Community conservation committee in illegal/HWC prone areas promoted	Nos	6	2018	6	6	6	6	6	6	6	54	60	Six Gewogs every year
	Agro-forestry in different ecological zones piloted	Nos	0	2018		1	1	1	1			3	3	
Output 03: Agro-forestry activities enhanced	Support on climate resilient agro-pastoral and silvo-pastoral farming practices for park residents.	Gewogs	0	2018		3	3	3	3	3	3	30	30	All six Gewogs
	Prevailing knowledge on agro-forestry practices in PNP documented	Nos	0	2018	1							2	2	

Program 5: Diversification and promotion of sustainable ecotourism and recreational avenues																		
Result Level (Output)	Indicators	Baseline			Annual Plan Target											Actual target	Total	Remarks
		Unit	Qty	Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10				
	Trekking trail developed, mapped and maintained	Nos	2	2018	1	1	1	1	1	1	1	1	1	1	10	12	One trekking trail developed, mapped and maintained every after one year
Output 01: Access and benefit from nature-based opportunities for local communities increased	Unique eco-tourism products packaged and operationalized	Nos	0	2018				1			1				2	2	Expected to operationalize in 5th year of the plan
	Local handicraft product outlet center developed	Nos	1	2018			1		1		1			1	4	5	
	Existing eco-trails and In-situ Rhododendron garden maintained.	Nos	1	2018	1			1			1			1	4	5	Maintain every after two years
	Innovative Community based programs initiated (Eco-lodge and trekking trail)	Nos	0	2018		1				1						2	Expected to operationalize in 2nd year
Output 02: Tourism and conservation through festival and interpretation enhanced	Facilitate local festival (Park residents)	Nos	8	2018	1	1	1	1	1	1	1	1	1	1	10	18	Observe once in every year
	Maintenance of campsites and update of visitor information center completed	Nos	1	2018	1	1				1	1				4	5	
	Heritage forests operationalized	Nos	1	2018	1	1	1	1	1	1	1	1	1	1	10	11	

Result Level (Output)	Indicators	Baseline			Annual Plan Target										Actual target	Total	Remarks
		Unit	Qty	Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10			
Output 03: Institutional capacity building and linkages enhanced	Capacity of park staffs and community on nature-based tourism governance built	Nos	0	2018	4	4	4	4	4	4	4	4	4	4	40	40	Study tour for community and staff; and long term training for staff
	Ecotourism networking and marketing strengthened	Nos	4	2018	1	1	1	1	1	1	1	1	1	1	10	14	Tourism networking carried out every year with relevant agencies

Program 6: Strengthening institutional capacity

Result Level (Output)	Indicators	Baseline			Annual Plan Target										Actual target	Total	Remarks
		Unit	Qty	Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10			
	Socio-ecological survey for management plan revision conducted	Nos	3	2018									1		1	4	Once in 10th year
	Conservation management plan printed	Nos	3	2018										1	1	4	Once in 5th year
	Assessment of park management effectiveness using METT+ conducted	Nos	1	2018					1					1	2	3	Once in every five years
Output 01: Protected Area management enhanced/ strengthened	Lingmithang Park Range office and staff quarters constructed	Nos	1	2018	1	1									2	3	
	Tsamang staff quarters constructed	Nos	0	2018		1	1								2	3	
	Staff quarters at park headquarters constructed	Nos	7	2018			1			1	1				4	11	
	Furniture for new office procured	Nos	0	2018		1	1								2	2	

Table (continued from previous page). Column headers appear on the preceding page; generic labels are used here. Cells highlighted in yellow in the source are shown in **bold**.

Output	Activity	Unit	Baseline	Year	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	Total	Grand total	Remarks
	Office equipment procured	Nos	13	2018	**5**	5	5	5	5						25	38	Procure 3 laptops and two printers
	Extension kits for field staff procured	Nos	2	2018	**1**	1	1	1	1	1	1	1	1	1	10	14	
	SMART patrolling implemented	Nos	0	2018	**1**	1	1	1	1	1	1	1	1	1	10	10	Implemented every year
	Intelligence network between various law enforcement agencies established	Nos	0	2018	1	1	1	1	1	1	1	1	1	1	10	10	
	Zero poaching strategy efficiently implemented	Nos	0	2018	**2**	2	2	2	2	2	2	2	2	2	20	20	Strategy fully implemented from the very 1st year
	Four wheel drive utility vehicle (Toyota hilux) procured	Nos	1	2018				1				1			2	3	
	Communication and forest fire control equipment procured	Nos	0	2018			1		1		1		1		4	4	
	High specs computers for data repository procured	Nos	1	2018	**1**				1						2	3	Supply for headquarters
Output 02: Forest protection and enforcement enhanced	Field inspection for various purposes EC/LC/ FC conducted	Nos		2018	1	1	1	1	1	1	1	1	1	1	10	10	Throughout the year
	Field inspection for land exchange/substitution/land lease with relevant agencies conducted	Nos		2018	1	1	1	1	1	1	1	1	1	1	10	10	Whenever necessary
	Sengor Sub-Range office and staff quarters constructed	Nos	1	2018					1						1	2	Old one will be dismantled
	Ungar Sub-Range office and staff quarters constructed	Nos	0	2018				1							1	1	

Activities	Unit	Baseline	Year								Total	Grand Total	Remarks
Furniture for these two field offices procured	Nos	1	2018				1				1	2	
Maintenance of old office buildings and staff quarters completed	Nos	0	2018	1		1		1			2	2	Eastern Park Range
Basic equipment for a rapid response team to rescue wildlife procured	Nos	1	2018		1	1	1	1		1	5	6	Procure basic equipment and drugs if required
Maintenance of computers and peripherals completed	Nos	7	2018	5	5	5	5	5	5	5	50	57	Yearly once
Capacity building for staff on wildlife study designing and methodology conducted	Nos	0	2018	1	1	1	1	1	1		6	6	Technical staffs
Park staff on park management and conservation leadership trained	Nos	0	2018	10					10		20	20	Technical staffs
Output 03: Professional capacity enhanced — Park staff on writing grant/project proposals and project management trained	Nos	3	2018		10	10	10				30	33	Technical staffs
Capacity building for staff on wildlife monitoring techniques conducted	Times	0	2018	1	1	1	1	1	1		5	5	Technical staffs
Capacity building for staff on GPS handling and application conducted (Mapping)	Times	5	2018	1	1	1	1	1	1		5	10	Techincal staffs
Park staffs on wildlife management and statistical analysis trained	Heads	0	2018	4	4	4			4		12	12	Technical staffs

Program 7: Enhancing proper waste management and environmental education

Result Level (Output)	Indicators	Baseline			Annual Plan Target										Actual target	Total	Remarks
		Unit	Qty	Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10			
	Park staffs and community on PA landscape management trained	Nos	15	2018	7		13		10		9		8		47	62	Technical and administrative staffs
	Capacity building for staff on Wildlife crime investigation conducted	Heads	0	2018		3			3			3			9	9	Technical staffs
	Capacity building for staff on SMART conducted	Times	0	2018	1	1	1	1	1	1	1	1	1	1	10	10	Technical staffs
	Study tour for field staff on wildlife management conducted	Nos	20	2018	20	20	20	20	20	20	20	20	20	20	200	200	Technical and administrative staffs
	Capacity building for CFMG and NWFP Group enhanced	Nos	0	2018	1	1	1	1	1	1	1	1	1	1	10	10	NWFP Group & CFMG
	Training on carbon stock assessment attended	Nos	0	2018	2					2					4	4	Technical staff
Output 01: Conservation education/ awareness through conservation arts and specimens strengthened	Global significant days on species conservation/ international days observed	Nos	4	2018	4	4	4	4	4	4	4	4	4	4	40	44	
	Audio-visual equipment procured	Nos	0	2018	1					1					2	2	

Activities	Unit	Baseline	Year	FY1	FY2	FY3	FY4	FY5	FY6	FY7	FY8	FY9	FY10	Total	Grand Total	Remarks
Way/office signboards/signages in the park established/replaced	Times	0	2018	1			1			1			1	4	4	
Interpretation centers and souvenir shops up-scaled	Times	1	2018	1			1			1			1	4	5	
Nature club programs in schools and monasteries supported	Nos	6	2018	5	5	5	5	5	5	5	5	5	5	50	56	
Short trainings for birding and botany for citizen scientist and park staffs conducted	Times	0	2018	1	1	1	1	1	1	1	1	1	1	10	10	Participants from park and community
Bioengineering/landscaping work in critical areas implemented	Nos	0	2018		2			2			2			6	6	
Orchidarium established (orchid garden)	Nos	1	2018	1										1	1	Orchid species to be collected from the forestry resources extraction sites (Rescue)
Audio visual on park developed for VIC	Nos	0	2018	1						1				2	2	
Traditional knowledge about NWFP utilization documented	Nos	0	2018			1								1	1	Two productions over ten years

Result Level (Output) / Indicators	Baseline			Annual Plan Target										Actual target	Total	Remarks
	Unit	Qty	Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10			
Waste management plans developed	Nos	0	2018		1						1			2	2	
Output 02: Waste Cleaning campaigns conducted	Nos	12	2018	12	12	12	12	12	12	12	12	12	12	120	140	Conduct every month
management activities in the forest areas strengthened Proper waste management inside the park strengthened (waste segregation and disposal)	Nos	2	2018	1	1	1	1	1	1	1	1	1	1	10	12	Every year
Awareness campaign on waste management conducted	Nos	1	2018	1	1	1	1	1	1	1	1	1	1	10	11	Conduct every year

Program 8: Strengthening Institutional Linkages, Monitoring and Evaluation

Result Level (Output) / Indicators	Baseline			Annual Plan Target										Actual target	Total	Remarks
	Unit	Qty	Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10			
Output 01: Institutional linkage with biodiversity conservation partner agencies enhanced Land inspection and report submission to the concerned Dzongkhag Land Registrar conducted	Gewogs	6	2018	6	6	6	6	6	6	6	6	6	6	60	66	
Periodic anti-poaching patrol in three zones conducted	Nos	1	2018	4	4	4	4	4	4	4	4	4	4	40	41	4 times in a year (once in a season)
Periodic patrol in the important river basin conducted	Nos	1	2018	4	4	4	4	4	4	4	4	4	4	40	41	5 times in a year (once in a season)
Extension kits, camping equipment, survey equipment for patrol team procured	Nos		2018			1			1				1	3	3	Procure in three occasion

Output	Activity	Unit	Baseline	Base Year											Total	Cumulative	Remarks
	Old CF plans (review record keeping and planning/ inventory, signboards, handing over, travel) revised	Nos	3	2018	3	1	2	1	1	1	2	2			13	16	
	Old NWFP plan (review record keeping and planning/ inventory, signboards, handing over, travel) revised	Nos	3	2018		2		2		2					6	9	
Output 02: Systematic monitoring and evaluation of implemented activities ensured	Mid-term review of CF management plan conducted	Nos	2	2018	1	1	2	6	3	1	2				16	18	
	Monitor CF and NWFPs governance (field and record keeping) conducted	Nos	13	2018	18	18	18	18	18	18	18	18	18	18	180	193	CF & NWFPs Groups
	Monitoring and evaluation of plantation	Times	0	2018		1	1	1	1	1	1	1			7	7	
	Carryout monitoring and evaluation of wood-based industries conducted	Times	2	2018	1	1	1	1	1	1	1	1	1	1	10	12	
	Photography monitoring of significant conservation area conducted	Nos	0	2018	2	2	2	2	2	2	2	2	2	2	20	20	Twice in a yeaar
	Monitoring of HWC mitigation measures (Solar electric fence, GECC) conducted	Nos	6	2018	6	6	6	6	6	6	6	6	6	6	60	66	Cover all six Gewogs

Program 9: Preservation of forest encompassing cultural, religious or historical sites with significant ecological and cultural values

Result Level (Output)	Indicators	Baseline			Annual Plan Target										Actual target	Total	Remarks
		Unit	Qty	Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10			
Output 01: Cultural, religious and historical sites maintained and preserved	No. of sites identified	Nos	0	2018	1				1	1					3	3	
Output 02: Ecosystem diversity and habitats contiguity maintained	No. of management plan developed	Nos	0	2018		1			1				1		3	3	

Program 10: Sustainable management and utilization of forest resources in vicinity of settlement in the park

Result Level (Output)	Indicators	Baseline			Annual Plan Target										Actual target	Total	Remarks
		Unit	Qty	Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10			
Output 01: Community participation in sustainable forest management and conservation increased	Local Forest Management Plan prepared	Nos	1	2018	2	1	1								4	5	
	Local Forest Management Plan revised	Nos	0	2018										1	1	1	One LFMP each for all six Gewogs

Result Level (Output)	Indicators	Unit	Baseline Qty	Baseline Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Actual target	Total	Remarks
Output 02: Sustainable management and utilization of timber promoted	Scientific thinning in multiple-use and buffer zone operationalized	Gewogs	6	2018	6	6	6	6	6	6	6	6	6	6	60	66	Taken into account for thinning are all six Gewogs every year
	Monitoring of proper utilization of allotted rural timber reported	Gewogs	0	2018	6	6	6	6	6	6	6	6	6	6	60	60	Regular monitoring in six Gewogs
	Existing FNCRR 2017 enforced/implemented	Gewogs	6	2018	6	6	6	6	6	6	6	6	6	6	60	66	Enforcement in all six Gewogs every year

Program 11: Catering administrative service efficiently for the park staff

Result Level (Output)	Indicators	Unit	Baseline Qty	Baseline Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Actual target	Total	Remarks
Output 01: Administrative service for park staff and basic utilities for office ensured	Staff salary timely disbursed	Nos	41	2018	41	41	41	41	41	41	41	41	41	41	410	451	Current staff strength
	Travel in-country (LTC, transfer grants) for staff disbursed	Nos	41	2018	41	41	41	41	41	41	41	41	41	41	410	451	Current staff strength
	Communication (telephone, internet and fax) services enhanced	Nos	9	2018	9	9	9	9	9	9	9	9	9	9	90	99	Current telephones and internet facilities
	Utilities (electricity, water and fuel wood) bills timely paid	Nos	5	2018	7	7	7	8	8	8	8	8	8	8	63	68	Eight offices
	Office supplies (stationeries, text books, uniform) procured	Nos	5	2018	7	7	7	8	8	8	8	8	8	8	63	68	Eight offices
	Vehicle maintenances (hilux) ensured	Nos	1	2018	1	1	1	2	2	2	2	2	2	2	17	18	Current pool hilux
	Maintenances of building and water supply ensured	Nos	5	2018	7	7	7	8	8	8	8	8	8	8	63	68	Number of current office sites

Taxes, duties, royalties and bank charges, advertisement ensured	Nos	41	2018	41	41	41	41	41	41	41	41	41	41	410	451	Current staff strength
Provident fund (government contribution) ensured	Nos	41	2018	41	41	41		41	41	41	41	41	41	410	451	Current staff strength

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Annexure 2: Management Programs and Activities (Capital)

Management Programs and Activities	Y1 Cap	Y2 Cap	Y3 Cap	Y4 Cap	Y5 Cap	Y6 Cap	Y7 Cap	Y8 Cap	Y9 Cap	Y10 Cap	Total
Program 1: Enhanced understanding of landscape, and species composition and abundance in the park											
Output 01: Knowledge on floral and faunal diversity enhanced											
Activity 1: Conduct study on status and distribution pattern on Asiatic golden cat, takin, Himalayan black bear, Clouded leopard, Common leopard, Red panda, musk deer, tiger (One species annually)	0.2	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	**7.6**
Activity 2: Habitat assessment of White-bellied Heron and Pallas' fish eagle		0.2					0.4		0.3		**0.7**
Activity 3: Rufous-necked Hornbill nesting site identified and mapped		0.3					0.4				**0.7**
Activity 4: Status and distribution of Eurasian Otter			0.35					0.45			**0.8**
Activity 5: Survey and publish 2nd edition of pictorial guide books of Flora and Fauna		0.45				0.45			0.5		**1.4**
Activity 6: Conduct study on tiger and its population dynamics			0.6				0.7				**1.3**
Activity 7: Study on the orchid diversity, grass and ferns		0.2		0.3		0.3					**0.8**
Activity 8: Study on the Fungi diversity		0.2						0.35			**0.55**
Activity 9: Monitoring of tigers through camera traps		0.15		0.15		0.15		0.2		0.2	**0.85**
Activity 10: Survey and publish reports/scientific papers on lesser known flora and fauna			0.7		0.7		0.8		0.8		**3**
Activity 11: Develop conservation action plan for key species		1.3		1.3		1.3		1.5		1.5	**6.9**
Activity 12: Study on dietary pattern and habitat utilization by wild pig			0.5					0.7			**1.2**
Output 02: Ecosystem diversity and habitats contiguity maintained											
Activity 1: Survey of lesser known reptiles, amphibians and fishes				0.6					0.6		**1.2**
Activity 2: Study on mountain ecosystem - flora and fauna diversity					0.5						**0.5**
Activity 3: Carryout landscape improvement in the park and semi-urban areas		0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.7	**4.9**
Activity 4: Identify and map the suitable habitat of Red panda and musk deer		0.5					0.7				1.2

Activity	Budget allocation (breakdown)	Total
Activity 5: Understanding grazing impacts on different ecological zone	0.15, 0.3, 0.3	0.75
Activity 6: Purchase extension kits and camping equipment for survey team	1, 1, 1.5, 1.5	5
Activity 7: Photographs monitoring of key sites in different seasons every year.	0.1, 0.1, 0.1, 0.15, 0.15, 0.15, 0.2, 0.2, 0.2, 0.2	1.55
Activity 8: Identify and map high key biodiversity areas	0.3, 0.4	0.7
Program 2. Wildlife habitat enrichment and species resilience in multiple-use and buffer zones		
Output 01: Adequate availability of minerals and water for mammals ensured		
Activity 1: Map the waterholes & saltlicks	0.5, 0.6, 0.6	1.7
Activity 2: Restore degraded saltlicks	0.1, 0.3, 0.3, 0.3	1
Activity 3: Create artificial waterholes	0.15, 0.3, 0.3, 0.3, 0.4	1.45
Activity 4: Carryout restoration or management interventions in degraded wetlands	0.3, 0.5, 0.5, 0.4, 0.2	1.9
Output 02: Adequate availability of food and cover for wild animals ensured		
Activity 1: Inventory degraded forest land and plant selected species	0.5, 0.5, 0.6, 0.6	2.2
Activity 2: Uproot exotic plant species and replace with native palatable plant species	0.2, 0.2, 0.2, 0.2, 0.3, 0.3, 0.3, 0.3, 0.4, 0.4	2.8
Activity 3: Carryout habitat enrichment through plantation of tubers, fruits/nuts bearing trees	0.3, 0.3, 0.3, 0.3, 0.4, 0.4, 0.4, 0.4, 0.45, 0.45	3.7
Activity 4: Conduct consultation meeting with park residents to review zonation	1.5, 2	3.5
Activity 5: Sanitary felling of trees and cleaning of forests to improve the wildlife habitats	0.2, 0.2, 0.2, 0.2, 0.2, 0.2, 0.25, 0.25, 0.25, 0.25	2.2
Activity 6: Supplement natural food stock in the forest with domestic horticulture varieties (jack fruit, mango, sweet potato and tapioca, etc.) in warm broadleaved forests	0.3, 0.3, 0.3, 0.4	1.3
Activity 7: Purchase field equipment (camera traps, binoculars, camera, tents, field gears, GPS, handsets, etc.)	0.8, 0.8, 0.8, 0.8, 0.9, 0.9, 2, 2, 1	10
Activity 8: Survey and map area under invasive plants	0.2, 0.3	0.5
Activity 9: Survey and map forest fire prone areas	0.1, 0.1, 0.2	0.4

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Activity / Output											Total
Activity 10: Maintenance of plantation	0.5	0.5	0.5	0.4	0.4	0.3	0.3	0.2		0.2	**3.3**
Output 03: Key stone/flagship species resilience enhanced											
Activity 1: Identify and demarcate critical conservation areas			1		1					0.3	**2.3**
Activity 2: Create awareness on climate resilient wildlife health management interventions & sterilization of dogs (Wildlife diseases)	0.6	0.6	0.8	0.6	0.5	0.5	0.8	0.5		0.5	**5.4**
Activity 3: Conduct intensive anti-poaching patrol in suspected and prone areas for illegal harvest of forest produce	0.7	0.7	1	0.7	0.7	0.6	1	0.6	0.6	0.6	**7.2**
Activity 4: Conduct periodic anti-poaching patrol in suspected and prone area for hunting	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	**4.2**
Program 3: Empowering local community to ensure sustainable management and utilization of natural resources											
Output 01: Technology on sustainable resource management and utilization of Non Wood Forest Products developed											
Activity 1: Conduct awareness on efficient use of timber by forest based industries	0.15	0.15	0.15	0.1	0.1	0.1	0.1	0.1	0.1	0.1	**1.15**
Activity 2: Conduct training for power chainsaw operator on harvesting of tree	0.4	0.4		0.4	0.4	0.5		0.3	0.3	0.3	**1.9**
Activity 3: Climate smart efficient energy adopted	0.8	0.2	3	0.8	0.8	1	2	0.6	0.6	0.6	**10.4**
Output 02: Community participation in sustainable forest management and conservation increased											
Activity 1: Establish new CFs (initiation, planning/inventory, signboards, handing over, travel)				0.7				0.6			**1.3**
Activity 2: Establish new NWFP user group (initiation, planning/inventory, signboards, handing over, travel)			0.7		0.3		0.3				**1.3**
Activity 3: Conduct CF networking & CF annual meeting	0.2	0.2	0.6	0.2	0.2	0.3	0.5	0.5	0.15	0.3	**2.8**
Activity 4: Study on impact of grazing in alpine meadows		0.65		0.6		0.5	0.5				**2.25**
Activity 5: Survey and map drinking water sources			0.2			2			0.2	0.2	**2.4**
Output 03: Revenue and employment generation from forestry based enterprises ensured											
Activity 1: Upscale Community-based natural resource management	0.4	0.4	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.2	**2.6**

The following is a budget/activity planning table (rotated on the page). Values are annual/phased allocations with the final (yellow) column showing the total.

Activity	Allocations (left → right)	Total
Activity 2: Promote cultivation of NWFPS – *Paris polyphylla* (Satuwa) in private land wherever feasible	0.17, 0.15, 0.6, 0.15, 0.12, 0.2, 0.8, 0.12, 0.3, 0.3	**2.61**
Activity 3: Promote forestry based employment opportunities	0.3, 0.7, 0.5	**1.5**
Output 04: Incidences of forest fire reduced		
Activity 1: Formation of Forest Fire Management Committee in all Gewogs and chiwogs	1, 1.8	**2.8**
Activity 2: Identify forest fire prone zone, and construct fire line wherever appropriate (Bumthang, Lhuentse & Mongar)	0.2, 0.2, 0.6, 0.2, 0.2, 0.7, 0.2, 0.2, 0.2	**2.7**
Activity 3: Yearly advocacy on forest fire prevention and management in all Gewogs.	0.3, 0.3, 0.3, 0.3, 0.3, 0.4, 0.4, 0.4, 0.5, 0.4	**3.6**
Activity 5: Identify and carry out scientific thinning in conifer forests in multiple use and buffer zones	0.5, 0.5, 0.5, 0.5, 0.5, 0.7, 0.7, 0.7, 0.7, 0.7	**6**
Program 4: Reduce Human-Wildlife Conflict and enhance communities livelihood		
Output 01: Socio-economic well-being of communities through integrated conservation and development programs enhanced		
Activity 1: Study on NWFP product diversification opportunities	0.2, 0.3, 0.4	**0.9**
Activity 2: Procure and supply of NWFPs processing equipment	0.6, 0.6, 0.8, 0.5, 0.5, 0.5	**3.5**
Activity 3: Support NWFPs product marketing	0.4, 0.4, 0.5, 0.6, 0.6	**2.5**
Activity 4: Upscale alternative income source established through support of agriculture and livestock intensification program	0.9, 0.9, 1.5, 0.9, 1.2, 1.2, 2, 1.2, 1.2	**11**
Activity 5: Off-set resource extraction from major river basin by supplying alternative materials (CGI sheets, fencing materials)	0.9, 0.9, 1.5, 1, 1.2, 1.2, 1.5, 1.2, 1.2	**10.6**
Activity 6: Explore and adopt advance technology on NWFP and economically valuable tree species	0.3, 0.3, 0.5	**1.1**
Activity 7: Review ICDP activities and wildlife management interventions	0.4, 0.5, 0.6	**1.5**
Output 02: HWC mitigation measures enhanced		
Activity 1: Map the human wildlife conflict hotspots	0.3, 0.3, 0.4	**1**

Activity / Output											Total
Activity 2: Upscale cost effective crop protection measures to avoid accidental killing of significant conservation species (tiger) in the process of lethal retaliatory action by farmers		0.8	0.8	0.8	0.8	0.8	0.8	1.2	1.2	1.2	**8.4**
Activity 3: Institutionalize community conservation committee in illegal prone areas		0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	**2.3**
Activity 4: Establish wildlife rescue and rehabilitation Unit (Shed construction, purchase of equipment, animal feed, etc.)		0.8	0.4	0.1	0.1	0.1	0.1	0.1			**1.7**
Activity 5: Enhance capacity building wildlife rescue and rehabilitation	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	**1.5**
Output 03: Agroforestry activities enhanced											
Activity 1: Document prevailing knowledge on agro-forestry practices	0.4					0.6					**1**
Activity 2: Support climate resilient agro-forestry and silvi-pastoral farming practices for park residents			0.4	0.4	0.4	0.6	0.6	0.6	0.6	0.6	**4.2**
Activity 3: Pilot agro-forestry in different ecological zones					0.5		0.7		0.7		**1.9**
Program 5: Diversification and promotion of sustainable ecotourism and recreational avenues											
Output 01: Access and benefit from nature-based opportunities for local communities increased											
Activity 1: Construct community eco-lodge	5					7					**12**
Activity 2: Establish short trekking/walking trail & carryout maintenance		0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	**5**
Activity 3: Establish local handicraft product outlet center			1.5	1.5			1.7	1.7			**6.4**
Activity 4: Carry out maintenance of existing eco-trails and Rhododendron garden	0.5		0.4			0.6				0.7	**2.2**
Output 02: Tourism and conservation through festival and interpretation enhanced											
Activity 1: Facilitate local festivals	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	**2.5**
Activity 2: Carryout maintenance of campsites and visitor information center	0.8	0.8				0.9	0.9				**3.4**
Activity 3: Heritage forest plan operationalized	0.15	0.15	0.15	0.15	0.15	0.2	0.2	0.2	0.2	0.2	**1.75**
Activity 4: Strengthen tourism networking and marketing	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	**1.5**

Activity											Total
Activity 5: Capacity building of staffs & local community on nature-based tourism governance	1.5	1.5	1.5	1.5	1.5	2	2	2	2	2	**17.5**
Program 6: Strengthen institutional capacity											
Output 01: Protected Area management enhanced/strengthened											
Activity 1: Ecological and social survey for next park management plan									1.5	1.5	**3**
Activity 2: Present and print park management plan										0.3	**0.3**
Activity 3: Assess park management effectiveness using METT+					0.3					0.4	**0.7**
Activity 5: Construct Lingmithang Range office and staff quarters	6.02	6									**12.02**
Activity 6: Construct Tsamang staff quarters		3	1.5								**4.5**
Activity 7: Construct staff quarters at park headquarters		2.02	5								**7.02**
Activity 8: Procure furniture for new office		0.4	0.4								**0.8**
Activity 9: Procure laptops, printers and photocopiers	0.2				0.2		0.2	0.3	0.3		**1.2**
Activity 10: Procure and supply extension kits for staffs	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	**3.5**
Output 02: Forest protection and enforcement enhanced											
Activity 1: Commission and implement SMART patrolling	0.2	0.2	0.2	0.2	0.2	0.25	0.25	0.3	0.3	0.3	**2.4**
Activity 3: Procure basic equipment for a rapid response team to rescue wildlife (Drugs & other accessories)		0.2		0.2		0.2		0.3	0.3		**1.2**
Activity 4: Conduct training on anti-poaching patrol techniques						0.2		0.3	0.3		**0.8**
Activity 5: Establish intelligence network between various law enforcement agencies	0.25	0.25	0.25	0.25	0.25	0.3	0.3	0.3	0.3	0.3	**2.75**
Activity 6: Implement zero Poaching Strategy efficiently	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	**2.5**
Activity 7: Procurement of Toyota hilux	2.9									3.5	**6.4**
Activity 8: Maintenance of old office buildings and staff quarters (eastern Park Range)	1							1.8			**2.8**
Activity 10: Construct Sengor Sub-Range office and staff quarters			3								**3**
Activity 11: Construct Ungar Sub-Range office and staff quarters	3										**3**

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Activity										Total
Activity 12: Procure furniture for these two offices			0.6							**0.6**
Activity 13: Maintenance of office buildings and staff quarters (headquarters)	2	2	3	2	3					**12**
Activity 15: Procure high specs computers for data repository	0.2	0.3								**0.5**
Activity 16: Purchase of communication and forest fire control equipment.	0.3	0.2	0.3	0.3						**1.1**
Activity 17: Carry out inspection in the field and process EC/LC/ FC for timely service delivery	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	**3** (with 0.3)
Activity 18: Carry out inspection and process for land exchange/substitution with relevant agencies	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	**2** (with 0.2)
Output 03: Professional capacity enhanced										
Activity 1: Attend training on carbon stock assessment	0.2	0.3								**0.5**
Activity 2: Conduct training on NWFPs product diversification	0.25									**0.25**
Activity 3: Support capacity building on record keeping for NWFP group & CFMG	0.3	0.3	0.4	0.4						**1.4**
Activity 4: Study tour for CFMG (In-country)	0.3	0.3	0.4							**1**
Activity 5: Conduct training on CF management	0.2	0.2	0.3							**0.7**
Activity 5: Build the capacity of park staffs on wildlife management and statistical analysis (Long term)	1.4	1.4	1.4							**4.2**
Activity 6: Capacity building for park staffs and community on PA landscape management (ex-country)	3	6	5	5	5					**24**
Activity 7: Study tour for field staff on wildlife management (ex-country)	4	4	6	6	6	6	6	6	6	**50**
Activity 8: Capacity building for staff on wildlife study designing and methodology (ex-country)	0.3	0.3	0.5	0.5	0.5	0.3				**2.4**
Activity 9: Capacity building for staff on wildlife monitoring techniques (ex-country)	0.3	0.3	0.3	0.5	0.5					**1.9**
Activity 10: Capacity building for staff on GPS handling and application (in-country)	0.2	0.2	0.2	0.3	0.3					**1.2**

Activity / Output	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	Total
Activity 11: Capacity building for staff on Park management and conservation leadership (ex-country)	3									5	**8**
Activity 12: Capacity building for staff on writing grant/project proposals and project management (in-country)				0.4				0.4	0.5		**1.3**
Activity 13: Capacity building for staff on Wildlife crime investigation		0.3					0.3		0.5		**1.1**
Activity 14: Train staff on SMART connect	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	**3**
Program 7: Enhancing proper waste management and environmental education											
Output 01: Conservation education/awareness through conservation arts and specimens strengthened											
Activity 1: Observe international/national days related to wildlife and conservation programs	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	**3.5**
Activity 2: Procure audio-visual equipment	0.6					0.7					**1.3**
Activity 3: Create awareness or educate target community on conservation and protection regime of significant species	0.3			0.3				0.4		0.4	**1.4**
Activity 4: Document traditional knowledge about NWFP utilization								0.3			**0.3**
Activity 5: Develop signboards/signages in the park				0.3			0.3		0.4	0.4	**1.4**
Activity 6: Update information on park for VIC	0.8	0.8	0.8							0.9	**3.3**
Activity 7: Support nature club programs in schools and monasteries	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	**4.5**
Activity 8: Conduct short trainings for birding and botany for citizen scientist and park staffs	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	**2**
Activity 9: Establish orchidium (orchid garden)					0.2						**0.2**
Activity 10: Carry out bioengineering/landscaping work			0.7				0.8		0.8		**2.3**
Activity 11: Develop audio visual on park for VIC	0.7							0.8			**1.5**
Activity 12: Conduct study tour/training for field staff on environment education and interpretation	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7		7	**12.2**
Output 02: Waste management activities in the forest areas strengthened											

Activity											Total
Activity 1: Prepare waste management plan (survey and printing)	0.6	0.8									**1.4**
Activity 2: Strengthen proper waste management inside the park (Waste seggregation and disposal)	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	**3.5**
Activity 3: Conduct awareness on waste management	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	**2**
Activity 6: Conduct cleaning campaign	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	**0.8**
Program 8: Strengthening institutional linkages, monitoring and evaluation											
Output 01: Institutional linkage with biodiversity conservation partner agencies enhanced											
Activity 1: Conduct land inspection and submit report to the concerned Dzongkhag Land Registrar	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	**1.5**
Activity 3: Periodic patrol in three zones	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	**2.5**
Activity 4: Purchase of extension kits, camping equipment, survey equipment	0.8	0.9	0.9								**2.6**
Activity 5: Conduct periodic patrol in the important river basin	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	**1**
Output 02: Systematic monitoring and evaluation of activities ensured											
Activity 1: Revise old CF plans (review record keeping and planning/inventory, signboards, handing over, travel)	0.5	0.15	0.3	0.2	0.2	0.2	0.4	0.4		0.6	**2.35**
Activity 2: Revise old NWFP plan (review record keeping and planning/inventory, signboards, handing over, travel)	0.2	0.3	0.4								**0.9**
Activity 3: Carryout mid-term review of CF management plan	0.07	0.07	0.1	0.1	0.16	0.4	0.1	0.18			**1.08**
Activity 4: Monitor CF and NWFPs governance (field and record keeping)	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	**2.5**
Activity 5: Carryout monitoring and evaluation of plantation	0.2	0.2	0.2	0.25	0.25	0.25	0.3	0.3	0.3		**2.2**
Activity 6: Carryout monitoring and evaluation of wood-based industries	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	**1**
Activity 7: Pursue photography monitoring of significant conservation area	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.15	0.15	0.15	**1.15**
Activity 8: Monitor established HWC mitigation measures (Solar electric fence, GECC)	0.2	0.2	0.2	0.2	0.25	0.25	0.25	0.25	0.25	0.2	**2.2**
Activity 9: Evaluation of HWC mitigation programs	0.4	0.5									**0.9**

											Total
Program 9: Preservation of forest encompassing cultural, religious or historical sites with significant ecological and cultural values											
Output 01: Cultural, religious and historical sites maintained and preserved											
Activity 1: Identify cultural, religious and historical sites	0.1					0.15					**0.25**
Output 02: Ecosystem diversity and habitats contiguity maintained											
Activity 1: Develop management plan for sites		0.3			0.3				0.3		**0.9**
Program 10: Sustainable management and utilization of forest resources in vicinity of settlement in the park											
Output 01:Community participation in sustainable forest management and conservation increased											
Activity 1: Carry out resources inventory for Local Forest Management Plan in Metsho and Tsamang Gewogs	0.8	0.4	0.4								**1.6**
Activity 2: Revision of LFMP										0.6	**0.6**
Output 02: Sustainable management and utilization of timber promoted											
Activity 1: Timber marking, monitoring of felling and timber utilization	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	**4.5**
Activity 2: Implement and enforce the existing FNCRR 2017	0.3	0.3	0.3	0.13	0.3	0.4	0.4	0.4	0.4	0.4	**3.33**
Total	42.8	57.32	52.22	39.96	44.74	50.9	59.4	48.4	60.2	44.1	500.01

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Financial projection for 10 years (Re-current)

Management Programs and Activities	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Total
	Cur	Cur	Cur	Cur	Cur	Cur	Cur	Cur	Cur	Cur	
Program 11: Catering administrative service efficiently for the park staff (recurrent cost)											
Output 01: Administrative service for park staff and basic utilities for office ensured											
Pay and allowance	13.6	13.6	13.6	13.6	14.6	14.6	15.6	15.6	15.6	16.6	**147**
Travel in-country (LTC, transfer grants)	6.65	7.23	8.21	8.54	9.1	9.67	10.24	10.8	11.25	12.1	**93.79**
Communication (telephone, internet and fax)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	**5**
Utilities (electricity, water and fuel wood)	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	**3.5**
Office supplies (stationeries, text books, uniform, estension kids)	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	**5.6**
Vehicle maintenances (hilux)	0.18	0.19	0.2	0.21	0.22	0.23	0.24	0.25	0.26	0.27	**2.25**
Maintenances (building, water supply)	0.2	0.25	0.3	0.35	0.4	0.45	0.5	0.55	0.6	0.65	**4.25**
Taxes, duties, royalties and bank charges, advertisement	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	**1**
Other Personnel Emolument	0.5	0.5	0.57	0.59	0.59	0.6	0.6	0.65	0.67	0.67	**5.94**
Maintenance of property-Equipment	0.07	0.08	0.09	0.1	0.11	0.12	0.13	0.14	0.15	0.16	**1.15**
Maintenance of property-Computers	0.05	0.06	0.07	0.08	0.09	0.1	0.11	0.12	0.13	0.14	**0.95**
Op.Exp-Transportation	0.06	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	**5.46**
Op.Exp-In-country Meeting & Celebration	0.07	0.08	0.09	0.1	0.11	0.12	0.13	0.14	0.15	0.16	**1.15**
Total	22.89	24.1	25.24	25.68	27.33	28	29.66	30.36	30.92	32.86	277.04

Annexure 3: Local Forest Management Plan

དཔལ་ལྡན་འབྲུག་གཞུང་།   སོ་ནམས་དང་ནགས་ཚལ་ལྷན་ཁག །   ནགས་ཚལ་དང་གླིང་ཀ་ཞབས་ཏོག་ལས་ཁུངས།

Royal Government of Bhutan
Ministry of Agriculture & Forests
Department of Forests & Park Services
PHrumsengla National Park

Ura: Bumthang

SUSTAINABLE MANAGEMENT AND UTILIZATION OF FOREST RESOURCES PLAN FOR FOREST AREA INSIDE PHRUMSENGLA NATIONAL PARK

SENGOR VILLAGE SALENG GEWOG

MONGAR DZONGKHAG

Forest Management Area

N
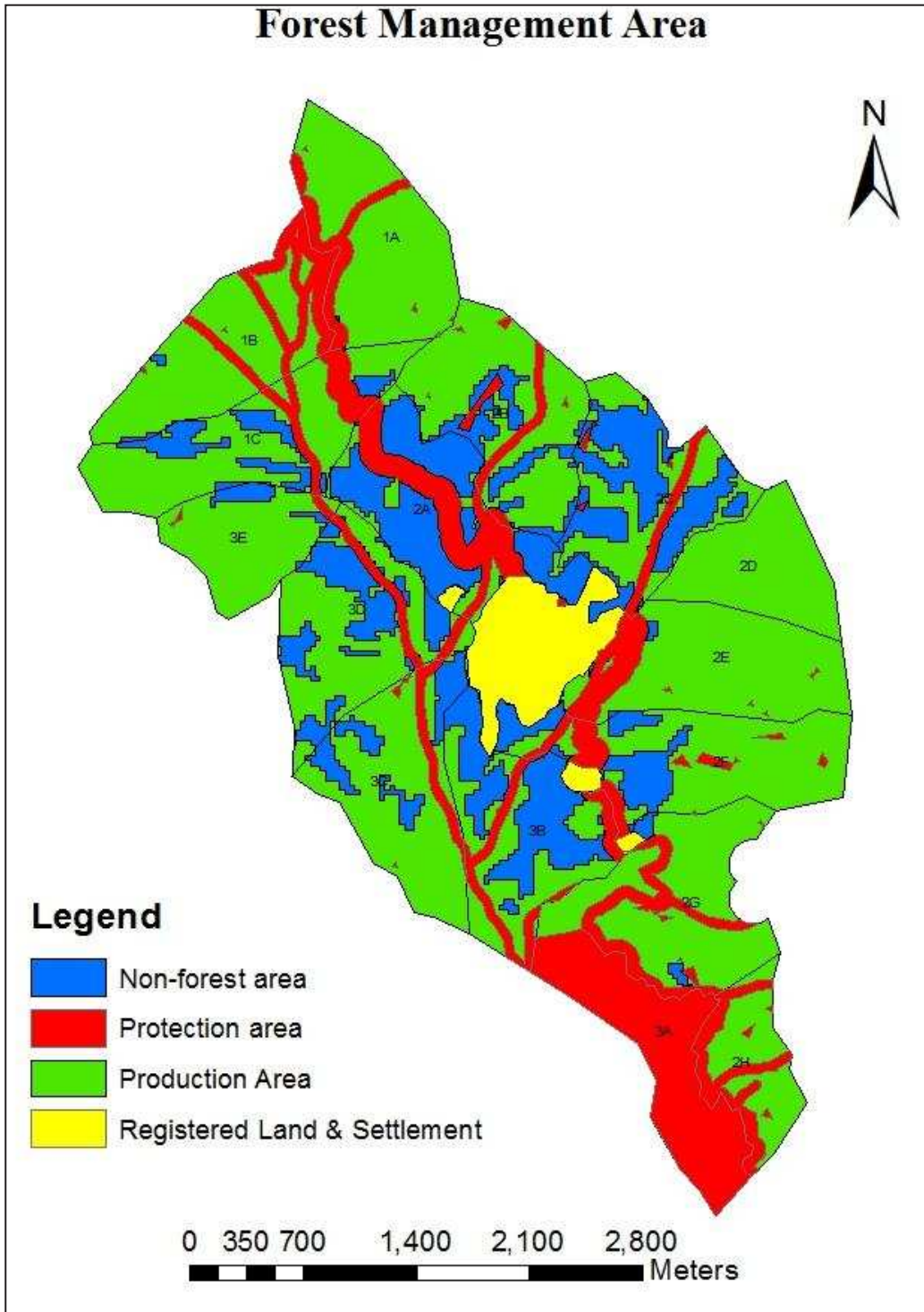
Legend

- Non-forest area
- Protection area
- Production Area
- Registered Land & Settlement

0 350 700   1,400   2,100   2,800
Meters

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Summary Results for Forest Management Area:

Sengor village under Saleng Gewog

Unit	Average basal area (m2/ha)	Aver. Stand Volume (m3/ha)	No of operable sample plots
	29.8	276	176

Area Distribution

Unit	Non Forest	Protection	Inoperable	Production	Total
ha	271.7	279.7	141.7	799.7	1492.8
%	18%	19%	9%	54%	100%

Forest Type Distribution

Unit	Hemlock	Fir	Spruce	Mix. Con.	Bluepine	Chirpine	Hardwood	Mixed HC	Total
%	35%	30%	2%	28%	0%	0%	0%	4%	100%

Age distribution

Unit	young	immature	mature	Overmature	Total
%	3%	10%	78%	8%	100%

Stand type distribution

Unit	natural	coppice	plantation	Total
%	100%	0%	0%	100%

Canopy closure

Unit	dense	closed	open	unstocked	Total
%	7%	57%	36%	0%	100%

Condition

Unit	good	average	poor	Total
%	13%	87%	0%	100%

Slope

Unit	gentle	moderate	steep	Total
%	20%	52%	28%	100%

Site Condition

Erosiveness

Unit	stable	moderate	unstable	Total
%	21%	77%	2%	100%

Soil Cover

Unit	high	moderate	low	Total
%	12%	87%	1%	

Forest Use

Unit	Intensive Side Uses			Extensive Side Uses		
	grazing	sokshing	lopping	grazing	sokshing	lopping
ha	210.1	0.0	0.0	199.0	0.0	0.0
%	26%	0%	0%	25%	0%	0%

NWFP Occurence and Firewood

Unit	NWFP abundant				NWFP sparse			
	Firewood	Bamboo	Cane	Daphne	Firewood	Bamboo	Cane	Daphne
ha	70.5	0.0	0.0	29.4	425.2	4.8	0.0	106.5
%	9%	0%	0%	4%	53%	1%	0%	13%

Management Options

Unit	No activity	Improvm.	Timber	Firewood	Silvopast.	Shokshing
ha	0.0	0.0	0.0	0.0	0.0	0.0
%	0%	0%	0%	0%	0%	0%

Potential Production

Timber

Unit	Drashing	Cham	Tsim	Poles,posts	Total
Ntot	19021	26132	18764	32044	**95961**
N/ha	24	33	23	40	**120**
m3	77510	25905	6090	3330	**112835**
m3/ha	96.9	32.4	7.6	4.2	**141.1**

Firewood

Unit	> 49cm	30-49cm	20-29 cm	10-19 cm	Total
Ntot	5945	6871	46804	255642	**315262**
N/ha	7	9	59	320	**394**
m3	39530	8018	12018	15481	**75047**
m3/ha	49.4	10.0	15.0	19.4	**93.8**

Sivicultural Measures

Unit	Planting	Thinning	Felling	
ha	0.0	181.7	643.2	0.0
%	0%	23%	80%	0%

Yield Regulation

AAC	**1703**	m3
2.1		m3/ha
Prod. Potential / AAC	**110**	years

"Conservation to Ensure the Ecological and Environmental Foundations for Achieving Gross National Happiness"

PART 7: TABLE OF CONTENTS

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1. BACKGROUND

This sustainable management and utilization of forest resources plan has been prepared by Pema Tshewang, Sr. Forest Ranger II, Phrumsengla National Park (PNP), Ura.

Forest resource assessment has been carried out by field staff under the direct supervision of the CFO, Coordinator and assessment group leader, PNP, from May to June 2019.

The objective of this plan is to regulate the rural wood supply to Sengor community under Saleng gewog, Mongar from Phrumsengla National Park Area on a sustainable basis.

This plan is valid for the period of 10 years: - 1st July 2019 to 30th December 2029.

1.1. Location and Extent

Sengor Chiwog is located towards the north-west of Saleng Gewog under Mongar Dzongkhag with 24 households. It is bordered by Jarey Gewog to the north, Lhuentse, Shingkhar Gewog of to the west, Zhemgang, Ura Gewog to the north–west, Bumthang, Thidangbi Chiwog to the East and Saleng Chiwog to the south. Sengor is an entry to Saleng Gewog and Mongar Dzonkhag if we are travelling from Bumthang to Mongar and it also serves as the last village for if we are heading towards west. The village experience temperate climate, with an altitude ranging from 2100-3700 masl.

An area for Sustainable Management and Utilization of Forest Resources Plan for Sengor village under Saleng gewog, Mongar was demarcated inside PNP through consultation with community. Following points are the areas looked into while demarcating the area for planning:
• Area traditionally used
• Area suitable for sustainable management and utilization of forest produce
• Area within the vicinity of the settlement.

Based on resolution of consultation meeting, total area of 2139.92 hectares (3 compartments with 23 sub-compartments) were identified for sustainable management and utilization of forest resources plan areas for Sengor village but with the recommendation from Department (NCD)the area is reduce to 1515.66 ha. (3 compartments with 16 sub-compartments) for protection

purpose (including registered land and settlement) as shown in Figure 1 and Table 1.
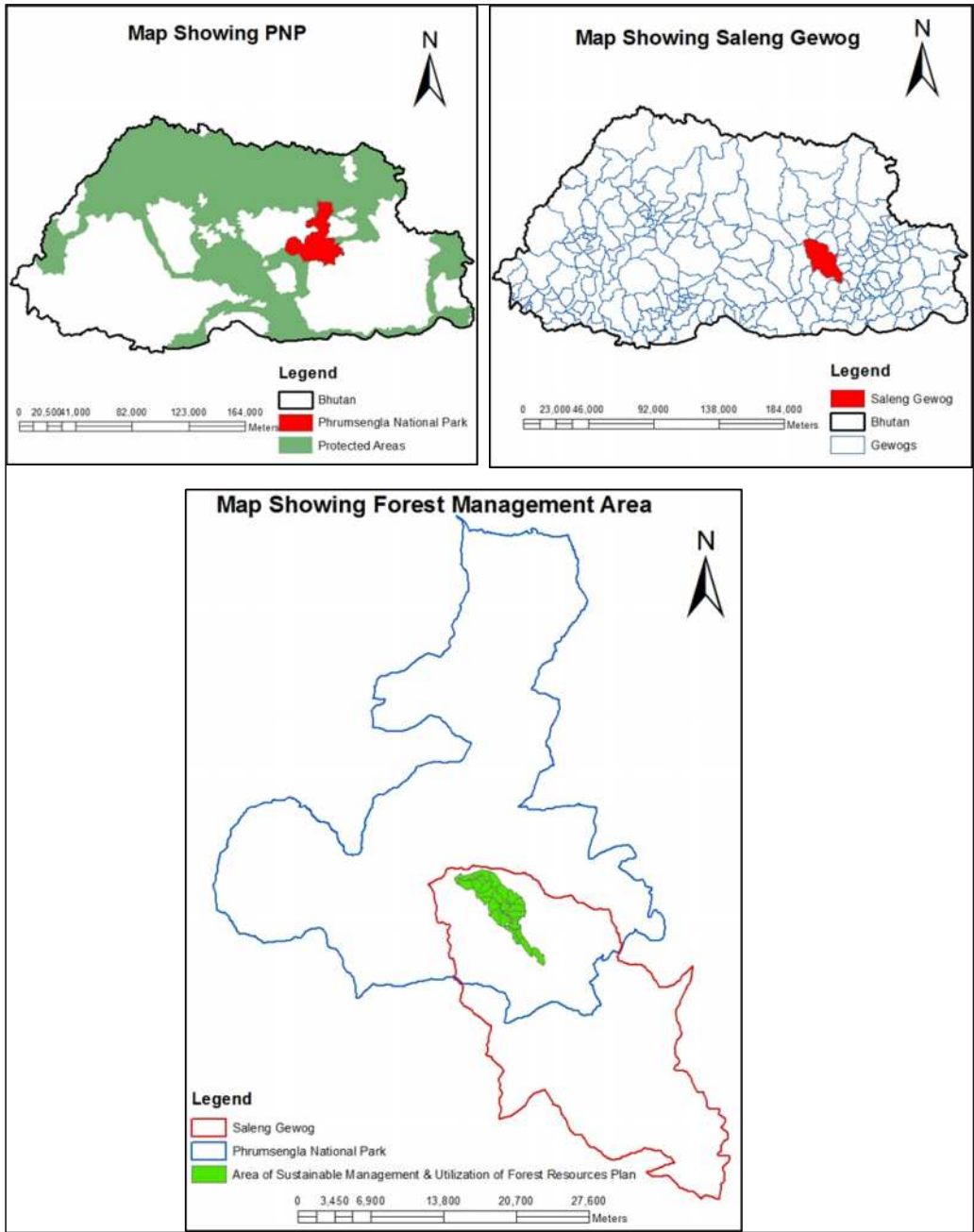
Figure 1: Map Showing Management Plan

Table 1: land use types within management area (LULC 2016)

Land Use Types	Area (Ha.)	Percentage
Broadleaf	49.59	3.27
Built up	2.53	0.17
Fir	95.04	6.27
Kamzhing	21.83	1.44
Meadows	370.55	24.45
Mixed conifer	935.14	61.70
Shrubs	40.98	2.70
Total	1515.66	100

2. FOREST MANAGEMENT AREA

2.1. Area

Sengor village is one of the Chiwog of Saleng gewog. The gewog covers a total area of 46167.99 ha. and 37.24% of its total area falls under the jurisdiction of Phrumsengla National Park as shown in Table 2. The Sustainable Management and Utilization of Forest Resources Plan area of Sengor falls under multiple-use zone where the park resident (Sengor community) can collect forest resources for their own use. The multi-use zone has special conservation value but that can tolerate different types of human uses. Inaccessible Area is termed for forest area that is excluded from Sustainable Management and Utilization of Forest Resources Plan area of Sengor but have scope for future management for utilization of forest resources. This inaccessible area falls under the multiple-use and buffer zone of PNP and the management will be governed by Phrumsengla National Park Management Plan. The buffer zone is the areas around the core zone where only low impact activities are allowed, such as research, environmental education and recreation. The buffer zone will safeguard the protected area (core zone) from encroachment and activities that may affect ecosystem.

Table 2: Different Management Regimes

Management Regimes	Area (Ha)	Coverage (%)	Name	Area (Ha)
Phrumsengla National Park	90717.60		Phrumsengla National Park	90717.60
Saleng Gewog	46167.99		Saleng Gewog	46167.99
Saleng Gewog inside PNP	17194.77		Saleng Gewog inside PNP	17194.77
Sustainable management and utilization of forest resources plan area for Sengor village under Saleng gewog	1515.66	8.81	Registered land	22.86
			Non-Forest Area	271.70
			Protection Area	279.70
			Inoperable Area	141.70
			Production Area	799.7
Sustainable management and utilization of forest resources plan area for Saling village under Saleng gewog	105.70	0.61	Sustainable management and utilization of forest resources plan area for Saling village under Saleng gewog	105.70
Inaccessible Area	15573.41	90.58	Inaccessible Area	14949.15
Total area of Saleng geog Falling inside PNP	17194.77	100		17194.77

The forest management area covers an area of 1515.66 hectares of Phrumsengla National Park. Registered land and settlement covers 1.5% of the total area of forest management area. The other management regimes like locally protected areas that falls in management area are excluded from this plan. The management area is divided into different zones with purpose to identify protected areas, existing plan, area where rural supply of timber is restricted and forest area available for rural supply. The different zones in forest management area are as shown in Table 3.

Table 3: Different zones in management Area

Types of Areas/Zones	Area (Ha)
Non-Forest Areas	271.7
Protection Zones	279.7
Inoperable Zones	141.7
Production Areas	799.7

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2.2. Forest Types and Condition

The forest management area lies in the fir and hemlock zone. The distribution of the forest types is shown in the Figure 2 and Table 4. The general condition of the forest is average with natural regeneration in entire compartments. The maximum sub-compartments are closer to the settlements and roads. The forest condition of sub-compartments area falling along the road is poorer due to use and disturbance by human habitation. Forest type distribution as well as forest condition and canopy closure per compartment can be derived from the respective sheet in Annex I.

The average standing volume is only 276.4 m3/ha and the average basal area is 29.8 m2/ha.

Table 4: Age Distribution

Over Matured	Matured	Immature	Young
8	78	10	4
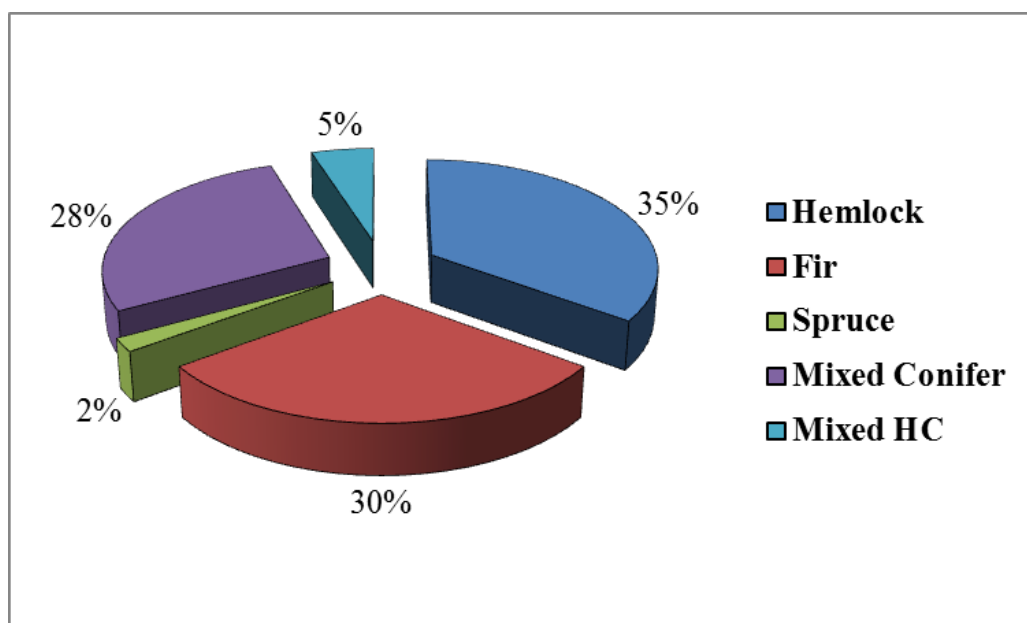
Figure 2: Forest Types

2.3. Site Condition and Forest Function

The average site condition is shown in Table 5, the site condition for individual compartments and sub-compartments can be derived from Annex 1 and 2 respectively.

Table 5: Site Condition

Slope	%	Erosiveness	%	Stability	%
Gentle	20	Stable	21	High	12
Moderate	52	Moderate	77	Moderate	87
Steep	28	Unstable	2	Low	1

In general forest management area is of moderate slope. There are some areas with steep slope in compartment 1 and 2 of the forest management area. In such areas the slope more than 45 degrees will be protected and tree marking will not be entertained to enhance the soil stability in the area. Moreover, buffer of 15 meters (m) from the edge of the stream, water sources and buffer of 180 m uphill and 90 m downhill of national highway are put in protected areas and the permit shall not be issued.

2.4. Accessibility

The forest management area at Sengor has 3 compartments with 16 sub-compartments. Around 80% of total sub-compartments are accessible with roads as the east-west national highways- Bumthang to Mongar highway passes through management area as shown Annexure 3 and 4.

3. NWFP AND OTHER FOREST USES

The availability of the NWFP in the forest management area is firewood, bamboo and Daphne. Some sub-compartments areas were found with dead bamboo and also new regeneration taking place during the resources assessment survey. This bamboo is hardly used by the local people in any form; hence the massive growth of this bamboo may pose a threat to the regeneration of plants in long run. The NWFP of Daphne is also found sparsely.

The grazing is intensive in some part of management area (Table 6) but the negative impact of grazing inside the forest can be considered lesser threat to forest resources. The occurrence of NWFP and forest uses in the forest management area is shown in the table below, for the distribution by compartment and sub-compartment refer to Annex I and II.

Table 6: NWFP and Forest Uses

NWFP	Abundant (%)	Sparse (%)	Forest Use	Intensive (%)	Extensive (%)
Bamboo	0	1	Grazing	26	25
Cane	-	-	Sokshing	-	-
Daphne	4	13	Lopping	-	-

Thogsumpa (*Paris polyphylla & Trillium govanianum*), Bjele namchu (*Araucaria sp.*) and Sangay shamu (*Tricholoma matsutake*) are the popular and important NWFP for the local people and grows in entire compartments of forest management area and are widely traded to the exporters visiting Sengor village.

4. SOCIO-ECONOMIC DATA

Sengor village/Chiwog consists of 24 households. The village has a school, Basic Health Unit, Livestock Extension Centre, Sub-Range office of Phrumsengla National Park and a Lhakhang. All the households are supply with adequate tap water.

Agriculture, livestock and forestry are the lifeline of the communities. The main cereals grown are Barley, Wheat and Buck-wheat, while livestock products are the main source of income for the community.

Based on the 2018 report of Livestock Extension Center of Saleng gewog, there are 222 cattle reared by Sengor community producing 2292 kgs of butter and 4004.1 kgs of cheeses (Table 7 & 8). The community derives additional income from off-farm activities and wild mushroom.

Table 7: Cattle Population

Breed	Calf < 1 year		Heifer	Milch	Dry	Brd. Bull	Bull	Bullock	Total
	Male	Female							
Jersey Cross	3	3	12	2	2	1	0	0	23
Brown Swiss Cross	8	12	16	30	14	0	0	0	80
Jatsha-Jatsham	3	6	7	37	14	0	0	0	67
Yanku-Yankum	12	5	6	5	0	0	11	0	39
Doethra-Doethram	1	0	2	4	0	0	6	0	13
Total	27	26	43	78	30	1	17	0	222

(Source: Saleng gewog Livestock Extension Center report, 2018)

Table 8: Dairy Production

Products	Quantity (Kg)		
	Total Production	Qty. Consumed	Qty. Sold
Butter	2292	1411	882
Cheese	4004.1	2659.5	1587.6

(Source: Saleng gewog Livestock Extension Center report, 2018)

5. FUTURE MANAGEMENT

5.1. Management Options

The dominating forest management option is rural timber, firewood and fencing poles. The sub-compartments far away from the settlements and not accessible by road have good forest stock and most of them are over matured stand. Overall, all the sub-compartments of management areas are with good stock (BA > 18m^2/ha) for timber and firewood extraction (Figure 3). For further improvement of stand, thinning, cleaning and singling activities has to be operated. There is risk of covering the forest ground by rhododendron species while extraction matured timber and firewood reducing the regeneration of timber species. To this, allotment of matured rhododendron as firewood is also need to be executed.

Forest Management Area needs protection from forest fire and illicit harvesting as the compartments are accessible to road and adjacent to agriculture and grazing land. The timber tree species found in the Management Area are sensitive to fire, especially younger trees and regeneration. Awareness program on forest fire prevention and regular monitoring activities need to take place.

The compartments areas are freely grazed by livestock and some of the timber trees are sensitive to grazing. Grazing shall be controlled in all compartments which are in the stage of natural regeneration.The distribution of silvicultural measures throughout the forest management area is shown in the Figure 3.

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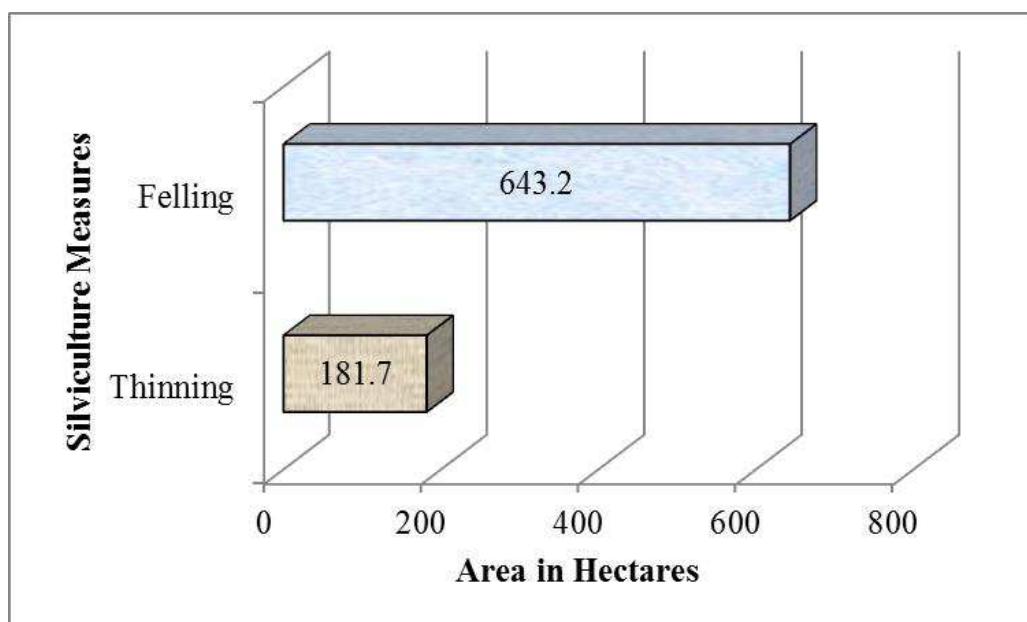
Figure 3: Silvicultural Measures

The management option for each individual compartment can be derived from the compartment register (Annexure II). Taking up of plantation as management option in Sengor is nil, this is due to low growth rate of planted plants and have abundant of natural regeneration.

5.2. Tree Marking and Silviculture

Tree marking is done in accordance with the Tree Marking Guidelines and the Silvicultural Guidelines prescribed by the department of forests and park services.

The silvicultural system applied is single tree selection system. Individual trees are harvested with the intention of maintaining a continuous canopy without significant gaps. Mark mature trees for timber that will promote the growth of nearby saplings and mark the trees that are malformed, dead, diseased and dying for firewood purpose to promote forest sanitation. While marking tree, opening of large area in forest stand is not recommended in single tree selection system.

6. YIELD REGULATION

The sustainable annual allowable cut AACsust. for the management area is calculated as follows:

AACsust. = total standing volume / average rotation period. = 1703 m3/year

Taking into account the forest type distribution the average production period for the forest management area is 110 years. The total standing volume is **187330**m3.

The overall production potential as determined by the forest resources assessment is **187882**m3. Dividing the overall production potential by the planning period of 10 years gives the silvicultural AAC:

AACsilv. = total production potential / 10 years = **18788**m3/year

As the AACsust. is lower than the AACsilv. the AAC is fixed at the level of the AACsust.

The Annual Allowable Cut for the Sengor Forest Management Area is fixed at 1703 m3.

The AAC per ha is 2.1 m3.

Taking into account the fixed AAC of 1703m3 then the total production potential of the forest management area will be used in a period of about 187882/1703 = 110 years. As this period is considerably longer than the planning period of 10 years, there will be no shortage in the availability of wood during the planning period.

Calculation of AAC:

1. The average rotation period is calculated by multiplication of the proportion forest type * rotation period of forest type
2. The sustainable AAC is determined by dividing the total standing stock by the average rotation period
3. The silvicultural AAC is determined by dividing the production period by the planning period of 10 years
4. The AAC is fixed at the sustainable AAC or silvicultural AAC, whichever is lower!

Unit	Forest Type Distribution								
	Hemlock	Fir	Spruce	Mix. Con.	Bluepine	Chirpine	Hardwood	Mixed HC	Total
Proportion	35%	30%	2%	28%	0%	0%	0%	4%	100%
Rotation period	130	140	130	120	90	90	130	120	130

AACsust. = standing volume/ rotation period	1703	m3
	2.1	m3/ha
AACsilv. = prod. Potential/10 years	18788	m3
	23	m3/ha
AACfixed	1703	m3
	2.1	m3/ha

Prod. Potential/ AAC =	110	years

7. DEMAND/SUPPLY ASSESSMENT

The rural and commercial wood demand of the Sengor village has been calculated as the average of the actual wood allotment from 2014 to 2018. The data were collected from field office and Data Management Section of the PNP.

The annual timber supply potential is calculated by dividing the total production potential (in number of trees) by the number of years it will take to use up the production potential with the fixed AAC.

Table 9: Demand/supply Assessment

Product	Total Production Potential	Silviculture Annual Potential	Sustainable Annual Supply Potential*	Annual Rural Demand	Annual Commercial Demand	Annual Total Demand	Supply - Demand
Drashing	19021	1902	173	8	0	8	165
Chams	26132	2613	238	20	0	20	218
Tsims	18764	1876	171	20	0	20	151
Poles	32044	3204	291	30	0	30	261

Remark: the total production potential divided 110 years

Drashing, shingleps, chams Tsims and poles can be supplied from the forest management area. Although there is surplus of timber trees, the rapid developmental activities and rise in population may increase the pressure on forest in future.

Firewood demand is calculated in truckloads. To compare it with the supply potential, it has to be converted into standing volume equivalent. The conversion factor applied is:

1 truckload is equivalent to 8 m3 standing volume.

Table 10: Firewood Demand/Supply Scenario in m3

Total Production Potential (Volume$_{tot}$)	Sustainable Annual Supply Potential*	Annual Demand	Supply - Demand
75047	682.25	824	-141.75

Remark: Annual Supply potential is the total production potential divided 110 years

The annual supply potential is less than the average annual demand of firewood of the last 5 years. There isshortage of firewood of 141.75 m3 and can be met from timber production but only unsound for use of timber and over matured trees can be allotted to promote forest sanitation and natural regeneration.

8. MONITORING

Monitoring is important for the control of the AAC. Each tree, which is marked for felling must be recorded in the tree marking book.

Explanations of abbreviations used in the compartment records

All information and data indicated in the sub-compartment record are related to the operable production area only.

A	abundant occurrence of NWFP
Bas. Area (m2/ha)	basal area per ha of the sub-compartment
Dbh	diameter breast height
E	extensive forest use

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Height 0,3<1.3m	number of trees of this height class
I	intensive forest use
m3	total standing volume in m3
N/ha	number of trees per ha
Ntotal	total number of trees of the sub-compartment
S	sparse occurrence of NWFP
Volume (m3/ha)	standing volume per ha of the sub-compartment
Volume conifer %	percentage of conifers in relation to the standing volume

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ANNEXURES

Annexure 1: Compiled Results by Compartment

Area Distribution, Basal Area and No. of Sample Plots for Forest Management Area:								Sengor village under Saleng Gewog	
Comp	**Sub-Compartment**		**Area Distribution (ha)**					**BA**	
No.	**No.**	**Name**	**Non Forest Area**	**Protection**	**Inoperable**	**Production**	**Total**	**(m2/ha)**	**No. of Plots**
1	A	Waibrang	0.1	14.1	9.5	76.2	99.9	24.8	18
1	B	Jatang	1.1	25.3	8.5	59.6	94.5	32.4	16
1	C	Gonmanpai	19.3	13.9	12.4	57.9	103.5	30.3	17
2	A	Charaymetog	59.5	30.8		10.5	100.8	20	1
2	B	Charaymetog	18.46	10	10.8	64.8	104.06	28	14
2	C	Waibrang	49.4	8.5		40.1	98	39	4
2	D	Mangshing				59	59	39.2	10
2	E	Kelsey-nang	1.2	14.3	4.7	79.4	99.6	24.6	18
2	F	Charcharla	22.4	12.8	21.4	49.9	106.5	24.3	10
2	G	Pholakhar		20.4	24.2	43.6	88.2	38.7	14
2	H	Khaplung		17.1	9.1	22.8	49	26.4	7
3	A	Zangrong		77.7		55.8	133.5	30	1
3	B	Pang-jug	43.5	16.2	14.3	25.1	99.1	33.4	11
3	C	Panglang	17.5	8.6	10.4	62.1	98.6	24.2	14
3	D	Bungsingla-tag	31.9	8.5	16.4	43.7	100.5	32.5	11
3	E	Bungsingla	7.3	1.5		49.2	58	29.2	10

Annexure I: Compiled Results by Compartment

Comp	**Sub-Compartment**		**Area Distribution (ha)**					**BA**	
No.	**No.**	**Name**	**Non Forest Area**	**Protection**	**Inoperable**	**Production**	**Total**	**(m2/ha)**	**No. of Plots**
1		North Side	20.5	53.3	30.4	193.7	297.9	28.8	51
2		East Side	150.96	113.9	70.2	370.1	705.16	30.7	78
3		Southwest side	100.2	112.5	41.1	235.9	489.7	29.1	47
Total			271.66	279.7	141.7	799.7	1492.76	29.8	176

Annexure I: Compiled Results by Compartment

Stand Data of Forest Management Area:							Sengor village under Saleng Gewog		
Comp	Sub-comp	Name	Production area	Basal Area	Volume	Tot. Volume	V conifer		
No.	No.		(ha)	(m2/ha)	(m3/ha)	(m3)	(%)		
1	A	Waibrang	76.2	24.8	529.4	40340.3	90.0		
1	B	Jatang	59.6	32.4	218.0	12992.8	73.0		
1	C	Gonmanpai	57.9	30.3	219.1	12685.9	72.0		
2	A	Charaymetog	10.5	20.0	164.0	1722.0	95.0		
2	B	Charaymetog	64.8	28.0	208.9	13536.7	73.0		
2	C	Waibrang	40.1	39.0	307.4	12326.7	79.0		
2	D	Mangshing	59.0	39.2	286.0	16874.0	80.0		
2	E	Kelsey-nang	79.4	24.6	230.5	18301.7	86.0		
2	F	Charcharla	49.9	24.3	269.9	13468.0	80.0		
2	G	Pholakhar	43.6	38.7	372.3	16232.3	91.0		
2	H	Khaplung	22.8	26.4	210.0	4788.0	76.0		
3	A	Zangrong	55.8	30.0	282.9	15785.8	90.0		
3	B	Pang-jug	25.1	33.4	291.8	7324.2	80.0		
3	C	Panglang	62.1	24.2	156.5	9718.7	76.0		
3	D	Bungsingla-tag	43.7	32.5	192.5	8412.3	60.0		
3	E	Bungsingla	49.2	29.2	336.1	16536.1	87.0		
0	0	0	0.0	0.0	0.0	0.0	0.0		

Annexure I: Compiled Results by Compartment

Compartment		Production area	Basal Area	Volume	Tot. Volume	V conifer
		(ha)	(m2/ha)	(m3/ha)	(m3)	(%)
1	North Side	193.7	28.8	340.8	66019.0	79.4
2	East Side	370.1	30.7	262.8	97249.5	81.4
3	Southwest side	235.9	29.1	244.9	57777.0	79.1
0	0	0.0	0.0	0.0	0.0	0.0
0	0	0.0	0.0	0.0	0.0	0.0
Total		799.7	29.8	276.4	221045.4	80.2

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Forest Type Distribution in Forest Management Area of:				Sengor village under Saleng Gewog							

Comp No.	Sub-C No.	Name	Prod. Area (ha)	Forest Type Distribution (in ha)								
				Hemlock	Fir	Spruce	Mix. Con.			H/wood	Mixed HC	Total
1	A	Waibrang	76.2		76.2							
1	B	Jatang	59.6		4.2		55.4					
1	C	Gonmanpai	57.9	4.1			53.8					
2	A	Charaymetog	10.5		10.5							
2	B	Charaymetog	64.8		64.8							
2	C	Waibrang	40.1	40.1								
2	D	Mangshing	59	11.8			47.2					
2	E	Kelsey-nang	79.4	27.8	37.3	14.3						
2	F	Charcharla	49.9	14.5	35.4							
2	G	Pholakhar	43.6	29.2			14.4					
2	H	Khaplung	22.8	22.8								4.6
3	A	Zangrong	55.8	55.8								
3	B	Pang-jug	25.1	25.1								3.5
3	C	Panglang	62.1	31.1			31.1					15.5
3	D	Bungsingla-tag	43.7				10.9				32.8	
3	E	Bungsingla	49.2	19.7	14.8		14.8					

Annexure I: Compiled Results by Compartment

Forest Type Distribution in percent in Forest Management Area of: Sengor

Compartment		Prod. Area (ha)	Forest Type Distribution (in ha)							
			Hemlock	Fir	Spruce	Mix. Con.			Mixed HC	Total
1	North Side	193.7	2%	41%		56%				**100%**
2	East Side	370.1	39%	40%	4%	17%				**100%**
3	Southwest side	235.9	56%	6%		24%			14%	**100%**
Total		799.7	35%	30%	2%	28%			4%	100%

Annexure I: Compiled Results by Compartment

Canopy Closure and Condition of Forest Management Area of:									Sengor village under Saleng Gewog			
Comp No.	Sub-Comp No.		Prod. Area	Canopy closure (ha)					Condition (ha)			
		Name	(ha)	dense	closed	open	unstocked	Total	good	average	poor	Total
1	A	Waibrang	76.2		48.0	28.2		76.2		76.2		76.2
1	B	Jatang	59.6	4.2	25.6	29.8		59.6	8.3	51.3		59.6
1	C	Gonmanpai	57.9	4.1	37.1	16.8		57.9		57.9		57.9
2	A	Charaymetog	10.5		10.5			10.5		10.5		10.5
2	B	Charaymetog	64.8		37.6	27.2		64.8		64.8		64.8
2	C	Waibrang	40.1		30.1	10.0		40.1	10.0	30.1		40.1
2	D	Mangshing	59	23.6	29.5	5.9		59.0	23.6	35.4		59.0
2	E	Kelsey-nang	79.4		4.8	74.6		79.4	4.8	74.6		79.4
2	F	Charcharla	49.9		42.9	7.0		49.9		49.9		49.9
2	G	Pholakhar	43.6	14.4	24.4	4.8		43.6	9.6	34.0		43.6
2	H	Khaplung	22.8		4.6	18.2		22.8	4.6	18.2		22.8
3	A	Zangrong	55.8		55.8			55.8		55.8		55.8
3	B	Pang-jug	25.1	3.5	18.1	3.5		25.1	3.5	21.6		25.1
3	C	Panglang	62.1		36.0	26.1		62.1	20.5	41.6		62.1
3	D	Bungsingla-tag	43.7	5.7	21.9	16.2		43.7	16.6	27.1		43.7
3	E	Bungsingla	49.2		29.5	19.7		49.2		49.2		49.2

Annexure I: Compiled Results by Compartment

	Compartment	Prod. Area	Canopy closure (ha)					Condition (ha)			
		(ha)	dense	closed	open	unstocked	Total	good	average	poor	Total
1	North Side	193.7	4%	57%	39%		**100%**	4%	96%		**100%**
2	East Side	370.1	10%	50%	40%		**100%**	14%	86%		**100%**
3	Southwest side	235.9	4%	68%	28%		**100%**	17%	83%		**100%**
	Total	799.7	7%	57%	36%		100%	13%	87%		100%

Annexure I: Compiled Results by Compartment

Age Distribution and Stand Types in Forest Management Area of:									Sengor village under Saleng Gewog			
Comp No.	Sub-Comp		Prod. Area	Age distribution					Stand type distribution			
	No.	Name	(ha)	young	imma-ture	mature	over-mature	Total	p/tation	natural	cop	Total
1	A	Waibrang	76.2			42.7	33.5	76.2		76.2		76.2
1	B	Jatang	59.6			59.6		59.6		59.6		59.6
1	C	Gonmanpai	57.9		8.1	49.8		57.9		57.9		57.9
2	A	Charaymetog	10.5		10.5			10.5		10.5		10.5
2	B	Charaymetog	64.8			64.8		64.8		64.8		64.8
2	C	Waibrang	40.1			40.1		40.1		40.1		40.1
2	D	Mangshing	59		5.9	53.1		59.0		59.0		59.0
2	E	Kelsey-nang	79.4		4.8	69.9	4.8	79.4		79.4		79.4
2	F	Charcharla	49.9			35.9	14.5	50.4		49.9		49.9
2	G	Pholakhar	43.6		9.6	29.2	4.8	43.6		43.6		43.6
2	H	Khaplung	22.8	4.6	9.1	9.1		22.8		22.8		22.8
3	A	Zangrong	55.8			55.8		55.8		55.8		55.8
3	B	Pang-jug	25.1	3.5	3.5	18.1		25.1		25.1		25.1
3	C	Panglang	62.1	15.5	20.5	26.1		62.1		62.1		62.1
3	D	Bungsingla-tag	43.7		5.7	38.5		44.1		43.7		43.7
3	E	Bungsingla	49.2		4.9	34.4	9.8	49.2		49.2		49.2

Annexure I: Compiled Results by Compartment

Compartment		Prod. Area	Age distribution					Stand type distribution			
		(ha)	young	imma-ture	mature	over-mature	Total	planta-tion	natural	coopice	Total
1	North Side	193.7		4%	79%	17%	**100%**		100%		**100%**
2	East Side	370.1	1%	11%	82%	6%	**100%**		100%		**100%**
3	Southwest side	235.9	8%	15%	73%	4%	**100%**		100%		**100%**
	Total	799.7	3%	10%	78%	8%	100%		100%		100%

Annexure I: Compiled Results by Compartment

Site Parameters of Forest Management Area of:												Sengor village under Saleng Gewog		
Comp No.	Sub-Compartment		Prod. Area	Slope (in ha)			Erosiveness (in ha)			Soil Cover (in ha)		
	No.	Name	(ha)	gentle	mod-erate	steep	stable	moder-ate	unstable	high	moderate	low
1	A	Waibrang	76.2	14.5	38.1	23.6	23.6	52.6			76.2	
1	B	Jatang	59.6	29.8	17.3	12.5	29.8	29.8		34.0	25.6	
1	C	Gonmanpai	57.9	20.8	20.8	16.2	8.1	45.7	4.1	24.9	33.0	
2	A	Charaymetog	10.5		10.5			10.5			10.5	
2	B	Charaymetog	64.8	5.2	43.4	16.2	11.0	53.8			64.8	
2	C	Waibrang	40.1	20.1	10.0	10.0	20.1	20.1			40.1	
2	D	Mangshing	59	11.8	23.6	23.6	11.8	47.2		5.9	53.1	
2	E	Kelsey-nang	79.4	19.1	56.4	4.0	14.3	65.1		14.3	65.1	
2	F	Charcharla	49.9		21.5	28.4		49.9			49.9	
2	G	Pholakhar	43.6		19.2	24.4	14.4	29.2		4.8	38.8	
2	H	Khaplung	22.8	4.6	13.7	4.6	4.6	18.2		4.6	18.2	
3	A	Zangrong	55.8		55.8			55.8			55.8	
3	B	Pang-jug	25.1		14.3	10.8	7.3	17.8			25.1	
3	C	Panglang	62.1	5.0	36.0	21.1	10.6	41.0	10.6	5.0	46.6	10.6
3	D	Bungsingla-tag	43.7	16.6	16.6	10.5	10.9	32.8			43.7	
3	E	Bungsingla	49.2	14.8	19.7	14.8	4.9	44.3			49.2	

Annexure I: Compiled Results by Compartment

Compartment		Prod. Area	Slope (in ha)			Erosiveness (in ha)			Soil Cover (in ha)		
		(ha)	gentle	moderate	steep	stable	moderate	unstable	high	moderate	low
1	North Side	193.7	34%	39%	27%	32%	66%	2%	30%	70%	
2	East Side	370.1	16%	54%	30%	21%	79%		8%	92%	
3	Southwest side	235.9	15%	60%	24%	14%	81%	4%	2%	93%	4%
Total		799.7	20%	52%	28%	21%	77%	2%	12%	87%	1%

Annexure I: Compiled Results by Compartment

Production Potential of Forest Management area:							Sengor village under Saleng Gewog							
Comp No.	Sub-Compartment		Prod. Area	Volume	harv. Volume	Extract.	Timber (Total Volume m3)				Firewood (Total Volume m3)			
	No.	Name	(ha)	(m3/ha)	(m3/ha)	Rate	Drashing	Cham	Tsim	Poles, posts	> 49cm	30-49cm	20-29 cm	10-19 cm
1	A	Waibrang	76.2	529.4	37595.0	93.2%	12360	355	78	0	21054	637	655	2456
1	B	Jatang	59.6	218.0	9062.0	69.7%	2801	4334	144	216	349	128	874	216
1	C	Gonmanpai	57.9	219.1	13393.0	105.6%	3708	2428	251	486	592	2438	1773	1717
2	A	Charaymetog	10.5	164.0	1331.0	77.3%	413	599	0	240	0	0	0	79
2	B	Charaymetog	64.8	208.9	10785.0	79.7%	4055	2515	178	217	320	588	1214	1698
2	C	Waibrang	40.1	307.4	10358.0	84.0%	4828	2220	0	0	807	633	1190	680
2	D	Mangshing	59.0	286.0	13975.0	82.8%	4375	3215	1489	703	1086	332	824	1951
2	E	Kelsey-nang	79.4	230.5	14068.0	76.9%	8963	1808	77	0	1862	1056	134	168
2	F	Charcharla	49.9	269.9	12280.0	91.2%	6694	272	0	0	2629	0	1248	1437
2	G	Pholakhar	43.6	372.3	12700.0	78.2%	4690	1675	834	141	3903	303	460	694
2	H	Khaplung	22.8	210.0	3503.0	73.2%	1568	815	127	0	97	793	0	103
3	A	Zangrong	55.8	282.9	13027.0	82.5%	9205	0	0	0	2311	0	771	740
3	B	Pang-jug	25.1	291.8	6074.0	82.9%	2558	454	299	76	1145	170	769	603
3	C	Panglang	62.1	156.5	7860.0	80.9%	1421	2375	1246	855	593	146	483	741
3	D	Bungsingla-tag	43.7	192.5	6989.0	83.1%	1001	1770	1162	396	105	74	1173	1308
3	E	Bungsingla	49.2	336.1	14882.0	90.0%	8870	1070	205	0	2677	720	450	890
0	0	0	0.0	0.0	0.0	0.0%	0	0	0	0	0	0	0	0

Annexure I: Compiled Results by Compartment

Total per Compartment													
Compartment		Prod. Area	Volume	harv. Volume	Extract.	Timber (Total Volume m3)				Firewood (Total Volume m3)			
		(ha)	(m3/ha)	(m3/ha)	Rate	Drashing	Cham	Tsim	Poles, posts	> 49cm	30-49cm	20-29 cm	10-19 cm
1	North Side	193.7	340.8	60050	91%	18869	7117	473	702	21995	3203	3302	4389
2	East Side	370.1	262.8	79000	81%	35586	13119	2705	1301	10704	3705	5070	6810
3	Southwest side	235.9	244.9	48832	85%	23055	5669	2912	1327	6831	1110	3646	4282
0	0	0.0	0.0	0	0%	0	0	0	0	0	0	0	0
0	0	0.0	0.0	0	0%	0	0	0	0	0	0	0	0
0	0	0.0	0.0	0	0%	0	0	0	0	0	0	0	0
Total		799.7	848.5	187882.0	85%	77510	25905	6090	3330	39530	8018	12018	15481

Annexure I: Compiled Results by Compartment

Production Potential of Forest Management Area:														

Comp No.	Sub-Compartment		Prod. Area	BA	BAextr.	Extract.	Timber (N total)				Firewood (N total)			
	No.	Name	(ha)	(m2/ha)	(m2/ha)	Rate	Drashing Cham		Tsim	Poles, posts	> 49cm	30-49cm	20-29 cm	10-19 cm
1	A	Waibrang	76.2	24.8	31.2	126.0%	1722	240	194		2192	656	2717	35041
1	B	Jatang	59.6	32.4	31.2	96.3%	933	4334	521	1929	79	177	3645	37606
1	C	Gonmanpai	57.9	30.3	28.3	93.5%	1059	2142	674	4213	167	448	6404	23876
2	A	Charaymetog	10.5	20.0	14.2	71.2%	151	395		1184				1184
2	B	Charaymetog	64.8	28.0	26.0	92.8%	1470	2184	440	1832	110	540	4838	25044
2	C	Waibrang	40.1	39.0	38.8	99.4%	1553	2590			275	834	4905	10219
2	D	Mangshing	59.0	39.2	36.3	92.6%	1356	3636	4326	7344	272	442	3125	28708
2	E	Kelsey-nang	79.4	24.6	20.6	83.6%	2681	1522	190		582	878	571	2113
2	F	Charcharla	49.9	24.3	23.6	97.1%	1004	179			403		4937	20975
2	G	Pholakhar	43.6	38.7	31.9	82.4%	1330	1818	2567	1646	486	284	1777	10422
2	H	Khaplung	22.8	26.4	21.7	82.3%	489	857	372		21	1159		1551
3	A	Zangrong	55.8	30.0	24.5	81.5%	2377				589		2273	6314
3	B	Pang-jug	25.1	33.4	27.7	82.9%	481	478	876	811	127	224	3213	8925
3	C	Panglang	62.1	24.2	21.1	87.1%	483	2761	4218	9374	237	173	1898	11131
3	D	Bungsingla-tag	43.7	32.5	27.5	84.5%	202	2071	3785	3711	46	114	4898	19172
3	E	Bungsingla	49.2	29.2	28.1	96.3%	1730	925	601		359	942	1603	13361

Sengor village under Saleng Gewog

Annexure I: Compiled Results by Compartment

Compartment		Prod. Area	BA	BAextr.	Extract.	Timber (N total)				Firewood (N total)			
		(ha)	(m2/ha)	(m2/ha)	Rate	Drashing	Cham	Tsim	Poles, posts	> 49cm	30-49cm	20-29 cm	10-19 cm
1	North Side	193.7	28.8	30.4	105%	3714	6716	1389	6142	2438	1281	12766	96523
2	East Side	370.1	30.7	27.6	90%	10034	13181	7895	12006	2149	4137	20153	100216
3	Southwest side	235.9	29.1	25.2	87%	5273	6235	9480	13896	1358	1453	13885	58903
	Total	799.7	88.6	83.2	94%	19021	26132	18764	32044	5945	6871	46804	255642

Annexure I: Compiled Results by Compartment

Silvicultural Measures for Forest Management Area:							Sengor village under Saleng Gewog				
Comp No.	Sub-Compartment		Production Area	Sivicultural Measures (in ha)				Sivicultural Measures (in % of area)			
	No.	Name	(ha)	Planting	Thinning	Felling		Planting	Thinning	Felling	
1	A	Waibrang	76.2			71.6				94	
1	B	Jatang	59.6		8.3	34.0			14	57	
1	C	Gonmanpai	57.9		8.1	41.1			14	71	
2	A	Charaymetog	10.5			10.5				100	
2	B	Charaymetog	64.8		11.0	37.6			17	58	
2	C	Waibrang	40.1		10.0	40.1			25	100	
2	D	Mangshing	59.0		11.8	53.1			20	90	
2	E	Kelsey-nang	79.4		14.3	69.9			18	88	
2	F	Charcharla	49.9			49.9				100	
2	G	Pholakhar	43.6		9.6	43.6			22	100	
2	H	Khaplung	22.8		9.1	13.7			40	60	
3	A	Zangrong	55.8		55.8	55.8			100	100	
3	B	Pang-jug	25.1		7.3	25.1			29	100	
3	C	Panglang	62.1		15.5	20.5			25	33	
3	D	Bungsingla-tag	43.7		10.9	27.5			25	63	
3	E	Bungsingla	49.2		9.8	49.2			20	100	

Annexure I: Compiled Results by Compartment

Compartment		Production Area	Sivicultural Measures (in ha)				Sivicultural Measures (in % of area)			
		(ha)	Planting	Thinning	Felling		Planting	Thinning	Felling	
1	North Side	193.7		16.5	146.7			76		
2	East Side	370.1		65.8	318.3			86		
3	Southwest side	235.9		99.4	178.1			76		
Total		799.7		181.7	643.2			23	80	

Annexure I: Compiled Results by Compartment

| NWFP Occurrence in Forest Management Area of: | | | | | | | | | Sengor village under Saleng Gewog | | | | | | | | | |

Comp No.	Sub-Compartment		Prod. Area	Firewood				Bamboo				Cane				Daphne			
	No.	Name	(ha)	Abundant		Sparse		Abundant		Sparse		Abundant		Sparse		Abundant		Sparse	
			(ha)	(ha)	(%)	(ha)	(%)	(ha)	(%)	(ha)	(%)	(ha)	(%)	(ha)	(%)	(ha)	(%)	(ha)	(%)
1	A	Waibrang	76.2	42.7	56	29.0	38												
1	B	Jatang	59.6			42.3	71												4.2	7
1	C	Gonmanpai	57.9			49.8	86									4.1	7	20.8	36
2	A	Charaymetog	10.5			10.5	100												
2	B	Charaymetog	64.8	11.0	17	48.6	75									11.0	17	5.2	8
2	C	Waibrang	40.1			20.1	50												
2	D	Mangshing	59			41.3	70											23.6	40
2	E	Kelsey-nang	79.4			60.3	76			4.8	6					4.8	6	4.8	6
2	F	Charcharla	49.9	7.0	14	14.5	29												
2	G	Pholakhar	43.6																
2	H	Khaplung	22.8			9.1	40									4.6	20		
3	A	Zangrong	55.8			55.8	100												
3	B	Pang-jug	25.1			3.5	14												
3	C	Panglang	62.1													5.0	8	26.1	42
3	D	Bungsingla-tag	43.7			10.9	25											21.9	50
3	E	Bungsingla	49.2	9.8	20	29.5	60												

Annexure I: Compiled Results by Compartment

	Compartment	Prod. Area	Firewood				Bamboo				Cane				Daphne			
			Abundant		Sparse		Abundant		Sparse		Abundant		Sparse		Abundant		Sparse	
		(ha)	(ha)	(%)	(ha)	(%)	(ha)	(%)	(ha)	(%)	(ha)	(%)	(ha)	(%)	(ha)	(%)	(ha)	(%)
1	North Side	193.7	42.7	22	121.1	63									4.1	2	25.0	13
2	East Side	370.1	18.0	5	204.4	55			4.8	1					20.3	5	33.5	9
3	Southwest side	235.9	9.8	4	99.8	42									5.0	2	47.9	20
	Total	799.7	70.5	9	425.2	53			4.8	1					29.4	4	106.5	13

Annexure I: Compiled Results by Compartment

| Current Side Uses within Forest Management Area: | | | | Sengor village under Saleng Gewog | | | | | | | | | | | | | | |

Comp No.	Sub-Compartment		Prod. Area	Grazing				Sokshing				Lopping			
	No.	Name	(ha)	Intensive		Extensive		Intensive		Extensive		Intensive		Extensive	
				(ha)	(%)	(ha)	(%)	(ha)	(%)	(ha)	(%)	(ha)	(%)	(ha)	(%)
1	A	Waibrang	76.2			4.8	6								
1	B	Jatang	59.6	4.2	7	29.8	50								
1	C	Gonmanpai	57.9	4.1	7	49.8	86								
2	A	Charaymetog	10.5	10.5	100										
2	B	Charaymetog	64.8	27.2	42	37.6	58								
2	C	Waibrang	40.1	20.1	50	10.0	25								
2	D	Mangshing	59.0	11.8	20	17.7	30								
2	E	Kelsey-nang	79.4	32.6	41	14.3	18								
2	F	Charcharla	49.9												
2	G	Pholakhar	43.6	4.8	11	9.6	22								
2	H	Khaplung	22.8	4.6	20										
3	A	Zangrong	55.8	55.8	100										
3	B	Pang-jug	25.1	3.5	14	3.5	14								
3	C	Panglang	62.1	10.6	17										
3	D	Bungsingla-tag	43.7	5.7	13	21.9	50								
3	E	Bungsingla	49.2	14.8	30										

Annexure I: Compiled Results by Compartment

Compartment		Prod. Area	Grazing				Sokshing				Lopping			
		(ha)	Intensive		Extensive		Intensive		Extensive		Intensive		Extensive	
		(ha)	(ha)	(%)	(ha)	(%)	(ha)	(%)	(ha)	(%)	(ha)	(%)	(ha)	(%)
1	North Side	193.7	8.3	4	84.4	44								
2	East Side	370.1	111.5	30	89.2	24								
3	Southwest side	235.9	90.3	38	25.4	11								
	Total	799.7	210.1	26	199.0	25								

Annexure 2: Compartment Register

Sub-Compartment Record							
Geog	Sengor- Saling	Comp.	1. North side	Sub-Comp.	Waibrang	No.	A

Areas in ha							
Non Forest Area	0.1	Protection	14.1	In-operable	9.5	Production	76.2

Forest Composition and Description

Stand data	
Bas. Area (m2/ha)	24.8
Volume (m3/ha)	529.4
Volume conifer %	90%

Number of trees/ha by diameter class (dbh>10cm)

Legend: Other Broadleaves, Rhododendron, Betula, Acer, Oak, Other Conifers, Fir, Spruce, Hemlock, Bluepine, Chirpine

Forest Type	%	Stand Type	%	NWFP+firew.	A	S
Hemlock		Plantation		Type	%	%
Fir	100	Natural	100	Firewood	56	38
Spruce		Coppice		Bamboo		
Mixed Conifer		**Canopy**	**%**	Cane		
Blue Pine		Dense		Daphne		
Chir Pine		Closed	63			
Hardwood		Open	38			
Mixed H/C		Unstocked		**Forest Use**	**I**	**E**
Age Class	**%**	**Condition**	**%**	Type	%	%
Young		Good		Grazing		6.3
Immature		Average	100	Shokshing		
Mature	56	Poor		Lopping		
Overmature	44	**Site Characteristics**				
Slope	**%**	**Erosiveness**	**%**	**Soil Cover**	**%**	
Gentle	19	Stable	31	High		
Moderate	50	Moderate	69	Moderate	100	
Steep	31	Unstable		Low		

Species	Height 0.3<1.3 m	N/ha per diameter class											Total (> 10cm)	
		<10	10<20	20<30	30<40	40<50	50<60	60<70	70<80	80<90	90+	N/ha	%
Chirpine													
Bluepine													
Hemlock	928	177	7	5								12	2
Spruce													
Fir	1127	243	28	5	3	5	2	5	7	7	36	97	15
Other Conifers													
Oak													
Acer	884	199	21		1							23	3
Betula		57	3		2							61	9
Rhododendron	906	221	417	31	1	3						452	70
Other Broadleaves			5									5	1
Total	**3846**	**840**	**531**	**48**	**5**	**9**	**2**	**5**	**7**	**7**	**36**	**650**	**100**

Future Management & Monitoring of Activities

Manag. Option		
	No activities	
	Improvement	tic
	Timber Use	tic
	Firewood Use	tic
	Silvopasture	
	Sokshing	

Production Potential (N, Volume)						No of trees removed each year										Total	%
Product size		N total	N/ha	%	(m3)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028		
>50	Drashing	1722	23	91	12360												
	Firewood	2192	29		21054												
30-49	Cham	240	3	80	355												
	Firewood	656	9		637												
20-29	Tsim	194	3	79	78												
	Firewood	2717	36		655												
10-19	Poles, etc.			87													
	Firewood	35041	460		2456												

Silvicultural Measures			Area in ha implemented per year											Total	%
Measure	Area (ha)	in %	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028		
Planting														
Thinning														
Felling	71.5	94%												

| Assessment carried out by | Pema & team | | | | | | | | | | | | Year: | 2019 |

Annexure 2: Compartment Register

Sub-Compartment Record							
Geog	Sengor- Saling	Comp.	1. North Side	Sub-Comp.	Jaktang	No.	B

Areas in ha							
Non Forest Area	1.1	Protection	25.3	In-operable	8.5	Production	59.6

Forest Composition and Description

Stand data	
Bas. Area (m2/ha)	32.4
Volume (m3/ha)	218.0
Volume conifer %	73%

Number of trees/ha by diameter class (dbh>10cm)

Legend: Other Broadleaves, Rhododendron, Betula, Acer, Oak, Other Conifers, Fir, Spruce, Hemlock, Bluepine, Chirpine

Forest Type	%	Stand Type	%	NWFP+firew.	A	S
Hemlock		Plantation		Type	%	%
Fir	7	Natural	100	Firewood		71
Spruce		Coppice		Bamboo		
Mixed Conifer	93	Canopy	%	Cane		
Blue Pine		Dense	7	Daphne		7
Chir Pine		Closed	43			
Hardwood		Open	50			
Mixed H/C		Unstocked		Forest Use	I	E
Age Class	%	Condition	%	Type	%	%
Young		Good	14	Grazing	7.1	50
Immature		Average	86	Shokshing		
Mature	100	Poor		Lopping		
Overmature		Site Characteristics				
Slope	%	Erosiveness	%	Soil Cover		%
Gentle	50	Stable	50	High		57
Moderate	29	Moderate	50	Moderate		43
Steep	21	Unstable		Low		

Species	Height 0.3<1.3 m	N/ha per diameter class											Total (> 10cm)	
		<10	10<20	20<30	30<40	40<50	50<60	60<70	70<80	80<90	90+	N/ha	%
Chirpine													
Bluepine													
Hemlock	2526	455	24		27	10	5	0	2	2		70	8
Spruce													
Fir	707	227	32		21	11	7	3	2	1		77	9
Other Conifers	25	76	16	9	6	4	1					37	4
Oak													
Acer	455	303	16	3								19	2
Betula	328	25											
Rhododendron	2627	3006	614	58	1							674	77
Other Broadleaves													
Total	**6669**	**4093**	**703**	**70**	**55**	**25**	**13**	**3**	**4**	**2**		**876**	**100**

Future Management & Monitoring of Activities

Manag. Option		
No activities		
Improvement	tic	
Timber Use	tic	
Firewood Use	tic	
Silvopasture		
Sokshing		

Production Potential (N, Volume)					No of trees removed each year											Total	%
Product size		N total	N/ha	%	(m3)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028		
>50	Drashing	933	16	74	2801												
	Firewood	79	1		349												
30-49	Cham	4334	73	94	4334												
	Firewood	177	3		128												
20-29	Tsim	521	9	100	144												
	Firewood	3645	61		874												
10-19	Poles, etc.	1929	32	94	216												
	Firewood	37606	631		2595												

Silvicultural Measures			Area in ha implemented per year											Total	%
Measure		Area (ha)	in %	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028		
Planting															
Thinning		8.5	14%												
Felling		34.1	57%												

Assessment carried out by	Phuntsho Wangdi & team	Year:	2019

Annexure 2: Compartment Register

Sub-Compartment Record

Geog	Sengor- Saling	Comp.	1. North Side	Sub-Comp.	Gonmanpai	No.	C

Areas in ha

Non Forest Area	19.3	Protection	13.9	In-operable	12.4	Production	57.9

Forest Composition and Description

Stand data

Bas. Area (m2/ha)	30.3
Volume (m3/ha)	219.1
Volume conifer %	72%

Number of trees/ha by diameter class (dbh>10cm)

Legend: Other Broadleaves, Rhododendron, Betula, Acer, Oak, Other Conifers, Fir, Spruce, Hemlock, Bluepine, Chirpine

Forest Type	%	Stand Type	%	NWFP+firew.	A	S
Hemlock	7	Plantation		Type	%	%
Fir		Natural	100	Firewood		86
Spruce		Coppice		Bamboo		
Mixed Conifer	93	**Canopy**	**%**	Cane		
Blue Pine		Dense	7	Daphne	7	36
Chir Pine		Closed	64			
Hardwood		Open	29			
Mixed H/C		Unstocked		**Forest Use**	**I**	**E**
Age Class	**%**	**Condition**	**%**	Type	%	%
Young		Good		Grazing	7.1	86
Immature	14	Average	100	Shokshing		
Mature	86	Poor		Lopping		
Overmature		**Site Characteristics**				
Slope	**%**	**Erosiveness**	**%**	**Soil Cover**		**%**
Gentle	36	Stable	14	High		43
Moderate	36	Moderate	79	Moderate		57
Steep	29	Unstable	7	Low		

Species	Height 0.3<1.3 m	<10	10<20	20<30	30<40	40<50	50<60	60<70	70<80	80<90	90+	N/ha	%
				N/ha per diameter class								**Total (> 10cm)**	
Chirpine													
Bluepine													
Hemlock	2829	379	8	6	3	9	6	7	4	3		45	7
Spruce													
Fir	126	101	65	6	7	13	4	1	1	1		99	14
Other Conifers	152	76		3	6	2						11	2
Oak													
Acer	783	126	40	12								52	8
Betula					1							1	0
Rhododendron	1642	1112	340	99	3							441	65
Other Broadleaves	253	25	32		1							34	5
Total	**5785**	**1819**	**485**	**125**	**22**	**24**	**10**	**8**	**5**	**4**		**684**	**100**

Future Management & Monitoring of Activities

Manag. Option

No activities	
Improvement	tic
Timber Use	tic
Firewood Use	tic
Silvopasture	
Sokshing	

Production Potential (N, Volume) | **No of trees removed each year**

Product size		N total	N/ha	%	(m3)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Total	%
>50	Drashing	1059	18	77	3708												
	Firewood	167	3		592												
30-49	Cham	2142	37	96	2438												
	Firewood	448	8		388												
20-29	Tsim	674	12	98	251												
	Firewood	6404	111		1573												
10-19	Poles, etc.	4213	73	100	486												
	Firewood	23876	412		1717												

Silvicultural Measures | **Area in ha implemented per year**

Measure	Area (ha)	in %	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Total	%
Planting														
Thinning	8.3	14%												
Felling	41.4	71%												

Assessment carried out by	Phuntsho Wangdi & team		Year:	2019

"Conservation to Ensure the Ecological and Environmental Foundations for Achieving Gross National Happiness"

Annexure 2: Compartment Register

Sub-Compartment Record							
Geog	Sengor- Saling	Comp.	2. East side	Sub-Comp.	Charaymetog	No.	A

Areas in ha							
Non Forest Area	59.5	Protection	30.8	In-operable		Production	10.5

Forest Composition and Description

Stand data	
Bas. Area (m2/ha)	20.0
Volume (m3/ha)	164.0
Volume conifer %	95%

Number of trees/ha by diameter class (dbh>10cm)

Legend: ⊞ Other Broadleaves, ▤ Rhododendron, ▨ Betula, ▨ Acer, ▥ Oak, ☐ Other Conifers, ▨ Fir, ▪ Spruce, ▨ Hemlock, ▨ Bluepine, ▪ Chirpine

Forest Type	%	Stand Type	%	NWFP+firew.	A	S
Hemlock		Plantation		Type	%	%
Fir	100	Natural	100	Firewood		100
Spruce		Coppice		Bamboo		
Mixed Conifer		**Canopy**	%	Cane		
Blue Pine		Dense		Daphne		
Chir Pine		Closed	100			
Hardwood		Open				
Mixed H/C		Unstocked		**Forest Use**	I	E
Age Class	%	**Condition**	%	Type	%	%
Young		Good		Grazing	100	
Immature	100	Average	100	Shokshing		
Mature		Poor		Lopping		
Overmature		**Site Characteristics**				
Slope	%	**Erosiveness**	%	**Soil Cover**		%
Gentle		Stable		High		
Moderate	100	Moderate	100	Moderate		100
Steep		Unstable		Low		

Species	Height 0.3<1.3 m	N/ha per diameter class										Total (> 10cm)	
		<10	10<20	20<30	30<40	40<50	50<60	60<70	70<80	80<90	90+	N/ha	%
Chirpine													
Bluepine													
Hemlock													
Spruce													
Fir			340			38	17	6				400	78
Other Conifers													
Oak													
Acer													
Betula													
Rhododendron	1061	707	113									113	22
Other Broadleaves													
Total	**1061**	**707**	**453**			**38**	**17**	**6**				**513**	**100**

Future Management & Monitoring of Activities

Manag. Option		
	No activities	
	Improvement	tic
	Timber Use	tic
	Firewood Use	tic
	Silvopasture	
	Sokshing	

Production Potential (N, Volume)					No of trees removed each year											Total	%
Product size		N total	N/ha	%	(m3)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028		
>50	Drashing	151	14	63	413												
	Firewood																
30-49	Cham	395	38	100	599												
	Firewood																
20-29	Tsim			###													
	Firewood																
10-19	Poles, etc.	1184	113	50	140												
	Firewood	1184	113		79												

Silvicultural Measures			Area in ha implemented per year											Total	%
Measure	Area (ha)	in %	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028			
Planting															
Thinning															
Felling	10.5	100%													

Assessment carried out by	Pema & Team	Year:	2019

Annexure 2: Compartment Register

Sub-Compartment Record							
Geog	Sengor-Saling	Comp.	2. East side	Sub-Comp.	Charaymetog	No.	B

Areas in ha							
Non Forest Area	18.5	Protection	10.0	In-operable	10.8	Production	64.8

Forest Composition and Description

Stand data	
Bas. Area (m2/ha)	28.0
Volume (m3/ha)	206.9
Volume conifer %	73%

Number of trees/ha by diameter class (dbh>10cm)

Legend: Other Broadleaves, Rhododendron, Betula, Acer, Oak, Other Conifers, Fir, Spruce, Hemlock, Bluepine, Chirpine

Forest Type	%	Stand Type	%	NWFP+firew.	A	S
Hemlock		Plantation		Type	%	%
Fir	100	Natural	100	Firewood	17	75
Spruce		Coppice		Bamboo		
Mixed Conifer		**Canopy**	**%**	Cane		
Blue Pine		Dense		Daphne	17	8
Chir Pine		Closed	58			
Hardwood		Open	42			
Mixed H/C		Unstocked		**Forest Use**	**I**	**E**
Age Class	**%**	**Condition**	**%**	Type	%	%
Young		Good		Grazing	42	58
Immature		Average	100	Shokshing		
Mature	100	Poor		Lopping		
Overmature		**Site Characteristics**				
Slope	**%**	**Erosiveness**	**%**	**Soil Cover**	**%**	
Gentle	8	Stable	17	High		
Moderate	67	Moderate	83	Moderate	100	
Steep	25	Unstable		Low		

Species	Height 0.3<1.3 m	N/ha per diameter class											Total (> 10cm)	
		<10	10<20	20<30	30<40	40<50	50<60	60<70	70<80	80<90	90+	N/ha	%
Chirpine													
Bluepine													
Hemlock	206	59											
Spruce													
Fir	1297	707	47	24	29	22	16	10	2			**150**	23
Other Conifers													
Oak													
Acer	2594	354	38	14	5							**57**	9
Betula						2						**2**	0
Rhododendron	1179	1032	377	61								**438**	68
Other Broadleaves													
Total	**5276**	**2152**	**462**	**98**	**35**	**24**	**16**	**10**	**2**			**647**	100

Future Management & Monitoring of Activities

Manag. Option		
No activities		
Improvement	tic	
Timber Use	tic	
Firewood Use	tic	
Silvopasture		
Sokshing		

Production Potential (N, Volume)					No of trees removed each year											Total	%
Product size		N total	N/ha	%	(m3)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028		
>50	Drashing	1470	23	88	4055												
	Firewood	110	2		320												
30-49	Cham	2184	34	72	2515												
	Firewood	540	8		588												
20-29	Tsim	440	7	83	178												
	Firewood	4838	75		1214												
10-19	Poles, etc.	1832	28	90	217												
	Firewood	25044	387		1698												

Silvicultural Measures			Area in ha implemented per year											Total	%
Measure	Area (ha)	in %	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028		
Planting														
Thinning	10.8	17%												
Felling	37.8	58%												

Assessment carried out by	Kesang Dukpa & team	Year:	2019

Annexure 2: Compartment Register

Sub-Compartment Record							
Geog	Sengor- Saling	Comp.	2. East side	Sub-Comp.	Waibrang	No.	C

Areas in ha							
Non Forest Area	49.4	Protection	8.5	In-operable		Production	40.1

Forest Composition and Description

Stand data	
Bas. Area (m2/ha)	39.0
Volume (m3/ha)	307.4
Volume conifer %	79%

Number of trees/ha by diameter class (dbh>10cm)

Legend: Other Broadleaves, Rhododendron, Betula, Acer, Oak, Other Conifers, Fir, Spruce, Hemlock, Bluepine, Chirpine

Forest Type	%	Stand Type	%	NWFP+firew.	A	S
Hemlock	100	Plantation		Type	%	%
Fir		Natural	100	Firew ood		50
Spruce		Coppice		Bamboo		
Mixed Conifer		**Canopy**	**%**	Cane		
Blue Pine		Dense		Daphne		
Chir Pine		Closed	75			
Hardw ood		Open	25			
Mixed H/C		Unstocked		**Forest Use**	**I**	**E**
Age Class	**%**	**Condition**	**%**	Type	%	%
Young		Good	25	Grazing	50	25
Immature		Average	75	Shokshing		
Mature	100	Poor		Lopping		
Overmature		**Site Characteristics**				
Slope	**%**	**Erosiveness**	**%**	**Soil Cover**	**%**	
Gentle	50	Stable	50	High		
Moderate	25	Moderate	50	Moderate	100	
Steep	25	Unstable		Low		

Species	Height 0.3<1.3 m	<10	10<20	20<30	30<40	40<50	50<60	60<70	70<80	80<90	90+	Total (> 10cm) N/ha	%
				N/ha per diameter class									
Chirpine													
Bluepine													
Hemlock	1061	354		10	62	19	27	18	8			**145**	27
Spruce													
Fir									1			**1**	0
Other Conifers					5							**5**	1
Oak					5							**5**	1
Acer	3890			10	5							**15**	3
Betula					5		2					**7**	1
Rhododendron	1238	177	255	112								**367**	67
Other Broadleaves													
Total	**6189**	**531**	**255**	**132**	**83**	**19**	**29**	**18**	**9**			**546**	**100**

Future Management & Monitoring of Activities

Manag. Option		
No activities		
Improvement	tic	
Timber Use	tic	
Firewood Use	tic	
Silvopasture		
Sokshing		

Production Potential (N, Volume)					No of trees removed each year											Total	%
Product size	N total	N/ha	%	(m3)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028		
>50 Drashing	1553	39	80	4828												
>50 Firewood	275	7	80	807												
30-49 Cham	2590	65	84	2220												
30-49 Firewood	834	21	84	633												
20-29 Tsim			92													
20-29 Firewood	4905	122	92	1190												
10-19 Poles, etc.			100													
10-19 Firewood	10219	255	100	680												

Silvicultural Measures			Area in ha implemented per year											Total	%
Measure	Area (ha)	in %	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028		
Planting														
Thinning	10.0	25%												
Felling	40.1	100%												

Assessment carried out by	Pema Tshewang & team	Year:	2019
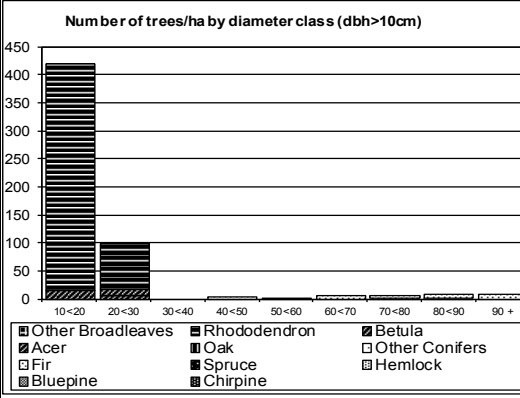
Annexure 2: Compartment Register

Sub-Compartment Record

Geog	Sengor- Saling	Comp.	2. East Side	Sub-Comp.	Mangshing	No.	D

Areas in ha

Non Forest Area		Protection		In-operable		Production	59.0

Forest Composition and Description

Stand data	
Bas. Area (m2/ha)	39.2
Volume (m3/ha)	286.0
Volume conifer %	80%

Number of trees/ha by diameter class (dbh>10cm)

Legend: Other Broadleaves, Rhododendron, Betula, Acer, Oak, Other Conifers, Fir, Spruce, Hemlock, Bluepine, Chirpine

Forest Type	%	Stand Type	%	NWFP+firew.	A	S
Hemlock	20	Plantation		Type	%	%
Fir		Natural	100	Firewood		70
Spruce		Coppice		Bamboo		
Mixed Conifer	80	**Canopy**	%	Cane		
Blue Pine		Dense	40	Daphne		40
Chir Pine		Closed	50			
Hardwood		Open	10			
Mixed H/C		Unstocked		**Forest Use**	I	E
Age Class	%	**Condition**	%	Type	%	%
Young		Good	40	Grazing	20	30
Immature	10	Average	60	Shokshing		
Mature	90	Poor		Lopping		
Overmature		**Site Characteristics**				
Slope	%	**Erosiveness**	%	**Soil Cover**		%
Gentle	20	Stable	20	High		10
Moderate	40	Moderate	80	Moderate		90
Steep	40	Unstable		Low		

Species	Height 0.3<1.3 m	<10	10<20	20<30	30<40	40<50	50<60	60<70	70<80	80<90	90+	N/ha	%
Chirpine													
Bluepine													
Hemlock	1627	318	136	65	35	14	13	7	1	4		**276**	31
Spruce													
Fir	71		11	8	6	1	3	2	5	1		**39**	4
Other Conifers				4	12							**17**	2
Oak													
Acer	460	71	11	8	2	1						**23**	3
Betula	141	35		4	2	1						**7**	1
Rhododendron	1874	1698	453	24	4							**481**	54
Other Broadleaves	177	212	23	20								**43**	5
Total	**4350**	**2334**	**634**	**134**	**62**	**18**	**17**	**9**	**6**	**5**		**885**	**100**

Future Management & Monitoring of Activities

Manag. Option

No activities	
Improvement	tic
Timber Use	tic
Firewood Use	tic
Silvopasture	
Sokshing	

Production Potential (N, Volume) / No of trees removed each year

Product size		N total	N/ha	%	(m3)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Total	%
>50	Drashing	1356	23	74	4375												
>50	Firewood	272	5		1086												
30-49	Cham	3636	62	86	3215												
30-49	Firewood	442	7		332												
20-29	Tsim	4326	73	94	1489												
20-29	Firewood	3125	53		824												
10-19	Poles, etc.	7344	124	96	703												
10-19	Firewood	28708	487		1951												

Silvicultural Measures / Area in ha implemented per year

Measure	Area (ha)	in %	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Total	%
Planting														
Thinning	11.8	20%												
Felling	53.1	90%												

Assessment carried out by	Phuntsho Wangdi & team	Year:	2019

Annexure 2: Compartment Register

Sub-Compartment Record							
Geog	Sengor- Saling	**Comp.**	2. East Side	**Sub-Comp.**	Kelsey-nang	**No.**	E

Areas in ha

Non Forest Area	1.2	Protection	14.3	In-operable	4.7	Production	79.4

Forest Composition and Description

Stand data	
Bas. Area (m2/ha)	24.6
Volume (m3/ha)	230.5
Volume conifer %	86%

Number of trees/ha by diameter class (dbh>10cm)

Legend: Other Broadleaves, Rhododendron, Betula, Acer, Oak, Other Conifers, Fir, Spruce, Hemlock, Bluepine, Chirpine

Forest Type	%	Stand Type	%	NWFP+firew.	A	S
Hemlock	35	Plantation		Type	%	%
Fir	47	Natural	100	Firewood		76
Spruce	18	Coppice		Bamboo		6
Mixed Conifer		**Canopy**	**%**	Cane		
Blue Pine		Dense		Daphne	6	6
Chir Pine		Closed	6			
Hardwood		Open	94	**Forest Use**	**I**	**E**
Mixed H/C		Unstocked		Type	%	%
Age Class	**%**	**Condition**	**%**	Grazing	41	18
Young		Good	6	Shokshing		
Immature	6	Average	94	Lopping		
Mature	88	Poor		**Site Characteristics**		
Overmature	6					
Slope	**%**	**Erosiveness**	**%**	**Soil Cover**		**%**
Gentle	24	Stable	18	High		18
Moderate	71	Moderate	82	Moderate		82
Steep	6	Unstable		Low		

Species	Height 0.3<1.3 m	<10	10<20	20<30	30<40	40<50	50<60	60<70	70<80	80<90	90+	N/ha	%
					N/ha per diameter class							Total (> 10cm)	
Chirpine													
Bluepine													
Hemlock	728	333	13		1	11	7	3	2	1		39	20
Spruce	312	62			4	1	6	1	1			12	6
Fir	811	479	7	2	5	7	6	10	7	2		47	24
Other Conifers					1							1	1
Oak													
Acer	1685	437	7		2	1	1					12	6
Betula		62	33	5	5	5	1	1	0			51	26
Rhododendron	1040	999	27	7								34	17
Other Broadleaves													
Total	**4577**	**2372**	**87**	**14**	**18**	**26**	**22**	**15**	**10**	**3**		**196**	**100**

Future Management & Monitoring of Activities

Manag. Option		
No activities		
Improvement	tic	
Timber Use	tic	
Firewood Use	tic	
Silvopasture		
Sokshing		

	Production Potential (N, Volume)				No of trees removed each year											Total	%
Product size		N total	N/ha	%	(m3)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028		
>50	Drashing	2681	34	82	8963												
	Firewood	582	7		1862												
30<49	Cham	1522	19	68	1808												
	Firewood	878	11		1056												
20<29	Tsim	190	2	67	77												
	Firewood	571	7		134												
10<19	Poles, etc.			31													
	Firewood	2113	27		168												

Silvicultural Measures			Area in ha implemented per year											Total	%
Measure	Area (ha)	in %	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028			
Planting															
Thinning	14.0	18%													
Felling	70.0	88%													

Assessment carried out by	Kesang Dukpa & team		**Year:**	2019

Annexure 2: Compartment Register

Sub-Compartment Record

Geog	Sengor- saling	Comp.	2. East Side	Sub-Comp.	Charcharla	No.	F

Areas in ha

Non Forest Area	22.4	Protection	12.8	In-operable	21.4	Production	49.9

Forest Composition and Description

Stand data	
Bas. Area (m2/ha)	24.3
Volume (m3/ha)	269.9
Volume conifer %	80%

Number of trees/ha by diameter class (dbh>10cm)

Legend: ⊞ Other Broadleaves, ▣ Rhododendron, ▨ Betula, ▧ Acer, ▦ Oak, ☐ Other Conifers, ▢ Fir, ▪ Spruce, ▥ Hemlock, ▨ Bluepine, ▨ Chirpine

Forest Type	%	Stand Type	%	NWFP+firew.	A	S
Hemlock	29	Plantation		Type	%	%
Fir	71	Natural	100	Firewood	14	29
Spruce		Coppice		Bamboo		
Mixed Conifer		**Canopy**	**%**	Cane		
Blue Pine		Dense		Daphne		
Chir Pine		Closed	86			
Hardwood		Open	14			
Mixed H/C		Unstocked		**Forest Use**	**I**	**E**
Age Class	**%**	**Condition**	**%**	Type	%	%
Young		Good		Grazing		
Immature		Average	100	Shokshing		
Mature	71	Poor		Lopping		
Overmature	29	**Site Characteristics**				
Slope	**%**	**Erosiveness**	**%**	**Soil Cover**		**%**
Gentle		Stable		High		
Moderate	43	Moderate	100	Moderate		100
Steep	57	Unstable		Low		

Species	Height 0.3<1.3 m	<10	10<20	20<30	30<40	40<50	50<60	60<70	70<80	80<90	90+	Total (> 10cm) N/ha	%
Chirpine													
Bluepine													
Hemlock										1	3	**4**	1
Spruce													
Fir	253					4	2	6	5	6	10	**33**	6
Other Conifers													
Oak													
Acer			16	6								**22**	4
Betula				12								**12**	2
Rhododendron			404	81								**486**	87
Other Broadleaves													
Total	**253**		**420**	**99**		**4**	**2**	**6**	**6**	**9**	**10**	**556**	**100**

Future Management & Monitoring of Activities

Manag. Option		
No activities		
Improvement	tic	
Timber Use	tic	
Firewood Use	tic	
Silvopasture		
Sokshing		

Production Potential (N, Volume)					No of trees removed each year											Total	%
Product size	N total	N/ha	%	(m3)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028		
>50 Drashing	1004	20	84	6694												
>50 Firewood	403	8		2629												
30-49 Cham	179	4	100	272												
30-49 Firewood																
20-29 Tsim			100													
20-29 Firewood	4937	99		1248												
10-19 Poles, etc.			100													
10-19 Firewood	20975	420		1437												

Silvicultural Measures			Area in ha implemented per year											Total	%
Measure	Area (ha)	in %	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028		
Planting														
Thinning														
Felling	49.9	100%												

Assessment carried out by	Pema & team		Year:	2019

Annexure 2: Compartment Register

Sub-Compartment Record

Geog	Sengor- Saling	Comp.	2. East Part	Sub-Comp.	Pholakhar	No.	G

Areas in ha

Non Forest Area		Protection	20.4	In-operable	24.2	Production	43.6

Forest Composition and Description

Stand data	
Bas. Area (m2/ha)	38.7
Volume (m3/ha)	372.3
Volume conifer %	91%

Number of trees/ha by diameter class (dbh>10cm)

Legend: Other Broadleaves, Rhododendron, Betula, Acer, Oak, Other Conifers, Fir, Spruce, Hemlock, Bluepine, Chirpine

Forest Type	%	Stand Type	%	NWFP+firew.	A	S
Hemlock	67	Plantation		Type	%	%
Fir		Natural	100	Firewood		
Spruce		Coppice		Bamboo		
Mixed Conifer	33	**Canopy**	**%**	Cane		
Blue Pine		Dense	33	Daphne		
Chir Pine		Closed	56			
Hardwood		Open	11	**Forest Use**	**I**	**E**
Mixed H/C		Unstocked		Type	%	%
Age Class	**%**	**Condition**	**%**	Grazing	11	22
Young		Good	22	Shokshing		
Immature	22	Average	78	Lopping		
Mature	67	Poor				
Overmature	11	**Site Characteristics**				
Slope	**%**	**Erosiveness**	**%**	**Soil Cover**		**%**
Gentle		Stable	33	High		11
Moderate	44	Moderate	67	Moderate		89
Steep	56	Unstable		Low		

Species	Height 0.3<1.3 m	<10	10<20	20<30	30<40	40<50	50<60	60<70	70<80	80<90	90+	N/ha	%
												Total (> 10cm)	
Chirpine													
Bluepine			13	23	2							**38**	6
Hemlock	275	39	13	41	25	17	13	13	12	6	5	**145**	24
Spruce													
Fir									1			**1**	0
Other Conifers			63	27	14	7	4					**115**	19
Oak													
Acer				14								**14**	2
Betula				14	2	1						**17**	3
Rhododendron			239	27								**266**	45
Other Broadleaves													
Total	**275**	**39**	**327**	**145**	**44**	**25**	**17**	**13**	**12**	**6**	**5**	**594**	**100**

Future Management & Monitoring of Activities

Manag. Option		
No activities		
Improvement	tic	
Timber Use	tic	
Firewood Use	tic	
Silvopasture		
Sokshing		

Production Potential (N, Volume)					No of trees removed each year											Total	%
Product size		N total	N/ha	%	(m3)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028		
>50	Drashing	1330	30	78	4690												
	Firewood	486	11		3903												
30-49	Cham	1818	42	70	1675												
	Firewood	284	7		303												
20-29	Tsim	2567	59	69	834												
	Firewood	1777	41		460												
10-19	Poles, etc.	1646	38	85	141												
	Firewood	10422	239		694												

Silvicultural Measures			Area in ha implemented per year											Total	%
Measure	Area (ha)	in %	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028		
Planting														
Thinning	9.7	22%												
Felling	43.6	100%												

Assessment carried out by	Pema Tshewang & team	Year:	2019

Annexure 2: Compartment Register

Sub-Compartment Record							
Geog	Sengor- Saling	Comp.	2. East Side	Sub-Comp.	Khaplung	No.	H

Areas in ha							
Non Forest Area		Protection	17.1	In-operable	9.1	Production	22.8

Forest Composition and Description

Stand data	
Bas. Area (m2/ha)	26.4
Volume (m3/ha)	210.0
Volume conifer %	76%

Number of trees/ha by diameter class (dbh>10cm)

Legend: Other Broadleaves, Rhododendron, Betula, Acer, Oak, Other Conifers, Fir, Spruce, Hemlock, Bluepine, Chirpine

Forest Type	%	Stand Type	%	NWFP+firew.	A	S
Hemlock	100	Plantation		Type	%	%
Fir		Natural	100	Firewood		40
Spruce		Coppice		Bamboo		
Mixed Conifer		**Canopy**	**%**	Cane		
Blue Pine		Dense		Daphne	20	
Chir Pine		Closed	20			
Hardwood		Open	80			
Mixed H/C		Unstocked		**Forest Use**	**I**	**E**
Age Class	**%**	**Condition**	**%**	Type	%	%
Young	20	Good	20	Grazing	20	
Immature	40	Average	80	Shokshing		
Mature	40	Poor		Lopping		
Overmature		**Site Characteristics**				
Slope	**%**	**Erosiveness**	**%**	**Soil Cover**		**%**
Gentle	20	Stable	20	High		20
Moderate	60	Moderate	80	Moderate		80
Steep	20	Unstable		Low		

Species	Height 0.3<1.3 m	N/ha per diameter class										Total (> 10cm)	
		<10	10<20	20<30	30<40	40<50	50<60	60<70	70<80	80<90	90+	N/ha	%
Chirpine													
Bluepine													
Hemlock	354	141		49	37	23	15	4	5	3		135	41
Spruce													
Fir													
Other Conifers													
Oak													
Acer													
Betula						5						5	2
Rhododendron			68		25							93	28
Other Broadleaves			68		29							97	29
Total	354	141	136	49	91	28	15	4	5	3		330	100

Future Management & Monitoring of Activities

Manag. Option		
No activities		
Improvement	tic	
Timber Use	tic	
Firewood Use	tic	
Silvopasture		
Sokshing		

Production Potential (N, Volume)					No of trees removed each year										Total	%
Product size	N total	N/ha	%	(m3)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028		
>50 Drashing	489	21	85	1568												
>50 Firewood	21	1		97												
30-49 Cham	857	38	74	815												
30-49 Firewood	1159	51		793												
20-29 Tsim	372	16	33	127												
20-29 Firewood																
10-19 Poles, etc.			50													
10-19 Firewood	1551	68		103												

Silvicultural Measures			Area in ha implemented per year											Total	%
Measure	Area (ha)	in %	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028		
Planting														
Thinning	9.1	40%												
Felling	13.7	60%												

Assessment carried out by	Kesang Dukpa & team		Year:	2019

Annexure 2: Compartment Register

Sub-Compartment Record						
Geog	Sengor- Saling	Comp.	3. Southwest side	Sub-Comp.	Zangrong	No.	A

Areas in ha							
Non Forest Area		Protection	77.7	In-operable		Production	55.8

Forest Composition and Description

Stand data	
Bas. Area (m2/ha)	30.0
Volume (m3/ha)	282.9
Volume conifer %	90%

Number of trees/ha by diameter class (dbh>10cm)

Legend: Other Broadleaves, Rhododendron, Betula, Acer, Oak, Other Conifers, Fir, Spruce, Hemlock, Bluepine, Chirpine

Forest Type	%	Stand Type	%	NWFP+firew.	A	S
Hemlock	100	Plantation		Type	%	%
Fir		Natural	100	Firewood		100
Spruce		Coppice		Bamboo		
Mixed Conifer		**Canopy**	**%**	Cane		
Blue Pine		Dense		Daphne		
Chir Pine		Closed	100			
Hardwood		Open				
Mixed H/C		Unstocked		**Forest Use**	**I**	**E**
Age Class	**%**	**Condition**	**%**	Type	%	%
Young		Good		Grazing	100	
Immature		Average	100	Shokshing		
Mature	100	Poor		Lopping		
Overmature		**Site Characteristics**				
Slope	**%**	**Erosiveness**	**%**	**Soil Cover**	**%**	
Gentle		Stable		High		
Moderate	100	Moderate	100	Moderate	100	
Steep		Unstable		Low		

Species	Height 0.3<1.3 m	N/ha per diameter class										Total (> 10cm)	
		<10	10<20	20<30	30<40	40<50	50<60	60<70	70<80	80<90	90+	N/ha	%
Chirpine													
Bluepine													
Hemlock	707			41	21		8	30	14	7		121	44
Spruce													
Fir													
Other Conifers													
Oak													
Acer			113									113	41
Betula				41								41	15
Rhododendron													
Other Broadleaves													
Total	**707**		**113**	**81**	**21**		**8**	**30**	**14**	**7**		**275**	**100**

Future Management & Monitoring of Activities

Manag. Option		
No activities		
Improvement	tic	
Timber Use	tic	
Firewood Use	tic	
Silvopasture		
Sokshing		

Production Potential (N, Volume)					No of trees removed each year											Total	%
Product size		N total	N/ha	%	(m3)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028		
>50	Drashing	2377	43	90	9205												
	Firewood	589	11		2311												
30-49	Cham																
	Firewood																
20-29	Tsim			50													
	Firewood	2273	41		771												
10-19	Poles, etc.			100													
	Firewood	6314	113		740												

Silvicultural Measures			Area in ha implemented per year											Total	%
Measure	Area (ha)	in %	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028		
Planting														
Thinning	55.8	100%												
Felling	55.8	100%												

Assessment carried out by	Pema Tshewang & Team	Year:	2019

Annexure 2: Compartment Register

Sub-Compartment Record							
Geog	Sengor-Saling	Comp.	3. Southwest side	Sub-Comp.	Pang-jug	No.	B

Areas in ha							
Non Forest Area	43.5	Protection	16.2	In-operable	14.3	Production	25.1

Forest Composition and Description

Stand data	
Bas. Area (m2/ha)	33.4
Volume (m3/ha)	291.8
Volume conifer %	80%

Number of trees/ha by diameter class (dbh>10cm)

Legend:
- Other Broadleaves
- Rhododendron
- Betula
- Acer
- Oak
- Other Conifers
- Fir
- Spruce
- Hemlock
- Bluepine
- Chirpine

Forest Type	%	Stand Type	%	NWFP+firew.	A	S
Hemlock	100	Plantation		Type	%	%
Fir		Natural	100	Firewood		14
Spruce		Coppice		Bamboo		
Mixed Conifer		**Canopy**	**%**	Cane		
Blue Pine		Dense	14	Daphne		
Chir Pine		Closed	71			
Hardwood		Open	14	**Forest Use**	**I**	**E**
Mixed H/C		Unstocked		Type	%	%
Age Class	**%**	**Condition**	**%**	Grazing	14	14
Young	14	Good	14	Shokshing		
Immature	14	Average	86	Lopping		
Mature	71	Poor		**Site Characteristics**		
Overmature						

Slope	%	Erosiveness	%	Soil Cover	%
Gentle		Stable	29	High	
Moderate	57	Moderate	71	Moderate	100
Steep	43	Unstable		Low	

Species	Height 0.3<1.3 m	<10	10<20	20<30	30<40	40<50	50<60	60<70	70<80	80<90	90+	Total (> 10cm) N/ha	%
Chirpine													
Bluepine													
Hemlock	101	253	226	52	18	7	5	7	7	5	5	333	39
Spruce													
Fir	51												
Other Conifers			16		6							22	3
Oak													
Acer				6								6	1
Betula					6							6	1
Rhododendron			275	122								397	47
Other Broadleaves			81									81	10
Total	**152**	**253**	**598**	**180**	**30**	**7**	**5**	**7**	**7**	**5**	**5**	**844**	**100**

Future Management & Monitoring of Activities

Manag. Option		
No activities		
Improvement	tic	
Timber Use	tic	
Firewood Use	tic	
Silvopasture		
Sokshing		

Production Potential (N, Volume)						No of trees removed each year											Total	%
Product size		N total	N/ha	%	(m3)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028		
>50	Drashing	481	19	84	2558												
	Firewood	127	5		1145												
30-49	Cham	478	19	76	454												
	Firewood	224	9		170												
20-29	Tsim	876	35	90	299												
	Firewood	3213	128		769												
10-19	Poles, etc.	811	32	65	76												
	Firewood	8925	356		603												

Silvicultural Measures			Area in ha implemented per year											Total	%
Measure	Area (ha)	in %	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028		
Planting														
Thinning	7.2	29%												
Felling	25.1	100%												

Assessment carried out by	Pema & team	Year:	2019

Annexure 2: Compartment Register

Sub-Compartment Record

Geog	Sengor- Saling	Comp.	3. Southwest side	Sub-Comp.		No.	C

Areas in ha

Non Forest Area	17.5	Protection	8.6	In-operable	10.4	Production	62.1

Forest Composition and Description

Stand data	
Bas. Area (m2/ha)	24.2
Volume (m3/ha)	156.5
Volume conifer %	76%

Number of trees/ha by diameter class (dbh>10cm)

Legend: Other Broadleaves, Rhododendron, Betula, Acer, Oak, Other Conifers, Fir, Spruce, Hemlock, Bluepine, Chirpine

Forest Type	%	Stand Type	%	NWFP+firew.	A	S
Hemlock	50	Plantation		Type	%	%
Fir		Natural	100	Firew ood		
Spruce		Coppice		Bamboo		
Mixed Conifer	50	**Canopy**	**%**	Cane		
Blue Pine		Dense		Daphne	8	42
Chir Pine		Closed	58			
Hardw ood		Open	42			
Mixed H/C		Unstocked		**Forest Use**	**I**	**E**
Age Class	**%**	**Condition**	**%**	Type	%	%
Young	25	Good	33	Grazing	17	
Immature	33	Average	67	Shokshing		
Mature	42	Poor		Lopping		
Overmature		**Site Characteristics**				
Slope	**%**	**Erosiveness**	**%**	**Soil Cover**	**%**	
Gentle	8	Stable	17	High	8	
Moderate	58	Moderate	67	Moderate	75	
Steep	33	Unstable	17	Low	17	

Species	Height 0.3<1.3 m	<10	10<20	20<30	30<40	40<50	50<60	60<70	70<80	80<90	90+	Total (> 10cm) N/ha	%
Chirpine													
Bluepine				7								7	1
Hemlock		88	47	20	26	9	5	4	1	0		112	17
Spruce													
Fir													
Other Conifers	295	383	189	48	16	4	1					257	39
Oak													
Acer	324	59	19	7	2		2					29	5
Betula	324	206	19	3								22	3
Rhododendron			179	24		1		1				205	31
Other Broadleaves			9	10								20	3
Total	**943**	**737**	**462**	**119**	**43**	**15**	**8**	**4**	**1**	**0**		**652**	**100**

Future Management & Monitoring of Activities

Manag. Option		
No activities		
Improvement	tic	
Timber Use	tic	
Firewood Use	tic	
Silvopasture		
Sokshing		

Production Potential (N, Volume) / No of trees removed each year

	Product size	N total	N/ha	%	(m3)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Total	%
>50	Drashing	483	8	91	1421												
	Firewood	237	4		593												
30-49	Cham	2761	44	81	2375												
	Firewood	173	3		146												
20-29	Tsim	4218	68	83	1246												
	Firewood	1898	31		483												
10-19	Poles, etc.	9374	151	71	855												
	Firewood	11131	179		741												

Silvicultural Measures / Area in ha implemented per year

Measure	Area (ha)	in %	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Total	%
Planting														
Thinning	15.5	25%												
Felling	20.7	33%												

Assessment carried out by	Tandin Wangchuk & team	Year:	2019

Annexure 2: Compartment Register

Sub-Compartment Record

Geog	Sengor-Saling	Comp.	3. SouthWest side	Sub-Comp.		No.	D

Areas in ha

Non Forest Area	31.9	Protection	8.5	In-operable	16.4	Production	43.7

Forest Composition and Description

Stand data	
Bas. Area (m2/ha)	32.5
Volume (m3/ha)	192.5
Volume conifer %	60%

Number of trees/ha by diameter class (dbh>10cm)

Legend: Other Broadleaves, Rhododendron, Betula, Acer, Oak, Other Conifers, Fir, Spruce, Hemlock, Bluepine, Chirpine

Forest Type	%	Stand Type	%	NWFP+firew.	A	S
Hemlock		Plantation		Type	%	%
Fir		Natural	100	Firewood		25
Spruce		Coppice		Bamboo		
Mixed Conifer	25	**Canopy**	**%**	Cane		
Blue Pine		Dense	13	Daphne		50
Chir Pine		Closed	50			
Hardwood		Open	38			
Mixed H/C	75	Unstocked		**Forest Use**	**I**	**E**
Age Class	**%**	**Condition**	**%**	Type	%	%
Young		Good	38	Grazing	13	50
Immature	13	Average	63	Shokshing		
Mature	88	Poor		Lopping		
Overmature		**Site Characteristics**				
Slope	**%**	**Erosiveness**	**%**	**Soil Cover**		**%**
Gentle	38	Stable	25	High		
Moderate	38	Moderate	75	Moderate		100
Steep	25	Unstable		Low		

Species	Height 0.3<1.3 m	N/ha per diameter class										Total (> 10cm)	
		<10	10<20	20<30	30<40	40<50	50<60	60<70	70<80	80<90	90+	N/ha	%
Chirpine													
Bluepine													
Hemlock		265	28	41	23	9	4	2	1	1		**110**	11
Spruce													
Fir													
Other Conifers			85	61	16	5						**166**	17
Oak													
Acer			71	25								**96**	10
Betula					5							**5**	1
Rhododendron			453	107								**560**	58
Other Broadleaves			28									**28**	3
Total		265	665	234	44	14	4	2	1	1		**966**	100

Future Management & Monitoring of Activities

Manag. Option		
No activities		
Improvement	tic	
Timber Use	tic	
Firewood Use	tic	
Silvopasture		
Sokshing		

Production Potential (N, Volume)					No of trees removed each year											Total	%
Product size		N total	N/ha	%	(m3)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028		
>50	Drashing	292	7	95	1001												
	Firewood	46	1		105												
30-49	Cham	2071	47	86	1770												
	Firewood	114	3		74												
20-29	Tsim	3785	87	85	1162												
	Firewood	4898	112		1173												
10-19	Poles, etc.	3711	85	79	396												
	Firewood	19172	439		1308												

Silvicultural Measures			Area in ha implemented per year											Total	%
Measure	Area (ha)	in %	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028		
Planting														
Thinning	10.9	25%												
Felling	27.3	63%												

Assessment carried out by	Tandin Wangchuk & team	Year:	2019

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Annexure 2: Compartment Register

Sub-Compartment Record

Geog	Sengor- Saling	Comp.	3. SouthWest Side	Sub-Comp.	Bungshingla	No.	E

Areas in ha

Non Forest Area	7.3	Protection	1.5	In-operable		Production	49.2

Forest Composition and Description

Stand data	
Bas. Area (m2/ha)	29.2
Volume (m3/ha)	336.1
Volume conifer %	87%

Number of trees/ha by diameter class (dbh>10cm)

Legend: Other Broadleaves, Rhododendron, Betula, Acer, Oak, Other Conifers, Fir, Spruce, Hemlock, Bluepine, Chirpine

Forest Type	%	Stand Type	%	NWFP+firew.	A	S
Hemlock	40	Plantation		Type	%	%
Fir	30	Natural	100	Firewood	20	60
Spruce		Coppice		Bamboo		
Mixed Conifer	30	**Canopy**	**%**	Cane		
Blue Pine		Dense		Daphne		
Chir Pine		Closed	60			
Hardwood		Open	40			
Mixed H/C		Unstocked		Forest Use	I	E
Age Class	%	Condition	%	Type	%	%
Young		Good		Grazing	30	
Immature	10	Average	100	Shokshing		
Mature	70	Poor		Lopping		
Overmature	20	Site Characteristics				
Slope	%	Erosiveness	%	Soil Cover	%	
Gentle	30	Stable	10	High		
Moderate	40	Moderate	90	Moderate	100	
Steep	30	Unstable		Low		

Species	Height 0.3<1.3 m	<10	10<20	20<30	30<40	40<50	50<60	60<70	70<80	80<90	90+	N/ha	%
												Total (> 10cm)	
Chirpine													
Bluepine													
Hemlock	920	460	33	8	15	12	11	8	8	8		**103**	22
Spruce													
Fir	141							0				**0**	0
Other Conifers													
Oak													
Acer	318		11	12	10	1						**35**	8
Betula				4		1						**5**	1
Rhododendron			294	16	6							**317**	69
Other Broadleaves													
Total	1379	460	306	65	25	16	13	11	9	8	8	**460**	100

Future Management & Monitoring of Activities

Manag. Option

No activities	
Improvement	tic
Timber Use	tic
Firewood Use	tic
Silvopasture	
Sokshing	

Production Potential (N, Volume)					No of trees removed each year											Total	%
Product size	N total	N/ha	%	(m3)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028		
>50 Drashing	1732	35	88	8870												
Firewood	359	7		2677												
30-49 Cham	925	19	92	1070												
Firewood	942	19		720												
20-29 Tsim	601	12	69	205												
Firewood	1603	33		450												
10-19 Poles, etc.			89													
Firewood	13361	272		890												

Silvicultural Measures			Area in ha implemented per year											Total	%
Measure	Area (ha)	in %	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028		
Planting														
Thinning	9.8	20%												
Felling	49.2	100%												

Assessment carried out by	Kesang Dukpa & team	Year:	2019

Annexure 3: Management Area map
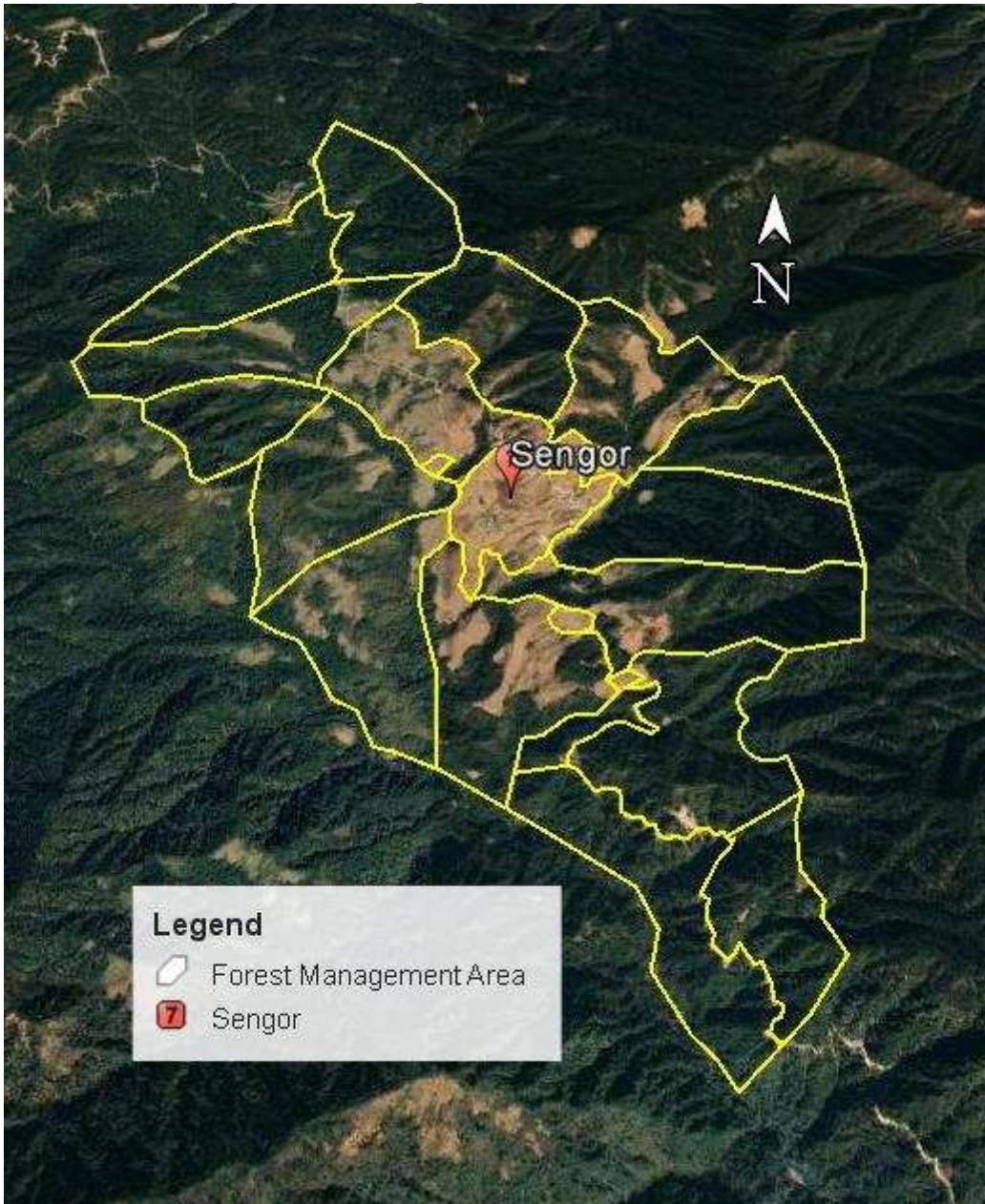
Annexure 4: Map Showing Compartments