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ནགས་ཚལ་དང་རྒྱུང་ཀ་ཞབས་རྟོག་ལས་ཁུངས།

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FOREWORD

Forests resources are fundamental natural capital that are critical for sustenance of the human population. Forests provides a range of ecosystem services and sustainability of forests and these services are under immense pressure from the effects of climate change and anthropogenic activities. Thus, sustainable conservation and management of forests resources have gained globally. Even in Bhutan, sustainable management of forests is very critical for the sustenance of livelihood as well as for the socioeconomic development process. Thus, data and information on these natural resources are very critical for policy makers, researchers and decision makers to make informed decisions and devise efficient strategies and interventions to enhance sustainable management of natural resources.

The Department of Forests and Park Services (DoFPS) strives to make forestry facts and information available at all times. We are pleased to publish yet another issue of Annual Forestry Facts and Figures (FFF) 2019. The information contained herein are those compiled and analysed from the data accrued for the year 2019, through Forest Information Reporting and Monitoring System (FIRMS), a centralised data sharing system updated on real-time basis from the field offices.

This report provides the most recent and reliable data and information on forest management, resource utilization, various services and the challenges faced by the Department. This publication also provides an account of Human Resources and list of offices and contacts under Department for better coordination with stakeholders and enhance public service delivery. I am optimistic that this information booklet will be useful to decision makers, researchers, academicians, conservationist, planners and all other stakeholders.

With the concerted efforts of everyone we have been able to achieve many things. Therefore, I would like to take the opportunity to sincerely acknowledge the collective efforts put in by all the colleagues in the field as well as functional offices towards fulfilling the mandates and goals of Department. Further, I congratulate Forest Resources Management Division (FRMD) for taking lead in publishing this booklet for the benefit of all stakeholders.

Tashi Delek!

(Lobzang Dorji)
DIRECTOR

CONTENTS

1. Introduction	1
2. Organizational Structure	2
3. Forest Definition and Types.....	10
4. Forest Cover.....	15
5. Total Biomass and Carbon Stock.....	16
6. Sustainable Forest Management	17
6.1. Protected Area Management	17
6.2. Forest Management Units	18
6.3. Local Forest Management Area.....	21
6.4. Community Forest Management	25
6.5. Non-Wood Forest Product Management	28
6.6. Watershed Management	33
6.7. Wetland Management	34
6.8. Payment for Ecosystem Services	34
6.9. Nature Recreation.....	35
6.10. Plantations	35
6.11. Private Forests	37
7. Resource Utilization.....	38
7.1. Allotment of Timber by Department.....	38
7.2. Production of Timber from FMUs and Outside FMUs.....	40
7.3. Non-Wood Forest Products	43
7.4. Woodbased Industries.....	44
8. Challenges.....	45
8.1. Forestry Clearance	45
8.2. Human Wildlife Conflict.....	45
8.3. Illegal Activities	46
8.4. Animal Rescue and Rehabilitation.....	47
8.5. Forest Fire	48
8.6. Human Resources	49
9. References	52

1. INTRODUCTION

Forestry Facts and Figures 2019 provides an account of the administrative functions, services and various program implemented by the Department of Forests and Park Services (DoFPS). The information outlined in this report are based on the data collated from the Forest Information and Reporting Management System (FIRMS) database, which is an online repository of information collected from 14 Divisional Forest Offices and 10 Park offices. Additional information was sourced from Functional Divisions for further analysis and validation.

The booklet presents critical information on forest types and cover, total biomass and carbon stock, in addition to total areas under different forest management regimes and the resources utilization scenarios. The booklet contains current status of Protected Areas, Forest Management Units (FMUs), Local Forest Management Plans (LFMPs), Community Forests (CFs) and Non-wood Forest Management (NWFP). The booklet also contains information on Watershed, Wetland and Payment for Ecosystem Services (PES scheme).

In addition, information on plantations and private forests are also reflected. Forest resource allocation is one of the critical services, the majority of which is the allotment of timbers for various construction purposes. The booklet presents the volume of timber allotted in last one year both through Natural Resources Development Corporation Limited (NRDCL) & Department and the revenue collected thereof through realization of royalties. The booklet also captures information on Wood-based Industries and challenges faced in managing resources of Bhutan.

KEY FACTS

Forest Cover		Protected Areas	
Area (ha)	2,730,889.00	Protected Area Network(km ²)	19,750.10
Percent (%)	71	Protected Area (%)	43.41
Basal area (5 % MoE) (m ²)	114,791,541.00	Biological Corridors (%)	8.03
Total Growing Stock (6% MoE) (mil m ³)	1001.00	Protected Area Network (%)	51.44
Total Biomass (forest) (Mt)	972.91	National Parks (Nos)	5
Total Carbon (forest) (Mt)	457.00	Wildlife Sanctuaries (Nos)	4
Soil Organic Carbon (Mt)	188.00	Strict Nature Reserve (Nos)	1
Total Forest Carbon Stock (Mt)	645.00	Biological Corridors (Nos)	8

Forest Types (%)		Biodiversity	Recorded/ Estimates (Nos)
Subtropical Forest	6	Vascular Plants	< 5,600
Fir Forest	9	Ferns	411
Warm Broadleaved Forest	18	Endemic plants	145
Blue Pine Forest	4	Bryophytes	282
Chir Pine Forest	3	Fungus	410
Cool Broadleaved Forest	26	Insect-Fungi	< 100
Evergreen Oak Forest	1	Lichen	280
Spruce Forest	1	Rhododendron species	47
Hemlock Forest	2	Orchids	469
Fir Forest	9	Mammals	129
Juniper-Rhododendron Scrub	1	Elephants	678
Functional & Field Offices (Nos)		Tigers	103
Functional Divisions	7	Snow leopards	96
Divisional Forest Offices	14	Birds	748
Protected Areas	10	Globally threatened Birds	47
Range Offices	71	Amphibians and reptiles	158
Beat Offices	98	Butterfly	750
Forest Check Posts	36	Moths	1,115
Forest Management Units	21	Fishes	125
Social Forestry Program			
Community Forest (CF) Management Groups (Nos)	804	Non-Wood Forest Produce (NWFP) Groups (Nos)	164
Households involved in CF (Nos)	33,281	Households involved in NWFP (Nos)	6,106
Community Forest Area(ha)	99,146.00	Sawmill (Nos)	119

2. ORGANIZATIONAL STRUCTURE

DoFPS is one of the oldest Departments established in 1952, with its headquarters at Samtse, and staffed then by Indian Forest Officers on deputation upon request of Royal Government of Bhutan. Lyonpo Chenkyab Dorji was appointed as the first Bhutanese Director of DoFPS in 1976. Currently, The Department has seven Functional Divisions, viz., Forest Protection and Enforcement Division (FPED), Social Forestry and Extension Division (SFED), Forest Resources Management Division (FRMD),

Nature Conservation Division (NCD), Watershed Management Division (WMD), Ugyen Wangchuck Institute for Conservation and Environmental Research (UWICER), Bumthang and Global Tiger Centre (GTC), Gelephu. There are 14 Divisional Forest Offices and 10 Protected Areas (National Parks, Wildlife Sanctuaries and Strict Reserve) (Figure 1). The main role of Functional Divisions is to formulate programme-based plans and provide technical backstopping to field offices. Forests and biodiversity related research and professional trainings are conducted by UWICER. GTC's core mandate is to coordinate activities related to Tiger conservation in Bhutan. Programme-based activities related to community and social forestry, sustainable forest management and utilization, wildlife conservation, watershed management and climate adaptation and resilience programs are implemented by Parks and Divisional Forest Offices through Range Offices and Beat Offices (Table 1 & Table 2).

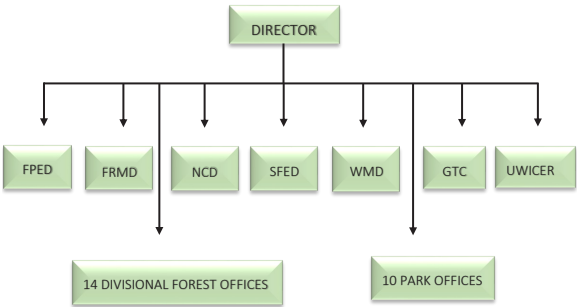


Figure 1: Organogram of DoFPS

Table 1: Divisional Forest Office-Gewog Jurisdiction

Divisional Forest Office	Range Office	Gewog	Dzongkhag
Bumthang	Bumthang	Part of Chhoeckhor	Bumthang
		Part of Tang	
	Chumey	Part of Chumey	Trongsa
	Trongsa	Drakteng	
Nubi			
Dagana	Dangana	Tseza	Dagana
		Part of Kana	
		Part of Khebisa	
	Dagapela	Tsendagang	
		Gesarling	
		Goshi	

		Trashiding	
		Dorona	
		Part of Kana	
	Lhamoy Zingkha	Lhamoi Zingkha	
		Karmaling	
	Drujeygang	Drujegang	
		Part of Khebisa	
Lajab			
Tsangkha			
Gedu	Tsimasham	Bjabcho	Chhukha
		Chapchaa	
		Part of Gelling	
	Gedu	Darla	
		Bongo	
		Part of Gelling	
		Dungna	
		Getena	
		Part of Phuntsholing	
	Phuentsholing	Samphelling	
		Part of Phuntsholing	
Lokchina			
Mongar	Mongar	Mongar	Mongar
		Chaskhar	
		Thangrong	
		Narang	
		Balam	
		Chali	
		Dramitse	
		Tshakaling	
	Gyelpozhing	Drepong	
		Jurmey	
		Khengkhar	
		Gongdue	
		Silambi	
	Lhuentse	Minjay	
Menbi			
Tsenkhar			
Gangzur			
Pema Gatshel	Pema Gatshel	Shumar	Pemagatshel
		Nanong	
		Zobel	
		Khar	

	Yurung	Chongshing		
		Chhimung		
		Dungmin		
	Nganglam	Norbugang		
		Decheeling		
		Choekhorling		
Paro	Paro	Tsento	Paro	
		Lamgong		
		Dopshari		
		Hungrel		
		Part of Shaba		
		Dogar		
		Doteng		
		Part of Wangchang		
	Haa	Haa	Bji	Haa
			Part of Samar	
			Sombaykha	
			Part of Useu	
			Gakiling	
			Katsho	
Samtse	Samtse	Phuntshopelri	Samtse	
		Samtse		
		Tading		
	Dophuchen	Dophuchen		Dumtoe
				Denchukha
				Dophuchen
	Norbugang	Norbugang		Norbugang
				Ugyentse
				Yoeseltse
				Sangngcholing
	Tashicholing	Tashicholing		Norgaygang
				Tendruk
				Pemaling
				Tashichhoeling
				Namgyacholing
Sarpang	Sarpang	Chhudzom	Sarpang	
		Shompangkha		
		Gakidling		
		Part of Senggye		
		Dekidling		

	Gelephu	Samtenling			
		Sershong			
		Chhuzaggang			
		Jigmecholing			
		Gelephu			
Samdrup Jongkhar	Samdrup Jongkhar	Orong	Samdrup Jongkhar		
		Gomdar			
		Dewathang			
		Wangphu			
Thimphu	Thimphu	Chang	Thimphu		
		Kawang			
	Khasadrapchu	Mewang			
		Genekha			
Trashigang	Wamrong	Lumang	Trashigang		
		Thrimshing			
		Kangpara			
		Khaling			
	Trashigang			Kanglung	
				Samkhar	
				Yangneer	
				Bartsham	
				Udzorong	
	Radhi			Radhi	
				Shongphu	
				Phongmey	
				Bidung	
	Yangtse			Yangtse	Trashiyangtse
				Khamdang	
				Toedtsho	
	Doksum			Ramjar	
				Jamkhar	
				Tongmijangsa	
				Yalang	
Tsirang	Tsirang	Barshong	Tsirang		
		Doongalagang			
		Gosarling			
		Kilkhorthang			
		Mendrelgang			
		Patshaling			
		Phuentenchu			
		Rangthaling			
		Semjong			

		Serigithang	
		Tsholingkhar	
		Tsirang Toe	
Wangdue	Wangdue	Athang	Wangdue
		Daga	
		Gasetsho Wom	
		Nahi	
		Gasetsho Gom	
		Nyisho	
		Kazhi	
		Phangyul	
		Thedtsho	
		Part of Bjena	
		Part of Rubesa	
	Nobding	Phobjikha	
		Gangtey	
		Dangchu	
		Sephu	
		Part of Bjena	
		part of Rubesa	
	Lobesa	Barp	Punakha
		Toedpisa	
	Punakha Range	Talo	
		Guma	
Chubu			
Toedwang			
Kabjisa			
Shegana			
Dzomi			
Lingmukha			
Zhemgang	Zhemgang	Nangkor	
		Trong	
	Khomshar	Bardo	
		Shingkhar	
	Panbang	Bjoka	
		Goshing	
Ngangla			

Table 2: Parks, Wildlife Sanctuaries and Strict Nature Reserve-Gewog Jurisdiction

Park Office	Range Office	Gewog	Dzongkhag
Bumdeling Wildlife Sanctuary	Khoma	Khoma	Lhuentse
	Serzhong	Shermuhung	Mongar
	Dungzam	Bumdeling	Trashiyangtse
Jomotsangkha Wildlife Sanctuary	Samdrupcholing	Phutshothang	Samdrup Jongkhar
		Pemathang	
		Martshala	
		Samrang	
	Jomotsangkha	Langchenphu	
		Serthi	
Lauri			
Jigme Singye Wangchuck National Park	Tingtibi	Part of Trong	Zhemgang
		Part of Jigmechholing	Sarpang
	Nabji	Khorphu	Trongsa
		Part of Jigmechholing	Sarpang
	Langthel	Part of Langthel	Trongsa
		Part of Tangsibji	
	Taksha	Athang	Wangdue
		Sergithang	Tsirang
Jigme Khesar Strict Nature Reserve	Gakiling	Gakiling	Haa
	Sombaykha	Sombaykha	
Jigme Dorji National Park	Soe	Yaktsa	Paro
		Yuetoe	
		Part of Tsento	
	Lingzhi	Lingzhi	Thimphu
		Naro	
	Ruecheyna	Goenshari	Punakha
		Part of Kabisa	
	Gasa	Khatoe	Gasa
		Khamaed	
	Lunana	Lunana	Punakha
		Part of Toewang	
Part of Chhubug			
Laya	Laya	Gasa	
Phrumsengla National Park	Ura	Ura	Bumthang
		Part of Chumey	
	Lingmethang	Tsamang	Mongar
		Part of Saling	

	Phawan	Metsho	Lhuentse
		Jarey	
Phibsoo Wildlife Sanctuary	Nichula	Nichula	Dagana
	Phibsoo	Senggey	Sarpang
Royal Manas National Park	Umling	Umling	Sarpang
		Tareythang	
	Gomphu	Trong	Zhemgang
		Phangkhar	
Manas	Ngangla		
Sakteng Wildlife Sanctuary	Sakteng	Sakteng	Trashigang
	Joenkhar	Sakteng	
	Merak	Merak	
Wangchuck Centennial National Park	Choekhor	Choekor	Bumthang
		Tang	
	Sephu	Sephu	Wangdue
		Kazhi	
		Dangchu	
		Gangte	
		Nubi	
	Dungkhar	Lunana	Gasa
		Gangzur	Lhuentse
Dungkar			

CHRONOLOGICAL MILESTONES OF DEPARTMENT

2018	<i>Bhutan For Life (BFL) launched</i>
2017	<i>Merger of Dzongkhag Forestry Office into Territorial Division</i>
2017	<i>Forest and Nature Conservation Rules and Regulations of Bhutan, 2017</i>
2011	<i>National Forest Policy</i>
2009	<i>Watershed Management Division created</i>
2008	<i>Wangchuck Centennial National Park created</i>
2000	<i>Forest and Nature Conservation Rules of Bhutan, 2000 passed</i>
1995	<i>National Assembly passed Forest and Nature Conservation Act, 1995</i>
1989	<i>Social Forestry and Extension Division created in HQ</i>
1981	<i>Bumthang Forest Division opened, followed by Mongar, Gedu, Tsirang & Paro Territorial Forest Divisions</i>

1979	Royal Decree of His Majesty the K4 to start Social Forestry
1976	2 Wildlife Circles were established in Sarpang & Thimphu
1974	National Forest Policy, 1974 was adopted
1973	Forest HQ shifted from Samtse to Thimphu
1972	FPED – the then Utilization Division was created
1971	FRMD – the then Working Plan Division was established
1969	DoFPS was first to have Forest Act, 1969
1961	Forest Office opened in Thimphu
1957	Forest Office Opened in Sarpang
1952	The Department of Forests and Park Services was established

3. FOREST DEFINITION AND TYPES

Forest in Bhutan is defined as “land with trees spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent. It does not include land that is predominantly under agriculture or urban land use” (National Forest Policy (NFP) of Bhutan 2011, FNCRR, 2017). Bhutan is divided into different forest types at different altitudinal zonation ranging from 200 m from the southern foothills to 4600 m in the northern alpine regions (Figure2). Each forest type is represented by different characteristics and species composition (Table 3).

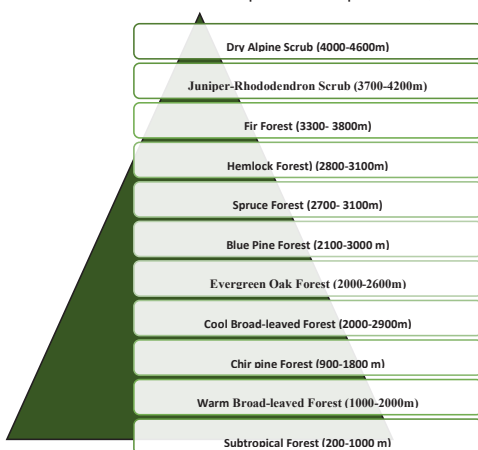


Figure 2: Forest Types of Bhutan

Table 3: Characteristics of Different Forest Types of Bhutan

Forest Type	Characteristics	Characteristic species
Subtropical Forest	<ul style="list-style-type: none"> Contain many tropical genera and species, forming dense jungle. e.g: Scattered Sal trees in Sarpang areas. 	<i>Acrocarpus fraxinifolius</i>
		<i>Ailanthus grandis</i>
		<i>Bombax ceiba</i>
		<i>Crateva religiosa</i>
		<i>Dellinia pentgyna</i>
		<i>Duabanga grandiflora</i>
		<i>Gmelina arborea</i>
		<i>Leea asiatica</i>
		<i>Musa pandanus</i>
		<i>Pterospermum acerifolium</i>
		<i>Shorea robusta</i>
		<i>Tetrameles nudiflora</i>
<i>Thunbergia sp</i>		
Warm Broad-leaved Forest	<ul style="list-style-type: none"> Type of Subtropical forest, but occurs at higher altitude with lower rainfall. Contains mixture of Evergreen and deciduous broad-leaved species. Many of the tropical genera like Duabanga, Pterospermum and Tetrameles are absent. 	<i>Alangium chinensis</i>
		<i>Altingia excelsa</i>
		<i>Bischofia javanica</i>
		<i>Callicarpa arborea</i>
		<i>Castanopsis indica</i>
		<i>Cordia oblique</i>
		<i>Dendrocalamus hookeri</i>
		<i>Dichroa febrifuga</i>
		<i>Engelhardia spicata</i>
		<i>Evodia fraxinifolia</i>
		<i>Macaranga pustulata</i>
		<i>Maesa spp</i>
		<i>Mussaenda roxburghii,</i>
		<i>Pouzolzia sanguinea</i>
<i>Rhaphidophora eximia</i>		
<i>Schima wallichii</i>		
<i>Wendlandia puberula</i>		
Chirpine Forest	<ul style="list-style-type: none"> Low-altitude xerophytic forest occurring in the deeper dry valleys of Bhutan. Almost no other tree species occur in such forest other than Chirpine. 	<i>Buddleja asiatica</i>
		<i>Bazzania bhutanica</i>
		<i>Cycas pectinata</i>
		<i>Cymbopogon flexuosus</i>
		<i>Euphorbia royleana</i>
		<i>Ficus obligodon</i>
		<i>Grewia sapida</i>
		<i>Indigofera dosua</i>
		<i>Rhus paniculata</i>
		<i>Ziziphus incurva</i>

Cool Broad-leaved Forest	<ul style="list-style-type: none"> • Found on moist exposed slopes. • Mixed forest in which oaks are less common and other trees, both deciduous and evergreen, e.g. Lauraceae, Exbucklandia etc., are more abundant together with dense shrubs, climbers and epiphytes. 	<i>Acer campbellii</i>
		<i>Acer sterculiaceum</i>
		<i>Betula alnoides</i>
		<i>Chirita lachensis</i>
		<i>Corylopsis himalayana</i>
		<i>Elatostema monandrum</i>
		<i>Lindera neesiana</i>
		<i>Brassaiopsis alpine</i>
		<i>Exbucklandia populnea</i>
		<i>Lindera pulcherrima</i>
		<i>Persea clarkeana</i>
		<i>Rosa moschata</i>
		<i>Rubus lineatus</i>
		<i>Symplocos dryophila</i>
<i>Ilex fragilis</i>		
<i>Lecathus penduncularis</i>		
Evergreen Oak Forest	<ul style="list-style-type: none"> • Characteristic feature of some parts of Central Bhutan (for e.g. Trongsa and hills above Mongar) • With increasing dryness, more xerophytic <i>Quercus</i> species, e.g. <i>Q. lanata</i>, <i>Q. griffithii</i> and <i>Q. semecarpifolia</i> and <i>Pinus wallichiana</i> are seen. • With increasing dryness, more xerophytic <i>Quercus</i> species, e.g. <i>Q. lanata</i>, <i>Q. griffithii</i> and <i>Q. semecarpifolia</i> and <i>Pinus wallichiana</i> are seen. • Not much shrub layer, whilst shady humid floors are dominated by small herbs. 	<i>Acer campbellii</i>
		<i>Castanopsis hystrix</i>
		<i>Cenchrus tribuloides</i>
		<i>Elatostema hookerianum</i>
		<i>Galeola lindleyana</i>
		<i>Juglans regia</i>
		<i>Pilea symmeria</i>
		<i>Quercus lamellosa</i>
		<i>Skimmia arborescens</i>
		<i>Symplocos lucida</i>
Blue Pine Forest	<ul style="list-style-type: none"> • Temperate equivalent of Chirpine forest and occupies the dry valleys of Bhutan. • Bluepine dominant with <i>Quercus</i> species in some places. 	<i>Berberis asiatica</i>
		<i>Berchemia edgeworthii</i>
		<i>Cotoneaster griffithii</i>
		<i>Elaeagnus parvifolia</i>
		<i>Euonymus grandifloras</i>
		<i>Indigofera heterantha</i>
		<i>Jasminum humile</i>

	<ul style="list-style-type: none"> Xerophytic shrubs occur and herbs mostly appear during the monsoon season. 	<i>Prinsepia utilis</i> <i>Lyonia ovalifolia</i> <i>Quercus griffithii</i> <i>Quercus semecarpifolia</i> <i>Rosa sericea</i> <i>Spirea canescens</i> <i>Zanthoxylum armatum</i>
Spruce Forest	<ul style="list-style-type: none"> Spruce forest with Hemlock and Fir forests occupy the montane cloud-forest zone of Bhutan. Often mixed with each other but separate forests can frequently be recognized Spruce are found at lower altitude than Hemlock and Fir. 	<i>Acer cappadocicum</i> <i>Acer pectinatum</i> <i>Berberis praecipua</i> <i>Enkianthus deflexus</i> <i>Larix griffithiana</i> <i>Lindera heterophylla</i> <i>Osmanthus suavis</i> <i>Picea brachytyla</i> <i>Picea spinolosa</i> <i>Salix daltiniana</i> <i>Salvia campanulate</i> <i>Taxus baccata</i>
Hemlock Forest	<ul style="list-style-type: none"> Appears at higher altitude than Spruce where <i>Tsuga dumosa</i> is dominant species mixed with Spruce and Fir. Shrubby and arborescent rhododendrons are frequent with dense growth of ferns, lichens and bryophytes. 	<i>Arundinaria griffithiana</i> <i>Betula utilis</i> <i>Buddleja colvilei</i> <i>Daphne bholua</i> <i>Gaultheria fragrantissima</i> <i>Larix griffithiana</i> <i>Litsea sericea</i> <i>Maddenia himalaica</i> <i>Magnolia globose</i> <i>Panax pseudo-ginseng</i> <i>Rhododendron falconeri</i> <i>Rhododendron hodgsonii</i> <i>Rhododendron keysii</i> <i>Rubus calophyllus</i> <i>Rubus pentagonus</i> <i>Sorbus thibetica</i> <i>Tsuga dumosa</i> <i>Viburnum mullaha</i>

Fir Forest	<ul style="list-style-type: none"> Occurs in the highest ridges of Bhutan below tree line, where huge tracts are covered by no other tree species than Fir (<i>Abies densa</i>) and some Hemlock and Birch in places. Luxuriant undergrowth of Rhododendrons and other shrubs with many small herbs on mossy ground layer are found. As tree lines are approached, the firs become stunted and are mixed with Junipers and smaller Rhododendron species 	<i>Abies densa</i>
		<i>Arundinaria maling</i>
		<i>Betula utilis</i>
		<i>Bryicarpum himalaicum</i>
		<i>Daphne bholua</i>
		<i>Juniperus pseudosabina</i>
		<i>Maddenia himalaica</i>
		<i>Primula denticulata</i>
		<i>Prunus rufa</i>
		<i>Rheum acuminatum</i>
		<i>Rhododendron cinnabarinum</i>
		<i>Rhododendron hodgsonii</i>
		<i>Ribes tikare</i>
		<i>Rubus fragarioides</i>
<i>Skimmia laureola</i>		
<i>Sorbus foliolosa</i>		
<i>Viburnum nervosum</i>		
Juniper-Rhododendron Scrub	<ul style="list-style-type: none"> Moist scrub vegetation occurring above tree line throughout Northern and Central Bhutan. Consists of scattered shrubs of Junipers, Rhododendron and <i>Potentilla arbuscula</i> but with rich herb layer appearing during the monsoon. Damp grassy meadow commonly found in this zone. 	<i>Gaultheria trichophylla</i>
		<i>Juniperus recurva</i>
		<i>Juniperus squamata</i>
		<i>Morina nepalensis</i>
		<i>Pedicularis megalantha</i>
		<i>Phlomis tibetica</i>
		<i>Potentilla arbuscula</i>
		<i>Primula sikkimensis</i>
		<i>Rhododendron lepidotum</i>
		<i>Thalictrum chelidonii</i> ,
		<i>Trollius pumilus</i>
Dry Alpine Scrub	<ul style="list-style-type: none"> More xerophytic vegetation found. Higher altitude than Juniper-Rhododendron Scrub. 	<i>Aconitum orochryseum</i>
		<i>Astragalus acaulis</i>
		<i>Chesneya nubigena</i>
		<i>Cremanthodium thomsonii</i>
		<i>Ephedra gerardiana</i>
		<i>Meconopsis calderiana</i>
		<i>Rheum nobile</i>
		<i>Rhododendron anthopogon</i>
		<i>Salix lindleyana</i>
		<i>Saussurea obvallata</i>
		<i>Saxifraga moorcroftiana</i>
		<i>Tanacetum gossypinum</i>
<i>Thermopsis barbata</i>		

(Source: FRMD, 2016)

4. FOREST COVER

71% of land (2,730,889 ha) in Bhutan is covered by forest (FRMD, 2016). Forest cover estimate is based on the forest definition mentioned in the National Forest Policy of Bhutan (MoAF, 2011). Amongst Dzongkhags, Pemagatshel, Zhemgang and Dagana has the highest forest cover of 83% and Gasa has the least with 36%.

Table 4: Dzongkhag wise Forest Cover

Dzongkhag	Dzongkhag Area (ha)	Forest Area (ha)	Forest Cover %	MoE %	90% Confidence Interval	
					Interval	
					Lower	Upper
Bumthang	269,091.00	144,842.00	54	13	47	60
Chukha	186,149.00	151,164.00	81	7	75	86
Dagana	170,608.00	141,861.00	83	7	77	88
Gasa	310,398.00	112,272.00	36	28	26	48
Haa	188,635.00	129,500.00	69	11	61	75
Lhuntse	283,091.00	213,792.00	76	12	66	83
Mongar	192,536.00	158,031.00	82	7	76	87
Paro	127,461.00	72,574.00	57	16	48	65
Pemagatshel	101,217.00	83,745.00	83	10	75	89
Punakha	109,878.00	79,316.00	72	14	62	80
Samdrup Jongkhar	185,881.00	133,622.00	72	9	65	77
Samtse	129,216.00	77,299.00	60	13	52	67
Sarpang	163,928.00	127,397.00	78	9	71	83
Thimphu	177,841.00	94,256.00	53	16	45	61
Trashigang	218,253.00	159,998.00	73	8	67	79
Trashiyangtse	143,496.00	99,860.00	70	14	60	78
Trongsa	179,607.00	142,571.00	79	10	72	85
Tsirang	63,163.00	48,857.00	77	13	68	85
Wangdue Phodrang	399,641.00	292,824.00	73	8	67	78
Zhemgang	239,308.00	198,036.00	83	6	78	87

(Source: FRMD, 2016)

5. TOTAL BIOMASS AND CARBON STOCK

Bhutan's forest store 645 million tonnes of carbon in the form of biomass carbon and soil organic carbon (SOC). The biomass carbon constitutes 457 million tonnes of carbon while SOC constitute 188 million tonnes of carbon 71% of the total carbon stock is constituted from trees, shrubs and herbs and forest soils accounts for only 29 % (Figure 3 & Table 5).

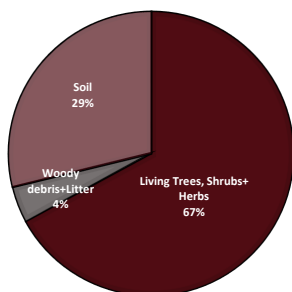


Figure 3: Total forest carbon stock

Table 5: Biomass and carbon stock estimates of forest with \pm margin of error at 90% confidence level

Carbon pools	Carbon Pool Constituent	Biomass (tonnes per ha)	Carbon (tons per ha)	Total Biomass (mill. tons)	Total carbon (mill.tons)
Above Ground Biomass	Trees	241 \pm 14	113.74	657.15	308.86
	Shrubs	1.61 \pm 0.27	0.76	4.72	2.22
	Herbs	0.71 \pm 0.15	0.33	2.07	0.97
	Sapling	26 \pm 10	12.22	72.31	33.99
Below Ground Biomass*	Tree Roots	64.46 \pm 5	30.30	157.41	73.98
	Sapling roots	8.88 \pm 3.8	4.17	22.08	10.38
Litter	Litter	13.25 \pm 2	6.23	39.03	18.34
Dead Organic Matter	Coarse woody Debris	6.44 \pm 3	3.03	18.14	8.53
Soil Organic Carbon	Soil (0-30cm depth)		64.07 \pm 4.17		187.85
Total Forest carbon stock					645.12

*Below Ground Biomass recalculated using Stand level equation (BGB=0.489*AGB^{0.89})

6. SUSTAINABLE FOREST MANAGEMENT

The National Forest Policy 2011 mandates all forests to be managed sustainably. In accordance to National Forest Policy 2011, Forests in Bhutan are managed under different management regimes; protected areas network, forest management units, local forest management areas, community forests and private forests (Figure 4).

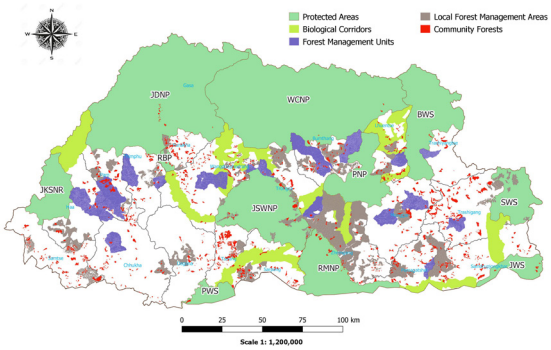


Figure 4: Sustainable Forest Management Map (Map Source: FRMD, 2019)

6.1. PROTECTED AREA MANAGEMENT

The Protected Area (PA) Network in Bhutan consists of the National Parks, Wildlife Sanctuaries, Strict Nature Reserve, Biological Corridors and the Royal Botanical Park. Encompassing about 51.44% of the country area, there are 5 National Parks, 4 Wildlife Sanctuaries, 1 Strict Nature Reserve, 1 Royal Botanical Park and 8 Biological Corridors (Figure 5). The Protected areas along with year of establishment are provided in Table 6.

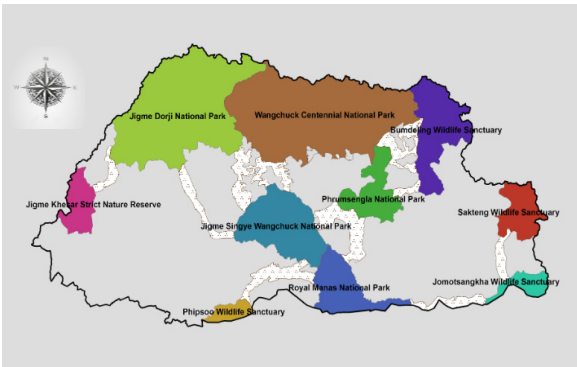


Figure 5: Protected Area Network in Bhutan (Map Source: FRMD, 2019)

Table 6: Protected Area Network

Name of Protected areas	Year of Establishment
Royal Manas National Park	1966
Phibsoo Wildlife Sanctuary	1993
Jomotsangkha Wildlife Sanctuary	1993
Jigme Khesar Strict Nature Reserve	1993
Jigme Dorji National Park	1995
Jigme Singye Wangchuck National Park	1995
Bumdeling Wildlife Sanctuary	1998
Phrumsengla National Park	2000
Sakteng Wildlife Sanctuary	2003
Royal Botanical Park	2004
Wangchuck Centennial National Park	2008
Biological Corridors	2008

6.2. FOREST MANAGEMENT UNITS

Sustainable harvesting of timber for rural use and commercial purposes is carried out in Forest Management Units (FMU). There are 21 FMUs designated in the country (Figure 6) covering 5.17 % of geographical area corresponding to a total area of 198,406.84 ha. Total 160,058.21 ha of FMU area is a forested area (Table 7). FMUs are managed as per the sustainable management plans prepared in line with provisions under the “Forest Management Code of Bhutan-2004”. In addition, for each FMU, Annual Operation plans are prepared to set the targets and guide the timber harvesting operations sustainably.

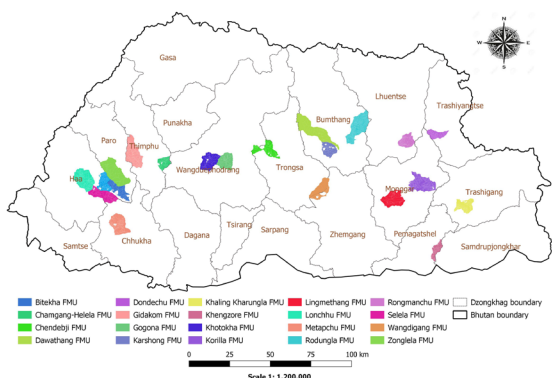


Figure 6: Forest Management Units in Bhutan
(Map Source: FRMD, 2019)

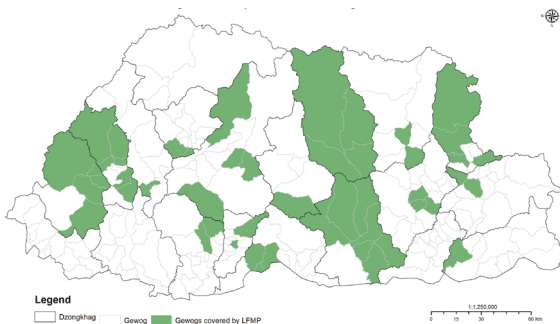
Table 7: List of existing FMUs and Annual Allowable Cut

Sl. No.	Name of units	Dzongkhag	Year of establishment	Total FMU area (ha)	Forested area (ha)	Annual Allowable Cut (AAC) - m ³			Plan Period	Plan Cycle
						Commercial	Rural	Total		
1	Dawathang		2000	17,541.66	13,648.00	9,756.00	2,424.00	12,180.00	1/1/2011 - 31/12/2020	Second
2	Rudongla	Bumthang	2002	14,686.58	12,368.91	12,000.00	2,999.00	14,999.00	1/1/2013-31/12/2023	Second
3	Karshong		1994	6,008.54	5,579.39	6,200.00	1,500.00	7,700.00	01/01/2020 to 31/12/2029	Third
4	Metapchhu	Chukha	2007	10,676.53	10,099.00	4,400.00	630.00	5,030.00	01/01/2018 -31/12/2027	Second
5	Haa East		1987	6,580.99	5,690.50	nil	500.00	500.00	1/02/2016-31/01/2026	Fourth
6	Lon Chhu	Haa	2010	12,664.49	8,846.00	5,300.00	1,000.00	6,300.00	01/01/2020 to 31/12/2029	Second
7	Sele La		1997	9,157.00	8,066.76	8,886.00	3,000.00	11,886.00	1/1/2011-31/12/2020	Second
8	Korila	Mongar	1993	13,137.00	6,922.00	1,100.00	2,700.00	3,800.00	1/11/2016-31/10/2026	Third
9	Lingmithang		1997	10,490.00	10,125.00	8,900.00	500.00	9,400.00	1/07/2019-30/06/2029	Third
10	Paro-Zonglela	Paro	1992	16,155.81	12,880.68	6,366.00	3,000.00	9,366.00	1/1/2012-31/12/2022	Third
11	Bitekha		2006	7,260.10	6,199.00	3,600.00	900.00	4,500.00	1/8/2016-31/7/2026	Second
12	Chamgang- Helela	Thimphu	1993	4,508.78	4,320.87	nil	1,800.00	1,800.00	1/08/2017-31/07/2027	Third
13	Gidakom		1977	13,100.00	9,105.00	3,670.00	2,000.00	5,670.00	1/4/2012-31/3/2022	Fourth

14	Dongdechu	Trashi yangtse	2001	4,856.00	3,172.00	3,965.00	1,249.83	5,214.83	1/4/2014-31/3/2024	Second
15	Chendebji	Trongsa	1996	7,852.98	6,912.12	4,700.00	2,000.00	6,700.00	01/01/2018 to 31/12/2027	Third
16	Khotokha	Wangdue	1984	9,281.00	8,785.90	7,900.00	1,900.00	9,800.00	1/1/2020 to 31/12/2029	Fourth
17	Gogona		2005	8,080.60	4,490.00	5,161.00	1,167.00	6,328.00	01/06/2015 to 31/05/2025	Second
18	Wangdigang	Zhemgang	1992	8,759.00	7,511.25	nil	2,100.00	2,100.00	1/1/2017-31/12/2026	Third
19	Rongmanchu	Lhuntse	2007	6,403.13	5,713.00	2,700.00	500.00	3,200.00	01/01/2018 - 31/12/2027	Second
20	Khaling Kharungla	Trashigang	1996	7,110.30	5,553.68	900.00	400.00	1,300.00	01/01/2020 to 31/12/2029	Third
21	Khengzore	Pema Gatsel	2019	4,096.35	4,069.15	3,700.00	400.00	4,100.00	1/01/2019-31/12/2028	First
		TOTAL		198,406.84	160,058.21	99,204.00	32,669.83	126,473.83		

6.3. LOCAL FOREST MANAGEMENT AREA

Areas outside Protected Areas, Community Forests, Forest Management Units and Action Plans are managed as Local Forest Management Areas (Figure 7). Local Forest Management Plans (LFMP) are developed by respective field offices for managing the forests resources. As of today, there are 49 LFMPs under implementation. Out of 49 plans, 15 LFMPs were approved in 2019 (35 to 49 row of Table 8).



*Figure 7: Local Forest Management Areas in Bhutan
(Map Source: FRMD, 2019)*

Table 8: List of existing Local Forest Management Plans

Sl. No.	Name of the Management plan for Areas Outside FMU System	Geog	Dzongkhag	Period	Area covered by Plan (Ha)	AAC (m ³ /yr)
1	Management plan for Areas Outside FMU System Tsenkhar Geog	Tsenkhar	Lhuentse	01 July 2012 to 30 June 2021		
2	Management plan for Areas Outside FMU System Shari Geog	Shari	Paro	01 July 2012 to 30 June 2021	1600	946
3	Management plan for Areas Outside FMU System Barp Geog	Barp	Punakha	01 July 2012 to 30 June 2021	2300	1442
4	Management plan for Areas Outside FMU System Thangrong Geog	Thangrong	Mongar	01 July 2012 to 30 June 2021	1421	704
5	Management plan for Areas Outside FMU System Nangkor Geog	Nangkor	Zhemgang	July 2012 to 30th June 2022	24334	19938
6	Management plan for Areas Outside FMU System Shermung Geog	Mongar (BWS)	Mongar	01/07/2012 to 30/06/2022	2100.1	1832
7	Management plan for Areas Outside FMU System Bumdeling Geog	Bumdeling	Trashi Yagtse	01/07/2012 to 31/06/2022		
8	Management plan for Areas Outside FMU System Toeb Geog	Toeb	Punakha	01/07/2012 to 30/06/2022	2562	4492
9	Management plan for Areas Outside FMU System Dogar Geog	Dogar	Paro	01/07/2014 to 30/06/2024	1263	591
10	Management plan for Areas Outside FMU System Shaba Geog	Shaba	Paro	01/07/2014 to 30/06/2024	769	713
11	Management plan for Areas Outside FMU System Bjee Geog	Bjee	Haa	01/07/2014 to 30/06/2024	1732	723
12	Management plan for Areas Outside FMU System Katsho Geog	Katsho	Haa	01/07/2014 to 30/06/2024	712	837
13	Management plan for Areas Outside FMU System Esue Geog	Esue	Haa	01/07/2014 to 30/06/2024	339	383
14	Management plan for Areas Outside FMU System Sama Geog	Sama	Haa	01/07/2014 to 30/06/2024	325	343

15	Management plan for Areas Outside FMU System Daga Geog	Daga	Wangdue Phodrang	01/04/2016 to 31/03/2026	21043.9	29403
16	Management plan for Areas Outside FMU System Laja Geog	Laja	Dagana	01/07/2016 to 30/06/2026	1000	371
17	Management plan for Areas Outside FMU System Khebesa Geog	Khebesa	Dagana	01/07/2016 to 30/06/2026	1000	320
18	Management plan for Areas Outside FMU System	Shingkhar	Zhemgang	01/07/2015 to 30/06/2025	2956	1416
19	Management plan for Areas Outside FMU System	Trong	Zhemgang	01/07/2016 to 30/06/2026	3386	1095
20	Management plan for Areas Outside FMU System Kikhorthang Geog	Kikhorthang	Tsirang	01/07/2017 to 30/06/2027	553.2	123
21	Management plan for Areas Outside FMU System Phobji Geog	Phobji	Wangdue Phodrang	01/11/2017 to 30/11/2027	3250.4	8247
22	Management plan for Areas Outside FMU System Samkhar Geog	Samkhar	Trashigang	01/01/2018 to 31/12/2027	5206.5	3140
23	Management plan for Areas Outside FMU System Bardo Geog	Bardo	Zhemgang	01/01/2018 to 31/12/2027	11793	17737
24	Management plan for Areas Outside FMU System Tang Geog	Tang	Bumthang	01/07/2018 to 31/06/2028	10008	5205
25	Management plan for Areas Outside FMU System Chumey Geog	Chumey	Bumthang	01/07/2018 to 31/06/2028	5228	15357
26	Management plan for Areas Outside FMU System Tsento Geog	Tsento	Paro	01/07/2018 to 31/06/2028	1952	843
27	Management plan for Areas Outside FMU System Lamgong Geog	Lamgong	Paro	01/07/2018 to 31/06/2028	1309	1073
28	Management plan for Areas Outside FMU System Phuntenchu Geog	Phuntenchu	Tsirang	01/07/2018 to 31/06/2028	2155	2569
29	Management plan for Areas Outside FMU System Goshing Geog	Goshing	Zhemgang	01/01/2019 to 31/12/2028	2179	3210
30	Management plan for Areas Outside FMU System Korphu Geog	Korphu	Trongsa	01/07/2018 to 31/06/2028	3543.4	2817
31	Management plan for Areas Outside FMU System Tongmajangsa Geog	Tongmajangsa	Trashiyangtse	01/01/2019 to 31/12/2028	1387	1305

32	Management plan for Areas Outside FMU System Ura Geog	Ura	Bumthang	01/01/2019 to 31/12/2028	5187	4237
33	Management plan for Areas Outside FMU System Doteng Geog	Doteng	Paro	01/01/2019 to 31/12/2028	3240	973
34	Management plan for Areas Outside FMU System Nangla Geog	Nangla	Zhemgang	01/01/2019 to 31/12/2028	3862	5155
35	Management plan for Areas Outside FMU System Chokor Geog	Chokor	Bumthang	01/07/2019 to 31/06/2029	3450	6897
36	Management plan for Areas Outside FMU System Yangtse Geog	Yangtse	Trashiyangtse	01/01/2019 to 31/12/2028	8340	13079
37	Management plan for Areas Outside FMU System Yangneer Geog	Yangneer	Trashigang	01/01/2019 to 31/12/2028	2907	1470
38	Management plan for Areas Outside FMU System Yallang Geog	Yallang	Trashigang	01/07/2019 to 30/06/2029	2209	3892
39	Management plan for Areas Outside FMU System Bjokha Geog	Bjokha	Zhemgang	01/01/2020 to 31/12/2029	2540	1323
40	Management plan for Areas Outside FMU System Dekiling Geog	Dekiling	Sarpang	01/07/2019 to 30/06/2029	3767	1740
41	Management plan for Areas Outside FMU System Gakidling Geog	Gakidling	Sarpang	01/07/2019 to 30/06/2029	3884	1587
42	Management plan for Areas Outside FMU System Sompangkha Geog	Sompangkha	Sarpang	01/07/2019 to 30/06/2029	1536	438
43	Management plan for Areas Outside FMU System Orong Geog	Orong	Samdrup Jongkhar	01/07/2019 to 30/06/2029	8700	2970
44	Management plan for Areas Outside FMU System Drepong Geog	Drepong	Mongar	01/04/2019 to 31/03/2029	4181	1565
45	Management plan for Areas Outside FMU System Gakiling Geog	Gakiling	Haa	01/07/2019 to 30/06/2029	5442	1875
46	Management plan for Areas Outside FMU System Gangtrey Geog	Gangtrey	Wangdue Phodrang	01/07/2019 to 30/06/2029	1377	1749
47	Management plan for Areas Outside FMU System Kabji Geog	Kabji	Wangdue Phodrang	01/07/2019 to 30/06/2029	3219	2681
48	Management plan for Areas Outside FMU System Geney Geog	Geney	Thimphu	01/07/2019 to 30/06/2029	3805	1805
49	Management plan for Areas Outside FMU System Menbi Geog	Menbi	Lhuntse	01/04/2019 to 31/03/2029	4617	2363

6.4. COMMUNITY FOREST MANAGEMENT

As of December 2019, there are 804 registered Community Forests (CF) covering an area of 99,146.00 ha, managed by 33,281 households (Figure 8 & Table 9). Bhutan established first CF in 1997 at Dozam covering area of 937.82 ha with 144-member households. In 2019, 28 CFs were established covering an area of 4704.482 ha with 935 household members (Table 10).

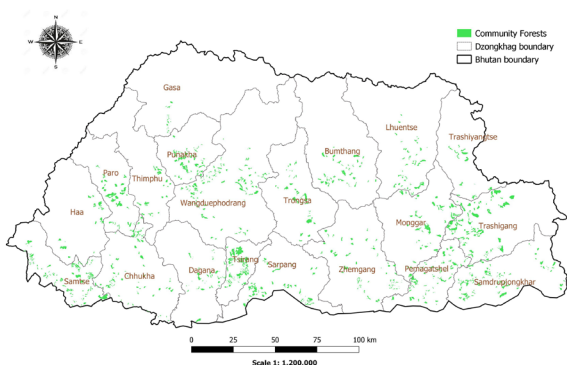


Figure 8: Community Forest Areas
(MAP Source: FRMD, 2019)

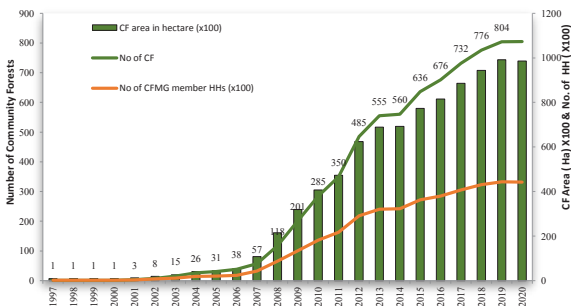


Figure 9: Trend of Community Forest Establishment in Bhutan

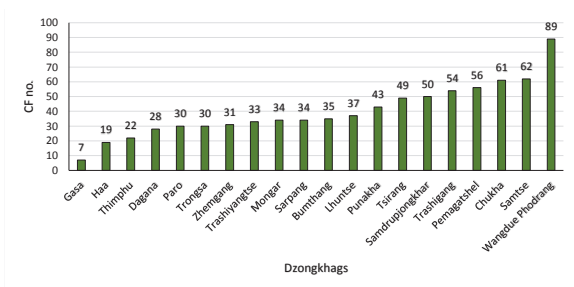


Figure 10: Dzongkhag wise distribution of Community Forests

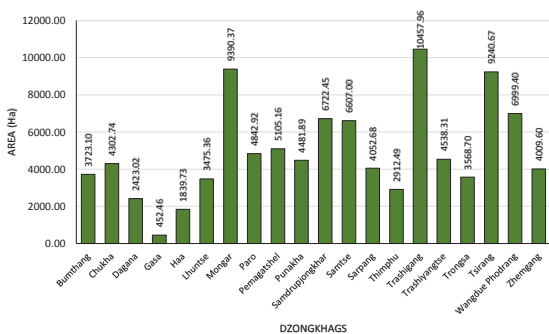


Figure 11: Community Forest Areas in Dzongkhags (ha)

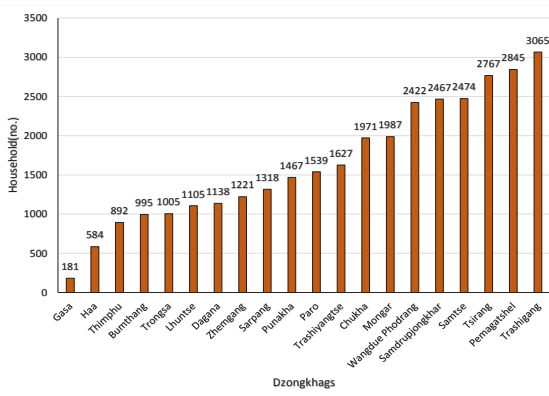


Figure 12: Community Forest Member Household Distribution in each Dzongkhag

Table 9: Details of Community Forest establishment in Bhutan

Sl. No	Dzongkhag	Community Forest (No)	Member Household (No)	Area (ha)
1	Bumthang	35	1,029	3,723.10
2	Chukha	61	1,971	4,302.74
3	Dagana	28	1,138	2,423.02
4	Gasa	7	181	452.46
5	Haa	19	584	1,839.73
6	Lhuntse	37	1,099	3,475.36
7	Mongar	34	2,049	9,822.37
8	Paro	30	1,590	4,410.92
9	Pemagatshel	56	2,845	5,105.16
10	Punakha	43	1,467	4,481.89
11	Samdrup Jongkhar	50	2,459	6,722.45
12	Samtse	62	2,474	6,607.00
13	Sarpang	34	1,318	4,052.68

14	Thimphu	22	892	2,912.49
15	Trashigang	54	3,065	10,457.96
16	Trashiyangtse	33	1,627	4,538.31
17	Trongsa	30	1,005	3,568.70
18	Tsirang	49	2,845	9,240.67
19	Wangdue Phodrang	89	2,422	6,999.40
20	Zhemgang	31	1,221	4,009.60
Grand Total		804	33,281	99,146.00

Table 10: Community Forests established in 2019

Sl. No	Community Forest	Dzongkhag	Gewog	Member Household (No)	Area (ha)
1	Cherup	Trongsa	Tangsibji	33	302.00
2	Uma Khamey	Wangdue Phodrang	Daga	43	229.00
3	Jaktoe	Wangdue Phodrang	Kazhi	28	140.00
4	Goensakha	Wangdue Phodrang	Kazhi	13	65.00
5	Pangzhing Goama KA	Samtse	Tading	30	60.20
6	Gangtokha	Dagana	Nichula	29	145.00
7	Sangkhey	Sarpang	Gakidling	43	168.40
8	Darna Tashi Dingkha	Haa	Katsho	50	142.93
9	Yatshap	Thimphu	Chang	42	42.00
10	Changarzam	Zhemgang	Phangkhar	13	74.00
11	Gomphu Nyamroop	Zhemgang	Trong	61	264.00
12	Gujong	Zhemgang	Phangkhar	15	87.00
13	Zurphel Chithuen	Zhemgang	Trong	27	145.00
14	Cherup Phendeyling	Punakha	Dzomi	72	262.00
15	Salapong	Zhemgang	Phangkhar	19	103.20
16	Drakarpo	Trashiyangtse	Jamkhar	23	112.00
17	Peling	Bumthang	Tang	21	65.92
18	Menjong	Tsirang	Phuentenchhu	56	517.58
19	Changchina	Punakha	Chhubu	15	75.00
20	Tseteyna Chethuen	Punakha	Kabjisa	29	161.00
21	Phusa Kuengacholing	Chukha	Getana	21	48.00
22	Kuchey	Samtse	Dungtoe	33	262.13
23	Kholakharka	Samtse	Namgaycholing	79	461.95
24	Khempa	Samtse	Denchukha	31	244.55
25	Khalinggoan	Samtse	Dungtoe	31	126.80
26	Demjee	Samtse	Denchukha	16	85.31
27	Phomrong	Bumthang	Tang	34	135.24
28	Zatshen	Paro	Dopshari	28	179.28
Total				935	4704.48

6.5. NON-WOOD FOREST PRODUCT MANAGEMENT

As of 2019, 164 Non-Wood Forest Product (NWFP) Management and Marketing Groups have been established across Bhutan. A total of 6106 rural households are registered as members of these NWFP groups (Figure 14) in 17 Dzongkhags. Samdrup Jongkhar Dzongkhag has the highest member households (966 households) and Tsirang has the least (38 households) (Figure 14). In 2019, a total of 39 NWFP groups were formed consisting of 1038 member households (table 11).

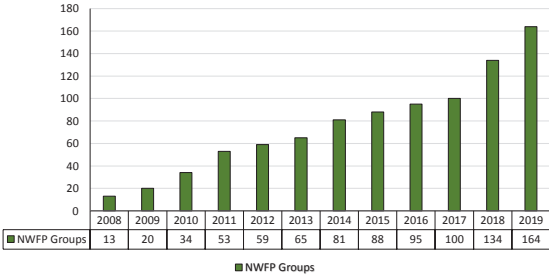


Figure 13: Trend of NWFP Groups establishment in Bhutan

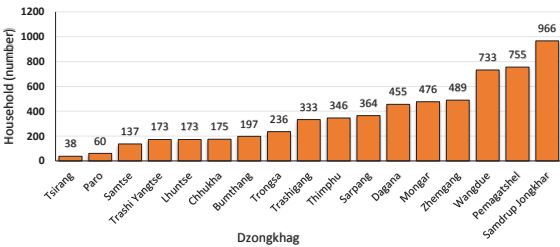


Figure 14: Member Households of NWFP Groups

Table 11: NWFP Groups established in 2019

Dzongkhag	Geog	Name of NWFP Group	Member Households	Species
Dagana	Nichula	Damchuna Shingmen Tshogpa	46	<i>Thysanolaena latifolia</i>
Lhuntse	Khoma	Singye Dzong Sangzoe Management Group	19	Incense materials
	Shelrimuhung	Jabgang NWFP (Community Cane) management and Marketing Group	35	<i>Plectocomia himalayana</i>
	Ngatshang	Desho Dulen Chirup Group	11	<i>Daphne sp.</i>
Mongar				<i>Plectocomia himalayana</i>
	Saling	Broksar Shingmen Thuenkey Tshogpa	18	<i>Calamus acanthospathus</i>
				<i>Calamus latifolius</i>
				<i>Rubia cordifolia</i>
	Saling	Resa Shingmen Thuenkey Nyamrup Detshen	30	<i>Piper pedicellatum</i>
				<i>Piper longum</i>
				<i>Rubia cordifolia</i>
Pemagatshel	Dechhenling	Yangmalashing Pipla Group	34	<i>Piper longum</i>
	Serthi	Barkalanga Shingmeim Thuenkey Wongbab Tshogpa	21	<i>Rubia cordifolia</i>
Samdrup Jongkhar	Serthi	Chitori Shingmeim Tshogpa	9	Bamboo (Bangdo)
	Serthi	Denphu Shingmeim Tshogpa	28	<i>Rubia cordifolia</i>

Samtse	Serthi	Deptsang Shingmein Thuenkyed Kuenthin Norphel Tshogpa	26	<i>Rubia cordifolia</i>
	Martshala	Kakaney group	25	<i>Rubia cordifolia</i>
	Serthi	Risum Tsholing shingmein Tshogpa	38	<i>Rubia cordifolia</i>
	Martshala	Samten group, Tsholingkhar	35	<i>Rubia cordifolia</i>
	Serthi	Serthi Shingmein Yargay Phunsum Tshogpa	47	<i>Rubia cordifolia</i>
	Serthi	Tashithangjay shingmein Thuenkay Yuntan Mijur Phuensum Tshogpa	15	<i>Rubia cordifolia</i>
	Namseling	Namseling NWFPP Collection and Marketing Group	17	<i>Tupistra nutans</i>
Sarpang	Dophuchen	Majuwa Pangkha Group	38	<i>Rubia cordifolia</i>
	Jigmecholing	Thruendrel Shingmen Tshogpa	55	<i>Piper longum</i>
				<i>Piper pedicellatum</i>
				<i>Persea gambiei</i>
				<i>Swertia chirayita</i>
	Gakiling	Lower Muga softbroom Management & Marketing Group	28	<i>Thysanolaena latifolia</i>
	Shompangkha	Shawali Bamboo Marketing Group (merged with Pakeygang CF)	28	<i>Swertia chirayita</i>
	Gakiling	Ratey Pani Softbroom Management & Marketing Group	51	<i>Thysanolaena latifolia</i>
	Pemaling, Tsuzorgang	Pemaling Pakshe Tshogpa	11	Bamboo

Thimphu	Gakiling	Sangkha Soft Broom Management and Marketing Group	51	<i>Thysanolaena latifolia</i>
	Dagala	Jhom Daga Ngomen Tshogpa	83	<i>Neopicrorhiza scrophulariiflora</i>
Trashi Yangtse	Bumdeling	Bumdir Herbal Tea Management Group	13	<i>Viscum nepalense</i>
				<i>Mentha piperita</i>
				<i>Hypericum spp.</i>
				<i>Ficus racemose</i>
				<i>Acer campbellii</i>
Trashigang	Yallang	Phuntsho Thingyee Tshogpa	10	<i>Zyanthoxylum sp</i>
	Merak	Chew Chew Kachap NWFP Group	7	<i>Rhododendron setosum</i>
	Merak	Kuenphen Poina Tshogpa	8	<i>Rhododendron anthopogon</i>
	Merak	Shingkar Ngomen Tshogpa	10	Incense (Balu / sulu)
	Kikorthang	Batesay NWFP Group	12	<i>Swertia chirayita</i>
Zhemgang	Mamung	Mamung Bamboo Management Plan	16	<i>Thysanolaena latifolia</i>
	Nangkor	Goling Jamphel Shingmin Thoenkhung Tshogpa	45	Bamboo
	Nangkor	Nyakhar Shingmin Gongphel Tshogpa	30	<i>Piper spp.</i>
	Nangkor	Shobling Shingmin Thoenkhung Tshogpa	10	<i>Piper spp.</i>

Nangkor	Tshaidang Shingmin Gongphel Tshogpa	28	<i>Piper</i> spp. Bamboo
Phangkhar	Salapong NWFP Management Group	17	<i>Piper</i> spp. Mushroom Yula
Phangkhar	Panabe NWFP Management Group	17	Bamboo <i>Piper</i> spp. <i>Phyllanthus emblica</i> <i>Zyanthoxylum</i> sp
Phangkhar	Zangbi Bamboo Management Plan	16	<i>Piper</i> spp. Bamboo

6.6. WATERSHED MANAGEMENT

Well managed watersheds play a pivotal role in supplying a wide range of ecosystem goods and services especially for reliable supply of quality water. Watersheds with good natural vegetation are also critical to maintain water flows and to minimize erosion. Watershed management refers to the management of watersheds in a holistic manner considering all aspects that are likely to influence the quality and quantity of water flowing from the watershed. There are five major river basins, five sub-basins and two minor basins. Out of it, a total 186 watersheds are delineated and assigned with a unique identity number (Figure 15). Manas Basin has the highest number of water sheds (64) and Jomochhu has the least number of watersheds (3). 27 watersheds run independently and is not connected to major basins of Bhutan. Mangdechhu, Chamkharchhu, Kurichhu, Kholongchhu and Drangmechhu join to form Manas Basin (Table 12).



Figure 15: Basin wise Watersheds in Bhutan
(Map Source: WMD, 2019)

Table 12: Number of Watersheds in Major Basins of Bhutan

Sl. No.	Basin	Number of Watersheds
1	Amochhu	11
2	Wangchhu	19
3	Punatsangchhu	52
4	Manas Basin	64
	• Mangdechhu	21
	• Chamkharchhu	11
	• Kurichhu	12
	Kholongchhu	5
	• Drangmechhu	15
5	Nyeramachhu	5
6	Jomochhu	3

7	Mao chhu	5
8	Independent watersheds	27
Total		186

6.7. WETLAND MANAGEMENT

In Bhutan, wetlands constitute rivers, streams and springs with associated riverine and riparian zones; lakes, ponds, swamps, marshes, fen, and peat lands with water that is static or flowing with distinct floral and faunal community.

Bhutan ratified the Convention on Wetlands of International Importance (Ramsar Convention) on 7th September 2012 and currently has 3 Ramsar sites (Table 13) designated with total area of 1225 hectares.

Table 13: Ramsar Sites in Bhutan

Sl. No	Name of Ramsar Site	Category	Dzongkhag	Total Area (ha)	Year of Declaration
1	Khotokha	Marshes	Wangduephodrang	113.50	2012
2	Bumdeling	Riverine	Tashiyangtse	141.50	2012
3	Gangtey-Phobji	Marshes	Wangduephodrang	970.00	2014

6.8. PAYMENT FOR ECOSYSTEM SERVICES

Payment for Ecosystem Services (PES) is an incentive based direct approach whereby service provider receives payments that are conditional on acceptable conservation performance. PES has been identified as a viable mechanism to manage watersheds across the country in the long run.

In 2019, a PES scheme was established between the Pawkhaola-Darachhu community and Damphu Municipality in Tsirang Dzongkhag. So far four PES schemes have been established and are successfully implemented (Table 14).

Table 14: PES Schemes in Bhutan

Sl. No.	Location	Dzongkhag	Year of Establishment	Annual Payment (Nu.)	Implementation status
1	Yakpugang,	Mongar	2015	142,800	2 nd agreement term
2	Namay-Nichu, Tsentso	Paro	2016	142,000	1 st agreement term
3	Burkhey	Chhukha	2016	125,000	1 st agreement term
4	Pawkhaola-Darachhu	Tsirang	2019	224,000*	1 st agreement term

*payment amount increases with increasing users

6.9. NATURE RECREATION

Recreation is another important ecosystem service provided by Forests. Rapid urbanisation and increasing awareness of the health benefits have created a rising demand for outdoor recreation globally and even in Bhutan. Currently nature tourism is increasing in Bhutan and the demand for appropriate places for local Bhutanese to recreate is also growing. The existing network of Protected Areas and other recreation areas provide avenues for nature recreation in Bhutan.

2,133 tourists visited the National Parks and Wildlife Sanctuaries in 2019 out of which 1,953 were international tourists and 180 were nationals. Royal Botanical Park at Lampelri, had 17088 visitors, of which 9,235 were International tourists including Regional tourist and 7,853 nationals (Table 15). The total revenue generated for 2019 from Sakteng WLS is Nu. 226,000 and Nu.1,319,710 from Royal Botanical Park, Lampelri (Table 16). Currently, no entry fee is charged for tourists visiting protected areas except Sakteng Wildlife Sanctuary (SWS) where individual tourist has to pay Nu.1,000.

Table 15: Visitor Information

Sl. No.	Name	Visitors (No.)
1	Jigme Dorji National Park	1,266
2	Phrumsengla National Park	277
3	Royal Manas National Park	428
4	Sakteng Wildlife Sanctuary	226
5	Wangchuck Centennial National Park	225
6	Jigme Singye Wangchuck National Park	140
7	Bumdeling Wildlife Sanctuary	58
8	Royal Botanical Park, Lampelri, Thimphu	17,088
9	Motithang Takin Preserve, Thimphu	68,150

Table 16: Revenue Collected from Tourist

Sl. No.	Name	Total Revenue (Nu)
1	Sakteng Wildlife Sanctuary	226,000.00
2	Royal Botanical Park	1,319,710.00
3	Takin Preserve	17,815,730.00

6.10. PLANTATIONS

The Green Bhutan Corporation Ltd (GBCL) was created in year 2017 with the core mandate to undertake afforestation, landscape development and greening activities, develop recreational areas in urban and other strategic places, production and supply of flowers and ornamental plants. Department and GBCL

created 351.71 ha plantation (Table 17) and maintained 275.60 ha plantation in 2019 (Table 18). Department also maintains nurseries for supplying seedlings for social forestry events to schools, public and institutions. Seven nurseries were created as given in Table 19.

Table 17: New Plantation created in 2019

Sl. No	Division/Park	Total area(ha)
1	Divisional Forest Office, Dagana	38
2	Divisional Forest Office, Gedu	10
3	Divisional Forest Office, Thimphu	36
4	Divisional Forest Office, Sarpang	3
5	Divisional Forest Office, Tsirang	43
6	Divisional Forest Office, Mongar	14.23
7	Divisional Forest Office, Paro	20
8	Divisional Forest Office, Pemagatsel	20.13
9	Divisional Forest Office, Trashigang	68
10	Divisional Forest Office, Wangdue	43.87
11	Sakteng Wildlife Sanctuary	3.16
12	Jigme Dorji National Park	41
13	Jomotsangkha Wildlife Sanctuary	5
14	Divisional Forest Office, Zhemgang	6.33
	Total	351.72

Table 18: Plantation maintained in 2019.

Sl. No	Name of Division/Park	Area (Ha)
1	Divisional Forest Office, Bumthang	24.00
2	Divisional Forest Office, Dagana	9.00
3	Divisional Forest Office, Thimphu	16.00
4	Divisional Forest Office, Samtse	5.00
5	Divisional Forest Office, Sarpang	6.90
6	Divisional Forest Office, Pemagatsel	4.00
7	Divisional Forest Office, Mongar	11.12
8	Divisional Forest Office, Tsirang	7.20
9	Divisional Forest Office, Wangdue	144.17
10	Divisional Forest Office, Zhemgang	1.81
11	Sakteng Wildlife Sanctuary	20.00
12	Jigme Dorji National Park	25.00
13	Phibsoo Wildlife Sanctuary	1.40
	Total	275.60

Table 19: New Nurseries Created and maintained in 2019

Sl. No	Office	Location name	Gewog	Type of Nursery
1	Divisional Forest Office, Dagana	Lha mozingkha	Deorali	12 beded
		Dagapela	Goshi	8 beded
2	Divisional Forest Office, Samtse	Samtse Office Compound	Samtse	20 beded
3	Divisional Forest Office, Pemagatshel	Gamazore	Khar	10 beded
4	Divisional Forest Office, Tsirang	Tsirang Range	Kikhorthang	Seedling production & Nursery maintenance
		Tsirang Division	Kikhorthang	Raising Ornamental seedling in Nursery
5	Jigme Dorji National Park	Damji	Khaoe	Seedling production & Nursery development

6.11. PRIVATE FORESTS

In 2019, 11.75 ha of forests were registered as Private Forests in Mongar, Samtse, Sarpang, Trashiyangtse and Tsirang as given in Table 20.

Table 20: New Private Forest registered in 2019

Sl. No	Dzongkhag	Gewog	Village	Area (ha)
1	Mongar	Shermuhung	Muhung	2.21
			Serzhong	2.22
2	Samtse	Doongtoed	Daragaon	0.08
			Khalingaon	0.24
		Dophuchen	Lepagang	0.38
3	Sarpang	Gelephu	Pelrithang	0.4
			Pemathang	0.51
			Zomlingthang	0.87
		Shompangkha	Gomchulakha	2.22
			Norbugang	0.12
			Pantharey	0.59
4	Trashiyangtse	Bumdeling	Phanteng	0.13
			Zhapang	1.54
5	Tsirang	Rangthangling	Sunkosh	0.24
Total				11.75

7. RESOURCE UTILIZATION

7.1. ALLOTMENT OF TIMBER BY DEPARTMENT

In 2019, the DoFPS allotted a total of 200,316 m³ timber in standing volume for various purposes. This accounts for 144,360 m³ and 55,956 m³ of timber in standing volume has been allotted on rural and commercial rate of royalty respectively by the Department (Table 21). From the total allotment of 200,316 m³, about 58,055 m³ was allotted as firewood and 2,044 m³ timber was allotted for construction of Dzongs and Lhakhangs. Nu. 13.66 million Royalty was realized from the supply of forest produce in 2019 (Table 22 to Table 24).

Table 21: Timber allotted by DoFPS in 2019

Sl. No.	Office	Rural (m ³)	Royalty (Nu.)	Commercial (m ³)	Royalty (Nu.)
1	Divisional Forest Office, Bumthang	19006.12	324752.70	13356.29	1987804.58
2	Divisional Forest Office, Dagana	10196.69	223603.28	1667.18	150799.00
3	Divisional Forest Office, Gedu	4263.28	105313.53	3627.70	116944.87
4	Divisional Forest Office, Mongar	8193.41	238113.92	3382.04	227634.73
5	Divisional Forest Office, Paro	7265.81	133464.92	4668.83	1248597.67
6	Divisional Forest Office, Pemagatshel	310.98	7616.71	217.14	10493.98
7	Divisional Forest Office, Samdrup Jongkhar	1874.20	52943.51	721.30	33534.68
8	Divisional Forest Office, Samtse	9435.88	240397.46	336.07	79261.38
9	Divisional Forest Office, Sarpang	3880.87	111524.53	1848.02	325926.83
10	Divisional Forest Office, Thimphu	6264.62	121033.87	1972.18	250782.48
11	Divisional Forest Office, Trashigang	13186.49	414871.47	2327.82	172705.60
12	Tsirang Forest Division	2939.56	51610.84	229.33	5754.00
13	Divisional Forest Office, Wangduephodrang	20717.18	470465.60	8969.70	1781588.86
14	Divisional Forest Office, Zhemgang	3009.29	58190.18	659.22	167855.55
15	Bumdeling Wildlife Sanctuary	5388.17	130132.95	528.07	87298.83
16	Jigme Dorji National Park	7751.20	131253.81	8467.01	1586650.34
17	Jigme Khesar Strict Nature Reserve	5393.61	94319.39	0.00	0.00
18	Jigme Singye Wangchuck National Park	931.32	31666.03	0.00	0.00
19	Jomotsangkha Wildlife Sanctuary	1878.42	55208.92	577.43	20849.77

20	Phibsoo Wildlife Sanctuary	313.11	5640.00	46.39	32739.69
21	Phrumsengla National Park	6073.01	1920894.36	1486.70	173643.29
22	Royal Manas National Park	584.19	14519.70	144.01	26705.16
23	Sakteng Wildlife Sanctuary	4333.43	126157.96	532.93	37565.28
24	Wangchuck Centennial National Park	1169.21	41105.29	190.40	30251.76

Table 22: Rural Firewood allotted by DoFPS

Sl. No	Office	Volume (m ³)	Royalty Realized (Nu.)
1	Divisional Forest Office, Bumthang	2,057.00	22,937.00
2	Divisional Forest Office, Dagana	4,064.00	98,050.00
3	Divisional Forest Office, Gedu	1,265.00	28,615.00
4	Divisional Forest Office, Mongar	4,578.00	104,492.00
5	Divisional Forest Office, Paro	1,470.00	18,784.00
6	Divisional Forest Office, Pemagatshel	225.00	5,940.00
7	Divisional Forest Office, Samtse	4,954.00	128,276.00
8	Divisional Forest Office, Sarpang	3,020.00	68,567.00
9	Divisional Forest Office, Thimphu	790.00	9,302.00
10	Divisional Forest Office, Trashigang	6,488.00	149,485.00
11	Divisional Forest Office, Tsirang	956.00	22,571.00
12	Divisional Forest Office, Wangdue	1,404.00	25,503.00
13	Divisional Forest Office, Zhemgang	23.00	9,680.00
14	Bumdeling Wildlife Sanctuary	2,505.00	56,522.00
15	Jigme Dorji National Park	754.00	10,640.00
16	Jigme Khesar Strict Nature Reserve	57.00	1,040.00
17	Jigme Singye Wangchuck National Park	360.00	8,100.00
18	Jomotsangkha Wildlife Sanctuary	148.00	3,715.00
19	Phibsoo Wildlife Sanctuary	120.00	2,700.00
20	Phrumsengla National Park	1,633.00	1,829,363.00
21	Royal Manas National Park	178.00	4,050.00
22	Sakteng Wildlife Sanctuary	2,692.00	60,833.00
23	Wangchuck Centennial National Park	703.00	10,597.00

Table 23: Commercial Firewood allotted by DoFPS

Sl. No	Office	Volume (m ³)	Royalty Realized (Nu.)
1	Divisional Forest Office, Bumthang	1,695.00	23,257.00
2	Divisional Forest Office, Dagana	951.00	21,734.00

3	Divisional Forest Office, Gedu	3,084.00	68,399.00
4	Divisional Forest Office, Mongar	2,625.00	75,286.00
5	Divisional Forest Office, Paro	146.00	10,570.00
6	Divisional Forest Office, Pemagatshel	157.00	3,960.00
7	Divisional Forest Office, Samdrup Jongkhar	630.00	14,201.00
8	Divisional Forest Office, Samtse	53.00	3,460.00
9	Divisional Forest Office, Sarpang	323.00	7,565.00
10	Divisional Forest Office, Thimphu	419.00	6,036.00
11	Divisional Forest Office, Trashigang	1,446.00	46,490.00
12	Divisional Forest Office, Tsirang	224.00	5,040.00
13	Divisional Forest Office, Wangdue	741.00	18,481.00
14	Divisional Forest Office, Zhemgang	125.00	10,201.00
15	Bumdeling Wildlife Sanctuary	117.00	2,636.00
16	Jigme Dorji National Park	3,483.00	74,406.00
17	Jomotsangkha Wildlife Sanctuary	480.00	10,789.00
18	Phibsoo Wildlife Sanctuary	0.00	0.00
19	Phrumsengla National Park	563.00	12,720.00
20	Royal Manas National Park	0.00	0.00
21	Sakteng Wildlife Sanctuary	349.00	7,853.00

Table 24: Timber Allotted by DoFPS to Dzongs and Lhakhangs

Sl. No	Purpose	Rural Volume (m ³)	Royalty (Nu.)	Commercial (m ³)	Royalty (Nu.)
1	Dzongs and Lhakhangs	966.00	38561.00	1078.00	849539.00

7.2. PRODUCTION OF TIMBER FROM FMUs AND OUTSIDE FMUs

11,325.87 m³ (3.93 million cft) of timber in standing volume was extracted from FMUs and areas outside FMUs in 2019 by NRDCL (Table 25 & Table 26). Total standing volume extracted from FMUs by NRDCL in 2019 was 80,460.76 m³ (Figure 16). The timber extracted from areas outside FMUs in 2019 by NRDCL accounts for a total of 30,865.11 m³ of timber in standing volume (Figure 17). The timbers thus extracted was supplied by NRDCL for various uses as indicated in Figure 18.

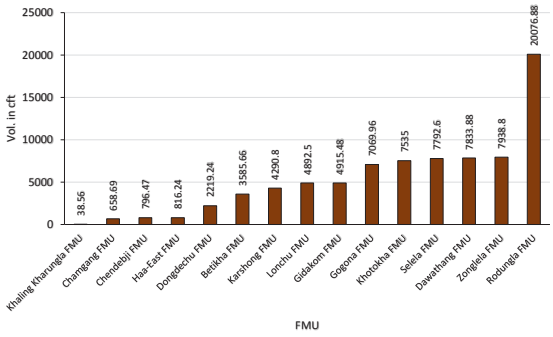


Figure 16: Total Timber Production (Standing Volume)from FMUs by NRDCCL

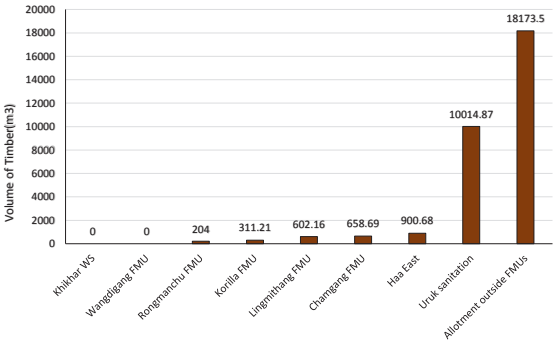


Figure 17: Total Timber Production (Standing Volume) from FMUs by NRDCCL on ad-hoc basis

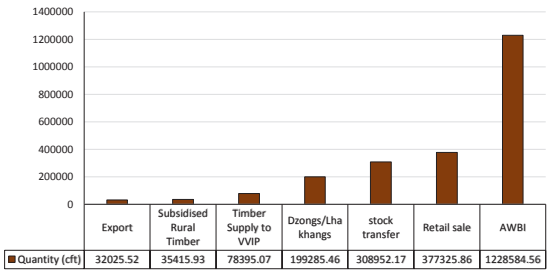


Figure 18: Timber(cft) allotted by NRDCCL for various purposes

Table 25: Timber Production from FMUs and Action Plans in 2019

Sl. No.	Forest Management Unit (FMU)	Standing Volume (m ³)
1	Karshong FMU	4,290.80
2	Dawathang FMU	7,833.88
3	Rodungla FMU	20,076.88
4	Chendebji FMU	796.47
5	Khotokha FMU	7,535.00
6	Gogona FMU	7,069.96
7	Dongdechü FMU	2,219.24
8	Khaling Kharungla FMU	38.56
9	Khengzore FMU	0.00
10	Zonglela FMU	7,938.80
11	Haa-East FMU	816.24
12	Selela FMU	7,792.60
13	Lonchu FMU	4,892.50
14	Betikha FMU	3,585.66
15	Gidakom FMU	4,915.48
16	Chamgang FMU	658.69
17	Metapchhu FMU	0.00
18	Lingmithang FMU	0.00
19	Korilla FMU	0.00
20	Rongmanchu FMU	0.00
21	Wangdigang FMU	0.00
Total		80,460.76

Table 26: Timber Production from outside FMUs and Adhoc Areas

Sl. No	Ad-hoc allotment outside Forest Management Unit (FMU)	Volume (m ³)
1	Uruk sanitation	10,014.87
2	Khikhar WS	0.00
3	Allotment outside FMUs	18,173.50
4	Lingmithang FMU	602.16
5	Korilla FMU	311.21
6	Rongmanchu FMU	204.00
7	Wangdigang FMU	0.00
8	Chamgang FMU	658.69
9	Haa East	900.68
Total		30,865.11

Note: A conversion ratio of 50:50 was adopted for conversion from standing volume to log volume.

7.3. NON-WOOD FOREST PRODUCTS

Total of Nu. 25,093,543.90 was collected as royalty from the Non-Wood Forest Products utilisation in 2019 (Table 27).

Table 27: NWFs Extracted and Royalty Realized in 2019

Sl. No.	Product Name	Unit	Quantity	Royalty Realized (Nu.)
1	Banana Leaves	Bundle	100	400.00
		Number	120	650.00
2	<i>Calamus sp.</i>	Number	120	120.00
		Bundle	782	2,942.00
		Truckload	3	1,240.00
3	Charcoal	Kilogram	7,300	1,476.00
4	Soil	Truckload	1,223	100,694.50
		Kilogram	1,700	3,400.00
5	<i>Cymbidium sp. (Olatshey)</i>	Bundle	6	240.00
6	<i>Daphne sp. (Bark)</i>	Kilogram	5,885	5,531.00
7	<i>Hippophae rhamnoides (Tarbu)</i>	Kilogram	1,100	4,400.00
8	<i>Edgeworthia sp. (Bark)</i>	Kilogram	1,000	600.00
9	<i>Diplazium spp. (Fern top)</i>	Truckload	2	140.00
10	Bamboo	Number	125,963	114,803.50
		Truckload	1,573	14,670.00
11	Lemon grass	Litre	560	2,800.00
12	Mushroom	Number	7,250	7,250.00
		Kilogram	52,875	106,950.00
3	<i>Knema sp.</i>	Kilogram	100	500.00
14	<i>Nardostachys jatamansi (Pangpoe)</i>	Kilogram	64,275	128,550.00
15	<i>Ophiocordyceps sinensis (Cordyceps)</i>	Kilogram	1,342	1,269,240.00
16	<i>Paris polyphylla</i>	Kilogram	535	8,215.00
17	<i>Rhododendron sp.</i>	Kilogram	3,081	6,241.00
18	<i>Rubia cordifolia</i>	Kilogram	24,524	377,504.00
19	River bed materials	Truckload	92,221	3,679,040.00
20	<i>Pouzolzia sp.</i>	Kilogram	8,962	17,924.00
21	<i>Phyllanthus emblica</i>	Kilogram	3	15.00
22	<i>Picrorhiza sp.</i>	Kilogram	10	120.00
23	Quartzite	Truckload	6	240.00
24	Resin	Kilogram	6,464	25,856.00.
25	<i>Piper longum (Pipla)</i>	Kilogram	600	12,000.00
26	Pine needles	Truckload	38	1,397.00
		Bundle	72	76.00

27	<i>Pinus wallichiana</i>	Number	200	2,000.00
28	<i>Juniperus sp. (Stem)</i>	Number	2	2,400.00
29	Leaf molds	Truckload	587	33,596.50
30	Leave litters	Truckload	14	786.00
31	Leaves (Incense)	Truckload	21	880.00
		Bundle	138	547.00
32	Stone dust	Truckload	99	3,200.00
33	Stone	M ³	294,902	1,470,926.00
		Truckload	241,805	9,592,816.00
		Tractor	7	832.00
34	Gravels/Stones Chips	Truckload	123,472	4,906,214.00
		M ³	87,223	436,435.00
35	Sand	Truckload	45,121	1,814,634.00
		M ³	177,486	897,719.50
36	Shilajit	Kilogram	805	6,440.00
37	<i>Swertia chirata</i>	Kilogram	150	3,600.00
38	<i>Thysanolaena latifolia (Broom grass)</i>	Bundle	1,042	2,824.50
		M ³	2,000	2,000.00
39	<i>Yushania maling</i>	Number	620	142.40
		Bundle	10	80.00
40	Wildlings (Saplings)	Number	3,066	14,766.00
41	<i>Zanthoxylum spp.</i>	Kilogram	380	1,520.00

7.4. WOODBASED INDUSTRIES

Currently there are 119 sawmills in Bhutan. Out of which, Haa has the highest number of sawmills, followed by Paro and Thimphu. The number of existing sawmills in each Dzongkhags are given in Figure 19.

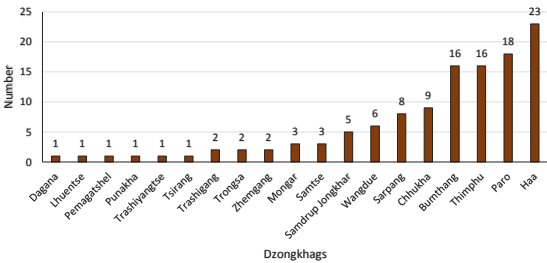


Figure 19: Number of existing sawmills as of 2019

8. CHALLENGES

8.1. FORESTRY CLEARANCE

In 2019, the Department issued forestry clearance for 1,127.43 ha of State Reserve Forest Land (SRFL) for various development activities (Figure 20). Amongst the field offices, Gedu Forest Division issued forestry clearances for 152.43 ha of SRFL which is the highest and Phibsoo Wildlife Sanctuary issued forestry clearance for only 0.27 ha of SRFL area, the lowest (Figure 21).

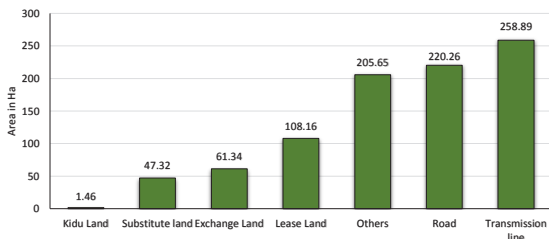


Figure 20. Forestry Clearance for various purposes

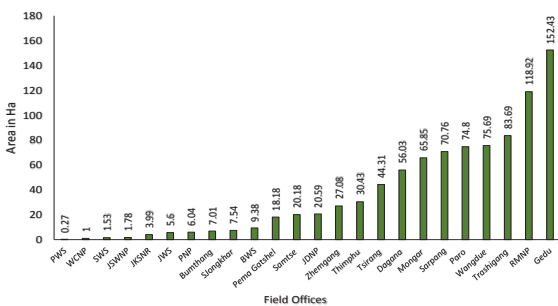


Figure 21: Forestry Clearance issued by Field Offices in 2019

8.2. HUMAN WILDLIFE CONFLICT

Human-wildlife conflicts such as crop depredation, livestock depredation, and retaliatory killing are some of the major challenges encountered. The key conflict species are tiger, leopard, monkey, deer and wild boar. In 2019, 13 domestic animals kills were reported (Table 28) and 17.24 ha of farm land with various crops were damaged (Table 29). Conducting advocacy and awareness programs to communities, encouraging solar electric fencings, bio fencing and instituting quick response teams in communities are some of the strategies implemented by the Department.

Table 28: Human Wildlife Conflict cases reported in 2019

Sl. No.	Division/Park	Predator Type	Livestock Type	Nos. killed
1	Jigme Dorji National Park	Tiger	Cattle	2
2	Jomotsangkha Wildlife Sanctuary	Tiger	Cattle	1
		Common leopard	Cattle	2
			Goat	1
3	Phibsoo Wildlife Sanctuary	Common leopard	Cattle	3
				1
4	Divisional Forest Office, Zhemgang	Tiger	Cattle	3

Table 29: Crop Depredation reported in 2019

Sl. No.	Division/Park	Crop Type	Area Affected (ha)
1	Jomotsangkha Wildlife Sanctuary	Banana	0.24
		Betel nut	0.01
		Buckwheat	0.00
		Maize	0.63
		Paddy	0.29
		Potato	0.04
2	Royal Manas National Park	Banana	0.20
		Betel nut	4.15
3	Divisional Forest Office, Samtse	Banana	0.08
		Betel nut	0.78
		Maize	0.26
4	Divisional Forest Office, Sarpang	Banana	8.82
		Beans	0.00
		Betel nut	0.42
		Chilli	0.81
		Litchi	0.04
		Maize	0.13
		Paddy	0.32

8.3. ILLEGAL ACTIVITIES

In 2019, the Department detected a total of 1,911 offences related to timber, poaching, fishing, NWFPs and land encroachments. Amongst these, offence related to illegal timber was highest with 795 incidences, followed by fishing and aquatic with 504 incidences. Poaching was the least with 49 cases (Table 30).

Table 30: Summary of Illegal Activities reported in 2019

Sl. No	Offence type	Total Cases (No.)	Fine (Nu.)	Compensation (Nu.)	Reward (Nu.)
1	Illegal Timber	795	7,571,910.09	11,573,248.00	1,998,388.00
2	Timber Misuse	61	1,008,306.00	1,159,067.00	166,086.30
3	Poaching	49	1,393,000.00	270,000.00	1,381,750.00
4	Fishing and Aquatic	504	3,274,090.00	17,120.00	3,107,273.00
5	NWFP	446	2,869,757.55	2,020,339.00	797,489.38
6	Land Related offence	56	875,187.00	17,701.55	241,546.75

8.4. ANIMAL RESCUE AND REHABILITATION

In 2019, Department rescued and rehabilitated 276 wild animals such as sambar, black bear, deer, hornbill, python, owlet, wild boar, goral, takin, monkey etc. Nature Conservation Division (NCD) rescued highest number of animals amongst offices (Figure 22). Department carried out rescue for 106 animals successfully and 74 wild animals have succumbed to injuries (Figure 23).

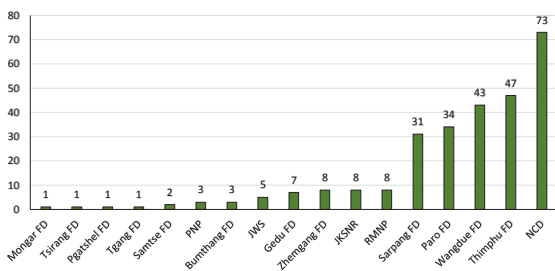


Figure 22: Animals rescued by NCD and Field offices in 2019 (Source: NCD, 2019)

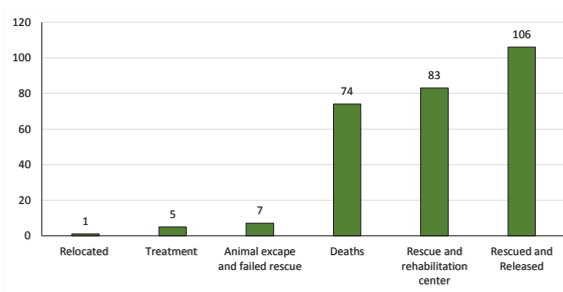


Figure 23: Rescue operation conducted in 2019 (Source: NCD, 2019)

8.5. FOREST FIRE

A total of 40 forest fire incidents took place in 2019 damaging a total forest area of 3524.72 ha. Wangduephodrang and Tashigang Dzongkhag experienced highest number of forest fire incidences i.e 8 numbers each (Figure 25). Mongar Dzongkhag was affected most by forest fire losing about 1549.36 hectares (Figure 26) area to forest fire. Reckless behaviour of picnickers, smokers, burning of agriculture debris, pasture development were the most common cause of forests fires in 2019. However, the causes of 80% of the fire incidents reported in 2019 couldn't be ascertained (Figure 24).

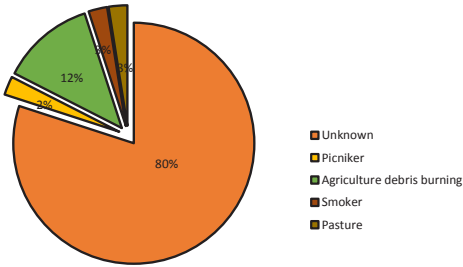


Figure 24: Causes of Forest Fire

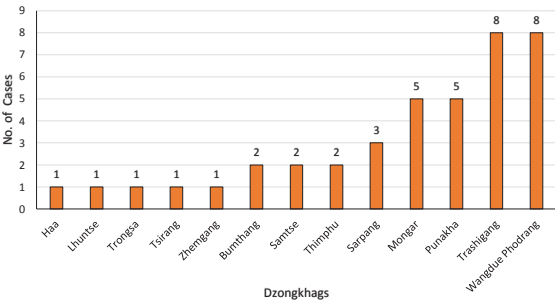


Figure 25: Forest Fire incidences in 2019

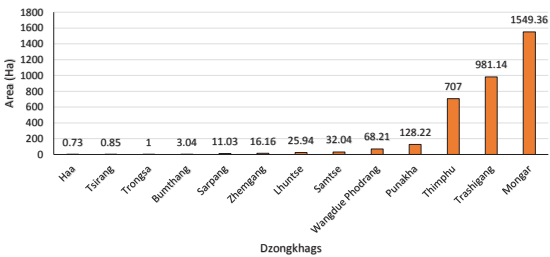


Figure 26: Area damaged by forest fire in 2019

8.6. HUMAN RESOURCES

The Department has a total of 1,480 staff members, out of which 1,402 are technical and 78 are non-technical. Of the total staff, 1,258 are males and 222 are female (Figure 26). By position levels, Forest Ranger category has the maximum staff with 644 individuals (Figure 27 & Figure 29).

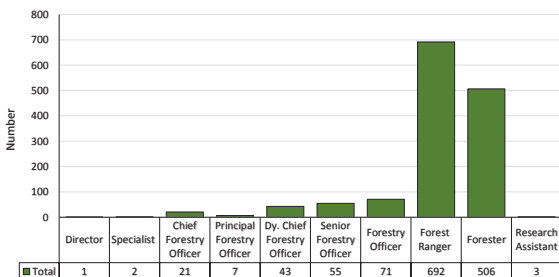


Figure 27: Human Resources by Position Categories
(Source: HRD, 2019)

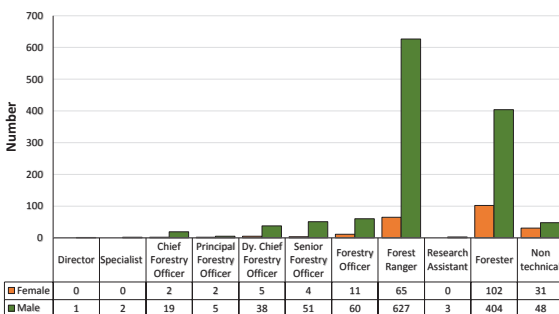


Figure 28: Gender Wise Human Resources and Position Levels of DoFPS (Source: HRD, 2019)

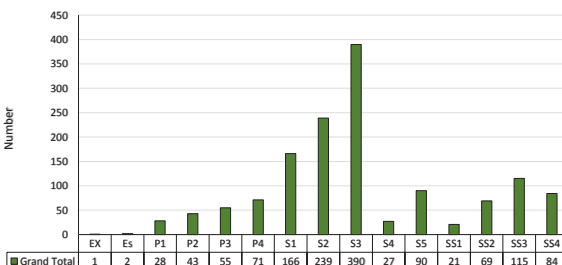


Figure 29: Technical foresters at different position levels of DoFPS (Source: HRD, 2019)

OFFICES AND CONTACT DETAILS

Sl. No.	Name of Offices	Telephone Number (Direct Line)	Telephone Number (PABX)	Email id
1	Directorate	+975-02-323055 / +975-02-321185 (PA)	+975-02-334458	ldorji@moaf.gov.bt
2	Social Forestry and Extension Division	+975-02-323138	+975-02-323138	kjtempheh@moaf.gov.bt
3	Forest Protection and Enforcement Division	+975-02-322487	+975-02-322487	kinleytsheringl@moaf.gov.bt
4	Watershed Management Division	+975-02-321193	+975-02-323568	sdelma@moaf.gov.bt
5	Nature Conservation Division	+975-02-324131	+975-02-325042	sonamwangdi@moaf.gov.bt
6	Forest Resources Management Division	+975-02-330016	+975-02-327723	norbuwangdi@moaf.gov.bt
7	Ugyen Wangchuck Institute for Conservation and Environmental Research	+975-03-631923	+975-03-631923	sdorji@uwice.gov.bt
8	Global Tiger Center	+975-17503160	+975-77113113	ttempa@moaf.gov.bt
9	Divisional Forest Office, Bumthang	+975-03-631181	+975-2-631182	pdukpa@moaf.gov.bt
10	Divisional Forest Office, Tashigang	+975-04-521494	+975-04-521240	kleki@moaf.gov.bt
11	Divisional Forest Office, Mongar	+975-04-641327	+975-04-641146	ktempa@trashiyangtse.gov.bt
12	Divisional Forest Office, Paro	+975-08-271221	+975-08-272163	lhenduptharchen@moaf.gov.bt
13	Divisional Forest Office, Sarpang	+975-06-365341	+975-06-365341	pdhendup@moaf.gov.bt
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16	Divisional Forest Office, Gedu	+975-05-282236	+975-05-282236	pemaw@moaf.gov.bt
17	Divisional Forest Office, Zhemgang	+975-17123146	+975-03-741205	jigmed@moaf.gov.bt
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19	Divisional Forest Office, Samtse	+975-05-365359	+975-05-365253	thinleyw@moaf.gov.bt
20	Divisional Forest Office, Wangdue	+975-02-376008	+975-02-376107	karmatenzing23@gmail.com
21	Divisional Forest Office, Dagana	+975-17620592	+975-06-483190	kenchodukpa@moaf.gov.bt
22	Divisional Forest Office, Pemagatshel	+975-07-471160	+975-07-471160	ugyenwangchuk@moaf.gov.bt
23	Jigme Dorji National Park	+975-16288188	+975-16288304	rnzndorji07@gmail.com
24	Jigme Singye Wangchuck National Park	+975-03-527006	+975-03-527005	tsobgyel@gmail.com
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26	Wangchuck Centennial National Park	+975-03-631604	+975-03-631604	tsheringdhendup@moaf.com
27	Phrumsengla National Park	+975-77192123	+975-77192125	yontennorbu@moaf.gov.bt
28	Bumdeling Wildlife Sanctuary	+975-04-781155	+975-04-781155	tsheringdhendup@moaf.gov.bt
29	Phibsoo Wildlife Sanctuary	+975-17151667	+975-17151663	drabten@moaf.gov.bt
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