

GLOBAL FOREST RESOURCES ASSESSMENT 2015

COUNTRY REPORT

Bhutan

Rome, 2014

FAO, at the request of its member countries, regularly monitors the world's forests and their management and uses through the Global Forest Resources Assessment (FRA). This country report is prepared as a contribution to the FAO publication, the Global Forest Resources Assessment 2015 (FRA 2015).

The content and the structure are in accordance with the recommendations and guidelines given by FAO in the document Guide for country reporting for FRA 2015 (<http://www.fao.org/3/a-au190e.pdf>). These reports were submitted to FAO as official government documents.

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Introductory Text

Place an introductory text on the content of this report

Bhutan is small landlocked country situated between longitude 88 ° 54' and 92 ° 10' East and latitude 26 ° 40' and 28 ° 15' North. The country is bordered by China in the North and India in East, West and South. The geographic area of 38,394 km² is almost mountainous with little flat plain limited to southern part of country. The elevation varies from 100masl in the southern foothill to more than 7,700masl in the northern mountains. Bhutan has a wide variety of climatic conditions influenced by the topography, elevation and rainfall patterns.

Bhutan's high, rugged mountains and deep valleys are rich in spectacular biodiversity and have been identified as one of the top ten biodiversity hotspots. Bhutan is home to around 5,603 species of vascular plant of which 105 are endemic, more than 770 bird species and 200 mammals of which 27 are globally threatened. The country has 70.46 % of forest cover of which 62.43% is broadleaf, 36.4% is conifer and 1.16% is mixed broadleaf and conifer. The constitution of the country also mandates the maintenance of 60 % of forest cover for perpetuity.

Department of Forest and Park Services is currently carrying out National Forest Inventory to know the status of forests of Bhutan. This inventory was deemed necessary to update the existing data. It is expected have changes in the figures of reporting once the National Forest Inventory is completed.

Desk Study?

Check "yes" if this survey is a Desk Study, "no" otherwise	
Desk Study?	no

1. What is the area of forest and other wooded land and how has it changed over time?

Documents for this question:

- [Guide for country reporting FRA 2015](#)
- [FRA 2015 Terms and Definitions](#)

1.1 Categories and definitions

Category	Definition
Forest	Land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use.
Other wooded land	Land not classified as "Forest" spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of 5-10 percent or trees able to reach these thresholds ; or with a combined cover of shrubs bushes and trees above 10 percent. It does not include land that is predominantly under agricultural or urban land use.
Other land	All land that is not classified as "Forest" or "Other wooded land".
...of which with tree cover (<i>sub-category</i>)	Land considered as "Other land", that is predominantly agricultural or urban lands use and has patches of tree cover that span more than 0.5 hectares with a canopy cover of more than 10 percent of trees able to reach a height of 5 meters at maturity. It includes bothe forest and non-forest tree species.
Inland water bodies	Inland water bodies generally include major rivers, lakes and water reservoirs.
Forest expansion	Expansion of forest on land that, until then, was not defined as forest.
...of which afforestation (<i>sub-category</i>)	Establishment of forest through planting and/or deliberate seeding on land that, until then, was not defined as forest.
...of which natural expansion of forest (<i>sub-category</i>)	Expansion of forests through natural succession on land that, until then, was under another land use (e.g. forest succession on land previously used for agriculture).
Deforestation	The conversion of forest to other land use or the longterm reduction of the tree canopy cover below the minimum 10 percent threshold.
...of which human induced (<i>sub-category</i>)	Human induced conversion of forest to other land use or the permanent reduction of the tree canopy cover below the minimum 10 percent threshold.
Reforestation	Natural regeneration or re-establishment of forest through planting and/or deliberate seeding on land already in forest land use.
...of which artificial reforestation (<i>sub-category</i>)	Re-establishment of forest through planting and/or deliberate seeding on land already in forest land use.

1.2 National data

1.2.1 Data sources

	References to sources of information	Variables	Years	Additional comments
1	RGOB, 1995. Land Cover Figures of Bhutan (National figures), Ministry of Agriculture, Royal Government of Bhutan	Landuse, Forest types	1995	N/A

2	Ministry of Agriculture, 1999. Atlas of Bhutan 1: 250,000 (Landcover and Area Statistic of 20 Dzongkhag)	Landuse, Forest types	1995	N/A
3	MoAF. 2010. Technical report Bhutan Land Cover Assessment 2010 (LCMP 2010)	Landuse, Forest types	2010	N/A
4	MoAF, 2011. Land cover atlas of Bhutan 1:250,000	Landuse and forest types	2010	N/A
5	RGoB, MoAF, 2011. National Forest Policy of Bhutan	Policy statement and defination	2011	N/A
6	DoFPS. 2011. Forestry Facts, Figures and Trends	Forest statistic	2011	N/A
7	NRDCL 2011. Annual Report	Plantation area	2011	N/A
8	DoFPS 2011. Information obtained from Plantation Section, Social Forestry Extension Division	Plantation area	2011	N/A

1.2.2 Classification and definitions

National class	Definition
Forest	Forest means 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.
Afforestation	The establishment of tree by sowing, planting or natural regeneration on an area from which trees always or very long been absent.
Deforestation	Clearing an area of forest on a non-temporary basis for another use. Clear cutting (even with stump removal), if shortly followed by reforestation for forestry purposes, is not deforesting.
N/A	N/A

1.2.3 Original data

Forest Area	
National Data for 1995	
LanduseCatogary	1995 (LUPP)(in 1000ha)
Forest	2550.021

Scrub Forest	305.293
Meadows	149.105
Agriculture	307.267
Horticulture	5.72
Improved Pasture	1.086
Plantation	6.337
Settlements	3.117
SnowCover	256.809
Landslips	47.8
Marshy areas	3.5
Water spreads	28.393
Rocky outcrops	174.952
Total	3839.4

National Data for 2010

Landuse category		2010 (LCMP) (in 1000 ha)
Forest	Fir	183.208
	Mixed Conifer	613.964
	Blue Pine	80.024
	Chir Pine	107.667
	Broadleaf + Conifer	31.472
	Broadleaf	1688.956
Shrub		400.526
Meadows		157.569
Agriculture land		112.556

Built up	6.151
Non- Built Up	0.330
Snow Cover	285.479
Bare areas	122.974
Water bodies	27.569
Marshy Land	0.319
Degraded Areas	20.636
Total	3839.40

Broad National Classes	Area in 1000 ha.	
	1995	2010
Forests ¹	2556.358	2705.291
Shrub/Scrub	305.293	400.526
Agriculture lands ²	312.987	112.556
Water spreads	28.393	27.569
Others ³	636.369	593.458
Total	3839.4	3839.4

Note: ¹ Includes plantation and excludes scrub and shrub.

² Includes Horticulture. ³ Others includes Snow/ glaciers; Bare land; Grassland/Pasture and Settlements.

Categories	Plantation during 1988-1992 (ha)	Average per year (ha)	Plantation during 1998-2002 (ha)	Average per year (ha)	Plantation during 2003-2007 (ha)	Average per year (ha)	Plantation (2008-2012 (ha)	Average per year (ha)
Normal Plantation	3439.10	687.82	1233.46	246.69	1980.23	396.05	1242.71	248.54
Plantation of harvested areas	1005.90	201.18	666.19	133.24	304.09	60.82	1317.69	263.54

Total	4445.00	889.00	1899.65	379.93	2284.32	456.87	2560.40	512.08
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1.3 Analysis and processing of national data

1.3.1 Adjustment

In the earlier report of Bhutan, the total geographical area was reported to be 47,000 square kilometres. But total area of the country, as per statistical yearbook of Bhutan 2012, National Statistics Bureau, Royal Government of Bhutan is 38,394 square kilometres. Therefore, county would like to maintain this figure for reporting.

1.3.2 Estimation and forecasting

Forest area					
Area under various broad national classes after estimation and forecasting using linear interpolation and extrapolation techniques is as under					
Broad National Classes	1990	2000	2005	2010	2015
Forests	2506.714	2606.002	2655.647	2705.291	2754.935
Shrub/Scrub	273.549	337.037	368.782	400.526	432.270
Agriculture lands	379.797	246.177	179.366	112.556	45.746
Water spreads	28.667	28.119	27.843	27.569	27.295
Others	650.673	622.065	607.762	593.458	579.154
Total	3839.4	3839.4	3839.4	3839.4	3839.4




1.3.3 Reclassification

Forest area					
Reclassification (percentage allocation) according to FRA classes					
Reclassification	Forest	Other wooded land	Other land with tree cover	Other land	Inland water
Forests	100 %				
Shrubs		100 %			
Agriculture land				100 %	
Water spreads					100 %
Others				100 %	

Forest expansion, reforestation		
National Class	Percentage of national class into FRA classes	
	Afforestation	Reforestation
Normal Plantation	100%	
Plantation of harvested areas		100%

1.4 Data

Table 1a

Categories		Area (000 hectares)				
		1990	2000	2005	2010	2015
	Forest	2506.714	2606.002	2655.647	2705.291	2754.935
	Other wooded land	273.549	337.037	368.782	400.526	432.27
	Other land	1030.47	868.242	787.128	706.014	624.9










	... of which with tree cover	N/A	N/A	N/A	N/A	N/A
	Inland water bodies	28.667	28.119	27.843	27.569	27.295
	TOTAL	3839.40	3839.40	3839.40	3839.40	3839.40

Table 1b

Categories		Annual forest establishment / loss (000 hectares per year)				...of which of introduced species (000 hectares per year)			
		1990	2000	2005	2010	1990	2000	2005	2010
	Forest expansion	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	... of which afforestation	0.688	0.247	0.396	0.249	N/A	N/A	N/A	N/A
	... of which natural expansion of forest	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Deforestation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	... of which human induced	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Reforestation	0.201	0.133	0.061	0.264	N/A	N/A	N/A	N/A
	... of which artificial	0.201	0.133	0.061	0.264	N/A	N/A	N/A	N/A

Tiers

Category	Tier for status	Tier for reported trend
Forest	Tier 2	Tier 2
Other wooded land	Tier 2	Tier 2
Forest expansion	Tier 2	Tier 2
Deforestation	N/A	N/A
Reforestation	Tier 2	Tier 2

Tier criteria

Category	Tier for status	Tier for reported trend
<ul style="list-style-type: none"> • Forest • Other wooded land • Afforestation • Reforestation • Natural expansion of forest • Deforestation 	<p>Tier 3 : Data sources: Either recent (less than 10 years ago) National Forest Inventory or remote sensing, with ground truthing, or programme for repeated compatible NFIs</p> <p>Tier 2 : Data sources: Full cover mapping / remote sensing or old NFI (more than 10 years ago)</p> <p>Tier 1 : Other</p>	<p>Tier 3 : Estimate based on repeated compatible tiers 3 (tier for status)</p> <p>Tier 2 : Estimate based on repeated compatible tier 2 or combination tier 3 and 2 or 1 (tier for status)</p> <p>Tier 1 : Other</p>

1.5 Comments

Category	Comments related to data definitions etc	Comments on the reported trends
Forest	N/A	The figure has been estimated using liner interpolation and extrapolation from 1995 and 2010 landuse and land cover data
Other wooded land	Shrubs is considered as other wooded land	N/A
Other land	It is sum of agriculture and other lands	N/A
Other land with tree cover	N/A	N/A
Inland water bodies	N/A	N/A
Forest expansion	This data is not available. AfforestationData reported is the average of 5 years period (i.e. 1988-1992, 1998-2002 , 2003-2007 and 2008-2012)	N/A
Deforestation	N/A	N/A
Reforestation	of which artificialData reported is the average of 5 years period (i.e. 1988-1992, 1998-2002 , 2003-2007 and 2008-2012).	N/A

Other general comments to the table

There is considerable difference in forest area reporting between 2010 and 2015, this is because: (1) Total geographical area of the country has changed. (2) Latest Land use data which was carried out in 2010 was used. National Forest Inventory is currently being carried out

2. What is the area of natural and planted forest and how has it changed over time?

Documents for this question:

- [Guide for country reporting FRA 2015](#)
- [FRA 2015 Terms and Definitions](#)

2.1 Categories and definitions

Term	Definition
Naturally regenerated forest	Forest predominantly composed of trees established through natural regeneration.
Naturalized introduced species	Other naturally regenerated forest where the tree species are predominantly non-native and do not need human help to reproduce/maintain populations over time.
Introduced species	A species, subspecies or lower taxon occurring <i>outside</i> its natural range (past or present) and dispersal potential (i.e. outside the range it occupies naturally or could occupy without direct or indirect introduction or care by humans).
Category	Definition
Primary forest	Naturally regenerated forest of native species where there are no clearly visible indications of human activities and the ecological processes are not significantly disturbed.
Other naturally regenerated forest	Naturally regenerated forest where there are clearly visible indications of human activities.
...of which of introduced species (<i>sub-category</i>)	Other naturally regenerated forest where the trees are predominantly of introduced species.
...of which naturalized (<i>sub-sub category</i>)	Other naturally regenerated forest where the trees are predominantly of naturalized introduced species.
Planted forest	Forest predominantly composed of trees established through planting and/or deliberate seeding.
...of which of introduced species (<i>sub-category</i>)	Planted forest where the planted/seeded trees are predominantly of introduced species.
Mangroves	Area of forest and other wooded land with mangrove vegetation.
...of which planted (<i>sub-category</i>)	Mangroves predominantly composed of trees established through planting.

2.2 National data

2.2.1 Data sources

	References to sources of information	Variables	Years	Additional comments
1	RGOB, 1995. Land Cover Figures of Bhutan (National figures), Ministry of Agriculture, Royal Government of Bhutan	Landuse, Forest types	1995	N/A
2	Ministry of Agriculture, 1999. Atlas of Bhutan 1: 250,000 (Landcover and Area Statistic of 20 Dzongkhag	Landuse, Forest types	1995	N/A

3	MoAF. 2010. Technical report Bhutan Land Cover Assessment 2010 (LCMP 2010)	Landuse, Forest types	2010	N/A
4	MoAF, 2011. Land cover atlas of Bhutan 1:250,000	Landuse and forest types	2010	N/A

2.2.2 Classification and definitions

National class	Definition
Protected Areas	A little more than half of the forest area in the Protected Areas have been categorised as Primary Forest. In this forest no human interference has taken place. In the other areas some human activities have taken place like collection of timber, firewood and non-wood forest products for bonafide consumption by the local people. This area has been categorised as Other naturally regenerated forest.
Forest covered by management plan	This refers to those forest areas that have approved management plans and are under intensive management. The forests are harvested under approved silvicultural system and are put under natural regeneration. However, if the natural regeneration fails even after three years then artificial regeneration are carried out.
Forest areas that are not covered by management plans	This refers to those forest areas that have no approved management plans. Removal on the selection system is done for supplying the timber and firewood for the local people for their bonafide consumption. The area is generally left for natural regeneration.
Plantation	Both afforestation and reforestation

2.2.3 Original data

Category	Area in (000ha)	
	1995	2010
Primary Forest	413	413
Other naturally regenerated forest	2143.358	2292.291
Planted forest	19.5	21.5
Total	2556.358	2705.291

2.3 Analysis and processing of national data

2.3.1 Adjustment

Not required

2.3.2 Estimation and forecasting

Category	Area in (000 ha)				
	1990	2000	2005	2010	2015
Primary Forest	413	413	413	413	413
Other naturally regenerated forest	2074.884	2172.832	2221.647	2270.791	2319.765
Planted forest	18.83	20.17	21	21.5	22.17
Total	2506.714	2606.002	2655.647	2705.291	2754.935

2.3.3 Reclassification

National Class	Percentage of a national class into FRA classes			
	Primary forest	Other naturally regenerated forest	Planted forests of native species	Planted forests of introduced species
	%	%	%	%
Protected Area	50%	50%		
Forest outside PA		100%		
Plantation			100%	

2.4 Data

Table 2a







Categories		Forest area (000 hectares)				
		1990	2000	2005	2010	2015
	Primary forest	413	413	413	413	413
	Other naturally regenerated forest	2074.884	2172.832	2221.647	2270.791	2319.765
	... of which of introduced species	N/A	N/A	N/A	N/A	N/A
	... of which naturalized	N/A	N/A	N/A	N/A	N/A
	Planted forest	18.83	20.17	21	21.5	22.17
	... of which of introduced species	N/A	N/A	N/A	N/A	N/A
TOTAL		2506.71	2606.00	2655.65	2705.29	2754.94

Table 2b

Primary forest converted to (000 ha)								
1990-2000			2000-2010			2010-2015		
Other natural regeneration	Planted	Other land	Other natural regeneration	Planted	Other land	Other natural regeneration	Planted	Other land
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 2c

Categories	Area (000 hectares)				
	1990	2000	2005	2010	2015
Mangroves (forest and OWL)	N/A	N/A	N/A	N/A	N/A
... of which planted	N/A	N/A	N/A	N/A	N/A

Tiers

Category	Tier for status	Tier for reported trend
Primary forest	Tier 3	Tier 3
Other naturally regenerated forest	Tier 3	Tier 3
Planted forest	Tier 3	Tier 3
Mangroves	Tier 3	Tier 3

Tier Criteria

Category	Tier for status	Tier for reported trend
Primary forest/Other naturally regenerated forest/Planted forest	<p>Tier 3 : Data sources: Recent (less than 10 years) National Forest Inventory or remote sensing with ground truthing or data provided by official agencies or programme for repeated compatible NFIs</p> <p>Tier 2 : Data sources: Full cover mapping/ remote sensing or old NFI (more than 10 years) Tier 1 : Other</p>	<p>Tier 3 : Estimate based on repeated compatible tiers 3 (tier for status) Tier 2 : Estimate based on repeated compatible tier 2 or combination tier 3 and 2 or 1 (tier for status) Tier 1 : Other</p>

2.5 Comments

Category	Comments related to data definitions etc	Comments on reported trend
Primary forest	This includes 50% of the Protected Area and, is assumed to remain same for 1990, 2000, 2005 and 2010.	N/A
Other naturally regenerating forest	This includes all the forest area in the country that has approved management plans, forest areas without management plans, protection area and 50% of Protected Area.	N/A
Planted forest	Plantation carried out by Department of Forest and Park Services, NRDCL and other agencies	N/A
Mangroves	Mangroves is not available in Bhutan	N/A

Other general comments to the table

Mangrove Forest is not available in Bhutan

3. What are the stocks and growth rates of the forests and how have they changed?

Documents for this question:

- [Guide for country reporting FRA 2015](#)
- [FRA 2015 Terms and Definitions](#)

3.1 Categories and definitions

Category	Definition
Growing stock	Volume over bark of all living trees with a minimum diameter of 10 cm at breast height (or above buttress if these are higher). Includes the stem from ground level up to a top diameter of 0 cm, excluding branches.
Net Annual Increment (NAI)	Average annual volume of gross increment over the given reference period less that of natural losses on all trees, measured to minimum diameters as defined for "Growing stock".
Above-ground biomass	All living biomass above the soil including stem stump branches bark seeds and foliage.
Below-ground biomass	All biomass of live roots. Fine roots of less than 2 mm diameter are excluded because these often cannot be distinguished empirically from soil organic matter or litter.
Dead wood	All non-living woody biomass not contained in the litter either standing lying on the ground or in the soil. Dead wood includes wood lying on the surface dead roots and stumps larger than or equal to 10 cm in diameter or any other diameter used by the country.
Carbon in above-ground biomass	Carbon in all living biomass above the soil including stem stump branches bark seeds and foliage.
Carbon in below-ground biomass	Carbon in all biomass of live roots. Fine roots of less than 2 mm diameter are excluded because these often cannot be distinguished empirically from soil organic matter or litter.
Carbon in dead wood	Carbon in all non-living woody biomass not contained in the litter, either standing, lying on the ground, or in the soil. Dead wood includes wood lying on the surface, dead roots and stumps larger than or equal to 10 cm in diameter or any other diameter used by the country.
Carbon in litter	Carbon in all non-living biomass with a diameter less than the minimum diameter for dead wood (e.g. 10 cm) lying dead in various states of decomposition above the mineral or organic soil.
Soil carbon	Organic carbon in mineral and organic soils (including peat) to a soil depth of 30 cm.

3.2 National data

3.2.1 Data sources

	References to sources of information	Variables	Years	Additional comments
1	DOF.1981.Report on Pre-investment Survey of Forest Resources in Southern Bhutan, Department of Forests, Royal Government of Bhutan (Part I)	Growing stock per stratum	1981	N/A

2	DOF.1981.Report on Pre-investment Survey of Forest Resources in Central and Eastern Bhutan, Department of Forests, Royal Government of Bhutan, Volume I	Growing stock per stratum	1981	N/A
3	DOF.1981.Report on Pre-investment Survey of Forest Resources in North Western Bhutan, Department of Forests, Royal Government of Bhutan	Growing stock per stratum	1981	N/A
4	Brown, Sandra. 1997. Estimating Biomass Change in Tropical Forests. A Primer. FAO Forestry Paper No. 134	Biomass Expansion Factor	All years	N/A

3.2.2 Classification and definitions

National class	Definition
Growing stock	Volume of all trees above 10cm dbh measured at breast height (i.e. 1.30 meters above the ground)
N/A	N/A
N/A	N/A
N/A	N/A

3.2.3 Original data

Growing stock			
Growing stock			
The total growing stock is from Pre-investment survey of Forest Resources of Bhutan, 1998 corresponding to forest area of LUPP, 1995.			
Forest Types	Area (000 ha)	Total Volume (000 m ³)	Volume per hectare (m ³ /ha)
Chir pine	100.059	8466	84.610
Blue pine	128.098	5607	43.771
Fir & Spruce	342.181	92635	270.719
Mixed conifers	477.949	40276	84.268

Conifers mixed with broadleaf	138.503	71764	518.140
Hardwood	1363.230	310229	227.569
Total	2550.02	528977	207.440

Applying the per hectare growing stock for 1995 (species wise) to the corresponding area in 2010 (table) result in the following table

Forest Types	Area (000 ha)	Volume (m ³ /ha)	Total Volume (000 m ³)
Chir pine	107.667	84.610	9109.70487
Blue pine	80.024	43.771	3502.730504
Fir & Spruce	183.208	270.719	49597.88655
Mixed conifers	613.964	84.268	51737.51835
Conifers mixed with broadleaf	31.472	518.140	16306.90208
Broadleaf	1688.956	227.569	384354.028
Total	2705.291		514608.7703

Biomass stock

Pre-Investment Survey of Forest Resources (PISFR) is the most important data source for the total growing stock and the growing stock per hectare. PISFR was carried out in 1981. Currently country is conducting National Forest Inventory to update the existing one.

The national data for biomass stock is not available. Therefore, the biomass has been estimated using growing stock, basic wood density and biomass expansion factor.

1. Basic Density

Species	Basic Density
	tonnes/m ³
Chir pine	0.39
Blue pine	0.30

Fir and Spruce	0.40
Mixed Conifer	0.41
Conifer mixed with broadleaf	0.45
Hardwood	0.49

The weighted basic density for 1995 is 0.459 and for 2010 is 0.469, which is computed using the above densities and relative species composition in 1995 and 2010.

Year	1990	2000	2005	2010	2015
Weighted Basic Density	0.456	0.462	0.466	0.469	0.472

1. Biomass Expansion Factor

There are no national estimates for Biomass Expansion Factor (BEF). The following table presents estimates of BEF using the formula $(BEF = EXP(3.213 - 0.506 * LN(\text{Stem biomass per hectare})))$ for broadleaved species (Sandra Brown, 1997) and using the formula $(BEF = \exp\{1.771 - 0.339 * LN(\text{Stem biomass per hectare})\})$ for conifers (Brown and Schroeder, 1999). The latter formula is for USA but is one of the few formula that are available for conifers that mainly cover pine and spruce species, which are the main constituent of the growing stock in Bhutan.

BEF	1990	2000	2005	2010	2015
Broadleaved Species	2.20	2.24	2.26	2.27	2.29
Coniferous Species	1.37	1.47	1.52	1.57	1.62
Weighted BEF	1.70	1.78	1.82	1.85	1.89

The table represents weighted average BEF, which is computed by using the broad proportion (60:40) of the volume of the coniferous and broadleaved species in the growing stock.

1. Root to Shoot ratio

Following the broad proportion (60:40) of the volume of the coniferous and broadleaved species in the growing stock in 1995 and 2010, a weighted average (0.372) Root to Shoot ratio has been calculated using the default values for conifers (0.46) and broadleaved (0.24) forests in GPG (2003).

Carbon stock

1. Conversion factor Biomass to Carbon

The forest carbon stock has been estimated based on the biomass data from Table T6 and using the default conversion factor (0.47) as provided in the IPCC Guidelines for National Greenhouse Gas Inventories Volume 4 (2006).

1. Carbon in forest litter

The default factor of 22 tonnes C per ha for conifer and 13 tonnes C per ha for broadleaf (Guidelines for National Greenhouse Gas Inventories, IPCC, 2006) has been assumed to estimate carbon content of forest litter.

1. Soil Carbon

The forest soil classification has not been done in Bhutan according to the classes mentioned in Guidelines for National Greenhouse Gas Inventories, IPCC, 2006. For that reason, based on expert knowledge, it has been assumed that HAC Soils span about 50% of forest area, LAC Soils about 30% of forest area and Sandy Soils about 20% of forest area.

Forest	Area (000 hectares)				
	1990	2000	2005	2010	2015
HAC Soils	1253.357	1303.001	1327.823	1352.646	1377.468
LAC Soils	752.014	781.801	796.694	811.587	826.481
Sandy Soils	501.343	521.200	531.129	541.058	550.987
Total	2506.714	2606.002	2655.647	2705.291	2754.935

3.3 Analysis and processing of national data

3.3.1 Adjustment

Not needed

3.3.2 Estimation and forecasting

1. Estimating growing stock.

Method of linear interpolation and extrapolation has been used to develop the estimates.

	Volume in million m³				
	1990	2000	2005	2010	2015
Total Growing Stock	533.8	524.2	519.4	514.6	509.8

Biomass stock

1. **Above Ground Biomass**

Category	Unit	1990	2000	2005	2010	2015
Growing stock	million m ³	533.8	524.2	519.4	514.6	509.8
Basic density	tonnes/m ³	0.456	0.462	0.466	0.469	0.472
BEF		1.70	1.78	1.82	1.85	1.89
Above Ground Biomass	million tonnes	413.8	431.1	440.5	446.5	454.8

1. **Below Ground Biomass**

A weighted root to shoot ratio of 0.372 have been used.

Category	Unit	1990	2000	2005	2010	2015
Above ground biomass	million tonnes	413.8	431.1	440.5	446.5	454.8
Root Shoot ratio		0.372	0.372	0.372	0.372	0.372

Below Ground Biomass	million tonnes	153.9	160.4	163.9	166.1	169.2
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Carbon Stock

1. Carbon in Living biomass and Dead wood biomass

FRA 2010 Cate/gories	Carbon (Million metric tonnes)									
	Forest					Other wooded land				
	1990	2000	2005	2010	2015	1990	2000	2005	2010	2015
Carbon in above ground biomass	194.5	202.6	207.0	209.9	213.7	n.a.	n.a.	n.a.	n.a.	n.a.
Carbon in below ground biomass	72.3	75.4	77.0	78.1	79.5	n.a.	n.a.	n.a.	n.a.	n.a.
Sub-total: Carbon in living biomass	266.8	278.0	284.0	288.0	293.2	n.a.	n.a.	n.a.	n.a.	n.a.
Carbon in dead wood	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

1. Carbon in Litter

Category	1990	2000	2005	2010	2015
Forest area (000 ha)	2506.714	2606.002	2655.647	2705.291	2754.935
Conifer	1156.519	1078.559	1039.579	1000.599	961.619

broadleaf	1350.195	1527.443	1616.068	1704.692	1793.317
Default factor (tonnes C/ha)					
Conifer	22	22	22	22	22
Broadleaf	13	13	13	13	13
Carbon (million tonnes)					
Conifer	25.443	23.728	22.870	22.013	21.155
Broadleaf	17.552	19.856	21.008	22.160	23.313
Total (million tonnes)	42.995	43.584	43.878	44.173	44.468

1. Soil Carbon

Following the IPCC Guidelines for National Greenhouse Gas Inventories Volume 4 (2006), it has been assumed that the per hectare carbon content of HAC, LAC and Sandy forest soils is 88, 63 and 34 tonnes respectively.

Forest	Carbon in million tonnes				
	1990	2000	2005	2010	2015
HAC Soils	110.295	114.664	116.849	119.033	121.217
LAC Soils	47.377	49.253	50.192	51.130	52.068
Sandy Soils	17.046	17.721	18.058	18.396	18.734
Total	174.718	181.638	185.099	188.559	192.019

3.3.3 Reclassification

Forest Types	Coniferous	Broadleaved
Chir pine	100%	
Blue pine	100%	

Fir & Spruce	100%	
Mixed conifers	100%	
Conifers mixed with broadleaf	50%	50%
Broadleaf		100%

3.4 Data

Table 3a




Category		Growing stock volume (million m ³ over bark)									
		Forest					Other wooded land				
		1990	2000	2005	2010	2015	1990	2000	2005	2010	2015
	Total growing stock	533.8	524.2	519.4	514.6	509.8	N/A	N/A	N/A	N/A	N/A
	... of which coniferous	203.1	162.6	142.4	122.1	101.8	N/A	N/A	N/A	N/A	N/A
	... of which broadleaved	330.7	361.6	377	392.5	408	N/A	N/A	N/A	N/A	N/A

Table 3b

Category/Species name			Growing stock in forest (million cubic meters)			
Rank	Scientific name	Common name	1990	2000	2005	2010
1 st	<i>Abies densa</i>	Fir	110	122	128	134
2 nd	<i>Quercus</i> spp.	Oak	95	105	110	115
3 rd	<i>Tsuga dumosa</i>	Hemlock	32	36	37	38
4 th	<i>Rhododendron</i> spp.	Rhododendron	20	22	23	24
5 th	<i>Machilus</i> spp.	Kawla	18	19	20	21
6 th	<i>Acer</i> spp.	Maple	16	17	18	19
7 th	<i>Betula</i> spp.	Birch	14	16	17	18
8 th	<i>Picea spinulosa</i>	Spruce	13	14	15	16

9 th	Michelia spp.	Champ	9	10	11	12
10 th	Pinus roxburghii	Chir pine	10	10	10	10
Remaining			196.8	153.2	130.4	107.6
TOTAL			533.80	524.20	519.40	514.60

THE PRE-FILLED VALUES FOR GROWING STOCK REFER TO THE FOLLOWING THRESHOLD VALUES (SEE TABLE BELOW)

Item	Value	Complementary information
Minimum diameter (cm) at breast height of trees included in growing stock (X)	5	N/A
Minimum diameter (cm) at the top end of stem for calculation of growing stock (Y)	5	N/A
Minimum diameter (cm) of branches included in growing stock (W)	N/A	N/A
Volume refers to above ground (AG) or above stump (AS)	AG	N/A

PLEASE NOTE THAT THE DEFINITION OF GROWING STOCK HAS CHANGED AND SHOULD BE REPORTED AS GROWING STOCK DBH 10 CM INCLUDING THE STEM FROM GROUND LEVEL UP TO A DIAMETER OF 0 CM, EXCLUDING BRANCHES.

Table 3c





Category		Net annual increment (m ³ per hectare and year)				
		Forest				
		1990	2000	2005	2010	2015
	Net annual increment	N/A	N/A	N/A	N/A	N/A
	... of which coniferous	N/A	N/A	N/A	N/A	N/A
	... of which broadleaved	N/A	N/A	N/A	N/A	N/A

Table 3d

Category		Biomass (million metric tonnes oven-dry weight)									
		Forest					Other wooded land				
		1990	2000	2005	2010	2015	1990	2000	2005	2010	2015
	Above ground biomass	413.8	431.1	440.5	446.5	454.8	N/A	N/A	N/A	N/A	N/A










	Below ground biomass	153.9	160.4	163.9	166.1	169.2	N/A	N/A	N/A	N/A	N/A
	Dead wood	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TOTAL		567.70	591.50	604.40	612.60	624.00	.00	.00	.00	.00	.00

Table 3e

Category		Carbon (Million metric tonnes)									
		Forest					Other wooded land				
		1990	2000	2005	2010	2015	1990	2000	2005	2010	2015
	Carbon in above ground biomass	194.5	202.6	207	209.9	213.7	N/A	N/A	N/A	N/A	N/A
	Carbon in below ground biomass	72.3	75.4	77	78.1	79.5	N/A	N/A	N/A	N/A	N/A
	<i>Subtotal Living biomass</i>	266.8	278	284	288	293.2	N/A	N/A	N/A	N/A	N/A
	Carbon in dead wood	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Carbon in litter	42.995	43.584	43.878	44.173	44.468	N/A	N/A	N/A	N/A	N/A
	<i>Subtotal Dead wood and litter</i>	42.995	43.584	43.878	44.173	44.468	N/A	N/A	N/A	N/A	N/A
	Soil carbon	174.718	181.638	185.099	188.559	192.019	N/A	N/A	N/A	N/A	N/A
TOTAL		484.51	503.22	512.98	520.73	529.69	.00	.00	.00	.00	.00

Tiers

Variable/category	Tier for status	Tier for trend
Total growing stock	Tier 1	Tier 1
Net annual increment	Tier 1	Tier 1
Above ground biomass	Tier 1	Tier 1
Below ground biomass	Tier 1	Tier 1

Dead wood	Tier 1	Tier 1
Carbon in above-ground biomass	Tier 1	Tier 1
Carbon in below ground biomass	Tier 1	Tier 1
Carbon in dead wood and litter	Tier 1	Tier 1
Soil carbon	Tier 1	Tier 1

Tier criteria

Category	Tier for status	Tier for reported trend
Total growing stock	Tier 3: Data sources Recent 10 years National Forest Inventory or remote sensing with ground truthing or programme for repeated compatible NFI 10 years Domestic volume functions Tier 2: Data sources/registers and statistics modelling or old NFI 10 years or partial field inventory Tier 1: Other data sources	Tier 3: Estimate based on repeated compatible tiers 3 (tier for status) Domestic growth functions Tier 2: Estimate based on repeated compatible tier 2 or combination tier 3 and 2 or 1 tier for status Tier 1: Other
Net annual increment	Tier 3: Scientifically tested national volume and growth functions Tier 2: Selection of volume and growth functions as relevant as possible Tier 1: Other	Tier 3: Confirmation/adjustment of functions used through scientific work Tier 2: Review work done to seek alternative functions Tier: 1 Other
Biomass	Tier 3: Country-specific national or sub-national biomass conversion expansion factors applied or other domestic or otherwise nationally relevant biomass studies Tier 2: Application of country specific national or sub-national biomass conversion factors from other country with similar climatic conditions and forest types Tier 1: International/regional default biomass expansion factors applied	Tier 3 : Estimate based on repeated compatible tiers 3 (tier for status) Tier 2 : Estimate based on repeated compatible tier 2 or combination tier 3 and 2 or 1 (tier for status) Tier 1 : Other
<ul style="list-style-type: none"> Carbon in above ground biomass Carbon in below ground biomass Carbon in dead wood and litter Soil carbon 	Tier 3: Country-specific national or sub-national biomass conversion expansion factors applied Tier 2: Application of country specific national or sub-national biomass conversion factors form from other country with similar climatic conditions and forest types Tier 1: International/regional default biomass expansion factors applied	Tier 3 : Estimate based on repeated compatible tiers 3 (tier for status) Tier 2 : Estimate based on repeated compatible tier 2 or combination tier 3 and 2 or 1 (tier for status) Tier 1 : Other

3.5 Comments on growing stock biomass and carbon

Category	Comments related to data definitions etc	Comments on the reported trend
Total growing stock	Growing stock is in decreasing trend because decrease and increase in area of different forest type	N/A
Growing stock of broadleaved coniferous	N/A	N/A

Growing stock composition	N/A	N/A
Net annual increment	Data on net annual increment is not available	N/A
Above-ground biomass	AGB increase despite GS reducing because of increase in wood density and increase in BEF while extrapolating	N/A
Below-ground biomass	BGB increase despite GS reducing because of increase in wood density and increase in BEF while extrapolating	N/A
Dead wood	Data on biomass and carbon of dead wood is not available	N/A
Carbon in above-ground biomass	N/A	N/A
Carbon in below-ground biomass	N/A	N/A
Carbon in dead wood	Data not available	N/A
Carbon in litter	N/A	N/A
Soil carbon	N/A	N/A

Other general comments to the table

Total growing stock is based on Preinvestment Survey of Forest Resources of Bhutan, 1981. This only available data is used for forest area of 1995 and 2010 to estimate the growing stock per hectare. Biomass has been interpolated and extrapolated based on growing stock of 1981 and forest area of 1995 and 2010. Growing stock data on other wooded land is not available, which is shrubs in case of Bhutan. Similarly any data on dead wood is also not available. Data on net annual increment of the forest is also not available.

4. What is the status of forest production and how has it changed over time?

Documents for this question:

- [Guide for country reporting FRA 2015](#)
- [FRA 2015 Terms and Definitions](#)

4.1 Categories and definitions

Term	Definition
Primary designated function	The primary function or management objective assigned to a management unit either by legal prescription documented decision of the landowner/manager or evidence provided by documented studies of forest management practices and customary use.
Non wood forest product (NWFP)	Goods derived from forests that are tangible and physical objects of biological origin other than wood.
Commercial value of NWFP	For the purpose of this table, value is defined as the commercial market value at the forest gate.
Category	Definition
Production forest	Forest area designated primarily for production of wood, fibre, bio-energy and/or non-wood forest products.
Multiple use forest	Forest area designated for more than one purpose and where none of these alone is considered as the predominant designated function.
Total wood removals	The total of industrial round wood removals and woodfuel removals.
...of which woodfuel	The wood removed for energy production purposes, regardless whether for industrial, commercial or domestic use.

4.2 National data

4.2.1 Data sources

	References to sources of information	Variables	Years	Additional comments
1	DoFPS. 2011. Forestry Facts, Figures and Trends	FMU, WS, NWFP, CF	2011	N/A
2	SFED.2013. Information obtained from Social Forestry Extension Division, DoFPS, MoAF	Community Forests	2013	N/A
3	SFED.2013. Information obtained from Social Forestry Extension Division, DoFPS, MoAF	NWFP	2012	N/A
4	FRMD.2013. Information obtained from Forest Resources Management Division, DoFPS, MoAF	FMU and WS	2013	N/A

4.2.2 Classification and definitions

National class	Definition
Production Forest	A forest management to harvest forest products and to sustain the bioproductivity of the system. The biotic or abiotic of the forest may be altered: e.g. by plowing, plating, and cultivation of selected crops, including the introduction of faster growing or exotic species
Multiple use forest	Any forest land other than production forest. This also included forest in protected areas and areas for biodiversity conservation
Community Forestry	Any area of Government Reserve Forest designated for management by a local community in accordance with the provisions under Section 36 of the Rules, as per Chapter I Section 3 of the Act.
Forest Management Unit (FMU)	A geographic area of Government Reserve Forest designated pursuant to the Forest and Nature Conservation Rules for scientific management of forest.

4.2.3 Original data

Category	Area in 000 ha				
	1990	2000	2005	2010	2015
Forest Management Unit	46.996	138.8	151.69	188.68	203.36
Working Scheme	0	1.528	5.666	12.383	13.24
Community Forest	0	0.358	2.973	33.989	56.736
Total	46.996	140.636	160.325	235.048	273.339

4.3 Analysis and processing of national data

4.3.1 Adjustment

Not needed

4.3.2 Estimation and forecasting

Category	Area in 000 ha				
	1990	2000	2005	2010	2015
Production forest	46.996	140.636	160.326	235.048	273.339
Conservation forest	1095.253	1108.681	1115.395	1122.109	1128.823
Multiple use forest	1411.461	1356.685	1379.926	1348.134	1352.773
Total	2506.714	2606.002	2655.647	2705.291	2754.935

4.3.3 Reclassification

Reclassification to FRA 2015 categories.			
National Classes	Production Forest	Conservation Forest	Multiple Use Forest
Forest Management Unit	100%		
Working Scheme	100%		
Community Forest	100%		
Protected Area		100%	
Multiple use forest			100%

4.4 Data

Table 4a



Categories		Forest area (000 hectares)				
		1990	2000	2005	2010	2015
	Production forest	46.996	140.636	160.326	235.048	273.339
	Multiple use forest	1411.461	1356.685	1379.926	1348.134	1352.773

Table 4b

Rank	Name of product	Key species	Commercial value of NWFP removals 2010 (value 1000 local currency)	NWFP category
1 st	Ophiocordyceps sinensis	Ophiocordyceps sinensis	150970	3
2 nd	Mushrooms	N/A	4281.73	1
3 rd	Bamboo and cane Products	Cane and bamboo	1247.14	5
4 th	Piper pedicellatum	Piper pedicellatum	881.66	3
5 th	Rubia cordifolia	Rubia cordifolia	337.7	4
6 th	Swertia chirayita	Swertia chirayita	298.66	3
7 th	Phyllanthus emblica	Phyllanthus emblica	191.68	3
8 th	Terminalia chebula	Terminalia chebula	324	3
9 th	Broom Grass	Thysanolaena maxima	31.6	8
10 th	Cinamomum tamala	Cinamomum tamala	19.514	3
TOTAL			158583.68	

2010	
Name of local currency	Ngultrum

Category
Plant products / raw material
1 Food
2 Fodder
3 Raw material for medicine and aromatic products

4 Raw material for colorants and dyes
5 Raw material for utensils handicrafts construction
6 Ornamental plants
7 Exudates
8 Other plant products
Animal products / raw material
9 Living animals
10 Hides skins and trophies
11 Wild honey and beeswax
12 Wild meat
13 Raw material for medicine
14 Raw material for colorants
15 Other edible animal products
16 Other non-edible animal products

Table 4c Pre-filled data from FAOSTAT

Year	FRA 2015 category (1000 m ³ u.b.)	
	Total wood removals	...of which woodfuel
1990	3903.812	3855.112
1991	3930.528	3869.728
1992	3953.821	3875.221
1993	3935.704	3872.204
1994	3939.139	3875.639
1995	3933.601	3888.601
1996	3964.649	3919.649
1997	4016.899	3971.899
1998	4110.712	4065.712
1999	4281.468	4142.468

2000	4354.796	4220.796
2001	4417.723	4283.723
2002	4480.414	4347.714
2003	4545.689	4412.789
2004	4611.867	4478.967
2005	4679.168	4546.268
2006	4737.049	4604.149
2007	4963.9	4662.9
2008	4980	4723
2009	4967	4783
2010	5035	4845
2011	5025.103	4897.103

Tiers

Category	Tier for status	Tier for reported trend
Production forest	Tier 3	Tier 3
Multiple use forest	Tier 3	Tier 3

Tier Criteria

Category	Tier for status	Tier for reported trend
Production forest Multiple use forest	Tier 3: Updated including field verifications national forest maps including functions Tier 2: Forest maps older than 6 years including forest functions Tier 1: Other	Tier 3 : Estimate based on repeated compatible tiers 3 (tier for status) Tier 2 : Estimate based on repeated compatible tier 2 or combination tier 3 and 2 or 1 (tier for status) Tier 1 : Other

4.5 Comments

Category	Comments related to data definitions etc	Comments on the reported trend
Production forest	Forest management units, working scheme and community forest was taken as production forest	Sum total of FMU, WS and CF.
Multiple use forest	All forest in Bhutan considered as multiple use but for reporting multiple use forest , production forest has been deducted from total forest area	Multiple forest is derived by subtracting production from actual forest cover

Total wood removals	N/A	N/A
Commercial value of NWFP	N/A	N/A

Other general comments to the table

Production forest is those forest managed on sustainable basis backed by approved scientific forest management plan. Production forest of Bhutan includes Forest management units, working schemes and community forests.

5. How much forest area is managed for protection of soil and water and ecosystem services?

Documents for this question:

- [Guide for country reporting FRA 2015](#)
- [FRA 2015 Terms and Definitions](#)

5.1 Categories and definitions

Category	Definition
Protection of soil and water	Forest area designated or managed for protection of soil and water
...of which production of clean water (<i>sub-category</i>)	Forest area primarily designated or managed for water production, where most human uses are excluded or heavily modified to protect water quality.
...of which coastal stabilization (<i>sub-category</i>)	Forest area primarily designated or managed for coastal stabilization.
...of which desertification control (<i>sub-category</i>)	Forest area primarily designated or managed for desertification control.
...of which avalanche control (<i>sub-category</i>)	Forest area primarily designated or managed to prevent the development or impact of avalanches on human life assets or infrastructure.
...of which erosion, flood protection or reducing flood risk (<i>sub-category</i>)	Forest area primarily designated or managed for protecting communities or assets from the impacts of erosion riparian floods and landslides or for providing flood plain services.
...of which other (<i>sub-category</i>)	Forest area primarily designated or managed for other protective functions.
Ecosystem services, cultural or spiritual values	Forest area primarily designated or managed for selected ecosystem services or cultural or spiritual values.
...of which public recreation (<i>sub-category</i>)	Forest area designated or managed for public recreation.
...of which carbon storage or sequestration (<i>sub-category</i>)	Forest area designated or managed for carbon storage or sequestration.
...of which spiritual or cultural services (<i>sub-category</i>)	Forest area designated or managed for spiritual or cultural services.
...of which other (<i>sub-category</i>)	Forest area designated or managed for other ecosystem services.

5.2 National data

5.2.1 Data sources

	References to sources of information	Variables	Years	Additional comments

1	RGOB, 1995. Land Cover Figures of Bhutan (National figures), Ministry of Agriculture, Royal Government of Bhutan	Landuse, Forest types	1995	N/A
2	MoAF. 2010. Technical report Bhutan Land Cover Assessment 2010 (LCMP 2010)	Landuse, Forest types	2010	N/A
3	DoFPS. 2011. Forestry Facts, Figures and Trends	Forest statistic	2011	N/A
4	N/A	N/A	N/A	N/A

5.2.2 Classification and definitions

National class	Definition
Protection Forest	The function of forest/other wooded land in providing protection of soil against erosion by water or wind, prevention of desertification, the reduction of risk of avalanches and rock or mud slides; and in conserving, protectin and regulating the quality and quantity of water supply, including the prevention of flooding. Includes: Protection against are and noise pollution.
N/A	N/A
N/A	N/A
N/A	N/A

5.2.3 Original data

National Data for Protection of Soil and Water		
Category	Area (000 ha)	
	1995	2010
Protection Forest (protection of soil and water)	2556.358	2705.291

National Data for Ecosystem services, cultural and spiritual values	
Category	Area (000 ha)

	1995	2010
Forest for ecosystem services	2556.358	2705.291

5.3 Analysis and processing of national data

5.3.1 Adjustment

5.3.2 Estimation and forecasting

Liner interpolation and extrapolation was used to estimate the data








Category	Area (000 ha)				
	1990	2000	2005	2010	2015
Protection Forest (protection of soil and water)	2506.714	2606.002	2655.647	2705.291	2754.935
Forest for ecosystem services	2506.714	2606.002	2655.647	2705.291	2754.935

5.3.3 Reclassification

National Classes	Protection of soil and water	Ecosystem services, cultural or spiritual values
All forest cover	100%	100%

5.4 Data

Table 5a

Categories		Forest area (1000 hectares)				
		1990	2000	2005	2010	2015
	Protection of soil and water	2506.714	2606.002	2655.647	2705.291	2754.935
	... of which production of clean water	N/A	N/A	N/A	N/A	N/A
	... of which coastal stabilization	N/A	N/A	N/A	N/A	N/A
	... of which desertification control	N/A	N/A	N/A	N/A	N/A
	... of which avalanche control	N/A	N/A	N/A	N/A	N/A
	... of which erosion, flood protection or reducing flood risk	N/A	N/A	N/A	N/A	N/A
	... of which other (please specify in comments below the table)	N/A	N/A	N/A	N/A	N/A

Other

N/A

Table 5b

Categories	Forest area (1000 hectares)				
	1990	2000	2005	2010	2015
Ecosystem services, cultural or spiritual values	2506.714	2606.002	2655.647	2705.291	2754.935
...of which public recreation	N/A	N/A	N/A	N/A	N/A
...of which carbon storage or sequestration	N/A	N/A	N/A	N/A	N/A

...of which spiritual or cultural services	N/A	N/A	N/A	N/A	N/A
...of which other (please specify in comments below the table)	N/A	N/A	N/A	N/A	N/A

Tiers

Category	Tier for reported trend	Tier for status
Protection of soil and water	Tier 3	Tier 3
Ecosystem services, cultural or spiritual values	Tier 3	Tier 3

Tier criteria

Category	Tier for status	Tier for reported trend
Protection of soil and water	Tier 3: High reliability data derived either from high intensity sample survey or data obtained from national or state agencies responsible for regulations or legislation relating to soil and water protection. Tier 2: Approaches based on low intensity or incomplete sample-based surveys or studies that provide data for specific areas that is extrapolated through statistical analysis to national level estimates. Tier 1: Other	Tier 3 : Estimate based on repeated compatible tiers 3 (tier for status) Tier 2 : Estimate based on repeated compatible tier 2 or combination tier 3 and 2 or 1 (tier for status) Tier 1 : Other
<ul style="list-style-type: none"> • Cultural or spiritual values • Public recreation • Spiritual or cultural services • Other 	Tier 3: High reliability data derived either from high intensity sample survey or data obtained from national or state agencies responsible for regulations. Tier 2: Approaches based on low intensity or incomplete sample-based surveys or studies that provide data for specific areas that is extrapolated through statistical analysis to national level estimates. Tier 1: Other	Tier 3 : Estimate based on repeated compatible tiers 3 (tier for status) Tier 2 : Estimate based on repeated compatible tier 2 or combination tier 3 and 2 or 1 (tier for status) Tier 1 : Other

5.5 Comments

Category	Comments related to data definitions etc	Comments on the reported trend
Protection of soil and water	All forest land of country attributes to protection of soil and water	N/A
Production of clean water	All forest land of country attributes to production of clean water	N/A
Coastal stabilization	All forest land of country attributes to coastal stabilization	N/A
Desertification control	All forest land of country attributes to desertification control	N/A

Avalanche control	All forest land of country attributes to avalanche control	N/A
Erosion, flood protection or reducing flood risk	All forest land of country attributes to erosion, flood protection or reducing flood risk	N/A
Other protective functions	N/A	N/A
Ecosystem services, cultural or spiritual values	All forest land of country attributes to ecosystem services, cultural or spiritual values	N/A
Public recreation	N/A	N/A
Carbon storage or sequestration	All forest land of country attributes to carbon storage or sequestration	N/A
Spiritual or cultural services	All forest land of country attributes to spiritual or cultural services	N/A
Other ecosystem services	N/A	N/A

Other general comments to the table

Function mapping of forest into different protective category is not applicable in Bhutan. Country assumes that all forest lands contribute as protective functions. Similarly country assumes all forest lands play vital role in delivering ecosystem services, recreation, carbon storage and spiritual and cultural services. Therefore, all forest area is recorded for protective function and ecosystem services.

6. How much forest area is protected and designated for the conservation of biodiversity and how has it changed over time?

Documents for this question:

- [Guide for country reporting FRA 2015](#)
- [FRA 2015 Terms and Definitions](#)

6.1 Categories and definitions

Category	Definition
Conservation of biodiversity	Forest area designated primarily for conservation of biological diversity. Includes but is not limited to areas designated for biodiversity conservation within the protected areas.
Forest area within protected areas	Forest area within formally established protected areas independently of the purpose for which the protected areas were established.

6.2 National data

6.2.1 Data sources

	References to sources of information	Variables	Years	Additional comments
1	RGOB, 1995. Land Cover Figures of Bhutan (National figures), Ministry of Agriculture, Royal Government of Bhutan	Forest	1995	N/A
2	MoAF, 2011. Land cover atlas of Bhutan 1:250,000	Forest	2010	N/A
3	DoFPS. 2011. Forestry Facts, Figures and Trends	Forest statistic	2011	N/A
4	GISS, 2013. Information obtained from Geographical Information System Section, FRMD, DoFPS	Forest statistic	2013	N/A
5	WCD, 2013. Information obtained from Wildlife Conservation Division, DoFPS	Protected areas and biological corridors	2013	N/A

6.2.2 Classification and definitions

National class	Definition
Protected area	Area set aside for biological diversity conservation which includes national parks, wildlife sanctuaries, strict nature reserves and biological corridors
Biological Corridor	Area set aside to connect one or more protected areas for movement of animals and birds
N/A	N/A

N/A	N/A
-----	-----

6.2.3 Original data

Category	Forest area (000 hectares)	
	1995	2010
Protected area	860.34	880.646
Conservation of biodiversity	241.627	241.463

6.3 Analysis and processing of national data

6.3.1 Adjustment

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6.3.2 Estimation and forecasting

FRA 2015 Categories	Forest area (000 hectares)				
	1990	2000	2005	2010	2015
Conservation of biodiversity	241.682	241.572	241.518	241.463	241.408
Forest area within protected areas	853.571	867.109	873.877	880.646	887.415



6.3.3 Reclassification

National Classes	Forest area within protected areas	Conservation of biodiversity
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Protected area	100%	
Biological Corridor		100%

6.4 Data

Table 6

Categories		Forest area (000 hectares)				
		1990	2000	2005	2010	2015
	Conservation of biodiversity	241.682	241.572	241.518	241.463	241.408
	Forest area within protected areas	853.571	867.109	873.877	880.646	887.415

Tiers

Category	Tier for status	Tier for reported trend
Conservation of biodiversity	Tier 3	Tier 3
Forest area within protected areas	Tier 3	Tier 3

Tier criteria

Category	Tier for status	Tier for reported trend
<ul style="list-style-type: none"> Conservation of biodiversity Forests within protected areas 	Tier 3: Data obtained from national or state agencies responsible for conservation and protected area or legislation relating to area protection. Tier 2: Studies that provide data for specific areas that is extrapolated through statistical analysis to national level estimates Tier 1 Other	Tier 3 : Estimate based on repeated compatible tiers 3 (tier for status) Tier 2 : Estimate based on repeated compatible tier 2 or combination tier 3 and 2 or 1 (tier for status) Tier 1 : Other

6.5 Comments

Category	Comments related to data definitions etc	Comments on the reported trend
Conservation of biodiversity	Forest lands within biological corridors of Bhutan is categorized as conservation of biodiversity	Forest area of biological corridors
Forest area within protected areas	Forest area of national parks, wildlife sanctuaries and strict reserves are documented under this category	Forest area of protected areas

Other general comments to the table

National parks, wildlife sanctuaries and strict reserves are considered as protected area and biological corridors are considered as area for conservation of biodiversity for reporting

7. What is the area of forest affected by woody invasive species?

Documents for this question:

- [Guide for country reporting FRA 2015](#)
- [FRA 2015 Terms and Definitions](#)

7.1 Categories and definitions

Category	Definition
Invasive species	Species that are non-native to a particular ecosystem and whose introduction and spread cause, or are likely to cause, socio-cultural, economic or environmental harm or harm to human health.

7.2 National data

7.2.1 Data sources

	References to sources of information	Variables	Years	Additional comments
1	Na	Na	Na	Na
2	N/A	N/A	N/A	N/A
3	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A

7.2.2 Classification and definitions

National class	Definition
Invasive species	Species of fauna and flora of non-local origin which established itself or has been introduced into a given area and has spread in the natural conditions on an undesirable scale, e.g. to the extent that it has replaced or seriously suppressed the species previously occupying this specific area.
N/A	N/A
N/A	N/A
N/A	N/A

7.2.3 Original data

--

7.3 Analysis and processing of national data

7.3.1 Adjustment

Na

7.3.2 Estimation and forecasting

Na

7.3.3 Reclassification

Na

7.4 Data

Table 7

Scientific name of woody invasive species	Forest area affected (000 ha)	
	2005	2010
1.Na	N/A	N/A
2.	N/A	N/A
3.	N/A	N/A
4.	N/A	N/A
5.	N/A	N/A
6.	N/A	N/A
7.	N/A	N/A

8.	N/A	N/A
9.	N/A	N/A
10.	N/A	N/A
Total	N/A	N/A

Tiers

Category	Tier for status	Tier for reported trend
Invasive species	Tier 1	Tier 1

Tier Criteria

Category	Tier for status	Tier for reported trend
Invasive species	Tier 3: Systematic assessment in forest inventory or other survey (e.g. by conservation department) within the last 5 years) Tier 2: Systematic assessment in forest inventory or other survey (e.g. by conservation department conducted more than 5 years ago) Tier 1: Other	Tier 3 : Estimate based on repeated compatible tiers 3 (tier for status) Tier 2 : Estimate based on repeated compatible tier 2 or combination tier 3 and 2 or 1 (tier for status) Tier 1 : Other

7.5 Comments

Category	Comments related to data definitions etc	Comments on the reported trend
Invasive species	Na	Na

Other general comments to the table

Data on woody invasive species was not available, therefore tier for status and reported trend was left blank. This means there was no source for data

8. How much forest area is damaged each year?

Documents for this question:

- [Guide for country reporting FRA 2015](#)
- [FRA 2015 Terms and Definitions](#)

8.1 Categories and definitions

Category	Definition
Number of fires	Number of fires per year
Burned area	Area burned per year
Outbreaks of insects	A detectable reduction in forest health caused by a sudden increase in numbers of harmful insects.
Outbreaks of diseases	A detectable reduction in forest health caused by a sudden increase in numbers of harmful pathogens, such as bacteria, fungi, phytoplasma or virus.
Severe weather events	Damage caused severe weather events, such as snow, storm, drought, etc.

8.2 National data

8.2.1 Data sources

	References to sources of information	Variables	Years	Additional comments
1	DoFPS 2013. Information obtained from Fire Section, Forest Protection and Enforcement Division	Number of fires and Burned area	2013	N/A
2	N/A	N/A	N/A	N/A
3	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A

8.2.2 Classification and definitions

National class	Definition
Na	Na
N/A	N/A
N/A	N/A
N/A	N/A

8.2.3 Original data

Forest fire incidences and area burned		
Year	Number of fire incidences	Area burned (000 ha)
2003	46	2.2
2004	46	1.1
2005	67	3.2
2006	37	7.9
2007	47	22.8
2008	45	3.9
2009	74	2.0
2010	49	3.7
2011	40	4.3
2012	39	4.4

8.3 Analysis and processing of national data

8.3.1 Adjustment

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8.3.2 Estimation and forecasting

Forest fire incidences and area burned		
Year	Number of fire incidences	Area burned (000 ha)
2003	46	2.2
2004	46	1.1
2005	67	3.2
2006	37	7.9

2007	47	22.8
2008	45	3.9
2009	74	2.0
2010	49	3.7
2011	40	4.3
2012	39	4.4

8.3.3 Reclassification

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8.4 Data

Table 8a

Category		000 ha, number of fires									
		2003		2004		2005		2006		2007	
		000 ha	#	000 ha	#	000 ha	#	000 ha	#	000 ha	#
	Total land area burned	0.75	46	1.61	46	0.75	67	3.32	37	6.27	47
	... of which forest area burned	0.31	N/A	0.42	N/A	0.13	N/A	0.94	N/A	3.2	N/A
Category		2008		2009		2010		2011		2012	
		000 ha	#	000 ha	#	000 ha	#	000 ha	#	000 ha	#
	Total land area burned	2	45	0.71	74	3.55	49	3.32	40	5.22	39
	... of which forest area burned	0.71	N/A	0.31	N/A	1.23	N/A	1.13	N/A	2	N/A

Table 8b

Outbreak category	Description/name	Year(s) of latest outbreak	Area damaged (000 hectares)
Na	Na	Na	N/A
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A

Outbreak category
1 Insects
2 Diseases
3 Severe weather events

Tiers

Category	Tier for status	Tier for trend
Area affected by fire	Tier 3	Tier 3
<ul style="list-style-type: none"> • Insects • Diseases • Severe weather events 	N/A	N/A

Tier criteria

Category	Tier for status	Tier for reported trend
Burned area	Tier 3 : National fire monitoring routines Tier 2 : Remote sensing surveys Tier 1 : Other	Tier 3 : Estimate based on repeated compatible tiers 3 (tier for status) Tier 2 : Estimate based on repeated compatible tier 2 or combination tier 3 and 2 or 1 (tier for status) Tier 1 : Other

<ul style="list-style-type: none"> • Insects • Diseases • Severe weather events 	Tier 3 : Systematic survey (e.g. via inventory or aerial damage assessment) Tier 2 : Management records Tier 1 : Other	Tier 3 : Estimate based on repeated compatible tiers 3 (tier for status) Tier 2 : Estimate based on repeated compatible tier 2 or combination tier 3 and 2 or 1 (tier for status) Tier 1 : Other
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8.5 Comments

Category	Comments related to data definitions etc	Comments on the reported trend
Burned area	Real data maintained and archived by Fire Section, FPED, DOFPS	N/A
Insects	Na	Na
Diseases	Na	Na
Severe weather events	Na	Na

Other general comments to the table

N/A

9. What is the forest area with reduced canopy cover?

Documents for this question:

- [Guide for country reporting FRA 2015](#)
- [FRA 2015 Terms and Definitions](#)

Category	Definition
Reduction in canopy cover	Forest that has undergone a reduction of canopy cover of more than 20% between the years 2000 and 2010 within the forest canopy cover range of 30-80% as detected by the MODIS VCF sensor.

Table 9

Category	Area of forest with reduced canopy cover (000 ha)
Reduction in canopy cover	123.06

Tiers

Category	Tier for reported trend
Reduction in canopy cover	Tier 2

Tier criteria

Category	Tier for reported trend
Reduction in canopy cover	Tier 3 : Remote sensing with ground truthing and/or Landsat imagery Tier 2 : Remote sensing using Modis (using pre-filled data provided by FAO) Tier 1 : Expert opinion

Comments

Category	Comments related to data definitions etc
Reduction in canopy cover	N/A

Other general comments

--

10. What forest policy and regulatory framework exists to support implementation of sustainable forest management SFM?

Documents for this question:

- [Guide for country reporting FRA 2015](#)
- [FRA 2015 Terms and Definitions](#)

10.1 Categories and definitions

Category	Definition
Policies supporting sustainable forest management	Policies or strategies that explicitly encourage sustainable forest management.
Legislation and regulations supporting sustainable forest management	Legislation and regulations that govern and guide sustainable forest management, operations and use.

10.2 National data

10.2.1 Data sources

	References to sources of information	Variables	Years	Additional comments
1	RGOB, 1995. Forest and Nature Conservation Act of Bhutan	N/A	1995	N/A
2	RGOB, 2003. Biodiversity Act of Bhutan.	N/A	2003	N/A
3	RGOB, MOA, DOF, FRDD, 2004. Forest Management Code of Bhutan	N/A	2004	N/A
4	RGOB, 2007. National Environmental Protection Act	N/A	2007	N/A
5	RGOB, MOAF, 2011. National Forest Policy of Bhutan	N/A	2011	N/A
6	RGOB, MOAF, 2006. Forest and Nature Conservation Rules of Bhutan	N/A	2006	N/A

10.2.2 Classification and definitions

National class	Definition
Sustainable Forest Management	Management regimes applied to forestland, which maintain the productive and renewable capacities as well as the genetic, species and ecological diversity of forest ecosystems. Sustainable forest management is required to obtain sustainable forest development

N/A	N/A
N/A	N/A
N/A	N/A

10.2.3 Original data

Sustainable forest management					
Category	Area in 000 ha				
	1990	2000	2005	2010	2015
Forest Management Unit	46.996	91.754	12.936	36.99	14.687
Working Scheme	0	1.528	4.138	6.717	0.857
Community Forest	0	0.358	2.615	31.016	22.747
Total	46.996	93.64	19.689	74.723	38.291

10.3 Data

Table 10

Category				
	National	Sub-national		
		Regional	Provincial/State	Local
Policies supporting sustainable forest management	yes	yes	yes	yes
... of which, in publicly owned forests	yes	yes	yes	yes
... of which, in privately owned forests	yes	yes	yes	yes

Legislation and regulations supporting sustainable forest management	yes	yes	yes	yes
... of which, in <u>publicly</u> owned forests	yes	yes	yes	yes
... of which, in <u>privately</u> owned forests	yes	yes	yes	yes

10.4 Comments

Variable / category	Comments related to data definitions etc
Policies supporting sustainable forest management	N/A
Legislation and regulations supporting sustainable forest management	N/A

Other general comments

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11. Is there a national platform that promotes stakeholder participation in forest policy development?

Documents for this question:

- [Guide for country reporting FRA 2015](#)
- [FRA 2015 Terms and Definitions](#)

11.1 Categories and definitions

Category	Definition
National stakeholder platform	A recognized procedure that a broad range of stakeholders can use to provide opinions, suggestions, analysis, recommendations and other input into the development of national forest policy.

11.2 National data

11.2.1 Data sources

	References to sources of information	Years	Additional comments
1	RGOB, 2007. The Local Governments' Act of Bhutan	2007	N/A
2	RGOB, MOAF, 2011. Forest Policy of Bhutan	2011	N/A
3	RGOB, 2007. National Environmental Protection Act	2007	N/A
4	RGOB, MOAF, 2006. Forest and Nature Conservation Rules of Bhutan	2006	N/A
5	RGOB, 1995. Forest and Nature Conservation Act of Bhutan	1995	N/A

Table 11

Is there a national platform that promotes or allows for stakeholder participation in forest policy development?	yes
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11.3 Comments

Category	Comments related to data definitions etc
National stakeholder platform	Local Government Act and Constitution of Bhutan mandates discussion with all relevant stakeholder

Other general comments

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12. What is the forest area intended to be in permanent forest land use and how has it changed over time?

Documents for this question:

- [Guide for country reporting FRA 2015](#)
- [FRA 2015 Terms and Definitions](#)

12.1 Categories and definitions

Category	Definition
Forest area intended to be in permanent forest land use	Forest area that is designated or expected to be retained as forest and is highly unlikely to be converted to other land use.
...of which permanent forest estate (<i>sub-category</i>)	Forest area that is designated by law or regulation to be retained as forest and may not be converted to other land use.

12.2 National data

12.2.1 Data sources

	References to sources of information	Variables	Years	Additional comments
1	The constitution of the Kingdom of Bhutan	Forest Cover	2008	N/A
2	RGOB, MOAF, 2011. National Forest Policy of Bhutan	Policy Statement	2011	N/A
3	RGOB, 1995. Land Cover Figures of Bhutan (National figures), Ministry of Agriculture, Royal Government of Bhutan	Landuse, Forest types	1995	N/A
4	MoAF, 2011. Land cover atlas of Bhutan 1:250,000	Landuse and forest types	2010	N/A
5	DoFPS. 2011. Forestry Facts, Figures and Trends	Forest statistic	2011	N/A

12.2.2 Classification and definitions

National class	Definition
Forest	Forest means 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.
N/A	N/A
N/A	N/A

N/A	N/A
-----	-----

12.2.3 Original data

National Forest Data		
Category	Area (000 ha)	
	1995	2010
Forest	2556.358	2705.291

12.3 Analysis and processing of national data

12.3.1 Adjustment

Not needed

12.3.2 Estimation and forecasting

Forest area after estimation and forecasting using linear interpolation and extrapolation techniques is as under					
Broad National Classes	1990	2000	2005	2010	2015
Forests	2506.714	2606.002	2655.647	2705.291	2754.935
Intended to be permanent forest estate (60% country land)	2303.64	2303.64	2303.64	2303.64	2303.64



12.3.3 Reclassification

Forest area intended to be in permanent forest land use : 60% of Country Land	
National Classes	Forest Area intended to be permanent forest estate

Forest	60% of country area
--------	---------------------

12.4 Data

Table 12

Categories		Forest area 2010 (000 ha)
	Forest area intended to be in permanent forest land use	2705.291
	... of which permanent forest estate	2303.64

Tiers

Category	Tier for status
Forest area intended to be in permanent forest land use	Tier 3
Permanent forest estate	Tier 3

Tier Criteria

Category	Tier for status
Forest area intended to be in permanent forest land use	Tier 3 : National or sub-national land use plans strategy documents or other reports within the past 10 years Tier 2 : National or sub-national land use plans strategy documents or other reports within the past 20 years Tier 1 : Other
Permanent forest estate	Tier 3 : National or sub-national land use plans strategy documents or other reports within the past 10 years Tier 2 : National or sub-national land use plans strategy documents or other reports within the past 20 years Tier 1 : Other

12.5 Comments

Category	Comments related to data definitions etc
Forest area intended to be in permanent forest land use	According to Constitution of the Kingdom of Bhutan, 60% of country's land area should be maintained under forest cover for all time
Permanent forest estate	Present permanent forest of Bhutan is 70.46% of country's geographical area.

Other general comments

According to Constitution of the Kingdom of Bhutan, 60 % of country's land area should be maintained under forest cover for all time,, there forest area intended to be permanent forest land estate is taken as 60% of country area for all the years
--

13. How does your country measure and report progress towards SFM at the national level?

Documents for this question:

- [Guide for country reporting FRA 2015](#)
- [FRA 2015 Terms and Definitions](#)

13.1 Categories and definitions

Category	Definition
Forest area monitored under a national forest monitoring framework	Forest area monitored by a national monitoring framework or systems that provide measurement based periodic monitoring of forest extent and quality.
Forest reporting at national scale	National reporting of forest extent and characteristics that includes some measure of progress toward sustainable forest management.

13.2 National data

13.2.1 Data sources

	References to sources of information	Variables	Years	Additional comments
1	IDS, FRMD, 2013. Information obtained from Inventory and Data Section under FRMD	NFI	2013	N/A
2	FIMS, FRMD, 2013. Information obtained from Forest Information Management Section under FRMD	All forestry activities	2013	N/A
3	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A

13.2.2 Classification and definitions

National class	Definition
Na	Na
N/A	N/A
N/A	N/A
N/A	N/A

13.3 Data

Table 13a

Category	% of total forest area	Most recent year	Check all boxes that apply					
			Continuous	Periodic	Permanent ground plots	Temporary ground plots	Aerial/remote sensing sample based	Aerial/remote sensing full coverage
Forest inventory	100	2014	yes	yes	yes	no	no	no
Other field assessments	N/A	N/A	yes	no	no	no	no	no
Updates to other sources	N/A	N/A	yes	no	no	no	no	no
Expert estimate	N/A	N/A						

Table 13b

Type of forest reporting used at national scale	Check boxes that apply
1 Criteria and Indicators reporting	yes
2 Periodic national state of the forest report	yes
3 Other (please document)	yes
4 None	no

Other type of forest reporting

Yearly forestry activities are compiled and sent from field divisions to head quarter which is further analysed, published and archived by Forest Information Management Section

13.4 Comments

Category	Comments
Na	Na
N/A	N/A
N/A	N/A

Other general comments

--

14. What is the area of forest under a forest management plan and how is this monitored?

Documents for this question:

- [Guide for country reporting FRA 2015](#)
- [FRA 2015 Terms and Definitions](#)

14.1 Categories and definitions

Category	Definition
Forest area with management plan	Forest area that has a long-term documented management plan, aiming at defined management goals which is periodically revised
...of which for production (<i>sub-category</i>)	Forest management plan mainly focused on production
...of which for conservation (<i>sub-category</i>)	Forest management plan mainly focused on conservation
Monitoring of forest management plans	Government monitoring of forest management plan implementation conducted through field visits or audits of forest management plan performance

14.2 National data

14.2.1 Data sources

	References to sources of information	Variables	Years	Additional comments
1	RGOB, DoFPS, 2011. Forestry Facts, Figure and Trends	Statistic of Forest	2011	N/A
2	WCD, 2013. Information obtained from Wildlife Conservation Division	Protected area	2013	N/A
3	GISS, FRMD, 2011. Information obtained from GIS section under FRMD	Forest Production and conservation statistic	2013	N/A
4	N/A	N/A	N/A	N/A

14.3 Data

Table 14a

Forest plan type	Forest area 2010 (000 ha)
Forest area with management plan	1084.464
... of which for production	235.048
... of which for conservation	849.416

Table 14b

Indicate which (if any) of the following are required in forest management plans in your country

1 Soil and water management	yes
2 High conservation value forest delineation	yes
3 Social considerations community involvement	yes

Table 14c

Percent of area under forest management plan that is monitored annually	40
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Tiers

Category	Tier for status
Forest area with management plan	Tier 3
Percent of area under forest management plan that is monitored annually	Tier 3

Tier criteria

Category	Tier for status
Forest area with management plan	Tier 3 : Reports that describe national records 5 years old or less that contain long-term forest monitoring plans Tier 2 : Industry or other records indicating the presence of a long-term forest management plan Tier 1 : Other
Percent of area under forest management plan that is monitored annually	Tier 3 : Government documentation of monitoring extent Tier 2 : Reports from forest managers or other documental sources Tier 1 : Other

14.4 Comments

Category	Comments
Production forest area with management plan	Figure includes all production area (FMUs, WSs and CFs) till 2010
Conservation forest area with management plan	Figure includes forest in protected areas having forest management plan.
% of forest area under management plan monitored annually	Both production and conservation area with management plans are monitored annually. % figure is based on total forest area of 2010 and not on actual country's geographical area

Other general comments

--

15. How are stakeholders involved in the management decision making for publicly owned forests?

Documents for this question:

- [Guide for country reporting FRA 2015](#)
- [FRA 2015 Terms and Definitions](#)

15.1 Categories and definitions

Category	Definition
Stakeholder involvement	Stakeholder involvement is defined as significant inputs into at least one aspect of forest management at the operational scale

Table 15

Please indicate the type of stakeholder involvement in forest management decision making required in your country	
1. Planning phase	yes
2. Operations phase	yes
3. Review of operations	yes

Tiers

Category	Tier for status
Type of stakeholder inputs	Tier 3

Tier criteria

Category	Tier for status
Type of stakeholder inputs	Tier 3 : Government (national or sub-national) documentation of stakeholder inputs Tier 2 : Government (national or subnational) requirement but stakeholder inputs not documented Tier 1 : Other

15.2 Comments

Category	Comments
Na	Na
N/A	N/A
N/A	N/A

Other general comments

--

16. What is the area of forest under an independently verified forest certification scheme?

Documents for this question:

- [Guide for country reporting FRA 2015](#)
- [FRA 2015 Terms and Definitions](#)

16.1 Categories and definitions

Category	Definition
FSC certification	Forest area certified under the Forest Stewardship Council certification scheme
PEFC certification	Forest area certified under the Programme for the Endorsement of Forest Certification scheme
Other international forest management certification	Forest area certified under an international forest management certification scheme with published standards and is independently verified by a third-party, excluding FSC and PEFC certification.
Certified forest area using a domestic forest management certification scheme	Area certified under a forest management certification scheme with published standards that are nationally recognized and independently verified by a thirdparty

16.2 Data

Table 16a













International forest management certification		Forest area (000 ha)						
		2000	2001	2002	2003	2004	2005	2006
	FSC	0	0	0	0	0	0	0
	PEFC	0	0	0	0	0	0	0
	Other	0	0	0	0	0	0	0
		2007	2008	2009	2010	2011	2012	
	FSC	0	0	0	0	0	0	
	PEFC	0	0	0	0	0	0	
	Other	0	0	0	0	0	0	

Table 16b

Domestic forest management certification		Forest area (000 ha)						
		2000	2001	2002	2003	2004	2005	2006
	1.Name	0	0	0	0	0	0	0
	2.Name	0	0	0	0	0	0	0
	3.Name	0	0	0	0	0	0	0

		2007	2008	2009	2010	2011	2012	
	1.Name	0	0	0	0	0	0	
	2.Name	0	0	0	0	0	0	
	3.Name	0	0	0	0	0	0	

Tier criteria

Category	Tier for status
International forest management certification	Tier 3: International forest management scheme records maintained by the certifying organization for the reporting year Tier 2: International forest management scheme records reported by the certifying organization for a period 2 years prior to the reporting year Tier: 1 Other
Domestic forest management certification	Tier 3: National registry reports for domestic forest management certification maintained by the certifying organization for the reporting year Tier 2: Domestic forest management scheme records reported by the certifying organization for a period 2 years prior to the reporting year Tier: 1 Other

Tiers

Category	Tier for status
International forest management certification	N/A
Domestic forest management certification	N/A

16.3 Comments

Category	Comments related to data definitions etc
Certified forest area using an international forest management certification scheme	N/A
Domestic forest management certification	N/A

Other general comments

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17. How much money do governments collect from and spend on forests?

Documents for this question:

- [Guide for country reporting FRA 2015](#)
- [FRA 2015 Terms and Definitions](#)

17.1 Categories and definitions

Category	Definition
Forest revenue	All government revenue collected from the domestic production and trade of forest products and services. For this purpose revenue include: <ul style="list-style-type: none"> • Goods : roundwood; sawnwood; biomass; woodbased panels; pulp and paper and non-wood forest products. • Services : including concession fees and royalties, stumpage payments, public timber sales revenue taxes and charges based on forest area or yield, taxes on domestic trade and export of forest products, special levies on forestry activities and payments into forest related funds, other miscellaneous inspection, licence and administrative fees levied by forest administrations, permit and licence fees for recreation and other forest related activities.
Public expenditure on forestry	All government expenditure on forest related activities.

17.2 National data

17.2.1 Data sources

	References to sources of information	Variables	Years	Additional comments
1	RGOB, DoFPS, 2011. Forestry Facts, Figure and Trends	Statistic of Forest	2011	N/A
2	RGOB, NSB. Statistical Yearbook of Bhutan	Forestry activities statistic	2005,2006,2007,2008, 2009,2010	N/A
3	DNB, MoF, RGoB.2013 DoFPS Budget Information obtained from Department of National Budget	Budget	2010	N/A
4	N/A	N/A	N/A	N/A

17.3 Data

Table 17

Category	Revenues / expenditures (000 local currency)		
	2000	2005	2010
Forest revenue	N/A	N/A	1040649.124
Public expenditure on forestry	N/A	N/A	1272779.189
	2000	2005	2010

Name of Local Currency	Ngultrum	N/A	N/A
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17.4 Comments

Category	Comments related to data definitions etc
Forest revenue	Sum of year revenue generated from forestry activities for five years (2008-2012)
Public expenditure on forestry	Budget released for forestry activities from Department of National Budget, Ministry of Finance, RGOB, Bhutan for the year 2010
Other general comments	N/A

Other general comments

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18. Who owns and manages the forests and how has this changed?

Documents for this question:

- [Guide for country reporting FRA 2015](#)
- [FRA 2015 Terms and Definitions](#)

18.1 Categories and definitions

Category	Definition
Public ownership	Forest owned by the State or administrative units of the public administration or by institutions or corporations owned by the public administration.
...of which owned by the state at national scale (<i>sub-category</i>)	Forest owned by the State at the national scale or administrative units of the public administration or by institutions or corporations owned by the public administration.
...of which owned by the state at the sub-national government scale (<i>sub-category</i>)	Forest owned by the State at the sub-national government scale or administrative units of the public administration or by institutions or corporations owned by the public administration.
Private ownership	Forest owned by individuals, families, communities, private cooperatives corporations and other business entities, private, religious and educational institutions, pension or investment funds, NGOs, nature conservation associations and other private institutions.
...of which individuals (<i>sub-category</i>)	Forest owned by individuals and families.
...of which private business entities and institutions (<i>sub-category</i>)	Forest owned by private corporations cooperatives companies and other business entities as well as private nonprofit organizations such as NGOs nature conservation associations, and private religious and educational institutions etc.
...of which local tribal and indigenous communities (<i>sub-category</i>)	Forest owned by a group of individuals belonging to the same community residing within or in the vicinity of a forest area or forest owned by communities of indigenous or tribal people The community members are coowners that share exclusive rights and duties and benefits contribute to the community development.
Unknown ownership	Forest area where ownership is unknown includes areas where ownership is unclear or disputed.
Categories related to management rights of public forests	Definition
Public Administration	The Public Administration (or institutions or corporations owned by the Public Administration) retains management rights and responsibilities within the limits specified by the legislation.
Individuals households	Forest management rights and responsibilities are transferred from the Public Administration to individuals or households through long-term leases or management agreements.
Private companies	Forest management rights and responsibilities are transferred from the Public Administration to corporations, other business entities private cooperatives, private nonprofit institutions and associations, etc., through long-term leases or management agreements.
Communities	Forest management rights and responsibilities are transferred from the Public Administration to local communities (including indigenous and tribal communities) through long-term leases or management agreements.
Other form of management rights	Forests for which the transfer of management rights does not belong to any of the categories mentioned above.

18.2 National data

18.2.1 Data sources

	References to sources of information	Variables	Years	Additional comments
1	RGOB, 1995. Land Cover Figures of Bhutan (National figures), Ministry of Agriculture, Royal Government of Bhutan	Landuse, Forest types	1995	N/A
2	MoAF. 2010. Technical report Bhutan Land Cover Assessment 2010 (LCMP 2010)	Landuse, Forest type	2010	N/A
3	RGOB, DoFPS, 2011. Forestry Facts, Figure and Trends	Statistic of Forest	2011	N/A
4	N/A	N/A	N/A	N/A

18.2.2 Classification and definitions

National class	Definition
Government Reserved Forest Land	Government Reserved Forest Land means forests, scrubs forest and/or any land and water body (excluding Thromde, Institutions and private forest) the ownership of which is not vested in any person and is under the custody of the Ministry
Community Forest	Any are of Government Reserved Forest designated for management by a local in accordance with the provision under Section 36 of the Rules, as per Chapter 1 Section 3 of the Act. This also falls under Government Reserved Forest Land
Private Forest	Any area of private land that has been registered as a private forest pursuant to Chapter IV Part A of the Rules.
N/A	N/A

18.2.3 Original data

Forest Area		
Landuse	Forest area (000 ha)	
	1995	2010
Forest	2556.358	2705.291
Community and Private forest Area		

Forest Category	Area (000 ha)				
	1990	2000	2005	2010	2015
Community Forest	0	0.358	2.973	33.989	56.736
Private Forest	0	0.004	0.06	0.4	0.74

18.3 Analysis and processing of national data

18.3.1 Adjustment

Not needed

18.3.2 Estimation and forecasting

Category	Forest Area (000 ha)				
	1990	2000	2005	2010	2015
All Forest	2506.714	2606.002	2655.647	2705.291	2754.935
Community forest	0	0.358	2.973	33.989	56.736
Private Forest	0	0.004	0.06	0.4	0.74









18.3.3 Reclassification

National Classes of Ownership	Public Ownership	Private Ownership	Individuals	Local Communities	Indigenous / tribal Ownership	Other types of Ownership
Government Reserved Forest	100%					

Community Forest				100%		
Private Forest			100%			

18.4 Data

Table 18a

Categories		Forest area (1000 hectares)			
		1990	2000	2005	2010
	Public ownership	2506.714	2605.998	2655.587	2704.891
	... of which owned by the state at national scale	2506.714	2605.998	2655.587	2704.891
	... of which owned by the state at the sub-national government scale	N/A	N/A	N/A	N/A
	Private ownership	0	0.004	0.06	0.4
	... of which owned by individuals	0	0.004	0.06	0.4
	... of which owned by private business entities and institutions	0	0	0	0
	... of which owned by local, tribal and indigenous communities	0	0	0	0
	Unknown ownership	0	0	0	0
TOTAL		2506.71	2606.00	2655.65	2705.29

Tiers

Category	Tier for status	Tier for reported trend
Public ownership	Tier 3	Tier 3
Private ownership	Tier 3	Tier 3
Unknown ownership	Tier 1	Tier 1

Tier criteria

Category	Tier for status	Tier for reported trend
Ownership	Tier 3: National forestry statistics registers of land titles or maps on land ownership or all forest area under one ownership category that is five years old or less. Tier 2: National forestry statistics registers of land titles or maps on land ownership or questionnaires that are more than five years old. Tier 1: Other	Tier 3 : Estimate based on repeated compatible tiers 3 (tier for status) Tier 2 : Estimate based on repeated compatible tier 2 or combination tier 3 and 2 or 1 (tier for status) Tier 1 : Other

Table 18b - Holder of management rights of public forests

Categories	Forest area (000 hectares)			
	1990	2000	2005	2010
Public Administration	2506.714	2605.64	2652.614	2670.902
Individuals	0	0.004	0.06	0.4
Private companies	0	0	0	0
Communities	0	0.358	2.973	33.989
Other	0	0	0	0
TOTAL	2506.71	2606.00	2655.65	2705.29

Category	Tier for reported trend	Tier for status
Public Administration	Tier 3	Tier 3
Individuals	Tier 3	Tier 3
Private companies	Tier 3	Tier 3
Communities	Tier 3	Tier 3
Other	Tier 1	Tier 1

18.5 Comments

Category	Comments related to data definitions etc	Comments on the reported trend
Public ownership	All forest is owned by the Government, including community forest except private forest	N/A
Private ownership	Owned by private individual	N/A
Unknown ownership	N/A	N/A

Management rights	N/A	N/A
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Other general comments to the table

In Table 18a, there are two figure mentioned, Public ownership and Private ownership. Since in the table community is under private ownership, therefore there is no figure mentioned in that row. Beside there is no particular local tribes or indigenous community in Bhutan. In Bhutan management ownership is given to community but land ownership still belongs to government. Therefore, the figure for community forest of Bhutan is merged with Public ownership.

19. How many people are directly employed in forestry?

Documents for this question:

- [Guide for country reporting FRA 2015](#)
- [FRA 2015 Terms and Definitions](#)

19.1 Categories and definitions

Category	Definition
Full-time equivalents (FTE)	A measurement equal to one person working full-time during a specified reference period.
Employment in forestry	Employment in activities related to production of goods derived from forests. This category corresponds to the ISIC/NACE Rev. 4 activity A02 (Forestry and logging).

19.2 National data

19.2.1 Data sources

	References to sources of information	Variables	Years	Additional comments
1	HRD, DoFPS, MoAF, 2013.	Staff statistic	2013	N/A
2	NRDCL, 2013. Information Obtained from NRDCL	Staff statistic	2013	N/A
3	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A

19.2.2 Classification and definitions

National class	Definition
Regular employees	All the regular employees of the Department of Forests and Park Services and Natural Resources Development Corporation Limited has been categorised as regular employees.
N/A	N/A
N/A	N/A
N/A	N/A

19.2.3 Original data

Regular employee	Number
Department of Forests and Park Services	1608

Natural Resources Development Corporation	350
Total	1958



Not needed

Category	Forest Area (000 ha)				
	1990	2000	2005	2010	2015
All Forest	2506.714	2606.002	2655.647	2705.291	2754.935
Community forest	0	0.358	2.973	33.989	56.736
Private Forest	0	0.004	0.06	0.4	0.74

National Classes of Ownership	Public Ownership	Private Ownership	Individuals	Local Communities	Indigenous / tribal Ownership	Other types of Ownership
Government Reserved Forest	100%					
Community Forest				100%		
Private Forest			100%			

19.3 Data

Table 19

Category		Employment (000 years FTE)			
		1990	2000	2005	2010
	Employment in forestry	N/A	N/A	N/A	1.9
	... of which female	N/A	N/A	N/A	0.6

19.4 Comments

Category	Comments related to data definitions etc	Comments on the reported trend
Employment in forestry	N/A	N/A

Other general comments to the table
N/A

20. What is the contribution of forestry to Gross Domestic Product (GDP)?

Documents for this question:

- [Guide for country reporting FRA 2015](#)
- [FRA 2015 Terms and Definitions](#)

20.1 Categories and definitions

Category	Definition
Gross value added from forestry (at basic prices)	This category corresponds to the ISIC/NACE Rev. 4 activity A02 (Forestry and logging).

20.2 Data

Table 20 (Pre-filled data from UNdata/EUROSTAT)

Category	Million	Currency	Year for latest available information
Gross value added from forestry (at basic prices)	2729	Ngultrum	2012

20.3 Comments

Category	Comments
Gross value added from forestry (at basic prices)	Na

Other general comments

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21. What is forest area likely to be in the future

Documents for this question:

- [Guide for country reporting FRA 2015](#)
- [FRA 2015 Terms and Definitions](#)

21.1 Categories and definitions

Category	Definition
Government target/aspiration for forest area	Government target/aspiration for forest area for a specific year.
Forests earmarked for conversion	Forest area that is allocated/classified or scheduled to be converted into non-forest uses.

21.2 National data

21.2.1 Data sources

	References to sources of information	Variables	Years	Additional comments
1	Na	Na	Na	Na
2	N/A	N/A	N/A	N/A
3	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A

21.3 Data

Table 21a

Category	Forest area (000 ha)	
	2020	2030
Government target/aspiration for forest area	2303.64	2303.64

Table 21b

Category	Forest area (000 ha)
	2013
Forests earmarked for conversion	N/A

21.4 Comments

Category	Comments
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Government target/aspiration for forest area	Constitution of the Kingdom of Bhutan demands 60% of country's land area should be maintained under forest cover for all time
Forests earmarked for conversion	Na

Other general comments

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