



Forestry Department

Food and Agriculture Organization of the United Nations

**GLOBAL FOREST RESOURCES
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The Forest Resources Assessment Programme

Sustainably managed forests have multiple environmental and socio-economic functions important at the global, national and local scales, and play a vital part in sustainable development. Reliable and up-to-date information on the state of forest resources - not only on area and area change, but also on such variables as growing stock, wood and non-wood products, carbon, protected areas, use of forests for recreation and other services, biological diversity and forests' contribution to national economies - is crucial to support decision-making for policies and programmes in forestry and sustainable development at all levels.

FAO, at the request of its member countries, regularly monitors the world's forests and their management and uses through the Forest Resources Assessment Programme. This country report forms part of the Global Forest Resources Assessment 2010 (FRA 2010).

The reporting framework for FRA 2010 is based on the thematic elements of sustainable forest management acknowledged in intergovernmental forest-related fora and includes variables related to the extent, condition, uses and values of forest resources, as well as the policy, legal and institutional framework related to forests. More information on the FRA 2010 process and the results - including all the country reports - is available on the FRA Web site (www.fao.org/forestry/fra).

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The Global Forest Resources Assessment Country Report Series is designed to document and make available the information forming the basis for the FRA reports. The Country Reports have been compiled by officially nominated country correspondents in collaboration with FAO staff. Prior to finalisation, these reports were subject to validation by forestry authorities in the respective countries.

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Introduction

Forestry is an extensive land use system in Nepal. The forest and trees provide a vast array of goods and services to human beings. Forest and tree resources provide the basic commodities such as fuel wood, timber and fodder to the people and serve as an important ecological function such as biodiversity conservation, erosion control, and carbondioxide consumption. Agriculture is the mainstay of economy in the country as agriculture and forestry together has 32% contribution in total gross domestic product of the country. Nearly two-third of the country's total population depends on agriculture profession for sustaining their livelihoods.

The rate of forest depletion was significantly high up to nineties due to political, socioeconomic and administrative reasons. The last National Forest Inventory (NFI) was carried out in early nineties in Nepal. According to that inventory, forest and shrub together cover about 5.83 million ha, which is 39.6% of the total land area of the country. The rate of forest area decreasing was 1.7% per annum during 1978/79 to 1994, whereas rate of forest and shrub depleting rate was 0.5% per annum during the same period. Since then NFI has not been done to update data on forest cover change.

Community Forestry (CF) policy has been implemented from the early eighties and started to handover all the accessible national forests to the local people for their management and use. The 90's was the decade of community forestry in Nepal and the policy and programme also extended to the whole part of the country. This policy has brought significant positive change to restore denuded mountain landscape. Recent studies from 20 Terai districts (southern most districts) revealed that the rate of forest cover changed was at an annual rate of 0.06% during the period of 1990/91 to 2000/2001.

Macro level studies and visual interpretations revealed that Nepal's forest coverage and condition has significantly improved due to the Community Forestry (CF) intervention. Contexts have been dramatically changed inside and outside the forest. However, forest and forestry data have not been updated yet at national level and early nineties data do not represent present situation. Although questions have been raised on reliability of National FRA2005 report, estimation and extrapolation from outdated data for FRA2010 will make another big mistake. Thus, new tables have been filled up from available data for FRA2010; however forest and forestry related primary data have not been changed. As result, many tables are not filled up. Besides, processes of calibration and estimation from outdated original data have not been followed. Most importantly, Nepal is planning to conduct NFI in near future and we would like to promise to provide updated data when data will be generated.

1 Table T1 – Extent of Forest and Other wooded land

1.1 FRA 2010 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 <i>in situ</i> . 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 <i>in situ</i> ; 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”.
Other land with tree cover (Subordinated to “Other land”)	Land classified as “Other land”, spanning 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.
Inland water bodies	Inland water bodies generally include major rivers, lakes and water reservoirs.

1.2 National data

1.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
DFRS, 1999. Forest Resources of Nepal (1987-1998). Department of Forest Research and Survey, Ministry of Forest And Soil Conservation, Kathmandu, Nepal	H	Area of forest and shrub	1994	NFI from 1988 to 1998.
HMG/ADB/FINNIDA, 1988. Master Plan for the Forestry Sector in Nepal. Ministry of Forest and Soil Conservation, Kathmandu, Nepal.	H	Area of forest and shrub	1985-86	Based on Land Resources Mapping Data of 1978/79
WECS, 1988. District, Regional and national Forest Cover Class Summaries of the Area, Fuelwood Yield and Wood Volume for the Kingdom of Nepal. Water and Energy Commission Secretariat, His Majesty's Government of Nepal.	H	Area of forest and shrub	1985-86	Based on Land Resources Mapping Data of 1978/79
FAO. 2005. Global Forest Resources Assessment 2005 Main Report FAO	H	Global Forestry Statistics	2005	

Italy Rome.				
MFSC, The future of Nepal's forest outlook for 2020.	H	Forestry statistics	2008	

1.2.2 Classification and definitions

The following table provides the classification and their definitions in use at Department of Forest Research and Survey, Ministry of Forests and Soil Conservation, Nepal.

National class	Definition
Forest	All land with a forest cover, i.e, with trees whose crowns cover more than 10 % of the area, and not used primarily for purposes other than forest. Temporarily clear-cut area that will be planted is also forest area.
Shrub	Same as <i>Forest</i> but well-defined stem can't be found

Source: DFRS, 1999.

1.2.3 Original data

The following table presents the national data on forest cover in Nepal. These information are based on The National Forestry Inventory Report prepared by the DFRS.

Categories	Land Cover in 000 ha			
	LRMP 1978/79	NRSC 1984	MPFS 1985/86	NFI 1994
Forest	5593	5284*	5504	4268
Shrub	692	-	706	1560
Total	6285		6210	5828

* include some shrub areas

A. Forests

For 1990

The method of linear interpolation has been used to estimate extent of forest in Nepal in 1990 using 1985 figures from the MPFS (1988) and the DFRS (1999).

For 2000

The FRA 2000 figure is considered to reflect reality on the ground. The FRA 2000 figure were developed through linear extra-polation method using figures from LRMP (1978) along with DFRS (1999) and adding 133,000 ha of plantation area (Validation Sheet for FRA 2000).

For 2005

The figure for 2005 has been linearly forecasted based on FRA 2000 report (which is based on LRMP (1978) and DFRS (1999)) and NFI 1994 i.e. same trend as in FRA 2000 and keeping in mind following facts:

- Trees outside the forest area haven't been included under the category of forest.*
- Forest patches less than 6.25 ha haven't been regarded as forest while interpreting the aerial photographs in carrying out National Forest Inventory, 1994.*
- The shrub area in 2005 may be more close to 1897 (000 ha) estimate than the following computed figure of 2235 (000 ha).*

For 2010

Micro level studies, district and regional level resource inventories revealed that forest cover in Nepal is significantly increased due Community Forestry(CF) intervention. However, NFI is not completed yet to update national data. Estimation from the last NFI 1994 data do not represent present context. Therefore, extent of forest in 2010 is Not Available(NA).

Variables	Extent in “000”ha					
	1978	1985	1994	1990	2000	2005
Extent of Forests in 1990		5504	4268	4817		
Extent of Forests in 2000	5605		4268		3767	3349
Add Plantations and forest patches (6.25 but > 0.5) not seen in Remote Sensing					133	
					3900	
Extent of Forest in 2005	5605		4268		3767	3349
Add Plantations and forest patches (6.25 but > 0.5) not seen in Remote Sensing						287
						3636
Extent of Forest in 2010						NA
Extent of Shrubs in 1990		706	1560	1180		
Extent of Shrubs in 2000	692		1560		1886	2157
Less (Plantations and forest patches) and add shrub patches (<6.25 but > 0.5 ha) not in Remote Sensing					-133	78
					1753	2235
Total (Forest and Shrub)				5997	5653	5871

1.2.4 Reclassification into FRA 2010 categories

Extent of forest data are NA for 2010. The reason for this is that there is no new category for 2010 but categories mentioned in the table were used for FRA2005.

National Land-Use	Percentage of a National Class belonging to a FRA Class			
	Forest	Other Wooded land	Other land with Tree Cover	Other land
Forest	100	-	-	-
Shrub	-	100	-	-
Others	-	-	-	100

1.3 Data for Table T1

FRA 2010 categories	Area (1000 hectares)			
	1990	2000	2005	2010
Forest	4 817	3 900	3 636	3 636
Other wooded land	1 180	1 753	1 897	1 897
Other land	8 303	8 647	8 767	8 767
...of which with tree cover				
Inland water bodies	418	418	418	418

Total for country	14 718	14 718	14 718	14718
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1.4 Comments to Table T1

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Forest	<ul style="list-style-type: none"> National Forest Inventory (NFI) has not been carried out from the last 1994. Positive impacts have been seen due to Community Forestry (CF) intervention and increasing of protected area system. Department of Forest Research and Survey (DFRS) has designed to complete NFI by 2013. 	<ul style="list-style-type: none"> Reporting of FRA2005 was based on 1994 data and questions have been raised about the reliability. Extrapolations and estimations by using outdated data lead toward the great mistake. Thus, same statistics of FRA2005 have been used and after completion of NFI, data will be updated.
Other wooded land	Previous data are outdated and no new data have been available.	<ul style="list-style-type: none"> DFRS has planned to accomplish new NFI up to 2013. Updated data will be submitted later.
Other land		
Other land with tree cover	<ul style="list-style-type: none"> Inventory of the trees outside forest under the category of 'other lands with trees' of FRA has not yet been carried out in Nepal. Most of the trees grown on land categories other than the forest are found in scattered and linear form. 	<ul style="list-style-type: none"> Data are not available. But this category will be included in forthcoming NFI process
Inland water bodies	The figure of the Inland Water Bodies has been adopted from the FAO STATISTICS for all the three years.	

Other general comments to the table
<ul style="list-style-type: none"> NFI is in the process. Nepal will able to report reliable forest and forestry data after completion the NFI FRA2015. Formulation of project document has been completed to conduct FRA in Nepal.

Expected year for completion of ongoing/planned national forest inventory and/or RS survey / mapping	
Preparation of cover map by using Remotely Sensed (RS) data.	2010
Accomplishment of field inventory and production of National Forest Resource Inventory Report.	2013

2 Table T2 – Forest ownership and management rights

2.1 FRA 2010 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.
Private ownership	Forest owned by individuals, families, communities, private co-operatives, corporations and other business entities, private religious and educational institutions, pension or investment funds, NGOs, nature conservation associations and other private institutions.
Individuals (sub-category of Private ownership)	Forest owned by individuals and families.
Private business entities and institutions (sub-category of Private ownership)	Forest owned by private corporations, co-operatives, companies and other business entities, as well as private non-profit organizations such as NGOs, nature conservation associations, and private religious and educational institutions, etc.
Local communities (sub-category of Private ownership)	Forest owned by a group of individuals belonging to the same community residing within or in the vicinity of a forest area. The community members are co-owners that share exclusive rights and duties, and benefits contribute to the community development.
Indigenous / tribal communities (sub-category of Private ownership)	Forest owned by communities of indigenous or tribal people.
Other types of ownership	Other kind of ownership arrangements not covered by the categories above. Also includes areas where ownership is unclear or disputed.
Categories related to the holder of management rights of public forest resources	
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 institutions	Forest management rights and responsibilities are transferred from the Public Administration to corporations, other business entities, private co-operatives, private non-profit 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.

2.2 National data

2.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments	
GoN, 1995. Forest Act 1993 and Forest Regulation 1995. Ministry of Forests and Soil Conservation, Kathmandu, Nepal	H			Official and legal definitions	1993 1995
GoN and MFSC. 2002. Nepal Biodiversity Strategy. Ministry of Forests and Soil Conservation.	H			Area of ownership	2000
GoN, National Park and Wild life Conservation Act 1973 with fourth amendment 1994	H			Categories of Protected areas	
MFSC, the future of Nepal's forest outlook for 2020	H			Forest ownership related data	2008

2.2.2 Classification and definitions

National class	Definition
National Forest	All forests excluding private forest within Nepal, whether marked and unmarked with forest boundaries and the terms shall also includes waste or uncultivated lands or unregistered lands surrounded by the forest or situated near the adjoining forest as well as paths, ponds, lakes, rivers or streams and riverine lands within the forest.
Government managed forest	A national forest to be managed by GoN.
Protected Forest	A national forest declared by GoN as the protected forest considering it to be of special environmental, scientific or cultural importance.
Community Forest	A national forest handed over to an user group for its development, conservation and utilization for the collective interest.
Leasehold Forest	A national forest handed over to any institution established on the prevailing laws, industry based on forest products or community for the purposes of conservation and development of forest.
Religious Forest	A national forest handed over to any religious body, group or community for its development, conservation and utilization.
Private Forest	A forest planted, nurtured or conserved in any private land own by an individual pursuant to prevailing law.
Protected Areas System	Include National Park, Wildlife Reserve, Hunting Reserve; Buffer Zone, Conservation Areas and Strict Nature Reserve which are geographically defined area regulated and managed to achieve specific conservation objectives

2.2.3 Original data

New data for many categories have not been available. However, same data used for FRA2005 have been depicted.

2.3 Analysis and processing of national data

2.3.1 Calibration

2.3.2 Estimation and forecasting

Since original data are so old which do not represent the present context. Thus, no estimations have been made from outdated data.

2.4 Data for Table T2

Table 2a - Forest ownership

FRA 2010 Categories	Forest area (1000 hectares)		
	1990	2000	2005
Public ownership	4817	3898	3636
Private ownership	N.A.	2	2.3
...of which owned by individuals			
...of which owned by private business entities and institutions			
...of which owned by local communities			
...of which owned by indigenous / tribal communities			
Other types of ownership			
TOTAL	4 817	3 900	3 638.3

Note: If other types of ownership is reported, please specify details in comment to the table.

Does ownership of trees coincide with ownership of the land on which they are situated?		Yes
	*	No
If No above, please describe below how the two differ:		
<ul style="list-style-type: none"> In Nepal, land ownership of all the forests belong to the Government but management ownership transfer to the local communities. About 1.2 million hectares of national forests have been handed over to the local communities for the management and use. Forests with privately owned land belong to the land owner. However, no data are available of private land. 		

Table 2b - Holder of management rights of public forests

FRA 2010 Categories	Forest area (1000 hectares)		
	1990	2000	2005
Public Administration	4317	3235	2514
Individuals	NA	NA	NA
Private corporations and institutions	NA	15	22
Communities	500	750	1100
Other	NA	NA	Na
TOTAL	4817	3900	3636

2.5 Comments to Table T2

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Public ownership	<ul style="list-style-type: none"> The past forest inventory reports have not categorized the forest on the basis of ownership. 	<ul style="list-style-type: none"> All the forest and shrub area presented in the inventory reports come under the public ownership category.
Private ownership	<ul style="list-style-type: none"> Privately owned forest over the country has not been assessed yet. There is no separate data base system of the private owned forest. 	<ul style="list-style-type: none"> Data reported are on the basis of area and numbers of private forests have been registered in the district forest offices.
Other types of ownership	<ul style="list-style-type: none"> No forest category falls under this ownership. 	<ul style="list-style-type: none"> Not reported yet.
Management rights	<ul style="list-style-type: none"> Under the public ownership, there are different management rights. National forest can be handed over to the local communities in the management contact. 	<ul style="list-style-type: none"> Community based forestry is strong in Nepal. Community forestry Data have been reported since 1990. The area managed under CF is collected from the record of Department of Forest (DoF).

Other general comments to the table

In Nepal forest with public ownership has different management tenures. However, given table does not address on that issues.

3 Table T3 – Forest designation and management

3.1 FRA 2010 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.
Protected areas	Areas especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means.
Categories of primary designated functions	
Production	Forest area designated primarily for production of wood, fibre, bio-energy and/or non-wood forest products.
Protection of soil and water	Forest area designated primarily for protection of soil and water.
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.
Social services	Forest area designated primarily for social services.
Multiple use	Forest area designated primarily for more than one purpose and where none of these alone is considered as the predominant designated function.
Other	Forest areas designated primarily for a function other than production, protection, conservation, social services or multiple use.
No / unknown	No or unknown designation.
Special designation and management categories	
Area of permanent forest estate (PFE)	Forest area that is designated to be retained as forest and may not be converted to other land use.
Forest area within protected areas	Forest area within formally established protected areas independently of the purpose for which the protected areas were established.
Forest area under sustainable forest management	To be defined and documented by the country.
Forest area with management plan	Forest area that has a long-term (ten years or more) documented management plan, aiming at defined management goals, which is periodically revised.

3.2 National data

3.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
GoN, 1995. Forest Act 1993 and Forest Regulation 1995. Ministry of Forest and Soil Conservation, Kathmandu, Nepal	H	Legal Definitions	1993 1995	
MSC, 2002. Nepal Biodiversity Strategy. Ministry of Forests and Soil Conservation, Kathmandu, Nepal.	H	Community, Lease hold, Production, PAs, Protection Forest.	1988 to 2002	

Government of Nepal 2007. The three year interim Plan (2007-2010). Government of Nepal. National Planning Commission, Nepal	H	Area of Community Forest and PAs	2007	
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3.2.2 Classification and definitions

National class	Definition
Protected Forest	A national forest declared by His Majesty's Government as the protected forest considering it to be of special environmental, scientific or cultural importance.
Community Forest	A national forest handed over to an user group for its development, conservation and utilization for the collective interest.
Protected Areas	A geographically defined area that is regulated and managed to achieve a specific conservation objective.
Production Forest	Forests which is primarily used for the production of timber, fuelwood and non timber forest product
Leasehold Forest	Forests leased to any institution established under current law, industry or community, for the production of forest products, agro-forestry, tourism or farming of insects and wildlife in a manner conducive to the conservation and development of forests.

3.2.3 Original data

A. Protected Areas

Protected Areas (Year of Establishment)	1990	2008	Forest & Shrub
	000 ha	000 ha	000 ha (%)
National Park (NP)			
1 Chitwan NP (1973)	93	93.2	80
1 Bardia NP (1976/1988)	97	97	
Shivapuri and Nagarjun NP (2002)		16	
Khaptad NP (1984)	23	23	
Makalu Barun NP (1991) ¹		150	86
Sagarmatha NP (1976)	115	115	2
Langtang NP (1976)	171	171	69
Shey Phoksundo NP (1984)	356	356	
Rara NP (1976)	11	11	
Sub Total NP	864	1050	(44.80%)
Wildlife Reserve (WR)			
Koshi Tappu WR (1976)	18	18	10
Parsa WR (1984)	50	50	49
Suklaphanta WR (1976)	31	31	
Sub Total WR	98	98	(87.54%)
Hunting Reserve (HR)			
Dhorpatan HR (1987)	133	133	16
Sub Total HR	133	133	(12.08%)
Conservation Area (CA)			
Kanchenjunga CA (1997)		204	49
Manaslu CA (1998)		166	
Annapurna CA (1986, 1992)		763	153
Sub Total CA	0	1133	(20.90%)

Buffer Zone			
Chitwan NP(1996)		75	
Bardia NP(1996)		33	
Makalu Barun NP(1999)		83	
Langtang NP(1998)		42	
Shey Phoksundo NP(1998)		135	
Sagarmatha NP(2000)		27	
Suklaphanta WR(2004)		25	
Koshitappu WR(2004)		17	
Parsa WR(2005)		29	
Rara NP(2006)		20	
Kaptad NP(2006)		22	
SubTotal Buffer Zone	0	508	
Total Area Protected	1095	2922	

Summary

Category	Area in 000 ha			Percentage Forest cover
	1990	2005	2008	
National Park (NP)	864	1015	1050	44.80
Wildlife Reserve (WR)	98	98	98	87.54
Hunting Reserve (HR)	133	133	133	12.08
Conservation Area (CA)	0	1133	1133	20.90
Buffer Zone	0	305	508	n.a.
Total Protected Area	1095	2684	2922	

B. Forest Areas

National Category	Year	Forest Area in 000 ha
Community Forest	1986	48.5
	1994	112.626
	1997	352.326
	2002	854.389
	2008	1270.43
Leasehold forest	2008	20.000
Protected Areas	2008	2922
Production Forest	1986	31
	1990	136
	2002	298.7
	2005	345
	2008	578
Protection Forest	2002	711.364

(1986 and 1990 estimated figures of production forest and 1986 figures for community forestry come from MPFS, 1988)

3.3 Analysis and processing of national data

Data for leasehold forestry and protected areas have been updated. However, other data remain same as of FRA2005.

3.3.1 Calibration

3.3.2 Estimation and forecasting

A. Protected Areas

In the year 1990, the PAs covered 1095 (000 ha) since a Park with an area of 150 (000 ha), three conservation areas spanning 1132 (000 ha) and the buffer areas covering 305 (000 ha) around the six national parks were added to PAs after 1990. Assuming that that the PA has the same relative percent of “forest” and “shrub” cover as in Table T1 for the year 1990 leads to the figure of 391(000) ha. of “forests” and 98 (000) ha. rest under Shrub land PA in 1990.

In the year 2000, the PA covered 2683 (000 ha) since only one National Park (Shivapuri) covering an area of 14.4 (000 ha) was added to the PA network between 2000 and 2002. Assuming that that the PA has the same relative percent forest and shrub as in Table T1 for the year 2000 leads to the figure of 811 (000 ha) of “forests” and 364 (000) ha. of “Shrub”.

The area of PAs in 2005 has been assumed to be same as in 2002. The information on forest cover is available for only 1695 (000 ha). The percent of “forest and shrub cover” derived from this data has been applied to each category (NR, WR, HR and CA) of PA. Further, assuming that the PAs have the same relative percent “forest” and “shrub” as in Table T1 for the year 2005 leads to the figure of 733 (000 ha) of “forests” and 449(000) ha of “Shrub”.

It is assumed that all the buffer zone were established after 1990 and with 0.737 million people living inside them, these areas do not meet definition of “forests”.

National Category	Area in 000 ha		
	1990	2000	2005
Forest in NP, WR, HR and CA	391	811	776
Shrub (OWL) in NP,WR, HR and CA	98	364	405
Buffer	n.a.	305	305
Sub total	489	1480	1486
Other Land in Pas	606	1203	1210
Total	1095	2683	2696

B. Area other than Protected Areas

It has been assumed that forest area figures presented in section 3.2.2.B represent “forest and Shrub” as defined by FRA. Further, it has been assumed that relative percent of “forests” and “Shrub” (OWL) cover in each of the categories is same as in over all percentage of “forests” as in Table 1.

a. Production Forests

The area of forest under “production forest” for 2002 has been assumed for 2000 and 2005.

b. Protection Forests

The area of “protection forests” in 2002 has been assumed for 1990, 2000 and 2005.

c. Community Forests

The areas has been linearly interpolated for 1990 and 2000 and the figure of 2 002 has been assumed for 2005

d. Lease Hold forests

The area under lease hold forests in 1998 has been assumed for 1990, 2000 and 2005.

National Category	Forest Area in 000 ha			OWL Area in 000 ha		
	1990	2000	2005	1990	2000	2005
Community Forest	65	451	529	16	203	325
Leasehold forest	6	5	4	1	2	3
Production Forest	109	206	185	27	93	114
Protection Forest	571	491	440	140	220	271

3.3.3 Reclassification into FRA 2010 categories

The management objectives of various forest categories are as below (HMGN/MFSC, 2002).

Forest Type	Forest Category	Management Objectives
National Forest	Forests managed by HMGN	Production of forest products
	Community Forests	Production of forest products and multiple purpose use
	Leasehold Forests	Rehabilitation of degraded forests, production of forest products, tourism, wildlife farming
	Religious Forests	Protection of religious site
	Protected Forests	Protection of wildlife, conservation of water, biodiversity and environment

A Reclassification (percentage allocation) into Primary Function FRA Classes

National Classes	Percentage of a National Class into FRA Class (Primary Function)					
	Production	Protective	Conservation	Social Services	Multiple Objective Forest	No Function
Production	100					
Community					100	
Lease Hold					100	
Protected Areas			100			
Protection		100				
Rest						100

3.4 Data for Table T3

Table 3a – Primary designated function

FRA 2010 Categories	Forest area (1000 hectares)			
	1990	2000	2005	2010
Production	109	206	185	
Protection of soil and water	571	491	440	
Conservation of biodiversity	391	811	776	
Social services	0	0	0	
Multiple use (include CF)	71	456	533	1270.43
Other (please specify in comments below the table)	3 675	1 936	1 702	
No / unknown	0	0	0	
TOTAL	4 817	3 900	3 636	

Table 3b – Special designation and management categories

FRA 2010 Categories	Forest area (1000 hectares)			
	1990	2000	2005	2010
Area of permanent forest estate				
Forest area within protected areas (Forest areas of PA and BZ?)	391	1116	1181	
Forest area under sustainable forest management (Includes CF, LHF, CFM and PAs)				
Forest area with management plan (CF, LHF, CFM)	NA	NA	NA	

3.5 Comments to Table T3

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Production	Forest resource inventory has not been done to designate production forest	
Protection of soil and water		
Conservation of biodiversity	Forests of core area and buffer zone have been included.	
Social services		
Multiple use	Community forest areas also include the area of forest, shrub land and pasture land.	
Other		
No / unknown designation		
Area of permanent forest estate		
Forest area within protected areas		
Forest area under sustainable forest management	Forest management guided by approved management plans, which includes community forests, leasehold forests, collaborative forests and protected area forests.	

Forest area with management plan	. Forest management models which have already management plan in place i.e. CF, CFM, LHF etc	
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Other general comments to the table
The trend in forest and shrub lands is based on ratio of the forest and the shrub in Table 1 and hence may not capture actual condition on the ground.

4 Table T4 – Forest characteristics

4.1 FRA 2010 Categories and definitions

Term / category	Definition
Naturally regenerated forest	Forest predominantly composed of trees established through natural regeneration.
Introduced species	A species, subspecies or lower taxon, occurring <u>outside</u> 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).
Characteristics categories	
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.
Other naturally regenerated forest of introduced species (sub-category)	Other naturally regenerated forest where the trees are predominantly of introduced species.
Planted forest	Forest predominantly composed of trees established through planting and/or deliberate seeding.
Planted forest of introduced species (sub-category)	Planted forest, where the planted/seeded trees are predominantly of introduced species.
Special categories	
Rubber plantations	Forest area with rubber tree plantations.
Mangroves	Area of forest and other wooded land with mangrove vegetation.
Bamboo	Area of forest and other wooded land with predominant bamboo vegetation.

4.2 National data

4.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
GoN, 2002. Nepal Biodiversity Strategy. Ministry of Forests and Soil Conservation, Kathmandu, Nepal.	H	Characteristics	2002	HMGN/MFSC. 2002. Nepal Biodiversity Strategy. Ministry of Forests and Soil Conservation, Kathmandu, Nepal.
DFRS, 1999. Forest Resources of Nepal (1987-1998). Department of Forest Research and Survey, Ministry of Forest And Soil Conservation, Kathmandu, Nepal	H	Characteristics	1994	DFRS, 1999. Forest Resources of Nepal (1987-1998). Department of Forest Research and Survey, Ministry of Forest And Soil Conservation, Kathmandu, Nepal
HMGN/ADB/FINNIDA, 1988. Master Plan for the Forestry Sector in Nepal.	H	Plantations	1985-86	HMGN/ADB/FINNIDA, 1988. Master Plan for the Forestry Sector in Nepal. Ministry of Forest and

Ministry of Forest and Soil Conservation, Kathmandu, Nepal.				Soil Conservation, Kathmandu, Nepal.
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4.2.2 Classification and definitions

There are no national definitions and record in FRA classes like primary, modified natural, semi-natural, productive plantation and protective plantation. Following assumptions have been made and related definitions and data are being provided for the purposes of this table.

A. Primary Forest: The forest area in National Parks, Wildlife Reserves and Hunting Reserves have been placed under this category of FRA 2010.

B. Modified Natural Forest: All the forest areas in conservation areas (under the category of protected area system) have been placed this category of FRA 2010 Class.

C. Semi-Natural Forest: The rest of the forest areas of the country (excluding plantations) have been placed under this category of FRA 2010 Class.

D. Productive Plantations: All plantation for industrial round wood, fuelwood and poles have been placed under this category of FRA 2010.

E. Protective Plantations: All plantations raised for watershed development have been placed under this category of FRA 2010.

National class	Definition
National Park	Area set aside for the conservation and management of the natural environment, including the ecological, biological and geomorphology associations of aesthetic importance.
Wildlife Reserve	An area established for the conservation and management of plants and wildlife and their habitat.
Hunting Reserve	An area set aside for the conservation and management of wildlife to provide opportunities for legal recreational hunting
Conservation Area	An area managed according to an integrated plan for the conservation of the natural environment and sustainable use of the natural resources contained within it.
Buffer Zone	A designated area surrounding a national parks or a reserve within which the use of forest products by local people is regulated to ensure sustainability.

4.2.3 Original data

A. Protected Areas of the country: From Table 3

National Category	Area in 000 ha			
	1990	2000	2005	2008
Forest in NP, WR and HR	391	384	349	1281
Forest in CA	0	427	384	1133
Total	391	811	733	2414

B. Forest Plantation

Purpose of plantation	Area in 000 ha	
	1986	1999
Industrial, Fuelwood and Pole Plantations		41.8
Watershed Development Plantation		9.5
Total	47.3	51.3

4.3 Analysis and processing of national data

Same data of 2005 have been used but area of PAs have been updated upto 2008.

4.3.1 Calibration

No calibrations have been made

4.3.2 Estimation and forecasting

No estimations have been done

4.3.3 Reclassification into FRA 2010 categories

4.4 Data for Table T4

Table 4a

FRA 2010 Categories	Forest area (1000 hectares)			
	1990	2000	2005	2010
Primary forest	391	384	370	NA
Other naturally regenerated forest	4377	3037	2806	NA
...of which of introduced species	NA	NA	NA	NA
Planted forest				NA
...of which of introduced species	49	52	53	NA
TOTAL	4 817	3 900	3 636	NA

Table 4b

FRA 2010 Categories	Area (1000 hectares)			
	1990	2000	2005	2010
Rubber plantations (Forest)	Not applicable	Not applicable	Not applicable	Not applicable
Mangroves (Forest and OWL)	Not applicable	Not applicable	Not applicable	Not applicable
Bamboo (Forest and OWL)	NA	NA	NA	NA

4.5 Comments to Table T4

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Primary forest	No	
Other naturally regenerating forest	No	
Planted forest	No	
Rubber plantations	No	Not applicable to Nepal
Mangroves	No	Not applicable to Nepal
Bamboo	No	No data are available

Other general comments to the table

5 Table T5 – Forest establishment and reforestation

5.1 FRA 2010 Categories and definitions

Term	Definition
Afforestation	Establishment of forest through planting and/or deliberate seeding on land that, until then, was not classified as forest.
Reforestation	Re-establishment of forest through planting and/or deliberate seeding on land classified as forest.
Natural expansion of forest	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).

5.2 National data

5.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments

5.2.2 Classification and definitions

National class	Definition

5.2.3 Original data

5.3 Analysis and processing of national data

5.3.1 Calibration

5.3.2 Estimation and forecasting

5.3.3 Reclassification into FRA 2010 categories

5.4 Data for Table T5

FRA 2010 Categories	Annual forest establishment (hectares/year)			...of which of introduced species ¹⁾ (hectares/year)		
	1990	2000	2005	1990	2000	2005
Afforestation						
Reforestation						
...of which on areas previously planted						
Natural expansion of forest						

Note: The figures for the reporting years refer to the averages for the 5-year periods 1988-1992, 1998-2002 and 2003-2007 respectively.

5.5 Comments to Table T5

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Afforestation		
Reforestation		
Natural expansion of forest		

Other general comments to the table

6 Table T6 – Growing stock

6.1 FRA 2010 Categories and definitions

Category	Definition
Growing stock	Volume over bark of all living trees more than X cm in diameter at breast height (or above buttress if these are higher). Includes the stem from ground level or stump height up to a top diameter of Y cm, and may also include branches to a minimum diameter of W cm.
Growing stock of commercial species	Growing stock (see def. above) of commercial species.

6.2 National data

6.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
DFRS, 1999. Forest Resources of Nepal (1987-1998). Department of Forest Research and Survey, Ministry of Forest And Soil Conservation, Kathmandu, Nepal	H	Growing Stock	1994	Department of Forest Research and Survey (DFRS) is the only government designated forest research and survey organization in Nepal that works in close collaboration with various national stakeholders and international agencies. The Forest Survey Division of the Department generates valuable statistics and information necessary to plan overall forestry development at national, regional and district level. Regarding the growing stock, the first inventory on a national level took place in the 1960s. Inventory results were presented for the Terai and adjoining regions in 1967 and for the Hills in 1973. The Master plan for forestry sector updated the figures for 1986 in 1988. The latest national forest inventory was completed in 1994 and report was published in 1999.
HMG/ADB/FINNIDA, 1988. Master Plan for the Forestry Sector in Nepal. Ministry of Forest and Soil Conservation, Kathmandu, Nepal.	H	Growing Stock	1985 1986	
WECS, 1988. District, Regional and national Forest Cover Class Summaries of the Area, Fuelwood Yield and	H	Growing Stock	1985 1986	

Wood Volume for the Kingdom of Nepal. Water and Energy Commission Secretariat, His Majesty's Government of Nepal.				
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6.2.2 Classification and definitions

National class	Definition
Growing Stock	The gross volume to a 10 cm top diameter outside bark (ob) of standing trees of greater than 10 cm diameter at breast height (dbh) Explanation: the volume over bark of all living trees more than 10 cm diameter at breast height (or above buttressed if these are higher). Includes the stem from ground level or stump height up to a top diameter of 10 cm excluding branches, twigs, stumps and roots.

6.2.3 Original data

	Unit	1960	1985/86	1994
Forest	Forest Area under consideration/ Inventory in million ha	2.5	5.416	2.179
	Growing stock of trees up to 10 cm diameter at breast height in million cum of	212	522	387.5
	Growing stock /ha	85	96.36	177.8

Source: HMG/ADB/FINNIDA, 1988; DFRS, 1999

The National Forest Inventory of 1960 and 1994 has provided the information on relative percentage of growing stock (GS) by tree species. Based only on the share of growing stock of the tree species, the relative ranking (first being the highest share in growing stock) of ten most common tree species are as follows:

Table: Ranking of Major Tree Species by Growing Stock

SN	Scientific Name	Common Name	Local name	Percent Share in GS of 1960	Percent Share in GS of 1994
1.	<i>Shorea robusta</i>	Sal	Sal, Sakhuwa	31.0	28.2
2.	<i>Quercus spp</i>	Oak	<i>Khasru</i>	n.a.	9.3
3.	<i>Terminalia alata</i>	Indian laurel	Asna, Saj	8.2	7.6
4.	<i>Pinus roxburghii</i>	Chir pine	Khote salla	6.9	6.3
5.	<i>Abies spectabilis</i>	Silver fir	Talis patra	9.5	4.4
6.	<i>Rhododendron spp</i>	Rhododendron	<i>Lali gurans</i>	n.a.	4.3
7.	<i>Alnus nepalensis</i>	Alder	Uttis	n.a.	2.9
8.	<i>Schima wallichii</i>		<i>Chilaune</i>	n.a.	2.0
9.	<i>Tsuga dumosa</i>	Hemlock	Thingure sall	2.4	1.9
10.	<i>Adina cordifolia</i>		Karma, Haldu	n.a.	1.8

Source: DFRS, 1999.

6.3 Analysis and processing of national data

6.3.1 Calibration

6.3.2 Estimation and forecasting

The growing stock for 1990, 2000 and 2005 has been derived from the forest area presented in T1 table. The national figure of average stem volume (ob) of 96.36 m³/ha for 1985/86 has been used to estimate the total growing stock in forests for the year 1990 (HMGN/ADB/FINNIDA, 1988). Similarly the figure of 177.8 m³/ha for 1994 has been used estimating growing stock in forests for 2000 and 2005 (DFRS, 1999). Regarding the growing stock in OWL (shrub land) the average stem volume of shrub (OWL) 30 cu.m/ha has been taken from the WECS, 1988.

Table: Total Growing Stock of Forest and Shrub land

Category	Growing stock in million cu.m ob		
	1990	2000	2005
Forest	464	694	647
OWL	35	53	67
Total	499	747	704

(Source: HMGN/ADB/FINNIDA, 1988; WECS, 1988, Department of Forest Research and Survey, 1999)

For the growing stock composition, it is assumed that the relative share of growing stock of the tree species will continue to remain same in years 1990 and 2000 as it was in 1994.

6.3.3 Reclassification into FRA 2010 categories

6.4 Data for Table T6

Table 6a – Growing stock

FRA 2010 category	Volume (million cubic meters over bark)							
	Forest				Other wooded land			
	1990	2000	2005	2010	1990	2000	2005	2010
Total growing stock	464	694	647		35	53	67	NA
... of which coniferous								NA
... of which broadleaved								NA
Growing stock of commercial species								NA

Table 6b – Growing stock of the 10 most common species

FRA 2010 category / Species name			Growing stock in forest (million cubic meters)	
Rank	Scientific name	Common name	1990	2000
1 st	<i>Shorea robusta</i>	Sal, Sakhuwa	130.8	195.6
2 nd	<i>Quercus spp</i>	Khasru	43.2	64.5
3 rd	<i>Terminalia alata</i>	Asna, Saj	35.3	52.7

4 th	<i>Pinus roxburghii</i>	Khote salla	29.2	43.7
5 th	<i>Abies spectabilis</i>	Talis patra	20.4	30.5
6 th	<i>Rhododendron spp</i>	<i>Lali gurans</i>	20.0	29.8
7 th	<i>Alnus nepalensis</i>	Uttis	13.5	20.1
8 th	<i>Schima wallichii</i>	<i>Chilaune</i>	9.3	13.9
9 th	<i>Tsuga dumosa</i>	Thingure sall	8.8	13.2
10 th	<i>Adina cordifolia</i>	Karma, Haldu	8.3	12.5
Remaining			145.2	217.5
Total			464	654

Note: Rank refers to the order of importance in terms of growing stock, i.e. 1st is the species with the highest growing stock. Year 2000 is the reference year for defining the species list and the order of the species.

Table 6c – Specification of threshold values

Item	Value	Complementary information
Minimum diameter (cm) at breast height ¹ of trees included in growing stock (X)	10 cm	
Minimum diameter (cm) at the top end of stem for calculation of growing stock (Y)	10 cm	
Minimum diameter (cm) of branches included in growing stock (W)	n.a.	
Volume refers to “above ground” (AG) or “above stump” (AS)	AG	

6.5 Comments to Table T6

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Total growing stock	National Forest Inventory Report 1999 has not mentioned the average stem volume (ob) per hectare of the shrub land and therefore this figure is taken from WECS, 1988.	No estimation and interpretation can be done from the early nineties data
Growing stock of broadleaved / coniferous		No estimation and interpretation can be done from the early nineties data
Growing stock of commercial species		No estimation and interpretation can be done from the early nineties data

Other general comments to the table

¹ Diameter at breast height (DBH) refers to diameter over bark measured at a height of 1.30 m above ground level or 30 cm above buttresses if these are higher than 1 m.

7 Table T7 – Biomass stock

7.1 FRA 2010 Categories and definitions

Category	Definition
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 2mm 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.

7.2 National data

7.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
FRA2005				

7.2.2 Classification and definitions

National class	Definition

7.2.3 Original data

7.3 Analysis and processing of national data

7.3.1 Calibration

7.3.2 Estimation and forecasting

7.3.3 Reclassification into FRA 2010 categories

7.4 Data for Table T7

FRA 2010 category	Biomass (million metric tonnes oven-dry weight)							
	Forest				Other wooded land			
	1990	2000	2005	2010	1990	2000	2005	2010
Above-ground biomass	557	770	718	NA	42	58	63	NA
Below-ground biomass	195	269	251	NA	15	20	22	NA
Dead wood	113	156	145	NA	9	12	13	NA
TOTAL	865	1195	1114	NA	66	90	98	NA

7.5 Comments to Table T7

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Above-ground biomass		
Below-ground biomass		
Dead wood		

Other general comments to the table

8 Table T8 – Carbon stock

8.1 FRA 2010 Categories and definitions

Category	Definition
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 specified depth chosen by the country and applied consistently through the time series.

8.2 National data

8.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments

8.2.2 Classification and definitions

National class	Definition

8.2.3 Original data

8.3 Analysis and processing of national data

8.3.1 Calibration

8.3.2 Estimation and forecasting

8.3.3 Reclassification into FRA 2010 categories

8.4 Data for Table T8

FRA 2010 Category	Carbon (Million metric tonnes)							
	Forest				Other wooded land			
	1990	2000			1990	2000	2005	2010
Carbon in above-ground biomass	278	385	359	NA	21	29	32	NA
Carbon in below-ground biomass	97	135	126	NA	7	10	11	NA
Sub-total: Living biomass	375	520	484	NA	28	39	43	NA
Carbon in dead wood	56	78	73	NA	4	6	6	NA
Carbon in litter	3.45	3.45	3.45		3.45	3.45	3.45	NA
Sub-total: Dead wood and litter	59.45	81.45	76.45		7.45	9.45	9.45	NA
Soil carbon	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL								

Soil depth (cm) used for soil carbon estimates	
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8.5 Comments to Table T8

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Carbon in above-ground biomass		
Carbon in below-ground biomass		
Carbon in dead wood		
Carbon in litter		
Soil carbon		

Other general comments to the table

9 Table T9 – Forest fires

9.1 FRA 2010 Categories and definitions

Category	Definition
Number of fires	Average number of vegetation fires per year in the country.
Area affected by fire	Average area affected by vegetation fires per year in the country.
Vegetation fire (supplementary term)	Any vegetation fire regardless of ignition source, damage or benefit.
Wildfire	Any unplanned and/or uncontrolled vegetation fire.
Planned fire	A vegetation fire regardless of ignition source that burns according to management objectives and requires limited or no suppression action.

9.2 National data

9.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Bajracharya, KM 2002. Forest Fire Situation in Nepal: A country Report submitted to IFFN/GFNC in January 2002. Pp 84-86. Website: www.fire.uni-freiburg.de/iffn/country/np .	H	Forest fire	2002	

9.2.2 Classification and definitions

National class	Definition

9.2.3 Original data

It has been reported that the forest area burnt annually in Nepal is around 4,00,000 hectare (Bajracharya, 2002).

9.3 Analysis and processing of national data

9.3.1 Calibration

9.3.2 Estimation and forecasting

The estimated extent of disturbances by fire 2000 has been assumed for 1990.

9.3.3 Reclassification into FRA 2010 categories

9.4 Data for Table T9

Table 9a

FRA 2010 category	Annual average for 5-year period					
	1990		2000		2005	
	1 000 hectares	number of fires	1 000 hectares	number of fires	1 000 hectares	number of fires
Total land area affected by fire						
... of which on forest	400	NA	400	NA	NA	NA
... of which on other wooded land	NA	NA	NA	NA	NA	NA
... of which on other land	NA	NA	NA	NA	NA	NA

Table 9b

FRA 2010 category	Proportion of forest area affected by fire (%)		
	1990	2000	2005
Wildfire	NA	NA	NA
Planned fire	NA	NA	NA

Note: The figures for the reporting years refer to the averages of annually affected areas for the 5-year periods 1988-1992, 1998-2002 and 2003-2007 respectively

9.5 Comments to Table T9

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Area affected by fire		
Number of fires		
Wildfire / planned fire		

Other general comments to the table

10 Table T10 – Other disturbances affecting forest health and vitality

10.1 FRA 2010 Categories and definitions

Term	Definition
Disturbance	Damage caused by any factor (biotic or abiotic) that adversely affects the vigour and productivity of the forest and which is not a direct result of human activities.
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.
Category	Definition
Disturbance by insects	Disturbance caused by insect pests.
Disturbance by diseases	Disturbance caused by diseases attributable to pathogens, such as bacteria, fungi, phytoplasma or virus.
Disturbance by other biotic agents	Disturbance caused by biotic agents other than insects or diseases, such as wildlife browsing, grazing, physical damage by animals, etc.
Disturbance caused by abiotic factors	Disturbances caused by abiotic factors, such as air pollution, snow, storm, drought, etc.

10.2 National data

10.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
DFRS, 2000. Study on Die - Back of Sissoo (<i>Dalbergia sissoo</i>). Department of Forest Research and Survey in Collaboration with TISC and CARE Nepal. Kathmandu, Nepal	H	Disease, pest	2000	
DoF, 2002. Hamro Ban. Department of Forests, Kathmandu, Nepal	H	Encroachment area	2002	
DoF, 2004 report on forest encroachment in Nepal	H	Encroachment area	2004	
MFSC, The future of Nepal,s forests outlook for 2020	H	Disease pest and encroachment	2008	

10.2.2 Classification and definitions

National class	Definition

10.2.3 Original data

To date, there is no data available on insect/pest damages to forests in Nepal except few data available for Sissoo (*Dalbergia sissoo*). Of the total Sissoo population of 49,401 ha in 24 districts in Nepal, only 1,222 ha is the natural stand. The survey reveals that 6.4 and 9.2 percent of the total sissoo population are dead and dying respectively. Accordingly there about 78 ha of sissoo population are dead and 112 ha are dying (DFRS, 2000).

10.3 Analysis and processing of national data

10.3.1 Calibration

10.3.2 Estimation and forecasting

It is assumed that the 78 ha of Sissoo plantation, which are dead, were affected by the “dieback” phenomenon around 1990. Further that the 112 ha of Sissoo plantations, which are currently dying, were affected after 1990.

10.3.3 Reclassification into FRA 2010 categories

10.4 Data for Table T10

Table 10a – Disturbances

FRA 2010 category	Affected forest area (1 000 hectares)		
	1990	2000	2005
Disturbance by insects	n.a.	n.a.	n.a.
Disturbance by diseases	0.078	0.112	
Disturbance by other biotic agents (human encroachment)	n.a.	n.a.	70
Disturbance caused by abiotic factors	n.a.	n.a.	n.a.
Total area affected by disturbances	0.078	0.112	

Notes: The figures for the reporting years refer to the averages of annually affected areas for the 5-year periods 1988-1992, 1998-2002 and 2003-2007 respectively.

The total area affected by disturbances is not necessarily the sum of the individual disturbances as these may be overlapping.

Table 10b – Major outbreaks of insects and diseases affecting forest health and vitality

Description / name	Tree species or genera affected (scientific name)	Year(s) of latest outbreak	Area affected (hectares)	If cyclic, approx. cycle (years)
Disturbance 1	NA	NA	NA	NA
Disturbance 2				
Disturbance 3	NA	NA	NA	NA
Disturbance 4				
Disturbance 5	NA	NA	NA	NA
Disturbance 6				
Disturbance 7	NA	NA	NA	NA
Disturbance 8				
Disturbance 9	NA	NA	NA	NA
Disturbance 10				

Note: Area affected refers to the total area affected during the outbreak.

Table 10c – Area of forest affected by woody invasive species

Scientific name of woody invasive species	Forest area affected 2005 (hectares)
Sp.1	NA
Sp.2	NA
Sp.3	NA
Sp.4	NA
Sp.5	NA
Total forest area affected by woody invasive species	NA

Note: The total forest area affected by woody invasive species is not necessary the sum of the values above, as these may be overlapping.

10.5 Comments to Table T10

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Disturbance by insects		
Disturbance by diseases		

Disturbance by other biotic agents (human encroachment)		
Disturbance caused by abiotic factors		
Major outbreaks		
Invasive species		

Other general comments to the table

Encroachment i.e. illegal conversion area of the forest land into other land, use is a other major cause of disturbance to forests and other wooded lands in Nepal. From 1964 to 1991, its extent has gone up to 3,80,000 ha, which on average is about 14,074 ha per ha. during this period.

11 Table T11 – Wood removals and value of removals

11.1 FRA 2010 Categories and definitions

Category	Definition
Industrial roundwood removals	The wood removed (volume of roundwood over bark) for production of goods and services other than energy production (woodfuel).
Woodfuel removals	The wood removed for energy production purposes, regardless whether for industrial, commercial or domestic use.

11.2 National data

11.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
MFSC, the future of Nepal's forests outlook for 2020	H	Wood removal and value of removal	2008	

11.2.2 Classification and definitions

National class	Definition

11.2.3 Original data

11.3 Analysis and processing of national data

11.3.1 Calibration

11.3.2 Estimation and forecasting

11.3.3 Reclassification into FRA 2010 categories

11.4 Data for Table T11

FRA 2010 Category	Industrial roundwood removals			Woodfuel removals		
	1990	2000	2005	1990	2000	2005
Total volume (1000 m ³ o.b.)	27.75	81	152	90.88	63.84	40.79
... of which from forest (All from national forests)	27.75	81	152	90.88	63.84	40.79
Unit value (local currency / m ³ o.b.) : Average Market value	NRs 12000	NRs 15000	NRs 16000			
Total value (1000 local currency)						

Note: The figures for the reporting years refer to the averages of annually affected areas for the 5-year periods 1988-1992, 1998-2002 and 2003-2007 respectively.

	1990	2000	2005
Name of local currency	Neplai rupees (NRs)	Neplai rupees (NRs)	Neplai rupees (NRs)

11.5 Comments to Table T11

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Total volume of industrial roundwood removals		
Total volume of woodfuel removals		
Unit value		
Total value		

Other general comments to the table

12 Table T12 – Non-wood forest products removals and value of removals

12.1 FRA 2010 Categories and definitions

Term	Definition
Non-wood forest product (NWFP)	Goods derived from forests that are tangible and physical objects of biological origin other than wood.
Value of NWFP removals	For the purpose of this table, value is defined as the market value at the site of collection or forest border.

NWFP categories

Category
<p><u>Plant products / raw material</u></p> <ol style="list-style-type: none"> 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 <p><u>Animal products / raw material</u></p> <ol style="list-style-type: none"> 9. Living animals 10. Hides, skins and trophies 11. Wild honey and bee-wax 12. Wild meat 13. Raw material for medicine 14. Raw material for colorants 15. Other edible animal products 16. Other non-edible animal products

12.2 National data

12.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
MFSC, the future of Nepal's forests outlook for 2020	H	NWFPs		

12.2.2 Classification and definitions

National class	Definition

12.2.3 Original data

12.3 Analysis and processing of national data

12.3.1 Calibration

12.3.2 Estimation and forecasting

12.3.3 Reclassification into FRA 2010 categories

12.4 Data for Table T12

Rank	Name of product	Key species	Unit	NWFP removals 2005		NWFP category
				Quantity	Value (1000 local currency) NRs	
1 st	Resin	Pinus roxbergaii	Metric tone	4000.		Exudates
2 nd	Katha	Acacia catechue	Metric tone	1600		Raw materials for colorants
3 rd	Texol	Texas buccata	Metric tone	75		Medicine
4 th	Other NWFps	Many species	Metric tone	16987.0462		With Diverse categories
5 th						
6 th						
7 th						
8 th						
9 th						
10 th						
All other plant products						

All other animal products					
TOTAL				44000.21	

	2005
Name of local currency	Nepali rupees (Nrs)

12.5 Comments to Table T12

Variable / category	Comments related to data, definitions, etc.
10 most important products	
Other plant products	
Other animal products	Not applicable
Value by product	
Total value	

Other general comments to the table

13 Table T13 – Employment

13.1 FRA 2010 Categories and definitions

Category	Definition
Full-time equivalents (FTE)	A measurement equal to one person working full-time during a specified reference period.
Employment	Includes all persons in paid employment or self-employment.
Paid employment	Persons who during a specified reference period performed some work for <u>wage or salary</u> in cash or in kind.
Self-employment	Persons who during a specified reference period performed some work for <u>profit or family gain</u> in cash or in kind (e.g. employers, own-account workers, members of producers' cooperatives, contributing family workers).

13.2 National data

13.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
DoF, 2004. Hamro Ban (Fiscal Year 2002/03). Department of Forests, Kathmandu, Nepal	H	Employment Statistics	2004	
DPR, 2004. Annual Report (Fiscal Year 2059/60). Department of Plant Resources, Kathmandu, Nepal	H	Employment Statistics	2004	
DFRS, 2004. Annual Report (Fiscal Year 2060/61). Department of Forest Research and Survey, Kathmandu, Nepal.	H	Employment Statistics	2004	
MoFSC, 2003. Human Resources Strategy Report (draft version). Ministry of Forest and Soil Conservation, Nepal.	H	HRD policy document	2003	
Personal Communication to The Timber Corporation of Nepal, Forest Product Development Board, Department of National Parks and Wildlife Conservation, Department of Soil Conservation and Watershed Management, Herbs Production and Processing Company	H	Employment statistics	2004	

Limited.				
HMGN/ADB/FINNIDA, 1988. Master Plan for the Forestry Sector in Nepal. Human Resources Development Plan. Ministry of Forest and Soil Conservation, Kathmandu, Nepal.	H	HRD policy	1985-86	
MFSC, The future of Nepal's forest outlook for 2020.	H	Employment	2008	

13.2.2 Classification and definitions

National class	Definition

13.2.3 Original data

The Master plan for Forestry Sector provides following estimates of employment in 1990.

Category	Employment (000 person years)
HMGN Employment – Regular Staff	13
Employment - Forestry Operations	
Forest Establishment	30.4
Soil Conservation and Watershed	5.9
Timber Harvesting	95.3
Sub Total	131.6
TOTAL	144.6

13.3 Analysis and processing of national data

13.3.1 Calibration

13.3.2 Estimation and forecasting

The estimate of employment for the year 1990 has been taken from Master Plan for the Forestry Sector of Nepal, 1988. The employment under HMGN has been apportioned to “services” based on the ratio of the conservation area (about 8%) to the total area of forest in Table 4. Similarly employment relating to soil conservation and watershed has been apportioned to “services”. The remaining employment through HMGN and other employment has been apportioned to “production”. This information coupled with information on forest

area provides following estimates of per hectare employment through “provision of services” and “provision of goods”.

Category	Conservation	Rest	Total
Forested Area (000 ha) in 1990	391	4426	4817
Employment /ha in 1990	0.01779	0.031099	0.048888

Using above estimated have lead to the following estimates of total employment.

Employment Categories	Employment (1000 person-years)	
	1990	2000
Provision of goods	137.6	96.1
Provision of services	7.0	14.4
Unspecified forestry activities		
TOTAL	144.6	100,5

13.3.3 Reclassification into FRA 2010 categories

13.4 Data for Table T13

FRA Category	Full Time Employment (1000 person-years)		
	1990	2000	2005
Employment in primary production of goods			
...of which paid employment	137.6	96.1	105
... of which self-employment			
Employment in management of protected areas			10

13.5 Comments to Table T13

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Employment in primary production of goods		
Paid employment / self-employment		
Employment in management of protected areas		

Other general comments to the table

The employment figure under the category of primary production of excludes the employment in fuelwood and fodder collection, which is mainly voluntary.

14 Table T14 – Policy and legal framework

14.1 FRA 2010 Categories and definitions

Term	Definition
Forest policy	A set of orientations and principles of actions adopted by public authorities in harmony with national socio-economic and environmental policies in a given country to guide future decisions in relation to the management, use and conservation of forest and tree resources for the benefit of society.
Forest policy statement	A document that describes the objectives, priorities and means for implementation of the forest policy.
National forest programme (nfp)	A generic expression that refers to a wide range of approaches towards forest policy formulation, planning and implementation at national and sub-national levels. The national forest programme provides a framework and guidance for country-driven forest sector development with participation of all stakeholders and in consistence with policies of other sectors and international policies.
Law (Act or Code) on forest	A set of rules enacted by the legislative authority of a country regulating the access, management, conservation and use of forest resources.

14.2 Data for Table T14

Indicate the existence of the following (2008)			
Forest policy statement with national scope	*	Yes	
		No	
If Yes above, provide:	Year of endorsement	1989	
	Reference to document	Master Plan for Forestry sector 1989 ,	
National forest programme (nfp)	*	Yes	
		No	
If Yes above, provide:	Name of nfp in country	Community Forestry programme	
	Starting year	Early eighties	
	Current status		In formulation
		*	In implementation
			Under revision
Reference to document or web site	www.mofsc.gov.np, www.dof.gov.np		
Law (Act or Code) on forest with national scope	*	Yes, specific forest law exists	
		Yes, but rules on forests are incorporate in other (broader) legislation	
		No, forest issues are not regulated by national legislation	
If Yes above, provide:	Year of enactment	1993	
	Year of latest amendment	1998	
	Reference to document	Forest Act 1993	

<p>In case the responsibility for forest policy- and/or forest law-making is decentralized, please indicate the existence of the following and explain in the comments below the table how the responsibility for forest policy- and law-making is organized in your country.</p>		
<p>Sub-national forest policy statements</p>		Yes
	*	No
<p>If Yes above, indicate the number of regions/states/provinces with forest policy statements</p>		
<p>Sub-national Laws (Acts or Codes) on forest</p>		Yes
	*	No
<p>If Yes above, indicate the number of regions/states/provinces with Laws on forests</p>		To date Nepal is governing by National laws and regulation.

14.3 Comments to Table T14

Variable / category	Comments related to data, definitions, etc.
Forest policy statement with national scope	
National forest programme (nfp)	
Law (Act or Code) on forest with national scope	
Sub-national forest policy statements	
Sub-national Laws (Acts or Codes) on forest	

Other general comments to the table

15 Table T15 – Institutional framework

15.1 FRA 2010 Categories and definitions

Term	Definition
Minister responsible for forest policy-making	Minister holding the main responsibility for forest issues and the formulation of the forest policy.
Head of Forestry	The Head of Forestry is the Government Officer responsible for implementing the mandate of the public administration related to forests.
Level of subordination	Number of administrative levels between the Head of Forestry and the Minister.
University degree	Qualification provided by University after a minimum of 3 years of post secondary education.

15.2 Data for Table T15

Table 15a – Institutions

FRA 2010 Category	2008
Minister responsible for forest policy formulation : please provide full title	One of the key roles of the Minister of Forests and Soil Conservation is to formulate the policies which are demanding to address the prevailing issues of forestry sector and provide the direction for future.
Level of subordination of Head of Forestry within the Ministry	* 1 st level subordination to Minister
	* 2 nd level subordination to Minister
	* 3 rd level subordination to Minister
	4 th or lower level subordination to Minister
Other public forest agencies at national level	<ul style="list-style-type: none"> ■ Department of forest ■ Department of National Park and wildlife Conservation ■ Department of Forest Research and Survey ■ Department of Plant resources ■ Department of Soil Conservation and Watershed Management
Institution(s) responsible for forest law enforcement	<ul style="list-style-type: none"> ■ All departments, regional and local level forestry agencies.

Table 15b – Human resources

FRA 2010 Category	Human resources within public forest institutions					
	2000		2005		2008	
	Number	%Female	Number	%Female	Number	%Female
Total staff	8400	2.5	9200	2.5	9545	3
...of which with university degree or equivalent	1098	2.2	1224	3	1278	3.5

Notes:

1. Includes human resources within public forest institutions at sub-national level

2. Excludes people employed in State-owned enterprises, education and research, as well as temporary / seasonal workers.

15.3 Comments to Table T15

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Minister responsible for forest policy formulation	<ul style="list-style-type: none"> Minister is responsible for formulating forestry sector policies to address the sectoral issues and administer overall forest sector. 	Data related for previous years are not available in the segregated form.
Level of subordination of Head of Forestry within the Ministry	<ul style="list-style-type: none"> Secretary is the executive chief, technical and administrative advisor of the Minister. 	
Other public forest agencies at national level	<ul style="list-style-type: none"> Five departments stipulated in the in the table 15a are the central level forestry organizations to translate the policies and programmes formulated by the Ministry 	
Institution(s) responsible for forest law enforcement	<ul style="list-style-type: none"> Local level forestry agencies are responsible for forest law enforcement 	
Human resources within public forest institutions	<ul style="list-style-type: none"> Personnel information system is poor within public forest institutions therefore, their management part is poor. 	

Other general comments to the table

- Although the indicators segregate male and female employees, their management part is lacking.

16 Table T16 – Education and research

16.1 FRA 2010 Categories and definitions

Term	Definition
Forest-related education	Post-secondary education programme with focus on forests and related subjects.
Doctor's degree (PhD)	University (or equivalent) education with a total duration of about 8 years.
Master's degree (MSc) or equivalent	University (or equivalent) education with a total duration of about five years.
Bachelor's degree (BSc) or equivalent	University (or equivalent) education with a duration of about three years.
Technician certificate or diploma	Qualification issued from a technical education institution consisting of 1 to 3 years post secondary education.
Publicly funded forest research centers	Research centers primarily implementing research programmes on forest matters. Funding is mainly public or channelled through public institutions.

16.2 National data

16.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Personnel information system of the MFSC	H	Forest related education	2000, 2005 and 2008	
Record from forestry related universities and colleges	H	Forestry related students	2008	The record does not show person reading in the abroad due to lack of record.

16.2.2 Original data

16.3 Analysis and processing of national data

16.3.1 Estimation and forecasting

16.4 Data for Table T16

FRA 2010 Category	Graduation ¹⁾ of students in forest-related education					
	2000		2005		2008	
	Number	%Female	Number	%Female	Number	%Female
Master's degree (MSc) or equivalent	NA	NA	20	20	34	15
Bachelor's degree (BSc) or equivalent	60	12	100	11	120	16
Forest technician certificate / diploma	220	13	190	10	200	15
FRA 2010 Category	Professionals working in publicly funded forest research centres ²⁾					
	2000		2005		2008	
	Number	%Female	Number	%Female	Number	%Female
Doctor's degree (PhD)	NA	NA	8		7	
Master's degree (MSc) or equivalent			42	10	39	15
Bachelor's degree (BSc) or equivalent			20	14	27	20

Notes:

1. Graduation refers to the number of students that have successfully completed a Bachelor's or higher degree or achieved a certificate or diploma as forest technician.
2. Covers degrees in all sciences, not only forestry.

16.5 Comments to Table T16

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Graduation of students in forest-related education	Given number of students affiliated on Forestry courses at government and private forestry universities and colleges.	
Professionals working in public forest research centres	Data includes all the professional working in the central level institutions ie Ministry , Tree improvement office, Department of Plant Resource and Department of Forests Research and Survey	

Other general comments to the table

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17 Table T17 – Public revenue collection and expenditure

17.1 FRA 2010 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, forest products include: roundwood; sawnwood; wood-based panels; pulp and paper; and non-wood forest products. As far as possible, this should include revenue collected by all levels of government (i.e. central, regional/provincial and municipal level), but it should exclude the income of publicly owned business entities.
Public expenditure	All government expenditure on forest related activities (further defined below).
Operational expenditure (sub-category to Public expenditure)	All government expenditure on public institutions solely engaged in the forest sector. Where the forest administration is part of a larger public agency (e.g. department or ministry), this should only include the forest sector component of the agency's total expenditure. As far as possible, this should also include other institutions (e.g. in research, training and marketing) solely engaged in the forest sector, but it should exclude the expenditure of publicly owned business entities.
Transfer payments (sub-category to Public expenditure)	All government expenditure on direct financial incentives paid to non-government and private-sector institutions, enterprises communities or individuals operating in the forest sector to implement forest related activities.
Domestic funding	Public expenditure funded from domestic public financial resources, including: retained forest revenue; forest-related funds; and allocations from the national budget (i.e. from non-forest sector public revenue sources).
External funding	Public expenditure funded from grants and loans from donors, non-governmental organisations, international lending agencies and international organisations, where such funds are channelled through national public institutions.

17.2 National data

17.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
MFSC, the future of Nepal's forest outlook for 2020	H	Forest revenue	2008	<ul style="list-style-type: none"> ■ The revenue does not include the revenue collected by the community Forests user groups
Department of Forests, official record	H	Revenue collection	2002, and 2005	<ul style="list-style-type: none"> ■ The revenue does not include the revenue collected by the community Forests user groups which is even higher than the government revenue.
Department of national Park and Wildlife Conservation, Official account	H	Revenue	2002 And 2005	
Community Forest User Group of Nepal (FECOFUN), National data base	H	Revenue earned from community Forests	2002 and 2005	

17.2.2 Classification and definitions

National class	Definition
Forest revenue	Revenue collected by government agencies and community based user groups from community forests.

17.2.3 Original data

17.3 Analysis and processing of national data

17.3.1 Calibration

17.3.2 Estimation and forecasting

17.3.3 Reclassification into FRA 2010 categories

17.4 Data for Table T17

Table 17a - Forest revenues

FRA 2010 Categories	Revenues (1000 local currency, NRs)	
	2000	2005
Forest revenue	734000	603000

Table 17b - Public expenditure in forest sector by funding source

FRA 2010 Categories	Domestic funding (1000 local currency)		External funding (1000 local currency)		Total (1000 local currency)	
	2000	2005	2000	2005	2000	2005
Operational expenditure	1241819	1588971	263129	322818	1504918	1911789
Transfer payments	39553	24235			39553	24235
Total public expenditure						
If transfer payments are made for forest management and conservation, indicate for what specific objective(s) - Please tick all that apply.	<input type="checkbox"/>	Reforestation				
	<input type="checkbox"/>	Afforestation				
	<input type="checkbox"/>	Forest inventory and/or planning				
	<input checked="" type="checkbox"/>	Conservation of forest biodiversity				
	<input type="checkbox"/>	Protection of soil and water				
	<input type="checkbox"/>	Forest stand improvement				
	<input type="checkbox"/>	Establishment or maintenance of protected areas				
	<input type="checkbox"/>	Other, specify below				

Comments to Table T17

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Forest revenue	The forest revenue mentioning was collected by government organizations from selling forest products (i.e. timber, NWFPs etc) and forest services (i.e. ecotourism and other).	However, there were more than 12000 community forest user groups over the country collected than two times more revenue than the government organization by managing community forest.
Operational expenditure		The revenue collected by communities from community forests management used by them which is not reflecting here.
Transfer payments	Out of total revenue collected by the government from protected areas, up to 50% will go back to the buffer zone.	

Other general comments to the table