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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 2005 (FRA 2005), which is the most comprehensive assessment to date. More than 800 people have been involved, including 172 national correspondents and their colleagues, an Advisory Group, international experts, FAO staff, consultants and volunteers. Information has been collated from 229 countries and territories for three points in time: 1990, 2000 and 2005.

The reporting framework for FRA 2005 is based on the thematic elements of sustainable forest management acknowledged in intergovernmental forest-related fora and includes more than 40 variables related to the extent, condition, uses and values of forest resources. More information on the FRA 2005 process and the results - including all the country reports - is available on the FRA 2005 Web site (www.fao.org/forestry/fra2005).

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The Global Forest Resources Assessment 2005 Country Report Series is designed to document and make available the information forming the basis for the FRA 2005 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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1 Table T1 – Extent of Forest and Other wooded land

1.1 FRA 2005 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)
FAO. 1997. Forests and Forest Management in Mongolia. RAP Publication 1997/4. Regional Office for Asia and Pacific. Bangkok. Thailand.	M	Extent	1994
Enkbayar, K. 1997. Protection Use and Restoration of Forest In Mongolia. A paper presented in “Reforestation Workshop 1997”. (Provides details of 1994 state of forests).	M	Extent	1994
GOM. 2004. Mongolian Forest. A country report submitted to Regional meeting of National Correspondents in November 2004. Bangkok. Thailand.	M	Extent	2002

1.2.2 Classification and definitions

The density measure used in Mongolia is Relative Stock Density (RSD). The RSD is the actual basal area of a stand divided by the normal basal area for a fully stocked stand. The normal basal area is read from a table using species and height as entries. All stands with an RSD above 0.3 are registered as natural forests in the Mongolian inventories. All stands with an RSD below 0.3 are registered as open forest. Translated to FRA definitions an RSD of 0.3 roughly corresponds approximately to 40% crown cover. There was no information of the minimum RSD for the Mongolian Open Forest category it includes fire damaged forest and logged over forest. According to the Mongolian Forest law of 1995 clear cutting is not permitted and selective cutting has to be used. This justifies placement of logged over areas and fire damaged areas in the forest category. Saxaul (*Haloxylon ammodendron*) forest does not grow above 4 meters in height and may thus correspond to shrub category of FRA 2005.

National class	Definition
Natural Forest	All forest stands with an Relative Stock Density above 0.3 are registered as natural forests
Open Forest	All forest stands with an Relative Stock Density less than 0.3 are registered as natural forests
Non Forest Area in Forest Land	All forest land which does not support Natural forests and Open forests.

1.2.3 Original data

A. 1994 Data

National Category	Area in 000 ha
Coniferous and Deciduous forest	11161
Saxual Forests (4512) + Shrub(460)	4972
Non Forest areas in Forest land	1383
Total Forest land	17516

(Enkbayar, 1997 and FAO, 1997)

B. 2002 Data

National Category	Area in 000 ha
Forest	10500
Saxual and Shrubs Forests	2388
Non Forest areas in Forest land	5404
Total Forest land	18292

C. Land Use (2000)

Land use	Area in 000 ha
Agricultural	130543
Urban land	416
Roads and	337
Forest land	18292
Water land	1667
Reserved Land	5157
Total area	156412

(UNEP, 2002)

1.3 Analysis and processing of national data

2.3.1 Calibration

Total area of the country in the “Mongolia Forestry Sector Review 2004” is 156.412 million ha., which differs from FAOSTAT (156.650 million ha).

Therefore, the difference in these two areas has been adjusted in the area of “Other land” so that total matches with the FAOSTAT figures. The area (zero) of Inland water bodies has been taken from FAO STAT.

Land Categories	Area (1000 hectares)	
	1994	2002
Forest	11161	10500
Saxual and Shrub	4972	2388
Other land	140517	143762
Inland water bodies	0	0
TOTAL	156650	156650

2.3.2 Estimation and forecasting

The following estimates of the extent of “forests” in 1990, 2000 and 2005 have been developed using the linear trend between 1994 and 2002. Figure for “Saxual and Shrub” for 1990 and 2000 have been developed by linear interpolation and for 2005 it has been assumed the same as in 2002.

Land Categories	Area (1000 hectares)		
	1990	2000	2005
Forest	11492	10665	10252
Saxual and Shrub	6264	3034	2388
Other land	138894	142951	144010
Inland water bodies	0	0	0
Total	156650	156650	156650

1.4 Reclassification into FRA 2005 classes

Forest is classified as forest. The Saxual and Shrub forests are classified as Other Wooded Lands.

1.5 Data for National reporting table T1

FRA 2005 Categories	Area (1000 hectares)		
	1990	2000	2005
Forest	11492	10665	10252
Other wooded land	6264	3034	2388
Other land	138894	142951	144010
...of which with tree cover ¹⁾	0	0	0
Inland water bodies	0	0	0
TOTAL	156650	156650	156650

1.6 Comments to National reporting table T1

2 Table T2 – Ownership of Forest and Other wooded land

2.1 FRA 2005 Categories and definitions

Category	Definition
Private ownership	Land owned by individuals, families, private co-operatives, corporations, industries, religious and educational institutions, pension or investment funds, and other private institutions.
Public ownership	Land owned by the State (national, state and regional governments) or government-owned institutions or corporations or other public bodies including cities, municipalities, villages and communes.
Other ownership	Land that is not classified either as “Public ownership” or as “Private ownership”.

2.2 National data

2.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)
FAO. 1997. Forests and Forest Management in Mongolia. RAP Publication 1997/4. Regional Office for Asia and Pacific. Bangkok. Thailand.	M	Ownership	1994

2.2.2 Classification and definitions

No national classification or definitions are available.

2.2.3 Original data

The report on “Forests and Forest Management in Mongolia” (FAO, 1997) mentions that all forests in Mongolia are state owned and that there are no plans to privatize forest land.

2.3 Analysis and processing of national data

2.3.1 Calibration

This step is not necessary.

2.3.2 Estimation and forecasting

This step is not necessary.

2.4 Reclassification into FRA 2005 classes

This step is not necessary.

2.5 Data for National reporting table T2

FRA 2005 Categories	Area (1000 hectares)			
	Forest		Other wooded land	
	1990	2000	1990	2000
Private ownership				
Public ownership	11492	10665	6264	3034
Other ownership				
TOTAL	11492	10665	6264	3034

2.6 Comments to National reporting table T2

3 Table T3 – Designated function of Forest and Other wooded land

3.1 FRA 2005 Categories and definitions

Types of designation

Category	Definition
Primary function	A designated function is considered to be primary when it is significantly more important than other functions. This includes areas that are legally or voluntarily set aside for specific purposes.
Total area with function	Total area where a specific function has been designated, regardless whether it is primary or not.

Designation categories

Category / Designated function	Definition
Production	Forest / Other wooded land designated for production and extraction of forest goods, including both wood and non-wood forest products.
Protection of soil and water	Forest / Other wooded land designated for protection of soil and water.
Conservation of biodiversity	Forest / Other wooded land designated for conservation of biological diversity.
Social services	Forest / Other wooded land designated for the provision of social services.
Multiple purpose	Forest / Other wooded land designated to any combination of: production of goods, protection of soil and water, conservation of biodiversity and provision of social services and where none of these alone can be considered as being significantly more important than the others.
No or unknown function	Forest / Other wooded land for which a specific function has not been designated or where designated function is unknown.

3.2 National data

3.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)
WWF. 2004. Mongolian Forest Ecosystems. WWF Mongolia Programme Office. (www.wwf.mn/documents/Forest%20ecosystems%20in%20MN%20-March04.pdf)	M	Area by designation	2004
WB. 2004. Mongolia Forest Sector Review. The World Bank.	M	Area by designation	2002
GOM. 1995. Forest Law of Mongolia (1995). Government of Mongolia. 1995	H	Definitions	1995
Enkbayar, K. 1997. Protection Use and Restoration of Forest In Mongolia. A paper presented in "Reforestation Workshop 1997".	M	Area	1994 to 1996
GOM. 1996. National Biodiversity Action plan. Mongolia	M	Area by designation	1993

3.2.2 Classification and definitions

National class	Definition
Forest within Special zones	It consists of sub-alpine forests, virgin zones, and protected zones within National Conservation Parks.
Forest within Protected zones	It includes forests of the specially protected areas, the green zone, prohibited strip, Saxual forests, oases, forests areas covering up to 100 ha, small tree groupings, scrub, sun-exposed forest areas and forests at slopes greater than 30 degrees. They exclude forests in special zones.
Special Protection Area	<p>It is an area to regulate relations concerning to utilization of and taking areas under special protection, preservation and protection of natural landscape in order to keep particular features of natural zones and belts, their peculiar formation, forms of rare and rarest fauna and flora, historical and cultural sites and natural sightseeing as well as studying and identifying their evolution.</p> <p>The special protected area is classified as under,</p> <p>a. national conservation park; b. natural complex area; c. natural reserve; d. national monument area.</p>
National Conservation Park	National conservation park means an area taken under special protection of the State in order to ensure the ecological balance for peculiar features of natural zone and belt, its state of originality and outstanding scientific significance.
Natural Complex Area	Natural complex area means an area taken under special protection of the State which has relatively conserved its natural original state and importance for historical, cultural and scientific knowledge, ecological education
Nature Reserves	<p>The Nature Reserves are areas set aside to protect or restore natural features or natural resources. There are four types of Nature Reserves</p> <p>a. Ecosystems or "natural complexes" b. Rare and Endangered plants c. Fossil animals or plants d. Geological formations.</p>
Natural and Historical Monuments	The Natural and Historical Monuments are intended to protect Mongolia's historical and cultural heritage. They include natural landscape formations such as waterfalls, caves and volcanic formations, as well as archaeological and religious sites.
Strictly Protected Areas	Strictly Protected Areas are ecologically importance for science and civilization," prevent "environmental imbalance."
Industrial zone forest / Utilization Forests	All forest that are not included in "Special zones "and "Protected zones".

3.2.3 Original data

A. for 1993

National Category	Area in 000 ha	Percentage
Strictly Protected Areas	8525	68
National Conservation Parks	3498	28
Nature Reserves	528	4
Natural and Historical Monuments	79	1

B. All data

National Categories	Area in 000 ha		
	1993	1994 ¹	2002
Strictly Protected Area	8525	8443	8443
Protected Area	4105 ²	7877	8220
Utilization forest		1196	1196
Total Forest Land		17516	17859

(Note: 1. The year of information is not clear. It can be for any year from 1994 to 1996. Hence assumed as 1994. 2. It is total of all protection areas excluding strictly protected areas.)

Information is not available on how much of the above area is forested and how much is not forested. It may therefore be reasonable to consider following percentage of forested and non-forested forest areas in table T1.

Category	Percentage composition	
	1994	2002
Forest	63.72	57.40
Shrub and Saxual	28.38	13.06
Non Forest in forest land	7.90	29.54
Total	100	100

3.3 Analysis and processing of national data

3.3.1 Calibration

The area for 2002 has been calibrated to that match the total area of forest land (18,292) in the original data in Table T1 by adjusting the area of “Utilization Forest” as by its definition it is the remainder area after providing for protected areas.

National Categories	Area in 000 ha	
	1994	2002
Strictly Protected Area	8443	8443
Protected Area	7877	8220
Utilization forest	1196	1629
Total Forest land	17516	18292

3.3.2 Estimation and forecasting

A. Forest and Non-forested Areas

Applying percentage of forest and non-forested as well as forest and shrubs from Table T1.

Category	1994			2002		
	SPA	PA	UTF	SPA	PA	UTF
Forest	5380	5019	762	4847	4718	935
Shrub and Saxual	2397	2236	339	1101	1074	213
Non Forest in forest land	666	622	95	2495	2428	481
Total	8443	7877	1196	8443	8220	1629

(Note SPA= Strictly Protected Areas, PA= Protected Areas, UTF= Utilization Forests)

B. Strictly Protected Areas, Protected Areas, Utilization Forests

Applying relative percentage of Strictly Protected Areas, Protected Areas, Utilization “Forests” and in “Shrub and Saxual” in 1994 data to 1990 and 2002 data to 2000 and 2005.

Category	Forest Area in 000 ha			Shrub and Saxual Area in 000 ha		
	1990	2000	2005	1990	2000	2005
SPA	5540	4923	4733	3019	1401	1102
PA	5168	4792	4607	2817	1363	1073
UTF	784	950	912	428	270	213
Total	11492	10665	10252	6264	3034	2388

(Note SPA= Strictly Protected Areas, PA= Protected Areas, UTF= Utilization Forests)

3.4 Reclassification into FRA 2005 classes

A. Primary Function

National Categories	Percentage allocation of National Categories – Primary Function				
	Production	Protection of Soil and water	Conservation of Biodiversity	Social Services	Multiple Purpose
Strictly Protected Areas			100		
Protection Areas		98		2*	
Utilization Forests	100				

*The area of Natural and Historical Monuments

B. Total Function

National Categories	Percentage allocation of National Categories – Total Function				
	Production	Protection of Soil and water	Conservation of Biodiversity	Social Services	Multiple Purpose
Strictly Protected Areas		100	100	100	
Protection Areas		100	100	100	
Utilization Forests	100				

3.5 Data for National reporting table T3

FRA 2005 Categories / Designated function	Area (1000 hectares)					
	Primary function			Total area with function		
	1990	2000	2005	1990	2000	2005
Forest						
Production	784	950	912	784	950	912
Protection of soil and water	5065	4696	4515	10605	9619	9248
Conservation of biodiversity	5540	4923	4733	10605	9619	9248
Social services	103	96	92	5643	5019	4825
Multiple purpose				not appl.	not appl.	not appl.
No or unknown function				not appl.	not appl.	not appl.
Total – Forest	11492	10665	10252	not appl.	not appl.	not appl.
Other wooded land						
Production	428	270	213	428	270	213
Protection of soil and water	2761	1336	1052	5780	2737	2154
Conservation of biodiversity	3019	1401	1102	5780	2737	2154
Social services	56	27	21	3075	1428	1123
Multiple purpose				not appl.	not appl.	not appl.
No or unknown function				not appl.	not appl.	not appl.
Total – Other wooded land	6264	3034	2388	not appl.	not appl.	not appl.

3.6 Comments to National reporting table T3

4 Table T4 – Characteristics of Forest and Other wooded land

4.1 FRA 2005 Categories and definitions

Category	Definition
Primary	Forest / Other wooded land of native species, where there are no clearly visible indications of human activities and the ecological processes are not significantly disturbed.
Modified natural	Forest / Other wooded land of naturally regenerated native species where there are clearly visible indications of human activities.
Semi-natural	Forest / Other wooded land of native species, established through planting, seeding or assisted natural regeneration.
Productive plantation	Forest / Other wooded land of introduced species, and in some cases native species, established through planting or seeding mainly for production of wood or non wood goods.
Protective plantation	Forest / Other wooded land of native or introduced species, established through planting or seeding mainly for provision of services.

4.2 National data

4.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)
GOM. 1999. Plantation data 1971-1993. Unpublished data from registers provided for country information for FRA 2000..	M	Area of plantation	1993
GOM. 2000. Area of Saxual reforested. Estimation by Ministry of Nature and Environment. Environmental Protection Agency. Bureau of Forestry and Wildlife. June 2000. Mongolia.	M	Area of “Saxual plantations”	2000
GOM. 2004. Mongolian Forest. A country report submitted to Regional meeting of National Correspondent in November 2004.Bangkok. Thailand.	M	Extent	2002

4.2.2 Classification and definitions

No national definitions or classes relating to Table 4 are available.

4.2.3 Original data

This table mainly uses information on forests from Table 3 and some information from draft country report for FRA 2000.

A. For Primary Forest Category of FRA 2005

The forested lands (Table 3) in “Strictly Protected forests” will be considered primary forests for 1990, 2000 and 2005.

B. For Plantations Category of FRA 2005

The country information for FRA 2000 records indicate that “industrial plantations” of *Larix sibirica* and *Pinus sylvestris* (66854 ha) and “other plantations” of *Haloxylon ammodendron* “Saxual” (8000 ha) have been raised till 1999. Broadly speaking about 90 percent of plantations were “industrial” and rest about 10 percent were for “other purposes”.

The country information for FRA 2005 indicates that following plantations have been raised during 1991 to 2003. It does not provide break down by species or by purpose.

Year	Area afforested in ha
1991	4992
1992	4467
1993	4585
1994	4934
1995	3970
1996	3211
1997	5001
1998	5289
1999	5005
2000	9030
2001	n.a.
2002	8000
2003	8275

4.3 Analysis and processing of national data

4.3.1 Calibration

This step is not necessary.

4.3.2 Estimation and forecasting

A. Primary Forest

The forested area of strictly protected forest in 2000 has been taken as primary forest in 1990, 2000 and 2005.

B. Productive plantations

Area of plantations (66854 ha) of *Larix sibirica* and *Pinus sylvestris* species raised till 1999 considered as “industrial plantations” in FRA 2000 have been taken as area of “productive plantations”. Area of plantations raised since 2000, estimated as below, have been added to the above figure. All productive plantations have been raised on “forest” land.

Following estimates of industrial plantations raised after 1999 have been developed assuming that,

- (a) percentage of “productive plantations” after 1999 was same (90%) as before 1999 and
- (b) level of plantation in 2001 was roughly same as in 2002 and
- (c) level of plantation in 2004 and 2005 to be same as in 2003.

(1) Area of “productive plantations” in 1990

Area of productive plantation in 1990 = Area of productive plantations till 1999 less area of productive plantations (90 percent of total planting) between 1991 and 1999 = 29,545 ha

(2) Area of productive plantation in 2000

Area of productive plantation in 2000 = Area of productive plantation in 1999 plus area of productive plantation in 2000 (90 percent of planting in 2000) = 66,854+8,127=74,981 ha

(2) Area of productive plantation in 2005

Area of productive plantation in 2005 = Area of productive plantation in 1999 plus area of productive plantation during 2000 to 2005 (90 percent of planting during 2000 and 2005) = 66,854+44869= 111723 ha

C. Protective plantations

Area of plantations (8000 ha) of Saxual, which was considered as “plantations for other (environmental etc.) purposes” in country information for FRA 2000 have been taken as area of “protective plantations”. Area of plantation raised since 2000, estimated as below, have been added to the above figure. All “protective” plantations have been raised on “Saxual” forest lands (Other Wooded lands).

(1) Area of “protective plantations” in 1990

Area of protective plantation in 2000 = Area of protective plantations till 1999 less area of protective plantations (10 percent of total planting) between 1991 and 1999 = 3,855ha

(2) Area of protective plantation in 2000

Area of protective plantation in 2000 = Area of protective plantation in 1999 plus area of protective plantation in 2000 (10 percent of planting in 2000) = 8000+903=8903 ha

(2) Area of protective plantation in 2005

Area of protective plantation in 2005 = Area of protective plantation in 1999 plus area of protective plantation during 2000 to 2005 (10 percent of planting during 2000 and 2005) = 8,000+4986= 12,986 ha

D. Modified Natural Forests

All remaining areas (Total less primary and less plantations) has been taken as “Modified Forests”.

4.4 Reclassification into FRA 2005 classes

FRA Categories	Percentage allocation of National Categories				
	Primary forests	Modified Natural	Semi-natural	Productive Plantation	Protective Plantation
Strictly Protected Areas	100				
Protected Areas		100			
Industrial Plantation				100	
Other Plantations					100
Remaining Areas		100			

4.5 Data for National reporting table T4

FRA 2005 Categories	Area (1000 hectares)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Primary	5540	4923	4733	3019	1401	1102
Modified natural	5922	5667	5407	3241	1624	1273
Semi-natural						
Productive plantation	30	75	112			
Protective plantation				4	9	13
TOTAL	11492	10665	10252	6264	3034	2388

4.6 Comments to National reporting table T4

5 Table T5 – Growing stock

5.1 FRA 2005 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.
Commercial growing stock	The part of the growing stock of species that are considered as commercial or potentially commercial under current market conditions, and with a diameter at breast height of Z cm or more.

5.2 National data

5.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)
WB. 2004. Mongolia Forest Sector Review. The World Bank.	M	Growing Stock	1997
Enkbayar, K. 1997. Protection Use and Restoration of Forest In Mongolia. A paper presented in “Reforestation Workshop 1997”. (Provides details of 1994 state of forests).	M	Growing stock	1994
FAO. 1997. Forests and Forest Management in Mongolia. RAP Publication 1997/4. Regional Office for Asia and Pacific. Thailand.	M	Extent	1994

5.2.2 Classification and definitions

No information on national classes and definitions is available.

5.2.3 Original data

The forest sector review report (WB, 2004) quotes following 1997 information on growing stock by species. The exact year of information is not available. It has been grouped here by “forests” and “other wooded land” and per hectare volume has also been indicated to facilitate its use for development of this reporting table 4.

Species	Area	Volume (m ³)	Volume (m ³ /ha)
Forests			
Siberian larch (<i>Larix sibirica</i>)	7526899	1017149100	
Scotch pine (<i>Pinus sylvestris</i>)	662113	90463600	
Siberian Pine (<i>Pinus sibirica</i>)	984658	163498400	
Siberian Spruce (<i>Picea obovata</i>)	27872	3633200	
Siberian Fir (<i>Abies sibirica</i>)	2337	375500	
Betula(<i>Betula platyphylaa</i>), Poplar (<i>Populus diverifolia</i>), Aspen(<i>Populus tremula</i>) and Willow (<i>Salix berberifolia</i>)	1198720	86254400	
Sub-Total (Forests)	10402599	1361374200	130.87
Other wooded Land			
Haloxylon ammodendron (<i>Saxual</i>)	2028823	1400100	
Sub-Total (OWL)	2028823	1400100	0.69

5.3 Analysis and processing of national data

5.3.1 Calibration

This step is not necessary.

5.3.2 Estimation and forecasting

The per ha figure of growing stock (130.87 for forests and 0.69 for Other Wooded lands) has been used for 1990, 2000 and 2005 with area figures from Table 1 to project growing stock in these three years.

Variables	1990	2000	2005
Forest Area 000 ha	11492	10665	10252
Per ha Growing Stock	130.87	130.87	130.87
Growing Stock (million m3)	1504	1396	1342
Other Wooded Lands 000 ha	6264	3034	2388
Per ha Growing Stock	0.69	0.69	0.69
Growing Stock (million m3)	4.32	2.09	1.65

The commercial growing stock has been assumed as 46.15 % (FAO, 1997).

5.4 Reclassification into FRA 2005 classes

This step is not necessary.

5.5 Data for National reporting table T5

FRA 2005 Categories	Volume (million cubic meters over bark)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Growing stock	1504	1396	1342	4.32	2.09	1.65
Commercial growing stock	694	644	619	1.99	0.97	0.76

No information is available on country thresholds.

5.6 Comments to National reporting table T5

6 Table T6 – Biomass stock

6.1 FRA 2005 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 living 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 biomass	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.

6.2 National data

6.2.1 Data sources

Data from Table T5 has been used as input to this table

6.2.2 Classification and definitions

Data from Table T5 has been used as input to this table

6.2.3 Original data

Data from Table T5 has been used as input to this table

6.3 Analysis and processing of national data

6.3.1 Calibration

This step is not necessary.

6.3.2 Estimation and forecasting

A. Weighted Density

Using basic wood densities for various boreal species in GPG, 2003 and their volume (original data Table 3) a weighted density of 0.48 tonnes/cubic meter has been estimated for “growing stock in “forest areas. As regards “Other wooded lands” (mainly Saxual) a density of 0.4 tonnes per hectare has been assumed.

B. Biomass Expansion factor

The default BEF (GPG, 2003) of 1.35 has been assumed for “forest” areas and a BEF of 1.3 for “Other Wooded Lands”.

C. Above Ground Biomass

The growing stock figures from Table 5 have been multiplied with basic density and BEF to get estimates of Above Ground Biomass.

D. Below Ground Biomass

The Above Ground Biomass figures have been multiplied with default root: shoot ratio (GPG, 2003) of 0.32 to get estimates of Below Ground Biomass.

E. Dead Wood Biomass

The total live biomass figures have been multiplied with default dead : live ratio (GPG, 2003) of 0.20 to get estimates of Dead Wood Biomass.

Variables	1990	2000	2005
Forest			
Growing Stock	1504	1396	1342
Weighted Density	0.48	0.48	0.48
BEF	1.35	1.35	1.35
Above Ground Biomass	974.6	904.6	869.6
Below Ground Biomass	311.9	289.5	278.3
Total Live Biomass	1286.5	1194.1	1147.9
Dead Wood Biomass	257.3	238.8	229.6
Other Wooded Lands			
Growing Stock	4.32	2.09	1.65
Weighted Density	0.4	0.4	0.4
BEF	1.3	1.3	1.3
Above Ground Biomass	2.2	1.1	0.9
Below Ground Biomass	0.7	0.3	0.3
Total Live Biomass	3.0	1.4	1.1
Dead Wood Biomass	0.6	0.3	0.2

6.4 Reclassification into FRA 2005 classes

This step is not needed.

6.5 Data for National reporting table T6

FRA 2005 Categories	Biomass (million metric tonnes oven-dry weight)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Above-ground biomass	974.6	904.6	869.6	2.2	1.1	0.9
Below-ground biomass	311.9	289.5	278.3	0.7	0.3	0.3
Dead wood biomass	257.3	238.8	229.6	0.6	0.3	0.2
TOTAL	1543.8	1432.9	1377.5	3.5	1.7	1.4

6.6 Comments to National reporting table T6

7 Table T7 – Carbon stock

7.1 FRA 2005 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 living 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 biomass	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 a minimum diameter chose by the country for lying dead (for example 10 cm), in various states of decomposition above the mineral or organic soil. This includes the litter, fomic, and humic layers.
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.

7.2 National data

7.2.1 Data sources

No national information is available.

7.2.2 Classification and definitions

No national information is available.

7.2.3 Original data

7.3 Analysis and processing of national data

7.3.1 Calibration

This step is not necessary.

7.3.2 Estimation and forecasting

The default factor of 0.5 (GPG. 2003) has been used to transform figures of biomass stock into figures of Carbon stock.

7.4 Reclassification into FRA 2005 classes

This step is not necessary.

7.5 Data for National reporting table T7

FRA 2005 Categories	Carbon (Million metric tonnes)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Carbon in above-ground biomass	487.3	452.3	434.8	1.1	0.5	0.4
Carbon in below-ground biomass	155.9	144.7	139.1	0.4	0.2	0.2
Sub-total: Carbon in living biomass	643.2	597.0	573.9	1.5	0.7	0.6
Carbon in dead wood	128.7	119.4	114.8	0.3	0.1	0.1
Carbon in litter						
Sub-total: Carbon in dead wood and litter	128.7	119.4	114.8	0.3	0.1	0.1
Soil carbon to a depth of _____ cm						
TOTAL CARBON	771.9	716.4	688.7	1.8	0.9	0.7

7.6 Comments to National reporting table T7

8 Table T8 – Disturbances affecting health and vitality

8.1 FRA 2005 Categories and definitions

Category	Definition
Disturbance by fire	Disturbance caused by wildfire, independently whether it broke out inside or outside the forest/OWL.
Disturbance by insects	Disturbance caused by insect pests that are detrimental to tree health.
Disturbance by diseases	Disturbance caused by diseases attributable to pathogens, such as a bacteria, fungi, phytoplasma or virus.
Other disturbance	Disturbance caused by other factors than fire, insects or diseases.

8.2 National data

8.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)
GOM. 2004. Mongolian Forest. A country report submitted to Regional meeting of National Correspondent in November 2004. Bangkok. Thailand.	M	Disturbance from fire and insects	2002

8.2.2 Classification and definitions

.No national classes or definitions are available

8.2.3 Original data

Years	Area in 000 ha	
	Fire Damage	Insect Damage
1980	107	115
1981	5	150
1982	154	150
1983	87	141
1984	156	105
1985	33	24
1986	29	27
1987	143	32
1988	2	24
1989	17	27
1990	650	33
1991	64	25
1992	391	29
1993	205	33
1994	120	135
1995	34	150
1996	2300	150
1997	2710	250
1998	732	420
1999	25	990
2000	663	1200

2001	88	1080
2002	583	10300
2003	382	584

8.3 Analysis and processing of national data

8.3.1 Calibration

This step is not necessary

8.3.2 Estimation and forecasting

Five year averages have been taken for 1990 and 2000. All damage has been assumed to be in forest areas.

National Variable	Area in 000 ha	
	1990	2000
Fire Damage	225	418
Insect Damage	28	2798

8.4 Reclassification into FRA 2005 classes

This step is not necessary.

8.5 Data for National reporting table T8

FRA-2005 Categories	Average annual area affected (1000 hectares)			
	Forests		Other wooded land	
	1990	2000	1990	2000
Disturbance by fire	225	418	n.a.	n.a.
Disturbance by insects	28	2798	n.a.	n.a.
Disturbance by diseases	n.a.	n.a.	n.a.	n.a.
Other disturbance	n.a.	n.a.	n.a.	n.a.

8.6 Comments to National reporting table T8

9 Table T9 – Diversity of tree species

9.1 FRA 2005 Categories and definitions

Category	Definition
Number of native tree species	The total number of native tree species that have been identified within the country.
Number of critically endangered tree species	The number of native tree species that are classified as “Critically endangered” in the IUCN red list.
Number of endangered tree species	The number of native tree species that are classified as “Endangered” in the IUCN red list.
Number of vulnerable tree species	The number of native tree species that are classified as “Vulnerable” in the IUCN red list.

9.2 National data

9.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)
IUCN. 2004. Red List of Threatened Species. Switzerland:	H	Threatened tree species	2000

9.2.2 National Classification and Definitions

There are no standard national definition or classification

9.2.3 Original National Data

Information is not available either nationally or at IUCN website for Threatened species.

9.3 Analysis and Processing of National Data

9.3.1 Calibration

This step is not necessary.

9.3.2 Estimation and Forecasting

This step is not necessary.

9.4 Reclassification into FRA 2005 Classes

This step is not considered necessary.

9.5 Data for National Reporting Table T9

FRA 2005 Categories	Number of species (year 2000)
Native tree species	n.a
Critically endangered tree species	0
Endangered tree species	0
Vulnerable tree species	0

9.6 Comments to National reporting table T9

Information is not available either nationally or at IUCN website for threatened species hence the figure has been assumed to be zero.

10 Table T10 – Growing stock composition

10.1 FRA 2005 Categories and definitions

List of species names (scientific and common names) of the ten most common species.

10.2 National data

10.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)
WB. 2004. Mongolia Forest Sector Review. The World Bank.	M	Growing Stock	1997
Enkbayar, K. 1997. Protection Use and Restoration of Forest In Mongolia. A paper presented in “Reforestation Workshop 1997”. (Provides details of 1994 state of forests).	M	Growing stock	1994
FAO. 1997. Forests and Forest Management in Mongolia. RAP Publication 1997/4. Regional Office for Asia and Pacific. Thailand.	M	Extent	1994

10.2.2 Classification and definitions

No information on national classes and definitions is available.

10.2.3 Original data

The forest sector review report (WB, 2004) quotes following 1997 information on growing stock by species. The percent species-wise composition of the growing stock will be drawn from the data given below.

Species	Volume (m ³)
Forests	
Siberian larch (<i>Larix sibirica</i>)	1017149100
Scots pine (<i>Pinus sylvestris</i>)	90463600
Siberian Pine (<i>Pinus sibirica</i>)	163498400
Siberian Spruce (<i>Picea obovata</i>)	3633200
Siberian Fir (<i>Abies sibirica</i>)	375500
Betula(<i>Betula platyphylaa</i>), Poplar (<i>Populus diversifolia</i>), Aspen(<i>Populus tremula</i>) and Willow (<i>Salix berberifolia</i>)	86254400

Enkbayar (1977) provides information on growing stock of Betula, Poplar, Aspen and Willows but does not mention the year of information. Therefore, relative share of these broad leaved species in their growing stock is drawn from this report to apply to above information from World Bank review report.

Species	Relative composition within broadleaves
Betula (<i>Betula platyphylaa</i>)	95
Poplar (<i>Populus spp.</i>)	4
Willow (<i>Salix berberifolia</i>)	1

10.3 Analysis and processing of national data

10.3.1 Calibration

This step is not necessary.

10.3.2 Estimation and forecasting

The relative share of species has been calculated from the growing stock detail of 1997 contained in the World Bank (2004) report. These ratios were applied to growing stock figures in Table 5. The World Bank report groups the growing stock figures of three broadleaved species. To segregate them, the figures of their relative share has been drawn from Enkbayar (1997).

10.4 Data for National reporting table T10

FRA 2005 Categories / Species name (Scientific name and common name)	Growing Stock in Forests (million cubic meters)	
	1990	2000
Siberian larch (<i>Larix sibirica</i>)	1123.7	1043.0
Siberian Pine (<i>Pinus sibirica</i>)	180.6	167.7
Scots pine (<i>Pinus sylvestris</i>)	99.9	92.8
Betula (<i>Betula platyphylaa</i>)	90.6	84.0
Siberian Spruce (<i>Picea obovata</i>)	4.0	3.7
Poplar (<i>Populus spp.</i>)	3.8	3.5
Willow (<i>Salix berberifolia</i>)	1.0	0.9
Siberian Fir (<i>Abies sibirica</i>)	0.4	0.4
Name of 9th most common species	n.a.	n.a.
Name of 10th most common species	n.a.	n.a.
Remainder of species		
TOTAL	1504	1396

10.5 Comments to National reporting table T10

The above data is not based on actual inventory.

11 Table T11 – Wood removal

11.1 FRA 2005 Categories and definitions

Category	Definition
Industrial wood removal	The wood removed (volume of roundwood over bark) for production of goods and services other than energy production (wood fuel).
Woodfuel removal	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)
GOM. 2004. Mongolian Forest. A country report submitted to Regional meeting of National Correspondent in November 2004. Bangkok. Thailand.	M	Removal	2002
WB. 2004. Mongolia Forest Sector Review. The World Bank.	M	Removal	2002

11.2.2 Classification and definitions

No national classes or definitions are available

11.2.3 Original data

A. Total Harvest

Years	Removal 000 m3
1980	2130
1981	2174
1982	1939
1983	2203
1984	2068
1985	2236
1986	2205
1987	1919
1988	1801
1989	1291
1990	1200
1991	892
1992	855
1993	857
1994	865
1995	636
1996	653
1997	509
1998	711
1999	464

2000	520
2001	593
2002	568
2003	577

B. Breakdown of Harvest by Round Wood and Fuelwood

The forest sector review (page 119) provides breakdown of harvest in to round wood and fuelwood but only for some selected years as given below. The figure in brackets provide percentage of round wood and fuelwood in total harvest

Year	Harvest in 000 cubic meters (percent of total)		
	Total	Roundwood	Fuelwood
1980	2812	1220 (43.39)	1592 (56.61)
1990	1200	580 (48.33)	620 (51.67)
Average 1991-93	1063	528 (49.67)	535 (50.33)
2000	520	91 (17.50)	429 (82.50)
2001	593	85 (14.33)	508 (85.67)
2002	620	40 (6.45)	580 (93.55)

Further, the forest sector review mentions that about 124 (000 cubic meters) of fuelwood comes from Saxual.

11.3 Analysis and processing of national data

11.3.1 Calibration

This step is not necessary

11.3.2 Estimation and forecasting

Five year averages have been taken for 1990 and 2000. The figure for 2005 has been assumed same as in 2000. Since data is scanty, hence, the percentage of round wood and fuelwood in total harvest as shown against 1990 and 2000 have been used for 1990 and 2000 and the percentage shown against 2002 has been used for 2005 data

Area of Removal	Total Removal of Wood in 000 m ³		
	1990	2000	2005
Total Harvest	1208	572	572
Round Wood	584	100	37
Fuelwood	624	472	535

It is assumed that all industrial round wood comes from forests.

As regards, fuelwood removal estimated above (less removal of 124 thousand cubic meters removal of Saxual) is being treated as removal from forests. The fuelwood removal of 124 (000 cubic meters) from Saxual is assumed for 1990, 2000 and 2005.

Area of Removal	Removal of Fuelwood in 000 m ³		
	1990	2000	2005
Forest	500	348	411
Other Wooded land (Saxual)	124	124	124
Total	624	472	535

11.4 Reclassification into FRA 2005 classes

This step is not needed.

11.5 Data for National reporting table T11

FRA 2005 Categories	Volume in 1000 cubic meters of roundwood over bark					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Industrial roundwood	584	100	37	0	0	0
Woodfuel	500	348	411	124	124	124
TOTAL for Country	1084	448	448	124	124	124

11.6 Comments to National reporting table T11

12 Table T12 – Value of wood removal

12.1 FRA 2005 Categories and definitions

Category	Definition
Value of industrial wood removal	Value of the wood removed for production of goods and services other than energy production (wood fuel).
Value of wood fuel removal	Value of the wood removed for energy production purposes, regardless whether for industrial, commercial or domestic use.

12.2 National data

12.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)
WB. 2004. Mongolia Forest Sector Review. The World Bank.	M	Value of removal	1997

12.2.2 Classification and definitions

No national classes or definitions are available

12.2.3 Original data

The forest sector review report estimates that average stumpage during 2000 was about USD 1.80 per cubic meter for round wood and USD 0.60 per cubic meter for fuelwood.

12.3 Analysis and processing of national data

12.3.1 Calibration

This step is not needed.

12.3.2 Estimation and forecasting

The removal figures in Table 11 have been multiplied with stumpage rate of 1.80 USD for industrial round wood and 0.60 USD for fuelwood.

12.4 Reclassification into FRA 2005 classes

This step is not needed.

12.5 Data for National reporting table T12

FRA 2005 Categories	Value of roundwood removal (1000 USD)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Industrial roundwood	1051	180	67	0	0	0
Woodfuel	300	209	247	74	74	74
TOTAL for Country	1351	389	314	74	74	74

12.6 Comments to National reporting table T12

The table uses stumpage value to calculate value of removal of industrial round wood and wood fuel.

13 Table T13 – Non-wood forest product removal

No national data is available.

14 Table T14 – Value of non-wood forest product removal

No national data is available.

15 Table T15 – Employment in forestry

No national data is available.