Forestry Department
Food and Agriculture Organization of the United Nations

GLOBAL FOREST RESOURCES ASSESSMENT

COUNTRY REPORTS

PAKISTAN

FRA2005/198
Rome, 2005

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).

The Global Forest Resources Assessment process is coordinated by the Forestry Department at FAO headquarters in Rome. The contact person for matters related to FRA 2005 is:

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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 *in situ*. It does not include land that is predominantly under agricultural or urban land use.
Other wooded land	Land not classified as "Forest", spanning more than 0.5 hectares; with trees higher than 5 meters and a canopy cover of 5-10 percent, or trees able to reach these thresholds *in situ*; 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	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)
GOP. 1992. Forestry Sector Master Plan 1992. Reid, Collins and Associates, Canada, and Silviconsult Ltd. Sweden.	H	Area	1990
GOP. 2004. National Forest and Rangeland Resource Assessment Pakistan Forest Institute, Peshawar. 2004.	M	Area	1990, 2000

1.2.2 Classification and definitions

Forest Types	Remarks/Major Species
Coniferous Forests	These forests mostly grow in the north and north west hilly regions of Pakistan between an elevation of 1000m and 3500m.
Sub-Alpine	*Betula utilis* (Birch, Bhuj), *Abies pindrow* (Fir, Paludar)
Himalayan Moist Temperate	*Abies pindrow* (Fir, Palundar), *Picea smithiana* (Spruce, Kachal), *Cedrus deodara* (Deodar), *Pinus wallichiana* (Kail, Biar), *Taxus baccata* (Yew), *Aesculus indica* (Bankhor), *Juglans regia* (Akhrot, Khor), *Populus ciliata* (Palach), *Quercus dilatita* (Oak), *Acer caesium* (Tarkan), *Prunus padus* (Kalakath).
Dry Temperate	*Pinus wallichiana*(Kail, Biar), *Cedrus deodara* (Deodar), *Juniperus excelsa* (Shur, Shupa),*Pinus gerardiana* (Chilgoza), *Quercus ilex* (Bani, Breh).
Sub-Tropical Pine	*Pinus roxburghii* (Chir, Chil), *Quercus incana* (Rin, Ring), *Rhododendron arboreum* (Chahan, Bras).
Scrub Forests	These forests grew upto 1000m in elevation in the north and north western regions of Pakistan. Main Species are following *Acacia modesta*(Phulai), *Olea ferruginea* (Kau), *Acacia nilotica* (Kikar, Babul).
Tropical Thorn	*Acacia nilotica* (Kikar, Babul), *Acacia modesta* (Phulai), *Prosopis cineraria* (Jand, Kandi), *Salvadora oleoides cineraria* (Wan, Pilu), *Zizyphus mauritiana* (Ber), *Tamarix aphylla* (Farash, Ghaz), *Tecoma undulata* (Lahura), *Nannorrhops ritchieana (Mazri)*
Riverain Forests	*Acacia nilotica* (Kikar, Babul), *Dalbergia sissoo* (Shisham, Tali), *Prosopis cineraria* (Jand, Kandi) *Tamarix dioica* (Lei, Dilchhi), *Populus euphratica* (Bahn).
Mangrove Forests	*Avicennia marina* (Timur), *Ceriops tagal* (Chowree or Kirree).
Irrigated Plantations	*Dalbergia sissoo*(Shisham, tali), *Morus alba* (Toot), *Salmalia malabarica*

	(Simal), *Populus deltoides* (Sofeda, Poplar), *Eucalyptus camaldulensis* (Lachi, Safeda), *Acacia nilotica* (Kikar, Babul).
Linear Plantations Along Canals, Roads And Railway Lines.	Same as above and some ornamental species such as *Bauhinia variegata* (Kachanar), *Jacaranda mimosefolia* (Nila Gul Mohr, Jacaranda), *Cassia fistula* (Amaltas), etc.

The names of tree species in parenthesis are local/English.

1.2.3 Original National Data

A. For 1990

Landuse (000 ha) in Forest Sector Master Plan, 1992

Country classification	Area (000 ha)
Conifer –Dense	138
Conifer –Sparse	1775
Scrub	1191
Riverain – Dense	115
Riverain – Medium	58
Mangrove – Medium	87
Mangrove – Sparse	120
Irrigated Plantation	103
Other Plantation (Linear Plantation 16 + Misc.155+Farm trees 466)	637
Rangelands	28507
Agriculture	20580
Other land (Barren 26893+ Urban 138 + Unclassified 6725)	33756
Water Bodies	913
Total land area (000 ha)	**87980**

(Source: GOP, 1992)

B. For 2000

Country classification	**1990**	**1996**	**2000**
Conifer	1913	1479	1512
Riverain	173	144	150
Mangrove	207	159	158
Plantation	103	165	174
Scrub	1191	1652	1323
Grand Total	**3587**	**3599**	**3317**

(Source: GOP, 2004)

C. Updated Figures on Plantations

	Plantation area in "000 ha			
Year	**Irrigated**	**Farm Land**	**Linear Plantation**	**Total**
1992	234	466	16	716
2000	296	663	21	980
2004	318	781	17	1116

(Source: Email communication NC)

1.3 Analysis and processing of national data

1.3.1 Calibration

(i) Classification of Forest Areas

A. For 1990

Category	Allocation to a FRA Class
Coniferous	Forest
Riverine	Forest
Coastal	Forest
Irrigated plantations	Forest but this figure is not used
Scrub	Other Wooded land
Mazri lands	Other land
Linear plantations	Other land
Other Plantations (Linear, Private, Farm trees, Misc. Plantings)	Other land
Rangelands	Other land
Agriculture	Other land
Other land (Barren + Urban + Unclassified)	Other land
Water Bodies	Inland Water bodies

B. For 2000

Category	Allocation to a FR A Class
Conifers	Forest
Riverain	Forest
Mangrove	Forest
Plantation	Forest but this figure is not used
Scrub	Other Wooded Land

C. Plantations

The updated figures on plantation have been used. The "irrigated plantations" have been treated as forest plantations and classified as forests. Their figures for 1992 are being assumed for 1990 and that for 2004 for 2005. There is no information available regarding minimum area and width etc. of farm plantations and the linear plantations to qualify them as "other land with tree cover", therefore these plantation areas are being added to "other land".

(ii) Area Calibrations

The country area figure (79610000) and inland water area figure (2522000 ha) of Pakistan maintained by U.N Statistical Division at New York do not match with the area figures reported above. Therefore, there is a need to calibrate the area. This has been achieved by adjusting all the differences in area of the other land as under.

Category of landuse	**Area in 000 ha**	
	1990	**2000**
Forests (Excl. Plantation)	2293	1820
Irrigated Plantation (Forests)	234	296
Other Wooded Land	1191	1323
..of which Other land with trees		
Other land	73370	73649
Inland water bodies	2522	2522
Total Country Area	**79610**	**79610**

1.3.2 Estimation and forecasting

The linear interpolation method (Area in 2005 = {area in 2000 + ((Area in 2000-Area in 1990)/(2000-1990))*(2005-2000)} has been used to forecast the areas under "Forests" and "Other Wooded lands" for 2005.

Category of landuse	**1990**	**2000**	**2005**
Forests (Excluding Plantations)	2293	1820	1584
Irrigated Plantation (Forests)	234	296	318
Other Wooded Land	1191	1323	1389
Other land with trees			
Other land	73370	73649	73797
Inland water bodies	2522	2522	2522
Total Country Area	**79610**	**79610**	**79610**

1.4 Reclassification into FRA 2005 classes

This step has been taken in above section.

1.5 Data for National reporting table T1

FRA 2005 Categories	**Area (1000 hectares)**		
	1990	**2000**	**2005**
Forest	2527	2116	1902
Other wooded land	1191	1323	1389
Other land	73370	73649	73797
…of which with tree cover [1)]			
Inland water bodies	2522	2522	2522
TOTAL	**79610**	**79610**	**79610**

1) Area of "Other land with tree cover" is included in the area reported under "Other land" and should therefore be excluded when calculating the total area for the country.

1.6 Comments to National reporting table T1

1. There is no information available regarding minimum area and width etc. farm plantations and the linear plantations to qualify them as “other land with tree cover”, therefore these plantation areas are being added to “other land”.

2. There are some positive indications of farmers’ interest in tree plantings. The Government of Pakistan is trying its best to reduce the current deforestation rate through community participation, allocating more funds for forestry projects in the country, offering more incentives to the tree growers to raise plantations under agro- forestry and social forestry programmes and finding suitable tree species for waterlogged , saline and arid lands.

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)
IUCN. 1998. Changing Perspectives on forest policy. Editor: James Mayers. Authors Javed Ahmed and Fawad Mahmood. IUCN in Collaboration with Government of Pakistan.1998.	H	Ownership	1990

2.2.2 Classification and definitions

National class	Definition
State Owned Forests	State owned forests are forests on state owned lands. These forest lands include reserved forests, protected forests, unclassed forests, municipal and resumed lands.
Private Owned Forests	Private owned forests are a broad category encompassing all forests held in private ownership. These includes Guzara forests, Communal Forests, Chos Act Areas, Section 38 areas and Forests on farmlands
Reserved Forests	The forests under the control of Forest Department which have been declared as Reserved Forests under Forest Act 1927 and are generally without rights and privileges. The ownership is vested in government.
Protected Forests	The forests which have been declared as Protected Forests under the provision of the Forest Act 1927 and have some rights and concessions of grazing, grass cutting and collection of dry wood etc. The ownership is vested in the government.
Unclassed Forests	The public forest lands under the control of Forests Department which are neither Reserved Forests nor Protected Forests and are known as unclassed forests. The ownership is vested in government.
Municipal Forest	The forests whose control has been transferred from Forest Department to Municipal and Cantonment authorities. The ownership is vested in the government.
Resumed Lands	Private lands taken over by the Government under various land reforms and Martial Law regulations and managed by the Forest Departments. The ownership is vested in the government.
Guzara Forests	The forest areas to meet bona fide domestic needs of local communities. These forests are managed by the Forest Department.
Community Forests	This I sub category of "Guzara" where the forests are owned by the entire village. These forests are managed by the Forest Department. The

	ownership is vested in local people either as individual or as joint property known as "village shamilat".
Chos Act Forests	Private lands, subject to erosion, taken over by the government for the purpose of soil and water conservation under the Punjab Land Preservation (Chos) Act, 1900. The ownership remains private..
Section 38 Areas	Privately owned lands voluntarily and temporarily put under the control of Punjab Forest Department for conservation and preservation of soil and vegetation. The ownership remains private.

2.2.3 Original data

A. From IUCN (1998) for 1990

Category of Forest Land	Area in 000 ha
State Owned	
Reserved	1682
Protected	994
Un-classed	43
Municipal	208
Resumed	100
Sub-total	3027 (66%)
Privately Owned	
Guzara	622
Chos	3
Section 38	48
Communal	878
Sub-total	1551 (34%)
Total	4578 (100%)

The figures in bracket reflect the percentages to the total area of forest land.

2.3 Analysis and processing of national data

2.3.1 Calibration

This step is not necessary.

2.3.2 Estimating and Forecasting

The relative percentage of private (34%) and publicly (66%) owned forest lands for 1990 has been assumed for the area under "forests" and the "Other wooded lands" reported in Table 1 for 1990 and 2000.

2.4 Reclassification into FRA 2005 Classes

National Classes	Percentage of a National class belonging to a FRA Class		
	Public Ownership	Private Ownership	Other Ownership
Privately owned Forests		100	
Public owned Forests	100		
Privately Owned OWL		100	
Publicly Owned OWL	100		

2.5 Data for National reporting table T2

FRA 2005 Categories	Area (1000 hectares)			
	Forest		Other wooded land	
	1990	2000	1990	2000
Private ownership	859	719	405	450
Public ownership	1668	1397	786	873
Other ownership	-	-	-	-
TOTAL	2527	2116	1191	1323

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)
WI. 1993. Review and Analysis of Forest Policies of Pakistan by Abeed Ullah Jan 1993. Winrock International, FPDP, Government of Pakistan.	M	Designation	1990
GOP. Economic Survey 1999-2000. Government of Pakistan	H	Designation	2000
WWF Pakistan. 2005. Website on Protected Areas	H	Protected Areas	2004

3.2.2 Classification and definitions

National class	Definition
Protection Forest	Forests managed for the biological stabilities.
Production Forest	Forests managed for timber requirements.

3.2.3 Original data

A. Percentage of Productive and Protective Forests in 1990 and 2000 (GOP and WI)

Category	Productive		Protective		Total (000 ha)
	Area (000 ha)	Percentage	Area (000 ha)	Percentage	
Forests					
1990	837	28	2196	72	3033
2000	830	32	1780	68	2610
Scrub Forests					
1990	329	28	862	72	1191
2000	452	32	970	68	1422

B. Area of Protected Areas (WWF- Pakistan Website)

National Parks	Region	Area in ha	Year of Establishment
Lal Suhanra	Punjab	51,588	1972
Kirthar	Sindh	308,733	1974
Khunjerab	Northern Areas	227,143	1975
Hazarganji-Chiltan	Balochistan	15,555	1980
Margalla Hills	Federal Capital Territory	17,386	1980
Ayubia	North West Frontier Province	1,684	1984
Chitral Gol	North West Frontier Province	7,750	1984
Chinji	Punjab	6,070	1987
Deosai Plains	Northern Areas	363,600	1993
Handrap Shandhoor	Northern Areas	51,800	1993
Sheikh Buddin	North West Frontier Province	15,540	1993
Central Karakoram	Northern Areas	973,845	1995
Machiara	AJK	13,593	1996
Hingol	Balochistan	699,088	1997

In addition to national parks, there are 82 wildlife sanctuaries on 2,749,054 ha, and 82 game reserves on 3,535,284 ha (www.fao.org/docrep/003/x6900e/x6900e0o.htm) but their year of establishment is not available. It has been assumed that these were established before 1990.

Variable	Area in 000 ha		
	1990	2000	2005
Protected Area	636	2753	2753
Wild life Sanctuaries	2749	2749	2749
Game Reserve	3535	3535	3535
Total PA	6920	9038	9038

3.3 Analysis and processing of national data

3.3.1 Calibration

This step is not necessary

3.3.2 Estimation and forecasting

Assumptions

(a) The productive forest mainly serves productive function
(b) The protective areas mainly serve conservation of biodiversity function
(c) All forest areas less productive forests and those that are under "protected areas" are used as multipurpose forests.

Estimation

A. Productive forests

Following the original data, it is assumed that 28% of the "forests" and "other wooded lands" served production function in 1990 and about 32 % of them in the year 2000. It is assumed that the percentage for 2000 applies to 2005.

Variable	**1990**	**2000**	**2005**
Percent of Productive forest	28	32	32
Area of Productive Forests in "000"ha	708	677	608
Percent of Productive OWL	28	32	32
Area Productive areas in OWL in "000"ha	333	423	444

B. Protected Areas

Following tables indicates the area of forests and other wooded lands serving specific function of the conservation of biodiversity. It is based on the assumption that the overall relative percentage between "forests" (3.2, 2.6 and 2.3) and "other wooded lands" (1.5, 2.1 and 2.4) in the total area of the country in 1990, 2000 and 2005 as reflected in Table 1 also holds good for "protected areas".

Variable	**1990**	**2000**	**2005**
Percent of Forest in Table 1	3.2	2.7	2.4
Area of Forests in PAs in "000"ha	220	240	216
Percent of Owl in Table 1	1.5	1.7	1.7
Area of OWL in PAs in "000"ha	104	150	158
Total	323	390	374

B. Multipurpose Function

In view of non-availability of any documented data, the remainder of "forests" and "Other wooded lands" has been assumed to serve the multipurpose function.

Variable	**Area in 000 ha**		
	1990	**2000**	**2005**
Multipurpose Forests	1600	1199	1077
Multipurpose Scrub	754	749	787
Total Multipurpose	2354	1948	1864

3.4 Reclassification into FRA 2005 classes

A. For Area under Primary Function

National Class	Percentage of a National Class to a FRA Classes of Primary Function					
	Production For./OWL	Protection For./OWL	Conservation of Biodiversity	Social Service	Multiple Function	Unknown Function.
	%	%	%	%	%	%
Production Forest./Scrub	100					
Protected Areas Forest/Scrub			100			
Multiple Purpose Forest/Scrub					100	

B. For Area under Total Area with Function

National Class	Percentage of a National Class to FRA Classes of Total Function					
	Production For. / OWL	Protection For./ OWL	Conservation of Biodiversity	Social Service	Multiple Function	Unknown Function.
	%	%	%	%	%	%
Production Forest./Scrub	100					
Protected Areas Forest/Scrub		100	100	100		
Multiple Purpose Forest/Scrub	100	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	708	677	608	2307	1876	1686
Protection of soil and water				1819	1439	1294
Conservation of biodiversity	220	240	216	220	240	216
Social services				220	240	216
Multiple purpose	1599	1199	1078	not appl.	not appl.	not appl.
No or unknown function				not appl.	not appl.	not appl.
Total - Forest	**2527**	**2116**	**1902**	**not appl.**	**not appl.**	**not appl.**
Other wooded land						
Production	333	423	444	1087	1173	1231
Protection of soil and water				858	900	945
Conservation of biodiversity	104	150	158	104	150	158
Social services				104	150	158
Multiple purpose	754	750	787	not appl.	not appl.	not appl.
No or unknown function				not appl.	not appl.	not appl.
Total – Other wooded land	**1191**	**1323**	**1389**	**not appl.**	**not appl.**	**not appl.**

3.6 Comments to National reporting table T3

In the absence of specific data, the above table is mainly based on assumptions.

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)
GOP. 1992. Forestry Sector Master Plan 1992. Reid, Collins and Associates, Canada, and Silviconsult Ltd. Sweden.	H	Area	1990
IUCN. 1998. Changing Perspectives on forest policy. Editor: James Mayers. Authors Javed Ahmed and Fawad Mahmood. IUCN in Collaboration with Government of Pakistan.1998.	H	Area	1990

4.2.2 Classification and definitions

There are national classification and definitions relating to this table.

4.2.3 Original data

No data is available about the characteristics of forests and other wooded lands. All the information incorporated in the Table 4 has been derived from earlier tables mainly Table 1 and Table 3 with following assumptions.

(a) There are no primary forests.

(b) Pakistan does not have primary forests in the country. Most of the forests are modified or semi-natural. These forests are under great pressure because of human activities, population pressure and increasing demand for fuelwood and timber. Unfortunately, in the past enough efforts were not made to raise the productive or protective plantations in those areas, which were earlier over harvested or cleared. Therefore, forests, excluding irrigated plantations have been classified as “modified forests”.

(c) All irrigated plantations are for productive purposes.

4.3 Analysis and processing of national data

4.3.1 Calibration

This step is not necessary as information is being used from Table 1 and Table 3.

4.3.2 Estimation and forecasting

This step is not necessary as information is being used from Table 1 and Table 3.

4.4 Reclassification into FRA 2005 classes

National Classes	Percentage of a National class that matches a FRA Class				
	Primary	Modified	Semi-Natural	Productive Plantation	Protective Plantation
	%	%	%	%	%
Irrigated plantations				100	
Rest of the forest/owl area		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						
Modified	2293	1820	1584	1191	1323	1389
Semi-natural						
Productive plantation	234	296	318			
Protective plantation						
TOTAL	**2527**	**2116**	**1902**	**1191**	**1323**	**1389**

4.6 Comments to National reporting table T4

Pakistan does not have primary forests in the country. Most of the forests are modified or semi-natural. These forests are under great pressure because of human activities, population pressure and increasing demand for fuelwood and timber. Unfortunately, in the past enough efforts were not made to raise the productive or protective plantations in those areas, which were earlier over harvested or cleared. Therefore, forests, excluding irrigated plantations have been classified as “modified forests”.

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)
FSMP. 1992. Forestry Sector Master Plan 1992. Reid, Collins and Associates, Canada, and Silviconsult Ltd. Sweden.	H	Growing Stock	1990
GOP. 1999. Biodiversity Action Plan. Government of Pakistan. Prepared with support from IUCN/WWF and financed by World Bank/GEF. August 1999	M	Growing Stock rate of decline	1992
HESS. 1992. House Hold Energy Strategy Survey 1990 to 1992. Pakistan	M	Growing Stock	1990

5.2.2 Classification and definitions

National class	Definition
Growing stock	Volume over bark of all living trees more than 4 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 1 cm, and may also include branches to a minimum diameter of 5 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 5 cm or more.

5.2.3 Original data

A complete national inventory of forest growing stock is not available. The working plans of forest department cover approximately 50 % of coniferous forests and contain estimates of volume, but many of these are based on outdated inventories. The FSMP (1992) compiled data of 29 working plans in NWFP, 3 in Punjab and 4 in AJK, and 3 working schemes in Northern Areas to provide following estimates of the growing stock in coniferous forests.

	Coniferous forests		Weighted GS per ha (m^3 /ha)
Province	Area	GS per ha (m^3 /ha)	
AJK	241	169	
Northern Areas	660	90	
NWFP	940	132	
Punjab	30	246	
Ballochistan	42	n.a.	
Total	1913		123.78

The FSMP (1992) considered the estimates of growing stock of HESS (1992) for non-coniferous and non-farm areas and concluded that a national average of 39 m^3/ha for broad leaved (non-coniferous areas) were reasonable.

The GOP (1999) highlights the FSMP (1992) estimate of annual rate (4%) of decline in growing stock in its National Biodiversity Action Plan (1999).

5.3 Analysis and processing of national data

5.3.1 Calibration

This step is not necessary as calibrated area figures from earlier tables will be used.

5.3.2 Estimation and forecasting

The weighted average growing stock density has been used to estimate the growing stock. The commercial growing stock has been assumed to be 43 percent of the total growing stock. The area of coniferous forests in 2005 has been linearly forecasted using its original data for 1990 and 2000 in Table 1.

Variable	Unit	1990	2000	2005
Area of coniferous forests	"000" ha	1913	1512	1312
Growing Stock per ha	m3/ha	123.78	123.78	123.78
Growing Stock in Coniferous forests	**million m3**	**237**	**187**	**162**
Area of non-coniferous forests	"000" ha	614	604	590
Growing Stock per ha	m3/ha	39	39	39
Growing Stock in non-coniferous forests	**million m3**	**24**	**24**	**23**
Total Growing Stock in forests	**million m3**	**261**	**211**	**185**
Total Commercial Growing Stock	**million m3**	**112**	**91**	**80**

5.4 Reclassification into FRA 2005 Classes

National Classification	Percentage of a National Class to a FRA Class	
	Growing Stock	Commercial Growing Stock
Growing stock	100	
Commercial Growing Stock		100

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	**261**	**211**	**185**	n.a	n.a	n.a
Commercial growing stock	**112**	**91**	**80**	n.a	n.a	n.a

Additional information

Specification of country threshold values	Unit	Value	Complementary information
1. Minimum diameter at breast height of trees included in Growing stock (X)	cm	>4	
2. Minimum diameter at the top end of stem (Y) for calculation of Growing stock	cm	> 1	
3. Minimum diameter of branches included in Growing stock (W)(at thin end)	cm	5	
4. Minimum diameter at breast height of trees in Commercial growing stock (Z)	cm	>5	
5. Volume refers to “Above ground” (AG) or “Above stump” (AS)	AG / AS	AG	
6. Have any of the above thresholds (points 1 to 4) changed since 1990	Yes/No	No	
7. If yes, then attach a separate note giving details of the change	Attachment		

5.6 Comments to National reporting table T5

Generally, a declining trend in forest tree growing stock may be observed as a result of decrease in the forest cover in the country.

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

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)
FSMP. 1992. Forestry Sector Master Plan 1992. Reid, Collins and Associates, Canada, and Silviconsult Ltd. Sweden.	H	Biomass	1990
GPG. 2003. Good Practice Guidance for Land Use, Land use Change and Forestry. IPCC.	H	Biomass	1990 and onwards

6.2.2 Classification and definitions

No standard national definitions relating to this table are available.

6.2.3 Original data

The growing stock figures have been used form Table 5.

The FSMP, 1992 (Page 2-18) used a density of 0.7 tonnes/cubic meter. The same has been used in 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

Assumptions

(a) The weighted density has been assumed to be 0.7 as indicated in FSMP (1992).

(b) The Biomass expansion factor has been calculated as under using Sandra Brown formula {BEF = EXP(3.213-0.506*LN(Biomass/ha)}, which is mainly for Asian broad leaved forests.

Variable	Unit	1990	2000	2005
Growing stock	million cubic meter	261	211	185
Weighted wood density		0.7	0.7	0.7
Stem biomass	**Million ton**	183	147	130
Forest Area	000 ha	2527	2116	1902
Stem Biomass/ha	cubic meter/ha	72	70	68
BEF		**2.85**	**2.9**	**2.94**

(c) The weighted root shoot ratios have been calculated for each of the three reference years based on the relative percentage of conifers and non-coniferous forest using the default factors given in GPG, 2003 for coniferous and non-coniferous forests.

Variables	1990	2000	2005
Default factor for Coniferous	0.32	0.32	0.32
% of coniferous	0.76	0.71	0.69
Default factor for non-coniferous	0.43	0.43	0.43
% of non-coniferous	0.24	0.29	0.31
Weighted Root Shoot Ratio	**0.347**	**0.351**	**0.354**

(d) The dead to live ratio has been assumed to be 0.11 following GPG, 2003.

Biomass

Variable	Unit	1990	2000	2005
Above Ground Biomass	**Million tonne**	**520**	**428**	**381**
Root Shoot ratio		0.347	0.351	0.354
Below Ground Biomass		**180**	**150**	**135**
Total Live biomass	Million tonne	701	578	517
Dead Live Ratio		0.11	0.11	0.11
Dead Wood Biomass		**77**	**64**	**57**

6.4 Reclassification into FRA 2005 classes

Table: Reclassification (Percentage allocation) into FRA 2005 classes

National Classification	Percentage of a National Class to a FRA Class		
	Above Ground	Below Ground	Dead Wood Biomass
Above Ground Biomass	100	0	0
Below Ground Biomass	0	100	0
Dead Wood Biomass	0	0	100

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	520	428	381	n.a.	n.a.	n.a.
Below-ground biomass	180	150	135	n.a.	n.a.	n.a.
Dead wood biomass	77	64	57	n.a.	n.a.	n.a.
TOTAL	**777**	**642**	**573**	n.a.	n.a.	n.a.

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, fumic, 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

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)
GPG. 2003. Good Practice Guidance for Land Use, Land use Change and Forestry. IPCC.	H	Biomass	1990 and onwards

7.2.2 Classification and definitions

There no standard national definition and classification for this table.

7.2.3 Original data

The data from Table 6 has been used for this table.

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 from GPG, 2003 has been used to calculate the Carbon content from biomass estimates in Table 6. Further the default factor of 2.1 tonnes/ha of carbon in forest litter has also been assumed for this table.

Variable	**Unit**	**1990**	**2000**	**2005**
Above Ground Biomass	million tonnes	520	428	381
Carbon in Above Ground Biomass	**million tonnes**	**260**	**214**	**191**
Below Ground Biomass	million tonnes	180	150	135
Carbon in Below Ground Biomass	**million tonnes**	**90**	**75**	**68**
Dead Wood Biomass	million tonnes	77	64	57
Carbon in Dead Wood Biomass	**million tonnes**	**39**	**32**	**28**
Forest Area	million ha	2.53	2.12	1.90
Carbon in forest litter	**million tonnes**	**5**	**4**	**4**

7.4 Reclassification into FRA 2005 classes

There is no need for reclassification.

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	260	214	191	n.a.	n.a.	n.a.
Carbon in below-ground biomass	90	75	68	n.a.	n.a.	n.a.
Sub-total: Carbon in living biomass	**350**	**289**	**259**	n.a.	n.a.	n.a.
Carbon in dead wood	39	32	28	n.a.	n.a.	n.a.
Carbon in litter	5	4	4	n.a.	n.a.	n.a.
Sub-total: Carbon in dead wood and litter	**44**	**36**	**32**	n.a.	n.a.	n.a.
Soil carbon to a depth of _____ cm	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
TOTAL CARBON	**394**	**325**	**291**	n.a.	n.a.	n.a.

7.6 Comments to National reporting table T7

A declining trend is evident in the above ground carbon quantity because of shrinking forest resources in the country.

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 National Data Sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)
A preliminary Survey on Forest Fires in Pakistan By Muhammad Ayaz. PJF Vol53(1),2003	H	Forest Fire	1990, 2000
FAO. 2000. Status of Forestry in Asia and the Pacific 2003-2004- Status. Change and Trends	H	Forest Fire	2000

8.2.2 National Classification and Definitions

The Forest Department of Pakistan defines the forest fires as follows:

Any fire on forest land which is not used as a tool in forest production or management in accordance with an approved plan.

The definition is totally compatible with FRA 2005 definition.

The national definitions for disturbance by insect and diseases are not available.

8.2.3 Original National Data

FRA-2005 Categories	Average annual area affected (1000 hectares)			
	Forests		Other wooded land	
	1990	2000	1990	2000
Disturbance by fire	49	41	NA	NA
Disturbance by insects	5	10	NA	NA
Disturbance by diseases	51	70	NA	NA
Other disturbance	NA	NA	NA	NA

During 1990-2000, subtropical pine forests of N.W.F.P, Punjab, and Balochistan suffered from disease “Decay of Timber”. Similarly, in Balochistan, Juniper trees were attacked by the mistletoe . Shisham trees throughout the country are under attack by a complex disease “Die back”. During the year 2000, Blue Pine trees in Muree, Azad Kashmir and Galies were attacked by Blue Pine Beetles.

8.3 Analysis and Processing of National Data

8.3.1 Calibration

This step is not necessary.

8.3.2 Estimation and Forecasting

This step is not necessary.

8.4 Reclassification into FRA 2005 Classes

Reclassification of national data on forest fire is not necessary as the national and FRA 2005 definitions match with each other.

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	49	41	NA	NA
Disturbance by insects	5	10	NA	NA
Disturbance by diseases	51	70	NA	NA
Other disturbance	NA	NA	NA	NA

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)
FAO. 2003. Status of forest genetic resources conservation and management in Pakistan. Author Shams R. Khan. Forest Genetic Resources Working Paper FGR/67. FAO	M	Threatened tree species	2000
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 definitions or classification

9.2.3 Original National Data

A. IUCN Red list

The IUCN, 2004 list of threatened species mentions only following two tree species that are vulnerable in Pakistan

1. Rhamnella gilgitica
2. Ulmus wallichiana

B. National List

The country has about 1104 native species. It maintains following list of important threatened species, which is quite long and is classified based on the level and nature of threats to the integrity of populations of these species (FAO, 2003).

Species in ecogeographic (or genecological) zones	Ecological zone	Direct causes of threats (1-6)							
		Reserves, natural areas	*In situ* conservation stands	Managed forests	Plantations	*Ex situ* conservation stands	Villages, fields, homesteads	Exper. fields, trials	Degree of threat index (1 – 5)
Abies pindrow	DWT	1,2	-	1	-	-	-	-	5
Acacia albida	ASA	-	-	-	-	1	-	1	1
A. ampliceps	ASA	-	-	-	-	1	-	1	1
A. catechu	ST	-	-	-	-	-	-	1	2-4
A. nilotica var. *cupressiformis*	ASA	1,2	-	-	1,2	1	4	1,2	5
A. Senegal	T	-	-	1,6	2	-	-	-	2-4
A. tortilis	ASA	-	-	-	2	-	-	-	1
A. victoriae	ASA	-	-	-	2	-	-	-	1
Acer caesium	WT	-	-	1	-	-	-	-	2-4
Aelagnus hortensis	DT	1,2	-	-	1,2	-	-	-	2-4
Alnus nitida	ST	-	-	-	-	-	1,2,4,6	-	5
Atropa acuminate	DWT	1,2,4	-	1	-	-	-	-	5
Aviecinia officinalis	T	3	-	1	-	-	-	-	2-4
Azadirachta indica	ASA	-	-	1,2	1,2	-	2,4	-	2-4
Bombacopsis quinata	T	-	-	-	-	-	-	1	1
Casuarina equisetifolia	ASA	-	-	-	-	-	-	1	1
C. glauca	ASA	-	-	-	-	-	-	1	1
C. obesa	ASA	-	-	-	-	-	-	1	1
Celtis eriocarpa	ST	1,2	-	1,2	-	-	2,4	-	5
Ceratonia siliqua	A	-	-	1,2	-	-	2,4,5	-	2-4
Dalbergia sissoo	ASA	-	-	-	1	1	3	1	2-4
Diospyrus kaki	ST	1,2	-	2	-	-	4	-	5
Eucalyptus camaldulensis	ASA	-	-	-	-	1	-	1	1
E. citriodora	ASA	1	-	-	1	1	4,5	1	5
E. microtheca	A	1	-	-	1	1	4	1	5
E. torelliana	ASA	-	-	-	1	1	-	1	1
Fraxinus xanthoxyloides	WT	1,2	-	1,2	-	-	-	-	5
Grewia asiatica	ST	2	-	1,2	-	-	2,4	-	5
Juglans regia	DWT	1	-	1	1,2	-	2,4,5	-	2-4
Juniperus macropoda	DT	2	-	1	-	-	-	-	2-4
Morus alba (wild)	ST	2	-	2	-	-	4,5	-	5
Morus alba (Chinese)	ST	-	-	-	1	-	-	-	2-4
Paulownia tomentosa	T	-	-	-	-	-	1	1	1
Pinus greggii	ST	1	-	-	-	2,4	4	1	1
P. gerardiana	DT	1,2,3,4	-	-	-	-	-	1	2,4
P. wallichiana var. karakorama	DT	1,2,3,4	-	-	1,2	1	-	1	2-4
Pistacia khinjuk	DT	1,2	-	-	-	-	-	-	2-4
Populus alba	WT	1,2	-	1	-	-	-	-	5
P. ciliate	WT	1,2	-	1	-	-	-	-	5
P. deltoides (American)	T&ST	-	-	-	3	-	-	-	2-4
P. euphratica	T	-	-	-	1,2,3,6	-	-	-	5
P. nigra	DWT	-	-	-	1,6	-	1,5	1	2-4
Prosopis chilensis	ASA	-	-	-	-	-	-	1	1

P. pallida	ASA	-	-	-	-	-	-	1	1
Prunus amygdalis	WT	1	-	1,2	-	-	-	-	5
P. padis	WT	1	-	1,2	-	-	-	-	5
Pyrus communis	WT	1,2	-	1	-	-	-	-	5
P. pashia	WT	1	-	1	-	-	-	-	5
Quercus dilatata	DWT	1,2	-	-	-	-	-	-	2-4
Q. ilex	ST	1,2	-	-	-	-	-	-	2-4
Q. incana	WT	1,2	-	-	-	-	-	-	2-4
Q. semicarpifolia	WT	1,2	-	-	-	-	-	-	2-4
Rhizophora mucronata	T	1,2,3	-	-	-	-	-	-	2-4
Rhododendron spp.	ST	1,2,6	-	-	-	-	-	-	5
Salix babylonica	WT	1,2,3	-	-	-	-	4	-	5
S. tetrasperma	ST	1,2	-	-	-	-	4	-	5
Saussuria lappa	WT	1,2,4	-	1,2	-	1	-	-	5
Taxus baccata	WT	1,2,4,6	-	1,2	-	-	-	-	5
Zizyphus jujuba/ Z. nummularia	A	-	-	1	1,2	-	3,4	-	2-4

(Note: Source FAO, 2003
Direct causes of threats include the following categories:
1 = Unmanaged use and harvesting; 2 = Unmanaged grazing and browsing (domestic animals, wildlife);
3 = Wildfires, environmental biotic/abiotic factors (drought, pests, diseases, floods, pollution);
4 = Clearing for agriculture or pasture; 5 = Infrastructure development (dams, mining, urban expansion);
6 = Other, e.g. lack of knowledge/ignorance; fuelwood collection
Threat Index (1-5):
1 = Implementation/enforcement of regulations probable and regulations scientifically sound. Low level of threat.
5 = Implementation/enforcement of regulations unlikely; or threat severe with high probability of genetic degradation or loss. High level of threat.
2-4 = Intermediate between 1 and 5)

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	1104
Critically endangered tree species	0
Endangered tree species	0
Vulnerable tree species	2

9.6 Comments to National reporting table T9

Although a number of tree species in Pakistan are endangered because of climate change, over harvesting and population pressure but above table list only those that are mentioned in IUCN Red list.

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 National Data Sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)
FSMP. 1992. Forestry Sector Master Plan 1992. Reid, Collins and Associates, Canada, and Silviconsult Ltd. Sweden.	H	Growing Stock by species	1990
HESS. 1992. House Hold Energy Strategy Survey 1990 to 1992. Pakistan	M	Growing Stock by species	1990
FAO 1997. Country Report – Pakistan. Asia-Pacific Forestry Sector Outlook Study Working Paper. APFSOS/WP/11.	M	Growing Stock by species	1990

10.2.2 National Classification and Definitions

There is no national standard definition for ”Growing stock composition”.

10.2.3 Original National Data

A complete national inventory of forest growing stock is not available. The FSMP compiled data for 1.3 million ha area of 29 working plans in NWFP, 3 in Punjab and 4 in AJK, and 3 working schemes in Northern Areas and estimated following species-wise composition of the growing stock of coniferous forests These percentages are not for individual trees of these species, but for forest types dominated by one or two species.

Forest Types	Percent of Growing stock
Spruce/Fir (*Picea smithiana* and *Abies pindrow)*	39
Kail (*Pinus wallichiana*)	23
Deodar (*Cedrus deodara*)	18
Fir (*Abies pindrow*)	8
Spruce (*Picea smithiana*)	6
Chir (*Pinus roxburghii*)	4
Broad leaved	1
Scrub	1

Similar information on species composition for non-coniferous forests is not available.

10.3 Analysis and Processing of National Data

10.3.1 Calibration

This step is not necessary as the basic figures come from Table 5

10.3.2 Estimation and Forecasting

The 39 percent of coniferous forest is dominated by a mixture of Spruce and Fir trees. In addition, about 8 percent of coniferous forest is dominated by Fir and about 6 percent by Spruce. Therefore to estimate total relative dominance of Fir and Spruce in coniferous forests the 39 percent figure is broken down as 22 percent under Fir and 17 percent under Spruce following the ratio of 8:6. This leads to a total of 30 percent for Fir and 23 percent for Spruce. Due to lack of information, it is not possible to provide species-wise breakdown of non-coniferous growing stock.

Common Name	**Scientific Name**	**Percent composition**	**Growing stock million m^3 (1990)**	**Growing Stock million m^3 (2000)**
Fir	*Abies pindrow*	30	71.0	56.1
Kail	*Pinus wallichiana*	23	54.5	43.0
Spruce	*Picea smithiana*	23	54.5	43.0
Deodar	*Cedrus deodara*	18	42.6	33.7
Chir	*Pinus roxburghii*	4	9.5	7.5
Broad-leaved in Coniferous forests		2	4.7	3.7
Total Coniferous forests		100	236.8	187.2
Non-coniferous forests			23.9	23.6

10.4 Reclassification into FRA 2005 Classes

This step is not necessary.

10.5 Data for National Reporting Table T10

FRA 2005 Categories Common name	**FRA 2005 Categories Species name**	**Growing Stock in Forests (million cubic meters)**	
		1990	**2000**
Fir	*Abies pindrow*	71	56
Kail	*Pinus wallichiana*	54	43
Spruce	*Picea smithiana*	54	43
Deodar	*Cedrus deodara*	43	34
Chir	*Pinus roxburghii*	10	8
Broad-leaved Species		29	27
Total		**261**	**211**

10.6 Comments to National reporting table T10

The above data is not based on inventory for reference years.

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 (woodfuel).
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)
An overview of Forest Products Statistics in South and Southeast	H	Industrial and Fuelwood Production	2000
Forestry Statistics Today and Tomorrow. 1961-1991---2010, FAO. 1993	H	Industrial and Fuelwood Production	1990
Forestry Statistics of Pakistan.	H	Fuel wood and Timber Production	2000

11.2.2 National Classification and Definitions

No national definitions are available.

11.2.3 National data

Category	Removal in 000 m^3	
	1990	2000
Industrial wood removal	2434	2345
Woodfuel removal	24740	29315

11.3 Analysis and Processing of National Data

11.3.1 Calibration

This step was not necessary

11.3.2 Estimation and forecasting

The forecast for 2005 has been developed by linear-extrapolation.

11.4 Reclassification into FRA 2005 Classes

Table: Reclassification (Percentage allocation) into FRA 2005 classes

National Classification	Percentage of a National Class to a FRA Class	
	Industrial Round Wood	**Wood Fuel**
Wood	100	
Fuelwood		100

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	2434	2345	2301	n.a	n.a	n.a
Woodfuel	24740	29315	31603	n.a	n.a	n.a
TOTAL for Country	**27174**	**31660**	**33904**	n.a	n.a	n.a

11.6 Comments to National reporting table T11

Major use of wood in Pakistan is as fuelwood. It is expected that harvesting of trees for fuelwood will continue in the coming years because of population pressure, poverty and unavailability of alternate sources of energy.

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 (woodfuel).
Value of woodfuel 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)
U.N. Timber Statistics--Pakistan	H	Value of Industrial wood	2000

12.2.2 Classification and definitions

No national classification and definitions are available.

12.2.3 Original data

The value of industrial wood has been calculated assuming average price of industrial wood as 1350 Rs/m^3 and 2400 Rs/m^3 during 1990 and year 2000 respectively. The forecasted rate (linear –extrapolation) for 2005 is 2925 Rs/m^3. The fuel wood value has been calculated on the basis of basic density of 800kg/m3 and prices of Rs 40/40 kg and Rs 100/40 Kg for 1990 and 2000 respectively. This lead to the price of 800 Rs/m^3 and 2000 Rs/m^3 in 1990 and 2000. The forecasted price for 2005 is 2600 Rs/m^3.

The exchange rates of US dollar for 1990, 2000 and 2005 are Pakistani Rs 21.90, Rs 58.00 and Rs.59.50 respectively.

12.3 Analysis and processing of national data

12.3.1 Estimation and forecasting

A. Value in Local currency

FRA 2005 Categories	Value of roundwood removal (1000 Pakistan Rs)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Industrial roundwood	3285900	5628000	6730425	NA	NA	NA
Woodfuel	19792000	58630000	82167800	NA	NA	NA
TOTAL for Country	**23,077,900**	**64,258,000**	**88,898,225**	**NA**	**NA**	**NA**

B. Value in US dollars

FRA 2005 Categories	Value of roundwood removal (1000 US$)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Industrial roundwood	150729	97034	113116	NA	NA	NA
Woodfuel	907890	1010862	1380971	NA	NA	NA
TOTAL for Country	**1,058,619**	**1,107,897**	**1,494,088**	**NA**	**NA**	**NA**

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	150729	97034	113116	NA	NA	NA
Woodfuel	907890	1010862	1380971	NA	NA	NA
TOTAL for Country	**1,058,619**	**1,107,897**	**1,494,088**	**NA**	**NA**	**NA**

12.6 Comments to National reporting table T12

13 Table T13 – Non-wood forest product removal

13.1 FRA 2005 Categories and definitions

The following categories of non-wood forest products have been defined:

Category
Plant products / raw material
1. Food
2. Fodder
3. Raw material for medicine and aromatic products
4. Raw material for colorants and dyes
5. Raw material for utensils, handicrafts & construction
6. Ornamental plants
7. Exudates
8. Other plant products
Animal products / raw material
9. Living animals
10. Hides, skins and trophies
11. Wild honey and bee-wax
12. Bush meat
13. Raw material for medicine
14. Raw material for colorants
15. Other edible animal products
16. Other non-edible animal products

13.2 National data

13.2.1 Data sources

References to sources of information	**Quality (H/M/L)**	**Variable(s)**	**Year(s)**
FAO. 2003. Non-Wood Forest Products In The Near East: A Regional And National Overview. Authors. Amal Sabra and Sven Walter. http://www.fao.org/docrep/003/y1797e/y1797e15.htm	H	NWFP Removal	1990
Latif. Et. al. 2003. Potential and Market Status of Mushrooms as Non-Timber Forest Products in Pakistan. Authors: Abdul Latif , Zabta Khan Shinwari and Shaheen Begum. Ethnobotany Project, University Town, Peshawar, Pakistan.	H	NWFP Removal	2000

13.2.2 Classification and definitions

There is no national standard definition.

13.2.3 Original data

Category	Removal of NWFP (tonnes)	
	1990	**2000**
Food		
Morel (Morchella esculenta)	55	65
Seeds of Pinus gerardiana	21000	25,000
Walnut (Juglans regia)	18600	20000
Wild persimmon (Diospyros lotus)	80	75
Sub-total	39735	45140
Fodder	4,200,000	4,000,000
Medicines	568	600
Raw material for colorants and dyes.	40,000	42,000
Raw material for utensils, handicrafts & construction	42100	37,315
Ornamental plants	NA	NA
Exudates	4132	3500
Other plant products	250	240

13.3 Analysis and processing of national data

13.3.1 Calibration:

This step is not necessary

13.3.2 Estimation and Forecasting

The figure for 2005 has been forecasted using linear-extrapolation.

13.4 Reclassification into FRA 2005 classes

This is not necessary as national classes and FRA classes are almost similar.

13.5 Data for National reporting table T13

FRA 2005 Categories	Scale factor	Unit	NWFP removal		
			1990	2000	2005
Plant products / raw material		tons			
1. Food		tons	39735	45140	47842.5
2. Fodder	million	tons	4.2	4	3.9
3. Raw material for medicine and aromatic products		tons	568	600	616
4. Raw material for colorants and dyes		tons	40000	42000	43000
5. Raw material for utensils, handicrafts & construction		tons	42100	37000	34450
6. Ornamental plants		No	NA	NA	NA
7. Exudates		tons	4132	3500	3184
8. Other plant products		tons	250	240	235
Animal products / raw material					
9. Living animals		No	NA	NA	NA
10. Hides, skins and trophies		No	NA	NA	NA
11. Wild honey and bee-wax		tons	65	55	50
12. Bush meat			NA	NA	NA
13. Raw material for medicine			NA	NA	NA
14. Raw material for colorants			NA	NA	NA
15. Other edible animal products			NA	NA	NA
16. Other non-edible animal products		tons	245	240	238

13.6 Comments to National reporting table T13

The main non-wood forest products (NWFP) of Pakistan are food products such as mushrooms (e.g. *Morchella esculenta, M. conica, M.anqusticipt*), honey, pine nuts (*Pinus gerardiana*), walnuts (*Juglans regia*), fruits (*Diospyros lotus, Capparis aphalla, Ziziphus spp., Viurnum nervosum, Morus alba*), vegetables (*Bauhinia variegata, Moringa oleifera, Dryopteris filix-mas*), condiments (*Punica granatum, Carum carvi*), medicinal plants (e.g. *Valeriana wallichii, Artemisia maritima, Hyoscyamus niger, Ephedra nebrodemsis, Digitalis purporea*) and essential oils (e.g. Eucalyptus oil, Peppermint oil, Menthol, Lemon oil and Orange oil). Other NWFP include exudates such as resins (*Pinus roxburghii*) and gums (palosa gum from Acacia modesta), tannins (*Acacia nilotica*), utensils and construction materials such as bhabar grass (*Eulaliopsis binata*) and fibres (*Nonnorrhops ritchieana*) miscellaneous products such as soap nut *(Sapindus mukorossi),* neem leaves and seeds (*Azadirachta indica*), walnut bark *(Juglans regia*) and animal products (Honey and silk cocoons). Mushrooms, pine nuts, some medicinal plants and resins constitute the main export products

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

14.1 FRA 2005 Categories and definitions

The following categories of non-wood forest products have been defined:

Category
Plant products / raw material
1. Food
2. Fodder
3. Raw material for medicine and aromatic products
4. Raw material for colorants and dyes
5. Raw material for utensils, handicrafts & construction
6. Ornamental plants
7. Exudates
8. Other plant products
Animal products / raw material
9. Living animals
10. Hides, skins and trophies
11. Wild honey and bee-wax
12. Bush meat
13. Raw material for medicine
14. Raw material for colorants
15. Other edible animal products
16. Other non-edible animal products

14.2 Data sources

References to sources of information	**Quality (H/M/L)**	**Variable(s)**	**Year(s)**
FAO. 2003. Non-Wood Forest Products In The Near East: A Regional And National Overview. Amal Sabra and Sven Walter. http://www.fao.org/docrep/003/y1797e/y1797e15.htm	H	NWFP Removal	1990
Latif. Et. al. 2003. Potential and Market Status of Mushrooms as Non-Timber Forest Products in Pakistan. Authors: Abdul Latif , Zabta Khan Shinwari and Shaheen Begum. Ethnobotany Project, University Town, Peshawar, Pakistan.	H	NWFP Removal	2000

14.2.1Original data

It is difficult to collect the exact value of non-wood forest products produced and marketed in the country. Following are rough estimates only.

Category	**Value in US dollars (000)**	
	1990	**2000**
Food	10420	12000
Fodder	NA	NA
Raw Material for Medicine	8,300	9,000
Raw Material for Colorants	5,796	6,000
Raw Material for Utensil	5,040	4,000
Ornamental Plants	NA	NA
Exudates	500	400
Other plant products	NA	NA
Honey	240	270

14.3 Analysis and processing of national data

14.3.1 Calibration:

This step is not necessary

14.3.2 Estimation and Forecasting

The figure for 2005 has been forecasted using linear-extrapolation.

14.4 Reclassification into FRA 2005 Classes

A. Plant Products

National Class	Percentage allocation of National Class to FRA 2005 classes							
	Food	Fodder	Raw Medicine	Raw Colorants	Raw Utensil	Orna-Mental	Exudates	Other
Nuts	100							
Drug& Spices			100					
Fodder & Grass		100						
Tanning Material				100				
Raw Material for Utensil					100			
Resin							100	
Others								100

B. Animal Products

National Class	Percentage allocation of National Class to FRA 2005 classes							
	Living Animal	Hides etc.	Wild Honey..	Bush Meat	Raw mat. Medicine	Raw mat. colorants	Other Edible	Other Non-edible
Wild Honey and bee wax			100					
Other non-edible animal products								100

14.5 Data for National Reporting Table T14

FRA 2005 Categories	Value of the of NWFP removed (1000 USD)		
	1990	**2000e**	**2005**
Plant products / raw material			
1. Food	10420	12000	12790
2. Fodder	n.a.	n.a	n.a
3. Raw material for medicine and aromatic products	8,300	9,000	9350
4. Raw material for colorants and dyes	5,796	6,000	6102
5. Raw material for utensils, handicrafts & construction	5,040	4,000	3480
6. Ornamental plants	n.a.	n.a	n.a
7. Exudates	500	400	350
8. Other plant products	n.a	n.a	n.a
Animal products / raw material			
9. Living animals	n.a	n.a	n.a
10. Hides, skins and trophies	n.a	n.a	n.a
11. Wild honey and bee-wax	240	270	285
12. Bush meat	n.a	n.a	n.a
13. Raw material for medicine	n.a	n.a	n.a
14. Raw material for colorants	n.a	n.a	n.a
15. Other edible animal products	n.a	n.a	n.a
16. Other non-edible animal products	1300	1400	1450
TOTAL	**31,596**	**33,070**	**33,807**

14.6 Comments to National reporting table T14

It is difficult to collect the exact value of non-wood forest products produced and marketed in the country.

15 Table T15 – Employment in forestry

15.1 FRA 2005 Categories and definitions

Category	Definition
Primary production of goods	Employment in activities related to primary production of goods, like industrial roundwood, woodfuel and non-wood forest products.
Provision of services	Employment in activities directly related to services from forests and woodlands.
Unspecified forestry activities	Employment in unspecified forestry activities.

15.2 National data

15.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)
FAO. 2003. An overview of forest products statistics in South and Southeast Asia. National Forestry Statistics-Pakistan http://www.fao.org/documents/show_cdr.asp?url_file=/DOCREP/005/AC778E/AC778E00.HTM)	M	Employment	1990-2000
Economic Survey of Pakistan 2003	H	Primary Production	2000
FAO. 2004. Trends and current status of the contribution of the forestry sector to national economies. Forest Products and Economic Division Working Paper FSFM/ACC/07.	M	Employment	2004

15.2.2 Classification and definitions

National class	Definition
Primary production of goods	Employment in activities related to primary production of goods, like industrial roundwood, woodfuel and non-wood forest products.
Provision of services	Employment in activities directly related to services from forests and woodlands.
Unspecified forestry activities	Employment in unspecified forestry activities.

15.2.3 Original data

FAO 2004 provides estimates of employment mainly on production. This is close to primary employment in production.

Category	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Employment in Forestry (000 person years)	31	29	30	24	21	17	23	25	26	26	29

It is assumed that employment related to provision of services may be additional 10 percent in roughly in proportion of the area under conservation to biodiversity (Table 3).

15.3 Analysis and Processing of National Data

15.3.1 Calibration

This step is not considered necessary.

15.3.2 Estimation and forecasting

A. Employment related to the production of goods.

1990: The average of figures of 1990, 1991 and 1992 has been taken
2000: The average of figures of 1998, 1999 and 2000 has been taken

B. Employment related to the provision of services.

10 percent of figures for employment though provision of goods.

15.4 Reclassification into FRA 2005 Classes

This step is not necessary.

15.5 Data for National reporting table T15

FRA 2005 Categories	Employment (1000 person-years)	
	1990	2000
Primary production of goods	30	27
Provision of services	3	3
Unspecified forestry activities		
TOTAL	**33**	**30**