Forestry Department
Food and Agriculture Organization of the United Nations

GLOBAL FOREST RESOURCES ASSESSMENT 2010

COUNTRY REPORT

ETHIOPIA

FRA2010/065
Rome, 2010

The Forest Resources Assessment Programme

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

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

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

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 2010 is:

Mette Løyche Wilkie
Senior Forestry Officer
FAO Forestry Department
Viale delle Terme di Caracalla
Rome 00153, Italy

E-mail: Mette.LoycheWilkie@fao.org

Readers can also use the following e-mail address: fra@fao.org

Contents

Report preparation and contact persons

The present report was prepared by the following person(s):

Name (FAMILY NAME, First name)	**Institution / address**	**E-mail**	**Fax**	**Tables**
Mesfin Hailesellassie	NRMD, Addis Ababa, Ethiopia	mamo_meskerem@yahoo.com		T1 to T17

1 Table T1 – Extent of Forest and Other wooded land

1.1 FRA 2010 Categories and definitions

Category	Definition
Forest	Land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds *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 (Subordinated to "Other land")	Land classified as "Other land", spanning more than 0.5 hectares with a canopy cover of more than 10 percent of trees able to reach a height of 5 meters at maturity.
Inland water bodies	Inland water bodies generally include major rivers, lakes and water reservoirs.

1.2 National data

1.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Woody Biomass Inventory and Strategic Planning Project (WBISPP), Ministry of Agriculture and Rural Development, May 2004	H	Land use/ Land cover, Growing stock	Land sat TM images: 1986-1989 and 1995	Woody Biomass Inventory using remote sensing (satellite imagery). Satellite images were used to derive estimates for 2000 and 2005. Several assumptions were made to arrive at estimates for 2005.
Ethiopian Forestry Action Program (EFAP), 1994, Ministry of Natural Resources and Environmental Protection.	M	Forest resource base	1992	EFAP' estimation of Ethiopia's forest resource base for 1992 was used.

1.2.2 Classification and definitions

National class	Definition
Forest	Land with relatively continuous cover of trees, which are evergreen or semi-deciduous, only being leafless for a short period, and then not simultaneously for all species. The canopy should preferably have more than one story.
High Wood Land	Combretum-Terminalia Woodland with trees >5 m and crown tree cover > 20%. It is found in East and West Wellega , Jima & Illubabor zone of Oromia region, in zone 2 of Gmbella Region, all of Benshangule -Gumuz Region, and west Gojam, Awi and north Gonder zone of Amhara region. In other areas, it is woodland lying above 1250m above sea level. This class does not

	include shrubs and bushes.
Plantation	Mainly Eucalyptus, Cupressus and Pinus plantation with >5 m and crown density > 20% & thus is included in "Forest " as defined by FAO
Low woodland	All other woodlands and shrubland <5m in height and with crown cover >20%
Other land	Other land is land area that is not categorized as forest. This includes agricultural land, settlements, etc

1.2.3 Original data

Table 1.2.3a Estimates for 2000 as obtained from the WBISPP report

Regions (1)	**Forest**	**"High" Wood land**	**Plantation**	**Low Woodland + Shrubland**	**Other land**	**Water**	**Total**
	ha	**ha**	**ha**	ha	ha	ha	ha
Oromiya	2205619	5257683	62770	9806112	18422447	260500	**36015130**
SNNPR	740271	560000	237198	1349431	7667390	152860	**10707150**
Gambella	491805	899578	0	422042	1371684	0	**3185109**
Dire Dawa	0	0	0	36635	92163	0	**128798**
Harari	216	0	0	7497	24839	0	**32552**
Amhara	92744	841896	199496	7863448	6456317	310379	**15764280**
Tigray	9332	0	649	2135637	2788537	6212	**4940367**
Beneshangul	68495	2471761	0	1416368	955145	15216	**4926985**
Afar	39197	0	0	3169871	6329065	82142	**9620275**
Somali	4257	18160	1410	20090489	9007056	968	**29122340**
Addis Ababa	0	-	7900	0	54450	0	**62350**
ETHIOPIA	**3651935**	**10049079**	**509422**	**46297530**	53169093	**828277**	**114505336**

Note: Low woodland and shrub land are included in the other land category in the WBISPP report. However, for the purpose of FRA report these two categories are separated.

Table 1.2.3.b Estimated figures for 2005 as projected by the WBISPP report

	Area in hectares						
Regions	**Forest**	**"High" Wood land**	**Plantation**	**Low Woodland + Shrubland**	**Other land**	**Water**	**Total**
Oromiya	2032012	4869511	62770	9806112	18984226	260500	**36015130**
SNNPR	638427	548480	237198	1349431	7780755	152860	**10707150**
Gambella	461586	899578	0	422042	939122	0	**3185109**
Dire Dawa	0	0	0	36635	92163	0	**128798**
Harari	216	0	0	7497	24839	0	**32552**
Amhara	84466	841896	199496	7863448	6464595	310379	**15764280**
Tigray	9332	0	649	2135637	2788537	6212	**4940367**
Beneshangul	68495	2454991	0	1416368	971915	15216	**4926985**
Afar	39197	0	0	3169871	6329065	82142	**9620275**
Somali	4257	18160	1410	20090489	9007056	968	**29122340**
Addis Ababa	0	-	7900	0	54450	0	**62350**
ETHIOPIA	**3337988**	**9632616**	**509422**	**46297530**	**53436723**	**828277**	**114505336**

Note: Low woodland and shrub land are included in other land category in the WBISPP report. However, for the purpose of FRA report these two categories are separated.

Explanatory notes on the WBISPP results

1- Land use/Land cover data was obtained from satellite images dating from 1986-1989 for part of the country (250 000km2). Methodology was developed and used to calculate deforestation of natural forests and woodland up to year 2000. Again, land use/land cover data was obtained from satellite imagery dating from 1995 for the rest part of the country. The result of the two analyses makes the data for year 2000.

2- In order to forecast for year 2005 the future rate of deforestation caused by expanding population and its needs for agriculture land etc. the analysis made a number of assumptions in order to come up to year 2005.

3- Methodology used by WBISPP to forecast deforestation of natural forests and woodland is the following:

- Forest cover according to national classification:

WBISPP has recognized three classes of forest based on the percentage crown cover:

Closed: crown cover of the upper stratum exceeds 80 percent
Dense: crown cover of the upper strata is between 50 to 80 percent
Open: crown cover of the upper stratum is between 20 to 50 percent.

4- The project estimates that the total area under forest according to national definitions for the year 2000 and 2005 is 4 073 213 ha and 2 699 561 ha respectively. (Please refer table 1.2.3a and 1.2.3b of T1 (1.2.3 Original data: National category)). From the total forest areas, it is assumed that Closed, Dense and Open forests cover 20 17 and 63 percents respectively.

5- The "original data" for the year 1989 and 2000 are based on the forest area of 1989 (for Oromiya SNNPR and Gambella Regions) and 2000 (the remaining eight Regions). Therefore based on the forest area of 1989 and considering deforestation (from 1989 – 2000) the result was directly given in Table 1.2.3a for the year 2000 and Table 1.2.3b for the year 2005 by WBISPP for all Regions. The analysis was conducted at the wereda level and then aggregated to Administrative Zone and then Region. In order to forecast the future rate of deforestation caused by expanding population and its need for agricultural land the analysis made a number of assumptions:

(i) It was assumed that agriculture first would expand into non-forested areas, which were suitable for cropping - successively into grassland then Shrubland then woodland - because of the ease of clearing.
(ii) Once all grassland Shrubland and woodland had been cleared then people would start to move into the natural forest.
(iii) The number of farm families was assumed to increase at the medium annual rate of increase as forecast by the CSA's 1994 Population and Housing Census for the Region concerned.
(iv) Migration from other weredas either nearby or further away was not taken into consideration because of the current lack of data at the wereda or Zonal level on migration patterns and rates.
(v) Each family was assumed to clear the area required for cropping (as determined in the Project's Socio-economic Survey) and an equal amount for settlement and livestock grazing.
(vi) It was assumed that areas of forest with slopes over 30% would not be cleared for agriculture.
(vii) It was assumed that some Regional Forest Areas would have full protection as follows:
- Arero
- Chilimo Gagi
- Gara Muleta
- Megada
- Menegesha-Suba
- Munessa-Shashamene
- Tiro-Boter-Becho
- Yabello
- Yerer
- Zukwala

(viii) No account was taken of clearing or thinning of forest for coffee plantation. It is know that there are some medium scale coffee plantations (e.g. at Bebeka and Tepi in SNNP Region) are being developed in some areas but the scale of this development is not known.

No account was taken of the establishment of additional plantations which may off-set part of the estimated deforestation rate of 140 000 ha per year. However, no reliable information exists on the annual rate of new plantations.

Summary of 2000 and 2005 data as taken from the WBISPP report

National Categories	Area in hectares	
	2000	**2005**
Forest	3651935	3337988
High woodland area	10049079	9632616
Plantations	509422	509422
Low woodland + Shrubland	46297530	46297530
Other land	53169093	53899503
Inland Water	828277	828277
Total	114505336	114505336

1.3 Analysis and processing of national data

1.3.1 Calibration

Calibration is done for the total country area since the figure of inland water estimated using the UN /FAO figures for total inland water is considered unrealistically high.

	UN/FAO	National data
Land Area in hectares	100 000 000	113 677 059
Inland Water in ha	10 430 000	828 277
Total Country Area (1)	110 430 000	114 505 336
Calibration factor	0.9644092	

Results after Calibration

National Classes	Area in hectares	
	2000	**2005**
Forest	3 521 960	3 219 186
High woodland area	9 691 424	9 289 784
Plantations	491 291	491 291
Low woodland + Shrubland	44 649 764	44 649 764
Other land	51 276 763	51 981 177
Inland water	798 798	798 798
Total	**110 430 000**	**110 430 000**

1.3.2 Reclassification into FRA 2010 categories

Reclassification is done before estimation and forecasting.

Reclassification	Forest	OWL
Forest	100%	
High woodland area	100%	
Plantations	100%	
Low woodland + Shrubland		100%

Results after reclassification 2000 and 2005 data

FRA Category	Area in hectares	
	2000	**2005**
Forests	**13 704 675**	**13 000 261**
OWL	44 649 764	44 649 764

1.3.3 Estimation and forecasting

Using a linear extrapolation, the areas of forest and OWL (in 1990 and 2000) have been estimated and forecasted.

FRA Category	Area in hectares			
	1990	**2000**	**2005**	**2010**
Forests	15 113 503	13 704 675	13 000 261	12 295 847
OWL	44 649 764	44 649 764	44 649 764	44 649 764

1.4 Data for Table T1

FRA 2010 categories	Area (1000 hectares)			
	1990	**2000**	**2005**	**2010**
Forest	15 114	13 705	13 000	12 296
Other wooded land	44 650	44 650	44 650	44 650
Other land	49 867	51 276	51 981	52 685
...of which with tree cover	n/a	n/a	n/a	n/a
Inland water bodies	799	799	799	799
TOTAL	**110 430**	**110 430**	**110 430**	**110 430**

1.5 Comments to Table T1

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Forest		No new information is available on the situation of the forest area. It is believed that the trend of deforestation remains the same as it was between 2000 and 2005.
Other wooded land		
Other land		
Other land with tree cover		
Inland water bodies	Figure from FAOStat has not been used in that case for the table T1. Based on the results of WBISPP, it is estimated that inland water area is equal to 798 798 ha (after calibration).	

Other general comments to the table

Expected year for completion of ongoing/planned <u>national</u> forest inventory and/or RS survey / mapping	
Field inventory	-
Remote sensing survey / mapping	-

Note: Under the sustainable land management project, sponsored by the World Bank, some field and remote sensing surveys are planned.

2 Table T2 – Forest ownership and management rights

2.1 FRA 2010 Categories and definitions

Category	Definition
Public ownership	Forest owned by the State; or administrative units of the public administration; or by institutions or corporations owned by the public administration.
Private ownership	Forest owned by individuals, families, communities, private co-operatives, corporations and other business entities, private religious and educational institutions, pension or investment funds, NGOs, nature conservation associations and other private institutions.
Individuals *(sub-category of Private ownership)*	Forest owned by individuals and families.
Private business entities and institutions *(sub-category of Private ownership)*	Forest owned by private corporations, co-operatives, companies and other business entities, as well as private non-profit organizations such as NGOs, nature conservation associations, and private religious and educational institutions, etc.
Local communities *(sub-category of Private ownership)*	Forest owned by a group of individuals belonging to the same community residing within or in the vicinity of a forest area. The community members are co-owners that share exclusive rights and duties, and benefits contribute to the community development.
Indigenous / tribal communities *(sub-category of Private ownership)*	Forest owned by communities of indigenous or tribal people.
Other types of ownership	Other kind of ownership arrangements not covered by the categories above. Also includes areas where ownership is unclear or disputed.
Categories related to the holder of management rights of public forest resources	
Public Administration	The Public Administration (or institutions or corporations owned by the Public Administration) retains management rights and responsibilities within the limits specified by the legislation.
Individuals/households	Forest management rights and responsibilities are transferred from the Public Administration to individuals or households through long-term leases or management agreements.
Private institutions	Forest management rights and responsibilities are transferred from the Public Administration to corporations, other business entities, private co-operatives, private non-profit institutions and associations, etc., through long-term leases or management agreements.
Communities	Forest management rights and responsibilities are transferred from the Public Administration to local communities (including indigenous and tribal communities) through long-term leases or management agreements.
Other form of management rights	Forests for which the transfer of management rights does not belong to any of the categories mentioned above.

2.2 National data

2.2.1 Data sources

All forests are publicly owned.

2.3 Data for Table T2

Table 2a - Forest ownership

FRA 2010 Categories	Forest area (1000 hectares)		
	1990	2000	2005
Public ownership	15 114	13 705	13 000
Private ownership	0	0	0
...of which owned by individuals			
...of which owned by private business entities and institutions			
...of which owned by local communities			
...of which owned by indigenous / tribal communities			
Other types of ownership	0	0	0
TOTAL	**15 114**	**13 705**	**13 000**

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

Does ownership of trees coincide with ownership of the land on which they are situated?	X	Yes
		No
If **No** above, please describe below how the two differ:		

Table 2b - Holder of management rights of public forests

FRA 2010 Categories	Forest area (1000 hectares)		
	1990	2000	2005
Public Administration	15 114	13 705	13 000
Individuals	0	0	0
Private corporations and institutions	0	0	0
Communities	0	0	0
Other	0	0	0
TOTAL	**15 114**	**13 705**	**13 000**

2.4 Comments to Table T2

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Public ownership		
Private ownership		
Other types of ownership	Community ownership on forest is not clearly assessed. Therefore it is assumed that all forests are public ones.	
Management rights		

Other general comments to the table

3 Table T3 – Forest designation and management

3.1 FRA 2010 Categories and definitions

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

3.2 National data

3.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Ethiopian Forestry Action Programme (EFAP) 1994 Ministry of Natural Resources & Environmental Protection	M	Report	1992	

3.2.2 Original data

There are no protected forests (gazetted/demarcated) in Ethiopia, as all forests are considered multi-purpose.
Based on the WBISPP report, the plantation area in 2000 and 2005 remains stable and was estimated at 491 000 ha after calibration (see table T1).
It is assumed that plantation area should be considered as production forests.

For 2010, it is assumed that the plantation area will be increased by about 20 000 ha. Presently, important efforts have been conducted.

3.3 Data for Table T3

Table 3a – Primary designated function

FRA 2010 Categories	Forest area (1000 hectares)			
	1990	2000	2005	2010
Production	491	491	491	511
Protection of soil and water	0	0	0	0
Conservation of biodiversity	0	0	0	0
Social services	0	0	0	0
Multiple use	14 623	13 214	12 509	11 785
Other (please specify in comments below the table)	0	0	0	0
No / unknown	0	0	0	0
TOTAL	**15 114**	**13 705**	**13 000**	**12 296**

Table 3b – Special designation and management categories

FRA 2010 Categories	Forest area (1000 hectares)			
	1990	2000	2005	2010
Area of permanent forest estate	n/a	n/a	n/a	n/a
Forest area within protected areas	n/a	n/a	n/a	n/a
Forest area under sustainable forest management	n/a	n/a	n/a	n/a
Forest area with management plan	n/a	n/a	n/a	n/a

3.4 Comments to Table T3

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Production	Since there had been no recent study on production forestry, it will be fair to take the figure previously reported.	
Protection of soil and water		
Conservation of biodiversity		

Social services		
Multiple use		
Other		
No / unknown designation		
Area of permanent forest estate	No data available	
Forest area within protected areas	No data available	
Forest area under sustainable forest management	No data available	
Forest area with management plan	No data available	

Other general comments to the table

4 Table T4 – Forest characteristics

4.1 FRA 2010 Categories and definitions

Term / category	Definition
Naturally regenerated forest	Forest predominantly composed of trees established through natural regeneration.
Introduced species	A species, subspecies or lower taxon, occurring outside its natural range (past or present) and dispersal potential (i.e. outside the range it occupies naturally or could occupy without direct or indirect introduction or care by humans).
Characteristics categories	
Primary forest	Naturally regenerated forest of native species, where there are no clearly visible indications of human activities and the ecological processes are not significantly disturbed.
Other naturally regenerated forest	Naturally regenerated forest where there are clearly visible indications of human activities.
Other naturally regenerated forest of introduced species *(sub-category)*	Other naturally regenerated forest where the trees are predominantly of introduced species.
Planted forest	Forest predominantly composed of trees established through planting and/or deliberate seeding.
Planted forest of introduced species *(sub-category)*	Planted forest, where the planted/seeded trees are predominantly of introduced species.
Special categories	
Rubber plantations	Forest area with rubber tree plantations.
Mangroves	Area of forest and other wooded land with mangrove vegetation.
Bamboo	Area of forest and other wooded land with predominant bamboo vegetation.

4.2 National data

As indicated in FRA 2005, there are no national data available. However, in almost all forests area there is human intervention. In this context, forests are considered as naturally regenerated forest.

Data provided for rubber plantations and bamboo are expert estimates.

4.3 Data for Table T4

Table 4a

FRA 2010 Categories	Forest area (1000 hectares)			
	1990	2000	2005	2010
Primary forest	0	0	0	0
Other naturally regenerated forest	14 623	13 214	12 509	11 785
...of which of introduced species	n/a	n/a	n/a	n/a
Planted forest	491	491	491	511
...of which of introduced species	n/a	n/a	n/a	n/a
TOTAL	**15 114**	**13 705**	**13 000**	**12 296**

Table 4b

FRA 2010 Categories	Area (1000 hectares)			
	1990	2000	2005	2010
Rubber plantations (Forest)	n/a	n/a	0.8	0.8
Mangroves (Forest and OWL)	0	0	0	0
Bamboo (Forest and OWL)	n/a	n/a	1 000	1 000

4.4 Comments to Table T4

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Primary forest		
Other naturally regenerating forest		
Planted forest		
Rubber plantations	Ethiopia has rubber plantation around an area called Bonga. But no precise data is available. This fact (of rubber plantation in Ethiopia) is even missed in a number of publications. The figure provided (for 2005 and 2010) is an expert estimation.	
Mangroves		
Bamboo	The figure provided (for 2005 and 2010) is an expert estimation.	

Other general comments to the table

5 Table T5 – Forest establishment and reforestation

5.1 FRA 2010 Categories and definitions

Term	Definition
Afforestation	Establishment of forest through planting and/or deliberate seeding on land that, until then, was not classified as forest.
Reforestation	Re-establishment of forest through planting and/or deliberate seeding on land classified as forest.
Natural expansion of forest	Expansion of forests through natural succession on land that, until then, was under another land use (e.g. forest succession on land previously used for agriculture).

5.2 National data

5.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Expert knowledge	L	Plantations	2007 and 2008	

5.2.2 Original data

According to data/information collected from regions, more than 800 000 000 seedlings (an estimate) have been annually planted in Ethiopia during the 2 last years (2007 and 2008).
Depending on the survival rate considered, based long dry season and poor tending and care activities, it is assumed that 10 000 ha have been annually established.

It is very difficult to assess the afforested and reforested areas. It is assumed that one third is reforestation and the remaining afforestation.

5.3 Data for Table T5

FRA 2010 Categories	Annual forest establishment (hectares/year)			...of which of introduced species [1] (hectares/year)		
	1990	2000	2005	1990	2000	2005
Afforestation	n/a	n/a	6 700	n/a	n/a	n/a
Reforestation	n/a	n/a	3 300	n/a	n/a	n/a
...of which on areas previously planted	n/a	n/a	n/a	n/a	n/a	n/a
Natural expansion of forest	n/a	n/a	n/a	n/a	n/a	n/a

Note: The figure for 2005 refers to the averages for the 2-year periods 2007-2008.

5.4 Comments to Table T5

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Afforestation	Expert estimate based on number of seedlings planted and assumed survival rate.	
Reforestation	Expert estimate based on number of seedlings planted and assumed survival rate.	
Natural expansion of forest		

Other general comments to the table

6 Table T6 – Growing stock

6.1 FRA 2010 Categories and definitions

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

6.2 National data

6.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
WBISPP, 2004	H	Land use/ Land cover	1986-1989 and 1995	Woody Biomass Inventory and Strategic Planning Project using remote sensing (satellite imagery)

6.2.2 Original data

As no growing stock data are available, growing stock has been estimated from the following above-ground biomass figures presented in T7:

FRA 2005 Categories	1990	2000	2005	2010
Above-ground biomass Forest (1000 tonnes)	484216	425639	396351	367062
Above-ground biomass Other wooded land (1000 tonnes)	364967	364967	364967	364967

6.3 Analysis and processing of national data

6.3.1 Estimation and forecasting

Growing stock has been estimated from the above-ground biomass figures in T7 by using the following formula and applying default conversion factors from IPCC GPG (2003).

GS = AGB / BEF / WD / 1000

GS = Growing stock (million m3)
AGB = Above-ground biomass (1000 tons)
BEF = Biomass expansion factor = 2.4 for Forest, and 6.1 for Other Wooded Land
WD = Wood density = 0.58

Furthermore, growing stock of commercial species is assumed to be 25% of the total growing stock on forest land and zero on Other Wooded Land

6.4 Data for Table T6

Table 6a – Growing stock

FRA 2010 category	Volume (million cubic meters over bark)							
	Forest				Other wooded land			
	1990	2000	2005	2010	1990	2000	2005	2010
Total growing stock	347.9	305.8	284.7	263.7	103.2	103.2	103.2	103.2
... of which coniferous	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
... of which broadleaved	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Growing stock of commercial species	87.0	76.4	71.2	65.9	0	0	0	0

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

No information is available for table T6b.

FRA 2010 category / Species name			Growing stock in forest (million cubic meters)		
Rank	Scientific name	Common name	1990	2000	2005
1st					
2nd					
3rd					
4th					
5th					
6th					
7th					
8th					
9th					
10th					
Remaining					
TOTAL					

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

Table 6c – Specification of threshold values

Item	Value	Complementary information
Minimum diameter (cm) at breast height[1] of trees included in growing stock (X)	-	
Minimum diameter (cm) at the top end of stem for calculation of growing stock (Y)	-	
Minimum diameter (cm) of branches included in growing stock (W)	-	
Volume refers to "above ground" (AG) or "above stump" (AS)	-	

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

6.5 Comments to Table T6

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Total growing stock	Estimated from available data on above-ground biomass using IPCC-GPG default factors.	
Growing stock of broadleaved / coniferous		
Growing stock of commercial species		
Growing stock composition		

Other general comments to the table

7 Table T7 – Biomass stock

7.1 FRA 2010 Categories and definitions

Category	Definition
Above-ground biomass	All living biomass above the soil including stem, stump, branches, bark, seeds, and foliage.
Below-ground biomass	All biomass of live roots. Fine roots of less than 2mm diameter are excluded because these often cannot be distinguished empirically from soil organic matter or litter.
Dead wood	All non-living woody biomass not contained in the litter, either standing, lying on the ground, or in the soil. Dead wood includes wood lying on the surface, dead roots, and stumps larger than or equal to 10 cm in diameter or any other diameter used by the country.

7.2 National data

7.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
WBISPP. 2004	M	Land use/ land cover	1986-1989 and 1995	Woody Biomass Inventory and Strategic Planning Project using remote sensing (satellite imagery)

7.2.2 Original data

National classes	Stem biomass *)	Calibrated area from T1 (hectares)	
	(tons/ha)	2000	2005
High woodland	3.57	9691424	9289784
Forest	35.57	3521960	3219186
Plantations	**)	491291	491291
Total area - Forest		**13704675**	**13000261**
Shrub + low wooded land	1.34	44649764	44649764
Total area - Other wooded land		**44649764**	**44649764**

Notes:
*) The data source is not clear, but it is assumed that the given values refer to stem biomass;
**) No biomass data are given for plantations, it is assumed to be the same as for Forest.

The following conversion factors have been used for calculating biomass for forests:

Biomass expansion factor	2.4	(average for temperate broadleaved and tropical broadleaved)
Root/shoot ratio	0.27	(tropical/subtropical dry forest)

The following conversion factors have been used for calculating biomass for shrubs and other woodlands:

Biomass expansion factor	6.1	(average for temperate broadleaved and tropical broadleaved)
Root/shoot ratio	0.48	Tropical Shrubland

7.3 Analysis and processing of national data

7.3.1 Estimation and forecasting

The biomass figures per hectare are multiplied with respective areas.

	Above-ground biomass (1000 tons)	
	2000	**2005**
High woodland	83036	79595
Forest	300663	274815
Plantations	41941	41941
Total Forest	**425639**	**396351**
Shrub + low wooded land	364967	364967
Total Other wooded land	**364967**	**364967**

Then, estimated biomasses of forest and OWL, 1990 and 2000, have been extrapolated.

	Above-ground biomass (1000 tons)			
	1990	**2000**	**2005**	**2010**
Total Forest	484216	425639	396351	367062
Total Other wooded land	364967	364967	364967	364967

Applying the conversion factors to the aboveground biomass gives the Below-ground biomass

7.4 Data for Table T7

FRA 2010 category	**Biomass (million metric tonnes oven-dry weight)**							
	Forest				**Other wooded land**			
	1990	**2000**	**2005**	**2010**	**1990**	**2000**	**2005**	**2010**
Above-ground biomass	484	426	396	367	365	365	365	365
Below-ground biomass	131	115	107	99	175	175	175	175
Dead wood	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
TOTAL	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

7.5 Comments to Table T7

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

Other general comments to the table

8 Table T8 – Carbon stock

8.1 FRA 2010 Categories and definitions

Category	Definition
Carbon in above-ground biomass	Carbon in all living biomass above the soil, including stem, stump, branches, bark, seeds, and foliage.
Carbon in below-ground biomass	Carbon in all biomass of live roots. Fine roots of less than 2 mm diameter are excluded, because these often cannot be distinguished empirically from soil organic matter or litter.
Carbon in dead wood	Carbon in all non-living woody biomass not contained in the litter, either standing, lying on the ground, or in the soil. Dead wood includes wood lying on the surface, dead roots, and stumps larger than or equal to 10 cm in diameter or any other diameter used by the country.
Carbon in litter	Carbon in all non-living biomass with a diameter less than the minimum diameter for dead wood (e.g. 10 cm), lying dead in various states of decomposition above the mineral or organic soil.
Soil carbon	Organic carbon in mineral and organic soils (including peat) to a specified depth chosen by the country and applied consistently through the time series.

8.2 National data

8.2.1 Original data

Data from T7

8.3 Analysis and processing of national data

8.3.1 Estimation and forecasting

A/- Carbon stock is calculated by multiplying the biomass by 0.47. Carbon stocks of litter and soil have not been estimated.

B/- Carbon in the litter has been estimated, based on the standard factor of 2.1 (tropical), and
- Soil carbon has been estimated, based on the factor of 65 (Tropical moist climate with a majority of HAC soils).

The biomass/ hectare values are then applied to the forest and other wooded land areas values in table T1 to get the biomass for the reporting years.

Year	1990	2000	2005	2010
Total Forest (1000 ha)	15 114	13 705	13 000	12 296
Carbon in the litter (1000 t.)	31 739	28 781	27 300	25 822
Soil carbon (1000 t.)	982 410	890 825	845 000	799 240

Year	1990	2000	2005	2010
Total OWL area (1000 ha)	44 650	44 650	44 650	44 650
Carbon in the litter (1000 t.)	93 765	93 765	93 765	93 765
Soil carbon (1000 t.)	2 902 250	2 902 250	2 902 250	2 902 250

8.4 Data for Table T8

FRA 2010 Category	Carbon (Million metric tonnes)							
	Forest				Other wooded land			
	1990	2000	2005	2010	1990	2000	2005	2010
Carbon in above-ground biomass	227	200	186	172	172	172	172	172
Carbon in below-ground biomass	62	54	50	47	82	82	82	82
Sub-total: Living biomass	289	254	236	219	254	254	254	254
Carbon in dead wood	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Carbon in litter	32	29	27	26	94	94	94	94
Sub-total: Dead wood and litter	***n/a***	***n/a***	***n/a***	***n/a***	***n/a***	***n/a***	***n/a***	***n/a***
Soil carbon	982	890	845	799	2 902	2 902	2 902	2 902
TOTAL	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**

Soil depth (cm) used for soil carbon estimates	30

8.5 Comments to Table T8

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

Other general comments to the table

9 Table T9 – Forest fires

No data available for this table.
It could be noted that in 2008 the fire affected 16 163 ha of land in the autonomous region of Oromiya.

10 Table T10 – Other disturbances affecting forest health and vitality

No data available for this table.
Some seasonal outbreaks of disease had been noticed on "*Cupressus lusitanica*". But still the exact affected area is not known.

There are certain woodland areas in Eastern Ethiopia where "*Prosopis juliflora*" is causing some socio-cultural damage. But the exact extent of area affected by this invasive woody species and the magnitude of damage is not known exactly. That needs its own detailed study.

11 Table T11 – Wood removals and value of removals

11.1 FRA 2010 Categories and definitions

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

11.2 National data

11.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
FAO Stat	M	Industrial wood Fuelwood	1993-2007	

11.2.2 Original data

From FAOStat
ub = under bark
ob = over bark

Industrial Round Wood

Year	1988	1989	1990	1991	1992
Vol cum ub	0	0	0	0	0
	Average 1990 ub		0		
	Average 1990 ob		0		

Year	1998	1999	2000	2001	2002
Vol cum ub	2397300	2454300	2459000	2457600	2459500
	Average 1990 ub		2445540		
	Average 1990 ob		2812371		

Year	2003	2004	2005	2006	2007
Vol cum ub	2930200	2928000	2928000	2928000	2928000
	Average 1990 ub		2928440		
	Average 1990 ob		3367706		

Fuel wood

Year	1988	1989	1990	1991	1992
Vol cum ub	0	0	0	0	0
	Average 1990 ub		0		
	Average 1990 ob		0		

Year	1998	1999	2000	2001	2002
Vol cum ub	84134597	85785168	87471092	88824543	90201752
	Average 1990 ub		87283430		
	Average 1990 ob		100375945		

Year	2003	2004	2005	2006	2007
Vol cum ub	91603192	93029336	94480674	95703059	97131100
	Average 1990 ub		94389472		
	Average 1990 ob		108547893		

For 1990, it is assumed that no comprehensive data were in fact available.

11.3 Data for Table T11

FRA 2010 Category	Industrial roundwood removals			Woodfuel removals		
	1990	2000	2005	1990	2000	2005
Total volume (1000 m^3 o.b.)	n/a	2812	3368	n/a	100376	108548
... of which from forest	n/a	2812	3368	n/a	100376	108548
Unit value (local currency / m^3 o.b.)	n/a	n/a	n/a	n/a	n/a	n/a
Total value (1000 local currency)	n/a	n/a	n/a	n/a	n/a	n/a

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

	1990	2000	2005
Name of local currency	Birr (ETB)	Birr (ETB)	Birr (ETB)

11.4 Comments to Table T11

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Total volume of industrial roundwood removals	For 1990, it is assumed that no comprehensive data were in fact available.	

Total volume of woodfuel removals	Data on woodfuel are mainly estimates. To assess and update the situation, national survey is required.	
Unit value	It is difficult to have a clear idea about the roundwood value, which is between 25 and 40 US$/m3 (according to different expert options).	
Total value		

Other general comments to the table

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

12.1 FRA 2010 Categories and definitions

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

NWFP categories

Category
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. Wild meat
13. Raw material for medicine
14. Raw material for colorants
15. Other edible animal products
16. Other non-edible animal products

12.2 National data

12.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Ethiopian Export Promotion Agency Report	H		1994 - 2004	Provides export data of Natural Gum products
Commercial Bank of Ethiopia Report	H		2004	Same as above

12.2.2 Original data

Existing data sources is limited only to the category exudates. Exudates include Natural Gums. That is Gum arabic (from Acacia senegal and Aseyal) and Other Natural Gums (from *Boswellia papyrifera, B.ogadensis B. rivae* and mainly from *Commiphora myrrha.*

Year	Gum Arabic		Other Natural Gums		Source
	Quantity (kg)	Value (Birr)	Quantity (kg)	Value (Birr)	
2001	830100	9964191	1208647	13945315	EEPA
2002	874672	10738644	1501978	17661176	EEPA
2003	380875	5380585	2338765	30237751	EEPA
2004	95711	699715	1620960	17991590	CBE
Average 2001-2004	545340	6695784	1667588	19958958	

The figures for 2005 refer to the averages for the 4-year periods 2001-2004.

12.3 Data for Table T12

Rank	Name of product	Key species	Unit	NWFP removals 2005		NWFP category
				Quantity	Value (1000 local currency)	
1st	Gum Arabic		Kg	545340	6696	7
2nd	Other Natural Gums		Kg	1667588	19959	7
3rd						
4th						
5th						
6th						
7th						
8th						
9th						
10th						
All other plant products						
All other animal products						
TOTAL					**n/a**	

	2005
Name of local currency	Birr (ETB)

12.4 Comments to Table T12

Variable / category	Comments related to data, definitions, etc.
10 most important products	
Other plant products	
Other animal products	
Value by product	
Total value	

Other general comments to the table

13 Table T13 – Employment

No comprehensive data is available for this table.

14 Table T14 – Policy and legal framework

14.1 FRA 2010 Categories and definitions

Term	Definition
Forest policy	Forest policy is the set of orientations and principles of actions adopted by public authorities in harmony with national socio-economic and environmental policies in a given country to guide future decisions in relation to the management, use and conservation of forest and tree resources for the benefit of the society.
Forest law	Set of rules enacted by the legislative authority of a country regulating the access, management, conservation and use of forest resources.

14.2 Data for Table T14

Indicate the existence of the following (2008)			
1. Forest policy statement with national scope		X	Yes
			No
If Yes above, provide:	Year of endorsement	2007	
	Reference to document	Ministry of Agriculture and Rural Development (MoARD)	
2. National forest programme (nfp)		X	Yes
			No
If Yes above, provide:	Name of nfp in country	Ethiopian NFP	
	Starting year	2008	
	Current status	X	In formulation
			In implementation
			Under revision
			Process temporarily suspended
	Reference to document or web site	Ministry of Agriculture and Rural Development(MoARD)	
3. Law (Act or Code) on forest with national scope			Yes, specific forest law exists
			Yes, but rules on forests are incorporated in other (broader) legislation
		X	No, forest issues are not regulated by national legislation (but see the comment)
If Yes above, provide:	Year of enactment		
	Year of latest amendment		
	Reference to document		

In case the responsibility for forest policy- and/or forest law-making is decentralized, please indicate the existence of the following and explain in the comments below the table how the responsibility for forest policy- and law-making is organized in your country.		
4. Sub-national forest policy statements	X	Yes
		No
If Yes above, indicate the number of regions/states/provinces with forest policy statements	Two.	
5. Sub-national Laws (Acts or Codes) on forest		Yes
	X	No
If Yes above, indicate the number of regions/states/provinces with Laws on forests		

Explanatory notes to the reporting table:

1. The national forest policy document or statement describes the objectives, priorities and means for implementation of the forest policy. It is endorsed when it is officially recognised as a government policy or instruction. The endorsement is formalised by the Minister in charge of forests by a dated and signed document.
2. The term "national forest programme" is a generic expression referring to a wide range of approaches towards forest policy formulation, planning and implementation at national and sub-national levels and providing a framework and guidance for country-driven forest sector development in consultation and participation of all stakeholders and in consistence with policies of other sectors and international policies.
3. The term "law on forest" refers to a Law (Act or Code) providing specific rules on forests and forest sector management, such as access, management and use of forest resources. The Law is enacted when the legislative authority adopted its text.
4. Same as (1) but the policy documents or statements refer to sub-national administrative units, e.g. States in a Federation or Autonomous Regions or Provinces.
5. Same as (3) but indicate if specific Laws on forests exist at sub-national level (at the level of regions/states/provinces).

14.3 Comments to Table T14

Variable / category	Comments related to data, definitions, etc.
Forest policy statement with national scope	
National forest programme (nfp)	
Law (Act or Code) on forest with national scope	Basic legislation is provided by the Proclamation No. 94/1994 which covers the conservation, development and utilisation of forests.
Sub-national forest policy statements	
Sub-national Laws (Acts or Codes) on forest	

Other general comments to the table

15 Table T15 – Institutional framework

15.1 FRA 2010 Categories and definitions

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

15.2 Data for Table T15

Table 15a

FRA 2010 Category	2008	
Minister responsible for forest policy formulation : please provide full title	Ministry of Agriculture and Rural Development	
Level of subordination of Head of Forestry within the Ministry		1st level subordination to Minister
		2nd level subordination to Minister
	X	3rd level subordination to Minister
		4th or lower level subordination to Minister
Other public forest agencies at national level	No	
Institution(s) responsible for forest law enforcement	Ministry of Agriculture and Rural Development	

Table 15b

FRA 2010 Category	Human resources within public forest institutions					
	2000		2005		2008	
	Number	%Female	Number	%Female	Number	%Female
Total staff	n/a	n/a	n/a	n/a	675	n/a
...of which with university degree or equivalent	n/a	n/a	n/a	n/a	n/a	n/a

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

15.3 Comments to Table T15

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Minister responsible for forest policy formulation		
Level of subordination of Head of Forestry within the Ministry		
Other public forest agencies at national level		
Institution(s) responsible for forest law enforcement		
Human resources within public forest institutions	At the National level there is one head of department, 2 senior forestry officers and 5 foresters. At the region, we have 8 senior officers covering sometimes both agriculture and forestry, 16 forestry experts, and 2 000 extension officers commonly referred to as development agents that cover natural (and also forest) resources in general.	

Other general comments to the table

16 Table T16 – Education and research

16.1 FRA 2010 Categories and definitions

Term	Definition
Annual graduation of students	Number of students that have successfully completed a Bachelor's or higher degree in forest science or achieved a certificate or diploma as forest technician.
Doctor's degree (PhD)	University (or equivalent) education with a total duration of about 8 years.
Master's degree (MSc) or equivalent	University (or equivalent) education with a total duration of about five years.
Bachelor's degree (BSc) or equivalent	University (or equivalent) education with a duration of about three years.
Technician certificate or diploma	Qualification issued from a technical education institution consisting of 1 to 3 years post secondary education.
Publicly funded forest research centers	Research centers implementing research programmes on forest matters. Funding is public or channelled through public institutions.

16.2 National data

16.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Wondo Genet Collage	M	Education	2008	Train forestry students
Ethiopian Institute of Agricultural Research	H	Research	2008	
Institute of Biodiversity Conservation	H	Research	2008	

16.3 Data for Table T16

FRA 2010 Category	Annual graduation of students within the country					
	2000		2005		2008	
	Number	%Female	Number	%Female	Number	%Female
Master's degree in Forest Science	n/a	n/a	n/a	n/a	5	n/a
Bachelor's degree in Forest Science	n/a	n/a	n/a	n/a	30	n/a
Forest technician certificate / diploma	n/a	n/a	n/a	n/a	60	n/a
FRA 2010 Category	**Professionals working in public forest research centres**					
	2000		2005		2008	
	Number	%Female	Number	%Female	Number	%Female
Doctor's degree (PhD)	10	0	21	0	23	10%
Master's degree (MSc) or equivalent	18	5.5%	23	4.34%	33	6%
Bachelor's degree (BSc) or equivalent	9	0%	13	7.7%	15	11.7%

16.4 Comments to Table T16

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Annual graduation of students within the country		
Professionals working in public forest research centres	On pubic funded research centers, there are two at the national level (Ethiopian Institute of Agricultural Research and the Institute of Biodiversity Conservation) dealing with both agriculture and forestry, and five other centers at the regional level.	

Other general comments to the table

17 Table T17 – Public revenue collection and expenditure

No national data is available for this table.
Since public revenue collection is done at various levels including regions, it is very difficult to get comprehensive data.