Forestry Department
Food and Agriculture Organization of the United Nations

GLOBAL FOREST RESOURCES ASSESSMENT 2010

COUNTRY REPORT

GHANA

FRA2010/077
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The Forest Resources Assessment Programme

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

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

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

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
AFFUM-BAFFOE Kofi	Forestry Commission, Resource Management Support Centre, Box 1457, Kumasi, Ghana	Kofi1964-ba@Hotmail.com Kofi@rmsc.fcghana.com	00233-51-22687/28495	1 - 17

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
1. Reporting Progress, Ghana Forests, Timber Industry Development Board and Forestry Commission, 2002.	M	Forest cover change	1989	Provides secondary information on the growing stock and other general information about the forest of Ghana. **Used for reference years 2000.**
2. Kotey N.A, Francois J., Owusu JGK., Yeboah R., Amanor K.S. and Antwi L. 1998. Falling into place, Ghana, policy that works for forest and people. IIAD. United Kindom. IIAD 1996	M	Area of forests reserves and off forest reserves	1996	

1.2.2 Classification and definitions

National class	Definition
Forest Reserve (FR)	Forest land within reserves and under protection
Off-Forest Reserve (OFR)	Any land area apart from permanent forest reserve in the High forest Zone or Forest lands within the HFZ outside reserves mainly made up of mosaic of agricultural fields, fallow lands, secondary forest patches, etc.

1.2.3 Original data

Original national data	Area in hectares	
	1989	1996
Forest reserve	1 700 000	1 634 100
Off-Forest reserve	5 965 900	5 001 385
Total Forest Cover	**7 665 900**	6 635 485
Other land	15 336 100	16 118 515
Total Land Area	**23 002 000**	**22 754 000**

1.3 Analysis and processing of national data

1.3.1 Calibration

Years	Actual land Area	UN FAO stats	Calibration factor
1990	23 002 000	22 754 000	0.989218329

National Classes	Area in hectares	
	1989	1996
Forest reserve	1 681 671	1 634 100
Off-Forest reserve	5 901 578	5 001 385
Total Forest Cover	**7 583 249**	**6 635 485**
Other land	15 170 751	16 118 515
Total Land Area	**22 754 000**	**22 754 000**

1.3.2 Reclassification into FRA 2010 categories

National Classes	Forest	OWL	OL
Forest reserve	100%		
Off-Forest reserve	100%		
Total Forest Cover			
Other land			100%

1.3.3 Estimation and forecasting

Based on the reference data, the annual deforestation rate is assumed to be 135 394.86 ha. This trend has been applied to estimate the forest area in 1990 and 2000.

Since 2000 the Forestry Commission of Ghana has embarked on a national plantation development programme with a target of 20 000 ha a year. It is estimated that by 2010, 200 000 ha of plantation would be established. The 2005 and 2010 Figures have been adjusted to take account of this.

FRA 2010 Categories	1990	2000	2005	2010
Forest	7 447 854	6 093 906	5 516 932	4 939 958
Other Land	15 306 146	16 660 094	17 237 068	17 814 042
Water	1 100 000	1 100 000	1 100 000	1 100 000
Total	23 854 000	23 854 000	23 854 000	23 854 000

1.4 Data for Table T1

FRA 2010 categories	Area (1000 hectares)			
	1990	2000	2005	2010
Forest	7 448	6 094	5 517	4 940
Other wooded land	0	0	0	0
Other land	15 306	16 660	17 237	17 814
...of which with tree cover	n/a	n/a	n/a	n/a
Inland water bodies	1 100	1 100	1 100	1 100
TOTAL	**23 854**	**23 854**	**23 854**	**23 854**

1.5 Comments to Table T1

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Forest		
Other wooded land	Original data do not allow for identifying areas of other wooded land. Any such areas are included within the categories of forest and other land.	
Other land		
Other land with tree cover		
Inland water bodies	Total inland water bodies were quoted from the FAO STAT with the assumption that there has not been any change since the year 2000.	

Other general comments to the table

Expected year for completion of ongoing/planned national forest inventory and/or RS survey / mapping	
Field inventory	n/a
Remote sensing survey / mapping	n/a

2 Table T2 – Forest ownership and management rights

2.1 FRA 2010 Categories and definitions

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

2.2 National data

2.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Article 267 of the Constitution of the Republic of Ghana	H	Ownership of Land	1992	

2.2.2 Classification and definitions

National class	Definition
Communal / Customary Ownership	Land owned by communes under the traditional Social system, where all stool lands in practice belong to the paramount chiefs who are traditional heads of paramount stools or skins.
Public (Government) Ownership	Land belonging to the state, acquired by legislation and vested for the people of Ghana
Individual Ownership	Land owned by individuals purchased from Traditional rulers and government or state

2.2.3 Original data

There is one main type of land ownership in Ghana, which is the Communal or Customary Ownership. Lands in Ghana are owned by the traditional rulers and held in trust for them by the state. Article 267 of the Ghanaian constitution stipulates, "All stool lands in Ghana shall vest in the appropriate stool on behalf of and in trust for the subjects of the stool, in accordance with the customary law and usage". All land is therefore considered to be under public ownership.

2.3 Data for Table T2

Table 2a - Forest ownership

FRA 2010 Categories	Forest area (1000 hectares)		
	1990	2000	2005
Public ownership	7 448	6 094	5 517
Private ownership	0	0	0
...of which owned by individuals	0	0	0
...of which owned by private business entities and institutions	0	0	0
...of which owned by local communities	0	0	0
...of which owned by indigenous / tribal communities	0	0	0
Other types of ownership	0	0	0
TOTAL	**7 448**	**6 094**	**5 517**

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	n/a	n/a	n/a
Individuals	n/a	n/a	n/a
Private corporations and institutions	n/a	n/a	n/a
Communities	n/a	n/a	n/a
Other	n/a	n/a	n/a
TOTAL	**7 448**	**6 094**	**5 517**

2.4 Comments to Table T2

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Public ownership	In Ghana, Forest and Forest Lands are owned publicly.	
Private ownership		
Other types of ownership		
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
1. Agyarko. T. Forestry Outlook Study for Africa. Ghana, Ministry of Land and Forestry	M	Forest designation	1995	Source of the information is Forest Service Division, 1995
2. Expert Opinion	L	Reclassification		

3.2.2 Classification and definitions

National class	Definition
Production Areas	These are areas designated for removal of timber, which usually fall within the High Forest zone.
Permanent Protection	These comprise largely hills, swamps and all other protected areas.
Conversion Areas	These are degraded areas (Basal Area ≤5m2/ha), within Forest Reserves which require planting or reserved for plantation development.
Convalescence	These are temporary protected areas usually 40 years within timber production areas of natural Forest Reserves with reduced stocking, primarily due to over exploitation and or bush fires but are capable of natural rehabilitation.

3.2.3 Original data

The following data refer to year 1996

Forest type	Area (ha)	%
Timber Production Area	762 400	47
Permanent Protection	352 500	22
Convalescence	122 000	7
Conversion	127 200	8
Not inventoried (conversion)	270 000	16
Total Reserve Area	**1 634 100**	**100**
Other off-forest reserves (1)	5 001 385	
….Of which timber production area (2)	374 000	7

Notes :
1) Other forest reserve area information is from T1
2) Of which 374000 is timber production area is from Forest Service Division

3.3 Analysis and processing of national data

3.3.1 Reclassification into FRA 2010 categories

National Class	Production	Protection of soil and water	Conservation of biodiversity	Social	Unknown designation
Timber Production Area	100%				
Permanent Protection		100%			
Convalescence (1)			35%	65%	
Conversion	100%				
Not inventoried (conversion)	100%				
Other off forest reserves (2)	7%				93%

Notes:
1) Expert opinion
2) 374 000 out of 5 001 385 ha of other off forest reserve area is designated for production.

Results after reclassification the 1996 data

National Classes	Production	Protection of soil and water	Conservation of biodiversity	Social	Unknown designation
Timber Production Area	762 400				
Convalescence	0		42 700	79 300	
Permanent Protection	0	352 500			
Conversion	127 200				
Not inventoried (conversion)	270 000				
Other off forest reserves	350 097			0	4 651 288
Total	**1 509 697**	**352 500**	**42 700**	**79 300**	**4 651 288**

The following table of the type of forests designation together with their respective proportion to the total forests area was generated: The respective proportion will be used to generate data for 1990, 2000, 2005 and 2010 since there was only one data set available.

FRA Categories	Area in ha	Proportion of the total
Production	1 509 697	23%
Protection of soil and water	352 500	5%
Conservation of biodiversity	42 700	1%
Social	79 300	1%
Unknown or no designation	4 651 288	70%
Total	**6 635 485**	**100%**

3.3.2 Estimation and forecasting

The area for forests for 1990, 2000, 2005 and 2010 are directly taken from T1

Type	Area in hectares			
	1990	**2000**	**2005**	**2010**
Forest	7 447 854	6 093 906	5 516 932	4 939 958

Applying the above percentages per designation to the total forest areas for each year respectively generate the following table. Areas of protection of soil and water and conservation of biodiversity are maintained constant. This table will be used for the final table.

National Classes (1)	Area in hectares			
	1990	**2000**	**2005**	**2010**
Production	1 694 526	1 386 478	1 255 205	1 123 933
Protection of soil and water (2)	352 500	352 500	352 500	352 500
Conservation of biodiversity (2)	42 700	42 700	42 700	42 700
Social	89 009	72 828	65 932	59 037
Unknown or no designation	5 269 119	4 239 401	3 800 594	3 361 788
Total Forest area	**7 447 854**	**6 093 906**	**5 516 932**	**4 939 958**

Notes:
1).The above table was generated from percentages generated from original data from source 1.
2). Assumption is that the area under protection of soil and water plus the area under conservation of biodiversity will not change.

3.4 Data for Table T3

Table 3a – Primary designated function

FRA 2010 Categories	Forest area (1000 hectares)			
	1990	2000	2005	2010
Production	1 694	1 386	1 255	1 124
Protection of soil and water	353	353	353	353
Conservation of biodiversity	43	43	43	43
Social services	89	73	66	59
Multiple use	0	0	0	0
Other (please specify in comments below the table)	0	0	0	0
No / unknown	5 269	4 239	3 800	3 361
TOTAL	**7 448**	**6 094**	**5 517**	**4 940**

Table 3b – Special designation and management categories

FRA 2010 Categories	Forest area (1000 hectares)			
	1990	2000	2005	2010
Area of permanent forest estate	7 051	5 697	5 120	4 543
Forest area within protected areas	43	43	43	43
Forest area under sustainable forest management	1 694	1 100	1 200	1 380
Forest area with management plan	850	482	599	971

3.5 Comments to Table T3

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Production		
Protection of soil and water		
Conservation of biodiversity		
Social services		

Multiple use		
Other		
No / unknown designation		
Area of permanent forest estate	It is assumed to be equal to total forest minus the conversion area (of 397 200 ha).	
Forest area within protected areas	it is assumed to be equal to Biodiversity conservation area.	
Forest area under sustainable forest management		
Forest area with management plan		

Other general comments to the table
According to the inventory reports (March 1995) only 15% of the area, which is protected on grounds of genetic diversity, is well stocked and accessible. The rest of the areas are either inaccessible or degraded.

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

4.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
FAO The world's mangroves 1980-2005	M	Mangroves	1990, 2000, 2005 and 2010	

4.2.2 Original data

Data from Table T3 was used as an input to generate data for the final Table.

National Classes (1)	Area in hectares			
	1990	2000	2005	2010
Production (1)	1 694 526	1 386 478	1 255 205	1 123 933
of which Production from natural forest	1 644 526	1 326 478	1 095 205	863 933

of which Plantations	50 000	60 000	160 000	260 00
Protection of soil and water	352 500	352 500	352 500	352 500
Conservation of biodiversity	42 700	42 700	42 700	42 700
Social	89 009	72 828	65 932	59 037
Unknown or no designation	5 269 119	4 239 401	3 800 594	3 361 788
Total Forest area	**7 447 854**	**6 093 906**	**5 516 932**	**4 939 958**

Notes:

1. Reclassification for productive plantation and timber production was done on the bases of an assumption that 20 000 hectares of plantation is established each year from 2000 according to records. Therefore adding 60 000ha to (20 000 by 5) gives 160 000 and cumulatively to 260 000 in 2010.

4.3 Analysis and processing of national data

4.3.1 Reclassification into FRA 2010 categories

The following reclassification matrix was then applied:

National Classes	Primary	Other naturally regenerated forests	Planted forest
Production			
of which Production from natural forest		100%	
of which Plantations			100%
Protection of soil and water	100%		
Conservation of biodiversity	100%		
Social		100%	
Unknown or no designation		100%	

4.3.2 Estimation and forecasting

FRA 2010 Categories	Area in hectares			
	1990	2000	2005	2010
Primary Forest	395 200	395 200	395 200	395 200
Other naturally regenerated forests	7 002 654	5 638 706	4 961 732	4 284 758
Planted forest	50 000	60 000	160 000	260 000
Total	**7 447 854**	**6 093 906**	**5 516 932**	**4 939 958**

4.4 Data for Table T4

Table 4a

FRA 2010 Categories	Forest area (1000 hectares)			
	1990	2000	2005	2010
Primary forest	395	395	395	395
Other naturally regenerated forest	7 003	5 639	4 962	4 285
...of which of introduced species	n/a	n/a	n/a	n/a
Planted forest	50	60	160	260
...of which of introduced species	n/a	n/a	n/a	n/a
TOTAL	**7 448**	**6 094**	**5 517**	**4 940**

Table 4b

FRA 2010 Categories	Area (1000 hectares)			
	1990	2000	2005	2010
Rubber plantations (Forest)	n/a	n/a	n/a	n/a
Mangroves (Forest and OWL)	16.8	13.8	12.4	11.0
Bamboo (Forest and OWL)	n/a	n/a	n/a	n/a

4.5 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		
Mangroves		
Bamboo		

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 Original data

Since 2000 the Forestry Commission of Ghana has embarked on a national plantation development programme with a target of 20 000 ha a year. It is estimated that by 2010, 200 000 ha of plantation would be established. The 2005 and 2010 Figures have been adjusted to take account of this.

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	n/a	n/a	n/a	n/a
Reforestation	n/a	20 000	20 000	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:
1. The figures for the reporting years refer to the averages for the 5-year periods 2000-2002 and 2003-2007 respectively.

5.4 Comments to Table T5

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Afforestation		
Reforestation		Since 2000, the forestry commission of Ghana has embarked on a national plantation development programme with a target of 20 000 ha a year.

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
Baytas A, Rezvani F, Forest Resource Accounting in Ghana, 1970-1987., Centre for Economic Research on Africa. School of Business, Montclair State University. Upper Montclair, New Jersey	M	Volume/ha	1980	
Resource Management Support Centre Mensuration and Inventory Unit Kumasi Report of Multi Resource Inventory	M	Growing stock	1990 and 2001	

6.2.2 Classification and definitions

National class	Definition
Closed Productive Forests	Managed or logged forests are those that have some control of use such as harvesting regulations and/or silvicultural treatments
Unproductive forest	Refers to those forests used for protection (watershed management or soil stabilisation) or conservation in national parks
Open forest	Mixed forest or grassland with at least 10% tree cover and a continuous grass layer
Plantations	Refers to forests stands artificially established for harvest.

6.2.3 Original data

Original Data (Source above, data year 1980)

National Classes	Area	Growing Stock	Growing Stock
	1000 ha	1000 m3	m3/ha
Closed productive forest	1 167	161 046	138.0
Unproductive forest	551	64 464	117.0
Open forests	6 975	195 300	28.0
Plantations	75	7 500	100.0
TOTAL	**8 768**	**428 310**	**48.8**

Areas from table T3 was used as an input to the estimations for this table

National Classes	Area in hectares			
	1990	2000	2005	2010
Production	1 694 526	1 386 478	1 255 205	1 123 933
Protection of soil and water	352 500	352 500	352 500	352 500
Conservation of biodiversity	42 700	42 700	42 700	42 700
Social	89 009	72 828	65 932	59 037
Unknown or no designation	5 269 119	4 239 401	3 800 594	3 361 788
Total Forest area	**7 447 854**	**6 093 906**	**5 516 932**	**4 939 958**

6.3 Analysis and processing of national data

6.3.1 Estimation and forecasting

Assumptions:
1. Production (forests) = Close productive forest
2. Protection of soil and water = Unproductive forests
3. Conservation of biodiversity + Social + Unknown or no designation (forests) = Open Forests

	Area (hectares)			
National Classes	**1990**	**2000**	**2005**	**2010**
Close productive forest	1 694 526	1 386 478	1 255 205	1 123 933
Unproductive forests	352 500	352 500	352 500	352 500
Open Forests	5 400 828	4 354 928	3 909 226	3 463 525
Total Forest	**7 447 854**	**6 093 906**	**5 516 932**	**4 939 958**

As no other information is available, It is assumed that volume per ha did not change from 1980 to 2005.

Applying the above forest areas from table T3 and multiplying these with the respective volume per hectare for each reporting year gives:

		Growing stock (1000 m3)			
	m3/ha	**1990**	**2000**	**2005**	**2010**
Closed productive forest	136 (1)	230 456	188 561	170 708	152 855
Unproductive forests	117	41 243	41 243	41 243	41 243
Open forests	28	151 223	121 938	109 458	96 979
Total		**422 921**	**351 741**	**321 409**	**291 077**

Note: 1. The figure 136 m3/ha is a weighted average for Close productive forest and Plantations

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	423	352	321	291	n/a	n/a	n/a	n/a
... 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	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

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

FRA 2010 category / Species name			Growing stock in forest (million cubic meters)		
Rank	**Scientific name**	**Common name**	**1990**	**2000**	**2005**
1st	*Triplochiton scelroxylon*	WAWA	15.94	18.35	n/a
2nd	*Celtis mildbraedii*	ESA	-	17.73	n/a
3rd	*Piptadeniastrum africanum*	DAHOMA	7.73	7.21	n/a
4th	*Ceiba pentandra*	ONYINA	10.27	6.37	n/a
5th	*Terminalia superba*	OFRAM	5.95	5.17	n/a
6th	*Celtis zenkeri*	ESAKOKO	10.12	5.03	n/a
7th	*Petersianthus macrocarpus*	ESIA	6.85	4.77	n/a
8th	*Nesogordonia papaverifera*	DANTA	5.21	4.15	n/a
9th	*Psycanthus angolensis*	OTIE	5.79	4.12	n/a
10th	*Antiaris toxicaria*	KYENKYEN	9.17	3.85	n/a
Remaining			**346**	**275.25**	n/a
TOTAL			**423**	**352**	**321**

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

Table 6c – Specification of threshold values

Item	Value	Complementary information
Minimum diameter (cm) at breast height[1] of trees included in growing stock (X)	10 cm	
Minimum diameter (cm) at the top end of stem for calculation of growing stock (Y)	5 cm	
Minimum diameter (cm) of branches included in growing stock (W)		
Volume refers to "above ground" (AG) or "above stump" (AS)	AG	

6.5 Comments to Table T6

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Total growing stock		
Growing stock of broadleaved / coniferous		
Growing stock of commercial species		
Growing stock composition	Most of the common names of tree species were not known so local names were used in place.	

Other general comments to the table

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

7 Table T7 – Biomass stock

7.1 FRA 2010 Categories and definitions

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

7.2 National data

7.2.1 Original data

Since no original data exist, data from T6 is used as input for the estimation of biomass stock.

		Growing stock (1000 m3)			
	m3/ha	1990	2000	2005	2010
Closed productive forest	136 (1)	230 456	188 561	170 708	152 855
Unproductive forests	117	41 243	41 243	41 243	41 243
Open forests	28	151 223	121 938	109 458	96 979
Total		**422 921**	**351 741**	**321 409**	**291 077**

7.3 Analysis and processing of national data

7.3.1 Estimation and forecasting

The following conversion factors were applied:

National Classes	Stem Vol. m3/ha	Density ton/m3	Stem wood ton/ha	BEF	R/S ratio
Closed productive forest	136	0.58	78.88	2.73	0.24
Unproductive forests	117	0.58	67.86	2.94	0.24
Open forests	28	0.58	16.24	6.07	0.24

Notes:
BEF calculated using formula from FAO forestry paper 134
Wood density: Average for Africa (FAO Forestry Paper 134)
R/S ratio: Appendix 5 of Guidelines

The following table is obtained from T6:

	Area (hectares)			
National Classes	**1990**	**2000**	**2005**	**2010**
Closed productive forest	1 694 526	1 386 478	1 255 205	1 123 933
Unproductive forests	352 500	352 500	352 500	352 500
Open Forests	5 400 828	4 354 928	3 909 226	3 463 525
Total Forest	**7 447 854**	**6 093 906**	**5 516 932**	**4 939 958**

7.3.2 Reclassification into FRA 2010 categories

The following procedure was applied for biomass estimation:

1. Multiply area of respective national classes by stem wood by biomass expansion factor = Above ground biomass
2. Multiplying above ground biomass by Root - Shoot ratio = below ground biomass
3. Multiplying living biomass by 0.14 = dead wood biomass

	Biomass (million tonnes)			
	1990	**2000**	**2005**	**2010**
Closed productive forest				
Above – ground biomass	364.9	298.6	270.3	242.0
Below – Ground biomass	87.6	71.7	64.9	58.08
Living biomass	452.5	370.2	335.2	300.1
Unproductive forests				
Above – ground biomass	70.3	70.3	70.3	70.3
Below – ground biomass	16.9	16.9	16.9	16.9
Living biomass	87.2	87.2	87.2	87.2
Open Forest				
Above – ground biomass	532.4	429.3	385.4	341.4
Below – ground biomass	127.8	103.0	92.5	81.9
Living biomass	660.2	532.3	477.9	423.3

Summing the three different classes generates the final table:

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	967.6	798.2	726.0	653.7	n/a	n/a	n/a	n/a
Below-ground biomass	232.3	191.6	174.3	156.9	n/a	n/a	n/a	n/a
Dead wood	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
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

Since no national data exist, data from tables T1 and T7 are used as an input for the estimation of carbon stock.

8.3 Analysis and processing of national data

8.3.1 Estimation and forecasting

A/-The default conversion factor of 0.47 was used to convert from biomass to carbon

FRA 2005 Categories	Carbon in Million metric tonnes			
	1990	2000	2005	2010
Carbon in above – ground biomass	454.8	375.2	341.2	307.2
Carbon in below – ground biomass	109.2	90.1	81.9	73.7
Carbon in Total Living biomass	564.0	465.3	423.1	380.9

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 47 (tropical, moist with LAC soils).

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

Year	1990	2000	2005	2010
Total Forest (1000 ha)	7 448	6 094	5 517	4 940
Carbon in the litter (1000 C)	15 641	12 797	11 586	10 374
Soil carbon (1000 C)	350 056	286 418	259 299	232 180

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	454.8	375.2	341.2	307.2	n/a	n/a	n/a	n/a
Carbon in below-ground biomass	109.2	90.1	81.9	73.7	n/a	n/a	n/a	n/a
Sub-total: Living biomass	***564.0***	***465.3***	***423.1***	***380.9***	***n/a***	***n/a***	***n/a***	***n/a***
Carbon in dead wood	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Carbon in litter	15.6	12.8	11.6	10.4	n/a	n/a	n/a	n/a
Sub-total: Dead wood and litter	***n/a***	***n/a***	***n/a***	***n/a***	***n/a***	***n/a***	***n/a***	***n/a***
Soil carbon	350	286	259	232	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**

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

9.1 FRA 2010 Categories and definitions

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

9.2 National data

9.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Resource Management Support Centre, Fire Ecology Unit, Forestry Commission	L	Forest fires	2008	

9.2.2 Original data

The data about fire has been established according to expert knowledge (the Fire Ecology Unit).

9.3 Data for Table T9

Table 9a

FRA 2010 category	Annual average for 5-year period					
	1990		2000		2005	
	1000 hectares	number of fires	1000 hectares	number of fires	1000 hectares	number of fires
Total land area affected by fire	4 000	215	3 500	150	2 500	100
... of which on forest	1 000	15	500	50	500	40
... of which on other wooded land	2 000	100	2 000	50	1 000	50
... of which on other land	1 000	100	1 000	50	1 000	10

Table 9b

FRA 2010 category	Proportion of forest area affected by fire (%)		
	1990	2000	2005
Wildfire	75%	60%	80%
Planned fire	25%	40%	20%

9.4 Comments to Table T9

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Area affected by fire	The information used is from expert point of view. There is a fire ecology unit within the Forestry Commission. They provide the information after some assumptions. There is little information with regards to this table.	
Number of fires		
Wildfire / planned fire		

Other general comments to the table

10 Table T10 – Other disturbances affecting forest health and vitality

10.1 FRA 2010 Categories and definitions

Term	Definition
Disturbance	Damage caused by any factor (biotic or abiotic) that adversely affects the vigour and productivity of the forest and which is not a direct result of human activities.
Invasive species	Species that are non-native to a particular ecosystem and whose introduction and spread cause, or are likely to cause, socio-cultural, economic or environmental harm or harm to human health.
Category	**Definition**
Disturbance by insects	Disturbance caused by insect pests.
Disturbance by diseases	Disturbance caused by diseases attributable to pathogens, such as bacteria, fungi, phytoplasma or virus.
Disturbance by other biotic agents	Disturbance caused by biotic agents other than insects or diseases, such as wildlife browsing, grazing, physical damage by animals, etc.
Disturbance caused by abiotic factors	Disturbances caused by abiotic factors, such as air pollution, snow, storm, drought, etc.

10.2 National data

10.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Dr. P. Bosu Forest Research Institute Of Ghana (FORIG)	H	Disturbances affecting Forest Health and Vitality	2005	

10.2.2 Original data

No original data exist. Information is based on contacts with FORIG.
There are no documented data on most of the categories for Table T10.
The values do not represent a continuous coverage of outbreak. The damages occurred in different areas and in smaller pockets

10.3 Data for Table T10

Table 10a – Disturbances

FRA 2010 category	Affected forest area (1000 hectares)		
	1990	2000	2005
Disturbance by insects	n/a	n/a	2
Disturbance by diseases	n/a	n/a	2
Disturbance by other biotic agents	n/a	n/a	n/a
Disturbance caused by abiotic factors	n/a	n/a	n/a
Total area affected by disturbances	**n/a**	**n/a**	**n/a**

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

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

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

Description / name	Tree species or genera affected (scientific name)	Year(s) of latest outbreak	Area affected (1000 hectares)	If cyclic, approx. cycle (years)
Stem borers	*Tectona grandis*	2004	< 1	n/a
Stem dieback	*Tectona grandis*	2008	< 1	n/a
Decline	*Cedrela odorata*	2006	< 1	n/a

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

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

Scientific name of woody invasive species	Forest area affected 2005 (1000 hectares)
Broussonetia papyrifera	50
Total forest area affected by woody invasive species	50

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

10.4 Comments to Table T10

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Disturbance by insects		
Disturbance by diseases		
Disturbance by other biotic agents		
Disturbance caused by abiotic factors		
Major outbreaks		
Invasive species		

Other general comments to the table
There are no documented data on most of the categories for Table T10. The values do not represent a continuous coverage of outbreak. The damages occurred in different areas and in smaller pockets.

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
1. Resource Management Support Centre – Production Unit Timber Information Forms Annual report	M	National log production in volumes	1988 - 2007	National Production Statistics of wood removal based on the annual allowable cut (AAC) Source only provides information on production for forest
2. FAO Stat	M	Fuelwood	2009	
3. Forestry Commission	H	Stumpage fees	2003	

11.2.2 Original data

Table of Industrial Roundwood and Wood Fuel removed from the forests

Year	Volume of Industrial Wood removal over bark in cubic metres from the forest (1)	Volume of Industrial Wood removal under bark in cubic metres (2)	Volume of Industrial Wood removal overr bark in cubic metres (3)	Volume of wood fuel under bark in cubic metres (2)	Volume of wood fuel over bark in cubic metres (3)
1988	1 400 000	970 000	1 115 500	12 750 000	14 662 500
1989	900 000	920 000	1 058 000	12 870 000	14 800 500
1990	1 289 023	1 440 000	1 656 000	12 870 000	14 800 500
1991	1 229 430	1 379 000	1 585 850	11 000 000	12 650 000
1992	1 318 406	1 300 000	1 495 000	15 000 000	17 250 000
1993	966 757	1 832 000	2 106 800	18 100 000	20 815 000
1994	1 681 872	1 864 000	2 143 600	20 678 000	23 779 700
1995	1 194 416	1 283 000	1 475 450	20 678 000	23 779 700
1996	1 166 407	1 255 000	1 443 250	20 678 000	23 779 700
1997	1 202 889	1 278 000	1 469 700	20 678 000	23 779 700
1998	1 400 822	1 227 000	1 411 050	20 678 000	23 779 700
1999	1 102 203	1 102 000	1 267 300	20 678 000	23 779 700
2000	981 883	998 000	1 147 700	20 678 000	23 779 700
2001	1 245 536	1 212 000	1 393 800	20 678 000	23 779 700

2002	1 364 392	1 104 000	1 269 600	20 678 000	23 779 700
2003	1 177 482	1 400 000	1 610 000	20 678 000	23 779 700
2004	902 232	1 350 000	1 552 500	20 678 000	23 779 700
2005	934 886	1 200 000	1 380 000	20 678 000	23 779 700
2006	1 717 722	1 304 000	1 499 600	20 678 000	23 779 700
2007	1 353 890	1 304 000	1 499 600	20 678 000	23 779 700

Notes:

1. Source; country data (source 1)
2. Source; FAOStat (source 2)
3. Conversion factor used to convert to over bark = 1.15

11.3 Analysis and processing of national data

11.3.1 Estimation and forecasting

Volumes of Industrial Roundwood and fuelwood

Year	5 year Average volume 1988 - 1992	5 year Average volume 1998 - 2002	5 year Average volume 2003 - 2007
	1990	2000	2005
Industrial Round wood (from the forest)	1 245 372	1 218 968	1 217 242
Industrial Round wood (total)	1 382 070	1 297 890	1 508 340
Wood fuel	14 832 700	23 779 700	23 779 700

Unit value

Based on expert knowledge, the average stumpage fee (for the industrial roundwood) could be summarized as follows:

Average Stumpage Price (Cedis)	
1990 and 2000	**2005**
41 806	126 466

To which an average logging cost has been added:

Average Logging Cost (Cedis)	
1990 and 2000	**2005**
140 940	190 000

By adding up the price and the cost, the unit value is estimated:

Average Logging Cost (Cedis)	
1990 and 2000	**2005**
182 746	316 466

11.4 Data for Table T11

FRA 2010 Category	Industrial roundwood removals			Woodfuel removals		
	1990	2000	2005	1990	2000	2005
Total volume (1000 m^3 o.b.)	1 382.1	1 297.9	1 508.3	14 832.7	23 779.7	23 779.7
... of which from forest	1 245.4	1 219.0	1 217.2	14 832.7	23 779.7	23 779.7
Unit value (local currency / m^3 o.b.)	182 746	182 746	316 466	n/a	n/a	n/a
Total value (1000 local currency)	252573247	237186033	477325668	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	Cedis	Cedis	Cedis

11.5 Comments to Table T11

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Total volume of industrial roundwood removals		
Total volume of woodfuel removals	Based on expert advices, it has been decided to keep for 2006 and 2007, the figure of 2005.	
Unit value		
Total value		

Other general comments to the table

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

No comprehensive data is available for this table.

13 Table T13 – Employment

13.1 FRA 2010 Categories and definitions

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

13.2 National data

13.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Ghana Timber Association (G.T.A)	H	Employment in primary production of goods	1990 - 2005	
Ghana Timber Millers Organization (G.T.M.O)	H	Employment in primary production of goods	1990 - 2005	

13.2.2 Original data

No original data exist.

13.3 Data for Table T13

FRA 2010 Category	Employment (1000 years FTE)		
	1990	2000	2005
Employment in primary production of goods	2.5	2.0	3.0
...of which paid employment	2.5	2.0	3.0
...of which self-employment	n/a	n/a	n/a
Employment in management of protected areas	n/a	n/a	n/a

13.4 Comments to Table T13

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Employment in primary production of goods	Refers to Paid employment.	
Paid employment / self-employment	G.T.M.O has about 80 companies nationwide mainly in the High Forest Zone, and companies employ between 50 – 1 000 workers.	
Employment in management of protected areas		

Other general comments to the table
According to the information obtained from FAO (Contribution of the forest sector to national economies, 1990-2006) forestry employment seems quite stable, since 1990, with an estimated 10 000 persons.

14 Table T14 – Policy and legal framework

14.1 FRA 2010 Categories and definitions

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

14.2 Data for Table T14

Indicate the existence of the following (2008)			
Forest policy statement with national scope		X	Yes
			No
If Yes above, provide:	Year of endorsement	1994	
	Reference to document	*www.fcghana.com/publications/laws/forest_wildlife_policy/index.html*	
National forest programme (nfp)		X	Yes
			No
If Yes above, provide:	Name of nfp in country	National Forest Programme Project	
	Starting year	1993	
	Current status		In formulation
			In implementation
		X	Under revision
			Process temporarily suspended
	Reference to document or web site	*www.fcghana.com/pfma_fao/home.html*	
Law (Act or Code) on forest with national scope		X	Yes, specific forest law exists
			Yes, but rules on forests are incorpo-rated in other (broader) legislation
			No, forest issues are not regulated by national legislation
If Yes above, provide:	Year of enactment	1998	
	Year of latest amendment	2003	
	Reference to document	*www.fcghana.com/publications/laws/act_547/index.html*	

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.		
Sub-national forest policy statements		Yes
		No
If Yes above, indicate the number of regions/states/provinces with forest policy statements		
Sub-national Laws (Acts or Codes) on forest		Yes
		No
If Yes above, indicate the number of regions/states/provinces with Laws on forests		

14.3 Comments to Table T14

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

Other general comments to the table

15 Table T15 – Institutional framework

15.1 FRA 2010 Categories and definitions

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

15.2 Data for Table T15

Table 15a – Institutions

FRA 2010 Category	2008	
Minister responsible for forest policy formulation : please provide full title	Mrs. Esther Obeng Dapaah, Minister for Lands, Forestry and Mines.	
Level of subordination of Head of Forestry within the Ministry	X	1st level subordination to Minister Forestry Commission
		2nd level subordination to Minister Chief Executive Officer
		3rd level subordination to Minister Executive Directors
		4th or lower level subordination to Minister Regional Manager / District Managers
Other public forest agencies at national level	Ministry of Food and Agriculture	
Institution(s) responsible for forest law enforcement	Ministry of Justice and Attorney General's Department	

Table 15b – Human resources

FRA 2010 Category	Human resources within public forest institutions					
	2000		2005		2008	
	Number	%Female	Number	%Female	Number	%Female
Total staff	3 495	n/a	3 549	n/a	3 576	n/a
...of which with university degree or equivalent	n/a	n/a	n/a	n/a	n/a	n/a

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	It should be noted that percentage of female is about 10% in management, 10% in operations and 40% in operations as field staffs.	

Other general comments to the table

16 Table T16 – Education and research

16.1 FRA 2010 Categories and definitions

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

16.2 National data

16.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Forest Research Institute of Ghana (FORIG)	H	Professionals working in publicly funded forest research centres	2000 - 2008	
Wood Industry Training Centre (WITC)	H	Graduation of students in Forest related education	2000 - 2008	
Kwame Nkrumah University of science and Technology	H	Graduation of students in Forest related education	2000 - 2008	

16.2.2 Original data

Institution	FRA 2010 Category	Graduation of Students in forest – related education					
		2000		2005		2008	
		Number	% Female	Number	% Female	Number	% Female
Wood Industry Training (WITC)	Master's degree (MSc) or equivalent	0	0%	0	0%	0	0%
	Bachelor's degree (BSc) or equivalent	0	0%	0	0%	0	0%
	Forest technician certificate / diploma	44	(6) 13.6%	106	(10) 9.4%	60	(3) 5%
Faculty of Forest Resources Technology, KNUST	Master's degree (MSc) or equivalent	0	0%	0	0%	0	0%
	Bachelor's degree (BSc) or equivalent	0	0%	0	0%	0	0%
	Forest technician certificate / diploma	851	(145) 17%	194	(29) 15%	115	(15) 13%
Faculty of Renewable Natural Resources, KNUST	Master's degree (MSc) or equivalent	90	(14) 15.5%	58	(8)13.7%	26	(4) 15%
	Bachelor's degree (BSc) or equivalent	164	(28) 17%	162	(60) 37%	150	(50) 33%
	Forest technician certificate / diploma	0	0%	0	0%	0	0%
Faculty Of Agriculture KNUST	Master's degree (MSc) or equivalent	32	(10) 31.3%	15	(9) 60%	11	(6) 55.5%

16.3 Analysis and processing of national data

The table below represents the averages of data from the three institutions above.

FRA 2010 Category	Graduation of Students in forest – related education					
	2000		2005		2008	
	Number	% **Female**	**Number**	% **Female**	**Number**	% **Female**
Master's degree (MSc) or equivalent	122	(24) 19.7%	73	(17)23.3%	37	(10) 27.0%
Bachelors degree (BSc) or equivalent	164	(28) 17.0%	162	(60) 37.0%	150	(50) 33.0%
Forest Technician Certificate	895	(151) 16.9%	300	(39) 13.0%	175	(18) 10.3%

16.4 Data for Table T16

FRA 2010 Category	Graduation [1] of students in forest-related education					
	2000		2005		2008	
	Number	%Female	Number	%Female	Number	%Female
Master's degree (MSc) or equivalent	122	19.7%	73	23.3%	37	27.0%
Bachelor's degree (BSc) or equivalent	164	17.0%	162	37.0%	150	33.0%
Forest technician certificate / diploma	895	16.9%	300	13.0%	175	10.3%
FRA 2010 Category	**Professionals working in publicly funded forest research centres [2]**					
	2000		2005		2008	
	Number	%Female	Number	%Female	Number	%Female
Doctor's degree (PhD)	12	8.3%	16	6.3%	19	10.5%
Master's degree (MSc) or equivalent	18	11.1%	21	23.8%	17	35.3%
Bachelor's degree (BSc) or equivalent	12	33.3%	21	14.3%	15	20.0%

Notes:

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

16.5 Comments to Table T16

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Annual graduation of students within the country		
Professionals working in public forest research centres		

Other general comments to the table

17 Table T17 – Public revenue collection and expenditure

No data provided.