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Food and Agriculture Organization of the United Nations

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The Forest Resources Assessment Programme

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

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

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

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

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Introduction

Estonian Centre of Forest Protection and Silviculture (CFPS) is responsible for the dissemination of forest sector statistics in Estonia. Data of forest resources is published annually in Forest statistical yearbook “Mets” (see http://www.metsad.ee/eng/main_public.html) and in NFI yearbook “Eesti metsad” (see http://www.metsad.ee/trykised_eesti_metsad.html). CFPS is responsible for data collection about forest resources, forest utilisation and management, forest health, game management etc. Different other institutions provide statistics and information about forests and forestry as well – e.g. Estonian Statistical Office, Rescue Board, Environmental Inspectorate, University of Life Sciences, Land Board.

The main data source for estimates of forest resource parameters is National Forest Inventory.

National Forest Inventory – overview

Large-area forest resource information, based on selective sampling, was conducted in Estonia during the last decade of previous century. Until the 1990s the national account of forest resources was based on stand-wise forest inventories. After independence was regained in Estonia in 1991, the ownership reform program was started. Part of it was land reform. Intensified forest management together with the land reform created a need for new inventory methods.

The first National Forest Inventory (NFI) covering the whole country commenced in 1999. The main objective of the NFI is to give a description of Estonia’s forests, but the NFI also gives information about the distribution of land by land-use classes and the afforestation and growing stock of non-forest land, etc. The Estonian Forest Survey Centre conducted the NFI in 1999–2002. After its liquidation in 2003, the department of NFI continued its work as a subunit of the administrative institution Centre of Forest Protection and Silviculture (CFPS). NFI department is responsible for the inventories, planning of the design and estimation methods, field measurements, as well as calculation and publication of the results.

Methodologically, the NFI is designed as an annual research effort, which, using optimal methods, must ensure continuous updating of information and the forest database. A network of sample plots, covering the whole country, has been planned for five years with 20% clusters measured each year. Results of the sampling inventory are taken from point estimates of the different parameters obtained using data obtained from the measured sample plots. Cluster sampling with partial replacement is used. Approximately 25% of the sample plots (and half of volume plots) are permanent. Because all permanent sample plots are re-measured every 5 years, the history of NFI can be divided into 5-year cycles. In connection with the need for additional information the variables measured on sample plots have increased year by year.

The Estonian NFI covers all land use classes, including all forests and other wooded lands in all ownership groups, including protected forests. Assessments of the forest resource by the NFI have become the basis for national and international statistics in Estonia. Noticeable, but inevitable, is the change of several assessments during the period 1990-2000, when the drastic change from stand-wise inventory statistics to the NFI took place. Therefore the changes during that period may seem to be larger than they were in reality. The extrapolation of NFI data to the year 1990 cannot be a solution in that case.

The basis of the assessment in this report is still the national forest definition. Starting from the 2005, GFRA forest criteria and OWL criteria were used in parallel with the national

forest definition. The aim was to present more precise and internationally comparable assessments in the future.

The statistical design for the Estonian NFI is a systematic sampling without pre-stratification. The network of sample plots covers the whole country and the sampling intensity is also the same throughout the country. The sample (cluster) distribution is based on a national 5 km x 5 km quadrangle grid, determined by the L-EST coordinates system. Three types of circular sample plots with fixed-radius are used: (a) volume sample plots, (b) site category sample plots, (c) regeneration and felling sample plots. Plots with multiple land categories or stands of distinctly different parameters are divided into sections according to detailed regulations.

The method of sampling with partial replacement is used. Sample plots are organised into clusters to increase the efficiency of the survey – into permanent clusters and temporary clusters that form 800 x 800 metre squares. Volume sample plots are divided into permanent sample plots with a radius of 10 m and temporary sample plots (radius = 7 m) according to the ratio of 1/1,25. Altogether, about 5000 permanent sample plots have been established since 1999, half of which are located on productive forest land. The re-measuring of permanent sample plots started in 2004. Site category plots, regeneration and felling plots are always temporary plots with a radius of 7 m.

All population units have equal probability of selection into the sample. The result is point estimates of multiple population parameters based on the measurement data. The area estimate of a land stratum is calculated as the product of the known land area of the administrative unit and the ratio of the number of sample plots in the stratum to the total number of plots. Area estimation is based on the total land area and inland water, Lake Peipsi, which is known and assumed to be error-free. To prevent errors, inventory results of the last five years are combined during data processing. The possibility of alterations in time is taken into consideration.

Volume is calculated over bark, from the ‘stump height’, excluding branches. The mean volume for a given stratum is the ratio of the sum of volumes for all trees on plots belonging to the stratum and the number of sample plots which belong to the stratum.

The results of the Estonian NFI are provided for the whole country, separately for forests administrated by the Estonian State Forest Management Centre and for other forest owners. Some estimates for the 15 Estonian counties are also provided. The inventory results are available in the annual report “Estonian Forests. Statistics of forest resources and conditions by National Forest Inventory”, and also on the Internet: <http://www.metsad.ee>.

The NFI will provide a baseline of where our forest resources are and how they are changing over time.

1 Table T1 – Extent of Forest and Other wooded land

1.1 FRA 2010 Categories and definitions

Category	Definition
Forest	Land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds <i>in situ</i> . It does not include land that is predominantly under agricultural or urban land use.
Other wooded land	Land not classified as “Forest”, spanning more than 0.5 hectares; with trees higher than 5 meters and a canopy cover of 5-10 percent, or trees able to reach these thresholds <i>in situ</i> ; or with a combined cover of shrubs, bushes and trees above 10 percent. It does not include land that is predominantly under agricultural or urban land use.
Other land	All land that is not classified as “Forest” or “Other wooded land”.
Other land with tree cover (Subordinated to “Other land”)	Land classified as “Other land”, spanning more than 0.5 hectares with a canopy cover of more than 10 percent of trees able to reach a height of 5 meters at maturity.
Inland water bodies	Inland water bodies generally include major rivers, lakes and water reservoirs.

1.2 National data

1.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Eesti NSV metsade majandamise ja puidukasutuse arenduskava “Eesti mets 2010” (<i>Forest management and wood utilisation development plan until 2010</i>), Tallinn 1989	L	Forest	1988	The combined stand-wise forest inventory data of 1979–1988
FRA 2005 Country report (Calculations for FRA 2005, unpublished)	H	Forest, OWL, inland water bodies	2000	NFI-data (combined) from period 1999–2003
Calculations for FRA 2010, unpublished	H	Forest, OWL, inland water bodies	2005	NFI 2003–2007
“Eesti Metsad 2007” (<i>Estonian Forests 2007</i>), Tallinn 2008 http://www.metsad.ee/trykised_eesti_metsad.html	H	Forest, OWL, inland water bodies	2007	NFI 2007 (combined NFI-data from period 2003–2007)
FAOSTAT	H	Total land area	1990, 2000, 2005	
FAOSTAT	M	Inland water bodies	1990, 2000, 2005	

1.2.2 Classification and definitions

National class	Definition
Forest	Forest is defined as land, spanning more than 0.1 ha (a) covered with trees with the minimum height of 1.3 m and the minimum crown cover of 30%, or (b) managed for the purpose of timber production or the preservation of woody plant cover.
Other wooded land (OWL)	Land not classified as “forest”, with tree groups growing in shrubs or on natural grassland, spanning more than 0.1 ha. It does not include land that is predominantly under agricultural or urban land use.
Other land with trees	Urban parks, squares and gardens – no data.
Inland water bodies	According to used FRA 2010 definition.

1.2.3 Original data

FRA 2010 Categories	Area (1000 hectares)			
	1988	2000	2005	2007
Forest	1916	2243	2252	2212.7
Other wooded land	n.a.	94	110	121.9
Other land	2323	1944	1906	1937.6
...of which with tree cover	n.a.	n.a.	n.a.	n.a.
Inland water bodies	284	242	255	250.5
TOTAL	4523	4523	4523	4522.7

1.3 Analysis and processing of national data

1.3.1 Calibration

National data and FAOSTAT data	Area (1000 hectares)	
	2000	2005
National data Total land area (Total country area – Inland water bodies)	4281	4268
FAOSTAT Total land area	4239	4239
Difference	-42	-29
National data Inland water	242	255
FAOSTAT Inland water	284	284
Difference	42	29

The national data is calibrated to tally with the official FAOSTAT figures. The difference in Total land area is subtracted from the category Other land. And the difference in Inland water is added to the national data of Inland water.

1.3.2 Estimation and forecasting

The National Forest Inventory results of 1999–2007 are combined during data processing.

- a) The 1990 estimate was derived by interpolation of forest area based on stand-wise forest inventory data 1979–1988 and the data of the NFI 1999–2003.

- b) Forest area for 2000 is derived by interpolation from NFI data 1999–2003.
 c) Estimations for 2005 are averages from NFI data 2003–2007.
 d) Forecasting for 2010 was made by linear extrapolation, using data reported for 2000, 2005 and the latest inventory – NFI 2007. Thus, the possibility of alterations in time is taken into consideration.

1.3.3 Reclassification into FRA 2010 categories

Not applied.

1.4 Data for Table T1

FRA 2010 categories	Area (1000 hectares)			
	1990	2000	2005	2010
Forest	2090	2243	2252	2217
Other wooded land	0	94	110	133
Other land	2149	1902	1877	1889
...of which with tree cover	n.a.	n.a.	n.a.	n.a.
Inland water bodies	284	284	284	284
TOTAL	4523	4523	4523	4523

1.5 Comments to Table T1

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Forest	Forested areas below limit of forest according to the FRA definition (i.e. in size of 0.1 – 0.5 ha) comprise approximately 8000 ha (0.4%).	The total forest area has increased since 1950-es until 2003–2004 in Estonia. During the last 5 years the trend seems to be slowly decreasing.
Other wooded land	Insufficient Data (ID) is reported for the 1990. The Land Reform (in 90s) has two different influences on the other wooded land: a) former agricultural land become covered with trees, b) OWL become covered with woods and classified as forest. It is difficult to say, which of them had stronger effect. Thus, the Other land figure for 1990 includes all Other wooded land.	
Other land		
Other land with tree cover	No data	
Inland water bodies	The national data is calibrated to tally with the official FAOSTAT figures.	

Other general comments to the table

Expected year for completion of ongoing/planned <u>national forest inventory and/or RS survey / mapping</u>	
Field inventory	annual
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 (<i>sub-category of Private ownership</i>)	Forest owned by individuals and families.
Private business entities and institutions (<i>sub-category of Private ownership</i>)	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 (<i>sub-category of Private ownership</i>)	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 (<i>sub-category of Private ownership</i>)	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
Calculations for FRA 2010, unpublished	H	Forest area by ownership categories	2000, 2005	NFI-data (combined) from period 2000–2007
Land cadastre (Land Board) http://xgis.maaamet.ee	H	Forest area registered in land cadastre	2000, 2005	
Land Title Book https://kinnistusraamat.rik.ee	H	Ownership categories	2000, 2005	

2.2.2 Classification and definitions

National class	Definition
Public ownership	According to used FRA 2010 definition.
Private ownership	According to used FRA 2010 definition.
...of which owned by individuals	According to used FRA 2010 definition.
...of which owned by private business entities and institutions	According to used FRA 2010 definition.
Land left for privatization	According to law (– Ownership Reform program): land, which had been unlawfully expropriated in 1940, was due to be returned to its initial owners or to their descendants. In case, there is no subjects of ownership reform – land left for privatization. Sub-category of public ownership, classified as ‘Other types of ownership’.

2.2.3 Original data

FRA 2010 Categories	Forest area (1000 hectares)		
	1988	2000	2005
Public ownership	1916	899	894
Private ownership	0	953	978
...of which owned by individuals	0	793	783
...of which owned by private business entities and institutions	0	160	195
Other types of ownership	0	391	380
TOTAL	1916	2243	2252

2.3 Analysis and processing of national data

2.3.1 Calibration

Not applied.

2.3.2 Estimation and forecasting

In 1990, under the Soviet occupation, the only ownership category was public ownership. The National Forest Inventory results of 2000–2007 are combined during data processing using data of the Land Cadastre and the Land Title Book:

- a) Year 2000 is calculated using the NFI data from 2000–2003.
- b) Estimations for 2005 – average values of the NFI data from 2003–2007.

2.3.3 Reclassification into FRA 2010 categories

National class ‘Land left for privatization’ classified as ‘Other types of ownership’.

2.4 Data for Table T2

Table 2a - Forest ownership

FRA 2010 Categories	Forest area (1000 hectares)		
	1990	2000	2005
Public ownership	2090	899	894
Private ownership	0	953	978
...of which owned by individuals	0	793	783
...of which owned by private business entities and institutions	0	160	195
...of which owned by local communities	0	0	0
...of which owned by indigenous / tribal communities	0	0	0
Other types of ownership	0	391	380
TOTAL	2090	2243	2252

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?	<input checked="" type="checkbox"/>	Yes
	<input type="checkbox"/>	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	2090	898	893
Individuals	0	1	1
Private corporations and institutions	0	0	0
Communities	0	0	0
Other	0	0	0
TOTAL	2090	899	894

2.5 Comments to Table T2

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Public ownership	NFI 2000–2007, Land Cadastre, Land Title Book	
Private ownership	NFI 2001–2007, Land Cadastre, Land Title Book	In 1990, private forest ownership was absent, until the land reform started in 1993 in Estonia. The latest trend shows that private ownership owned by individuals goes slightly downwards due to increasing area of land owned by private business entities.
Other types of ownership	Land left for privatization (sub-category of public ownership, for details, see Table 2.2.2). NFI 2000–2007, Land Cadastre	Decreasing trend – until the finish of the land reform program.
Management rights	By default, holder of management rights of public forest is public administration. Individuals could hold management rights by law: a) on hereditary farm land https://www.riigiteataja.ee/ert/act.jsp?id=22203 b) by usufruct of agricultural land https://www.riigiteataja.ee/ert/act.jsp?id=13183713	

Other general comments to the table

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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
Eesti NSV metsade majandamise ja puidukasutuse arenduskava "Eesti mets 2010" (<i>Forest management and wood utilisation development plan until 2010</i>), Tallinn 1989	L	Designated functions of forest	1988	The combined stand-wise forest inventory data of 1979–1988
FRA 2005 Country report (Calculations for FRA 2005, unpublished)	M	Designated functions of forest	2000	NFI-data, combined from period 1999–2003

“Eesti Metsad 2007” (<i>Estonian Forests 2007</i>), Tallinn 2008 http://www.metsad.ee/trykised_eesti_metsad.html	H	Designated functions of forest	2007	NFI 2007 (combined NFI-data from period 2003–2007)
Calculations for FRA 2010, unpublished	H	Designated functions of forest	2000, 2005	NFI 1999–2007
Forest Register http://register.metsad.ee/avalik/	H	Forest with management plan	2000, 2005	

3.2.2 Classification and definitions

National class	Definition
Production forest	Forest area designated for production and extraction of woody forest products.
Protection of soil and water	According to used FRA 2010 definition.
Conservation of biodiversity	According to used FRA 2010 definition, strictly protected forest.
Multiple purpose forest	According to used FRA 2010 definition.
Area of permanent forest estate	According to used FRA 2010 definition.
Forest area within protected areas	According to used FRA 2010 definition.

3.2.3 Original data

FRA 2010 Categories	Forest area (1000 hectares)			
	1988	2000	2005	2007
Production	1387	1746	1556	1524
Protection of soil and water	246	267	244	234
Conservation of biodiversity	116	137	179	182
Social services	167	0	0	0
Multiple use	0	93	273	272
Other (please specify in comments below the table)	0	0	0	0
No / unknown	0	0	0	0
TOTAL	1916	2243	2252	2213

3.3 Analysis and processing of national data

3.3.1 Calibration

Not applied.

3.3.2 Estimation and forecasting

The percentages of categories of designated functions (1988) were applied to the forest area for 1990.

The National Forest Inventory results of 1999–2007 are combined during data processing for categories of designated functions.

- Forest area of categories for 2000 is derived by interpolation from NFI data 1999–2003.
- Estimations for 2005 are averages from NFI data 2003–2007.
- Forecasting for 2010 was made by linear extrapolation, using data reported for 2000, 2005 and the latest inventory – NFI 2007. Thus, the possibility of alterations in time is taken into consideration.

3.3.3 Reclassification into FRA 2010 categories

Not applied.

3.4 Data for Table T3

Table 3a – Primary designated function

FRA 2010 Categories	Forest area (1000 hectares)			
	1990	2000	2005	2010
Production	1513	1746	1556	1472
Protection of soil and water	268	267	244	258
Conservation of biodiversity	127	137	179	208
Social services	182	0	0	0
Multiple use	0	93	273	279
Other (please specify in comments below the table)	0	0	0	0
No / unknown	0	0	0	0
TOTAL	2090	2243	2252	2217

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.	905	905	694
Forest area within protected areas	127	141	185	213
Forest area under sustainable forest management	n.a.	2243	2252	2217
Forest area with management plan	2090	1230	1543	1530

3.5 Comments to Table T3

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Production	NFI 1999–2007	Continually decreasing.
Protection of soil and water	NFI 1999–2007	In 2004, the rules concerning protection of water were changed cardinally, therefore trend is non-calculable.
Conservation of biodiversity	NFI 1999–2007	Continually increasing. Covering 10% of total forest area by conservation of biodiversity is one of the goals of the Forest Development Plan.
Social services	All public forests not strictly protected have public access for social services by law.	
Multiple use	NFI 1999–2007	
Other		
No / unknown designation		
Area of permanent forest estate	According to the Forest Act in force: 2000, 2005 – 20% of land area, 2010 – public forest area in year 1940.	
Forest area within protected areas	IUCN I...IV protected area management categories. NFI 1999–2007	
Forest area under sustainable forest management	By the law (– Forest Act etc): the total forest area. All the forest is under sustainable forest management.	Same as forest land area.
Forest area with management plan	Query from the Forest Register, forest area with valid (– not older than 10 years) management plans.	Forest management plan is not compulsory from year 2009, instead the standwise forest inventory data not older than 10 years and registered in Forest Register is pre-requisite for most of forest management activities

Other general comments to the table

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4 Table T4 – Forest characteristics

4.1 FRA 2010 Categories and definitions

Term / category	Definition
Naturally regenerated forest	Forest predominantly composed of trees established through natural regeneration.
Introduced species	A species, subspecies or lower taxon, occurring <u>outside</u> its natural range (past or present) and dispersal potential (i.e. outside the range it occupies naturally or could occupy without direct or indirect introduction or care by humans).
Characteristics categories	
Primary forest	Naturally regenerated forest of native species, where there are no clearly visible indications of human activities and the ecological processes are not significantly disturbed.
Other naturally regenerated forest	Naturally regenerated forest where there are clearly visible indications of human activities.
Other naturally regenerated forest of introduced species (<i>sub-category</i>)	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 (<i>sub-category</i>)	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
“Eesti Metsad 2007” (<i>Estonian Forests 2007</i>), Tallinn 2008 http://www.metsad.ee/trykised_eesti_metsad.html	H	Forest area by categories	2007	NFI 2006–2007
Calculations for FRA 2010, unpublished	M	Forest area by categories	2000, 2005, 2010	NFI 1999–2007

4.2.2 Classification and definitions

National class	Definition
Primary forest	According to used FRA 2010 definition.
Other naturally regenerated forest	According to used FRA 2010 definition (‘modified natural’ according to FRA 2005 definition, incl. introduced species).
Planted forest	According to used FRA 2010 definition (‘semi-natural’ according to FRA 2005 definition, incl. introduced species).
Introduced species	According to used FRA 2010 definition.

4.2.3 Original data

FRA 2010 Categories	Forest area (1000 hectares)
	2007
Primary forest	963
Other naturally regenerated forest	1082
...of which of introduced species	0
Planted forest	168
...of which of introduced species	2
TOTAL	2213

4.3 Analysis and processing of national data

4.3.1 Calibration

Not applied.

4.3.2 Estimation and forecasting

No data available for reference year 1990.

Naturalness has not been observed by NFI before year 2006. Therefore the average percentages of categories of forest characteristics (2006–2007) were applied to the forest area for reference years 2000, 2005 and 2010.

4.4 Data for Table T4

Table 4a

FRA 2010 Categories	Forest area (1000 hectares)			
	1990	2000	2005	2010
Primary forest	n.a.	976	980	964
Other naturally regenerated forest	n.a.	1097	1102	1085
...of which of introduced species	n.a.	0	0	0
Planted forest	n.a.	170	170	168
...of which of introduced species	n.a.	2	2	2
TOTAL	2090	2243	2252	2217

Table 4b

FRA 2010 Categories	Area (1000 hectares)			
	1990	2000	2005	2010
Rubber plantations (Forest)	0	0	0	0
Mangroves (Forest and OWL)	0	0	0	0
Bamboo (Forest and OWL)	0	0	0	0

4.5 Comments to Table T4

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Primary forest	NFI 2006–2007	
Other naturally regenerating forest	NFI 2006–2007	
Planted forest	NFI 2006–2007	
Rubber plantations		
Mangroves		
Bamboo		

Other general comments to the table

Observations of forest area by characteristics categories are not long enough (– ‘naturalness’ has not been registered by NFI before 2006), therefore no trend analyses could be made.

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
Calculations for FRA 2010, unpublished	M	Afforestation, reforestation, natural expansion of forest	2003	NFI (permanent plots) 1999–2007

5.2.2 Classification and definitions

Comply with FRA 2010 definitions.

5.2.3 Original data

FRA 2010 Categories	Annual forest establishment (hectares/year)	...of which of introduced species ¹⁾ (hectares/year)
	2003	2003
Afforestation	352	0
Reforestation	9247	0
...of which on areas previously planted	n.a.	0
Natural expansion of forest	2630	0

Note: The figures for the reporting year refer to the average for the 5-year period 2001–2005.

5.3 Analysis and processing of national data

5.3.1 Calibration

Not applied.

5.3.2 Estimation and forecasting

No data available for year 1990.

No data especially about areas previously planted.

Due to short time-series of the NFI observations, the average percentage of forest establishment and reforestation (2001–2005) were applied to the forest area for reference years 2000 and 2005.

5.3.3 Reclassification into FRA 2010 categories

Not applied.

5.4 Data for Table T5

FRA 2010 Categories	Annual forest establishment (hectares/year)			...of which of introduced species ¹⁾ (hectares/year)		
	1990	2000	2005	1990	2000	2005
Afforestation	n.a.	351	352	n.a.	0	0
Reforestation	n.a.	9223	9262	n.a.	0	0
...of which on areas previously planted	n.a.	n.a.	n.a.	n.a.	0	0
Natural expansion of forest	n.a.	2623	2634	n.a.	0	0

5.5 Comments to Table T5

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Afforestation		
Reforestation	Re-establishment of forest through natural succession excluded. All together: for 2000 – 51 979 and for 2005 – 52 199 ha per year	
Natural expansion of forest	Forest succession on land previously used for agriculture was relatively high 5 to 15 years ago in Estonia.	

Other general comments to the table

The figures for the reporting years refer to the average for the 5-year period 2001–2005, taking into account forest area for reference years 2000 and 2005. No trend because of short time-series of the observations.

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
Eesti NSV metsade majandamise ja puidukasutuse arenduskava "Eesti mets 2010" (<i>Forest management and wood utilisation development plan until 2010</i>), Tallinn 1989.	L	Growing stock on forest land	1988	The combined stand-wise forest inventory data of 1979–1988
"Eesti Metsad 2007" (<i>Estonian Forests 2007</i>), Tallinn 2008 http://www.metsad.ee/trykised_eesti_metsad.html	H	Growing stock, growing stock composition	2007	NFI 2007 (combined NFI-data from period 2003–2007)
Calculations for FRA 2010, unpublished	H	Growing stock (by species) on forest land and OWL	2000, 2005, 2010	NFI 1999–2007

6.2.2 Classification and definitions

National class	Definition
Growing stock	Volume over bark of all living trees (more than 0 cm in diameter at breast height). Includes the stem from stump height up to a top of tree, excludes branches.

6.2.3 Original data

FRA 2010 category	Volume (million cubic meters over bark)							
	Forest				Other wooded land			
	1988	2000	2005	2007	1988	2000	2005	2007
Total growing stock	ID	458.3	455.0	451.5	n.a.	4.7	5.5	5.6
... of which coniferous	ID	242.3	246.9	249.9	n.a.	0.9	1.1	1.1
... of which broadleaved	ID	215.9	208.1	201.6	n.a.	3.8	4.4	4.5
Growing stock of commercial species	ID	458.3	455.0	451.5	n.a.	4.7	5.5	5.6

6.3 Analysis and processing of national data

6.3.1 Calibration

Not applied.

6.3.2 Estimation and forecasting

Insufficient Data (ID) is reported for the reference year 1990 due to the high difference in estimates between stand-wise inventory and National Forest Inventory data.

The National Forest Inventory results of 1999–2007 are combined during data processing for growing stock estimations and for growing stock composition.

- Growing stock for 2000 is derived by interpolation from NFI data 1999–2003.
- Estimations for 2005 are averages from NFI data 2003–2007.
- Forecasting for 2010 Forest was made by linear extrapolation, using data reported for 2000, 2005 and the latest inventory – NFI 2007. Thus, the possibility of alterations in time is taken into consideration.
- Forecasting for 2010 OWL was made by linear extrapolation, using data reported for 2005 and the latest inventory – NFI 2007.

6.3.3 Reclassification into FRA 2010 categories

Not applied.

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	n.a.	458.3	455.0	449.4	n.a.	4.7	5.5	5.8
... of which coniferous	n.a.	242.3	246.9	252.5	n.a.	0.9	1.1	1.2
... of which broadleaved	n.a.	215.9	208.1	196.9	n.a.	3.8	4.4	4.6
Growing stock of commercial species	n.a.	458.3	455.0	449.4	n.a.	4.7	5.5	5.8

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
1 st	<i>Pinus sylvestris</i>	Scots pine	n.a.	127.7	138.4
2 nd	<i>Picea abies</i>	Norway spruce	n.a.	114.1	108.2
3 rd	<i>Betula pendula</i> , <i>Betula pubescens</i>	Common silver birch, Downy birch	n.a.	102.7	100.3
4 th	<i>Populus tremula</i>	European aspen	n.a.	37.6	34.9
5 th	<i>Alnus incana</i>	White alder	n.a.	37.1	32.6
6 th	<i>Alnus glutinosa</i>	European black alder	n.a.	21.0	21.8
7 th	<i>Fraxinus excelsior</i>	European ash	n.a.	5.9	5.9
8 th	<i>Salix caprea</i>	Goat willow	n.a.	4.5	4.8
9 th	<i>Quercus robur</i>	Pedunculate oak	n.a.	2.7	2.8
10 th	<i>Padus avium</i>	European bird cherry	n.a.	1.2	1.1
Remaining			n.a.	3.8	4.0
TOTAL			ID	458.3	455.0

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)	0	DBH measured at a height of 1.30 m above stump height
Minimum diameter (cm) at the top end of stem for calculation of growing stock (Y)	0	
Minimum diameter (cm) of branches included in growing stock (W)		Excluded
Volume refers to “above ground” (AG) or “above stump” (AS)	AS	

6.5 Comments to Table T6

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Total growing stock	Insufficient Data (ID) is reported for 1990 in the reporting table due to inconsistencies in data for the period 1979–1988 compared with NFI data for 1999–2007 period.	
Growing stock of broadleaved / coniferous		Growing stock of broadleaved species shows slowly increasing trend.

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.

Growing stock of commercial species	All tree species are commercial species.	
Growing stock composition	Not available (n.a.) is reported for 1990 due to inconsistencies in data for that period compared with NFI data.	

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
“Eesti Metsad 2007” (<i>Estonian Forests 2007</i>), Tallinn 2008 http://www.metsad.ee/trykised_eesti_metsad.html	H	Growing stock, growing stock composition	2007	NFI 2007 (combined NFI-data from period 2003–2007)
Calculations for FRA 2010, unpublished (see table T6, present report)	H	Growing stock (by species) on forest land and OWL	2000, 2005, 2010	NFI 1999–2007
“GFRA 2010– guidelines for country reporting to FRA2010”, Rome 2008, Appendix 5 – Default values and conversion factors for estimating biomass and carbon.		Wood densities of stemwood, BEF, root-shoot ratio	2000, 2005, 2010	Factors for calculation of biomass stocks

7.2.2 Classification and definitions

Comply with FRA 2010 definitions

7.2.3 Original data

Common name	Scientific name	Growing stock volume (1000 m3)					
		Forest			Other wooded land		
		2000	2005	2010*	2000	2005	2010*
Scots pine	<i>Pinus sylvestris</i>	127 720	138 436	149 896	391	426	451
Norway spruce	<i>Picea abies</i>	114 107	108 241	102 589	607	631	667
Common silver birch, Downy birch	<i>Betula pendula</i> , <i>Betula pubescens</i>	102 673	100 349	97 585	1 391	1 329	1 406
European aspen	<i>Populus tremula</i>	37 581	34 936	33 073	146	57	61
White alder	<i>Alnus incana</i>	37 115	32 619	27 565	762	1 071	1 133

European black alder	<i>Alnus glutinosa</i>	21 032	21 808	21 173	287	385	407
Willow species	<i>Salix species</i>	4 468	4 750	4 527	383	655	693
European ash	<i>Fraxinus excelsior</i>	5 906	5 887	5 023	479	273	289
Pedunculate oak	<i>Quercus robur</i>	2 725	2 823	3 059	31	240	254
<i>Other broadleaved</i>		1 579	1 595	1 408	64	192	203
European bird cherry	<i>Padus avium</i>	1 188	1 121	1 061	58	97	103
Tilia cordata	<i>Small-leaved lime</i>	853	1 012	1 050	0	0	0
Acer platanoides	<i>Norway maple</i>	441	752	941	95	89	94
Ulmus laevis, Ulmus glabra	<i>European white elm, Wych elm</i>	386	442	435	25	1	1
<i>Other coniferous</i>		503	215	0	0	18	19
Total		458 278	454 986	449 386	4 721	5 463	5 779
		Deadwood (1000 m3)					
Scots pine	<i>Pinus sylvestris</i>	8 169	6 581	7 394	22	60	78
Norway spruce	<i>Picea abies</i>	6 421	8 861	10 224	18	48	63
Common silver birch, Downy birch	<i>Betula pendula, Betula pubescens</i>	3 069	3 736	4 353	8	21	27
European aspen	<i>Populus tremula</i>	589	1 552	1 820			
European black alder	<i>Alnus glutinosa</i>	530	1 023	1 153	41	109	143
White alder	<i>Alnus incana</i>	2 286	4 575	5 228			
Willow species	<i>Salix species</i>	352	922	1 091	4	10	13
Other	Teised	856	927	1 052	6	15	20
Total		22 271	28 177	32 314	98	263	344

7.3 Analysis and processing of national data

7.3.1 Calibration

Not applied.

7.3.2 Estimation and forecasting

Growing stock and deadwood of forest land and other wooded land by tree species for years 2000, 2005 and 2010 was used to calculate biomass stock. Year 2010 volume figures for tree species were calculated using forecast for total volume (see 6.3.2 of present report) on forest and wooded land. Total volume was divided using distribution of tree species from last NFI (2007) results. Basic wood densities for boreal and temperate species from the appendix 5 table 5.7 (“GFRA 2010 – guidelines for country reporting to FRA2010”) were used to calculate stemwood biomass for different tree species. Default values of biomass expansion factors (the appendix 5 table 5.8 were used to calculate above-ground biomass. Average below-ground to aboveground biomass ratio (conifer forest – AGBM 50–150 t/ha, temperate other broadleaf forest – AGBM 75–150 t/ha) the appendix 5 table 5.3.

7.3.3 Reclassification into FRA 2010 categories

Not applied.

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	n.a.	270.321	268.249	264.324	n.a.	3.071	3.536	3.741
Below-ground biomass	n.a.	69.934	69.616	68.776	n.a.	0.738	0.848	0.897
Dead wood	n.a.	16.672	20.867	23.925	n.a.	0.073	0.198	0.256
TOTAL	n.a.	356.926	358.733	357.025	n.a.	3.882	4.581	4.894

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	Deadwood includes all standing and lying deadwood larger than or equal to 8cm in diameter	

Other general comments to the table

8 Table T8 – Carbon stock

8.1 FRA 2010 Categories and definitions

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

8.2 National data

8.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Table T7 Biomass stock, present report	M	Biomass stocks	2000, 2005, 2010	See table 7.4
Kõlli R., Asi E., Köster T., “Organic carbon pools in Estonian forest soils”, Baltic forestry, 2004 Vol. 10, No 1, p 19-26	M	Forest soil groups, thickness of soil cover (SC) and pools of soil organic carbon (SOC) in Estonian forest soils	1991	Shares of forest soil groups from total forest area in 1991 were used to calculate forest and other wooded land soil group areas in 1990, 2000, 2005 and 2010
Table T1, present report	H	Area of forest and other wooded land	2000, 2005, 2010	Data for calculation of soil carbon
“GFRA 2010– guidelines for country reporting to FRA2010”, Rome 2008, Appendix 5 – Default values and conversion factors for estimating biomass and carbon.		Wood densities of stemwood, BEF, root-shoot ratio	2000, 2005, 2010	Carbon fraction of aboveground forest biomass

8.2.2 Classification and definitions

Comply with FRA 2010 definitions.

8.2.3 Original data

Forest soil groups, thickness of soil cover* (SC) and pools of soil organic carbon (SOC) in Estonian forest soils in 1991

Group No	Soil or soil association	Soil code by WRB	% from forest land	Thickness of soil cover (SC) mean (M) + standard deviation (SD)		SOC pools of soil cover Mg ha ⁻¹	Forest land area in 1991 (1000 ha)	Sum of SOC pools of soil cover in Gg
				M	SD			
I	Rendzic & Sceleitic & Gleyic Leptosols	LP rz sk gl	0.8	24	+ 3.6	102	16.1	1642
II	Calcaric & Endosceleitic Cambisols	CM ca skn	1.9	56	+ 18.9	109	38.3	4175
III	Mollic & Endogleyic Cambisols	CM mo gln	3.3	47	+ 8.1	76	66.5	5054
IV	Sceleitigleyic Cambisols	CM gls	1.3	43	+ 9.8	96	26.2	2515
V	Cutanic & Endogleyic Luvisols	LV ct gln	2.4	70	+ 18.8	95	48.4	4590
VI	Glossic & Gleyiglossic Albeluvisols	AB gs gls	3.6	92	+ 18.7	64	72.6	4646
VII	Haplic Albeluvisols	AB ha	2.7	86	+ 13.9	88	54.4	4787
VIII	Endogleyic Albeluvisols	AB gln	1.6	72	+ 19.4	65	32.2	2093
IX	Haplic Podzols	PZ ha	3.8	67	+ 25.0	45	76.6	3447
X	Endogleyic Podzols	PZ gln	2.2	62	+ 16.7	44	44.3	1949
XI	Mollic & Calcic & Eutric Gleysols	GL mo cc eu	12.1	39	+ 12.6	120	243.9	29268
XII	Luvic & Epidystric Gleysols	GL lv dye	8.0	55	+ 21.0	126	161.3	20324
XIII	Spodic & Umbric & Dystric Gleysols	GL sd um dy	9.2	70	+ 14.6	113	185.4	20950
XIV	Saprihistic Gleysols	GL his	5.3	51	+ 11.9	209	106.8	22321
XV	Fibrihistic Podzols	PZ hif	3.1	76	+ 18.0	114	62.5	7125
XVI	Eutric & Salic Fluvisols	FL eu sz	1.1	26	+ 5.7	84	22.2	1865
XVII	Eutric & Sapric Histosols	HS eu sa	16.3	50	+ 0	333	328.6	109424
XVIII	Dystric Histosols	HS dy	6.9	50	+ 0	210	139.1	29211
XIX	Fibric Histosols	HS fi	13.7	50	+ 0	139	276.2	38392
XX	Protic & Spolic Regosols	RG pr sp	0.7	<25		43	14.1	619
Total			100				2016	314397

* Soil cover or solum as a whole, whose depth reaches from the surface to the unchanged parent material or C horizon.

8.3 Analysis and processing of national data

8.3.1 Calibration

Not applied.

8.3.2 Estimation and forecasting

Carbon stock in living biomass and deadwood on forest land and other wooded land was calculated using biomass stock figures (see T7). Factor 51% of carbon content in biomass for conifers and 49% for broad-leaved were used for calculations.

For the calculation of soil carbon in soil cover on forest and other wooded land the following data were used:

- soil organic carbon pools of soil cover
- share of soil groups from total forest land area in 1991.

Area of forest land and other wooded land for years 2000, 2005 and 2010 were obtained from table T1. Distribution of soil groups by area and SOC pools in 1991 were applied to the area of forest and other wooded land in 2000, 2005, 2010.

8.3.3 Reclassification into FRA 2010 categories

Not applied.

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	n.a.	133.634	132.719	130.866	n.a.	1.490	1.715	1.814
Carbon in below-ground biomass	n.a.	34.693	34.564	34.170	n.a.	0.359	0.412	0.436
Sub-total: Living biomass	n.a.	168.327	167.283	165.036	n.a.	1.849	2.126	2.250
Carbon in dead wood	n.a.	8.323	10.354	11.869	n.a.	0.036	0.097	0.127
Carbon in litter	n.a.	n.a.	n.a.	n.a.	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	325.958	349.820	351.224	345.765	n.a.	14.660	17.156	20.743
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	55 (weighted average)
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8.5 Comments to Table T8

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

Other general comments to the table

9 Table T9 – Forest fires

9.1 FRA 2010 Categories and definitions

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

9.2 National data

9.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Aastaraamat Mets 2008, (Yearbook Forest 2008), Centre of Forest Protection and Silviculture, Estonia, 2009.	H	forest fires: burnt forest area (ha)	1988–1992, 1998–2002, 2003–2007	Registered number and area of forest fires during the year
FRA2010 report for Estonia, Table T1	H, L(1990)	Forest area	1990, 2000, 2005	Forest area is used for calculation of the share of forest fires from total forest area
Estonian Rescue Board database, based on query for FRA 2010 report	H	Number of vegetation fires	2006–2007	

9.2.2 Classification and definitions

Comply with FRA 2010 definitions.

9.2.3 Original data

Year	Forest fires			Vegetation fires	
	Number	Area (ha)	Average area (ha)	Number	Area (ha)
1988	106	55.00	0.5	n.a.	n.a.
1989	106	81.60	0.8	n.a.	n.a.
1990	164	194.00	1.2	n.a.	n.a.
1991	39	58.00	1.5	n.a.	n.a.
1992	348	1787.00	5.1	n.a.	n.a.
Average for 1988-1992	152.6	435.12	2.9	n.a.	n.a.

1998	61	54.00	0.9	n.a.	n.a.
1999	130	1103.40	8.5	n.a.	n.a.
2000	158	683.80	4.3	n.a.	n.a.
2001	91	61.80	0.7	n.a.	n.a.
2002	356	2081.70	5.8	n.a.	n.a.
Average for 1998-2002	159.2	796.94	5.0	n.a.	n.a.
2003	111	206.60	1.9	n.a.	n.a.
2004	89	378.90	4.3	n.a.	n.a.
2005	65	86.50	1.3	n.a.	n.a.
2006	260	3095.60	11.9	5075	n.a.
2007	64	292.37	4.6	2055	n.a.
Average for 2003-2007	117.8	811.99	6.9	3565	n.a.

9.3 Analysis and processing of national data

9.3.1 Calibration

Not applied.

9.3.2 Estimation and forecasting

The average area and number of forest fires for 1990 was obtained, using the data for years 1988–1992, for 2000 years 1998–2002 and for 2005 years 2003–2007 for forest fires. The average number of vegetation fires in 2005 is average of data for years 2006 and 2007.

9.3.3 Reclassification into FRA 2010 categories

9.4 Data for Table T9

Table 9a

FRA 2010 category	Annual average for 5-year period					
	1990		2000		2005	
	1000 hectares	number of fires	1000 hectares	number of fires	1000 hectares	number of fires
Total land area affected by fire	n.a.	n.a.	n.a.	n.a.	n.a.	3565
... of which on forest	0.435	152.6	0.797	159.2	0.812	117.8
... of which on other wooded land	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
... of which on other land	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Table 9b

FRA 2010 category	Proportion of forest area affected by fire (%)		
	1990	2000	2005
Wildfire	100.0	100.0	100.0
Planned fire	0.0	0.0	0.0

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

9.5 Comments to Table T9

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Area affected by fire	Area of forest fires is registered by Rescue Board and later in case of need specified in cooperation of the Centre of Forest Protection and Silviculture with forest owner or county level forest authority. Area of vegetation fires on non-forest land is not usually recorded (mostly the fires on grasslands)	
Number of fires	Number of fires is registered by Rescue Board.	Vegetation fires as separate type of fires have been registered since 2006. No distinction by type of fires is possible for earlier years.
Wildfire / planned fire	Planned fire is not used as management measure in Estonia. All fires should be suppressed.	

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
Online database of the Statistical Office of Estonia (http://pub.stat.ee/px-web.2001/I_Databas/Environment/04Natural_resources_and_their_use/06Forest_resources/06Forest_resources.asp); or Aastaraamat Mets 2008, (<i>Yearbook Forest 2008</i>), Centre of Forest Protection and Silviculture, Estonia, 2009.	M	Area of disturbances	1991–1992, 1998–2002, 2003–2007	Registered damaged areas at the end of the year
Calculations for FRA 2010, unpublished	L	Disturbances caused by stem damaging insects	2005	Based on the reports of damages from state forests
Metsakaitsetised kompleksuuringud männivaksiku kahjustuskolletes Orava, Värskas, Vastseliina, Käsmu ja Sagadi metskonnas (MSK-7). Lõpparuanne, Tartu 1994. Final report of the assessment of the Bupalus piniaria damages in Orava, Värskas, Vastseliina, Käsmu and Sagadi forest districts, Tartu 1994.	H	Forest area damaged by Bupalus piniaria	1990-1993	

Damage assessment reports by Estonian Centre of Forest Protection and Silviculture, unpublished	H	Forest area damaged by <i>Calliteara pudibunda</i> , <i>Acantholyda posticalis</i>	2004, 2005, 2008	Forest damage assessment reports, carried out by forest pathologists
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10.2.2 Classification and definitions

National class	Definition
Disturbance by insects	Disturbance by insects includes disturbances caused by needle, leaf and stem pests.
Disturbance by diseases	Disturbance by diseases includes damages of root rot and pine bark inflammation (some of the diseases may be classified under the other unspecified causes and not reported in FRA)
Disturbance by other biotic agents	Disturbance by other biotic agents includes game damages.
Disturbance caused by abiotic factors	Disturbance caused by abiotic factors include unfavourable water conditions and windfall.

10.2.3 Original data

Damaged forest stands as of 31 December by year and reason for damage

Year	Total	Needle pests	Leaf pests	Stem pests	Other damages	Root rot	Pine bark inflammation	Other forest diseases	Unfavourable water conditions	Unfavourable weather conditions	Mechanic damages caused by games	Windfall	Forest fires	Human activities	Other reasons
1991	39209	548	122	660	1057	..	..	3697	..	..	33125	..	..	..	..
1992	38465,4	354	146,2	1371	1435,8	..	..	3340,5	..	..	31817,9	..	..	..	..
1993	26036,4	58,7	280,8	2128,5	1076,4	..	..	2797,3	..	..	19694,7	..	..	..	..
1994	22752,8	50,5	334,4	2276,8	1122,5	..	..	2358,8	..	422,7	15606	..	474,9	105	1,2
1995	21671	23,6	309,2	1875,9	1425,7	..	..	1848,6	..	370,9	15430,1	..	241,9	124,4	20,7
1996	20313,6	32,6	247,5	1329,3	1046,3	..	..	1503,1	..	368	15354,5	..	276,1	143	13,2
1997	18225	17,8	136,1	2206,8	1354,2	..	..	2034,8	..	349,9	11796,8	..	221,8	106,8	0
1998	13638,3	25,5	76,6	..	..	2702,6	85,5	..	1428,2	..	8071,5	569,9	279,8	0	398,7
1999	13556,1	25,6	95,5	..	..	2501,7	61	..	1279,9	..	7186,8	1811	185,1	0	409,5
2000	16781,3	14,3	631,1	..	..	2602,5	62,1	..	3302,1	..	8673,9	716,2	294,3	0	484,8
2001	20454,1	17,3	57,1	..	..	2533,5	71,7	..	3461,9	..	7659,1	6127,7	138,5	0	387,3
2002	21779,6	43	4,9	..	..	1985,6	1,5	..	228,1	..	1026,2	15953	554,8	..	1982,5
2003	13574,8	34	117	..	..	4279,4	0	..	419,3	..	2011,7	5116,8	85,7	..	1510,9

2004	11180,9	7,9	90,2	..	..	3757,4	2,5	..	1178,7	..	2299,5	3071,7	104,2	..	668,8
2005	39932,4	28,3	356,7	..	..	3722,2	33,6	..	1428,1	..	1653,5	32137,8	32,2	..	540,1
2006	17088,8	63,9	5,1	..	..	2647,4	1	..	587,1	..	1701,8	10155	822,1	..	1105,4
2007	13142,1	90,4	12,8	..	..	2804	17,2	..	375,4	..	2114,6	4880,5	91,1	..	2756,1
2008	12616,6	145,8	17,9	0	0	4391,2	0	0	595,1	0	1785,8	3291,7	152,6	0	2236,5

10.3 Analysis and processing of national data

10.3.1 Calibration

Not applied.

10.3.2 Estimation and forecasting

The average area of disturbances for 2000 was obtained, using the data for years 1998–2002, and for 2005 years 2003–2007 were used. The average area of disturbances in 1990 is average of data for years 1991 and 1992.

10.3.3 Reclassification into FRA 2010 categories

Not applied.

10.4 Data for Table T10

Table 10a – Disturbances

FRA 2010 category	Affected forest area (1000 hectares)		
	1990	2000	2005
Disturbance by insects	1.60	n.a.	1.31
Disturbance by diseases	3.28	2.67	3.45
Disturbance by other biotic agents	32.47	6.52	1.96
Disturbance caused by abiotic factors	n.a.	6.98	11.87
Total area affected by disturbances	n.a.	n.a.	18.26

Notes: The figures for the reporting years refer to the averages of annually affected areas for the 5-year periods 1998-2002 and 2003-2007 respectively. for 1990 the figure is average of 1991-1992,

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)
Bupalus piniaria	<i>Pinus sylvestris</i>	1990–1993	5.0	
Calliteara pudibunda	<i>Betula pubescens</i> , <i>Betula pendula</i> , <i>Alnus glutinosa</i>	2004, 2005	0.4	
Acantholyda posticalis	<i>Pinus sylvestris</i>	2008	0.3	

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)
Total forest area affected by woody invasive species	0.00

10.5 Comments to Table T10

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Disturbance by insects	Damages of needle and leaf eating insects in all forests and damages of bark beetles in state forests	
Disturbance by diseases	Mainly root diseases (mainly <i>Heterobasidion</i> root rot)	
Disturbance by other biotic agents	Game damages, especially moose (<i>Alces alces</i>) damages	Heavy damages occurred in 1980'ies due to high population density of moose. Intensive harvest of moose and felling of damaged spruce stands reduced the area of damaged forests.
Disturbance caused by abiotic factors	Damages caused by storm and unfavourable water conditions. Unfavourable water conditions (waterlogging) were caused mainly by beaver (<i>Castor fiber</i>).	Population of beaver consistently increased during last twenty years.. Higher figure of year 2005 was caused by the severe storm damages in January 2005.
Major outbreaks		
Invasive species		

Other general comments to the table

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
Eesti NSV metsade majandamise ja puidukasutuse arenduskava "Eesti mets 2010" (<i>Forest management and wood utilisation development plan until 2010</i>), Tallinn 1989	M	Wood removals from forest land	1988	
Felling volumes available at web-site of the Estonian Statistical Office on-line database http://pub.stat.ee/px-web.2001/1_Databas/Economy/12Forestry/12Forestry.asp	M	Wood removals from forest land	1991	
Calculations for FRA 2010, unpublished	H	Wood removals and value of removals	2000, 2005	NFI 1999–2008, theoretical assortmentation of the felling volume
Average roadside prices in state forest (by timber assortments sold from State Forest Management Centre) http://www.rmk.ee/files/Metsamaterjali%20hinnad%20kuude%201999%20C3%B5ikes%20alates%201999.xls	H	Value of removals (unit prices)	1999–2007	excl. VAT

11.2.2 Classification and definitions

Comply with FRA 2005 definitions.

11.2.3 Original data

FRA 2010 Category	Industrial roundwood removals				Woodfuel removals			
	1988	1991	2000	2005	1988	1990	2000	2005
Total volume (1000 m ³ o.b.)	n.a.	n.a.	8975	4565	n.a.	n.a.	2194	1590
... of which from forest	2540	1991	8931	4484	1065	1016	2183	1561
Unit value (local currency / m ³ o.b.)	n.a.	n.a.	468.4	591.6	n.a.	n.a.	129.0	209.4
Total value (1000 local currency)	n.a.	n.a.	4203635	2700408	n.a.	n.a.	283038	332852

11.3 Analysis and processing of national data

11.3.1 Calibration

Not applied.

11.3.2 Estimation and forecasting

No data available for prices and for removals outside forest land in 1990. The figures for the 1990 refer to the average of years 1988 and 1991.

Estimations for year 2000 and 2005 are based on theoretical assortment of the felling volume. Conversion factor 1.14 was used to calculate sawlogs' from volume under bark to volume over bark.

The data for 2000 refer to the average for the 3-year periods 1999–2001. The figures for the reporting year 2005 refer to the average for the 5-year period 2003–2007.

11.3.3 Reclassification into FRA 2010 categories

Not applied.

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.)	n.a.	8975	4565	n.a.	2194	1590
... of which from forest	2266	8931	4484	1040	2183	1561
Unit value (local currency / m ³ o.b.)	n.a.	468.4	591.6	n.a.	129.0	209.4
Total value (1000 local currency)	n.a.	4203635	2700408	n.a.	283038	332852

	1990	2000	2005
Name of local currency	RBL	EEK	EEK

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	1990 = Average (1988, 1991) – no data for removals outside forest land; 2000 = Average (1999 to 2001), NFI data 1999–2002; 2005 = Average (2003 to 2007), NFI data 2003–2008; Excludes oversize of logs;	Land reform program and market economy resulting in intensive cutting of forests in 1990es. Wood removals has increased rapidly until year 2000, since that the trend is decreasing.
Total volume of woodfuel removals	1990 = Average (1988, 1991) – no data for removals outside forest land; 2000 = Average (1999 to 2001), NFI data 1999–2002; 2005 = Average (2003 to 2007), NFI data 2003–2008;	
Unit value	Average roadside prices in state forest, excl. VAT	
Total value	excl. VAT	EEK = Estonian Kroon (1 € = 15.6566 EEK)

Other general comments to the table

Estimation of wood removals and value of removals based on theoretical assortmentation of the felling volume.

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
<u>Plant products / raw material</u>
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
<u>Animal products / raw material</u>
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
1. Online database of the Statistical Office of Estonia http://pub.stat.ee/px-web.2001/I_Databas/Economy/16Hunting/16Hunting.asp	M	Number of hides, skins	2005	According to number of hunted animals, assuming that hides, and skins are used from all killed animals
2. "Forest Management and Protection in Estonia", April 2003, Tartu Estonia, 58 p; ISBN 9949-10-040-2	L	Christmas trees	2003	Expert estimate
3.. Calculations for FRA 2010, unpublished	L	Wild meat	2005	Expert estimate for mass of the meat body of hunted moose, red deer, roe deer, wild boar,

12.2.2 Classification and definitions

Comply with FRA 2010 definitions

12.2.3 Original data

NWF products	Unit	2003	Value of the NWFP removed (1000 EEK)
Christmas trees	1000 pcs	200	30000
Sum. 6 Ornamental plants		200	30000

NWF products		Unit	2005
1. Moose	<i>Alces alces</i>	Number (pcs)	4612
2. Red deer	<i>Cervus elaphus</i>	Number (pcs)	130
3. Roe deer	<i>Capreolus capreolus</i>	Number (pcs)	10215
4. Wild boar	<i>Sus scrofa</i>	Number (pcs)	11332
5. Brown bear	<i>Ursus arctos</i>	Number (pcs)	23
6. Wolf	<i>Canis lupus</i>	Number (pcs)	18
7. Lynx	<i>Lynx lynx</i>	Number (pcs)	86
8. Red fox	<i>Vulpes vulpes</i>	Number (pcs)	7806
9. Raccoon dog	<i>Nyctereutes procyonoides</i>	Number (pcs)	3992
10. Mountain hare	<i>Lepus timidus</i>	Number (pcs)	345
11. European hare	<i>Lepus europaeus</i>	Number (pcs)	1221
12. Marten	<i>Martes martes</i>	Number (pcs)	1184
13. Badger	<i>Meles meles</i>	Number (pcs)	110
14. Beaver	<i>Castor fiber</i>	Number (pcs)	5758
15. Polecat	<i>Mustela putorius</i>	Number (pcs)	233
16. Mink	<i>Mustela vison</i>	Number (pcs)	213
Sum. 10 Skins and hides			47278

NWF products		Unit	2005	Value of the NWFP removed (1000 EEK)
1. Moose	<i>Alces alces</i>	1000 kg	595.5	23818
2. Red deer	<i>Cervus elaphus</i>	1000 kg	7.8	312
3. Roe deer	<i>Capreolus capreolus</i>	1000 kg	122.6	4903
4. Wild boar	<i>Sus scrofa</i>	1000 kg	453.3	18131
Sum. 12 Bush meat			1179.2	47164

12.3 Analysis and processing of national data

12.3.1 Calibration

Not applied.

12.3.2 Estimation and forecasting

The amount of Christmas trees for 2005 is repeated figure of 2003.

12.3.3 Reclassification into FRA 2010 categories

Not applied.

12.4 Data for Table T12

Rank	Name of product	Key species	Unit	NWFP removals 2005		NWFP category
				Quantity	Value (1000 EEK)	
1 st	Christmas trees	Norway spruce	Number (1000 pcs)	200	30000	6
2 nd	Wild meat	Moose	1000 kg	595.5	23818	12
3 rd	Wild meat	Wild boar	1000 kg	453.3	18131	12
4 th	Wild meat	Roe deer	1000 kg	122.6	4903	12
5 th	Wild meat	Red deer	1000 kg	7.8	312	12
6 th	Hides, skins	See 12.2.3	Number (1000 pcs)	47.278	n.a.	10
7 th						
8 th						
9 th						
10 th						
All other plant products						
All other animal products						
TOTAL					n.a.	

	2005
Name of local currency	Estonian Kroon (EEK)

12.5 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	Prices for bush meat are the prices of year 2005 (expert estimate 40 EEK/kg). The price of Christmas trees is for year 2003(expert estimate).
Total value	

Other general comments to the table

13 Table T13 – Employment

13.1 FRA 2010 Categories and definitions

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

13.2 National data

13.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Estonian Labor Force Survey results, Estonian Statistical Office on-line database available at http://pub.stat.ee/px-web.2001/I_Databas/Social_life/09Labour_market/04Employed_persons/02Annual_statistics/02Annual_statistics.asp	H	Employment, paid employment,	1990, 2000, 2005	
Ministry of Environment, expert estimate for FRA 2010	M	Employment in management of protected areas	1990, 2005	

13.2.2 Classification and definitions

Comply with FRA 2010 definitions. The Estonian Labour Force Survey is based on the definitions devised by the International Labour Organisation.

13.2.3 Original data

FRA 2010 Category	Employment (1000 years FTE)		
	1990	2000	2005
Employment in primary production of goods	9.8	9.5	6.0
...of which paid employment	9.7	7.4	3.9
Employment in management of protected areas	0.2	0.145	0.125

13.3 Analysis and processing of national data

13.3.1 Calibration

Not applied.

13.3.2 Estimation and forecasting

Self-employment was calculated as difference between total and paid employment

13.3.3 Reclassification into FRA 2010 categories

Not applied.

13.4 Data for Table T13

FRA 2010 Category	Employment (1000 years FTE)		
	1990	2000	2005
Employment in primary production of goods	9.8	9.5	6.0
...of which paid employment	9.7	7.4	3.9
...of which self-employment	0.1	2.1	2.1
Employment in management of protected areas	0.2	0.145	0.125

13.5 Comments to Table T13

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Employment in primary production of goods		
Paid employment / self-employment		
Employment in management of protected areas	Figures are the expert estimate (based on available documentation incl. studies on institutions) and maybe not converted to the FTE's.	

Other general comments to the table

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	<input checked="" type="checkbox"/>	Yes	
	<input type="checkbox"/>	No	
If Yes above, provide:	Year of endorsement	1997	
	Reference to document	http://www.riigiteataja.ee/ert/act.jsp?id=73663	
National forest programme (nfp)	<input checked="" type="checkbox"/>	Yes	
	<input type="checkbox"/>	No	
If Yes above, provide:	Name of nfp in country	Eesti metsanduse arengukava aastani 2010, <i>Estonian Forestry Development Programme until 2010</i>	
	Starting year	2002	
	Current status	<input type="checkbox"/>	In formulation
		<input checked="" type="checkbox"/>	In implementation
		<input checked="" type="checkbox"/>	Under revision
Reference to document or web site	http://www.riigiteataja.ee/ert/act.jsp?id=221835		
Law (Act or Code) on forest with national scope	<input checked="" type="checkbox"/>	Yes, specific forest law exists	
	<input type="checkbox"/>	Yes, but rules on forests are incorporated in other (broader) legislation	
	<input type="checkbox"/>	No, forest issues are not regulated by national legislation	
If Yes above, provide:	Year of enactment	2007	
	Year of latest amendment	2009	
	Reference to document	http://www.riigiteataja.ee/ert/act.jsp?id=13119089	

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	<input type="checkbox"/>	Yes
	<input checked="" type="checkbox"/>	No
If Yes above, indicate the number of regions/states/provinces with forest policy statements		
Sub-national Laws (Acts or Codes) on forest	<input type="checkbox"/>	Yes
	<input checked="" type="checkbox"/>	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)	“Eesti metsanduse arengukava aastani 2010” in English is available at http://www.metsad.ee/projekt/mak2010_eng.pdf
Law (Act or Code) on forest with national scope	Translation of Forest Act 2007 (without later amendments) is available in English at http://www.legaltext.ee/et/andmebaas/ava.asp?m=022
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	Minister of Environment	
Level of subordination of Head of Forestry within the Ministry		1 st level subordination to Minister
	x	2 nd level subordination to Minister
		3 rd level subordination to Minister
		4 th or lower level subordination to Minister
Other public forest agencies at national level	Environmental Board, Centre of Forest Protection and Silviculture	
Institution(s) responsible for forest law enforcement	Environmental Inspectorate	

Table 15b – Human resources

FRA 2010 Category	Human resources within public forest institutions					
	2000		2005		2008	
	Number	%Female	Number	%Female	Number	%Female
Total staff	137	23.27	227	27.3	241	31.53
...of which with university degree or equivalent	102	30.4	169	28.4	180	32.78

Notes:

1. Includes human resources within public forest institutions at sub-national level
2. Excludes people employed in State-owned enterprises, education and research, as well as temporary / seasonal workers.

15.3 Comments to Table T15

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Minister responsible for forest policy formulation		
Level of subordination of Head of Forestry within the Ministry	Official title Deputy Secretary General on Nature Conservation and Forestry	
Other public forest agencies at national level		
Institution(s) responsible for forest law enforcement		
Human resources within public forest institutions	Data as of beginning of the reference year.	

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 a duration of about three years.
Technician certificate or diploma	Qualification issued from a technical education institution consisting of 1 to 3 years post secondary education.
Publicly funded forest research centers	Research centers primarily implementing research programmes on forest matters. Funding is mainly public or channelled through public institutions.

16.2 National data

16.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Institute of Forestry and Rural Engineering, data submitted directly for FRA2010	H	Graduation of students with Masters and Bachelor degree, Professionals working in publicly funded forest research centres	2000, 2005, 2008	Institute of Forestry and Rural Engineering
Luuva Forestry School, data submitted directly for FRA2010	H	Graduation of students with forest technician certificate / diploma	2000, 2005, 2008	

16.2.2 Original data

See final reporting table

16.3 Analysis and processing of national data

16.3.1 Estimation and forecasting

Not applied.

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	1	0	10	20	15	13
Bachelor's degree (BSc) or equivalent	34	18	37	27	53	17
Forest technician certificate / diploma	36	8	41	12	38	8
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)	22	18	24	25	30	17
Master's degree (MSc) or equivalent	23	26	26	42	34	32
Bachelor's degree (BSc) or equivalent	2	100	7	57	7	57

Notes:

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

16.5 Comments to Table T16

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Graduation of students in forest-related education	In 2006 the first graduation according to the Bologna principles, i.e. bachelor study 3 years. Before 2006, bachelor program 4 years.	
Professionals working in public forest research centres		

Other general comments to the table

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17 Table T17 – Public revenue collection and expenditure

17.1 FRA 2010 Categories and definitions

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

17.2 National data

17.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Yearbook "Forest 2007", Tartu 2008; http://www.metsad.ee/mets_xx/10_majandusylevaade_mets-2007.pdf	H	Transfer payments domestic and external funding	2005	Transfer payments by The Estonian Agricultural Registers and Information Board and Private Forest Centre
Calculations made by Estonian Private Forest Centre, unpublished	H	Transfer payments, domestic funding	2000	Transfer payments by Private forest Centre
Calculations made by Estonian Centre of Forest Protection and Silviculture, unpublished	H	Transfer payments, domestic funding for forest management planning of private forests	2000, 2005	Transfer payments from state budget

17.2.2 Classification and definitions

Comply with FRA 2010 definitions

17.2.3 Original data

Institution responsible for transfer payment	Domestic funding (1000 EEK)		External funding (1000 EEK)		Total (1000 EEK)	
	2000	2005	2000	2005	2000	2005
Transfer payments from state budget for forest management planning	4250.0	6500.0	0.0	0.0	4250.0	6500.0
Transfer payments made by Private Forest Centre	427.2	11102.1	0.0	0.0	427.2	11102.1
Transfer payments made by Agricultural Registers and Information Board	0.0	0.0	0.0	17420.0	0.0	17420.0
Total transfer payments	4677.2	17602.1	0.0	17420.0	4677.2	35022.1

17.3 Analysis and processing of national data**17.3.1 Calibration**

Not applied.

17.3.2 Estimation and forecasting

Not applied.

17.3.3 Reclassification into FRA 2010 categories

Not applied.

17.4 Data for Table T17**Table 17a - Forest revenues**

FRA 2010 Categories	Revenues (1000 local currency)	
	2000	2005
Forest revenue	n.a.	n.a.

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

FRA 2010 Categories	Domestic funding (1000 EEK)		External funding (1000 EEK)		Total (1000 EEK)	
	2000	2005	2000	2005	2000	2005
Operational expenditure	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Transfer payments	4 677	17 602	0.0	17 420	4 677	35 022
Total public expenditure	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
If transfer payments are made for forest management and conservation, indicate for what specific objective(s) - Please tick all that apply.	<input checked="" type="checkbox"/>	Reforestation				
	<input checked="" type="checkbox"/>	Afforestation				
	<input checked="" type="checkbox"/>	Forest inventory and/or planning				
	<input checked="" type="checkbox"/>	Conservation of forest biodiversity				
	<input type="checkbox"/>	Protection of soil and water				
	<input checked="" type="checkbox"/>	Forest stand improvement				
	<input type="checkbox"/>	Establishment or maintenance of protected areas				
	<input checked="" type="checkbox"/>	Other, specify below				
		Cultivation of planting stock, small-scaled forestry projects of economic cooperation, cocoon watch of forests, training and extension services for private forest owners, support measures for associations of private forest owners, melioration of forest areas				

17.5 Comments to Table T17

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Forest revenue	No published data available for years 2000 and 2005. Data are located in different datasets e.g. Estonian Statistical Office is able to provide from National Accounts the Employers' social contributions (D.121) and Other taxes on production (taxes on land, pollution resulting from production activities, charge for special exploitation of water, tax on use of motor vehicles, etc - D.29): relevant figures for year 2000 are 528,3 and 60,8 million EEK and for year 2005 1 006,4 and 86,6 million EEK (including data for NACE 02, 20, 21, 361). For the reference years Tax and Customs Board cannot provide relevant figures for VAT and other taxes according to same categories.	
Operational expenditure	2 major forest administration institutions are part of a larger public agencies and it is not possible to separate the forest sector component of the agency's total expenditure.	
Transfer payments		No external funding (EU) was available for transfer payments up to year 2005.

Other general comments to the table

Definition of forest revenue is not clear enough and further clarification (references to specific classifications and categories) is needed in the next round of FRA.