Forestry Department
Food and Agriculture Organization of the United Nations

GLOBAL FOREST RESOURCES ASSESSMENT 2010

COUNTRY REPORT

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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:

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Introduction

The work in this report was conducted by the Icelandic Forest Inventory (IFI) which is a cluster project at the Iceland Forest Research (IFR). IFR is a division of the Iceland Forest Service (IFS), the official forestry agency in Iceland. One of the main projects of the IFI is a National Forest Inventory. Other inventories and forest mensuration work are also part of IFI work.

Although all tables are filled in by one person, many other people have taken a part in this work .
First I want to mention mr. Einar Gunnarsson at the Icelandic Forestry Association who did, as in FRA2005 prepare some of the data used in T11 and T12. My co-worker at IFI mr. Björn Traustason did the necessary GIS analysis. Dr. Borgþór Magnússon and his staff from the Icelandic Institute Of Natural History gave information on wildfires. The five directors of the regional afforestation projects contributed with essential information for tables 13 to 17 and Dr. Bjarni D. Sigurdsson, professor and the head of the forestry study line at the Icelandic Agricultural University gave information about higher forestry education. The finance director of IFS, mr. Gunnlaugur Guðjónsson gave information used in table 17.
Finally Dr. Þröstur Eysteinsson, vice director of Iceland Forest Service contributed with data in table 13 – 15 and conducted an in country review of the report.
I want to use the opportunity to thank all these people. Without their input this work would not be finalised.

May 2009.
Arnór Snorrason

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
New data from a sample plot inventory of the settlement area of Reykjavík city	H	Estimates of canopy cover of trees reaching more than 5 m at maturity	2008	Work conducted by IFI
New data from the first sample plot inventory of forests and woodlands in Iceland	H	Area estimates built on sample plots	2005-2008	Work conducted by IFI. Data from 4 of 5 years of the first cycle.
FAOSTAT		Total surface area, water bodies		
Landmælingar Íslands (E: National land survey of Iceland). CORINE landcover classification for 2000 and 2006 Responsible: Kolbeinn Árnason kolbeinn@lmi.is	H	Urban areas	2000 and 2006	As an estimate for Other land with tree cover.

Unpublished references:

New results of the first sample plot inventory in Icelandic woodlands and forests. These results have not been published yet but the methodology of the inventory will be published soon in the country report book of the Cost E43 project. See:

Snorrasson, A. 2009. Iceland country report. In: Tomppo, E., Gschwantner, Th. (eds). National Forest Inventories in Europe, USA and New Zealand. Managing Forest Ecosystems. Vol xx. Springer, Dordrecht.

New data from a sample plot inventory of trees and shrubs in Reykjavík city. Directed by Iceland Forest Inventory.

Results tables for CORINE land cover classification. Source: National land survey of Iceland . CORINE landcover classification for 2000 and 2006. Responsible specialist: Kolbeinn Árnason, kolbeinn@lmi.is

1.2.2 Classification and definitions

A general official classification of forests and woodlands has been defined in accordance to the demand of the Kyoto protocol of the UNFCCC. (See: http://unfccc.int/national_reports/initial_reports_under_the_kyoto_protocol/items/3765.php

To define area as a forest it has to pass these minimum requirements:

- tree crown cover: 10 percent
- minimum land area: 0.5 hectare
- tree height: 2 meters

Further IFI has added practical requirements that are in accordance to international definitions:

- minimum width of forest: 20 m
- maximum permanent gap in forest. 0.5 ha

In the new sample plot inventory (NSPI) these definitions are incorporated. The inventory is also constructed in such a manner that classes can be broken up based on international definitions of forest, such as the FAO definition with minimum 5 m height at maturity.
The two traditional woodland classes of Iceland are the two main strata of NSPI with different sample intensity. These classes are the self-regenerated birch woodlands of natural origin (birch woodlands: BW) and human induced plantation/seeding of both native tree species and exotics (cultivated forest: CF).
Instead of using the old data from former surveys to classify BW, data and analysed results from NSPI is used to classify forests and other wooded land after the FAO classification.

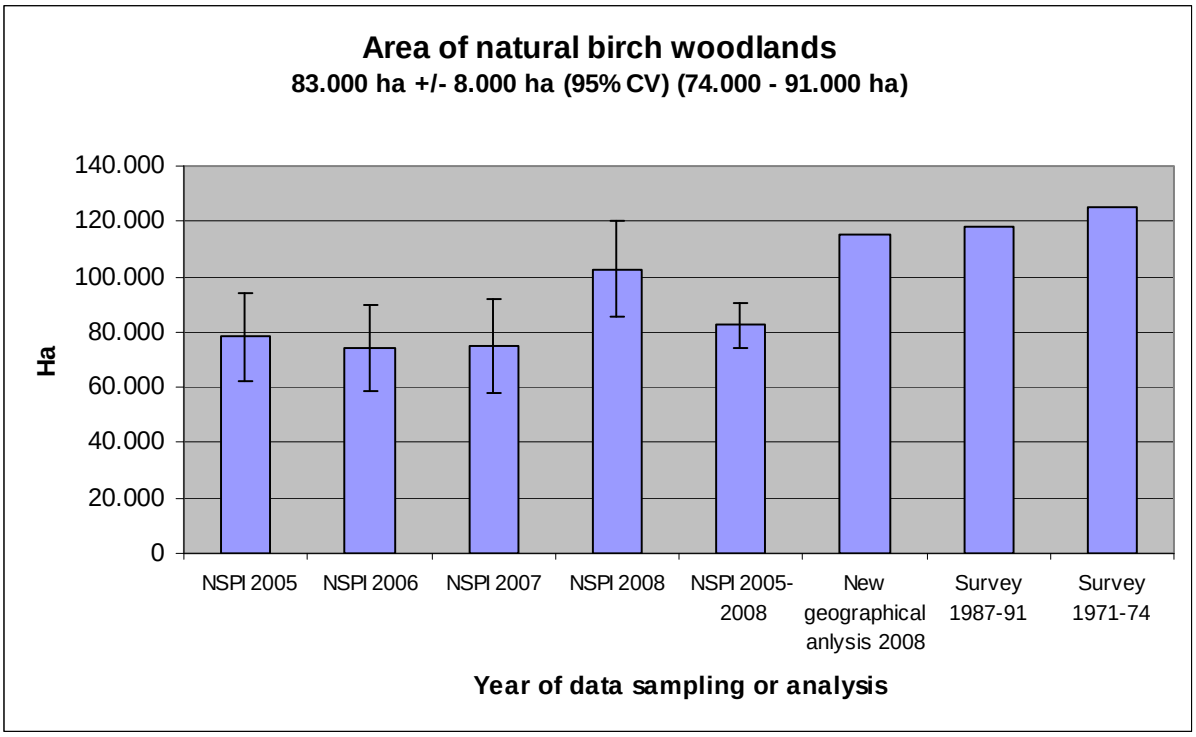
As in FRA2005 a part of urban areas is defined as; Other land with tree cover. This is an expert estimate based on data from a sample plot inventory conducted by IFI in 2008 in Reykjavík city which is the biggest urban area in Iceland. A mean canopy cover of the whole area was estimated at 9.9 %.

National class	Definition
Natural birch woodlands (BW)	All land dominated by self-regenerated mountain birch (*Betula pubescens*) of natural origin. The mean height can vary from 0.3 m to 10.0 m.
Cultivated forests (CF)	Forests originating from plantation/seeding of trees of both exotic and native species.
Other land with trees	A part of urban areas

1.2.3 Original data

There have been two geographical surveys on BW: one in 1972- 1975 and a second in 1987-1991. Both where based on in-field delineation of polygons with woodland cover connected with optical estimates of mean height class and canopy cover etc.
In the latter survey some field measurements were done that partially improved the first survey, but it was not a repetition of the former one and can therefore not give any possibilities of time series estimation. The latest geographical analysis of BW resulted in 115 400 ha of natural birch woodland. In that figure, CF within BW was excluded for the first time (4000 ha) (Traustason & Snorrason 2008).

NSPI data give a new estimate of the area of BW and for the first time with confidence limits: **83000 ha +/- 8000 ha (95% CL)**

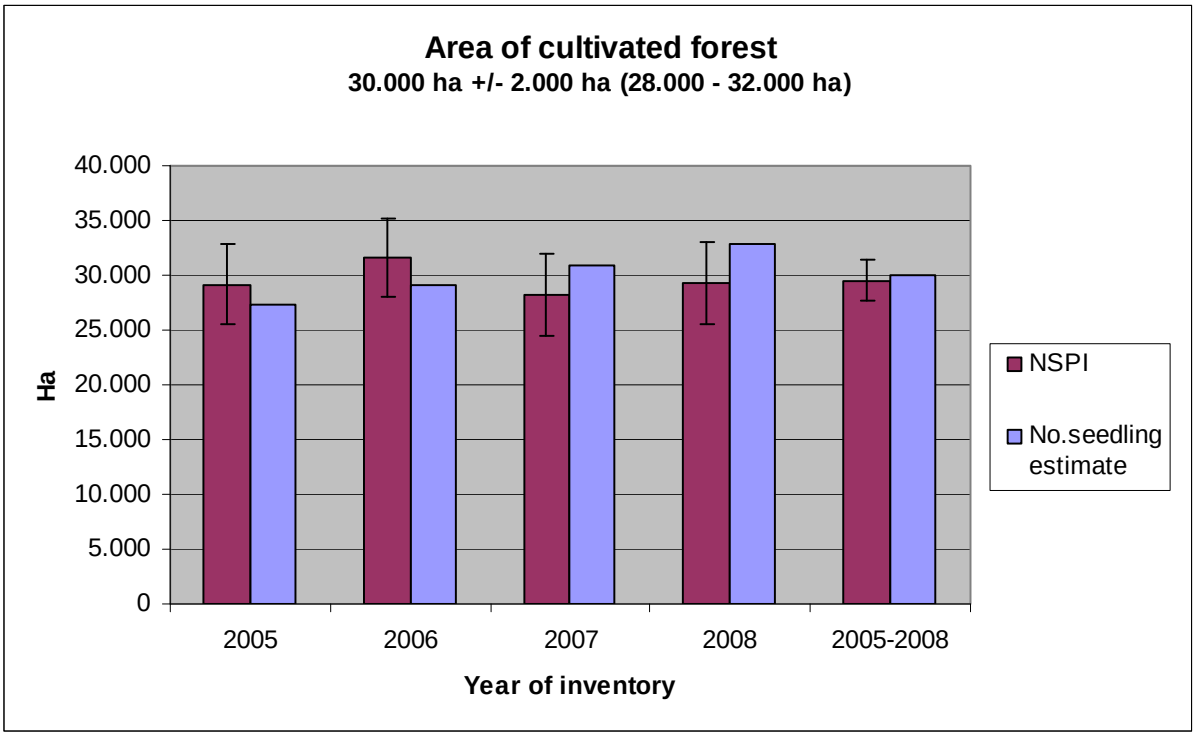


Classification of BW into different FRA2010 land classes can be done through NSPI. Of 83000 ha, 3000 ha are classified as forest (> 5m), 46000 ha as woodland (2-5 m) and 34000 ha as shrubland (<2 m). Woodland and shrubland are defined as other wooded land, together 80000 ha. These new data show other results than estimated in FRA2005. Both the total area of BW and the classification into forest and other wooded land are different. The only

explanation lies in much better data in NSPI than in the old surveys, which obviously overestimated both the total area and the forest part of BW.

It has to be pointed out that the differences in these two estimates have nothing to do with changes over time, i.e. from 1971-75 to 2005-2008. No such changes in land use have taken place that can explain this difference as deforestation. On the contrary, land use changes have been in the opposite direction with decreasing grazing pressure from domestic animals.

Recently the first country-wide geographical overview of all CF was carried out (Traustason & Snorrason 2008). It was an aggregation of geographical data from different sources, as management plans etc. In this overview the total area of CF was estimated at 41400 ha. For some time it has been known that the plantation reports through management plans are overestimating the area of CF so the lower estimate of the NSPI was not unexpected.
Until now CF has been indirectly estimated after high quality annual statistics of the number of seedlings planted. In this report we will use instead data directly from NSPI. NSPI data give a new estimate of the area of CF and for the first time with confidence limits: **30000 ha +/- 2000 ha (95% CL)**



As shown in figure 2, the new CF estimate does not differ much from the estimate using the old indirect method of number of seedling planted annually.

NSPI also shows that part of the CF can not be classified as FAO defined forest (equal or higher than 5 m at maturity). It is estimated in the field that 15% of CF will not reach FAO-forest definition and instead grow into woodland (2-5 m at maturity).
In the field the age of the plantations in the plots are estimated so it is possible to extract information of different area of CF at different times as requested in Table T1.

A new sample plot inventory of trees in the urban area of Reykjavik showed that mean canopy cover of trees was 9.9% of the total urban area of the city. Most of the trees are

growing in private gardens in areas defined in the CORINE land classification system as "Discontinuous urban fabric". It is an expert estimate that in these areas canopy cover will exceed well over 10% and can be defined as Other land with tree cover.

Discontinuous urban fabric was estimated in the new Icelandic CORINE project to be:

8900 ha in the year 2000 and 9700 ha in the year 2006.

Reference:

Bjorn Traustason and Arnor Snorrason. Spatial distribution of forest and woodlands in Iceland in accordance with the CORINE land cover classification. *Icelandic Agricultural Science.* 21. p 39-47.

1.3 Analysis and processing of national data

1.3.1 Calibration

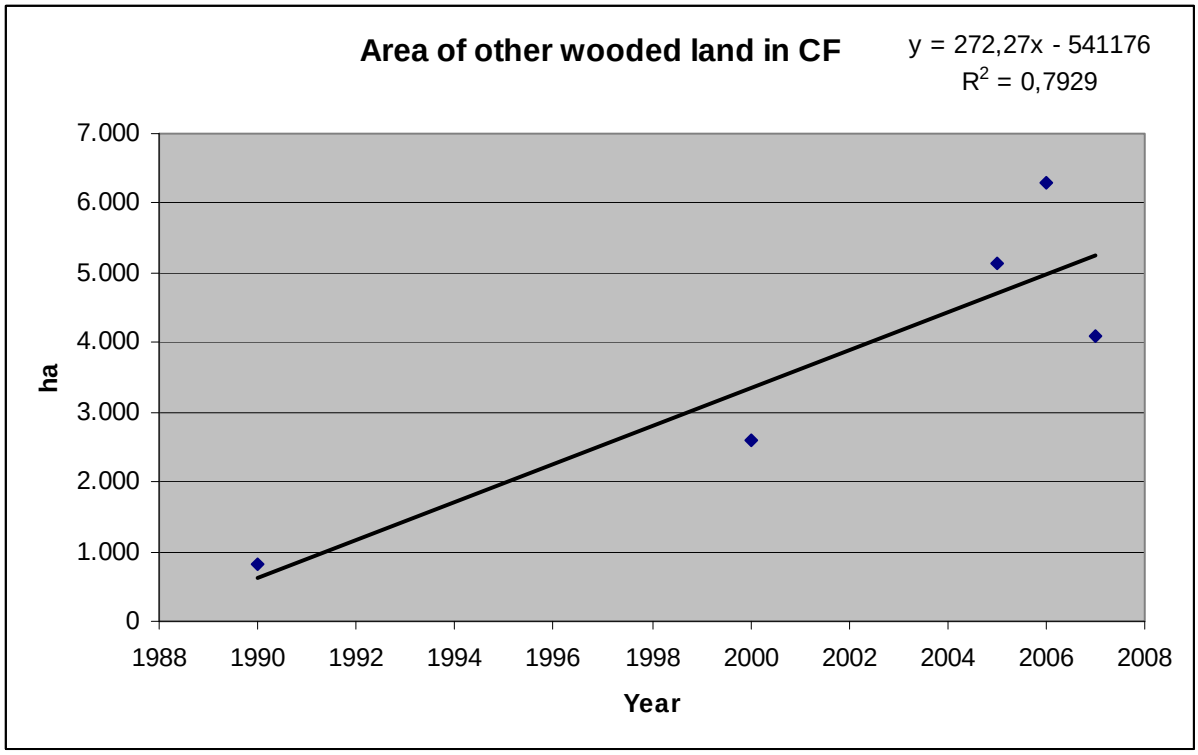
No calibration was done on the data.

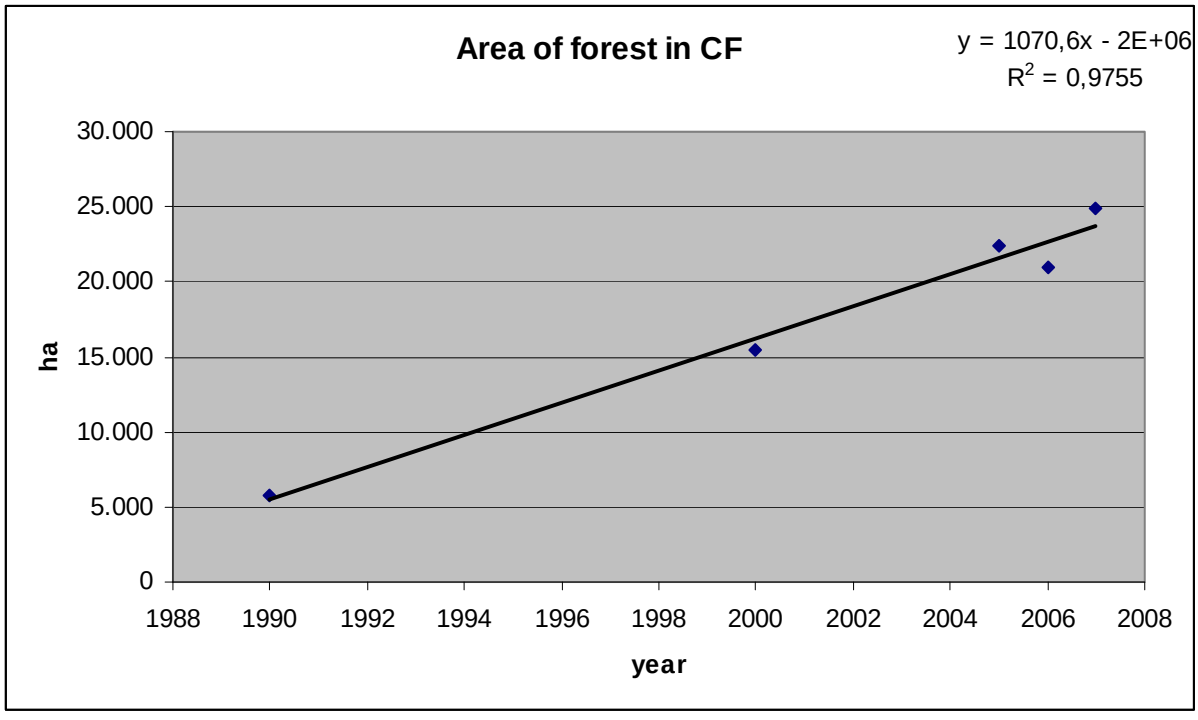
1.3.2 Estimation and forecasting

For BW we used the results from NSPI directly and assumed that the BW has not changed over the time period and will not change in the nearest future (2010).

For CF we also used the new data from NSPI and the age of the plantations to estimate the area of CF at different times, that is in 1990, 2000 and 2005. The 1990 and 2000 estimates are built on all four years of measurements (2005-2008) but the 2005 estimate is built on the three last measurement years (2006-2008).

To estimate a forecasted figure for 2010 we used linear regression with added information of forest area for the year 2006 and 2007 built on NSPI measurements in 2007 and 2008. (See figures).





Thus, the CF estimates are (in ha):

Year	1990	2000	2005	2010
Forest	5700	15400	22400	26900
OWL	800	2600	5100	6100

Other land with tree cover was estimated with extrapolation of the area of Discontinuous urban fabric for the year 1990 and 2010, and with interpolation for the year 2005. Actual estimate of Discontinuous urban fabric for the year 2000 was used.

8900 ha in the year 2000 and 9700 ha in the year 2006.

1.3.3 Reclassification into FRA 2010 categories

Year	1990	2000	2005	2010
Forest	**8700**	**18400**	**25400**	**29900**
BW	3000	3000	3000	3000
CF	5700	15400	22400	26900
OWL	**80800**	**82600**	**85100**	**86100**
BW	80000	80000	80000	80000
CF	800	2600	5100	6100
OLT	**7600**	**8900**	**9600**	**10300**

1.4 Data for Table T1

FRA 2010 categories	Area (1000 hectares)			
	1990	2000	2005	2010
Forest	8.7	18.4	25.4	29.9
Other wooded land	80.8	82.6	85.1	86.1
Other land	9935.5	9924.0	9914.5	9909.0
...of which with tree cover	7.6	8.9	9.6	10.3
Inland water bodies	275	275	275	275
Total for country	**10 300**	**10 300**	**10 300**	**10300**

1.5 Comments to Table T1

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Forest		Since 1990 4-6 million seedling has been planted in various afforestation programs. These activities are the main reason for the increase in forest area.
Other wooded land		
Other land		
Other land with tree cover		
Inland water bodies		

Other general comments to the table
The use of NSPI data resulted in lower area estimates for both forest and other wooded land than reported in FRA2005. The main reason is the lower area estimates of the natural birch woodlands. It must be kept in mind that the confidence limits of the area estimates of the natural birch woodlands is high (+/- 8000 ha).

Expected year for completion of ongoing/planned national forest inventory and/or RS survey / mapping	
Field inventory	2009
Remote sensing survey / mapping	not ongoing

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
New data from the first sample plot inventory of forests and woodlands in Iceland	H	Area estimates build on sample plots	2005-2008	Work conducted by IFI. Data from 4 of 5 years of the first cycle.

2.2.2 Classification and definitions

National class	Definition

See text in 2.2.3.and table in 2.3.3.

2.2.3 Original data

The data variable from the NSPI used to describe the ownership of forest is a classification variable that identifies the authority or guardianship of the forest area.

2.3 Analysis and processing of national data

2.3.1 Estimation and forecasting

Forest area of birch woodland (BW) is estimated to 3000 ha (T1) 60% is owned by IFS. 20% by municipality and 20% is privately owned by individuals according to the NSPI. These are assumed to be constant over time.
Forest area of cultivated forest (CF) is estimated through data in NSPI as described in 2.2.3. The ages of the plantations are used to estimate change in time.

	1990	2000	2005
Public ownership	2340	4235	5119
Private ownership individuals	1918	7295	12401
Private ownership institutions	1442	3870	4879

2.3.2 Reclassification into FRA 2010 categories

Table describing the relationship between classes for the variable and the T2 classes:

	Public ownership	Private ownership individuals	Private ownership institutions
State Forest Service	x		
Forest Associations			x
Regional Forest Projects		x	
Land reclamation forest project			x
Soil Conservation Service of Iceland	x		
Farmes forestry project		x	
Private forests		x	
Munipical forests	x		

The ownership of the forest follows mainly these relations although there are minor exceptions. It is especially the Land reclamation forest project class where the minority of the areais in Public ownership (municipalities) or Private individual ownership (private landowners or farmers).

2.4 Data for Table T2

Table 2a - Forest ownership

FRA 2010 Categories	Forest area (1000 hectares)		
	1990	2000	2005
Public ownership	4.7	6.6	7.5
Private ownership	4.0	11.8	17.9
...of which owned by individuals	2.5	7.9	13.0
...of which owned by private business entities and institutions	1.4	3.9	4.9
...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	**8.7**	**18.4**	**25.4**

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?		Yes
	x	No
If **No** above, please describe below how the two differ:		
In most cases the owner of the trees is the same as owner of the land but there are some exceptions. The most frequent exception is when the farmer living on a farm ownes the forest he has grown but the land is owned by the state. Other exceptions are the Forestry Society forests that are often grown on land owned by the municipalities.		

Table 2b - Holder of management rights of public forests

FRA 2010 Categories	Forest area (1000 hectares)		
	1990	2000	2005
Public Administration	4.7	6.6	7.5
Individuals	0	0	0
Private corporations and institutions	0	0	0
Communities	0	0	0
Other	0	0	0
TOTAL	**4.7**	**6.6**	**7.5**

2.5 Comments to Table T2

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Public ownership		
Private ownership		
Other types of ownership		
Management rights	Management right in public forest as practiced abroad is not known in Iceland. On the other hand a minor part of the Forest Societie's forests are planted and "managed" by individuals who foster small areas. How big this part is, is unknown.	

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
GIS built on the natural birch woodlands survey*	H	Native birch woodlands	´72–´75 And ´87-´91	Fieldwork for the original was done in 1972- 1975 but in 1987-1991 some field assessments were done that partially improved the former survey, but it did not replace the former survey.
New data from the first sample plot inventory of forests and woodlands in	H	Area estimates built on	2005-2008	Work conducted by IFI. Data from 4 of 5 years of the first cycle.

Iceland		sample plots		

* Same references and sources as for T1

3.2.2 Classification and definitions

3.2.3 Original data

Native birch forests:

The natural birch woodland are often not fenced and therefore used for grazing of domestic animals, mostly sheep. In more recent times they are also used for recreation and can therefore be classified as woodland for social services. They also play an important role in protection of soil and water and conservation of biodiversity. A small part of the woodlands are selectively cut regularly and the wood sold mostly as firewood.

If we just look at the plots that represent the estimated area of natural birch forest (3000 ha), 60% are IFS forests. They are protected from grazing and managed sustainability by selective cutting or without intervention. They are used by the public as recreation areas. Given these many functions they can be defined as multiple-use forests. The remaining (40%) natural birch forests are open for grazing and should be defined as other function.

A small part of the natural birch forest falls under nature conservation as it is located within national parks or nature reserves. The area of natural birch forest (reaching 5 m or more in height) in the GIS is 2799 ha. 107 ha of that area is within a national park and should be defined as conservation of biodiversity.

Cultivated forest.

The data variable from the NSPI used to describe the primary designated function of forest is a classification variable that describes the usage of the forest.

Table of the relationship between classes for the variable and the T3 classes:

	Pro-duction	Protection of soil and water	Conserv-ation of bio-diversity	Social services	Multible use	Other	No/un-known
Multible					x		
Wood producton	x						
Land reclamation		x					
Recreation				x			
Summerhouse				x			
Trial field				x			
Seed production	x						
Cristmaas tree	x						
Shelter forest		x					
Natural conservation			x				
Other						x	
Undefinded							x

3.3 Analysis and processing of national data

3.3.1 Estimation and forecasting

Table 3a

For CF the ratio between classes was extracted from NSPI and calibrated towards the results in FRA2010 Table 1. Change in ratio between classes was used to estimate a class ratio for the year 2010. A simple linear regression was used.

	1990	2000	2005	2010
Production	792	2893	4293	6000
Protection of soil and water	285	1386	2688	3766
Conservation of biodiversity	0	0	0	0
Social services	2114	4653	5787	5836
Multible use	2451	6314	9632	11298
Other	57	154	0	0
No/unknown	0	0	0	0
Total	**5700**	**15400**	**22400**	**26900**

To get a final result the forest part of the BW has to be added. 107 ha of 2799 ha can be classified as conserved. Calibrated towards 3000 ha it will be 115 ha. The rest, that is 3000 – 115 ha, will go to multiple use (60 % = 1731 ha) and to Other (Grazing forest = 40% = 1154 ha).

	1990	2000	2005	2010
Production	792	2893	4293	6000
Protection of soil and water	285	1386	2688	3766
Conservation of biodiversity	115	115	115	115
Social services	2114	4653	5787	5836
Multible use	4183	8045	11363	13029
Other	1211	1308	1154	1154
No/unknown	0	0	0	0
Total	**8700**	**18400**	**25400**	**29900**

Table 3b

See comment in 3.5 about table 3b. Forest area within protected areas is assumed to be the same as the Conservation of biodiversity class in Table 3a. Forest area under sustainable forest management is defined rather narrowly and only includes areas of IFS forests where the new thorough management plans have been implemented which is only a small part of the IFS forests. The table hereunder gives an overview of CF:

year	ha
1990	855
2000	1.117
2005	1.290
2010	1.422

The 2010 estimate is made by simple linear regression of the three other figures that are aggregated from NSPI.

1800 ha or 60% of defined forest in BW is added to all years of the table above. So forest under sustainable forest management will be:

year	ha
1990	2.655
2000	2.917

2005	3.090
2010	3.222

Forest area with management plans is more common than forest area under sustainable management. Almost all forest areas of the state and of the regional forest projects are managed with long term forestry planning. About 20% of the forest area of the forestry associations has also been planned. The same variable as used in analysis in T2 can be used to sum up this classification for CF.

year	ha
1990	3.260
2000	11.064
2005	17.290
2010	21.192

The 2010 estimate is made by simple linear regression of the three other figures that are aggregated from NSPI.
1800 ha or 60% of defined forest in BW is added to all years of the table above. So forest with management plans will be:

year	ha
1990	5.060
2000	12.864
2005	19.090
2010	22.992

3.3.2 Reclassification into FRA 2010 categories

3.4 Data for Table T3

Table 3a – Primary designated function

FRA 2010 Categories	Forest area (1000 hectares)			
	1990	2000	2005	2010
Production	0.79	2.89	4.29	6.00
Protection of soil and water	0.29	1.39	2.69	3.77
Conservation of biodiversity	0.12	0.12	0.12	0.12
Social services	2.11	4.65	5.79	5.83
Multiple use	4.18	8.04	11.36	13.03
Other (please specify in comments below the table)	1.21	1.31	1.15	1.15
No / unknown	0	0	0	0
TOTAL	**8.70**	**18.40**	**25.40**	**29.90**

The category; Others are mostly forests in areas open to grazing.

Table 3b – Special designation and management categories

FRA 2010 Categories	Forest area (1000 hectares)			
	1990	2000	2005	2010
Area of permanent forest estate	0	0	0	0
Forest area within protected areas	0.12	0.12	0.12	0.12
Forest area under sustainable forest management	2.66	2.92	3.09	3.22
Forest area with management plan	5.06	12.64	19.09	22.992

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	Almost all areas in other are forest used as grazing areas.	
No / unknown designation		
Area of permanent forest estate	The forestry act in Iceland does not designate any areas permanently as forest area. So no forests are classified hereunder.	
Forest area within protected areas	This is the forest area within national parks	
Forest area under sustainable forest management	Only a part of the forest area of the IFS has gone through very thorough management planning. These plans are reviewed and implementation is under control.	
Forest area with management plan	Forests of IFS, the regional afforestation projects and about 20% of the Forestry Associations forests have undergone management planning and are defined hereunder	

Other general comments to the table

4 Table T4 – Forest characteristics

4.1 FRA 2010 Categories and definitions

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

4.2 National data

4.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
New data from the first sample plot inventory of forests and woodlands in Iceland	H	Area estimates build on sample plots	2005-2008	Work conducted by IFI. Data from 4 of 5 years of the first cycle.

4.2.2 Classification and definitions

National class	Definition

4.2.3 Original data

See chapter 4.5. for definition of classes. Of planted forest of introduced species only the area of planted exotics are used (see discussion in chapter 4.5). The area classified by species can be extracted from the NSPI database. Native species are: *Betula pubescens, Salix phylicifolia, Sorbus aucuparia* and *Populus tremula.*

4.3 Data for Table T4

Table 4a

FRA 2010 Categories	Forest area (1000 hectares)			
	1990	2000	2005	2010
Primary forest	0	0	0	0
Other naturally regenerated forest	3.0	3.0	3.0	3.0
...of which of introduced species	0	0	0	0
Planted forest	5.7	15.4	22.4	26.9
...of which of introduced species	4.5	12.4	17.4	20.9
TOTAL	**8.7**	**18.4**	**25.4**	**29.9**

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

4.4 Comments to Table T4

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Primary forest	Although the natural birch forest originates from primary forest it is drastically affected by humans and not defined as such.	
Other naturally regenerating forest	Natural regeneration of other species than birch is currently rare so here the area of natural birch forest is used	
Planted forest	Almost all CF are planted so the area of CF is used in the class.	
Rubber plantations	Not applicable	
Mangroves	Not applicable	
Bamboo	Not applicable	

Other general comments to the table
It is difficult to define what forest of introduced species is. It is clear that all plantations of exotics are introduced. But what about plantations of native birch? Almost all plantations of native birch are of native but non-local provenances. Only a few provenances from South-east Iceland, that have the best growth, are used all around the country. Use of local provenances is rare because they often are shrubby and grow slowly. Strictly, one can define the native birch plantations as introduced although they are defined not as introduced in this report.

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
New data from the first sample plot inventory of forests and woodlands in Iceland	H	Area estimates build on sample plots	2005-2008	Work conducted by IFI. Data from 4 of 5 years of the first cycle.

5.2.2 Classification and definitions

National class	Definition

Introduced species are defined in same way as in T4.

5.2.3 Original data

In the NSPI there is a variable that describes the original status of the land transformed to cultivated forest. So it is rather straight forward to estimate the afforestation and reforestation areas from NSPI. No plantation measured in NSPI and younger than from 1987 was classified as reforestation so the two reforestation lines in T5 will be zero.
On the other hand areal information of natural expansion of forest is currently lacking (That is only expansion of the BW). Next year Icelandic Forest Inventory will start remapping the natural birch woodland which is planned to take 10 years. Gradually, information of woodland and forest expansion will then be available.

5.3 Analysis and processing of national data

5.3.1 Estimation and forecasting

For the years 1988-1992 and 1998-2002 complete series can be extracted from the NSPI. For the period 2003-2007 the data are only complete for 2003 and 2004. The mean annual afforestation area for these two years is used as an average for the period 2003-2007.

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	610	1270	1750	540	1000	1310
Reforestation	0	0	0	0	0	0
...of which on areas previously planted	0	0	0	0	0	0
Natural expansion of forest	n.a.	n.a.	n.a.	0	0	0

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

5.5 Comments to Table T5

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Afforestation		
Reforestation		
Natural expansion of forest		

Other general comments to the table
In 1990 the government started the first regional afforestation program on East-Iceland to encourage farmers and private landowners to start afforestation on their lands. At the same time country wide land reclamation afforestation program was launched and has been going on ever since. The actors there are the local forestry associations and municipalities around the country. More regional programs in other regions where started around year 2000 and now five regional programs are ongoing covering all regions in Iceland. That is the explanation of increasing afforestation in Iceland.

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
New data from the first sample plot inventory of forests and woodlands in Iceland*	H	Area estimates built on sample plots	2005-2008	Work conducted by IFI. Data from 4 of 5 years of the first cycle.
Project assessing the growth potential of eleven tree species in Iceland**	H	Mean stem volume/ha	1999-2001	Used to calculate mean growing stock/ha for each 10-year age interval for eleven tree species
Single tree volume functions for eleven tree species in Icelandic Forestry ***	H	stem volume /tree	2001-2002	Used in the calculation of growing stock of measured plots in the growth potential project

* Same references and sources as for T1

** Published references:

Snorrason, A. & S. F. Einarsson (2001). Landsúttekt á skógræktarskilyrðum. Áfangaskýrsla 1997-2001 fyrir Vestfirði. *Rit Mógilsár Rannsóknastöðvar Skógræktar* 7: 64.

Snorrason, A. & S. F. Einarsson (2002). Landsúttekt á skógræktarskilyrðum. Áfangaskýrsla 1997-2002 fyrir Suðurland og Suðvesturland. *Rit Mógilsár Rannsóknastöðvar Skógræktar* 14: 68.

Snorrason, A., S. F. Einarsson, T. Traustason & B. Fanney D (2001). Landsúttekt á skógræktarskilyrðum. Áfangaskýrsla 1997-2001 fyrir Norðurland. *Rit Mógilsár Rannsóknastöðvar Skógræktar* 6: 71.

Snorrason, A., L. Heiðarsson & S. F. Einarsson (2002). Landsúttekt á skógræktarskilyrðum. Áfangaskýrsla 1997-2002 fyrir Austurland. *Rit Mógilsár Rannsóknastöðvar Skógræktar* 13: 68.

Snorrason, A., T. Traustason, S. F. Einarsson & B. Fanney D (2001). Landsúttekt á skógræktarskilyrðum. Áfangaskýrsla 1997-2001 fyrir Vesturland. *Rit Mógilsár Rannsóknastöðvar Skógræktar* 5: 70.

Unpublished references:

Raw data and analyzed and aggregated data made from the growth potental assessment. These data are stored at the IFI . Head of the IFI is Arnór Snorrason (email: arnor@skogur.is).

*** Published references:

Snorrason A & Einarsson S F 2006. Single tree biomass- and stem volume functions for eleven tree species used in Icelandic forestry. Icelandic Agricultural Sciences 19. p 15-24.

6.2.2 Classification and definitions

National class	Definition

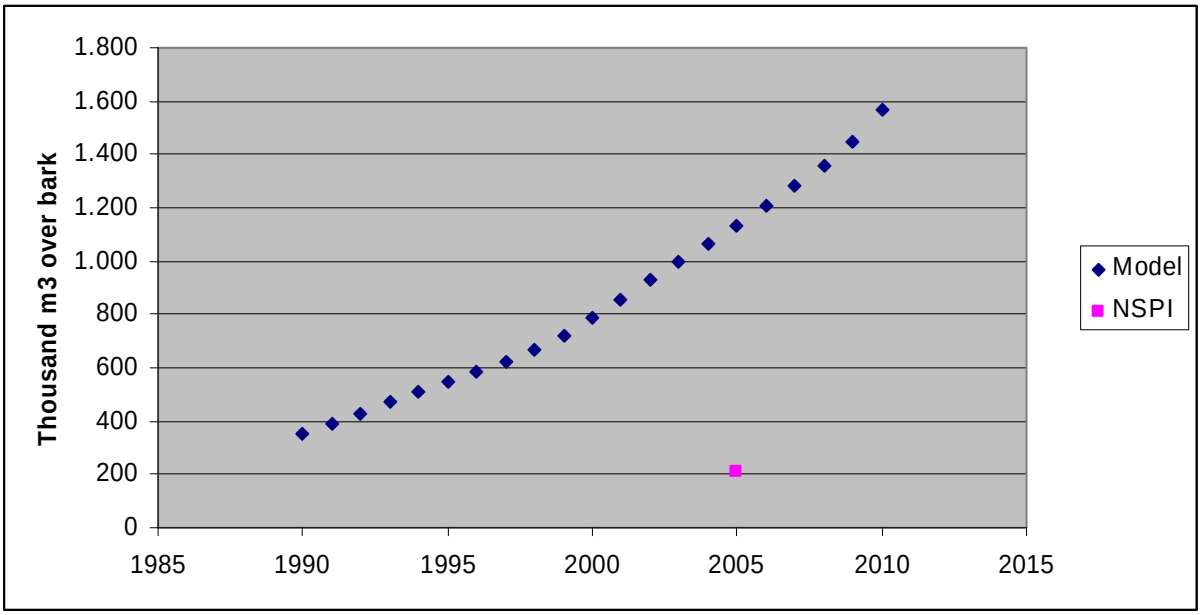
National classification is identical to the FRA2010 classification.

6.3 Analysis and processing of national data

6.3.1 Estimation and forecasting

Cultivated forest: The main data source for CF is NSPI. Tree measurements done in NSPI are used to estimate growing stock. Stem volume of trees is estimated with single tree volume functions (Snorrason & Einarsson 2006). Tree growth measurements in NSPI make it also possible to calculate current annual increment of the volume of the growing stock. It is therefore possible to estimate growing stock of CF for the year 2005. This can also be done for the woodland part of CF.

To estimate the growing stock of CF in other reporting years (1990, 2000 and 2010) a growth model built on extensive field measurements carried out 1999-2001 on the eleven most-used tree species in Icelandic forestry is used. These tree species were measured in plots evenly spread around the country. The objective was to determine growth potential for these species. The species are: Downy birch (*Betula pubescens* Ehrh.). Black cottonwood (*Populus trichocarpa* Torr. & Gray). Rowan (*Sorbus aucuparia* L.) Fast-growing willow species; feltleaf willow (*Salix alaxensis* Cov.); dark-leaved willow (*Salix myrsinifolia* Salisb.). Picea spp. [Sitka spruce (*Picea sitchensis* (Bong.) Carr.); Engelmann spruce (*P. engelmanni* Parry); white spruce (*P. glauca* (Moench) Voss.) and Norway spruce (*P. abies* (L.) Karst.), Lodgepole pine (*Pinus contorta* Dougl.) and Siberian larch (*Larix sibirica* Ledeb.). A total of 1,340 measurements were used to calculate mean growing stock (stem volume with bark) per ha in 10 years age classes for each species.



In the graph the model results are compared to calculated growing stock for 2005 from tree measurements in NSPI which is only 18% of the model figure for the same year. To get estimates for other years the model figure was calibrated by the relative differences between measured and modelled figure in 2005.
The results of growing stock for CF are then (m^3):

	Forest				Other wooded land			
	1990	**2000**	**2005**	**2010**	**1990**	**2000**	**2005**	**2010**
Total growing stock	63000	142300	204600	282100	1200	2800	4000	5500
of wich coniferious	45400	102500	147400	203200	800	1700	2500	3400
of which broadleaved	17600	39800	57200	78900	400	1100	1500	2100

Natural birch forest and woodland: It is more difficult to estimate the wood stock of BW. Here two data sources where used. First, the growing stock measurement in 1999-2001 of the native Downy birch (*Betula pubescens* Ehrh.). The measurements were classified in three mean height classes and for each class a mean stem volume was calculated. The second data source is the area classification of the natural forests and woodlands in the NSPI. There height classification of the area with tree-cover was used. Only part of the area of BW has tree-cover. The other parts are small openings between the tree-covered areas. Woodland with mean height under 2 m was excluded from the wood stock calculation because they have few stems higher than 1.3 m which is the minimum tree size for growing stock by definition.

Tree grown area in:	ha	m3/ha	m3
Forest	2800		167800
Mean height >5	600	111	66600
Mean height 2-5	2200	46	101200
Woodland and Shrubland	54100		
Mean height 2-5	16000	46	736000
Mean height < 2	38100	0	0

As before no changes in time are reported for BW.

It is not possible to estimate commercial growing stock. The main reason is that there is no developed wood and timber market in the country. The very limited sales of wood give no possibilities to calculate margins for utilisation of wood raw materials from the forests and woodlands.

In table 6b only the six most common species are reported although it was theoretically possible to calculate values for more species. When using NSPI, breaking the data down more can lead to false results so it is better not to report species with growing stock estimates less than ten thousand cubic meters.
For the same reason it did not add any information to the table to calculate calibrated figures for year 2000 and 1990.

6.3.2 Reclassification into FRA 2010 categories

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	0.230	0.310	0.372	0.450	0.737	0.739	0.740	0.742
... of which coniferous	0.045	0.102	0.147	0.203	0.001	0.002	0.003	0.004
... of which broadleaved	0.185	0.208	0.225	0.247	0.736	0.737	0.737	0.738
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	*Betula pubescens*	Downy birch	n.a.	n.a.	0.198
2nd	*Larix sibirica*	Siberian larch	n.a.	n.a.	0.054
3rd	*Pinus contorta*	Lodgepole pine	n.a.	n.a.	0.035
4th	*Picea sitchensis*	Sitka spruce	n.a.	n.a.	0.027
5th	*P. abies*	Norway spruce	n.a.	n.a.	0.022
6th	*Populus trichocarpa*	Black cottonwood	n.a.	n.a.	0.016
7th					
8th					
9th					
10th					
Remaining					0.020
TOTAL			n.a.	n.a.	**0.326**

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	
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)		Not included
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	The large decrease in the estimate of growing stock from the FRA2005 is due to much better estimate done with data from a new systematic sampling plot inventory. The FRA2005 estimates where build on not so good data, that is annual plantation statistic and growth model for different tree species.	
Growing stock of broadleaved / coniferous		
Growing stock of commercial species		
Growing stock composition		

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 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
New data from the first sample plot inventory of forests and woodlands in Iceland*	H	ABGr biomass estimate built on tree measurement on sample plots	2005-2008	Work conducted by IFI. Data from 4 of 5 years of the first cycle.
Project assessing the growth potential of eleven tree species in Iceland**	H	Mean ABGr biomass/ha	1999-2001	Used to calculate mean ABGr biomass/ha for each 10 years age interval for eleven tree species. Used as an input in a timeline model and to estimate mean biomass for height classes of birch.
Single tree biomass functions for eleven tree species in Icelandic Forestry ***	H	biomass ABGr /tree	2001-2002	Used in the calculation of biomass of measured plots in NSPI and the growth potential project
*****	H	root/shoot ratio	1998-2001	Used to estimate root/shoot ratio
******	H	biomass of other vegetation	2002-2003	

* and ** Same references and sources as for T1

*** and **** Same references and sources as for T5

***** and ******Snorrason A., Sigurdsson B.D., Gudbergsson G., Svavarsdottir K., Jonsson Th.H. (2002). Carbon sequestration in forest plantations in Iceland, Icel. Agric. Sci. 15 (2002) 79-91.

******Sigurdsson, Bjarni D., Borgthor Magnusson, Asrun Elmarsdottir and Brynhildur Bjarnadottir (2005). Effects of afforestation on biomass, carbon stock and composition of ground vegetation: a chronosequence study in Iceland. Annals of Forest Science 62, 881-888.

7.2.2 Classification and definitions

National class	Definition

FRA 2010 default definitions are used.

7.2.3 Original data

Annual biomass estimates are conducted to meet the requirements of the carbon reporting of UNFCCC. They can not be used directly in this report as they follow the country wise (CW) definition of forest that is not equal to the FAO definition. The FAO definition and CW are different only in one point, that is height at maturity. The CW definition uses 2 m as minimum height at maturity instead of 5 m height at maturity as in the FAO definition. In NSPI it is possible, as for the area, to break up the data by mature height classes so direct information on biomass stock of trees above ground and below ground can be reported.

Data sources and assessment methods are similar as for T6 with few exceptions. The exceptions are:

1. Instead of stem volume functions, functions for total biomass above ground (stump) are used to estimate the biomass (Snorrason & Einarsson 2006).
2. Model estimating biomass above ground is used instead of model estimating growing stock.
3. Country specific root/shoot ratio found in in-country research is used to estimate below ground biomass (Snorrason et.al. 2002). The ratio is: 0.25. Note that fine-roots are excluded and the stump is included in the belowground estimate.
4. Dead wood biomass is excluded. If international definition of dead wood is followed the occurrence is rare. Dead wood has been measured in NSPI but not yet estimated.
5. Natural birch woodland with mean height under 2 m (shrubland) is included in the biomass estimation. According to NSPI the cover of the shrubland is estimated to 38,100 ha. Mean biomass stock above ground is estimated to be 13 tonnes /ha in shrubland with full canopy cover. The same figures for woodland (2-5 m) and forest > 5 m are 49 and 87 tonnes/ha respectively.
6. Above ground biomass of other vegetation than trees is estimated and added to above ground biomass of trees. Average of 12 measurement plots was 3 tonnes/ha (Snorrason et.al. 2002). Other research with ca. 50 measurements gave biomass in other vegetation than trees around 3.6 tonnes/ha (Sigurdsson et.al. 2005). Above ground biomass in other vegetation than trees is estimated to be 3.4 tonnes/ha.

7.3 Analysis and processing of national data

7.3.1 Estimation and forecasting

The table hereunder gives an overview over key figures that are aggregated further in T7 (in tonnes dry biomass).

				Forest				Other wooded land			
				1990	2000	2005	2010	1990	2000	2005	2010
Above-ground biomass			CF-trees	49.074	120.084	172.912	246.416	1.014	2.481	3.572	5.091
		CF-other vegetation		19.380	52.360	76.160	91.460	2.720	8.840	17.340	20.740
			BW-trees	109.437	109.437	109.437	109.437	1.281.284	1.281.284	1.281.284	1.281.284
		BW-other vegetation		10.200	10.200	10.200	10.200	272.000	272.000	272.000	272.000
Above-ground biomass sum:				**188.091**	**292.082**	**368.709**	**457.513**	**1.557.018**	**1.564.605**	**1.574.197**	**1.579.115**
Below-ground biomass			CF-trees	12.333	30.180	43.457	61.930	277	678	976	1.390
			BW-trees	27.359	27.359	27.359	27.359	320.321	320.321	320.321	320.321
Below-ground biomass sum:				**39.693**	**57.539**	**70.816**	**89.289**	**320.598**	**320.999**	**321.297**	**321.712**
Total				**227.784**	**349.621**	**439.526**	**546.803**	**1.877.616**	**1.885.604**	**1.895.494**	**1.900.827**

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	0.188	0.292	0.369	0.458	1.557	1.565	1.574	1.579
Below-ground biomass	0.040	0.058	0.071	0.089	0.321	0.321	0.321	0.322
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	Biomass of other vegetation than trees are included in the above-ground biomass estimate. See also comment in chapter 7.2.3.	
Below-ground biomass		
Dead wood	See comment in chapter 7.2.3.	

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
Same references in chapter 7.2.1.				See chapter 7.2.1.
* & **	H	C-stock in litter	1998-2003	Research results of C-stock measurements of litter in forest in Iceland.
*** & ****	H	C-stock in organic soils	1998-2002	Results of C-stock measurements in organic soils in Iceland.
*****	H	C-stock in inorganic forest soils	2001-2003	Research results of C-stock measurements in inorganic forest soils in Iceland.

*Snorrason A., Sigurdsson B.D., Gudbergsson G., Svavarsdottir K., Jonsson Th.H. (2002). Carbon sequestration in forest plantations in Iceland, Icel. Agric. Sci. 15 (2002) 79-91.

**Sigurdsson, Bjarni D., Borgthor Magnusson, Asrun Elmarsdottir and Brynhildur Bjarnadottir (2005). Effects of afforestation on biomass, carbon stock and composition of ground vegetation: a chronosequence study in Iceland. Annals of Forest Science 62, 881-888.

***Oskarsson, H., Arnalds, O., Gudmundsson, J. and Gudbergsson, G., 2004 Organic carbon in Icelandic Andosols: geographical variation and impact of erosion. Catena 56, 225–238.

****Arnalds, O., 2004. Volcanic soils of Iceland. Catena 56, 3 –20.

*****Sigurðsson, B.D., Elmarsdóttir, Á., Bjarnadóttir, B. & Magnússon, B., 2008. Mælingar á kolefnisbindingu mismunandi skógargerða. Fræðaþing landbúnaðarins 2008. 8 pp.

8.2.2 Classification and definitions

National class	Definition

FRA 2010 default definitions are used.

8.2.3 Original data

The same data sources and assessment methods are used as in T6 with some additions. They are:

1. Results from in-country research are used to estimate C-stock in litter. An average for 12 measurements for litter was 6.0 tonnes C/ha (Snorrason et.al. 2002). Because the litter is more or less concentrated to the area below the trees the litter area is decreased at same ratio as the tree-cover area of both BW and CF. All open areas in forest are excluded.
2. The same in-country results give 1.5 tonnes C/ha in other vegetation than trees, a similar mean value as found by Sigurdsson et.al. 2005. They are used to estimate C-stock in other vegetation than trees. A total area of both BW and CF is used.
3. Inorganic soils of Iceland are mostly volcanic soils (Andosols). The in-country research mentioned before gave 81 tonnes C/ha for 0-30 cm depth although total C-stock down to bedrock was higher or 148 tonnes C/ha (Snorrason et.al. 2002). This figure is similar to extensive measurement of the C-content of various soil types in Iceland (Oskarsson et.al. 2004) where mean value in brown andisols was around 70 tonnes C/ha. Brown andisol is the main type of inorganic soil in Iceland. New research of the C-stock of both BW and CF showed higher figures especially for West Iceland where precipitation is higher than in East Iceland. Mean values for 0-30 cm depth were ca. 150 tonnes C/ha in West Iceland but ca. 80 tonnes C/ha in East Iceland (Sigurðsson et.al. 2008). Here the moderate figure of 81 tonnes C/ha will be used for all inorganic soils of the both BW and CF.
4. A minor part of CF is on organic soils. C-stock for 0-30 cm depth is estimated to ca. 200 tonnes C/ha according to newly published research results (Oskarsson et.al. 2004 & Arnalds 2004).

8.3 Analysis and processing of national data

8.3.1 Estimation and forecasting

Following the IPCC Good Practice Guidance, we calculated the Carbon Stock of AGB and BGB by multiplying biomass values with 0.5.

The table hereunder gives an overview over key figures that are aggregated further in T8 (Tonnes of Carbon (C).

				Forest				Other wooded land			
C-stock				**1990**	**2000**	**2005**	**2010**	**1990**	**2000**	**2005**	**2010**
Above ground biomass			CF-trees	24.537	60.042	86.456	123.208	507	1.240	1.786	2.546
		CF-other vegetation		8.550	23.100	33.600	40.350	1.200	3.900	7.650	9.150
			BW-trees	54.719	54.719	54.719	54.719	640.642	640.642	640.642	640.642
		BW-other vegetation		4.500	4.500	4.500	4.500	120.000	120.000	120.000	120.000
C-stock in above-ground biomass				**92.305**	**142.361**	**179.275**	**222.777**	**762.349**	**765.783**	**770.078**	**772.338**
Below ground biomass			CF-trees	6.167	15.090	21.728	30.965	138	339	488	695
			BW-trees	13.680	13.680	13.680	13.680	160.161	160.161	160.161	160.161
C-stock in below-ground biomass				**19.846**	**28.770**	**35.408**	**44.645**	**160.299**	**160.499**	**160.648**	**160.856**
Biomas subtotal:				**112.152**	**171.130**	**214.683**	**267.421**	**922.648**	**926.282**	**930.727**	**933.193**
Necromass			Dead wood	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
			CF-litter	29.640	80.080	116.480	139.880	4.160	13.520	26.520	31.720
			BW-litter	10.648	10.648	10.648	10.648	324.785	324.785	324.785	324.785
C-stock dead wood and litter				**40.288**	**90.728**	**127.128**	**150.528**	**328.945**	**338.305**	**351.305**	**356.505**
SOC		CF-inorganic soil		409.060	1.105.179	1.607.533	1.930.475	57.412	186.589	366.001	437.766
		CF-organic soil		129.976	351.163	510.783	613.395	18.242	59.287	116.294	139.097
			BW	243.000	243.000	243.000	243.000	6.480.000	6.480.000	6.480.000	6.480.000
Soil organic carbon-stock				**782.036**	**1.699.342**	**2.361.316**	**2.786.870**	**6.555.654**	**6.725.876**	**6.962.295**	**7.056.863**
Total C-stock				**934.475**	**1.961.200**	**2.703.127**	**3.204.820**	**7.807.247**	**7.990.463**	**8.244.327**	**8.346.561**

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	0.092	0.142	0.179	0.223	0.762	0.766	0.770	0.772
Carbon in below-ground biomass	0.020	0.029	0.036	0.044	0.160	0.160	0.161	0.161
Sub-total: Living biomass	***0.112***	***0.171***	***0.215***	***0.267***	***0.922***	***0.926***	***0.931***	***0.933***
Carbon in dead wood	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Carbon in litter	0.040	0.091	0.127	0.151	0.329	0.338	0.351	0.357
Sub-total: Dead wood and litter	***n.a.***	***n.a.***	***n.a.***	***n.a.***	***n.a.***	***n.a.***	***n.a.***	***n.a.***
Soil carbon	0.782	1.699	2.361	2.787	6.556	6.726	6.962	7.057
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 the biomass of other vegetation than trees are included in this category.	
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
Data from The Icelandic Institute Of Natural History (INH)	H	Area of wildfires	Annual reports	INH does report wildfires by mapping the area of each fire.
New GIS database built on the natural birch woodlands survey and spatial information of CF	H	Area of NW and CF		

Reference:

*Bjorn Traustason and Arnor Snorrason. Spatial distribution of forest and woodlands in Iceland in accordance with the CORINE land cover classification. *Icelandic Agricultural Science.* 21. p 39-47.

9.2.2 Original data

INH started to register and map all wildfires after the big fire in 2006. Before that time no systematic registration was carried out. When merging the wildfire maps and the forest area map it is possible to estimate forest and woodland fires. Forest and woodland fires are rare but they do occur. The area burned each time is small. As an example there was a wildfire in an afforestation area in 2008. 9,1 ha of CF was burned in that fire.

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	n.a.	n.a.	n.a.	n.a.	1.3	1
... of which on forest	n.a.	n.a.	n.a.	n.a.	0	0
... of which on other wooded land	n.a.	n.a.	n.a.	n.a.	0	0
... of which on other land	n.a.	n.a.	n.a.	n.a.	1.3	1

Table 9b

FRA 2010 category	**Proportion of forest area affected by fire (%)**		
	1990	**2000**	**2005**
Wildfire	n.a.	n.a.	0
Planned fire	n.a.	n.a.	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

9.4 Comments to Table T9

Variable / category	**Comments related to data, definitions, etc.**	**Comments on the reported trend**
Area affected by fire		
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
GIS built on the natural birch woodlands survey*	H	Area of NW	´72–´75 And ´87-´91	Fieldwork for the original was done in 1972- 1975 but in 1987-1991 some field assessments were done that did partially improve the former survey, but it did not replace the former survey.
Digital maps of affected natural birch woodland	H	Affected NW	2005-6	Field assessment (Hallgrímsson et.al. 2006)

10.2.2 Original data

For most of the described disturbances, an area estimate of affected forest does not exist. Most of them do not lead to serious mortality or deforestation with the exception of the outbreak of Lepidopteran larvae in natural birch woodlands in Northeast Iceland. The following overview gives some ideas of disturbances that have occurred:

Insects

2005 (2003-2007)

2003-2007: Broom moth (*Melancha pisi).* Increasing damage in young plantations in south- and south east Iceland.

2003-2005: Serious damage to natural birch forest in East-Iceland caused by repeated infestation of Lepidopteran larvae (*Epinotia solandriana* and *Acleris notana*) in the years 2003 to 2005. Affected area was inventoried and is reported here (Hallgrímsson et.al. 2006).

2003: Green spruce aphid (*Elatobium abietinum*) outbreak in West- and South-Iceland. (Halldórsson et.al. 2006)

2000 (1998-2002)
Broom moth (*Melancha pisi).* Restricted damage in young plantations in south- and south east Iceland planted in areas with Nootka lupin (*Lupinus nootkaensis*)(Sigurðsson et.al. 2003).

Damage in restricted areas of natural birch forest in East-Iceland caused by infestation of Lepidopteran larvae (*Epinotia solandriana* and *Acleris notana*) in the years 1998 to 2002 (Hallgrímsson et.al. 2006).

1990 (1988-1992)

1991: Green spruce aphid (*Elatobium abietinum*) outbreak in West-, South- and East-Iceland.

Pests
2005 (2003-2007)

2000 (1998-2002)

1999-2000: Poplar rust infestation (*Melampsora laric-populina*) on Black cottonwood in South Iceland (Halldórsson et.al. 2001).

1998: Larch needle cast disease (*Meria laricis*) on larch in South Iceland in 1999 (Eyjólfsdóttir et.al. 1999).

Abiotic damages

2005 (2003-2007)

2003. Spring frost damages on Siberian larch (*Larix sibirica*) on north and east Iceland. Severe needle and shot dieback damage was reported (Heiðarsson et. al. 2004).

Refernences:

Eyjólfsdóttir, G.G., Halldórsson, G., Oddsdóttir, E.S. and Sverrisson, H. (1999). Sveppafár á Suðurlandi. Skógræktarritið 1999 (2). p.114-125. [In Icelandic with English summary].

Eyjólfsdóttir, G.G., Oddsdóttir, E.S., Sigurgeirsson, A. and Sverrisson, H. (2001). Viðnámsþróttur alaskaaspar gegn asparryði. Skógræktarritið 2001 (1). p. 43-48. [In Icelandic with English summary].

Halldórsson, G., Eggertsson, Ó. and Benedikz, Þ. (2006). Áhrif sitkalúsar á vöxt grenis. Árskýrsla Skógræktar ríkisins 2005. p.33-35. [In Icelandic].

Hallgrímsson, H., Halldórsson, G., Kjartansson, B.Þ. and Heiðarsson, L. (2006) Birkidauðinn á austurlandi 2005. Skógræktarritið 2006 (2). p. 46-55. [In Icelandic].

Heiðarsson, L., Eysteinsson, Þ. and Skúlason, B. (2004). Hretskemmdir á lerki í Eyjafirði og á Héraði vorið 2003. Skógræktarritið 2004. (1). p. 85-87. [In Icelandic].

Sigurðsson, B.D., Halldórsson, G. and Heiðarsson, L. (2003). Ertuygla. "Nýr" vágestur í skógrækt í nánd við lúpínubreiður. [Brom moth causes problems on afforestation sites in S and SE Iceland]. (1). p.87-91. [In Icelandic with English summary].

10.3 Analysis and processing of national data

10.3.1 Estimation and forecasting

As mentioned earlier the only damage event mapped is the Lepidopteran outbreak in 2003-2005. This outbreak was also the most serious one and caused dramatic mortality of trees and in some cases total deforestation of natural birch woodland. Most of these areas are not forest by FAO definition and the forest part was found by merging the NFI GIS database to a map of affected areas. In table 10a natural birch forest with severe and medium damage is reported. 125 ha with minimal damage are not reported.

10.4 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.	0.02
Disturbance by diseases	n.a.	n.a.	n.a.
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)
Larvae defoliation leading to dieback and mortality/Lepidopteran outbreak	*Betula pubescens*	2006	0.02	probably outbreak of 4-6 years with 50 year interval
larvae defoliation leading to dieback and increased mortality/Broom moth outbreak	*Both conifers and deciduous species*	2008	?	not known yet
Green spuce aphid causing defoliation leading to decreased growth and rarely to mortality	*Picea species especially American species*	2003	?	no rhythm but 1 to 2 major outbreaks per decade
Poplar rust infestation damage to foliage in late summer leading to poor hardiness and frost damage dieback next winter	*Poulus trichcarpa*	2000	?	no rhythm climate influences the outbreak

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

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

10.5 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	Spring and autumn frost damage is common in Iceland and often causes disturbance/mortality in young plantations but extent and frequency are not monitored systematically.	
Major outbreaks		
Invasive species	No woody species are invasive in Iceland.	

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
Annual report of wood sale of the State Forest Service*	M		1986-2007	Wood products made mostly at the State Forest Service

* Published references: Figures of wood production have been published in the annual journal of the Icelandic Forest Association with some exceptions (Icelandic name of the journal: Ársrit Skógræktarfélags Íslands (from 1930 to 1991), Skógræktarritið (from 1992 up to day). Until 1987 the figures where included in the annual reports of the Forestry director for IFS. From 1997 (for the year 1996) the Forestry Association started to publish figures about wood production in its annual report of forest activity and have done it up to the present.
Unpublished references: Tables in Excel with annual figures for the year: 1988-1992 and 1996-2003 and 2003-2007 for various products. Conversions to cubic meters were worked out at the office of the Forest Association. Contact persons: Einar Gunnarsson (einar@skog.is). We have a copy of this table at IFR.

11.2.2 Classification and definitions

National class	Definition

National class is identical to FRA2010 class.

11.3 Analysis and processing of national data

11.3.1 Estimation and forecasting

As estimation methods have not changed since FR2005. Stocks in 1990 and 2000 are the same as reported in FRA2005. The 2005 estimates are new and the analysis and calculations are built on mean values for the years of 2003-2007.
Value units are changed. Utilisation costs of secondary products were estimated and subtracted from the product unit price. The price per unit and a factor to convert selling unit into roundwood cubic meter is shown in the table hereunder:

Product	Sale price ISKR/unit	% utilisation Costs	Forest price ISKR/unit	Convention factor m3/unit	Forest Price ISKR/m3
Roundwood, birch (m3)	60600	0%	60600	1,00	60600
Roundwood, larch (m3)	41000	0%	41000	1,00	41000
Roundwood, other (m3)	30500	0%	30500	1,00	30500
Trestles (no)	1000	0%	1000	0,06	16667
Sawned wood, larch (m3)	91200	40%	54720	2,00	27360
Sawned wood, larch (m3)	136500	40%	81900	2,00	40950
Sawned wood, larch (m3)	68000	40%	40800	2,00	20400
Wood chips (m3)	5200	20%	4160	0,38	10947
Smooking wood (ton)	350000	60%	140000	1,64	85400
Fence poles (no)	300	30%	210	0,01	15000
Wood slices (no)	125	50%	62,5	0,00	47505
Wood coal (kg)	343	60%	137,2	0,01	10103
Flag poles (no)	8000	25%	6000	0,20	30000
Fuelwood (ton)	28900	30%	20230	1,43	14161

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.)	0.12	0.17	0.50	0.15	0.16	0.23
... of which from forest	0.12	0.17	0.50	0.15	0.16	0.23
Unit value (local currency / m^3 o.b.)	19500	19500	20200	14200	14200	14200
Total value (1000 local currency)	2340	3315	10100	2130	2272	3266

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	Icelandic krona (ISKR)	ISKR	ISKR

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		Use of domestic roundwood from thinning is currently increasing because of the fall of the currency. It can now compete with imported products.
Total volume of woodfuel removals	The only woodfuel removal reported is woodfuel sold by the IFS. Use of woodfuel for house heating is very rare and most of the woodfuel is used for pizza baking in open fireplaces.	A small woodfuel energy-plant is under construction in east Iceland so woodfuel consumption will take a step up in the nearest future. The mean price of woodfuel will fall.
Unit value		
Total value		

Other general comments to the table
Until 2004 the data is only from the IFS, that is removals from forest managed by IFS. From 2004 up to today, data from the Reykjavik Forestry Association is added to IFS data. There is some removal going on in other forests but it is not documented and can therefore not be estimated. Specialist judgement is that these removals are considerably less than reported removals. But nevertheless the figures in T11 are underestimates. The removals are coming from plantations and natural birch forests. It is possible that a very small part of the fuel wood originates from woodlands instead of forests but no data about the division between forests and woodland in removals exsist.

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

12.1 FRA 2010 Categories and definitions

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

NWFP categories

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

12.2 National data

12.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Annual report of domestic Christmas tree production	M	Number of trees and mean price	1986-2007	

* Published references: Figures for domestic Christmas tree production have been published in the annual journal of the Icelandic Forestry Association with some exceptions (Icelandic name of the journal: Ársrit Skógræktarfélags Íslands (from 1930 to 1991), Skógræktarritið (from 1992 up to day). Until 1987 the figures where included in the annual reports of the Forestry director IFS. From 1994 (for the year 1993) the Forestry

Association started to publish figures about Christmas tree production in its annual report of forest activity and have done it up to the present.
Unpublished references: Tables in Excel with annual figures and unit prices for the year: 1988-2007 were worked out at the office of the Forest Association. Contact persons: Einar Gunnarsson (einar@skog.is). There is a copy of this table at IFR.

12.3 Data for Table T12

Rank	Name of product	Key species	Unit	NWFP removals 2005		NWFP category
				Quantity	Value (1000 local currency)	
1st	Christmas trees	Picea abies	no.	7800	21000	6
2nd						
3rd						
4th						
5th						
6th						
7th						
8th						
9th						
10th						
All other plant products						
All other animal products						
TOTAL					**21000**	

	2005
Name of local currency	ISKR

12.4 Comments to Table T12

Variable / category	Comments related to data, definitions, etc.
10 most important products	Mushroom picking in the forest is an increasing leisure activity by the public. No estimates of annual stock or value exist. The same is true for material for decoration and handicrafts. The leisure value of forest is not included but surely is the most valuable "product" of forest and woodland in Iceland.
Other plant products	
Other animal products	

Value by product	
Total value	

Other general comments to the table
The number of Christmas trees is underestimated because the documentation does not fully cover all fellings. Slightly increasing private production and sale is not documented. Fellings for domestic use are also not documented.

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
Information from institutions in the forest sector.	L	No. of person-years in 1990, 2000 and 2005	2004-5	IFI sent questions to the various actors of forestry in the country

13.2.2 Original data

Although IFI sent out a questionnaire but the answers where not fully compatible. Some recalculation of reported employment was necessary to cover all direct forest activities. That is the reason for low data quality assessment.

13.3 Data for Table T13

FRA 2010 Category	Employment (1000 years FTE)		
	1990	2000	2005
Employment in primary production of goods	0.129	0.156	0.220
...of which paid employment	0.115	0.079	0.082
...of which self-employment	0.014	0.077	0.138
Employment in management of protected areas	0	0	0

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		
Paid employment / self-employment		Due to the regional afforestation projects that provide grants for afforestation on private land, self-employment is increasing
Employment in management of protected areas		

Other general comments to the table
Although the quality of the data is low similar values are estimated for the year 1990 and 2000 as in FRA2005.

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			Yes
		x	No
If Yes above, provide:	Year of endorsement		
	Reference to document		
National forest programme (nfp)			Yes
		x	No
If Yes above, provide:	Name of nfp in country		
	Starting year		
	Current status		In formulation
			In implementation
			Under revision
			Process temporarily suspended
	Reference to document or web site		
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	1955 (General) and 2006 (Regional afforestation projects)	
	Year of latest amendment	General: 2007	
	Reference to document	General forest-law: http://www.althingi.is/dbabin/unds.pl?txti=/wwwtext/html/lagasofn/136a/1955003.ht	

		ml&leito=sk%F3gr%E6kt#word1 Forest law for regional afforestation projects: http://www.althingi.is/dbabin/ unds.pl?txti=/wwwtext/html/lagasofn/136a/2006095.ht ml&leito=sk%F3gr%E6kt#word1

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

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	There is one general forest law (1955) and one law concerning the five regional afforestation projects.
Sub-national forest policy statements	The long time goal setting of the regional afforestation projects can be considered as forest policy statement
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	x	1st level subordination to Minister
		2nd level subordination to Minister
		3rd level subordination to Minister
		4th or lower level subordination to Minister
Other public forest agencies at national level		
Institution(s) responsible for forest law enforcement	Iceland Forest Service (Skógrækt ríkisins) Regional afforestation projects (5 units)	

Table 15b – Human resources

FRA 2010 Category	Human resources within public forest institutions					
	2000		2005		2008	
	Number	%Female	Number	%Female	Number	%Female
Total staff	**54**	**29**	**58**	**24**	**60**	**30**
...of which with university degree or equivalent	18	28	24	19	29	37

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	Minister of fisheries and agriculture is responsible for the five regional afforestation projects.	
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		

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
Information from Agricultural University of Iceland	H			Information are given from professor Bjarni Diðrik Sigurðsson
Information from Iceland Forest Research	H			Inside information from IFR

16.2.2 Original data

16.3 Analysis and processing of national data

16.3.1 Estimation and forecasting

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	0		0		1	100
Bachelor's degree (BSc) or equivalent	0		0		3	67
Forest technician certificate / diploma	0		4	75	3	67
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)	3	0%	5	0%	4	0%
Master's degree (MSc) or equivalent	5	20%	4	50%	5	40%
Bachelor's degree (BSc) or equivalent	3	33%	3	67%	3	67%

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		
Professionals working in public forest research centres	Refers only to professionals working at IFR which is the only research centre primarily implementing research program on forest matters.	

Other general comments to the table

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
Financial book-keeping of the official forestry institutions	H	As requested in table	2000 & 2005	Data sampled through questionnaire to the state owned forest institutions

17.2.2 Classification and definitions

National class	Definition

17.2.3 Original data

17.3 Analysis and processing of national data

17.3.1 Calibration

17.3.2 Estimation and forecasting

17.3.3 Reclassification into FRA 2010 categories

17.4 Data for Table T17

Table 17a - Forest revenues

FRA 2010 Categories	Revenues (1000 local currency)	
	2000	2005
Forest revenue	0	0

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

FRA 2010 Categories	Domestic funding (1000 local currency)		External funding (1000 local currency)		Total (1000 local currency)	
	2000	2005	2000	2005	2000	2005
Operational expenditure	456341	651105	3680	3863	460021	654968
Transfer payments	106984	268327	2233	2811	109217	271138
Total public expenditure	563325	919433	5913	6674	569238	926106

If transfer payments are made for forest management and conservation, indicate for what specific objective(s) - Please tick all that apply.		
		Reforestation
	x	Afforestation
		Forest inventory and/or planning
		Conservation of forest biodiversity
		Protection of soil and water
	x	Forest stand improvement
		Establishment or maintenance of protected areas
		Other, specify below

17.5 Comments to Table T17

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Forest revenue	There are no special taxes on forest production or forest activity in Iceland.	
Operational expenditure		
Transfer payments	Transfer payments are mostly payments to landowners and farmers for their labour and to buy seedlings for afforestation and thinning of young stands	

Other general comments to the table