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Swedish Presidency
of the European Union

INFORMAL SUBMISSION BY SWEDEN ON BEHALF OF THE EUROPEAN COMMUNITY AND ITS MEMBER STATES ON FOREST DATA

Bangkok, 2009-09-30

This voluntary submission by the EU aims at providing basic forest data to support the decision making process on forest management accounting rules. The EU believes that transparent data are needed to support the negotiating process, and looks forward to data submissions by other Parties.

Forests and sustainable forest management have been important to the EU for many years. Amongst other things, this is reflected in the growth in forest area and carbon stocks throughout the 20th century, as well as in the increasing importance of the economic, ecological and social functions of the forests.

The basis for this submission is the data contained in international databases, disaggregated by Member State and, when sufficient data are available, aggregated to the EU-27 level. When more detailed, updated or revised national information and projections exist, these have been used. An Annex at the end of this submission provides more details on the data brought forward by each Member State. Additional data may be provided subsequently by Member States, depending on the availability and needs arising from the development of the negotiations.

Forest Area

The data presented below reproduce forest areas reported by EU Member States to the UNFCCC in Table 5.A "Total Forest Land" in their most recent submission (2009).

In some cases, Member states are now able to present more recent revisions of data, and these have been included in the table and replace UNFCCC data. Those cases are identified in the column "source" where instead of "UNFCCC" you will find "nat.data". Further details on the new data provided in the table are shortly described in an Annex on country specific notes.

Forest area projections are not, at this point in time, available for all Member States. However, the table includes those estimates whenever available.

Forest areas in the EU-27 covered about 155Mha in 2007. This area has been increasing at an average yearly rate of about 394.000 ha/year (+0.3%/year), although the rate of increase has been declining.

Member	Historical forest area [1.000 ha]																		Annual change			Projections		
State	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	1.000 ha/a	%/a	Source	2015	2020	Source
Austria	3.600,7	3.579,9	3.602,9	3.626,2	3.630,6	3.565,9	3.564,7	3.563,0	3.560,7	3.564,5	3.568,0	3.571,3	3.574,4	3.577,2	3.583,2	3.589,1	3.594,9	3.600,7	-0,8	0,0%	UNFCCC Subm 2009			
Belgium	641,1	639,3	637,5	635,7	633,9	632,1	628,4	626,6	624,8	624,2	621,0	621,0	621,0	621,0	621,0	621,0	621,0	621,0	-1,3	-0,2%	UNFCCC Subm 2009			
Bulgaria	3.329,5	3.332,4	3.329,0	3.329,0	3.354,0	3.357,0	3.355,0	3.352,0	3.899,7	3.370,1	3.398,3	3.466,2	3.488,9	3.547,5	4.063,6	4.076,5	4.076,5	4.108,5	46,5	1,4%	UNFCCC Subm 2009			
Cyprus	161,0										173,0					174,0			0,9	0,6%	FAO			
Czech Republic	2.576,9	2.576,7	2.576,5	2.576,1	2.576,9	2.577,5	2.578,4	2.579,2	2.581,1	2.581,8	2.584,5	2.586,1	2.590,2	2.591,3	2.592,8	2.594,5	2.596,2	2.598,2	1,4	0,1%	UNFCCC Subm 2009			
Denmark	555,0	557,3	559,5	561,7	563,9	566,1	567,7	570,2	572,5	574,7	576,9	580,7	584,5	586,5	590,6	592,5	598,3	602,1	2,7	0,5%	nat.data	616,4	625,9	nat.data
Estonia	2.163,0	2.171,0	2.179,0	2.187,0	2.195,0	2.203,0	2.211,0	2.219,0	2.227,0	2.235,0	2.243,0	2.251,2	2.259,4	2.267,6	2.275,8	2.284,0	2.251,9	2.212,7	5,9	0,3%	UNFCCC Subm 2009			
Finland	21.770,2	21.828,4	21.886,6	21.944,8	22.003,0	22.061,2	22.119,5	22.181,3	22.243,3	22.312,4	22.374,2	22.420,9	22.445,9	22.438,2	22.338,5	22.238,7	22.138,9	22.039,2	27,8	0,1%	UNFCCC Subm 2009			
France	15.259,0	15.185,0	15.356,1	15.540,2	15.653,4	15.739,9	15.802,2	15.836,6	15.880,9	15.824,5	15.884,1	15.943,7	16.003,3	16.062,9	16.122,5	16.184,1	16.248,2	16.314,9	59,2	0,4%	UNFCCC Subm 2009			
Germany	10.502,9	10.506,5	10.510,1	10.531,2	10.552,2	10.573,3	10.594,4	10.615,4	10.636,5	10.657,6	10.678,6	10.699,7	10.720,7	10.741,8	10.763,2	10.777,4	10.798,9	10.823,3	20,0	0,2%	UNFCCC Subm 2009			
Greece	6.513,1	6.513,1	6.513,1	6.513,1	6.515,5	6.518,7	6.521,7	6.527,7	6.529,5	6.533,5	6.535,9	6.548,9	6.551,2	6.553,7	6.556,1	6.558,7	6.560,9	6.563,2	3,5	0,1%	UNFCCC Subm 2009			
Hungary	1.574,0	1.584,0	1.591,7	1.602,1	1.612,1	1.625,2	1.637,4	1.651,4	1.663,7	1.679,7	1.672,7	1.703,3	1.714,6	1.740,3	1.770,3	1.789,6	1.805,8	1.826,0	14,7	0,9%	UNFCCC Subm 2009			
Ireland	481,7	501,0	517,1	534,9	552,4	575,6	596,6	608,2	621,4	634,1	649,5	665,0	681,1	689,9	700,3	711,5	719,6	727,5	14,7	3,1%	UNFCCC NIR			
Italy	9.249,5	9.345,2	9.441,0	9.536,7	9.632,4	9.728,2	9.823,9	9.919,7	10.015,4	10.111,1	10.206,9	10.302,6	10.398,3	10.494,1	10.589,8	10.685,5	10.781,3	10.879,1	95,8	1,0%	UNFCCC Subm 2009			
Latvia	3.371,0	3.375,0	3.380,8	3.388,8	3.386,8	3.422,1	3.423,5	3.413,3	3.388,2	3.382,3	3.379,8	3.378,5	3.391,9	3.368,6	3.400,2	3.421,9	3.421,9	3.391,1	1,0	0,0%	UNFCCC Subm 2009			
Lithuania	1.854,2	1.858,7	1.863,2	1.867,7	1.872,1	1.876,6	1.881,1	1.888,0	1.901,2	1.914,5	1.927,7	1.938,2	1.951,0	1.967,7	1.987,7	2.014,0	2.030,0	2.040,0	11,2	0,6%	UNFCCC Subm 2009			
Luxembourg	88,7	89,0	89,3	89,5	89,8	90,1	90,4	90,7	91,0	91,3	91,6	91,9	92,2	92,5	92,7	93,0	93,3	93,6	0,3	0,3%	UNFCCC Subm 2009			
Malta																								
Netherlands	383,6	384,2	384,9	386,2	385,6	386,9	387,6	388,2	388,9	389,6	390,2	390,9	391,6	392,3	392,9	393,6	394,3	394,9	0,7	0,2%	UNFCCC Subm 2009			
Poland	8.680,5	8.688,3	8.698,1	8.707,0	8.724,8	8.731,6	8.755,4	8.777,2	8.789,1	8.823,9	8.833,7	8.860,5	8.883,3	8.907,2	8.937,0	8.963,8	8.990,6	9.014,4	20,3	0,2%	UNFCCC Subm 2009			
Portugal	3.351,8	3.363,6	3.375,4	3.387,2	3.399,0	3.410,9	3.418,0	3.425,1	3.432,2	3.439,3	3.446,4	3.452,3	3.458,2	3.464,1	3.469,9	3.475,8	3.475,8	3.475,8	7,4	0,2%	UNFCCC Subm 2009			
Romania	6.685,4	6.680,1	6.681,8	6.681,1	6.680,2	6.680,1	6.690,3	6.688,5	6.672,3	6.790,6	6.457,3	6.652,5	6.663,3	6.751,6	6.779,2	6.742,8	6.754,7	6.740,9	3,8	0,1%	UNFCCC Subm 2009			
Slovakia	1.921,7	1.927,9	1.925,8	1.928,3	1.925,9	1.923,5	1.923,7	1.919,9	1.919,3	1.922,0	1.928,3	1.927,4	1.928,7	1.928,8	1.930,7	1.931,6	1.932,0	1.932,9	0,5	0,0%	UNFCCC Subm 2009			
Slovenia	1.071,2	1.081,3	1.085,6	1.089,9	1.094,2	1.097,9	1.098,8	1.109,7	1.111,0	1.115,7	1.134,2	1.142,9	1.149,6	1.157,8	1.163,8	1.169,2	1.173,8	1.183,3	6,6	0,6%	UNFCCC Subm 2009			
Spain	12.545,2	12.545,2	12.545,2	12.545,2	12.602,2	12.681,6	12.778,2	12.867,3	12.951,0	13.005,4	13.067,5	13.104,7	13.126,5	13.149,7	13.170,6	13.191,3	13.213,4	13.230,3	48,8	0,4%	nat.data			
Sweden	28.200,8	28.197,1	28.202,4	28.203,3	28.196,4	28.187,4	28.185,5	28.190,2	28.195,9	28.202,9	28.197,3	28.198,7	28.205,8	28.214,3	28.379,5	28.176,4	27.946,7	27.668,2	-11,2	0,0%	UNFCCC Subm 2009			
UK	2.244,2	2.263,5	2.280,7	2.298,9	2.316,7	2.335,9	2.351,6	2.368,1	2.383,9	2.399,9	2.415,9	2.432,5	2.444,9	2.456,4	2.466,9	2.476,9	2.483,9	2.493,0	15,0	0,7%	UNFCCC Subm 2009	2.566,8	2.613,7	nat.data
EU-27	**148.775**	**148.774**	**149.213**	**149.692**	**150.149**	**150.548**	**150.985**	**151.376**	**152.280**	**152.180**	**152.436**	**152.931**	**153.320**	**153.763**	**154.739**	**154.927**	**154.703**	**154.575**	**394**	**0,3%**				

Emissions and Removals

To date, the most complete time series on emissions and removals from forests in the European Union comes from the information submitted to the UNFCCC (Convention Reporting) by its Member States.

The EU notes that the reporting categories under the Convention do not fully reflect the activities currently described and defined in the Kyoto Protocol but has matched the Convention reporting to Kyoto Protocol accounting for activities was carried out using the following methodology:

Emissions and Removals from Forest Management were estimated as emissions and removals of all GHG's from the row "Forest Land remaining Forest Land" of CRF Table 5, assuming that "managed forest" under the Convention generally corresponds to "forest management" under the KP.

Emissions and removals from Afforestation and Reforestation were estimated as emissions and removals of all GHG's from the row "Forest Land remaining Forest Land". When the time series started before 1990, the value in a given year was divided by the length of the transition period used by the country (typically 20 yrs) and multiplied by the numbers of years between 1989 and the given year

Emissions and removals from Deforestation were estimated as CO_2 emissions and removals from forests converted to other land uses [5.B.2.1 + 5.C.2.1 + 5.D.2.1 + 5.E.2.1 + 5.F.2.1] + Non-CO2 gases in 5(III)B.2.1 + Biomass burning in forests converted to other land uses [5(V)B.2.1 + 5(V)C.2.1 + 5(V)D.2.1]

This methodology has limitations, mainly in the cases where there are missing data for one or more UNFCCC reporting categories; when forest definitions used under the Convention and under the KP differs substantially; due to the differences in land-use change reporting under the convention and under the KP, in particular the IPCC default 20 year rule for transition between land uses is not identical with the since 1990 rule used for KP accounting[1]. These limitations have to be kept in mind when using these data in the context of KP accounting rules.

The table presented below reproduces UNFCCC Convention Reporting data, aggregated as explained above, disaggregated by Member State and aggregated in four categories of net-removals / net-emissions: forest management; afforestation and reforestation; deforestation; total.

[1] Under convention reporting, forest areas undergo transitions between categories, whereby areas from "land converted to forest land" move to "forest land remaining forest land" category, only after a transtion period (generally 20 years). For example, an afforested area in 1980 remains in the L->F category until 1999 and is then transferred to the F->F in 2000. In KP reporting, Article 3.3. areas ca not moove to Article 3.4 areas; furthermore deforestation areas can not moove to any other activity (thus it can only increase in time). Article 3.4 forest areas are initiated at 1990 levels and can, therefore, only decrease in time due to deforestation events.

It should be noted that, due to the data gaps mentioned above, the totals mentioned in the table represents only the sum of the available data, and does not represent the EU total. This is particularly true for AR and Deforestation.

In some cases, Member states are now able to present more recent revisions of data, which may include specific estimation of KP activities, and those have been included in the table and replace UNFCCC data. Those cases are identified in the column “source” where instead of “UNFCCC” you will find “nat.data”. Further details on the new data provided in the table are shortly described in an Annex on country specific notes.

The EU is currently working on projections for forest emissions and removals. However, some Member States are already prepared to submit national data on projections, which have been included in the table where available. The projection for an EU-27 total is also presented, based on a previous modelling exercise coordinated by the Joint Research Centre of the European Commission. These values may change due to the ongoing work refining future projections.

At EU level and in all member states forest have performed as net-removers of carbon dioxide from the atmosphere for most years in the period 1990-2007. In 2007, the available data indicate a sink of about 395 $MtCO_2eq$ from forest management, and an additional 39 $MtCO_2eq$ from afforestation and reforestation, as well as a source of about 19 $MtCO_2eq$ from deforestation, although data availability for the three activities differ.

Member State	Activity	Historical Net-Removals (-) or Net-Emissions (+) (1.000ton CO_2eq)																		Projected NR or NE		
		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Source	2015	2020	Source
Austria	FM	-11.511	-17.416	-12.214	-16.051	-14.992	-14.288	-9.638	-18.809	-17.028	-21.550	-20.230	-19.960	-17.950	-12.920	-13.750	-13.780	-9.940	-6.700	a)	+400 to -4.300	+2.300 to -2.700	nat.data
	AR	-220	-454	-701	-963	-1.138	-1.295	-1.399	-1.472	-1.512	-1.615	-1.705	-1.782	-1.846	-1.897	-2.007	-2.113	-1.951	-2.173	d)			
	D	2.186	2.233	2.279	2.326	2.242	1.947	1.842	1.737	1.632	1.589	1.546	1.503	1.461	1.418	1.385	1.352	1.143	1.183	c)			
	Total	-9.545	-15.637	-10.637	-14.688	-13.888	-13.636	-9.196	-18.544	-16.908	-21.576	-20.389	-20.239	-18.336	-13.400	-14.372	-14.542	-10.748	-7.690				
Belgium	FM	-3.205	-2.919	-3.233	-3.162	-3.192	-3.019	-3.071	-3.093	-2.977	-2.920	-3.236	-4.510	-4.079	-3.458	-2.901	-2.095	-2.777	-3.169	UNFCCC			
	AR																						
	D																						
	Total	-3.205	-2.919	-3.233	-3.162	-3.192	-3.019	-3.071	-3.093	-2.977	-2.920	-3.236	-4.510	-4.079	-3.458	-2.901	-2.095	-2.777	-3.169				
Bulgaria	FM	-6.157	-7.636	-7.412	-7.476	-7.302	-7.524	-6.517	-6.872	-6.860	-7.200	-8.976	-9.467	-8.318	-7.056	-7.965	-6.996	-6.996	-6.993	UNFCCC			
	AR	-5	-2	0																			
	D																						
	Total	-6.162	-7.637	-7.412	-7.476	-7.302	-7.524	-6.517	-6.872	-6.860	-7.200	-8.976	-9.467	-8.318	-7.056	-7.965	-6.996	-6.996	-6.993				
Cyprus	FM																						
	AR																						
	D																						
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Czech	FM	-5.473	-10.021	-11.706	-10.375	-7.857	-7.894	-8.143	-7.356	-7.963	-7.917	-8.171	-8.487	-8.209	-6.455	-6.843	-7.307	-3.965	-1.155	c)			
Republic	AR	-20	-42	-60	-82	-97	-110	-129	-146	-169	-171	-190	-199	-245	-277	-303	-331	-356	128	c) d)			
	D	155	261	228	261	192	169	285	258	440	283	227	169	173	270	243	235	168	139	c)			
	Total	-5.338	-9.801	-11.538	-10.196	-7.762	-7.835	-7.987	-7.243	-7.693	-7.804	-8.133	-8.517	-8.280	-6.462	-6.903	-7.403	-4.153	-888				
Denmark	FM	-932	-932	-932	-932	-932	-721	-932	-932	-932	-932	-679	-679	-46	-277	-677	-677	-750	596	b)	251	416	nat.data
	AR	-51	-51	-51	-51	-51	-51	-51	-51	-51	-51	-138	-138	-136	-136	-137	-137	-326	132	b)	-208	-359	nat.data
	D	0	0	0	0	0	212	0	0	88	0	0	0	632	269	171	0	0	0	b)	0	0	nat.data
	Total	-984	-984	-984	-984	-984	-560	-983	-983	-895	-983	-816	-816	450	-144	-643	-814	-1.076	728		43	57	
Estonia	FM	-8.032	-7.785	-9.538	-9.234	-6.971	-6.896	-7.027	-5.123	-4.847	-889	-695	-2.707	-2.282	-4.486	-7.100	-7.252	-8.095	-6.883	UNFCCC			
	AR																						
	D																						
	Total	-8.032	-7.785	-9.538	-9.234	-6.971	-6.896	-7.027	-5.123	-4.847	-889	-695	-2.707	-2.282	-4.486	-7.100	-7.252	-8.095	-6.883				
Finland	FM	-23.189	-37.682	-31.501	-30.042	-22.819	-23.116	-32.160	-24.995	-22.366	-24.595	-25.715	-30.064	-30.179	-29.802	-30.768	-36.362	-40.692	-32.812	UNFCCC			
	AR																						
	D																						
	Total	-23.189	-37.682	-31.501	-30.042	-22.819	-23.116	-32.160	-24.995	-22.366	-24.595	-25.715	-30.064	-30.179	-29.802	-30.768	-36.362	-40.692	-32.812				
France	FM	-48.104	-41.169	-46.503	-54.578	-56.870	-56.796	-60.468	-62.205	-62.496	-64.312	-49.243	-57.676	-64.782	-68.347	-69.055	-71.202	-71.777	-72.614	c)			
	AR	-329	-696	-1.114	-1.590	-2.134	-2.730	-3.389	-4.109	-4.752	-5.354	-6.028	-6.711	-7.337	-8.133	-8.632	-9.509	-11.977	-12.561	c) d)			
	D	11.113	8.906	9.010	9.072	9.176	9.308	9.398	9.537	9.660	9.870	10.040	9.847	9.799	9.973	8.653	8.735	10.156	10.155	c)			
	Total	-37.320	-32.958	-38.606	-47.096	-49.828	-50.217	-54.459	-56.776	-57.588	-59.796	-45.231	-54.539	-62.320	-66.507	-69.034	-71.976	-73.598	-75.020				
Germany	FM	-65.480	-65.470	-65.393	-65.423	-65.378	-65.369	-65.346	-65.326	-65.302	-65.298	-65.296	-65.276	-20.383	-20.397	-20.420	-20.426	-20.420	-20.408	b)			
	AR	-50	-186	-322	-457	-593	-729	-865	-1.001	-1.137	-1.273	-1.409	-1.545	-1.681	-1.817	-1.953	-2.089	-2.225	-2.361	b)			
	D	2.875	2.923	2.973	3.019	3.071	3.115	3.169	3.211	3.267	3.307	3.365	3.406	3.444	3.447	3.477	3.478	4.517	3.553	b)			
	Total	-62.655	-62.732	-62.742	-62.861	-62.900	-62.983	-63.042	-63.116	-63.172	-63.265	-63.341	-63.416	-18.620	-18.767	-18.896	-19.037	-18.128	-19.216				

Member State	Activity	Historical Net-Removals (-) or Net-Emissions (+) (1.000ton CO_2eq)																		Projected NR or NE		
		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Source	2015	2020	Source
Greece	FM	-1.990	-2.319	-1.850	-2.498	-2.236	-2.996	-2.946	-2.737	-2.186	-2.917	-1.359	-3.641	-3.871	-3.932	-3.804	-3.767	-3.707	-2.303	UNFCCC			
	AR	0	0	0	0	-25	-58	-90	-152	-171	-213	-238	-374	-398	-425	-450	-476	-500	-524	UNFCCC			
	D																						
	Total	-1.990	-2.319	-1.850	-2.498	-2.261	-3.054	-3.036	-2.889	-2.357	-3.130	-1.597	-4.015	-4.269	-4.357	-4.254	-4.243	-4.207	-2.827				
Hungary	FM	-3.913	-4.379	-5.183	-7.257	-7.920	-7.920	-3.286	-3.331	-5.185	-1.973	-1.185	-3.029	-2.594	-4.742	-4.030	-5.293	-4.436	-4.067	UNFCCC			
	AR	-4	-17	51	-312	-275	58	715	578	-50	-200	1.114	872	1.419	66	-711	1.513	667	-435	d)			
	D																						
	Total	-3.917	-4.396	-5.132	-7.569	-8.196	-7.862	-2.571	-2.753	-5.235	-2.173	-70	-2.157	-1.175	-4.676	-4.742	-3.781	-3.770	-4.502				
Ireland	FM	-996	-1.144	-865	-858	-567	-389	-336	-231	-530	-576	-89	23	-370	-1.199	-725	-901	-839	-1.491	b)	-773	737	nat.data
	AR	10	7	-10	-35	-64	-101	-153	-223	-349	-439	-561	-761	-953	-1.152	-1.376	-1.618	-1.503	-1.634	b)			
	D	415	415	415	415	415	415	415	415	415	415	415	415	415	415	415	415	415	415	b)			
	Total	-571	-722	-460	-478	-216	-75	-74	-39	-464	-600	-235	-323	-908	-1.936	-1.686	-2.104	-1.927	-2.710				
Italy	FM	-52.388	-73.749	-69.684	-54.459	-70.871	-76.017	-78.479	-70.242	-67.679	-75.290	-68.562	-77.024	-83.331	-72.668	-78.730	-81.220	-81.801	-53.168	UNFCCC			
	AR	-1.003	-1.249	-1.290	-1.206	-1.389	-1.507	-1.617	-1.623	-1.661	-1.785	-1.795	-1.924	-2.057	-2.049	-2.166	-2.266	-2.359	-2.204	UNFCCC			
	D																						
	Total	-53.392	-74.998	-70.974	-55.664	-72.260	-77.525	-80.095	-71.866	-69.340	-77.075	-70.356	-78.948	-85.389	-74.718	-80.895	-83.486	-84.161	-55.372				
Latvia	FM	-21.637	-22.991	-24.084	-24.152	-24.018	-24.033	-25.032	-23.631	-23.250	-23.276	-24.262	-25.777	-25.643	-26.058	-27.906	-28.091	-32.458		b)			
	AR	-23	-26	-29	-34	-36	-39	-44	-52	-54	-59	-64	-69	-73	-73	-73	-73	-73		b)			
	D																						
	Total	-21.660	-23.017	-24.114	-24.186	-24.054	-24.072	-25.076	-23.683	-23.304	-23.334	-24.327	-25.846	-25.715	-26.131	-27.978	-28.164	-32.531	0				
Lithuania	FM	-9.593	-9.407	-9.455	-8.233	-8.767	-6.949	-7.510	-8.006	-8.408	-8.433	-7.843	-7.628	-7.048	-7.406	-7.651	-7.999	-8.138	-8.179	UNFCCC			
	AR	-97	-188	-272	-351	-423	-489	-550	-612	-692	-774	-848	-918	-1.003	-1.116	-1.244	-1.425	-1.540	-1.631	d)			
	D																						
	Total	-9.689	-9.594	-9.727	-8.584	-9.190	-7.438	-8.060	-8.617	-9.100	-9.207	-8.691	-8.546	-8.051	-8.522	-8.894	-9.424	-9.678	-9.810				
Luxembourg	FM																						
	AR																						
	D																						
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Malta	FM																						
	AR																						
	D																						
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Netherlands	FM	-2.529	-2.898	-2.648	-2.864	-2.874	-2.739	-2.927	-2.658	-2.741	-2.677	-2.448	-2.495	-2.566	-2.558	-2.493	-2.414	-2.359	-2.167	UNFCCC			
	AR	-3	-8	-17	-28	-42	-49	-79	-102	-127	-155	-222	-262	-306	-353	-403	-457	-514	-575	UNFCCC			
	D	265	271	277	283	290	296	303	310	316	323	317	324	332	340	346	352	358	364	UNFCCC			
	Total	-2.267	-2.635	-2.388	-2.609	-2.626	-2.491	-2.703	-2.450	-2.551	-2.509	-2.353	-2.432	-2.540	-2.571	-2.550	-2.519	-2.514	-2.378				

Member State	Activity	Historical Net-Removals (-) or Net-Emissions (+) (1.000ton CO_2eq)																		Projected NR or NE		
		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Source	2015	2020	Source
Poland	FM	-35.944	-41.908	-40.265	-33.849	-33.339	-33.091	-33.784	-35.723	-35.608	-35.918	-36.148	-35.484	-41.204	-42.043	-44.633	-45.991	-50.832	-50.552	UNFCCC			
	AR	-158	-295	-492	-624	-838	-934	-1.102	-1.322	-1.449	-1.737	-1.572	-1.849	-2.095	-2.285	-2.525	-2.873	-3.240	-3.577	d)			
	D																						
	Total	-36.102	-42.203	-40.757	-34.473	-34.176	-34.025	-34.886	-37.044	-37.058	-37.655	-37.720	-37.333	-43.299	-44.328	-47.157	-48.864	-54.072	-54.129				
Portugal	FM	677	-380	-2.616	-3.209	-4.327	-4.697	-6.163	-6.399	-6.946	-6.453	-6.845	-6.521	-6.922	5.518	-2.452	-1.145	-2.860	-3.190	UNFCCC			
	AR	-577	-577	-577	-577	-577	-577	-577	-577	-577	-577	-577	-577	-577	-577	-577	-577	-577	-577	UNFCCC			
	D	981	981	981	981	981	981	981	981	981	981	981	981	981	981	981	981	981	981	UNFCCC			
	Total	1.082	24	-2.212	-2.805	-3.922	-4.292	-5.758	-5.995	-6.542	-6.048	-6.440	-6.117	-6.517	5.922	-2.047	-741	-2.455	-2.786				
Romania	FM	-35.583	-37.041	-37.846	-39.131	-39.734	-38.987	-38.003	-38.390	-40.481	-39.208	-37.999	-39.007	-36.536	-36.174	-35.492	-37.181	-37.200	-36.222	UNFCCC			
	AR																						
	D																						
	Total	-35.583	-37.041	-37.846	-39.131	-39.734	-38.987	-38.003	-38.390	-40.481	-39.208	-37.999	-39.007	-36.536	-36.174	-35.492	-37.181	-37.200	-36.222				
Slovakia	FM	-4.436	-5.474	-6.045	-6.123	-5.195	-4.388	-3.955	-2.704	-3.117	-2.784	-4.301	-5.533	-5.624	-5.137	-3.510	-159	-2.555	-2.718	UNFCCC			
	AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-464	-514	-519	-525	UNFCCC			
	D	-1.775	-1.629	-1.962	-1.606	-999	-615	-609	-1.861	-677	-420	-1.682	204	98	269	92	152	344	344	UNFCCC			
	Total	-6.211	-7.103	-8.007	-7.729	-6.194	-5.003	-4.564	-4.565	-3.794	-3.204	-5.983	-5.330	-5.526	-4.868	-3.883	-521	-2.731	-2.899				
Slovenia	FM	-3.186	-3.924	-3.941	-4.423	-4.397	-4.905	-4.795	-4.328	-4.750	-5.077	-5.175	-5.275	-5.496	-5.318	-5.644	-5.430	-4.733	-5.774	UNFCCC			
	AR																						
	D																						
	Total	-3.186	-3.924	-3.941	-4.423	-4.397	-4.905	-4.795	-4.328	-4.750	-5.077	-5.175	-5.275	-5.496	-5.318	-5.644	-5.430	-4.733	-5.774				
Spain	FM	-19.733	-19.652	-19.821	-19.836	-19.343	-19.763	-19.875	-19.783	-19.786	-19.837	-19.746	-19.850	-19.808	-19.766	-19.796	-19.661	-19.359	-19.883	b)			
	AR	0	0	0	0	-461	-1.109	-2.000	-2.822	-3.664	-4.185	-4.896	-5.358	-5.565	-5.798	-5.964	-6.116	-6.343	-6.465	b)			
	D																						
	Total	-19.733	-19.652	-19.821	-19.836	-19.804	-20.872	-21.875	-22.605	-23.450	-24.022	-24.642	-25.208	-25.373	-25.564	-25.760	-25.777	-25.702	-26.349				
Sweden	FM	-35.890	-39.373	-36.889	-33.694	-30.487	-28.993	-36.112	-39.695	-39.716	-38.088	-37.617	-35.725	-36.684	-36.771	-31.476	-28.196	-26.247	-21.988	UNFCCC			
	AR	0	0	-50	0	-50	-50	-100	-150	-150	-150	-250	-300	-350	-400	-450	-650	-800	-950	b)			
	D	850	1.150	1.400	1.700	1.650	2.650	2.200	1.950	2.050	3.000	1.550	1.650	1.900	2.750	2.750	2.300	2.050	1.800	b)			
	Total	-35.040	-38.223	-35.539	-31.994	-28.887	-26.393	-34.012	-37.895	-37.816	-35.238	-36.317	-34.375	-35.134	-34.421	-29.176	-26.546	-24.997	-21.138				
United Kingdom	FM	-12.201	-12.712	-13.339	-13.712	-14.190	-13.929	-13.708	-13.494	-13.395	-13.501	-13.795	-14.334	-15.032	-15.633	-16.288	-15.732	-15.210	-14.309	b)	-7.660	-4.802	nat.data
	AR	28	178	208	126	-43	-260	-512	-768	-1.004	-1.226	-1.414	-1.575	-1.741	-1.943	-2.135	-2.327	-2.475	-2.628	b)	-3.398	-4.040	nat.data
	D	167	175	183	183	200	204	234	252	263	331	394	457	424	426	412	415	395	386	UNFCCC	401	394	nat.data
	Total	-12.006	-12.360	-12.948	-13.402	-14.033	-13.984	-13.985	-14.010	-14.136	-14.395	-14.816	-15.452	-16.348	-17.150	-18.011	-17.644	-17.290	-16.550		-10.656	-8.448	
EU-27	**FM**	**-411.427**	**-468.380**	**-462.963**	**-451.571**	**-454.578**	**-455.418**	**-470.214**	**-466.061**	**-464.548**	**-471.619**	**-449.615**	**-480.126**	**-448.955**	**-427.086**	**-444.107**	**-449.277**	**-458.144**	**-376.150**		**-311.178**	**-301.462**	**e)**
Total	**AR**	**-2.502**	**-3.604**	**-4.727**	**-6.183**	**-8.237**	**-10.031**	**-11.942**	**-14.603**	**-17.570**	**-19.964**	**-20.792**	**-23.469**	**-24.944**	**-28.366**	**-31.570**	**-32.038**	**-36.612**	**-38.559**		**-49.524**	**-59.717**	**e)**
	D	**17.233**	**15.686**	**15.786**	**16.635**	**17.217**	**18.681**	**18.218**	**16.790**	**18.434**	**19.680**	**17.154**	**18.956**	**19.661**	**20.559**	**18.923**	**18.415**	**20.527**	**19.320**		**27.528**	**34.007**	**e)**
	Total	**-396.696**	**-456.298**	**-451.904**	**-441.119**	**-445.597**	**-446.768**	**-463.937**	**-463.874**	**-463.684**	**-471.903**	**-453.253**	**-484.639**	**-454.238**	**-434.893**	**-456.754**	**-462.900**	**-474.229**	**-395.390**		**-333.174**	**-327.171**	**e)**

NOTES

a) UNFCCC + nat.data for some years - please refer to country annex for details

b) national data - please refer to country annex for details

c) UNFCCC + KP data for some years - please refer to country annex for details

d) UNFCCC data corrected due to 20years transition rule - see text above for details

e) EC JRC projection

Natural Disturbances

In the amendments it seeks for forest accounting under the KP, the EU proposes to address *force majeure*, i.e., the compliance risk arising extraordinary events or circumstances that are beyond the control of Parties.

The concept of *force majeure* proposed by the EU addresses only emissions from events beyond the control of parties and large enough to pose compliance risk. The information presented illustrates the level and, where possible, the inter-annual variability of some of these events and the ranges that were observed in the available time series. The EU does not, in this submission, make any judgement on which events or circumstances would qualify as *force majeure*. That issue will be addressed in the negotiations with other Parties.

Information on emissions and removals, by natural disturbance type, are not ready to be presented at this stage. The tables shown below present the data available on forest areas affected by natural disturbances at Member-State level. Natural disturbances are aggregated in two categories: *Storms, Wind and Snow* and *Fires*. Other natural disturbances include damage from *pests and diseases* and from *drought*. Although data on Insects and diseases also exists in some international databases, the EU found the data to be not directly comparable between MS, as each country follows own definitions, but all Member States report on at least some forest damage to FAO, UNECE, MCPFE and ICP Forests.

Additional qualitative analysis of natural disturbances using the report from the study 'Feasibility Study on means of combating forest dieback in the European Union', commissioned by the European Commission[2] was also included.

The EU notes that several types of natural disturbances often act in combination, e.g. forests damaged by fire or storm are more susceptible to insect or fungi attack or, vice versa, forests attacked by insects or fungi are more susceptible to storm or snow break. It may therefore be difficult to assign damaged forest areas to one specific natural disturbance type.

According to MCPFE (2003) storm, wind, snow or other identifiable abiotic factors represent the most important causes of damage in many countries. Insects and diseases represent the second most important causes of damage. Damage by unidentified causes was reported by 15 countries. Fire is the most important damaging agent in the Mediterranean countries.

[22] http://ec.europa.eu/environment/forests/pdf/forestdieback_backgroundreport.pdf

STORMS, WIND, SNOW

Over the past decades damage severity has increased with extensive storm events, for instance, in 1990 cyclones 'Vivian' and 'Wiebke', in 1999 cyclone 'Lothar', in 2001 cyclones 'Pyry' and 'Janika', in 2005 cyclone 'Gudrun', in 2007 cyclone 'Kyrill' and latest storm 'Klaus'' in 2009. This is almost half of the annual wood production in Europe. In November 2004 storms damaged 330,000 ha forests in the Slovac Republic with 5.4 Mio m3 timber thrown (total annual cut 6.7 Mio m3). On 8/9 Jan 2005 cyclone 'Gudrun' hit mainly Sweden and Denmark; in Sweden 85 Mio m3 timber (nearly 1 annual cut) had to be harvested; in 2006 about 50 Mio Euro had to be invested for reforestation; in Denmark 1.5-2 Mio m3 timber (1.5-2 times annual cut) had to be harvested, about 2000 ha private forest and 700 ha state forest were clearfelled, 750 ha private forest damaged. In western part of Finland storms 'Pyry' (1.11) and 'Janika' (16-17.11) damaged 7,3 Mio m3 of timber in November 2001 (Ihalainen and Ahola 2003). On 14/18 Jan 2007 storm 'Kyrill' caused salvage felling and harvesting of 20 Mio m3 in Germany, 12 Mio m3 in Sweden and 0.6 Mio m3 in Belgium. On 24 Jan 2009 storm 'Klaus' damaged 680 Kha forests in France (90% of maritime pine forests: 326 000 ha damaged at less than 20%, 120 000 damaged between 20-40%, 69 000 ha damaged between 40-60%, 164 000 ha damaged at more than 60%) with 42,3 Mio m3 timber thrown (nearly ¾ times annual cut). After 'Lothar' in 1999, the Swiss Federal Office for the Environment (BAFU) initiated a basic research programme on causes and risk-development of storms. Normally, snow and ice do not severely damage trees, but influence their growth direction and may in case of repeated avalanches, lead to decrease in stability. Still, with increasing age and diameter, the danger of breaking also increases.

Member State	Storm, Wind & Snow (1.000ha)																
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Source
Austria																	UNECE
Belgium											2,6					2,1	UNECE
Bulgaria	3,8										29,6					10,5	UNECE
Cyprus	0,0										0,0					0,0	UNECE
Czech Rep.	19,4										9,6					10,3	UNECE
Denmark										20,0						15,0	nat.data
Estonia											18,0					33,0	UNECE
Finland	207,0										274,0					250,0	UNECE
France	9,0										230,0					0,0	UNECE
Germany																	UNECE
Greece																	UNECE
Hungary	63,0										117,9					104,3	UNECE
Ireland	0,6	0,3	0,4	0,3	0,5	0,1	0,3	0,2	1,3	3,0	3,0	1,3	0,8	0,4	0,2	0,3	nat.data
Italy											803,0					605,0	UNECE
Latvia											1,0					240,7	UNECE
Lithuania	36,9										58,7					41,7	UNECE
Luxembourg	5,3										0,3					0,3	UNECE
Malta																	UNECE
Netherlands																	UNECE
Poland																	UNECE
Portugal											67,0						UNECE
Romania	150,0																UNECE
Slovakia	4,8										6,0					10,9	UNECE
Slovenia											0,3					0,3	UNECE
Spain																	UNECE
Sweden	661,0										652,0					1.071,0	UNECE
United Kingdom	5,5										5,5					5,5	UNECE
EU-27 Total	**1.166**										**2.278**					**2.401**	

Note that the definition used for the table from UNECE is: Damaged areas to be reported are areas with damage present in the reporting year. This means that there may be an accumulation of areas as long as it is judged that an area is affected. After some years of recovery the affected area will leave the definition of damage.

TOTAL BURNT AREA AND FOREST FIRES

Data for area affected by fires comes for the European's Commission Joint Research Centre – European Forest Fire Information System (http://effis.jrc.ec.europa.eu/) and covers most Member-States for the time period 1990-2008.

At EU-27 level, 400 to 500 thousand hectares burned every year between 1990 and 2008. Annual values ranged between a minimum of 180.000ha in 2008 and a maximum of 818.000ha in 2003. The later coincided with a severe heat wave that was felt throughout Europe.

Natural factors, such as such as droughts, winds, the relief and difficulties of access play a decisive part in the scale and spread of the fires, but they are mainly not initiating a fire.

According to the European Forest Fire Information System (EFFIS), in average less than 10% of all fires are provoked by natural causes (e.g. lightening, heat). The vast majority of fires are caused as a result of human activity. Of these, 30% are of a criminal nature, or in pursuit of various interests such as urban development, game management, timber production and livestock farming. 50% are due to negligence, age-old rural practices such as burning the stubble and regenerating annual pastureland for livestock, day-trippers, recreational activities etc, while the causes of the remainder are unclear. The percentage of unknown or unclear causes has fallen in recent decades, a result primarily of more thorough investigations.

In the period 1990-2008, the five member-states around the Mediterranean Basin (France, Greece, Italy, Portugal and Spain) accounted for more than 85% of total burnt area, reflecting the hotter and dryer conditions that those countries experienced during summer.

Further analysis of the data shows that the inter-annual variability in each Member State is very high and no clear trends are identifiable, suggesting that other factors – alongside fire suppression – play a role in determining the areas affected by fires.

Also visible is the fact that the years with most impact vary from member-state to Member State, reflecting variations in climatic conditions around the Mediterranean Basin. In 2005 fires were particularly severe in Portugal and Spain, with Greece and Italy showing relatively small figures in that year. Just two years later, in 2007, the exact opposite happened, with Greece and Italy being severely hit by fires, while Portugal and Spain experienced much lower than average values.

Member State	Total Burnt Area (1.000ha)																							
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Min	median	average	Max	Source
Austria																0,1	0,1	0,0		0,0	0,1	0,1	0,1	EFFIS
Belgium																								EFFIS
Bulgaria		0,5	5,2	18,2	18,1	0,6	0,9	0,6	6,9	8,2	57,4	20,2	6,5	5,0	1,1	1,5	3,5	43,0	5,3	0,5	5,3	11,3	57,4	EFFIS
Cyprus											8,0	4,8	2,2	2,3	1,2	1,8	1,2	2,5	2,4	1,2	2,3	2,9	8,0	EFFIS
Czech Rep.	0,2	0,1	1,3	1,1	0,8	0,4	2,0	3,4	1,1	0,3	0,4	0,1	0,2	1,2	0,3	0,2	0,4	0,3		0,1	0,4	0,8	3,4	nat.data
Denmark																								EFFIS
Estonia													2,1	0,2	0,4	0,1	2,6	0,3	1,3	0,1	0,4	1,0	2,6	EFFIS
Finland							0,4	1,1	0,1	0,6	0,3	0,2	0,6	0,7	0,4	0,5	1,6	0,6	0,8	0,1	0,6	0,6	1,6	EFFIS
France	72,6	10,1	16,6	16,7	25,0	18,1	11,4	21,6	19,3	15,9	24,1	20,6	30,1	73,3	13,7	22,1	7,8	8,5	6,0	6,0	18,1	22,8	73,3	EFFIS
Germany		0,9	4,9	1,5	1,1	0,6	1,4	0,6	0,4	0,4	0,6	0,1	0,1	1,3	0,3	0,2	0,5	0,3	0,5	0,1	0,6	0,9	4,9	EFFIS
Greece	38,6	23,6	66,3	54,0	52,6	19,2	23,0	34,8	92,9	8,3	145,0	18,4	4,3	3,3	10,7	6,4	12,7	213,9	29,2	3,3	23,6	45,1	213,9	nat.data
Hungary										0,8	1,6		1,2	0,8	0,2	3,5	0,6	4,6	2,4	0,2	1,2	1,7	4,6	EFFIS
Ireland																								
Italy	195,3	99,9	105,7	203,7	136,3	48,9	58,0	111,2	155,6	71,1	114,6	76,4	40,8	91,8	60,2	47,6	39,9	227,7	66,3	39,9	91,8	102,7	227,7	EFFIS
Latvia	0,3	0,1	8,4	0,6	0,3	0,5	0,9	0,4	0,2	1,5	1,3	0,3	2,2	0,6	0,5	0,1	3,4	0,3	0,4	0,1	0,5	1,2	8,4	EFFIS
Lithuania			0,8	0,3	0,3	0,3	0,5	0,2	0,1	0,5	0,4	0,1	0,7	0,4	0,3	0,1	1,2	0,0	0,1	0,0	0,3	0,4	1,2	EFFIS
Luxembourg																								
Malta																								
Netherlands																								
Poland	7,3	2,6	43,8	8,3	9,2	5,3	14,1	6,6	4,0	8,3	7,0	3,4	5,6	28,6	4,3	7,4	5,9	2,8	3,0	2,6	6,6	9,3	43,8	EFFIS
Portugal	137,3	182,5	57,0	50,0	77,3	169,6	88,9	30,5	158,4	70,6	159,6	111,9	124,4	425,7	129,5	338,3	75,5	31,5	17,2	17,2	111,9	128,2	425,7	EFFIS
Romania	0,4	0,3	0,7	0,5	0,3	0,2	0,2	0,1	0,1	0,4	3,6	1,0	3,5	0,8	0,1	0,2	0,9	2,5	0,4	0,1	0,4	0,9	3,6	EFFIS
Slovakia										0,6	0,9	0,3	0,6	1,6	0,2	0,5	0,3	0,7	0,1	0,1	0,6	0,6	1,6	EFFIS
Slovenia													0,2	2,1	0,1	0,3	1,4	0,1		0,1	0,3	0,7	2,1	EFFIS
Spain	213,2	281,9	110,2	96,4	480,8	144,7	77,5	99,9	158,7	85,2	221,2	106,1	115,9	174,8	157,7	200,5	166,6	98,7	39,9	39,9	144,7	159,5	480,8	nat.data
Sweden							1,6	5,9	0,4	1,8	1,6	1,3	2,6	4,0	1,9	1,6	5,7	1,1	4,3	0,4	1,8	2,6	5,9	EFFIS
United Kingdom																								
EU-27 Total	**665**	**602**	**421**	**451**	**802**	**408**	**281**	**317**	**598**	**274**	**748**	**365**	**344**	**818**	**383**	**633**	**332**	**640**	**180**	**180**	**411**	**493**	**818**	

NOTES

EFFIS - JRC European Forest Fire Information System

EFFIS data cover burnt areas for different land use types. Due to changes in the way was collected over time, consistent time series going back to 1990 are only available to total burnt area. The table below presents the data on forest burnt areas, reported by Member States where that information was available. As it can be seen from comparing the two tables, the variability of affected areas is very similar.

Member State	Forest Burnt Area (1.000ha)																							
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Min	median	average	Max	Source
Austria																								
Belgium																								
Bulgaria																								
Cyprus																								
Czech Rep.																								
Denmark																								
Estonia																								
Finland																								
France																								
Germany																								
Greece	21,1	8,0	23,2	24,2	23,4	9,0	8,1	16,1	46,1	4,8	69,6	8,4	0,9	1,0	2,6	2,2	6,5	83,3	13,4	0,9	9,0	19,6	83,3	nat.data
Hungary																								
Ireland	0,4	0,3	0,2	0,3	0,4	0,5	0,6	0,3	0,2	0,1	0,3	0,7	0,2	0,9	0,6	0,2	0,2	0,2		0,1	0,3	0,4	0,9	nat.data
Italy	98,4	30,2	44,5	116,4	47,1	21,0	20,3	62,8	73,0	39,4	58,2	38,2	20,2	44,1	20,9	21,5	16,4	116,6		16,4	41,7	49,4	116,6	nat.data
Latvia	0,3	0,1	8,4	0,6	0,0	0,5	0,9	0,4	0,2	1,5	1,3	0,3	2,4	0,6	0,5	0,1	3,4	0,3		0,0	0,5	1,2	8,4	nat.data
Lithuania																								
Luxembourg																								
Malta																								
Netherlands																								
Poland																								
Portugal	79,5	125,5	39,7	23,8	13,5	87,6	30,5	11,5	57,4	31,1	68,6	45,6	65,2	286,1	56,1	213,5	36,3	9,6	5,5	5,5	45,6	67,7	286,1	nat.data
Romania																								
Slovakia																								
Slovenia																								
Spain	73,2	116,9	40,4	33,4	250,4	42,1	10,3	21,3	42,7	23,9	45,9	19,2	25,2	53,7	51,7	69,4	71,1	29,4		10,3	42,4	56,7	250,4	nat.data
Sweden	1,7	1,4	1,4	1,5	1,4	1,4	1,7	6,6	0,8	3,6	2,6	3,4	5,1	5,4	5,3	4,4	8,8	2,4		0,8	2,5	3,3	8,8	nat.data
United Kingdom	0,6	1,1	0,3	0,5	0,4	2,9	1,4	1,9	1,0	0,2	0,6	0,7	0,6	0,5	0,6	0,1	1,5	1,7	1,6	0,1	0,6	1,0	2,9	nat.data
EU-27 Total	**275**	**283**	**158**	**201**	**337**	**165**	**74**	**121**	**221**	**104**	**247**	**117**	**120**	**392**	**138**	**311**	**144**	**244**		**74**	**183**	**203**	**392**	

NOTES

nat.data - data provided by member state

PESTS AND DISEASES

Although some data on areas affected by pest and diseases is reported to FAO, UNECE and MCPFE by EU Member States, the EU decided not to present them due to a lack of clarity in interpreting what constitutes a 'disturbance'.

DROUGHT AND HEAT

Drought as stress factor induces defoliation and weakens trees, thus accelerating their vulnerability against other damaging agents and decreasing productivity. Much of Europe was affected by extreme heat waves during the summer of 2003 and 2004. The ICP Forests monitoring data showed a marked effect of these weather extremes on forest condition (see ICP Forests, 2005, 2006). In some regions of central Europe defoliation scores in 2003 and 2004 were the highest ever recorded. Continuous growth measurements revealed growth reductions at low altitudes, whereas at higher elevations and in the far north accelerated tree growth was measured. Especially damaging insect populations like bark beetles increased under the favourable warm and dry weather condition in 2003.

Harvested Wood Products

In this section the EU provides raw data on both harvest rates, using the FAO wood production as a proxy and on emissions and removals from the HWP pool.

TOTAL HARVEST RATES

About 405 million cubic meters over bark were produced by European forests in 2007, reflecting an average growth in harvesting rates of about 7.8 Mm^3ob / year.

Member State	Total Roundwood Production (1000m^{3}ob)																			
	Historical																		Projected		
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Source	2015	2020	Source
Austria	17.620	12.871	13.719	13.727	16.083	15.462	16.811	16.493	15.717	15.774	14.869	15.083	16.627	19.102	18.461	18.447	21.431	23.875	nat.data			
Belgium											4.510	4.215	4.500	4.765	4.850	4.950	5.075	4.945	FAO			
BEL+LUX	5.610	4.755	4.240	4.240	4.340	4.110	3.985	4.005	4.837	5.059									FAO			
Bulgaria	4.089	3.650	3.545	3.547	2.685	2.844	3.205	3.041	3.231	4.352	4.784	3.992	4.833	4.833	5.986	5.862	5.992	5.696	FAO			
Cyprus	63	54	45	53	47	48	45	41	35	36	21	18	15	12	10	10	7	20	FAO			
Czech Rep.	13.332	10.751	9.850	10.406	11.950	12.365	12.600	13.491	13.991	14.203	14.441	14.374	14.541	15.140	15.601	15.510	17.678	18.508	FAO			
Denmark	2.255	2.309	2.228	2.281	2.282	2.282	2.282	2.129	1.558	1.560	2.952	1.613	1.446	1.627	1.516	2.963	2.358	2.566	FAO			
Estonia	0	0	2.146	2.439	3.550	3.710	3.901	5.393	6.061	6.704	8.910	10.200	10.500	10.500	6.800	5.500	5.400	5.900	FAO			
Finland	43.230	34.863	38.482	42.244	48.745	50.219	46.597	51.329	53.660	53.637	54.262	52.210	53.389	54.240	54.398	52.250	50.812	56.870	FAO			
France	68 128	68 822	68 688	64 551	65 625	65 773	62 623	62 903	62 314	61 729	70 522	64 320	59 300	56 980	57 269	56 832	57 622	58 786	nat.data			
Germany	84.707	33.618	32.954	33.152	39.813	39.343	37.014	38.207	39.052	37.634	53.710	39.483	42.380	51.182	54.504	56.946	62.290	76.728	FAO			
Greece	2.492	2.546	2.321	2.218	2.091	1.961	2.012	1.744	1.692	2.214	2.245	1.916	1.591	1.673	1.694	1.523	1.562	1.743	FAO			
Hungary	5.973	5.490	5.006	4.496	4.527	4.331	3.653	4.241	4.167	5.231	5.902	5.811	5.836	5.785	5.660	5.940	5.913	5.640	FAO			
Ireland	1.787	1.837	2.156	2.003	2.220	2.424	2.520	2.398	2.493	2.842	2.940	2.700	2.911	2.951	2.818	2.913	2.938	2.981	UNECE			
Italy	7.972	8.327	8.357	8.818	9.465	9.736	9.121	9.146	9.550	11.138	9.329	8.099	7.511	8.219	8.697	8.691	8.619	8.124	FAO			
Latvia	5.000	4.400	4.000	4.800	5.700	6.900	6.800	8.900	10.000	10.800	11.000	11.200	12.200	11.700	11.500	11.300	9.810	10.010	nat.data			
Lithuania	0	0	3.160	4.508	3.992	5.960	5.540	5.149	4.879	4.924	5.500	5.700	6.115	6.275	6.120	6.050	5.590	5.855	FAO			
Luxemburg											260	270	257	257	277	249	268	291	FAO			
Malta									0	0	0	0	0	0	0	0	0	0	FAO			
Netherlands	1.420	1.123	1.253	1.075	1.043	1.104	952	1.109	1.023	1.044	1.039	865	839	1.044	1.026	1.110	1.107	1.022	FAO			
Poland	17.617	17.026	18.778	18.590	18.776	20.350	20.286	21.731	23.107	24.268	26.025	25.016	27.137	30.836	32.733	31.945	32.384	35.935	FAO			
Portugal	11.205	10.809	10.278	10.207	9.819	9.350	8.978	8.978	8.548	8.978	10.831	8.946	8.742	9.673	10.869	10.746	10.805	10.805	FAO			
Romania	12.608	12.961	12.440	8.840	11.925	12.178	12.250	13.529	11.649	12.704	13.148	12.424	15.154	15.440	15.809	14.501	13.970	15.341	FAO			
Slovakia				5.249	5.318	5.323	5.460	4.945	5.519	5.795	6.163	5.788	5.782	6.355	7.240	9.302	7.869	8.875	FAO			
Slovenia			1.671	1.065	1.944	1.866	1.991	2.208	2.133	2.068	2.253	2.257	2.283	2.591	2.551	2.733	3.179	2.882	FAO			
Spain	15.590	15.188	13.924	13.767	15.305	16.075	15.631	15.631	14.874	14.810	14.321	15.131	15.839	16.105	16.290	15.531	15.716	14.528	FAO			
Sweden	52.871	51.400	53.520	54.000	56.300	63.600	56.300	60.200	60.600	58.700	63.300	63.200	66.600	67.100	67.300	98.200	64.600	77.200	FAO			
United Kingdom	6.350	6.372	6.408	6.711	7.920	8.146	7.495	7.835	7.595	7.774	7.791	7.881	7.789	8.072	8.325	8.519	8.424	9.021	FAO			
EU-27 Total	**311.791**	**240.350**	**250.481**	**258.436**	**285.840**	**299.687**	**285.429**	**301.873**	**305.972**	**312.248**	**340.505**	**318.391**	**334.818**	**355.477**	**361.035**	**391.689**	**363.796**	**405.359**				

NOTES

FAO - data FAOSTAT; ForesSTAT

nat.data - data provided by member state

CARBON CHANGES IN THE HWP POOL

The data presented are a first approximation to carbon stock change in the harvested wood pool for EU MS. Further work is ongoing and will be provided when available.

The calculation tool used in the estimation presented below was the IPCC HWP model, from the 2006 IPCC Guidelines (IPCC 2006). Using parts of the model it is possible to estimate the contribution of HWP to the national GHG balance of the reporting country. Explanation of the estimation methods is provided in the 2006 GL (IPCC 2006, Vol.4, Ch. 12) and in Pingoud and Wagner (2006). The estimates are based on a Tier 1 level method and were provided by Kim Pingoud in 2008 using the production (PA) and domestically consumed and produced HWP (SCAD) (Cowie et al. 2006). Only HWP in use were considered, because there is no unified database on HWP in landfills in the EU27[3].

In the model the stock change estimates are based on the balance of semi-finished HWP. Two pools of HWP in use with different decay rates were considered:

- *Solidwood products* comprising of sawnwood, wood-based panels and optionally other industrial roundwood such as poles and
- *Paper products* comprising of paper and paperboard. Roundwood fluxes not sequestered into these HWP pools were assumed to be oxidised into the atmosphere either in energy production or just in decay without any energy recovery.

The activity data of the reporting countries consisted of historical production and trade flows of roundwood wood and semi-finished wood products described in IPCC (2006, Vol.4, Ch. 12). The model used the FAO database (FAO 2008), including time series of various HWP commodities, mostly since 1961 until 2006, mainly from all countries globally. (Activity data for 2007 were not available when the analysis was completed.) Older historical time series, prior to 1961, were approximated assuming that there has been a continuous exponential growth in all commodities since 1900, which is the starting year of integration in the model. A growth of 1.51% [4] per year was used for all countries.

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[3] ***References***

Cowie A., Pingoud, K., Schlamadinger, B. 2006. Stock changes or fluxes? Resolving terminological confusion in the debate on land use change and forestry, Climate Policy, Vol. 6(2): 161-179.

FAO 2008. FAO Statistics: ForesSTAT. http://faostat.fao.org/site/381/default.aspx. Data downloaded between 14 and 22 May 2008.

IPCC 2006. Pingoud, K., Skog, K., Martino, D.L., Tonosaki, M., Xiaoquan, Z., Ford-Robertson, J. 2006. Chapter 12. Harvested Wood Products. 33 p.+ HWP Worksheet MS Excel. In: *2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 4, Agriculture, Forestry and Other Land Use*. http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.htm

Pingoud, K., Wagner, F. 2006. Methane emissions from landfills and decay of harvested wood products: the first order decay revisited. *Mitigation and Adaptation Strategies for Global Change*. Vol. 11, Nos. 5-6: 961-978.

[4] 1.51% is the estimated annual increase for industrial roundwood production in *Europe* for the period 1900 to 1961 (IPCC 2006, Vol.4, Ch 12, Table 12.3, p. 12.18).

For conversion factors default values given in IPCC (2006, Vol.4, Ch. 12, Table 12.4, p. 12.19) were used in the calculations. Half lives of 30 years for solid wood products and 2 years for paper products were assumed. Results will differ if different assumptions are made on half-lives of HWP.

The commodity *Other Industrial Roundwood* was excluded from the calculations in this study, as the data delivered to FAO appeared to be unreliable for many countries.

Under the Production approach, which includes exported goods, the stock change in the HWP pool, originating from wood produced in the EU-27 in 2006, was 84 $MtCO_2$. Since 1990 the HWP C stock-changes in the EU-27 have increased at an average annual rate of 2.4 $MtCO_2$.

Under the SCAD[5] approach, which excludes exported goods, the stock change in the HWP pool originating from the sum of the wood produced in the 27 Member States in 2006 was 20 $MtCO_2$. Since 1990 the HWP C stock-changes in the EU-27 have increased at an average annual rate of 208 $KtCO_2$. In the numbers presented, HWP traded between MS are treated as exports. Data for the EU total are not presented since it would require additional calculations.

The results constitute a first estimate of the accounting proposal as suggested by EU and are to be revised as soon as country specific information (data on half-lives, growth rates, etc.) is available.

[5] Stock change of domestically produced and consumed HWP (SCAD)

Member State	Harvested Wood Products - Production Approach (1.000 tonCO$_2$eq) 30y/2y																	
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Source
Austria	-3.698	-2.105	-1.858	-1.414	-2.270	-2.795	-2.906	-3.114	-3.217	-2.519	-2.320	-3.111	-4.058	-4.720	-3.991	-4.012	-3.175	pingoud
Belgium	-2.272	-2.261	-1.865	-1.482	-971	-1.263	-2.119	-1.458	-2.470	-1.264	-619	-97	-1.305	-1.727	-1.479	-1.171	-687	pingoud
Bulgaria	-101	97	1.029	933	875	796	703	663	634	657	318	157	183	199	-199	-79	-28	pingoud
Cyprus	-7	1	1	-11	-7	-6	-7	2	-4	-7	8	16	17	18	18	18	18	pingoud
Czech Rep.	-1.377	-60	-221	-828	-1.325	-1.826	-2.088	-1.824	-1.296	-1.563	-1.694	-1.950	-1.856	-2.882	-2.768	-2.764	-3.577	pingoud
Denmark	-376	-333	57	-68	18	91	8	251	416	516	166	51	699	616	700	408	504	pingoud
Estonia	-249	-252	-255	-2.182	-781	-4.837	-1.436	-7.397	-6.781	-4.091	-3.516	-2.294	-2.173	-1.935	-1.905	-1.517	-1.399	pingoud
Finland	-2.110	-181	-893	-3.212	-5.201	-3.253	-2.850	-6.179	-5.676	-5.314	-6.052	-2.627	-3.395	-3.924	-4.588	-266	-2.838	pingoud
France	-8.288	-8.279	-6.993	-4.644	-5.428	-4.715	-5.392	-5.908	-6.906	-7.789	-10.279	-8.792	-7.906	-7.634	-7.489	-7.153	-6.054	pingoud
Germany	-14.918	-25.410	-18.715	-13.552	-16.991	-16.010	-13.968	-18.878	-25.052	-17.905	-19.271	-17.285	-20.293	-20.008	-25.847	-29.785	-32.032	pingoud
Greece	-503	-543	-531	-926	-811	-664	-567	451	146	21	-186	31	-178	-188	-81	-150	-195	pingoud
Hungary	-1.206	-428	-959	79	-185	-101	-306	-1.118	-715	-393	-524	-401	-506	-547	-139	-120	-336	pingoud
Ireland	-386	-574	-786	-745	-737	-798	-1.016	-969	-1.006	-1.096	-1.110	-1.109	-958	-1.344	-1.171	-1.220	-1.419	pingoud
Italy	-1.027	-443	-296	-1.181	-390	-1.728	-2.184	-1.508	-1.642	-1.609	-451	159	180	-73	-225	-310	-757	pingoud
Latvia	-474	-480	-486	-82	-1.556	-1.595	-1.498	-3.288	-4.261	-3.687	-4.568	-4.988	-5.004	-5.377	-5.422	-5.340	-5.741	pingoud
Lithuania	-166	-168	-170	-558	-1.025	-1.184	-1.474	-1.225	-1.174	-1.087	-1.542	-1.504	-1.598	-1.777	-1.581	-1.448	-1.404	pingoud
Luxembourg	-74	-73	-61	-42	-21	-25	-42	-27	-48	-41	-10	-33	-19	5	-212	-258	-255	pingoud
Malta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	pingoud
Netherlands	-2.113	-1.034	-949	-468	-734	120	61	-199	410	147	167	271	817	42	-3.692	1.978	1.067	pingoud
Poland	921	1.121	31	-107	-1.807	-378	-459	-1.621	-2.601	-2.597	-3.180	-2.135	-2.935	-4.203	-5.045	-4.032	-4.935	pingoud
Portugal	-1.793	-1.833	-1.311	-1.072	-1.193	-1.033	-1.022	-992	-645	-884	-1.149	-1.342	-1.393	-1.570	-1.448	-1.178	-1.340	pingoud
Romania	584	1.416	1.100	953	1.955	1.722	1.771	1.582	1.329	628	90	305	-285	-1.065	-1.451	-1.066	-1.473	pingoud
Slovakia	-501	-24	-81	385	-140	-90	-259	-552	-1.017	-1.378	-1.792	-726	-1.010	-1.131	-1.515	-2.660	-2.242	pingoud
Slovenia	-286	-290	-293	-328	-265	-290	-223	-362	-496	-215	-312	-335	-563	-361	-307	-378	-474	pingoud
Spain	-2.569	-2.641	-1.547	-2.303	-2.652	-3.101	-3.043	-3.063	-1.806	-3.738	-4.375	-4.951	-5.140	-4.655	-4.532	-3.817	-4.457	pingoud
Sweden	-5.200	-3.004	-2.924	-4.148	-4.329	-5.023	-4.806	-5.327	-4.196	-3.391	-4.753	-4.523	-4.754	-5.250	-5.370	-7.687	-7.306	pingoud
United Kingdom	-3.277	-3.320	-3.176	-2.936	-3.738	-3.753	-2.814	-3.755	-3.980	-4.368	-4.368	-3.590	-3.198	-3.360	-4.533	-3.349	-3.150	pingoud
Sum of 27 MS	**-51.464**	**-51.103**	**-42.152**	**-39.937**	**-49.710**	**-51.735**	**-47.936**	**-65.815**	**-72.054**	**-62.965**	**-71.321**	**-60.802**	**-66.632**	**-72.851**	**-84.273**	**-77.356**	**-83.683**	
EU Total	**-51.464**	**-51.103**	**-42.152**	**-39.937**	**-49.710**	**-51.735**	**-47.936**	**-65.815**	**-72.054**	**-62.965**	**-71.321**	**-60.802**	**-66.632**	**-72.851**	**-84.273**	**-77.356**	**-83.683**	

Member State	Harvested Wood Products - SCAD Approach (1.000 tonCO_2eq) 30y/2y																	
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Source
Austria	-1.101	-581	-821	-874	-1.041	-622	-1.069	-1.019	-973	-377	-286	-919	-694	-654	-449	-747	-614	pingoud
Belgium	45	19	149	205	464	250	-331	555	131	681	732	647	716	793	807	957	1.021	pingoud
Bulgaria	32	161	1.112	938	858	818	879	884	704	1.059	775	575	695	692	633	1.043	1.037	pingoud
Cyprus	2	8	12	-1	-1	-1	4	13	10	12	12	19	21	25	21	21	21	pingoud
Czech Rep.	-1.345	416	237	101	432	316	286	426	508	584	352	315	130	-197	-101	56	-643	pingoud
Denmark	12	32	274	-56	204	237	150	376	620	491	346	477	489	429	560	465	517	pingoud
Estonia	-126	-128	-130	15	167	117	275	144	178	-30	-78	-264	-228	-370	-414	-303	-384	pingoud
Finland	-1.065	43	-313	-161	-641	-474	-870	-1.721	-1.167	-1.330	-1.867	-948	-980	-1.344	-1.245	-478	-590	pingoud
France	-4.562	-4.165	-3.271	-2.821	-3.098	-2.614	-3.548	-2.826	-2.743	-2.559	-3.762	-3.272	-1.961	-1.258	-1.927	-1.442	-1.408	pingoud
Germany	-10.011	-6.977	-6.377	-5.387	-6.757	-6.876	-6.199	-6.584	-6.339	-7.339	-6.918	-4.356	-3.795	-5.727	-7.069	-7.655	-10.029	pingoud
Greece	-326	-342	-134	-854	-779	-606	-515	604	263	142	-65	104	-105	-152	-122	-409	-502	pingoud
Hungary	-472	15	34	331	184	373	407	-146	647	520	445	469	454	370	530	533	360	pingoud
Ireland	-178	-124	-127	-219	-276	-290	-351	-341	-388	-463	-540	-609	-258	-327	-401	-281	-350	pingoud
Italy	-135	325	435	-143	468	-924	-1.349	-838	-1.027	-1.065	43	378	362	-161	-205	-431	-190	pingoud
Latvia	-307	-311	-315	233	295	541	232	-45	-144	-304	-284	-374	-482	-168	-322	-556	-831	pingoud
Lithuania	-112	-113	-115	-423	-238	11	-136	-54	-295	-199	-254	-244	-265	-261	-396	-407	-525	pingoud
Luxembourg	24	54	47	31	29	25	22	24	19	24	20	19	2	13	13	27	6	pingoud
Malta	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	pingoud
Netherlands	363	937	865	723	722	703	870	968	921	587	840	693	745	847	699	799	866	pingoud
Poland	1.093	1.494	833	768	-500	461	100	-635	-1.296	-1.002	-1.284	-415	-627	-1.288	-2.050	-1.598	-2.798	pingoud
Portugal	-83	-257	1	-314	-244	-340	-315	-220	-270	-495	-629	-749	-440	-207	-299	172	200	pingoud
Romania	-360	508	225	-42	1.526	1.425	1.483	1.648	1.619	1.387	1.247	1.048	913	581	486	237	-49	pingoud
Slovakia	-412	217	121	359	431	421	388	554	247	71	-151	249	343	67	-438	-1.062	-499	pingoud
Slovenia	-33	-35	-37	-165	-97	-156	-195	-193	-274	-122	-183	-172	-347	-167	-91	-26	17	pingoud
Spain	-2.223	-2.219	-1.144	-1.480	-2.025	-2.266	-2.482	-1.888	-513	-2.663	-3.160	-3.204	-3.429	-3.378	-3.678	-2.503	-2.940	pingoud
Sweden	-2.528	-1.118	-106	686	714	-570	848	-514	312	646	-1.167	-1.538	-1.391	-1.522	-527	-982	-302	pingoud
United Kingdom	-434	-330	-448	-816	-1.366	-1.450	-781	-1.151	-1.087	-1.604	-1.925	-1.767	-1.567	-775	-1.262	-1.315	-1.090	pingoud
Sum of 27 MS	**-24.237**	**-12.467**	**-8.988**	**-9.363**	**-10.566**	**-11.488**	**-12.194**	**-11.978**	**-10.335**	**-13.344**	**-17.736**	**-13.835**	**-11.698**	**-14.138**	**-17.244**	**-15.882**	**-19.696**	
EU Total	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	

Austria

HISTORICAL NET-REMOVALS (-) OR NET-EMISSIONS (+)

As indicated in the Austrian NIR 2009, the results of the national forest inventory by the Federal Research Centre for Forests (NFI, BFW 2008) serve as main basis for the estimates of forest biomass increment and drain. The Austrian NFI provides measured data for both, increment and drain. The latest NFI has been conducted in 2000 – 2002. For the following years, only mean values for biomass increment and drain, resulting on basis of the data from the latest NFI, have been reported. The whole time series will be officially revised after finalisation of the subsequent NFI.

In Austria another statistic for harvest exists, the so called „timber harvest reports“, which are annually published by the Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management according to the national forest law. Basis for these data are records and estimates of the forest owners on harvested wood. The recent „timber harvest reports“ by the Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLUW 2009) give evidence that the harvest rates in the last years have increased substantially compared to the NFI 2000 – 2002. The increment remained stable during the last decades. This results in a reduction of the net sink compared to 2000 – 2002 data.

These data provide for an appropriate representation of the C- fluxes on ‘forest land remaining forest land’ for the most recent years on a conservative basis, as the timber harvest reports underestimate the total harvest rates compared to the estimates on biomass drain resulting from the NFI (see data comparison for 2000 – 2002).

LITERATURE:

BFW 2009: National Forest Inventory. Federal Research Centre for Forests, Vienna, information on the last NFIs can be downloaded at the website: http://bfw.ac.at/rz/bfwcms.web?dok=788

BMLFUW 2009: Holzeinschlagsmeldungen. Timber harvest reports by the Federal Ministry of Agriculture, Forestry, Environment and Water Management, Vienna, the reports of the last years can be downloaded at the website: http://gpool.lfrz.at/dev/cgi-bin/bizzzhoo2/main.cgi?catid=13733&rq=cat&tfqs=catt&catt=default

SCENARIOS FOR NET-REMOVALS AND NET-EMISSIONS, YEARS 2015 AND 2020

MODEL INFORMATION

PROGNAUS (PROGNosis for AUStria) (Ledermann 2006) is a yield and silvicultural science-based model, which was developed and applied in 1995 for the first time and is updated continuously. PROGNAUS consists of several sub-models, basically a basal area increment model (Monserud and Sterba 1996), a height increment model (Nachtmann 2006), a tree recruitment model (Ledermann 2002) and a model describing tree mortality (Monserud and Sterba 1999). The performance of PROGNAUS was tested in several studies (e.g. Sterba and Monserud 1997, Sterba et al. 2002). Furthermore, PROGNAUS was applied to evaluate different forest management regimes (Ledermann and Sterba 2006).

DATA SOURCE

According to the national inventory report, systematically measured statistics – such as the national forest inventory (NFI, BFW 2009) – are considered to have highest reliability in reporting forest area, land use changes from and to forests, stock, increment and drain (NIR, UBA 2009). The results of the latest NFI conducted in 2000 – 2002 therefore form the basis for the modelling of the Austrian forest carbon stock changes in the year 2015 and 2020.

DESCRIPTION

Special importance was attached to the silvicultural relevance of tending activities by means of intensive preliminary cuttings and thinnings. As final cutting such stands were declared, which had a negative growth of the economic value. Additionally to the silvicultural aspects, economic and ecological facts were considered in the calculations. The harvesting costs were estimated via different harvesting models and opposed to revenues gained from diverse price scenarios[6]. Harvests on inventory plots with a positive profit margin free of harvesting costs were up-scaled to the attainable harvesting potential. Ecological aspects were concerned in the harvesting potential insofar, as the selection of the harvesting method and the parts of the trees to be harvested were determined. The results were converted into cubic metres of stem wood over bark (m^3 o.b.) on the basis of the timber assortment classifications, and finally translated into Gg C of whole tree biomass – for the years 2015 and 2020.

Due to the kind of projected harvesting activities, it is assumed that an increase of the harvesting intensity due to higher prices does not cause changes in increment, which according to the latest NFI's remained quite stable during the last decades. An increase in prices mainly leads to additional preliminary cuttings of the smaller dimensions in stands.

[6] 71 €: average biomass price in 2004-2006; 81 €: biomass price end of 2006; 100 €: assumption on moderate increase in biomass prices compared to 2004-2006; 162 €: assumption of doubling of biomass price (same development as oil price in period 1985-2005).

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UBA 2009: Austrias National Inventory Report. Umweltbundesamt, Vienna, information can be downloaded at the website: http://www.umweltbundesamt.at/umweltschutz/luft/emiberichte/

ROUNDWOOD PRODUCTION

Source: national data

Denmark

DATA SOURCE:

1. National Forest Inventory - NFI - conducted by Forest and Landscape Denmark for The Danish Forest and Nature Agency, Ministry of Environment. The NFI started in 2002 and is a continous forest inventory with partial replacement. The rotation is 5 years. (Nord-Larsen et al 2008)

2. Forest Census 1990 and 2000, conducted by Statistics Denmark - in cooperation with The Danish Forest and Nature Agency and Forest and Landscape Denmark. (Danmarks Statistik 1994, Larsen & Johannsen 2002)

3. Mapping of the forest area based on satellite images in 1990 and 2005, with suppport from ESA - GMES - FM and the Ministry of Climate and Energy.

CARBON STOCK 1990 - 2007:

Based on the mapped forest area in 1990 and in 2005 a calculation of carbon stored in both the old forest (forest established pre-1990 - under the Kyoto Protocol Article 3.4) and in new forests (afforestation since 1990 - under the Kyoto Protocol Article 3.3) was performed. The forest areas in 1990 as well as in 2005 have been mapped to be larger than previously estimated for the times.

The calculation of carbon stock in 1990 and in 2000 used age distribution as reported in census 1990 and Forest in 2000 as an expression of the total forest land allocation to species and ages. Based on the actual measurements of carbon storage in different species and age classes, the total standing carbon stock was calculated. For each of the years 1990 - 2000 calculated a standing carbon stock as a moving average, corrected for the small scale deforestation which was detected.

Since the NFI was initiated in 2002, it is representative from 2005. Calculation of carbon stock in the period 2000-2004 is based on NFI in 2005 and carbon stock as calculated for 2000.
For 2005-2007 carbon stock is calculated solely on the basis of the NFI - with additional information about the total forest area from satellite image mapping.

PROJECTIONS 2008-2020:

The prognosis for carbon stock during the period 2008 - 2020 is based on the NFI data on carbon stock in management classes - species and age classes. Forecasts are based on are allocation to age classes based on probabilities for rejuvenation of each management class. It assumes a constant distribution of species (no species change), but a calculation of percentage of area rejuvenated each year with the same species. For each year, these calculations are combined with NFI data for carbon stocks in each management class. Evolution of the total carbon pool can then be calculated. The probabilities for rejuvenation is estimated based on the forest census data from 1990 and 2000 (Nord-Larsen & Heding 2002). The projections involve no estimation of growth or harvesting.

The projections are performed similarly for old as well as new forests. In the afforestation an annual afforestation of 1900 ha is assumed, with a species distribution similar to the distribution observed in the NFI, except for a constant area with Christmas trees.

The forecast for the period 2008 - 2020 show a decreasing trend of forest carbon stock. This is due to the current high proportion of old trees, which face rejuvenation. Hereby large old trees felled and replaced by new small trees. The net result is that the total carbon stock decreases. If the forests had a completely even distribution of ages, carbon stock would be virtually constant - assuming unchanged harvesting and growth. Changes in forest management, may affect the development of forests. Thus, a postponement of cutting of old trees - will postpone the decline in carbon storage. Conversely, increased logging (e.g. due to increased demand, increased price or similar) may lead to a sharper decline in carbon stock.

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Nord-Larsen, T., Johannsen, V. K., Bastrup-Birk, A and Jørgensen, B. B. (eds.) (2008). Skove og plantager 2006. Skov og Landskab and Skov- og Naturstyrelsen, Hørsholm. 185 p. ISBN: 978-87-7903-368-9

Nord-Larsen, T., Heding, N. (2002). Træbrændselsressourcer fra danske skove over ½ ha - opgørelse og prognose 2002. Arbejdsrapport nr. 36, Skov & Landskab (FSL), Hørsholm, 2002. 78s. ill.

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France

FRENCH OVERSEAS TERRITORIES

French overseas territories (New Caledonia, French Polynesia, Mayotte island, Wallis et Futuna islands, St Pierre et Miquelon islands, French Austral and Antarctic territories) are included in the UNFCCC reporting framework but not in the Kyoto Protocol accounting framework. Due to a lack of data, emissions by sources and removals by sinks from the LULUCF sector in these overseas territories are currently considered to be zero. Discussions are on-going between the French Government and these overseas territories to determine whether they could be fully included in the post-2012 regime.

	Forest area					
	1990	2000	2005	1000 ha/a	%/a	Source
Metropolitan area	14.538	15.351	15.554	68	+0.5	GFRA2005
French Guiana*	8.176	8.127	8.103	-5	-0.1	GFRA2005
Martinique island*	0.047	0.041	0.038	-1	-1.3	GFRA2005
Guadeloupe island*	0.071	0.066	0.063	-1	-0.8	GFRA2005
Réunion island*	0.104	0.101	0.099	0	-0.3	GFRA2005
New Caledonia**	nd	nd	0.717	nd	nd	GFRA2005
French Polynesia**	nd	nd	0.105	nd	nd	GFRA2005
Mayotte island**	nd	nd	0.005	nd	nd	GFRA2005
Wallis et Futuna islands**	nd	nd	0.005	nd	nd	GFRA2005
St Pierre et Miquelon islands**	nd	nd	0.003	nd	nd	GFRA2005
TOTAL (excluding overseas territories)	22.936	23.686	23.857	61	+0.3	
TOTAL (including overseas territories)	nd	nd	24.692	nd	nd	

* “Département d’outre-mer”, overseas departments: status equivalent to metropolitan Départements. They are therefore included in the UNFCCC reporting and Kyoto Protocol accounting frameworks.; ** “Collectivités et Territoires d’outre-mer”, overseas territories : They have a certain level of autonomy. Currently, they are included in the UNFCCC reporting framework but not in the Kyoto Protocol accounting framework.

FRENCH GUIANA

In French Guiana, only the costal area (around 1,5 millions hectares upon 8 in total) is considered "managed forest" for the 1st CP. The remaining part of the forest is considered unmanaged (see "assigned amount report submitted in 2006 to the European Commission according to the article 8 d), paragraph 1, of the decision n°280/2004/CE"). The UNFCCC reporting includes the costal area, using the conservative hypothesis that the forest is at equilibrium and is therefore reported as zero.

France passed a legislation last year to expand the Forest Code to the whole forest of French Guiana. As a consequence, consideration is being given to implement forest management accounting for the whole forest of French Guiana. In that case, in the absence of further data, removals by sinks will be considered to be zero, while emissions by sources (harvest) will be accounted for.

DEFORESTATION

Emissions from deforestation are reported and accounted for in the whole Kyoto perimeter: metropolitan area + the 4 overseas Departement: Reunion island, Martinique island, Guadeloupe island and French Guiana. Current data on deforestation from 1990 to 2007 took into account metropolitan area (annual national forest inventories) and French Guiana (UNFCCC reporting and Kyoto format voluntary reporting done in 2008: emissions from deforestation from 1990 to 2006 estimated using satellite remote sensing and a biomass assessment. Relevant documents will soon be posted on the UNFCCC REDD website). Data for the 3 other overseas Departement were based on experts saying. In 2008, 1990 to 2006 data on emissions from deforestation in these 3 departements were refined using satellite remote sensing and airborne imageries and specific biomass assessments. Relevant documents will also soon be posted on the UNFCCC REDD website.

STORMS, WIND, SNOW

Here are data to be submitted soon to FAO/GFRA2010:

Year	Loss (Mm3)	Surface (1,000 ha)	Source
1990	9	n.d.	French national research centre on agriculture
1996	1,5	n.d.	French national research centre on agriculture
1999[1]	176	1 146	French National Forest inventory
2007[2]	0,2	n.d.	French state forest agency
2009[3]	48	680	French National Forest inventory

(1) Lothar and Martin; (2) Kyrill; (3) Klaus

INSECTS AND DISEASES

Since 1990, major outbreaks are the following:

- Ips typographus on Picea excelsia caused the loss of 0,75 Mm3 (around 3 000 ha) from 1990 to 1997 (stands weakened after several droughts) and another loss of 3.50 Mm3 (around 14 000 ha) from 2000 to 2006 (stands weakened after the storms of 1999);
- Ips sexandatus on Pinus pinaster caused the loss of 1.20 Mm3 (around 5 000 ha) from 2000 to 2006 (stands weakened after the storms of 1999);
- Rust (Melampsora larici-populina) on Poplar (cultivar Luisa Avanzo and cultivar Beaupré) caused the loss of around 30 000 ha.

In total, and taking into account other insects outbreaks and diseases, roughly 55 000 ha were damaged from 1990 to 2006.

It is worth to be noted that losses of production due to the defoliation of hardwood species in metropolitan area or due to hydric stress in temperate or tropical forest have major impacts on France's forest sink. For instance, the following events can be quoted:

- Diseases, due mainly to hydric stress, affected around 10 000 ha of Quercus robur from 1990 to now;
- The 2005 drought is estimated to have caused a decrease of around 5 GteqCO2 of the sink in the Amazon forest (article published the 6th of March 2009 by the University of Leeds in Science). French Guiana representing around 1,4% of the Amazon forest (8,1 Mha upon 600 Mha), 70 mteqCO2 is a rough estimate of the loss of the sink in French Guiana in 2005.

FOREST FIRES

Data on forest fires was gathered by the Statistics department of the French Ministry of agriculture and fisheries from 1990 to 2006 and by the French national forest inventory from 2007 to now. The following data show that there is a poor correlation between surface burnt and the number of forest fires:

Year	Surface (ha)	Number of forest fires
1990	76 625	nd
1991	10 129	nd
1992	16 607	4 008
1993	16 695	4 765
1994	24 996	4 635
1995	18 119	6 545
1996	11 399	6 401
1997	21 582	8 005
1998	19 282	6 289
1999	15 906	4 960
2000	24 078	4 603
2001	20 642	4 309
2002	30 162	4 097
2003	73 278	7 023
2004	13 710	3 767
2005	22 400	5 500
2006	7 850	4 608
2007	8 751	3 382
2008	6 001	2 781
Total	**351 458**	**> 85 678**

Treatment of data is underway to desaggregate total burnt areas between forest area and non-forest area (shrublands like ‘’maquis’’ or ‘’garrigues)’, with the aim to submit it in advance of Copenhaguen.

HARVESTED WOOD PRODUCT

A voluntary reporting of carbon stored in HWP in France was done for the 2006 national GHG inventory.The methodology used in the study was consistent with chapter 12 of the 2006 IPCC guidelines for National Greenhouse Gas inventories dealing with harvested wood products. The method used corresponded to Tier 3, as both method and data used were country specific. The five HWP variables were calculated allowing the three approaches proposed by the IPCC (stock change, production and atmospheric flow) to be tested.

The study analysed five stocks or pools of carbon downstream of the forest in the wood chain and the paper sector : the productive system was analyzed (wood construction, wood furniture, wood packaging, wood energy, pulp and paper). The variation of carbon stored in landfill was also calculated. The stocks were identified (intermediate technical stocks and final in service stocks), and then quantified. Sensitivity analyses have been performed on the lifetime of long-lived products. All five sectors were analyzed through monographs and statistical data on physical fluxes of products. Storage duration for each stock was evaluated as robustly as possible, on the basis of direct information, enquiries, and economical and technical assessments.

Germany

The submitted data is based on the drafts and calculations made for the German inventory submission 2010 at vTI. In this submission some improvements regarding area estimation (activity data) and carbon stock changes (emission factors) are incorporated. Especially the carbon stock changes in forest biomass hade to be updated according to new data from additional measurements made within an study based on methods and sampling design of the national forest inventory. Because of these new informations the reported removals on forest land by forest management had for 2003-2007 had to be updated to about 4.7 mill. tons of carbon per year. Reports and publications on the updated data are actually under preparation. Within the National Inventory Report 2010 the recalculations and steps for compiling the inventory will be explained in detail.

Greece

Data on forest fires from the Ministry of Rural Development and Food.

Ireland

Historical forest area: Ireland NIR 2007 pp 170 Table E1

Emissions and removals

FM: Ireland NIR 2009 pp 91 Table 7.2

AR &D: voluntary Kyoto Protocol 2007, to UNFCCC (assumes a deforestation rate of 250 ha per year). For methodologies and literature used see:

Black. K. 2007. The Ireland carbon reporting manual supplementary to KP tables v1.01. pp28. UNFCCC submission.

Areas windthrown: FAO Forest Resource Assessment 2010 data submission

Areas burnt: FAO Forest Resource Assessment

Projections are based on the CARBWARE model and (see Black 2007 above) and planned harvest levels in Coillte (State Forestry Board) forests

Italy

SOURCE FOR FOREST FIRE DATA
Italian National Forest Service – Corpo Forestale dello Stato. (available on the Italian National Forest Service web site:

http://www3.corpoforestale.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/340)

Latvia

Latvia's data source is National Inventory Report submission 2009. All data provided is consistent with submission 2009.

Preparing GHG inventory in LULUCF sector for year 2007 (submission in 2009) the forest data source has been changed (new NFI data is used) and all historical data are recalculated.

Please, see National Inventory Report of Latvia on the web page:

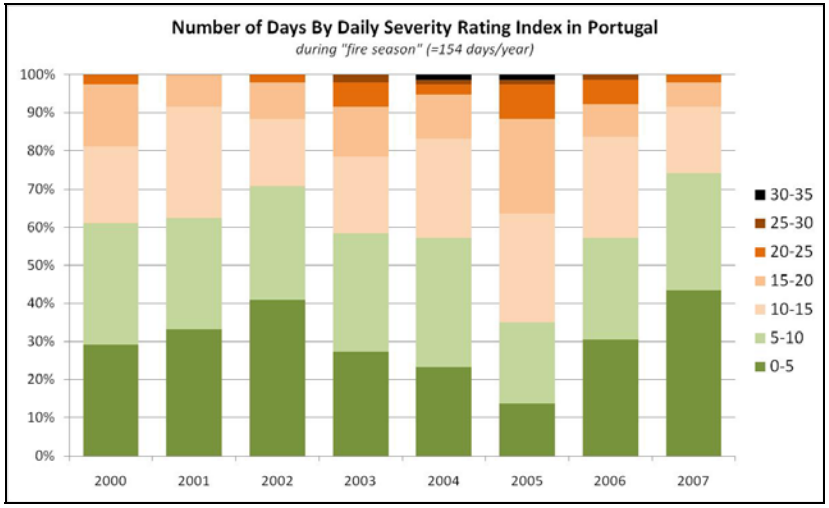
http://cdr.eionet.europa.eu/lv/un/colqlvn8g/envsews7a/CRF_XML_UNFCCC_150409.zip/manage_document

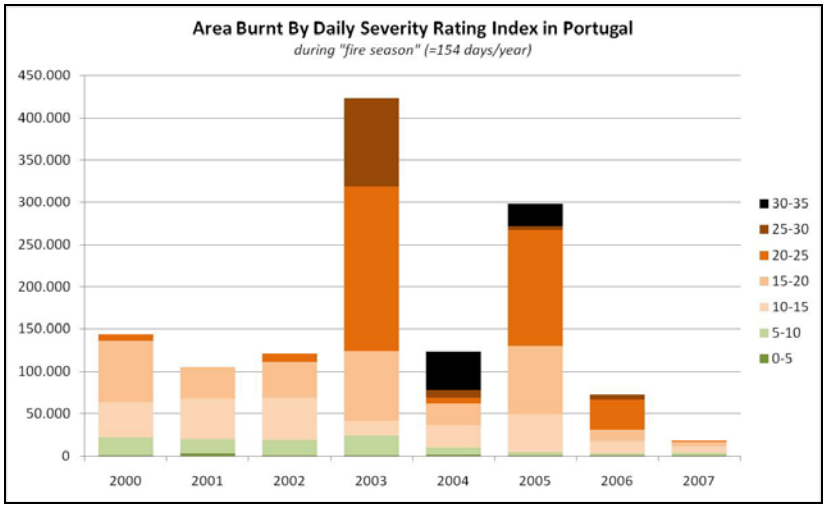
Portugal

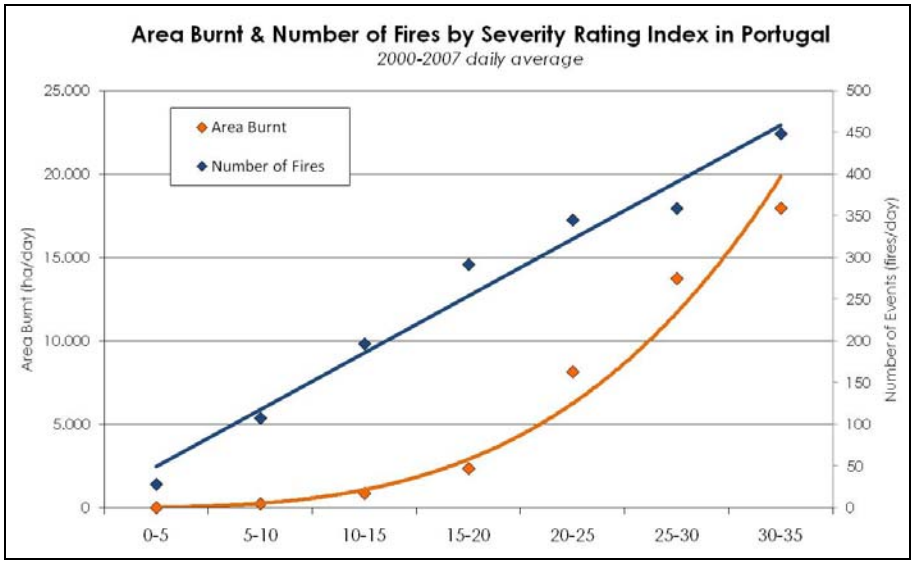
Natural Disturbances

Data on fires and forest fires is derived from annual fire reports (in Portuguese only) available at http://www.afn.min-agricultura.pt/portal/dudf/informacoes/relatorios. Other indicators on fire size, number, fire risk, etc. are also available in those reports. The 2003 annual report contains an extensive analysis of the impact of that summer's heat wave on forest fires.

The relation between the daily severity index (an index calculated daily that reflects a combination of weather forecasts indicators and conditions in the forest fuels for fire propagation) and fire area and number are illustrated below.







Spain

NATURAL DISTURBANCES

Pest and diseases play an important role in the vitality of Spanish forest affecting the C sequestration availability (http://www.mma.es/portal/secciones/biodiversidad/montes_politica_forestal/sanidad_forestal/actividades_y_tareas/red_ce_nivel1/). According the Spanish Annual Forest Condition Inventory between 15 and 20 % of the forest are affected in terms of vitality, which has as principal consequence loss of growth (mainly due to Mediterranean oak and pine defoliators) and weakness and isolated episodes of dieback and death where bark beetles are the main contributing actors.

In the Mediterranean area drought is the main actor that disrupts the C sequestration process in two lines: acting as stressor factor that combined with pest attacks increase the mortality rates of forest, and contributing to the intensity of damages produced by forest fires. Every year between 30 and 50% of the damage causes detected in the Forest Condition Inventory are linked to drought, in a similar trend of pest/diseases identified causes.

TABLE "FOREST FIRES"

Total forest burnt area comes from Spanish NIR 2009, Table 7.2.3.
(http://unfccc.int/files/national_reports/annex_i_ghg_inventories/national_inventories_submissions/application/zip/esp_2009_nir_14apr.zip)

Total burnt area comes from European's Commission Joint Research Centre – European Forest Fire Information System (EFFIS)

HISTORICAL NET-REMOVALS (-) OR NET-EMISSIONS (+)

National definition for forest (F) for UNFCCC and KP are different. In Spanish National Inventory submission to UNFCCC, F definition considered a threshold of FCC >10%.

In its Initial Report, Spain submitted to UNFCCC its definition for Forest under the Kyoto Protocol. In this definition, Forests are those areas with FCC>20%.

For this reason, the area of forest land remaining forest land reported in the data update for data submission is different from data contained in National Inventory. These are the data that will be used for the calculations of emissions and removals of FL remaining FL under the KP, that will be presented next year as part of the supplementary information under the KP in the Annual National Inventory.

Calculations of historical net-removals have been made using implied emission factors from common reporting format table's from submission 1990-2007. It must be pointed out that emission of N_2O and CH_4 from wild forest fires have been discounted from these net removals.

Sweden

This text is provided to explain assumptions behind data and to add information on certain issues.

EMISSIONS AND REMOVALS

First note that AR and D by definition is not comparable to land-use conversions from and to Forest land according to the UNFCCC-reporting.

AFFORESTATION/REFORESTATION

Afforestation/Reforestation is defined as managed land (all Cropland, all Grassland and all Settlements) converted to Forest land (all Forest land assumed managed) and areas are accumulated from the beginning of 1990 and onwards. Growth rate increase by age and consequently the net removals from living biomass is supposed to gradually increase, partly from an increasing accumulated area but mainly due to the gradually increased growth rate. Land under AR could only leave this class when it is deforested.

Deforestation

Deforestation is defined as land use conversions from Forest land to other managed land. Deforested areas are accumulated from the beginning of 1990 and onwards. Sweden is monitoring trees using permanent sample plots on all land where trees are supposed to occur. It is possible to consistently trace biomass to land use from 1990 and onwards. The main emission is connected to the year of conversion. However, there may be trees left on the deforested area that continue to grow and to some extent will compensate the emissions by a small removal every year after the conversion.

Litter and Soil organic carbon pool changes associated with AR and D

Afforestation and reforestation normally occur on land-use that already contains relatively large amounts of carbon like Cropland and Grassland. Since the production of litter are very low the first years after forest establishment it is likely that the annual changes in the litter and soil organic carbon pools will be very small. Deforestation may result in large changes as well as relatively small changes in the litter and soil organic carbon pools. Changes due to deforestation to Cropland and Grassland are regarded as small but a drastic change may be expected when a forest is converted to settlements (i.e. a road) since all vegetation is removed decreasing the litter input to zero.

A preliminary study on deforestation in Sweden for the period 1990-2007 shows that the annual conversion of forest land to Cropland is ca 500 ha and to Grassland ca 700 ha on average, respectively. Conversions of Forest land to other land-use classes than Cropland and Grassland constitutes ca 9000 ha, of which about 40% have become roads, 20% have become power lines and 40% have become settlement areas in some form. This information has been used to estimate the Litter and Soil organic carbon pool changes due to Deforestation.

Uncertainties

The major part of the net carbon emission/removals in the LULUCF sector in Sweden comes from the carbon pool changes on Forest land. Net changes in the pools depend on gains and losses of carbon and since these two variables as well as the pools are very large, even small relative changes in them will largely affect the annual values of net emission/removals. To deal with these large annual fluctuations and also to decrease the uncertainties, Sweden uses permanent sample plots of the NFI where subsample of 6000 plots is re-inventoried in a five-year cycle. The years between the inventories are interpolated and consequently the annual carbon stock and the annual changes calculated using the stock change method can be based on up to 30000 plots halving the uncertainties compared to a system based on only 6000 sample plots[7]. The uncertainty ranges for AR, D and FM as reported in the table of emission/removals for 2007 are presented in the table below:

[7] National inventory report 2009, Sweden: http://www.naturvardsverket.se/upload/05_klimat_i_forandring/statistik/2008/NIR_submission_2009.pdf

Activity	Mean value [1000 ton CO_2 –eq]	Uncertainty range (2 x SE)
AR	-950	-400 to -1400
D	1800	-300 to 4000
FM	-21988,4	-18000 to -26000

NATURAL DISTURBANCES

STORM/WIND/SNOW

In Sweden, two major storms took place in 2005 and in 2007. In the storm in 2005, approximately 75 million m³ were wind thrown or damaged which corresponds to nearly an entire year's cutting for the whole of Sweden and represents ca 2.5 % of the total standing stock. About 12 million m³ was estimated to be damaged in a storm that swept southern Sweden in January 2007.

A European study on wind damages[8] points out that the main reason for the increase in storm damages is the growing standing stock, both in absolute terms but also per hectare. The mean age has also affected the forest stands vulnerability for damages.

To cope with the storm in 2005 harvesting capacity was transferred from the north of Sweden to the damaged areas in the south. This decreased the harvest levels in other parts of Sweden mainly during 2005 but also during 2006. Therefore the effect of the storm on the total standing stock was reduced.

The Swedish system for reporting to UNFCCC, using several years of sampling and interpolation, levels out the effect of the storms. However, a slightly decrease in the removal trend can be seen for the last years of reporting.

The accounting under Kyoto protocol does not include storage of roundwood or HWP. Including these two mechanisms in the accounting could be a way to allocate the removals and emissions to the actual year and to compensate for large losses of standing stock due to storms.

FIRE

Fires have always been a natural element in the forest. 150 years ago ca 1% of the forested area in Sweden was burning, today less than 0,02 % of the area is burned. Less frequent forest fires is one of the major changes in the forest since the 2000 century.

[8] Schelhaas m.fl. 2003

INSECTS/DECEASES

The volume of trees available for the spruce bark beetle increases after a storm. It was estimated that ca 0.7-1.5 million m^3 was killed annually by the spruce bark beetle the years after the storm in 2005.

HWP

IPCC suggest different levels of Tiers for the calculations of HWP. The results presented in this submission are calculated using the lowest level (Tier 1). This means that data from international databases (FAO) and methods proposed by the IPCC is used. In Sweden we currently consider the possibilities to calculate HWP on higher Tier-levels. We both investigate the possibility to use data of higher accuracy and to use alternative methods. We also plan to assess the actual HWP-pools in order to adjust the half time values used as default for domestically consumed HWP. For exports, one option would be to apply the IPCC default parameters for the calculation.

ROUND WOOD PRODUCTION

Raw material as round wood, chips or pulp is not included in the calculations of HWP when using the Production, Stock change or the SCAD approaches. Introducing HWP distribute the emissions from harvested wood over several years depending on the use of the wood. However, since the raw material stock is not included, large annual losses from the Living biomass pool due to large storms or large fellings a single year is not compensated for the actual year. It will thus show up in the HWP pool several years after the storm introducing an unknown lag effect on the actual annual emissions.

United Kingdom

Data on forest area and Kyoto Protocol activities are consistent with the UK Greenhouse gas inventory which is available on the UNFCCC website (http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/4771.php).

Projections are made using the same assumptions as the inventory and assuming that the historical pattern of land-use continues. A description of the inventory and projections methodology and HWP estimates can be found at http://www.edinburgh.ceh.ac.uk/ukcarbon .

NATURAL DISTURBANCES

Data on storms, wind and snow, and the effect of insects and diseases are from the UK's returns to the 2005 Global Forest Resources Assessment, and were obtained from the 1995-99 National Inventory of Woodland and Trees (http://www.forestry.gov.uk/forestry/HCOU-54PG9U). The data shown on storms, wind and snow and on insects and diseases were obtained from the 2005 Global Forest Resources Assessment. For the UK, these figures were estimated from the 1995-99 National Inventory of Woodland and Trees (and assumed to be the same for all years reported on). The 2010 Global Forest Resources Assessment is currently ongoing - a copy of the UK report on Forestry Commission website (see http://www.forestry.gov.uk/forestry/infd-7aqfxg). Given that there is no more recent data available, figures for storms, wind and snow and for insects and diseases are unchanged from those reported for the 2005 Global Forest Resources Assessment.

Work for the 2010 Global Forest Resources Assessment is currently ongoing - a copy of the UK report is at http://www.forestry.gov.uk/forestry/infd-7aqfxg.

Information on fires for the period up to 2003-4 is available for state forests. These figures are reported annually to UNECE and were published in Forestry Statistics 2004 (http://www.statistics.gov.uk/hub/agriculture-environment/forestry/forest-and-woodlands) and used for Global FRA report. Data from 2004 onwards are estimated for GHG inventory purposes using the Burg Regression as set out on the CEH website (see above).

HARVESTED WOOD PRODUCTS

Roundwood production figures are collected annually by international organisations, who then share the data to avoid countries receiving multiple data requests for the same figures. The collection of 2008 data is currently ongoing (with Eurostat requesting data from EU countries by 8 October). A copy of UK 2008 returns are available on http://www.forestry.gov.uk/website/forestry.nsf/byunique/infd-7aqhzh. UK revises historic figures annually, on the basis of new data received, note that overbark figures are being collected for the first time this year - the table shown in the EU draft paper (like the main JQ1 return) actually shows data in m^3 underbark.

The UK makes estimates of changes in the HWP pool using the production method. The most recent inventory data indicate that for the period 1990 to 2007 inclusive, the accumulation of CO_2 in HWP averaged about 0.9 ktCO2 compared with about 2.5 $ktCO_2$ calculated by Pingoud.

UK 2008 returns on roundwood production (underbark) are available at http://www.forestry.gov.uk/website/forestry.nsf/byunique/infd-7aqhzh.