

Calculation of emission factors for living biomass in Swiss forests for the Swiss GHGI 2014

Internal documentation of data delivery and more recent data

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28.03.2014

Summary

For the Swiss Greenhouse Gas Inventory (GHGI) 1990-2011 (FOEN 2013), forest emission factors for the years 2006 to 2011 were calculated based on data from National Forest Inventory (NFI) 3 (2004-2006) and NFI 4 data from 2009 to 2011 (NFI 4a). For the Swiss GHGI 1990-2012 (FOEN 2014), NFI 4 data from the year 2012 were available for calculating emission factors for the years 2006 to 2012 (NFI 4a+). Hence, the number of available sample plots for calculating emission factors increased by 660 plots from 1953 to 2613. The re-calculation of relevant variables based on the additional data from 2012 resulted in minor changes in the estimates of biomass in growing stock (+0.5%), biomass in cut and mortality (-1%) and biomass in gross growth (+1.6%). The changes were within the range of uncertainty of the estimates. Decrease of cut and mortality is in good agreement with most recent data from the Swiss Forestry Statistics. Increase of gross growth is mainly caused by the variability of the measured field data (mainly tree diameter in 7 m, d7) and lies within the uncertainty of the estimation.

1 Introduction

For the Swiss Greenhouse Gas Inventory (GHGI) 1990-2012 (FOEN 2014), forest emission factors for the years 2006 to 2012 were calculated based on data from the National Forest Inventory (NFI) 3 (2004-2006) and NFI 4a+ (2009-2012) (see Annex). Compared to data delivery for FOEN (2013), additional data from year 2012 were available for estimations. Hence, the number of available sample plots for calculating emission factors increased by 660 plots from 1953 to 2613. Emission factors for the Swiss GHGI are calculated annually from biomass in growing stock, cut and mortality and gross growth. This report describes and analyzes changes in the estimation of emission factors for the forestry sector reported in FOEN (2013) and FOEN (2014).

2 Data and methods

2.1 Pooling of strata

The NFI 4a+ data include ca. 40% of all NFI forest plots (common and accessible forest NFI 3-4a+) in Switzerland (2613 out of ca. 6000). Since the variability between sample plots is large, a minimum number of sample plots is needed to obtain reliable estimates of means and sampling errors. Small strata did not include a sufficient number of plots (**Fehler! Verweisquelle konnte nicht gefunden werden.**) and were pooled together for data delivery 2014 (FOEN 2014) (**Fehler! Verweisquelle konnte nicht gefunden werden.**):

- Plateau above 1200 m (6 sample plots) → Plateau above 600 m
- Pre-Alps below 600 m (16 sample plots) → Pre-Alps below 1200 m
- Alps West below 600 m (14 sample plots) → Alps West below 1200 m
- Alps Est below 6000 m (9 sample plots) → Alps Est below 1200 m

Table 1 Number of sample plots in NFI 4a+ per GHGI strata 2013.

Alt	Jura	Plateau	Pre-Alps	Alps West	Alps Est	Southern Alps	Switzerland
<600	116	301	16	14	9	44	500
600-1200	278	214	296	97	129	116	1130
>1200	52	6	171	267	325	162	983
Total	446	521	483	378	463	322	2613

Table 2 Number of sample plots in pooled strata for GHGI 2014.

Alt	Jura	Plateau	Pre-Alps	Alps West	Alps Est	Southern Alps	Switzerland
<600	116	301	-	-	-	44	500
600-1200	278	220	312	111	138	116	1130
>1200	52	-	171	267	325	162	983
Total	446	521	483	378	463	322	2613

2.2 Additional data year 2012

Data delivery 2014 contained 34% more sample plots (2009-2011: 1953 sample plots, 2009-2012: 2613 sample plots → +660).

3 Result: Comparison between NFI data 2009-2011 and 2009-2012

To analyze the differences between data delivery 2013 (NFI 2009-2011) and 2014 (NFI 2009-2012), results with the original definition of 15 strata (see Table 1 and 2) were compared. Additionally, on all strata coniferous and deciduous trees were separated. Therefore, all differences resulted from the additional data from 2012.

For biomass in growing stock, differences between data delivery 2013 and data delivery 2014 were within plus/minus one standard error of the data delivery 2013, except deciduous stands in the Plateau above 1200 m (**Fehler! Verweisquelle konnte nicht gefunden werden.**). The biomass of the overall growing stock increased by 1.15 ± 4.9 t/ha or ca. 0.5%. Only 6 sample plots were available in Plateau above 1200 m and this strata was therefore pooled with strata between 600 und 1200 m in the analysis for the data delivery 2014.

Table 3 Biomass of living trees $\pm$ standard error of the mean. Comparison between data delivery NIR 2013 and NIR 2014. Positive numbers indicate an increase, negative number a decrease in the estimate for 2014 compared to 2013. Strata with changes larger than twice the standard error are highlighted in color. Forest area is related to common and accessible forest area NFI 4a+/2009-2012. Data are stratified for 5 NFI-regions, 3 altitudinal levels (altitude above see from DHM25) and for conifers/deciduous trees.

		Jura		Plateau		Pre-Alps		Alp West		Alp Est		Southern Alps		CH	
Alt		1000 kg/ha	$\pm$	1000 kg/ha	$\pm$	1000 kg/ha	$\pm$	1000 kg/ha	$\pm$	1000 kg/ha	$\pm$	1000 kg/ha	$\pm$	1000 kg/ha	$\pm$
<600	Con	-5.75	12.6	3.21	8.9	-25.41	56.3	3.68	10.7	-24.03	40.8	1.71	3.7	-0.20	6.7
	Dec	-7.36	16.4	-4.75	11.2	-3.44	70.1	-19.55	62.6	30.21	30.3	7.67	19.0	-3.49	8.6
	All	-13.11	15.7	-1.54	13.0	-28.85	77.8	-15.86	65.0	6.18	49.8	9.39	17.7	-3.69	10.2
600-1200	Con	3.52	8.6	11.23	12.2	11.34	11.0	0.74	11.2	-3.50	17.4	-4.90	9.9	5.18	5.5
	Dec	-6.17	10.0	-1.96	16.0	-5.57	9.6	3.68	17.0	2.36	13.0	-2.08	15.5	-2.74	5.3
	All	-2.64	11.4	9.26	17.7	5.78	12.1	4.42	18.0	-1.15	20.1	-6.99	15.0	2.45	5.4
>1200	Con	10.78	13.8	-33.28	46.5	9.57	17.0	1.87	11.2	-1.07	9.8	-2.06	13.8	1.63	5.7
	Dec	0.50	11.9	7.29	1.7	-2.79	8.4	2.69	2.5	-0.71	2.8	2.44	4.8	0.57	2.2
	All	11.28	15.6	-25.99	46.9	6.76	16.9	4.55	11.8	-1.79	10.3	0.38	12.6	2.20	6.3
Total	Con	2.04	7.4	6.53	6.9	9.01	10.1	1.85	9.4	-1.96	9.1	-2.16	8.9	2.86	2.9
	Dec	-6.49	7.1	-3.64	9.5	-3.51	7.6	1.92	6.2	0.21	5.1	1.09	7.5	-1.71	2.9
	All	-4.45	8.0	2.90	11.0	5.50	8.9	3.78	9.9	-1.75	8.9	-1.07	9.1	1.15	4.9

For cut and mortality, differences between data delivery 2013 and data delivery 2014 were all within plus/minus one standard error of the data delivery 2013 (**Fehler! Verweisquelle konnte nicht gefunden werden.**). Overall, the estimate for cut and mortality decreased by -0.05 ± 0.3 t Biomass per ha or minus 1%. This is in good agreement with the Swiss Forestry Statistics¹.

Overall gross growth of Switzerland has increased by 100 kg per ha and year with an uncertainty of ± 400 kg per ha and year (double standard error of the mean, simple error of the mean is ± 200 kg per ha and year, **Fehler! Verweisquelle konnte nicht gefunden werden.**). This is a change of plus 1.6%. While the Swiss estimate of gross growth for deciduous trees decreased, the estimate for coniferous trees has increased. Some strata showed deviances slightly larger than double the standard error.

¹ <https://www.news.admin.ch/message/index.html?lang=de&msg-id=49703> (28.3.14)

Table 4 Annual cut and mortality of living trees $\pm$ standard error of the mean Comparison between data delivery NIR 2013 and NIR 2014. Positive numbers indicate an increase, negative number a decrease in the estimate for 2014 compared to 2013. There are no strata with changes larger than twice the standard error. Forest area is related to common and accessible forest area NFI 4a+/2009-2012. Data are stratified for 5 NFI-regions, 3 altitudinal levels (altitude above see from DHM25) and for conifers/deciduous trees.

		Jura		Plateau		Pre-Alps		Alp West		Alp Est		Southern Alps		CH	
Alt		1000 kg/ha	$\pm$	1000 kg/ha	$\pm$	1000 kg/ha	$\pm$	1000 kg/ha	$\pm$	1000 kg/ha	$\pm$	1000 kg/ha	$\pm$	1000 kg/ha	$\pm$
<600	Con	-0.21	1.2	0.60	0.8	0.34	1.3	-0.30	1.3	-0.10	1.1	0.00	NA	0.30	0.6
	Dec	-0.57	1.1	0.28	0.7	-1.66	4.7	-0.97	3.7	-1.23	4.1	-0.72	1.0	-0.12	0.5
	All	-0.78	1.5	0.88	1.2	-1.32	4.7	-1.26	3.9	-1.33	4.9	-0.72	1.0	0.18	0.8
600-1200	Con	0.15	0.6	-0.68	1.4	0.37	0.8	0.28	0.3	0.38	0.6	-0.25	1.1	0.08	0.4
	Dec	-0.23	0.6	-0.53	0.7	0.05	0.4	-0.19	0.5	0.16	0.6	-0.21	0.8	-0.15	0.3
	All	-0.08	1.0	-1.20	1.6	0.42	1.1	0.09	0.6	0.54	0.9	-0.47	1.3	-0.07	0.5
>1200	Con	0.23	0.5	-0.43	1.1	-0.09	1.2	-0.33	0.7	0.06	0.4	-0.29	0.5	-0.13	0.3
	Dec	0.04	0.1	0.00	NA	-0.03	0.1	-0.02	0.1	0.00	0.0	0.06	0.1	0.00	0.0
	All	0.27	0.5	-0.43	1.1	-0.12	1.2	-0.34	0.8	0.06	0.4	-0.23	0.5	-0.13	0.3
Total	Con	0.05	0.5	0.08	0.8	0.19	0.7	-0.17	0.5	0.14	0.3	-0.24	0.5	0.04	0.2
	Dec	-0.31	0.5	-0.06	0.5	0.00	0.3	-0.10	0.2	0.01	0.2	-0.15	0.3	-0.09	0.1
	All	-0.26	0.7	0.02	1.0	0.19	0.8	-0.27	0.6	0.16	0.4	-0.39	0.6	-0.05	0.3

Table 5 Annual gross growth of living trees $\pm$ two standard errors of the mean. Comparison between data delivery NIR 2013 and NIR 2014. Positive numbers indicate an increase, negative number a decrease in the estimate for 2014 compared to 2013. Strata with changes larger than twice the standard error are highlighted in color. Forest area is related to common and accessible forest area NFI 4a+/2009-2012. Data are stratified for 5 NFI-regions, 3 altitudinal levels (altitude above see from DHM25) and for conifers/deciduous trees.

		Jura		Plateau		Pre-Alps		Alp West		Alp Est		Southern Alps		CH	
Alt		1000 kg/ha	$\pm$	1000 kg/ha	$\pm$	1000 kg/ha	$\pm$	1000 kg/ha	$\pm$	1000 kg/ha	$\pm$	1000 kg/ha	$\pm$	1000 kg/ha	$\pm$
<600	Con	-0.04	0.7	0.49	0.7	-0.73	2.8	0.51	0.8	-0.21	2.9	0.49	0.5	0.31	0.5
	Dec	-0.66	1.8	0.51	0.9	0.91	3.0	0.36	5.7	3.17	7.0	-1.58	3.3	0.10	0.8
	All	-0.70	1.9	1.00	1.0	0.17	3.4	0.88	5.7	2.96	9.0	-1.09	3.3	0.41	0.8
600-1200	Con	0.37	0.6	0.52	0.8	0.65	0.7	0.19	1.0	0.00	0.9	0.06	0.3	0.40	0.3
	Dec	-0.72	0.7	-0.06	1.1	-0.35	0.7	0.09	1.8	-0.63	1.3	0.55	1.7	-0.28	0.4
	All	-0.35	0.8	0.47	1.3	0.30	0.9	0.28	1.8	-0.64	1.6	0.60	1.7	0.12	0.6
>1200	Con	0.24	1.1	1.77	1.6	0.54	0.9	-0.06	0.7	-0.33	0.6	-0.27	1.1	-0.05	0.4
	Dec	-0.24	1.0	-0.09	0.0	-0.34	0.6	0.36	0.2	-0.06	0.2	-0.12	0.3	-0.02	0.2
	All	0.00	1.5	1.67	1.6	0.20	1.1	0.30	0.7	-0.39	0.6	-0.39	1.0	-0.07	0.4
Total	Con	0.25	0.4	0.53	0.5	0.55	0.5	0.03	0.6	-0.23	0.5	-0.04	0.6	0.21	0.2
	Dec	-0.67	0.7	0.26	0.6	-0.29	0.5	0.29	0.5	-0.18	0.5	-0.09	0.8	-0.11	0.3

All	-0.42	0.8	0.79	0.7	0.26	0.7	0.32	0.7	-0.41	0.7	-0.13	0.9	0.10	0.4
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4 Discussion

Estimations of biomass in growing stock was very similar in both data deliveries NFI 4a (2009-2011) and NFI 4a+ (2009-2012). The decrease of cut and mortality by 1% is in accordance with the sinking amount of harvesting reported in the Swiss Forestry Statistics for the year 2012¹. Gross growth increased by 1.6%.

Plausibility checks and quality analysis showed now inconsistencies in the data derivations and the algorithms. Analysis of the raw data showed that the variability in gross growth is mainly caused by the variability of the measured tree diameters in 7 m tree height (d7). D7 is a measurement from the base of the tree and is technically challenging. Calculation of gross growth, however, is sensitive to d7. The variability in estimated gross growth can therefore be explained by the variability in the measurement of delta d7 (value of d7 measured in NFI4a+ less value of d7 measured in NFI3). Analysis of delta d7 indicated patterns according to regions and field crews. Such a group effect in the delta d7 was found in all NFIs (1 to 4) as some crews generally measure slightly larger d7 and others measure slightly smaller d7 values. Independent control measurements always showed that the observed deviations between the groups are within the normal measurement error. Having 9 groups and 18'000 trees as in NFI 1, 2 and 3, those measurement errors were statistically accurate. So far, no analysis have been done based on data from individual years.

To analyze the effect of the data year 2012, we estimated gross growth with only one data year containing only 1800 trees measured for d7 by three groups. Delta d7 measurements of the year 2012 are all within the variability observed in the NFIs so far. Measurements of two groups are approximately around the expected mean, measurements of the third group are in the upper range of the variability. As no group is below the expected mean, there is a small trend of the overall mean delta d7 to larger values. This leads to a slight increase of gross growth. However, statistically, there is now difference between the two data deliveries and measurements of delta d7 of all three groups are within the empirical variability observed in NFI 1, 2 and 3.

5 Literature

FOEN 2013. Switzerland's Greenhouse Gas Inventory 1990–2011. National Inventory Report 2013 including reporting elements under the Kyoto Protocol. Submission of 15 April 2013 under the United Nations Framework Convention on Climate Change and under the Kyoto Protocol: 245-324.

FOEN 2014. Switzerland's Greenhouse Gas Inventory 1990–2012. National Inventory Report 2014 including reporting elements under the Kyoto Protocol. Submission of April 2014 under the United Nations Framework Convention on Climate Change and under the Kyoto Protocol.





Annex

Data delivery 2009-2011 (NIR 2013)

A1 Data delivery NIR 2013: Biomass of living trees, common and accessible forest area NFI 3/2009-2011. Data are stratified for 5 NFI-regions, 3 altitudinal levels (altitude above see from DHM25) and for conifers/deciduous trees.

		Jura		Plateau		Pre-Alps		Alp West		Alp Est		Southern Alps		CH	
Alt		1000 kg/ha	± %	1000 kg/ha	± %	1000 kg/ha	± %	1000 kg/ha	± %	1000 kg/ha	± %	1000 kg/ha	± %	1000 kg/ha	± %
<600	Con	78.86	16	98.92	9	119.74	47	15.94	67	107.44	38	3.85	96	83.94	8
	Dec	182.39	9	160.66	7	269.49	26	164.67	38	275.26	11	172.7	11	172.05	5
	All	261.25	6	259.58	5	389.23	20	180.6	36	382.7	13	176.54	10	255.99	4
600-1200	Con	142.54	6	135.04	9	182.61	6	93.14	12	157.87	11	33.08	30	137.91	4
	Dec	142.8	7	159.89	10	119.61	8	106.43	16	93.11	14	154.69	10	132.19	4
	All	285.34	4	294.94	6	302.22	4	199.57	9	250.99	8	187.78	8	270.1	2
>1200	Con	125.5	11	258.29	18	242.23	7	186.52	6	195.06	5	153.09	9	190.99	3
	Dec	47.48	25	2	87	39.94	21	10.47	24	10.2	27	26.68	18	20.2	11
	All	172.98	9	260.29	18	282.18	6	196.99	6	205.27	5	179.77	7	211.19	3
Total	Con	123.91	6	115.15	6	202.11	5	156.03	6	182.79	5	89	10	147.47	2
	Dec	142.76	5	158.69	6	95.38	8	41	15	38.93	13	93.24	8	97.89	3
	All	266.67	3	273.84	4	297.49	3	197.02	5	221.72	4	182.24	5	245.36	2

A2 Data delivery NIR 2013: Annual cut and mortality of living trees, common and accessible forest area NFI 3/2009-2011. Data are stratified for 5 NFI-regions, 3 altitudinal levels (altitude above see from DHM25) and for conifers/deciduous.

		Jura		Plateau		Pre-Alps		Alp West		Alp Est		Southern Alps		CH	
Alt		1000 kg/ha	± %	1000 kg/ha	± %	1000 kg/ha	± %	1000 kg/ha	± %	1000 kg/ha	± %	1000 kg/ha	± %	1000 kg/ha	± %
<600	Con	3.1617	37	5.0785	16	1.5603	83	1.391	95	2.81	40	0	.	3.9238	15
	Dec	4.089	26	3.893	18	6.7449	70	4.3575	86	6.2367	66	3.2979	30	4.0192	13
	All	7.2507	21	8.9715	13	8.3052	57	5.7485	67	9.0467	54	3.2979	30	7.943	10
600-1200	Con	2.9061	19	7.3763	19	4.2344	20	1.0154	32	2.2563	28	1.095	98	3.643	11
	Dec	3.1825	20	3.824	18	1.3049	33	1.1272	44	1.5905	40	2.2084	36	2.339	11
	All	6.0886	16	11.2003	14	5.5392	19	2.1426	28	3.8468	23	3.3034	40	5.982	9
>1200	Con	0.9619	49	1.2779	87	3.706	32	2.1548	34	1.5438	23	1.4431	36	2.0475	16
	Dec	0.177	73	0	.	0.2554	44	0.1482	43	0.0477	54	0.223	36	0.1477	21
	All	1.1389	42	1.2779	87	3.9615	30	2.303	33	1.5915	22	1.6661	32	2.1951	15
Total	Con	2.7601	17	5.9651	13	3.9723	17	1.8332	29	1.7708	17	1.1192	42	3.0995	8
	Dec	3.0913	16	3.8244	13	1.0815	28	0.5605	36	0.6069	34	1.366	24	1.8396	8
	All	5.8514	12	9.7896	10	5.0538	16	2.3937	24	2.3777	16	2.4852	23	4.9391	6

A3 Data delivery NIR 2013: Annual gross growth of living trees, common and accessible forest area NFI 3/2009-2011.
Data are stratified for 5 NFI-regions, 3 altitudinal levels (altitude above see from DHM25) and for conifers/deciduous trees.

		Jura		Plateau		Pre-Alps		Alp West		Alp Est		Southern Alps		CH	
Alt		1000 kg/ha	± %	1000 kg/ha	± %	1000 kg/ha	± %	1000 kg/ha	± %	1000 kg/ha	± %	1000 kg/ha	± %	1000 kg/ha	± %
<600	Con	2.1113	17	3.4391	10	2.5037	55	0.6578	64	2.8837	50	0.2882	90	2.7251	9
	Dec	5.0317	18	4.8265	9	4.4893	33	2.9327	98	7.7726	45	6.5643	25	5.0218	8
	All	7.143	13	8.2655	6	6.993	24	3.5904	79	10.6563	42	6.8525	24	7.7469	5
600-1200	Con	3.2299	9	4.6341	9	4.4456	8	2.1829	22	3.2613	14	0.2787	62	3.4117	5
	Dec	3.74	10	4.3713	13	3.1241	12	2.0211	44	3.0083	21	4.1583	20	3.5052	6
	All	6.97	6	9.0053	7	7.5697	6	4.204	22	6.2696	13	4.437	19	6.9168	4
>1200	Con	3.1015	17	2.6228	31	4.689	10	3.6661	10	3.685	8	3.5445	15	3.8008	5
	Dec	0.968	50	0.0058	87	0.88	34	0.3964	25	0.3584	32	0.6039	26	0.532	15
	All	4.0695	19	2.6286	30	5.569	10	4.0625	9	4.0434	8	4.1483	12	4.3329	5
Total	Con	2.9215	7	3.9123	7	4.4786	6	3.1703	9	3.5491	7	1.9105	15	3.4262	3
	Dec	3.7758	9	4.5925	7	2.3626	11	0.9104	29	1.2557	18	2.7123	15	2.682	5
	All	6.6973	6	8.5048	4	6.8412	5	4.0807	9	4.8048	7	4.6228	10	6.1082	3

Data delivery 2009-2012 (NIR 2014)

A4 Data delivery NIR 2014: Biomass of living trees, common and accessible forest area NFI 3/2009-2012. Data are stratified for 5 NFI-regions, 3 altitudinal levels (altitude above see from DHM25) and for conifers/deciduous trees.

		Jura		Plateau		Pre-Alps		Alp West		Alp Est		Southern Alps		CH	
Alt		1000 kg/ha	± %	1000 kg/ha	± %	1000 kg/ha	± %	1000 kg/ha	± %	1000 kg/ha	± %	1000 kg/ha	± %	1000 kg/ha	± %
<600	Con	73.11	14	102.13	7	188.84	5	84.5	11	149.75	9	5.56	98	83.74	6
	Dec	175.03	7	155.91	7	121.84	7	114.53	13	109.15	11	180.37	9	168.56	4
	All	248.14	5	258.04	4	310.68	3	199.03	8	258.9	6	185.93	9	252.3	3
600-1200	Con	146.06	5	148.41	7	188.84	5	84.5	11	149.75	9	28.18	27	143.09	3
	Dec	136.63	6	153.88	8	121.84	7	114.53	13	109.15	11	152.61	9	129.45	3
	All	282.7	3	302.3	5	310.68	3	199.03	8	258.9	6	180.79	8	272.55	2
>1200	Con	136.28	10	148.41	7	251.8	6	188.39	5	193.99	4	151.03	8	192.62	3
	Dec	47.98	20	153.88	8	37.15	19	13.16	20	9.49	24	29.12	16	20.77	9
	All	184.26	6	302.3	5	288.94	5	201.54	5	203.48	4	180.15	6	213.39	2
Total	Con	125.95	5	121.68	5	211.12	4	157.88	5	180.83	4	86.84	9	150.33	2
	Dec	136.27	5	155.05	5	91.87	7	42.92	12	39.14	11	94.33	7	96.18	3
	All	262.22	3	276.74	3	302.99	3	200.8	4	219.97	4	181.17	4	246.51	1

A5 Data delivery NIR 2014: Annual cut and mortality of living trees, common and accessible forest area NFI 3/2009-2012. Data are stratified for 5 NFI-regions, 3 altitudinal levels (altitude above see from DHM25) and for conifers/deciduous trees.

		Jura		Plateau		Pre-Alps		Alp West		Alp Est		Southern Alps		CH	
Alt		1000 kg/ha	± %	1000 kg/ha	± %	1000 kg/ha	± %	1000 kg/ha	± %	1000 kg/ha	± %	1000 kg/ha	± %	1000 kg/ha	± %
<600	Con	2.9525	33	5.681	14	4.4698	15	1.2738	28	2.6455	22	0	.	4.2245	12
	Dec	3.5218	23	4.1699	14	1.5462	24	1.2461	40	1.9596	27	2.5805	30	3.8974	11
	All	6.4743	19	9.8509	10	6.0161	14	2.52	24	4.605	18	2.5805	30	8.1219	9
600-1200	Con	3.0554	15	6.539	16	4.4698	15	1.2738	28	2.6455	22	0.8401	98	3.7241	9
	Dec	2.9548	17	3.2085	16	1.5462	24	1.2461	40	1.9596	27	1.9977	31	2.1895	10
	All	6.0102	13	9.7475	12	6.0161	14	2.52	24	4.605	18	2.8378	36	5.9136	7
>1200	Con	1.1923	45	6.539	16	3.6117	26	1.8288	31	1.6048	19	1.1488	35	1.9182	13
	Dec	0.2131	59	3.2085	16	0.2269	40	0.1302	39	0.0504	46	0.2834	44	0.1509	21
	All	1.4054	43	9.7475	12	3.8386	25	1.959	30	1.6551	18	1.4321	29	2.0691	13
Total	Con	2.8111	14	6.0435	10	4.1662	13	1.6659	25	1.9144	14	0.8803	41	3.1426	6
	Dec	2.7821	14	3.7637	11	1.0794	23	0.4578	33	0.6184	27	1.2156	22	1.7513	7
	All	5.5933	11	9.8072	8	5.2455	12	2.1237	21	2.5327	13	2.0959	21	4.8939	5

A6 Data delivery NIR 2014: Annual gross growth of living trees, common and accessible forest area NFI 3/2009-2012. Data are stratified for 5 NFI-regions, 3 altitudinal levels (altitude above see from DHM25) and for conifers/deciduous trees.

		Jura		Plateau		Pre-Alps		Alp West		Alp Est		Southern Alps		CH	
Alt		1000 kg/ha	± %	1000 kg/ha	± %	1000 kg/ha	± %	1000 kg/ha	± %	1000 kg/ha	± %	1000 kg/ha	± %	1000 kg/ha	± %
<600	Con	2.0725	18	3.9271	8	4.9238	7	2.2217	20	3.2212	12	0.7791	97	3.0386	7
	Dec	4.3743	15	5.3339	7	2.913	11	2.2615	30	2.9321	14	4.982	19	5.1214	6
	Tot	6.4469	11	9.261	5	7.8368	5	4.4832	17	6.1532	9	5.7611	20	8.16	4
600-1200	Con	3.6042	8	5.1363	8	4.9238	7	2.2217	20	3.2212	12	0.3363	56	3.8079	4
	Dec	3.0186	9	4.1961	9	2.913	11	2.2615	30	2.9321	14	4.7042	17	3.2249	5
	Tot	6.6229	5	9.3324	5	7.8368	5	4.4832	17	6.1532	9	5.0405	16	7.0328	3
>1200	Con	3.3385	18	5.1363	8	5.2282	8	3.6063	9	3.3554	8	3.2758	13	3.7477	4
	Dec	0.7276	49	4.1961	9	0.5362	32	0.7607	30	0.2936	26	0.4851	48	0.515	17
	Tot	4.0661	19	9.3324	5	5.7644	8	4.3671	10	3.649	7	3.761	12	4.2628	4
Total	Con	3.175	7	4.438	5	5.0315	5	3.1998	9	3.3155	7	1.8747	14	3.6385	3
	Dec	3.1036	8	4.8532	6	2.0719	11	1.2014	21	1.0785	14	2.6211	14	2.5711	4
	Tot	6.2786	5	9.2912	3	7.1034	5	4.4012	8	4.394	6	4.4958	9	6.2096	2