

## Net GHG emissions

Annual net GHG emissions estimates from human-induced land use and land-use change on forests and peatland for 2001–2012. The results represent the annual sum of all GHG emissions and removals presented as CO<sub>2</sub>-e. Areas represent the total annual area of forest and peatland subject to change, for the purposes of GHG accounting in the INCAS framework.

### Total annual GHG emissions from forest and peatland in Indonesia

Year	Net Emission (tCO <sub>2</sub> -eq)
2001	768.427.027
2002	1.291.390.588
2003	1.115.359.424
2004	1.212.797.925
2005	1.128.569.960
2006	1.465.962.201
2007	1.025.724.810
2008	1.037.881.918
2009	1.219.344.208
2010	868.238.637
2011	925.417.865
2012	862.133.249

### Total annual area of forest and peatland subject to change in Indonesia

Year	Area (Ha)
2001	1.263.637
2002	2.250.157
2003	2.030.537
2004	2.338.964
2005	2.167.285
2006	2.951.553
2007	2.027.415
2008	2.073.015
2009	2.527.155
2010	1.501.311
2011	1.635.292
2012	1.507.028

#### NOTE:

These results include ongoing GHG emissions from deforestation and forest degradation activities that were detected during previous years, including 1990 – 2000.

#### DISCLAIMER

The INCAS is a continually improving and evolving system. It is primarily designed to estimate GHG emissions and removals at the national and subnational levels. The INCAS utilises the best available data and information, and transparent methods, definitions, and assumptions. The results are not based on site specific data nor direct measurements. The results presented on this website do not represent official Government of Indonesia GHG accounts as reported to the UNFCCC or otherwise.

## Net GHG emissions by Carbon Pool

Annual net GHG emissions estimates from human-induced land use and land-use change on forests and peatland for 2001–2012. Results are presented as CO<sub>2</sub>-e emissions for all primary GHGs and all pools; covering emissions and removals from carbon stock changes (live above-ground biomass, live below-ground biomass, litter, deadwood, and emissions from forest fires), in addition to emissions from mineral soils, peat fires and peat biological oxidation. Areas represent the total annual area of forest and peatland subject to change, for the purposes of GHG accounting in the INCAS framework.

### Net GHG Emission (tCO<sub>2</sub>-eq) in Indonesia

Year	Aboveground (tCO <sub>2</sub> -eq)	Belowground (tCO <sub>2</sub> -eq)	Litter (tCO <sub>2</sub> -eq)	Deadwood (tCO <sub>2</sub> -eq)	CH <sub>4</sub> emissions from forest fire (tCO <sub>2</sub> -eq)	N <sub>2</sub> O emissions from forest fire (tCO <sub>2</sub> -eq)	Mineral soil (tCO <sub>2</sub> -eq)	Peat fire (tCO <sub>2</sub> -eq)	Peat Biological Oxidation (tCO <sub>2</sub> -eq)	Total (tCO <sub>2</sub> -eq)
2001	173.525.750	42.652.469	896.669	162.537.938	2.933.331	190.863	45.139.929	33.421.181	307.128.896	768.427.027
2002	406.235.697	59.411.519	13.107.311	251.854.139	24.727.444	1.608.940	46.021.320	179.920.945	308.503.274	1.291.390.588
2003	365.043.163	70.461.674	13.861.723	229.789.804	15.701.004	1.021.617	47.364.675	62.299.323	309.816.441	1.115.359.424
2004	410.413.900	68.827.349	21.138.233	228.647.469	23.455.924	1.526.206	48.707.283	97.093.898	312.987.663	1.212.797.925
2005	351.201.653	67.424.744	22.233.339	223.712.295	18.883.080	1.228.665	50.030.169	77.267.691	316.588.324	1.128.569.960
2006	528.868.924	79.968.604	29.207.726	233.605.932	37.688.233	2.452.259	51.727.495	182.619.459	319.823.569	1.465.962.201
2007	291.810.972	69.740.476	23.516.553	231.488.702	10.942.284	711.981	53.431.151	22.315.312	321.767.378	1.025.724.810
2008	293.675.797	73.084.397	23.672.979	229.733.684	12.353.353	803.795	55.418.554	24.797.451	324.341.906	1.037.881.918
2009	371.278.712	72.174.576	29.192.369	242.764.933	24.424.995	1.589.260	57.466.852	92.761.804	327.690.706	1.219.344.208
2010	141.355.599	49.159.728	23.574.945	245.975.621	4.043.499	263.098	59.370.541	14.701.421	329.794.183	868.238.637
2011	162.816.961	41.637.518	24.214.293	235.173.294	11.735.635	763.602	58.866.168	57.340.566	332.869.828	925.417.865
2012	124.229.261	23.507.359	24.098.779	225.169.249	14.861.491	966.992	57.816.986	56.689.395	334.793.736	862.133.249

### Total annual area of forest and peatland subject to change in Indonesia

Year	Area (Ha)
2001	1.263.637
2002	2.250.157
2003	2.030.537
2004	2.338.964
2005	2.167.285
2006	2.951.553
2007	2.027.415
2008	2.073.015
2009	2.527.155
2010	1.501.311
2011	1.635.292
2012	1.507.028

#### NOTE:

These results include ongoing GHG emissions from any deforestation and forest degradation activities that were detected during previous years, including 1990 – 2000.

#### DISCLAIMER

The INCAS is a continually improving and evolving system. It is primarily designed to estimate GHG emissions and removals at the national and subnational levels. The INCAS utilises the best available data and information, and transparent methods, definitions, and assumptions. The results are not based on site specific data nor direct measurements. The results presented on this website do not represent official Government of Indonesia GHG accounts as reported to the UNFCCC or otherwise.

## Net GHG emissions by Gas

Annual net GHG emissions estimates from human-induced land use and land-use change on forests and peatland for 2001–2012. The results are broken down by direct CO<sub>2</sub>, N<sub>2</sub>O, and CH<sub>4</sub> emissions, and CO<sub>2</sub> emissions from dissolved organic carbon (DOC) exported from drained organic soils—all presented as CO<sub>2</sub>-e. Areas represent the total annual area of forest and peatland subject to change, for the purposes of GHG accounting in the INCAS framework.

### Net GHG Emission (tCO<sub>2</sub>-eq) in Indonesia

Year	CO <sub>2</sub> (tCO <sub>2</sub> )	N <sub>2</sub> O (tCO <sub>2</sub> -eq)	CH <sub>4</sub> (tCO <sub>2</sub> -eq)	DOC (tCO <sub>2</sub> -eq)	Total (tCO <sub>2</sub> -eq)
2001	690.365.402	15.283.846	28.248.604	34.529.175	768.427.027
2002	1.152.203.387	16.818.470	87.723.455	34.645.276	1.291.390.588
2003	1.015.655.720	16.393.301	48.542.821	34.767.581	1.115.359.424
2004	1.095.344.974	17.099.041	65.345.822	35.008.088	1.212.797.925
2005	1.020.645.430	16.978.339	55.761.958	35.184.233	1.128.569.960
2006	1.310.399.710	18.427.134	101.727.547	35.407.811	1.465.962.201
2007	939.369.399	16.898.577	33.884.265	35.572.568	1.025.724.810
2008	948.897.600	17.226.396	36.011.908	35.746.013	1.037.881.918
2009	1.099.568.758	18.244.817	65.616.149	35.914.484	1.219.344.208
2010	789.820.345	17.122.193	25.247.285	36.048.814	868.238.637
2011	827.639.196	17.607.245	43.963.942	36.207.482	925.417.865
2012	761.080.726	17.742.117	46.979.634	36.330.772	862.133.249

### Total annual area of forest and peatland subject to change in Indonesia

Year	Area (Ha)
2001	1.263.637
2002	2.250.157
2003	2.030.537
2004	2.338.964
2005	2.167.285
2006	2.951.553
2007	2.027.415
2008	2.073.015
2009	2.527.155
2010	1.501.311
2011	1.635.292
2012	1.507.028

#### NOTE:

These results include ongoing GHG emissions from any deforestation and forest degradation activities that were detected during previous years, including 1990 – 2000.

#### DISCLAIMER

The INCAS is a continually improving and evolving system. It is primarily designed to estimate GHG emissions and removals at the national and subnational levels. The INCAS utilises the best available data and information, and transparent methods, definitions, and assumptions. The results are not based on site specific data nor direct measurements. The results presented on this website do not represent official Government of Indonesia GHG accounts as reported to the UNFCCC or otherwise.

## Net GHG emissions by UNFCCC land-use category: forest land

Annual net carbon stock change and net GHG emissions/removals are presented in a modified common reporting format (CRF) table for the UNFCCC forest land-use categories, separated by forest land remaining forest land, and land converted to forest land. Areas represent the total annual area of forest subject to change, for the purposes of GHG accounting in the INCAS framework.

### Indonesia

GREENHOUSE GAS SOURCE AND SINK CATEGORIES														
Land-use category	Subdivision	Carbon Stock Change/Net CO <sub>2</sub> emissions/removals	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
A. Total forest land	Area (ha)		1.204.994	2.011.699	1.656.099	1.995.202	1.803.141	2.456.122	1.560.372	1.554.632	2.014.339	1.076.951	1.300.978	1.291.297
	Net carbon stock change in living biomass (t C)		(51.560.642)	(96.496.941)	(71.394.000)	(86.854.441)	(67.944.715)	(100.159.391)	(40.855.349)	(35.120.557)	(55.729.926)	1.253.314	(14.037.946)	(15.301.836)
	Net carbon stock change in dead organic matter (t C)		(7.165.453)	(39.108.918)	(37.374.491)	(41.243.783)	(41.982.234)	(47.006.181)	(45.931.679)	(45.806.664)	(50.370.085)	(50.870.185)	(49.123.961)	(48.046.280)
	Net carbon stock change in mineral soils (t C)		-	-	-	-	-	-	-	-	-	-	-	-
	Net carbon stock change in organic soils (t C)		(40.830.986)	(41.110.706)	(41.362.645)	(42.077.218)	(42.930.130)	(43.596.439)	(44.022.673)	(44.602.681)	(45.387.596)	(45.972.325)	(46.769.869)	(47.381.473)
	Net emissions/removals (t CO <sub>2</sub> )		365.042.632	647.960.736	550.480.833	623.976.623	560.475.956	699.460.709	479.635.569	460.276.307	555.454.559	350.493.719	403.083.179	406.008.496
1. Forest land remaining forest land	Area (ha)		1.081.146	1.874.033	1.534.485	1.893.446	1.710.951	2.364.047	1.460.766	1.454.248	1.898.412	934.547	1.223.885	1.255.701
	Net carbon stock change in living biomass (t C)		(52.017.447)	(97.354.726)	(72.631.425)	(88.473.802)	(69.970.092)	(102.625.818)	(43.834.069)	(38.629.565)	(59.793.293)	(3.512.049)	(19.240.301)	(20.793.716)
	Net carbon stock change in dead organic matter (t C)		(7.149.222)	(39.086.090)	(37.345.131)	(41.221.349)	(41.953.464)	(46.979.791)	(45.893.296)	(45.754.593)	(50.317.369)	(50.819.843)	(49.102.863)	(48.054.388)
	Net carbon stock change in mineral soils (t C)		-	-	-	-	-	-	-	-	-	-	-	-
	Net carbon stock change in organic soils (t C)		(40.830.986)	(41.110.706)	(41.362.645)	(42.077.218)	(42.930.130)	(43.596.439)	(44.022.673)	(44.602.681)	(45.387.596)	(45.972.325)	(46.769.869)	(47.381.473)
	Net emissions/removals (t CO <sub>2</sub> )		366.658.072	651.022.245	554.910.404	629.832.018	567.796.847	708.407.512	490.416.806	472.951.746	570.160.280	367.782.128	422.081.121	426.175.116
2. Land converted to forest land	Area (ha)		123.848	137.666	121.614	101.756	92.190	92.075	99.606	100.385	115.927	142.404	77.093	35.595
	Net carbon stock change in living biomass (t C)		456.805	857.785	1.237.425	1.619.361	2.025.377	2.466.427	2.978.720	3.509.009	4.063.367	4.765.363	5.202.355	5.491.879
	Net carbon stock change in dead organic matter (t C)		(16.231)	(22.828)	(29.360)	(22.435)	(28.770)	(26.390)	(38.383)	(52.071)	(52.716)	(50.342)	(21.098)	8.108
	Net carbon stock change in mineral soils (t C)		-	-	-	-	-	-	-	-	-	-	-	-
	Net carbon stock change in organic soils (t C)		-	-	-	-	-	-	-	-	-	-	-	-
	Net emissions/removals (t CO <sub>2</sub> )		(1.615.440)	(3.061.509)	(4.429.571)	(5.855.395)	(7.320.891)	(8.946.804)	(10.781.237)	(12.675.438)	(14.705.721)	(17.288.409)	(18.997.942)	(20.166.621)

#### NOTE:

Swamp forests are assumed to be drained from the time of the first harvesting event.

Net carbon stock change in organic soils (where present) includes areas of peat degradation before 2001. This is necessary to account for ongoing emissions from drained peatland.

#### DISCLAIMER

The INCAS is a continually improving and evolving system. It is primarily designed to estimate GHG emissions and removals at the national and subnational levels. The INCAS utilises the best available data and information, and transparent methods, definitions, and assumptions. The results are not based on site specific data nor direct measurements. The results presented on this website do not represent official Government of Indonesia GHG accounts as reported to the UNFCCC or otherwise.

## Net GHG emissions by UNFCCC land-use category: cropland

Annual net carbon stock change and net GHG emissions/removals are presented in a modified common reporting format (CRF) table for the UNFCCC land use category forest land converted to cropland. Areas represent the total annual area of forest land converted to cropland, for the purposes of GHG accounting in the INCAS framework.

### Indonesia

GREENHOUSE GAS SOURCE AND SINK CATEGORIES														
Land-use category	Subdivision	Carbon Stock Change/Net CO <sub>2</sub> emissions/removals	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
2.1 Forest land converted to cropland		Area (ha)	58.643	238.458	374.438	343.762	364.144	495.432	467.043	518.383	512.816	424.360	334.313	215.731
		Net carbon stock change in living biomass (t C)	(7.397.054)	(30.497.755)	(47.380.047)	(43.847.718)	(46.226.121)	(65.887.208)	(57.749.591)	(64.904.951)	(65.211.879)	(53.212.040)	(41.722.366)	(24.989.969)
		Net carbon stock change in dead organic matter (t C)	(37.407.622)	(33.153.296)	(29.075.925)	(26.879.590)	(25.093.848)	(24.670.271)	(23.615.209)	(23.304.244)	(23.800.089)	(22.643.606)	(21.618.108)	(19.935.909)
		Net carbon stock change in mineral soils (t C)	(11.181.445)	(11.399.762)	(11.732.192)	(12.064.672)	(12.392.408)	(12.811.600)	(13.232.444)	(13.724.120)	(14.232.449)	(14.707.692)	(14.587.808)	(14.331.225)
		Net carbon stock change in organic soils (t C)	(32.738.272)	(62.469.910)	(38.677.714)	(45.763.025)	(41.788.389)	(63.250.649)	(30.784.709)	(31.327.038)	(45.150.364)	(29.253.015)	(37.859.722)	(37.580.778)
		Net emissions/removals (t CO <sub>2</sub> )	325.322.770	504.242.651	465.174.888	471.368.350	460.169.474	610.939.001	459.733.830	488.621.293	544.114.199	439.326.626	424.556.017	355.072.230

### NOTE:

All areas subject to deforestation are assumed to be converted to cropland.

Net carbon stock change in dead organic matter includes areas deforested before 2001. This is necessary to account for lag emissions from decaying dead organic matter.

Net carbon stock change in mineral soils assumes all areas subject to deforestation are converted to cropland, including areas deforested before 2001. This is necessary to account for ongoing emissions from disturbed mineral soil.

Net carbon stock change in organic soils includes areas of peat degradation before 2001. This is necessary to account for ongoing emissions from drained peatland.

### DISCLAIMER

The INCAS is a continually improving and evolving system. It is primarily designed to estimate GHG emissions and removals at the national and subnational levels. The INCAS utilises the best available data and information, and transparent methods, definitions, and assumptions. The results are not based on site specific data nor direct measurements. The results presented on this website do not represent official Government of Indonesia GHG accounts as reported to the UNFCCC or otherwise.

## Net GHG emissions by REDD+ activity

Annual net GHG emissions estimates for each REDD+ activity for 2001–2012 are presented as CO<sub>2</sub>-equivalent emissions for all primary GHGs, covering carbon pools from forest components (i.e. live above-ground biomass, live below-ground biomass, litter and deadwood, but excluding soil). Emissions from forest fires are also included. Areas represent the total additional annual area of forest impacted by each REDD+ activity, for the purposes of GHG accounting in the INCAS framework.

### Net GHG Emission (tCO<sub>2</sub>-eq) excluding soil, by REDD+ activity in Indonesia

Year	Deforestation (tCO <sub>2</sub> -eq)	Forest Degradation (tCO <sub>2</sub> -eq)	SMF (tCO <sub>2</sub> -eq)	Enhancement Forest C- stock (tCO <sub>2</sub> -eq)	Total (tCO <sub>2</sub> -eq)
2001	164.356.481	218.633.668	1.362.311	(1.615.440)	382.737.020
2002	235.135.709	522.088.555	2.782.295	(3.061.509)	756.945.049
2003	282.617.373	413.413.929	4.277.254	(4.429.571)	695.878.986
2004	262.168.210	494.015.391	3.680.875	(5.855.395)	754.009.081
2005	265.583.856	422.024.254	4.396.556	(7.320.891)	684.683.775
2006	338.573.120	577.388.045	4.777.316	(8.946.804)	911.791.678
2007	299.836.062	329.479.098	9.677.045	(10.781.237)	628.210.968
2008	326.496.415	308.847.894	10.655.135	(12.675.438)	633.324.006
2009	330.368.096	414.112.530	11.649.940	(14.705.721)	741.424.846
2010	278.893.880	191.532.040	11.234.979	(17.288.409)	464.372.491
2011	233.304.995	250.413.654	11.620.595	(18.997.942)	476.341.302
2012	165.340.389	256.330.688	11.328.675	(20.166.621)	412.833.132

### Total additional annual area of forest impacted by REDD+ activity in Indonesia

Year	Deforestation (Ha)	Forest Degradation (Ha)	SMF (Ha)	Enhancement Forest C- stock (Ha)	Total (Ha)
2001	58.643	1.060.372	20.775	123.848	1.263.637
2002	238.458	1.851.791	22.242	137.666	2.250.157
2003	374.438	1.510.628	23.856	121.614	2.030.537
2004	343.762	1.869.198	24.248	101.756	2.338.964
2005	364.144	1.682.844	28.106	92.190	2.167.285
2006	495.432	2.332.893	31.154	92.075	2.951.553
2007	467.043	1.372.924	87.842	99.606	2.027.415
2008	518.383	1.368.761	85.487	100.385	2.073.015
2009	512.816	1.814.412	84.000	115.927	2.527.155
2010	424.360	854.823	79.724	142.404	1.501.311
2011	334.313	1.144.958	78.927	77.093	1.635.292
2012	215.731	1.177.797	77.905	35.595	1.507.028

#### NOTE:

The results reflect the definitions of REDD+ activities adopted for the GHG inventory in this analysis, the observed forest cover changes and forest management activities 2000–2012, as well as historical land-use changes that result in ongoing GHG emissions.

#### DISCLAIMER

The INCAS is a continually improving and evolving system. It is primarily designed to estimate GHG emissions and removals at the national and subnational levels. The INCAS utilises the best available data and information, and transparent methods, definitions, and assumptions. The results are not based on site specific data nor direct measurements. The results presented on this website do not represent official Government of Indonesia GHG accounts as reported to the UNFCCC or otherwise.

## Net GHG emissions by event

Annual net GHG emissions estimates from forests for 2001–2012, excluding soil. The results are broken down by the type of event that initiated the change in carbon stocks/emissions. Areas represent the total annual area impacted by each event type, for the purposes of GHG accounting in the INCAS framework.

### Net GHG Emission (tCO<sub>2</sub>-eq) excluding soil, by event type in Indonesia

Year	Clearing (tCO <sub>2</sub> -eq)	Logging (tCO <sub>2</sub> -eq)	Fire (tCO <sub>2</sub> -eq)	Planting (tCO <sub>2</sub> -eq)	Total (tCO <sub>2</sub> -eq)
2001	164.168.966	195.858.407	24.325.087	(1.615.440)	382.737.020
2002	225.583.448	289.260.295	245.162.816	(3.061.509)	756.945.049
2003	267.302.132	281.699.400	151.307.025	(4.429.571)	695.878.986
2004	243.984.501	292.874.585	223.005.390	(5.855.395)	754.009.081
2005	242.718.112	284.447.456	164.839.098	(7.320.891)	684.683.775
2006	302.872.072	275.216.608	342.649.801	(8.946.804)	911.791.678
2007	290.029.662	257.833.975	91.128.569	(10.781.237)	628.210.968
2008	313.180.791	247.826.639	84.992.014	(12.675.438)	633.324.006
2009	310.654.164	243.299.750	202.176.651	(14.705.721)	741.424.846
2010	273.790.025	192.603.505	15.267.371	(17.288.409)	464.372.491
2011	226.885.067	184.178.485	84.275.692	(18.997.942)	476.341.302
2012	159.674.576	157.228.082	116.097.095	(20.166.621)	412.833.132

### Total annual area of forest impacted by event type in Indonesia

Year	Clearing (Ha)	Logging (Ha)	Fire (Ha)	Planting (Ha)	Total (Ha)
2001	58.275	990.091	91.423	123.848	1.263.637
2002	219.610	1.017.845	875.036	137.666	2.250.157
2003	344.907	1.033.649	530.368	121.614	2.030.537
2004	310.888	1.115.483	810.837	101.756	2.338.964
2005	321.090	1.128.032	625.973	92.190	2.167.285
2006	428.267	1.145.009	1.286.203	92.075	2.951.553
2007	453.671	1.105.857	368.281	99.606	2.027.415
2008	497.094	1.100.239	375.297	100.385	2.073.015
2009	479.382	1.105.789	826.057	115.927	2.527.155
2010	419.027	801.394	138.486	142.404	1.501.311
2011	325.560	803.957	428.681	77.093	1.635.292
2012	207.999	691.971	571.462	35.595	1.507.028

#### NOTE:

These results include ongoing GHG emissions from any deforestation and forest degradation activities that were detected during previous years, including 1990 – 2000.

#### DISCLAIMER

The INCAS is a continually improving and evolving system. It is primarily designed to estimate GHG emissions and removals at the national and subnational levels. The INCAS utilises the best available data and information, and transparent methods, definitions, and assumptions. The results are not based on site specific data nor direct measurements. The results presented on this website do not represent official Government of Indonesia GHG accounts as reported to the UNFCCC or otherwise.

## Net GHG emissions by forest function

Annual net emissions estimates from forests for 2001–2012, excluding soil. The results are broken down by forest function. Deforestation events mainly occurred in production forests, especially in convertible production forest, and forested land allocated for other uses, known as APL (*areal penggunaan lain*). Areas represent the total annual area of forest subject to change by each forest function, for the purposes of GHG accounting in the INCAS framework.

### Net GHG Emission (tCO<sub>2</sub>-eq) excluding soil, by forest function in Indonesia

Year	APL (tCO <sub>2</sub> -eq)	Conservation & Protection (tCO <sub>2</sub> -eq)	Production (tCO <sub>2</sub> -eq)	Total (tCO <sub>2</sub> -eq)
2001	98.417.220	65.754.660	218.565.140	382.737.020
2002	191.283.815	164.694.667	400.966.568	756.945.049
2003	166.959.238	127.376.899	401.542.849	695.878.986
2004	174.498.557	154.769.797	424.740.727	754.009.081
2005	155.925.635	128.211.583	400.546.557	684.683.775
2006	232.513.031	173.200.208	506.078.439	911.791.678
2007	130.673.820	113.753.669	383.783.479	628.210.968
2008	148.262.730	106.702.907	378.358.369	633.324.006
2009	192.617.790	128.872.517	419.934.538	741.424.846
2010	105.412.806	86.781.450	272.178.235	464.372.491
2011	111.518.949	81.595.920	283.226.434	476.341.302
2012	75.225.608	67.133.753	270.473.771	412.833.132

### Total annual area of forest impacted by forest function in Indonesia

Year	APL (Ha)	Conservation & Protection (Ha)	Production (Ha)	Total (Ha)
2001	151.637	199.172	912.829	1.263.637
2002	415.702	454.754	1.379.701	2.250.157
2003	359.321	327.508	1.343.708	2.030.537
2004	407.917	532.792	1.398.255	2.338.964
2005	356.186	441.941	1.369.159	2.167.285
2006	568.962	604.275	1.778.317	2.951.553
2007	264.236	324.406	1.438.773	2.027.415
2008	310.582	315.234	1.447.198	2.073.015
2009	453.708	415.085	1.658.361	2.527.155
2010	228.363	207.753	1.065.196	1.501.311
2011	263.383	211.364	1.160.544	1.635.292
2012	199.194	162.718	1.145.117	1.507.028

#### NOTE:

These results include ongoing GHG emissions from deforestation and forest degradation activities that were detected during previous years, including 1990 – 2000.

#### DISCLAIMER

The INCAS is a continually improving and evolving system. It is primarily designed to estimate GHG emissions and removals at the national and subnational levels. The INCAS utilises the best available data and information, and transparent methods, definitions, and assumptions. The results are not based on site specific data nor direct measurements. The results presented on this website do not represent official Government of Indonesia GHG accounts as reported to the UNFCCC or otherwise.



## Mineral soil emissions

Total annual emissions in tonnes CO<sub>2</sub>-e from the soil organic carbon pool on mineral soil subject to change from forest to non-forest. This includes CO<sub>2</sub> emissions and non-CO<sub>2</sub> emissions (N<sub>2</sub>O) from mineral soil. Areas represent the total additional annual area of mineral soil subject to change from forest to non-forest, for the purposes of GHG accounting in the INCAS framework.

### Net GHG Emission (tCO<sub>2</sub>-eq) from mineral soil subject to change from forest to non-forest in Indonesia

Year	N <sub>2</sub> O (t CO <sub>2</sub> -eq)	CO <sub>2</sub> (t CO <sub>2</sub> )	Total (t CO <sub>2</sub> -eq)
2001	4.141.300	40.998.630	45.139.929
2002	4.222.191	41.799.129	46.021.320
2003	4.346.637	43.018.037	47.364.675
2004	4.470.152	44.237.132	48.707.283
2005	4.591.339	45.438.830	50.030.169
2006	4.751.627	46.975.868	51.727.495
2007	4.912.189	48.518.963	53.431.151
2008	5.096.782	50.321.773	55.418.554
2009	5.281.205	52.185.647	57.466.852
2010	5.442.338	53.928.203	59.370.541
2011	5.377.538	53.488.630	58.866.168
2012	5.269.162	52.547.824	57.816.986

### Total additional annual area of mineral soil subject to change from forest to non-forest in Indonesia.

Year	Annual area of mineral soil subject to change from forest to non-forest (Ha)
2001	40.353
2002	165.052
2003	253.886
2004	253.664
2005	248.994
2006	325.777
2007	331.621
2008	371.192
2009	375.820
2010	328.538
2011	254.790
2012	166.033

#### NOTE:

Net carbon stock change in mineral soils assumes all areas subject to deforestation are converted to cropland, including areas deforested before 2001. This is necessary to account for ongoing emissions from disturbed mineral soil.

#### DISCLAIMER

The INCAS is a continually improving and evolving system. It is primarily designed to estimate GHG emissions and removals at the national and subnational levels. The INCAS utilises the best available data and information, and transparent methods, definitions, and assumptions. The results are not based on site specific data nor direct measurements. The results presented on this website do not represent official Government of Indonesia GHG accounts as reported to the UNFCCC or otherwise.

### Peat fire emissions by fire type

Total annual GHG emissions from peat fires for 2001–2012. Results include CO<sub>2</sub> emissions and non-CO<sub>2</sub> emissions (CH<sub>4</sub>) from the burning of peat presented as CO<sub>2</sub>-e emissions. Results are broken down by the first fire, second fire, and third and subsequent fires to occur at a location during the period, to account for different peat fire characteristics. Areas represent the total annual area of peatland impacted by fire, for the purposes of GHG accounting in the INCAS framework.

#### Net GHG Emission (tCO<sub>2</sub>-eq) from peat fire in Indonesia

Year	First Fire (tCO <sub>2</sub> -eq)	Second Fire (tCO <sub>2</sub> -eq)	Third and subsequent fire (tCO <sub>2</sub> -eq)	Total (tCO <sub>2</sub> -eq)
2001	34.243	33.386.938	-	33.421.181
2002	4.758.844	170.128.158	5.033.943	179.920.945
2003	1.222.677	53.040.613	8.036.032	62.299.323
2004	3.374.448	76.890.372	16.829.077	97.093.898
2005	8.336.968	51.350.170	17.580.554	77.267.691
2006	11.199.832	134.582.701	36.836.926	182.619.459
2007	1.807.386	13.126.957	7.380.969	22.315.312
2008	3.929.944	11.938.125	8.929.382	24.797.451
2009	8.807.648	50.813.591	33.140.565	92.761.804
2010	1.001.417	6.332.691	7.367.312	14.701.421
2011	2.720.061	29.064.041	25.556.464	57.340.566
2012	472.066	27.128.957	29.088.373	56.689.395

#### Total annual area of peat land impacted by fire in Indonesia

Year	Area subject to First Fire (Ha)	Area subject to Second Fire (Ha)	Area subject to Third and subsequent fire (Ha)	Total (Ha)
2001	69	109.569	-	109.638
2002	9.544	558.328	45.431	613.303
2003	2.452	174.069	72.525	249.046
2004	6.768	252.339	151.882	410.989
2005	16.720	168.521	158.664	343.905
2006	22.462	441.674	332.452	796.588
2007	3.625	43.080	66.613	113.318
2008	7.882	39.179	80.587	127.648
2009	17.664	166.760	299.092	483.517
2010	2.008	20.783	66.490	89.281
2011	5.455	95.383	230.646	331.484
2012	947	89.032	262.522	352.500

#### NOTE:

Excludes emissions from biomass burning.

#### DISCLAIMER

The INCAS is a continually improving and evolving system. It is primarily designed to estimate GHG emissions and removals at the national and subnational levels. The INCAS utilises the best available data and information, and transparent methods, definitions, and assumptions. The results are not based on site specific data nor direct measurements. The results presented on this website do not represent official Government of Indonesia GHG accounts as reported to the UNFCCC or otherwise.

## Peat fire emissions by gas

Total annual GHG emissions from peat fires in Indonesia for 2001–2012. Results are presented as CO<sub>2</sub> emissions and methane (CH<sub>4</sub>) emissions from the burning of peat, presented as CO<sub>2</sub>-e. Areas represent the total annual area of peatland impacted by fire, for the purposes of GHG accounting in the INCAS framework.

### Net GHG Emissions (tCO<sub>2</sub>-eq) from peat fire in Indonesia

Year	CO <sub>2</sub> (tCO <sub>2</sub> )	CH <sub>4</sub> (tCO <sub>2</sub> -eq)	Total (tCO <sub>2</sub> -eq)
2001	24.837.173	8.584.007	33.421.181
2002	133.709.450	46.211.495	179.920.945
2003	46.298.157	16.001.166	62.299.323
2004	72.155.978	24.937.920	97.093.898
2005	57.422.000	19.845.691	77.267.691
2006	135.714.869	46.904.590	182.619.459
2007	16.583.773	5.731.539	22.315.312
2008	18.428.391	6.369.060	24.797.451
2009	68.936.553	23.825.251	92.761.804
2010	10.925.459	3.775.962	14.701.421
2011	42.613.024	14.727.542	57.340.566
2012	42.129.102	14.560.293	56.689.395

### Total annual area of peat land impacted by fire in Indonesia

Year	Area subject to fire (Ha)
2001	109.638
2002	613.303
2003	249.046
2004	410.989
2005	343.905
2006	796.588
2007	113.318
2008	127.648
2009	483.517
2010	89.281
2011	331.484
2012	352.500

#### NOTE:

Excludes emissions from biomass burning.

#### DISCLAIMER

The INCAS is a continually improving and evolving system. It is primarily designed to estimate GHG emissions and removals at the national and subnational levels. The INCAS utilises the best available data and information, and transparent methods, definitions, and assumptions. The results are not based on site specific data nor direct measurements. The results presented on this website do not represent official Government of Indonesia GHG accounts as reported to the UNFCCC or otherwise.

## Peat biological oxidation emissions by gas

Total annual GHG emissions from peat biological oxidation on disturbed peatland for the period 2001 to 2012. Results include direct emissions of CO<sub>2</sub>, N<sub>2</sub>O, CH<sub>4</sub> and CO<sub>2</sub> emissions from dissolved organic carbon (DOC) exported from drained organic soils, all presented as CO<sub>2</sub>-equivalent. Areas represent the total additional annual area of peatland subject to biological oxidation, for the purposes of GHG accounting in the INCAS framework.

### Net GHG Emissions (tCO<sub>2</sub>-eq) from peat biological oxidation in Indonesia

Year	Annual Biological Oxidation (tCO <sub>2</sub> )	N <sub>2</sub> O (tCO <sub>2</sub> -eq)	CH <sub>4</sub> (tCO <sub>2</sub> -eq)	DOC (tCO <sub>2</sub> -eq)	Total (tCO <sub>2</sub> -eq)
2001	244.916.773	10.951.684	16.731.265	34.529.175	307.128.896
2002	246.086.142	10.987.339	16.784.516	34.645.276	308.503.274
2003	247.183.161	11.025.047	16.840.652	34.767.581	309.816.441
2004	249.924.913	11.102.683	16.951.978	35.008.088	312.987.663
2005	253.212.570	11.158.335	17.033.187	35.184.233	316.588.324
2006	256.057.787	11.223.248	17.134.724	35.407.811	319.823.569
2007	257.709.961	11.274.407	17.210.442	35.572.568	321.767.378
2008	259.980.579	11.325.819	17.289.495	35.746.013	324.341.906
2009	263.035.968	11.374.352	17.365.903	35.914.484	327.690.706
2010	264.900.789	11.416.757	17.427.824	36.048.814	329.794.183
2011	267.695.477	11.466.104	17.500.765	36.207.482	332.869.828
2012	269.399.151	11.505.963	17.557.850	36.330.772	334.793.736

### Total annual area of additional peat land subject to biological oxidation in Indonesia

Year	Annual area of peat subject to degradation (Ha)
2001	85.987
2002	238.235
2003	228.510
2004	284.551
2005	350.129
2006	524.131
2007	262.858
2008	274.848
2009	409.098
2010	202.130
2011	258.214
2012	261.759

#### NOTE:

These results include ongoing GHG emissions from degraded peat that was disturbed during previous years, including 1990 – 2000.

#### DISCLAIMER

The INCAS is a continually improving and evolving system. It is primarily designed to estimate GHG emissions and removals at the national and subnational levels. The INCAS utilises the best available data and information, and transparent methods, definitions, and assumptions. The results are not based on site specific data nor direct measurements. The results presented on this website do not represent official Government of Indonesia GHG accounts as reported to the UNFCCC or otherwise.

### Peat biological oxidation emissions by REDD+ activity

Total annual GHG emissions from peat biological oxidation on disturbed peatland for 2001–2012. Results are broken down by REDD+ activity that initiated the peatland drainage and degradation. Areas represent the total additional annual area of peatland subject to biological oxidation, for the purposes of GHG accounting in the INCAS framework.

#### Net GHG Emissions (tCO<sub>2</sub>-eq) from peat biological oxidation, by REDD+ activity in Indonesia

Year	Deforestation (tCO <sub>2</sub> -eq)	Deforested before 2001 (tCO <sub>2</sub> -eq)	Forest Degradation (tCO <sub>2</sub> -eq)	Forest Degradation before 2001 (tCO <sub>2</sub> -eq)	SMF (tCO <sub>2</sub> -eq)	Total (tCO <sub>2</sub> -eq)
2001	25.117.617	90.891.822	44.082.665	143.533.742	3.503.050	307.128.896
2002	25.280.868	90.891.822	45.293.791	143.533.742	3.503.050	308.503.274
2003	25.480.807	90.891.822	46.407.020	143.533.742	3.503.050	309.816.441
2004	25.625.057	90.891.822	49.433.991	143.533.742	3.503.050	312.987.663
2005	25.813.382	90.891.822	52.846.328	143.533.742	3.503.050	316.588.324
2006	26.241.524	90.891.822	55.653.431	143.533.742	3.503.050	319.823.569
2007	26.358.472	90.891.822	57.473.364	143.533.742	3.509.977	321.767.378
2008	26.538.156	90.891.822	59.861.281	143.533.742	3.516.904	324.341.906
2009	26.738.607	90.891.822	63.002.703	143.533.742	3.523.832	327.690.706
2010	26.482.921	90.891.822	65.354.939	143.533.742	3.530.759	329.794.183
2011	26.389.689	90.891.822	68.516.888	143.533.742	3.537.686	332.869.828
2012	25.869.913	90.891.822	70.953.645	143.533.742	3.544.613	334.793.736

#### Total annual area of additional peat land subject to biological oxidation in Indonesia

Year	Annual area of peat subject to degradation (Ha)
2001	85.987
2002	238.235
2003	228.510
2004	284.551
2005	350.129
2006	524.131
2007	262.858
2008	274.848
2009	409.098
2010	202.130
2011	258.214
2012	261.759

#### NOTE:

These results include ongoing GHG emissions from degraded peat that was disturbed during previous years, including 1990 – 2000.

#### DISCLAIMER

The INCAS is a continually improving and evolving system. It is primarily designed to estimate GHG emissions and removals at the national and subnational levels. The INCAS utilises the best available data and information, and transparent methods, definitions, and assumptions. The results are not based on site specific data nor direct measurements. The results presented on this website do not represent official Government of Indonesia GHG accounts as reported to the UNFCCC or otherwise.