

World on the Edge - Natural Systems Data - All Ecosystems

[Humanity's Ecological Footprint, 1961-2007](#)

GRAPH: Humanity's Ecological Footprint, 1961-2007

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GRAPH: Plan B Carbon Dioxide Emissions Reduction Goals for 2020

A full listing of data for the entire book is on-line at:

http://www.earth-policy.org/books/wote/wote_data

This is part of a supporting dataset for Lester R. Brown, **World on the Edge: How to Prevent Environmental and Economic Collapse** (New York: W.W. Norton & Company, 2011). For more information and a free download of the book, see Earth Policy Institute on-line at www.earth-policy.org.

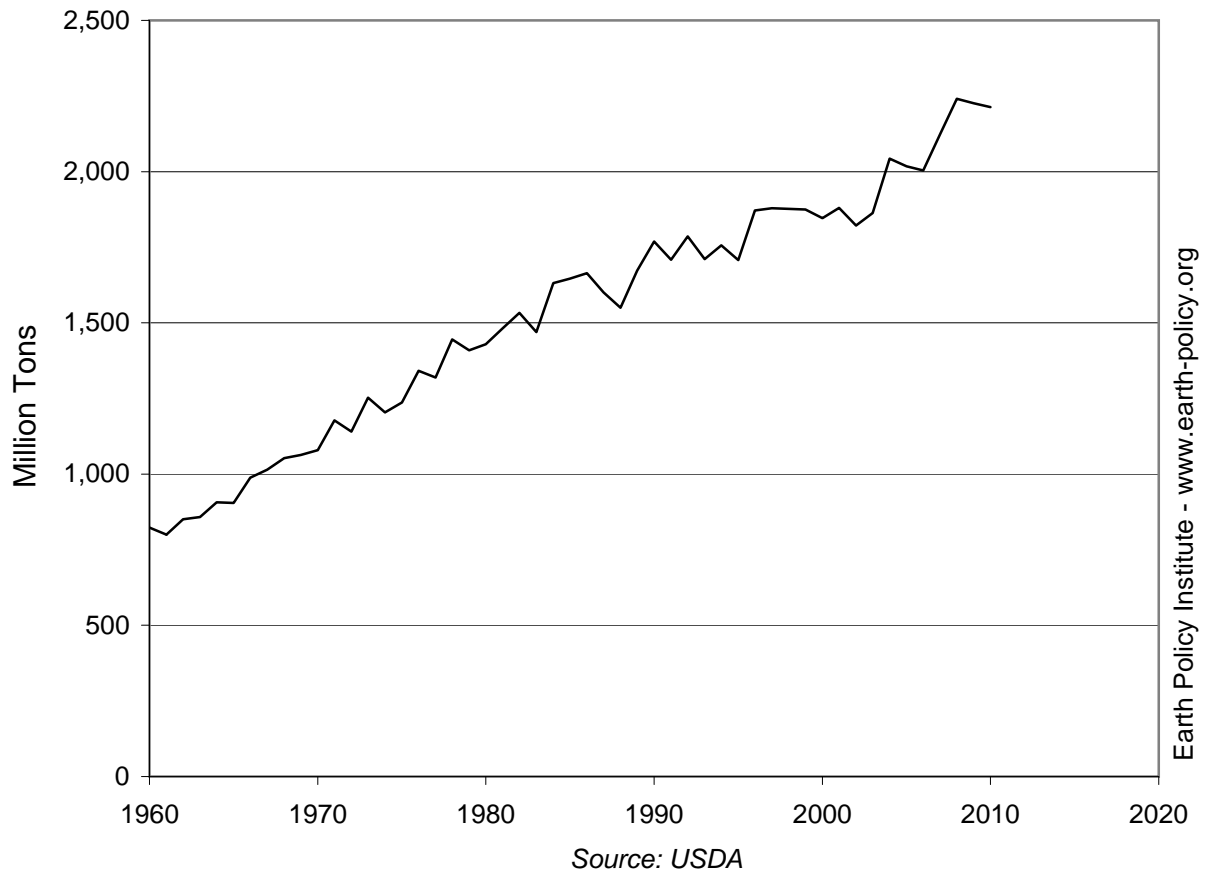
World Grain Production, Area, and Yield, 1960-2010

Year	Production Million Tons	Area Million Hectares	Yield Tons per Hectare
1960	824	639	1.29
1961	800	635	1.26
1962	850	641	1.33
1963	858	648	1.32
1964	906	657	1.38
1965	905	653	1.39
1966	988	655	1.51
1967	1,014	665	1.52
1968	1,052	670	1.57
1969	1,063	672	1.58
1970	1,079	663	1.63
1971	1,177	672	1.75
1972	1,141	661	1.73
1973	1,253	688	1.82
1974	1,203	690	1.74
1975	1,237	707	1.75
1976	1,342	716	1.87
1977	1,319	714	1.85
1978	1,445	713	2.03
1979	1,409	710	1.98
1980	1,429	722	1.98
1981	1,482	732	2.02
1982	1,533	717	2.14
1983	1,469	708	2.07
1984	1,632	711	2.29
1985	1,647	716	2.30
1986	1,664	710	2.34
1987	1,601	686	2.33
1988	1,550	689	2.25
1989	1,673	697	2.40
1990	1,769	696	2.54
1991	1,709	694	2.46
1992	1,786	695	2.57
1993	1,711	685	2.50
1994	1,756	685	2.56
1995	1,707	682	2.50
1996	1,872	703	2.66
1997	1,879	691	2.72
1998	1,877	687	2.73
1999	1,874	670	2.80
2000	1,846	666	2.77
2001	1,880	667	2.82
2002	1,822	653	2.79
2003	1,864	665	2.80
2004	2,043	669	3.05
2005	2,017	674	2.99
2006	2,004	673	2.98
2007	2,125	692	3.07
2008	2,241	697	3.22
2009	2,226	686	3.24
2010	2,213	689	3.21

Source: U.S. Department of Agriculture, *Production, Supply and Distribution*, electronic database, at www.fas.usda.gov/psdonline, updated 12 August 2010.

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World Grain Production, 1960-2010



Environmental Indicators for Top Failing States, 2010

Country	Failed State Rank (2010) ¹	Failed State Score (2010) ¹	Population Density	Livestock Density	Arable Land	Forests as a Share of Total Land Area	Annual Forest Area Change ²	Total Renewable Water Resources	Internal Renewable Water Resources
			(2010)	(2009)	(2007)	(2010)	(2005-2010)	(2008)	(2008)
			Population per Square Kilometer	Animals per Square Kilometer	Hectares per Person	Percent	Percent	Cubic Meters Per Person Per Year ³	Cubic Meters Per Person Per Year ³
Somalia	1	114.3	15	50	0.11	11	-1.1	1,647	672
Chad	2	113.3	9	13	0.40	9	-0.7	3,940	1,374
Sudan	3	111.8	17	57	0.48	29	-0.1	1,560	726
Zimbabwe	4	110.2	32	22	0.26	40	-2.0	2,558	1,568
Dem. Rep. of the Congo	5	109.9	29	3	0.11	68	-0.2	19,967	14,006
Afghanistan	6	109.3	45	33	0.30	2	0.0	2,389	2,021
Iraq	7	107.3	72	25	0.17	2	0.0	2,512	1,170
Central African Republic	8	106.4	7	14	0.45	36	-0.1	33,280	32,496
Guinea	9	105.0	42	31	0.23	27	-0.5	22,984	22,984
Pakistan	10	102.5	232	193	0.13	2	-2.4	1,273	311
Haiti	11	101.6	367	128	0.09	4	-0.8	1,421	1,317
Côte d'Ivoire	12	101.2	67	14	0.14	33	n.s.	3,941	3,732
Kenya	13	100.7	70	64	0.14	6	-0.3	792	534
Nigeria	14	100.2	171	114	0.25	10	-4.0	1,893	1,462
Yemen	15	100.0	46	37	0.06	1	0.0	92	92
Burma	16	99.4	75	29	0.22	48	-1.0	23,566	20,237
Ethiopia	17	98.8	77	99	0.18	11	-1.1	1,512	1,512
Timor-Leste	18	98.2	79	29	0.16	50	-1.4	-	-
North Korea	19	97.8	199	35	0.12	47	-2.1	3,239	2,813
Niger	20	97.8	13	25	1.04	1	-1.0	2,288	238

Notes:

"-" indicates no data available; "n.s." (not significant) indicates a very small value.

¹ Failed state ranks and scores for 2010 are based on 2009 data.

² Negative figures indicate forest area losses.

³ Regions where water supplies are less than 1,700 cubic meters per person per year are considered to be "water stressed," those where water supplies are less than 1,000 cubic meters per person per year are said to suffer from "water scarcity," and those with less than 500 cubic meters per person per year suffer from "absolute water scarcity."

Source: Compiled by Earth Policy Institute with failed state ranks and scores from Fund for Peace and *Foreign Policy*, "The Failed States Index," *Foreign Policy*, July/August 2010; population density from U.N. Population Division, *World Population Prospects: The 2008 Revision Population Database*, at esa.un.org/unpp, updated 11 March 2009; livestock from U.N. Food and Agriculture Organization (FAO), *ProdSTAT*, electronic database, at faostat.fao.org, updated September 2010, with land area from Central Intelligence Agency, *The World Factbook*, at www.cia.gov/library/publications, updated December 2010; arable land from World Bank, *World Development Indicators*, electronic database, at data.worldbank.org/indicator, viewed 29 November 2010; forest area and area change from FAO, *Global Forest Resources Assessment 2010: Global Tables* (Rome: 2010); renewable water resources from FAO, *AQUASTAT*, electronic database, at www.fao.org/nr/water/aquastat/data/query/index.html, viewed 30 November 2010; definitions of water stress and scarcity from United Nations, Water for Life Decade, "Water Scarcity," at www.un.org/waterforlifedecade/scarcity.html, viewed 8 December 2010.

Environmental Indicators for Top Strong States, 2010

Country	Failed State Rank (2010) ¹	Failed State Score (2010) ¹	Population Density (2010) Population per Square Kilometer	Livestock Density (Latest Year) Animals per Square Kilometer	Arable Land (2007) Hectares per Person	Forests as a Share of Total Land Area	Annual Forest Area Change ²	Total Renewable Water Resources (2008) Cubic Meters Per Person Per Year ³	Internal Renewable Water Resources (2008) Cubic Meters Per Person Per Year ³
						(2010) Percent	(2005-2010) Percent		
Norway	177	18.7	13	11	0.18	33	0.8	80,134	80,134
Finland	176	19.3	16	3	0.43	73	0.0	20,739	20,173
Sweden	175	20.9	21	5	0.29	69	0.0	18,903	18,577
Switzerland	174	21.8	184	53	0.05	31	0.4	7,095	5,357
Ireland	173	22.4	65	167	0.24	11	1.2	11,720	11,043
Denmark	172	22.9	127	39	0.42	13	0.4	1,099	1,099
New Zealand	171	23.9	16	158	0.20	31	-0.1	77,305	77,305
Austria	170	27.2	100	29	0.17	47	0.1	9,320	6,597
Luxembourg	168	27.3	190	81	0.13	33	0.0	6,445	2,079
Australia	168	27.3	3	13	2.10	19	-0.6	23,346	23,346
Canada	166	27.9	3	2	1.37	34	0.0	87,255	85,691
Netherlands	166	27.9	401	163	0.06	11	0.0	5,506	666
Iceland	165	29.8	3	5	0.02	n.s.	3.3	539,683	539,683
Japan	164	31.3	336	12	0.03	69	0.0	3,378	3,378
Belgium	163	32.0	350	89	0.08	22	0.2	1,728	1,133
Portugal	162	33.1	117	55	0.10	38	0.1	6,434	3,559
United Kingdom	161	33.9	255	169	0.10	12	0.3	2,392	2,359
Singapore	160	34.8	7,082	1	0.00	3	0.0	130	130
France	159	34.9	114	50	0.30	29	0.3	3,284	2,877
United States	158	35.3	33	11	0.57	33	0.1	9,847	9,042

Notes:

"-" indicates no data available; "n.s." (not significant) indicates a very small value.

¹ Failed state ranks and scores for 2010 are based on 2009 data.

² Positive figures indicate forest area gains; negative figures indicate forest area losses.

³ Regions where water supplies are less than 1,700 cubic meters per person per year are considered to be "water stressed," those where water supplies are less than 1,000 cubic meters per person per year are said to suffer from "water scarcity," and those with less than 500 cubic meters per person per year suffer from "absolute water scarcity."

Source: Compiled by Earth Policy Institute with failed state ranks and scores from Fund for Peace and *Foreign Policy*, "The Failed States Index," *Foreign Policy*, July/August 2010; population density from U.N. Population Division, *World Population Prospects: The 2008 Revision Population Database*, at esa.un.org/unpp, updated 11 March 2009; livestock from U.N. Food and Agriculture Organization (FAO), *ProdSTAT*, electronic database, at faostat.fao.org, updated September 2010, with land area from Central Intelligence Agency, *The World Factbook*, at www.cia.gov/library/publications, updated December 2010; arable land from World Bank, *World Development Indicators*, electronic database, at data.worldbank.org/indicator, viewed 29 November 2010; forest area and area change from FAO, *Global Forest Resources Assessment 2010: Global Tables* (Rome: 2010); renewable water resources from FAO, *AQUASTAT*, electronic database, at www.fao.org/nr/water/aquastat/dbase/index.stm, viewed 30 November 2010; definitions of water stress and scarcity from United Nations, Water for Life Decade, "Water Scarcity," at www.un.org/waterforlifedecade/scarcity.html, viewed 8 December 2010.

Plan B Budget: Additional Annual Funding Needed to Restore the Earth

Activity	Funding
	Billion U.S. Dollars
Planting trees	23
Protecting topsoil on cropland	24
Restoring rangelands	9
Restoring fisheries	13
Stabilizing water tables	10
Protecting biological diversity	31
Total	110

Sources: Compiled by Earth Policy Institute, with planting trees to reduce flooding and conserve soil from Lester R. Brown and Edward C. Wolf, "Reclaiming the Future," in Lester R. Brown et al., *State of the World 1988* (New York: W. W. Norton & Company, 1988), p. 174, using data from U.N. Food and Agriculture Organization (FAO), *Fuelwood Supplies in the Developing Countries*, Forestry Paper 42 (Rome: 1983), plus planting trees to sequester carbon from Intergovernmental Panel on Climate Change, *Climate Change 2007: Mitigation of Climate Change. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge, U.K.: Cambridge University Press, 2007), pp. 543, 559; protecting topsoil based on Lester R. Brown and Edward C. Wolf, "Reclaiming the Future," in Lester R. Brown et al., *State of the World 1988* (New York: W. W. Norton & Company, 1988), p. 174, using data from FAO, *Fuelwood Supplies in the Developing Countries*, Forestry Paper 42 (Rome: 1983); restoring rangelands from United Nations Environment Programme, *Status of Desertification and Implementation of the United Nations Plan of Action to Combat Desertification* (Nairobi: 1991), pp. 73–92, with figures converted from 1990 to 2004 dollars using implicit price deflators from U.S. Department of Commerce, Bureau of Economic Analysis, "Table C.1. GDP and Other Major NIPA Aggregates," in *Survey of Current Business*, September 2005, p. D–48; restoring fisheries from Andrew Balmford et al., "The Worldwide Costs of Marine Protected Areas," *Proceedings of the National Academy of Sciences*, vol. 101, no. 26 (29 June 2004), pp. 9,694–97; stabilizing water tables from author's estimate; protecting biological diversity from World Parks Congress, *Recommendations of the Vth IUCN World Parks Congress* (Durban, South Africa: 2003), pp. 17–19, and World Parks Congress, "The Durban Accord," at www.iucn.org/about/work/programmes/pa/pa_event/wcpa.wpc, viewed 19 October 2007.

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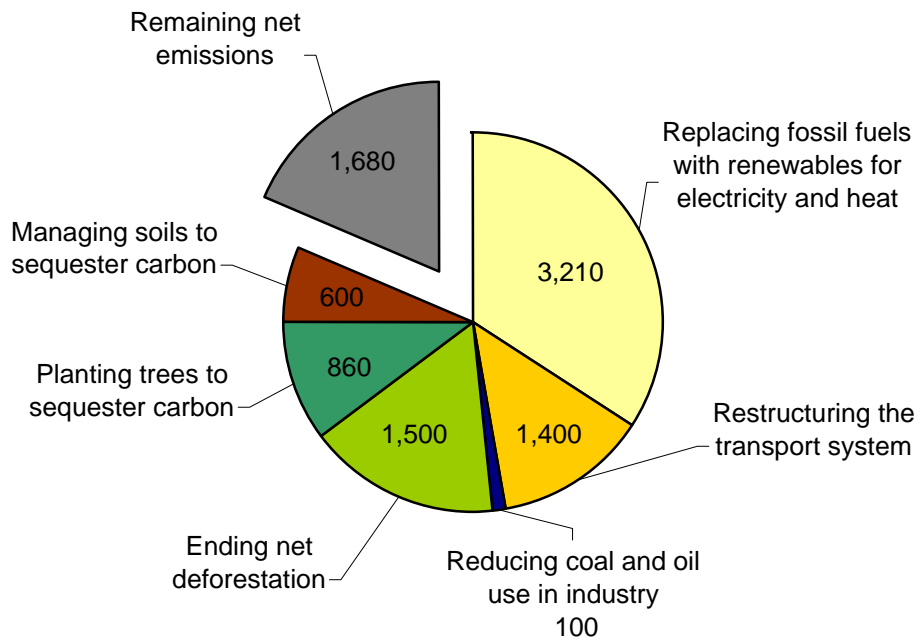
Plan B Carbon Dioxide Emissions Reductions and Sequestration in 2020

Action	Amount
	Million Tons of Carbon
Energy Restructuring	
Replacing fossil fuels with renewables for electricity and heat	3,210
Restructuring the transport system	1,400
Reducing coal and oil use in industry	100
Biological Carbon Sequestration	
Ending net deforestation	1,500
Planting trees to sequester carbon	860
Managing soils to sequester carbon	600
Total Carbon Dioxide Reductions in 2020	7,670
Carbon Dioxide Emissions in 2006	9,350
Percent Reduction from 2006 Baseline	82.0

Source: Calculated by Earth Policy Institute using International Energy Agency (IEA), *World Energy Outlook 2008* (Paris: 2008), p. 507; IEA, *Tracking Industrial Energy Efficiency and CO2 Emissions* (Paris: 2007); Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2007: Mitigation of Climate Change. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge, U.K.: Cambridge University Press, 2007), pp. 543, 559; and Rattan Lal, "Soil Carbon Sequestration Impacts on Global Climate Change and Food Security," *Science*, vol. 304 (11 June 2004), pp. 1,623–27.

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Plan B Carbon Dioxide Emissions Reduction Goals for 2020 (Million Tons of Carbon)



Baseline Emissions (2006) = 9,350 Million Tons of Carbon

Source: EPI