

Environment

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Environment

Introduction

At present, Ireland's rate of economic development continues to cause pressures on the environment. This follows a period of several decades during which population, urbanisation, industrial and agricultural intensification have given rise to gradually increasing environmental pressures.

This chapter contains data on a number of these direct and indirect pressures on the environment, details of which are drawn primarily from the Environmental Protection Agency (EPA).

Table 18.1 contains information on the land areas afforested, together with the associated levels of carbon sinks (changes in forest and other woody biomass stocks). Forests absorb carbon dioxide from the atmosphere and store it in the biomass until the eventual release as a result of burning or timber decay.

Sources of energy by fuel type and energy consumption over the period 1980-2000, which give an indication of the needs of the Irish economy for energy and how they are sourced, are given in Tables 18.3-18.4. The Transport sector accounts for an increasing proportion of energy consumption and Table 18.2 details the growth in vehicle numbers and CO₂ emissions. An example of a pressure indicator derived from economic prosperity and economic activity has been included in Table 18.2, namely the number of cars per 1,000 population.

The next eight tables (Tables 18.5-18.12) deal with greenhouse gases, acid rain agents, environmental pressures over time, such as river quality and the generation of waste. Tables 18.5-18.8 give a picture as to where Ireland has progressed vis-à-vis emissions of greenhouse gases and acidifying agents. Finally, data is provided on various aspects of Ireland's weather in Tables 18.13-18.16 in respect of 2000.

Recent trends

- The total number of registered vehicles has increased by 60% over the period 1990-2000. The number of cars per 1,000 population has converged rapidly to the European average over the last decade. Related CO₂ emissions have increased by 106% in the same period.
- Greenhouse gas emissions have increased by 24% over the period 1990-2000, while Ireland has agreed to limit the growth in greenhouse gases within 13% above 1990 levels under the Kyoto Protocol.
- Acid rain precursors emissions have decreased by 7% over the period 1990-2000.
- Each household produced on average over one tonne of waste per annum in 1998, of which a quarter is packaging.
- Only 9% of municipal waste in Ireland was recovered in 1998.
- Ireland's total primary energy requirement in 2000 has increased by 74% since 1980.
- The percentage of land area under forest has increased by 65% over the period 1980-2000.

Table 18.1 Land areas afforested and CO₂ sinks

Year	Hectares public	Hectares private	Hectares total	Hectares annual change	CO ₂ sinks kilotonnes
1980	291,086	102,221	393,307	–	–
1981	297,185	102,496	399,681	6,374	–
1982	303,201	102,994	406,195	6,514	–
1983	308,899	103,321	412,220	6,025	–
1984	314,091	103,794	417,885	5,665	–
1985	318,716	104,411	423,127	5,242	–
1986	323,404	106,691	430,095	6,968	–
1987	328,799	109,645	438,444	8,349	–
1988	335,910	114,241	450,151	11,707	–
1989	342,539	122,738	465,277	15,126	–
1990	349,209	131,885	481,094	15,817	-450.11
1991	357,064	143,177	500,241	19,147	-422.95
1992	364,629	152,311	516,940	16,699	-318.05
1993	371,456	161,482	532,938	15,998	-380.85
1994	378,078	174,319	552,397	19,459	-407.25
1995	384,445	191,662	576,107	23,710	-428.68
1996	388,871	208,217	597,088	20,981	-420.15
1997	389,722	218,800	608,522	11,434	-497.91
1998	392,648	228,802	621,450	12,928	-573.62
1999	393,539	240,579	634,118	12,668	-500.51
2000	396,725	253,088	649,813	15,695	-407.33

Source: Forest Service

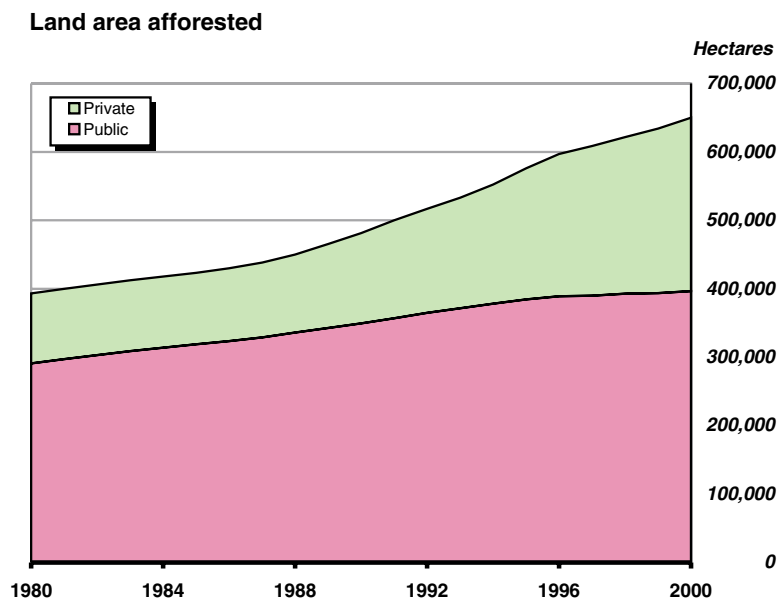


Table 18.2 Environmental pressures – transport

Year	Number of private cars	Total number of vehicles	Population	Number of cars per 1,000 of population	CO ₂ emissions from road transport kilotonnes
1979	682,958	853,211	3,368,200	203	n/a
1980	734,371	911,031	3,401,000	216	n/a
1981	774,594	949,819	3,443,400	225	n/a
1982	709,000	882,140	3,480,000	204	n/a
1983	718,555	897,381	3,504,000	205	n/a
1984	711,098	906,109	3,529,000	202	n/a
1985	709,546	914,758	3,540,000	200	n/a
1986	711,087	922,484	3,540,600	201	n/a
1987	736,595	959,753	3,546,500	208	n/a
1988	749,459	981,296	3,530,700	212	n/a
1989	773,396	1,019,560	3,509,500	220	n/a
1990	796,408	1,054,259	3,505,800	227	4,642
1991	836,583	1,105,545	3,525,700	237	4,927
1992	858,498	1,126,473	3,554,500	242	5,330
1993	891,027	1,151,238	3,574,100	249	5,383
1994	939,022	1,202,273	3,585,900	262	5,523
1995	990,384	1,262,503	3,601,300	275	5,954
1996	1,057,383	1,338,616	3,626,100	292	6,657
1997	1,134,429	1,432,330	3,660,600	310	7,269
1998	1,196,901	1,510,853	3,704,900	323	8,283
1999	1,269,245	1,608,156	3,744,700	339	9,149
2000	1,319,250	1,682,221	3,786,900	348	9,583

Source: Department of the Environment and Local Government, CSO and Environmental Protection Agency

Number of private cars and population

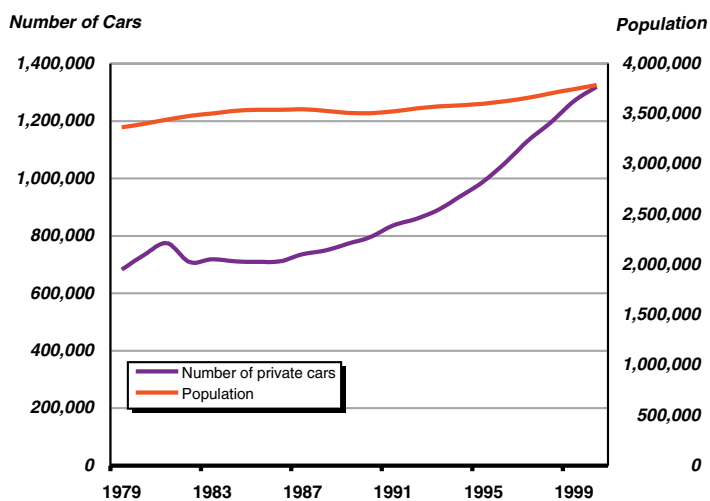


Table 18.3 Energy sources by fuel type

Year	1980	1985	1990	1995	2000	1980	1985	1990	1995	2000
	Millions of tonnes of oil equivalent (TOE)					Percentages				
Coal	0.73	1.05	2.16	1.92	1.99	9.1	13.1	22.9	17.9	14.2
Peat	1.17	1.45	1.36	1.21	0.80	14.6	18.0	14.4	11.3	5.7
Oil	5.61	3.89	4.29	5.45	7.87	69.8	48.4	45.5	50.9	56.3
Natural Gas	0.46	1.59	1.45	1.92	3.06	5.7	19.8	15.4	17.9	21.9
Renewables	0.07	0.06	0.17	0.20	0.25	0.9	0.7	1.8	1.9	1.8
Total	8.04	8.04	9.43	10.7	13.97	100.0	100.0	100.0	100.0	100.0

Source: Department of Public Enterprise

Table 18.4 Final energy consumption by sector

Million TOE

Year	1980	1985	1990	1995	2000
Transport	1.73	1.72	2.03	2.46	3.90
Residential	1.94	2.09	2.19	2.13	2.58
Industry	1.96	1.68	1.72	1.68	2.27
Agriculture	n/a	n/a	0.25	0.29	0.33
Services	0.60	0.68	1.01	1.23	1.53
Total	6.23	6.17	7.20	7.79	10.61

%

Year	1980	1985	1990	1995	2000
Transport	27.8	27.9	28.2	31.6	36.8
Residential	31.1	33.9	30.4	27.3	24.3
Industry	31.5	27.2	23.9	21.6	21.4
Agriculture	n/a	n/a	3.5	3.7	3.1
Services	9.6	11.0	14.0	15.8	14.4
Total	100.0	100.0	100.0	100.0	100.0

Source: Department of Public Enterprise

Final Energy Consumption by Sector
(Agriculture energy consumption only available after 1986)

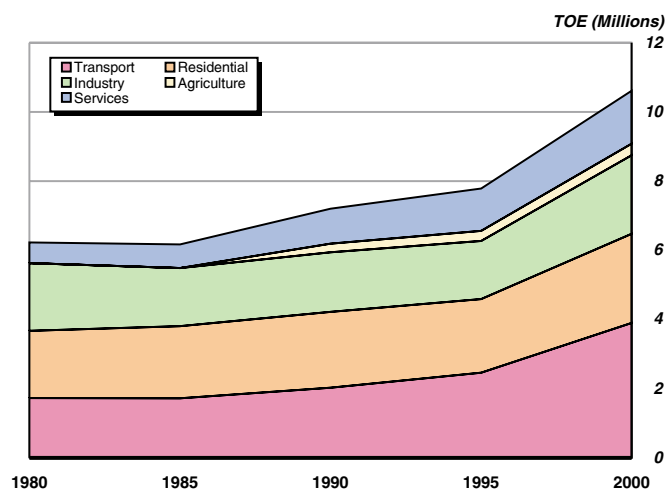


Table 18.5 Greenhouse gas emissions

Kilotonnes

Year	1990	1996	1997	1998	1999	2000
Carbon Dioxide (CO ₂)	31,508	35,629	38,000	39,957	41,825	43,815
Methane (CH ₄)	611	646	655	649	634	610
Nitrous Oxide (N ₂ O)	29	31	31	32	33	31
Total	32,148	36,306	38,686	40,638	42,492	44,456

Source: Environmental Protection Agency

Table 18.6 Greenhouse gas emissions, CO₂ equivalent

CO₂ equivalent kilotonnes

Year	1990	1996	1997	1998	1999	2000
Carbon Dioxide (CO ₂)	31,508	35,629	38,000	39,957	41,825	43,815
Methane (CH ₄)	12,836	13,559	13,747	13,631	13,307	12,800
Nitrous Oxide (N ₂ O)	9,086	9,660	9,548	10,066	10,143	9,657
Total	53,430	58,848	61,295	63,654	65,275	66,272
Index (1990=100)	100	110	115	119	122	124

Source: Environmental Protection Agency

Greenhouse gas emissions

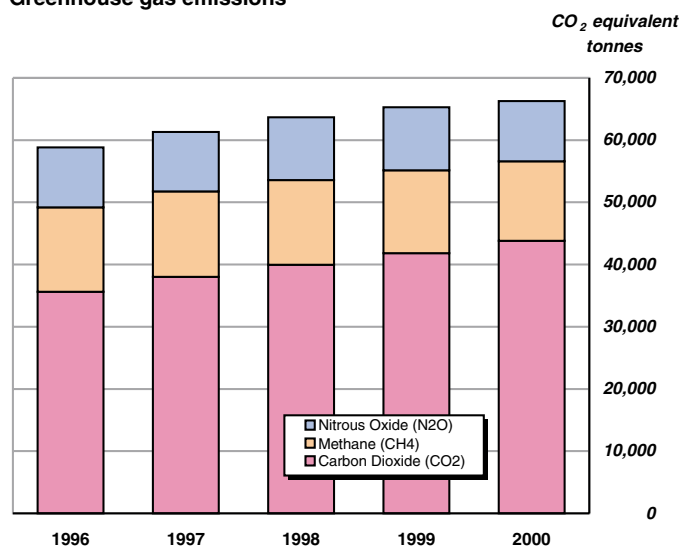


Table 18.7 Acid rain and ozone precursors

Tonnes

Year	1990	1996	1997	1998	1999	2000
Sulphur Dioxide (SO ₂)	185,786	147,380	166,114	176,061	157,369	131,489
Nitrogen Oxides (NOX)	118,026	120,026	118,414	121,772	119,250	125,132
Ammonia (NH ₃)	112,317	121,941	123,397	127,497	126,987	122,440
Volatile Organic Compounds (VOC)	108,706	109,281	112,593	113,922	94,579	97,825
Carbon Monoxide (CO)	400,920	306,832	312,159	317,732	285,310	279,571
Total	925,755	805,460	832,677	856,984	783,495	756,457

Source: Environmental Protection Agency

Table 18.8 Acid rain precursors

SO₂ equivalent per tonne of gas emitted

Year	1990	1996	1997	1998	1999	2000
Sulphur Dioxide (SO ₂)	185,786	147,380	166,114	176,061	157,369	131,489
Nitrogen Oxides (NOX)	82,618	83,502	82,381	84,717	82,962	87,054
Ammonia (NH ₃)	213,402	229,541	232,282	240,000	239,040	230,481
Total	481,806	460,423	480,777	500,778	479,371	449,024
Index (1990=100)	100	96	100	104	99	93

Source: Environmental Protection Agency

Acid rain precursors

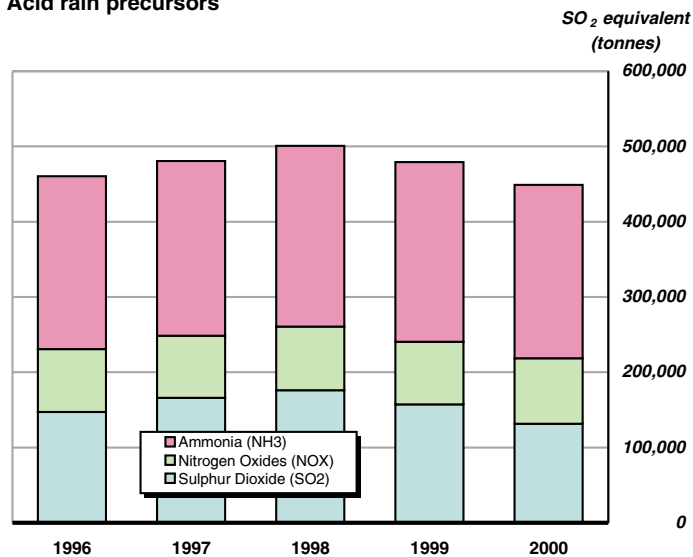


TABLE 18.7
TABLE 18.8

Table 18.9 Lead concentrations and sales of unleaded petrol in Dublin*ug/m³*

Description	1995	1996	1997	1998	1999	2000
O'Connell Street	0.1	0.1	0.1	0.1	0.04	0.02
College Street	0.2	0.1	0.1	0.1	0.1	0.05
Pearse Street	0.3	0.2	0.2	0.1	0.1	0.06
Branch Road (Dublin Port area)	0.4	0.5	0.4	0.3	0.3	0.64
Ranelagh	0.1	0.1	0.1	0.04	0.04	0.02
Kilbarrack	0.1	0.04	0.03	0.02	0.01	0.01
Unleaded Petrol Sales (%)	57	64	73	80	92	100

Source: Dublin Corporation

TABLE 18.9

TABLE 18.10

Table 18.10 River quality*%*

Year	1986	1990	1994	1997	2000
Unpolluted	69	66	57	51	58
Slightly polluted	20	19	27	29	26
Moderately polluted	8	13	15	18	14
Seriously polluted	3	2	1	2	2
Total	100	100	100	100	100

Source: Environmental Protection Agency

Table 18.11 Total household and commercial waste collected

Tonnes				
Year	1993	1995	1998	2000
Household and commercial waste collected	1,186,312	1,385,439	1,852,450	2,242,292
Index (1984=100.0)	139.0	162.1	216.7	262.3

Source: Environmental Protection Agency

Table 18.12 Disposal and recovery of household and commercial waste and packaging in 1998

Material								Total
	Paper	Glass	Plastic	Ferrous, aluminium and other metals	Textiles	Organics	Others	
Waste quantity landfilled	547,850	80,758	192,928	49,424	36,142	455,204	323,463	1,685,769
Household waste landfilled	219,573	61,526	133,453	39,852	32,708	370,542	268,046	1,125,700
Commercial waste landfilled	328,277	19,232	59,475	9,572	3,434	84,662	55,417	560,069
Waste quantity recovered	94,302	36,000	7,476	4,828	3,247	5,665	15,167	166,685
Household waste recovered	7,150	14,100	648	1,542	3,247	5,665	5,167	37,519
Commercial waste recovered	87,152	21,900	6,828	3,286	0	0	10,000	129,166
Total Waste Recovered (%)	14.7	30.8	3.7	8.9	8.2	1.2	4.5	9.0
Packaging quantity disposed	255,520	75,419	164,432	37,988	4,568	–	43,859	581,786
Household packaging disposed	58,162	59,459	116,775	29,691	3,187	–	28,545	295,819
Commercial packaging disposed	197,358	15,960	47,657	8,297	1,381	–	15,314	285,967
Packaging quantity recovered	42,262	36,000	3,458	1,540	0	–	10,000	93,260
Household packaging recovered	1,632	14,100	648	1,040	0	–	0	17,420
Commercial packaging recovered	40,630	21,900	2,810	500	0	–	10,000	75,840
Total Packaging Recovered (%)	14.2	32.3	2.1	3.9	0.0	–	18.6	13.8

Source: Environmental Protection Agency

Disposal and recovery of household and commercial waste in 1998

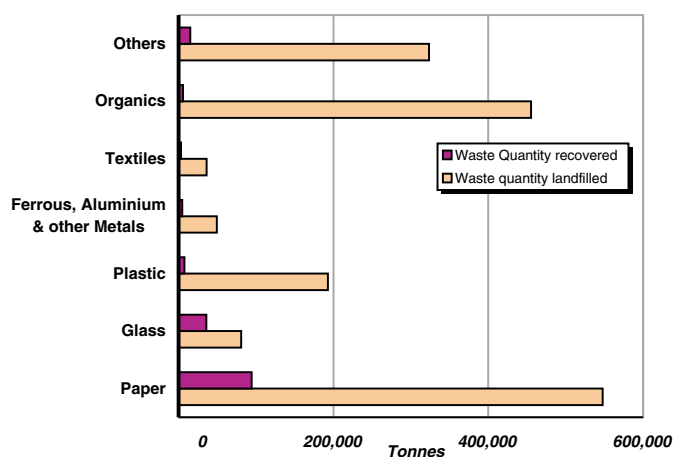


TABLE 18.11
TABLE 18.12

Table 18.13 Rainfall, 2000

Station	Total	% of Average	Most in a day	
			Amount	Date(s)
	<i>mm</i>		<i>mm</i>	
Shannon Airport	1,097.0	118	39.0	27 July
Cork Airport	1,142.9	95	43.1	05 November
Malin Head	1,175.9	111	30.4	20 September
Dublin Airport	843.4	n/a	41.2	05 November
Casement Aerodrome	868.0	122	55.5	05 November
Valentia Observatory	1,768.1	124	48.5	30 November
Kilkenny	931.2	113	42.4	16 May
Belmullet	1,340.3	117	25.8	24 October
Connacht Airport	1,371.6	n/a	22.4	07 March
Clones	968.7	104	23.2	31 August
Birr	908.0	113	29.4	02 November
Mullingar	1,008.2	109	37.4	05 November
Rosslare	1,066.6	122	37.6	07 December

Source: Met Éireann

TABLE 18.13

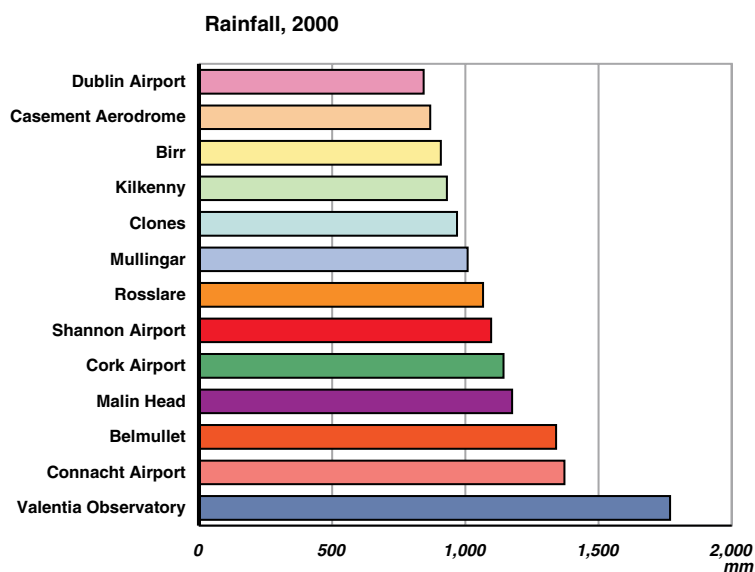


Table 18.14 Temperature, 2000

°C

Station	Daily Mean	Difference from average ¹	Extremes	
			Highest	Lowest
Shannon Airport	11.1	+0.9	27.6	-4.9
Cork Airport	10.1	+0.6	24.2	-3.6
Malin Head	9.8	+0.4	23.9	-2.8
Dublin Airport	9.5	n/a	25.7	-7.4
Casement Aerodrome	9.8	+0.5	27.6	-8.3
Valentia Observatory	10.8	+0.3	26.1	-2.9
Kilkenny	10.0	+0.6	26.1	-5.0
Belmullet	10.6	+0.9	26.3	-5.5
Connacht Airport	8.6	n/a	24.7	-6.9
Clones	9.5	+0.6	25.5	-9.3
Birr	9.9	+0.5	25.9	-7.8
Mullingar	9.5	+0.6	26.3	-8.0
Rosslare	10.7	+0.6	23.9	-1.7

¹ Average = 30 year average, 1961-1990
Source: Met Éireann

TABLE 18.14

TABLE 18.15

Table 18.15 Sunshine, 2000

Station	Daily Mean	% of average	Most in a day	
			Amount	Date(s)
	<i>hours</i>		<i>hours</i>	
Shannon Airport	3.93	113	14.6	27 June
Cork Airport	4.12	108	14.8	20 July
Malin Head	3.78	112	14.9	22 July
Dublin Airport	4.08	104	14.8	17 July
Casement Aerodrome	3.89	105	15.0	16 June
Valentia Observatory	3.68	109	14.2	19 July
Kilkenny	4.00	114	14.9	21 July
Belmullet	3.57	102	15.1	22 July
Connacht Airport	3.58	n/a	15.0	06 July
Clones	3.60	113	13.4	28 June
Birr	3.41	103	13.8	22 July
Mullingar	3.91	112	14.9	22 July
Rosslare	4.72	109	14.9	21 July

Source: Met Éireann

Table 18.16 Number of days, 2000, with various weather conditions

Station	Number of days with:						
	Rain	Snow	Air frost	Hail	Thunder	Fog	Gale gusts
Shannon Airport	253	6	11	13	9	31	74
Cork Airport	234	9	14	4	4	106	73
Malin Head	267	16	3	38	13	8	181
Dublin Airport	258	6	31	9	9	41	85
Casement Aerodrome	214	7	24	12	11	17	85
Valentia Observatory	293	4	15	22	9	20	105
Kilkenny	249	n/a	43	n/a	n/a	n/a	46
Belmullet	297	12	7	63	15	14	166
Connacht Airport	283	25	27	18	3	150	91
Clones	269	n/a	27	n/a	n/a	n/a	61
Birr	256	n/a	22	n/a	n/a	n/a	34
Mullingar	258	n/a	30	n/a	n/a	n/a	38
Rosslare	214	1	5	6	5	35	60

Source: Met Éireann

TABLE 18.16