

Environment

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- The total number of registered vehicles has increased by 68% over the period 1990-2001. Related CO₂ emissions have increased by 122% in the same period.
- Greenhouse gas emissions have increased by 31% over the period 1990-2001.
- Acid rain precursors emissions have decreased by 7% over the period 1990-2001.
- Each household produced on average over one tonne of waste per annum in 2001.
- Only 13% of municipal waste in Ireland was recovered in 2001, an improvement on the 9% in 1998.
- Ireland's total primary energy requirement in 2001 has increased by 57% since 1990.
- The percentage of land area under forest has increased by 38% over the period 1990-2001.

Introduction

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

Awareness of the necessity for environmental protection has grown substantially in the last number of years. There is increasing concern regarding environmental pollution in all of its aspects.

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 1980-2001, 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 2001.

Table 18.1 Land areas afforested and CO₂ sinks

	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
2001	397,042	268,235	665,277	15,464	-1,007.02

Source: Forest Service

Land area afforested

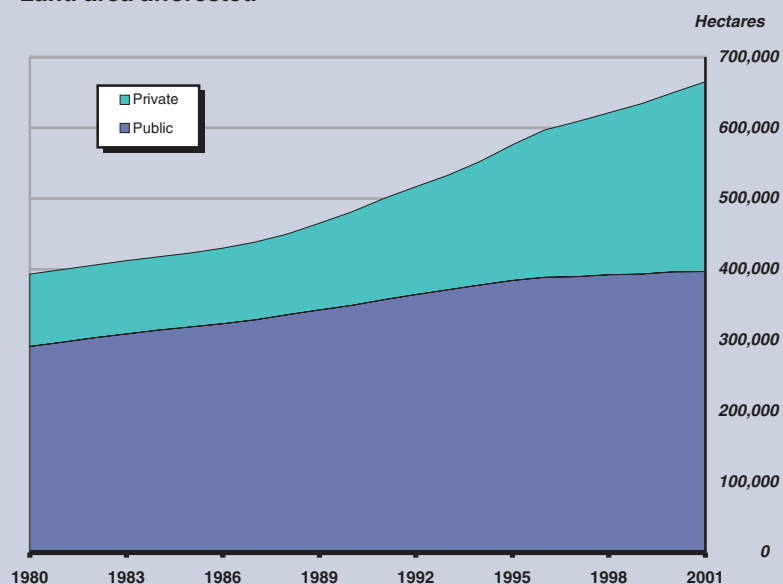


Table 18.2 Environmental pressures – transport

	Number of private cars	Total number of vehicles	Population	Number of private cars per 1,000 of population	CO ₂ emissions from road transport kilotonnes
1979	682,958	853,211	3,368,200	203	–
1980	734,371	911,031	3,401,000	216	–
1981	774,594	949,819	3,443,400	225	–
1982	709,000	882,140	3,480,000	204	–
1983	718,555	897,381	3,504,000	205	–
1984	711,098	906,109	3,529,000	202	–
1985	709,546	914,758	3,540,000	200	–
1986	711,087	922,484	3,540,600	201	–
1987	736,595	959,753	3,546,500	208	–
1988	749,459	981,296	3,530,700	212	–
1989	773,396	1,019,560	3,509,500	220	–
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
2001	1,384,704	1,769,684	3,838,900	361	10,300

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

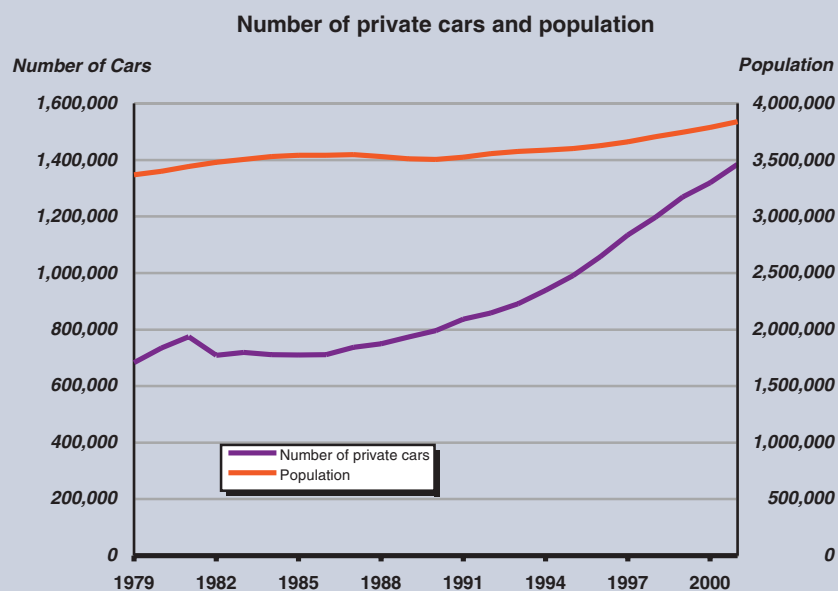


Table 18.3 Energy sources by fuel type

	Millions of tonnes of oil equivalent (TOE)						Percentages					
	1980	1985	1990	1995	2000	2001	1980	1985	1990	1995	2000	2001
Coal	0.73	1.05	2.16	1.92	1.99	2.04	9.1	13.1	22.9	17.9	14.2	13.8
Peat	1.17	1.45	1.36	1.21	0.80	0.88	14.6	18.0	14.4	11.3	5.7	6.0
Oil	5.61	3.89	4.29	5.45	7.87	8.44	69.8	48.4	45.5	50.9	56.3	57.2
Natural Gas	0.46	1.59	1.45	1.92	3.06	3.14	5.7	19.8	15.4	17.9	21.9	21.3
Renewables	0.07	0.06	0.17	0.20	0.26	0.26	0.9	0.7	1.8	1.9	1.9	1.8
Total	8.04	8.04	9.43	10.7	13.98	14.76	100.0	100.0	100.0	100.0	100.0	100.0

Source: Department of Public Enterprise

TABLE 18.3

TABLE 18.4

Table 18.4 Final energy consumption by sector

	Millions of tonnes of oil equivalent (TOE)						Percentages					
	1980	1985	1990	1995	2000	2001	1980	1985	1990	1995	2000	2001
Transport	1.73	1.72	2.03	2.46	3.90	4.31	27.8	27.9	28.2	31.1	36.7	38.6
Residential	1.94	2.09	2.19	2.18	2.57	2.68	31.1	33.9	30.4	27.6	24.2	24.0
Industry	1.96	1.68	1.72	1.75	2.25	2.25	31.5	27.2	23.9	22.1	21.2	20.2
Agriculture	n/a	n/a	0.25	0.29	0.33	0.33	n/a	n/a	3.5	3.7	3.1	3.0
Services	0.60	0.68	1.01	1.23	1.57	1.59	9.6	11.0	14.0	15.5	14.8	14.2
Total	6.23	6.17	7.20	7.91	10.62	11.16	100.0	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)

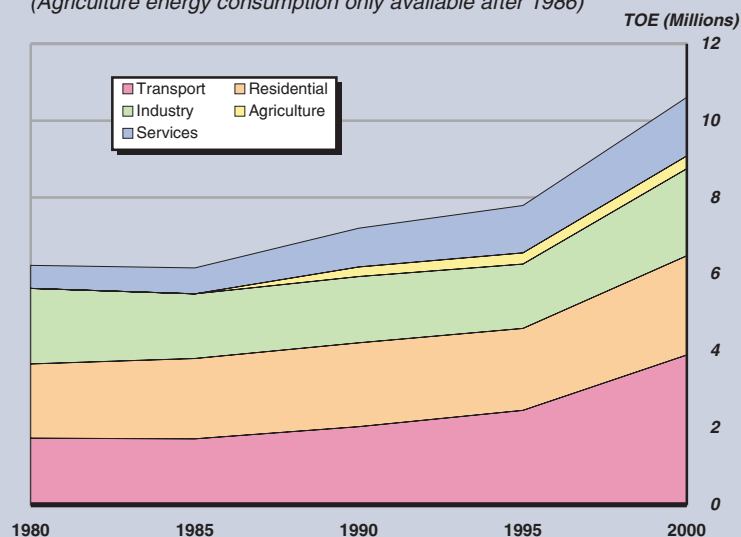


Table 18.5 Greenhouse gas emissions*Kilotonnes*

	1990	1996	1997	1998	1999	2000	2001
Carbon Dioxide (CO ₂)	31,797	35,954	38,312	40,250	42,133	44,159	46,460
Methane (CH ₄)	567	608	617	618	614	609	598
Nitrous Oxide (N ₂ O)	31	33	34	34	35	35	34
Total	32,394	36,595	38,963	40,902	42,782	44,803	47,092

*Source: Environmental Protection Agency***Table 18.6 Greenhouse gas emissions, CO₂ equivalent***CO₂ equivalent kilotonnes*

	1990	1996	1997	1998	1999	2000	2001
Carbon Dioxide (CO ₂)	31,797	35,954	38,312	40,250	42,133	44,159	46,460
Methane (CH ₄)	11,900	12,769	12,955	12,970	12,885	12,785	12,563
Nitrous Oxide (N ₂ O)	9,542	10,264	10,422	10,652	10,828	10,760	10,401
HFCs, PFCs and SF ₆	179	262	342	257	411	547	594
Total	53,418	59,249	62,031	64,128	66,257	68,251	70,018
Base year 1990=100	100	111	116	120	124	128	131

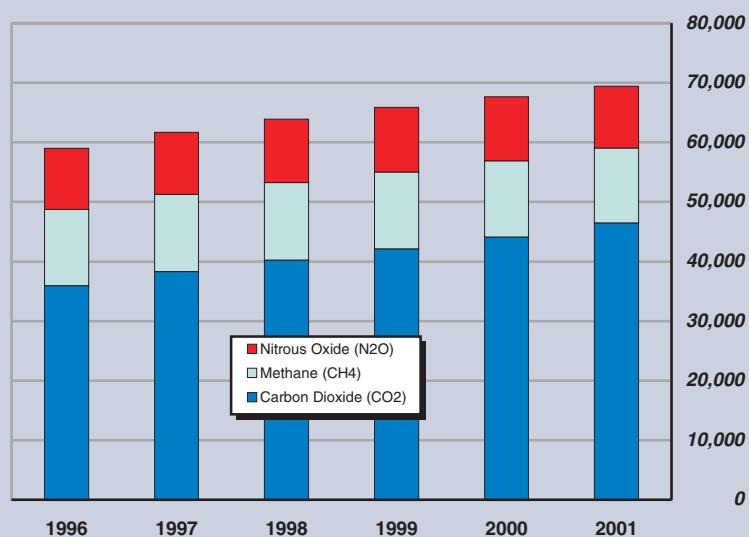
*Source: Environmental Protection Agency***Greenhouse gas emissions***CO₂ equivalent
kilotonnes*

Table 18.7 Acid rain and ozone precursors

Tonnes

	1990	1996	1997	1998	1999	2000	2001
Sulphur Dioxide (SO ₂)	185,786	147,380	166,114	176,061	157,369	131,489	126,150
Nitrogen Oxides (NOX)	122,410	126,710	124,510	128,610	126,340	132,680	134,950
Ammonia (NH ₃)	112,317	121,941	123,397	126,550	126,987	122,440	122,599
Volatile Organic Compounds (VOC)	110,940	111,930	115,730	117,740	98,670	90,330	86,971
Carbon Monoxide (CO)	400,920	306,832	312,159	317,732	285,310	279,571	273,274
Total	932,373	814,793	841,910	866,693	794,676	756,510	743,944

Source: Environmental Protection Agency

Table 18.8 Acid rain precursorsSO₂ equivalent per tonne of gas emitted

	1990	1996	1997	1998	1999	2000	2001
Sulphur Dioxide (SO ₂)	185,786	147,380	166,114	176,061	157,369	131,489	126,150
Nitrogen Oxides (NOX)	85,161	88,152	86,622	89,474	87,895	92,305	93,885
Ammonia (NH ₃)	213,402	229,541	232,282	238,218	239,040	230,481	230,780
Total	484,349	465,073	485,018	503,753	484,304	454,275	450,815
Base year 1990=100	100	96	100	104	100	94	93

Source: Environmental Protection Agency

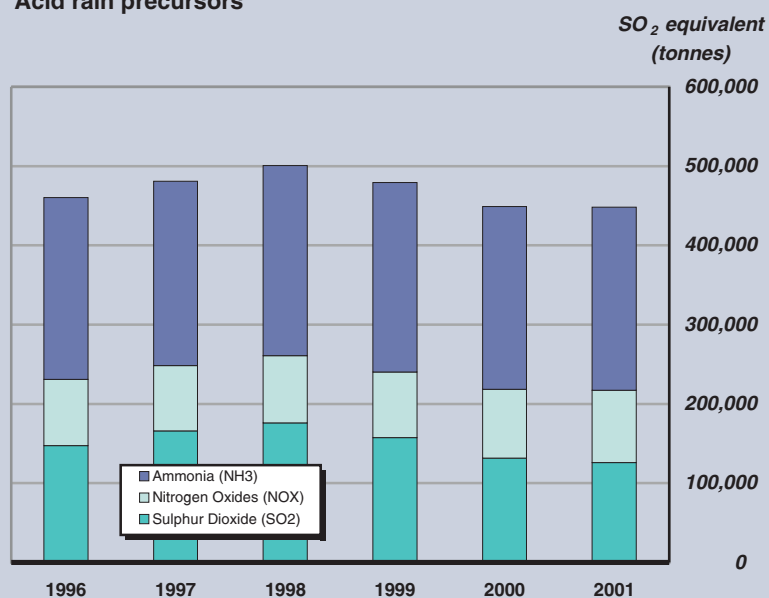
Acid rain precursors

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

Location	1993	1994	1995	1996	1997	1998	1999	2000	2001
O'Connell Street	0.2	0.2	0.1	0.1	0.1	0.1	0.04	0.02	0.04
College Street	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.05	0.06
Pearse Street	0.4	0.3	0.3	0.2	0.2	0.1	0.1	0.06	0.07
Branch Road (Dublin Port area)	0.3	0.3	0.4	0.5	0.4	0.3	0.3	0.64	0.53
Ranelagh	0.1	0.1	0.1	0.1	0.1	0.04	0.04	0.02	0.02
Kilbarrack	0.1	0.05	0.1	0.04	0.03	0.02	0.01	0.01	0.01
Unleaded Petrol (%) of total sales	40	49	57	64	73	80	92	100	100

*Source: Dublin Corporation***Table 18.10 River quality***% of channel length*

	1987	1991	1995-1997	1998-2000
Unpolluted	77	71	67	70
Slightly polluted	12	17	18	17
Moderately polluted	10	11	14	12
Seriously polluted	1	1	1	1
Total	100	100	100	100

Source: Environmental Protection Agency

Table 18.11 Total household and commercial waste collected

	Tonnes				
	1984	1993	1995	1998	2001
Household and commercial waste collected	854,866	1,188,312	1,385,439	1,852,450	2,297,603
Base year 1984=100	100	139.0	162.1	216.7	268.8

Source: Environmental Protection Agency

Table 18.12 Disposal and recovery of household and commercial waste and packaging in 2001

	Paper	Glass	Plastic	Ferrous, aluminium and other metals	Textiles	Organics	Others	Total
Waste quantity landfilled	638,109	108,292	221,494	65,596	56,013	555,926	346,619	1,992,049
Household waste landfilled	279,833	55,214	145,563	46,430	46,430	404,064	277,323	1,254,857
Commercial waste landfilled	358,276	53,078	75,931	19,167	9,584	151,862	69,296	737,194
Waste quantity recovered	166,305	42,939	15,932	3,961	4,060	22,233	50,124	305,554
Household waste recovered	22,229	22,614	925	2,297	4,060	19,846	2,915	74,886
Commercial waste recovered	144,076	20,325	15,007	1,664	0	2,386	47,209	230,667
Total Waste Recovered (%)	20.7	28.4	6.7	5.7	6.8	3.8	12.6	13.3
Packaging quantity disposed	291,560	64,118	186,033	54,679	2,486	7,372*	45,404	651,652
Packaging quantity recovered	88,649	41,156	20,447	29,083	0	41,254*	678	221,267
Total Packaging Recovered (%)	23.3	39.1	9.9	34.7	0.0	84.8	1.5	25.3

* Wood

Source: Environmental Protection Agency

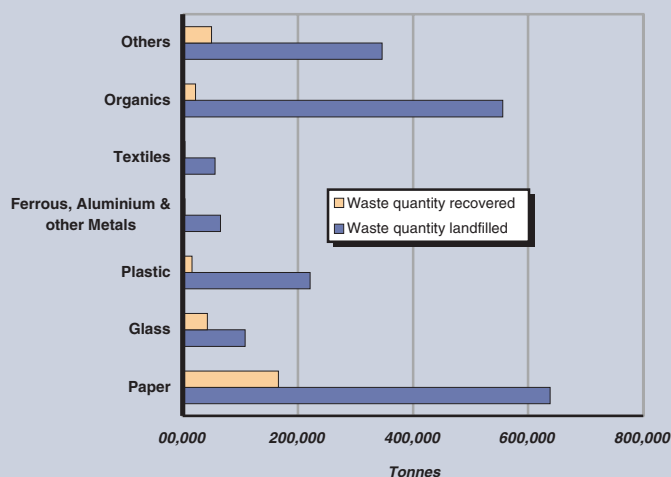
Disposal and recovery of household and commercial waste in 2001

Table 18.13 Rainfall, 2001

Station	Total	% of Average	Most in a day	
			Amount	Date
	<i>mm</i>		<i>mm</i>	
Shannon Airport	793.5	85	19.9	05 October
Cork Airport	1,077.3	91	65.5	17 July
Malin Head	856.7	80	27.4	10 July
Dublin Airport	628.9	n/a	33.4	07 October
Casement Aerodrome	581.1	81	26.2	07 October
Valentia Observatory	1,253.4	87	35.0	06 March
Kilkenny	783.5	95	24.9	14 August
Belmullet	990.5	86	27.2	03 December
Connacht Airport	1,081.2	n/a	27.4	06 October
Clones	731.0	79	20.8	08 August
Birr	664.4	83	23.2	14 August
Mullingar	763.6	82	24.1	06 June
Rosslare	869.1	99	46.6	07 October

Source: Met Éireann

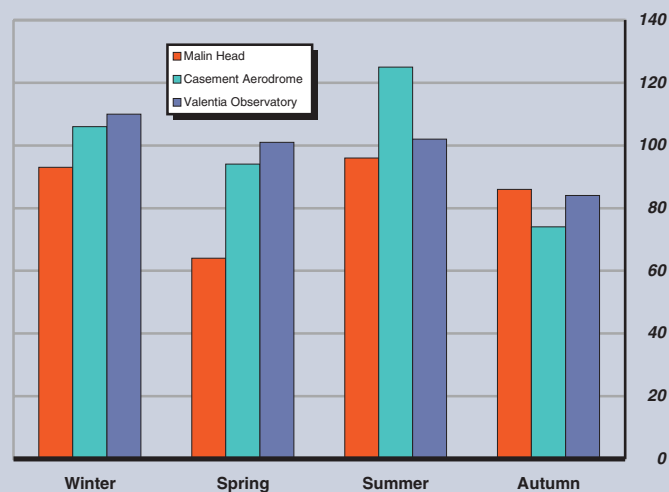
Percentage of normal rainfall, 2001

Table 18.14 Temperature, 2001

Station	Daily Mean	Difference from average ¹	Extremes	
			Highest	Lowest
Shannon Airport	10.9	0.8	26.0	-5.4
Cork Airport	10.3	0.8	23.8	-4.0
Malin Head	9.7	0.4	22.3	-2.5
Dublin Airport	9.5	n/a	26.9	-7.9
Casement Aerodrome	9.6	0.3	26.6	-9.0
Valentia Observatory	10.8	0.4	23.2	-4.0
Kilkenny	9.8	0.5	26.6	-7.4
Belmullet	10.3	0.7	23.1	-4.8
Connacht Airport	8.5	n/a	22.1	-3.8
Clones	9.3	0.5	25.4	-5.4
Birr	9.8	0.5	25.4	-7.8
Mullingar	9.4	0.6	25.5	-8.0
Rosslare	10.8	0.7	23.7	-1.4

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

TABLE 18.14

Difference from normal mean temperature, 2001

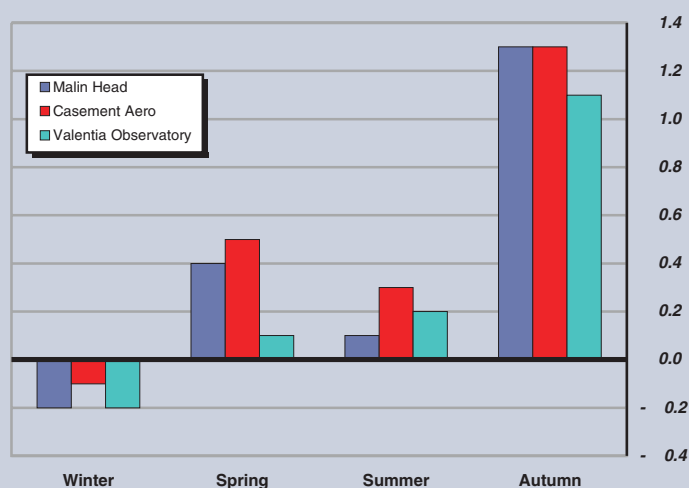


Table 18.15 Sunshine, 2001

Station	Daily Mean	% of average	Most in a day	
			Amount	Date
	<i>hours</i>		<i>hours</i>	
Shannon Airport	3.98	114	14.5	23 May
Cork Airport	4.66	123	15.0	01 July
Malin Head	3.76	112	14.5	07 May
Dublin Airport	4.21	108	14.7	23 May
Casement Aerodrome	4.07	112	14.5	23 May
Valentia Observatory	4.07	120	14.8	03 June
Kilkenny	4.04	115	14.0	07 May
Belmullet	3.95	113	14.8	23 May
Connacht Airport	3.52	n/a	15.0	23 May
Clones	3.70	116	14.9	23 May
Birr	3.55	106	14.0	23 May
Mullingar	4.04	115	14.4	23 May
Rosslare	4.84	112	14.8	01 July

Source: Met Éireann

TABLE 18.15

Percentage of normal sunshine, 2001

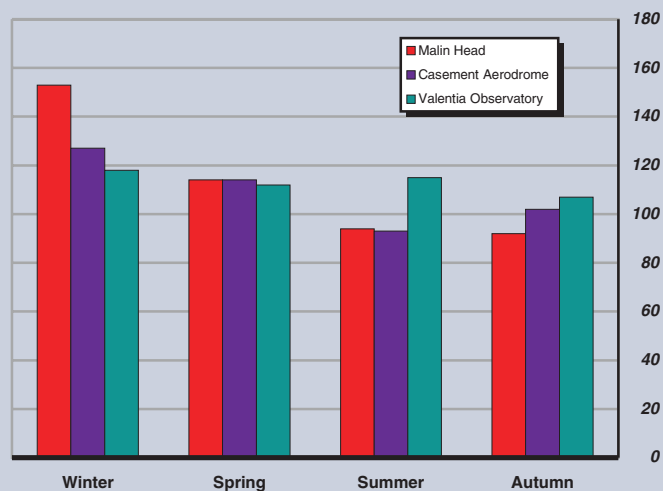


Table 18.16 Number of days in 2001 with various weather conditions*Number of days*

Station	Rain	Snow	Air frost	Hail	Thunder	Fog	Gale gusts
Shannon Airport	213	3	28	4	3	35	40
Cork Airport	217	7	17	5	5	109	67
Malin Head	247	18	10	31	3	11	168
Dublin Airport	231	11	50	8	3	41	61
Casement Aerodrome	201	9	52	6	8	25	57
Valentia Observatory	256	3	12	16	8	20	62
Kilkenny	213	n/a	59	n/a	n/a	n/a	23
Belmullet	259	12	16	41	2	17	107
Connacht Airport	271	27	50	11	0	164	59
Clones	242	n/a	55	n/a	n/a	n/a	36
Birr	216	n/a	51	n/a	n/a	n/a	25
Mullingar	228	n/a	56	n/a	n/a	n/a	20
Rosslare	195	3	5	5	6	46	84

*Source: Met Éireann***TABLE 18.16**

