

HMSO

THE BRITISH SURVEY OF

Fertiliser Practice

FERTILISER USE ON FARM CROPS
FOR CROP YEAR 1995



THE SCOTTISH OFFICE
Agriculture and Fisheries Department



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Further statistical analyses of the survey results are also available. For details and costs please contact:

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FOREWORD

The British Survey of Fertiliser Practice provides information on fertiliser use on the major crops and grass grown in mainland Britain.

The Survey is organised and funded jointly by the Fertiliser Manufacturers' Association (FMA), the Ministry of Agriculture, Fisheries and Food (MAFF) the Scottish Office Agriculture, Environment and Fisheries Department (SOAEFD). The Survey has the full support of the Farmers' Unions in England, Scotland and Wales.

The Survey is carried out annually and based upon returns from a sample of approximately 1500 farms, a new sample being chosen each year. The survey design, statistical analysis and much of the reporting on results for the 1995 Survey were carried out at Edinburgh University Data Library; the farm interviews were undertaken by Produce Studies Ltd.

The organisers gratefully acknowledge the cooperation of all farmers taking part in the Survey.

Fertiliser Manufacturers' Association
Ministry of Agriculture, Fisheries and Food
Scottish Office Agriculture, Environment and Fisheries Department

April 1996

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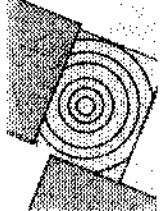


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MAIN POINTS FROM THE 1995 BRITISH SURVEY OF FERTILISER PRACTICE



The Survey estimates for Great Britain in 1995 show:

- Overall nitrogen use rose by 1 kg/ha over 1994 on both tillage crops and grassland.
- Small reductions in the use of phosphate and potash on tillage crops since 1994.

The estimates for England and Wales in 1995 show:

- A further recovery in total nitrogen rates, which increased by 2 kg/ha on both tillage crops and grass.
- Total nitrogen rates rose on winter wheat and oilseed rape, due to greater use of straight nitrogen, but decreased on potatoes and sugar beet, mainly because less compound nitrogen was applied.
- Total nitrogen use increased on both cut and grazed grassland, mostly as a result of changes in straight nitrogen use.
- Although overall rates of phosphate and potash decreased slightly on both tillage crops and grass, the longer term trends in annual use of these nutrients remain relatively stable.

The estimates for Scotland in 1995 indicate:

- A large increase of 12 kg/ha in total nitrogen rate on tillage crops to 140 kg/ha, the highest recorded estimate from this survey, due to increases in the nitrogen rates for oilseed rape, winter wheat and spring barley.
- Overall nitrogen use on grassland rose by 3 kg/ha, caused mainly by increased use of compound nitrogen on both cut and grazed grass, but the longer term pattern since 1989 remains fairly static.
- Slight decreases in phosphate and potash use on tillage crops and small increases on grass, but little change in the longer term trends.

SECTION A – THE BRITISH SURVEY OF FERTILISER PRACTICE



1 – Introduction

The main purpose of the Survey is to estimate, for a range of crops and nutrients, the average rate of fertiliser and lime application used annually in agricultural production. The Survey is used by the British fertiliser industry, by Government and by the wider agricultural community. It is the principal source of information on rates of field application and on fertiliser use. The Survey also serves an important role, when used in conjunction with the estimates of crop area from the annual Agricultural Census, of enabling the tonnage of fertiliser used annually to be estimated.

Rates of fertiliser application for 1995 are reported in detail in Section D. The Tables are grouped and referenced by geographic coverage: Britain (GB), England and Wales (EW) and Scotland (SC). There are tables covering the major crop groups, grassland, product types, and farm types. There are separate tables for total use and for 'straight' and 'compound' products. For example, Table EW 1.2 contains information on the application of straight nitrogen, phosphate and potash in England and Wales for major crops and grassland.

HISTORY

The British Survey of Fertiliser Practice (BSFP) has its origins in surveys begun during wartime in 1942 under Dr Frank Yates, conducted thereafter as the Survey of Fertiliser Practice for England and Wales. The survey was re-designed in 1969 as an annual survey to monitor changes in the pattern of fertiliser use, and the methodology was extended to Scotland in 1983. In 1992 responsibility for the management and design of the survey passed from Rothamsted Experimental Station to a research services team led by the Data Library at the University of Edinburgh - see Burnhill, Chalmers and Fairgrieve (1995)[†]. Publications with information on past survey results and trends include those by Chalmers, Kershaw and Leech (1990), Church and Lewis (1977) and Yates and Boyd (1965)[‡].

In earlier years the Surveys for England and Wales and for Scotland were run in parallel, with separate Reports of their findings. The convention adopted since 1992 is to compile summary tables of British fertiliser practice into a single report, combining the equivalent tables for England and Wales and for Scotland.

TRENDS

Commentary on change is set out in Section B. Recent changes in agricultural policies and financing have been affecting fertiliser practice and we wish to provide evidence for others to use in their investigations. We have included summary tables on both the average field rates of nutrient fertiliser application in order to show changes in farmers' fertiliser practice, and the overall rates of application, to allow estimates of total tonnage applied.

†

Burnhill, P M, Chalmers A G & Fairgrieve, J (1995) *The British Survey of Fertiliser Practice: fertiliser use on farm crops 1994*, HMSO, Edinburgh, 1995 ISBN 0 11495304X (£25)

Chalmers, A G, Kershaw, C D & Leech, P K (1990) 'Fertiliser use on farm crops in Great Britain: results from the Survey of Fertiliser Practice, 1969-88' *Outlook on Agriculture* 19 pp 269-278

Church, B M & Lewis, D A (1977) 'Fertiliser use on farm crops, England & Wales: information from the Survey of Fertiliser Practice, 1942-1976' *Outlook on Agriculture* 9 pp 186-193

Yates, F & Boyd D A (1965) 'Two decades of Surveys of Fertiliser Practice' *Outlook on Agriculture* 4 pp 203-21

SAMPLING

The 1995 British Survey of Fertiliser Practice involved the random selection of a nationally representative sample of 1,451 farm holdings in Great Britain (1,200 from England and Wales and 251 from Scotland). As part of the selection process, farms with less than 20 hectares of crops and grass were excluded from the survey and the remainder were stratified according to four size groups and five farm type groups (three for England and Wales and two for Scotland). This produced twenty stratification cells in all, the number of farm holdings sampled within each varying in proportion to the total area of crops and grass.

Further details of sampling including estimates of sampling error are given in Section C (Sample Methodology and Sampling Variation).

FIELDWORK

The survey was carried out by personal interviews with farmers and farm managers, recording information on fertiliser use during the 1994-95 growing season.

CONFIDENTIALITY

Throughout the administration of the survey, strict safeguards were applied to ensure accuracy and the confidentiality of information relating to individual farms. The Data Library at the University ensures that none outside the Survey team may identify individual farm data.

2 – Definitions

1. For the purpose of the Survey, the term **Britain** is used to cover mainland Britain, Anglesey and the Isle of Wight.
2. The **survey year** ran from 1 October 1994 to 30 September 1995 corresponding to the 1995 growing year or the post-1994 harvest year. The recording period for fertiliser application varied for different crop and grass groups.
3. For the purposes of this survey, a **field** is defined as any single area of land measuring more than 0.2 hectares (i.e. half an acre) which has had a uniform cropping and fertiliser history since October 1994. Two areas within the same natural boundary receiving different treatments (crops or fertilisers) were recorded separately. Agricultural land which had been set aside under the Arable Area Payment Scheme was recorded but was not included in analyses unless used to grow an industrial crop. Fallow land other than set aside was always recorded in the survey.
4. In the report **tillage** is defined as all crops except grass, forestry and glasshouse crops. **Grass** refers to all forms of grass which may be grazed, conserved or grown for seed production. Rough grazing is excluded.
5. The abbreviation **N** is used for Nitrogen; P_2O_5 or **P** for Phosphate; K_2O or **K** for Potash; **FYM** for farmyard manure. The phrase **total use** includes both Straight and Compound products.
6. For each fertiliser-nutrient, the **overall application rate** is calculated by the ratio of the total quantity of nutrient used, in kilograms (kg), to the total extent of crop area, in hectares (ha). When combined with knowledge of the national total crop area, these overall application rates provide the means to estimate the national tonnage of fertiliser used during the survey year.
7. The **average field rate** (of application) is the rate of nutrient used by farmers on those fields which received any dressing of the nutrient. Crop area without any application of the nutrient is excluded from the calculation of the average field rates of application. These field-specific application rates provide direct evidence of the level and variation in farming practice.
8. The term **dressing cover** is used to describe the proportion of crop area treated with any dressing of the fertiliser nutrient in question, and is stated as a percentage.

Any change in an overall application rate is due to a change in the (actual) field rate of application used on farms or to a change in the dressing cover, or due to changes in both. Arithmetically, the overall rate is equivalent to the sum obtained by multiplying the average field rate of application by the proportion of crop area that receives any nutrient dressing. The overall application rate of a nutrient on a crop by definition cannot be greater than the average field rate of application.

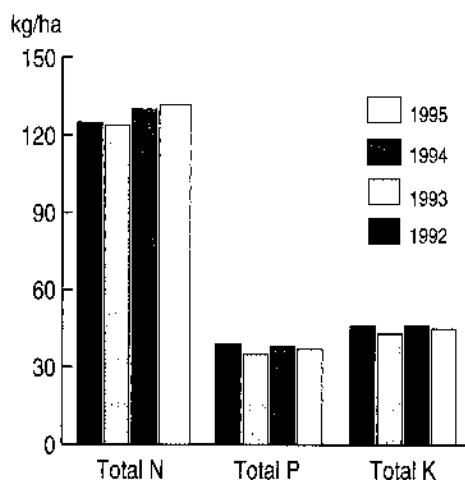


SECTION B - COMMENTARY ON THE RESULTS FROM THE 1995 BSFP

1 - Overall fertiliser usage

GREAT BRITAIN

Figure B1.1 Overall fertiliser usage on all crops & grass, Great Britain 1992-1995



The overall rate of total nitrogen application in 1995 rose on both tillage and grass in Britain. It increased by 2kg/ha to reach 132kg/ha on all crops and grass (Table B1.1 and Figure B1.1). Overall rates of phosphate (P_2O_5) and potash (K_2O) showed little change from those recorded in 1994.

Table B1.1 Overall fertiliser usage, Great Britain 1992 - 1995 (kg/ha)

Total nitrogen			
	tillage	grass	all crops and grass
1992	146	106	125
1993	137	112	124
1994	147	116	130
1995	149	118	132

Straight nitrogen			Compound nitrogen		
tillage	grass	all crops and grass	tillage	grass	all crops and grass
124	51	87	1992	22	39
113	56	82	1993	24	41
120	51	84	1994	26	47
125	52	85	1995	25	47

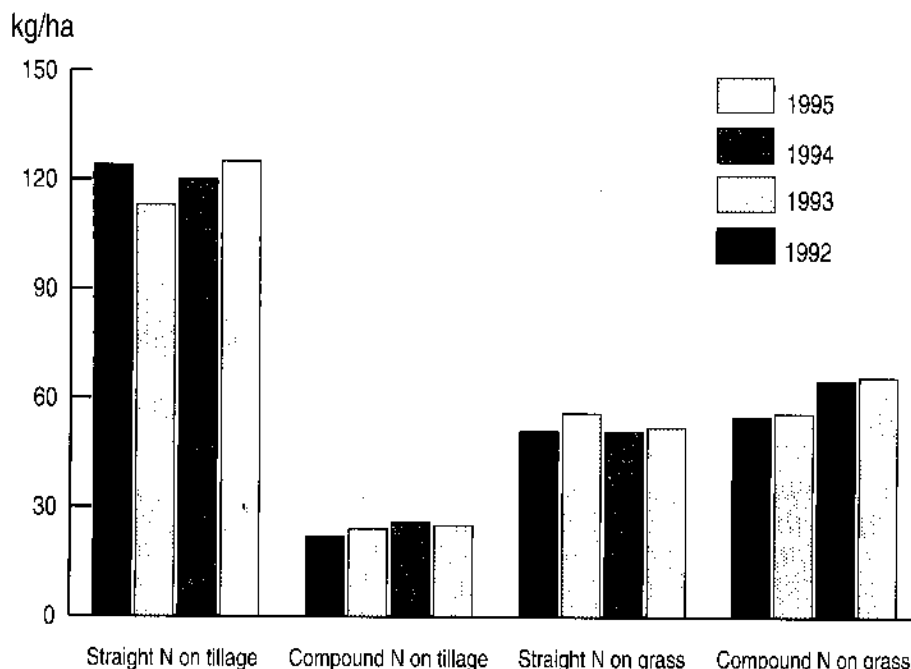
Total phosphate			Total potash		
tillage	grass	all crops and grass	tillage	grass	all crops and grass
56	22	39	1992	64	46
52	21	35	1993	60	43
53	24	38	1994	63	46
53	24	37	1995	61	45

NITROGEN

The small but significant increase in total nitrogen use on tillage crops in 1995 reflected the rise in the use of straight nitrogen, up by 5 kg/ha (Table B1.1 and Figure 1.2). The overall rate of total nitrogen is the highest since combined data for Britain was first reported in 1992.

There was also a small (2 kg/ha) but significant rise in total nitrogen rate on grass in 1995, reflecting increases in application rates of both compound nitrogen and straight nitrogen. The overall application rate for nitrogen on grass has increased substantially in Britain since the low figure recorded for nitrogen use on grassland in England and Wales in 1992.

Figure B1.2 Nitrogen usage in Britain 1992-1995



PHOSPHATE AND POTASH

The overall rate of phosphate application was unchanged on both tillage and grassland in 1995; a small decrease (2 kg/ha) was recorded in potash use on tillage crops.

GENERAL TRENDS IN ENGLAND AND WALES AND IN SCOTLAND

1992 was the first year that data were collected and processed on a GB basis; it is therefore easier to report more detailed changes in the longer term trends separately for England and Wales and for Scotland. Overall fertiliser rates from 1990 to 1995 are shown in Table B1.2, and illustrated in Figures B1.3 - B1.5 (England and Wales) and B1.6 - B1.8 (Scotland).

Table B1.2 Overall fertiliser usage 1990 - 1995 (kg/ha)

TOTAL NITROGEN						
	<i>tillage</i>		<i>grass</i>		<i>all crops and grass</i>	
	E&W	Scot	E&W	Scot	E&W	Scot
1990	149	131	132	116	141	122
1991	154	128	133	111	143	117
1992	147	125	104	111	126	116
1993	137	130	112	114	124	119
1994	149	128	117	111	133	118
1995	151	140	119	114	134	124

STRAIGHT NITROGEN							COMPOUND NITROGEN						
	<i>tillage</i>		<i>grass</i>		<i>all crops and grass</i>			<i>tillage</i>		<i>grass</i>		<i>all crops and grass</i>	
	E&W	Scot	E&W	Scot	E&W	Scot		E&W	Scot	E&W	Scot	E&W	Scot
131	82	68	38	100	55	1990	18	49	64	78	41	67	
138	75	69	36	104	51	1991	16	53	64	75	39	67	
132	74	55	36	94	49	1992	15	51	49	75	32	67	
118	80	63	33	89	49	1993	19	50	49	81	35	70	
127	72	54	37	90	50	1994	22	56	63	74	43	68	
130	90	57	33	92	54	1995	20	51	63	81	42	70	

TOTAL PHOSPHATE							TOTAL POTASH						
	<i>tillage</i>		<i>grass</i>		<i>all crops and grass</i>			<i>tillage</i>		<i>grass</i>		<i>all crops and grass</i>	
	E&W	Scot	E&W	Scot	E&W	Scot		E&W	Scot	E&W	Scot	E&W	Scot
51	68	24	28	38	43	1990	62	74	36	35	49	50	
53	65	23	24	38	40	1991	62	72	35	31	49	47	
51	67	19	30	35	43	1992	59	72	26	34	43	48	
49	65	19	28	33	41	1993	58	72	27	34	42	47	
51	69	23	29	37	43	1994	62	74	31	30	46	46	
50	68	22	31	36	45	1995	59	72	30	34	44	48	

ENGLAND AND WALES

In 1995, nitrogen use in England and Wales increased on both tillage crops (up by 1%) and on grass (up by 2%), reflecting increases in application rates of straight nitrogen (up by 2% and 5%, respectively). There was a general fall in both phosphate and potash use. The longer term trends in nitrogen, phosphate and potash use since 1970 are illustrated in Figures B1.3 to B1.5.

NITROGEN

The small increase in total nitrogen use on tillage crops in 1995 confirmed the recovery in nitrogen usage observed in the previous season. This increase was the net result of more straight nitrogen use, offset by a fall in the overall rate of compound nitrogen. Overall use of compound nitrogen had shown a general recovery in the previous two years following the long steady decline in the years up until 1992.

The further recovery in nitrogen use on tillage crops in 1995 reflected increases in the overall rate of straight nitrogen for Winter wheat (+7kg/ha) and oilseed rape (+4kg/ha), offset by a fall in the overall rate on both sugar beet (-4 kg/ha) and maincrop potatoes (-17 kg/ha). The reduction in set-aside requirement from 15 to 12%, brought larger areas of land back into agricultural production for the main arable crops, and this would also have contributed to the change in overall rate for tillage crops during 1995 (Figure B2.1 - discussed later).

The rise in total nitrogen use on grass in 1995, due to an increase in straight nitrogen, continued the recovery observed in England and Wales since the low figure recorded in 1992. However, overall use is still significantly less than the general level for the 1989 - 1991 period. The overall rate of compound nitrogen on grass remained unchanged from 1994.

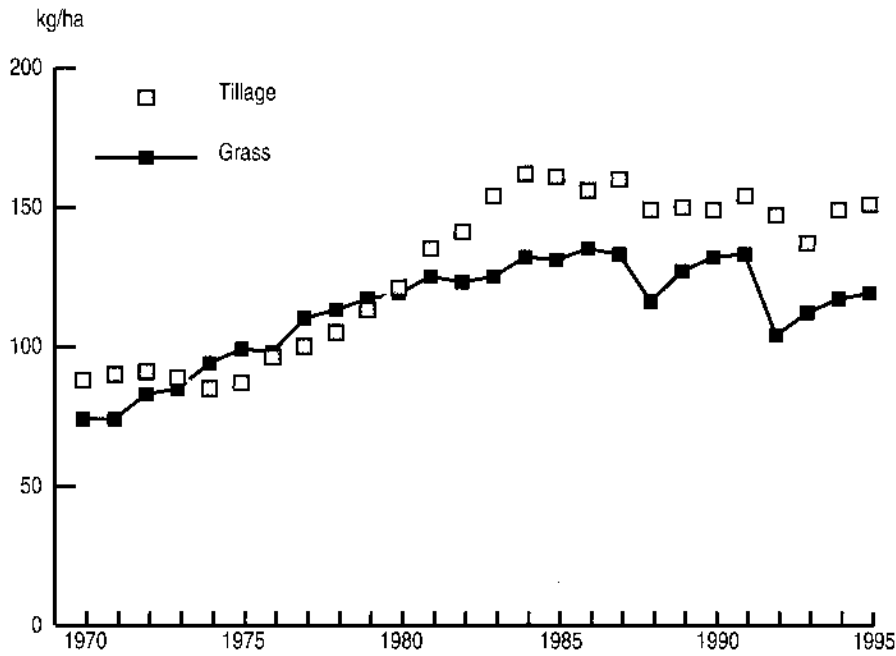
As a net result, the total nitrogen rate on all crops and grass in England and Wales rose by 1 kg/ha to 134 kg/ha in 1995.

LONGER TERM TRENDS

The longer term trends in total nitrogen use (Figure B1.3) show that rates on both tillage crops and grassland reached a plateau in the mid-1980s, after rising steadily over the previous ten to fifteen years. The subsequent pattern of use on tillage crops suggests a gradual decline from the mid-1980s, but with signs of recovery during the two last years. The trends for grassland are broadly similar. However, until the mid-1980s, nitrogen use rose more slowly on grassland than on tillage; the subsequent trend is less clear because of the large drop in rate in 1988, and in 1992 (grassland) and 1993 (tillage).

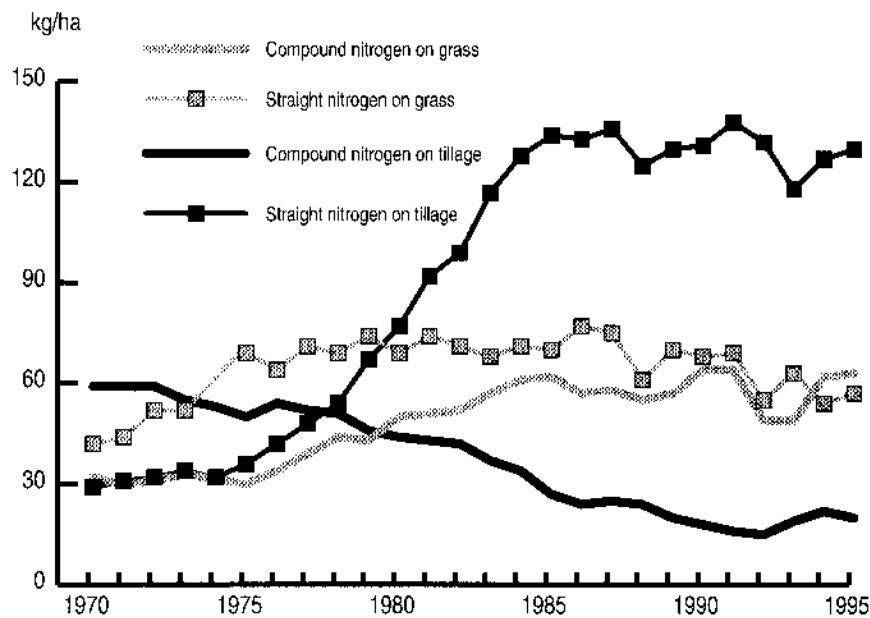
The longer term trends for compound and straight N are illustrated in Figure B1.4. Overall usage of compound N on grass has become more variable in recent years. A long term decline of straight N on grass is evident. It is not clear whether there is any such trend for straight N on tillage crops.

Figure B1.3 Overall use of total nitrogen in England and Wales 1970-1995



Straight nitrogen use on tillage crops (Figure B 1.4) has followed a similar pattern to total nitrogen rates since 1970: there were appreciable annual increases until the mid-1980s, and the falls in 1988 and 1993 were then followed by periods of recovery. In contrast, the annual changes in overall use of straight nitrogen on grass suggest some reversion of the gradual increase over the last two decades, despite annual fluctuations. The trends in compound nitrogen use since 1970 (Figure B1.4) suggest a long term decline on tillage crops until 1992, followed by a slight upturn. The general rise in the overall rate of compound nitrogen on grass until the mid-1980s has been replaced by more recent annual fluctuations.

Figure B1.4 Overall use of straight and compound nitrogen in England and Wales 1970-1995

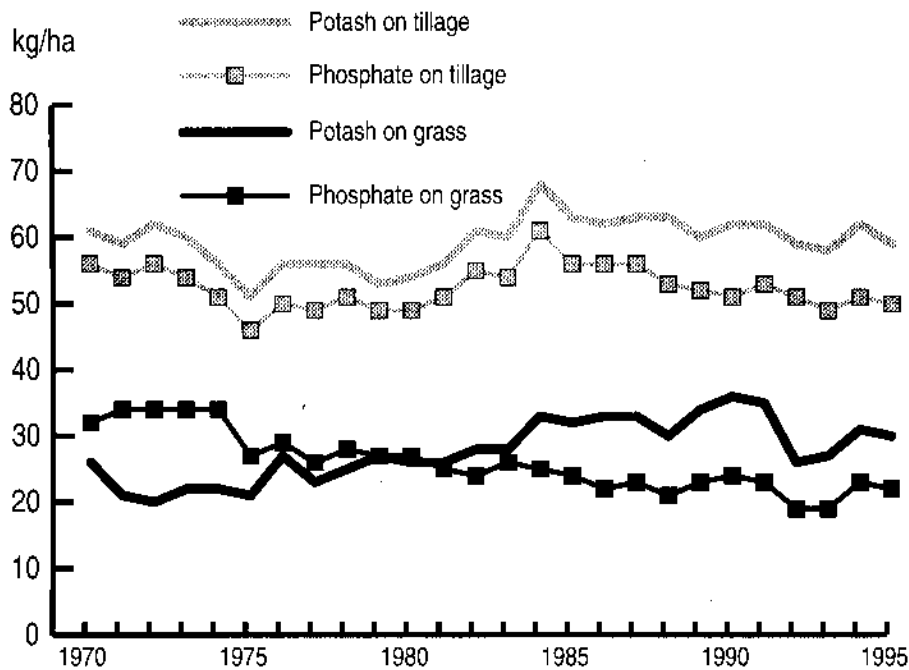


PHOSPHATE AND POTASH

In 1995 overall use of phosphate and potash on tillage crops in England and Wales dropped by 1 kg/ha and 2 kg/ha respectively, partly due to a large decrease in the rates of these nutrients on sugar beet. There was also a small decrease in the application rates of phosphate and potash on grass in 1995.

Annual phosphate and potash use on tillage crops and grass since 1970 do not suggest any definite changes, apart from a gradual decline in the use of phosphate on grass (Figure B1.5).

Figure B1.5 Overall use of phosphate and potash in England and Wales 1970-1995



SCOTLAND

Total nitrogen use rose substantially on tillage crops in 1995 (up by 9%), mostly due to increased use of straight nitrogen on cereals and oilseed rape. Nitrogen use also increased on grass (up 3%) but this was a net result of increased use of compound nitrogen and a decrease in the use of straight nitrogen. Phosphate and potash use fell slightly on tillage crops but increased on grass. Annual usage since 1983, the first year in which this Survey collected data for Scotland, is shown in Figures B1.6 to B1.8.

NITROGEN

The overall total nitrogen rate for tillage crops increased substantially in Scotland in 1995, rising by 12 kg/ha to 140 kg/ha, the highest level recorded by this Survey for Scotland (Figure B1.6). Although straight nitrogen use increased markedly, the overall rate of compound nitrogen dropped back to the 1990-93 levels for tillage crops (Figure B1.7).

Overall use of nitrogen on grass increased by 3 kg/ha in 1995, although there is little evidence of any real, longer term change (Figure B1.6).

The overall nitrogen rate for all crops and grass increased by 6 kg/ha to 124 kg/ha in 1995.

Figure B1.6 Overall use of nitrogen in Scotland 1983-1995

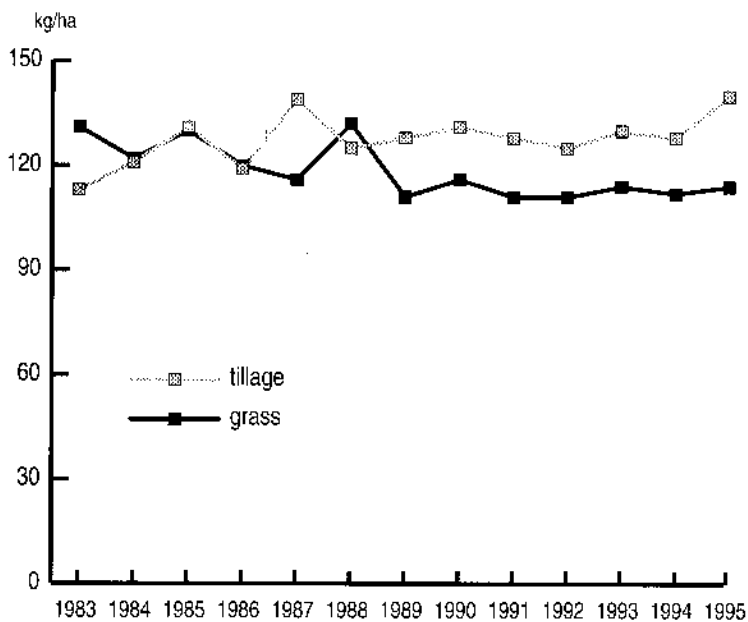
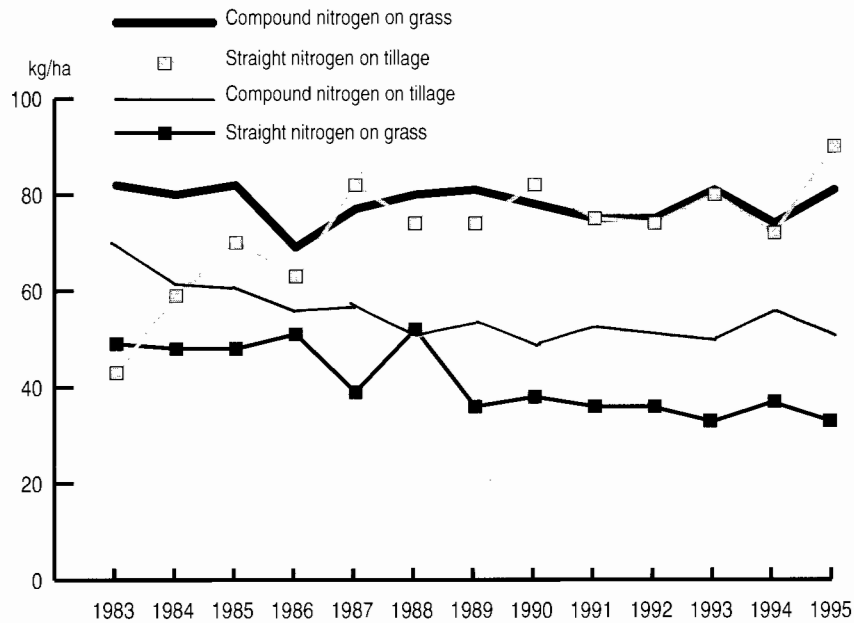


Figure B1.7 Overall use of straight and compound nitrogen, Scotland 1983-1995



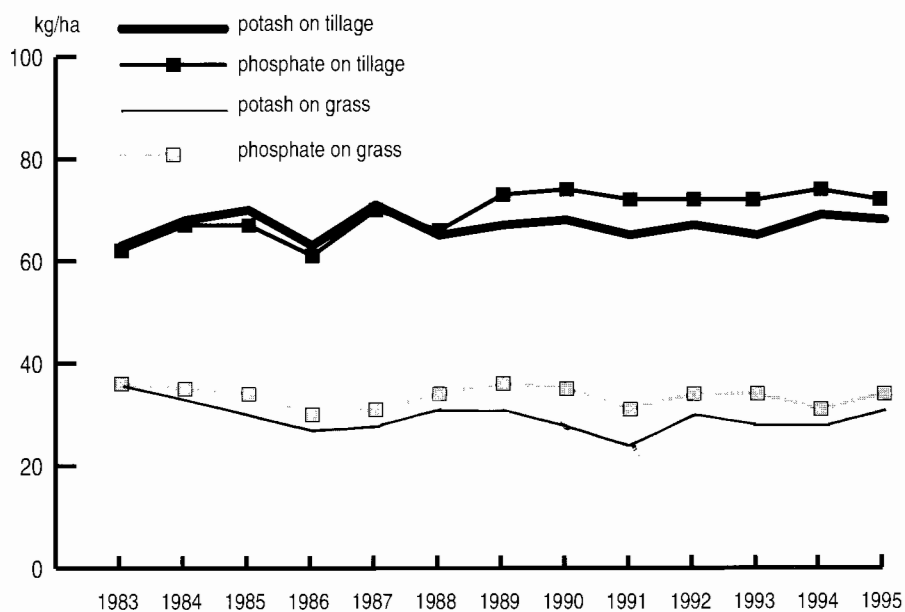
PHOSPHATE AND POTASH

Overall rates of phosphate and potash were 1-2 kg/ha lower on tillage crops in 1995, but these apparent changes were well within the range of annual fluctuations in these nutrient rates (Figure B1.8).

The overall rates of phosphate and potash on grass increased by 2 and 4 kg/ha respectively but, as was the case for tillage crops, these changes are not significant.

Overall rates of phosphate and potash, as shown in Figure B1.8, have been relatively stable since 1983.

Figure B1.8 Overall use of phosphate and potash, Scotland 1983-1995



2 – Fertiliser use on major tillage crops

Estimates of overall fertiliser use for the major tillage crops from 1990 to 1995 are shown in Table B2.1. Equivalent estimates for average field rates of application are given in Table B2.2. Detailed statistics are presented in Section D.

The reader should note that small apparent changes in fertiliser use on individual crops should be treated with some caution as these estimates are based on a smaller number of farms and fields than those for the summary estimates for all tillage crops. Information on 'sampling errors', which help in judging whether apparent changes may be real or attributable to sampling variation alone, is given in Section C.

The principal purpose of this report is to present a record of the average fertiliser application for the year and of year-to-year changes. An explanation is sometimes offered for the observed change in the overall rate of application, itself a product of the rate of application actually used (the average field application) and the proportion of the crop area which receives a fertiliser dressing (the dressing cover). For example, some changes are due to shifts in the intended market end-use or the time of sowing (Autumn or Spring) as this influences nitrogen use on cereals or oilseed rape.

CROPPING PATTERNS

Recent changes in the general cropping patterns for England and Wales and for Scotland are summarised in Figures B2.1 and B2.2 respectively. These figures do not show the changes that have been taking place in recent years in the use of set-aside, which has been included in the past along with 'other tillage'.

Figure B2.1 Cropping areas in England and Wales 1988 - 1995

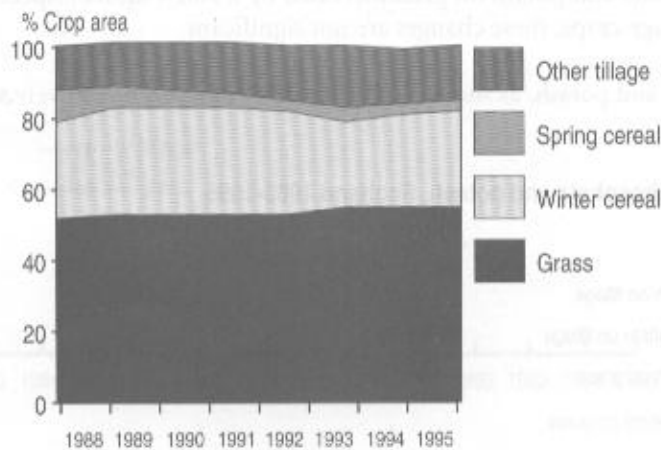


Figure B2.2 Cropping areas in Scotland 1988 - 1995

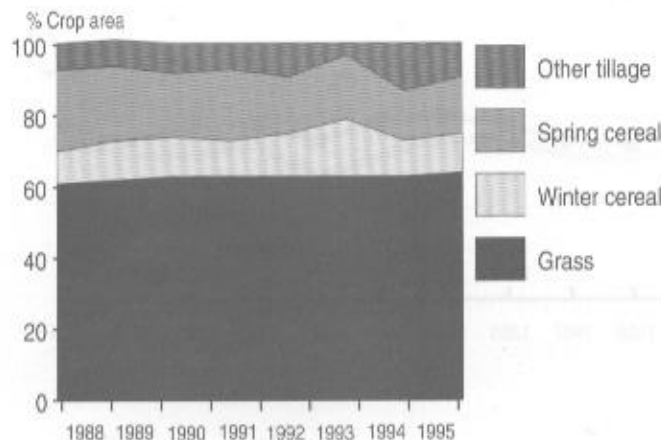


Table B2.1 Overall fertiliser usage on major tillage crops 1990-1995 (kg/ha)

TOTAL NITROGEN

	<i>winter wheat</i>		<i>spring barley</i>		<i>winter barley</i>		<i>maincrop potatoes</i>		<i>oilseed rape</i>		<i>sugar beet</i>
	E&W	Scot	E&W	Scot	E&W	Scot	E&W	Scot	E&W	Scot	E&W
1990	182	200	92	91	137	174	190	166	227	214	121
1991	186	202	89	89	138	179	191	148	227	227	122
1992	184	197	88	92	139	165	181	152	198	189	115
1993	184	193	90	94	133	172	197	155	179	182	110
1994	185	200	101	89	141	166	200	161	183	159	122
1995	192	208	100	97	141	178	183	152	187	190	118

STRAIGHT NITROGEN

	<i>winter wheat</i>		<i>spring barley</i>		<i>winter barley</i>		<i>maincrop potatoes</i>		<i>oilseed rape</i>		<i>sugar beet</i>
	E&W	Scot	E&W	Scot	E&W	Scot	E&W	Scot	E&W	Scot	E&W
1990	174	182	49	28	124	158	33	0	210	189	93
1991	180	185	48	21	130	156	31	0	212	192	93
1992	178	176	44	25	128	142	31	2	185	150	88
1993	173	174	52	32	121	150	36	4	164	145	86
1994	170	174	68	21	124	136	50	2	164	114	92
1995	176	182	57	34	128	154	41	5	168	152	96

COMPOUND NITROGEN

	<i>winter wheat</i>		<i>spring barley</i>		<i>winter barley</i>		<i>maincrop potatoes</i>		<i>oilseed rape</i>		<i>sugar beet</i>
	E&W	Scot	E&W	Scot	E&W	Scot	E&W	Scot	E&W	Scot	E&W
1990	8	17	44	63	11	16	157	166	17	24	29
1991	6	17	41	68	8	24	160	148	15	36	28
1992	6	21	45	68	11	23	150	149	13	39	27
1993	11	20	39	62	12	22	160	152	15	38	24
1994	15	27	32	68	17	31	150	159	19	44	30
1995	15	25	43	63	13	24	143	145	20	38	22

TOTAL PHOSPHATE

	<i>winter wheat</i>		<i>spring barley</i>		<i>winter barley</i>		<i>maincrop potatoes</i>		<i>oilseed rape</i>		<i>sugar beet</i>
	E&W	Scot	E&W	Scot	E&W	Scot	E&W	Scot	E&W	Scot	E&W
1990	49	73	35	55	51	69	206	169	51	61	61
1991	51	67	35	52	52	76	212	144	59	65	54
1992	50	76	35	53	54	81	188	182	53	63	59
1993	50	68	36	55	50	74	190	163	51	55	58
1994	50	81	32	53	50	74	196	184	47	62	57
1995	50	72	37	55	51	77	187	180	47	57	51

TOTAL POTASH

	<i>winter wheat</i>		<i>spring barley</i>		<i>winter barley</i>		<i>maincrop potatoes</i>		<i>oilseed rape</i>		<i>sugar beet</i>
	E&W	Scot	E&W	Scot	E&W	Scot	E&W	Scot	E&W	Scot	E&W
1990	50	82	45	57	61	77	267	238	55	71	141
1991	51	80	46	56	61	90	277	193	54	76	141
1992	50	84	43	61	62	87	264	222	53	69	136
1993	46	72	48	61	59	79	271	218	46	63	139
1994	51	84	45	60	61	75	259	227	49	64	127
1995	50	75	50	59	62	81	269	207	48	63	111

Table B2.2 Average field rates on major tillage crops 1990-1995 (kg/ha)

TOTAL NITROGEN

	<i>winter wheat</i>		<i>spring barley</i>		<i>winter barley</i>		<i>maincrop potatoes</i>		<i>oilseed rape</i>		<i>sugar beet</i>
	E&W	Scot	E&W	Scot	E&W	Scot	E&W	Scot	E&W	Scot	E&W
1990	184	200	97	92	139	174	193	166	228	220	122
1991	187	202	90	89	139	179	192	162	227	227	127
1992	187	200	90	93	140	165	193	156	199	189	122
1993	185	194	94	94	133	176	203	163	181	182	115
1994	186	201	103	90	142	170	202	169	186	159	127
1995	193	209	101	98	142	181	188	160	190	190	122

STRAIGHT NITROGEN

	<i>winter wheat</i>		<i>spring barley</i>		<i>winter barley</i>		<i>maincrop potatoes</i>		<i>oilseed rape</i>		<i>sugar beet</i>
	E&W	Scot	E&W	Scot	E&W	Scot	E&W	Scot	E&W	Scot	E&W
1990	177	183	86	60	132	158	108	52	212	196	112
1991	182	185	84	60	135	159	102	0	214	192	111
1992	182	183	87	56	135	145	114	86	189	160	107
1993	178	178	87	60	128	158	108	61	172	164	105
1994	175	176	94	51	132	151	124	60	174	142	108
1995	183	187	87	65	134	163	114	47	177	163	113

COMPOUND NITROGEN

	<i>winter wheat</i>		<i>spring barley</i>		<i>winter barley</i>		<i>maincrop potatoes</i>		<i>oilseed rape</i>		<i>sugar beet</i>
	E&W	Scot	E&W	Scot	E&W	Scot	E&W	Scot	E&W	Scot	E&W
1990	39	27	67	66	42	24	173	166	42	36	83
1991	36	33	59	69	42	35	179	162	41	46	99
1992	42	34	63	71	53	34	172	154	40	52	80
1993	49	40	64	67	49	36	178	159	43	50	72
1994	45	35	58	71	47	38	175	168	45	49	86
1995	55	36	66	64	46	32	165	154	50	49	77

TOTAL PHOSPHATE

	<i>winter wheat</i>		<i>spring barley</i>		<i>winter barley</i>		<i>maincrop potatoes</i>		<i>oilseed rape</i>		<i>sugar beet</i>
	E&W	Scot	E&W	Scot	E&W	Scot	E&W	Scot	E&W	Scot	E&W
1990	63	74	44	55	60	74	208	169	62	66	68
1991	67	73	43	53	63	79	216	158	69	69	65
1992	68	78	44	55	64	81	201	187	68	64	77
1993	67	73	44	57	61	76	200	171	65	60	74
1994	67	85	43	54	64	78	211	192	65	65	80
1995	65	80	45	55	62	81	193	191	63	67	70

TOTAL POTASH

	<i>winter wheat</i>		<i>spring barley</i>		<i>winter barley</i>		<i>maincrop potatoes</i>		<i>oilseed rape</i>		<i>sugar beet</i>
	E&W	Scot	E&W	Scot	E&W	Scot	E&W	Scot	E&W	Scot	E&W
1990	69	83	53	57	71	82	270	238	68	76	144
1991	71	83	50	57	74	91	285	211	70	80	145
1992	72	85	50	62	75	87	279	228	73	69	152
1993	69	77	57	62	72	81	284	229	65	68	156
1994	72	88	57	61	76	79	276	238	71	66	144
1995	70	84	58	60	74	83	277	220	68	74	133

ENGLAND AND WALES

Overall nitrogen use in England and Wales rose appreciably on winter wheat (+7 kg/ha) in 1995, and also increased on oilseed rape (+4 kg/ha), both increases were due to increased application rates of straight nitrogen. Overall nitrogen use on spring barley decreased by 1 kg/ha, a net result of changes in straight and compound use. Total nitrogen use on winter barley was unchanged. There was, however, a decrease in the overall rates on maincrop potatoes (-17 kg/ha), due to a significant reduction in both straight and compound nitrogen applications, and on sugar beet (-4 kg/ha), mainly due a drop in the rate of compound nitrogen.

Overall application rates of nitrogen to winter cereals and winter oilseed rape during the 1994-95 autumn and winter period were similar to those in the previous season.

Overall rates of phosphate recovered on spring barley, but fell back on potatoes. There was also a large fall in the application rate on sugar beet. Overall potash use recovered on spring barley and potatoes. There was, however, a decrease in the potash rate on sugar beet.

WINTER WHEAT

Total usage on winter wheat (Table B2.1) increased (by 4%) to the highest level for recent years (192 kg/ha). This was due to a recovery in the use of straight nitrogen, caused by an increase in the percentage of the crop area receiving in excess of 200-250 kg/ha and a decrease in the percentage receiving less than 100 kg/ha of nitrogen (Table B2.9). The Survey results since 1987 suggest a shift in fertiliser practice away from straight to compound products for this crop, possibly as a means of combining an early spring top dressing of nitrogen with annual phosphate and potash 'maintenance' requirements; the average field rate of compound nitrogen having risen from 39 kg/ha in 1990 to 55 kg/ha in 1995.

Nitrogen fertiliser requirements for winter wheat depend on soil type and its nitrogen fertility, expected yield level and intended end use. Extra nitrogen, either as a solid dressing or late foliar urea spray, is often applied to milling varieties to boost grain protein content for breadmaking. As a result, milling winter wheats received on average 14-16 kg/ha nitrogen more than other, mostly feed, varieties in 1994 and 1995, despite their inherently lower yield potential (Table B2.3).

**Table B2.3 Average field application rates of nitrogen on cereals by market use
England and Wales 1994-1995**

	Total Nitrogen kg/ha					
	winter wheat		spring barley		winter barley	
	milling	non milling	malting	non malting	malting	non malting
1994	200	184	100	105	127	148
1995	204	190	99	104	129	149

Crop area estimates from this survey suggest that a fifth of the winter wheat area in England and Wales was grown for milling use in 1995. In comparison, the UK estimate obtained by the Home-Grown Cereals Authority¹ indicated that 16% of the total winter wheat area was planted to Group 1 (ie favoured for breadmaking) varieties.

WINTER BARLEY

The overall rate of total nitrogen for winter barley was unchanged in 1995, following the increase in 1994, although there were changes in both straight and compound nitrogen rates. In 1995 one third of the crop area was grown for malting both in England and Wales, according to estimates from this survey; a similar proportion of the winter barley was also grown for malting in the UK¹.

Smaller rates of fertiliser nitrogen are recommended for malting varieties of barley than for feed types, to reduce the risk of high grain nitrogen contents which would adversely affect some malting processes, although this is less critical for certain types of lager beer production. Overall nitrogen use on malting winter barleys in 1994 and 1995 reflected this difference in crop husbandry requirement, as nitrogen rates were about 20 kg/ha less than for other, non-malting (mostly feed types) in each year (Table B2.3).

SPRING BARLEY

Total nitrogen use on spring barley showed little net change (-1 kg/ha) in 1995; the drop in straight nitrogen use was partially offset by an increase in compound nitrogen. This would seem to confirm the increase to 101 kg/ha in the nitrogen rate observed in 1994, and reflects recent changes in varietal choice and market outlet.

In contrast to the autumn sown crop, average field rates of nitrogen on spring malting barley are only 5 kg/ha less than for other (feed and seed) types of spring barley (Table B2.3). The nitrogen rates reported for malting varieties are, however, similar to recommended levels of 90-100 kg/ha for mineral soil types with low nitrogen residues (Nitrogen Index 0)², whereas average nitrogen use on other (non-malting) spring barleys is well below the typical recommended rates of 125-150 kg/ha nitrogen. Estimates from this survey suggest that about half of the total crop of spring barley area in England and Wales was grown for malting in 1995; the corresponding HGCA estimate for the UK was three quarters, illustrating the importance of the Scottish crop for the malting market.

Table B2.4 Percentage distribution of cereal crop area England and Wales 1994-1995

	Percentage of total cereal crop area						%
	winter wheat		spring barley		winter barley		
	milling	non milling	malting	non malting	malting	non malting	
1994	27	73	48	52	29	71	
1995	22	78	51	49	33	67	

OILSEED RAPE

The overall rate and average field rate of nitrogen on oilseed rape increased by 4 kg/ha in 1995, confirming the small recovery suggested in 1994, after the sharp drop recorded over the previous two years. However, the overall application rates for total and straight nitrogen remain well below the pre-1992 rates. The overall rate (and the average field rate) of compound nitrogen has increased since 1992.

The recent changes in the total nitrogen rate would seem to result from a complex of reasons. The initial fall, in 1992, was attributed to changes in subsidy support to an area-based payment system (via the 1992 transitional Oilseed Scheme) with consequent reductions in commodity prices and, hence, in nitrogen fertiliser recommendations. (In 1993 that Scheme was subsequently included in the Arable Payment Scheme). Spring sown oilseed rape has a smaller fertiliser nitrogen requirement than the autumn sown crop, because of its lower yield potential, and the further drop in nitrogen use in 1993 was associated with an increase in the proportion of the spring sown crop area³.

¹HGCA Weekly Digest, Volume 22, No.14, October 1995

²Fertiliser Recommendations for Agricultural and Horticultural Crops, MAFF Reference Book 209, HMSO London

³Reference: MAFF (1993). 'Survey of oilseed rape production August 1993 - England'. Stats 187/93 Government Statistical Service, Guildford.

As the spring sown crop receives less nitrogen than the autumn sown crop, the decrease in the percentage of the crop that was spring sown in 1994, from 33% to 25%, was a major reason for the small (+4kg/ha) increase in the overall (and average field) rate of total nitrogen that year for oilseed rape. In 1995, the percentage of crop area that was spring sown decreased again¹; to an estimated 16%. This shift in cropping pattern for oilseed rape and increases in rapeseed commodity prices (which raise the economic optimum inputs of fertiliser nitrogen) are suggested as reasons for the increased nitrogen use in 1995. That increase was mostly due to increased straight nitrogen usage. In practice, the percentage of the total oilseed rape crop area receiving a high total nitrogen dressing, of more than 200 kg/ha, rose from 44 % in 1994 to 50 % in 1995 (Table B2.9).

**Table B2.5 Average field application rates of nitrogen on oilseed rape ,
England and Wales 1994-1995**

Total Nitrogen	kg/ha			
	winter sown		spring sown	
	industrial	non industrial	industrial	non industrial
1994	182	218	115	123
1995	209	207	118	120

Table B2.6 Percentage distribution of oilseed rape crop area, England and Wales 1994-1995

	%			
	winter sown		spring sown	
	industrial	non industrial	industrial	non industrial
1994	15	85	25	75
1995	16	84	19	81

Table B2.5 gives a breakdown of nitrogen use for both autumn and spring sown oilseed rape, according to industrial or non-industrial end uses in 1994 and 1995. The Survey indicates that almost all the industrial cropping was on set-aside land.

Overall nitrogen use decreased on non-industrial, but increased on industrial crops of both winter and spring oilseed rape between 1994 and 1995. The lower field rates of nitrogen applied to crops for industrial use in 1994, compared with conventional crops (shown in Table B2.5), reflected price differences for these two markets. In 1995, however, there was little or no difference in average nitrogen inputs for industrial and non-industrial crops. Increases in forward prices for rapeseed may have influenced the rise in nitrogen inputs for industrial oilseed rape crops in 1995, and this change, combined with a shift away from Spring cropping, caused the net increase of 4 kg/ha in the overall nitrogen rate for the total oilseed rape crop.

SUGAR BEET

Overall nitrogen use on Sugar beet dropped in 1995 by 4 kg/ha to 118 kg/ha, related to a large drop in compound nitrogen use which was partly offset by an increase in straight nitrogen. Nitrogen use had declined steadily during the late 1980s, as a result of increasing farmer awareness about the adverse effect of excessive nitrogen input on sugar quality. Estimates since 1989 suggest that the average field rate of total nitrogen may, except for 1993, fluctuate around 125 kg/ha, slightly above recommended levels of nitrogen application for mineral soils.

¹MAFF (1995) 'Survey of oilseed rape production August 1995 and revised August 1994 - England' Stats 199/95, Government Statistics Service York

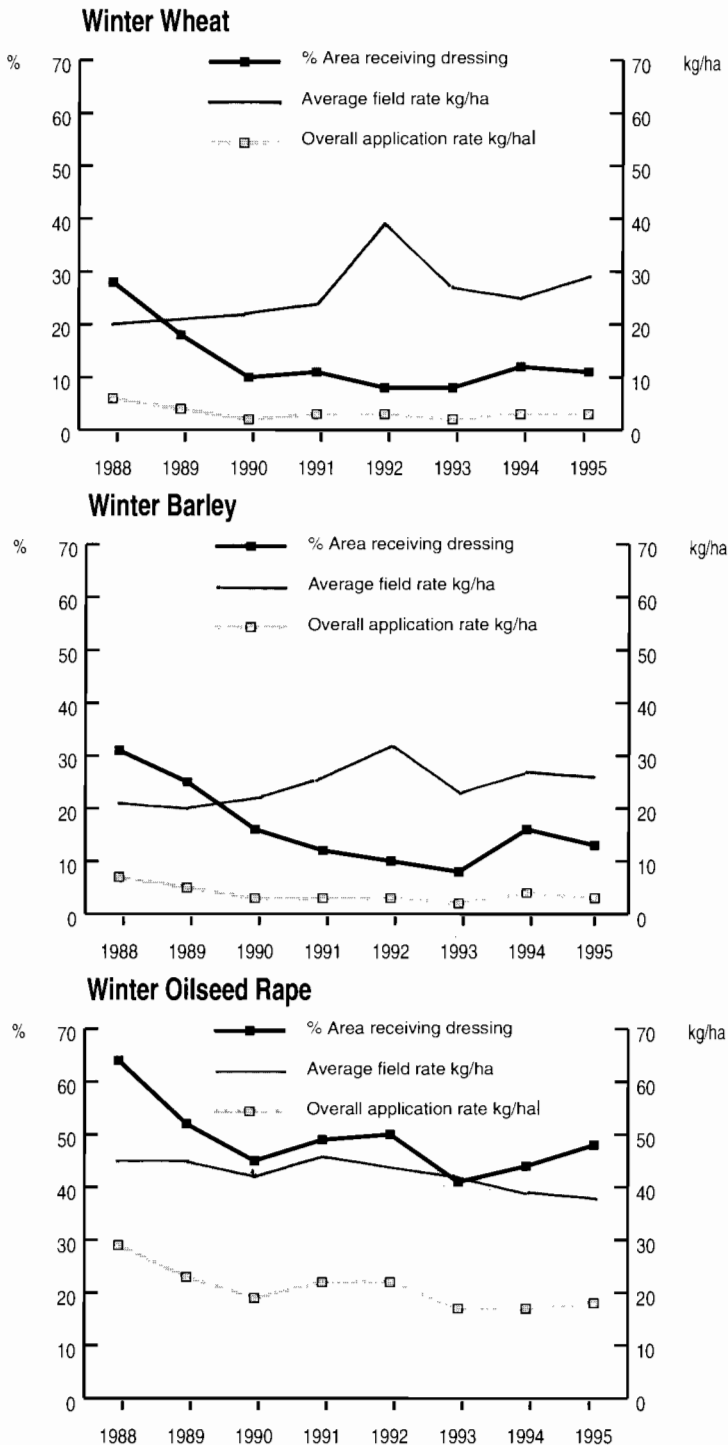
POTATOES

Overall nitrogen usage on potatoes decreased by 17 kg/ha in 1995 to 183 kg/ha, due to reductions in both straight and compound nitrogen use. This change reflected a drop of eleven percentage points in the proportion of the crop area which received a total nitrogen dressing above 250 kg/ha. Even so, straight nitrogen use has increased over the past few years, possibly due to an increasing tendency for growers to apply part of the nitrogen requirement as a top dressing at tuber initiation stage for irrigated crops, rather than applying all the nitrogen in the seedbed.

AUTUMN AND WINTER FERTILISER NITROGEN APPLICATIONS

Recent trends in the application of fertiliser nitrogen to winter cereals and winter oilseed rape during the August to January period are summarised in Figure B2.3.

Figure B2.3 Application of nitrogen during the period August to January in England and Wales 1988 – 1995



This shows an end to the general downward trend, between 1988 and 1993, in the overall application rate of nitrogen on all three crops during this first part of the cropping season. This trend was due in the main to a decline in the percentage of the crop area receiving any dressing of nitrogen. Nevertheless, the average field rates of nitrogen on winter cereal fields which did receive dressings of nitrogen, increased during that period.

Autumn nitrogen fertiliser is not normally recommended for winter cereals, both for economic and environmental reasons. Seedbed nitrogen at 30 kg/ha is still recommended by ADAS for winter oilseed rape, unless the soil nitrogen fertility is high. The economic benefit is, however, small and, in practice, less than half of the crop area receives an Autumn nitrogen dressing.

The overall nitrogen rates applied to these autumn sown crops during the August to January period have not shown any definite, further change since 1993.

PHOSPHATE AND POTASH

The overall application rate of phosphate showed little net change (-1 kg/ha) on tillage crops in 1995 (Table B1.2), application rates on winter cereals and oilseed rape were similar to 1994 levels. Phosphate use did increase on spring barley (+ 5 kg/ha), but it dropped on main crop potatoes (-9 kg/ha) and on sugar beet (-6 kg/ha) (Table B2.1).

A major contributory factor to the decrease of 3 kg/ha in the overall application rate of potash on tillage in 1995 was the very large drop in the overall rate (-16 kg/ha) for sugar beet, caused by reductions in the extent of dressing cover. Potash use showed little or no change on winter wheat, winter barley or oilseed rape, but increased on Spring barley (+5 kg/ha) and potatoes (+10 kg/ha) (Table B2.1).

SCOTLAND

Use of nitrogen on **tillage crops** increased by 12 kg/ha to 140 kg/ha (Table B1.2), the highest annual estimate so far for Scotland. Use of nitrogen was up on all the major tillage crops except maincrop potatoes. Overall nitrogen use increased substantially on **oilseed rape** in 1995, reversing the decline that followed the sharp fall in 1992 when the Transitional Oilseeds Scheme was introduced. Nitrogen use also increased considerably on **winter wheat** and **spring barley**.

Overall rates of phosphate and potash for individual crops showed various changes from 1994, but the actual increases or decreases were mostly slight and all, apart from potash on **oilseed rape**, were within the range of annual fluctuations observed over the last six years. Overall usage of these two nutrients showed net decreases of 1-2 kg/ha on **tillage crops** in 1995.

NITROGEN

The overall nitrogen rate for **winter wheat** increased by 8 kg/ha in 1995 (Table B2.1). The rate for **spring barley** also increased by 8 kg/ha, to 97 kg/ha, the highest rate recorded so far, and use on **oilseed rape** increased by 31 kg/ha to 190 kg/ha. The increase on total nitrogen use on these crops were related to more use of straight nitrogen, offset slightly by a drop in compound nitrogen usage. In the case of the **winter wheat** there was a dramatic increase in the use of high application rates (Table B2.9). In contrast, overall use on **potatoes** fell back, to 152 kg/ha.

Table B2.7 Average field application rates of nitrogen on cereals by market use Scotland 1994-95

	Total Nitrogen						kg/ha
	winter wheat		spring barley		winter barley		
	milling	non milling	malting	non malting	malting	non malting	
1994	172	203	95	85	123	184	
1995	241	208	104	85	174	183	

Table B2.8 Percentage distribution of cereal crop area Scotland 1994-95

	Percentage distribution of cereal crop area						%
	winter wheat		spring barley		winter barley		
	milling	non milling	malting	non malting	malting	non malting	
1994	8	92	51	49	16	84	
1995	4	96	72	28	25	75	

WINTER WHEAT

Only 4% of the total crop area was grown for milling in 1995, according to area estimates obtained from this survey (Table B2.8). The milling estimate was obtained from a small sample size of only twenty-two fields and so the apparent difference between the two categories of Winter wheat should be treated with caution. Census data suggest a 2% increase in the total crop area in 1995.

WINTER BARLEY

Average N use on malting types, which were estimated from this Survey to represent a quarter of the total crop area, was 9 kg/ha less than for other types of winter barley in 1995 (Table B2.7). Although this difference is less than that observed for England and Wales, overall N rates for both categories of winter barley are larger in Scotland. Census data indicated a 28% increase in the winter barley area in 1995 and this major change in cropping practice contributed to the large increase in N use on tillage crops.

SPRING BARLEY

Agricultural census data indicate that Scotland accounts for a high proportion of the total British spring barley crop. The malting crop, estimated as three quarters of the total spring barley area, received 20 kg/ha more nitrogen than the other (feed and seed) crop categories in 1995, contrary to expected fertiliser practice. Overall nitrogen use on malting types was similar to recommended amounts, but nitrogen use on other types of spring barley was relatively low.

OILSEED RAPE

Census data suggest that the main reason for the large increase in fertiliser nitrogen use was a swing back from spring to winter oilseed rape, which increased from 45% in 1994 to 63% of the total crop area in 1995. Reliable estimates of nitrogen use on industrial crops are not available for either autumn or spring sowings, as insufficient levels were recorded.

PHOSPHATE AND POTASH

Overall use of phosphate increased by 2 kg/ha on spring barley and by 3 kg/ha on Winter barley, but dropped on potatoes (-4 kg/ha), oilseed rape (-5 kg/ha) and winter wheat (-9 kg/ha) (Table B2.1). However, these changes in application rates were within the range of estimated values for each crop since 1989.

The overall rates of potash application on potatoes and winter wheat fell, by 20 kg/ha and 9 kg/ha respectively, increased by 6 kg/ha to 81 kg/ha on winter Barley and showed little or no change on the other major arable crops compared with 1994.

Table B2.9 Distribution of field application rates of nitrogen on major tillage crops and grassland, England and Wales 1993-1995 (as row %)

		kg/ha											average	overall	
		0	<25	25-	50-	75-	100-	125-	150-	200-	250-	300-	400+	rate	rate
Winter wheat	1993	1	•	1	1	3	3	9	44	34	5	•	1	185	184
	1994	1	•	•	3	4	3	8	42	32	6	•	1	186	185
	1995	•	•	•	1	3	3	9	37	38	6	1	1	193	192
Spring barley	1993	4	1	6	13	36	21	13	4	1	•	•	•	94	90
	1994	2	1	4	11	32	23	18	8	•	•	•	•	103	101
	1995	1	•	5	10	35	25	17	6	2	•	•	•	101	100
Winter barley	1993	1	1	1	3	13	19	26	33	3	•	1	•	133	133
	1994	1	1	•	3	10	15	28	35	6	1	•	•	142	141
	1995	1	•	1	3	9	15	29	35	4	1	•	•	142	141
Maincrop potatoes	1993	3	1	•	2	4	2	4	30	41	9	2	1	203	197
	1994	1	1	1	2	5	8	4	27	24	23	7	•	202	201
	1995	3	3	1	3	3	5	7	37	20	11	7	1	188	183
Sugar beet	1993	4	1	6	7	13	17	37	14	•	•	•	•	115	110
	1994	4	1	8	8	13	12	34	13	1	4	2	1	127	122
	1995	3	2	5	6	9	28	31	12	3	1	•	1	122	118
Oilseed rape	1993	1	•	•	2	7	7	16	23	33	10	1	•	181	179
	1994	2	1	1	2	6	8	12	24	29	13	1	1	186	183
	1995	1	•	2	2	6	6	8	22	37	11	2	•	190	187
All tillage	1993	12	1	3	4	10	8	12	28	18	3	1	•	155	137
	1994	8	1	2	5	8	8	13	29	19	5	1	•	162	149
	1995	8	1	2	4	8	9	14	27	22	4	1	1	164	151
All grass	1993	20	•	10	14	12	6	9	10	7	5	5	1	140	112
	1994	20	1	8	15	9	7	8	11	9	6	6	1	145	117
	1995	17	2	9	15	10	7	8	11	8	6	6	2	143	119

Source: British Survey of Fertiliser Practice 1993, 1994, 1995

Table B2.10 Distribution of field application rates of nitrogen on major tillage crops and grassland, Scotland 1993– 1995 (as row %)

		kg/ha											average rate	overall rate	
		0	<25	25-	50-	75-	100-	125-	150-	200-	250-	300-			400+
Winter wheat	1993	1	•	•	1	2	4	4	36	45	8	•	•	194	193
	1994	•	2	•	•	5	1	4	28	48	11	1	•	201	200
	1995	1	1	•	•	•	1	4	26	57	7	3	•	209	208
Spring barley	1993	•	1	5	14	33	35	11	1	•	•	•	•	94	94
	1994	1	2	7	19	25	37	6	1	•	1	•	•	90	89
	1995	1	•	6	14	31	35	8	3	3	•	•	•	98	97
Winter barley	1993	2	•	•	•	3	4	14	55	21	1	•	•	172	172
	1994	2	3	2	•	2	9	15	36	31	•	•	•	170	166
	1995	1	•	•	1	5	5	8	51	25	4	•	•	181	178
Maincrop potatoes	1993	3	1	•	•	1	10	18	48	13	6	•	•	155	163
	1994	5	•	3	•	11	8	7	43	14	10	•	•	169	161
	1995	6	•	•	•	10	9	26	25	25	•	•	•	160	151
Oilseed rape	1993	•	•	•	8	5	15	11	9	31	20	1	•	182	182
	1994	•	1	4	10	8	14	10	19	20	10	3	•	159	159
	1995	•	•	2	•	3	14	13	14	28	24	1	•	190	190
All tillage	1993	2	1	3	10	16	19	10	18	18	5	•	•	140	130
	1994	2	3	5	12	17	19	7	14	15	4	1	•	131	128
	1995	2	1	4	8	17	20	8	14	21	5	1	•	144	140
All grass	1993	16	1	7	18	9	10	10	11	10	5	4	•	135	114
	1994	11	1	9	16	14	11	13	12	5	5	3	•	125	111
	1995	12	1	9	20	12	10	10	9	7	5	4	1	130	114

+ obtained directly from 1993 Agricultural Census

Source: British Survey of Fertiliser Practice 1993, 1994, 1995

3 – Fertiliser use on grassland

GREAT BRITAIN

Total nitrogen use on grassland in Great Britain increased by 2 kg/ha in 1995 as a result of a rise in both straight and compound use (Table B1.1 - repeated below in summary form as Table B3.1). This confirms the continued recovery since the dramatic fall in 1992.

Table B3.1 Overall fertiliser usage on grass in GB 1992-1995 (kg/ha)

	<i>Straight nitrogen</i>	<i>Compound nitrogen</i>	<i>Total nitrogen</i>	<i>Total phosphate</i>	<i>Total potash</i>
1992	51	55	106	22	28
1993	56	56	112	21	29
1994	51	65	116	24	31
1995	52	66	118	24	31

ENGLAND AND WALES

The partial recovery in overall nitrogen use on all grass in England and Wales continued in 1995 following the low figure recorded in 1992 (Table B3.2). This reflects an increase in the overall use of straight nitrogen despite a substantial fall in the the average field rate to its lowest level since 1990: there was a compensating increase in the dressing cover. Use of compound nitrogen held steady.

Overall rates of phosphate and potash both dropped slightly (by 1 kg/ha) on all grass (Table B1.2), due to very minor changes in their use on grazed grass and grass cut for hay, combined with decreases of 2-4 kg/ha on grass for silage (Table B3.4).

Table B3.2 Overall nitrogen fertiliser usage on grass 1990-1995 (kg/ha)

	<i>Straight nitrogen</i>		<i>Compound nitrogen</i>		<i>Total nitrogen</i>	
	<i>E & W</i>	<i>Scot</i>	<i>E & W</i>	<i>Scot</i>	<i>E & W</i>	<i>Scot</i>
1990	68	38	64	78	132	116
1991	69	36	64	75	133	111
1992	55	36	49	75	104	111
1993	63	33	49	81	112	114
1994	54	37	63	74	117	111
1995	57	33	63	81	119	114

The percentages of the total grass area which are utilised primarily for grazing or cutting regimes are summarised in Table B3.3. The pattern of grazing and cutting regimes had remained similar over a long period until 1994, when the estimated percentage area used for grazing dropped markedly by 7% to 89%. Other data from the survey suggest that the wet spring in 1994, which produced an excess supply of grass for grazing requirements, may have resulted in a larger area than normal being taken for first cut silage. The percentage area used for grazing recovered towards the longer term average level in 1995; the proportion of the grass area cut for silage or hay was unchanged.

Table B3.3 Grassland utilisation 1990-1995 (% of grass area)

	<i>grazed</i> ¹		<i>silage</i> ²		<i>hay</i> ²	
	<i>E & W</i>	<i>Scot</i>	<i>E & W</i>	<i>Scot</i>	<i>E & W</i>	<i>Scot</i>
1990	97	99	31	24	11	8
1991	97	99	29	22	12	9
1992	94	98	28	23	12	9
1993	96	98	29	27	12	8
1994	89	80	29	25	14	7
1995	93	87	29	25	15	8

NITROGEN

The small increase of 2 kg/ha in 1995 in the overall rate of total nitrogen use on all grass was caused by increased usage on each category of grass utilisation. (Table B3.4), but the average field rate fell for grazed grass and grass cut for silage.

Overall and average field rates of fertiliser vary according to grass utilisation, as shown in Table B3.4, with higher rates on grass cut for silage. The longer term trends in overall nitrogen rates for grazed and cut grass from 1983 to 1995 are displayed in Figure B3.1.

Table B3.4 Fertiliser application rate by grass utilisation 1990-1995

TOTAL NITROGEN (kg/ha)						Average Field Rate						
Overall application rate												
<i>grazed</i> ¹		<i>silage</i> ²		<i>hay</i> ²		<i>grazed</i> ¹		<i>silage</i> ²		<i>hay</i> ²		
<i>E&W</i>	<i>Scot</i>	<i>E&W</i>	<i>Scot</i>	<i>E&W</i>	<i>Scot</i>	<i>E&W</i>	<i>Scot</i>	<i>E&W</i>	<i>Scot</i>	<i>E&W</i>	<i>Scot</i>	
129	89	199	182	90	104	1990	152	111	213	183	103	108
131	87	207	196	92	83	1991	159	112	229	196	104	98
103	109	172	205	75	108	1992	136	107	185	210	105	114
110	114	170	188	89	100	1993	139	134	178	190	110	107
113	100	180	174	82	101	1994	140	114	189	177	108	110
115	108	185	186	85	110	1995	138	125	187	187	108	119

TOTAL PHOSPHATE (kg/ha)						Average Field Rate						
Overall application rate												
<i>grazed</i> ¹		<i>silage</i> ²		<i>hay</i> ²		<i>grazed</i> ¹		<i>silage</i> ²		<i>hay</i> ²		
<i>E&W</i>	<i>Scot</i>	<i>E&W</i>	<i>Scot</i>	<i>E&W</i>	<i>Scot</i>	<i>E&W</i>	<i>Scot</i>	<i>E&W</i>	<i>Scot</i>	<i>E&W</i>	<i>Scot</i>	
23	20	33	44	22	33	1990	36	30	42	47	35	38
22	17	33	46	22	25	1991	36	24	44	49	34	33
18	30	30	48	16	32	1992	33	35	41	54	31	38
18	28	28	46	18	33	1993	32	36	40	49	34	37
22	25	36	47	18	31	1994	35	34	45	53	32	39
21	29	32	49	19	34	1995	33	37	41	51	32	42

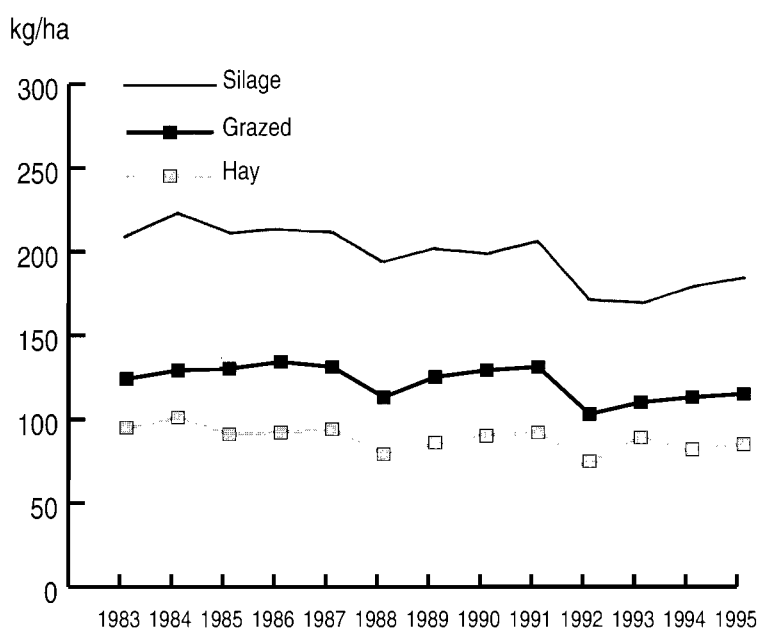
TOTAL POTASH (kg/ha)						Average Field Rate						
Overall application rate												
<i>grazed</i> ¹		<i>silage</i> ²		<i>hay</i> ²		<i>grazed</i> ¹		<i>silage</i> ²		<i>hay</i> ²		
<i>E&W</i>	<i>Scot</i>	<i>E&W</i>	<i>Scot</i>	<i>E&W</i>	<i>Scot</i>	<i>E&W</i>	<i>Scot</i>	<i>E&W</i>	<i>Scot</i>	<i>E&W</i>	<i>Scot</i>	
34	20	68	69	26	39	1990	53	31	84	72	40	44
35	17	74	74	28	29	1991	54	26	91	77	42	38
25	33	54	70	20	42	1992	45	32	69	77	39	42
26	33	54	71	22	35	1993	46	45	70	76	41	40
29	25	61	61	22	36	1994	47	36	75	71	39	45
28	30	59	68	24	42	1995	45	42	72	73	41	51

¹May also be cut

²May also be grazed.

Most areas had a dry, cold spring followed by exceptionally dry conditions during the summer and this weather pattern severely restricted grass production during the main part of the normal growing season. As a result, less nitrogen fertiliser was applied during that part of the season, compared with normal practice.

Figure B3.1 Nitrogen use by grass utilisation, England and Wales 1983-1995



The continued slow recovery evident in 1995 in the overall rate of nitrogen on grazed grass, with an increase of 2 kg/ha, is due to a recovery in the percentage of grass used for grazing (Table B3.3); it masks a fall in the average field rate of straight nitrogen on grazed grass (Table B3.5). There was a fall in the average rate of straight nitrogen on grass whatever the utilisation; that for compound nitrogen held steady.

Table B3.5 Straight and compound nitrogen use by grass utilisation 1993-1995

STRAIGHT NITROGEN (kg/ha)

Overall application rate						Average Field Rate						
<i>grazed</i> ¹		<i>silage</i> ²		<i>hay</i> ²		<i>grazed</i> ¹		<i>silage</i> ²		<i>hay</i> ²		
E&W	Scot	E&W	Scot	E&W	Scot	E&W	Scot	E&W	Scot	E&W	Scot	
62	33	88	40	51	27	1993	130	102	134	112	107	87
53	34	74	54	38	30	1994	132	94	130	121	111	102
54	32	79	50	40	35	1995	122	108	125	118	101	101

COMPOUND NITROGEN (kg/ha)

Overall application rate						Average Field Rate						
<i>grazed</i> ¹		<i>silage</i> ²		<i>hay</i> ²		<i>grazed</i> ¹		<i>silage</i> ²		<i>hay</i> ²		
E&W	Scot	E&W	Scot	E&W	Scot	E&W	Scot	E&W	Scot	E&W	Scot	
48	80	82	147	38	73	1993	88	108	115	162	74	85
59	66	106	120	44	71	1994	96	89	132	140	78	88
60	76	105	136	45	76	1995	96	100	132	148	77	94

¹May also be cut

²May also be grazed.

The patterns of nitrogen usage on grass for grazing and for hay suggest a slight downward trend since 1983, but grass for grazing also shows some recovery since 1992. The decline in the overall nitrogen usage on grass for silage was more marked until 1992; it has recovered partially since.

PHOSPHATE AND POTASH

Recent trends in overall rates of phosphate and potash on all grass suggest a small recovery in the use of these nutrients, following the sharp decline in 1992, due to increases in the dressing covers over the last two years (Table B 3.6). This recovery appears to be associated mainly with the recent net upturn since 1992 in the extent of phosphate and potash use on grazed grass (Table B3.4).

In 1995 the overall rates of phosphate and potash fell back slightly on grazed grass (by 1 kg/ha) and more so (by 3 kg/ha for potash and 4 kg/ha for phosphate) on grass cut for silage (Table B3.4). Overall use of phosphate and potash on grass cut for hay showed a slight increase and decrease respectively in 1995.

Table B3.6 Dressing cover on grassland 1990-1995

%	Total nitrogen		Total phosphate		Total potash	
	E&W	Scot	E&W	Scot	E&W	Scot
1990	85	87	65	76	66	75
1991	82	83	62	75	64	73
1992	75	83	55	75	55	71
1993	80	84	57	77	58	74
1994	80	89	63	76	62	72
1995	83	88	64	80	63	75

%	Straight nitrogen		Compound nitrogen	
	E&W	Scot	E&W	Scot
1990	50	35	63	76
1991	49	34	60	75
1992	41	31	59	69
1993	48	32	55	75
1994	41	37	63	76
1995	46	31	63	78

SCOTLAND

The proportion of the grassland area that was grazed in Scotland partly recovered in 1995, following a sharp drop in 1994 (Table B3.3). Little or no change occurred in the percentage areas cut for hay or silage.

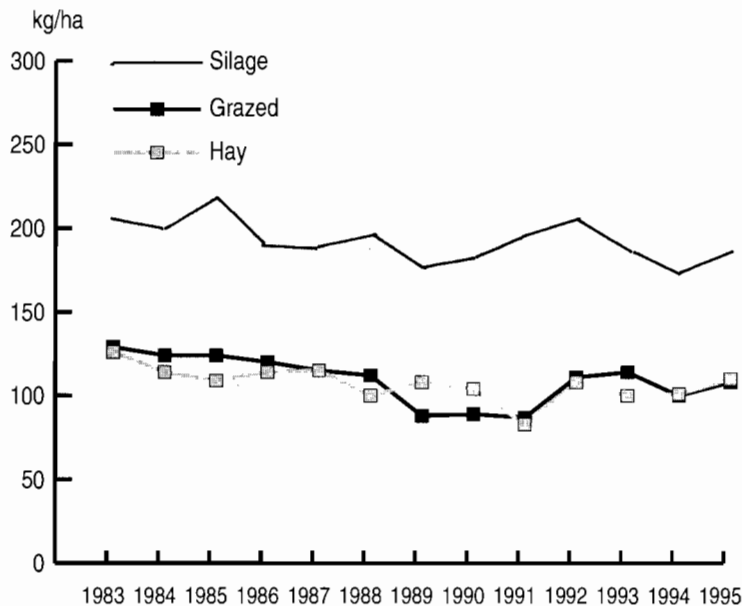
Total nitrogen use on all grass in 1995 increased by 3 kg/ha to the 1993 levels of 114 kg/ha, related to increases in the average field rate for both grazed and the cut grass categories. Overall use of phosphate and potash on all grass increased by 2 and 4 kg/ha respectively in 1995 (Table B1.2), also as a result of increases for both grazed and cut grass. The longer term patterns in phosphate and potash use do not however show any clear trends.

NITROGEN

The overall rate of total nitrogen for all grass increased by three percentage points in 1995, the net result of an increase in compound nitrogen use and a drop in the overall rate of straight nitrogen. The small increase in use of nitrogen may have been brought about by the extended grass growing season in 1995. In practice, however, the annual changes could be considered as sampling fluctuation about an unchanged average (Table B3.2). This variation reflects annual fluctuations in overall rates of straight and compound nitrogen, which are related to changes in average field rates (Table B3.5) and dressing covers (Table B3.6).

Overall total nitrogen use on grazed grass increased by 8 kg/ha in 1995 to 108 kg/ha, similar to the 1992 average level and above the longer term average. The total nitrogen rate on silage increased by 12 kg/ha to 186 kg/ha, well within the range of levels recorded in recent years (Figure B3.2). The total nitrogen rate on hay also increased in 1995.

Figure B3.2 Nitrogen use by grass utilisation Scotland 1983-1995



PHOSPHATE AND POTASH

The estimates for overall use of potash on all grass (Table B1.2) suggest a possible recovery in 1995, after the sudden drop the previous year but this increase, of 3 kg/ha, is just within the bounds of sample variation (Table C5). Overall phosphate and potash use on all grass increased by 2 and 4 kg/ha respectively in 1995, these changes were associated with increased usage on both grazed and cut grass (Table B3.4).

The trends since 1989 suggest a small increase in phosphate and potash use on grazed grass, but relatively static levels of usage on cut grass (Table B3.4).

4 – Sulphur Use on Tillage and Grassland

Sulphur is one of the essential minor nutrients for plant growth. The sulphur supply available to crops depends on sulphur inputs from atmospheric (wet and dry) deposition, use of organic manures and sulphur-containing fertilisers; there is also sulphur release from soil organic matter by mineralisation. Long term reductions in sulphur dioxide emissions, have caused a steady decline in annual levels of atmospheric sulphur deposition over the past twenty years. This reduction is expected to continue in the future as a consequence of efforts to reduce atmospheric pollution. As plants derive a significant amount of their sulphur requirement from atmospheric sources, sulphur deficiency is becoming an increasing threat to crops which need large amounts of sulphur, such as oilseed rape, cereals and intensively cut grass. This is especially the case when they are grown on sandy or shallow soils receiving little or no organic manures in areas of Britain where atmospheric deposition is now less than 50 kg/ha sulphur (as SO₃) per annum.

Many farmers are now using sulphur-containing fertilisers to avoid the risk of deficiency, and Survey data from 1993, the first year when application rates of sulphur were recorded, and 1995 confirm a general increase in sulphur applications to oilseed rape and cereals (Table B 4.1).

Table B4.1 Sulphur use on major tillage crops 1993 and 1995

DRESSING COVER (%)

	<i>winter wheat</i>		<i>spring barley</i>		<i>winter barley</i>		<i>main crop potatoes</i>		<i>oilseed rape</i>	
	E&W	Scot	E&W	Scot	E&W	Scot	E&W	Scot	E&W	Scot
1993	3	11	2	10	2	6	-	3	5	19
1995	11	21	3	17	11	18	1	1	20	35

AVERAGE RATE (kg/ha)

	<i>winter wheat</i>		<i>spring barley</i>		<i>winter barley</i>		<i>main crop potatoes</i>		<i>oilseed rape</i>	
	E&W	Scot	E&W	Scot	E&W	Scot	E&W	Scot	E&W	Scot
1993	30	23	21	16	26	32	-	8	40	35
1995	28	35	30	28	27	46	52	3	43	49

Table B4.2 Sulphur use on grassland 1995

DRESSING COVER (%)

	<i>grazed</i>		<i>silage</i>		<i>hay</i>		<i>all grass</i>	
	E&W	Scot	E&W	Scot	E&W	Scot	E&W	Scot
1995	4	7	6	18	4	4	4	9

AVERAGE RATE (kg/ha SO₃)

	<i>grazed</i>		<i>silage</i>		<i>hay</i>		<i>all grass</i>	
	E&W	Scot	E&W	Scot	E&W	Scot	E&W	Scot
1995	36	28	35	35	39	45	36	29

ENGLAND AND WALES

TILLAGE CROPS

Dressing covers with sulphur have increased since 1993 on winter wheat, winter barley and oilseed rape, but not on spring barley. Field average rates for cereals are similar to recommended amounts of 25 to 35 kg/ha SO_3 (as a water soluble form) where there is a deficiency risk (Table B4.1).

Oilseed rape has a larger sulphur requirement than cereals and 75 kg/ha SO_3 is recommended where deficiency is anticipated. Average field rates over the 1993-95 period have, however, tended to be appreciably less than the recommended amount (Table B4.1).

The proportions of these arable crops which receive sulphur are likely to increase in future years, as the geographic distribution of sulphur deficiency becomes more widespread and a wider range of soil types is affected.

GRASSLAND

Grassland cut intensively for silage is likely to suffer sulphur deficiency where soil type and level of atmospheric deposition predispose the crop to a deficiency risk; however grass that is taken for hay or predominantly grazed is unlikely to be affected. On silage ground, sulphur deficiency normally reduces yield of second and subsequent cuts, rather than first cut, unless the deficiency is very severe.

Sulphur use by cutting or grazing management for 1995 is summarised in Table B4.2. The three systems of management show surprisingly little difference in sulphur dressing covers, which range from 4% (grazed) to 6% (cut for silage). Average field rates in 1995 were similar for both cut and grazed grass and, at 35 - 39 kg/ha SO_3 , were close to the recommended rate of 40 kg/ha SO_3 for each silage cut susceptible to sulphur deficiency.

SCOTLAND

The incidence of sulphur deficiency has, up until now, been more pronounced in Scotland than elsewhere in the UK because of even lower rates of atmospheric sulphur deposition, combined with a greater concentration of cropping on coarse textured soils.

TILLAGE CROPS

Dressing covers with sulphur have increased sharply since 1993 on oilseed rape, with over a third of the crop area receiving a sulphur dressing in 1995 (compared with 20% in England and Wales; Table B4.1).

The proportion of the total crop area treated with sulphur has also increased since 1993 for each of the major cereal crops, although winter wheat and spring barley have not shown a consistent annual trend, and estimates of field average rates have varied widely from 16 to 46 kg/ha SO_3 (Table 4.1).

GRASSLAND

A much larger proportion of grass cut for silage (18%) was treated with sulphur in 1995, compared with grazed grass (4%) or grass cut for hay (7%), in line with the trend which would be expected from deficiency risk. This pattern contrasts the one observed in England and Wales, where only 6% of the area cut for silage received sulphur, and reflects a greater risk of sulphur deficiency in Scotland.

5 – Re-estimation of 1994 and 1993 figures, grass categories

The methods used to handle missing information on some survey questionnaires about the date that grassland was last re-seeded were revised for the 1995 survey. These new methods have also been used to re-estimate the summary statistics for 1993 and 1994. The revised figures for 1994, relating to Tables GB 1.1 to 1.3, EW 1.1 and SC 1.1 to 1.3 are reproduced as Table 5.1 (overleaf).

This revision only affects the two grassland categories 'grass under 5 years' and 'grass 5 years and over', in 1993 and 1994. It does not affect the summary for 'all grass' and 'all crops and grass', nor does it affect the estimates for 1992 or before.

A full set of the revised summary statistics for 1993 and 1994 is available on request from:

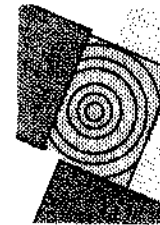
Edinburgh University Data Library (BSFP Team)
Main Library Building
George Square
Edinburgh
EH8 9LJ

Table 5.1 Re-estimation of grassland categories 1994

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P ₂ O ₅	K ₂ O	FYM	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
GB 1.1											
Grass under 5 years	94	76	77	47	179	46	68	168	35	53	1745
Grass 5 years and over	79	62	61	41	127	33	41	100	21	25	4191
GB 1.2											
Grass under 5 years	55	1	3	•	143	79	97	78	1	3	1745
Grass 5 years and over	36	1	1	•	120	73	99	43	1	1	4191
GB 1.3											
Grass under 5 years	75	76	75	•	120	45	66	90	34	50	1745
Grass 5 years and over	62	62	60	•	91	33	40	57	20	24	4191
EW 1.1											
Grass under 5 years	94	75	77	49	194	47	74	182	35	57	1195
Grass 5 years and over	77	59	59	43	130	33	412	100	20	24	3088
EW 1.2											
Grass under 5 years	60	2	3	•	148	79	90	89	1	2	1195
Grass 5 years and over	36	1	1	•	127	69	97	46	1	1	3088
EW 1.3											
Grass under 5 years	74	74	75	•	125	46	72	92	34	54	1195
Grass 5 years and over	59	59	58	•	91	32	40	54	19	23	3088
SC 1.1											
Grass under 5 years	94	78	77	40	141	42	53	133	33	41	550
Grass 5 years and over	87	75	70	34	116	34	39	101	25	27	1103
SC 1.2											
Grass under 5 years	41	0	2	•	122	113	118	50	0	3	550
Grass 5 years and over	35	1	1	•	89	92	115	32	1	1	1103
SC 1.2											
Grass under 5 years	76	78	75	•	109	42	51	83	33	38	550
Grass 5 years and over	76	74	70	•	92	33	38	70	24	27	1103

Source: British Survey of Fertiliser Practice 1993, 1994

SECTION C – SURVEY METHODOLOGY AND SAMPLING VARIATION



The British Survey of Fertiliser Practice has a nationally representative sampling design resulting in high precision estimates. Although 'random' sampling is involved, the design used leads to estimates that are more precise than those which would have been obtained by a 'simple random sampling' of farms. The design is similar to that used by Rothamsted Experimental Station for the pre-1992 Surveys.

Table C1 Sampling characteristics of British Survey of Fertiliser Practice 1995

	farms in population in 1994	total crops & grass in 1994 <i>column</i> %	notional sampling fraction %	target sample size	achieved sample size	achieved sample fraction %
ENGLAND & WALES						
Livestock						
(MAFF 'robust' types 4-7)						
<i>crops & grass area 20-50 ha</i>	26076	11.4	0.51	135	129	0.49
<i>51-100 ha</i>	19046	16.4	1.01	194	184	0.96
<i>101-200 ha</i>	8952	11.9	1.56	140	131	1.46
<i>200+ ha</i>	2966	4.6	1.82	54	48	1.61
Crops & mixed						
(MAFF 'robust' types 1,2,8)						
<i>crops & grass area 20-50 ha</i>	9941	4.8	0.56	56	51	0.51
<i>51-100 ha</i>	10522	10.2	1.13	119	115	1.09
<i>101-200 ha</i>	9868	16.3	1.96	194	176	1.78
<i>200+ ha</i>	7197	23.6	3.76	271	241	3.34
Horticulture						
(MAFF 'robust' type 3)						
<i>crops & grass area 20-50 ha</i>	712	0.3	2.11	15	13	1.82
<i>51-100 ha</i>	238	0.2	5.04	12	10	4.20
<i>101-200 ha</i>	109	0.2	4.58	5	5	4.58
<i>200+ ha</i>	45	0.1	11.10	5	5	11.10
Total for England and Wales	95672	100%		1200	1108	
NB Farms predominantly engaged in horticulture were deliberately oversampled in order to provide sufficient precision in estimation of fertiliser dressings on such crops.						
SCOTLAND						
Cereal/gen. cropping/hort.						
(SOAEFD 'robust' groups 1-3)						
<i>crops & grass area 20-50 ha</i>	1205	2.6	0.58	7	7	0.58
<i>51-100 ha</i>	1467	6.7	1.15	17	15	1.02
<i>101-200 ha</i>	1329	11.7	2.25	30	29	2.18
<i>200+ ha</i>	559	10.9	5.01	28	28	5.01
Livestock & mixed						
(SOAEFD 'robust' groups 4-8)						
<i>crops & grass area 20-50 ha</i>	4330	9.3	0.55	24	24	0.55
<i>51-100 ha</i>	4553	20.4	1.14	52	51	1.12
<i>101-200 ha</i>	2750	23.4	2.03	56	55	2.00
<i>200+ ha</i>	802	15.0	4.61	37	36	4.48
Total for Scotland	16995	100%		251	245	



Farms with less than 20 hectares of crops and grass were excluded from the survey; this is because this is the definition used in the agricultural census, the returns to which are employed as a sampling frame. Farms are stratified according to four size groups and five farm types (three for England and Wales and two for Scotland) in order to reflect the variability in fertiliser practice across Britain. This produced twelve stratification cells for England and Wales and eight stratification cells for Scotland. The fraction of farm holdings sampled from within each cell varied in proportion to the total area of crops and grass so that the larger farm areas were well represented in the survey sample: a 'variable fraction stratification' scheme which is set out in Table C1.

The farm holdings within each cell were ordered according to the 'parish-holding number' to allow a high degree of implicit geographic stratification in the final 'systematic' selection of farms to the sample by MAFF and SOAFD. Overall, 1,363 farms were successfully surveyed, an achieved 'sampling fraction' of 1.2% of farms (Table C2).

Table C2 Summary sampling characteristics 1995

	farms population in 1994	total crops & grass in 1994 (million ha)	target sample size	achieved sample size	achieved sampling fraction (%)
England & Wales	95672	7.8	1200	1108	1.2
Scotland	16995	1.5	251	245	1.4
Great Britain	112667	9.3	1451	1353	1.2

Note that the farms were stratified according to information collected in the 1994 Agricultural Census. Results from the Survey were 'weighted' using the inverse of the achieved sampling fraction for the appropriate stratification cell.

ACHIEVED SAMPLE

Some non-response is inevitable in all voluntary sample surveys. Consequently, not all the 1451 farms in the target sample for the 1995 Survey were successfully surveyed: in some instances the interviewers were unable to make contact with the farm managers, and some farmers refused to take part in the survey also some were found, on inspection, to be farms that should have been excluded from the survey (invalid). Overall, returns were obtained for 1363 farms: 1190 of these responses were from the 'main' sample and 173 responses were from a 'reserve' sample. The reserve sample was constructed by selecting, within each stratification cell, the farm having the next (adjacent) 'county-parish-holding number' to each member of the main sample, enhancing the extent of similarity and exchangeability. The use of a reserve sample, adopted in previous surveys, is a strategy designed to counter the threat of bias from the non-response to the main sample; any over-sampling created thereby is discounted subsequently through the use of sampling weights. The use of a reserve sample also means that there can be no one simple 'response rate', although the net response rate (excluding the farms discovered to be invalid) to the main sample, which was 83.7% in 1995, is the most appropriate for comparison with previous years and with other surveys. Refusals constitute a major reason for non-response to voluntary sample surveys. A summary of the main reasons for refusal is given in Table C4.

Table C3 Response to main and reserve samples

issued from Main Sample	1451			1995	1994	1993
				%	%	%
response to Main Sample	1190		crude response rate	82.0	79.1	83.9
non-response	261	of which 30 invalid	net response rate	83.7	80.9	86.3
issued from Reserve Sample	261					
response to Reserve Sample	173		crude response rate	66.2	68.5	83.8
non-response	88	of which 9 invalid	net response rate	68.6	70.6	85.2
achieved sample size	1363		achieved rate	93.9	95.2	97.4

Table C4 Analysis of non-response 1992-1995

	1992	1993	1994	1995
a) net response rate	%	%	%	%
main sample	87	86	81	84
reserve sample	89	85	71	68
'overall' achieved rate (inc. 1994 'boost')	88	86	80	81
b) refusal rate	9.6	11.3	16.5	14.1
main reasons for refusal	%	%	%	%
too busy	31.3	34.2	38.1	28.5
not interested	22.1	11.2	21.1	29.7
don't do surveys	14.1	9.2	9.2	15.2
want payment	12.3	4.6	4.6	4.5
too much paperwork (IACS)	—	19.9	6.8	5.8
c) non-contact rate	2.5	2.6	4.0	3.9

SAMPLING VARIATION

Survey results can only be estimates and subject to a degree of sampling variation. Ideally, estimates from a survey would be both unbiased and reliable. Cross-checks with sources outside the survey and rigorous attention to survey practice help ensure a lack of bias. Reliability is easier to assess. By 'reliable' is meant that the results obtained from the selected sample are very similar to the results that would have been obtained had the sampling scheme provided a different set of farms to survey - a notion that justifies all random sampling. An indication of the reliability of a survey estimate is given by its 'standard error'.

Table C5 Standard errors for application rates for the major crops in 1995

ENGLAND & WALES

	standard error for overall application rate (kg/ha)					standard error for average field rates (kg/ha)					fields in sample
	total	str't	comp	total	total	total	str't	comp	total	total	
	N	N	N	P ₂ O ₅	K ₂ O	N	N	N	P ₂ O ₅	K ₂ O	
<i>Winter wheat</i>	0.8	0.7	0.1	0.3	0.4	0.7	1.4	0.6	0.4	0.7	2871
<i>Oilseed rape</i>	3.2	3.7	1.1	0.3	0.5	2.4	2.8	1.1	0.3	0.9	618
<i>Winter barley</i>	0.7	0.3	0.8	0.9	0.9	0.5	0.4	2.0	1.2	1.1	1000
<i>Spring barley</i>	1.1	0.9	0.3	1.0	1.7	1.0	0.7	0.3	1.1	2.0	450
<i>M C potatoes</i>	2.0	3.3	3.7	3.9	5.1	2.4	2.4	2.4	4.3	5.4	174
<i>Sugar beet</i>	1.1	1.5	1.1	1.9	2.1	1.2	1.4	2.6	2.4	2.2	353
<i>All tillage crops</i>	0.1	0.4	0.4	0.3	0.5	0.2	0.7	0.7	0.3	0.6	7027
<i>All grass</i>	2.3	1.8	0.5	0.1	0.7	1.3	2.9	0.4	0.2	0.6	3875

SCOTLAND

	standard error for overall application rate (kg/ha)					standard error for average field rates (kg/ha)					fields in sample
	total	str't	comp	total	total	total	str't	comp	total	total	
	N	N	N	P ₂ O ₅	K ₂ O	N	N	N	P ₂ O ₅	K ₂ O	
<i>Winter wheat</i>	1.4	2.2	1.9	0.7	0.4	1.4	1.8	0.9	0.6	0.6	304
<i>Oilseed rape</i>	5.8	7.1	1.4	0.9	1.1	6.0	6.5	1.5	1.3	1.6	124
<i>Winter barley</i>	5.2	5.8	0.8	1.0	1.1	4.5	4.4	1.1	0.7	0.7	114
<i>Spring barley</i>	0.7	1.4	0.8	0.9	0.5	0.6	2.0	0.9	0.9	0.4	501
<i>M C potatoes</i>	3.4	1.2	4.2	4.3	3.0	3.2	1.3	3.4	8.0	5.0	46
<i>All tillage crops</i>	1.3	1.4	0.2	0.5	0.3	1.4	1.1	0.2	0.6	0.4	1320
<i>All grass</i>	3.3	1.3	3.6	0.3	1.4	3.2	1.8	3.8	0.5	0.8	1665

The size of the 'standard error' is influenced by several factors, some of which vary across years. Changes in sample design have been kept to a minimum, although, in 1994 for Scotland and 1995 for England and Wales, the stratification was changed because of changes in farm types introduced by MAFF and SOAEFD.

Changes in the variability of application rates across farms in Britain, and therefore in the sample, also have an effect on the precision of sample survey results. This is especially critical for the precision of the overall application rates wherever there is change in the percentage of fields being dressed with fertiliser, or when there are marked changes in the very high or very low rates of application on fields in a farm.

When estimates are large relative to their standard error, this indicates reliability; standard errors which are relatively large show up poorly determined survey estimates. This is especially important for estimates of application rates for specialised crops as these are based upon only a small number of fields: the corresponding standard errors tend to be larger the fewer the number of fields, indicating less precision. But by itself, the number of fields in the sample growing a particular crop is only a rough guide to the size of the standard error. The sizes of standard errors for the application rates in the Survey actually depend upon the number of farms and fields in the sample, the sampling fraction, the variability in application rates across Britain's farms and upon the combined effectiveness of the sampling design and estimation methods. Note, for example, that the standard errors for estimates of application rates in Scotland are not very much larger than those for England and Wales, despite much smaller sample size.

The use of standard errors is best illustrated through examples. In 1995, in England and Wales, the estimated overall application rate of total nitrogen use on winter barley was 141 kg/ha. The low value of the corresponding standard error of 0.7 kg/ha, relative to the 141 kg/ha indicates very high reliability (good precision), a 'relative error' near to 0.49% (the ratio 0.7 to 141, as a percentage). However, the application of nitrogen on sugar beet provides another example with less, but also good, precision: the estimated overall application rate was 118 kg/ha, with a corresponding standard error of 1.1 kg/ha, a 'relative error' of 0.93%. The application of nitrogen on vegetables (brassicae) is estimated with much less precision: 212 kg/ha with a corresponding standard error of 12.1 kg/ha, with a much larger 'relative error' of 5.7% due, in part, to the small number (63) of fields of brassicae represented in the Survey.

Another way of expressing the reliability is to construct a 95% Confidence Interval. This is derived by creating a lower and upper bound, of length 2 times the standard error, about the survey estimate. The example for winter barley nitrogen would have a narrower Confidence Interval: with lower bound 139.6 ($141 - 2 \times 0.7$) and an upper bound of 142.4 ($141 + 2 \times 0.7$). On 95% of occasions such an interval will enclose the 'true value'; this gives confidence to believe that the true value lies in that narrow range. The comparable 95% Confidence Interval for the overall application rate of nitrogen on kale and cow cabbage would be much wider.

ASSESSING ESTIMATES OF CHANGE

This same approach can be adopted to assess the statistical significance of an apparent change over time in a given dressing-crop application rate. Sometimes, differences observed between years should be attributed to sampling variation. The rule of thumb is to take note of differences only when they are nearly three or more times the size of the standard error of one year's estimate.

For example, the overall application rate of phosphate on sugar beet in 1995 was estimated at 51 kg/ha, an apparent decrease from 57 kg/ha in 1994. The difference is 6 kg/ha. The standard error in 1995 was 1.9 kg/ha. The observed difference of 6 kg/ha is just greater than 3 times 1.9 (= 5.7) kg/ha. There is, therefore, statistical evidence that the decrease is attributable to more than sampling variation alone.

Strictly, the standard error of the difference between survey estimates obtained from two independent samples is the square root of the sum of the squared standard errors for each of the two estimates. This applies to the comparison across two or more years. (And so, the rule of thumb for statistical significance of differences is equivalent to twice the standard error of the difference.) The approximation used above, only taking note of differences greater than three times standard error (of a point estimate), assumes that the standard error of each estimate was the same. Inevitably there will be some variation in the standard error estimate each year, even if the sampling design has remained the same. For example, in 1994 the standard error for phosphate on oilseed rape was reported as 0.5 as stated above, it was 1.9 in 1995, giving a standard error for the between year difference of 2.02 (square root of $0.5^2 + 1.9^2$): the observed difference of 6 kg/ha is clearly greater than twice this estimate of the standard error of the difference.

ESTIMATING THE STANDARD ERROR

The procedure required to obtain correct standard errors for a complex survey design is not straightforward. The 'classical' approach to estimating standard errors from such a complex survey design is to use complex formulae, appropriate to each statistic of interest, from the standard texts. With sufficient farms and fields in the sample, statistical theory provides methods to assess the reliability of estimates using the variability in the sample and knowledge of the sampling scheme used - the explicit stratification and clustering described above. This approach, in part developed at Rothamsted Experimental Station¹,

¹ Yates, F (1981) *Sampling Methods for Censuses and Surveys* (4th Edition) London: Charles Griffin

and used for earlier (pre-1992) surveys, has an advantage in terms of precision of standard error estimation, but it may be regarded as having unwanted bias, in that it fails to measure the gain in precision (reliability) obtained from the implicit stratification in the systematic selection. It also fails to measure sources of non-sampling variation. Moreover, it is computationally complex and difficult to extend to a wide variety of estimators.

The approach taken for the British Survey of Fertiliser Practice post-1992 was to build replication into the sampling design and use approximate sampling variance estimation to derive the standard errors. The simplest method of replication, the one adopted for the 1995 Survey for operational purposes, is to select two half-samples, each using exactly the same sampling scheme. The survey estimates are computed twice, once for each half sample. Calculation of the standard error is based on the difference between the values obtained in each half sample. This approach has the advantage that it takes account of the gain in reliability from the implicit stratification in the systematic selection (from the geographically ordered list). It is also computationally simple and applicable to a wide variety of survey statistics. The principal disadvantage of this approach is loss of precision in the estimated standard errors; although on average the standard errors are small and a good guide to the reliability of the survey results, one or more of the standard errors reported may occasionally under- (or over-) estimate. The extent of this drawback can be reduced by increasing the number of replicates used. This was in effect what was done, post-survey, by systematically sub-dividing the two design replicates to produce four working replicates. The formula used to derive the standard errors reported here makes use of the variation across these four working replicates.

We believe our approach in estimating standard errors is appropriate and cost-effective. As with the reliability of the survey estimate of application rates, it is possible to devote more resources to the estimate of more accurate measure of the standard error but just how much should be spent on this is a matter of judgement for a general survey report. Surveys always represent a compromise between cost, quality and timeliness, the mix chosen dependent on priority of purpose.

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Table GB1.1 Total fertiliser use, Britain 1995

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P ₂ O ₅	K ₂ O	FYM	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
Spring wheat	99	69	67	22	141	54	70	140	37	47	64
Winter wheat	100	77	73	9	194	66	72	193	51	52	3175
Spring barley	99	92	93	25	99	51	59	99	47	55	951
Winter barley	99	84	85	14	145	63	75	144	53	63	1114
Oats	97	77	80	11	116	64	70	112	49	56	243
Rye	95	82	75	9	130	57	70	124	47	53	22
Early potatoes	100	100	100	57	171	174	203	171	174	203	25
Maincrop potatoes	97	96	96	36	182	192	265	176	185	255	220
Sugar beet	97	73	83	24	122	70	133	118	51	111	353
Oilseed rape	99	77	73	15	190	63	69	188	49	50	742
Linseed	79	50	49	8	70	49	60	56	25	29	141
Forage maize	89	79	66	83	96	83	86	86	66	57	40
Turnips (stock)	92	90	92	59	91	98	73	83	88	67	67
Kale and cow cabbage	97	87	87	62	107	53	56	104	46	49	32
Other roots/green crops	84	85	83	36	112	87	95	95	74	79	106
Peas	10	53	57	6	25	64	70	3	34	40	215
Beans	8	52	44	8	97	67	71	8	35	31	230
Vegetables (brassicae)	97	96	94	5	226	119	196	219	114	184	83
Vegetables (other)	90	83	84	9	109	68	109	98	57	92	96
Small fruit	65	66	62	6	80	55	76	51	36	47	35
Top fruit	69	39	39	12	92	44	62	63	17	24	127
Other tillage	69	62	53	69	72	57	75	50	35	40	266
All tillage	93	78	76	16	161	67	80	149	53	61	8347
Grass under 5 years	95	73	73	46	185	43	64	175	31	47	1539
Grass 5 years and over	81	66	63	44	127	33	43	104	22	27	4001
All grass	84	68	65	44	140	35	48	118	24	31	5540
All crops & grass	88	72	70	31	150	51	64	132	37	45	13887

Table GB1.2 Use of straight fertiliser, Britain 1995

	Crop area receiving dressing (%)			Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
Spring wheat	80	5	2	130	68	75	103	4	1	64
Winter wheat	96	7	4	184	73	77	177	5	3	3175
Spring barley	59	1	3	76	70	76	45	1	3	951
Winter barley	95	5	6	136	65	80	130	3	5	1114
Oats	85	3	7	106	138	68	90	4	5	243
Rye	83	7	•	142	50	•	118	4	•	22
Early potatoes	36	•	•	71	•	•	25	•	•	25
Maincrop potatoes	30	5	13	108	158	217	33	8	29	220
Sugar beet	85	3	13	113	76	122	96	2	16	353
Oilseed rape	94	6	5	175	70	68	165	4	3	742
Linseed	67	3	3	66	17	62	45	•	2	141
Forage maize	49	•	•	114	•	•	56	•	•	40
Turnips (stock)	12	2	•	110	173	•	13	4	•	67
Kale and cow cabbage	35	•	•	94	•	•	33	•	•	32
Other roots/green crops	41	5	3	132	140	136	54	8	4	106
Peas	2	6	10	84	87	92	1	5	10	215
Beans	5	12	4	95	69	99	5	8	4	230
Vegetables (brassicae)	72	•	2	163	•	144	118	•	2	83
Vegetables (other)	64	3	5	109	113	140	70	3	8	96
Small fruit	54	8	9	51	145	144	28	12	12	35
Top fruit	53	8	12	90	89	84	48	7	10	127
Other tillage	31	2	9	87	75	93	27	1	8	266
All tillage	80	5	5	155	75	91	125	4	5	8347
Grass under 5 years	59	1	2	145	89	82	86	1	1	1539
Grass 5 years and over	39	2	1	111	92	80	43	1	1	4001
All grass	43	2	1	121	91	81	52	1	1	5540
All crops & grass	60	3	3	142	79	90	85	3	3	13887

Table GB1.3 Use of compound fertiliser, Britain 1995

	Crop area receiving dressing (%)			Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
Spring wheat	49	64	67	75	53	68	37	34	45	64
Winter wheat	31	71	70	52	65	70	16	46	49	3175
Spring barley	84	91	92	65	50	57	54	46	52	951
Winter barley	32	80	80	44	63	73	14	50	58	1114
Oats	42	74	74	51	61	69	22	45	51	243
Rye	20	75	75	28	58	70	6	44	53	22
Early potatoes	100	100	100	145	174	203	145	174	203	25
Maincrop potatoes	88	93	90	163	190	252	143	177	226	220
Sugar beet	28	71	72	77	69	133	22	49	95	353
Oilseed rape	45	71	70	50	63	67	22	45	47	742
Linseed	25	48	46	44	51	59	11	24	27	141
Forage maize	58	79	66	51	83	86	30	66	57	40
Turnips (stock)	86	90	92	81	94	73	70	84	67	67
Kale and cow cabbage	81	87	87	88	53	56	71	46	49	32
Other roots/green crops	62	81	81	66	82	93	41	66	75	106
Peas	9	47	47	13	60	63	1	28	30	215
Beans	4	40	40	71	66	67	3	26	27	230
Vegetables (brassicae)	77	96	92	130	119	197	101	114	182	83
Vegetables (other)	59	82	80	47	65	106	27	53	84	96
Small fruit	55	58	53	43	42	65	23	24	35	35
Top fruit	32	39	35	48	26	41	15	10	14	127
Other tillage	49	60	48	47	56	67	23	34	32	266
All tillage	40	73	72	61	66	77	25	49	56	8347
Grass under 5 years	71	73	72	125	41	64	89	30	46	1539
Grass 5 years and over	64	65	63	94	32	42	61	21	27	4001
All grass	66	66	65	101	34	47	66	22	31	5540
All crops & grass	54	70	68	87	50	62	47	35	42	13887

Table GB1.4 Use of lime, Britain 1995

	Crop area receiving dressing (%)					Average field rate of CaO equivalent (tonne/ha)						fields in sample	
	ground limestone	ground chalk	magnesian limestone	sugar beet waste	other	all	ground limestone	ground chalk	magnesian limestone	sugar beet waste	other		all
Spring wheat	5.1	5.7	10.1	0	2.2	23.0	2.4	3.7	2.7	•	4.0	3.0	64
Winter wheat	4.1	1.3	1.1	0.2	0.2	7	3.5	2.7	2.5	4.7	2.0	3.1	3175
Spring barley	10.5	0.5	8.3	0.2	0.1	19.7	2.3	2.5	2.4	1.2	1.2	2.3	951
Winter barley	6.1	1.6	2.8	0.4	0.4	11.3	2.2	2.2	2.5	3.8	5.1	2.4	1114
Oats	7.0	1.1	4.1	0	0	12.2	5.7	2.5	2.6	•	•	4.4	243
Rye	0	0	0	0	0	0	•	•	•	•	•	•	22
Early potatoes	0	0	0	0	0	0	•	•	•	•	•	•	25
Maincrop potatoes	1.0	0	1.4	0	0	2.5	3.8	•	2.5	•	•	3.0	220
Sugar beet	9.0	5.2	3.0	1.9	0	19.1	2.5	2.5	2.8	3.9	•	2.7	353
Oilseed rape	7.8	3.6	3.9	0.1	0.2	15.6	2.3	2.7	2.7	0.6	3.1	2.5	742
Linseed	1.8	1.0	0	0	0	2.7	1.8	2.6	•	•	•	2.1	141
Forage maize	12.4	0	0	0.5	0	12.9	2.5	•	•	3.1	•	2.5	40
Turnips (stock)	15.3	0	1.4	0	2.3	19.0	2.5	•	2.7	•	1.8	2.4	67
Kale and cow cabbage	3.9	0	8.3	0	4.2	16.4	2.5	•	2.7	•	4.0	3.0	32
Other roots/green crops	10.0	3.3	3.1	0	0.7	17.2	2.4	2.8	2.8	•	0.7	2.5	106
Peas	3.4	1.2	0.9	0	0.9	6.3	2.4	2.5	1.7	•	2.1	2.3	215
Beans	2.9	0.8	0.7	0	0.4	4.8	2.4	3.2	1.4	•	0.7	2.3	230
Vegetables (brassicae)	7.7	0	19.6	0	0	27.3	4.8	•	1.8	•	•	2.7	83
Vegetables (other)	6.6	0.8	18.8	0	0	26.3	2.0	1.2	2.2	•	•	2.1	96
Small fruit	1.1	0	0	0	0	1.1	3.7	•	•	•	•	3.7	35
Top fruit	1.8	4.5	9.1	0	0.2	15.6	1.9	2.2	1.9	•	2.5	2.0	127
Other tillage	13.8	1.2	2.7	0	3.7	21.4	2.2	2.2	1.8	•	2.3	2.2	266
All tillage	6.0	1.6	2.9	0.2	0.4	11.2	2.7	2.6	2.4	3.7	2.7	2.6	8347
Grass under 5 years	3.4	0.2	3.7	0	0.2	7.6	2.3	2.0	2.5	5.3	3.5	2.4	1539
Grass 5 years & over	3.7	0.1	2.3	0	0.2	6.3	2.3	1.8	2.7	3.1	2.9	2.5	4001
All grass	3.6	0.1	2.6	0	0.2	6.6	2.3	1.9	2.6	4.1	3.0	2.5	5540
All crops & grass	4.7	0.8	2.8	0.1	0.3	8.7	2.6	2.5	2.5	3.7	2.8	2.6	13887

Table GB3.0 Product and nutrient use by month of application, Britain 1995

(a) Product Use													Total product
row %	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	('000 tonnes)
Straight N	0	4	30	40	14	5	3	2	1	0	0	0	2381
Straight P	3	4	21	8	7	0	2	12	16	16	7	5	62
Straight K	2	12	23	12	6	2	1	2	5	18	14	2	57
Compounds	1	4	24	26	11	8	5	3	8	7	2	1	2764
Unknown	0	5	13	9	41	7	2	0	8	4	4	6	49
All fertilisers	0	4	27	32	13	7	4	3	5	4	1	1	5313

(b) Nutrient Use													Total nutrient
row %	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	('000 tonnes)
N	0	4	28	37	15	7	4	2	1	1	0	0	1254
P2O5	1	5	24	22	8	3	2	4	13	13	4	2	352
K2O	1	5	24	20	9	6	4	3	11	11	4	2	427
Total	1	4	27	31	12	6	4	3	5	5	1	1	2033

Note: product use refers to total tonnage of the products used by farmers in the survey year 1995
 nutrient use refers to the tonnage of each nutrient contained in the products used (eg 100kg of a 20:10:10 compound contains 20kg of N, 10kg of P2O5 and 10kg of K2O; 100 kg of ammonium nitrate, one of the the 'straight N' products contains, typically, 34.5 kg of N)

Table EW1.1 Total fertiliser use in England and Wales 1995

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P ₂ O ₅	K ₂ O	FYM	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
Spring wheat	100	68	67	20	141	55	71	141	37	47	60
Winter wheat	100	77	71	8	193	65	70	192	50	50	2871
Spring barley	99	83	86	22	101	45	58	100	37	50	450
Winter barley	99	83	84	14	142	62	74	141	51	62	1000
Oats	98	75	79	9	116	63	71	113	47	56	179
Rye	95	82	75	9	131	58	71	124	47	53	21
Early potatoes	100	100	100	56	170	174	203	170	174	203	24
Maincrop potatoes	97	97	97	33	188	193	277	183	187	269	174
Sugar beet	97	73	83	24	122	70	133	118	51	111	353
Oilseed rape	99	75	71	12	190	63	68	187	47	48	618
Linseed	79	51	49	7	70	49	60	56	25	29	140
Forage maize	89	79	66	83	96	83	86	86	66	57	40
Turnips (stock)	78	78	78	69	109	42	52	85	33	41	24
Kale and cow cabbage	95	81	81	68	98	52	55	93	42	44	23
Other roots/green crops	85	80	84	37	113	82	104	96	65	87	67
Peas	7	52	57	6	33	66	72	2	35	41	198
Beans	8	51	44	8	97	67	71	8	34	31	229
Vegetables (brassicae)	96	93	91	5	222	111	216	212	104	197	63
Vegetables (other)	89	82	83	8	114	60	109	102	49	91	81
Small fruit	39	42	35	10	68	73	96	27	30	33	32
Top fruit	69	39	39	12	92	44	62	63	17	24	127
Other tillage	69	61	53	70	72	58	76	50	35	40	253
All tillage	92	75	73	15	164	66	81	151	50	59	7027
Grass under 5 years	94	68	68	53	203	43	73	191	29	50	977
Grass 5 years and over	81	64	62	46	129	32	43	105	21	27	2898
All grass	83	64	63	48	143	34	48	119	22	30	3875
All crops & grass	87	70	68	32	154	51	65	134	36	44	10902

Table EW1.2 Use of straight fertiliser, England and Wales 1995

	Crop area receiving dressing (%)			Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
Spring wheat	80	6	2	132	68	75	106	4	1	60
Winter wheat	96	8	4	183	73	78	176	6	3	2871
Spring barley	66	2	4	87	65	97	57	1	4	450
Winter barley	95	5	6	134	66	79	128	3	5	1000
Oats	89	2	9	108	118	68	96	3	6	179
Rye	85	7	0	142	50	•	120	4	•	21
Early potatoes	37	0	0	71	•	•	26	•	•	24
Maincrop potatoes	36	7	17	114	158	217	41	10	37	174
Sugar beet	85	3	13	113	76	122	96	2	16	353
Oilseed rape	95	7	4	177	70	70	168	5	3	618
Linseed	67	3	3	66	17	62	44	•	2	140
Forage maize	49	0	0	114	•	•	56	•	•	40
Turnips (stock)	30	0	0	120	•	•	36	•	•	24
Kale and cow cabbage	36	0	0	90	•	•	32	•	•	23
Other roots/green crops	51	0	4	123	•	136	63	•	6	67
Peas	2	7	12	84	87	92	2	6	11	198
Beans	5	12	4	95	69	99	5	8	4	229
Vegetables (brassicae)	65	0	0	152	•	•	99	•	•	63
Vegetables (other)	73	3	6	111	113	140	81	4	9	81
Small fruit	24	14	15	76	145	144	18	21	21	32
Top fruit	53	8	12	90	89	84	48	7	10	127
Other tillage	31	2	9	88	74	93	27	1	8	253
All tillage	83	6	6	158	74	94	130	5	5	7027
Grass under 5 years	70	1	2	149	68	85	104	1	1	977
Grass 5 years and over	41	2	1	114	94	80	47	2	1	2898
All grass	46	2	1	123	90	82	57	1	1	3875
All crops & grass	64	4	3	145	77	92	92	3	3	10902

Table EW1.3 Use of compound fertiliser, England and Wales 1995

	Crop area receiving dressing (%)			Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
Spring wheat	47	62	67	75	53	69	36	33	46	60
Winter wheat	28	70	68	55	63	68	15	44	47	2871
Spring barley	65	82	84	66	44	56	43	36	47	450
Winter barley	28	79	79	46	61	72	13	48	57	1000
Oats	36	73	73	50	61	69	18	44	51	179
Rye	18	75	75	25	59	71	5	44	53	21
Early potatoes	100	100	100	144	174	203	144	174	203	24
Maincrop potatoes	86	93	88	165	190	262	143	176	232	174
Sugar beet	28	71	72	77	69	133	22	49	95	353
Oilseed rape	39	68	67	50	62	66	20	42	45	618
Linseed	26	48	46	44	51	59	11	24	27	140
Forage maize	58	79	66	51	83	86	30	66	57	40
Turnips (stock)	61	78	78	80	42	52	49	33	41	24
Kale and cow cabbage	73	81	81	84	52	55	61	42	44	23
Other roots/green crops	51	80	80	64	82	101	33	65	81	67
Peas	5	47	47	13	61	65	1	28	30	198
Beans	4	40	40	71	66	67	3	26	27	229
Vegetables (brassicae)	90	93	91	126	111	216	113	104	197	63
Vegetables (other)	55	81	78	39	57	105	21	46	82	81
Small fruit	23	27	20	38	35	60	9	10	12	32
Top fruit	32	39	35	48	26	41	15	10	14	127
Other tillage	48	59	47	46	57	67	22	34	32	253
All tillage	33	70	69	62	65	78	20	46	54	7027
Grass under 5 years	65	67	67	134	42	72	88	28	48	977
Grass 5 years and over	62	62	61	93	30	42	58	19	26	2898
All grass	63	63	62	100	33	48	63	21	30	3875
All crops & grass	48	67	66	87	49	63	42	33	41	10902

Table EW1.4 Use of lime, England and Wales 1995

	Crop area receiving dressing (%)						Average field rate of CaO equivalent (tonne/ha)						Fields in sample
	ground limestone	ground chalk	magnesian limestone	sugar beet waste	other	all	ground limestone	ground chalk	magnesian limestone	sugar beet waste	other	all	
Spring wheat	5.3	6.0	7.5	0	2.3	21.1	2.4	3.7	2.7	•	4.0	3.1	60
Winter wheat	4.0	1.4	0.8	0.2	0.2	6.6	3.6	2.7	2.5	5.0	2.3	3.3	2871
Spring barley	10.2	1.0	0.9	0	0	12.1	2.4	2.5	2.7	•	•	2.4	450
Winter barley	6.2	1.8	2.1	0.5	0.3	10.8	2.2	2.2	2.5	3.8	6.0	2.4	1000
Oats	6.0	1.3	2.2	0	0	9.5	3.6	2.5	2.7	•	•	3.2	179
Rye	0	0	0	0	0	0	•	•	•	•	•	•	21
Early potatoes	0	0	0	0	0	0	•	•	•	•	•	•	24
Maincrop potatoes	1.3	0	1.8	0	0	3.2	3.8	•	2.5	•	•	3.0	174
Sugar beet	9.0	5.2	3.0	1.9	0	19.1	2.5	2.5	2.8	3.9	•	2.7	353
Oilseed rape	9.0	4.3	2.2	0.1	0	15.6	2.3	2.7	3.0	0.6	•	2.5	618
Linseed	1.8	1.0	0	0	0	2.8	1.8	2.6	•	•	•	2.1	140
Forage maize	12.4	0	0	0.5	0	12.9	2.5	•	•	3.1	•	2.5	40
Turnips (stock)	7.5	0	4.1	0	6.4	17.9	2.5	•	2.7	•	1.8	2.3	24
Kale and cow cabbage	5.5	0	0	0	6.1	11.6	2.5	•	•	•	4.0	3.3	23
Other roots/green crops	15.2	5.1	2.4	0	1.1	23.8	2.4	2.8	3.2	•	0.7	2.5	67
Peas	3.8	1.3	0	0	1.0	6.0	2.4	2.5	•	•	2.1	2.4	198
Beans	2.9	0.9	0.7	0	0.4	4.8	2.4	3.2	1.4	•	0.7	2.3	229
Vegetables (brassicae)	11.5	0	1.6	0	0	13.1	4.8	•	2.7	•	•	4.6	63
Vegetables (other)	6.0	1.0	16.8	0	0	23.8	1.8	1.2	1.6	•	•	1.7	81
Small fruit	1.9	0	0	0	0	1.9	3.7	•	•	•	•	3.7	32
Top fruit	1.8	4.5	9.1	0	0.2	15.6	1.9	2.2	1.9	•	2.5	2.0	127
Other tillage	14.1	1.2	2.6	0	3.8	21.7	2.2	2.2	1.8	•	2.3	2.1	253
All tillage	5.8	1.9	1.6	0.3	0.4	9.9	2.7	2.6	2.5	4.0	2.8	2.7	7027
Grass under 5 years	3.6	0.3	0.9	0.1	0.3	5.2	2.3	2.0	2.2	5.3	3.5	2.4	977
Grass 5 years and over	3.9	0.1	2.3	0	0.2	6.5	2.3	1.8	2.9	3.1	2.9	2.6	2898
All grass	3.9	0.1	2	0	0.3	6.3	2.3	1.9	2.9	4.1	3.1	2.5	3875
All crops & grass	4.8	1.0	1.8	0.1	0.3	8.0	2.6	2.5	2.7	4.0	2.9	2.6	10902

Table EW1.5 Percentage of crop area by field application rate – N, England and Wales 1995

row %	kg/ha													Fields in sample
		0	<25	25-	50-	75-	100-	125-	150-	200-	250-	300-	400+	
Spring wheat		0	0	2	8	11	14	25	27	10	3	0	0	60
Winter wheat		0	0	0	1	3	3	9	37	38	6	1	1	2871
Spring barley		1	0	5	10	35	25	17	6	2	0	0	0	450
Winter barley		1	0	1	3	9	15	29	35	4	1	0	0	1000
Oats		2	0	3	5	21	28	26	13	0	0	1	0	179
Rye		5	0	10	3	15	2	47	9	0	0	9	0	21
Early potatoes		0	12	9	0	0	0	8	30	23	18	0	0	24
Maincrop potatoes		3	3	1	3	3	5	7	37	20	11	7	1	174
Sugar beet		3	2	5	6	9	28	31	12	3	1	0	1	353
Oilseed rape		1	0	2	2	6	6	8	22	37	11	2	0	618
Linseed		21	0	17	30	28	2	0	1	0	0	1	0	140
Forage maize		11	6	27	6	0	18	8	23	2	0	0	0	40
Turnips (stock)		22	0	3	7	27	10	22	0	8	0	0	0	24
Kale and cow cabbage		5	1	4	11	50	6	11	2	8	0	0	0	23
Other roots/green crops		15	5	2	17	15	16	8	18	4	0	2	0	67
Peas		93	5	0	1	0	0	0	1	0	0	0	0	198
Beans		92	1	1	1	1	0	2	0	1	0	0	0	229
Vegetables (brassicae)		4	0	7	5	1	2	5	9	32	7	23	3	63
Vegetables (other)		11	8	5	9	21	8	12	19	8	0	0	0	81
Small fruit		61	10	1	13	5	0	10	0	0	0	0	0	32
Top fruit		31	4	9	10	26	3	7	2	5	2	0	0	127
Other tillage		31	14	10	11	16	10	4	4	0	0	0	0	253
All tillage		8	1	2	4	8	9	14	27	22	4	1	1	7027
Grass under 5 years		6	1	2	8	8	7	7	16	16	14	13	3	977
Grass 5 years and over		19	2	10	16	11	7	8	10	7	4	4	1	2898
All grass		17	2	9	15	10	7	8	11	8	6	6	2	3875
All crops & grass		13	1	6	9	9	8	11	18	15	5	3	1	10902

Table EW1.6 Percentage of crop area by field application rate – P₂O₅, England and Wales 1995

row %	kg/ha													fields in sample
		0	<25	25-	50-	75-	100-	125-	150-	200-	250-	300-	400+	
Spring wheat		32	1	33	17	15	2	0	0	0	0	0	0	60
Winter wheat		23	2	13	37	21	3	1	0	0	0	0	0	2871
Spring barley		17	13	35	29	5	1	0	1	0	0	0	0	450
Winter barley		17	3	16	39	22	1	0	1	0	0	0	0	1000
Oats		25	5	17	30	18	2	2	1	0	0	0	0	179
Rye		18	0	23	44	14	0	0	0	0	0	0	0	21
Early potatoes		0	14	0	0	9	10	0	25	15	24	3	0	24
Maincrop potatoes		3	8	2	1	4	6	5	29	21	6	13	2	174
Sugar beet		27	4	19	25	11	6	3	3	0	1	0	0	353
Oilseed rape		25	3	15	34	18	5	0	0	0	0	0	0	618
Linseed		49	8	16	19	6	0	1	0	0	0	0	0	140
Forage maize		21	11	15	20	7	17	0	0	10	0	0	0	40
Turnips (stock)		22	1	50	20	6	0	1	0	0	0	0	0	24
Kale and cow cabbage		19	8	47	7	13	6	0	0	0	0	0	0	23
Other roots/green crops		20	2	14	17	28	3	4	10	2	0	0	0	67
Peas		48	1	13	24	10	3	1	1	0	0	0	0	198
Beans		49	1	7	24	16	4	0	0	0	0	0	0	229
Vegetables (brassicae)		7	1	6	25	5	15	1	41	0	0	0	0	63
Vegetables (other)		18	23	10	32	4	4	1	3	3	1	0	0	81
Small fruit		58	10	12	4	0	1	0	15	0	0	0	0	32
Top fruit		61	16	5	4	13	0	0	0	0	0	0	0	127
Other tillage		39	8	18	20	9	1	4	1	0	0	0	0	253
All tillage		25	4	15	33	17	3	1	1	1	0	0	0	7027
Grass under 5 years		32	12	31	16	6	1	0	0	0	0	0	0	977
Grass 5 years and over		36	23	30	7	2	1	0	0	0	0	0	0	2898
All grass		36	21	30	9	3	1	0	0	0	0	0	0	3875
All crops & grass		30	13	23	20	10	2	1	1	0	0	0	0	10902

Source : British Survey of Fertiliser Practice 1995

Table EW1.7 Percentage of crop area by field application rate – K₂O, England & Wales 1995

row %	kg/ha	Application rate (kg/ha)												Fields in sample
		0	<25	25-	50-	75-	100-	125-	150-	200-	250-	300-	400+	
Spring wheat	33	0	28	9	14	4	6	4	0	0	0	0	60	
Winter wheat	29	2	13	27	21	6	1	1	0	0	0	0	2871	
Spring barley	14	6	29	26	17	6	0	1	0	0	0	0	450	
Winter barley	16	2	11	28	29	11	2	1	0	0	0	0	1000	
Oats	21	3	13	24	29	7	3	1	0	0	0	0	179	
Rye	25	0	3	42	25	6	0	0	0	0	0	0	21	
Early potatoes	0	14	0	0	9	3	0	6	32	23	11	3	24	
Maincrop potatoes	3	2	7	0	2	0	1	5	10	25	33	11	174	
Sugar beet	17	1	5	10	13	13	8	20	6	5	1	0	353	
Oilseed rape	29	1	15	26	20	6	1	0	0	0	0	0	618	
Linseed	51	2	18	17	8	5	0	0	0	0	0	0	140	
Forage maize	34	7	4	16	16	13	0	10	0	0	0	0	40	
Tumips (stock)	22	6	46	5	12	4	6	0	0	0	0	0	24	
Kale and cow cabbage	19	8	47	6	8	9	3	0	0	0	0	0	23	
Other roots/green crops	16	2	12	3	26	17	7	9	5	2	0	0	67	
Peas	43	1	14	21	14	2	1	4	0	0	0	0	198	
Beans	56	2	5	15	14	6	1	1	0	0	0	0	229	
Vegetables (brassicae)	9	0	2	1	1	2	0	21	57	3	5	0	63	
Vegetables (other)	17	4	22	8	1	1	22	20	3	1	0	0	81	
Small fruit	65	2	8	4	5	1	0	15	0	0	0	0	32	
Top fruit	61	6	15	3	9	0	2	3	0	0	0	0	127	
Other tillage	47	3	15	12	10	2	4	5	1	0	0	0	253	
All tillage	27	2	13	24	20	7	2	3	1	1	1	0	7027	
Grass under 5 years	32	6	20	15	10	6	7	3	1	0	0	0	977	
Grass 5 years and over	38	18	26	8	5	2	1	1	0	0	0	0	2898	
All grass	37	16	25	9	6	3	2	1	1	0	0	0	3875	
All crops & grass	32	9	20	16	13	5	2	2	1	1	0	0	10902	

Source : British Survey of Fertiliser Practice 1995

Table EW2.1 Average fertiliser practice by grassland utilisation, England and Wales 1995

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P ₂ O ₅	K ₂ O	FYM	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
Grazed – not mown	77	58	55	37	122	30	31	94	17	17	1905
Grazed – mown	92	74	74	61	157	37	59	144	27	43	1572
All grazings	83	65	63	47	138	33	45	115	21	28	3477
Cut for seed grazed	•	•	•	•	•	•	•	•	•	•	0
Cut for seed not grazed	95	41	41	0	167	85	69	159	35	28	14
All cut for seed	95	41	41	0	167	85	69	159	35	28	14
Cut for silage grazed	99	81	83	66	180	39	66	179	32	55	1036
Cut for silage not grazed	96	70	76	64	225	51	105	216	35	80	232
All cut for silage	99	79	82	66	187	41	72	185	32	59	1268
Cut for hay grazed	79	61	59	53	105	31	39	83	19	23	529
Cut for hay not grazed	78	57	60	26	140	42	58	109	24	35	115
All cut for hay	79	61	59	50	108	32	41	85	19	24	644
All mowings	92	73	74	60	165	38	64	151	28	47	1926
All grass	83	64	63	48	143	34	48	119	22	30	3881

Source: British Survey of Fertiliser Practice 1995

Table EW2.2 Percentage of grass area by field application rate – N, England and Wales 1995

row %	kg/ha	0	<25	25-	50-	75-	100-	125-	150-	200-	250-	300-	400+	Fields in sample
Grazed – not mown		23	3	13	17	10	6	7	8	5	4	3	2	1905
Grazed – mown		8	1	5	14	11	10	10	13	12	8	8	1	1572
All grazings		17	2	9	16	10	7	8	10	8	6	5	1	3477
Cut for seed grazed		•	•	•	•	•	•	•	•	•	•	•	•	0
Cut for seed not grazed		5	0	0	0	0	0	6	79	10	0	0	0	14
All cut for seed		5	0	0	0	0	0	6	79	10	0	0	0	14
Cut for silage grazed		1	1	2	11	9	9	12	15	18	10	11	1	1036
Cut for silage not grazed		4	1	0	4	7	9	5	13	22	13	16	5	232
All cut for silage		1	1	1	10	9	9	11	15	18	11	12	2	1268
Cut for hay grazed		21	1	10	19	16	11	6	8	2	3	2	0	529
Cut for hay not grazed		22	0	4	11	19	4	14	16	2	1	2	4	115
All cut for hay		21	1	10	18	16	10	7	9	2	3	2	0	644
All mowings		8	1	4	13	11	9	10	13	13	8	8	1	1926
All grass		17	2	9	15	10	7	8	11	8	6	6	2	3881

Source : British Survey of Fertiliser Practice 1995

Table EW2.3 Percentage of grass area by field application rate – P₂O₅, England and Wales 1995

row %	kg/ha	0	<25	25-	50-	75-	100-	125-	150-	200-	250-	300-	400+	Fields in sample
Grazed – not mown		42	25	25	5	2	0	0	0	0	0	0	0	1905
Grazed – mown		26	18	38	12	4	1	0	0	0	0	0	0	1572
All grazings		35	22	30	8	3	1	0	0	0	0	0	0	3477
Cut for seed grazed		•	•	•	•	•	•	•	•	•	•	•	•	0
Cut for seed not grazed		59	0	5	18	6	0	12	0	0	0	0	0	14
All cut for seed		59	0	5	18	6	0	12	0	0	0	0	0	14
Cut for silage grazed		19	18	40	15	6	1	0	0	0	0	0	0	1036
Cut for silage not grazed		30	12	26	22	4	2	3	0	1	0	0	0	232
All cut for silage		21	17	38	16	6	1	1	0	0	0	0	0	1268
Cut for hay grazed		39	20	33	7	1	0	0	0	0	0	0	0	529
Cut for hay not grazed		43	13	21	17	5	1	1	0	0	0	0	0	115
All cut for hay		39	19	32	8	1	0	0	0	0	0	0	0	644
All mowings		27	17	36	14	4	1	0	0	0	0	0	0	1926
All grass		36	21	30	9	3	1	0	0	0	0	0	0	3881

Source : British Survey of Fertiliser Practice 1995

Table EW2.4 Percentage of grass area by field application rate – K₂O, England and Wales 1995

row %	kg/ha	0	<25	25-	50-	75-	100-	125-	150-	200-	250-	300-	400+	Fields in sample
Grazed – not mown		45	21	26	4	3	0	0	0	0	0	0	0	1905
Grazed – mown		26	10	27	16	10	5	4	1	1	0	0	0	1572
All grazings		37	17	26	9	6	2	2	1	0	0	0	0	3477
Cut for seed grazed		•	•	•	•	•	•	•	•	•	•	•	•	0
Cut for seed not grazed		59	0	17	10	6	8	0	0	0	0	0	0	14
All cut for seed		59	0	17	10	6	8	0	0	0	0	0	0	14
Cut for silage grazed		17	8	25	20	14	8	6	2	1	0	0	0	1036
Cut for silage not grazed		24	3	15	11	9	12	10	7	5	4	0	0	232
All cut for silage		18	7	23	18	13	8	7	3	2	1	0	0	1268
Cut for hay grazed		41	14	31	9	3	1	0	1	0	0	0	0	529
Cut for hay not grazed		40	16	18	9	9	2	0	6	0	0	0	0	115
All cut for hay		41	15	29	9	3	1	0	1	0	0	0	0	644
All mowings		26	10	25	15	10	6	5	2	1	0	0	0	1926
All grass		37	16	25	9	6	3	2	1	1	0	0	0	3881

Source : British Survey of Fertiliser Practice 1995

Table EW3.0 Product and nutrient use by month of application, England & Wales -1995

(a) Product Use													Total product
row%	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	('000 tonnes)
Straight N	0	5	31	40	15	5	3	1	1	0	0	0	2089
Straight P	3	4	18	7	7	1	1	13	17	17	8	5	56
Straight K	2	13	23	11	5	1	1	2	6	18	15	2	53
Compounds	1	5	26	22	12	7	4	3	8	8	3	1	2145
Unknown	0	8	20	10	13	10	4	0	13	5	7	10	30
All fertilisers	0	5	28	30	13	6	4	2	5	4	2	1	4373

(b) Nutrient Use													Total nutrient
row %	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	('000 tonnes)
N	0	4	30	36	15	7	4	2	1	0	0	0	1050
P ₂ O ₅	1	5	26	18	7	3	1	4	14	14	5	3	279
K ₂ O	1	6	26	16	9	6	3	3	12	13	4	2	344
Total	1	5	28	29	12	6	3	3	5	5	2	1	1673

Note: *product use* refers to total tonnage of the products used by farmers in the survey year 1995

nutrient use refers to the tonnage of each nutrient contained in the products used (eg 100kg of a 20:10:10 compound contains 20kg of N, 10kg of P₂O₅ and 10kg of K₂O; 100 kg of ammonium nitrate, one of the 'straight N' products, contains typically 34.5 kg of N)

Table EW5.1 Average fertiliser practice on dairy farms, England and Wales 1995

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P ₂ O ₅	K ₂ O	FYM	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
Spring wheat	.	.	.	.	.	.	.	.	.	.	5
Winter wheat	100	76	76	37	167	58	63	167	45	48	116
Spring barley	98	88	88	53	89	41	46	86	36	40	37
Winter barley	97	82	82	41	137	67	77	134	55	63	83
Oats	.	.	.	.	.	.	.	.	.	.	6
Rye	.	.	.	.	.	.	.	.	.	.	0
Early potatoes	.	.	.	.	.	.	.	.	.	.	1
Maincrop potatoes	.	.	.	.	.	.	.	.	.	.	5
Sugar beet	.	.	.	.	.	.	.	.	.	.	2
Oilseed rape	.	.	.	.	.	.	.	.	.	.	4
Linseed	.	.	.	.	.	.	.	.	.	.	1
Forage maize	89	89	76	76	110	112	99	97	99	76	11
Turnips (stock)	100	92	92	81	111	36	40	111	33	37	10
Kale and cow cabbage	.	.	.	.	.	.	.	.	.	.	8
Other roots/green crops	.	.	.	.	.	.	.	.	.	.	7
Peas	.	.	.	.	.	.	.	.	.	.	0
Beans	.	.	.	.	.	.	.	.	.	.	0
Vegetables (brassicae)	.	.	.	.	.	.	.	.	.	.	0
Vegetables (other)	.	.	.	.	.	.	.	.	.	.	1
Small fruit	.	.	.	.	.	.	.	.	.	.	1
Top fruit	.	.	.	.	.	.	.	.	.	.	0
Other tillage	74	66	55	93	57	57	70	42	37	39	102
All tillage	91	76	72	59	122	62	72	110	47	52	400
Grass under 5 years	96	67	70	67	235	44	83	226	30	58	350
Grass 5 years and over	96	74	74	61	184	34	57	177	25	42	915
All grass	96	72	73	62	197	36	63	189	26	46	1265
All crops & grass	95	73	73	62	185	41	64	176	30	47	1665

Source: British Survey of Fertiliser Practice 1995

NB Some of these estimates are based on very few fields in the sample and should be treated with great caution.

Table EW5.2 Average fertiliser practice on cattle & sheep farms, England and Wales 1995

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P ₂ O ₅	K ₂ O	FYM	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
Spring wheat	.	.	.	.	.	.	.	.	.	.	2
Winter wheat	99	85	85	25	140	63	75	139	54	64	46
Spring barley	100	95	95	60	87	37	41	87	36	39	40
Winter barley	97	86	84	39	127	56	66	123	48	55	52
Oats	100	78	83	38	85	63	64	85	49	53	18
Rye	.	.	.	.	.	.	.	.	.	.	0
Early potatoes	.	.	.	.	.	.	.	.	.	.	0
Maincrop potatoes	.	.	.	.	.	.	.	.	.	.	7
Sugar beet	.	.	.	.	.	.	.	.	.	.	0
Oilseed rape	.	.	.	.	.	.	.	.	.	.	6
Linseed	.	.	.	.	.	.	.	.	.	.	2
Forage maize	.	.	.	.	.	.	.	.	.	.	0
Turnips (stock)	.	.	.	.	.	.	.	.	.	.	5
Kale and cow cabbage	.	.	.	.	.	.	.	.	.	.	6
Other roots/green crops	73	70	73	56	92	60	63	67	42	46	18
Peas	.	.	.	.	.	.	.	.	.	.	0
Beans	.	.	.	.	.	.	.	.	.	.	2
Vegetables (brassicae)	.	.	.	.	.	.	.	.	.	.	1
Vegetables (other)	.	.	.	.	.	.	.	.	.	.	0
Small fruit	.	.	.	.	.	.	.	.	.	.	0
Top fruit	.	.	.	.	.	.	.	.	.	.	1
Other tillage	80	62	54	38	100	47	110	80	29	60	14
All tillage	94	82	82	39	116	58	69	109	48	57	220
Grass under 5 years	96	80	76	61	147	36	51	141	29	39	188
Grass 5 years and over	73	64	61	50	89	31	34	65	20	21	1044
All grass	75	65	63	50	94	31	36	71	20	22	1232
All crops & grass	76	66	64	50	96	33	38	74	22	24	1452

Source: British Survey of Fertiliser Practice 1995

NB Some of these estimates are based on very few fields in the sample and should be treated with great caution.

Table EW5.3 Average fertiliser practice on other livestock/mixed farms, England and Wales 1995

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P ₂ O ₅	K ₂ O	FYM	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
Spring wheat	•	•	•	•	•	•	•	•	•	•	7
Winter wheat	99	73	72	17	193	65	72	192	47	52	410
Spring barley	100	86	83	29	100	42	48	100	37	40	86
Winter barley	99	83	85	20	140	63	76	138	52	64	219
Oats	94	76	73	11	103	60	67	97	45	49	53
Rye	•	•	•	•	•	•	•	•	•	•	6
Early potatoes	•	•	•	•	•	•	•	•	•	•	1
Maincrop potatoes	90	86	86	76	194	215	290	176	184	248	17
Sugar beet	86	68	100	73	117	65	162	101	45	162	14
Oilseed rape	96	69	61	30	158	63	70	152	43	43	96
Linseed	84	52	52	8	71	42	42	60	22	22	13
Forage maize	93	69	54	93	85	55	75	79	38	40	26
Turnips (stock)	•	•	•	•	•	•	•	•	•	•	4
Kale and cow cabbage	•	•	•	•	•	•	•	•	•	•	4
Other roots/green crops	93	83	82	34	100	91	110	93	76	90	21
Peas	30	64	64	13	44	48	51	13	31	33	19
Beans	14	71	58	25	127	67	74	18	47	43	29
Vegetables (brassicae)	•	•	•	•	•	•	•	•	•	•	3
Vegetables (other)	•	•	•	•	•	•	•	•	•	•	2
Small fruit	•	•	•	•	•	•	•	•	•	•	1
Top fruit	•	•	•	•	•	•	•	•	•	•	3
Other tillage	68	62	48	76	68	59	52	46	37	25	50
All tillage	93	75	73	25	155	64	76	144	48	56	1084
Grass under 5 years	94	66	66	31	204	47	77	192	31	51	244
Grass 5 years and over	79	52	49	24	135	33	43	107	17	21	370
All grass	83	56	53	26	157	37	55	131	21	29	614
All crops & grass	89	67	65	25	156	55	68	138	36	44	1698

Source: British Survey of Fertiliser Practice 1995

NB Some of these estimates are based on very few fields in the sample and should be treated with great caution.

Table EW5.4 Average fertiliser practice on cropping/horticultural farms, England and Wales 1995

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P ₂ O ₅	K ₂ O	FYM	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
Spring wheat	100	65	58	7	156	57	74	156	37	42	46
Winter wheat	100	77	71	4	195	66	70	194	50	50	2299
Spring barley	99	80	86	10	105	47	66	104	38	57	287
Winter barley	99	84	84	5	146	61	74	145	51	61	646
Oats	99	73	82	1	128	64	73	127	47	59	102
Rye	100	82	72	13	144	58	75	144	47	54	15
Early potatoes	100	100	100	57	167	166	193	167	166	193	22
Maincrop potatoes	98	98	98	25	188	189	275	184	185	269	145
Sugar beet	98	73	82	20	122	70	130	119	51	107	337
Oilseed rape	99	76	72	9	197	63	67	195	48	49	512
Linseed	84	54	53	5	70	50	61	59	27	32	124
Forage maize	.	.	.	.	.	.	.	.	.	.	3
Turnips (stock)	.	.	.	.	.	.	.	.	.	.	5
Kale and cow cabbage	.	.	.	.	.	.	.	.	.	.	5
Other roots/green crops	87	79	88	9	145	92	116	127	73	103	21
Peas	4	51	56	5	24	68	74	1	35	42	179
Beans	6	47	40	5	59	67	70	4	31	28	198
Vegetables (brassicacae)	95	93	93	4	227	113	221	216	105	205	59
Vegetables (other)	89	82	83	8	115	61	110	103	50	91	78
Small fruit	35	38	38	11	54	88	96	19	33	37	30
Top fruit	75	42	43	13	93	45	63	70	19	27	123
Other tillage	53	48	48	22	113	64	97	60	31	47	87
All tillage	92	75	73	7	172	68	83	158	51	60	5323
Grass under 5 years	83	50	50	11	174	51	68	144	26	34	195
Grass 5 years and over	79	43	41	9	129	36	42	102	16	18	569
All grass	79	45	43	9	138	39	48	110	18	21	764
All crops & grass	90	71	69	7	168	66	80	152	47	55	6087

Source: British Survey of Fertiliser Practice 1995

NB Some of these estimates are based on very few fields in the sample and should be treated with great caution.

Table SC1.1 Total fertiliser use, Scotland 1995

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P ₂ O ₅	K ₂ O	FYM	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
Spring wheat	•	•	•	•	132	48	53	•	•	•	4
Winter wheat	99	89	89	17	209	80	84	208	72	75	304
Spring barley	99	100	99	28	98	55	60	97	55	59	501
Winter barley	99	94	97	21	181	81	83	178	77	81	114
Oats	90	88	81	22	114	69	66	102	61	53	64
Rye	•	•	•	•	•	•	•	•	•	•	1
Early potatoes	•	•	•	•	•	•	•	•	•	•	1
Maincrop potatoes	94	94	94	46	160	191	220	151	180	207	46
Sugar beet	•	•	•	•	•	•	•	•	•	•	0
Oilseed rape	100	85	85	29	190	67	74	190	57	63	124
Linseed	•	•	•	•	78	•	•	•	•	•	1
Forage maize	•	•	•	•	•	•	•	•	•	•	0
Turnips (stock)	99	96	99	53	83	124	82	82	119	82	43
Kale and cow cabbage	•	•	•	•	•	•	•	•	•	•	9
Other roots/green crops	82	94	82	35	112	96	77	92	90	64	39
Peas	48	55	55	5	14	45	48	7	25	26	17
Beans	•	•	•	•	•	•	•	•	•	•	1
Vegetables (brassicae)	100	100	100	5	233	134	158	233	134	158	20
Vegetables (other)	90	90	90	17	78	109	110	71	98	99	15
Small fruit	•	•	•	•	•	•	•	•	•	•	3
Top fruit	•	•	•	•	•	•	•	•	•	•	0
Other tillage	91	91	91	16	75	49	53	68	44	49	13
All tillage	98	94	93	26	144	72	77	140	68	72	1320
Grass under 5 years	96	85	83	32	149	42	51	143	35	42	562
Grass 5 years and over	84	77	71	32	119	38	42	100	29	30	1103
All grass	88	80	75	32	130	39	45	114	31	34	1665
All crops & grass	91	85	82	29	135	52	59	124	45	48	2985

Table SC1.2 Use of straight fertiliser, Scotland 1995

	Crop area receiving dressing (%)			Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
Spring wheat	•	•	•	•	•	•	•	•	•	4
Winter wheat	98	•	3	187	•	55	182	•	2	304
Spring barley	53	1	3	65	82	57	34	•	2	501
Winter barley	95	1	4	163	•	95	154	•	4	114
Oats	62	6	•	93	180	•	58	11	•	64
Rye	•	•	•	•	•	•	•	•	•	1
Early potatoes	•	•	•	•	•	•	•	•	•	1
Maincrop potatoes	11	•	•	47	•	•	5	•	•	46
Sugar beet	•	•	•	•	•	•	•	•	•	0
Oilseed rape	93	•	6	163	•	57	152	•	3	124
Linseed	•	•	•	•	•	•	•	•	•	1
Forage maize	•	•	•	•	•	•	•	•	•	0
Turnips (stock)	2	4	•	43	173	•	1	7	•	43
Kale and cow cabbage	•	•	•	•	•	•	•	•	•	9
Other roots/green crops	21	16	•	175	140	•	36	22	•	39
Peas	•	•	•	•	•	•	•	•	•	17
Beans	•	•	•	•	•	•	•	•	•	1
Vegetables (brassicae)	88	•	5	179	•	144	157	•	7	20
Vegetables (other)	12	•	•	63	•	•	7	•	•	15
Small fruit	•	•	•	•	•	•	•	•	•	3
Top fruit	•	•	•	•	•	•	•	•	•	0
Other tillage	24	2	•	47	135	•	11	3	•	13
All tillage	67	1	3	133	122	63	90	1	2	1320
Grass under 5 years	40	1	2	133	137	78	53	2	1	562
Grass 5 years and over	26	1	1	89	81	76	28	1	1	1103
All grass	31	1	1	108	97	77	33	1	1	1665
All crops & grass	44	1	2	122	104	68	54	1	1	2985

Source: British Survey of Fertiliser Practice 1995

Table SC1.3 Use of compound fertiliser, Scotland 1995

	Crop area receiving dressing (%)			Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
Spring wheat	.	.	.	.	.	.	.	.	.	4
Winter wheat	70	89	88	36	80	84	25	72	74	304
Spring barley	99	100	99	64	54	58	63	54	57	501
Winter barley	76	94	93	32	81	82	24	76	76	114
Oats	78	82	81	57	60	66	45	50	53	64
Rye	.	.	.	.	.	.	.	.	.	1
Early potatoes	.	.	.	.	.	.	.	.	.	1
Maincrop potatoes	94	94	94	154	191	220	145	180	207	46
Sugar beet	.	.	.	.	.	.	.	.	.	0
Oilseed rape	77	85	84	49	67	71	38	57	60	124
Linseed	.	.	.	.	.	.	.	.	.	1
Forage maize	.	.	.	.	.	.	.	.	.	0
Turnips (stock)	99	96	99	82	117	82	81	112	82	43
Kale and cow cabbage	.	.	.	.	.	.	.	.	.	9
Other roots/green crops	82	82	82	67	83	77	55	68	64	39
Peas	48	55	55	14	45	48	7	25	26	17
Beans	.	.	.	.	.	.	.	.	.	1
Vegetables (brassicae)	52	100	95	148	134	159	76	134	151	20
Vegetables (other)	81	90	90	78	109	110	63	98	99	15
Small fruit	.	.	.	.	.	.	.	.	.	3
Top fruit	.	.	.	.	.	.	.	.	.	0
Other tillage	91	91	91	62	45	53	57	41	49	13
All tillage	86	93	92	59	71	75	51	67	70	1320
Grass under 5 years	82	84	82	111	40	50	91	34	41	562
Grass 5 years and over	76	77	71	101	37	41	76	28	29	1103
All grass	78	79	74	104	38	45	81	30	33	1665
All crops & grass	81	84	81	87	51	58	70	43	47	2985

Table SC1.4 Use of lime, Scotland 1995

	Crop area receiving dressing (%)					Average field rate of CaO equivalent (tonne/ha)					Fields in sample		
	ground limestone	ground chalk	magnesian limestone	sugar beet waste	other	all	ground limestone	ground chalk	magnesian limestone	sugar beet waste		other	all
Spring wheat	•	•	•	•	•	•	•	•	•	•	•	•	
Winter wheat	5.2	•	4.8	0.3	0.7	11.4	2.4	•	2.4	1.9	1.2	2.2	304
Spring barley	10.7	•	14.4	0.3	0.2	25.9	2.2	•	2.4	1.2	1.2	2.3	501
Winter barley	5.5	•	10.7	•	0.9	17.6	2.2	•	2.4	•	1.3	2.2	114
Oats	13.1	•	15.1	•	•	28.1	11.7	•	2.5	•	•	6.7	64
Rye	•	•	•	•	•	•	•	•	•	•	•	•	•
Early potatoes	•	•	•	•	•	•	•	•	•	•	•	•	1
Maincrop potatoes	•	•	•	•	•	•	•	•	•	•	•	•	46
Sugar beet	•	•	•	•	•	•	•	•	•	•	•	•	0
Oilseed rape	1.3	•	13.1	•	1.3	15.8	2.5	•	2.5	•	3.1	2.5	124
Linseed	•	•	•	•	•	•	•	•	•	•	•	•	1
Forage maize	•	•	•	•	•	•	•	•	•	•	•	•	0
Tumips (stock)	19.6	•	•	•	•	19.6	2.5	•	•	•	•	2.5	43
Kale and cow cabbage	•	•	•	•	•	•	•	•	•	•	•	•	9
Other roots/green crops	•	•	4.5	•	•	4.5	•	•	2.3	•	•	2.3	39
Peas	•	•	9.7	•	•	9.7	•	•	1.7	•	•	1.7	17
Beans	•	•	•	•	•	•	•	•	•	•	•	•	1
Vegetables (brassicae)	•	•	56.1	•	•	56.1	•	•	1.8	•	•	1.8	20
Vegetables (other)	10.4	•	30.3	•	•	40.7	2.5	•	3.9	•	•	3.5	15
Small fruit	•	•	•	•	•	•	•	•	•	•	•	•	3
Top fruit	•	•	•	•	•	•	•	•	•	•	•	•	0
Other tillage	•	•	8.2	•	•	8.2	•	•	2.7	•	•	2.7	13
All tillage	7.3	•	11.4	0.2	0.4	19.6	2.7	•	2.4	1.4	1.8	2.5	1320
Grass under 5 years	3.0	•	9.2	•	•	12.4	2.3	•	2.6	•	•	2.5	562
Grass 5 years and over	2.4	•	2.6	•	•	5.0	1.9	•	1.8	•	1.2	1.9	1103
All grass	2.6	•	4.8	•	•	7.5	2.1	•	2.3	•	1.2	2.2	1665
All crops & grass	4.3	•	7.2	0.1	0.2	11.9	2.4	•	2.4	1.4	1.8	2.3	2985

Table SC1.5 Percentage of crop area by field application rate – N, Scotland 1995

row %	kg/ha	Fields in sample												
		0	<25	25-	50-	75-	100-	125-	150-	200-	250-	300-	400+	
Spring wheat		•	•	•	•	•	•	•	•	•	•	•	•	4
Winter wheat	1	1	•	•	•	•	1	4	26	57	7	3	•	304
Spring barley	1	•	•	6	14	31	35	8	3	3	•	•	•	501
Winter barley	1	•	•	•	1	5	5	8	51	25	4	•	•	114
Oats	10	3	10	2	18	28	14	9	1	5	•	•	•	64
Rye	•	•	•	•	•	•	•	•	•	•	•	•	•	1
Early potatoes	•	•	•	•	•	•	•	•	•	•	•	•	•	1
Maincrop potatoes	6	•	•	•	•	10	9	26	25	25	•	•	•	46
Sugar beet	•	•	•	•	•	•	•	•	•	•	•	•	•	0
Oilseed rape	•	•	•	2	•	3	14	13	14	28	24	1	•	124
Linseed	•	•	•	•	•	•	•	•	•	•	•	•	•	1
Forage maize	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Turnips (stock)	1	•	•	23	27	14	19	9	8	•	•	•	•	43
Kale and cow cabbage	•	•	•	•	•	•	•	•	•	•	•	•	•	9
Other roots/green crops	18	•	•	6	22	19	9	10	1	15	•	•	•	39
Peas	52	43	•	•	5	•	•	•	•	•	•	•	•	17
Beans	•	•	•	•	•	•	•	•	•	•	•	•	•	1
Vegetables (brassicae)	•	•	•	•	•	•	12	•	•	73	7	7	•	20
Vegetables (other)	10	•	•	•	52	8	28	•	3	•	•	•	•	15
Small fruit	•	•	•	•	•	•	•	•	•	•	•	•	•	3
Top fruit	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Other tillage	9	•	•	•	24	60	7	•	•	•	•	•	•	13
All tillage	2	1	4	8	17	17	20	8	14	21	5	1	•	1320
Grass under 5 years	4	0	8	17	11	9	14	10	13	8	5	2	•	562
Grass 5 years and over	16	1	9	21	12	10	8	9	4	4	4	0	•	1103
All grass	12	1	9	20	12	10	10	9	7	5	4	1	•	1665
All crops & grass	9	1	7	15	14	13	9	11	12	5	3	•	•	2985

Source : British Survey of Fertiliser Practice 1995

Table SC1.6 Percentage of crop area by field application rate – P₂O₅, Scotland 1995

row %	kg/ha	Fields in sample													
		0	<25	25-	50-	75-	100-	125-	150-	200-	250-	300-	400+		
Spring wheat		•	•	•	•	•	•	•	•	•	•	•	•	•	304
Winter wheat	11	1	4	32	45	3	1	4	•	•	•	•	•	•	501
Spring barley	•	2	36	51	7	1	1	1	•	•	•	•	•	•	114
Winter barley	6	3	3	15	63	7	2	•	•	•	•	•	•	•	64
Oats	12	1	27	28	25	•	•	7	•	•	•	•	•	•	1
Rye	•	•	•	•	•	•	•	•	•	•	•	•	•	0	•
Early potatoes	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Maincrop potatoes	6	•	•	•	2	3	19	24	42	1	2	•	•	•	46
Sugar beet	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Oilseed rape	15	1	17	34	32	1	•	•	•	•	•	•	•	•	124
Linseed	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Forage maize	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Turnips (stock)	4	•	4	19	13	18	7	25	6	4	•	•	•	•	43
Kale and cow cabbage	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Other roots/green crops	6	2	9	35	19	•	4	25	•	•	•	•	•	•	9
Peas	45	•	38	15	3	•	•	•	•	•	•	•	•	•	39
Beans	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Vegetables (brassicae)	•	•	•	•	•	•	•	38	48	1	5	7	•	•	17
Vegetables (other)	10	•	11	7	6	42	15	1	•	7	•	•	•	•	1
Small fruit	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Top fruit	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Other tillage	9	•	65	22	2	•	•	2	•	•	•	•	•	•	13
All tillage	6	2	21	37	23	3	2	3	2	•	•	•	•	•	1320
Grass under 5 years	15	24	35	16	5	2	1	2	0	0	0	0	0	0	562
Grass 5 years and over	23	24	32	13	5	2	0	0	0	0	0	0	0	0	1103
All grass	20	24	33	14	5	2	1	1	•	•	•	•	•	•	1665
All crops & grass	15	16	29	22	12	2	1	2	1	•	•	•	•	•	2985

Table SC1.7 Percentage of crop area by field application rate – K₂O, Scotland 1995

row %	kg/ha	0	<25	25-	50-	75-	100-	125-	150-	200-	250-	300-	400+	Fields in sample
Spring wheat		•	•	•	•	•	•	•	•	•	•	•	•	4
Winter wheat		11	2	3	26	43	9	3	4	•	•	•	•	304
Spring barley		1	2	32	45	13	5	2	•	•	•	•	•	501
Winter barley		3	3	6	12	59	14	2	•	•	•	•	•	114
Oats		19	1	22	25	29	4	•	•	1	•	•	•	64
Rye		•	•	•	•	•	•	•	•	•	•	•	•	1
Early potatoes		•	•	•	•	•	•	•	•	•	•	•	•	1
Maincrop potatoes		6	•	2	•	•	5	4	22	29	16	18	•	46
Sugar beet		•	•	•	•	•	•	•	•	•	•	•	•	•
Oilseed rape		15	•	10	30	38	5	1	1	•	•	•	•	124
Linseed		•	•	•	•	•	•	•	•	•	•	•	•	1
Forage maize		•	•	•	•	•	•	•	•	•	•	•	•	•
Turnips (stock)		1	2	13	26	24	27	1	6	•	•	•	•	43
Kale and cow cabbage		•	•	•	•	•	•	•	•	•	•	•	•	9
Other roots/green crops		18	•	7	42	22	1	8	3	•	•	•	•	39
Peas		45	•	38	15	•	•	3	•	•	•	•	•	17
Beans		•	•	•	•	•	•	•	•	•	•	•	•	1
Vegetables (brassicae)		•	•	•	•	•	13	53	27	•	•	•	7	20
Vegetables (other)		10	•	•	18	6	58	•	1	•	7	•	•	15
Small fruit		•	•	•	•	•	•	•	•	•	•	•	•	3
Top fruit		•	•	•	•	•	•	•	•	•	•	•	•	•
Other tillage		9	•	65	2	4	20	•	•	•	•	•	•	13
All tillage		7	2	18	32	26	7	3	3	1	1	1	•	1320
Grass under 5 years		17	17	34	12	8	6	3	2	0	0	0	0	562
Grass 5 years and over		29	21	30	9	5	3	2	1	0	0	0	0	1103
All grass		25	19	31	10	6	4	2	1	•	•	•	•	1665
All crops & grass		18	13	26	18	14	5	2	2	•	•	•	•	2985

Source : British Survey of Fertiliser Practice 1995

Table SC2.1 Average fertiliser practice by grassland utilisation, Scotland 1995

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P ₂ O ₅	K ₂ O	FYM	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
Grazed – not mown	83	74	67	22	105	32	30	88	24	20	1009
Grazed – mown	98	91	90	59	176	51	71	172	46	64	427
All grazings	87	78	73	31	125	37	42	108	29	30	1436
Cut for seed grazed	.	.	.	.	.	.	.	.	.	.	0
Cut for seed not grazed	.	.	.	.	.	.	.	.	.	.	0
All cut for seed	.	.	.	.	.	.	.	.	.	.	0
Cut for silage grazed	100	94	93	64	192	54	77	192	51	71	318
Cut for silage not grazed	99	95	93	51	178	48	66	176	45	62	159
All cut for silage	99	95	93	59	187	51	73	186	49	68	477
Cut for hay grazed	92	80	80	41	123	41	49	113	32	40	109
Cut for hay not grazed	95	85	87	16	112	43	54	106	37	47	61
All cut for hay	93	82	83	33	119	42	51	110	34	42	170
All mowings	98	92	90	53	172	49	68	168	45	62	647
All grass	88	80	75	32	130	39	45	114	31	34	1668

Source: British Survey of Fertiliser Practice 1995

Table SC2.2 Percentage of grass area by field application rate – N, Scotland 1995

row %	kg/ha													Fields in
		0	<25	25-	50-	75-	100-	125-	150-	200-	250-	300-	400+	sample
Grazed – not mown		17	1	13	26	12	10	8	6	3	2	2	1	1009
Grazed – mown		2	•	1	8	11	10	11	19	16	13	9	•	427
All grazings		13	1	10	22	12	10	8	9	6	5	4	1	1436
Cut for seed grazed		•	•	•	•	•	•	•	•	•	•	•	•	0
Cut for seed not grazed		•	•	•	•	•	•	•	•	•	•	•	•	0
All cut for seed		•	•	•	•	•	•	•	•	•	•	•	•	0
Cut for silage grazed		•	•	•	5	9	9	9	22	18	16	11	•	318
Cut for silage not grazed		1	•	2	10	10	8	15	12	17	14	10	•	159
All cut for silage		1	•	1	7	9	9	11	18	18	16	11	•	477
Cut for hay grazed		8	•	3	18	19	10	18	11	10	•	3	•	109
Cut for hay not grazed		5	•	10	13	24	12	18	5	10	2	•	•	61
All cut for hay		7	•	5	16	21	11	18	9	10	1	2	•	170
All mowings		2	•	2	9	12	9	13	16	16	12	9	•	647
All grass		12	1	9	20	12	10	10	9	7	5	4	1	1668

Source: British Survey of Fertiliser Practice 1995

Table SC2.3 Percentage of grass area by field application rate - P₂O₅, Scotland 1995

row %	kg/ha	Fields in sample												
		0	<25	25-	50-	75-	100-	125-	150-	200-	250-	300-	400+	
Grazed – not mown		26	30	30	10	2	1	•	1	•	•	•	•	1009
Grazed – mown		9	11	37	23	14	4	1	1	•	•	•	•	427
All grazings		22	26	32	13	5	2	•	1	•	•	•	•	1436
Cut for seed grazed		•	•	•	•	•	•	•	•	•	•	•	•	0
Cut for seed not grazed		•	•	•	•	•	•	•	•	•	•	•	•	0
All cut for seed		•	•	•	•	•	•	•	•	•	•	•	•	0
Cut for silage grazed		6	10	36	25	17	4	1	1	•	•	•	•	318
Cut for silage not grazed		5	17	45	20	7	2	3	•	•	•	•	•	159
All cut for silage		5	13	39	23	13	3	2	1	•	•	•	•	477
Cut for hay grazed		20	16	40	17	5	2	•	•	•	•	•	•	109
Cut for hay not grazed		15	7	55	9	11	4	•	•	•	•	•	•	61
All cut for hay		18	13	45	14	7	3	•	•	•	•	•	•	170
All mowings		8	13	41	21	12	3	2	1	•	•	•	•	647
All grass		20	24	33	14	5	2	1	1	•	•	•	•	1668

Source: British Survey of Fertiliser Practice 1995

Table SC2.4 Percentage of grass area by field application rate – K₂O, Scotland 1995

row %	kg/ha	Fields in sample											
		0	<25	25-	50-	75-	100-	125-	150-	200-	250-	300-	400+
Grazed – not mown	33	27	31	6	2	1	•	•	•	•	•	•	1009
Grazed – mown	10	7	27	17	16	12	6	4	1	•	•	•	427
All grazings	27	22	30	9	5	4	2	1	•	•	•	•	1436
Cut for seed grazed	•	•	•	•	•	•	•	•	•	•	•	•	0
Cut for seed not grazed	•	•	•	•	•	•	•	•	•	•	•	•	0
All cut for seed	•	•	•	•	•	•	•	•	•	•	•	•	0
Cut for silage grazed	7	6	24	16	19	15	7	5	1	•	•	•	318
Cut for silage not grazed	7	3	42	11	14	10	10	3	•	•	•	•	159
All cut for silage	7	5	31	14	17	13	8	4	1	•	•	•	477
Cut for hay grazed	20	13	37	18	6	2	4	1	•	•	•	•	109
Cut for hay not grazed	13	4	45	16	13	6	•	3	•	•	•	•	61
All cut for hay	17	10	40	17	9	3	3	1	•	•	•	•	170
All mowings	10	6	33	15	15	11	7	3	•	•	•	•	647
All grass	25	19	31	10	6	4	2	1	•	•	•	•	1668

Source: British Survey of Fertiliser Practice 1995

Table SC3.0 Product and nutrient use by month of application, - Scotland 1995

(a) Product Use

row %	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total product ('000 tonnes)
Straight N	0	4	26	45	11	7	3	3	0	0	0	0	292
Straight P	0	5	46	18	8	0	15	0	5	1	0	3	5
Straight K	1	4	18	24	19	22	1	0	1	12	0	0	4
Compounds	0	1	17	41	11	11	5	4	6	3	0	0	619
Unknown	0	0	2	8	85	1	0	0	1	3	0	0	19
All fertilisers	0	2	19	41	13	9	5	4	4	2	0	0	940

(b) Nutrient Use

row %	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total nutrient ('000 tonnes)
N	0	1	20	44	13	11	5	4	1	1	0	0	206
P ₂ O ₅	1	3	17	39	11	5	4	4	9	5	1	0	75
K ₂ O	0	3	18	38	9	9	4	4	8	5	1	1	78
Total	0	2	19	42	11	9	4	4	4	3	1	0	359

Note: product use refers to total tonnage of the products used by farmers in the survey year 1995

nutrient use refers to the tonnage of each nutrient contained in the products used (eg 100kg of a 20:10:10 compound contains 20kg of N, 10kg of P₂O₅ and 10kg of K₂O;

100 kg of ammonium nitrate, one of the 'straight N' products, contains typically 34.5 kg of N)

Table SC5.1 Average fertiliser practice on general cropping farms, Scotland 1995

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P ₂ O ₅	K ₂ O	FYM	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
Spring wheat	.	.	.	.	.	.	.	.	.	.	3
Winter wheat	100	91	91	10	211	81	85	211	74	77	246
Spring barley	100	99	98	15	109	57	63	108	56	62	252
Winter barley	100	93	97	10	187	86	87	187	80	85	79
Oats	94	87	87	15	123	65	70	116	56	61	35
Rye	.	.	.	.	.	.	.	.	.	.	0
Early potatoes	.	.	.	.	.	.	.	.	.	.	0
Maincrop potatoes	93	93	93	49	161	196	224	150	183	209	37
Sugar beet	.	.	.	.	.	.	.	.	.	.	0
Oilseed rape	100	83	83	24	201	70	77	201	58	64	102
Linseed	.	.	.	.	.	.	.	.	.	.	1
Forage maize	.	.	.	.	.	.	.	.	.	.	0
Turnips (stock)	100	82	100	62	93	109	95	93	89	95	10
Kale and cow cabbage	.	.	.	.	.	.	.	.	.	.	2
Other roots/green crops	.	.	.	.	.	.	.	.	.	.	9
Peas	48	55	55	5	14	45	48	7	25	26	17
Beans	.	.	.	.	.	.	.	.	.	.	0
Vegetables (brassicae)	100	100	100	5	233	134	158	233	134	158	20
Vegetables (other)	83	83	83	18	71	108	131	59	90	109	11
Small fruit	.	.	.	.	.	.	.	.	.	.	2
Top fruit	.	.	.	.	.	.	.	.	.	.	0
Other tillage	.	.	.	.	.	.	.	.	.	.	5
All tillage	98	92	92	16	162	77	83	159	71	77	831
Grass under 5 years	94	67	68	13	156	40	49	147	27	33	128
Grass 5 years and over	77	61	61	13	111	43	47	86	26	29	126
All grass	87	66	66	12	137	43	49	120	28	32	255
All crops & grass	95	84	85	15	156	69	75	147	58	64	1086

Source: British Survey of Fertiliser Practice 1995

NB Some of these estimates are based on very few fields in the sample and should be treated with great caution.

Table SC5.2 Average fertiliser practice on dairy farms, Scotland 1995

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P ₂ O ₅	K ₂ O	FYM	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
Spring wheat	.	.	.	.	.	.	.	.	.	.	0
Winter wheat	.	.	.	.	.	.	.	.	.	.	4
Spring barley	100	100	100	44	90	50	53	90	50	53	32
Winter barley	.	.	.	.	.	.	.	.	.	.	3
Oats	.	.	.	.	.	.	.	.	.	.	1
Rye	.	.	.	.	.	.	.	.	.	.	0
Early potatoes	.	.	.	.	.	.	.	.	.	.	1
Maincrop potatoes	.	.	.	.	.	.	.	.	.	.	2
Sugar beet	.	.	.	.	.	.	.	.	.	.	0
Oilseed rape	.	.	.	.	.	.	.	.	.	.	1
Linseed	.	.	.	.	.	.	.	.	.	.	0
Forage maize	.	.	.	.	.	.	.	.	.	.	0
Turnips (stock)	.	.	.	.	.	.	.	.	.	.	1
Kale and cow cabbage	.	.	.	.	.	.	.	.	.	.	0
Other roots/green crops	.	.	.	.	.	.	.	.	.	.	0
Peas	.	.	.	.	.	.	.	.	.	.	0
Beans	.	.	.	.	.	.	.	.	.	.	0
Vegetables (brassicae)	.	.	.	.	.	.	.	.	.	.	0
Vegetables (other)	.	.	.	.	.	.	.	.	.	.	0
Small fruit	.	.	.	.	.	.	.	.	.	.	0
Top fruit	.	.	.	.	.	.	.	.	.	.	0
Other tillage	.	.	.	.	.	.	.	.	.	.	0
All tillage	100	96	96	54	126	60	61	126	58	59	45
Grass under 5 years	100	98	94	38	173	49	63	173	48	59	51
Grass 5 years and over	93	80	73	41	134	40	48	124	32	35	183
All grass	94	82	76	41	140	41	51	132	34	39	234
All crops & grass	95	84	79	43	138	44	52	131	37	41	279

Source: British Survey of Fertiliser Practice 1995

NB Some of these estimates are based on very few fields in the sample and should be treated with great caution.

Table SC5.3 Average fertiliser practice on mixed farms, in Scotland 1995

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P ₂ O ₅	K ₂ O	FYM	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
Spring wheat	.	.	.	.	.	.	.	.	.	.	1
Winter wheat	100	87	87	38	208	80	88	208	70	77	37
Spring barley	100	100	98	47	84	52	56	84	52	55	109
Winter barley	100	100	100	55	170	64	66	170	64	66	18
Oats	77	86	58	27	92	88	61	70	76	35	18
Rye	.	.	.	.	.	.	.	.	.	.	.
Early potatoes	.	.	.	.	.	.	.	.	.	.	.
Maincrop potatoes	.	.	.	.	.	.	.	.	.	.	.
Sugar beet	.	.	.	.	.	.	.	.	.	.	.
Oilseed rape	97	97	97	26	183	59	73	178	58	71	13
Linseed	.	.	.	.	.	.	.	.	.	.	.
Forage maize	.	.	.	.	.	.	.	.	.	.	.
Turnips (stock)	100	100	100	49	98	147	85	98	147	85	12
Kale and cow cabbage	.	.	.	.	.	.	.	.	.	.	1
Other roots/green crops	65	100	65	24	71	128	84	46	128	55	13
Peas	.	.	.	.	.	.	.	.	.	.	.
Beans	.	.	.	.	.	.	.	.	.	.	.
Vegetables (brassicae)	.	.	.	.	.	.	.	.	.	.	.
Vegetables (other)	.	.	.	.	.	.	.	.	.	.	.
Small fruit	.	.	.	.	.	.	.	.	.	.	.
Top fruit	.	.	.	.	.	.	.	.	.	.	.
Other tillage	.	.	.	.	.	.	.	.	.	.	.
All tillage	98	98	94	43	116	67	68	113	65	64	233
Grass under 5 years	95	87	82	37	156	43	50	148	38	41	143
Grass 5 years and over	92	78	67	25	128	35	38	105	27	25	160
All grass	88	82	74	33	144	39	44	128	32	32	302
All crops & grass	92	88	81	36	133	50	54	122	44	44	535

*Estimated area under crop

Source: British Survey of Fertiliser Practice 1995

NB Some of these estimates are based on very few fields in the sample and should be treated with great caution.

Table SC5.4 Average fertiliser practice on farms in less favoured areas, Scotland 1995

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P ₂ O ₅	K ₂ O	FYM	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
Spring wheat	.	.	.	.	.	.	.	.	.	.	0
Winter wheat	89	77	77	54	136	66	78	121	51	60	17
Spring barley	98	100	100	37	89	56	57	87	56	57	108
Winter barley	87	96	87	53	146	73	83	126	70	72	14
Oats	95	95	95	26	120	58	63	113	55	59	10
Rye	.	.	.	.	.	.	.	.	.	.	0
Early potatoes	.	.	.	.	.	.	.	.	.	.	0
Maincrop potatoes	.	.	.	.	.	.	.	.	.	.	0
Sugar beet	.	.	.	.	.	.	.	.	.	.	0
Oilseed rape	.	.	.	.	.	.	.	.	.	.	8
Linseed	.	.	.	.	.	.	.	.	.	.	0
Forage maize	.	.	.	.	.	.	.	.	.	.	0
Turnips (stock)	98	98	98	52	66	108	75	65	106	73	20
Kale and cow cabbage	.	.	.	.	.	.	.	.	.	.	6
Other roots/green crops	85	85	85	40	87	80	66	74	68	56	17
Peas	.	.	.	.	.	.	.	.	.	.	0
Beans	.	.	.	.	.	.	.	.	.	.	1
Vegetables (brassicae)	.	.	.	.	.	.	.	.	.	.	0
Vegetables (other)	.	.	.	.	.	.	.	.	.	.	2
Small fruit	.	.	.	.	.	.	.	.	.	.	1
Top fruit	.	.	.	.	.	.	.	.	.	.	0
Other tillage	.	.	.	.	.	.	.	.	.	.	7
All tillage	96	96	95	41	96	62	61	92	59	58	211
Grass under 5 years	98	92	91	40	136	40	51	133	37	47	240
Grass 5 years and over	82	79	73	33	114	37	41	94	29	30	634
All grass	86	83	77	35	120	38	44	104	31	34	874
All crops & grass	87	84	80	36	117	41	47	102	35	37	1085

Source: British Survey of Fertiliser Practice 1995

NB Some of these estimates are based on very few fields in the sample and should be treated with great caution.

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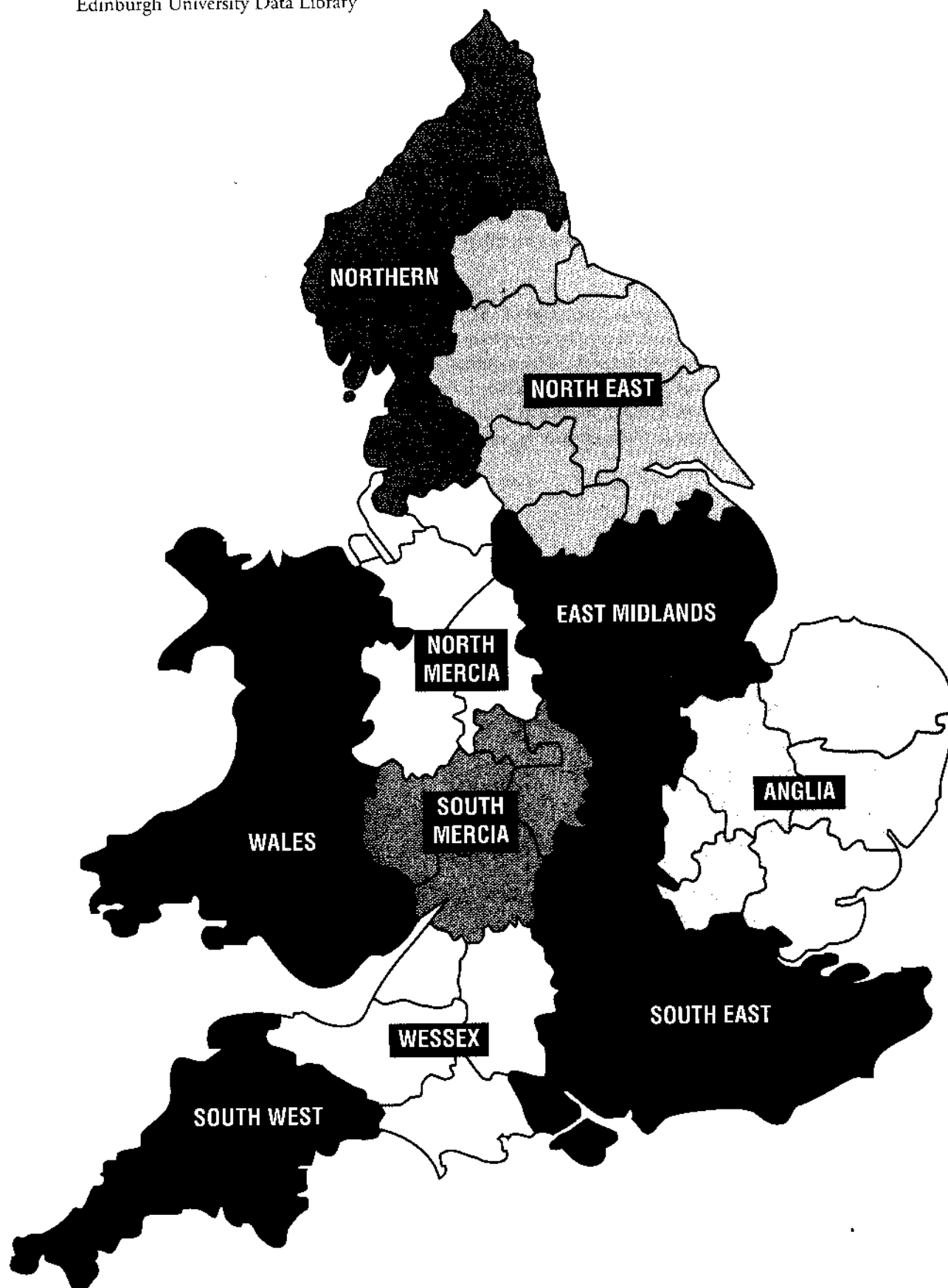
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BRITISH SURVEY OF FERTILISER PRACTICE
MAFF Administrative Regions

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BRITISH SURVEY OF FERTILISER PRACTICE
SOAFD Administrative Regions

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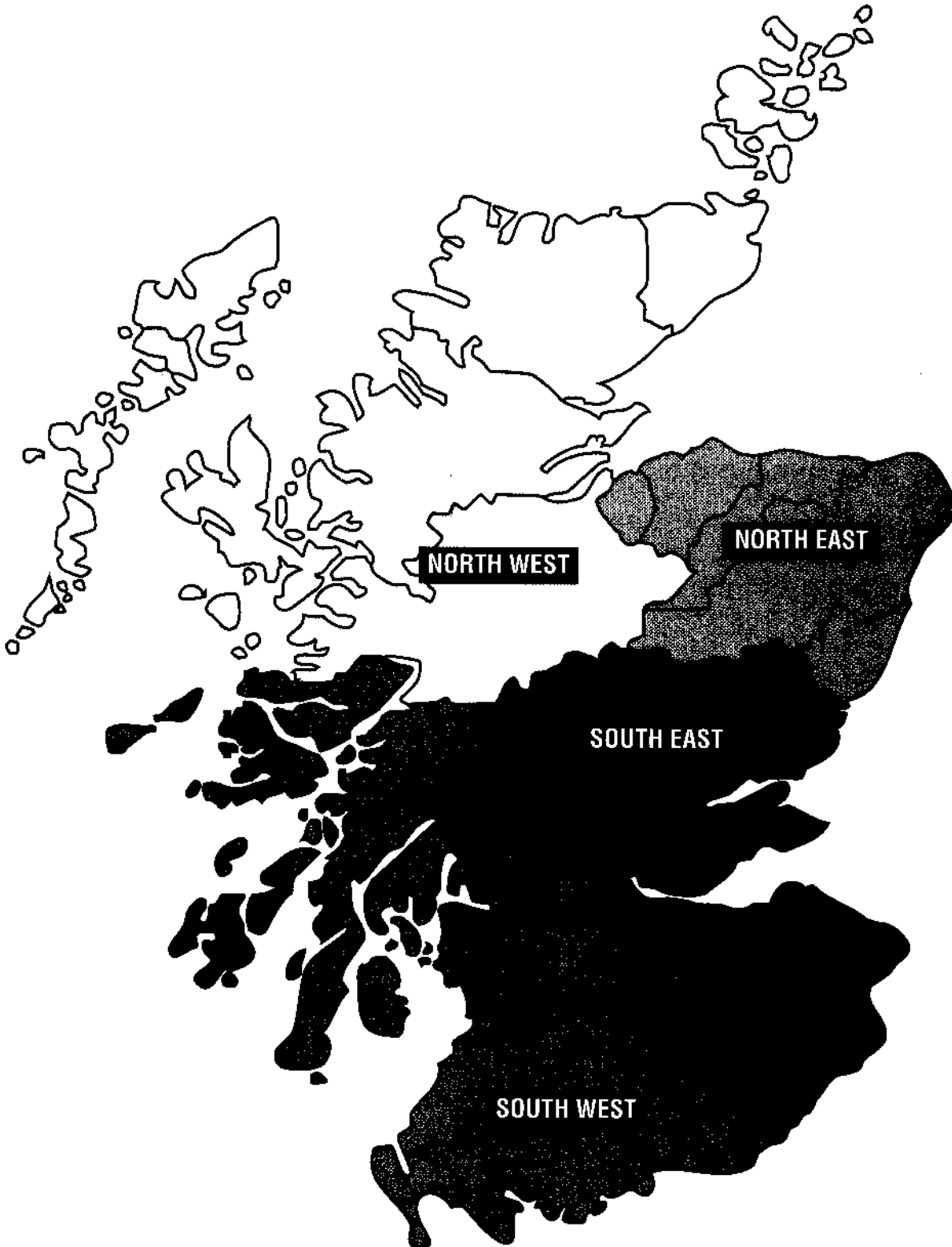


Table GB3.1 Product type as percentage of all product used by crop group in Britain 1995

column %	Spring cereal	Winter cereal	potatoes	sugar beet	oil seed rape	other tillage	all tillage	grass for grazing	grass for hay	grass for silage	grass not spec	all grass	all crops & grass
Calcium Ammonium Nitrate	0.1	0.4	0	0	1.1	0.8	0.4	0.2	0.4	0.1	0.1	0.1	0.3
Urea	1.6	5.6	0.8	1.7	7.7	2.0	4.7	1.7	1	1.6	0	1.6	3.3
Ammonium Nitrate	23.1	49.1	5.4	23.6	44.9	21.0	40.6	31.1	30.8	25.8	38.5	28.5	35.3
Other Straight N	2.1	9.9	0.7	2.0	11.7	6.0	8.1	3.8	0.9	2.8	3.9	3.1	5.9
Triple Super Phosphate	0.3	1.1	0.4	0.1	1.1	2.0	1.0	0.5	0.2	0.2	2.7	0.4	0.7
Single Super Phosphate	0	0	0	0	0	0	0	0	0	0.1	0	0.1	0
Other Straight P	0.1	0.2	0.7	2.4	0.1	0.9	0.4	0.7	0.5	0.1	0	0.4	0.4
Muriate of Potash	0.8	0.8	2.7	0.5	0.7	2.5	1.0	0.1	0.2	0.3	1.1	0.2	0.7
Other Straight K	0	0.1	1.0	7.8	0	1.1	0.7	0.1	0	0	0	0.1	0.4
NP	1.0	0.7	1.5	0.6	0.3	3.0	0.9	4.7	3.0	1.7	0	3.1	1.8
NK	1.2	0.7	0	1.3	0.3	1.3	0.8	2.0	2.7	14.0	0	8.0	3.9
PK	5.4	16.8	5.6	37.5	10.2	21.8	16.3	1.6	3.5	2.0	5.0	2.0	10.0
Very High N	1.3	2.1	0	0.1	2.9	0.8	1.8	30.1	15.8	20.0	9.3	24.0	11.5
High N	25.9	1.7	2.0	0.3	2.2	7.0	4.1	18.7	34.5	19.9	33	20.5	11.3
High P	0.4	1.2	3.1	0	1.0	2.3	1.2	0.2	0.3	0.1	0	0.2	0.8
High K	7.8	1.9	54.8	11.2	2.2	14.2	6.6	0.9	1.6	4.0	0.8	2.5	4.8
Low N	6.9	6.5	15.7	0	8.5	5.7	6.7	0.5	0.8	0.4	0.5	0.4	3.9
Low P	4.1	0.3	0.4	4.5	0.1	2.9	1.0	0.9	1.3	5.6	0	3.2	2.0
Equal NPK	11.4	0.8	4.7	0	4.4	3.4	2.4	1.9	2.4	0.7	3.6	1.3	1.9
Unknown	6.4	0.2	0.4	6.3	0.5	1.5	1.3	0.4	0.2	0.6	1.4	0.5	0.9
Total prod ('000 tonnes)	257	1864	148	186	296	221	2972	1008	164	1148	16	2335	5307

Source: British Survey of Fertiliser Practice 1995

Table GB3.3 Product use by month of application in Britain 1995

row %	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total Product ('000 tonnes)
Calcium Ammonium Nitrate	0	10	45	32	4	6	2	0	0	0	0	0	16
Urea	0	6	39	39	8	4	3	0	0	0	0	0	177
Ammonium Nitrate	0	4	29	40	16	5	3	2	1	0	0	0	1872
Other Straight N	0	6	32	44	9	4	2	1	0	0	0	0	316
Triple Super Phosphate	3	5	19	8	6	1	2	5	14	23	10	6	39
Single Super Phosphate	21	0	1	21	32	0	0	0	4	9	0	12	2
Other Straight P	0	3	26	5	6	0	3	26	21	4	3	3	21
Muriate of Potash	2	8	29	18	7	2	2	3	6	11	9	3	35
Other Straight K	1	19	14	4	4	2	0	0	4	28	22	2	22
NP	2	8	37	35	7	3	3	0	4	2	0	0	97
NK	0	2	6	6	27	34	19	5	1	0	0	0	209
PK	2	6	18	5	3	0	1	3	23	26	9	5	530
Very High N	0	1	24	34	14	12	8	5	1	0	0	0	613
High N	0	2	27	42	16	6	3	1	1	1	0	0	602
High P	0	10	35	23	14	1	0	1	9	2	4	0	41
High K	0	10	43	31	8	2	1	1	1	2	1	0	253
Low N	1	4	15	17	3	1	1	5	31	17	5	1	210
Low P	0	4	21	20	15	22	12	5	0	0	0	0	107
Equal NPK	0	5	30	37	6	5	2	8	3	3	0	0	102
Unknown	0	5	13	9	41	7	2	0	8	4	4	6	49
All fertilisers	0	4	27	32	13	7	4	3	5	4	1	1	5313

Source: British Survey of Fertiliser Practice 1995

Table GB3.2 Use of product type by crop group in Britain 1995

('000 tonnes)

row %	Spring cereal	Winter cereal	potatoes	sugar beet	oil seed rape	other tillage	all tillage	grass for grazing	grass for hay	grass for silage	grass not spec	all grass	all crops & grass
Calcium Ammonium Nitrate	1.6	49.8	0	0	19.6	10.2	81.2	9.2	3.9	5.6	0.1	18.8	16.4
Urea	2.4	58.6	0.7	1.8	12.8	2.5	78.8	9.7	1.0	10.5	0	21.2	177.0
Ammonium Nitrate	3.2	48.9	0.4	2.3	7.1	2.5	64.4	16.7	2.7	15.8	0.3	35.5	1872.2
Other Straight N	1.7	58.4	0.3	1.2	10.9	4.2	76.7	12.2	0.4	10.2	0.2	23.1	315.7
Triple Super Phosphate	2.2	53.6	1.7	0.3	8.7	11.1	77.5	13.4	0.7	7.2	1.1	22.4	38.9
Single Super Phosphate	0	13.1	0	0	0	0.8	13.9	20.7	0	65.5	0	86.1	2.3
Other Straight P	0.7	18.4	4.9	21.5	1.0	9.5	56.2	36.1	3.8	3.9	0	43.8	20.7
Muriate of Potash	6.2	43.1	11.4	2.7	6.1	15.5	85.0	4.2	0.9	9.1	0.5	14.7	35.0
Other Straight K	0.1	8.0	6.9	65.9	0	10.6	91.5	6.0	0	2.5	0	8.5	22.1
NP	2.7	12.5	2.2	1.1	1.0	6.9	26.5	48.8	5.0	19.6	0	73.4	97.5
NK	1.5	6.3	0	1.2	0.4	1.4	10.9	9.7	2.2	77.1	0	89	208.8
PK	2.6	58.9	1.6	13.2	5.7	9.1	91.1	3.0	1.1	4.4	0.2	8.7	530.4
Very High N	0.5	6.3	0	0	1.4	0.3	8.6	49.5	4.2	37.4	0.2	91.4	612.6
High N	11.0	5.2	0.5	0.1	1.1	2.6	20.4	31.2	9.4	37.9	0.9	79.5	602.3
High P	2.4	57.5	11.5	0	7.3	12.5	91.2	4.8	1.3	2.8	0	8.8	40.5
High K	7.9	14.1	32.1	8.2	2.5	12.4	77.4	3.4	1.1	18.1	0.1	22.6	253.1
Low N	8.4	57.5	11.1	0	12.0	6.0	95.0	2.2	0.6	2.0	0	4.8	209.5
Low P	9.9	4.6	0.6	7.8	0.2	6.0	29.1	8.1	2.0	60.3	0	70.4	106.7
Equal NPK	28.7	13.7	6.8	0.1	12.8	7.3	69.4	18.3	3.8	7.6	0.6	30.2	102.2
Unknown	33.9	8.8	1.3	24.1	3.2	6.7	77.9	7.5	0.6	13.5	0.5	22.1	48.9
Total product	4.8	35.1	2.8	3.5	5.6	4.2	55.9	19	3.1	21.6	0.3	44	5312.8

Source: British Survey of Fertiliser Practice 1995

Table EW3.1 Product type as percentage of all product used by crop group England and Wales 1995

column %	Spring cereal	Winter cereal	potatoes	sugar beet	oil seed rape	other tillage	all tillage	grass for grazing	grass for hay	grass for silage	grass not spec	all grass	all crops & grass
Calcium Ammonium Nitrate	0	0.4	0	0	0.9	0.6	0.4	0.2	0.5	0.1	0.2	0.2	0.3
Urea	1.4	5.8	1.0	1.7	8.0	2.3	5.0	2.1	1.3	1.7	0	1.8	3.7
Ammonium Nitrate	32.6	50.3	6.0	23.6	46.2	23.3	43	34.9	34.3	27.9	58.4	31.5	38.1
Other Straight N	3.3	8.9	0.7	2.0	11.2	3.4	7.5	3.8	0.6	2.9	6	3.1	5.7
Triple Super Phosphate	0.5	1.2	0.5	0.1	1.4	2.2	1.2	0.5	0.2	0.3	4.1	0.4	0.8
Single Super Phosphate	0	0	0	0	0	0	0	0.1	0	0.2	0	0.1	0.1
Other Straight P	0	0.2	0.8	2.4	0.1	0.5	0.4	0.8	0.6	0	0	0.4	0.4
Muriate of Potash	1.2	0.9	3.2	0.5	0.7	3.0	1.1	0.2	0	0.3	1.6	0.2	0.7
Other Straight K	0	0.1	1.2	7.8	0	1.3	0.8	0	0	0	0	0	0.5
NP	0.9	0.7	1.7	0.6	0.3	3.2	0.9	3.5	3.2	1.6	0	2.5	1.6
NK	2.2	0.6	0	1.3	0.2	1.5	0.7	2.5	3.3	16.5	0	9.6	4.5
PK	11.2	18.0	6.6	37.5	11.6	25.9	18.5	1.7	4.1	2.2	7.6	2.1	11.6
Very High N	2.6	2.2	0	0.1	3.4	0.9	2.0	27.8	14.6	17.9	9.7	21.7	10.3
High N	21.8	1.7	1.5	0.3	1.2	6.1	2.8	18.3	33.1	18.0	5.6	19.1	9.7
High P	0.6	1.3	2.5	0	1.2	0.7	1.2	0.2	0.4	0.1	0	0.2	0.8
High K	6.4	2.1	56.7	11.2	1.8	14.5	6.5	0.8	1.5	4.5	1.3	2.7	4.9
Low N	2.9	4.6	11.9	0	7.5	3.4	4.8	0.2	0.8	0.3	0.8	0.3	2.9
Low P	8.4	0.2	0.5	4.5	0.1	3.4	1.2	0.8	1.1	4.6	0	2.7	1.8
Equal NPK	3.4	0.5	4.6	0	3.4	2.4	1.2	1.3	0.5	0.4	2.5	0.8	1.0
Unknown	0.5	0.2	0.5	6.3	0.6	1.4	0.8	0.3	0	0.7	2.2	0.5	0.7
Total prod ('000 tonnes)	115	1677	127	186	246	181	2530	764	134	930	10	1838	4368

Source: British Survey of Fertiliser Practice 1995

Table EW3.2 Use of product type by crop group England and Wales 1995

('000 tonnes)

row %	Spring cereal	Winter cereal	potatoes	sugar beet	oil seed rape	other tillage	all tillage	grass for grazing	grass for hay	grass for silage	grass not spec	all grass	all crops & grass
Calcium Ammonium Nitrate	0	50.4	0	0	18.2	8.8	77.3	10.3	5.0	7.2	0.2	22.7	12.7
Urea	1.0	60.2	0.8	2.0	12.3	2.6	78.9	10.0	1.1	9.9	0	21.0	160.7
Ammonium Nitrate	2.2	50.6	0.5	2.6	6.8	2.5	65.2	16.0	2.8	15.6	0.4	34.7	1667.2
Other Straight N	1.5	59.9	0.4	1.5	11.0	2.4	76.8	11.6	0.3	10.7	0.3	23.0	248.3
Triple Super Phosphate	1.6	56.7	1.8	0.3	9.2	11.1	80.7	10.9	0.6	6.5	1.2	19.2	36.7
Single Super Phosphate	0	13.1	0	0	0	0.8	13.9	20.7	0	65.5	0	86.1	2.3
Other Straight P	0.3	21.8	5.8	25.4	1.2	5.1	59.7	34.4	4.4	1.5	0	40.3	17.5
Muriate of Potash	4.4	44.9	12.5	2.9	5.5	16.7	86.8	4.5	0.2	7.8	0.5	13.0	32.1
Other Straight K	0.1	8.3	7.4	70.9	0	11.4	98.2	0	0	1.8	0	1.8	20.6
NP	1.4	16.1	3.2	1.6	1.2	8.6	32.1	39.3	6.3	22.2	0	67.9	67.9
NK	1.3	5.1	0	1.3	0.3	1.4	9.4	9.8	2.3	78.5	0	90.6	195
PK	2.5	59.4	1.6	13.7	5.6	9.2	92.0	2.6	1.1	3.9	0.2	7.7	508.9
Very High N	0.7	8.3	0	0	1.9	0.4	11.2	47.1	4.4	37.1	0.2	88.8	450.1
High N	5.9	6.8	0.4	0.1	0.7	2.6	16.6	33.1	10.5	39.5	0.1	83.3	422.6
High P	2.2	67.0	9.6	0	8.6	3.5	90.9	4.7	1.6	2.9	0	9.1	33.5
High K	3.4	16.2	33.3	9.7	2.1	12.1	76.8	2.7	1.0	19.5	0.1	23.2	215.6
Low N	2.6	61.4	11.9	0	14.5	4.8	95.4	1.4	0.9	2.0	0.1	4.4	126.2
Low P	12.1	5.2	0.8	10.4	0.3	7.7	36.6	7.7	1.8	53.3	0	62.8	80.1
Equal NPK	8.8	19.7	12.8	0.1	18.5	9.4	69.3	21.4	1.4	7.3	0.6	30.7	45.3
Unknown	2.1	12.4	2.1	39.7	5.2	8.4	69.9	9.0	0	20.4	0.8	30.1	29.7
Total product	2.6	38.3	2.9	4.3	5.6	4.1	57.9	17.5	3.1	21.3	0.2	42.0	4372.7

Source: British Survey of Fertiliser Practice 1995

Table EW3.3 Product use in England & Wales by month of application-1995

row %	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total Product (000 tonnes)
Calcium Ammonium Nitrate	0	9	42	33	5	8	3	0	0	0	0	0	13
Urea	0	6	40	38	7	4	4	0	0	0	0	0	161
Ammonium Nitrate	0	4	30	39	16	5	3	2	1	0	0	0	1667
Other Straight N	0	5	31	44	11	5	2	0	0	0	0	0	248
Triple Super Phosphate	4	5	19	7	6	1	1	5	14	24	10	6	37
Single Super Phosphate	21	0	1	21	32	0	0	0	4	9	0	12	2
Other Straight P	0	3	19	5	6	0	0	31	25	4	3	3	17
Muriate of Potash	2	8	29	17	7	1	2	4	7	11	10	3	32
Other Straight K	1	21	15	2	2	0	0	0	4	30	24	2	21
NP	3	11	39	30	8	1	3	0	4	2	0	0	68
NK	0	1	6	5	29	33	20	5	1	0	0	0	195
PK	2	6	18	5	2	0	0	3	24	26	9	5	509
Very High N	0	2	27	33	15	10	8	5	1	0	0	0	450
High N	0	2	32	38	17	5	2	1	1	1	0	0	423
High P	0	13	41	26	3	0	0	1	9	2	5	0	33
High K	0	12	44	27	8	2	2	0	2	2	1	0	216
Low N	0	6	20	11	0	0	1	5	29	18	7	1	126
Low P	0	6	27	20	20	17	7	2	0	0	1	0	80
Equal NPK	0	11	37	19	8	5	1	8	5	6	0	0	45
Unknown	0	8	20	10	13	10	4	0	13	5	7	10	30
All fertilisers	0	5	28	30	13	6	4	2	5	4	2	1	4373

Source: British Survey of Fertiliser Practice 1995

Table EW4.1 Average fertiliser practice on tillage and grassland by MAFF Region 1995

		Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
		N	P ₂ O ₅	K ₂ O	FYM	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
Wessex	All tillage	90	78	73	28	158	64	75	143	50	55	397
	All grass	77	48	49	43	165	33	57	127	16	28	475
	All crops & grass	82	60	58	37	162	48	66	133	29	38	872
Anglia	All tillage	91	67	62	5	169	70	85	154	47	52	1924
	All grass	77	31	29	5	172	43	62	133	13	18	157
	All crops & grass	90	64	59	5	169	69	84	152	44	50	2081
Northern	All tillage	92	80	84	18	166	65	85	153	52	71	281
	All grass	85	77	77	55	144	35	44	122	27	34	467
	All crops & grass	86	78	78	47	149	41	54	128	32	42	748
North East	All tillage	96	79	82	22	164	65	90	158	52	73	707
	All grass	82	68	67	57	132	35	50	108	24	34	407
	All crops & grass	89	73	74	39	149	51	71	132	37	53	1114
North Mercia	All tillage	95	82	84	37	146	62	90	139	51	76	257
	All grass	91	66	64	57	195	38	68	177	25	43	287
	All crops & grass	92	72	71	50	177	48	77	163	34	55	544
South Mercia	All tillage	91	78	71	21	150	68	71	136	53	50	414
	All grass	85	46	48	39	144	33	46	122	15	22	263
	All crops & grass	88	62	59	30	147	55	61	129	34	36	677
East Midlands	All tillage	92	76	73	8	173	69	78	159	53	56	1334
	All grass	75	45	43	22	141	32	43	105	15	19	289
	All crops & grass	87	67	65	12	165	62	71	144	42	46	1623
South East	All tillage	92	79	78	10	172	61	70	158	49	55	934
	All grass	74	38	32	32	156	40	62	115	15	20	367
	All crops & grass	85	63	60	18	167	57	68	142	36	41	1301
South West	All tillage	91	78	79	33	113	65	76	102	51	60	304
	All grass	93	82	84	51	149	32	51	138	26	43	554
	All crops & grass	92	81	83	47	141	39	57	130	32	47	858
Wales	All tillage	91	80	80	18	166	66	87	150	53	69	475
	All grass	84	75	71	54	110	33	39	92	25	27	609
	All crops & grass	86	76	73	46	124	41	51	106	32	37	1084

Table SC3.1 Product type as percentage of all product used by crop group, Scotland 1995

column %	Spring cereal	Winter cereal	potatoes	sugar beet	oil seed rape	other tillage	all tillage	grass for grazing	grass for hay	grass for silage	grass not spec	all grass	all crops & grass
Calcium Ammonium Nitrate	0.2	1.0	•	•	1.8	1.4	0.8	0.1	•	•	•	•	0.4
Urea	1.8	3.7	•	•	5.9	0.4	2.8	0.5	•	1.2	•	0.8	1.7
Ammonium Nitrate	15.4	38.5	1.5	•	38.5	10.5	26.7	19.1	15.0	16.5	•	17.5	21.8
Other Straight N	1.1	19.0	0.2	•	14.1	18.1	11.7	4.0	1.9	2.5	•	3.2	7.2
Triple Super Phosphate	0.2	•	•	•	•	0.7	0.1	0.5	0.2	0.2	•	0.3	0.2
Single Super Phosphate	•	•	•	•	•	•	•	•	•	•	•	•	•
Other Straight P	0.1	•	•	•	•	2.7	0.3	0.6	•	0.3	•	0.4	0.3
Muriate of Potash	0.6	0.4	•	•	0.7	0.2	0.4	•	0.9	0.3	•	0.2	0.3
Other Straight K	•	•	•	•	•	•	•	0.5	•	0.1	•	0.3	0.2
NP	1.2	0.7	•	•	0.4	2.0	0.9	8.6	1.8	1.8	•	5.1	3.1
NK	0.4	1.7	•	•	0.7	0.6	1.0	0.5	0.2	3.7	•	1.9	1.5
PK	0.8	5.6	•	•	3.7	3.3	3.3	1.2	0.6	1.6	•	1.3	2.3
Very High N	0.2	0.9	0	•	0.5	0.3	0.5	37.2	21.4	28.7	8.3	32.2	17.3
High N	29.1	1.3	4.6	•	7.1	10.7	11.9	19.7	41.1	28.3	86.0	25.5	19.1
High P	0.2	0.4	6.7	•	0.1	9.8	1.5	0.2	•	0.1	•	0.1	0.8
High K	8.9	0.4	43.6	•	3.7	13.1	6.8	1.2	2.0	1.8	•	1.5	4.0
Low N	10.1	22.9	37.9	•	13.5	16.0	17.9	1.1	0.7	0.7	•	0.9	8.9
Low P	0.6	0.4	•	•	•	0.5	0.4	1.0	2.4	9.9	•	5.0	2.8
Equal NPK	17.9	2.7	5.6	•	9.4	8.0	9.0	3.7	10.8	2.1	5.7	3.4	6.0
Unknown	11.2	0.3	0.1	•	•	1.9	3.9	0.4	1.0	0.3	•	0.4	2.1
Total prod ('000 tonnes)	142	187	22	•	50	40	441	244	30	218	5	497	939

Source: British Survey of Fertiliser Practice 1995

Table SC3.2 Use of product type by crop group, Scotland 1995

row %													('000 tonnes)	
	Spring cereal	Winter cereal	potatoes	sugar beet	oil seed rape	other tillage	all tillage	grass for grazing	grass for hay	grass for silage	grass not spec	all grass	all crops & grass	
Calcium Ammonium Nitrate	7.2	48.0	.	.	24.5	14.8	94.5	5.5	.	.	.	5.5	3.7	
Urea	15.5	42.3	.	.	18.0	1.0	76.8	7.1	.	16.0	.	23.2	16.3	
Ammonium Nitrate	10.7	35.2	0.2	.	9.4	2.0	57.5	22.7	2.2	17.5	.	42.5	205.0	
Other Straight N	2.4	52.7	0.1	.	10.4	10.7	76.3	14.3	0.8	8.2	.	23.4	67.4	
Triple Super Phosphate	11.1	2.6	.	.	.	11.8	25.4	53.0	2.9	18.8	.	74.6	2.2	
Single Super Phosphate	.	.	.	.	.	.	.	.	.	.	.	.	0
Other Straight P	3.0	.	.	.	.	33.9	36.9	45.7	.	17.4	.	63.1	3.2
Muriate of Potash	26.9	23.2	.	.	11.6	3.0	64.8	.	9.2	23.9	.	33.1	2.9	
Other Straight K	.	3.2	.	.	.	.	3.2	85.5	.	11.3	.	96.8	1.5
NP	5.7	4.4	.	.	0.7	2.8	13.6	70.6	1.9	13.5	.	86.0	29.6	
NK	4.3	23.4	.	.	2.5	1.7	31.9	9.1	0.5	57.6	.	67.2	13.9	
PK	5.1	48.7	.	.	8.5	6.1	68.3	14.1	0.9	15.9	.	30.9	21.5	
Very High N	0.2	1.0	.	.	0.1	0.1	1.4	55.8	3.9	38.5	0.3	98.6	162.5	
High N	23.1	1.4	0.6	.	2.0	2.4	29.4	26.8	6.9	34.3	2.6	70.5	179.7	
High P	3.4	12.0	20.8	.	1.1	55.3	92.5	5.2	.	2.3	.	7.5	7.0	
High K	33.9	2.2	25.5	.	5.0	13.9	80.4	7.6	1.6	10.4	.	19.6	37.5	
Low N	17.3	51.6	9.9	.	8.1	7.7	94.6	3.3	0.2	1.9	.	5.4	83.3	
Low P	3.1	3.0	.	.	.	0.7	6.8	9.3	2.7	81.2	.	93.2	26.7	
Equal NPK	44.6	8.9	2.1	.	8.2	5.6	69.5	15.8	5.7	7.8	0.5	29.9	56.9	
Unknown	82.8	3.2	0.1	.	.	4.0	90.2	5.3	1.6	2.9	.	9.8	19.3	
Total product	15.1	19.9	2.3	.	5.3	4.2	46.9	26.0	3.2	23.2	0.6	52.9	940.2	

Source: British Survey of Fertiliser Practice 1995

The British Survey of Fertiliser Practice

Fertiliser Use on Farm Crops for Crop Year 1995

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CORRECTIONS

Scotland Tables 1995

SC3.3 to read

Table SC3.3 Product use by month of application—Scotland 1995

row%	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total product ('000 tonnes)	Product (tonnes)
Calcium Ammonium Nitrate	-	13	54	30	1	-	-	-	-	2	-	-	4	3
Urea	-	-	22	50	20	5	-	-	2	-	-	-	16	11
Ammonium Nitrate	-	2	23	44	14	9	4	4	-	-	-	-	205	7
Other Straight N	-	10	34	44	3	2	2	3	-	-	-	-	67	8
Triple Super Phosphate	-	11	15	36	12	-	13	-	12	2	-	-	2	17
Single Super Phosphate	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Other Straight P	-	-	67	6	5	-	17	-	-	-	-	-	-	35
Muriate of Potash	1	5	25	24	8	14	2	-	1	19	-	4	3	19
Other Straight K	-	-	3	23	38	36	-	-	-	-	-	-	3	50
NP	-	1	32	47	6	8	3	-	4	1	-	-	2	23
NK	-	5	10	13	11	49	12	-	-	-	-	-	14	33
PK	7	6	18	16	9	1	1	4	9	19	6	4	21	16
Very High N	-	-	15	39	14	16	8	6	1	1	-	-	162	26
High N	-	-	16	52	14	9	5	1	1	1	-	-	180	30
High P	-	-	6	10	64	5	2	1	12	-	-	-	7	30
High K	-	1	33	54	8	2	-	2	-	-	-	-	37	45
Low N	1	1	9	25	7	1	1	4	33	15	1	1	83	30
Low P	-	-	6	19	2	34	26	12	-	-	-	-	27	73
Equal NPK	-	-	25	52	5	5	2	8	1	-	-	-	57	19
Unknown	-	-	2	8	85	1	-	-	1	3	-	-	19	
All fertilisers	-	2	19	41	13	9	5	4	4	2	-	-	940	

Source: British Survey of Fertiliser Practice 1995

Ministry of Agriculture, Fisheries and Food
 Fertiliser Manufacturers Association
 The Scottish Office
 September 1996
 EDINBURGH: HMSO

Table SC3.3 Product use by month of a

row %
Calcium Ammonium Nitrate
Urea
Ammonium Nitrate
Other Straight N
Triple Super Phosphate
Single Super Phosphate
Other Straight P
Muriate of Potash
Other Straight K
NP
NK
PK
Very High N
High N
High P
High K
Low N
Low P
Equal NPK
Unknown
All fertilisers

Source: British Survey of Fertiliser Practice 1995

Table SC4.1 Average fertiliser practice – North East Scotland, 1995

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P ₂ O ₅	K ₂ O	FYM	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
Spring wheat	.	.	.	.	.	.	.	.	.	.	0
Winter wheat	100	90	90	36	209	76	80	209	68	72	33
Spring barley	100	100	100	45	93	56	59	93	56	59	106
Winter barley	100	100	100	33	177	71	76	177	71	76	16
Oats	.	.	.	.	.	.	.	.	.	.	5
Rye	.	.	.	.	.	.	.	.	.	.	0
Early potatoes	.	.	.	.	.	.	.	.	.	.	0
Maincrop potatoes	88	88	88	17	123	223	205	109	196	180	10
Sugar beet	.	.	.	.	.	.	.	.	.	.	0
Oilseed rape	99	93	93	42	174	70	70	172	66	66	29
Linseed	.	.	.	.	.	.	.	.	.	.	0
Forage maize	.	.	.	.	.	.	.	.	.	.	0
Turnips (stock)	100	94	100	78	76	129	77	76	121	77	19
Kale and cow cabbage	.	.	.	.	.	.	.	.	.	.	0
Other roots/green crops	.	.	.	.	.	.	.	.	.	.	7
Peas	.	.	.	.	.	.	.	.	.	.	1
Beans	.	.	.	.	.	.	.	.	.	.	0
Vegetables (brassicae)	.	.	.	.	.	.	.	.	.	.	2
Vegetables (other)	.	.	.	.	.	.	.	.	.	.	0
Small fruit	.	.	.	.	.	.	.	.	.	.	1
Top fruit	.	.	.	.	.	.	.	.	.	.	0
Other tillage	.	.	.	.	.	.	.	.	.	.	2
All tillage	99	97	97	43	123	69	69	122	68	67	231
Grass under 5 years	100	85	84	43	145	37	45	145	32	38	112
Grass 5 years and over	87	83	83	42	112	27	32	97	23	26	71
All grass	95	84	84	43	134	34	40	127	28	33	183
All crops & grass	97	90	90	43	129	51	54	125	46	48	414

Source: British Survey of Fertiliser Practice 1995

NB Some of these estimates are based on very few fields in the sample and should be treated with great caution.

Table SC4.2 Average fertiliser practice – South East Scotland, 1995

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P ₂ O ₅	K ₂ O	FYM	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
Spring wheat	.	.	.	.	.	.	.	.	.	.	2
Winter wheat	100	88	89	13	209	80	83	209	71	74	236
Spring barley	100	99	98	13	103	52	58	103	52	57	254
Winter barley	100	92	97	15	191	87	88	191	81	85	69
Oats	84	82	72	14	116	76	66	97	62	48	46
Rye	.	.	.	.	.	.	.	.	.	.	0
Early potatoes	.	.	.	.	.	.	.	.	.	.	0
Maincrop potatoes	99	99	99	60	171	184	234	169	182	231	26
Sugar beet	.	.	.	.	.	.	.	.	.	.	0
Oilseed rape	100	79	78	25	204	68	78	204	53	61	84
Linseed	.	.	.	.	.	.	.	.	.	.	1
Forage maize	.	.	.	.	.	.	.	.	.	.	0
Turnips (stock)	100	100	100	33	96	129	78	96	129	78	11
Kale and cow cabbage	.	.	.	.	.	.	.	.	.	.	9
Other roots/green crops	79	100	79	38	142	83	78	113	83	62	23
Peas	44	48	48	6	14	38	42	6	18	20	14
Beans	.	.	.	.	.	.	.	.	.	.	0
Vegetables (brassicae)	100	100	100	5	234	134	158	234	134	158	18
Vegetables (other)	85	85	85	16	69	111	121	59	94	103	12
Small fruit	.	.	.	.	.	.	.	.	.	.	2
Top fruit	.	.	.	.	.	.	.	.	.	.	0
Other tillage	.	.	.	.	.	.	.	.	.	.	7
All tillage	98	91	91	17	159	74	81	155	68	73	814
Grass under 5 years	91	76	78	8	148	42	45	135	32	35	226
Grass 5 years and over	73	66	57	15	99	41	42	72	27	24	273
All grass	82	71	67	12	125	41	44	102	29	29	499
All crops & grass	91	83	81	15	146	62	68	132	51	54	1313

Source: British Survey of Fertiliser Practice 1995

NB Some of these estimates are based on very few fields in the sample and should be treated with great caution.

Table SC4.3 Average fertiliser practice – South West Scotland 1995

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P ₂ O ₅	K ₂ O	FYM	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
Spring wheat	.	.	.	.	.	.	.	.	.	.	1
Winter wheat	84	92	92	53	188	77	77	158	71	71	14
Spring barley	100	100	100	67	76	49	50	76	49	50	83
Winter barley	92	97	92	33	136	70	70	125	68	65	24
Oats	.	.	.	.	.	.	.	.	.	.	8
Rye	.	.	.	.	.	.	.	.	.	.	1
Early potatoes	.	.	.	.	.	.	.	.	.	.	1
Maincrop potatoes	.	.	.	.	.	.	.	.	.	.	6
Sugar beet	.	.	.	.	.	.	.	.	.	.	0
Oilseed rape	.	.	.	.	.	.	.	.	.	.	2
Linseed	.	.	.	.	.	.	.	.	.	.	0
Forage maize	.	.	.	.	.	.	.	.	.	.	0
Turnips (stock)	.	.	.	.	.	.	.	.	.	.	8
Kale and cow cabbage	.	.	.	.	.	.	.	.	.	.	0
Other roots/green crops	.	.	.	.	.	.	.	.	.	.	5
Peas	.	.	.	.	.	.	.	.	.	.	0
Beans	.	.	.	.	.	.	.	.	.	.	1
Vegetables (brassicae)	.	.	.	.	.	.	.	.	.	.	0
Vegetables (other)	.	.	.	.	.	.	.	.	.	.	3
Small fruit	.	.	.	.	.	.	.	.	.	.	0
Top fruit	.	.	.	.	.	.	.	.	.	.	0
Other tillage	.	.	.	.	.	.	.	.	.	.	4
All tillage	95	97	96	55	102	62	62	97	61	60	161
Grass under 5 years	98	96	88	54	156	46	67	152	44	59	209
Grass 5 years and over	87	83	76	38	128	39	44	112	32	34	692
All grass	89	85	78	41	133	40	49	118	34	38	901
All crops & grass	89	86	79	42	130	42	50	117	37	40	1062

Source: British Survey of Fertiliser Practice 1995

NB Some of these estimates are based on very few fields in the sample and should be treated with great caution.