THE BRITISH SURVEY OF

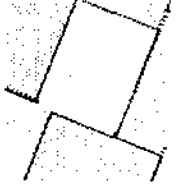
Fertiliser Practice

FERTILISER USE ON FARM CROPS FOR CROP YEAR 2000

DEFRA
Department for Environment, Food & Rural Affairs

FMA
Fertiliser Manufacturers Association

SCOTTISH EXECUTIVE
Environment and Rural Affairs 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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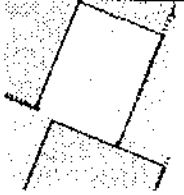

FOREWORD

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

The 2000 Survey was sponsored by the Department for Environment, Food and Rural Affairs (DEFRA)[1], the Scottish Executive Environment and Rural Affairs Department (SEERAD)[2] and the Fertiliser Manufacturers' Association (FMA). The Survey has the full support of the Farmers' Unions in England, Scotland and Wales.

The Survey is carried out annually and is based upon returns from a random, stratified sample of farms. In 2000, the Survey was co-ordinated by the Rural Business Unit at the University of Cambridge, which was also responsible for the survey design, statistical analysis and quality control monitoring. Produce Studies Ltd carried out the farm interviews.

August 2001

ACKNOWLEDGEMENTS

The sponsors gratefully acknowledge the co-operation of all farmers taking part in the 2000 British Survey of Fertiliser Practice.

The authors of the report wish to thank all those involved for their assistance and support in the design, conduct and analysis of the Survey.

The agronomic interpretation of the Survey results benefited from advice from Chris Dawson (Chris Dawson and Associates), Agronomic Consultant to the Fertiliser Manufacturers' Association.

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[1] Following a reorganisation of government departments in June 2001 the remit of the Department for Environment, Food and Rural Affairs (DEFRA) now encompasses that formerly held by the Ministry of Agriculture, Fisheries and Food (MAFF).

[2] The remit of the Scottish Executive Environment and Rural Affairs Department (SEERAD) now encompasses that formerly held by the Scottish Executive Rural Affairs Department (SERAD).

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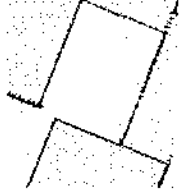

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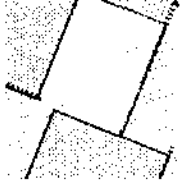

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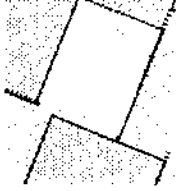
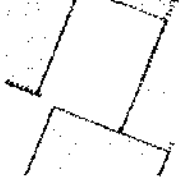




EXECUTIVE SUMMARY

The British Survey of Fertiliser Practice is an annual, nationally representative, survey based on a random stratified sample of farms from mainland Britain. In 2000, approximately 1,400 farms were surveyed. The main purpose of the survey is to estimate average application rates of nitrogen, phosphate and potash used for agricultural crops and grassland. Information is also collected on applications of sulphur fertilisers, organic manures and lime. Aggregated data have been obtained for Great Britain since 1983, the first year that the existing survey in England and Wales was extended to Scotland.

The main findings from the 2000 Survey on the use of each fertiliser nutrient in Great Britain are summarised below. Weather and economic factors which may have contributed to recorded changes in fertiliser use during the 1999/2000 cropping season are also discussed in the report.

Nitrogen

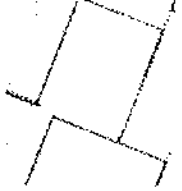
- The overall nitrogen rate on tillage crops was 149 kg/ha, which was 8 kg/ha higher than in the previous year and 3 kg/ha above the mean rate for the last five years. This rise in total nitrogen use, which represented a recovery to the levels reported for 1995 and 1997, resulted from increased use of straight nitrogen. Increased application rates on cereal crops, maincrop potatoes and sugar beet, together with changes in relative cropping areas, were the main underlying causes for this change in total nitrogen use on tillage crops, as a combined crop category. Nitrogen use decreased slightly on oilseed rape, because a greater percentage of the total crop area was spring (10%), rather than autumn sown, compared to 1999.

- Autumn-winter timings of nitrogen fertiliser were applied to 7-11% of the winter cereal crop areas. These dressing covers were similar to those reported for the previous year and lower than in recent years. Autumn nitrogen was applied to 39% of the winter oilseed rape crop area, which was slightly more than in 1999.

- The overall rate of total nitrogen on grassland dropped by 11 kg/ha in 2000, down to 99 kg/ha, the lowest level recorded over the last five years (mean: 111 kg/ha). This decrease was mostly caused by less use of straight nitrogen, although the overall application rate of compound nitrogen also fell slightly. This downward shift in nitrogen use was associated with a fall in the livestock numbers in the dairy, beef and sheep sectors.

Phosphate

- Overall phosphate use on tillage crops was 47 kg/ha, which was 2 kg/ha higher than in 1999 but still lower than in recent years. Overall application rates of phosphate increased slightly on cereal crops, but decreased on oilseed rape, maincrop potatoes and sugar beet, compared to 1999. The downward shift in phosphate use on tillage crops in 1999-2000 was mainly related to a cutback in the percentage area of some crops, particularly winter cereals, that received phosphate although there were also some small changes in actual application rates. The overall rate of phosphate on grassland was unchanged at 20 kg/ha, still the lowest application rate for the last five years.



Potash

- The overall potash use on tillage crops fell by 2 kg/ha in 2000, to 55 kg/ha, following the significant drop in application rate which was recorded in the previous year. As for phosphate, the lower overall usage was mainly caused by a decrease in dressing covers for some crops, rather than any major changes in the potash rates actually applied. Overall potash use also dropped by 2 kg/ha on grassland to 26 kg/ha and, as for tillage crops, was the lowest recorded rate over the last five years.

Sulphur

- Sulphur-containing fertiliser was applied to 15-16% of the winter cereal, 18% of the spring barley and 29% of the oilseed rape crop area in 2000. These dressing covers were almost the same as in 1999, except for a small increase on spring barley. Sulphur use on these arable crops, which are among the first to suffer from any deficiency of sulphur, had increased between 1993, when the Survey first started to collect data on sulphur applications, and 1997. Subsequent sulphur use has been static, despite the increasing risk of sulphur deficiency with declining atmospheric sulphur deposition. Actual application rates have been similar to those currently recommended for the prevention of sulphur deficiency.

- Sulphur use on grassland hardly changed in 2000, with 5% of all grassland receiving an application of sulphur. The risk of sulphur deficiency is however greatest with intensive silage cutting and sulphur-containing fertiliser was actually applied to 9% of silage grass. The extent of sulphur use has remained at a very low, static level since 1993. Actual application rates have been very close to the sulphur rate recommended for the prevention of sulphur deficiency in individual silage cuts.

Longer term trends

The longer term trends in application rates since 1983 show that:

- Overall nitrogen use has declined on both tillage crops and grassland. Autumn nitrogen use decreased appreciably on both winter cereals and to a lesser extent, on winter oilseed rape between 1985 and the early 1990s. Further, but small reductions in the percentage crop areas receiving autumn-applied nitrogen have also been recorded over the last few years.

- Phosphate use has declined gradually on tillage crops but, until a drop in the last three years, had been relatively stable on grassland.

- Potash use has decreased on tillage crops, despite some apparent recovery in application rate in 1997 and 1998. Overall potash rates on grassland have shown larger annual fluctuations, but have also decreased slightly.

SECTION A

THE BRITISH SURVEY OF FERTILISER PRACTICE

A1 INTRODUCTION AND STRUCTURE OF THE REPORT

The British Survey of Fertiliser Practice (BSFP) is unique in its range and in its aspiration to produce an accurate assessment of fertiliser use for England and Wales, and for Scotland. To achieve this aim, estimates from the survey data are used in conjunction with crop areas from the Annual Agricultural Census[5]. It relates applications of nutrients to major crop types and grassland throughout Great Britain. The report is the principal source of estimates for fertiliser applications in Great Britain, and is used by the British fertiliser industry, by Government and by the wider agricultural community. With such a high profile it is essential that the claims made from the survey are underpinned by an effective methodology. Section A2 describes this methodology, detailing measures undertaken to avoid bias and unreliability. National changes in relative cropping areas are discussed in Section A3.

Section B provides a commentary of recent changes in survey data and longer term trends. Section C presents the main tables of results from the Survey, grouped by geographic coverage. They include major crop groups, grassland, product types and farm types. Figures for estimates of 'total', 'straight' and 'compound' nutrient rates are presented in separate tables. Supplementary questions, which change each year, are also included in the Survey. Section D provides an analysis of information which was gathered in the 2000 Survey regarding the calibration and testing of farm fertiliser spreaders.

A1.1 HISTORY

The survey has been in existence, in various forms, since 1942 for England and Wales. It was extended to Scotland in 1983. Historical data from 1942 to 1997 have been summarised in several reviews spanning this period of time[6, 7, 8, 9].

The current methods of survey design and implementation are the result of adaptation of the original design by Rothamsted Experimental Station, undertaken by Edinburgh Data Library at the University of Edinburgh between 1992 and 1998. In 1999 responsibility for design and analysis transferred to the Rural Business Unit at the University of Cambridge.

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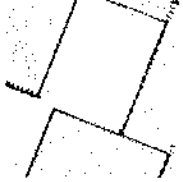
[5] MAFF, SOAEFD and the Welsh Office. *The Digest of Agricultural Census Statistics UK 1998.*

[6] Yates, F. and Boyd, D.A. (1965). Two decades of Surveys of Fertiliser Practice. *Outlook on Agriculture* **5**, 203-210.

[7] Church, B.M. and Lewis, D.A. (1977). Fertiliser use on farm crops, England and Wales: Information from the Survey of Fertiliser Practice, 1942-1976. *Outlook on Agriculture* **9**, 186-193.

[8] Chalmers, A.G., Kershaw, C.D. and Leech, P.K. (1990). Fertiliser use on farm crops in Great Britain: Results from the Survey of Fertiliser Practice, 1969-1988. *Outlook on Agriculture* **19**, 269-278.

[9] Chalmers, A.G., Renwick, A.W., Johnston, A.E. and Dawson, C.J. (1999). Design, development and use of a national survey of fertiliser applications. *Proceedings No. 437.* York: The International Fertiliser Society.



A2 SURVEY METHODOLOGY

A2.1 SAMPLE

The basis of the sample framework is the Agricultural Census[10]. Each year, two samples are extracted from the Census, one for England and Wales and one for Scotland. In England and Wales, farms are classified into one of three types, cropping, livestock and horticulture. Farms are then further classified into four size groups. In Scotland, a similar number of size groups are used but farms are classified into only two types, mainly cropping and mainly livestock. This produces 20 stratification cells, 12 for England and Wales and eight for Scotland, shown in Tables A2.1 and A2.2. Holdings less than 20 hectares in size are excluded from the BSFP sample. The process of random stratification results in more precise estimates than those which would be obtained by simple random sampling. The 'robust' farm types (coded 1-8) identified for each farm group classification in Tables A2.1 and A2.2 are defined in Section A2.4.

The fraction of farm holdings sampled from each cell is proportional to the total area of crops and grass (see Column 3, Tables A2.1 and A2.2). An exception to this is that in England and Wales a deliberate policy of over sampling is undertaken for the horticultural group to ensure sufficient numbers for a robust estimate to be made. The notional sampling fraction presented in Tables A2.1 and A2.2 indicates the percentage of the total population of holdings that are sampled in each cell. As the larger farms cover a greater area, then a higher proportion of these holdings are sampled. The process of selecting the actual holdings to be surveyed involves two steps. First the holdings in each cell are ordered by geographic location (using the County, Parish, Holding (CPH) identifier). This enables a high degree of geographic dispersion in the sample. The number of farms to be surveyed is then drawn at random from these stratified groups. This process leads to a *sought* sample (a total of 1478 farms) that is representative of the population as a whole. The actual sample *achieved* is influenced, like all surveys, by a number of factors.

Current census data for the year of the survey were not available. Therefore, information used from the census to draw the annual sample is to some extent historic, being either one or two years old. For this reason not all of the holdings selected were actually eligible for the survey, simply through the process of structural change. In addition, as the survey is voluntary, it is also inevitable that there will be some non-response from those that are eligible. The existing system of a main and one reserve was felt to be unnecessarily restrictive in recruitment with an adverse effect on sample size. As a result, for the 2000 survey, a move was made towards establishing a core of co-operators who would stay in the survey for a certain number of years. This procedure is already used on other surveys by other departments of MAFF. Co-operators in 1999 were asked if they would be prepared to continue for the year 2000. Approximately one-third of the sample agreed to continue. It was also decided to have three reserve lists in an attempt to reduce the rate of non-response. Non-response is a problem as it may introduce bias into the survey. Clearly it would be wrong to assume that those farms that did not co-operate have the same level of fertiliser use as those that did. Reserve lists were drawn which matched geographically and by farm type and size to the continuing sample from 1999 (to provide alternatives if any of the continuing sample changed their minds). The rest of the main sample was drawn to complete the sample structure and three reserve lists were provided by selecting the nearest holding, as represented by the CPH number, that falls in the same stratification cell as the main list holding. This ensures that the geographical dispersion is maintained.

[10] The June census is undertaken annually and records information on farm size, cropping and stocking and employment. It is the most accurate information available on farming in the UK.

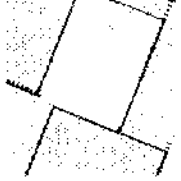


Table A2.1 Derivation of the stratified random sample for the 2000 survey, England and Wales

	farm holdings in population in 1999	total crops and grass in 1999 (column %)	notional sampling fraction[a] (%)	target sample size	achieved sample size	achieved sample fraction[b] (%)
England and Wales						
Livestock						
(DEFRA robust types 4-7)						
crops & grass area						
20-50 ha	23322	9.3	0.48	112	133	0.57
51-100 ha	16728	13.7	0.98	164	184	1.10
101-200 ha	7861	12.0	1.83	144	146	1.86
200+ ha	2620	11.9	5.46	143	83	3.17
Crops & mixed						
(DEFRA robust types 1,2,8)						
crops & grass area						
20-50 ha	10324	4.1	0.47	49	48	0.46
51-100 ha	10279	8.6	1.00	103	93	0.90
101-200 ha	9164	14.9	1.95	179	152	1.66
200+ ha	5955	24.8	5.00	298	282	4.74
Horticulture						
(DEFRA robust type 3)						
crops & grass area						
20-50 ha	732	0.3	1.64	12	17	2.32
51-100 ha	200	0.2	4.00	8	10	5.00
101-200 ha	80	0.2	12.50	10	9	11.25
200+ ha	29	0.1	20.69	6	0	0.00
Total for England and Wales	87294	100.0		1228	1157	1.23

Each farm in the main sample is contacted; if for whatever reason a farm is not able to take part in the survey, the first reserve for that farm is then contacted. If this farm also refuses then the second and if necessary the third reserve is contacted. If all four farms refuse then no farm is recruited into the survey. Any over sampling (or under sampling) that occurs through this process is corrected for by the use of weighting factors, which are the inverse of the achieved sampling fraction.

[a] The *notional sampling fraction* is found by expressing the *target sample size* as a percentage of the *farm holdings in population in 1999*.

[b] The *achieved sample fraction* is found by expressing the *achieved sample size* as a percentage of the *farm holdings in population in 1999*.

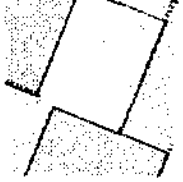


Table A2.2 Derivation of the stratified random sample for the 2000 survey, Scotland

	farm holdings in population in 1999	total crops and grass in 1999 (column %)	notional sampling fraction[a] (%)	target sample size	achieved sample size	achieved sample fraction[b] (%)
Scotland						
Cereal/general cropping/horticulture						
(SEERAD robust types 1-3)						
crops & grass area						
20-50 ha	1281	2.7	0.53	7	5	0.39
51-100 ha	1501	6.8	1.14	17	16	1.07
101-200 ha	1416	12.4	2.19	31	33	2.33
200+ ha	634	12.6	4.96	31	33	5.21
Livestock & mixed						
(SEERAD robust types 4-8)						
crops & grass area						
20-50 ha	3703	7.9	0.53	20	22	0.59
51-100 ha	4018	18.1	1.12	45	49	1.22
101-200 ha	2695	23.0	2.14	58	48	1.78
200+ ha	867	16.5	4.74	41	41	4.73
Total for Scotland	16115	100.0		250	247	1.53

A2.2 DATA COLLECTION

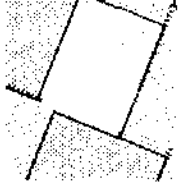
Data collection was undertaken by Produce Studies Ltd, who visited farms between May and August 2000. The timing of the survey was set so that the majority of holdings were visited after they had applied their last fertiliser dressing for the crop year. In addition to collecting information on the fertiliser use on each field, the recorder collected general information on the holding and some supplementary information. The supplementary questions in 2000 considered the calibration and testing of fertiliser spreaders by farmers and are discussed in Section D.

A2.3 DATA PROCESSING

The data processing and analysis were undertaken by the Rural Business Unit at the University of Cambridge. Some idea of the complexity of the survey can be given through the amount of data that has to be inputted and processed. In 2000 the 1406 farms recorded represented one per cent of the total crops and grass area in Britain. This equated to over 10,000 fields and nearly 20,000 applications of fertiliser.

[a] The *notional sampling fraction* is found by expressing the *target sample size* as a percentage of the *farm holdings in population in 1999*.

[b] The *achieved sample fraction* is found by expressing the *achieved sample size* as a percentage of the *farm holdings in population in 1999*.



At present the database is designed in Microsoft Access, which provides a user-friendly interface as well as a powerful tool for checking data accuracy. Various checks were built in at the inputting stage, for example the total nutrient applied to the field was calculated and checked against a credible range.

The high degree of detail collected per farm enabled analysis of fertiliser use at a number of levels; by crop, by type of fertiliser (straight or compound), by timing of application, by geographic region, etc. This enables the survey to present a comprehensive picture of fertiliser use in Britain. The longevity of the survey also means that it is invaluable for demonstrating the changing trends in fertiliser use.

Each participating farmer receives customised feedback highlighting their fertiliser use by crop and/or grass categories and comparison with regional averages. In addition to the individual feedback, co-operators also have the option to receive a summary report highlighting the main findings from the survey.

A2.4 DEFINITIONS OF TERMS

1. For the purpose of the Survey, the term **Great Britain** (or **Britain**) is defined to cover England (including the Isle of Wight), Wales (including Anglesey) and mainland Scotland.

2 The **survey year** ran from autumn 1999 to autumn 2000, corresponding to the 2000 season or harvest year. The recording period for fertiliser applications varied for different crop and grass groups.

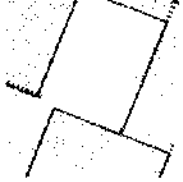
3. For the purposes of this survey, a **field** is defined as any single area of land measuring more than 0.2 ha (half an acre) which had a uniform cropping and fertiliser history from autumn 1999. For data collection and processing purposes, separate fields with identical cropping and fertiliser management on the same farm are blocked together as one 'field', to represent the total combined area of those fields. Areas within the same natural boundary receiving different treatments (crops on 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 it was used to grow an industrial crop. Fallow land other than set-aside has always been recorded in the survey.

4. In the report, **tillage** is defined as all crops except grass, forestry, glasshouse crops and land designated as 'set-aside' under the Arable Area Payments scheme. Grass refers to all forms of grassland which may be grazed, conserved or grown for seed production; rough grazing is excluded.

5. The abbreviation **N** is used for nitrogen; $\mathbf{P_2O_5}$ for phosphate; $\mathbf{K_2O}$ for potash, $\mathbf{SO_3}$ for sulphur and **FYM** for all types of organic manure e.g. slurries and solid manures. The phrase **total use** includes both straight (single nutrient) and compound (multi nutrient) products. Fertiliser products containing nitrogen and sulphur only are classified as **Other Straight N**.

6. For each fertiliser nutrient, the **average field rate** (of application) is defined as the sum of nutrient applied divided by the total area of 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 on the level and variation in farming practice.

7. 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.



8. The **overall application rate** is defined as the total quantity of nutrient used, in kilograms (kg), divided by the total extent of crop area, in hectares (ha) (including any areas without application of the nutrient). When combined with information from the national total crop area estimates in the Agricultural Census, these overall application rates provide a means of estimating the tonnage of fertiliser nutrient used during the survey year.

   Any change in an overall application rate is due to a change in either the (actual) field rate of application used on farms, or to a change in the dressing cover, or to changes in both. Arithmetically, overall application 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.

9. The UK farm type system, which is based on the EC system, aggregates a wide range of defined farm types into nine 'robust' types:

   (1) Cereals;
   (2) General Cropping;
   (3) Horticulture;
   (4) Pigs and Poultry;
   (5) Dairy;
   (6) Cattle and Sheep (LFA);
   (7) Cattle and Sheep (low ground);
   (8) Mixed;
   (9) Other.

   The composition of 'robust' types is presented in greater detail in Appendix 4. The sampling framework outlined in Section A2.1 can be related to robust types as set out below.

   England and Wales:

BSFP sampling frame	*robust types*
cropping	1, 2, 8
livestock	4, 5, 6, 7
horticulture	3

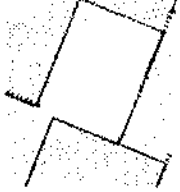
   Scotland:

BSFP sampling frame	*robust types*
mainly cropping	1, 2, 3, 8
mainly livestock	4, 5, 6, 7

   Data presented in tables EW5.1 to EW5.4 and SC5.1 to SC5.4 in Section C are derived from the robust types shown below.

   England and Wales:

table number	*farm type(s) as given in table title*	*robust types*
EW5.1	dairy farms	5
EW5.2	cattle and sheep farms	6, 7
EW5.3	other livestock farms	4, 8
EW5.4	cropping/horticultural farms	1, 2, 3



Scotland:

table number	*farm type(s) as given in table title*	*robust types*
SC5.1	general cropping farms	2
SC5.2	dairy farms	5
SC5.3	mixed farms	8
SC5.4	farms in Less Favoured Areas	All farms in LFAs

10. Regional analysis of the Survey data for England is based on the DEFRA administrative regions, which were revised in 1996 to take account of changes to county boundaries and nomenclature resulting from the introduction of Unitary Local Authorities between April 1995 and April 1998[11]. These revised regions are termed **BSFP regions** and are detailed in Appendices 3 and 4.

11. Where changes in application rates are termed 'significant' this indicates that there is a ninety-five percent probability that this is not due to sampling error.

12. Commentary in Section B suggesting possible reasons for observed differences in fertiliser practice is shown in *italics*.

A3 GENERAL TRENDS AND ISSUES

A3.1 CROP AREAS AND WEATHER CONDITIONS

Annual changes in relative cropping areas, as well as any changes in fertiliser practice for individual crops, may affect nutrient application rates when aggregated across the main crop groupings. Table A3.1 provides a summary of census estimates for areas of individual major crops, crop groupings and total tillage and grassland categories in 1998/99 and 1999/2000, and illustrates percentage changes in relative cropping areas over the past five years. There were about 10.3 million hectares of managed agricultural land in Britain in 2000, of which 4.6 million hectares (45%) were cultivated for tillage cropping and the remainder, 5.7 million hectares, were grassland (excluding rough grazing).

The total tillage area was slightly lower, by 37,100 ha (1%) in 2000, partly because the area set-aside under the Arable Area Payment Scheme[12] increased by 12,800 ha. The winter cereal areas rose by 266,100 ha (15%) for winter wheat and 40,600 ha (8%) for winter barley, representing full or slight recovery, respectively, in these cropping areas after falls in the previous season due to the combined effects of increased set-aside requirement, difficult conditions for autumn drilling and also, for winter barley, lower profitability. Spring barley cropping fell by 88,500 ha (15%) because of the increased area of autumn-sown cereals. The linseed area dropped back again by 137,600 ha (66%) after a large increase in 1999 when the economic returns for this crop were more favourable.

The total oilseed rape area fell by 84,800 ha (20%), due to a large drop (91,800 ha) in the area of winter oilseed rape. This was slightly offset by an increase of 7,000 ha for the spring-sown

[11] Anon (1999). *The Gazeteer of old and new geographies of the United Kingdom.* Office for National Statistics, Publications, Newport.

[12] MAFF (1999). *Arable Area Payments Scheme.* Explanatory Guide: Part I (PB 4462. AR32A) and Part II (PB 4463. AR32B).

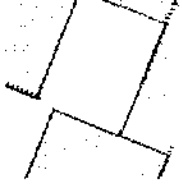


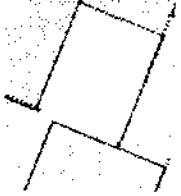
Table A3.1 Cropping and grassland areas ('000 ha), Great Britain 1998/1999 - 1999/2000

Crops	1998/1999 '000s ha	1999/2000 '000s ha	% change since 1999	% change since 1995	1999/2000 crop areas as % of total tillage area
Wheat	1815	2081	14.7	12.4	44.8
Barley - winter	543	584	7.5	-14.4	12.6
- spring	600	512	-14.8	7.2	11.0
Total Cereals[1]	*3099*	*3307*	*6.7*	*5.4*	*71.2*
Oilseed rape - winter	387	295	-23.7	4.3	6.4
- spring	30	37	23.3	-46.4	0.8
Sugar beet	183	173	-5.6	-11.9	3.7
Potatoes[2]	170	145	-14.8	-10.7	3.1
Linseed	209	71	-65.8	33.7	1.5
Peas/beans[3]	202	208	3.0	6.9	4.5
Maize/other fodder	163	161	-1.2	-6.9	3.5
Vegetables	124	117	-5.6	-8.8	2.5
Total tillage[4]	*4685*	*4648*	*-0.8*	*2.7*	*100.0*
Set-aside[5]	570	583	2.2	-7.7	12.5
Grassland					**1999/2000 grass areas as % of total grass area**
Less than 5 years old	1085	1094	0.8	-8.8	19
5 years and older	4752	4593	-3.4	-2.7	81
Total grass[6]	*5837*	*5686*	*-2.6*	*-3.9*	*100*
Total crops and grass[7]	*10522*	*10334*	*-1.8*	*-1.0*	

[1] including minor cereals (oats, rye, triticale, mixed corn)
[2] early + second early + maincrop potatoes
[3] harvested dry for animal consumption or, for peas, human consumption
[4] including other crops and bare fallow, but not set-aside
[5] including industrial crops; the percentage area is expressed as the ratio of set-aside area to the total area designated for cultivation
[6] managed grassland, excluding rough grazing
[7] total tillage + total grassland

Source: Annual DEFRA/SEERAD/NAWAD June Census data

crop which has a lower nitrogen requirement. The combined reductions in the spring barley, oilseed rape and linseed areas (310,900 ha) accounted for the increase (306,700 ha) in winter cereal cropping in the 1999/2000 season. Other tillage crop categories showed little change in area, compared to 1999, apart from decreases for sugar beet (10,200 ha; 6%) and potatoes (25,100 ha; 15%). The total area of managed grassland fell by an estimated 150,000 ha (3%) because of a decrease in the area of older grassland (at least five years old). One fifth of grassland was less than five years old in 2000.



The total tillage area was 124,000 ha (3%) higher in 2000, compared to 1995, because of a decline in the grassland area and also some decrease (48,300 ha) in set-aside. Over the last five years, winter wheat and spring barley cropping has increased while winter barley has declined, resulting in a net increase of 168,800 ha in the total cereal area. The winter oilseed rape area was slightly higher (4%) in 2000 than in 1995, but the spring-sown crop had dropped by 32,000 ha (46%), because of changes in the relative profitability of these two crops due to Arable Area Payments and rapeseed commodity prices. The other tillage crop categories all showed net decreases, ranging from 7 to 12% in their cropping areas between 1995 and 2000, apart from linseed (+34%) and peas and beans (+7%). Since 1995, the total grassland area has fallen by 237,100 ha (4%) because the areas of younger (less than five years old) and older grassland have both decreased, by comparable amounts.

Unusual seasonal weather conditions can influence fertiliser usage in some years. For example:

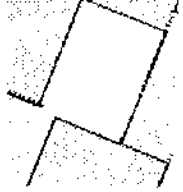
- A very wet autumn can delay the establishment of winter sown crops, or alter the ratio of winter to spring sown crops, with their different fertiliser requirements.

- Prolonged wet weather can increase leaching losses of some nutrients, particularly nitrogen and sulphur. Weather conditions also affect other aspects of soil chemistry and nutrient availability.

- Adverse weather conditions may disrupt planned farming activities, such as fertiliser spreading.

- Growing conditions determine plant growth and hence affect nutrient requirements.

The weather conditions in autumn 1999 were generally mild, with periods of heavy rainfall during the second half of September and November, but relatively dry weather in October and part of November. The drier conditions provided adequate opportunities in most areas for drilling autumn-sown arable crops, in contrast to the previous season. Rainfall was well above average over the winter months, except for a drier than normal January, while temperatures remained mild most of the time. The spring 2000 weather was characterised by extremes in rainfall; March was mostly very dry but April was the wettest on record, with extreme flooding in parts of Britain. May, however, was generally dry apart from heavy downpours in Southern England. The summer weather was unsettled, with cool temperatures during July, and the showery conditions in August delayed harvesting operations. Wheat and barley yields at harvest were 1-2% higher, but oilseed rape yields were 10% lower, than the five-year means.



SECTION B

COMMENTARY ON FERTILISER USE IN GREAT BRITAIN

This commentary refers to rates of application in Britain of fertilisers containing nitrogen (N), phosphate (P_2O_5), potash (K_2O) and sulphur (SO_3) on tillage crops and grassland (excluding rough grazing). Section B1 of the report covers the five-year period 1996 to 2000. Comments on longer term trends are made in Section B2, using data available from what were, prior to 1992, two separate Surveys of Fertiliser Practice for England and Wales and for Scotland.

The estimates of overall application rates from the survey relate to usage on farms during the 1999/2000 growing season: they form a basis for estimating quantities of fertiliser used in Great Britain. The estimates of the average field rates provide a better indication than overall application rates of actual usage levels and also of any annual variation in fertiliser practice on farms.

The statistics on the pattern of fertiliser practice reported for Great Britain largely reflect practice in England and Wales due to its greater area of total crops and grassland: about 8.7 million hectares in England and Wales and about 1.8 million hectares in Scotland. In what is otherwise a commentary on Britain as a whole, remarks on the separate regions are only made to highlight particular trends of interest. Readers interested in more detailed recent trends for individual crops in England and Wales or in Scotland, can refer to tables presented in the final Section of this and earlier annual reports, in conjunction with the summary tables of annual fertiliser use in the main text of the 1995 Report[13].

The nutrient rates presented and discussed in the main text of this report are based on crop areas estimated from the survey data. Data from the 2000 Agricultural Census on crop areas have been summarised in Table A3.1. Crop area estimates from the Agricultural Census have greater reliability as they are derived from a far larger sample of farms. Census crop areas are used in the Appendix of the report to re-estimate application rates, for total tillage and grassland crop groupings, taking into account the limitations of survey crop area estimates extrapolated from a comparatively small survey sample. This is the fourth successive year that these adjusted rates have been calculated and the adjusted estimates have generally been very close to those reported in Section B of the annual reports, apart from some differences in the estimated rates reported for grassland in some years.

[13] Burnhill, P. M., Chalmers, A. G. and Fairgrieve, J. (1996). *The British Survey of Fertiliser Practice: fertiliser use on farm crops 1995*. HMSO: Edinburgh.

B1 2000 RESULTS FOR GREAT BRITAIN AND CHANGES IN RECENT YEARS

B1.1 OVERVIEW OF FERTILISER USE ON ALL CROPS AND GRASS

Overall rates of total nitrogen, phosphate and potash in Great Britain over the last five years are illustrated in Figure B1.1, which is based on data presented in Tables B1.1 and B1.2. Application rates for straight and compound nitrogen applied on crops and grassland are also presented in Table B1.1. Definitions of the terms used are set out in Section A of this report.

Figure B1.1 Overall fertiliser use (kg/ha) on all crops and grass, Great Britain 1996 - 2000

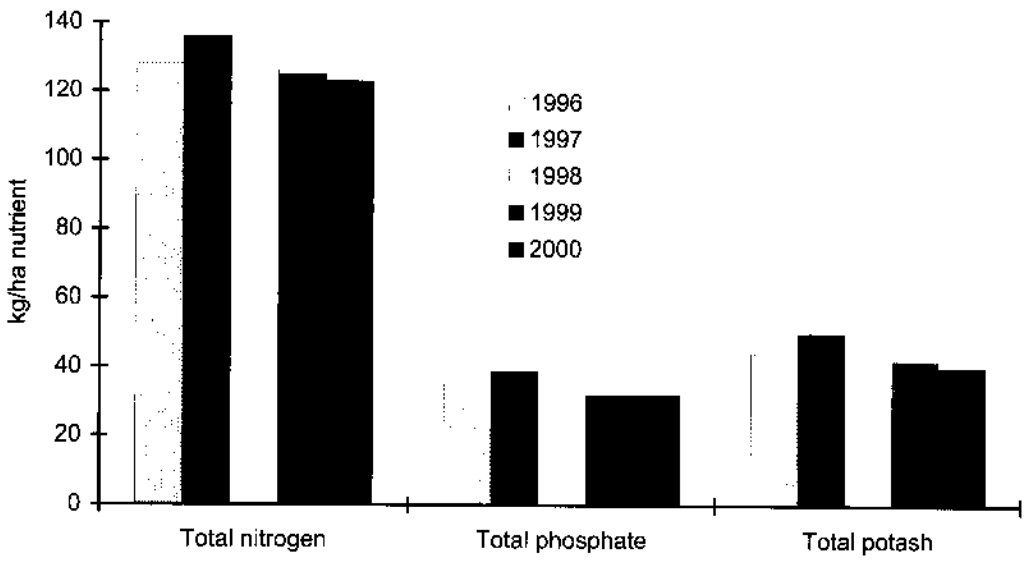


Table B1.1 Overall nitrogen use (kg/ha), Great Britain 1996 - 2000

Total nitrogen

	tillage crops	*grass*	*all crops and grass*
1996	145	115	128
1997	149	123	136
1998	144	109	126
1999	141	110	125
2000	149	99	123

Straight nitrogen

	tillage crops	*grass*	*all crops and grass*
1996	121	53	84
1997	126	54	88
1998	123	53	87
1999	121	52	85
2000	130	43	85

Compound nitrogen

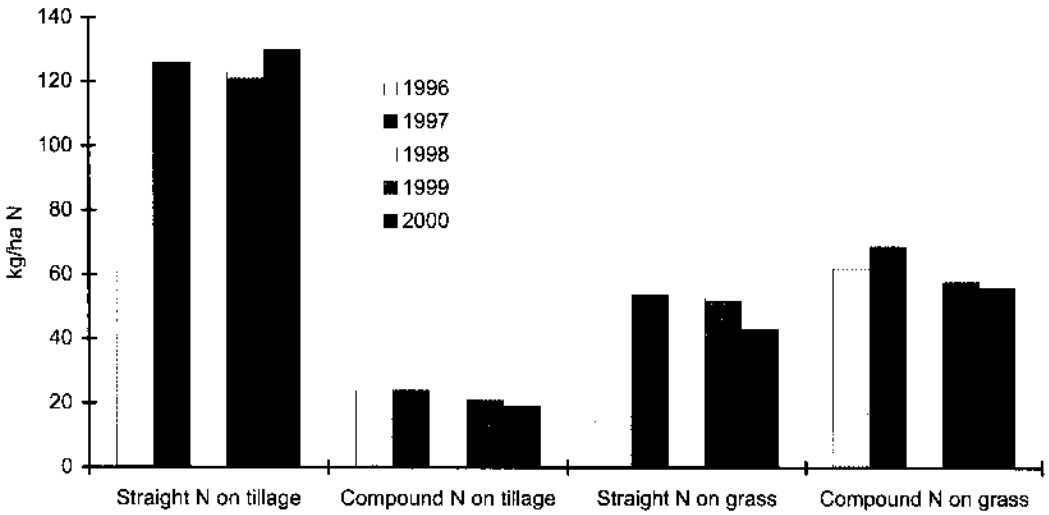
	tillage crops	*grass*	*all crops and grass*
1996	24	62	45
1997	24	69	47
1998	21	56	39
1999	21	58	40
2000	19	56	38

B1.1.1 NITROGEN

All Crops and Grassland

Total nitrogen use on all crops and grassland decreased slightly, by 2 kg/ha in 2000 to 123 kg/ha, due to a drop in compound N use (Table B1.1, Figure B1.1). This overall rate of total nitrogen was the lowest recorded not only over the last five years but also, as in 1993, since the British survey started in 1983 (see section B2.1.1). The decline in total nitrogen use during 1996-2000 was mainly associated with a drop in the overall application rate of compound nitrogen on managed agricultural land. During this five-year period, however, straight nitrogen use has shown very little net change.

Figure B1.2 Overall straight and compound nitrogen use (kg/ha), Great Britain 1996 - 2000

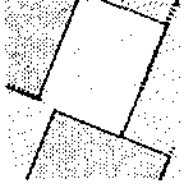


Tillage Crops

Overall total nitrogen use rose significantly by 8 kg/ha to 149 kg/ha in 2000, back to the same level reported in 1995 and 1997, because of an increase in the overall rate of straight nitrogen (+9 kg/ha). Total nitrogen use on tillage crops appears to have recovered, following a fall in the overall application rate during 1998-1999, giving a five-year mean rate of 146 kg/ha. Compound nitrogen use has decreased since 1996, while straight nitrogen use has shown some increase, particularly in 2000. Changes in cropping areas, rather than application rates to individual crops, have been the major factor influencing the recent pattern of nitrogen use on the all tillage crops category.

Grassland

Estimated total nitrogen use on grassland showed a significant drop of 11 kg/ha in 2000, to 99 kg/ha, because of lower overall application rates of both straight nitrogen (-9 kg/ha) and, to a lesser extent, compound nitrogen (-2 kg/ha). This total nitrogen rate was the lowest reported for both the last five years (mean: 111 kg/ha) and also for the whole survey period since 1983. The likely causes of this sharp drop in nitrogen use in 2000 are discussed in Section B1.3.1. Overall use of straight nitrogen had been relatively steady since 1996 until it dropped in 2000, while compound nitrogen use had tended to decline.



B1.1.2 PHOSPHATE AND POTASH

Phosphate

Overall phosphate use on tillage crops rose by 2 kg/ha in 2000, to 47 kg/ha (Table B1.2), but was still at a lower level compared to 1996-98 (mean: 53 kg/ha), because of the smaller dressing covers for this fertiliser nutrient in the last two years. In contrast, average field rates (data not presented) have shown little or no change over the last five years. Phosphate use on grassland was unchanged in 2000, at 20 kg/ha, so that the overall application rate was consistently lower in 1998-2000 (mean: 20 kg/ha) compared to 1996-97 (mean: 24 kg/ha). The combined effects of these changes resulted in a net drop of 4 kg/ha in phosphate use on all crops and grassland over the last five years.

Table B1.2 Overall phosphate and potash use (kg/ha), Great Britain 1996 - 2000

Total phosphate				Total potash			
	tillage crops	*grass*	*all crops and grass*		*tillage crops*	*grass*	*all crops and grass*
1996	52	23	36	*1996*	61	30	44
1997	55	25	39	*1997*	67	35	50
1998	51	21	35	*1998*	64	29	45
1999	45	20	32	*1999*	57	28	42
2000	47	20	32	*2000*	55	26	40

Potash

Potash use on tillage crops decreased by 2 kg/ha to 55 kg/ha in 2000, continuing the lower level of usage recorded in 1999 compared to the previous three years (mean: 64 kg/ha). As for phosphate, this lower overall usage reflected a drop in dressing cover rather than average field rate. The overall rate of potash on grassland also decreased by 2 kg/ha in 2000, to 26 kg/ha, resulting in a net decline of 4 kg/ha in application rate over the last five years. During this period, potash use on all crops and grassland has dropped by 4 kg/ha, to 40 kg/ha, because of the combined decreases on both tillage crops and on grassland.

B1.2 FERTILISER USE ON MAJOR TILLAGE CROPS

Overall and average field rates of fertiliser application for major tillage crops in Great Britain over the past five years are summarised in Tables B1.3 and B1.4. More detailed statistics for 2000 are presented in Section C. Longer term trends in overall application rates of nitrogen, phosphate and potash since 1983, are summarised in Section B2.

Small apparent changes in fertiliser use on individual crops should be treated with a degree of caution as these estimates are based on a smaller number of farms and fields than the aggregate 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 Appendix 1.

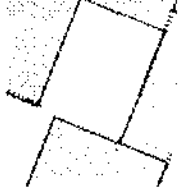


Table B1.3 Overall fertiliser use (kg/ha) on major tillage crops, Great Britain 1996 - 2000

Total nitrogen

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1996	185	94	140	171	188	107
1997	192	95	143	169	203	110
1998	182	92	135	188	188	109
1999	185	99	141	158	197	97
2000	188	107	146	160	195	104

Straight nitrogen

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1996	174	41	125	25	168	84
1997	179	40	127	30	182	85
1998	171	40	120	49	170	88
1999	174	53	127	27	180	78
2000	177	62	134	32	180	91

Compound nitrogen

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1996	11	52	16	146	20	23
1997	13	54	15	139	21	25
1998	11	52	15	139	18	22
1999	11	46	14	131	17	19
2000	11	45	12	128	15	13

Total phosphate

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1996	51	47	52	178	52	40
1997	53	51	58	173	51	50
1998	48	42	51	184	50	49
1999	41	45	47	169	46	52
2000	44	47	48	159	41	39

Total potash

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1996	53	56	60	248	52	96
1997	56	59	70	249	55	133
1998	53	58	66	276	48	121
1999	46	54	61	251	48	128
2000	47	56	61	234	43	91

[a] All 1997 to 2000 figures for maincrop potatoes include 'second earlies'.

[b] Single crop grouping for the combined winter and spring oilseed rape areas.

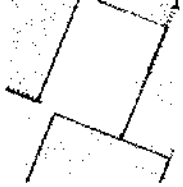


Table B1.4 Average field rates (kg/ha) on major tillage crops, Great Britain 1996 - 2000

Total nitrogen

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1996	188	96	143	180	197	112
1997	193	96	144	184	204	112
1998	183	95	136	193	188	111
1999	189	101	142	178	202	104
2000	193	112	150	174	195	108

Straight nitrogen

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1996	179	77	137	111	183	100
1997	185	71	138	101	194	100
1998	176	74	127	123	177	102
1999	182	85	134	93	188	93
2000	185	96	142	73	190	105

Compound nitrogen

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1996	48	67	51	162	50	74
1997	49	69	49	160	50	82
1998	47	67	46	164	45	73
1999	57	68	54	164	47	85
2000	49	65	44	156	47	75

Total phosphate

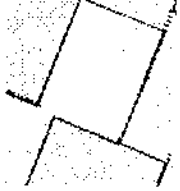
	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1996	68	53	64	190	65	67
1997	68	57	65	186	64	63
1998	68	51	66	195	66	68
1999	72	54	62	192	71	75
2000	69	58	65	187	70	76

Total potash

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1996	74	62	73	259	67	129
1997	75	64	78	267	71	143
1998	77	64	80	291	68	139
1999	78	62	77	287	76	153
2000	77	66	80	265	75	142

[a] All 1997 to 2000 figures for maincrop potatoes include 'second earlies'.

[b] Single crop grouping for the combined winter and spring oilseed rape areas.



B1.2.1 NITROGEN

Overall rates of total nitrogen increased on the major cereal crops and sugar beet in 2000, due to greater use of straight nitrogen, but there was little change in application rate on maincrop potatoes and oilseed rape. This increased use of nitrogen fertiliser on cereals and sugar beet, together with changes in cropping area (see Section A3.1), accounted for most of the 9 kg/ha rise in overall nitrogen rate for all tillage crops, as a single grouping, to 149 kg/ha. This estimated increase suggests a possible recovery in overall nitrogen use, back to previously reported levels for tillage crops.

Winter wheat

The overall rate of total nitrogen on winter wheat rose again by 3 kg/ha in 2000, to 188 kg/ha, because of a further increase in straight nitrogen use (Table B1.3). Total nitrogen use in 2000 was slightly higher (+2 kg/ha) than the five year mean of 186 kg/ha for 1996-2000. During this period, net changes in straight and compound nitrogen use have been relatively small.

The field cropping information collected in the Survey enables separate estimates to be made of nitrogen fertiliser use on milling and non-milling (feed/seed) categories of winter wheat (Table B1.5). The field average nitrogen rate on milling winter wheats in 2000 was, at 211 kg/ha, the highest rate recorded over the last five years (mean: 203 kg/ha), although similar to the estimated rate in 1997. The corresponding rate on non-milling wheats has, however, shown little change during 1996-2000 (mean: 184 kg/ha), apart from the higher reported level of 190 kg/ha in 1997.

Table B1.5 Average field application rates (kg/ha) of nitrogen on cereals by market use, Great Britain 1996 - 2000

Total nitrogen

	winter wheat		*spring barley*		*winter barley*	
	milling	*non-milling*	*malting*	*non-malting*	*malting*	*non-malting*
1996	198	185	97	93	129	152
1997	209	190	98	91	126	151
1998	192	180	100	89	116	146
1999	204	183	103	99	125	149
2000	211	184	105	103	135	154

The mean difference of 19 kg/ha in average nitrogen rate between milling and non-milling wheats reflects differences in crop husbandry and nitrogen management practices.

Nitrogen fertiliser requirements for winter wheat depend on the intended market end use, as well as upon soil type and the residual soil nitrogen fertility from previous cropping and manure practice[14]*. Milling varieties are often grown as a second wheat and often receive extra nitrogen, either as a solid dressing or as late foliar urea spray, which is applied to improve the chances of achieving an adequate grain protein content for a milling premium. High yielding feed crops, rather than lower yielding varieties of milling wheat, are often grown as a first winter wheat after a break crop. This is to exploit the potential yield and residual soil nitrogen benefits from the crop rotation, and also to avoid any risk of lower grain protein concentrations as a result of high yield diluting the grain nitrogen concentration for first wheat in the rotation. Nitrogen fertiliser strategies on farms can be assessed from trends in grain nitrogen concentration, to confirm whether nitrogen usage is correct.*

[14] MAFF (2000). *Fertiliser Recommendations for Agricultural and Horticultural Crops*. MAFF Reference Book 209 (Seventh edition). London: TSO.

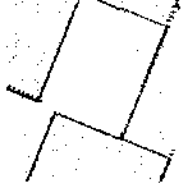


Table B1.6 Percentage distribution (% crop area) of cereal crop areas by market use, Great Britain 1996 - 2000[1]

	winter wheat		*spring barley*		*winter barley*	
	milling	*non-milling*	*malting*	*non-malting*	*malting*	*non-malting*
1996	20	80	65	35	30	70
1997	16	84	65	35	33	67
1998	26	74	52	48	33	67
1999	28	72	66	34	34	66
2000	28	72	59	41	27	73

[1] As estimated from the Survey.

The survey estimates of crop areas suggest that, over the last three years, about a quarter of the total winter wheat area was grown for milling (mean: 27%), rather than feed/seed markets (Table B1.6). In 1996-97, however, no more than a fifth of the crop area was estimated to be milling varieties. The increase in average field nitrogen rate on milling crops, rather than changes in the type of wheat grown, was the main reason for the rise in overall nitrogen use on the total winter wheat crop in 2000.

Information on autumn and early winter applications of nitrogen on winter wheat, and also on winter barley, is presented in Section B2.2.2.

Spring barley

Overall use of total nitrogen on spring barley increased significantly by 8 kg/ha to 107 kg/ha in 2000, because of a rise in the overall rate of straight nitrogen. This total nitrogen rate was the highest over the 1996-2000 period (mean: 97 kg/ha), as a result of consecutive increases over the last two years. Although overall use of straight nitrogen has increased since 1996, the compound nitrogen rate has declined on spring barley.

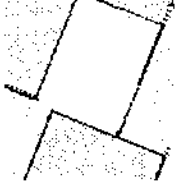
Further analysis of the data by crop type shows that the field average rates of total nitrogen increased slightly in both malting (+2 kg/ha) and non-malting (+4 kg/ha) crops in 2000 (Table B1.5). Over the last five years nitrogen rates have recovered on both malting (mean: 101 kg/ha), and non-malting (mean: 95 kg/ha) crops of spring barley, after falls in 1996-97 or 1996-98, respectively.

Estimated nitrogen rates on malting crops have been consistently slightly higher on malting than non-malting crops, with a mean difference of 6 kg/ha over the last five years.

This slightly higher use of nitrogen on malting than non-malting crops may seem anomalous, since lower rates of nitrogen are recommended for malting than for feed barley, under the same conditions of soil type and nitrogen fertility level. This recommendation is made to avoid the risk of high grain nitrogen content which would adversely affect subsequent malt quality. However, malting crops are normally grown on soils with low nitrogen fertility and the average field rates of nitrogen reported for malting varieties in Table B1.5 are generally in the range recommended for mineral soil types with low nitrogen residues (100 - 120 kg/ha)[15]*. Feed crops on the other hand are often grown within mixed rotations, which tend to have a higher soil nitrogen fertility, with consequently less need for nitrogen fertiliser.*

The survey estimates indicated a slight decrease in 2000, to 59%, in the proportion of spring barley grown for malting but, over the last five years, the percentage area has remained around

[15] MAFF (2000). *Fertiliser Recommendations for Agricultural and Horticultural Crops*. MAFF Reference Book 209 (Seventh edition). London: TSO.



two-thirds except in 1998, when it dropped to about a half. The increase in overall nitrogen rate on the total spring barley crop in 2000 reflected rises in average field rate and also dressing cover for both malting and non-malting crops.

Winter barley

Overall total nitrogen use on winter barley increased by 5 kg/ha in 2000 to 146 kg/ha because of, as for the other major cereal crops, a rise in the overall rate of straight nitrogen. The overall compound nitrogen rate, however, showed a small decrease. The total nitrogen rate has fluctuated over the last five years (mean: 141 kg/ha) with no clear trend, because of the combined effects of a general increase and decrease in straight and compound nitrogen rates, respectively, over this period.

Nitrogen requirements for winter barley, as with the spring sown crop, depend on a range of agronomic factors, including the intended market for the grain. Field average rates of nitrogen increased on both malting and non-malting crops in 2000 and were the highest levels recorded over 1996 - 2000 resulting in five-year means of 126 and 150 kg/ha, respectively. The latest results suggest that, following a drop in 1998, nitrogen rates on both crop types may have recovered to the levels reported in 1995-96.

The higher application rates of nitrogen (five-year mean of +24 kg/ha) on non-malting, compared to malting winter barley crops, reflect typical agronomic practice. The majority of winter barley feed crops are grown in England in arable rotations, usually after a previous cereal crop, when the soil nitrogen fertility status is low. Malting crops are also normally grown on soils with low available nitrogen status and, under similar cropping conditions, higher nitrogen rates are recommended for feed crops.

The survey estimates indicated a drop in 2000 in the relative crop area grown for malting, down to a quarter, compared to about a third in recent years (Table B1.6).

Maincrop potatoes

Overall total nitrogen use on maincrop[a] potatoes showed very little change between 1999 and 2000 (mean: 159 kg/ha), whereas nitrogen use had been consistently higher in the previous three years (mean: 176 kg/ha). This difference was related to a reduction in overall use of compound nitrogen, as straight nitrogen use showed relatively little change during the 1996-2000 period.

About 75-80% of the total fertiliser nitrogen input for maincrop potatoes is applied in compound form, as a seedbed dressing, whereas the straight nitrogen dressings tend to be applied as a top dressing on irrigated crops at tuber initiation stage.

Oilseed rape

Overall total nitrogen use on oilseed rape, as a combined category for both the autumn and spring sown crop, hardly changed in 2000, down by just 2 kg/ha to 195 kg/ha, after a rise in application rate in the previous season (Table B1.3). This slight drop reflected a decrease in the overall application rate of compound nitrogen, while straight nitrogen use did not change. The overall total rate in 2000 was virtually the same as the five-year mean of 194 kg/ha. Compound nitrogen use has decreased slightly in recent years, although the reported changes in total nitrogen rate were mostly related to fluctuations in straight nitrogen use. On average, nearly 90% of total fertiliser nitrogen was applied in straight form.

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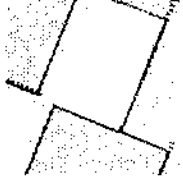
[a] All 1997 to 2000 figures for maincrop potatoes include 'second earlies'.



A more detailed breakdown of the data for oilseed rape shows that the average field rate of nitrogen on winter oilseed rape hardly changed during 1998-2000 (mean: 204 kg/ha), but had been higher in the preceding two years (mean: 213 kg/ha) (Table B1.7). Estimated average field nitrogen rates have been slightly more variable on spring oilseed rape over the last five years, excluding the unusually high estimated rate in 1999 when the sample size was very limited (only twenty-five fields) and unlikely to have been sufficiently representative[16]. The five-year mean nitrogen rates were 208 kg/ha for winter oilseed rape, compared to 123 kg/ha for spring oilseed rape (excluding 1999).

Table B1.7 Average field application rates of nitrogen (kg/ha) on winter and spring oilseed rape and percentage distribution (%) of crop areas, Great Britain 1996 - 2000[1]

Total nitrogen (kg/ha)			Percentage Distribution (%)		
	winter oilseed rape	*spring oilseed rape*		*winter oilseed rape*	*spring oilseed rape*
1996	212	127	*1996*	81	19
1997	215	120	*1997*	88	12
1998	204	115	*1998*	83	17
1999	204	161	*1999*	95	5
2000	203	133	*2000*	90	10

[1] As estimated from the Survey.

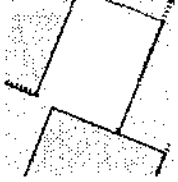
Most of the oilseed rape area is autumn, rather than spring sown and, over the last five years, the percentage grown as winter oilseed rape has tended to increase (Table B1.7). However, the proportion of spring-sown oilseed rape doubled in 2000 according to survey estimates, up to 10% of the total crop area, after a sharp drop in 1999. The shifts in these relative cropping areas have been the main factor determining nitrogen use on oilseed rape as a combined crop category, together with a smaller effect from the annual changes in the nitrogen rates actually applied to the autumn and spring sown crops.

Information on autumn and early winter applied nitrogen for winter oilseed rape is given in Section B2.2.2.

Sugar beet

Estimated overall nitrogen use on sugar beet had fallen in 1999, after remaining fairly steady in the previous three years, but partly recovered in 2000 with an increase of 7 kg/ha to 104 kg/ha. This rise in total rate reflected an increase in the overall rate of straight nitrogen, which was partly offset by a drop in compound nitrogen use. Total nitrogen rise in 2000 was very close to the five-year mean of 105 kg/ha.

[16] Chalmers, A. G., Hounsome, B., Lang, B., Renwick, A. and Rush, C. (2000). *The British Survey of Fertiliser Practice: fertiliser use on farm crops for the crop year 1999*. The BSFP Authority: London.



B1.2.2 PHOSPHATE AND POTASH

Phosphate

The small increase (+2 kg/ha) in overall phosphate use on tillage crops in 2000 was mainly caused by increased application rates on cereal crops (Table B1.3). In contrast, however, recorded phosphate use decreased on maincrop potatoes, oilseed rape and sugar beet. Despite the small increase, phosphate use on tillage crops remained below the 1996-2000 mean (50 kg/ha), following the drop in dressing cover in 1999. Average field rates on these crops have shown relatively little or no change over the last five years, apart from some apparent increase for sugar beet.

Overall phosphate rates rose slightly on winter wheat (+3 kg/ha) and winter barley (+1 kg/ha) in 2000, to 44 and 48 kg/ha respectively. However, phosphate use on these winter cereal crops was still lower than 1996-1998 levels (means: 51 and 54 kg/ha for winter wheat and winter barley, respectively), following the marked drop in overall application rates in 1999. The field average rate actually decreased (-3 kg/ha) on winter wheat, but increased (+3 kg/ha) on winter barley in 2000, so that changes in overall rates were also influenced by shifts in the proportion of each crop area receiving phosphate fertiliser, particularly for winter wheat.

The lower phosphate (also potash) use on winter cereal crops in 1999-2000 may reflect short term changes in fertiliser policy on some farms to make cost savings in fertiliser inputs, in response to the current economic difficulties facing the agricultural industry.

The overall phosphate rate also rose on spring barley in 2000, by 2 kg/ha to 47 kg/ha, mainly because of an increase (+4 kg/ha) in average field rate. Phosphate use on this crop fluctuated between 1996 and 2000, but the overall application rate in 2000 was very close to the five-year mean of 46 kg/ha.

Estimated overall use of phosphate on maincrop potatoes dropped significantly by 10 kg/ha in 2000, to 159 kg/ha, reflecting decreases in both average field rate and dressing cover. Overall phosphate use appears to have decreased in the last five years (mean: 173 kg/ha) and this medium-term trend can mainly be attributed to a decline in the percentage crop area receiving any application of phosphate-containing fertiliser.

The overall application rate of phosphate on oilseed rape decreased by 5 kg/ha in 2000, to 41 kg/ha, due to a further decrease in dressing cover. Phosphate use on this crop had also fallen in 1999, after a period relatively steady usage for several years, resulting in a five-year mean of 48 kg/ha. The recent results indicate a cutback in the percentage crop area receiving phosphate.

The recorded overall rate of phosphate on sugar beet dropped significantly in 2000, by 13 kg/ha to 39 kg/ha, due to a decrease in dressing cover for this nutrient. Estimated usage has, however, tended to fluctuate during the last five years (mean: 46 kg/ha), despite remaining at about 50 kg/ha during 1997-1999.

Potash

Overall potash use on tillage crops was 2 kg/ha lower in 2000, at 55 kg/ha, mainly because of decreased application rates on maincrop potatoes, oilseed rape and sugar beet. Potash use, as for phosphate, remained below the five-year average (61 kg/ha) after the appreciable drop in overall application rate in 1999. Average field rates on these crops have, however, shown relatively little or no change over the last five years, apart from an apparent increase for sugar beet.

Overall potash use showed very slight apparent increases on winter wheat (+1 kg/ha) and spring barley (+2 kg/ha) in 2000 but no change on winter barley, with recorded overall rates of 47, 56 and 61 kg/ha, respectively (Table B1.3). The average field rates increased by 3-4 kg/ha on spring barley and winter barley, but was marginally lower (-1 kg/ha) on winter wheat (Table B1.4). The lower levels of potash use recorded on these cereal crops in 1999 appears to have continued in 2000, so that the mean overall rates for winter wheat, spring barley and winter barley in 1999-2000 were 7, 4 and 4 kg/ha lower, at 47, 55 and 61 kg/ha, respectively, than those for 1996-1998.

The apparent cutback in potash applications to winter cereals in 1999-2000 may, as for phosphate, reflect short-term strategies on some farms for saving fertiliser costs, to improve gross margins for cereal production at low grain prices.

The overall potash rate on maincrop potatoes showed a recorded drop of 17 kg/ha in 2000, to 234 kg/ha, mainly due to a decrease in average field rate. The overall application rate had been about 250 kg/ha since 1996, apart from an apparent increase in 1998, giving a five-year mean of 252 kg/ha.

Overall potash use on oilseed rape decreased by 5 kg/ha in 2000, to 43 kg/ha, because of a drop in dressing cover. The overall application rate had previously shown a drop of 7 kg/ha in 1998. Potash use in 2000 was consequently below the five-year mean of 49 kg/ha and the recent results suggest a decrease in the proportion of oilseed rape receiving potash fertiliser.

Overall potash use on sugar beet dropped significantly by 37 kg/ha in 2000, to 91 kg/ha, the lowest recorded rate over the last five years. This decrease was caused by reductions in both field average rate (-9 kg/ha) and dressing cover, compared to 1999.

Part of the reason for recent apparent fluctuations in estimates of nutrient application rates for sugar beet and potatoes may lie in the reporting process. It may be that when fertilisers are delivered and applied by contractors the information on constituent details is less readily available to the farmer completing the Survey than if fertilisers are self-purchased and applied.

B1.2.3 SULPHUR

The risk of sulphur deficiency in crops such as oilseed rape, cereals and intensively cut grass, which have a high sulphur requirement, has increased appreciably over the last decade. Sulphur reserves have become depleted in some soil types, particularly sandy and shallow soils, because of the continuing reduction in sulphur dioxide emissions from industrial sources and consequent decline in atmospheric deposition of sulphur over the last thirty years[17]. Sulphur application is now an essential agronomic requirement for susceptible crops grown in some parts of Great Britain.

The Survey has collected detailed information on sulphur fertiliser use since 1993, when only 3-6% of the cereal crop areas and 8% of the oilseed rape area received an application of sulphur. By 1997, the proportions of these crop areas which were treated with sulphur had increased markedly to 13-14% for cereals and 30% for oilseed rape (Table B1.8). Since then, however, dressing covers for sulphur have generally remained static on these crops, despite the steadily increasing risk of deficiency which may now be affecting 30-50% of arable land in Great Britain, according to modelling estimates[17].

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[17] McGrath, S. P., Zhao, F. J. and Withers, P. J. A. (1996). Development of sulphur deficiency in crops and its treatment. *Proceedings No. 379*. York: The International Fertiliser Society. ISSN 0369-9277.

In 2000, the proportion of each cereal crop which was dressed with a sulphur-containing fertiliser rose by 6% points for spring barley, although it hardly changed for winter cereals. Even so, the current trend is still one of steady sulphur use, with applications to about one sixth of each of the major cereal crop areas. Large apparent changes in average field rates of sulphur (as SO_3) application have sometimes been recorded e.g. as reported for winter wheat (+15 kg/ha) and spring barley (+11 kg/ha) in 2000. However, no specific trends have emerged from the results, with five-year means of 41, 43 and 32 kg/ha for winter wheat, winter barley and spring barley, respectively. These mean rates are in line with the recommended practice of 25-40 kg/ha SO_3, applied as a water soluble form in early spring, for potentially sulphur-deficient cereal crops[18].

Table B1.8 Dressing cover (% area) and average application rate (kg/ha SO_3) of sulphur on cereals and oilseed rape, Great Britain 1996 - 2000

Dressing cover (%)

	winter wheat	*winter barley*	*spring barley*	*oilseed rape*
1996	8	10	7	30
1997	13	13	14	30
1998	15	13	13	30
1999	14	14	12	31
2000	15	16	18	29

Average field rate (kg/ha SO_3)

	winter wheat	*winter barley*	*spring barley*	*oilseed rape*
1996	46	47	26	48
1997	38	40	39	63
1998	38	36	27	51
1999	34	45	28	66
2000	49	45	39	68

Oilseed rape has a higher sulphur requirement than cereals and almost a third of the crop area receives a sulphur application. The estimated average field rate on oilseed rape has varied during 1996-2000, resulting in a five-year mean of 59 kg/ha SO_3. This mean rate is within the recommended range of 50-75 kg/ha SO_3 for sulphur fertiliser application where the crop is grown on sulphur-deficient soils[18].

A higher proportion of cereal and oilseed crops are treated with sulphur in Scotland than in England and Wales (Table B1.9).

This regional difference reflects the greater risk of sulphur deficiency in Scotland, due to extremely low levels of atmospheric sulphur deposition, compared to most other areas of Britain. The continuing decline in atmospheric sulphur deposition suggests that sulphur containing fertilisers may need to be used more widely in future years, to prevent the occurrence of sulphur deficiency in arable crops.

[18] MAFF (2000). *Fertiliser Recommendations for Agricultural and Horticultural Crops*. MAFF Reference Book 209 (Seventh edition). London: TSO.

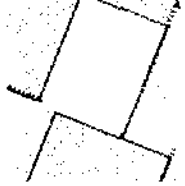


Table B1.9 Dressing cover (% area) of sulphur on cereals and oilseed rape by region, 1999 - 2000

		winter wheat	*winter barley*	*spring barley*	*oilseed rape*
England and Wales	*1999*	14	13	10	31
	2000	13	14	14	25
Scotland	*1999*	32	29	14	47
	2000	45	29	22	55
Great Britain	*1999*	14	14	12	31
	2000	15	16	18	29

B1.3 FERTILISER USE ON GRASSLAND

Overall fertiliser usage on grassland in Great Britain over the last five years, as previously reported in Section B1.1, is summarised again in Table B1.10. The corresponding estimates of dressing cover and average field rates for each nutrient are shown in Table B1.11.

Table B1.10 Overall fertiliser use (kg/ha) on grassland, Great Britain 1996 - 2000

	straight nitrogen	*compound nitrogen*	*total nitrogen*	*total phosphate*	*total potash*
1996	53	62	115	23	30
1997	54	69	123	25	35
1998	53	56	109	21	29
1999	52	58	110	20	28
2000	43	56	99	20	26

The drop in overall total nitrogen use on grassland in 2000 reflected decreases in both dressing cover (-4%) and average field rate (-5 kg/ha) (Table B1.11). For straight nitrogen, the overall rate decreased mainly because of an appreciable drop (-11 kg/ha) in average field rate. The small drop in overall compound nitrogen rate reflected a large decrease (-12 kg/ha) in average field rate, which was largely offset by an increase (+6 percentage points) in dressing cover. Over the last five years, dressing covers have tended to decrease for total and straight nitrogen, but may have recovered for compound nitrogen after a drop in 1998-99. The corresponding average field rates have not shown any consistent change during this period, although the compound nitrogen rate dropped in 2000 to its lowest level for the last five years.

Average field rates and dressing covers hardly changed for either phosphate or potash in 2000, but the combined effects accounted for the small reduction (-2 kg/ha) observed in the overall rate for potash. Over the last five years, dressing covers have tended to decrease for phosphate but have not shown a clear trend for potash. No consistent changes have been apparent in the corresponding average field rates, over the same period.

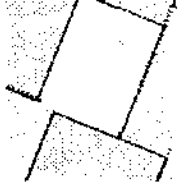


Table B1.11 Dressing cover (%) and average application rate (kg/ha) of fertiliser on grassland, Great Britain 1996 - 2000

Dressing cover (%)

	straight nitrogen	*compound nitrogen*	*total nitrogen*	*total phosphate*	*total potash*
1996	42	66	86	68	47
1997	42	68	86	70	69
1998	43	60	79	62	63
1999	39	61	79	61	61
2000	35	67	75	60	59

Average field rate (kg/ha)

	straight nitrogen	*compound nitrogen*	*total nitrogen*	*total phosphate*	*total potash*
1996	124	94	133	34	45
1997	129	101	142	36	51
1998	125	93	138	33	46
1999	134	96	138	33	46
2000	123	84	133	34	45

B1.3.1 NITROGEN

The Survey information collected for grassland fields enables nitrogen and other fertiliser nutrient usage to be assessed in more detail according to sward management practice.

Cutting and Grazing Management

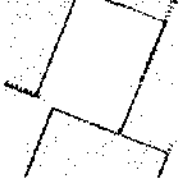
Fertiliser requirements for grassland vary according to the type of livestock enterprise, intensity of production and the associated cutting and grazing regimes used for sward management. Fertiliser use on dairy, other livestock and mixed farms in England and Wales and in Scotland in 2000 are presented in Section C tables. The Survey estimates for annual distributions of the total grassland area between grazing and cutting management regimes since 1996 are summarised in Table B1.12. These should not however be taken as authoritative national estimates of grassland utilisation, as the Survey is designed to estimate fertiliser application rates, not to derive accurate crop areas. Fertiliser usage for the different cutting and grazing categories is presented in Table B1.13. The differences in average field rates for each nutrient illustrate the influence of grassland management practice on fertiliser inputs.

Table B1.12 Grassland utilisation (% of grass area), Great Britain 1996 - 2000

	grazed[a]	*silage*[b]	*hay*[b]
1996	88	30	12
1997	91	35	13
1998	94	36	12
1999	96	34	13
2000	93	33	13

[a] May also be cut.

[b] May also be grazed.



Nearly all grassland is grazed at some stage during the season (Table B1.12). Grassland utilisation for cutting and grazing showed very little or no change in 2000 and, except in 1996, has been fairly consistent over the past five years, giving means of 92%, 34% and 13% for grazed, silage and hay categories, respectively.

Table B1.13 Nitrogen application rates (kg/ha) by grassland utilisation, Great Britain 1996 - 2000

Total nitrogen

	overall application rate				*average field rate*		
	grazed[a]	*silage*[b]	*hay*[b]		*grazed*[a]	*silage*[b]	*hay*[b]
1996	110	172	94	*1996*	128	178	107
1997	119	179	85	*1997*	138	185	99
1998	107	168	82	*1998*	136	176	101
1999	108	168	72	*1999*	137	180	101
2000	97	147	86	*2000*	130	163	110

Straight nitrogen

	overall application rate				*average field rate*		
	grazed[a]	*silage*[b]	*hay*[b]		*grazed*[a]	*silage*[b]	*hay*[b]
1996	52	71	46	*1996*	125	127	106
1997	53	72	33	*1997*	129	134	94
1998	52	79	44	*1998*	125	130	100
1999	51	76	31	*1999*	133	139	98
2000	48	59	42	*2000*	127	135	104

Compound nitrogen

	overall application rate				*average field rate*		
	grazed[a]	*silage*[b]	*hay*[b]		*grazed*[a]	*silage*[b]	*hay*[b]
1996	58	101	48	*1996*	90	129	79
1997	66	107	52	*1997*	98	130	77
1998	55	89	39	*1998*	92	118	71
1999	57	92	41	*1999*	94	125	77
2000	49	88	44	*2000*	72	94	86

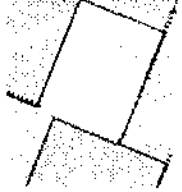
The overall application rate of total nitrogen decreased in 2000 on both grazed grass (-11 kg/ha) and grass cut for silage (-21 kg/ha) to 97 and 147 kg/ha respectively, in large part because of changes in average field rates for these two categories (Table B1.13). Total nitrogen use was, however, unchanged on grassland used for hay production.

Over the last five years, overall total nitrogen rates have shown a net decrease for all three management categories, although there was relatively little change in application rates for grazed and silage grass during 1996-1999, apart from a recorded rise in 1997. During 1996-2000, average field rates of total nitrogen did not show any clear trend in either the grazed or cut grassland categories.

The fall in nitrogen use on grassland in 2000 was associated with decreases in livestock numbers, which reflected economic pressures and would have reduced herbage production requirements. The total breeding herd decreased by about 4% in both the dairy and beef sectors

[a] May also be cut.

[b] May also be grazed.



in Great Britain, while the total number of sheep and lambs also dropped, by about 5% (Source: Agricultural Census data). In England and Wales (representing four-fifths of the British grassland area), overall nitrogen use in 2000 fell on both younger (less than five years old) and older grassland by 19% and 9%, respectively, to 157 and 85 kg/ha, mainly because of decreases in dressing cover. Nitrogen fertiliser practice showed the same pattern of change at the farm type level, for both dairy and beef/sheep farms.

B1.3.2 PHOSPHATE AND POTASH

Phosphate and potash requirements for grassland depend, as for nitrogen, on the sward management system.

Table 1.14 Phosphate and potash use (kg/ha) by grassland utilisation, Great Britain 1996 - 2000

Total phosphate

	overall application rate				*average field rate*		
	grazed[a]	*silage*[b]	*hay*[b]		*grazed*[a]	*silage*[b]	*hay*[b]
1996	22	34	21	*1996*	33	43	31
1997	24	36	24	*1997*	35	44	34
1998	20	30	19	*1998*	33	40	32
1999	20	27	16	*1999*	33	39	29
2000	20	30	18	*2000*	33	40	33

Total potash

	overall application rate				*average field rate*		
	grazed[a]	*silage*[b]	*hay*[b]		*grazed*[a]	*silage*[b]	*hay*[b]
1996	27	58	26	*1996*	42	69	40
1997	32	64	28	*1997*	47	75	41
1998	28	54	23	*1998*	44	67	39
1999	27	51	20	*1999*	44	67	37
2000	25	47	21	*2000*	43	62	42

In 2000, the overall phosphate rate rose by 2-3 kg/ha on cut grass to 30 and 18 kg/ha for silage and hay respectively, due to increases in average field rate and also, for silage, dressing cover. The overall phosphate rate on grazed grass was, however, unchanged in 2000 and has now been at 20 kg/ha for the last three years, about 3 kg/ha lower than reported levels in 1996-97. The drop in 1998 had resulted from a decrease in dressing cover, rather than field average rate. The cut grass categories have shown a similar trend in overall phosphate use over the last five years although, for silage, the change was mainly caused by a reduction in field average rate.

Overall potash rate in 2000 decreased on grazed (-2 kg/ha) and silage (-4 kg/ha) grass in 2000, to 25 and 47 kg/ha respectively, mainly because of a reduction in average field rates (Table B1.14). Overall potash use on grass cut for hay was virtually unchanged (+1 kg/ha) at 21 kg/ha. Between 1996 and 2000, the overall potash rate has shown a net decrease on both the grazed and, particularly the cut grassland categories, mainly because of reductions in dressing cover.

As most phosphate and potash fertiliser inputs on grassland are applied in some form of NPK compound, these two nutrients would be expected to show similar trends in application rates.

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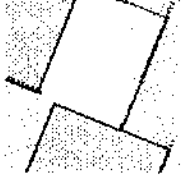
[a] May also be cut.

[b] May also be grazed.



B1.3.3 SULPHUR

Sulphur deficiency, causing loss of herbage yield and/or quality, is a potential risk on some soil types where grassland is cut intensively for silage, but deficiency is unlikely where swards are used mainly for grazing or single hay cuts. Potential yield losses of silage due to sulphur deficiency on coarse textured or shallow soils in low sulphur deposition areas are most likely to occur in second and subsequent cuts, rather than first cut, unless the deficiency is very severe. The Survey data confirm that, as expected, a higher proportion of grassland cut for silage is treated with sulphur compared to grazed grass or grass used for hay cutting (Table B1.15). Although dressing covers increased slightly in 2000, there has been no real change in the proportion of grassland receiving sulphur fertiliser either in the last five years (means: 7% for silage grass and 3% for grazed and hay grass) or indeed since 1993, when information on sulphur applications was first collected in the Survey.

The significant proportion of heavier textured soil types which occur in the main grassland farming areas, and inputs of available sulphur from slurry applications to silage fields, are among possible reasons for the current low level of sulphur fertiliser use on grassland. Insufficient farmer awareness about the risks of sulphur deficiency in cut grass, particularly for second cut silage, may also be a contributory factor.

Table B1.15 Dressing cover (% area) and average application rate (kg/ha SO_3) of sulphur on grassland, Great Britain 1996 - 2000

Dressing cover (%)

	grazed[a]	*silage*[b]	*hay*[b]	*all grass*
1996	3	6	1	3
1997	4	8	5	5
1998	3	6	4	3
1999	3	7	2	4
2000	4	9	4	5

Average field rate (kg/ha SO_3)

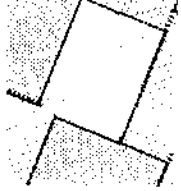
	grazed[a]	*silage*[b]	*hay*[b]	*all grass*
1996	40	45	24	42
1997	34	43	27	38
1998	32	39	32	34
1999	55	62	34	56
2000	40	44	41	41

Estimated average field rates of sulphur application for each sward management category did not show any consistent changes during 1996-2000, resulting in five year means of 40, 47 and 32 kg/ha SO_3 for grazed, silage and hay grassland, respectively (Table B1.15). The mean rate for silage grass over the whole season is slightly above the recommended rate of 25-40 kg/ha SO_3 for each silage cut at risk of sulphur deficiency[19].

[a] May also be cut.

[b] May also be grazed.

[19] MAFF (2000). *Fertiliser Recommendations for Agricultural and Horticultural Crops*. MAFF Reference Book 209 (Seventh edition). London: TSO.



B2 LONGER TERM TRENDS

B2.1 LONGER TERM TRENDS FOR GREAT BRITAIN

The British Survey of Fertiliser Practice was first undertaken as an integrated British survey in 1992. Before then, the annual Survey of Fertiliser Practice had been carried out separately for England and Wales and for Scotland. Survey statistics from those earlier surveys have, however, been collated in order to report an aggregated series for total nitrogen, phosphate and potash use on tillage crops and grassland in Great Britain since 1983, when the survey in Scotland started. Data series are also presented in this section for England and Wales, starting from 1969 when the present design of the survey was first used, and for Scotland, beginning in 1983. The aggregated data for Great Britain follow a similar pattern to that observed for England and Wales, because a large proportion of both the tillage and grassland areas in Britain are located in England and Wales.

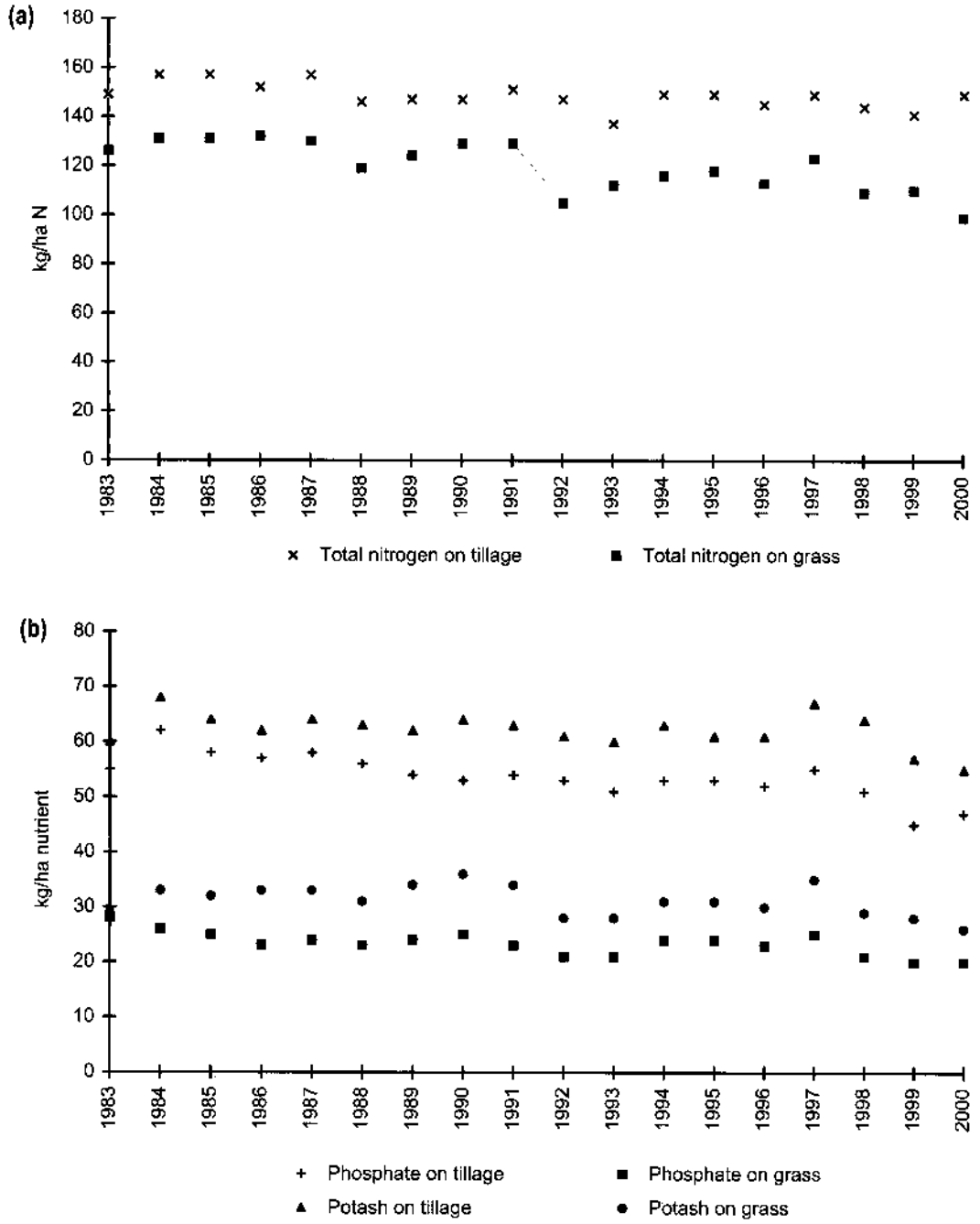
B2.1.1 NITROGEN USE

Table B2.1 Total overall nitrogen application rates (kg/ha), Great Britain 1983 - 2000

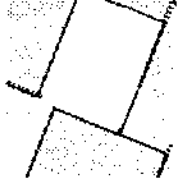
	tillage crops	*grass*	*all crops and grass*
1983	149	126	136
1984	157	131	143
1985	157	131	144
1986	152	132	142
1987	157	130	143
1988	146	119	132
1989	147	124	136
1990	147	129	138
1991	151	129	139
1992	147	105	124
1993	137	112	123
1994	149	116	131
1995	149	118	132
1996	145	113	128
1997	149	123	136
1998	144	109	126
1999	141	110	125
2000	149	99	123

Overall total nitrogen rates for tillage crops and grassland in Great Britain since 1983 are summarised in Table B2.1 and presented graphically in Figure B2.1(a). Overall nitrogen use has been consistently higher on tillage crops than on grassland ever since the British survey started.

Figure B2.1 **Overall application rates (kg/ha) of (a) total nitrogen and (b) phosphate and potash on tillage crops and grassland, Great Britain 1983 - 2000**



The maximum overall rate of nitrogen on tillage crops was recorded in the mid 1980s, at 157 kg/ha. Overall nitrogen use dropped in 1988 and, since then, has remained at a lower level with annual rates mostly in the range 145-149 kg/ha. However, larger fluctuations in overall nitrogen rates was recorded in both 1991, when there was a temporary increase to 151 kg/ha, and in 1993, when the application rate fell sharply to 137 kg/ha. Overall nitrogen use showed another, smaller drop in 1998-99 before apparently recovering in 2000. The downward shift in total nitrogen use on tillage crops since the mid 1980s was caused by the combined effects of changes in (i) the relative cropping areas of the major arable crops, as influenced by seasonal weather and market economic factors, (ii) the widespread introduction of set-aside in 1993 and



(iii) the nitrogen application rates for particular crops (see Figure B2.2 (a)). Most of total nitrogen fertiliser used on tillage crops each year has, since 1983, been applied in straight form.

Overall nitrogen use on grassland also peaked in the mid 1980s, at around 131 kg/ha, and then dropped very sharply to 119 kg/ha in 1988 before largely recovering over the following three years. Subsequent nitrogen use has, however, declined as a result of the net effects of a very significant drop in overall application rate in 1992 and, despite some recovery over the following five years, further falls in 1998 and again in 2000. The overall nitrogen rate of 99 kg/ha on grassland in 2000 was the lowest rate recorded so far in the British survey and, over a longer timescale, this level of nitrogen use had not been observed in England and Wales since the mid 1970s (see Figure B2.3 (a)). Straight nitrogen was the dominant form of nitrogen input to managed grassland in Great Britain until the late 1980s but, since then, just over half of the total nitrogen applied has been in compound form.

Overall nitrogen use on all crops and grassland, as a single category, decreased by 13% between 1984-86 (mean: 143 kg/ha) and 1998-2000 (mean: 125 kg/ha), reflecting the downward trend observed on both grassland and, to a lesser extent, on tillage crops (Table B2.1).

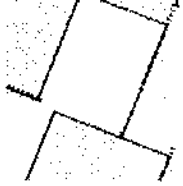
B2.1.2 PHOSPHATE AND POTASH USE

Annual overall rates of phosphate and potash on tillage crops and on grassland since 1983 are illustrated in Figure B2.1(b), using the data presented in Table B2.2. Overall rates of phosphate and potash applied to tillage crops were approximately double those used on grassland.

Table B2.2 Overall phosphate and potash application rates (kg/ha), Great Britain 1983 - 2000

	tillage crops		*grass*		*all crops and grass*	
	phosphate	*potash*	*phosphate*	*potash*	*phosphate*	*potash*
1983	55	60	28	29	40	43
1984	62	68	26	33	42	49
1985	58	64	25	32	41	48
1986	57	62	23	33	40	47
1987	58	64	24	33	40	48
1988	56	63	23	31	39	47
1989	54	62	24	34	39	48
1990	53	64	25	36	39	49
1991	54	63	23	34	38	49
1992	53	61	21	28	36	44
1993	51	60	21	28	34	43
1994	53	63	24	31	38	46
1995	53	61	24	31	37	45
1996	52	61	23	30	36	44
1997	55	67	25	35	39	50
1998	51	64	21	29	35	46
1999	45	57	20	28	32	42
2000	47	55	20	26	32	40

Overall phosphate use on tillage crops had gradually declined over the fifteen-year period since 1983, from a five-year mean of 58 kg/ha in 1983-87 to 53 kg/ha in 1993-97. Despite a temporary recorded rise in 1997, the overall application rate subsequently showed a further downward shift in 1999 and a similar level of phosphate use was also observed in the following year. Consequently, overall phosphate use is currently (1999-2000 mean: 46 kg/ha) about



12 kg/ha less than in the mid 1980s. Reductions in dressing cover for cereal and oilseed rape cropping were a major factor in the most recent drop in phosphate use on tillage crops (see Sections B1.1.2 and B1.2.2). The overall rate of phosphate on grassland was highest in 1983, at 28 kg/ha, and then application remained relatively stable at 23-25 kg/ha between 1985 and 1997, apart from a temporary recorded drop to 21 kg/ha in 1992-93. However, overall phosphate use decreased again in 1998, to 21 kg/ha, and has subsequently stayed at this lower level. Mean annual use over the last three years (20 kg/ha) represents a net decline of 5 kg/ha in overall phosphate rate, compared to the 1983-87 mean.

Overall potash use on tillage crops had declined slightly, on average by 3 kg/ha between 1983-87 (mean: 64 kg/ha) and 1992-96 (mean: 61 kg/ha). The overall application rate appeared to recover in 1997-98, but then dropped significantly by 7 kg/ha in 1999 with a further slight fall in 2000. The most recent falls, like phosphate use on tillage, have been associated principally with lower dressing covers on cereals and oilseed rape crops. Latest usage (1999-2000 mean: 56 kg/ha), if sustained, represents a net decline of 8 kg/ha in overall potash rate since the mid 1980s. The pattern of overall potash use on grassland has been more variable, compared to tillage crops, but has also shown a net decline between 1983 and 2000. Overall potash rates were relatively stable at 31-33 kg/ha during the mid-late 1980s but, since then, have tended to decline despite temporary recorded increases in 1989-91 and in 1997. Annual potash use over the last three years has been consistently lower (mean: 28 kg/ha) than overall application rates in earlier years and represents a net decline of 4 kg/ha since 1983-87 (mean: 32 kg/ha).

B2.1.3 FERTILISER USE ON MAJOR TILLAGE CROPS

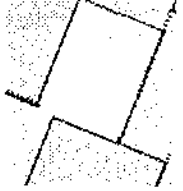
Overall application rates of total nitrogen, phosphate and potash on the main arable crops in Great Britain since 1983 are shown in Figure B2.2. Nitrogen application rates on the major cereal crops, oilseed rape, maincrop potatoes and sugar beet have all decreased to some extent since the early-mid 1980s. Overall phosphate rates have also declined on all these crops, except spring barley. However, the five-year means for 1983-87 and 1996-2000 suggest that overall potash use has hardly changed on winter wheat, actually increased on spring and winter barley, but dropped on oilseed rape, maincrop potatoes and sugar beet.

Nitrogen

Between 1983-87 and 1996-2000, there were small decreases in the five-year mean overall nitrogen rates of 3 kg/ha for winter wheat and, despite the large recorded increase in 2000, 2 kg/ha for spring barley, to 186 and 97 kg/ha, respectively (Figure B2.2(a)); for winter barley, however, there was a large drop, of 12 kg/ha, to 141 kg/ha.

Nitrogen use on oilseed rape decreased between 1984 and 1994 and subsequently showed a slight recovery. Before 1992, this change was mainly caused by reductions in autumn-applied nitrogen, as a result of cutbacks in both area treated and average rate. Between 1992 and 1994 the decreases in total nitrogen use resulted from reduced autumn and spring nitrogen recommendations for oilseed rape, to reflect economic changes associated with the introduction of Arable Area Payments, and an increase in the proportion of spring-sown crops, which have a lower nitrogen requirement than winter oilseed rape. Five-year means indicate a large net drop of 87 kg/ha in overall nitrogen rate between 1983-87 and 1996-2000, to 193 kg/ha.

Since the early 1980s, overall nitrogen use on maincrop potatoes has tended to decrease, despite some large variability in estimated annual rates; mean usage dropped by 28 kg/ha between 1983-87 and 1996-2000, to 169 kg/ha. On sugar beet, nitrogen use dropped sharply in 1985 and then gradually declined to 110 kg/ha in 1993, with little net change subsequently



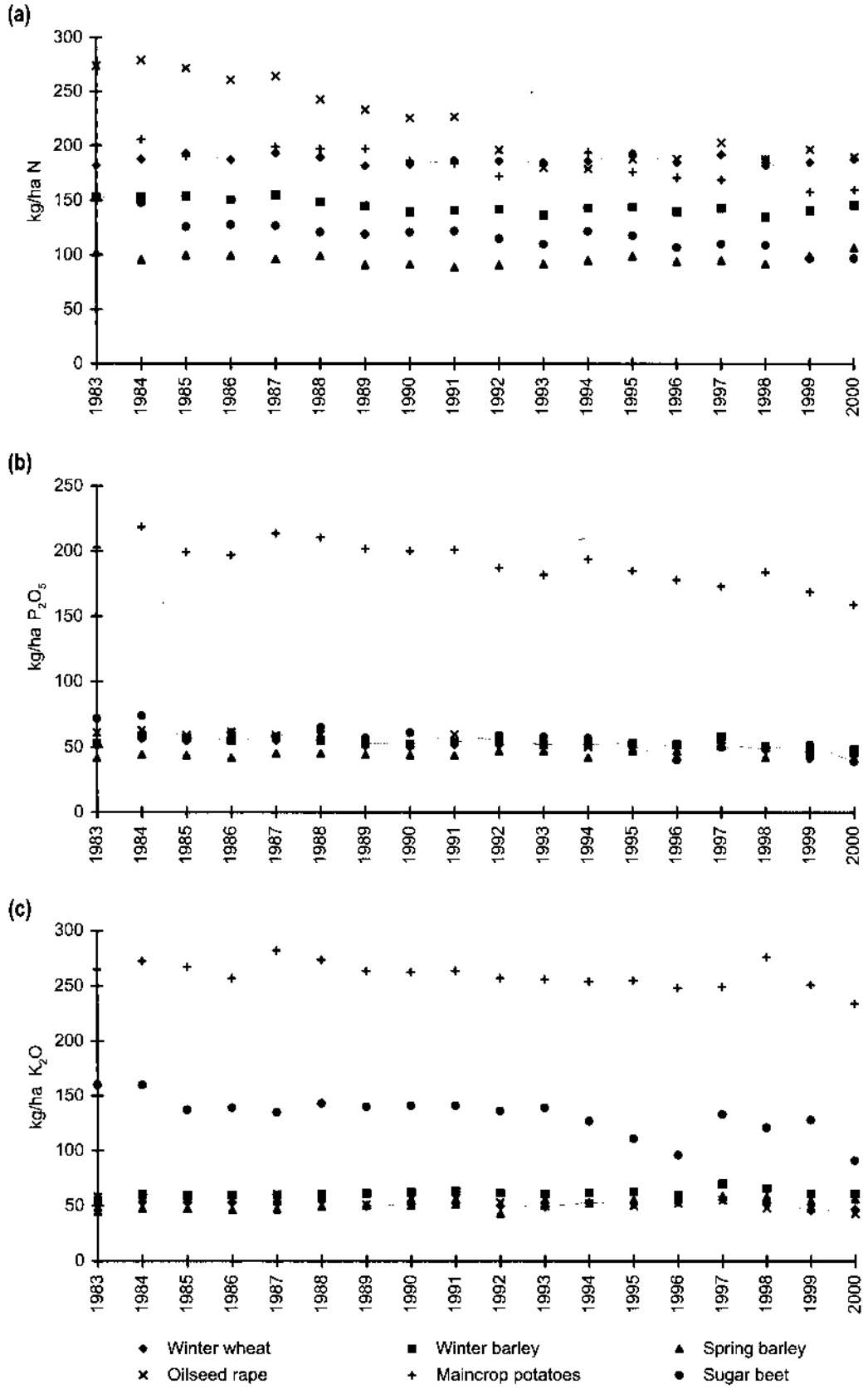
despite the recorded drop in application rate in 1999. The trend towards less nitrogen use on sugar beet reflected greater industry and farmer awareness about the adverse effects of excessive nitrogen input on sugar yield, related to the formation of high concentrations of amino-nitrogen compounds in the roots.

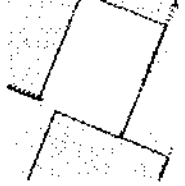
Phosphate and potash

Overall application rates of phosphate have gradually declined on winter wheat and, less consistently, on winter barley since the mid 1980s (Figure B2.2(b)); five-year means show decreases between 1983-87 and 1996-2000 of 8 and 5 kg/ha, down to 47 and 51 kg/ha, respectively. In contrast, however, phosphate use has risen slightly on spring barley since 1983 and the corresponding five-year means show an increase of 3 kg/ha, to 46 kg/ha. Overall phosphate use has also declined on oilseed rape (-13 kg/ha), maincrop potatoes (-33 kg/ha) and sugar beet (-18 kg/ha) between 1983-87 and 1996-2000, down to five-year means of 48, 173 and 46 kg/ha, respectively.

Between 1983-87 and 1996-2000, mean overall potash rates hardly changed on winter wheat (-1 kg/ha) but increased on winter barley (+5 kg/ha; mainly because of higher rates in 1997-1998) and spring barley (+10 kg/ha; reflecting a longer-term upward trend), to 51, 64 and 57 kg/ha, respectively. Annual application rates have, however, decreased on winter cereals in the last two years. The corresponding five-year means for oilseed rape, maincrop potatoes and sugar beet show decreases of 6, 17 and 32 kg/ha over the same timescale to 49, 252 and 114 kg/ha, respectively, as a result of downward trends in application rate over part or all of the 1983-2000 period.

Figure B2.2 **Overall application rates (kg/ha) of (a) total nitrogen, (b) phosphate and (c) potash on major arable crops, Great Britain 1983 - 2000**





B2.2 LONGER TERM TRENDS FOR ENGLAND AND WALES

The earlier surveys for England and Wales, which together now account for around 83% (8.6 million ha) of the agricultural land in Britain, provide a longer time series than for Great Britain, based on the present survey design.

B2.2.1 NITROGEN USE

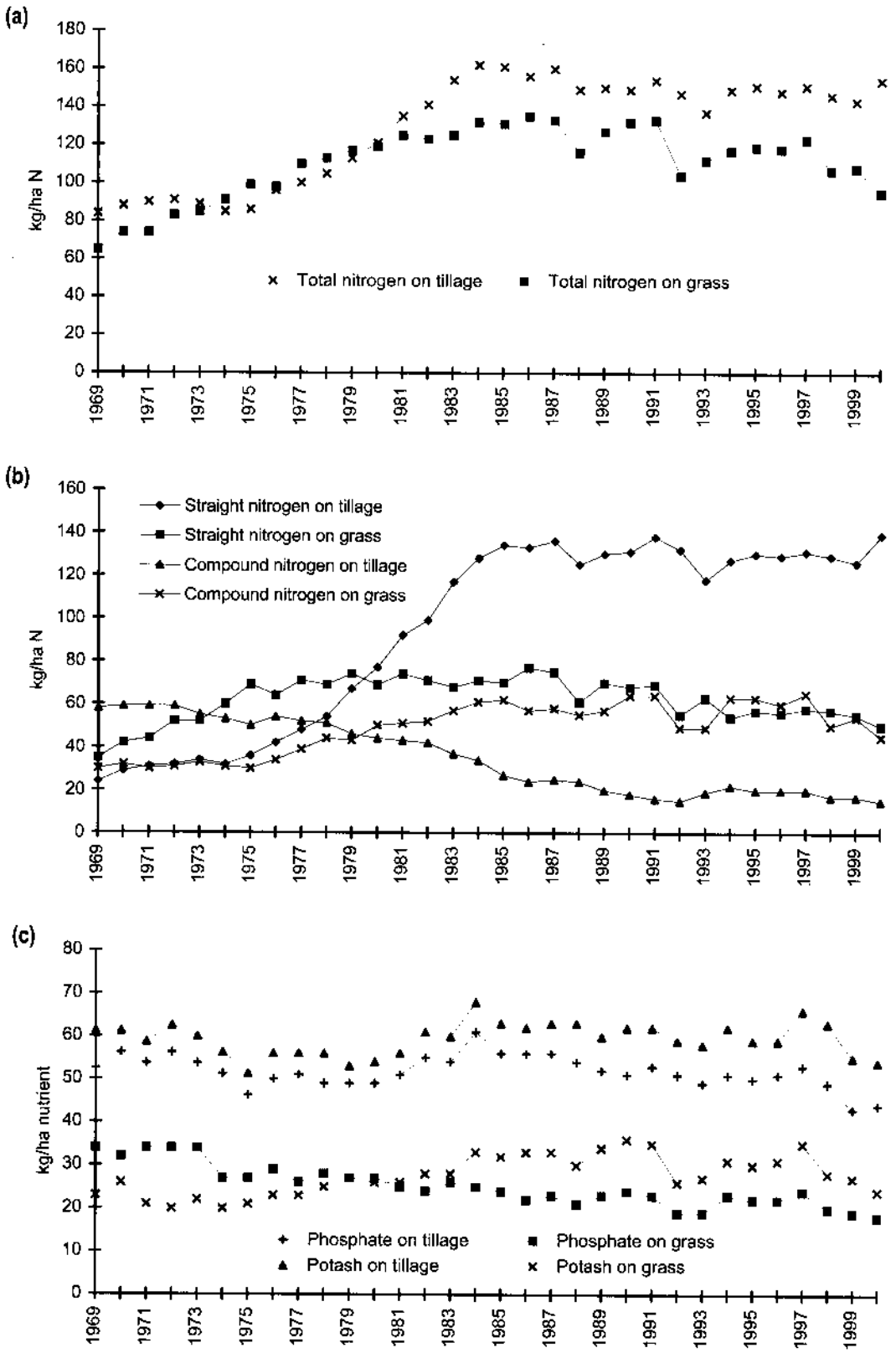
Overall total nitrogen rates, which had been increasing prior to 1969, continued to rise on both tillage crops and grassland until the mid 1980s (Figure B2.3(a)). The more rapid increase in nitrogen use on tillage crops than on grassland over this period can be attributed, in part, to the steadily improving yield potential of new cereal cultivars and also to the introduction and subsequent expansion of oilseed rape cropping. Nitrogen use on both tillage crops and grassland then remained quite steady for several years but application rates have subsequently shown net decreases since the late 1980s. The decline since 1988 was characterised, particularly on grassland, by a repeated pattern of sharp decreases and partial recovery. As a result, mean overall nitrogen use on tillage crops was 11 kg/ha (7%) lower in 1996-2000, compared to 1983-87, at 148 kg/ha. The corresponding means for grassland showed a drop of 21 kg/ha (16%), to 110 kg/ha during 1996-2000.

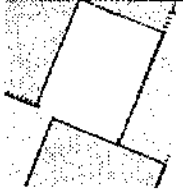
The falls in nitrogen use on tillage crops in the 1988 and 1999 seasons can be largely attributed to the reduced cropping areas of winter cereal and winter oilseed rape due, except for oilseed rape in 1999, to very wet autumns which restricted drilling opportunities. The large drop in nitrogen use on tillage crops in 1993 also resulted from a fall in the proportion of the total tillage area cropped with cereals and oilseed rape, but this was caused by the introduction of the Arable Area Payment Scheme (AAPS) and widespread adoption of rotational set-aside on arable farms. This scheme halved the commodity price for oilseed rape, thereby reducing the optimum economic fertiliser nitrogen rate for this crop. A big increase in spring instead of winter oilseed rape cropping, in response to rape seed price reductions under the AAPS, was a further contributory factor to the drop in nitrogen use on tillage crops in 1993.

The sharp drop in nitrogen use on grassland in both 1988 and 1992 may have partly reflected the influence of seasonal weather pattern on grass growth and related nitrogen requirements. The increased use of fertiliser nitrogen on grassland during the 1980s had been accentuated by its high cost/benefit ratio, reliability in producing a consistent response and its potential to support high stocking rates and high output. Nitrogen recommendations for grassland were reduced in the early 1990s, in light of further research findings, which could also partly account for the lower use of nitrogen in recent years. The further, large fall in nitrogen use in 2000 was associated with a reduction in livestock numbers in the dairy, beef and sheep sectors. Favourable growing conditions in a wetter than average season may also have been a contributory factor, by reducing the amount of nitrogen fertiliser needed for herbage production.

Most nitrogen fertiliser on tillage crops in England and Wales is now applied in straight form following the large steady increase in straight nitrogen application rate which occurred between 1975 and 1985, combined with a decrease in compound nitrogen use between 1970 and 1992 (Figure B2.3(b)). The pattern of straight nitrogen use has largely determined the changes in total nitrogen rate on tillage crops since 1969. On grassland, however, compound nitrogen use increased between 1975 and 1990, while straight nitrogen use remained fairly static, so that both forms have subsequently been used at very similar overall rates.

Figure B2.3 **Overall application rates (kg/ha) of (a) total nitrogen, (b) straight and compound nitrogen and (c) phosphate and potash on tillage crops and grassland, England and Wales 1969 - 2000**





B2.2.2 AUTUMN AND WINTER APPLICATIONS OF NITROGEN FERTILISER

Applications of nitrogen fertiliser during the autumn and early winter period have decreased considerably on both winter cereals and winter oilseed rape in England and Wales since 1985 (Figure B2.4). Autumn nitrogen is not normally recommended for winter cereals, as economic yield benefits are rare and autumn-applied nitrogen is vulnerable to leaching loss. As a direct outcome of this advice, the percentage of winter cereal crop areas receiving autumn or winter applied nitrogen dropped from 56%-64% in the 1984/85 season to 11%-12% of the crop areas in 1990/91. The dressing covers for winter cereals subsequently showed little or no further change until the last two seasons, when they dropped to just 6% of the crop areas. Average field rates of autumn-winter applied nitrogen have, despite some annual fluctuations, tended to increase slightly since 1985, resulting in mean rates of 26 and 30 kg/ha for winter wheat and winter barley, respectively, during 1996-2000.

The proportion of winter oilseed rape dressed with autumn-winter applied nitrogen fell rapidly between 1985 and 1989 down to about a half, but showed little further change until 1997/98, when it dropped to one third of the crop area. In contrast to winter cereals, the average field rate has decreased since 1985, resulting in a mean rate over the last five years of 39 kg/ha. Autumn nitrogen at 30 kg/ha is recommended for winter oilseed rape, unless the soil has a high nitrogen fertility, as the crop normally requires more nitrogen than winter cereals during the autumn growth period. However, the economic benefits are usually small and this is reflected in current fertiliser practice.

The survey results may indicate the implementation of good agronomic and environmental practice by arable farmers in response to their awareness of research findings and advisory recommendations.

In Scotland, autumn nitrogen is also only recommended for winter oilseed rape, although some farmers still consider that autumn-applied nitrogen reduces the risk of poor establishment of winter cereal crops under the colder and wetter conditions in that part of Britain. In practice, autumn nitrogen is used more widely on these crops in Scotland than in England and Wales, but at broadly similar field rates (Table B2.3).

Table B2.3 Dressing cover (% area) and average application rate (kg/ha) of autumn or winter-applied (August to January) nitrogen on winter cereals and winter oilseed rape by region, 1999 - 2000

Dressing cover (%)

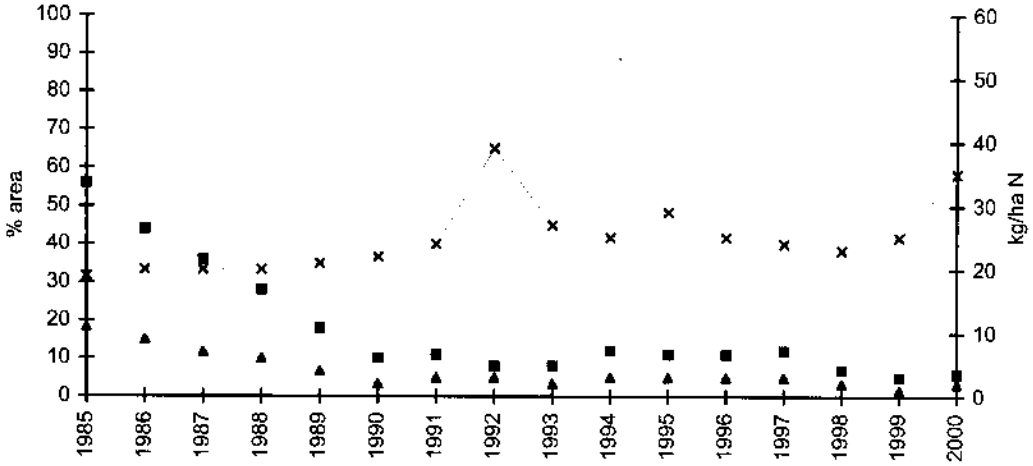
		winter wheat	*winter barley*	*oilseed rape*
England and Wales	*1999*	5	6	32
	2000	6	6	36
Scotland	*1999*	35	54	72
	2000	35	45	55
Great Britain	*1999*	6	10	35
	2000	7	11	39

Application rate (kg/ha)

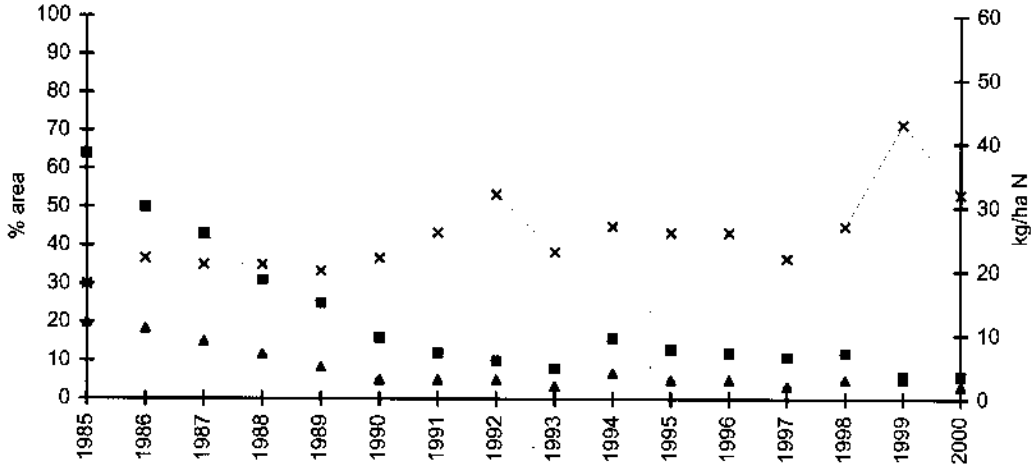
		winter wheat	*winter barley*	*oilseed rape*
England and Wales	*1999*	25	43	42
	2000	35	32	43
Scotland	*1999*	27	28	45
	2000	27	28	38
Great Britain	*1999*	25	37	43
	2000	33	30	42

Figure B2.4 **Nitrogen use on winter cereals and winter oilseed rape during the period August to January, England and Wales 1985 - 2000**

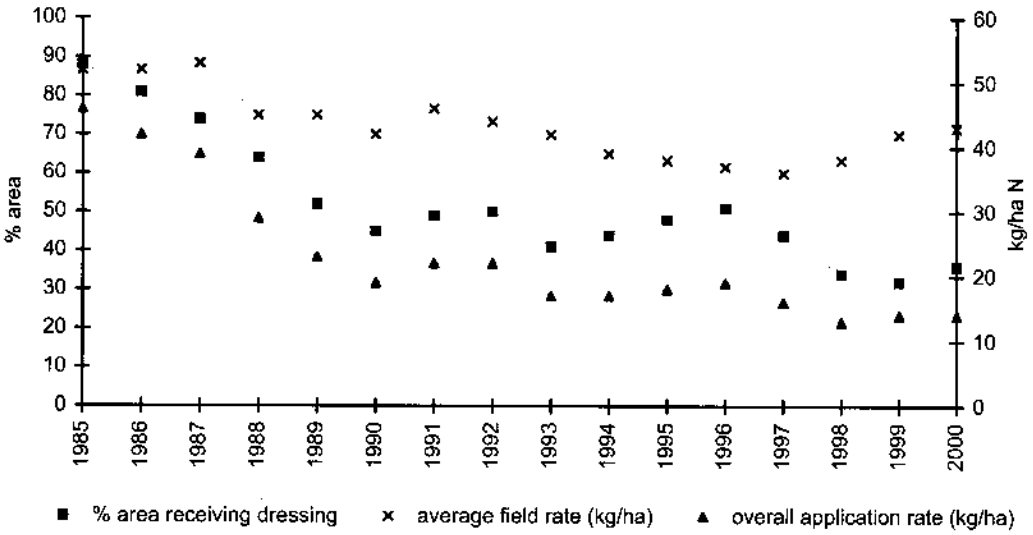
Winter wheat



Winter barley



Winter oilseed rape



B2.2.3 PHOSPHATE AND POTASH USE

Overall application rates of phosphate and potash on tillage crops have shown a broadly similar pattern of annual changes in overall use, over the last thirty years (Figure B2.3.(c)). The five-year mean rates for phosphate and potash both increased marginally by 2 kg/ha between 1969-73 and 1983-87, to 57 and 63 kg/ha, but then dropped to 48 and 59 kg/ha, respectively in 1996-2000. The falls in overall phosphate and potash use over the least two years, meant that application rates were down to, or close to, the lowest recorded levels since 1969.

Annual phosphorus and potassium balances, based on total elemental inputs and removal, have been calculated for tillage land in England and Wales from 1969 to 1997, using data from the fertiliser survey to estimate the nutrient inputs from inorganic fertiliser and organic manure sources[20]. The annual overall balances were positive for both elements, but decreased over this period from 25 to 15 kg/ha total phosphorus (equivalent to 57 to 34 kg/ha total phosphate) and from 46 to 33 kg/ha total potassium (equivalent to 55 to 40 kg/ha total potash). These estimated balances, which represent gross total rather than immediately plant-available surpluses, will have decreased further between 1997 and 2000, due to more recent reductions in phosphate and potash fertiliser use on tillage land. Nutrient inputs form organic manures, applied to about 16% of the tillage area each year, represented a significant contribution to the overall surpluses for both nutrients. Actual balances at individual field level would however have varied considerably, according to manure use within the crop rotation, with little if any estimated surplus in the absence of manure inputs[21]. Allowing for manure additions, the overall surplus balances[20] should have gradually increased topsoil phosphorus and potassium concentrations but this was not readily apparent in results from the Representative Soil Sampling Scheme, which provides unbiased national estimates of the current nutrient status of soils and monitors the long term trends[22]. This finding may be at least partly explained by a tendency towards deeper cultivations, as tractor power has increased, which would in effect 'dilute' topsoil phosphorous and potassium concentrations. The Representative Soil Sampling Scheme uses a 'rolling' sample of farms which is selected from those taking part in the fertiliser survey, to obtain a representative cross-section of agricultural soils.

Overall phosphate use on grassland slowly but steadily declined from 34 kg/ha in 1969, to 19 kg/ha 1992, then recovered slightly before dropping back to approximately 19 kg/ha over the last three years.

Insoluble phosphate fertilisers, such as basic slag or ground rock phosphate, were still commonly used on grassland in the early 1970s, at application rates which may have supplied relatively large amounts of total phosphate. Since then, phosphate inputs have been largely based on fertiliser products containing water soluble phosphate, which may partly explain the decline observed in the overall application rate.

In contrast, the overall rate of potash on grassland gradually increased from approximately 20 kg/ha in the early 1970s to approximately 35 kg/ha by 1990, then tended to decrease in subsequent years, down to 24 kg/ha in 2000.

The estimated overall phosphorus balance on grassland decreased from a surplus of 20 kg/ha total phosphorus in 1969 to 17 kg/ha in 1997 (the equivalent of 46 to 39 kg/ha total phosphate),

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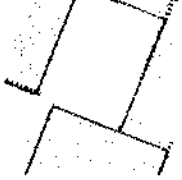
[20] Webb, J., Loveland, P.J., Chambers, B. J., Mitchell, R. and Garwood, T. (in press). The impact of modern farming practices on sustainable use of soil in England and Wales. *Journal of Agricultural Science.*

[21] Salter, J. L., Higgs, B. and Dawson, C.J. (1996). The impact of fertiliser strategies on the phosphate status of arable soils in England and Wales. *Soil Use and Management* **12**, 221-228.

[22] Skinner, R. J. and Todd, A.D. (1998). Twenty-five years of monitoring the soil pH and nutrient status in England and Wales. *Soil Use and Management* **14**, 162-169.



while the corresponding potassium balance actually increased from 25 to 33 kg/ha total potassium (the equivalent of 29 to 39 kg/ha total potash)[23]. Phosphorus and potassium inputs from non-grass feeds were a significant factor in these overall nutrient surpluses for grassland.

B2.3 LONGER TERM TRENDS FOR SCOTLAND

Overall rates for total nitrogen, phosphate and potash use on tillage crops and on grassland since 1983, the first year that the Survey was undertaken in Scotland, are presented in Figure B2.5. The trends differ from those for England and Wales over the same timescale.

B2.3.1 NITROGEN USE

Recorded annual overall rates of total nitrogen on tillage crops in Scotland tended to fluctuate during 1983-87 (mean: 125 kg/ha) and 1995-2000 (mean: 131 kg/ha), but were relatively stable in the intervening years, ranging from 125-131 kg/ha (mean: 128 kg/ha) (Figure B 2.5 (a)). The results may thus suggest a slight rise in overall nitrogen application rates to tillage crops since 1983. Total nitrogen rates on tillage crops in Scotland are about 10-15% lower than those in England and Wales, largely because of differences in cropping practice and associated nitrogen requirement; malting spring barley and mixed rotations are more common in Scotland than in England and Wales, where winter wheat and oilseed rape are grown on a much higher proportion of the total tillage area.

Total nitrogen use on grassland hardly changed between 1989 and 1995 (mean: 113 kg/ha) but, as for tillage crops, tended to fluctuate over the 1983-88 (mean: 125 kg/ha) and 1996-2000 (mean: 112 kg/ha) periods. The general pattern of results would suggest a small drop in total nitrogen use on grass at the end of the 1980s, but no clear change thereafter.

Before 1985, more nitrogen was applied to tillage crops in compound than in straight form (Figure B2.5(b)). Subsequently, about 60-65% of the total nitrogen input for tillage crops has been applied in straight form; the corresponding proportion in England and Wales is about 90%. Compound nitrogen has consistently been the main form of nitrogen fertiliser used on grassland, with relatively little change in application rate since 1983 apart from a marked drop in 1996 and higher recorded usage in 1997-99, compared to earlier years. Straight nitrogen use has decreased since the late 1980s, down to about one quarter of the total nitrogen input on grassland in recent years.

B2.3.2 PHOSPHATE AND POTASH USE

Overall rates of phosphate and potash on tillage crops tended to fluctuate between 1983 and 1988 but were relatively stable (means: 67 and 73 kg/ha , respectively) from 1989 to 1998 (Figure B2.5(c)). Estimated phosphate and potash use has, however, dropped slightly, in the last two years.

Overall rates of phosphate and potash on grassland show similar patterns of annual usage. Compared to 1983-97, mean overall rates in 1996-2000 were 3 kg/ha lower for phosphate and 1 kg/ha lower for potash, at 31 and 33 kg/ha, respectively. These results suggest a slight drop in phosphate, but hardly any change in potash use, despite the observed fall in potash rate in 1996.

Overall application rates of both nutrients tended to be higher than those used in England and Wales, on both tillage crops and grassland.

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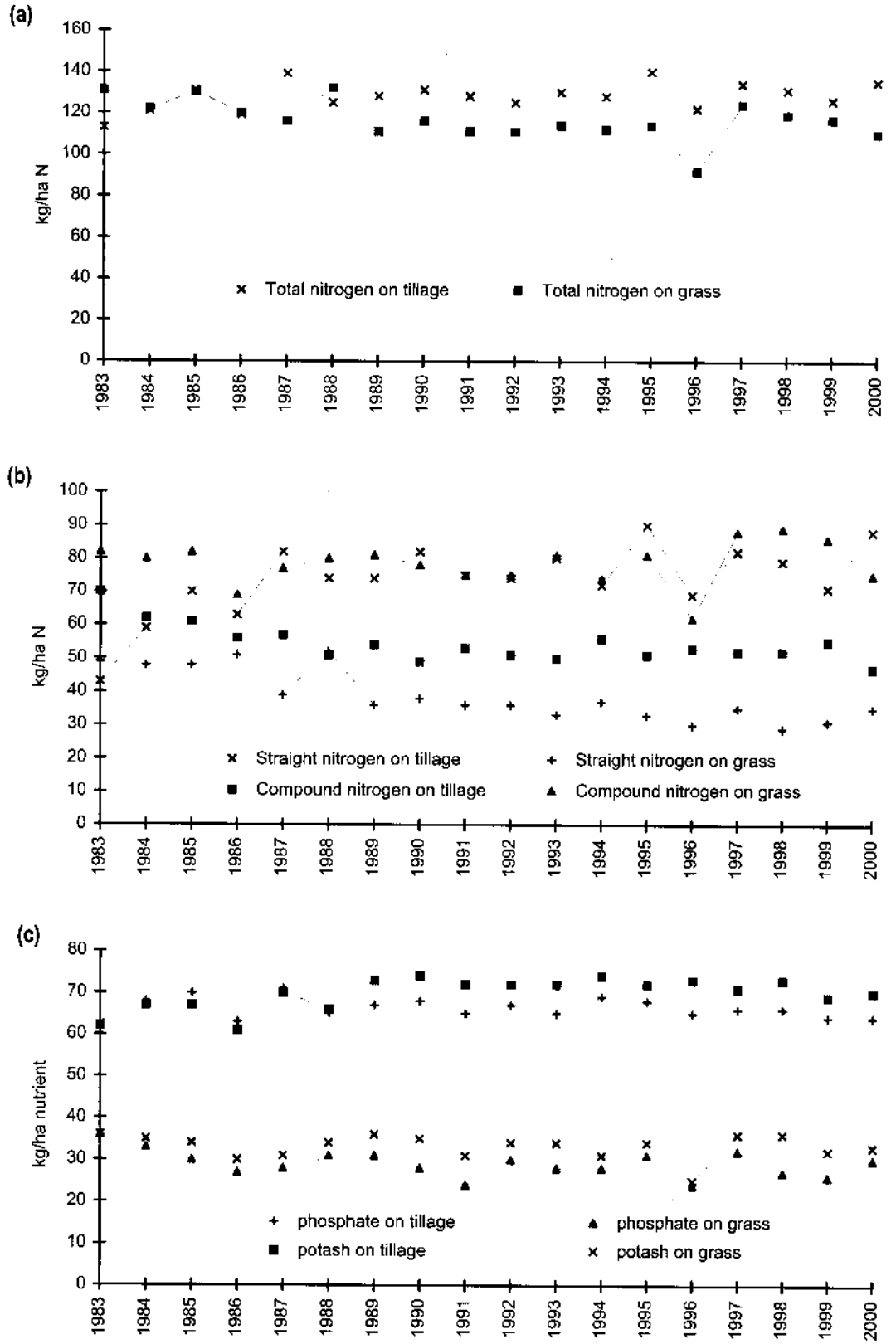
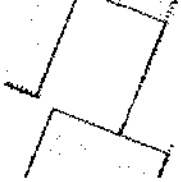
[23] Webb, J., Loveland, P.J., Chambers, B. J., Mitchell, R. and Garwood, T. (in press). The impact of modern farming practices on sustainable use of soil in England and Wales. *Journal of Agricultural Science*.

Figure B2.5 **Overall application rates (kg/ha) of (a) total nitrogen, (b) straight and compound nitrogen and (c) phosphate and potash on tillage crops and grassland, Scotland 1983 - 2000**





SECTION C - TABLES

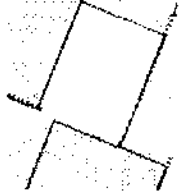
CONTENTS

The numbering of these tables corresponds to that used in the 1993 - 1999 BSFP Reports

GREAT BRITAIN TABLES 2000

ENGLAND AND WALES TABLES 2000

Note:
1. Row percentages may not sum to exactly 100 due to rounding.
2. No estimates are shown for crops with less than 5 fields in the sample. Nevertheless, some estimates are based on very few fields in the sample and should be treated with great caution.
3. FYM refers to any form of organic manure applied.
4. The symbol • and zeros are both used to denote cases where either insufficient data exist or recorded figures are too small to be shown. The symbol • has been used in some tables in preference to zeros for increased clarity.



SCOTLAND TABLES 2000

Note:
1. Row percentages may not sum to exactly 100 due to rounding.
2. No estimates are shown for crops with less than 5 fields in the sample. Nevertheless, some estimates are based on very few fields in the sample and should be treated with great caution.
3. FYM refers to any form of organic manure applied.
4. The symbol · and zeros are both used to denote cases where either insufficient data exist or recorded figures are too small to be shown. The symbol · has been used in some tables in preference to zeros for increased clarity.

Table GB1.1 Total fertiliser use, Great Britain 2000

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring wheat	79	51	52	22	146	56	60	116	28	31	62
Winter wheat	97	64	60	13	193	69	77	188	44	47	2796
Spring barley	96	81	84	28	112	58	66	107	47	56	881
Winter barley	97	73	76	17	150	65	80	146	48	61	841
Oats	92	78	73	16	112	62	71	103	49	52	199
Rye/Triticale/Durum wheat	90	54	60	5	139	74	80	126	40	48	51
Seed potatoes	88	80	80	31	183	115	165	161	93	133	21
Early potatoes	100	86	86	23	135	173	217	135	149	186	14
2nd Early/Maincrop potatoes	92	85	88	30	174	187	265	160	159	234	227
Sugar beet	96	51	64	31	108	76	142	104	39	91	273
Spring oilseed rape	95	64	68	24	133	56	65	127	36	44	73
Winter oilseed rape	97	60	57	14	203	71	76	197	42	43	525
Linseed	74	45	45	5	70	52	64	52	24	29	60
Forage maize	80	69	41	78	72	61	97	58	42	39	149
Rootcrops for stockfeed	91	83	84	49	78	96	96	71	80	81	78
Leafy forage crops	83	69	71	31	99	53	57	82	37	40	56
Arable silage/Other fodder crop	73	61	64	43	130	58	79	95	36	51	40
Peas - human consumption	4	27	31	1	39	61	76	2	17	24	96
Peas - animal consumption	12	51	55	8	66	70	76	8	36	42	112
Beans - animal consumption	2	49	44	3	42	77	72	1	37	32	170
Vegetables (brassicae)	95	87	90	4	221	73	171	210	64	153	56
Vegetables (other)	56	54	62	11	104	86	104	58	46	64	126
Soft fruit	83	46	72	0	66	53	103	55	24	74	47
Top fruit	74	44	49	5	78	26	66	58	11	32	78
Other tillage	50	38	34	13	82	75	92	41	28	32	117
All tillage	90	67	64	18	165	71	86	149	47	55	7148
Grass under 5 years	87	72	72	48	170	43	63	147	31	46	1280
Grass 5 years and over	72	57	56	41	121	31	38	87	18	21	2744
All grass	75	60	59	42	133	34	45	99	20	26	4024
All crops and grass	82	61	62	31	150	52	65	123	32	40	11172

Source: British Survey of Fertiliser Practice 2000.

Table GB1.2 Use of straight fertiliser, Great Britain 2000

	Crop area receiving dressing (%)			Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring wheat	60	1	3	160	58	101	96	0	3	62
Winter wheat	96	5	5	185	70	93	177	4	4	2796
Spring barley	65	1	2	96	119	109	62	1	2	881
Winter barley	94	5	8	142	102	97	134	5	8	841
Oats	70	10	6	111	84	110	78	9	7	199
Rye/Triticale/Durum wheat	82	0	8	143	0	110	118	0	9	51
Seed potatoes	46	37	0	180	5	0	82	2	3	21
Early potatoes	35	0	0	62	0	0	22	0	0	14
2nd Early/Maincrop potatoes	45	4	19	73	70	221	33	3	43	227
Sugar beet	87	4	18	105	59	154	91	2	28	273
Spring oilseed rape	83	1	6	111	96	95	92	1	6	73
Winter oilseed rape	95	5	4	195	77	80	185	4	3	525
Linseed	64	2	3	64	106	60	41	3	2	60
Forage maize	39	7	16	85	55	110	33	4	18	149
Rootcrops for stockfeed	27	0	1	96	102	207	26	0	2	78
Leafy forage crops	42	2	2	110	185	42	46	3	1	56
Arable silage/Other fodder crop	22	2	11	121	75	188	27	1	21	40
Peas - human consumption	1	3	8	35	69	83	0	2	7	96
Peas - animal consumption	5	1	5	75	108	30	4	2	1	112
Beans - animal consumption	1	9	3	47	114	101	1	11	4	170
Vegetables (brassicae)	59	0	3	138	0	104	82	0	3	56
Vegetables (other)	38	7	13	112	113	127	42	7	17	126
Soft fruit	60	9	41	74	113	143	45	10	59	47
Top fruit	67	2	12	67	58	98	45	1	12	78
Other tillage	36	5	1	87	170	144	31	9	2	117
All tillage	80	5	6	161	79	112	130	4	7	7148
Grass under 5 years	50	1	3	135	127	103	68	2	3	1280
Grass 5 years and over	31	1	1	119	55	66	37	1	0	2744
All grass	35	1	1	123	70	84	43	1	1	4024
All crops and grass	57	3	4	149	77	108	85	2	4	11172

Source: British Survey of Fertiliser Practice 2000.

Table GB1.3 Use of compound fertiliser, Great Britain 2000

	Crop area receiving dressing (%)			Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring wheat	23	50	50	83	55	56	20	28	28	62
Winter wheat	20	59	57	49	67	73	10	40	42	2796
Spring barley	68	81	83	65	56	64	44	46	53	881
Winter barley	24	69	69	46	61	76	11	42	52	841
Oats	40	68	67	62	58	66	25	39	44	199
Rye/Triticale/Durum wheat	14	54	54	57	74	74	8	40	40	51
Seed potatoes	83	82	82	94	110	158	78	90	129	21
Early potatoes	73	86	86	157	173	217	114	149	186	14
2nd Early/Maincrop potatoes	81	85	80	156	184	238	127	156	191	227
Sugar beet	17	48	48	75	77	132	12	37	63	273
Spring oilseed rape	49	64	64	71	54	61	35	35	39	73
Winter oilseed rape	29	56	54	44	67	73	13	37	39	525
Linseed	21	48	47	51	44	56	11	21	26	60
Forage maize	56	62	30	45	62	72	25	38	21	149
Rootcrops for stockfeed	74	83	83	61	96	95	45	79	78	78
Leafy forage crops	52	69	69	68	48	57	35	33	39	56
Arable silage/Other fodder crop	57	65	63	117	53	48	66	35	30	40
Peas - human consumption	4	24	23	34	59	72	1	14	17	96
Peas - animal consumption	9	50	50	55	68	81	5	34	40	112
Beans - animal consumption	1	41	40	36	65	69	0	27	28	170
Vegetables (brassicae)	83	89	87	153	72	172	127	64	150	56
Vegetables (other)	28	47	49	59	82	95	16	38	47	126
Soft fruit	35	37	37	29	37	41	10	14	15	47
Top fruit	43	43	49	30	22	37	13	10	18	78
Other tillage	21	33	36	49	54	80	10	18	29	117
All tillage	29	62	60	63	68	80	19	42	48	7148
Grass under 5 years	76	72	75	104	39	57	79	28	43	1280
Grass 5 years and over	63	59	62	78	27	34	49	16	21	2744
All grass	67	63	60	84	30	40	56	19	24	4024
All crops and grass	49	61	59	77	49	59	38	30	35	11172

Source: British Survey of Fertiliser Practice 2000.

Table GB1.4 Use of lime, Great Britain 2000

	Crop area receiving dressing (%)						Average field rate of CaO equivalent (tonnes/ha)							
	Ground limestone	Ground chalk	Magnesian limestone	Sugar beet lime	Other	All	Ground limestone	Ground chalk	Magnesian limestone	Sugar beet lime	Other	All	Fields limed	Fields in sample
Spring wheat	.	.	.	.	.	.	.	.	.	.	.	.	3	62
Winter wheat	4.0	0.8	0.9	0.2	.	5.9	2.3	2.0	2.4	2.8	.	2.3	149	2796
Spring barley	4.9	0.8	5.0	0.3	.	11.0	2.0	1.8	2.4	3.3	.	2.2	119	881
Winter barley	6.5	0.2	1.5	0.4	.	8.6	2.4	2.1	1.8	3.4	.	2.4	78	841
Oats	2.5	.	2.3	.	.	4.8	2.2	.	1.5	.	.	2.0	12	199
Rye/Triticale/Durum wheat	.	.	.	.	.	.	.	.	.	.	.	.	3	51
Seed potatoes	.	.	.	.	.	.	.	.	.	.	.	.	1	21
Early potatoes	.	.	.	.	.	.	.	.	.	.	.	.	0	14
2nd Early/Maincrop potatoes	.	.	.	.	.	.	.	.	.	.	.	.	0	227
Sugar beet	10.6	9.3	5.3	10.7	.	35.9	2.5	2.1	1.9	2.9	.	2.7	89	273
Spring oilseed rape	1.2	4.7	2.0	.	4.4	12.3	1.2	1.5	2.0	.	0.4	1.1	7	73
Winter oilseed rape	7.5	1.0	1.8	0.9	.	11.2	2.3	2.0	2.2	1.6	.	2.3	47	525
Linseed	.	.	.	.	.	.	.	.	.	.	.	.	0	60
Forage maize	15.2	1.8	3.5	.	.	20.5	2.7	2.5	1.6	.	.	2.5	27	149
Rootcrops for stockfeed	11.9	.	2.9	0.7	.	15.5	1.9	.	2.2	1.1	.	1.9	11	78
Leafy forage crops	5.0	0.4	13.3	.	.	18.7	1.7	1.5	2.6	.	.	2.0	14	56
Arable silage/Other fodder crop	0.4	.	12.4	.	.	12.8	2.5	.	2.7	.	.	2.5	5	40
Peas - human consumption	.	.	.	.	.	.	.	.	.	.	.	.	2	96
Peas - animal consumption	1.9	3.8	1.9	.	.	7.6	2.5	0.8	2.6	.	.	1.6	7	112
Beans - animal consumption	0.3	1.7	.	0.3	.	2.3	1.2	0.6	.	1.2	.	1.3	5	170
Vegetables (brassicae)	.	.	.	.	.	.	.	.	.	.	.	.	4	56
Vegetables (other)	5.2	0.5	0.7	2.5	.	8.9	2.5	4.0	2.1	1.3	.	2.7	14	126
Soft fruit	.	.	.	.	.	.	.	.	.	.	.	.	1	47
Top fruit	4.9	1.9	.	.	.	6.8	0.3	0.2	.	.	.	0.1	8	78
Other tillage	.	0.4	0.3	.	.	0.7	.	0.1	0.1	.	.	.	5	117
All tillage	4.8	1.1	1.8	0.7	.	8.4	2.3	2.0	2.2	2.7	.	2.5	611	7148
Grass under 5 years	2.7	0.2	1.9	.	.	4.8	2.4	1.3	2.4	.	.	2.2	102	1280
Grass 5 years and over	1.6	0.1	1.3	0.3	.	3.3	2.2	2.8	2.4	2.1	.	2.1	130	2744
All grass	1.8	0.1	1.4	0.3	.	3.6	2.2	2.3	2.4	2.1	.	2.1	232	4024
All crops and grass	3.3	0.6	1.6	0.5	.	6.0	2.3	2.0	2.3	2.5	.	2.3	843	11172

Source: British Survey of Fertiliser Practice 2000.

Table GB2.1 Average fertiliser practice by grassland utilisation, Great Britain 2000

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Grazed - not mown	67	53	50	28	115	29	30	77	15	15	1914
Grazed - mown	87	70	71	31	149	38	57	130	26	41	1612
All grazings	75	60	58	38	130	33	43	97	20	25	3526
Cut for seed - grazed	.	.	.	.	.	.	.	.	.	.	0
Cut for seed - not grazed	66	67	100	0	182	63	88	121	42	88	6
All cut for seed	66	67	100	0	182	63	88	121	42	88	6
Cut for silage - grazed	90	75	77	70	160	39	60	144	29	46	1239
Cut for silage - not grazed	87	72	71	56	183	45	73	160	32	52	250
All cut for silage	90	74	76	68	163	40	62	147	30	47	1489
Cut for hay - grazed	79	56	52	48	110	32	42	87	18	22	516
Cut for hay - not grazed	69	46	48	33	111	37	42	77	17	20	114
All cut for hay	78	55	51	46	110	33	42	86	18	21	630
All mowings	87	70	71	63	152	39	58	132	27	42	1998
All grass	75	60	59	42	133	34	45	100	20	26	4024

Source: British Survey of Fertiliser Practice 2000.

Table GB3.0 Product and nutrient use by month of application, Great Britain 2000

(a) Product use

row %	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total Product ('000 tonnes)
Straight N	1	0	0	0	0	4	31	31	22	6	2	3	2076
Straight P	21	20	6	2	2	6	21	8	6	3	2	4	62
Straight K	8	9	9	2	12	16	20	7	7	6	3	1	78
Compounds	7	7	2	1	1	6	23	22	14	8	5	4	2291
All fertilisers	5	4	1	0	1	5	26	26	17	7	4	3	4508

(b) Nutrient use

row %	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total Nutrient ('000 tonnes)
N	1	0	0	0	0	4	29	30	21	8	4	3	1205
P_2O_5	13	13	4	1	1	8	24	17	9	4	2	4	319
K_2O	11	11	4	1	2	8	23	15	10	6	3	4	391
Total	5	5	2	1	1	6	27	25	16	7	3	3	1915

Note: product use refers to the total tonnage of the products used by farmers in the survey year 2000;
nutrient use refers to the tonnage of each nutrient contained in the products used.
(e.g. 100 kg of a 20 : 10 : 10 compound contains 20 kg of N, 10 kg of P_2O_5, and 10 kg of K_2O, while 100 kg of ammonium nitrate, one of the straight N products, contains typically 34.5 kg of N).

Source: British Survey of Fertiliser Practice 2000.

Table GB3.1 Product type as percentage of all product used by crop group, Great Britain 2000

column %	spring cereal	winter cereal	potatoes	sugar beet	oilseed rape	other tillage	all tillage	grass for grazing	grass for hay	grass for silage	grass not spec	all grass	all crops and grass
Calcium Ammonium Nitrate	.	0.0	.	.	.	0.2	0.0	0.0	.	.	.	0.0	0.7
Urea	0.9	5.7	0.0	1.9	11.6	2.0	5.1	1.2	2.8	1.0	1.9	1.5	3.5
Ammonium Nitrate	32.9	58.6	8.4	36.3	52.9	27.8	50.0	29.8	30.6	26.1	29.1	29.4	40.3
Other Straight N	1.5	1.4	0.5	0.3	2.6	1.0	1.4	0.6	9.5	2.8	.	1.7	1.5
Triple Superphosphate	0.2	1.1	0.3	3.2	1.4	2.5	1.2	0.2	0.3	0.2	0.9	0.3	0.8
Single Superphosphate	.	0.1	.	.	.	0.2	0.1	0.0	.	.	.	0.0	0.0
Other Straight P	0.2	0.4	0.5	1.0	0.3	3.2	0.6	0.6	0.8	0.5	.	0.5	0.6
Muriate of Potash	0.6	1.4	5.3	3.5	0.8	4.1	1.7	0.3	0.5	0.4	0.8	0.4	1.2
Other Straight K	0.1	0.1	4.3	9.2	0.2	0.4	0.7	0.3	0.4	0.2	1.0	0.3	0.5
NP	1.1	0.9	1.6	0.8	0.9	3.0	1.1	3.8	2.4	2.9	3.5	3.6	2.2
NK	1.7	0.9	.	0.6	1.2	1.3	1.0	7.2	1.8	11.8	1.2	7.1	3.7
PK	10.2	20.7	7.0	32.4	15.3	23.2	19.3	2.5	3.2	2.9	13.3	2.7	12.1
Very High N	3.4	1.7	0.1	0.0	1.3	2.9	1.8	27.9	19.4	24.0	22.5	26.9	12.8
High N	19.2	1.1	10.4	1.7	2.2	11.0	4.1	22.1	24.9	22.7	18.1	21.4	11.7
High P	1.4	0.6	5.4	0.2	0.5	2.5	1.0	0.2	0.8	0.4	.	0.3	0.7
High K	5.4	1.2	40.2	8.8	1.0	6.4	3.9	1.3	0.9	2.3	1.1	1.5	2.9
Low N	6.7	3.3	13.4	0.1	4.7	5.7	4.2	0.4	0.1	0.5	.	0.8	2.7
Low P	.	.	.	.	.	0.6	0.1	0.3	0.5	0.1	.	0.2	0.1
Equal NPK	14.4	0.9	2.6	.	3.1	2.0	2.5	1.4	1.0	1.1	6.7	1.5	2.0
Total Product ('000 tonnes)	**240**	**1621**	**104**	**108**	**249**	**212**	**2534**	**1452**	**198**	**825**	**20**	**1974**	**4508**

NB: Precise estimates of product type use cannot be derived from the data collected (at field-level) on fertiliser nutrient contents. In addition some calculations are based on a small number of observations. Care should be taken in interpreting these data and other sources sought for validation.

Source: British Survey of Fertiliser Practice 2000.

Table GB3.2 Use of product type by crop group, Great Britain 2000

row %	spring cereal	winter cereal	potatoes	sugar beet	oilseed rape	other tillage	all tillage	grass for grazing	grass for hay	grass for silage	grass not spec	all grass	total product ('000 tonnes)
Calcium Ammonium Nitrate	.	47.2	.	.	.	43.2	90.3	9.7	.	.	.	9.7	31
Urea	1.4	58.1	0.0	1.3	18.1	2.7	81.6	13.7	4.4	6.3	0.3	18.4	159
Ammonium Nitrate	4.3	51.4	0.5	2.1	7.1	3.2	68.6	28.3	4.2	14.0	0.4	31.4	1816
Other Straight N	5.2	33.4	0.8	0.5	9.2	2.9	51.9	14.5	34.5	40.0	.	48.1	70
Triple Superphosphate	1.5	47.5	0.8	9.6	9.6	14.6	83.6	10.2	1.8	4.2	0.7	16.4	36
Single Superphosphate	.	57.2	.	.	.	31.9	89.1	10.9	.	.	.	10.9	2
Other Straight P	1.5	25.6	2.0	4.0	2.6	25.2	60.9	39.1	7.6	19.4	.	39.1	27
Muriate of Potash	2.8	43.8	10.7	7.2	3.8	16.8	85.1	9.8	2.3	8.4	0.4	14.9	52
Other Straight K	0.9	7.0	18.9	41.7	2.5	3.3	74.2	20.4	4.4	9.8	1.1	25.8	24
NP	2.7	14.8	1.7	0.8	2.2	6.4	28.6	66.2	6.0	28.6	1.0	71.4	101
NK	2.4	9.3	.	0.4	1.8	1.7	15.6	76.8	2.8	71.1	0.2	84.4	165
PK	4.5	61.8	1.3	6.4	7.0	9.0	90.1	8.0	1.5	5.4	0.7	9.9	543
Very High N	1.4	4.7	0.0	0.0	0.6	1.0	7.8	84.9	8.5	41.3	1.1	92.2	577
High N	8.7	3.2	2.1	0.3	1.0	4.4	19.8	73.5	12.0	42.8	0.9	80.2	527
High P	11.4	31.2	18.8	0.6	4.0	17.5	83.4	14.2	7.0	12.7	.	16.6	30
High K	10.1	15.1	32.6	7.4	2.0	10.6	77.7	17.4	1.8	17.8	0.2	22.3	129
Low N	13.3	43.5	11.5	0.1	9.6	9.8	87.7	5.4	0.3	4.1	.	12.3	122
Low P	.	.	.	.	.	24.1	24.1	100.0	23.6	23.2	.	75.9	6
Equal NPK	37.6	15.3	2.9	.	8.4	4.7	68.9	26.9	2.8	11.7	2.0	31.1	92
All Fertilisers	**5.3**	**36.0**	**2.3**	**2.4**	**5.5**	**4.7**	**56.2**	**32.2**	**4.4**	**18.3**	**0.4**	**43.8**	**4508**

NB: Precise estimates of product type use cannot be derived from the data collected (at field-level) on fertiliser nutrient contents. In addition some calculations are based on a small number of observations. Care should be taken in interpreting these data and other sources sought for validation.

Source: British Survey of Fertiliser Practice 2000.

Table GB3.3 Product use by month of application, Great Britain 2000

row %	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	total Product ('000 tonnes)
Calcium Ammonium Nitrate	0.1	8.4	40.8	23.9	25.3	1.0	0.4	0.1	0.1	.	.	.	31
Urea	0.3	7.0	43.2	31.4	15.1	1.7	0.3	.	0.4	0.4	.	0.1	159
Ammonium Nitrate	0.2	5.0	32.8	30.4	22.7	4.8	1.5	1.6	0.5	0.3	0.2		1816
Other straight N	2.4	8.6	30.2	10.3	18.7	10.5	6.4	1.1	2.1	5.5	3.9	0.4	70
Triple Superphosphate	3.6	9.7	25.5	4.7	5.7	1.3	1.4	3.7	20.4	18.1	5.7	0.2	36
Single Superphosphate	17.3	15.0	45.0	6.3	6.7	.	.	.	9.7	.	.	.	2
Other Straight P	.	0.8	17.3	34.6	.	.	2.0	7.1	9.5	8.2	20.5	.	27
Muriate of Potash	12.2	20.7	22.1	7.1	7.6	3.3	1.0	0.8	9.3	5.3	9.0	1.5	52
Other Straight K	.	24.1	13.6	2.6	4.7	1.8	.	.	4.8	20.0	9.7	18.7	24
NP	1.0	10.7	44.4	17.4	13.9	5.5	1.7	0.4	1.0	2.1	2.0	.	101
NK	.	2.8	17.2	10.9	23.3	29.2	12.3	3.9	0.4	.	.	.	165
PK	3.2	10.4	16.9	4.4	2.9	0.9	1.1	4.4	21.5	23.0	9.2	2.2	543
Very High N	.	3.3	21.4	32.7	15.5	14.5	6.6	4.6	1.0	0.2	0.2	.	577
High N	0.1	2.2	27.6	29.5	24.9	8.1	3.8	2.7	0.7	0.3	0.1	.	527
High P	.	9.1	41.7	10.9	27.8	3.7	.	3.7	1.7	1.4	.	.	30
High K	0.6	4.1	43.5	24.9	18.4	3.6	0.7	0.5	2.0	0.6	0.1	1.0	129
Low N	.	8.8	26.9	11.9	7.0	0.8	1.2	5.8	13.4	19.8	4.4	.	122
Low P	.	8.2	.	54.0	29.1	.	8.3	.	.	.	.	.	6
Equal NPK	0.3	1.6	36.8	26.8	16.0	3.9	2.5	5.6	2.4	4.3	.	.	92
All Fertilisers	**0.8**	**6.0**	**30.2**	**23.9**	**18.4**	**5.5**	**2.3**	**2.4**	**4.1**	**4.3**	**1.7**	**0.3**	**4508**

NB: Precise estimates of product type use cannot be derived from the data collected (at field-level) on fertiliser nutrient contents. In addition some calculations are based on a small number of observations. Care should be taken in interpreting these data and other sources sought for validation.

Source: British Survey of Fertiliser Practice 2000.

Table EW1.1 Total fertiliser use, England and Wales 2000

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring wheat	80	47	49	17	152	58	64	122	27	32	50
Winter wheat	98	63	60	13	193	68	76	188	43	45	2592
Spring barley	96	71	77	20	115	52	62	111	37	48	404
Winter barley	99	71	74	17	146	64	81	145	45	60	727
Oats	91	72	65	14	114	66	79	104	48	51	143
Rye/Triticale/Durum wheat	91	54	60	4	140	74	81	127	40	49	48
Seed potatoes	.	.	.	.	.	.	.	.	.	.	4
Early potatoes	100	80	80	31	103	206	228	103	165	183	12
2nd Early/Maincrop potatoes	92	84	88	29	181	196	279	165	165	244	189
Sugar beet	95	51	65	31	109	76	141	104	39	91	273
Spring oilseed rape	93	57	60	24	132	53	68	123	30	41	57
Winter oilseed rape	98	57	54	15	202	70	76	198	40	41	453
Linseed	74	45	45	5	70	52	64	52	24	29	60
Forage maize	80	69	41	78	73	61	97	58	42	40	147
Rootcrops for stockfeed	83	64	67	72	107	86	111	88	55	74	43
Leafy forage crops	85	61	62	39	98	43	51	83	26	32	30
Arable silage/Other fodder crop	51	25	31	4	103	73	184	53	18	56	22
Peas - human consumption	4	27	31	1	24	61	75	1	17	24	93
Peas - animal consumption	10	50	54	7	55	71	77	5	35	41	106
Beans - animal consumption	2	48	44	3	42	76	72	1	37	31	168
Vegetables (brassicae)	95	88	91	4	224	73	171	212	65	156	55
Vegetables (other)	54	53	59	10	113	90	111	61	48	66	112
Soft fruit	84	44	70	5	68	56	109	56	24	76	44
Top fruit	74	44	49	0	78	26	66	58	11	32	78
Other tillage	50	39	35	14	73	76	94	37	29	33	105
All tillage	91	62	61	16	169	71	87	153	44	54	6015
Grass under 5 years	86	66	69	48	183	44	68	157	29	47	874
Grass 5 years and over	70	54	53	41	122	30	38	85	16	20	2245
All grass	72	56	54	46	134	33	44	95	18	24	3119
All crops and grass	81	59	58	31	153	52	66	124	31	39	9134

Source: British Survey of Fertiliser Practice 2000.

Table EW1.2 Use of straight fertiliser, England and Wales 2000

	Crop area receiving dressing (%)			Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring wheat	68	1	3	160	58	101	109	1	3	50
Winter wheat	97	6	5	185	69	93	179	4	5	2592
Spring barley	75	1	3	107	104	110	81	1	3	404
Winter barley	96	4	9	141	104	97	135	5	9	727
Oats	84	14	9	111	84	111	93	12	10	143
Rye/Triticale/Durum wheat	83	0	8	144	0	110	119	0	9	48
Seed potatoes	.	.	.	.	.	.	.	.	.	4
Early potatoes	48	0	0	63	0	0	30	0	0	12
2nd Early/Maincrop potatoes	44	2	20	76	81	229	33	2	46	189
Sugar beet	87	4	18	105	59	154	91	2	28	273
Spring oilseed rape	90	2	6	111	96	67	100	2	4	57
Winter oilseed rape	95	5	4	197	76	86	187	4	4	453
Linseed	64	4	3	64	106	60	41	4	2	60
Forage maize	39	7	17	85	55	110	33	4	18	147
Rootcrops for stockfeed	49	0	3	108	0	207	53	0	5	43
Leafy forage crops	54	0	0	114	0	113	62	0	0	30
Arable silage/Other fodder crop	39	4	21	128	75	188	50	3	40	22
Peas - human consumption	0	3	8	0	69	83	0	2	7	93
Peas - animal consumption	4	1	5	79	108	30	3	2	1	106
Beans - animal consumption	1	9	4	47	114	101	1	11	4	168
Vegetables (brassicae)	60	0	3	139	0	104	83	0	3	55
Vegetables (other)	42	8	13	107	113	133	45	9	17	112
Soft fruit	62	10	43	75	113	146	47	11	62	44
Top fruit	67	2	12	67	58	98	45	1	12	78
Other tillage	33	6	2	75	170	144	25	10	3	105
All tillage	84	5	7	164	78	113	138	4	8	6015
Grass under 5 years	56	2	4	146	132	98	82	2	4	874
Grass 5 years and over	32	1	1	123	58	69	39	1	1	2245
All grass	36	1	2	129	76	83	47	1	2	3119
All crops and grass	59	3	4	153	78	108	91	2	4	9134

Source: British Survey of Fertiliser Practice 2000.

Table EW1.3 Use of compound fertiliser, England and Wales 2000

	Crop area receiving dressing (%)			Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring wheat	16	46	46	79	58	61	13	27	28	50
Winter wheat	18	58	56	50	66	72	9	38	41	2592
Spring barley	46	70	74	64	50	59	29	35	44	404
Winter barley	19	67	66	49	60	76	9	40	50	727
Oats	22	58	57	44	60	71	10	35	40	143
Rye/Triticale/Durum wheat	14	54	54	57	74	74	8	40	40	48
Seed potatoes	.	.	.	.	.	.	.	.	.	4
Early potatoes	62	80	80	118	206	228	73	165	183	12
2nd Early/Maincrop potatoes	81	85	80	163	192	246	131	163	197	189
Sugar beet	17	48	48	75	77	132	12	37	63	273
Spring oilseed rape	36	56	56	65	51	66	23	29	37	57
Winter oilseed rape	23	53	50	45	66	72	10	35	36	453
Linseed	21	48	47	51	44	56	11	21	26	60
Forage maize	57	62	30	45	62	72	25	38	22	147
Rootcrops for stockfeed	45	64	64	78	86	107	35	55	69	43
Leafy forage crops	37	61	62	54	43	50	20	26	31	30
Arable silage/Other fodder crop	12	21	21	24	72	80	3	15	17	22
Peas - human consumption	4	24	23	24	58	71	1	14	16	93
Peas - animal consumption	6	49	49	39	69	81	2	34	40	106
Beans - animal consumption	1	40	40	36	64	69	0	26	27	168
Vegetables (brassicae)	85	91	89	153	72	172	130	65	152	55
Vegetables (other)	23	45	48	70	86	101	16	39	49	112
Soft fruit	32	34	34	31	39	41	10	13	14	44
Top fruit	43	43	51	30	22	37	13	10	19	78
Other tillage	23	36	36	53	53	81	12	19	29	105
All tillage	22	58	56	64	68	81	14	40	45	6015
Grass under 5 years	70	64	69	108	39	62	75	25	43	874
Grass 5 years and over	62	53	56	76	26	34	47	14	19	2245
All grass	61	55	55	82	29	39	50	16	22	3119
All crops and grass	44	57	55	77	49	60	34	28	33	9134

Source: British Survey of Fertiliser Practice 2000.

Table EW1.4 Use of lime, England and Wales 2000

	Crop area receiving dressing (%)						Average field rate of CaO equivalent (tonnes/ha)							
	Ground limestone	Ground chalk	Magnesian limestone	Sugar beet lime	Other	All	Ground limestone	Ground chalk	Magnesian limestone	Sugar beet lime	Other	All	Fields limed	Fields in sample
Spring wheat	.	.	.	.	.	.	.	.	.	.	.	.	1	50
Winter wheat	4.3	0.8	0.6	0.3	.	6.0	2.3	2.0	2.4	2.8	.	2.3	135	2592
Spring barley	3.7	1.7	2.0	0.7	.	8.1	2.2	1.8	2.3	3.3	.	2.4	40	404
Winter barley	6.8	0.3	1.1	0.4	.	8.6	2.4	2.1	1.8	3.4	.	2.4	66	727
Oats	.	.	.	.	.	.	.	.	.	.	.	.	3	143
Rye/Triticale/Durum wheat	.	.	.	.	.	.	.	.	.	.	.	.	2	48
Seed potatoes	.	.	.	.	.	.	.	.	.	.	.	.	0	4
Early potatoes	.	.	.	.	.	.	.	.	.	.	.	.	0	12
2nd Early/Maincrop potatoes	.	.	.	.	.	.	.	.	.	.	.	.	0	189
Sugar beet	10.6	9.3	5.3	10.7	.	35.9	2.5	2.1	1.9	2.9	.	2.7	89	273
Spring oilseed rape	1.6	6.5	0.6	.	6.1	14.8	1.2	1.5	2.0	.	0.4	1.0	5	57
Winter oilseed rape	6.5	1.1	1.3	1.0	.	9.9	2.8	2.0	2.4	1.6	.	2.6	38	453
Linseed	.	.	.	.	.	.	.	.	.	.	.	.	0	60
Forage maize	15.4	1.8	3.5	.	.	20.7	2.7	2.5	1.6	.	.	2.5	27	147
Rootcrops for stockfeed	18.5	.	.	1.6	.	20.1	2.0	.	.	1.1	.	2.0	6	43
Leafy forage crops	.	.	.	.	.	.	.	.	.	.	.	.	4	30
Arable silage/Other fodder crop	.	.	.	.	.	.	.	.	.	.	.	.	2	22
Peas - human consumption	.	.	.	.	.	.	.	.	.	.	.	.	2	93
Peas - animal consumption	1.9	4.0	2.0	.	.	7.9	2.5	0.8	2.6	.	.	1.6	7	106
Beans - animal consumption	0.3	1.7	.	0.3	.	2.3	1.2	0.6	.	1.2	.	1.3	5	168
Vegetables (brassicae)	.	.	.	.	.	.	.	.	.	.	.	.	4	55
Vegetables (other)	4.2	0.6	.	2.9	.	7.7	2.5	6.2	.	1.3	.	2.9	10	112
Soft fruit	.	.	.	.	.	.	.	.	.	.	.	.	1	44
Top fruit	4.9	1.9	.	.	.	6.8	0.3	0.2	.	.	.	0.1	8	78
Other tillage	.	0.5	0.3	.	.	0.8	.	0.1	0.1	.	.	0.1	5	105
All tillage	4.8	1.3	1.1	0.8	.	8.0	2.4	2.0	2.1	2.7	.	2.6	460	6015
Grass under 5 years	3.5	0.2	1.7	.	.	5.4	2.4	1.3	2.4	.	.	2.2	76	874
Grass 5 years and over	1.4	0.1	1.1	0.4	.	3.0	2.3	2.8	2.4	2.1	.	2.1	102	2245
All grass	1.8	0.1	1.2	0.3	.	3.4	2.3	2.3	2.4	2.1	.	2.2	178	3119
All crops and grass	3.3	0.7	1.1	0.6	.	5.7	2.4	2.0	2.3	2.5	.	2.4	638	9134

Source: British Survey of Fertiliser Practice 2000.

Table EW1.5 Percentage of crop area by field application rate - N, England and Wales 2000

row %	kg/ha																		Fields in sample
	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	
Spring wheat	20	0	1	1	3	15	19	14	2	3	13	0	3	0	5	.	.	.	50
Winter wheat	1	0	1	2	4	5	6	15	19	21	11	6	4	3	1	.	.	.	2592
Spring barley	4	0	3	10	23	26	14	10	7	2	1	.	.	.	.	.	.	.	404
Winter barley	0	0	1	4	4	14	25	28	12	6	2	1	2	.	.	.	.	.	727
Oats	8	0	1	9	22	26	22	10	1	1	0	0	1	.	.	.	.	.	143
Rye/Triticale/Durum wheat	9	1	3	4	7	18	22	17	14	0	3	1	.	.	.	.	.	.	48
Seed potatoes	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4
Early potatoes	0	6	0	4	47	15	5	1	23	.	.	.	.	.	.	.	.	.	12
2nd Early/Maincrop potatoes	8	2	2	3	5	7	11	9	16	16	10	5	3	1	0	0	1	.	189
Sugar beet	5	1	9	8	18	18	28	8	2	1	1	.	.	.	.	.	.	.	273
Spring oilseed rape	7	0	13	1	10	1	18	24	13	10	.	.	.	.	.	.	.	.	57
Winter oilseed rape	2	1	1	2	4	2	4	9	13	24	15	14	5	3	1	.	.	.	453
Linseed	29	1	27	19	9	12	2	0	1	.	.	.	.	.	.	.	.	.	60
Forage maize	20	12	10	12	21	9	7	7	0	0	2	1	.	.	.	.	.	.	147
Rootcrops for stockfeed	20	0	8	27	5	14	16	5	3	2	.	.	.	.	.	.	.	.	43
Leafy forage crops	16	2	22	5	24	14	6	1	0	1	0	10	.	.	.	.	.	.	30
Arable silage/Other fodder crop	48	4	7	5	2	10	21	0	2	0	0	1	.	.	.	.	.	.	22
Peas - human consumption	96	3	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	93
Peas - animal consumption	92	3	1	3	0	1	.	.	.	.	.	.	.	.	.	.	.	.	106
Beans - animal consumption	98	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	168
Vegetables (brassicae)	5	1	0	1	1	3	18	15	6	2	8	15	19	7	.	.	.	.	55
Vegetables (other)	48	6	0	7	9	7	14	2	5	0	2	.	.	.	.	.	.	.	112
Soft fruit	16	13	16	23	28	3	.	.	.	.	.	.	.	.	.	.	.	.	44
Top fruit	26	5	14	8	20	16	6	1	2	.	.	.	.	.	.	.	.	.	78
Other tillage	50	3	5	19	14	2	3	1	1	.	.	.	.	.	.	.	.	.	105
All tillage	9	1	3	5	8	11	8	9	18	19	3	4	2	1	.	.	.	.	6015
Grass under 5 years	14	1	4	8	11	15	6	9	6	5	4	5	4	2	2	2	1	.	874
Grass 5 years and over	30	2	12	19	9	5	6	4	3	3	2	3	1	1	1	.	.	.	2245
All grass	27	1	9	16	10	6	6	5	4	3	3	4	2	1	1	1	.	.	3119
All crops and grass	15	2	6	9	9	3	4	8	15	15	3	4	2	2	1	1	.	.	9134

Source: British Survey of Fertiliser Practice 2000.

Table EW1.6 Percentage of crop area by field application rate - P_2O_5, England and Wales 2000

row %	kg/ha 0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	Fields in sample
Spring wheat	53	2	11	22	9	2	1	1	.	.	.	.	.	.	.	.	.	.	50
Winter wheat	37	2	11	28	15	3	1	1	1	1	.	.	.	.	.	.	.	.	2592
Spring barley	29	9	29	19	7	5	1	0	1	.	.	.	.	.	.	.	.	.	404
Winter barley	28	2	24	25	15	3	1	1	.	.	.	.	.	.	.	.	.	.	727
Oats	27	3	23	24	15	6	2	0	1	.	.	.	.	.	.	.	.	.	143
Rye/Triticale/Durum wheat	46	0	25	20	7	1	1	.	.	.	.	.	.	.	.	.	.	.	48
Seed potatoes	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4
Early potatoes	20	0	8	0	6	0	10	22	27	4	4	.	.	.	.	.	.	.	12
2nd Early/Maincrop potatoes	16	2	4	6	3	6	16	9	15	9	8	3	0	1	.	.	.	.	189
Sugar beet	49	7	15	19	7	3	2	.	.	.	.	.	.	.	.	.	.	.	273
Spring oilseed rape	46	2	15	22	10	3	0	1	.	.	.	.	.	.	.	.	.	.	57
Winter oilseed rape	43	1	13	26	12	4	1	1	.	.	.	.	.	.	.	.	.	.	453
Linseed	62	7	9	17	4	3	.	.	.	.	.	.	.	.	.	.	.	.	60
Forage maize	31	2	23	32	8	1	3	.	.	.	.	.	.	.	.	.	.	.	147
Rootcrops for stockfeed	26	13	4	15	29	4	5	1	2	.	.	.	.	.	.	.	.	.	43
Leafy forage crops	41	5	19	21	8	2	1	.	.	.	.	.	.	.	.	.	.	.	30
Arable silage/Other fodder crop	76	0	2	10	10	1	0	2	.	.	.	.	.	.	.	.	.	.	22
Peas - human consumption	73	0	6	12	7	2	.	.	.	.	.	.	.	.	.	.	.	.	93
Peas - animal consumption	52	1	8	18	14	2	4	.	.	.	.	.	.	.	.	.	.	.	106
Beans - animal consumption	52	0	12	22	11	2	1	.	.	.	.	.	.	.	.	.	.	.	168
Vegetables (brassicae)	12	10	5	40	21	9	1	0	2	1	.	.	.	.	.	.	.	.	55
Vegetables (other)	47	4	8	18	13	5	1	1	1	0	1	1	.	.	.	.	.	.	112
Soft fruit	56	9	17	2	8	7	.	.	.	.	.	.	.	.	.	.	.	.	44
Top fruit	56	19	16	4	0	5	.	.	.	.	.	.	.	.	.	.	.	.	78
Other tillage	61	2	13	13	4	1	5	.	.	.	.	.	.	.	.	.	.	.	105
All tillage	38	3	13	24	15	4	2	.	.	.	.	.	.	.	.	.	.	.	6015
Grass under 5 years	34	12	26	16	6	3	1	1	1	1	.	.	.	.	.	.	.	.	874
Grass 5 years and over	44	24	23	6	2	0	0	0	.	.	.	.	.	.	.	.	.	.	2245
All grass	44	22	24	7	2	1	.	.	.	.	.	.	.	.	.	.	.	.	3119
All crops and grass	41	15	18	10	9	3	1	1	1	.	.	.	.	.	.	.	.	.	9134

Source: British Survey of Fertiliser Practice 2000.

Table EW1.7 Percentage of crop area by field application rate - K_2O, England and Wales 2000

row %	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	Fields in sample
	kg/ha																		
Spring wheat	51	4	6	12	21	2	1	2	.	.	.	.	.	.	.	.	.	.	50
Winter wheat	40	2	7	19	21	7	2	1	1	1	.	.	.	.	.	.	.	.	2592
Spring barley	23	1	26	22	18	7	2	1	.	.	.	.	.	.	.	.	.	.	404
Winter barley	24	1	10	23	24	12	2	2	0	1	.	.	.	.	.	.	.	.	727
Oats	38	0	18	17	13	9	1	4	1	0	1	.	.	.	.	.	.	.	143
Rye/Triticale/Durum wheat	40	1	2	28	19	5	1	3	.	.	.	.	.	.	.	.	.	.	48
Seed potatoes	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4
Early potatoes	20	0	0	0	6	0	0	9	19	13	4	5	6	0	8	6	2	2	12
2nd Early/Maincrop potatoes	12	0	0	2	2	5	1	3	7	4	13	19	7	10	8	4	2	1	189
Sugar beet	36	1	3	13	19	7	2	6	6	3	3	.	.	.	.	.	.	.	273
Spring oilseed rape	42	0	12	16	16	10	1	0	2	.	.	.	.	.	.	.	.	.	57
Winter oilseed rape	46	0	7	17	12	16	1	0	0	0	1	.	.	.	.	.	.	.	453
Linseed	60	2	9	18	5	6	.	.	.	.	.	.	.	.	.	.	.	.	60
Forage maize	59	1	8	9	8	7	2	4	2	.	.	.	.	.	.	.	.	.	147
Rootcrops for stockfeed	23	1	13	11	9	12	11	1	3	13	3	.	.	.	.	.	.	.	43
Leafy forage crops	40	0	15	18	14	12	1	.	.	.	.	.	.	.	.	.	.	.	30
Arable silage/Other fodder crop	70	0	2	19	2	3	0	1	0	0	2	1	.	.	.	.	.	.	22
Peas - human consumption	69	0	1	10	11	8	.	.	.	.	.	.	.	.	.	.	.	.	93
Peas - animal consumption	47	0	4	21	16	7	5	.	.	.	.	.	.	.	.	.	.	.	106
Beans - animal consumption	57	0	5	16	14	7	.	.	.	.	.	.	.	.	.	.	.	.	168
Vegetables (brassicae)	9	0	4	2	0	1	5	25	29	17	9	.	.	.	.	.	.	.	55
Vegetables (other)	41	0	3	4	7	10	8	5	7	8	5	0	1	0	1	.	.	.	112
Soft fruit	30	0	6	13	26	22	1	.	.	.	.	.	.	.	.	.	.	.	44
Top fruit	51	0	5	9	6	9	0	8	2	1	0	0	6	0	1	2	.	.	78
Other tillage	65	0	1	7	4	2	3	1	7	7	0	2	1	.	.	.	.	.	105
All tillage	38	1	8	18	19	7	3	2	1	1	1	.	.	.	.	.	.	.	6015
Grass under 5 years	31	10	23	13	8	6	3	2	2	1	.	.	.	.	.	.	.	.	874
Grass 5 years and over	47	20	21	7	3	1	1	.	.	.	.	.	.	.	.	.	.	.	2245
All grass	45	17	21	8	4	2	1	1	1	.	.	.	.	.	.	.	.	.	3119
All crops and grass	42	10	15	13	10	4	2	1	1	1	1	.	.	.	.	.	.	.	9134

Source: British Survey of Fertiliser Practice 2000.

Table EW2.1 Average fertiliser practice by grassland utilisation, England and Wales 2000

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Grazed - not mown	63	48	46	28	117	28	29	74	13	13	1452
Grazed - mown	87	68	70	66	148	36	56	128	24	39	1382
All grazings	73	56	55	44	132	32	43	96	18	24	2834
Cut for seed - grazed	.	.	.	.	.	.	.	.	.	.	0
Cut for seed - not grazed	66	67	100	0	182	63	88	121	42	88	6
All cut for seed	66	67	100	0	182	63	88	121	42	88	6
Cut for silage - grazed	90	73	76	72	159	37	59	144	27	45	1037
Cut for silage - not grazed	82	64	66	60	192	46	72	158	29	47	150
All cut for silage	89	72	75	71	163	38	61	145	27	45	1187
Cut for hay - grazed	78	53	50	49	109	31	39	85	16	20	468
Cut for hay - not grazed	67	41	42	38	113	36	41	76	15	17	84
All cut for hay	77	52	49	48	109	31	39	84	16	19	552
All mowings	86	67	69	64	150	37	57	129	25	39	1611
All grass	73	56	55	46	134	33	44	95	18	24	3119

Source: British Survey of Fertiliser Practice 2000.

Table EW2.2 Percentage of grass area by field application rate - N, England and Wales 2000

row %	kg/ha 0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	Fields in sample
Grazed - not mown	37	1	10	20	8	4	5	3	3	2	1	3	1	1	1	0	1	1	1452
Grazed - mown	13	0	8	12	13	10	8	8	5	4	6	6	3	1	2	1	0	1	1382
All grazings	27	1	9	17	10	6	6	5	4	3	3	4	2	1	1	1	0	1	2834
Cut for seed - grazed	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Cut for seed - not grazed	33	0	0	0	0	0	0	17	33	0	17	.	.	.	.	.	.	.	6
All cut for seed	33	0	0	0	0	0	0	17	33	0	17	.	.	.	.	.	.	.	6
Cut for silage - grazed	10	0	6	11	11	10	8	9	5	4	6	7	3	2	2	2	0	1	1037
Cut for silage - not grazed	18	0	2	7	8	5	10	7	6	6	9	5	2	0	9	3	0	2	150
All cut for silage	11	0	6	11	11	10	9	9	5	5	7	7	3	1	3	2	0	1	1187
Cut for hay - grazed	22	1	14	13	17	7	7	5	4	1	4	2	0	1	1	.	.	.	468
Cut for hay - not grazed	33	1	11	10	11	13	8	0	6	0	2	3	1	.	.	.	.	.	84
All cut for hay	23	1	14	13	17	7	7	5	4	1	4	2	0	1	1	.	.	.	552
All mowings	14	1	8	12	12	9	8	8	5	4	6	6	3	1	2	1	0	1	1611
All grass	27	1	9	16	10	6	6	5	4	3	3	4	2	1	1	1	0	1	3119

Source: British Survey of Fertiliser Practice 2000.

Table EW2.3 Percentage of grass area by field application rate - P_2O_5, England and Wales 2000

row %	kg/ha 0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	Fields in sample
Grazed - not mown	52	23	20	4	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1452
Grazed - mown	32	23	30	10	3	1	.	.	.	.	.	.	.	.	.	.	.	.	1382
All grazings	44	23	24	6	2	.	.	.	.	.	.	.	.	.	.	.	.	.	2834
Cut for seed - grazed	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Cut for seed - not grazed	33	0	17	33	17	.	.	.	.	.	.	.	.	.	.	.	.	.	6
All cut for seed	33	0	17	33	17	.	.	.	.	.	.	.	.	.	.	.	.	.	6
Cut for silage - grazed	28	23	33	11	3	1	.	.	.	.	.	.	.	.	.	.	.	.	1037
Cut for silage - not grazed	36	10	29	16	8	0	1	.	.	.	.	.	.	.	.	.	.	.	150
All cut for silage	29	22	32	12	4	1	.	.	.	.	.	.	.	.	.	.	.	.	1187
Cut for hay - grazed	47	23	23	4	2	1	.	.	.	.	.	.	.	.	.	.	.	.	468
Cut for hay - not grazed	59	10	18	12	1	.	.	.	.	.	.	.	.	.	.	.	.	.	84
All cut for hay	48	22	22	5	2	1	.	.	.	.	.	.	.	.	.	.	.	.	552
All mowings	33	23	30	10	4	1	.	.	.	.	.	.	.	.	.	.	.	.	1611
All grass	44	22	24	7	2	1	.	.	.	.	.	.	.	.	.	.	.	.	3119

Source: British Survey of Fertiliser Practice 2000.

Table EW2.4 Percentage of grass area by field application rate - K_2O, England and Wales 2000

row %	kg/ha																	Fields in sample
	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	
Grazed - not mown	54	20	19	5	1	1	.	.	.	.	.	.	.	.	.	.	.	.	1452
Grazed - mown	30	16	25	12	7	5	2	1	2	.	.	.	.	.	.	.	.	.	1382
All grazings	45	18	22	8	3	2	1	1	1	.	.	.	.	.	.	.	.	.	2834
Cut for seed - grazed	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Cut for seed - not grazed	0	0	17	33	17	17	0	17	.	.	.	.	.	.	.	.	.	.	6
All cut for seed	0	0	17	33	17	17	0	17	.	.	.	.	.	.	.	.	.	.	6
Cut for silage - grazed	24	15	25	15	8	5	3	2	2	.	.	.	.	.	.	.	.	.	1037
Cut for silage - not grazed	34	6	18	14	13	3	7	4	0	1	.	.	.	.	.	.	.	.	150
All cut for silage	25	14	24	15	9	5	3	2	2	.	.	.	.	.	.	.	.	.	1187
Cut for hay - grazed	50	17	22	6	2	1	1	1	.	.	.	.	.	.	.	.	.	.	468
Cut for hay - not grazed	58	9	22	6	6	.	.	.	.	.	.	.	.	.	.	.	.	.	84
All cut for hay	51	16	22	6	2	1	1	1	.	.	.	.	.	.	.	.	.	.	552
All mowings	31	15	24	12	7	4	3	2	1	.	.	.	.	.	.	.	.	.	1611
All grass	44	17	21	8	4	2	1	1	1	.	.	.	.	.	.	.	.	.	3119

Source: British Survey of Fertiliser Practice 2000.

Table EW3.0 Product and nutrient use by month of application, England and Wales 2000

(a) Product use

row %	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total Product ('000 tonnes)
Straight N	1	0	0	0	0	5	31	30	23	6	2	2	1842
Straight P	20	21	5	2	2	6	22	8	6	3	2	2	56
Straight K	9	9	10	2	13	17	21	6	5	4	3	1	72
Compounds	8	7	3	1	1	8	23	18	14	8	5	5	1764
All fertilisers	5	4	2	0	1	6	27	24	18	7	3	3	3735

(b) Nutrient use

row %	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total Nutrient ('000 tonnes)
N	1	0	0	0	0	5	29	29	21	7	4	3	1027
P_2O_5	14	14	5	1	1	9	24	13	9	3	2	4	255
K_2O	12	11	5	1	3	10	22	12	10	6	4	5	320
Total	6	5	2	0	1	7	27	23	17	6	3	4	1602

Note: product use refers to the total tonnage of the products used by farmers in the survey year 2000;
nutrient use refers to the tonnage of each nutrient contained in the products used.
(e.g. 100 kg of a 20 : 10 : 10 compound contains 20 kg of N, 10 kg of P_2O_5, and 10 kg of K_2O, while 100 kg of ammonium nitrate, one of the straight N products, contains typically 34.5 kg of N).

Source: British Survey of Fertiliser Practice 2000.

Table EW3.1 Product type as percentage of all product used by crop group, England and Wales 2000

column %	spring cereal	winter cereal	potatoes	sugar beet	oilseed rape	other tillage	all tillage	grass for grazing	grass for hay	grass for silage	grass not spec	all grass	all crops and grass
Calcium Ammonium Nitrate	.	0.0	.	.	.	0.3	0.0	0.0	.	.	.	0.0	0.8
Urea	0.9	5.7	0.0	1.9	11.9	2.4	5.4	1.4	3.2	1.2	2.5	1.7	3.8
Ammonium Nitrate	42.1	59.6	8.3	36.3	54.1	30.9	52.5	32.1	33.2	28.5	31.2	31.8	43.1
Other Straight N	2.3	1.2	0.6	0.3	2.5	1.0	1.3	0.6	11.0	3.5	.	2.0	1.6
Triple Superphosphate	0.5	1.1	0.3	3.2	1.5	3.1	1.3	0.2	0.3	0.2	1.1	0.3	0.9
Single Superphosphate	.	0.1	.	.	.	0.3	0.1	0.0	.	.	.	0.0	0.0
Other Straight P	0.3	0.4	0.5	1.0	0.3	3.8	0.7	0.6	0.5	0.5	.	0.5	0.6
Muriate of Potash	1.2	1.5	5.4	3.5	0.9	5.0	2.0	0.4	0.5	0.5	1.0	0.5	1.3
Other Straight K	0.1	0.1	4.7	9.2	0.2	0.4	0.8	0.1	0.1	0.2	1.2	0.2	0.5
NP	0.5	0.9	1.3	0.8	0.9	3.6	1.1	3.6	2.5	2.9	4.5	3.5	2.1
NK	1.1	0.7	.	0.6	0.8	1.6	0.7	8.7	2.1	13.9	1.6	8.5	4.0
PK	18.9	21.6	6.9	32.4	16.5	27.5	21.3	2.4	3.3	3.1	17.3	2.6	13.5
Very High N	2.7	1.6	0.1	0.0	1.5	0.8	1.5	25.3	18.5	20.7	17.6	24.5	11.1
High N	19.5	1.1	8.7	1.7	1.6	7.7	3.0	21.2	21.7	20.4	15.1	20.2	10.2
High P	1.7	0.6	6.0	0.2	0.4	1.4	0.9	0.2	1.0	0.4	.	0.2	0.7
High K	2.2	1.2	41.1	8.8	1.1	6.3	3.8	1.5	1.0	2.7	1.4	1.6	2.9
Low N	3.4	1.9	13.4	0.1	3.0	3.0	2.6	0.4	0.0	0.4	.	0.4	1.7
Low P	.	.	.	.	.	.	.	0.1	0.6	.	.	0.1	0.0
Equal NPK	2.5	0.7	2.8	.	2.7	1.0	1.0	1.2	0.6	0.9	5.3	1.2	1.1
Total Product ('000 tonnes)	**116**	**1476**	**95**	**108**	**209**	**171**	**2174**	**1418**	**218**	**802**	**21**	**1560**	**3735**

NB: Precise estimates of product type use cannot be derived from the data collected (at field-level) on fertiliser nutrient contents. In addition some calculations are based on a small number of observations. Care should be taken in interpreting these data and other sources sought for validation.

Source: British Survey of Fertiliser Practice 2000.

Table EW3.2 Use of product type by crop group, England and Wales 2000

row %	spring cereal	winter cereal	potatoes	sugar beet	oilseed rape	other tillage	all tillage	grass for grazing	grass for hay	grass for silage	grass not spec	all grass	total product ('000 tonnes)
Calcium Ammonium Nitrate	.	44.5	.	.	.	45.3	89.8	10.2	.	.	.	10.2	31
Urea	0.8	58.8	0.0	1.4	17.5	2.9	81.4	14.3	4.9	6.6	0.4	18.6	143
Ammonium Nitrate	3.0	53.7	0.5	2.4	6.9	3.2	69.7	27.8	4.4	14.0	0.4	30.3	1608
Other Straight N	4.4	30.1	0.9	0.5	8.8	2.9	47.6	13.9	39.8	46.2	.	52.4	60
Triple Superphosphate	1.5	47.6	0.7	10.2	9.3	15.2	84.6	9.2	1.9	4.2	0.7	15.4	34
Single Superphosphate	.	57.2	.	.	.	31.9	89.1	10.9	.	.	.	10.9	2
Other Straight P	1.7	26.1	2.0	4.7	2.5	28.7	65.7	34.3	4.6	15.9	.	34.3	23
Muriate of Potash	2.7	44.1	10.4	7.5	3.6	17.0	85.2	10.2	2.4	8.8	0.4	14.8	50
Other Straight K	0.7	8.4	22.7	50.1	2.3	3.3	87.5	8.8	0.6	8.1	1.3	12.5	20
NP	0.8	17.3	1.5	1.1	2.3	7.9	30.8	65.2	6.9	29.6	1.2	69.2	78
NK	0.9	6.4	.	0.4	1.1	1.9	10.7	82.6	3.1	74.8	0.2	89.3	149
PK	4.3	63.1	1.3	6.9	6.8	9.3	91.9	6.7	1.4	5.0	0.7	8.1	504
Very High N	0.8	5.8	0.0	0.0	0.8	0.3	7.7	86.5	9.7	40.0	0.9	92.3	415
High N	5.9	4.2	2.2	0.5	0.9	3.4	17.1	78.9	12.4	43.0	0.8	82.9	381
High P	7.9	38.6	23.3	0.7	3.8	9.8	84.0	13.1	8.7	11.7	.	16.0	24
High K	2.4	16.8	36.6	8.9	2.2	10.1	76.9	19.4	2.1	20.2	0.3	23.1	107
Low N	6.3	44.7	20.4	0.1	10.0	8.1	89.6	8.9	0.1	5.5	.	10.4	63
Low P	.	.	.	.	.	.	0.0	100.0	75.7	.	.	100.0	2
Equal NPK	7.0	23.7	6.4	.	13.6	4.3	55.0	40.6	3.2	17.8	2.7	45.0	41
All Fertilisers	**3.1**	**39.5**	**2.6**	**2.9**	**5.6**	**4.6**	**58.2**	**38.0**	**5.8**	**21.5**	**0.6**	**41.8**	**3735**

NB: Precise estimates of product type use cannot be derived from the data collected (at field-level) on fertiliser nutrient contents. In addition some calculations are based on a small number of observations. Care should be taken in interpreting these data and other sources sought for validation.

Source: British Survey of Fertiliser Practice 2000.

Table EW3.3 Product use by month of application, England and Wales 2000

row %	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	total Product ('000 tonnes)
Calcium Ammonium Nitrate	0.1	8.2	40.9	24.1	25.2	1.0	0.4	.	0.1	.	.	.	31
Urea	0.4	8.0	43.4	30.8	13.9	1.9	0.4	.	0.5	0.5	0.1	0.1	143
Ammonium Nitrate	0.2	5.2	33.1	29.8	23.1	4.6	1.5	1.4	0.5	0.3	0.2	0.0	1608
Other straight N	2.6	9.4	32.3	8.0	16.3	10.3	6.9	1.2	2.3	6.0	4.3	0.4	60
Triple Superphosphate	4.0	10.3	24.8	4.5	4.2	1.4	0.9	3.7	21.2	19.2	5.6	0.3	34
Single Superphosphate	17.3	15.0	45.0	6.3	6.7	.	.	.	9.7	.	.	.	2
Other Straight P	.	0.8	17.3	34.7	.	.	1.9	7.0	9.6	8.2	20.5	.	23
Muriate of Potash	12.6	21.3	21.9	6.2	7.9	3.4	1.0	0.9	9.5	4.5	9.3	1.6	50
Other Straight K	.	24.0	13.7	2.6	4.7	1.8	.	.	4.8	20.0	9.7	18.7	20
NP	1.3	12.8	39.9	16.2	15.6	7.0	1.9	.	0.5	2.7	2.2	.	78
NK	.	3.1	16.7	8.2	23.4	30.4	13.5	4.2	0.4	.	.	.	149
PK	3.3	11.1	17.0	4.1	2.4	0.5	1.1	4.6	22.1	22.2	9.4	2.2	504
Very High N	.	4.6	26.0	28.8	17.3	10.3	6.0	5.1	1.2	0.4	0.2	.	415
High N	0.1	3.3	30.7	24.6	23.4	8.6	4.5	3.7	0.6	0.4	0.1	.	381
High P	.	12.1	52.1	10.4	16.7	2.3	.	2.6	1.8	1.8	.	.	24
High K	0.8	4.5	44.4	24.3	17.1	3.6	0.9	0.6	2.1	0.3	0.1	1.2	107
Low N	.	12.2	34.0	7.1	3.0	0.7	1.8	6.8	8.2	20.0	6.3	.	63
Low P	.	16.3	.	57.9	24.8	.	.	.	.	.	.	.	2
Equal NPK	.	3.7	31.7	18.9	14.0	6.5	5.0	9.4	2.4	8.6	.	.	41
All Fertilisers	**0.9**	**6.8**	**31.1**	**22.3**	**18.1**	**5.1**	**2.3**	**2.4**	**4.3**	**4.4**	**1.9**	**0.4**	**3735**

NB: Precise estimates of product type use cannot be derived from the data collected (at field-level) on fertiliser nutrient contents. In addition some calculations are based on a small number of observations. Care should be taken in interpreting these data and other sources sought for validation.

Source: British Survey of Fertiliser Practice 2000.

Table EW4.1 Average fertiliser practice on tillage and grassland by BSFP region, 2000

		Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
		N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Wessex	All tillage	92	73	71	21	167	58	89	153	42	63	284
	All grass	64	46	46	41	142	35	48	91	16	22	236
	All crops & grass	76	57	56	33	155	47	69	117	27	39	520
Anglia	All tillage	92	50	45	10	168	78	93	154	39	42	1415
	All grass	61	23	25	18	147	49	79	90	11	20	109
	All crops & grass	89	48	44	10	167	77	92	149	37	40	1524
Northern	All tillage	95	84	84	46	156	68	86	149	58	72	196
	All grass	70	58	60	48	122	30	40	85	17	24	434
	All crops & grass	73	62	63	47	128	37	48	94	23	30	630
North East	All tillage	91	63	68	21	174	74	95	159	46	65	930
	All grass	73	53	53	41	137	33	53	100	19	28	363
	All crops & grass	85	59	63	28	163	62	83	138	36	52	1293
North Mercia	All tillage	91	72	76	41	138	52	85	125	38	64	260
	All grass	84	63	65	61	173	30	53	144	19	34	196
	All crops & grass	86	66	68	54	160	39	65	138	25	44	456
South Mercia	All tillage	89	72	70	30	167	69	70	148	49	49	354
	All grass	75	44	42	33	137	33	42	103	14	17	146
	All crops & grass	83	59	57	32	154	56	60	128	33	34	500
East Midland	All tillage	91	63	58	10	177	77	90	160	49	53	1183
	All grass	69	39	40	26	141	29	39	97	11	15	283
	All crops & grass	85	57	54	14	170	69	81	145	39	43	1466
South East	All tillage	88	64	65	9	176	66	80	156	42	52	1008
	All grass	60	31	30	26	142	45	52	85	14	16	354
	All crops & grass	79	52	53	15	168	62	74	132	32	39	1362
South West	All tillage	87	81	80	40	139	59	79	121	48	63	241
	All grass	90	76	76	57	160	35	45	144	27	35	309
	All crops & grass	89	77	77	53	155	42	54	139	32	42	550
Wales	All tillage	89	82	77	56	113	59	69	101	49	53	144
	All grass	74	65	62	46	142	35	48	83	20	25	689
	All crops & grass	74	65	63	47	112	33	42	84	21	26	833

Source: British Survey of Fertiliser Practice 2000.

Table EW5.1 Average fertiliser practice on dairy farms, England and Wales 2000

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_6	K_2O	
Spring wheat	79	65	65	42	106	35	35	84	23	23	7
Winter wheat	96	60	63	42	152	49	64	146	30	40	121
Spring barley	93	83	85	74	100	50	57	92	41	48	41
Winter barley	99	82	84	41	128	59	68	127	48	57	66
Oats	100	60	60	57	101	77	83	101	47	50	12
Rye/Triticale/Durum wheat	.	.	.	.	.	.	.	.	.	.	2
Seed potatoes	.	.	.	.	.	.	.	.	.	.	0
Early potatoes	.	.	.	.	.	.	.	.	.	.	0
2nd Early/Maincrop potatoes	100	100	100	25	92	100	210	92	100	210	6
Sugar beet	.	.	.	.	.	.	.	.	.	.	2
Spring oilseed rape	100	100	100	25	148	60	50	148	60	50	5
Winter oilseed rape	.	.	.	.	.	.	.	.	.	.	4
Linseed	.	.	.	.	.	.	.	.	.	.	0
Forage maize	82	75	42	88	70	61	96	58	46	40	84
Rootcrops for stockfeed	89	89	100	100	109	59	146	97	53	146	6
Leafy forage crops	89	82	82	49	88	38	38	78	31	31	10
Arable silage/Other fodder crop	43	14	14	48	139	67	85	60	10	12	10
Peas - human consumption	.	.	.	.	.	.	.	.	.	.	0
Peas - animal consumption	.	.	.	.	.	.	.	.	.	.	1
Beans - animal consumption	.	.	.	.	.	.	.	.	.	.	0
Vegetables (brassicae)	.	.	.	.	.	.	.	.	.	.	3
Vegetables (other)	.	.	.	.	.	.	.	.	.	.	0
Soft fruit	.	.	.	.	.	.	.	.	.	.	0
Top fruit	.	.	.	.	.	.	.	.	.	.	0
Other tillage	.	.	.	.	.	.	.	.	.	.	3
All tillage	90	70	61	59	116	56	73	104	39	45	383
Grass under 5 years	85	68	69	72	214	39	76	182	27	52	330
Grass 5 years and over	90	66	67	69	179	34	52	161	23	35	551
All grass	88	67	68	70	189	36	59	167	24	40	881
All crops and grass	89	67	67	68	177	39	61	157	26	41	1264

Source: British Survey of Fertiliser Practice 2000.

Table EW5.2 Average fertiliser practice on cattle and sheep farms, England and Wales 2000

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring wheat	.	.	.	.	.	.	.	.	.	.	3
Winter wheat	95	83	83	43	173	68	79	164	57	65	48
Spring barley	91	88	88	57	87	38	49	80	34	43	39
Winter barley	99	77	79	43	136	58	76	135	45	60	63
Oats	78	62	62	23	69	44	57	53	27	35	18
Rye/Triticale/Durum wheat	.	.	.	.	.	.	.	.	.	.	4
Seed potatoes	.	.	.	.	.	.	.	.	.	.	0
Early potatoes	.	.	.	.	.	.	.	.	.	.	1
2nd Early/Maincrop potatoes	.	.	.	.	.	.	.	.	.	.	3
Sugar beet	.	.	.	.	.	.	.	.	.	.	0
Spring oilseed rape	.	.	.	.	.	.	.	.	.	.	1
Winter oilseed rape	100	74	74	27	162	57	63	162	42	46	5
Linseed	.	.	.	.	.	.	.	.	.	.	2
Forage maize	58	72	58	100	69	60	97	40	43	56	11
Rootcrops for stockfeed	85	96	96	100	79	90	119	67	87	114	15
Leafy forage crops	71	53	56	74	82	45	52	58	24	29	12
Arable silage/Other fodder crop	.	.	.	.	.	.	.	.	.	.	1
Peas - human consumption	.	.	.	.	.	.	.	.	.	.	0
Peas - animal consumption	.	.	.	.	.	.	.	.	.	.	0
Beans - animal consumption	.	.	.	.	.	.	.	.	.	.	2
Vegetables (brassicae)	.	.	.	.	.	.	.	.	.	.	0
Vegetables (other)	.	.	.	.	.	.	.	.	.	.	2
Soft fruit	.	.	.	.	.	.	.	.	.	.	0
Other tillage	.	.	.	.	.	.	.	.	.	.	2
All tillage	87	76	75	48	132	60	73	114	45	55	232
Grass under 5 years	92	83	85	65	131	39	52	120	33	44	204
Grass 5 years and over	63	55	53	37	88	27	31	55	15	16	957
All grass	64	56	54	38	92	28	33	59	16	18	1162
All crops and grass	65	57	55	39	94	30	35	62	17	19	1394

Source: British Survey of Fertiliser Practice 2000.

Table EW5.3 Average fertiliser practice on other livestock/mixed farms, England and Wales 2000

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring wheat	100	20	31	47	121	45	81	121	9	25	7
Winter wheat	98	59	55	27	180	66	79	176	38	43	478
Spring barley	90	65	68	39	111	57	65	99	37	44	71
Winter barley	98	60	61	29	149	63	78	147	38	48	154
Oats	99	86	76	21	111	58	55	110	50	42	31
Rye/Triticale/Durum wheat	95	48	48	5	125	49	61	119	23	29	9
Seed potatoes	.	.	.	.	.	.	.	.	.	.	2
Early potatoes	.	.	.	.	.	.	.	.	.	.	1
2nd Early/Maincrop potatoes	82	78	84	62	150	145	197	123	113	166	23
Sugar beet	100	36	51	70	107	69	120	107	25	62	28
Spring oilseed rape	82	67	90	39	146	44	46	119	29	41	14
Winter oilseed rape	97	34	29	35	184	61	76	178	21	22	73
Linseed	82	55	44	10	72	48	69	59	26	30	14
Forage maize	74	49	39	93	87	66	102	65	33	40	44
Rootcrops for stockfeed	65	58	58	93	108	103	103	70	59	59	8
Leafy forage crops	.	.	.	.	.	.	.	.	.	.	1
Arable silage/Other fodder crop	.	.	.	.	.	.	.	.	.	.	3
Peas - human consumption	0	15	29	59	0	66	62	0	10	18	11
Peas - animal consumption	16	78	70	61	75	91	106	12	71	75	19
Beans - animal consumption	4	41	41	8	44	82	87	2	34	36	36
Vegetables (brassicae)	69	69	88	27	166	137	129	115	94	114	10
Vegetables (other)	46	34	52	18	87	76	73	40	25	37	17
Soft fruit	78	42	78	0	71	68	102	55	29	79	6
Top fruit	.	.	.	.	.	.	.	.	.	.	3
Other tillage	88	88	91	58	45	39	51	40	34	46	11
All tillage	91	57	55	33	159	66	81	144	37	45	1074
Grass under 5 years	85	50	58	37	174	52	74	148	26	43	188
Grass 5 years and over	72	44	42	26	132	32	33	95	14	14	326
All grass	76	46	46	29	145	38	47	110	18	22	514
All crops and grass	84	52	51	31	153	55	68	129	29	35	1588

Source: British Survey of Fertiliser Practice 2000.

Table EW5.4 Average fertiliser practice on cropping/horticultural farms, England and Wales 2000

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring wheat	78	46	48	17	164	64	70	129	30	33	33
Winter wheat	99	63	60	9	195	69	76	193	44	45	1945
Spring barley	98	70	77	6	122	52	64	120	36	50	253
Winter barley	99	72	77	8	149	66	84	147	47	64	444
Oats	90	71	62	9	120	70	89	108	50	55	82
Rye/Triticale/Durum wheat	94	57	67	0	152	79	84	144	45	57	33
Seed potatoes	.	.	.	.	.	.	.	.	.	.	2
Early potatoes	100	76	76	24	88	197	240	88	150	183	10
2nd Early/Maincrop potatoes	93	85	88	27	186	205	291	173	175	257	157
Sugar beet	95	53	66	27	109	77	143	103	41	94	243
Spring oilseed rape	94	50	49	30	129	54	80	122	27	39	37
Winter oilseed rape	98	61	59	11	206	71	76	202	43	45	371
Linseed	73	43	45	7	70	55	64	51	23	29	44
Forage maize	93	58	11	92	58	45	84	54	26	9	8
Rootcrops for stockfeed	100	38	43	25	125	66	86	125	25	37	14
Leafy forage crops	88	30	31	25	68	45	94	60	13	29	7
Arable silage/Other fodder crop	83	47	67	26	69	78	235	57	37	158	8
Peas - human consumption	4	28	32	6	24	60	76	1	17	24	82
Peas - animal consumption	9	47	52	4	49	66	71	5	31	37	86
Beans - animal consumption	2	50	44	4	42	75	69	1	38	30	130
Vegetables (brassicae)	99	92	92	0	230	65	178	227	60	163	45
Vegetables (other)	57	56	62	18	115	91	115	65	51	71	90
Soft fruit	85	44	68	6	67	54	111	57	24	76	38
Top fruit	76	45	51	2	78	26	66	60	12	33	75
Other tillage	44	29	24	7	88	105	138	39	31	32	89
All tillage	91	63	62	10	176	73	90	159	46	56	4326
Grass under 5 years	79	53	56	5	173	70	68	137	37	38	151
Grass 5 years and over	63	29	29	13	100	33	40	63	9	12	410
All grass	66	34	35	11	119	45	49	79	15	17	561
All crops and grass	88	59	59	10	171	72	87	150	42	52	4887

Source: British Survey of Fertiliser Practice 2000.

Table SC1.1 Total fertiliser use, Scotland 2000

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring wheat	76	76	76	71	94	48	37	72	36	28	12
Winter wheat	97	82	83	9	199	75	82	193	61	68	204
Spring barley	96	91	91	37	109	63	70	104	57	64	477
Winter barley	95	91	91	19	167	71	75	159	64	68	114
Oats	94	94	94	21	107	55	58	100	51	55	56
Seed potatoes	90	90	90	46	123	97	145	111	88	131	17
2nd Early/Maincrop potatoes	94	94	94	42	125	119	167	118	111	157	38
Spring oilseed rape	100	84	92	23	136	60	60	136	51	55	16
Winter oilseed rape	96	80	81	9	203	75	76	195	60	61	72
Rootcrops for stockfeed	98	98	98	30	59	102	88	57	100	86	35
Leafy forage crops	79	83	88	20	102	68	64	81	56	56	26
Arable silage/Other fodder crop	91	95	95	83	146	54	48	134	52	45	18
Peas - animal consumption	83	83	83	43	108	58	67	90	48	56	6
Vegetables (other)	69	58	75	18	63	61	70	44	35	52	14
Other tillage	48	25	25	11	177	68	68	84	17	17	12
All tillage	95	87	88	26	142	69	76	135	60	67	1133
Grass under 5 years	90	85	81	34	142	41	53	127	35	43	406
Grass 5 years and over	82	74	69	36	118	37	41	96	27	28	499
All grass	86	78	73	35	127	38	46	110	30	33	905
All crops and grass	89	82	79	31	134	52	59	118	42	47	2038

NB: Due to insufficient data some crop categories have been omitted from this table. Consequently, the number of fields for *all tillage* is not the sum of the individual crop caregories presented.

Source: British Survey of Fertiliser Practice 2000.

Table SC1.2 Use of straight fertiliser, Scotland 2000

	Crop area receiving dressing (%)			Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Winter wheat	91	2	2	181	98	98	165	2	2	204
Spring barley	55	0	1	81	169	103	45	0	1	477
Winter barley	88	7	2	149	95	90	131	7	2	114
Oats	32	0	0	116	0	44	37	0	0	56
Seed potatoes	39	0	0	97	0	0	38	0	0	17
2nd Early/Maincrop potatoes	47	9	15	51	48	130	24	4	19	38
Spring oilseed rape	63	0	7	111	0	152	70	0	11	16
Winter oilseed rape	93	2	4	186	88	27	173	2	1	72
Rootcrops for stockfeed	9	1	0	40	102	0	4	1	0	35
Leafy forage crops	20	5	4	88	185	31	18	10	1	26
Arable silage/Other fodder crop	8	0	0	76	0	0	6	0	0	18
Peas - animal consumption	26	0	0	57	0	0	15	0	0	6
Vegetables (other)	11	0	17	225	0	100	26	0	17	14
Other tillage	45	0	0	175	0	0	79	0	0	12
All tillage	65	2	2	135	97	95	88	2	2	1133
Grass under 5 years	43	0	1	96	79	157	41	0	1	406
Grass 5 years and over	32	3	0	94	48	40	30	1	0	499
All grass	36	2	1	95	51	90	34	1	0	905
All crops and grass	48	2	1	118	69	93	57	1	1	2038

NB: Due to insufficient data some crop categories have been omitted from this table. Consequently, the number of fields for *all tillage* is not the sum of the individual crop caregories presented.

Source: British Survey of Fertiliser Practice 2000.

Table SC1.3 Use of compound fertiliser, Scotland 2000

	Crop area receiving dressing (%)			Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring wheat	79	79	76	89	44	35	70	35	27	12
Winter wheat	60	79	80	45	74	82	27	59	65	204
Spring barley	88	91	91	66	62	68	58	56	62	477
Winter barley	64	84	89	41	68	74	27	58	66	114
Oats	83	94	94	75	55	58	63	51	54	56
Seed potatoes	92	96	96	77	91	136	71	88	130	17
2nd Early/Maincrop potatoes	85	85	79	110	126	174	94	107	138	38
Spring oilseed rape	84	84	84	79	60	52	66	51	44	16
Winter oilseed rape	52	80	79	43	71	75	22	57	59	72
Rootcrops for stockfeed	98	98	98	55	101	88	54	99	86	35
Leafy forage crops	79	83	83	80	56	66	64	47	55	26
Arable silage/Other fodder crop	99	103	107	128	50	41	127	51	44	18
Vegetables (other)	58	58	58	32	61	61	18	35	35	14
Other tillage	29	26	26	20	65	65	6	17	17	12
All tillage	75	86	86	62	68	74	47	58	64	1133
Grass under 5 years	88	92	86	98	38	49	86	35	42	406
Grass 5 years and over	78	81	78	83	32	36	65	26	28	499
All grass	82	81	81	89	34	41	73	28	33	905
All crops and grass	78	84	82	78	49	56	61	41	46	2038

NB: Due to insufficient data some crop categories have been omitted from this table. Consequently, the number of fields for *all tillage* is not the sum of the individual crop caregories presented.

Source: British Survey of Fertiliser Practice 2000.

Table SC1.4 Use of lime, Scotland 2000

	Crop area receiving dressing (%)						Average field rate of CaO equivalent (tonnes/ha)							
	Ground limestone	Ground chalk	Magnesian limestone	Sugar beet lime	Other	All	Ground limestone	Ground chalk	Magnesian limestone	Sugar beet lime	Other	All	Fields limed	Fields in sample
Winter wheat	0.5	.	5.7	.	.	6.2	2.5	.	2.3	.	.	2.1	14	204
Spring barley	6.1	.	7.9	.	.	14.0	1.9	.	2.4	.	.	2.1	79	477
Winter barley	3.8	.	4.3	.	.	8.1	2.6	.	1.9	.	.	2.1	12	114
Oats	3.9	.	8.4	.	.	12.3	1.4	.	1.5	.	.	1.7	9	56
Winter oilseed rape	14.4	.	5.8	.	.	20.2	1.1	.	1.9	.	.	1.3	9	72
Rootcrops for stockfeed	6.3	.	6.0	.	.	12.3	1.5	.	2.2	.	.	1.8	5	35
Leafy forage crops	9.2	.	38.6	.	.	47.8	1.2	.	2.6	.	.	2.0	10	26
All tillage	4.7	.	7.1	.	.	11.8	1.8	.	2.3	.	.	2.0	151	1133
Grass under 5 years	1.0	.	3.0	.	.	4.0	2.3	.	2.5	.	.	2.1	26	406
Grass 5 years and over	2.8	.	2.4	.	.	5.2	1.9	.	2.4	.	.	2.0	28	499
All grass	2.2	.	3.0	.	.	5.2	2.0	.	2.4	.	.	2.0	54	905
All crops and grass	3.2	.	5.0	.	.	8.2	1.8	.	2.3	.	.	2.0	205	2038

NB: Due to insufficient data some crop categories have been omitted from this table. Consequently, the number of fields for *all tillage* is not the sum of the individual crop caregories presented.

Source: British Survey of Fertiliser Practice 2000.

Table SC1.5 Percentage of crop area by field application rate - N, Scotland 2000

row %	kg/ha																		Fields in sample
	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	
Spring wheat	24	0	0	18	36	22	.	.	.	.	.	.	.	.	.	.	.	.	12
Winter wheat	2	0	0	3	2	9	4	10	20	24	16	5	1	3	.	.	.	.	204
Spring barley	2	0	3	14	28	30	11	3	3	3	1	1	.	.	.	.	.	.	477
Winter barley	0	0	1	2	8	7	12	29	17	16	7	1	1	.	.	.	.	.	114
Oats	4	0	5	20	22	23	8	12	2	2	2	.	.	.	.	.	.	.	56
Seed potatoes	5	2	10	2	13	24	26	6	0	0	12	.	.	.	.	.	.	.	17
2nd Early/Maincrop potatoes	9	5	14	0	2	23	7	17	10	7	3	0	3	.	.	.	.	.	38
Spring oilseed rape	0	0	0	0	39	15	15	18	0	5	0	7	.	.	.	.	.	.	16
Winter oilseed rape	3	0	1	1	0	13	3	13	19	13	9	24	2	.	.	.	.	.	72
Rootcrops for stockfeed	11	6	33	24	16	7	0	1	1	.	.	.	.	.	.	.	.	.	35
Leafy forage crops	19	0	9	10	32	8	5	0	9	7	.	.	.	.	.	.	.	.	26
Arable silage/Other fodder crop	9	1	7	6	9	0	30	24	4	0	0	10	.	.	.	.	.	.	18
Peas - animal consumption	76	0	0	8	3	0	13	.	.	.	.	.	.	.	.	.	.	.	6
Vegetables (other)	19	57	12	7	0	0	4	.	.	.	.	.	.	.	.	.	.	.	14
Other tillage	77	0	0	2	0	5	7	2	0	0	0	2	0	4	.	.	.	.	12
All tillage	4	2	3	8	16	19	10	9	9	11	5	4	.	.	.	.	.	.	1133
Grass under 5 years	10	1	5	14	10	11	15	12	4	8	3	2	3	3	.	.	.	.	406
Grass 5 years and over	17	1	15	18	11	9	10	7	3	3	1	1	1	2	.	.	.	.	499
All grass	15	1	8	16	11	10	12	9	3	5	3	1	2	2	2	.	.	.	905
All crops and grass	7	1	7	14	12	13	12	9	5	7	3	2	2	2	2	1	.	.	2038

NB: Due to insufficient data some crop categories have been omitted from this table. Consequently, the number of fields for *all tillage* is not the sum of the individual crop caregories presented.

Source: British Survey of Fertiliser Practice 2000.

Table SC1.6 Percentage of crop area by field application rate - P_2O_5, Scotland 2000

row %	kg/ha 0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	Fields in sample
Spring wheat	24	0	54	22	.	.	.	.	.	.	.	.	.	.	.	.	.	.	12
Winter wheat	19	1	8	32	33	6	0	1	.	.	.	.	.	.	.	.	.	.	204
Spring barley	5	5	25	44	15	4	0	1	.	.	.	.	.	.	.	.	.	.	477
Winter barley	4	5	13	26	42	6	.	.	.	.	.	.	.	.	.	.	.	.	114
Oats	4	5	33	31	27	1	.	.	.	.	.	.	.	.	.	.	.	.	56
Seed potatoes	5	0	0	47	21	10	14	2	.	.	.	.	.	.	.	.	.	.	17
2nd Early/Maincrop potatoes	9	25	9	1	11	4	28	5	9	.	.	.	.	.	.	.	.	.	38
Spring oilseed rape	11	2	7	69	10	.	.	.	.	.	.	.	.	.	.	.	.	.	16
Winter oilseed rape	22	0	10	39	25	2	0	1	.	.	.	.	.	.	.	.	.	.	72
Rootcrops for stockfeed	11	0	14	14	39	7	12	4	.	.	.	.	.	.	.	.	.	.	35
Leafy forage crops	16	2	39	28	6	9	.	.	.	.	.	.	.	.	.	.	.	.	26
Arable silage/Other fodder crop	5	7	43	29	0	5	1	10	.	.	.	.	.	.	.	.	.	.	18
Peas - animal consumption	39	0	10	47	4	.	.	.	.	.	.	.	.	.	.	.	.	.	6
Vegetables (other)	33	0	2	54	12	.	.	.	.	.	.	.	.	.	.	.	.	.	14
Other tillage	91	0	2	1	6	.	.	.	.	.	.	.	.	.	.	.	.	.	12
All tillage	10	4	17	36	23	5	2	2	1	.	.	.	.	.	.	.	.	.	1133
Grass under 5 years	13	24	39	15	6	1	1	1	.	.	.	.	.	.	.	.	.	.	406
Grass 5 years and over	25	29	31	10	3	1	.	.	.	.	.	.	.	.	.	.	.	.	499
All grass	22	27	34	12	4	1	.	.	.	.	.	.	.	.	.	.	.	.	905
All crops and grass	17	18	28	24	10	3	.	.	.	.	.	.	.	.	.	.	.	.	2038

NB: Due to insufficient data some crop categories have been omitted from this table. Consequently, the number of fields for *all tillage* is not the sum of the individual crop caregories presented.

Source: British Survey of Fertiliser Practice 2000.

Table SC1.7 Percentage of crop area by field application rate - K_2O, Scotland 2000

row %	kg/ha																		Fields in sample
	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	
Spring wheat	24	0	76	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	12
Winter wheat	19	1	3	28	34	12	2	2	.	.	.	.	.	.	.	.	.	.	204
Spring barley	5	3	20	39	24	6	2	.	.	.	.	.	.	.	.	.	.	.	477
Winter barley	3	4	5	26	54	7	.	.	.	.	.	.	.	.	.	.	.	.	114
Oats	4	5	29	34	25	3	.	.	.	.	.	.	.	.	.	.	.	.	56
Seed potatoes	5	0	0	36	0	6	12	6	4	20	8	2	.	.	.	.	.	.	17
2nd Early/Maincrop potatoes	9	22	3	1	7	9	6	6	1	25	2	7	0	0	1	.	.	.	38
Spring oilseed rape	11	18	0	61	3	0	0	7	.	.	.	.	.	.	.	.	.	.	16
Winter oilseed rape	16	0	14	35	27	3	2	1	1	.	.	.	.	.	.	.	.	.	72
Rootcrops for stockfeed	11	0	7	18	45	6	4	1	8	.	.	.	.	.	.	.	.	.	35
Leafy forage crops	12	2	47	24	2	0	0	4	9	.	.	.	.	.	.	.	.	.	26
Arable silage/Other fodder crop	5	9	33	48	5	0	1	.	.	.	.	.	.	.	.	.	.	.	18
Peas - animal consumption	39	0	0	14	29	18	.	.	.	.	.	.	.	.	.	.	.	.	6
Vegetables (other)	12	0	2	54	6	23	3	.	.	.	.	.	.	.	.	.	.	.	14
Other tillage	91	0	3	1	5	.	.	.	.	.	.	.	.	.	.	.	.	.	12
All tillage	10	4	14	31	29	7	3	2	.	.	.	.	.	.	.	.	.	.	1133
Grass under 5 years	18	20	25	17	8	5	3	1	1	1	.	.	.	.	.	.	.	.	406
Grass 5 years and over	30	28	24	9	2	2	1	1	1	.	.	.	.	.	.	.	.	.	499
All grass	26	26	24	12	4	3	2	1	1	.	.	.	.	.	.	.	.	.	905
All crops and grass	19	17	21	21	14	4	2	1	1	.	.	.	.	.	.	.	.	.	2038

NB: Due to insufficient data some crop categories have been omitted from this table. Consequently, the number of fields for *all tillage* is not the sum of the individual crop caregories presented.

Source: British Survey of Fertiliser Practice 2000.

Table SC2.1 Average fertiliser practice by grassland utilisation, Scotland 2000

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Grazed - not mown	83	74	69	26	107	32	31	89	23	21	462
Grazed - mown	88	89	84	49	161	47	64	141	42	53	230
All grazings	85	78	73	34	123	37	42	104	29	30	692
Cut for silage - grazed	92	88	86	58	164	49	64	150	43	55	202
Cut for silage - not grazed	97	88	81	50	169	43	74	165	38	60	100
All cut for silage	93	88	85	55	165	47	67	154	41	56	302
Cut for hay - grazed	81	90	76	36	128	43	57	104	39	43	48
Cut for hay - not grazed	76	69	69	8	106	41	46	80	29	32	30
All cut for hay	80	85	74	29	123	43	55	99	36	41	78
All mowings	90	88	82	46	161	46	66	145	41	54	387
All grass	86	79	74	35	128	38	45	110	30	33	905

Source: British Survey of Fertiliser Practice 2000.

Table SC2.2 Percentage of grass area by field application rate - N, Scotland 2000

	kg/ha																		
row %	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	Fields in sample
Grazed - not mown	17	0	11	23	12	9	10	7	3	2	1	2	1	2	0	1	.	.	462
Grazed - mown	13	2	5	4	7	15	8	14	3	7	6	1	6	5	1	0	1	1	230
All grazings	15	1	10	18	11	10	11	9	3	3	3	2	2	2	.	.	.	.	692
Cut for silage - grazed	8	2	6	4	8	16	9	14	4	7	6	1	6	6	0	0	1	1	202
Cut for silage - not grazed	3	0	0	1	9	7	24	17	4	20	9	2	2	1	0	2	.	.	100
All cut for silage	7	1	4	3	9	13	13	15	4	11	7	1	5	5	0	1	1	1	302
Cut for hay - grazed	19	0	1	6	12	22	17	15	0	2	6	.	.	.	.	.	.	.	48
Cut for hay - not grazed	4	1	7	27	19	17	23	2	0	1	.	.	.	.	.	.	.	.	30
All cut for hay	10	0	2	11	14	23	19	13	0	2	5	.	.	.	.	.	.	.	78
All mowings	10	1	4	4	8	14	14	14	4	9	7	1	4	4	0	1	1	1	387
All grass	15	1	8	16	11	10	12	9	3	5	3	1	2	2	2	.	.	.	905

Source: British Survey of Fertiliser Practice 2000.

Table SC2.3 Percentage of grass area by field application rate - P_2O_5, Scotland 2000

row %	kg/ha																		Fields in sample
	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	
Grazed - not mown	26	35	31	6	1	.	.	.	.	.	.	.	.	.	.	.	.	.	462
Grazed - mown	11	14	40	24	9	2	.	.	.	.	.	.	.	.	.	.	.	.	230
All grazings	22	29	33	11	3	1	.	.	.	.	.	.	.	.	.	.	.	.	692
Cut for silage - grazed	12	16	35	26	9	1	1	.	.	.	.	.	.	.	.	.	.	.	202
Cut for silage - not grazed	12	18	50	12	4	3	1	.	.	.	.	.	.	.	.	.	.	.	100
All cut for silage	12	16	39	23	8	1	1	.	.	.	.	.	.	.	.	.	.	.	302
Cut for hay - grazed	10	9	52	18	11	.	.	.	.	.	.	.	.	.	.	.	.	.	48
Cut for hay - not grazed	31	21	24	10	14	.	.	.	.	.	.	.	.	.	.	.	.	.	30
All cut for hay	15	11	46	16	12	.	.	.	.	.	.	.	.	.	.	.	.	.	78
All mowings	12	15	42	20	8	1	1	.	.	.	.	.	.	.	.	.	.	.	387
All grass	22	27	34	12	4	1	.	.	.	.	.	.	.	.	.	.	.	.	905

Source: British Survey of Fertiliser Practice 2000.

Table SC2.4 Percentage of grass area by field application rate - K_2O, Scotland 2000

row %	kg/ha																	Fields in sample
	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	
Grazed - not mown	31	35	26	6	1	.	.	.	.	.	.	.	.	.	.	.	.	.	462
Grazed - mown	16	14	22	25	13	4	2	3	1	.	.	.	.	.	.	.	.	.	230
All grazings	27	29	24	11	4	2	1	1	.	.	.	.	.	.	.	.	.	.	692
Cut for silage - grazed	14	15	20	26	13	5	3	3	1	.	.	.	.	.	.	.	.	.	202
Cut for silage - not grazed	19	9	28	11	5	17	5	4	1	.	.	.	.	.	.	.	.	.	100
All cut for silage	15	13	22	21	10	11	3	3	1	.	.	.	.	.	.	.	.	.	302
Cut for hay - grazed	24	7	24	27	14	1	0	1	1	.	.	.	.	.	.	.	.	.	48
Cut for hay - not grazed	31	18	28	7	11	3	3	.	.	.	.	.	.	.	.	.	.	.	30
All cut for hay	26	10	25	22	13	1	1	1	1	.	.	.	.	.	.	.	.	.	78
All mowings	17	12	24	21	11	7	3	3	1	.	.	.	.	.	.	.	.	.	387
All grass	27	26	24	12	4	3	2	1	1	.	.	.	.	.	.	.	.	.	905

Source: British Survey of Fertiliser Practice 2000.

Table SC3.0 Product and nutrient use by month of application, Scotland 2000

(a) Product use

row %	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total Product ('000 tonnes)
Straight N	0	0	0	0	0	2	32	34	18	7	2	4	234
Straight P	27	16	10	0	0	2	14	5	1	2	3	19	6
Straight K	0	9	0	0	0	0	16	15	30	31	0	0	6
Compounds	5	4	1	0	0	1	22	35	13	11	4	3	527
All fertilisers	3	3	1	0	0	1	25	34	15	10	4	4	773

(b) Nutrient use

row %	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total Nutrient ('000 tonnes)
N	1	1	0	0	0	1	26	37	16	10	4	3	178
P_2O_5	9	8	2	2	0	2	25	29	11	6	2	4	63
K_2O	7	8	1	2	0	2	24	30	11	9	3	3	70
Total	4	4	1	1	0	2	25	34	14	9	3	3	311

Note: product use refers to the total tonnage of the products used by farmers in the survey year 2000;
nutrient use refers to the tonnage of each nutrient contained in the products used.
(e.g. 100 kg of a 20 : 10 : 10 compound contains 20 kg of N, 10 kg of P_2O_5, and 10 kg of K_2O, while 100 kg of ammonium nitrate, one of the straight N products, contains typically 34.5 kg of N).

Source: British Survey of Fertiliser Practice 2000.

Table SC3.1 Product type as percentage of all product used by crop group, Scotland 2000

column %	spring cereal	winter cereal	potatoes	sugar beet	oilseed rape	other tillage	all tillage	grass for grazing	grass for hay	grass for silage	grass not spec	all grass	all crops and grass
Calcium Ammonium Nitrate	.	0.0	.	.	.	0.0	.	.	.	.	.	.	0.0
Urea	0.9	5.7	.	.	9.7	0.4	3.8	0.4	.	0.4	.	0.6	2.1
Ammonium Nitrate	24.3	48.1	9.1	.	46.2	14.6	34.9	20.0	14.4	15.9	22.1	20.1	26.9
Other Straight N	0.8	3.5	.	.	2.8	0.7	2.1	0.5	.	.	.	0.5	1.2
Triple Superphosphate	.	0.6	0.5	.	0.7	0.2	0.4	0.2	.	0.1	.	0.2	0.3
Single Superphosphate	.	.	.	.	.	.	.	.	.	.	.	.	.
Other Straight P	.	0.6	0.9	.	0.3	0.5	0.4	0.8	2.8	0.8	.	0.6	0.5
Muriate of Potash	0.1	0.5	4.2	.	0.5	0.5	0.5	.	.	.	.	0.1	0.3
Other Straight K	0.1	.	.	.	0.3	0.3	0.1	0.9	2.7	0.4	.	0.9	0.5
NP	1.7	0.9	5.2	.	1.0	0.6	1.3	4.6	1.9	2.9	.	4.3	2.9
NK	2.2	4.0	.	.	3.3	.	2.7	1.0	0.2	2.9	.	1.4	2.0
PK	2.2	12.0	7.6	.	9.2	5.1	7.4	2.8	3.1	2.2	.	3.1	5.1
Very High N	4.1	2.1	0.6	.	0.2	11.6	3.6	38.5	24.9	37.8	38.5	36.0	21.0
High N	18.9	0.7	27.8	.	5.4	24.9	11.0	25.8	45.5	32.3	27.7	25.9	19.0
High P	1.2	.	.	.	0.7	7.1	1.3	0.3	.	0.5	.	0.3	0.7
High K	8.4	1.0	30.0	.	0.6	6.9	4.9	0.5	.	0.7	.	0.9	2.8
Low N	9.8	17.2	13.5	.	13.5	17.0	14.1	0.3	0.8	0.8	.	2.1	7.7
Low P	.	.	.	.	.	3.3	0.4	1.2	0.1	0.7	.	0.6	0.5
Equal NPK	25.5	3.0	0.3	.	5.5	6.3	11.4	2.4	3.6	1.8	11.7	2.5	6.6
Total Product ('000 tonnes)	**125**	**145**	**9**	.	**40**	**41**	**359**	**339**	**35**	**192**	**6**	**414**	**773**

NB: Precise estimates of product type use cannot be derived from the data collected (at field-level) on fertiliser nutrient contents. In addition some calculations are based on a small number of observations. Care should be taken in interpreting these data and other sources sought for validation.

Source: British Survey of Fertiliser Practice 2000.

Table SC3.2 Use of product type by crop group, Scotland 2000

row %	spring cereal	winter cereal	potatoes	sugar beet	oilseed rape	other tillage	all tillage	grass for grazing	grass for hay	grass for silage	grass not spec	all grass	total product ('000 tonnes)
Calcium Ammonium Nitrate	.	100.0	.	.	.	.	100.0	.	.	.	.	.	0
Urea	7.0	51.9	.	.	23.9	1.1	83.8	8.8	.	4.4	.	16.2	16
Ammonium Nitrate	14.5	33.5	0.4	.	8.8	2.9	60.1	32.5	2.4	14.6	0.7	39.9	208
Other Straight N	10.0	54.3	.	.	12.0	3.1	79.5	18.1	.	.	.	20.5	9
Triple Superphosphate	.	46.2	2.4	.	13.9	3.7	66.3	26.1	.	5.0	.	33.7	2
Single Superphosphate	.	.	.	.	.	.	.	.	.	.	.	.	0
Other Straight P	.	22.2	2.1	.	3.4	5.0	32.8	67.2	25.1	40.0	.	67.2	4
Muriate of Potash	5.2	36.6	19.2	.	10.3	10.8	82.2	.	.	.	.	17.8	2
Other Straight K	1.8	.	.	.	3.1	3.3	8.2	78.0	23.2	18.3	.	91.8	4
NP	9.7	6.0	2.1	.	1.8	1.1	20.6	69.8	3.0	25.1	.	79.4	22
NK	17.3	36.7	.	.	8.2	.	62.2	21.7	0.4	35.1	.	37.8	16
PK	6.8	44.6	1.7	.	9.3	5.3	67.7	23.8	2.7	10.5	.	32.3	39
Very High N	3.1	1.9	0.0	.	0.1	2.9	8.0	80.5	5.4	44.7	1.5	92.0	162
High N	16.1	0.7	1.7	.	1.5	6.9	26.9	59.6	10.8	42.2	1.2	73.1	147
High P	26.1	.	.	.	5.1	49.9	81.1	18.9	.	16.9	.	18.9	6
High K	48.4	6.7	12.5	.	1.1	13.0	81.8	7.1	.	6.0	.	18.2	22
Low N	20.6	42.2	2.1	.	9.1	11.7	85.7	1.8	0.5	2.7	.	14.3	59
Low P	.	.	.	.	.	34.5	34.5	100.0	1.3	33.2	.	65.5	4
Equal NPK	62.2	8.5	0.1	.	4.2	5.0	80.0	15.8	2.5	6.7	1.5	20.0	51
All Fertilisers	**16.1**	**18.8**	**1.2**	.	**5.1**	**5.3**	**46.5**	**43.8**	**4.5**	**24.8**	**0.8**	**53.5**	**773**

NB: Precise estimates of product type use cannot be derived from the data collected (at field-level) on fertiliser nutrient contents. In addition some calculations are based on a small number of observations. Care should be taken in interpreting these data and other sources sought for validation.

Source: British Survey of Fertiliser Practice 2000.

Table SC3.3 Product use by month of application, Scotland 2000

row %	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	total Product ('000 tonnes)
Calcium Ammonium Nitrate	.	21.5	27.6	13.4	32.1	.	.	5.4	.	.	.	.	0
Urea	.	.	41.7	35.2	23.1	.	.	.	.	.	.	.	16
Ammonium Nitrate	.	3.3	30.8	34.5	19.4	6.5	2.0	2.9	0.2	0.4	.	.	208
Other straight N	.	.	5.6	35.8	45.8	12.5	.	.	.	.	0.2	.	9
Triple Superphosphate	.	5.1	30.9	6.7	17.6	0.1	5.5	3.6	14.4	9.4	6.7	.	2
Single Superphosphate	.	.	.	.	.	.	.	.	.	.	.	.	0
Other Straight P	.	.	.	100.0	.	.	.	.	.	.	.	.	4
Muriate of Potash	.	.	30.0	38.3	.	.	.	.	.	31.4	.	.	2
Other Straight K	.	.	16.6	16.7	50.0	16.7	.	.	.	.	.	.	4
NP	.	2.9	61.1	21.9	7.5	.	0.9	1.8	2.7	.	1.2	.	22
NK	.	.	21.6	34.9	22.3	18.6	1.5	1.1	.	.	.	.	16
PK	2.3	1.5	16.0	8.0	8.6	6.2	0.7	1.8	14.4	32.8	5.9	1.8	39
Very High N	.	0.9	12.7	39.9	12.0	22.5	7.8	3.7	0.5	.	.	.	162
High N	.	.	21.4	39.4	28.0	6.9	2.4	0.7	0.9	.	0.2	.	147
High P	.	.	10.4	12.4	61.3	8.0	.	6.8	1.2	.	.	.	6
High K	.	2.2	39.5	27.4	23.9	3.8	.	.	1.2	2.1	.	.	22
Low N	.	4.4	17.8	18.2	12.3	1.0	0.4	4.5	20.2	19.5	1.9	.	59
Low P	.	.	.	49.5	33.0	.	16.5	.	.	.	.	.	4
Equal NPK	0.5	.	40.6	32.8	17.4	1.9	0.6	2.8	2.4	1.0	.	.	51
All Fertilisers	**0.2**	**1.9**	**25.4**	**32.0**	**19.6**	**8.0**	**2.5**	**2.5**	**3.4**	**4.0**	**0.6**	**0.1**	**773**

NB: Precise estimates of product type use cannot be derived from the data collected (at field-level) on fertiliser nutrient contents. In addition some calculations are based on a small number of observations. Care should be taken in interpreting these data and other sources sought for validation.

Source: British Survey of Fertiliser Practice 2000.

Table SC4.1 Average fertiliser practice, North East Scotland 2000

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Winter wheat	95	89	89	9	197	69	76	188	62	67	23
Spring barley	94	91	91	45	107	58	62	100	53	56	195
Winter barley	88	87	87	15	188	66	67	166	57	59	46
Oats	100	100	100	30	103	44	50	103	44	50	21
Seed potatoes	85	85	85	67	111	88	83	94	75	70	5
Spring oilseed rape	100	100	100	37	116	62	47	116	62	47	6
Winter oilseed rape	100	100	93	14	205	71	71	205	71	66	17
Rootcrops for stockfeed	98	98	98	43	58	91	78	57	89	76	18
All tillage	93	91	90	32	137	63	65	128	57	59	341
Grass under 5 years	92	88	85	18	137	35	47	126	31	39	129
Grass 5 years and over	94	78	77	20	112	33	37	106	26	28	80
All grass	93	85	82	19	127	34	43	118	29	35	209
All crops and grass	93	88	86	26	132	49	55	123	43	47	550

NB: Due to insufficient data some crop categories have been omitted from this table. Consequently, the number of fields for *all tillage* is not the sum of the individual crop caregories presented.

Source: British Survey of Fertiliser Practice 2000.

Table SC4.2 Average fertiliser practice, South East Scotland 2000

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring wheat	57	57	57	61	103	64	39	59	37	23	9
Winter wheat	97	77	79	8	202	75	83	195	58	65	168
Spring barley	97	90	91	21	111	67	79	107	61	71	217
Winter barley	100	93	93	17	160	72	79	160	68	74	63
Oats	89	89	89	16	114	65	70	101	58	63	24
Seed potatoes	91	91	91	37	105	103	178	96	94	163	11
2nd Early/Maincrop potatoes	93	93	93	43	124	119	173	116	111	162	35
Spring oilseed rape	100	57	78	0	170	56	89	170	32	69	10
Winter oilseed rape	94	67	73	6	201	77	79	189	52	58	54
Rootcrops for stockfeed	95	95	95	35	81	147	113	77	139	107	13
Leafy forage crops	69	75	81	20	102	53	57	71	40	46	19
Arable silage/Other fodder crop	100	100	100	53	96	69	57	96	69	57	8
Vegetables (other)	89	74	96	17	64	61	70	56	45	67	9
Other tillage	48	24	24	5	183	69	69	88	16	16	10
All tillage	95	83	85	16	152	74	85	144	62	72	664
Grass under 5 years	87	79	77	17	133	43	54	116	34	41	162
Grass 5 years and over	81	61	56	28	101	33	33	82	20	18	218
All grass	82	66	62	25	111	37	40	92	24	25	380
All crops and grass	89	75	75	20	135	59	68	120	45	51	1044

NB: Due to insufficient data some crop categories have been omitted from this table. Consequently, the number of fields for *all tillage* is not the sum of the individual crop caregories presented.

Source: British Survey of Fertiliser Practice 2000.

Table SC4.3 Average fertiliser practice, South West Scotland 2000

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring barley	99	100	100	82	102	66	66	100	66	66	38
Arable silage/Other fodder crop	90	94	94	83	156	52	47	141	49	43	10
All tillage	95	95	95	81	118	62	61	113	59	58	72
Grass under 5 years	88	89	77	67	165	50	67	145	45	52	74
Grass 5 years and over	80	82	76	46	129	39	48	104	32	36	145
All grass	82	84	76	51	138	42	52	113	35	40	219
All crops and grass	83	85	78	54	136	44	53	113	38	42	291

NB: Due to insufficient data some crop categories have been omitted from this table. Consequently, the number of fields for *all tillage* is not the sum of the individual crop caregories presented.

Source: British Survey of Fertiliser Practice 2000.

Table SC5.1 Average fertiliser practice on general cropping farms, Scotland 2000

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring wheat	100	100	100	0	111	74	37	111	74	37	6
Winter wheat	96	83	84	4	201	74	83	194	62	69	163
Spring barley	96	91	92	19	119	68	78	114	62	72	220
Winter barley	94	89	89	10	170	73	76	160	65	68	79
Oats	91	91	91	8	124	61	63	113	56	58	24
Seed potatoes	88	88	88	38	138	90	153	122	80	135	12
2nd Early/Maincrop potatoes	93	93	93	45	141	146	207	131	135	192	31
Spring oilseed rape	100	84	92	23	136	60	60	136	51	55	16
Winter oilseed rape	96	79	80	9	203	74	76	195	59	61	68
Rootcrops for stockfeed	98	98	98	16	53	101	99	52	98	97	13
Vegetables (other)	88	72	96	16	64	61	70	57	44	67	8
Other tillage	45	19	19	0	191	75	75	86	15	15	9
All tillage	94	86	87	13	159	74	83	150	64	73	665
Grass under 5 years	86	81	79	13	150	40	49	129	32	39	82
Grass 5 years and over	86	69	63	23	107	36	36	92	25	23	86
All grass	86	75	71	18	128	38	43	111	29	31	168
All crops and grass	93	84	84	14	153	67	76	142	56	64	833

NB: Due to insufficient data some crop categories have been omitted from this table. Consequently, the number of fields for *all tillage* is not the sum of the individual crop caregories presented.

Source: British Survey of Fertiliser Practice 2000.

Table SC5.2 Average fertiliser practice on dairy farms, Scotland 2000

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring barley	100	100	100	88	88	71	71	88	71	71	12
Arable silage/Other fodder crop	77	87	87	87	167	48	57	128	41	50	6
All tillage	93	91	91	88	110	61	63	103	55	57	29
Grass under 5 years	89	87	83	69	195	62	83	173	54	69	42
Grass 5 years and over	95	88	88	69	166	47	57	157	41	50	67
All grass	93	87	86	69	175	52	65	162	45	56	109
All crops and grass	93	88	87	71	168	53	65	156	46	56	138

NB: Due to insufficient data some crop categories have been omitted from this table. Consequently, the number of fields for *all tillage* is not the sum of the individual crop caregories presented.

Source: British Survey of Fertiliser Practice 2000.

Table SC5.3 Average fertiliser practice on mixed farms, Scotland 2000

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Winter wheat	100	72	72	42	191	81	82	191	59	59	37
Spring barley	96	91	90	52	99	56	60	95	51	54	245
Winter barley	100	100	100	45	157	62	70	157	62	70	34
Oats	95	95	95	28	96	51	55	91	48	53	32
Seed potatoes	100	100	100	60	59	127	112	59	127	112	5
2nd Early/Maincrop potatoes	100	100	100	29	67	18	17	67	18	17	7
Rootcrops for stockfeed	98	98	98	48	67	104	72	66	102	71	22
Leafy forage crops	76	81	86	24	92	71	66	70	58	57	24
Arable silage/Other fodder crop	100	100	100	75	136	56	41	136	56	41	11
Vegetables (other)	19	19	19	88	52	66	66	10	13	13	6
All tillage	95	89	89	49	112	60	61	107	54	55	439
Grass under 5 years	90	86	81	29	129	37	48	117	31	38	282
Grass 5 years and over	78	71	65	29	105	33	37	82	24	24	346
All grass	82	76	70	29	114	35	41	94	26	29	628
All crops and grass	85	79	75	34	113	41	47	97	33	35	1067

NB: Due to insufficient data some crop categories have been omitted from this table. Consequently, the number of fields for *all tillage* is not the sum of the individual crop caregories presented.

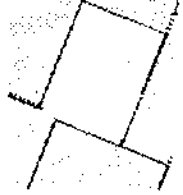
Source: British Survey of Fertiliser Practice 2000.

Table SC5.4 Average fertiliser practice on farms in Less Favoured Areas, Scotland 2000

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring wheat	60	60	60	100	94	37	37	57	22	22	5
Winter wheat	100	80	80	31	193	86	75	193	69	60	13
Spring barley	96	97	96	51	96	58	62	93	56	60	128
Winter barley	100	100	100	51	162	76	82	162	76	82	7
Oats	100	100	100	15	68	36	37	68	36	37	7
Rootcrops for stockfeed	100	100	100	53	72	128	87	72	128	87	16
Leafy forage crops	65	65	65	37	73	92	38	47	60	25	8
Arable silage/Other fodder crop	46	69	69	35	46	69	48	21	47	33	5
All tillage	95	94	94	48	105	64	67	100	60	63	203
Grass under 5 years	92	88	80	37	133	39	48	123	34	38	158
Grass 5 years and over	79	73	67	34	111	37	41	88	27	27	245
All grass	83	78	71	35	118	38	43	99	29	31	403
All crops and grass	85	80	75	37	116	42	48	99	34	36	606

NB: Due to insufficient data some crop categories have been omitted from this table. Consequently, the number of fields for *all tillage* is not the sum of the individual crop caregories presented.

Source: British Survey of Fertiliser Practice 2000.



SECTION D

SUPPLEMENTARY SURVEY ANALYSIS ON FERTILISER SPREADER CALIBRATION AND TESTING

Summary

- In 2000, 89% of farms owned one or more fertiliser spreaders, compared to 92% of farms in 1993. Most (79%) farms owned one spreader, while a tenth (10%) owned two but only 1% owned three and no farms had more than three spreaders. The percentage of farms owning more than one spreader increased, as would be expected, with farm size. However, fewer farms had more than one spreader compared to 1993, when some larger farms had as many as five spreaders.

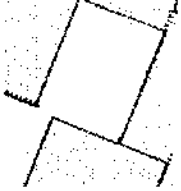
- Two-thirds (67%) of the farm-owned spreaders were spinning disc, a fifth (21%) were oscillating spout and 5-7% were pneumatic or liquid sprayer types. Between 1993 and 2000, the proportion of spinning disc spreaders had increased, with a commensurate decrease in the percentage of oscillating spout and pneumatic spreaders.

- The majority (58%) of spinning disc spreaders and liquid sprayers, nearly half (43%) of the pneumatic but only a quarter (24%) of the oscillating spout spreaders, were less than six years old in 2000. A greater proportion of oscillating spout and pneumatic spreaders were over ten years old, compared to the other two types of spreader. The distribution of age ranges was similar to that in 1993, apart from a slight increase (+5% points) in the percentage of all spreaders that were more than fifteen years old.

- Nearly all (90-91%) of pneumatic spreaders and liquid sprayers, two-thirds (69%) of spinning disc and close to a half (42%) of oscillating spout spreaders had been calibrated at some stage during on-farm use. The proportion of all spreaders which were known to have been calibrated, had increased from 47% in 1993 to 66% in 2000. Although it was not known whether any calibration had been carried out on 17% of spreaders in 1993, the corresponding figure in 2000 was only 7%, suggesting some improvement in the extent of spreader calibration practice.

- The majority of spinning disc (69%), oscillating spout (58%) and pneumatic (71%) spreaders and also liquid sprayers (84%), expressed as percentages of calibrated spreaders, had last been calibrated since the beginning of 2000. All calibrations of pneumatic spreaders and liquid sprayers had been undertaken within the previous three years but a small proportion of spinning disc (5%) and oscillating spout (11%) spreaders had last been calibrated between three and five or more years ago. Compared to 1993, a slightly higher percentage of the latest calibrations had been done in the current calendar year.

- About a quarter (28%) of all spreaders in 2000 were known to have been tray tested at some stage, compared to 22% in 1993. However, in 1993 it was not known whether any tray testing had ever been carried out on 20% of spreaders, whereas the corresponding figure in 2000 was 12%, which might account for the small apparent increase in tray testing during this period. The length of time since the last tray testing showed a similar pattern to the timescales recorded for the most recent calibration.



Introduction

General and supplementary information is collected for each farm holding that is surveyed, as well as details of fertiliser, lime and manure use on each field. The supplementary questions vary each year and tend to look specifically at a topic related to fertiliser use. In 2000, farmers were asked a number of questions about the type and age of their own fertiliser applicators and how recently the spreaders had been calibrated or tray tested.

A similar set of supplementary questions had previously been included in the 1993 survey[24] and, in the following sections, the 2000 results are presented and compared with those obtained seven years previously. Other references, as listed in the footnotes, can be consulted for further information on spreader types, their mode of operation and tray testing procedures[25,26,27] and also the effects of uneven fertiliser spreading[28].

Number, type and age of spreaders on farms

Most (89%) farms owned at least one fertiliser spreader in 2000 (Table D1.1), which was almost the same proportion of farms as in 1993 (92%).

Table D1.1 Number of fertiliser spreaders owned by farm size, as a percentage (%) of farms

farm size (ha)	Number of spreaders					number
	0	1	2	3	>3	of
row %						farms
20 - 50	18	79	3	0	0	197
51 -100	11	83	5	1	0	323
101 - 200	9	81	9	1	0	400
200+	9	74	16	2	0	483
All	11	79	9	1	0	
Number of farms	152	1104	130	17	0	1403

About four-fifths of all farms owned one fertiliser spreader, while a tenth owned two but only 1% had as many as three spreaders. As would be expected, the proportion of farms with more than one spreader increased with increasing farm size, but only 2% of farms over 200 ha in size had three spreaders and no farms owned more than three. The percentage (74-83%) of farms owning one fertiliser spreader was similar for each farm size category. The proportion of farms not owning any spreader at all, possibly because fertiliser was applied by a contractor or the farm was managed organically or as part of an Agri-Environment Scheme with no fertiliser input, was highest for small (20-50 ha) farms (18%) and least (9%) for medium to large (>100 ha) sized farms.

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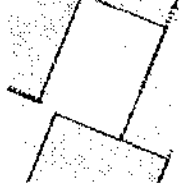
[24] *Fertiliser Spreaders - Calibration and Testing*. Supplementary Report. The British Survey of Fertiliser Practice 1993. Unpublished report.

[25] Bull, D.A. and Crowe, J.M. (1985). Fertiliser Spreading mechanisms and their performance in practice. *Proceedings No. 241*. York: The International Fertiliser Society.

[26] Moller, Nils and Svensson, Jan E.T. (1991). Modern techniques in application of granular fertilisers. *Proceedings No. 311*. York: The International Fertiliser Society.

[27] British Standards Institute BS 6483, Fertiliser Distributors. Part 1, 1984: Methods of evaluating performance under laboratory and field conditions (ISO 5690/1-1982). Part 2, 1985: Method of test for fertiliser distributors in lines (ISO 5690/2-1984).

[28] Dilz, K., van Brakel, G.D. and Richards, I.R. (1985). Effects of uneven fertiliser spreading on crop yield and quality. *Proceedings No. 240*. York: The International Fertiliser Society.



In 1993, the numbers of fertiliser spreaders in use on farms had shown a very similar distribution, at 10, 74, 13 and 2% of all farms with none, one, two or at least three spreaders, respectively. However, the maximum number of spreaders per farm had decreased by 2000, from five to three. Within farm sizes, however, the proportion of medium to large sized farms with at least two fertiliser spreaders had dropped by 8% (100-200 ha) or 15% (200+ ha) points between 1993 and 2000, while the percentages of those farm sizes with only one spreader had risen by similar percentages. This suggests some rationalisation of on-farm machinery policies for fertiliser spreader equipment in the intervening years, to help reduce overhead costs. The results also indicated a 3-4% increase in farms over 100 ha in size which did not own any spreaders, which may suggest a small increase in the use of contract spreading services.

Spinning disc spreaders were, at two thirds of the total number, the most common spreader type used on farms in 2000, followed by oscillating spout spreaders at one fifth, while pneumatic spreaders and liquid sprayers represented just 5% and 7% respectively of all farm-owned spreaders (Table D1.2). The use of disc and pneumatic spreaders and liquid sprayers increased with increasing farm size, while the percentage of farm-owned oscillating spout spreaders decreased accordingly, reflecting changes in spreader capacity and spout width requirements.

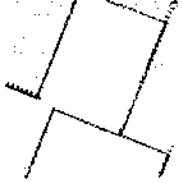
Table D1.2 Distribution of spreader types by farm size, as percentages (%) of farm-owned fertiliser spreaders

farm size (ha)	type of spreader				number
row %	disc	spout	pneumatic	liquid	of spreaders
20 - 50	47.1	48.3	3.5	1.2	259
51 -100	62.5	32.2	1.9	3.4	525
101 - 200	74.2	15.4	5.5	4.9	714
200+	72.0	8.7	8.2	11.0	915
All	67.0	21.0	5.0	7.0	
Number of spreaders	1639	484	133	157	2413

Between 1993 and 2000, the proportion of disc spreaders had increased (from 50 to 67%), due to corresponding decreases in the proportion of oscillating spout (down from 34 to 21%) and pneumatic (down from 10 to 5%) spreader types, while the percentage of liquid sprayers had hardly changed (up from 6 to 7%).

Table D1.3 Percentage (%) of fertiliser spreaders in different year age ranges, by spreader type (equivalent % farmed areas shown in brackets)

spreader type row %	5 or less	6 - 10	11 - 15	16 - 20	more than 20
Disc	58 (63)	31 (29)	6 (6)	3 (1)	2 (1)
Spout	24 (30)	40 (36)	19 (20)	11 (11)	5 (4)
Pneumatic	43 (58)	32 (29)	13 (9)	9 (3)	3 (1)
Liquid	58 (59)	33 (32)	7 (8)	1 (0)	1 (0)
All	49 (59)	33 (30)	10 (8)	5 (2)	2 (1)
Number of spreaders	1127	775	240	114	54



The results in subsequent tables are presented as percentages of both farm-owned spreaders and also, in brackets, the total area farmed. Both sets of data show very similar trends and the results are discussed in terms of the figures for farmer-owned spreaders.

Approximately half of all farm-owned spreaders in 2000 were no more than five years old, while a third were six to ten years old, and 16% were over ten years old (Table D1.3). Only 2% were more than twenty years old. In 2000, the majority (58%) of both spinning disc spreaders and liquid sprayers, nearly half (43%) of pneumatic spreaders but only a quarter (24%) of oscillating spout spreaders owned on farms, were less than six years old. Approximately a third of each spreader type was 6-10 years old, so that the proportion of spreaders over ten years old was greater for oscillating spout and pneumatic spreaders (22-30%) than for spinning disc spreaders and liquid sprayers (9-11%). The distribution of age ranges by spreader type had been very similar in 1993, except that the proportion of each type (excluding liquid sprayers) which was over fifteen years old had increased slightly by 2000 (from 2 to 7%, for the 'all' spreader category).

Spreader calibration

Two thirds of all fertiliser spreaders had been calibrated on at least one occasion since their initial use (Table D1.4). If the 'not known' category is excluded, the proportion of all remaining spreaders which were definitely calibrated at least once becomes 71%, compared to 57% in 1993, suggesting some increase in the practice of calibrating fertiliser spreaders on farm. This comparison must, however, be treated cautiously, as there was a higher proportion (17%) of spreaders in the 'not known' category in 1993.

Table D1.4 Percentage (%) of each fertiliser spreader type that had been calibrated at least once (equivalent % farmed area in brackets)

spreader type row %	yes		no		not known	
Disc	69	(79)	25	(17)	6	(4)
Spout	42	(47)	45	(43)	13	(10)
Pneumatic	91	(93)	5	(4)	4	(4)
Liquid	90	(93)	9	(4)	1	(2)
All	66	(78)	27	(17)	7	(4)

Nearly all (90-91%) the pneumatic spreaders and liquid sprayers had been calibrated at some stage, whereas only two thirds (69%) of spinning disc and less than half (42%) of oscillating spout spreaders had ever been calibrated. Compared to 1993, the estimated percentages of calibrated spreaders (calculated after excluding those spreaders where the calibration history was unknown) had risen in each category, from: 62 to 73% for spinning disc; 36 to 48% for oscillating spout; 75 to 95% for pneumatic spreaders; and 72 to 91% for liquid sprayers.

The most recent year of calibration was also recorded for those spreaders with a known calibration history (Table D1.5). Encouragingly, the majority of each spreader type, ranging from 84 % for liquid sprayers to 58% for oscillating spout spreaders, had been calibrated during the current (2000) calendar year. Between 14% (liquid sprayers) and 25% (pneumatic spreaders) of each spreader type had been calibrated in the previous (1999) calendar year. Virtually all (99-100%) of the most recent calibrations on liquid sprayers and pneumatic spreaders, and most of those on spinning disc (92%) and oscillating spout (83%) spreaders, had been undertaken since the beginning of 1998, *i.e.* during the last three seasons. However, for the latter two types, an appreciable percentage (14% and 21%, respectively) had last been calibrated 4-6 years, or even longer, ago.

Table D1.5 **Distribution (%) of the year in which fertiliser spreaders were last calibrated for each spreader type (% farmed area in brackets)**

year column %	disc		spout		pneumatic		liquid		all
2000	69	(73)	58	(55)	71	(69)	84	(87)	71
1999	17	(16)	20	(25)	25	(25)	14	(12)	16
1998	6	(5)	5	(8)	4	(6)	1	(1)	5
1997	3	(2)	5	(4)	0	(0)	1	(0)	3
1996	1	(1)	3	(2)	0	(0)	0	(0)	2
1995	2	(2)	2	(3)	0	(0)	0	(0)	2
pre 1995	2	(1)	6	(4)	0	(0)	0	(0)	2

Compared to 1993, the results in 2000 suggest that there were small increases in the proportion of (a) spinning disc (+8% points) and pneumatic (+5% points) spreaders calibrated during the current calendar year and (b) liquid sprayers (+9% points) calibrated in the previous year. For oscillating spout spreaders, however, the distribution of years since last calibrated hardly changed between 1993 and 2000, although the proportion calibrated in the current year was an estimated 2% points higher in 2000. Overall, there appeared to be a slight improvement since 1993 in the practice of spreader calibration, with 87% of all calibrations carried out within the last two years.

Tray testing

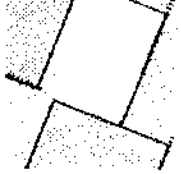
A quarter (28%) of all farm-owned spreaders had definitely been tray or, for liquid sprayers, nozzle tested at some stage during their use, to check the fertiliser spread pattern (Table D1.6). For individual spreader types, about a third (35%) of spinning disc, a quarter (23%) of pneumatic but only 14% of oscillating spout spreaders were known to have been tray tested. Spread pattern testing was also reported to have been done a small proportion (15%) of liquid sprayers. A much smaller percentage of each spreader type had been tray tested, compared to calibrated, as would be expected given the greater complexity and time associated with tray testing. The tray testing:calibration ratio for solid fertiliser applicators was highest (about 1:2) for spinning disc spreaders and lowest (about 1:4) for pneumatic spreaders. The percentage of spreaders where it was not known whether they had been tray tested (12%) was greater than the corresponding figure for past calibration (7%).

Table D1.6 **Percentage (%) of each fertiliser spreader type that had been tray tested at least once (equivalent % farmed area in brackets)**

spreader type row %	yes		no		not known	
Disc	35	(47)	54	(44)	11	(9)
Spout	14	(16)	69	(70)	17	(14)
Pneumatic	23	(21)	59	(58)	19	(21)
Liquid	15	(18)	78	(75)	7	(71)
All	28	(38)	59	(52)	12	(10)

Expressed as a percentage of those spreaders where it was definitely known whether or not tray testing had ever been undertaken, the 2000 survey indicated that 32% had been while the corresponding figure (excluding liquid sprayers) for the 1993 survey was 28%. These results suggest little change in the use of tray testing, in contrast to spreader calibration practice, during the last seven years.

The length of time since tray testing was last carried out for each spreader type showed similar trends to those reported for the most recent year of calibration (Table D1.7). Approximately

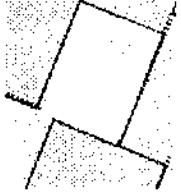


one half (45-53%) of spinning disc and pneumatic spreaders and one third (37%) of oscillating spout spreaders, which had been tray tested at some stage, were actually tested in 2000. About three quarters (73%) of liquid sprayers were also reported to have been nozzle tested since the beginning of the current calendar year. Between one fifth and one third of such spreaders had been tested in the previous calendar year (1999) and, for pneumatic spreaders and liquid sprayers, the remaining 6-7% had all last been tray tested two years ago, during 1998. The time interval since the most recent testing was, however, longer for some spinning disc and oscillating spout spreaders, as 14-15% had last been tested during the previous three to five years (in 1995-97), while the last testing had been over five years ago for 4 and 11%, respectively, for these two spreader types. This pattern of time intervals was similar to that obtained for the most recent year of spreader calibration, with about three quarters of spreader tray testing undertaken within the last two years.

Table D1.7 **Distribution (%) of the year in which fertiliser spreaders were last tray tested for each spreader type (farmed area in brackets)**

year column %	disc		spout		pneumatic		liquid		all
2000	45	(52)	37	(27)	53	(44)	73	(83)	46
1999	27	(27)	29	(46)	35	(45)	20	(14)	26
1998	10	(9)	11	(9)	6	(10)	7	(3)	9
1997	6	(5)	8	(6)	0	(0)	0	(0)	6
1996	4	(3)	3	(1)	0	(0)	0	(0)	3
1995	5	(3)	3	(5)	0	(0)	0	(0)	4
pre 1995	4	(2)	11	(6)	6	(1)	0	(0)	5

Compared to 1993, the results suggested small increases in the percentages of all three types of solid fertiliser spreader which had been tray tested during the current calendar year (+5% points for spinning disc and pneumatic spreaders and +9% points for oscillating spout spreaders), mainly related to falls in the percentages tray tested during the previous 2-4 years.



APPENDIX 1 - SURVEY STATISTICS

App1.1 SAMPLING VARIATION

Table App 1.1 Standard errors of application rates for the major crops in 2000

Great Britain

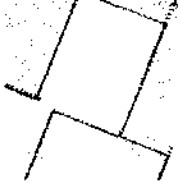
	standard error for overall application rate (kg/ha)					standard error for average field rates (kg/ha)					Fields in sample
	total N	strt N	comp N	total P_2O_5	total K_2O	total N	strt N	comp N	total P_2O_5	total K_2O	
winter wheat	2.7	1.5	2.0	2.9	2.8	1.1	4.2	3.5	0.7	1.3	2796
oilseed rape	2.9	1.9	3.6	3.1	3.2	2.9	2.5	2.7	1.7	0.9	598
winter barley	3.9	3.5	1.5	2.8	2.5	2.5	2.2	0.9	1.1	0.9	841
spring barley	5.5	3.2	4.1	3.2	8.6	4.2	2.1	2.2	2.9	2.2	881
m/c potatoes	7.3	5.2	8.3	5.6	9.1	5.2	9.6	7.2	5.3	8.3	227
sugar beet	1.7	1.8	2.6	1.2	3.5	2.8	2.5	4.5	1.1	8.4	273
all tillage crops	3.2	2.2	1.7	1.5	1.9	1.8	3.8	1.6	0.9	1.6	7148
all grass	3.5	1.5	2.4	1.7	0.7	3.1	3.7	2.2	1.5	1.2	4024

England and Wales

	standard error for overall application rate (kg/ha)					standard error for average field rates (kg/ha)					fields in sample
	total N	strt N	comp N	total P_2O_5	total K_2O	total N	strt N	comp N	total P_2O_5	total K_2O	
winter wheat	3.1	1.6	2.5	3.1	3.5	0.9	1.7	0.9	1.5	2.1	2592
oilseed rape	3.1	2.1	2.9	1.6	1.8	3.1	1.9	3.3	2.2	1.2	510
winter barley	4.0	2.1	1.6	2.9	2.9	3.9	2.5	1.3	1.2	0.8	727
spring barley	5.3	8.2	3.7	3.5	5.2	5.4	5.2	0.9	3.6	2.9	404
m/c potatoes	5.9	5.0	8.2	5.7	9.5	5.0	8.7	7.1	4.7	7.9	189
sugar beet	1.7	1.8	2.6	1.2	3.5	2.8	2.5	4.5	1.1	8.4	273
all tillage crops	3.4	2.6	1.5	1.9	2.1	2.2	3.6	1.8	1.2	1.9	6015
all grass	4.3	1.4	2.7	1.7	0.9	4.5	3.5	2.0	1.3	1.3	3119

Scotland

	standard error for overall application rate (kg/ha)					standard error for average field rates (kg/ha)					fields in sample
	total N	strt N	comp N	total P_2O_5	total K_2O	total N	strt N	comp N	total P_2O_5	total K_2O	
winter wheat	4.2	12.3	6.9	7.5	5.6	4.0	11.8	7.9	4.2	3.8	204
oilseed rape	2.9	2.8	3.9	4.2	5.3	2.7	9.6	2.2	6.5	4.0	88
winter barley	4.7	4.6	4.5	2.8	3.1	4.7	4.3	5.2	2.6	1.3	114
spring barley	2.5	3.5	3.9	3.2	2.9	2.3	4.5	1.2	3.8	3.1	477
m/c potatoes	8.2	12.6	16.4	13.5	18.2	17.0	21.2	17.7	13.6	17.1	38
all tillage crops	2.8	2.7	5.7	3.9	2.6	3.9	4.1	2.5	3.5	2.4	1133
all grass	4.7	2.1	3.3	1.8	1.9	5.6	3.9	2.4	1.7	2.3	905



App1.2 ESTIMATING THE STANDARD ERROR

The standard errors quoted in Table App 1.1 are derived using replication. The simplest method of replication 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. In 2000 there were four replicates for England and Wales; in Scotland there were two, these being systematically subdivided post survey.

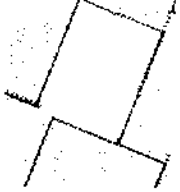
An alternative approach to estimation of overall rates

Table App 1.2 Re-estimation of overall total fertiliser use (kg/ha), Great Britain 2000

		straight nitrogen	compound nitrogen	total nitrogen	total phosphate	total potash
all tillage		130	19	149	47	55
	revised estimate	131	20	151	46	55
all grass		43	56	100	20	26
	revised estimate	44	56	100	20	26
all crops and grass		85	38	123	32	40
	revised estimate	86	38	124	31	40

It is in the nature of random sampling that the characteristics of each achieved sample will differ in several respects from one another, and from the underlying population. In particular, the proportion of different crops grown will differ in the achieved sample from that in the population. The method of adjustment used here in these alternative estimates attempts to counter this by 'post-stratifying' or 'weighting' by the distribution of area of the major crops reported to the Agricultural Census (June 2000).

In general, the adjusted estimates shown in Table App 1.2 are very close to those reported in Section B.



App1.3 RESPONSE RATE

Tables App 1.3 and App1.4 summarise information regarding the response received to the main and reserve samples.

Table App 1.3 Response to main and reserve samples in 2000

	2000	(% total)
Issued from main sample	1503	(100)
Non-response[1]	489	(33)
Response to main sample	1014	(67)
Issued from reserve sample 1	489	(33)
Non-response[1]	241	(16)
Response to reserve sample 1	248	(17)
Issued from reserve sample 2	241	(16)
Non-response[1]	137	(9)
Response to reserve sample 2	104	(7)
Issued from reserve sample 3	137	(9)
Non-response[1]	97	(6)
Response to reserve sample 3	40	(3)
Achieved sample response	1406	(94)

Table App 1.4 Response to main and reserve samples for 1996-2000

Net response rate	1996 %	1997 %	1998 %	1999 %	2000 %
Overall achieved rate	79	66	64	64	94
Refusal rate[1]	24	31	36	36	7

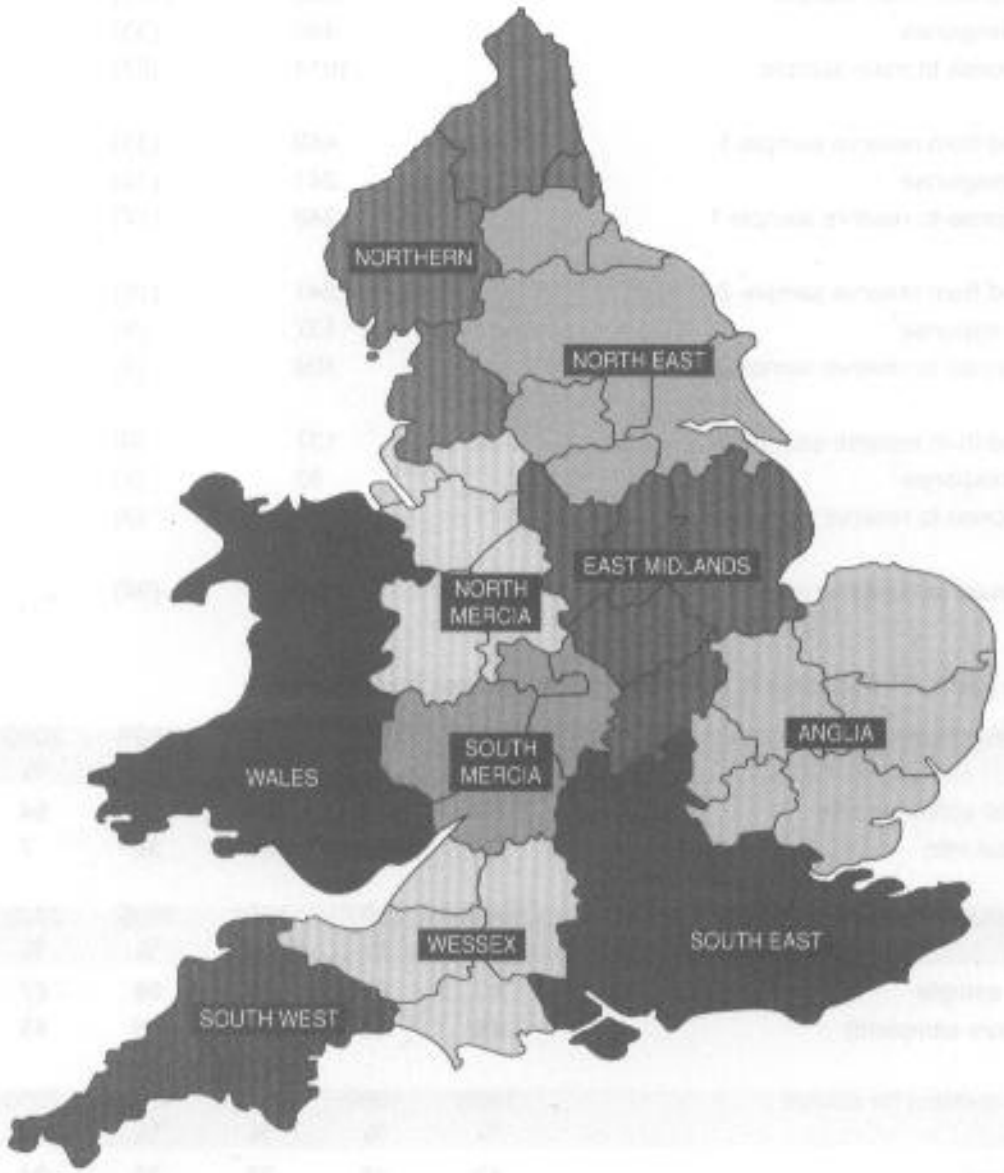
Net response rate	1996 %	1997 %	1998 %	1999 %	2000 %
Main sample	82	69	69	66	67
Reserve sample(s)	76	55	47	56	45

Main reasons for refusal	1996 %	1997 %	1998 %	1999 %	2000 %
Too busy	42	28	38	35	31
Not interested	21	32	32	26	10
Do not do surveys	6	4	10	10	7
Want payment	3	2	4	2	2
Too much paperwork (IACS)	14	2	3	1	3
Other[1]	14	32	13	26	49

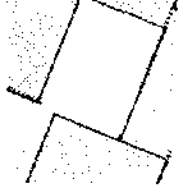
[1] includes non-contact

APPENDIX 2

App2.1 BSFP REGIONS[28] IN ENGLAND AND WALES



[28] DEFRA administrative regions have been revised since April 1996 as a result of changes to county boundaries and nomenclature bought about by the introduction of unitary local authorities. The BSFP regions marked above are based on the 1995 DEFRA administrative regions.



App2.2 COMPARISON OF BSFP AND DEFRA COUNTIES

Approximate English counties within BSFP and DEFRA Regions[30]

BSFP REGIONS

NORTHERN

8	Cumbria
21	Lancashire
31	Northumberland
30	Tyne and Wear

NORTH-EAST

4	Cleveland
12	Durham
51	East Riding of Yorks and N Lincs
50	North Yorkshire (Beverley)
48	North Yorkshire (Northallerton)
47	South Yorkshire
49	West Yorkshire

NORTH MERCIA

6	Cheshire
44	Greater Manchester
25	Merseyside
35	Shropshire
37	Staffordshire

SOUTH MERCIA

14	Gloucestershire
17	Hereford and Worcester
43	Warwickshire
46	West Midlands

EAST MIDLANDS

9	Derbyshire
22	Leicestershire
24	Lincolnshire
29	Northamptonshire
32	Nottinghamshire

ANGLIA

1	Bedfordshire
5	Cambridgeshire
13	Essex
18	Hertfordshire
28	Norfolk
38	Suffolk

SOUTH-EAST

2	Berkshire
3	Buckinghamshire
41	East Sussex
26/27	Greater London
15	Hampshire
16	Isle of Wight
20	Kent
33	Oxfordshire
40	Surrey
42	West Sussex

WESSEX

11	Dorset
34	N Somerset and S Gloucestershire
36	Somerset
45	Wiltshire

SOUTH-WEST

7	Cornwall
10	Devon

DEFRA REGIONS

NORTHERN

4	Cleveland
8	Cumbria
12	Durham
51	East Riding of Yorks and N Lincs
50	North Yorkshire (Beverley)
48	North Yorkshire (Northallerton)
47	South Yorkshire
30	Tyne and Wear
49	West Yorkshire

MIDLANDS & WESTERN

6	Cheshire
9	Derbyshire
44	Greater Manchester
17	Hereford and Worcester
21	Lancashire
22	Leicestershire
25	Merseyside
32	Nottinghamshire
35	Shropshire
37	Staffordshire
43	Warwickshire
46	West Midlands

EASTERN

1	Bedfordshire
5	Cambridgeshire
13	Essex
26	Greater London (E)
18	Hertfordshire
24	Lincolnshire
28	Norfolk
29	Northamptonshire
38	Suffolk

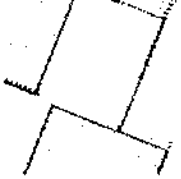
SOUTH-EASTERN

2	Berkshire
3	Buckinghamshire
41	East Sussex
27	Greater London (SE)
15	Hampshire
16	Isle of Wight
20	Kent
33	Oxfordshire
40	Surrey
42	West Sussex

SOUTH-WESTERN

7	Cornwall
10	Devon
11	Dorset
39	Isles of Scilly
34	N Somerset and S Gloucestershire
14	Gloucestershire
36	Somerset
45	Wiltshire

[30] DEFRA Statistics Dept, Foss House, York and Office for National Statistics (ONS) Geography User Guide, http://www.ons.gov.uk



App2.3 ENGLISH COUNTIES WITHIN BSFP AND DEFRA REGIONS

List of English counties indicating the BSFP and DEFRA Regions[31] within which they fall

	County	BSFP Region	DEFRA Region
1	Bedfordshire	Anglia	Eastern
2	Berkshire	South-East	South-Eastern
3	Buckinghamshire	South-East	South-Eastern
4	Cleveland	North-East	Northern
5	Cambridgeshire	Anglia	Eastern
6	Cheshire	North Mercia	Midlands & Western
7	Cornwall	South-West	South-Western
8	Cumbria	Northern	Northern
9	Derbyshire	East Midlands	Midlands & Western
10	Devon	South-West	South-Western
11	Dorset	Wessex	South-Western
12	Durham	North-East	Northern
13	Essex	Anglia	Eastern
14	Gloucestershire	South Mercia	South-Western
15	Hampshire	South-East	South-Eastern
16	Isle of Wight	South-East	South-Eastern
17	Hereford & Worcester	South Mercia	Midlands & Western
18	Hertfordshire	Anglia	Eastern
20	Kent	South-East	South-Eastern
21	Lancashire	Northern	Midlands & Western
22	Leicestershire	East Midlands	Midlands & Western
24	Lincolnshire	Eastern	East Midlands
25	Merseyside	North Mercia	Midlands & Western
26/27	Greater London (E)	South-East	Eastern
28	Norfolk	Anglia	Eastern
29	Northamptonshire	East Midlands	Eastern
30	Tyne and Wear	Northern	Northern
31	Northumberland	Northern	Northern
32	Nottinghamshire	East Midlands	Midlands & Western
33	Oxfordshire	South-East	South-Eastern
34	N Somerset and S Gloucestershire	Wessex	South-Western
35	Shropshire	North Mercia	Midlands & Western
36	Somerset	Wessex	South-Western
37	Staffordshire	North Mercia	Midlands & Western
38	Suffolk	Anglia	Eastern
39	Isles of Scilly		South-Western
40	Surrey	South-East	South-Eastern
41	East Sussex	South-East	South-Eastern
42	West Sussex	South-East	South-Eastern
43	Warwickshire	South Mercia	Midlands & Western
44	Greater Manchester	North Mercia	Midlands & Western
45	Wiltshire	Wessex	South-Western
46	West Midlands	South Mercia	Midlands & Western
47	South Yorkshire	North-East	Northern
48	North Yorkshire (Northallerton)	North-East	Northern
49	West Yorkshire	North-East	Northern
50	North Yorkshire (Beverley)	North-East	Northern
51	East Riding of Yorks and North Lincs	North-East	Northern

[31] DEFRA Statistics Dept, Foss House, York and Office for National Statistics (ONS) Geography User Guide, http://www.ons.gov.uk

APPENDIX 3

App3.1 BSFP REGIONS[32] IN SCOTLAND

[32] SEERAD administrative regions have been revised since April 1996 as a result of changes to county boundaries and nomenclature bought about by the introduction of unitary local authorities. The BSFP regions marked above are based on the 1995 SEERAD administrative regions.

APPENDIX 4

App4.1 UK FARM CLASSIFICATION SYSTEM

UK farm classification system (Revised 1994): composition of robust, main and other types by constituent EC type[33].

Robust types		Main types		Constituent EC types[a]
1	Cereals	1	Cereals	111, 1243, [1245]
2	General cropping	2	General cropping	121, 122, 123, [1244], 602, 603, 604, [6052]
3	Horticulture	3	Specialist fruit	321
		4	Specialist glass	2012, 2022, 2032
		5	Other horticulture	2011, 2013, 2021, 2023, 2034, 311, 312, 313, 314, 340, 601, 606
4	Pigs and poultry	6	Specialist pigs	501
		7	Specialist poultry	502
		8	Mixed pigs and poultry	503
5	Dairy	9	Dairy (LFA)[b]	411, 412 (LFA)
		10	Dairy (lowland)[b]	411, 412 (non-LFA)
6	Cattle and sheep (LFA)[b]	11	Specialist sheep (SDA)[b]	441 (SDA)
		12	Specialist beef (SDA)[b]	421, 422 (SDA)
		13	Mixed cattle and sheep (SDA)[b]	431, 432, 442, [4443] (SDA)
		14	Cattle and sheep (DA)[b]	421, 422, 431, 432, 441, 442, [4443] (DA)
7	Sheep and cattle (lowland)[b]	15	Cattle and lowland (sheep)[b]	421, 422, 431, 432, 441, 442, [4443]
8	Mixed	16	Cropping and dairy	811, 812
		17	Cropping, cattle and sheep	[8132], [8142]
		18	Cropping, pigs and poultry	821
		19	Cropping and mixed livestock	822, 823
		20	Mixed livestock	711, [7122], 721, 722, 723
9	Other[c]	21	Specialist mushrooms	2033
		22	Specialist set-aside	[1246]
		23	Specialist grass and forage	[1247], [4442], [6052], [7121], [8132], [8141]
		24	Specialist goats	443
		25	Specialist horses	[4441]
		26	Non-classified holdings: fallow	[91]
		27	Non-classified holdings: other	[92]

[a] 1985 EC Typology described in Commission Decision 85/377/EEC as amended with minor modifications to adapt it to UK conditions. These minor modifications are indicated by the EC farm type number being shown in square brackets. Definitions of these additional farm types are available from DEFRA Economics (Farm Business), Whitehall Place (West Block), London SW1A 2HH. EC types 112, 113, 1241, 322, 323 and 330 have not been allocated in the classification , since these types of production do not occur in the UK.

[b] Definitions of LFA (Less Favoured Area), lowland, SDA (Severely Disadvantaged Area), and DA (Disadvantaged Area) farms are available on request from: DEFRA Economics (Farm Business), Whitehall Place (West Block), London SW1A 2HH.

[c] Not included in the British Survey of Fertiliser Practice.

[33] MAFF 1999/2000, Farm incomes in the United Kingdom 1999/2000. MAFF Publications, London.