THE BRITISH SURVEY OF

Fertiliser Practice

FERTILISER USE ON FARM CROPS FOR CROP YEAR 2003

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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 2003 Survey was sponsored by the Department for Environment, Food and Rural Affairs (Defra) and the Scottish Executive Environment and Rural Affairs Department (SEERAD). 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 sample of farms. In 2003, 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 Research Ltd carried out the farm interviews.

July 2004

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The agronomic interpretation of the Survey results benefited from advice from Chris Dawson (Chris Dawson and Associates), Agronomic Consultant to the Agricultural Industries Confederation (AIC).

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EXECUTIVE SUMMARY

The British Survey of Fertiliser Practice is an annual, nationally representative, survey based on the selection of a random stratified sample of farms from mainland Britain. In 2003 approximately 1,300 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 2003 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 2002/2003 cropping season are also discussed in the report.

Nitrogen

- The total nitrogen use on all crops and grassland declined slightly in 2003 at 113 kg/ha compared with 117 kg/ha in 2002. Although most of the reduction was due to a further decline in nitrogen to grassland, there was also a slight reduction in the amount applied to tillage crops. The amount of nitrogen applied to grassland has continued to fall throughout the period 1999-2003. This decline is mainly associated with a drop in the application rate of straight nitrogen, although in 2003 the rate of compound N has also fallen.

- On arable crops the overall total nitrogen use (149 kg/ha) decreased slightly from the 2002 level which was the highest level in the last 5 years. Over recent years changes in cropping areas (notably in 2001), rather than application rates to individual crops, have been the major factor influencing the pattern of nitrogen use on the all tillage crops category. Overall rates of total nitrogen decreased on winter barley, maincrop/second early potatoes, oilseed rape and sugar beet in 2003 although it was increased on winter wheat to 197 kg/ha.

- Estimated total nitrogen use on grassland continued to show a decline with a drop of 6 kg/ha from the previous year. Unlike previous years this was due more to a decrease in the use of compound N (-5 kg/ha) than straight nitrogen (-1 kg/ha). The total nitrogen rate (83 kg/ha) was the lowest reported for both the last five years (mean: 95 kg/ha) and also for the whole survey period since 1983 and indicate that the declining trend is continuing.

Phosphate

- Overall phosphate use on tillage crops decreased by 4 kg/ha in 2003, to 40 kg/ha (Table B1.2), the lowest rate for the period. Phosphate use on grassland also decreased slightly (-2 kg/ha) compared with the previous year to 18 kg/ha. Over the last five years phosphate use on all crops and grassland has dropped by 4 kg/ha, from 32 to 28 kg/ha. The area of tillage crops receiving phosphate fertiliser was similar to previous years at 63%, whilst for grassland the area receiving phosphate fertiliser decreased slightly to 57%.

Potash

- Potash use on tillage crops decreased by 3 kg/ha to 54 kg/ha in 2003. The overall rate of potash on grassland also decreased (-3 kg/ha) in 2003, to 22 kg/ha, the lowest level for the period. Over the last five years, potash use on all crops and grassland has dropped by 6 kg/ha, to 36 kg/ha. Overall the area receiving potash fertiliser decreased by 1% to 61% in 2003 compared with the previous year. The area receiving potash fertiliser has fluctuated throughout the period.

Sulphur

- 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. Since then, however, dressing covers for sulphur generally remained fairly static until 2002 when the areas increased. There has been a further increase in 2003 with over half the oilseed rape crop now being treated.The dressing cover on grassland remains relatively low at about 5%, although the cover on silage grass is 10%.

- Over the last five years average application rates have tended to increase on all crops, although there was a decrease from 78 to 74 kg/ha for oilseed rape in 2003. The rates applied are generally higher than the standard recommendation of 25-40 kg/ha SO_3, applied as a water soluble form in early spring for potentially sulphur-deficient cereal crops but are more or less in line with the recommended 50-75 kg/ha for oilseed rape. The average application rate on grassland was 40kg/ha SO_3 which is similar to the 5 year mean of 42kg/ha.

Longer term trends

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

- Overall nitrogen use on all crops and grassland, as a single category averaged at 142 kg/ha (peak 144 kg/ha) in the first five years (1983-1987) of the Great Britain data set. The means for each of the subsequent five year periods are 1988-92: 134 kg/ha, 1993-1997: 130 kg/ha and 1998-2002: 121 kg/ha, reflecting the current downward trend observed both on grassland and, to a lesser extent, on tillage crops.

- Overall phosphate use on tillage crops had gradually declined over the period since 1983, from a five-year mean of 58 kg/ha in 1983-87, 54 kg/ha in 1988-1992, 53 kg/ha in 1993-97 to 46 kg/ha for the period 1998-2002. For grassland the five-year means have been 25 kg/ha in 1983-87, 23 kg/ha in 1988-1992, 23 kg/ha in 1993-97 and 20 kg/ha for the period 1998-2002. The 2003 rates of 40 and 16 kg/ha for tillage and grassland respectively were the lowest since the combined Great Britain data set began in 1983.

- Overall potash use on tillage crops had declined slightly between 1983 and 1997, with a five-year mean of 64 kg/ha in 1983-87, 63 kg/ha in 1998-1992, 62 kg/ha in 1993-1997. There was larger drop to 57 kg/ha for the period 1998-2002. 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 2003. 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 between 1998-2002 has been consistently lower (mean: 26 kg/ha) than in earlier years and the value of 22 kg/ha in 2003 represents the lowest value recorded since 1983.

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[3]. It relates applications of nutrients to major crop types and grassland throughout Great Britain. The report is the principal source of estimates and indicators 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 2003 Survey regarding the management of organic manures.

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 [4, 5, 6, 7, 8].

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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[3] Defra, SEERAD, and NAWAD Agricultural Census Statistics 2002.

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

[5] 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.

[6] 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.

[7] 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**. The International Fertiliser Society, York.

[8] Chalmers, A.G. (2001). A review of fertiliser,lime and organic manure use on farm crops in Great Britain from 1983 to 1997. *Soil Use and Management* **17,** 254-262.

A2 SURVEY METHODOLOGY

A2.1 SAMPLE

The basis of the sample framework is the Agricultural Census which is undertaken annually and records information on farm size, cropping, stocking and employment. 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 8 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, 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 1,478 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. In 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 divisions of Defra. Co-operators in 1999 were asked if they would be prepared to stay in the survey and 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.

Table A2.1 Derivation of the stratified random sample for the 2003 survey, England and Wales

	farm holdings in population in 2002	total crops and grass in 2002 (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	18498	9.9	0.46	85	99	0.54
51-100 ha	15545	18.1	0.96	149	141	0.91
101-200 ha	8658	19.4	1.84	159	162	1.87
200+ ha	3107	19.9	5.34	166	157	5.05
Crops & mixed						
(Defra robust types 1,2,8)						
crops & grass area						
20-50 ha	8628	2.3	0.49	42	38	0.44
51-100 ha	9228	5.1	1.03	95	83	0.90
101-200 ha	8729	9.0	2.00	175	156	1.79
200+ ha	6224	15.9	5.21	324	252	4.05
Horticulture						
(Defra robust type 3)						
crops & grass area						
20-50 ha	664	0.2	1.81	12	7	1.05
51-100 ha	170	0.1	4.71	8	7	4.12
101-200 ha	84	0.1	9.52	8	9	10.71
200+ ha	24	0.1	16.67	4	5	20.83
Total for England and Wales	79559	100.0		1228	1116	1.40

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 2002*.

[b] The *achieved sample fraction* is found by expressing the *achieved sample size* as a percentage of the *farm holdings in population in 2002*.

Table A2.2 Derivation of the stratified random sample for the 2003 survey, Scotland

	farm holdings in population in 2002	total crops and grass in 2002 (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	1157	2.4	0.52	6	8	0.69
51-100 ha	1491	6.8	1.14	17	19	1.27
101-200 ha	1428	12.5	2.17	31	28	1.96
200+ ha	686	13.7	4.96	34	35	5.10
Livestock & mixed						
(SEERAD robust types 4-8)						
crops & grass area						
20-50 ha	3380	7.1	0.53	18	20	0.59
51-100 ha	3683	16.5	1.11	41	43	1.17
101-200 ha	2693	22.9	2.15	58	61	2.27
200+ ha	962	18.2	4.68	45	43	4.47
Total for Scotland	15480	100.0		250	257	1.66

A2.2 DATA COLLECTION

Data collection was undertaken by Produce Studies Ltd, between June and November 2003. 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 2003 considered a number of questions relating to the usage of organic manures.

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 gained from the amount of data that has to be input and processed. In 2003 the 1,373 farms recorded represented one per cent of the total crops and grass area in Britain. This equated to over 10,000 fields and 20,000 applications of fertiliser.

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.

[a] The *notional sampling fraction* is found by expressing the *target sample size* as a percentage of the *farm holdings in population in 2002*.

[b] The *achieved sample fraction* is found by expressing the *achieved sample size* as a percentage of the *farm holdings in population in 2002*.

Each participating farmer receives customised feedback highlighting their fertiliser use by crop and/or grass categories and comparison with regional averages.

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 2002 to autumn 2003, corresponding to the 2003 season or harvest year. The recording period for fertiliser applications varied for different crop and grass groups on farms of not less than 20 hectares (ha) in size.

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 2001. 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 with nitrogen.

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	1, 2
SC5.2	dairy farms	5
SC5.3	mixed farms	4, 6, 7, 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 administrative regions, which were revised in 1996 by MAFF to take account of changes to county boundaries and nomenclature resulting from the introduction of Unitary Local Authorities between April 1995 and April 1998[9]. 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 2001/02 and 2002/03, and illustrates percentage changes in relative cropping areas over the past five years. There were about 10.4 million hectares of managed agricultural land in Britain in 2003, of which 4.4 million hectares (42%) were cultivated for tillage cropping and the remainder, 6.0 million hectares, were grassland (excluding rough grazing).

The total tillage area was slightly lower (-2.8%) in 2003, mainly due to an increase in the area of set aside. The area of wheat decreased by 159,100 ha (-8%) and the area of winter barley by 90,200 ha (-17%). This was partly offset by the increased area of spring barley 67,900 ha (13%). The total cereal area was down by 4.6% after a 9% increase the previous year. More land was entered as set aside giving an increase of 11%. The linseed area recovered somewhat to 32,000 ha, an increase of 168% over the low 2002 figure, but was still considerably less than than in 1998 when the economic returns for this crop were more favourable.

The total oilseed rape area increased by 103,000 ha (11%); this was due in part to an increase in the winter sown crop (up 20%) but mainly to a large increase in the area of sown in spring (up 154% over the previous year). The areas of potatoes, sugar beet and peas/beans all declined (8%, 4% and 6% respectively). Other tillage crop categories showed little change in area (less than 1%), compared to 2002. The total area of managed grassland increased by 227,700 (4%) mainly due to an increase in the area of older grassland, less than one fifth of grassland was less than 5 years old in 2002.

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

Table A3.1 Cropping and grassland areas ('000 ha) Great Britain, 2001/2002 - 2002/2003

Crops	2001/2002 '000s ha	2002/2003 '000s ha	% change since 2001/02	% change since 1997/98	2002/2003 crop areas as % of total tillage area
Wheat	1989	1830	-8.0	-10.2	41.3
Barley - winter	542	452	-16.6	-40.6	10.2
- spring	530	598	12.8	31.0	13.5
Total cereals[1]	*3207*	*3021*	*-5.8*	*-10.4*	*68.3*
Oilseed rape - total	357	460	28.9	-9.1	10.4
Sugar beet	169	162	-4.1	-14.1	3.7
Potatoes[2]	151	139	-8.1	-11.2	3.1
Linseed	12	32	167.6	-67.9	0.7
Peas/beans[3]	249	235	-5.6	10.5	5.3
Maize/other fodder	177	178	0.3	6.0	4.0
Vegetables	122	124	0.8	0.2	2.8
Total tillage[4]	*4552*	*4425*	*-2.8*	*-10.5*	*100.0*
Set-aside[5]	608	678	11.4	117.3	13.3

Grassland					2002/2003 grass areas as % of total grass area
Less than 5 years old	1094	1063	-2.8	-7.2	17.6
5 years and older	4715	4973	5.5	6.1	82.4
Total grass[6]	*5808*	*6036*	*3.9*	*3.4*	*100*
Total crops and grass[7]	*10361*	*10461*	*1.0*	*-2.9*	

[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 to the total tillage area including setaside designated for cultivation
[6] managed grassland, excluding rough grazing
[7] total tillage + total grassland

Source: Annual Defra/SEERAD/NAWAD June Census data

The total tillage area was 518,700 ha less (-10.5%) in 2003, compared to 1998. The total area of cereals was reduced by 10.4% in 2003 compared with 1998, the biggest change occurring in winter barley which was nearly 309,500 ha less in 2003. The oilseed rape area was slightly lower (-9.1%) as was the area of sugar beet (-14.1%) and potatoes (-11.2%) in 2003 than in 1998. Peas and beans showed an increase of 10%. Except for linseed the other tillage crop categories all showed a slight increase in their cropping areas between 1998 and 2003.

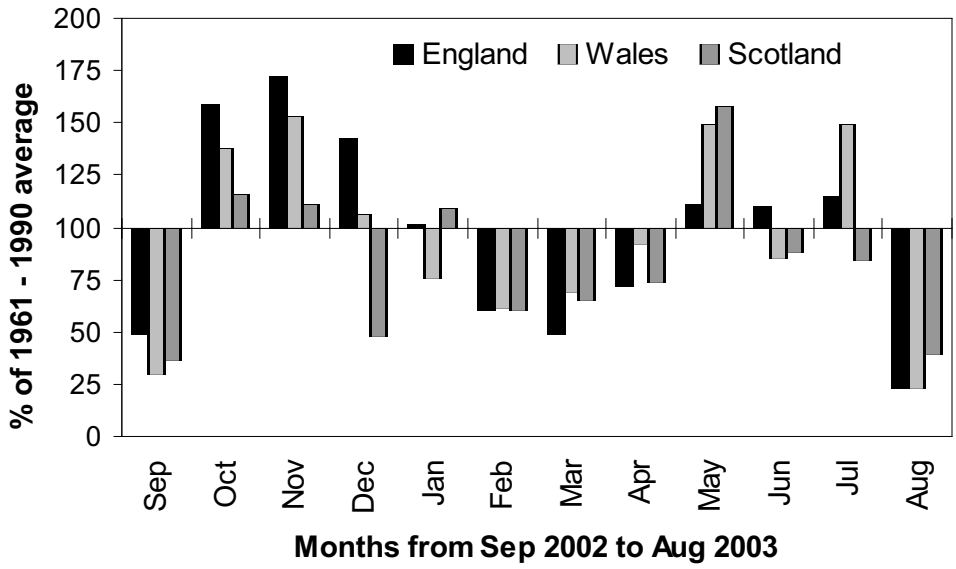
Unusual seasonal weather conditions can influence fertiliser usage in some years. For example:

- *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 may affect nutrient requirements.*

In contrast to the previous year when weather conditions were favourable for the planting of autumn sown crops, autumn 2002 caused problems for autumn drilling. In general September was very dry and as a result germination of autumn sown oilseed rape was often patchy and many crops were replaced with spring sown crops. This explains the increase in spring oilseed rape area. In October and November conditions became very wet in all regions except northern Scotland.

This hampered the drilling of winter cereals which may explain the increase in spring barley area. Around 1.6 million tonnes of sugar beet were still to be lifted at the end of the year, representing 19% of the crop. Conditions during the winter and summer were generally warmer than average and rainfall from January to April much lower than average (Figure A3.1). Hot dry conditions led to an early harvest and cereal yields were adversely affected in some areas.

Figure A3.1 Monthly rainfall as a percentage of the long term average (source: Meteorological Office)



SECTION B

COMMENTARY ON FERTILISER USE IN GREAT BRITAIN

This commentary refers to rates of application in mainland 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 1999 to 2003. 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 2002/2003 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[10]. A summary of the data from the last last 15 years is available in Chalmers 2001[11].

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 2003 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 sixth successive year that these adjusted rates have been calculated and the adjusted estimates are generally very close to those reported in Section B of the annual Reports. This year the difference between actual and estimated rates for straight nitrogen has decreased from the higher level of variation noted in 2001, which was attributed to problems caused by the Foot and Mouth outbreak.

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

[11] Chalmers AG (2001). A Review of fertiliser, lime and organic manure us on farm crops in Great Britain from 1983 to 1997. *Soil Use and Management* **17,** 254-262.

B1 2003 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 1999 - 2003

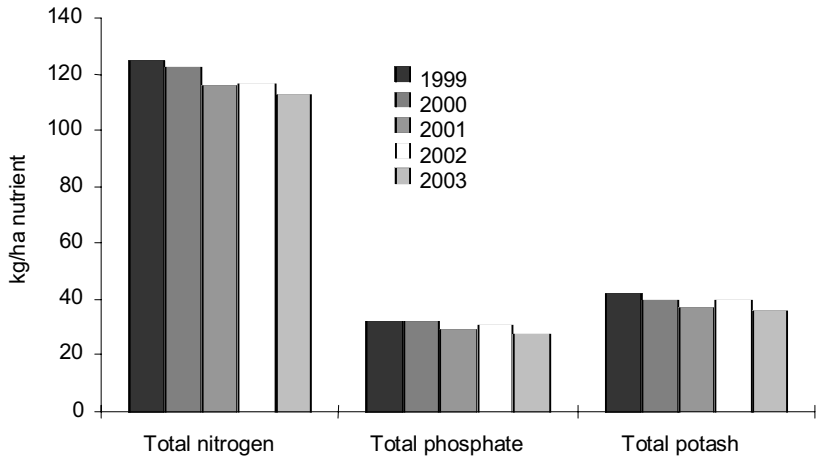


Table B1.1 Overall nitrogen use (kg/ha), Great Britain 1999 - 2003

Total nitrogen

	tillage crops	*grass*	*all crops and grass*
1999	141	110	125
2000	149	99	123
2001	145	94	116
2002	152	89	117
2003	149	83	113

Straight nitrogen

	tillage crops	*grass*	*all crops and grass*
1999	121	52	85
2000	130	43	85
2001	118	39	74
2002	129	32	76
2003	129	31	74

Compound nitrogen

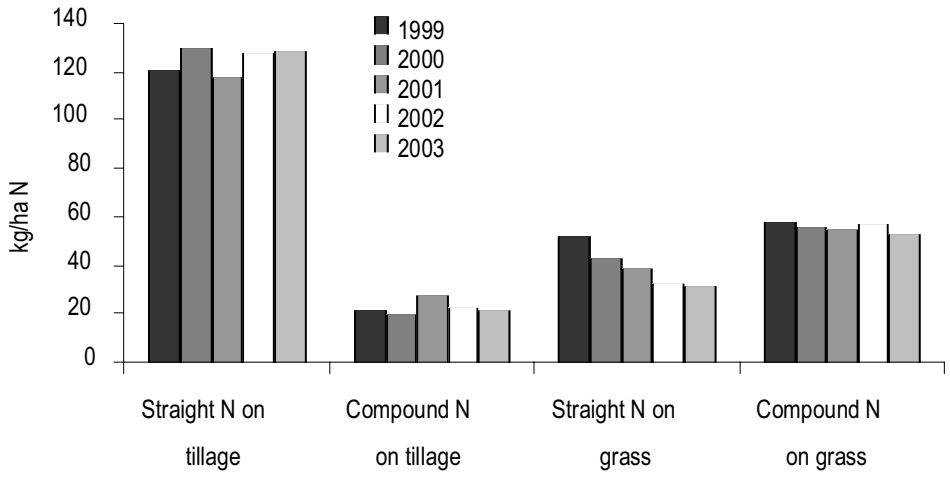
	tillage crops	*grass*	*all crops and grass*
1999	21	58	40
2000	19	56	38
2001	27	55	42
2002	23	57	42
2003	20	53	38

B1.1.1 NITROGEN

All crops and grassland

The total nitrogen use on all crops and grassland declined slightly in 2003 compared with the rates in 2002 (Figure B1.1). The amount of nitrogen applied to grassland has continued to fall throughout the period 1999-2003 (Table B1.1). This decline is mainly associated with a drop in the overall application rate of straight nitrogen (Figure B1.2), although in 2003 the rate of compound N has also fallen. The use of compound N on tillage land has returned to previous levels after a high value in 2001 which probably reflected the effects of the wet autumn in 2000 on crop management.

Figure B1.2 Overall straight and compound nitrogen use (kg/ha), Great Britain 1999 - 2003



Tillage crops

Overall total nitrogen use (149 kg/ha) decreased slightly from the 2002 level which was the highest level in the 5 year period. Over recent years changes in cropping areas (notably in 2001), rather than application rates to individual crops, have been the major factors influencing the pattern of nitrogen use on the all tillage crops category.

Grassland

Estimated total nitrogen use on grassland continued to show a decline with a drop of 6 kg/ha from the previous year. Unlike previous years this was due more to a decrease in the use of compound N (-4 kg/ha) than straight nitrogen (-1 kg/ha). This total nitrogen rate (83 kg/ha) was the lowest reported for both the last five years (mean: 95 kg/ha) and also for the whole survey period since 1983 (see section B2).

B1.1.2 PHOSPHATE AND POTASH

Phosphate

Overall phosphate use on tillage crops decreased by 4 kg/ha in 2003, to 40 kg/ha (Table B1.2), the lowest rate for the period. Phosphate use on grassland also decreased slightly (-2 kg/ha) compared with the previous year to 18 kg/ha. Over the last five years phosphate use on all crops and grassland has dropped by 4 kg/ha, from 32 kg/ha to 28 kg/ha. The area of tillage crops receiving phosphate fertiliser was similar to previous years at 63% (five year mean 64%), whilst for grassland the area receiving phosphate fertiliser decreased slightly to 57%.

Table B1.2 Overall phosphate and potash use (kg/ha), Great Britain 1999 - 2003

Total phosphate

	tillage crops	*grass*	*all crops and grass*
1999	45	20	32
2000	47	20	32
2001	43	19	29
2002	44	20	31
2003	40	18	28

Total potash

	tillage crops	*grass*	*all crops and grass*
1999	57	28	42
2000	55	26	40
2001	52	24	37
2002	57	25	40
2003	54	22	36

Potash

Potash use on tillage crops decreased by 3 kg/ha to 54 kg/ha in 2003. The overall rate of potash on grassland also decreased (-3 kg/ha) in 2003, to 22 kg/ha, the lowest level for the period. Over the last five years, potash use on all crops and grassland has dropped by 6 kg/ha, to 36 kg/ha. Overall, the area receiving potash fertiliser decreased by 1% to 61% in 2003 compared with the previous year. The area receiving potash fertiliser has fluctuated throughout the period.

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 2003 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 apparent changes may be real or attributable to sampling variation alone, is given in the Appendix.

Table B1.3 Overall fertiliser use (kg/ha) on major tillage crops, Great Britain 1999 - 2003

Total nitrogen

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1999	185	99	141	158	197	97
2000	188	107	146	160	195	104
2001	185	111	145	151	193	103
2002	193	110	154	158	199	106
2003	197	107	148	152	191	103

Straight nitrogen

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1999	174	53	127	27	180	78
2000	177	62	134	32	180	91
2001	171	66	127	37	176	83
2002	178	66	132	52	181	91
2003	186	61	128	37	179	91

Compound nitrogen

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1999	11	46	14	131	17	19
2000	11	45	12	128	15	13
2001	14	45	19	115	17	20
2002	15	43	22	108	18	15
2003	12	46	20	116	13	13

Total phosphate

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1999	41	45	47	169	46	52
2000	44	47	48	159	41	39
2001	42	43	45	127	41	36
2002	41	45	46	123	50	43
2003	39	44	41	130	38	34

Total potash

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1999	46	54	61	251	48	128
2000	47	56	61	234	43	91
2001	45	51	64	184	42	78
2002	47	56	62	221	50	104
2003	47	57	59	214	42	91

[a] 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 1999 - 2003

Total nitrogen

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1999	189	101	142	178	202	104
2000	193	112	150	174	195	108
2001	189	114	149	175	196	106
2002	197	113	156	172	201	112
2003	199	111	149	163	194	108

Straight nitrogen

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1999	182	85	134	93	188	93
2000	185	96	142	73	190	105
2001	184	95	143	96	186	100
2002	189	94	150	101	187	105
2003	193	90	143	122	185	105

Compound nitrogen

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1999	57	68	54	164	47	85
2000	49	65	44	156	47	75
2001	70	72	62	155	59	93
2002	63	63	61	129	52	81
2003	60	69	70	143	42	60

Total phosphate

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1999	72	54	62	192	71	75
2000	69	58	65	187	70	76
2001	66	55	65	163	64	76
2002	69	57	64	141	71	82
2003	64	54	60	149	60	63

Total potash

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1999	78	62	77	287	76	153
2000	77	66	80	265	75	142
2001	72	64	82	231	68	124
2002	80	68	80	235	77	129
2003	77	66	78	237	68	125

[a] 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 (Table B1.3) decreased on winter barley, maincrop/second early potatoes, oilseed rape and sugar beet in 2003 after increases in 2002, when rates applied were the highest in the five year period (1999-2003). Average field rates (Table B1.4) showed a similar trend.

Winter wheat

After an increase of 8 kg/ha in 2002, the overall rate of total nitrogen on winter wheat increased by a further 4 kg/ha to 197 kg/ha, the highest level in the five year period (Table B1.3). The average field rate at 199 kg/ha was also the highest for the period. The increase was largely due to an increase in the use of straight nitrogen which following a 7 kg/ha increase in overall rate in 2002 was increased by a further 8 kg/ha to 186 kg/ha. Both the overall and average field rates of compound nitrogen were at the values close to the average for the period (overall rate 12 kg/ha: 5-year mean 13 kg/ha; average field rate 60 kg/ha: 5-year mean 60 kg/ha).

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).

Table B1.5 Average field application rates (kg/ha) of nitrogen on cereals by market use, Great Britain 1999 - 2003

	winter wheat		*spring barley*		*winter barley*	
	milling	*non-milling*	*malting*	*non-malting*	*malting*	*non-malting*
1999	204	183	103	99	125	149
2000	211	184	105	103	135	154
2001	209	182	119	100	137	151
2002	208	192	118	101	149	159
2003	215	191	114	99	145	152

The mean difference of 24 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 average yield potential, soil type and the residual soil nitrogen fertility from previous cropping and manure practice[12]*. 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.*

[12] Anon (2000). Fertiliser Recommendations for Agricultural and Horticultural Crops. MAFF Reference Book 209 (Seventh edition). London: The Stationery Office.

The non-milling crop continues to be the major crop area (Table B1.6) although the proportion of milling wheat in 2003 was at it's highest for the period (5 year mean: 29%).

Table B1.6 Percentage distribution (% crop area) of cereal crop areas by market use, Great Britain 1999 - 2003, as estimated from the Survey

	winter wheat		*spring barley*		*winter barley*	
	milling	*non-milling*	*malting*	*non-malting*	*malting*	*non-malting*
1999	28	72	66	34	34	66
2000	28	72	59	41	27	73
2001	31	69	54	46	31	69
2002	27	73	61	39	33	67
2003	33	67	63	37	36	64

Spring barley

Overall use of total nitrogen on spring barley declined slightly to 107 kg/ha in 2003 which equals the mean for the five year period 1999-2003. The average field rate shows a similar pattern.The overall rate of straight nitrogen has decreased in 2003 whilst the compound nitrogen rate increased to 46 kg/ha after falling to the lowest value for the period (43 kg/ha) in 2002.

Further analysis of the data by crop type (Table B1.5) shows a slight decline in the average rate applied to the spring malting crop in 2003 compared with the high rates of the previous two years. For non-malting crops nitrogen application rate was at its highest for the period (103 kg/ha) in 2000. In 2003 it fell to the low level (99 kg/ha) applied in 1999.

Estimated nitrogen rates on malting crops have been consistently slightly higher on malting than non-malting crops, with a mean difference of 12 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 barley, under the same conditions of soil type and nitrogen fertility level, than for the feed varieties of barley. 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 (70 - 120 kg/ha)[13]*. 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 proportion of spring barley grown for malting has fluctuated during the last five years. (Table B1.6). The mean for the period 1999-2003 is 61%.

[13] Anon (2000). *Fertiliser Recommendations for Agricultural and Horticultural Crops*. MAFF Reference Book 209 (Seventh edition). London: The Stationery Office.

Winter barley

Overall total nitrogen use on winter barley decreased in 2003 to 148 kg/ha after reaching the highest level (154 kg/ha) for the 1999-2003 period in 2002 (mean 147 kg/ha). The overall use of straight nitrogen has fluctuated during the period and at 128 kg/ha in 2003 is close to the five year mean of 130kg/ha. The overall compound nitrogen rate has also fluctuated with the lowest level of 12 kg/ha in 2000 and the highest level of 22 kg/ha in 2002 (mean 17 kg/ha). Average field rates show a similar pattern.

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 decreased on both malting crops (-4 kg/ha) and on non-malting crops (-7 kg/ha) in 2003 after the high levels of 2002 (Table B1.5)

The higher application rates of nitrogen (five-year mean of +15 kg/ha) on non-malting, compared to malting winter barley crops, reflect typical agronomic practice. The majority of winter barley crops (both feed and malting) are grown in England in arable rotations, usually after a previous cereal crop, when the soil nitrogen fertility status is low. Higher nitrogen rates are recommended for feed crops.

During 2000 the survey estimates showed a drop in the relative crop area grown for malting, down to a quarter, compared to about a third in the previous years (Table B1.6). Since then the amount grown has increased each year reaching 36% in 2003.

Maincrop potatoes

Overall total nitrogen use on maincrop potatoes has fluctuated over the last five years, in 2003 it decreased by 6 kg/ha to 152 kg/ha, slightly below the five year mean of 156 kg/ha (Table B1.3). This reduction in 2003 appears to be mainly due to a fall in the area receiving fertiliser straight nitrogen. Overall most of the nitrogen input for maincrop potatoes is applied in compound form.

Oilseed rape

Overall total nitrogen use on oilseed rape, as a combined category for both the autumn and spring sown crop, decreased in 2003 to the lowest level for the 1999-2003 period (191 kg/ha) after reaching the highest level (199 kg/ha) in 2002 (mean 195 kg/ha).

The average field rate showed a similar fluctuation. Straight nitrogen is the main source of nitrogen for the oilseed rape crop.

A more detailed breakdown of the data for oilseed rape (Table B1.7) shows that the average field rate of nitrogen on winter oilseed rape was relatively stable during 1999-2003 (range 203-209 kg/ha) with the highest level occurring in 2001. Estimated average field nitrogen rates have been slightly more variable on spring oilseed rape over the last five years. The unusually high estimated rate in 1999 is unlikely to be representative as the sample size was very limited (only twenty five fields). The five-year mean nitrogen rates were 206 kg/ha for winter oilseed rape, compared to 141 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 estimated percentage distribution (%) of crop areas, Great Britain 1999 - 2003**

	Total nitrogen (kg/ha)		Percentage distribution (%)		
	winter oilseed rape	*spring oilseed rape*		*winter oilseed rape*	*spring oilseed rape*
1999	204	161	*1999*	95	5
2000	203	133	*2000*	90	10
2001	209	151	*2001*	81	19
2002	207	137	*2002*	91	9
2003	206	141	*2003*	81	19

Most of the oilseed rape area is autumn, rather than spring sown (Table B1.7). The lowest areas of winter crops (81%) occurred in 2001 and 2003. The high level of spring cropping in 2001 was almost certainly due to the difficult conditions in autumn 2000. In 2003 conditions were very dry during August so that winter sown crops did not establish well and were often replaced by a spring crop. 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.

Sugar beet

The overall nitrogen use on sugar beet decreased slightly (-3 kg/ha) in 2003 to 103 kg/ha, this is equal to the mean for the five year period 1999-2003. Average field rates showed a similar pattern of slight fluctuations with a five year mean of 108 kg/ha. Most of the nitrogen input for sugar beet is applied as straight nitrogen.

B1.2.2 PHOSPHATE AND POTASH

Phosphate

The decrease in overall phosphate use on tillage crops in 2003 can be partly attributed to the decrease in use on most of the major arable crops (Table B1.3). The mean rate of overall phosphate use on the major arable crops has declined steadily from 67 kg/ha in 1999 to 53 kg/ha in 2003. Although the trend is also downwards, average field rates on these crops display more variation over the period; part of the reason for the decline in overall rates seems to be a reduction in the area receiving phosphate fertiliser, except in 2001 when the increased area of spring crops and the wet autumn in 2000 had a major impact.

Overall phosphate rates decreased slightly for cereals: winter wheat -2 kg/ha, spring barley -1 kg/ha, and winter barley -5 kg/ha in 2003, to 39, 44 and 41 kg/ha respectively. The rate for winter wheat was the lowest recorded in the period 1999 to 2003. The average field rate for each cereal crop also decreased. The area receiving phosphate fertiliser remained lower for winter wheat (61%) and winter barley (72%) than for spring barley (81%); this is mainly due to the greater use of NPK compounds on the last of these.

The overall rate of phosphate on maincrop potatoes increased by 7 kg/ha to 130 kg/ha in 2003 but still remains well below the rates applied in 1999 and 2000 (Table B1.3). The five year mean is 142 kg/ha. The increase in 2003 was mainly due to an increase in the average field rate to 149 kg/ha from 141 kg/ha the previous year.

The overall application rate of phosphate on oilseed rape decreased to 38 kg/ha, the lowest value for the period. The highest rate occurred in 2002 and the mean for the period 1999-2003 was 43 kg/ha. The average field rate was also lower at 60 kg/ha.

The recorded overall rate of phosphate on sugar beet decreased in 2003, by 9 kg/ha to 34 kg/ha the lowest value for the period (mean: 41 kg/ha). The average field rate was also the lowest for the period at 63 kg/ha but there was little change in area receiving phosphate fertiliser at 53%.

Potash

Overall potash use on tillage crops decreased by 3 kg/ha in 2003, partly due to large reductions in application rates on three of the major arable crops (maincrop potatoes, oilseed rape and sugar beet). There has been some fluctuation during the 1999-2003 period but the general trend is downwards from 99 kg/ha in 1999 to 85 kg/ha in 2003. Over all tillage crops the area receiving potash fertiliser has remained fairly static but the average field rates of potash on these crops have fluctuated throughout the period.

There was no change in overall potash use on winter wheat, for spring barley the rate increased very slightly (+1 kg/ha) to 57 kg/ha whilst for winter barley there was a reduction of 3 kg/ha to 59 kg/ha (Table B1.3). The average field rates declined for all three crops to 77, 66 and 78 kg/ha for winter wheat, spring barley and winter barley respectively (Table B1.4).

The overall potash rate on maincrop potatoes decreased in 2003 by 7 kg/ha to 214 kg/ha. There has been a great deal of fluctuation in overall rate during the period 1999-2003 (range 184-251 kg/ha, mean 221 kg/ha). In comparison the average field rate has been less variable (range 231-287 kg/ha, mean 251 kg/ha). Thus the fluctuations in overall rate appear to be due to changes in the area receiving potash fertiliser (for example only 79% in 2001 compared with 91% in 2003).

After an increase in potash use on oilseed rape in 2002, rates returned to the 2001 level in 2003 with 42 kg/ha for the overall and 68 kg/ha for the average field rate. Potash use in 2002 (50 kg/ha) was the highest for the five-year period (mean 45 kg/ha).

Overall rates of potash for sugar beet have fluctuated throughout the period 1999-2003 (Table B1.3), with the highest value (128 kg/ha) in 1999 and the lowest value (78 kg/ha) in 2001. The rate of 91 kg/ha in 2003 was lower than the mean for the period of 98 kg/ha). Fluctuations in overall rate are partly related to average field rate and partly to changes in the area receiving fertiliser. For example the decrease in overall rate in 2003 was associated with a decrease in the average field rate of -5 kg/ha and by a decrease in the dressing cover from 81% to 72%.

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 is recognised that information on the nutrient content of fertilisers applied by contractors, may be less reliably recalled by farmers than for self-applied products.

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[14]. Sulphur application is now an essential agronomic requirement for susceptible crops grown in most 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. Since then, however, dressing covers for sulphur generally remained fairly static until 2002 when the areas increased. There has been a further increase in 2003 with over half the oilseed rape crop now being treated.

Over the last five years average application rates have tended to increased on all crops, although there was a decrease from 78 to 74 kg/ha for oilseed rape in 2003. The rates applied are generally higher than the standard recommendation of 25-40 kg/ha SO_3 applied as a water soluble form in early spring for potentially sulphur-deficient cereal crops but are in line with recommendations of 50-75 kg/ha for oilseed rape[15].

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[14] McGrath, S.P., Zhao, F.J. and Blake-Kalff, M.M.A. (2002). *History and outlook for sulphur fertilisers in Europe*. Proceedings No. 497. The International Fertiliser Society, York. ISBN 0 85310 133 7

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

Table B1.8 Dressing cover (% area) and average application rate (kg/ha SO_3) of sulphur on cereals and oilseed rape, Great Britain 1999 - 2003

Dressing cover (%)

	winter wheat	*winter barley*	*spring barley*	*oilseed rape*
1999	14	14	12	31
2000	15	16	18	29
2001	18	19	15	26
2002	28	27	25	47
2003	30	35	27	54

Average field rate (kg/ha SO_3)

	winter wheat	*winter barley*	*spring barley*	*oilseed rape*
1999	34	45	28	66
2000	49	45	39	68
2001	51	48	36	61
2002	48	54	40	78
2003	53	53	48	74

In general 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 probably reflects the greater awareness of the risk of sulphur deficiency in Scotland, due to historically extremely low levels of atmospheric sulphur deposition, compared to most other areas of Britain. However there is evidence in 2003 that farmers in England and Wales are now more aware of the need to apply sulphur.

Table B1.9 Dressing cover (% area) of sulphur on cereals and oilseed rape by region, 1999 - 2003

		winter wheat	*winter barley*	*spring barley*	*oilseed rape*
England and Wales	*1999*	14	13	10	31
	2000	13	14	14	25
	2001	17	14	11	23
	2002	27	22	20	43
	2003	29	34	27	55
Scotland*	*1999*	32	29	14	47
	2000	45	29	22	55
	2001	34	35	19	56
	2002	51	54	28	72
	2003	42	39	28	49

* Scottish data are apparently more variable due to smaller sample sizes.

B1.3 FERTILISER USE ON GRASSLAND

Overall fertiliser usage on grassland in Great Britain over the last five years, as previously shown in Tables B1.1 and B1.2, 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 1999 - 2003

	straight nitrogen	*compound nitrogen*	*total nitrogen*	*total phosphate*	*total potash*
1999	52	58	110	20	28
2000	43	56	99	20	26
2001	39	55	94	19	24
2002	32	57	89	20	25
2003	31	53	83	18	22

The 6 kg/ha drop in overall total nitrogen use on grassland in 2003 was associated with a decrease in both the average field rate and the % dressing cover (Table B1.11).

Over the last five years, the dressing cover for straight nitrogen has shown a gradual decline from a level of 39% in 1999 down to 27% in 2003. The corresponding average field rates have not shown any consistent change during this period. The area receiving compound nitrogen has fluctuated during the period, reaching its lowest level (56%) in 2003, (period mean: 60%). The average field rate for compound nitrogen has also fluctuated but not in the same pattern, the lowest rate for the period (84 kg/ha) occurring in 2000 (period mean: 93%).

Average field rates and dressing covers for phosphate and potash were at their lowest level for the five year period in 2003. The dressing cover was 57% (five year mean 59%) for both phosphate and potash. Whilst the average field rates fell to 31 kg/ha for phosphate and 39 kg/ha for potash compared with a mean for the period of 33 kg/ha and 43 kg/ha respectively.

Table B1.11 Dressing cover (%) and average application rate (kg/ha) of fertiliser on grassland, Great Britain 1999 - 2003

Dressing cover (%)

	straight nitrogen	*compound nitrogen*	*total nitrogen*	*total phosphate*	*total potash*
1999	39	61	79	61	61
2000	35	67	75	60	59
2001	31	57	72	58	58
2002	28	59	73	60	59
2003	27	56	70	57	57

Average field rate (kg/ha)

	straight nitrogen	*compound nitrogen*	*total nitrogen*	*total phosphate*	*total potash*
1999	134	96	138	33	46
2000	123	84	133	34	45
2001	128	96	133	32	42
2002	113	97	122	33	42
2003	114	94	119	31	39

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 2003 are presented in Section C tables. The Survey estimates for annual distributions of the total grassland area between grazing and cutting management regimes since 1999 are summarised in Table B1.12. These should not 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 1999 - 2003

	grazed [a]	*silage* [b]	*hay* [b]
1999	96	34	13
2000	93	33	13
2001	91	38	10
2002	92	31	10
2003	93	29	10

Nearly all grassland is grazed at some stage during the season (Table B1.12). Grassland utilisation for cutting and grazing had shown very little change in the previous four years, but in 2001 grazing and hay decreased whilst silage increased. It is not possible to say how much this may have been influenced by Foot and Mouth.

[a] May also be cut.

[b] May also be grazed.

Table B1.13 Nitrogen application rates (kg/ha) by grassland utilisation, Great Britain 1999 - 2003

Total nitrogen

	overall application rate				*average field rate*		
	grazed[a]	*silage*[b]	*hay*[b]		*grazed*[a]	*silage*[b]	*hay*[b]
1999	108	168	72	*1999*	137	180	101
2000	97	147	86	*2000*	130	163	110
2001	91	142	63	*2001*	130	165	85
2002	85	133	72	*2002*	117	155	105
2003	81	130	69	*2003*	115	150	100

Straight nitrogen

	overall application rate				*average field rate*		
	grazed[a]	*silage*[b]	*hay*[b]		*grazed*[a]	*silage*[b]	*hay*[b]
1999	51	76	31	*1999*	133	139	98
2000	48	59	42	*2000*	127	135	104
2001	40	52	23	*2001*	130	131	81
2002	31	44	29	*2002*	112	114	95
2003	29	43	31	*2003*	114	117	100

Compound nitrogen

	overall application rate				*average field rate*		
	grazed[a]	*silage*[b]	*hay*[b]		*grazed*[a]	*silage*[b]	*hay*[b]
1999	57	92	41	*1999*	94	125	77
2000	49	88	44	*2000*	72	94	86
2001	51	90	40	*2001*	95	127	75
2002	55	89	43	*2002*	93	124	85
2003	51	87	38	*2003*	91	117	76

During the period 1999-2003 overall total nitrogen rates have shown a net decrease for both grazed and silage categories, whilst rates for hay have fluctuated. The changes in overall application rate of total nitrogen appear to be mainly due to the changes in the average field rate. In 2001 the dressing cover was reduced significantly for all types of grassland probably due to Foot and Mouth. In 2003 71% of all grass received nitrogen. For cut grass 87% of silage and 69% of hay received nitrogen.

The overall use of straight nitrogen on grazed grass and silage has declined steadily over the last five years, partly as a result of reductions in the dressing cover but in 2002 also due to the large reduction in average field rate. The rates for hay are more variable but both were higher in 2003 than in the previous two years. Compound nitrogen inputs have fluctuated during the last five years with low rates in 2003 compared with the five year means for all categories of management. The five year means for overall nitrogen rate were 53, 89 and 41 kg/ha for grazed grass, silage and hay respectively.

The fall in nitrogen use on grassland in 2000 was attributed to decreases in livestock numbers and economic pressures. In 2001 Foot and Mouth led to a major reduction in livestock numbers with nearly 6 million animals destroyed either to combat disease or for welfare reasons which further reduced herbage production requirements. In England and Wales (representing four fifths of the British grassland area), overall nitrogen use in 2001 fell, compared with 1999, on

[a] May also be cut.

[b] May also be grazed.

both younger (less than five years old) and older grassland by 29% and 13%, respectively, to 137 and 81 kg/ha, mainly because of decreases in dressing cover. Although there was a partial recovery in 2002 the area receiving N fertiliser remains lower than pre-2000 levels.

B1.3.2 PHOSPHATE AND POTASH

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

Table B1.14 Phosphate and potash use (kg/ha) by grassland utilisation, Great Britain 1999 - 2003

Total phosphate

	overall application rate				*average field rate*		
	grazed[a]	*silage*[b]	*hay*[b]		*grazed*[a]	*silage*[b]	*hay*[b]
1999	20	27	16	*1999*	33	39	29
2000	20	30	18	*1999*	33	40	33
2001	18	27	15	*2000*	31	38	28
2002	19	30	20	*2001*	32	42	37
2003	17	27	16	*2003*	30	37	31

Total potash

	overall application rate				*average field rate*		
	grazed[a]	*silage*[b]	*hay*[b]		*grazed*[a]	*silage*[b]	*hay*[b]
1999	27	51	20	*1999*	44	67	37
2000	25	47	21	*2000*	43	62	42
2001	23	45	18	*2001*	40	59	35
2002	23	47	24	*2002*	40	63	44
2003	21	43	18	*2003*	37	57	36

Overall phosphate rates fluctuated throughout the period 1999-2003 (Table B1.14). In 2003 the rates of 17, 27 and 16 kg/ha for grazed grass, silage and hay respectively were close to the corresponding five year means of 19, 28 and 17 kg/ha. Average field rates showed a similar pattern

Although there have been fluctuations in overall potash rates between years the underlying trend appears to be downwards with a net decrease in inputs to all types of grass with rates in 2003 being the lowest (or equal lowest) for the period. The biggest decline has occurred with grazed grass and silage. Average field rates show a similar trend.

Most phosphate and potash fertiliser inputs on grassland are applied in some form of NPK compound (Section C).

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[a] May also be cut.

[b] May also be grazed.

B1.3.3 SULPHUR

The risk of sulphur deficiency is increasing; in grassland it can cause loss of herbage yield and/or quality. The risk is greatest where grassland is cut intensively for silage, and is less likely 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). Estimated dressing covers decreased slightly in 2001 (possibly due to Foot and Mouth), but have increased since, most notably on silage in 2002. The slightly higher than average dressing covers in 2003 mean that the proportion of grassland receiving sulphur fertiliser in the last five years (means: 9% for silage grass and 4% for grazed and hay grass) has increased for the first time 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 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 1999 - 2003

Dressing cover (%)

	grazed[a]	*silage*[b]	*hay*[b]	*all grass*
1999	3	7	2	4
2000	4	9	4	5
2001	2	5	2	2
2002	5	12	4	6
2003	4	10	6	5

Average field rate (kg/ha SO_3)

	grazed[a]	*silage*[b]	*hay*[b]	*all grass*
1999	55	62	34	56
2000	40	44	41	41
2001	34	33	30	31
2002	42	48	57	44
2003	37	44	44	40

Estimated average field rates of sulphur application for each sward management category did not show any consistent changes during 1999-2003, resulting in five year means of 42, 46 and 41 kg/ha SO_3 for grazed, silage and hay grassland, respectively (Table B1.15). The recommended rate for silage grass is 40 kg/ha SO_3 for each susceptible cut.

[a] May also be cut.

[b] May also be grazed.

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 is located in England and Wales.

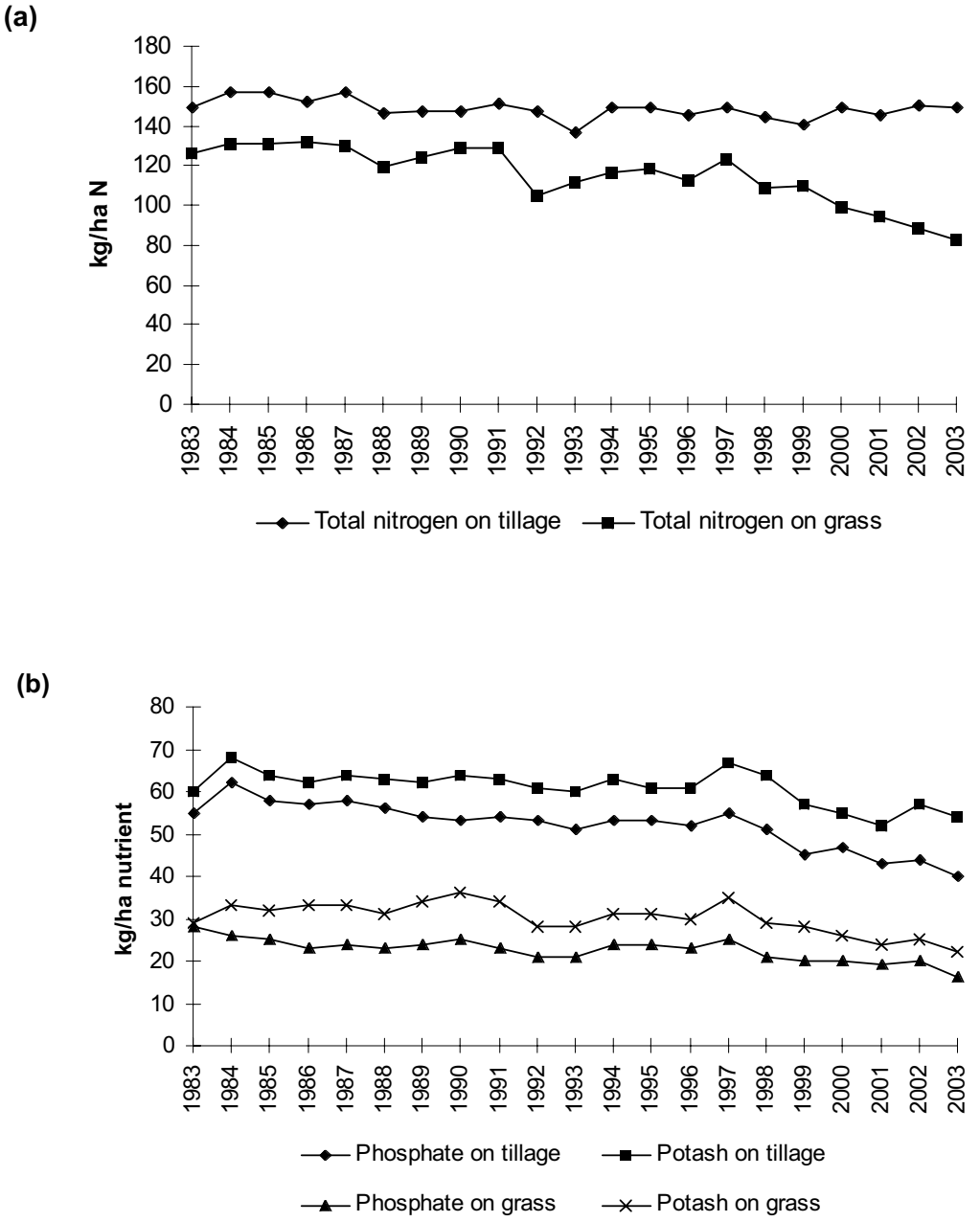
B2.1.1 NITROGEN USE

Table B2.1 Total overall nitrogen application rates (kg/ha), Great Britain 1983 - 2003

	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
2001	145	94	116
2002	150	89	117
2003	149	83	113

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 - 2003



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 were recorded both in 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 reaching levels of 149 kg/ha in 2000, 2003 and 150 kg/ha in 2002. 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 the 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 which occurred in 1998 through to 2003. The overall nitrogen rate of 83 kg/ha on grassland in 2003 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)).

Overall nitrogen use on all crops and grassland, as a single category, averaged at 142 kg/ha (peak 144 kg/ha) in the first five years (1983-1987) of the Great Britain data set. The means for each of the subsequent five year periods are 1988-92: 134 kg/ha, 1993-1997: 130 kg/ha and 1998-2002: 121 kg/ha, reflecting the downward trend observed both on grassland and, to a lesser extent, on tillage crops (Table B 2.1).

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 - 2003

	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
2001	43	52	19	24	29	37
2002	44	57	20	25	31	40
2003	40	54	16	22	28	36

Overall phosphate use on tillage crops had gradually declined over the period since 1983, from a five-year mean of 58 kg/ha in 1983-1987, 54 kg/ha in 1988-1992, 53 kg/ha in 1993-1997 to 46 kg/ha for the period 1998-2002. The 2003 rate of 40 kg/ha was the lowest since Great Britain records began in 1983.

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 has decreased gradually since 1997 to a level of 16 kg/ha in 2003, the lowest recorded since 1983. The five-year means have been 25 kg/ha in 1983-87, 23 kg/ha in 1988-1992, 23 kg/ha in 1993-97 and 20 kg/ha for the period 1998-2002.

Overall potash use on tillage crops had declined slightly between 1983 and 1997, with a five-year mean of 64 kg/ha in 1983-87, 63 kg/ha in 1998-1992, 62 kg/ha in 1993-1997. There was a larger drop to 57 kg/ha for the period 1998-2002. The overall application rate appeared to recover in 1997, but then dropped each year to a low of 52 kg/ha in 2001 followed by a slight recovery in 2002 and 2003. The 2001 value is the lowest level recorded since 1983 and represents a 23% fall from the peak value of 68 kg/ha in 1984. Like phosphate use on tillage, the 2001 level was associated principally with a higher proportion of spring barley, which has a lower fertiliser requirement.

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 2003. 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 between 1998-2002 has been consistently lower (mean: 26 kg/ha) than in earlier years and the value of 22 kg/ha in 2003 represents the lowest value recorded since 1983.

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

Between 1983-87 the five year mean for winter wheat was 189 kg/ha. Over the following five years it declined to 185 kg/ha, increasing to 188 kg/ha for the period 1993 to 1997 and dropping slightly to 187 kg/ha in 1998-2002. The rates of 193 and 197 kg/ha in 2002 and 2003 (Figure B2.2(a)) are the highest recorded since 1983. For winter barley the mean since 1988 has settled at about 10 kg/ha less than the peak of 153 kg/ha in 1983-87. For spring barley the mean for the 1998-2002 five year period at 104 kg/ha is higher than each of the previous five years cycles (99, 92 and 95 kg/ha) and the values in the new millennium are the highest since records started in 1983.

Nitrogen use on oilseed rape decreased between 1984-1994 and then 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 1992-1994 the decreases in total nitrogen use resulted from reduced autumn and spring nitrogen recommendations for oilseed rape. This coincided with the introduction of Arable Area Payments, and a temporary increase in the proportion of spring-sown crops, which have a lower nitrogen requirement than winter oilseed rape. After reaching a low of 179 kg/ha in 1994 rates have tended to fluctuate between 188 kg/ha and 203 kg/ha, mean usage for the period 1993-1997 was 188 kg/ha compared with 194 kg/ha for 1998-2002.

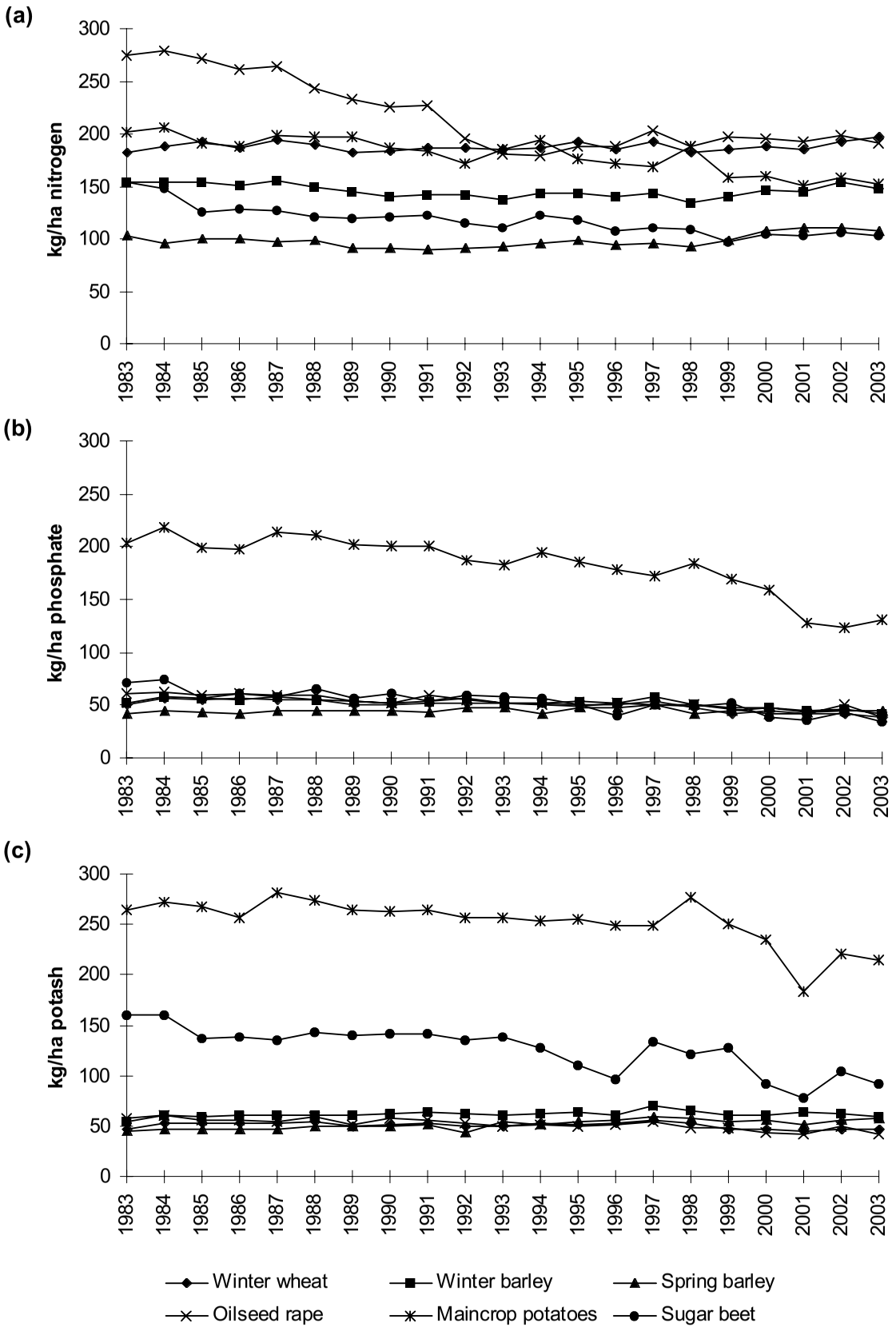
Since the early 1980s, overall nitrogen use on maincrop potatoes has tended to decrease, despite some large variability in estimated annual rates; mean usage was 197, 187, 179 and 163 kg/ha for the periods 1983-1987, 1988-1992, 1993-1997 and 1998-2002 respectively. Sugar beet has also shown a decline (137, 120 113 and 104 kg/ha) over the same periods. The rate of 152 kg/ha for maincrop potatoes continues the decline. The current rate of 103 kg N/ha for sugar beet reflects the greater industry and farmer awareness about the adverse effects of unnecessarily high 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)); the mean for the five year period 1998-2002 showed a drop to below 50 kg/ha for the first time in both crops (43 kg/ha for winter wheat and 47 kg/ha for winter barley). This downward trend continued in 2003 with a fall to 39 and 41 kg/ha for winter wheat and winter barley respectively. In contrast, however, phosphate use has risen slightly on spring barley between 1983 and 1997, but has declined since then. Overall phosphate use has also declined on oilseed rape, maincrop potatoes and sugar beet with means for 1983-87 of 61, 206 and 64 kg/ha respectively declining to 43, 135 and 38 in the new millennium.

On winter wheat the mean overall potash rates were very similar for the five year periods 1983-87, 1988-92 and 1993-97 at 52, 52 and 53 kg/ha respectively but there was a reduction to 48 kg/ha in 1998-2002. For barley the same periods have seen an increase in potash use from 59 kg/ha (winter barley) and 47 kg/ha (spring barley) in 1983-87 to 63 and 55 kg/ha in 1998-2002. The corresponding means for oilseed rape, maincrop potatoes and sugar beet show decreases from 57, 269 and 146 kg/ha in 1983-1987 to levels of 46, 233 and 104 kg/ha for the period 1998- 2002. Rates in 2003 indicate that the downward trend is continuing.

Figure B2.2 **Overall application rates (kg/ha) of (a) total nitrogen, (b) phosphate and (c) potash on major arable crops, Great Britain 1983 - 2003**



B2.1.4 AUTUMN AND WINTER APPLICATIONS OF NITROGEN FERTILISER

In 1985 about two thirds of the winter cereals and nearly 90% of winter oilseed rape received autumn and early winter nitrogen. Since that time the area has decreased considerably in England and Wales and to a lesser extent in Scotland. For cereals the dressing cover is now less than 5% in England and Wales and less than 50% in Scotland (Table B2.3). The large reduction in 2003 in Scotland means that the Great Britain values have fallen below 10% for both crops for the first time. This reduction is in keeping with the standard advice that autumn nitrogen is not required for winter cereals, as economic yield benefits are rare and autumn-applied nitrogen is vulnerable to leaching loss. In Scotland 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. The area receiving autumn nitrogen is now too low for data relating to average field application to be used.

In England and Wales 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. The proportion in Scotland is higher although with the low number of crops in the sample the values for 2001 onwards should be treated with caution. The average field rate for England and Wales was 49 kg/ha in 1985-89, 43 kg/ha in 1990-94, 38 kg/ha in 1995-99 and 45 kg/ha in 2000-03. 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 be taken to indicate the implementation of good agronomic and environmental practice by arable farmers in response to their awareness of research findings and advisory recommendations.

Table B2.3 **Dressing cover (% area) of autumn or winter-applied (August to January) nitrogen on winter cereals and winter oilseed rape by region, 1999 - 2003 and average application rate (kg/ha) for winter oilseed rape.**

Winter cereals - dressing cover (%)

		winter wheat	*winter barley*
England and Wales	*1999*	5	6
	2000	6	6
	2001	5	5
	2002	5	8
	2003	4	4
Scotland	*1999*	35	54
	2000	35	45
	2001	32	64
	2002	38	64
	2003	20	46
Great Britain	*1999*	6	10
	2000	7	11
	2001	7	14
	2002	8	16
	2003	5	9

Winter oilseed rape - dressing cover and application rate

		dressing cover	*application rate*
England and Wales	*1999*	32	42
	2000	36	43
	2001	36	44
	2002	37	51
	2003	36	40
Scotland	*1999*	72	45
	2000	55	38
	2001	91 [a]	39
	2002	80 [b]	31
	2003	87 [c]	37
Great Britain	*1999*	35	43
	2000	33	42
	2001	43	43
	2002	41	47
	2003	42	39

[a] Only 34 fields with oilseed rape, of those 32 had winter applications

[b] Only 38 fields with oilseed rape, of those 30 had winter applications

[c] Only 56 fields with oilseed rape, of those 44 had winter applications

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

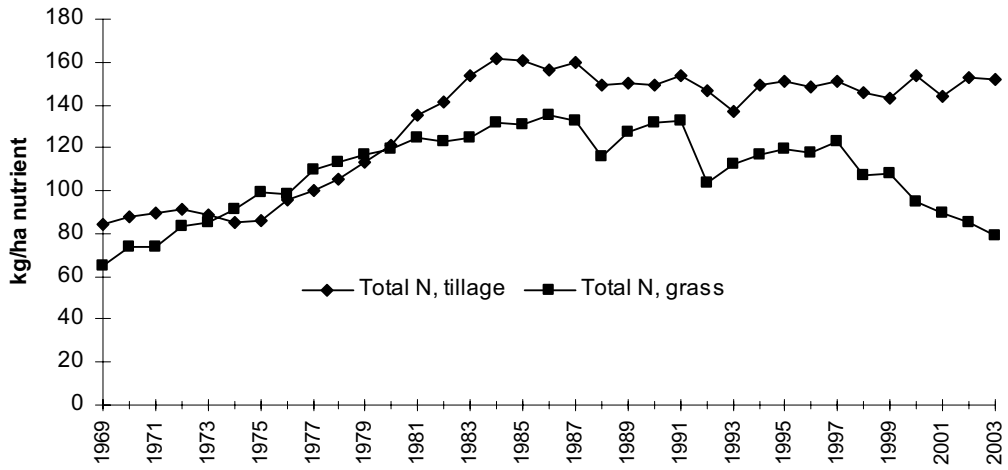
The falls in nitrogen use on tillage crops in the 1988, 1999 and 2001 seasons can be largely attributed to the reduced cropping areas of winter cereal and winter oilseed rape due, except for oilseed rape in 1999, to very wet autumns which restricted drilling opportunities. For example in England in 2001 there was a 46% increase in the area of spring barley grown compared with the previous season. 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. 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 wide 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. Increasing use of extended grazing practice on dairy farms, with consequently smaller silage requirements for winter feeding, may also have been a contributory factor to the reduction in nitrogen use on grassland. In 2001 Foot and Mouth had a major impact on livestock numbers with the North, West and South West being particularly badly affected. There was an average of 10% reduction in the dressing cover in these areas with a 5% reduction for England and Wales as a whole compared with the previous year. Nitrogen application rates to grass were the lowest since the early 1970s.

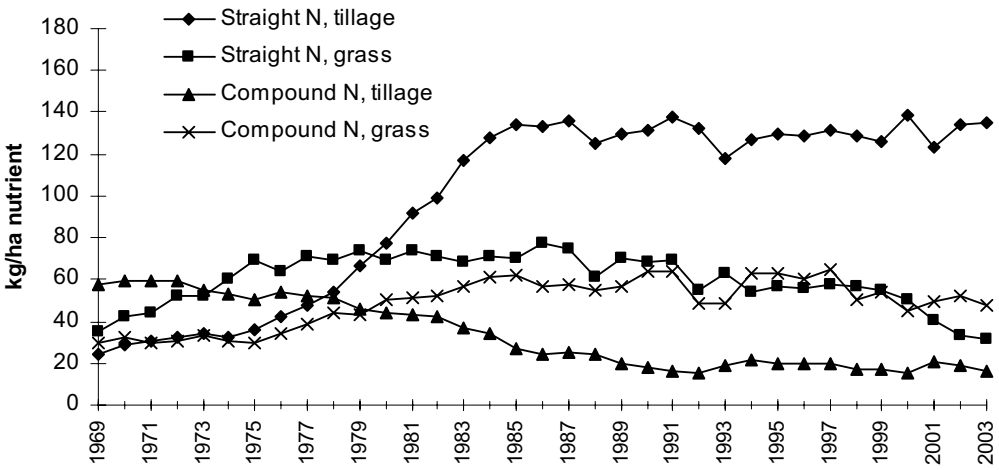
Most nitrogen fertiliser on tillage crops in England and Wales is now applied in straight form following the large steady increase in straight nitrogen application rate which occurred between 1975-1985, combined with a decrease in compound nitrogen use between 1970-1992 (Figure B2.3(b)). The pattern 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. Since 1998 use of straight N on grass has declined reaching the lowest level since 1969 in 2003.

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 - 2003**

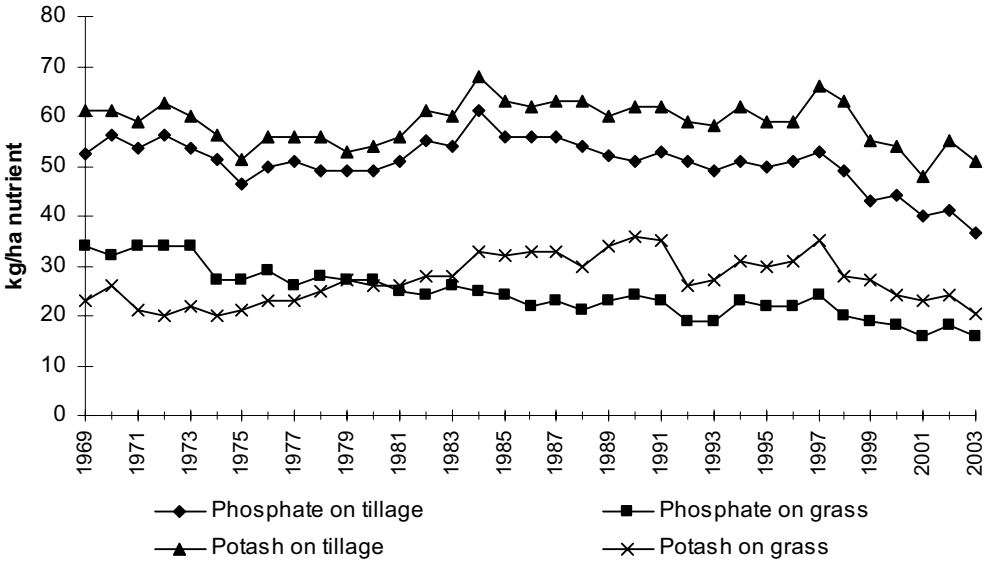
(a)



(b)



(c)



B2.2.2 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 mean rates for phosphate were 52, 54, and 50 kg/ha during the 1970s, 1980s and 1990s. For potash the equivalent figures were 57, 61 and 61 kg/ha. The falls in overall phosphate and potash use over the last four years, meant that in 2003 application rates were at, or close to, the lowest recorded levels since 1969.

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 19 kg/ha in 1999. Levels continued to decline into the 2000s and, at 16 kg/ha, reached their lowest recorded level in 2001 and this was repeated in 2003. The mean rates for phosphate were 30, 24, and 22 kg/ha during the 1970s, 1980s and 1990s, and 17 kg/ha over the last four 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 with a mean rate of 23, 30 and 31 kg/ha during the 1970s, 1980s and 1990s. Rates have declined in the 2000s with the mean for the first four years at 23 kg/ha.

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 both grass and tillage crops in Scotland tended to fluctuate during 1983-88 and 1995-2003, but were relatively stable in the intervening years (Figure B 2.4 (a)). Total nitrogen rates on tillage crops in Scotland were much lower than those in England and Wales during the 1980s. This was 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. However during the 2000s there has been a change to more winter barley at the expense of spring and this is now reflected in the nitrogen inputs as the rates in Scotland have increased relative to those in England. In 2001 the rate of 147 kg/ha was the highest level since records began in 1983 and was greater than the rate used in England and Wales (Figure B2.5(a)).

Before 1985, more nitrogen was applied to tillage crops in compound than in straight form (Figure B2.4(b)). Subsequently, about 60-65% of the total nitrogen input for tillage crops has been applied in straight form, in 2002 this increased temporarily to 70%; the corresponding proportion in England and Wales is nearly 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 have been relatively stable since 1989 (Figure B2.4(c)) with an average of 65 kg/ha for phosphate and 72 kg/ha for potash.

Overall application rates of phosphate to tillage crops are higher in Scotland (Figure B2.6(a)) and the difference has increased over the last six years as rates have fallen significantly in England and Wales. Potash rates were very similar in both countries between 1983-88 (Figure B2.6(b). Between 1989 and 1996 there was about 10 kg/ha more potash applied in Scotland. As with phosphate this difference has increased in recent years as rates in England and Wales have declined.

Overall rates of phosphate and potash on grassland declined from 1983 to 1986. Since then rates have fluctuated from year to year but the average has remained fairly static at around 28 kg/ha for phosphate and 33 kg/ha for potash. Phosphate applications to grass in England and Wales have been consistently lower (Figure B2.7(a)). For grassland rates of potash were generally similar until 1997, since then rates in England and Wales have declined more rapidly than those in Scotland (Figure B2.7(b)).

Figure B2.4 **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 - 2003**

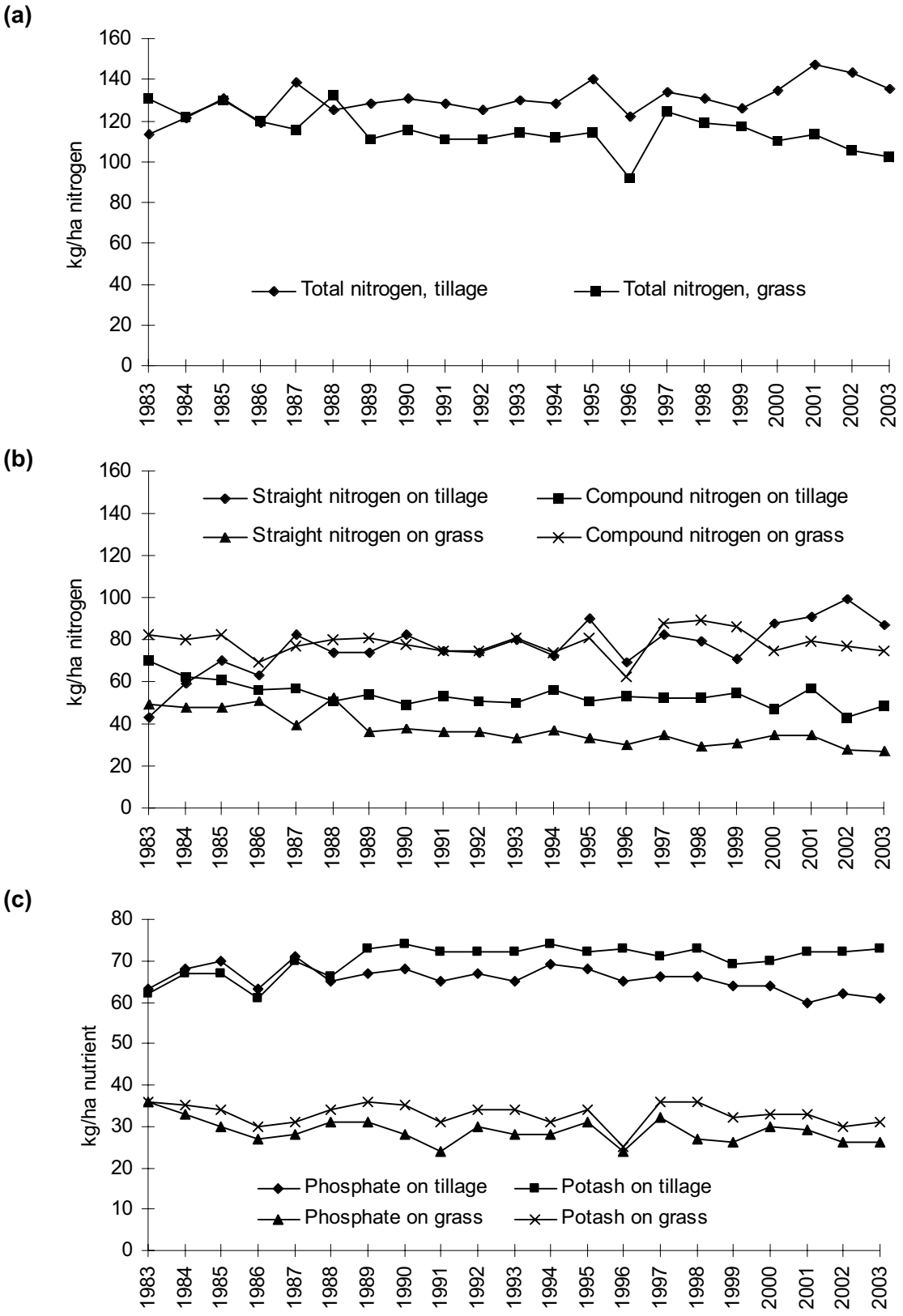
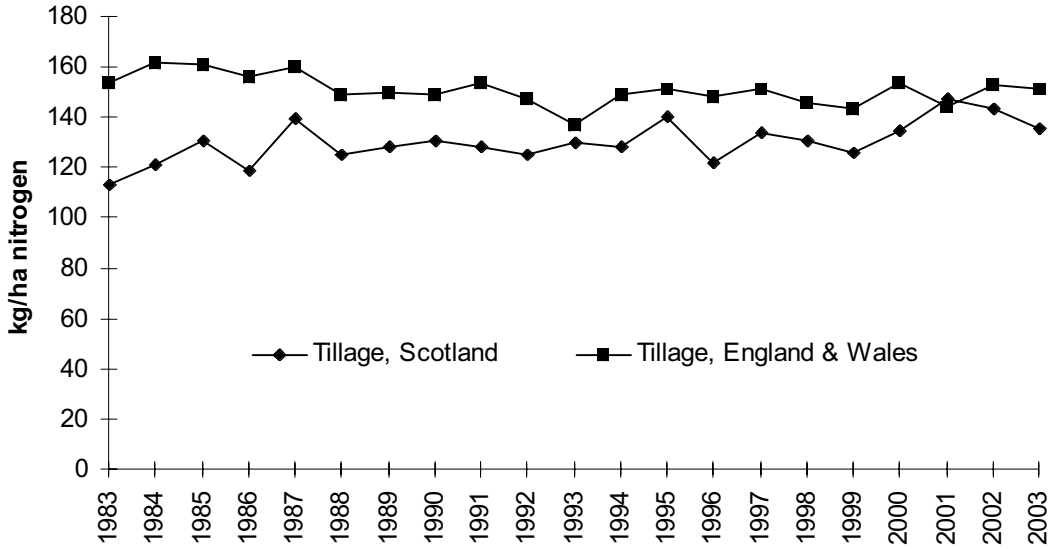


Figure B2.5 **Overall application rates (kg/ha) of (a) total nitrogen to tillage crops, (b) total nitrogen to grassland, Scotland and England and Wales 1983 - 2003**

(a)



(b)

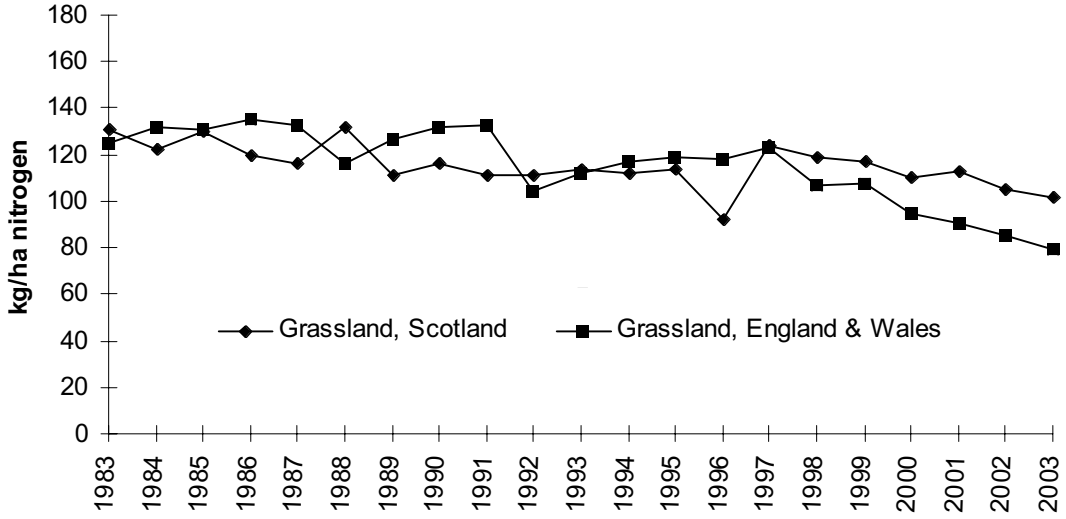
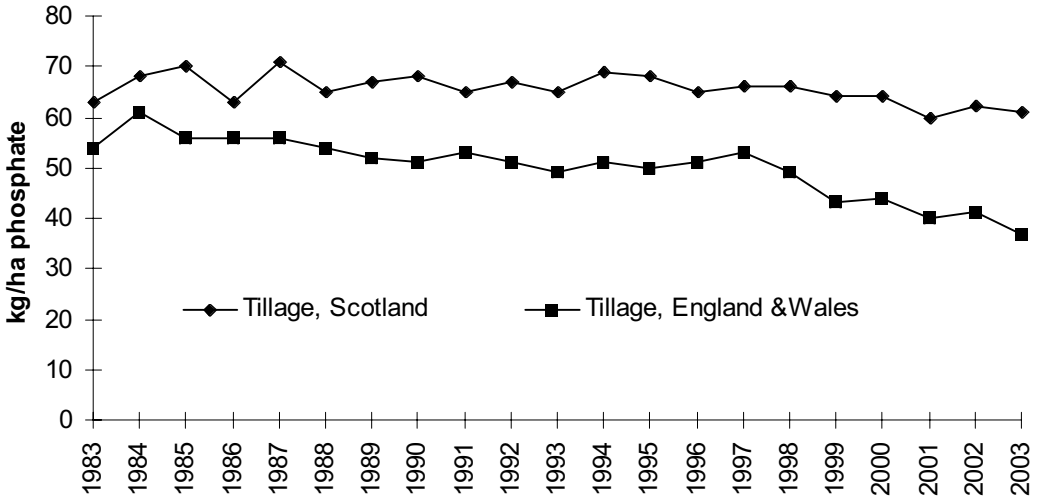


Figure B2.6 **Overall application rates (kg/ha) of (a) phosphate and (b) potash to tillage crops in Scotland and England and Wales 1983 - 2003**

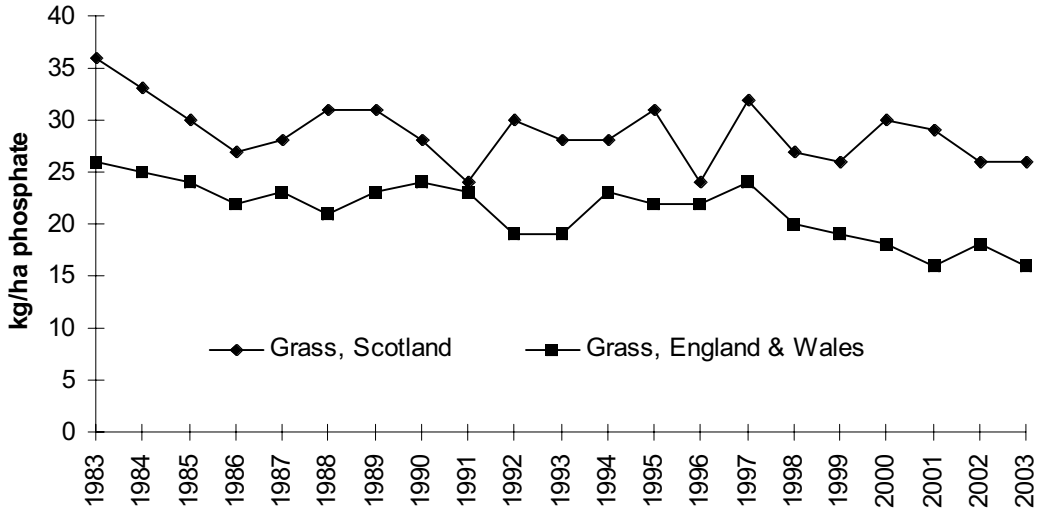
(a)



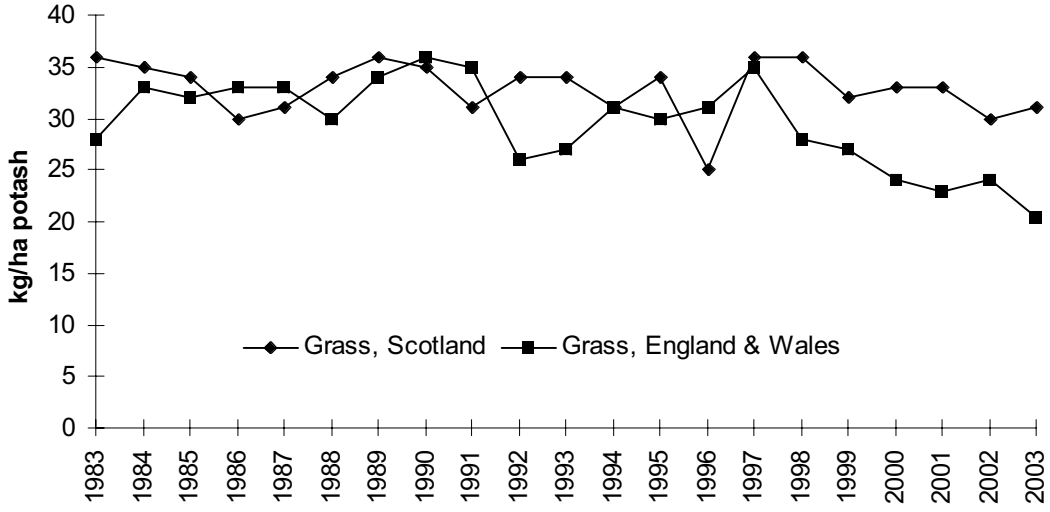
(b)

Figure B2.7 **Overall application rates (kg/ha) of (a) phosphate and (b) potash to grassland in Scotland and England and Wales 1983 - 2003**

(a)



(b)



SECTION C - TABLES

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GREAT BRITAIN TABLES 2003

ENGLAND AND WALES TABLES 2003

Note:
1. Row percentages may not sum to exactly to 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.

SCOTLAND TABLES 2003

Note:
1. Row percentages may not sum to exactly to 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.

Table GB1.1 Total fertiliser use, Great Britain 2003

	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	75	48	54	20	157	46	57	117	22	31	77
Winter wheat	99	61	61	12	199	64	77	197	39	47	1980
Spring barley	97	82	85	31	111	54	66	107	44	57	822
Winter barley	99	69	77	16	149	60	78	148	41	59	605
Oats	91	74	79	19	110	57	70	100	42	55	188
Rye/Triticale/Durum wheat	61	25	27	30	126	90	112	77	22	30	22
Seed potatoes	66	84	84	0	131	150	213	87	127	180	7
Early potatoes	59	59	59	17	204	150	237	119	88	139	9
2nd Early/Maincrop potatoes	93	87	91	39	163	149	237	152	130	214	138
Sugar beet	96	53	72	25	108	63	125	103	34	91	208
Spring oilseed rape	96	54	60	16	141	52	64	135	28	38	96
Winter oilseed rape	99	65	62	10	206	62	70	205	40	43	364
Linseed	78	42	49	7	87	53	61	68	22	30	33
Forage maize	73	57	55	92	64	75	108	46	43	60	127
Rootcrops for stockfeed	88	85	85	59	89	108	100	79	92	85	65
Leafy forage crops	75	71	71	44	88	38	43	66	27	31	37
Arable silage/Other fodder crop	52	34	49	60	116	44	77	61	15	37	36
Peas - human consumption	4	32	30	1	40	66	74	1	21	23	73
Peas - animal consumption	8	35	50	14	57	52	71	5	18	35	93
Beans - animal consumption	9	42	36	6	31	64	73	3	27	27	176
Vegetables (brassicae)	99	99	99	27	184	55	148	182	55	147	21
Vegetables (other)	65	63	64	9	136	67	158	88	43	102	66
Soft fruit	93	39	41	0	108	42	135	100	16	55	23
Top fruit	54	17	20	0	92	38	86	50	6	17	50
Other tillage	35	38	37	9	104	65	107	37	24	40	79
All tillage	90	63	66	18	166	63	82	149	40	54	5395
Grass under 5 years	85	69	71	41	156	36	54	132	24	39	1075
Grass 5 years and over	67	55	53	37	108	30	35	73	17	19	2751
All grass	70	57	57	38	119	31	39	83	18	22	3826
All crops and grass	79	60	61	29	143	46	60	113	28	36	9221

Source: British Survey of Fertiliser Practice 2003.

Table GB1.2 Use of straight fertiliser, Great Britain 2003

	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	64	1	0	146	53	0	94	0	0	77
Winter wheat	96	5	9	193	73	87	186	4	8	1980
Spring barley	69	1	7	90	73	81	61	0	6	822
Winter barley	90	2	10	143	70	83	128	1	8	605
Oats	70	4	10	111	47	68	77	2	7	188
Rye/Triticale/Durum wheat	61	0	2	126	0	113	77	0	3	22
Seed potatoes	0	0	0	0	0	0	0	0	0	7
Early potatoes	19	0	2	175	0	111	34	0	2	9
2nd Early/Maincrop potatoes	44	3	24	122	56	191	37	2	40	138
Sugar beet	87	2	28	105	86	119	91	2	33	208
Spring oilseed rape	92	3	9	136	110	86	124	4	8	96
Winter oilseed rape	98	5	8	196	58	84	192	3	7	364
Linseed	60	0	7	83	0	43	50	0	3	33
Forage maize	32	15	23	76	96	144	24	14	34	127
Rootcrops for stockfeed	21	3	2	87	159	132	18	4	2	65
Leafy forage crops	32	0	0	83	0	0	26	0	0	37
Arable silage/Other fodder crop	15	0	4	95	0	75	14	0	3	36
Peas - human consumption	0	4	3	0	98	120	0	4	4	73
Peas - animal consumption	3	2	18	89	85	89	3	2	16	93
Beans - animal consumption	5	9	5	34	68	64	2	6	3	176
Vegetables (brassicae)	46	0	0	108	0	0	49	0	0	21
Vegetables (other)	56	4	8	135	75	141	71	3	11	66
Soft fruit	82	8	26	101	18	121	83	1	31	23
Top fruit	46	4	8	88	12	70	41	0	6	50
Other tillage	27	6	5	90	66	148	24	4	7	79
All tillage	79	4	10	163	73	97	129	3	9	5395
Grass under 5 years	44	1	2	123	71	105	54	1	2	1075
Grass 5 years and over	23	1	0	111	81	77	25	1	0	2751
All grass	27	1	1	114	79	91	30	1	1	3826
All crops and grass	50	2	5	148	74	97	74	2	4	9221

Source: British Survey of Fertiliser Practice 2003.

Table GB1.3 Use of compound fertiliser, Great Britain 2003

	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	39	47	54	60	46	57	24	22	31	77
Winter wheat	19	56	54	60	62	73	12	35	40	1980
Spring barley	70	81	80	69	57	66	46	44	51	822
Winter barley	29	68	69	70	59	74	20	40	51	605
Oats	35	74	75	77	59	69	23	40	48	188
Rye/Triticale/Durum wheat	0	25	25	0	90	112	0	22	28	22
Seed potatoes	66	84	84	131	150	213	87	127	180	7
Early potatoes	41	59	59	210	150	234	86	88	137	9
2nd Early/Maincrop potatoes	84	87	83	143	151	215	116	128	174	138
Sugar beet	21	51	53	60	63	109	13	32	57	208
Spring oilseed rape	28	51	52	37	48	59	11	24	30	96
Winter oilseed rape	32	61	54	42	62	67	13	38	36	364
Linseed	31	42	42	60	53	64	19	22	27	33
Forage maize	47	50	34	47	57	76	22	28	26	127
Rootcrops for stockfeed	78	83	83	78	106	100	60	87	82	65
Leafy forage crops	67	71	71	60	38	43	40	27	31	37
Arable silage/Other fodder crop	39	34	49	119	44	71	46	15	34	36
Peas - human consumption	4	29	27	40	60	68	1	17	19	73
Peas - animal consumption	6	33	33	36	50	60	2	17	20	93
Beans - animal consumption	4	33	32	28	62	74	1	21	24	176
Vegetables (brassicae)	66	99	99	203	55	148	134	55	147	21
Vegetables (other)	19	59	59	87	67	153	17	40	90	66
Soft fruit	32	31	32	53	48	74	17	15	24	23
Top fruit	16	16	20	56	37	58	9	6	11	50
Other tillage	17	33	32	77	62	101	13	20	33	79
All tillage	31	60	59	69	63	77	21	37	45	5395
Grass under 5 years	69	69	70	113	35	53	78	24	37	1075
Grass 5 years and over	54	54	53	88	29	35	47	16	18	2751
All grass	56	56	56	94	30	39	53	17	22	3826
All crops and grass	45	58	57	86	45	56	39	26	32	9221

Source: British Survey of Fertiliser Practice 2003.

Table GB1.4 Use of lime, Great Britain 2003

	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	5.4	-	4.5	-	-	9.9	4.5	-	4.9	-	-	4.6	4	77
Winter wheat	1.9	1.4	0.7	0.4	0.4	4.9	4.7	7.3	4.7	5.5	15.3	6.4	81	1980
Spring barley	9.3	0.8	3.5	0.5	1.0	15.1	4.4	3.0	4.1	5.3	3.6	4.2	118	822
Winter barley	5.2	0.1	1.5	-	0.6	7.4	4.4	4.9	5.3	-	6.9	4.8	51	605
Oats	1.5	2.5	1.8	-	3.0	8.7	4.9	6.0	5.0	-	7.4	6.1	12	188
Rye/Triticale/Durum wheat	-	6.8	-	-	-	6.8	-	6.1	-	-	-	6.1	2	22
Seed potatoes	-	-	-	-	-	-	-	-	-	-	-	-	0	7
Early potatoes	-	-	-	-	-	-	-	-	-	-	-	-	0	9
2nd Early/Maincrop potatoes	0.6	-	0.1	-	-	0.6	4.9	-	4.9	-	-	4.9	3	138
Sugar beet	9.4	3.1	1.5	7.8	3.3	25.1	4.7	6.4	4.9	9.4	5.9	7.1	45	208
Spring oilseed rape	7.6	0.8	-	-	-	8.5	5.2	3.5	-	-	-	5.1	5	96
Winter oilseed rape	5.3	1.5	2.3	1.2	0.1	10.5	5.2	6.4	4.5	4.6	4.9	5.1	38	364
Linseed	-	-	-	-	-	-	-	-	-	-	-	-	1	33
Forage maize	13.8	1.4	3.4	-	3.3	21.9	4.1	4.9	4.5	-	5.6	4.4	24	127
Rootcrops for stockfeed	1.5	-	3.6	-	0.5	5.7	4.1	-	4.9	-	4.9	4.7	6	65
Leafy forage crops	9.4	-	7.2	-	-	16.6	4.9	-	4.9	-	-	4.9	4	37
Arable silage/Other fodder crop	3.1	-	3.7	-	-	6.8	4.9	-	5.4	-	-	5.2	4	36
Peas - human consumption	5.0	2.2	1.0	1.7	-	9.9	4.2	4.9	3.7	6.2	-	4.6	6	73
Peas - animal consumption	1.0	5.3	0.5	-	-	6.8	6.3	5.1	3.7	-	-	5.1	5	93
Beans - animal consumption	0.7	-	0.5	0.1	2.8	4.2	4.0	-	3.9	2.5	8.4	6.9	10	176
Vegetables (brassicae)	16.9	-	14.8	18.8	4.6	55.1	6.8	-	7.5	9.9	6.7	8.0	10	21
Vegetables (other)	4.2	2.8	9.1	-	-	16.1	4.9	2.5	7.4	-	-	5.9	10	66
Soft fruit	-	-	-	-	-	-	-	-	-	-	-	-	0	23
Top fruit	-	-	-	-	1.3	1.3	-	-	-	-	4.4	4.4	3	50
Other tillage	-	0.9	-	-	4.3	5.2	-	4.9	-	-	4.9	4.9	6	79
All tillage	4.3	1.2	1.6	0.7	0.8	8.5	4.6	6.2	4.8	7.2	8.1	5.4	448	5395
Grass under 5 years	1.9	0.2	0.5	-	0.7	3.3	3.7	5.7	4.2	-	4.7	4.1	129	1075
Grass 5 years and over	3.1	0.1	0.8	-	1.7	5.6	3.3	4.2	4.6	-	5.3	4.1	76	2751
All grass	2.1	0.2	0.5	-	0.9	3.7	3.6	5.5	4.3	-	4.9	4.1	205	3826
All crops and grass	3.1	0.6	1.0	0.3	0.8	5.8	4.2	6.1	4.6	7.2	6.3	5.0	653	9221

Source: British Survey of Fertiliser Practice 2003.

Table GB2.1 Average fertiliser practice by grassland utilisation, Great Britain 2003

	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	52	49	25	103	28	28	65	15	14	1913
Grazed - mown	83	67	70	64	135	34	51	112	23	35	1484
All grazings	70	57	56	38	115	30	37	81	17	21	3398
Cut for seed - grazed	-	-	-	-	-	-	-	-	-	-	0
Cut for seed - not grazed	-	-	-	-	-	-	-	-	-	-	4
All cut for seed	-	-	-	-	-	-	-	-	-	-	4
Cut for silage - grazed	86	71	75	69	144	35	54	124	25	41	1119
Cut for silage - not grazed	90	76	80	54	176	45	67	158	34	53	268
All cut for silage	87	72	76	67	150	37	57	130	27	43	1387
Cut for hay - grazed	71	54	52	47	100	30	34	71	16	18	428
Cut for hay - not grazed	58	44	43	33	101	37	44	59	16	19	127
All cut for hay	69	52	50	44	100	31	36	69	16	18	555
All mowings	83	67	70	61	140	35	53	115	24	37	1852
All grass	70	57	57	38	119	31	39	83	18	22	3826

Source: British Survey of Fertiliser Practice 2003.

Table GB3.0 Product and nutrient use by month of application, Great Britain 2003.

(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	7	29	36	18	5	2	2	1829
Straight P	14	6	0	3	11	19	13	13	15	1	1	6	34
Straight K	4	2	7	10	4	28	30	9	3	0	0	0	78
Compounds	6	4	2	1	1	6	27	25	12	8	4	4	2153
All fertilisers	4	2	1	1	1	7	28	30	15	7	3	3	4093

(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	28	35	17	7	4	2	1057
P_2O_5	10	8	2	1	2	9	26	22	9	4	2	5	266
K_2O	9	6	3	2	2	10	27	20	8	6	3	4	346
Total	4	3	1	1	1	7	28	30	14	6	3	3	1669

Note: product use refers to the total tonnage of the products used by farmers in the survey year 2003;
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 2003.

Table GB3.1 Product type as percentage of all product used by crop group, Great Britain 2003

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	1.7	2.7	0.0	1.2	5.8	1.6	2.6	0.1	0.0	0.3	0.0	0.2	1.6
Urea	1.6	6.5	2.4	1.4	8.7	0.8	5.4	1.8	1.5	1.9	0.6	1.8	4.0
Ammonium Nitrate	26.7	45.3	6.7	23.0	38.6	18.1	38.1	23.4	28.3	18.6	20.0	22.9	31.9
UAN	3.8	8.8	1.2	2.3	8.1	0.8	7.1	0.2	0.1	0.4	0.0	0.3	4.4
Other Straight N	2.7	4.1	1.4	1.5	6.9	2.3	3.9	0.4	0.4	0.9	0.0	0.6	2.6
Triple Superphosphate	0.3	1.0	0.1	0.7	0.9	2.4	0.9	0.5	0.2	0.1	0.9	0.4	0.7
Single Superphosphate	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Other Straight P	0.0	0.0	0.1	0.0	0.0	1.3	0.1	0.0	0.0	0.0	0.0	0.0	0.1
Muriate of Potash	1.3	1.7	4.8	1.2	1.4	6.3	2.0	0.2	0.0	0.3	1.5	0.2	1.3
Other Straight K	0.3	0.1	1.7	17.7	0.2	0.7	1.0	0.0	0.0	0.1	1.9	0.0	0.6
NP	1.2	0.9	3.0	0.6	2.0	2.9	1.2	3.5	2.0	1.7	0.0	3.3	2.1
NK	1.9	1.2	2.0	1.1	0.8	6.9	1.6	6.2	3.2	12.7	12.9	6.7	3.6
PK	7.6	17.7	8.5	27.8	11.0	28.4	16.3	1.9	1.6	1.9	3.3	1.9	10.5
Very High N	5.1	3.7	1.0	0.2	1.0	2.6	3.3	33.8	20.9	31.1	27.7	33.2	15.1
High N	14.5	1.2	2.6	0.0	0.4	4.7	3.0	24.4	34.3	24.2	22.9	24.0	11.3
High P	0.5	0.2	2.9	0.5	0.6	1.4	0.5	0.2	1.2	0.2	0.0	0.2	0.4
High K	7.5	0.8	35.2	3.5	0.8	4.7	3.5	0.8	1.3	1.9	0.0	1.1	2.5
Low N	7.5	3.1	9.8	13.6	9.8	3.0	5.1	0.3	2.7	0.7	3.3	0.7	3.3
Low P	3.7	0.2	10.8	3.0	0.3	6.8	1.6	0.8	0.9	1.8	0.0	1.0	1.4
Equal NPK	12.0	0.7	5.7	0.5	2.6	4.1	2.7	1.3	1.3	1.0	5.0	1.3	2.2
Total Product ('000 tonnes)	**317**	**1540**	**108**	**108**	**265**	**126**	**2466**	**1444**	**145**	**735**	**8**	**1627**	**4093**

N.B: Precise estimates of quantities by product type cannot be derived from the data collected (at field level) on 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 2003.

Table GB3.2 Use of product type by crop group, Great Britain 2003

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	8.1	60.4	0.0	2.0	22.9	2.9	96.2	2.3	0.0	2.9	0.0	3.8	68
Urea	3.2	61.3	1.6	0.9	14.2	0.6	81.9	15.8	1.3	8.4	0.0	18.1	162
Ammonium Nitrate	6.5	53.2	0.6	1.9	7.8	1.7	71.6	25.3	3.1	10.3	0.1	28.4	1313
UAN	6.8	75.8	0.7	1.4	12.0	0.5	97.3	1.9	0.1	1.5	0.0	2.7	180
Other Straight N	7.9	59.4	1.5	1.5	17.3	2.8	90.4	4.7	0.6	5.9	0.0	9.6	106
Triple Superphosphate	3.0	52.9	0.4	2.5	7.7	10.1	76.5	22.7	0.8	3.0	0.2	23.5	31
Single Superphosphate	0.0	0.0	14.4	0.0	0.0	13.9	28.3	71.7	17.4	54.2	0.0	71.7	1
Other Straight P	0.5	0.0	5.6	1.3	2.6	70.6	80.6	19.4	0.0	3.5	0.0	19.4	2
Muriate of Potash	8.1	50.8	10.0	2.6	7.1	15.5	94.1	4.7	0.0	4.6	0.2	5.9	52
Other Straight K	4.2	8.2	7.0	72.8	1.6	3.3	97.2	2.2	0.0	1.4	0.5	2.8	26
NP	4.3	16.6	3.8	0.8	6.1	4.3	36.0	58.4	3.4	14.7	0.0	64.0	85
NK	4.1	12.7	1.5	0.8	1.5	5.9	26.6	59.9	3.1	62.5	0.6	73.4	148
PK	5.6	63.1	2.1	7.0	6.7	8.3	92.8	6.3	0.5	3.2	0.1	7.2	433
Very High N	2.6	9.2	0.2	0.0	0.4	0.5	13.0	78.6	4.9	36.8	0.3	87.0	621
High N	9.9	3.8	0.6	0.0	0.2	1.3	15.8	75.6	10.7	38.2	0.4	84.2	464
High P	10.0	22.6	19.3	3.7	10.7	11.3	77.7	19.9	10.2	9.6	0.0	22.3	16
High K	23.0	12.0	36.9	3.6	2.1	5.7	83.3	11.1	1.9	13.8	0.0	16.7	104
Low N	17.3	34.5	7.7	10.7	19.0	2.8	92.0	3.3	2.8	3.7	0.2	8.0	137
Low P	21.1	4.8	21.0	5.9	1.5	15.4	69.6	21.9	2.3	23.3	0.0	30.4	56
Equal NPK	42.9	12.0	7.0	0.6	7.8	5.8	76.0	20.2	2.0	8.0	0.4	24.0	89
All Fertilisers	**7.8**	**37.6**	**2.6**	**2.7**	**6.5**	**3.1**	**60.4**	**34.7**	**3.5**	**17.7**	**0.2**	**39.6**	**4093**

N.B: Precise estimates of quantities by product type cannot be derived from the data collected (at field level) on 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 2003.

Table GB3.3 Product use by month of application, Great Britain 2003.

row %	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	total Product ('000 tonnes)
Calcium Ammonium Nitrate	0.0	25.1	54.4	12.8	3.0	1.8	0.6	0.5	1.9	0.0	0.0	0.0	68
Urea	0.0	8.1	37.1	38.1	14.3	1.5	0.3	0.2	0.2	0.2	0.0	0.0	162
Ammonium Nitrate	0.1	4.7	26.3	37.5	20.2	5.3	2.9	2.1	0.6	0.2	0.2	0.0	1313
UAN	0.1	10.6	30.2	40.3	15.4	1.6	1.1	0.4	0.3	0.1	0.0	0.0	180
Other straight N	0.0	12.7	26.6	28.2	11.8	13.7	4.2	1.4	0.0	0.3	0.0	0.3	106
Triple Superphosphate	11.6	20.9	12.8	9.5	15.0	0.7	0.6	4.3	14.8	6.9	0.1	2.8	31
Single Superphosphate	0.0	0.0	14.4	6.1	0.0	0.0	0.0	71.7	7.8	0.0	0.0	0.0	1
Other Straight P	0.0	5.4	15.4	59.6	18.0	0.0	0.0	0.0	1.4	0.3	0.0	0.0	2
Muriate of Potash	5.4	25.1	37.2	11.5	5.1	0.6	0.4	0.1	5.3	1.5	3.8	4.0	52
Other Straight K	1.4	34.8	16.7	4.4	0.2	0.0	0.0	0.3	2.5	4.3	13.6	21.9	26
NP	0.0	14.8	37.9	19.7	9.7	4.4	2.1	1.6	6.3	3.3	0.0	0.0	85
NK	0.4	1.5	19.5	13.0	21.0	29.4	9.4	5.0	0.7	0.1	0.0	0.0	148
PK	4.6	15.8	16.7	6.4	1.3	0.3	0.6	6.5	21.1	17.0	6.7	3.0	433
Very High N	0.0	1.8	24.8	29.5	15.3	15.0	8.0	4.4	1.2	0.0	0.1	0.0	621
High N	0.1	2.5	23.4	38.8	20.8	6.7	4.5	2.5	0.5	0.1	0.0	0.0	464
High P	0.0	8.7	16.8	36.0	8.9	0.0	0.0	2.9	13.8	11.0	1.8	0.0	16
High K	0.0	3.8	52.2	31.8	8.8	1.6	0.3	0.0	0.9	0.6	0.0	0.0	104
Low N	0.9	17.7	42.1	13.1	1.9	1.1	0.3	6.1	9.2	6.3	1.1	0.2	137
Low P	0.0	2.2	45.1	34.7	8.1	6.6	1.5	1.8	0.0	0.0	0.0	0.0	56
Equal NPK	2.3	2.1	40.3	32.2	6.8	2.3	0.4	3.4	3.8	1.5	5.0	0.0	89
All Fertilisers	**0.8**	**7.2**	**27.5**	**29.6**	**14.5**	**6.6**	**3.3**	**3.0**	**3.5**	**2.4**	**1.1**	**0.5**	**4093**

N.B: Precise estimates of quantities by product type cannot be derived from the data collected (at field level) on 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 2003.

Table EW1.1 Total fertiliser use, England and Wales 2003

	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	71	41	47	22	153	42	56	109	17	26	64
Winter wheat	99	59	59	12	199	63	76	197	38	45	1825
Spring barley	94	63	71	23	114	46	63	107	29	44	435
Winter barley	99	67	75	15	146	58	77	145	38	58	526
Oats	89	68	75	17	113	60	74	101	41	55	156
Rye/Triticale/Durum wheat	61	25	27	30	126	90	112	77	22	30	22
Seed potatoes	-	-	-	-	-	-	-	-	-	-	3
Early potatoes	50	50	50	20	201	125	205	101	63	103	8
2nd Early/Maincrop potatoes	93	85	90	40	160	150	237	149	128	212	115
Sugar beet	96	53	72	25	108	63	125	103	34	91	208
Spring oilseed rape	95	50	56	16	143	51	64	136	26	36	84
Winter oilseed rape	99	61	58	10	204	60	69	202	37	40	308
Linseed	78	41	48	6	87	53	62	68	22	30	32
Forage maize	74	57	56	92	63	75	109	47	43	61	124
Rootcrops for stockfeed	72	64	63	59	102	103	113	73	66	71	29
Leafy forage crops	73	64	64	50	98	28	31	72	18	20	15
Arable silage/Other fodder crop	51	28	47	63	128	42	85	66	12	40	24
Peas - human consumption	4	31	30	1	40	67	75	2	21	22	68
Peas - animal consumption	8	35	50	13	59	52	71	5	18	36	88
Beans - animal consumption	8	42	36	6	32	64	74	3	27	26	171
Vegetables (brassicae)	99	99	99	27	187	54	152	186	54	151	18
Vegetables (other)	64	63	64	9	137	65	160	88	41	102	61
Soft fruit	92	34	36	0	112	42	136	103	15	49	19
Top fruit	54	17	20	0	92	38	86	50	6	17	50
Other tillage	35	37	37	9	105	65	107	37	24	40	78
All tillage	89	58	61	16	170	63	83	152	37	51	4531
Grass under 5 years	82	62	67	46	167	34	57	136	21	38	702
Grass 5 years and over	64	52	50	38	108	30	35	69	15	17	2282
All grass	67	53	53	40	118	30	39	79	16	20	2984
All crops and grass	77	56	57	29	146	46	61	112	26	34	7515

Source: British Survey of Fertiliser Practice 2003.

Table EW1.2 Use of straight fertiliser, England and Wales 2003

	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	0	0	144	0	0	87	0	0	64
Winter wheat	96	5	9	193	73	87	186	4	7	1825
Spring barley	72	1	8	108	75	73	78	1	6	435
Winter barley	89	2	10	141	70	84	125	1	8	526
Oats	76	5	12	110	47	68	84	2	8	156
Rye/Triticale/Durum wheat	61	0	2	126	0	113	77	0	3	22
Seed potatoes	-	-	-	-	-	-	-	-	-	3
Early potatoes	23	0	2	175	0	111	41	0	2	8
2nd Early/Maincrop potatoes	45	3	24	126	56	185	39	2	39	115
Sugar beet	87	2	28	105	86	119	91	2	33	208
Spring oilseed rape	94	4	10	138	110	86	129	4	8	84
Winter oilseed rape	98	5	8	195	58	89	191	3	7	308
Linseed	61	0	7	83	0	43	50	0	3	32
Forage maize	32	15	24	76	96	144	25	14	34	124
Rootcrops for stockfeed	39	6	4	103	173	132	40	10	6	29
Leafy forage crops	47	0	0	82	0	0	39	0	0	15
Arable silage/Other fodder crop	19	0	5	95	0	75	18	0	4	24
Peas - human consumption	0	4	3	0	98	120	0	4	4	68
Peas - animal consumption	3	2	18	89	85	89	3	2	16	88
Beans - animal consumption	5	9	5	34	68	64	2	6	3	171
Vegetables (brassicae)	46	0	0	107	0	0	49	0	0	18
Vegetables (other)	56	4	8	137	75	141	72	3	12	61
Soft fruit	88	8	28	101	18	121	89	2	33	19
Top fruit	46	4	8	88	12	70	41	0	6	50
Other tillage	27	6	5	90	66	151	24	4	7	78
All tillage	81	5	10	168	73	98	135	3	9	4531
Grass under 5 years	22	1	0	115	83	77	63	1	2	702
Grass 5 years and over	50	1	2	127	71	110	26	1	0	2282
All grass	26	1	1	118	81	92	31	1	1	2984
All crops and grass	51	3	5	154	75	97	79	2	5	7515

Source: British Survey of Fertiliser Practice 2003.

Table EW1.3 Use of compound fertiliser, England and Wales 2003

	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	33	41	47	68	42	56	22	17	26	64
Winter wheat	18	55	52	64	61	72	11	34	38	1825
Spring barley	42	63	64	69	45	60	29	28	38	435
Winter barley	25	66	67	80	57	74	20	37	49	526
Oats	24	68	70	70	56	66	17	38	47	156
Rye/Triticale/Durum wheat	0	25	25	0	90	112	0	22	28	22
Seed potatoes	-	-	-	-	-	-	-	-	-	3
Early potatoes	29	50	50	210	125	201	60	63	101	8
2nd Early/Maincrop potatoes	82	85	83	141	151	215	110	126	173	115
Sugar beet	21	51	53	60	63	109	13	32	57	208
Spring oilseed rape	24	47	48	32	47	58	8	22	28	84
Winter oilseed rape	25	56	50	46	60	65	11	34	33	308
Linseed	30	41	41	58	53	65	18	22	27	32
Forage maize	47	50	34	47	58	76	22	29	26	124
Rootcrops for stockfeed	46	59	59	72	96	111	33	57	66	29
Leafy forage crops	63	64	64	52	28	31	33	18	20	15
Arable silage/other fodder crops	35	28	47	139	42	77	48	12	36	24
Peas - human consumption	4	28	27	40	60	69	2	17	18	68
Peas - animal consumption	5	33	32	38	50	60	2	16	19	88
Beans - animal consumption	4	32	32	30	62	74	1	20	23	171
Vegetables (brassicae)	64	99	99	214	54	152	137	54	151	18
Vegetables (other)	17	59	58	96	65	155	16	38	90	61
Soft fruit	27	26	27	53	50	59	14	13	16	19
Top fruit	16	16	20	56	37	58	9	6	11	50
Other tillage	16	32	32	79	61	101	13	20	33	78
All tillage	23	55	54	71	61	78	16	33	41	4531
Grass under 5 years	63	62	65	117	33	55	74	20	36	702
Grass 5 years and over	51	50	50	85	28	34	44	14	17	2282
All grass	53	52	52	91	29	38	48	15	20	2984
All crops and grass	39	53	53	86	44	56	34	24	30	7515

Source: British Survey of Fertiliser Practice 2003.

Table EW1.4 Use of lime, England and Wales 2003

	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	64
Winter wheat	1.9	1.5	0.7	0.5	0.4	5.0	4.7	7.3	4.8	5.5	15.3	6.5	72	1825
Spring barley	7.4	1.6	1.1	1.0	1.8	12.8	4.6	3.0	5.3	5.3	3.6	4.4	48	435
Winter barley	4.9	0.1	1.2	-	0.7	6.9	4.4	4.9	5.8	-	6.9	4.9	44	536
Oats	1.8	3.0	1.8	-	3.6	10.2	4.9	6.0	4.9	-	7.4	6.1	11	156
Rye/Triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	-	-	2	22
Seed potatoes	-	-	-	-	-	-	-	-	-	-	-	-	0	3
Early potatoes	-	-	-	-	-	-	-	-	-	-	-	-	0	8
2nd Early/Maincrop potatoes	-	-	-	-	-	-	-	-	-	-	-	-	3	115
Sugar beet	9.4	3.1	1.5	7.8	3.3	25.1	4.7	6.4	4.9	9.4	5.9	7.1	45	208
Spring oilseed rape	8.2	0.9	-	-	-	9.1	5.2	3.5	-	-	-	5.1	5	84
Winter oilseed rape	6.0	1.7	1.9	1.4	0.1	11.1	5.2	6.4	4.6	4.6	4.9	5.2	34	308
Linseed	-	-	-	-	-	-	-	-	-	-	-	-	1	32
Forage maize	14.0	1.4	3.5	-	3.4	22.3	4.1	4.9	4.5	-	5.6	4.4	24	124
Rootcrops for stockfeed	-	-	-	-	-	-	-	-	-	-	-	-	1	29
Leafy forage crops	-	-	-	-	-	-	-	-	-	-	-	-	1	15
Arable silage/Other fodder crop	-	-	-	-	-	-	-	-	-	-	-	-	3	24
Peas - human consumption	5.2	2.3	-	1.7	-	9.2	4.2	4.9	-	6.2	-	4.7	5	68
Peas - animal consumption	1.0	5.5	0.5	-	-	7.0	6.3	5.1	3.7	-	-	5.1	5	88
Beans - animal consumption	0.8	-	-	0.1	2.9	3.7	4.0	-	-	2.5	8.4	7.3	8	171
Vegetables (brassicae)	17.8	-	15.5	19.7	4.8	57.8	6.8	-	7.5	9.9	6.7	8.0	10	18
Vegetables (other)	4.4	2.9	9.6	-	-	16.9	4.9	2.5	7.4	-	-	5.9	10	61
Soft fruit	-	-	-	-	-	-	-	-	-	-	-	-	0	19
Top fruit	-	-	-	-	-	-	-	-	-	-	-	-	3	50
Other tillage	-	0.9	-	-	4.3	5.2	-	4.9	-	-	4.9	4.9	6	78
All tillage	3.8	1.4	1.1	0.8	0.9	8.0	4.7	6.2	5.3	7.2	8.2	5.7	344	4531
Grass under years	2.9	0.1	0.6	-	2.2	5.8	3.9	4.2	4.9	-	5.6	4.6	51	702
Grass 5 years and over	2.0	0.2	0.4	-	0.3	3.0	3.9	5.7	4.8	-	9.6	4.8	114	2282
All grass	2.2	0.2	0.4	-	0.6	3.4	3.9	5.5	4.8	-	7.5	4.7	165	2984
All crops and grass	2.9	0.7	0.7	0.4	0.7	5.5	4.4	6.1	5.1	7.2	7.9	5.4	509	7515

Source: British Survey of Fertiliser Practice 2003.

Table EW1.5 Percentage of crop area by field application rate - N, England and Wales 2003

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	29	0	5	7	10	0	14	10	11	6	2	0	4	2	-	-	-	-	64
Winter wheat	1	0	1	3	3	3	5	13	17	20	14	10	3	3	2	-	-	-	1825
Spring barley	6	1	4	8	18	23	27	8	2	2	1	-	-	-	-	-	-	-	435
Winter barley	1	1	3	4	4	13	29	24	10	6	3	1	1	-	-	-	-	-	526
Oats	11	0	7	5	17	27	22	8	2	0	1	-	-	-	-	-	-	-	156
Rye/Triticale/Durum wheat	39	0	0	8	4	23	13	4	7	2	-	-	-	-	-	-	-	-	22
Seed potatoes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
Early potatoes	50	0	0	0	0	0	0	0	21	29	-	-	-	-		-	-	-	8
2nd Early/Maincrop potatoes	7	8	6	3	1	6	7	18	13	17	11	2	2	-	-	-	-	-	115
Sugar beet	4	0	7	9	20	24	28	4	1	2	1	-	-	-	-	-	-	-	208
Spring oilseed rape	5	1	4	1	10	15	23	20	12	4	3	3	-	-	-	-	-	-	84
Winter oilseed rape	1	0	3	3	3	4	1	13	16	20	15	8	8	4	0	2	-	-	308
Linseed	22	1	20	23	21	3	2	0	0	0	0	0	0	7	-	-	-	-	32
Forage maize	26	16	14	20	13	7	0	1	4	-	-	-	-	-	-	-	-	-	124
Root crops for stockfeed	28	4	13	14	7	2	12	6	13	-	-	-	-	-	-	-	-	-	29
Leafy forage crops	27	0	0	31	4	15	23	-	-	-	-	-	-	-	-	-	-	-	15
Arable silage/Other fodder crop	49	0	17	2	4	6	1	1	0	0	20	-	-	-	-	-	-	-	24
Peas - human consumption	96	2	0	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	68
Peas - animal consumption	92	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	88
Beans - animal consumption	92	2	5	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	171
Vegetables (brassicae)	1	0	0	20	0	0	7	0	23	8	12	26	2	-	-	-	-	-	18
Vegetables (other)	36	1	2	3	6	21	8	3	14	0	2	4	-	-	-	-	-	-	61
Soft fruit	8	0	3	1	29	34	1	22	0	0	0	0	2	-	-	-	-	-	19
Top fruit	46	0	12	1	11	19	11	-	-	-	-	-	-	-	-	-	-	-	50
Other tillage	65	4	7	4	6	5	6	3	-	-	-	-	-	-	-	-	-	-	78
All tillage	11	1	3	5	6	8	11	12	12	12	9	5	2	2	1	-	-	-	4531
Grass under 5 years	18	1	4	8	9	7	13	7	7	5	6	3	3	5	3	1	-	-	702
Grass 5 years and over	36	2	10	16	10	5	6	5	3	2	1	2	1	1	1	-	-	-	2282
All grass	33	1	9	15	10	6	7	5	3	2	2	2	1	1	1	1	-	-	2984
All crops and grass	23	1	6	10	8	7	9	8	7	7	5	3	2	2	1	-	-	-	7515

Source: British Survey of Fertiliser Practice 2003.

Table EW1.6 Percentage of crop area by field application rate - P_2O_5, England and Wales 2003

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	59	18	9	4	10	-	-	-	-	-	-	-	-	-	-	-	-	-	64
Winter wheat	41	4	10	26	15	4	-	-	-	-	-	-	-	-	-	-	-	-	1825
Spring barley	37	12	23	21	7	-	-	-	-	-	-	-	-	-	-	-	-	-	435
Winter barley	33	5	16	29	14	3	-	-	-	-	-	-	-	-	-	-	-	-	526
Oats	32	1	17	36	13	1	1	-	-	-	-	-	-	-	-	-	-	-	156
Rye/Triticale/Durum wheat	75	0	1	3	17	4	-	-	-	-	-	-	-	-	-	-	-	-	22
Seed potatoes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
Early potatoes	50	11	0	7	0	0	0	23	0	9	-	-	-	-	-	-	-	-	8
2nd Early/Maincrop potatoes	15	9	4	6	5	3	9	14	12	9	10	1	0	1	2	-	-	-	115
Sugar beet	47	5	19	12	11	2	3	0	1	0	1	-	-	-	-	-	-	-	208
Spring oilseed rape	50	7	18	12	8	5	-	-	-	-	-	-	-	-	-	-	-	-	84
Winter oilseed rape	39	8	7	30	14	1	2	-	-	-	-	-	-	-	-	-	-	-	308
Linseed	59	8	2	24	7	-	-	-	-	-	-	-	-	-	-	-	-	-	32
Forage maize	43	10	9	20	5	2	3	6	0	0	0	2	-	-	-	-	-	-	124
Rootcrops for stockfeed	36	3	6	6	17	2	19	6	5	-	-	-	-	-	-	-	-	-	29
Leafy forage crops	36	10	49	5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	15
Arable silage/Other fodder crop	72	6	9	12	1	-	-	-	-	-	-	-	-	-	-	-	-	-	24
Peas - human consumption	69	2	6	15	5	0	1	0	0	1	-	-	-	-	-	-	-	-	68
Peas - animal consumption	65	6	9	12	6	0	1	-	-	-	-	-	-	-	-	-	-	-	88
Beans - animal consumption	58	1	9	18	9	4	-	-	-	-	-	-	-	-	-	-	-	-	171
Vegetables (brassicae)	1	20	67	6	0	0	0	6	-	-	-	-	-	-	-	-	-	-	18
Vegetables (other)	37	3	12	26	14	3	6	-	-	-	-	-	-	-	-	-	-	-	61
Soft fruit	66	11	22	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19
Top fruit	83	8	0	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50
Other tillage	63	5	4	15	10	2	0	2	-	-	-	-	-	-	-	-	-	-	78
All tillage	42	5	12	24	12	3	1	1	-	-	-	-	-	-	-	-	-	-	4531
Grass under 5 years	38	22	27	10	2	1	-	-	-	-	-	-	-	-	-	-	-	-	702
Grass 5 years and over	48	22	22	5	1	1	-	-	-	-	-	-	-	-	-	-	-	-	2282
All grass	47	22	23	6	1	1	-	-	-	-	-	-	-	-	-	-	-	-	2984
All crops and grass	44	15	18	14	6	2	-	-	-	-	-	-	-	-	-	-	-	-	7515

Source: British Survey of Fertiliser Practice 2003.

Table EW1.7 Percentage of crop area by field application rate - K_2O, England and Wales 2003

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	6	9	19	13	-	-	-	-	-	-	-	-	-	-	-	-	-	64
Winter wheat	41	3	7	16	20	9	3	1	-	-	-	-	-	-	-	-	-	-	1825
Spring barley	29	7	19	17	19	8	1	-	-	-	-	-	-	-	-	-	-	-	435
Winter barley	25	4	9	20	27	9	3	1	1	-	-	-	-	-	-	-	-	-	526
Oats	25	1	12	27	24	8	2	2	-	-	-	-	-	-	-	-	-	-	156
Rye/Triticale/Durum wheat	73	0	1	0	0	26	-	-	-	-	-	-	-	-	-	-	-	-	22
Seed potatoes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
Early potatoes	50	0	0	0	0	0	11	21	0	0	0	0	16	0	0	2	-	-	8
2nd Early/Maincrop potatoes	10	2	3	3	5	2	4	4	5	2	6	6	18	17	9	1	1	2	115
Sugar beet	28	4	5	3	11	12	10	15	4	3	2	2	0	0	0	0	1	-	208
Spring oilseed rape	44	6	18	6	14	12	0	1	-	-	-	-	-	-	-	-	-	-	84
Winter oilseed rape	42	7	10	18	13	7	1	1	0	1	-	-	-	-	-	-	-	-	308
Linseed	52	4	7	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	32
Forage maize	44	6	7	5	13	9	4	1	3	2	3	4	-	-	-	-	-	-	124
Rootcrops for stockfeed	37	1	6	7	17	4	5	4	18	-	-	-	-	-	-	-	-	-	29
Leafy forage crops	36	10	49	5	0	1	-	-	-	-	-	-	-	-	-	-	-	-	15
Arable silage/Other fodder crop	53	6	12	7	1	0	15	5	-	-	-	-	-	-	-	-	-	-	24
Peas - human consumption	70	2	5	11	7	3	0	0	0	1	1	-	-	-	-	-	-	-	68
Peas - animal consumption	50	5	7	15	17	3	1	3	-	-	-	-	-	-	-	-	-	-	88
Beans - animal consumption	64	2	4	8	15	5	-	-	-	-	-	-	-	-	-	-	-	-	171
Vegetables (brassicae)	1	20	0	0	0	0	0	24	26	19	8	2	-	-	-	-	-	-	18
Vegetables (other)	36	0	3	3	4	3	10	17	2	14	5	3	-	-	-	-	-	-	61
Soft fruit	64	3	4	0	1	0	19	0	0	0	8	-	-	-	-	-	-	-	19
Top fruit	80	3	1	4	0	8	0	4	-	-	-	-	-	-	-	-	-	-	50
Other tillage	63	5	4	2	4	6	1	9	6	-	-	-	-	-	-	-	-	-	78
All tillage	39	4	9	15	18	8	3	2	1	-	-	-	-	-	-	-	-	-	4531
Grass under 5 years	33	15	21	14	5	8	2	1	2	-	-	-	-	-	-	-	-	-	702
Grass 5 years and over	50	20	21	6	1	1	0	1	-	-	-	-	-	-	-	-	-	-	2282
All grass	47	19	21	7	2	2	1	1	-	-	-	-	-	-	-	-	-	-	2984
All crops and grass	43	12	15	11	9	5	2	1	1	-	-	-	-	-	-	-	-	-	7515

Source: British Survey of Fertiliser Practice 2003.

Table EW2.1 Average fertiliser practice by grassland utilisation, England and Wales 2003

	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	59	47	45	26	102	28	27	61	13	12	1428
Grazed - mown	81	64	67	63	133	33	49	108	21	33	1286
All grazings	67	53	52	39	115	30	37	77	16	19	2714
Cut for seed - grazed	-	-	-	-	-	-	-	-	-	-	0
Cut for seed - not grazed	-	-	-	-	-	-	-	-	-	-	4
All cut for seed	-	-	-	-	-	-	-	-	-	-	4
Cut for silage - grazed	85	68	72	70	143	34	53	121	23	39	946
Cut for silage - not grazed	89	73	80	61	184	42	65	164	31	52	145
All cut for silage	85	68	73	68	149	35	55	127	24	40	1091
Cut for hay - grazed	69	50	49	46	98	30	35	67	15	17	393
Cut for hay - not grazed	51	35	34	42	91	35	45	46	12	15	83
All cut for hay	66	48	47	45	97	31	36	64	15	17	476
All mowings	81	63	67	62	137	34	51	111	21	34	1496
All grass	67	53	53	40	118	30	39	79	16	20	2984

Source: British Survey of Fertiliser Practice 2003.

Table EW2.2 Percentage of grass area by field application rate - N, England and Wales 2003

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	41	2	11	17	8	4	5	4	2	2	1	1	1	0	2	-	-	-	1428
Grazed - mown	19	1	6	12	14	10	11	6	5	4	3	2	2	2	1	1	-	-	1286
All grazings	33	2	10	15	10	6	7	5	3	2	2	2	1	1	1	1	-	-	2714
Cut for seed - grazed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Cut for seed - not grazed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
All cut for seed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Cut for silage - grazed	15	0	5	11	14	10	13	6	6	4	4	3	3	2	1	1	1	-	946
Cut for silage - not grazed	11	0	1	13	10	7	5	8	7	5	5	8	2	10	8	1	-	-	145
All cut for silage	15	0	5	12	13	10	12	7	6	4	4	4	3	3	2	1	1	-	1091
Cut for hay - grazed	31	2	9	14	14	10	8	6	2	2	1	0	0	0	0	1	-	-	393
Cut for hay - not grazed	49	1	7	17	10	5	5	1	2	0	0	0	2	1	-	-	-	-	83
All cut for hay	34	1	9	15	14	9	7	5	2	1	1	0	1	0	1	-	-	-	476
All mowings	19	1	6	13	14	9	10	6	5	4	3	3	2	3	1	1	-	-	1496
All grass	33	1	9	15	10	6	7	5	3	2	2	2	1	1	1	1	-	-	2984

Source: British Survey of Fertiliser Practice 2003.

Table EW2.3 Percentage of grass area by field application rate - P_2O_5, England and Wales 2003

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	53	23	19	4	0	1	-	-	-	-	-	-	-	-	-	-	-	-	1428
Grazed - mown	36	23	30	9	2	-	-	-	-	-	-	-	-	-	-	-	-	-	1286
All grazings	47	23	23	6	1	1	-	-	-	-	-	-	-	-	-	-	-	-	2714
Cut for seed - grazed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Cut for seed - not grazed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
All cut for seed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Cut for silage - grazed	32	24	31	10	2	-	-	-	-	-	-	-	-	-	-	-	-	-	946
Cut for silage - not grazed	27	19	33	10	10	1	-	-	-	-	-	-	-	-	-	-	-	-	145
All cut for silage	32	23	32	10	3	-	-	-	-	-	-	-	-	-	-	-	-	-	1091
Cut for hay - grazed	50	19	24	6	1	-	-	-	-	-	-	-	-	-	-	-	-	-	393
Cut for hay - not grazed	65	10	16	5	3	-	-	-	-	-	-	-	-	-	-	-	-	-	83
All cut for hay	52	17	22	6	1	-	-	-	-	-	-	-	-	-	-	-	-	-	476
All mowings	37	22	29	9	2	-	-	-	-	-	-	-	-	-	-	-	-	-	1496
All grass	47	23	23	6	1	1	-	-	-	-	-	-	-	-	-	-	-	-	2984

Source: British Survey of Fertiliser Practice 2003.

Table EW2.4 Percentage of grass area by field application rate - K_2O, England and Wales 2003

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	55	21	19	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1428
Grazed - mown	33	17	24	13	5	5	1	1	1	-	-	-	-	-	-	-	-	-	1286
All grazings	48	19	21	7	2	2	-	-	-	-	-	-	-	-	-	-	-	-	2714
Cut for seed - grazed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Cut for seed - not grazed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
All cut for seed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Cut for silage - grazed	28	16	25	15	6	7	1	1	1	-	-	-	-	-	-	-	-	-	946
Cut for silage not grazed	20	18	26	10	3	12	5	4	0	1	0	1	-	-	-	-	-	-	145
All cut for silage	27	16	25	14	5	7	2	2	1	-	-	-	-	-	-	-	-	-	1091
Cut for hay - grazed	51	17	22	9	1	0	0	0	1	-	-	-	-	-	-	-	-	-	393
Cut for hay - not grazed	66	8	18	4	1	1	2	0	0	1	-	-	-	-	-	-	-	-	83
All cut for hay	53	15	21	8	1	0	0	0	1	-	-	-	-	-	-	-	-	-	476
All mowings	33	16	24	12	4	6	1	1	1	-	-	-	-	-	-	-	-	-	1496
All grass	47	19	21	7	2	2	1	1	-	-	-	-	-	-	-	-	-	-	2984

Source: British Survey of Fertiliser Practice 2003.

Table EW3.0 Product and nutrient use by month of application, England and Wales 2003.

(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	7	29	36	18	5	2	2	1621
Straight P	14	6	0	3	11	10	13	11	15	1	1	6	33
Straight K	5	3	8	11	4	28	29	8	4	0	0	0	71
Compounds	7	5	2	1	1	8	26	22	13	8	4	4	1634
All fertilisers	4	3	1	1	1	8	28	28	15	6	3	3	3351

(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	6	29	34	18	7	3	2	881
P_2O_5	11	9	3	2	3	11	23	19	9	3	2	5	205
K_2O	9	8	3	2	3	11	26	17	9	5	2	4	274
Total	4	3	1	1	1	8	28	28	15	6	3	3	1359

Note: product use refers to the total tonnage of the products used by farmers in the survey year 2003;
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 2003.

Table EW3.1 Product type as percentage of all product used by crop group, England and Wales 2003

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	2.9	2.8	0.0	1.2	6.4	1.7	2.9	0.1	0.0	0.3	0.0	0.2	1.9
Urea	2.9	6.6	2.8	1.4	9.5	0.9	5.9	2.2	1.9	2.3	0.6	2.2	4.5
Ammonium Nitrate	34.3	45.0	7.1	23.0	38.2	19.2	39.3	25.4	28.4	20.0	21.2	24.7	33.9
UAN	7.3	9.5	1.3	2.3	9.2	0.8	8.1	0.3	0.2	0.4	0.0	0.3	5.2
Other Straight N	1.6	4.0	1.6	1.5	5.6	2.5	3.7	0.3	0.3	1.0	0.0	0.6	2.6
Triple Superphosphate	0.3	1.1	0.1	0.7	1.0	2.6	1.1	0.6	0.2	0.2	1.0	0.5	0.9
Single Superphosphate	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.0	0.1	0.0
Other Straight P	0.0	0.0	0.1	0.0	0.0	1.4	0.1	0.0	0.0	0.0	0.0	0.0	0.1
Muriate of Potash	1.8	1.7	4.7	1.2	1.4	6.9	2.1	0.2	0.0	0.4	1.6	0.2	1.4
Other Straight K	0.0	0.1	1.9	17.7	0.2	0.8	1.1	0.1	0.0	0.1	2.0	0.1	0.7
NP	0.2	0.9	2.7	0.6	1.9	3.2	1.2	3.3	1.6	1.6	0.0	3.1	1.9
NK	2.8	1.3	2.4	1.1	0.8	7.6	1.7	7.5	3.6	15.2	13.7	8.0	4.0
PK	14.6	17.9	9.6	27.8	11.9	30.3	17.9	1.7	1.7	1.9	3.5	1.7	11.9
Very High N	5.8	3.9	1.2	0.2	1.1	2.8	3.4	31.0	20.2	29.2	24.4	31.0	13.6
High N	15.1	1.1	3.1	0.0	0.2	2.9	2.1	24.0	34.1	22.7	23.3	23.5	10.0
High P	0.3	0.2	3.3	0.5	0.7	0.2	0.4	0.3	1.4	0.3	0.0	0.3	0.4
High K	2.3	0.8	33.4	3.5	0.9	3.3	2.6	1.0	1.5	1.9	0.0	1.1	2.1
Low N	2.5	2.1	9.6	13.6	8.6	2.1	3.8	0.1	3.1	0.3	3.5	0.5	2.6
Low P	3.6	0.2	8.2	3.0	0.2	7.3	1.3	0.6	0.9	1.1	0.0	0.6	1.0
Equal NPK	1.7	0.8	6.7	0.5	2.0	3.3	1.3	1.3	1.0	60.9	5.3	1.3	1.3
Total Product ('000 tonnes)	**143**	**1418**	**93**	**108**	**233**	**116**	**2111**	**1124**	**116**	**569**	**7**	**1240**	**3351**

N.B: Precise estimates of quantities by product type cannot be derived from the data collected (at field level) on 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 2003.

Table EW3.2 Use of product type by crop group, England and Wales 2003

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	6.6	61.4	0.0	2.1	23.4	3.1	96.6	2.1	0.0	2.8	0.0	3.4	64
Urea	2.7	61.5	1.7	1.0	14.6	0.7	82.1	15.7	1.4	8.5	0.0	17.9	151
Ammonium Nitrate	4.3	56.2	0.6	2.2	7.8	2.0	73.1	24.7	2.9	9.9	0.1	26.9	1135
UAN	5.9	76.9	0.7	1.4	12.3	0.6	97.8	1.8	0.1	1.2	0.0	2.2	176
Other Straight N	2.7	65.9	1.7	1.9	15.2	3.4	90.8	4.1	0.4	6.3	0.0	9.2	86
Triple Superphosphate	1.6	54.5	0.4	2.6	7.9	10.4	77.4	21.9	0.8	3.1	0.2	22.6	29
Single Superphosphate	0.0	0.0	14.4	0.0	0.0	13.9	28.3	71.7	17.4	54.2	0.0	71.7	1
Other Straight P	0.0	0.0	5.7	1.3	2.6	71.0	80.5	19.5	0.0	3.5	0.0	19.5	2
Muriate of Potash	5.4	52.4	9.4	2.9	7.0	17.0	94.0	5.0	0.0	4.7	0.2	6.0	47
Other Straight K	0.1	6.7	7.1	77.8	1.7	3.6	97.0	2.4	0.0	1.5	0.6	3.0	25
NP	0.6	21.1	4.0	1.0	7.1	5.8	39.5	57.0	2.8	14.5	0.0	60.5	64
NK	2.9	13.1	1.6	0.9	1.4	6.5	26.5	61.6	3.1	63.2	0.7	73.5	135
PK	5.2	63.9	2.2	7.6	7.0	8.8	94.7	4.7	0.5	2.7	0.1	5.3	398
Very High N	1.8	12.3	0.2	0.0	0.6	0.7	15.7	76.4	5.1	36.5	0.4	84.3	455
High N	6.4	4.6	0.8	0.0	0.2	1.0	13.0	80.4	11.8	38.5	0.5	87.0	335
High P	3.1	20.5	25.9	4.9	14.4	1.7	70.6	26.6	13.6	12.2	0.0	29.4	12
High K	4.7	17.0	44.8	5.4	2.9	5.6	80.4	15.4	2.4	15.9	0.0	19.6	69
Low N	4.2	35.5	10.4	17.1	23.4	2.8	93.5	1.1	4.1	2.2	0.3	6.5	86
Low P	14.9	6.6	21.9	9.4	1.0	24.3	78.0	19.6	2.9	17.5	0.0	22.0	35
Equal NPK	5.4	23.8	13.8	1.1	10.6	8.5	63.2	32.2	2.5	11.2	0.8	36.8	45
All Fertilisers	**4.2**	**42.3**	**2.8**	**3.3**	**7.0**	**3.5**	**63.1**	**33.0**	**3.4**	**16.7**	**0.2**	**36.9**	**3351**

N.B: Precise estimates of quantities by product type cannot be derived from the data collected (at field level) on 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 2003.

Table EW3.3 Product use by month of application, England and Wales 2003.

row %	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	total Product ('000 tonnes)
Calcium Ammonium Nitrate	0.0	24.7	56.0	11.1	3.2	1.9	0.6	0.5	2.0	0.0	0.0	0.0	64
Urea	0.0	8.2	36.8	38.0	14.7	1.5	0.2	0.2	0.2	0.2	0.0	0.0	151
Ammonium Nitrate	0.1	4.9	27.1	37.2	19.8	5.0	2.9	1.9	0.7	0.1	0.2	0.0	1135
UAN	0.1	10.8	30.8	40.9	14.5	1.2	0.8	0.4	0.3	0.1	0.0	0.0	176
Other straight N	0.0	12.9	25.1	25.3	12.5	16.4	5.2	1.8	0.1	0.4	0.0	0.4	86
Triple Superphosphate	12.1	21.3	13.0	7.1	15.3	0.7	0.6	4.5	15.4	7.2	0.1	2.9	29
Single Superphosphate	0.0	0.0	14.4	6.1	0.0	0.0	0.0	71.7	7.8	0.0	0.0	0.0	1
Other Straight P	0.0	5.4	14.9	59.9	18.1	0.0	0.0	0.0	1.5	0.3	0.0	0.0	2
Muriate of Potash	6.0	23.9	36.9	10.6	5.4	0.7	0.4	0.1	5.8	1.6	4.2	4.4	47
Other Straight K	1.5	34.7	14.3	4.3	0.3	0.0	0.0	0.3	2.6	4.2	14.5	23.4	25
NP	0.0	19.1	36.0	15.7	11.9	2.7	1.3	1.3	8.4	3.6	0.0	0.0	64
NK	0.4	1.5	20.0	12.3	21.2	28.8	10.0	4.9	0.8	0.1	0.0	0.0	135
PK	4.6	16.0	15.3	6.5	0.9	0.3	0.7	6.9	21.7	17.6	6.3	3.2	398
Very High N	0.0	2.4	29.2	26.3	15.8	14.8	6.8	3.7	1.0	0.0	0.1	0.0	455
High N	0.1	3.1	23.0	35.1	24.5	6.3	4.3	2.6	0.7	0.1	0.0	0.0	335
High P	0.0	11.6	12.4	45.6	0.6	0.1	0.0	3.9	10.8	12.7	2.3	0.0	12
High K	0.0	5.1	49.1	32.7	9.6	1.2	0.1	0.0	1.4	0.9	0.0	0.0	69
Low N	1.4	23.9	45.8	8.7	2.2	0.6	0.0	6.1	3.8	5.8	1.7	0.0	86
Low P	0.0	3.6	48.8	30.8	9.5	4.0	0.4	2.9	0.0	0.0	0.0	0.0	35
Equal NPK	4.5	4.2	21.1	35.3	9.8	3.9	0.4	3.9	4.2	2.9	9.8	0.0	45
All Fertilisers	**0.9**	**8.1**	**27.6**	**28.1**	**14.9**	**6.3**	**3.1**	**2.9**	**3.7**	**2.6**	**1.2**	**0.7**	**3351**

N.B: Precise estimates of quantities by product type cannot be derived from the data collected (at field level) on 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 2003.

Table EW4.1 Average fertiliser practice on tillage and grassland by BSFP region, 2003

		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	91	59	70	32	189	66	92	172	39	64	217
	All grass	67	37	43	41	149	30	51	100	11	22	163
	All crops & grass	78	46	56	37	169	50	74	132	23	41	380
Anglia	All tillage	90	54	48	8	171	66	87	153	36	42	942
	All grass	39	22	22	5	87	53	53	34	12	12	65
	All crops & grass	85	51	46	7	168	66	85	143	34	39	1007
Northern	All tillage	94	72	80	28	130	43	68	122	31	55	260
	All grass	73	64	65	47	99	26	31	73	17	20	606
	All crops & grass	76	65	67	43	106	29	39	81	19	26	866
North East	All tillage	92	52	63	16	176	67	95	162	35	60	865
	All grass	59	40	43	39	145	34	45	86	14	19	376
	All crops & grass	78	47	54	26	166	55	79	129	26	42	1241
North Mercia	All tillage	79	56	63	41	144	51	85	114	28	53	175
	All grass	61	46	46	53	132	27	31	80	12	14	193
	All crops & grass	67	49	51	49	137	36	52	91	17	27	368
South Mercia	All tillage	86	64	63	16	187	66	74	160	43	47	341
	All grass	67	44	40	17	124	33	42	83	14	17	176
	All crops & grass	76	54	52	17	162	54	63	124	29	33	517
East Midland	All tillage	92	60	60	10	164	63	76	150	38	46	820
	All grass	68	32	30	24	113	27	33	77	8	10	216
	All crops & grass	85	52	52	14	153	57	69	129	30	36	1036
South East	All tillage	86	61	64	8	187	60	77	161	36	49	628
	All grass	47	29	28	14	118	31	41	55	9	11	281
	All crops & grass	70	48	49	10	169	53	69	118	25	34	909
South West	All tillage	82	77	76	37	134	60	80	110	46	60	173
	All grass	89	76	77	57	135	31	49	120	24	38	271
	All crops & grass	87	76	77	52	134	38	56	117	29	43	444
Wales	All tillage	80	72	73	72	88	74	83	70	53	61	110
	All grass	72	68	65	45	104	32	37	75	22	24	637
	All crops & grass	72	68	65	46	103	34	39	75	23	25	747

Source: British Survey of Fertiliser Practice 2003.

Table EW5.1 Average fertiliser practice on dairy farms, England and Wales 2003

	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	54	50	50	76	94	33	45	51	17	22	11
Winter wheat	93	58	59	44	164	45	68	153	26	40	87
Spring barley	84	68	73	80	80	28	36	67	19	26	56
Winter barley	100	71	75	52	117	43	61	117	30	46	48
Oats	84	67	67	59	94	51	75	80	34	51	8
Rye/Triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	2
Seed potatoes	-	-	-	-	-	-	-	-	-	-	0
Early potatoes	-	-	-	-	-	-	-	-	-	-	0
2nd Early/Maincrop potatoes	66	100	100	81	163	146	221	107	146	221	5
Sugar beet	100	31	100	100	130	132	139	130	41	139	5
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	4
Winter oilseed rape	-	-	-	-	-	-	-	-	-	-	2
Linseed	-	-	-	-	-	-	-	-	-	-	2
Forage maize	79	58	57	96	59	71	119	46	41	68	78
Rootcrops for stockfeed	36	47	22	64	40	118	56	14	56	13	5
Leafy forage crops	-	-	-	-	-	-	-	-	-	-	4
Arable silage/Other fodder crop	78	38	63	64	63	37	34	49	14	21	7
Peas - human consumption	-	-	-	-	-	-	-	-	-	-	1
Peas - animal consumption	-	-	-	-	-	-	-	-	-	-	4
Beans - animal consumption	-	-	-	-	-	-	-	-	-	-	2
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	0
Vegetables (other)	-	-	-	-	-	-	-	-	-	-	0
Soft fruit	-	-	-	-	-	-	-	-	-	-	1
Top fruit	-	-	-	-	-	-	-	-	-	-	0
Other tillage	-	-	-	-	-	-	-	-	-	-	3
All tillage	83	60	62	69	107	52	80	89	31	49	335
Grass under 5 years	89	67	76	73	201	32	66	179	22	50	232
Grass 5 years and over	78	57	58	63	156	31	45	122	18	26	546
All grass	80	59	62	65	167	32	51	134	19	32	778
All crops and grass	81	59	62	66	158	35	55	128	20	34	1113

Source: British Survey of Fertiliser Practice 2003.

Table EW5.2 Average fertiliser practice on cattle and sheep farms, England and Wales 2003

	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	71	135	46	46	135	46	46	5
Winter wheat	100	84	86	33	180	65	71	180	54	61	48
Spring barley	93	91	93	62	84	40	45	78	36	42	54
Winter barley	100	78	89	20	132	58	69	132	45	61	49
Oats	76	46	46	55	119	47	50	90	22	23	15
Rye/Triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	1
Seed potatoes	-	-	-	-	-	-	-	-	-	-	0
Early potatoes	-	-	-	-	-	-	-	-	-	-	1
2nd Early/Maincrop potatoes	-	-	-	-	-	-	-	-	-	-	3
Sugar beet	-	-	-	-	-	-	-	-	-	-	0
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	1
Winter oilseed rape	-	-	-	-	-	-	-	-	-	-	3
Linseed	-	-	-	-	-	-	-	-	-	-	1
Forage maize	51	51	36	94	65	53	63	33	27	22	8
Rootcrops for stockfeed	95	95	95	90	112	96	122	106	92	117	10
Leafy forage crops	82	82	82	18	105	29	29	86	24	24	7
Arable silage/Other fodder crop	-	-	-	-	-	-	-	-	-	-	4
Peas - human consumption	-	-	-	-	-	-	-	-	-	-	0
Peas - animal consumption	-	-	-	-	-	-	-	-	-	-	2
Beans - animal consumption	-	-	-	-	-	-	-	-	-	-	3
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	0
Vegetables (other)	-	-	-	-	-	-	-	-	-	-	2
Soft fruit	-	-	-	-	-	-	-	-	-	-	1
Top Fruit	-	-	-	-	-	-	-	-	-	-	0
Other tillage	-	-	-	-	-	-	-	-	-	-	1
All tillage	93	77	83	42	142	56	66	132	44	55	219
Grass under 5 years	89	78	77	49	109	32	39	97	25	30	182
Grass 5 years and over	60	55	53	37	77	28	29	46	16	15	1163
All grass	62	56	54	38	80	29	30	49	16	16	1345
All crops and grass	64	58	56	38	85	31	33	54	18	18	1564

Source: British Survey of Fertiliser Practice 2003.

Table EW5.3 Average fertiliser practice on other livestock/mixed farms, England and Wales 2003

	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	25	25	25	13	275	75	75	70	19	19	10
Winter wheat	97	64	69	20	188	64	82	183	41	56	311
Spring barley	96	70	73	33	116	43	47	111	30	34	64
Winter barley	98	72	78	30	141	60	73	138	44	57	105
Oats	71	76	76	29	116	65	71	82	49	54	37
Rye/Triticale/Durum wheat	34	11	11	8	67	121	121	23	14	14	8
Seed potatoes	-	-	-	-	-	-	-	-	-	-	0
Early potatoes	-	-	-	-	-	-	-	-	-	-	2
2nd Early/Maincrop potatoes	59	59	59	73	196	142	288	116	84	170	12
Sugar beet	100	37	66	61	120	56	108	120	20	71	20
Spring oilseed rape	100	100	100	20	53	31	31	53	31	31	16
Winter oilseed rape	100	55	55	14	139	50	64	139	28	36	33
Linseed	-	-	-	-	-	-	-	-	-	-	3
Forage maize	51	56	40	83	87	107	70	45	59	28	30
Rootcrops for stockfeed	-	-	-	-	-	-	-	-	-	-	4
Leafy forage crops	-	-	-	-	-	-	-	-	-	-	1
Arable silage/Other fodder crop	60	47	47	0	44	47	54	26	22	25	5
Peas - human consumption	0	0	0	0	0	0	0	0	0	0	9
Peas - animal consumptio	0	22	22	29	0	65	70	0	14	15	9
Beans - animal consumption	0	38	27	20	4	78	96	0	29	26	31
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	1
Vegetables (other)	53	51	15	76	194	68	84	103	35	12	12
Soft fruit	-	-	-	-	-	-	-	-	-	-	3
Top fruit	-	-	-	-	-	-	-	-	-	-	0
Other tillage	38	44	16	24	82	76	97	31	33	16	13
All tillage	86	62	64	27	164	63	78	141	39	50	739
Grass under 5 years	68	50	50	21	181	36	54	124	18	27	145
Grass 5 years and over	60	40	39	16	120	29	31	72	12	12	244
All grass	62	42	42	17	136	31	38	85	13	16	389
All crops and grass	74	52	53	22	152	49	61	112	26	32	1128

Source: British Survey of Fertiliser Practice 2003.

Table EW5.4 Average fertiliser practice on cropping/horticultural farms, England and Wales 2003

	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	88	38	49	6	154	37	57	136	14	28	38
Winter wheat	99	58	57	8	203	64	76	202	37	43	1379
Spring barley	95	59	68	11	120	49	71	114	29	49	261
Winter barley	100	64	72	6	152	58	81	151	37	58	324
Oats	96	70	79	5	113	60	77	108	42	61	96
Rye/Triticale/Durum wheat	90	10	16	9	156	49	102	140	5	17	11
Seed potatoes	-	-	-	-	-	-	-	-	-	-	3
Early potatoes	71	71	71	17	198	157	225	140	111	160	5
2nd Early/Maincrop potatoes	97	87	92	36	158	150	235	153	131	216	95
Sugar beet	95	55	72	21	107	63	126	102	35	92	183
Spring oilseed rape	94	48	56	16	145	53	65	136	26	36	63
Winter oilseed rape	100	61	58	8	205	61	70	205	37	40	270
Linseed	77	35	43	1	89	57	65	68	20	28	26
Forage maize	89	60	89	66	81	66	88	72	40	79	8
Rootcrops for stockfeed	75	40	48	25	108	125	116	81	50	56	10
Leafy forage crops	-	-	-	-	-	-	-	-	-	-	3
Arable silage/Other fodder crop	17	17	17	73	205	63	138	34	11	23	8
Peas - human consumption	4	34	33	1	40	67	75	2	23	25	58
Peas - animal consumption	8	35	53	9	54	52	72	4	18	38	73
Beans - animal consumption	9	42	53	2	35	62	71	3	26	26	135
Vegetables (brassicae)	99	99	53	23	187	48	147	186	48	146	17
Vegetables (other)	65	64	53	0	131	65	163	86	42	114	47
Soft fruit	100	27	53	0	113	54	123	113	15	36	14
Top fruit	54	17	53	0	92	38	86	50	6	17	50
Other tillage	37	39	53	5	112	65	113	42	25	50	61
All tillage	90	57	53	9	177	64	85	159	37	51	3238
Grass under 5 years	73	47	53	7	129	42	60	94	20	31	143
Grass 5 years and over	56	28	53	4	102	38	43	57	11	12	329
All grass	60	33	53	5	110	40	50	66	13	17	472
All crops and grass	86	54	53	9	171	62	82	146	33	46	3710

Source: British Survey of Fertiliser Practice 2003.

Table SC1.1 Total fertiliser use, Scotland 2003

	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	96	93	93	8	174	56	63	166	52	59	13
Winter wheat	100	87	95	12	201	70	82	200	61	78	155
Spring barley	100	98	99	38	107	60	69	107	59	68	387
Winter barley	100	90	91	24	173	72	82	173	64	74	79
Oats	98	96	96	27	98	51	57	96	49	55	32
Rye/Triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	4
Seed potatoes	-	-	-	-	-	-	-	-	-	-	1
Early potatoes	-	-	-	-	-	-	-	-	-	-	0
2nd Early/Maincrop potatoes	96	96	96	27	181	147	239	174	141	230	23
Sugar beet	-	-	-	-	-	-	-	-	-	-	0
Spring oilseed rape	100	100	100	16	115	55	62	115	55	62	12
Winter oilseed rape	100	95	93	10	225	71	74	225	68	69	56
Linseed	-	-	-	-	-	-	-	-	-	-	1
Forage maize	-	-	-	-	-	-	-	-	-	-	3
Rootcrops for stockfeed	99	99	99	58	83	110	95	83	109	94	36
Leafy forage crops	77	77	77	38	80	46	53	62	36	41	22
Arable silage/Other fodder crop	56	56	56	47	71	48	49	40	27	27	12
Peas - human consumption	0	45	45	0	0	51	57	0	23	26	5
Peas - animal consumption	10	41	41	35	13	62	62	1	25	25	5
Beans - animal consumption	33	100	100	0	9	62	53	3	62	53	5
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	3
Vegetables (other)	75	75	75	10	116	104	121	87	77	91	5
Soft fruit	-	-	-	-	-	-	-	-	-	-	4
Top fruit	-	-	-	-	-	-	-	-	-	-	0
Other tillage	-	-	-	-	-	-	-	-	-	-	1
All tillage	98	94	95	30	138	65	76	135	61	73	864
Grass under 5 years	90	82	79	31	137	37	50	124	31	39	373
Grass 5 years and over	81	72	70	31	112	33	37	91	24	26	469
All grass	84	75	73	31	122	34	42	102	26	31	842
All crops and grass	89	82	81	31	128	48	57	114	39	46	1706

Source: British Survey of Fertiliser Practice 2003.

Table SC1.2 Use of straight fertiliser, Scotland 2003

	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	89	5	0	153	53	0	136	3	0	13
Winter wheat	95	0	12	195	79	90	186	0	11	155
Spring barley	65	0	6	72	70	91	44	0	6	387
Winter barley	96	0	9	160	0	75	154	0	7	79
Oats	47	0	0	119	0	0	45	0	0	32
Rye/Triticale/Durum wheat	-	-	-	-	-	-	-	-	-	4
Seed potatoes	-	-	-	-	-	-	-	-	-	1
Early potatoes	-	-	-	-	-	-	-	-	-	0
2nd Early/Maincrop potatoes	32	0	19	78	0	244	25	0	48	23
Sugar beet	-	-	-	-	-	-	-	-	-	0
Spring oilseed rape	67	0	0	104	0	0	70	0	0	12
Winter oilseed rape	97	0	12	202	0	60	196	0	7	56
Linseed	-	-	-	-	-	-	-	-	-	1
Forage maize	-	-	-	-	-	-	-	-	-	3
Rootcrops for stockfeed	9	1	0	43	102	0	4	1	0	36
Leafy forage crops	17	0	0	87	0	0	15	0	0	22
Arable silage/Other fodder crop	0	0	0	0	0	0	0	0	0	12
Peas - human consumption	0	0	0	0	0	0	0	0	0	5
Peas - animal consumption	0	0	0	0	0	0	0	0	0	5
Beans - animal consumption	0	0	0	0	0	0	0	0	0	5
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	3
Vegetables (other)	57	0	0	90	0	0	52	0	0	5
Soft fruit	-	-	-	-	-	-	-	-	-	4
Top fruit	-	-	-	-	-	-	-	-	-	0
Other tillage	-	-	-	-	-	-	-	-	-	1
All tillage	71	0	7	124	70	93	87	0	7	864
Grass under 5 years	34	0	1	113	72	72	37	0	0	373
Grass 5 years and over	25	1	0	90	57	-	22	0	0	469
All grass	28	0	0	100	57	72	27	0	0	842
All crops and grass	44	0	3	114	62	92	50	0	3	1706

Source: British Survey of Fertiliser Practice 2003.

Table SC1.3 Use of compound fertiliser, Scotland 2003

	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	77	88	93	40	56	63	31	49	59	13
Winter wheat	46	87	87	33	68	76	14	60	67	155
Spring barley	95	98	94	69	63	70	62	58	62	387
Winter barley	57	90	87	35	72	78	20	64	68	79
Oats	80	97	97	86	69	75	51	49	55	32
Rye/Triticale/Durum wheat	-	-	-	-	-	-	-	-	-	4
Seed potatoes	-	-	-	-	-	-	-	-	-	1
Early potatoes	-	-	-	-	-	-	-	-	-	0
2nd Early/Maincrop potatoes	96	96	83	155	147	221	150	141	182	23
Sugar beet	-	-	-	-	-	-	-	-	-	0
Spring oilseed rape	82	100	100	56	55	62	45	55	62	12
Winter oilseed rape	85	95	83	34	71	75	29	68	62	56
Linseed	-	-	-	-	-	-	-	-	-	1
Forage maize	-	-	-	-	-	-	-	-	-	3
Rootcrops for stockfeed	99	99	99	79	109	95	79	108	94	36
Leafy forage crops	71	77	77	66	46	53	47	36	41	22
Arable silage/Other fodder crop	56	56	56	71	48	49	40	27	27	12
Peas - human consumption	0	45	45	0	51	57	0	23	26	5
Peas - animal consumption	10	41	41	13	62	62	3	62	53	5
Beans - animal consumption	33	100	100	9	62	53	1	25	25	5
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	3
Vegetables (other)	75	75	75	47	104	121	35	77	91	5
Soft fruit	-	-	-	-	-	-	-	-	-	4
Top fruit	-	-	-	-	-	-	-	-	-	0
Other tillage	-	-	-	-	-	-	-	-	-	1
All tillage	80	94	91	64	68	76	48	61	66	864
Grass under 5 years	81	82	79	107	37	49	87	31	39	373
Grass 5 years and over	69	72	70	99	32	37	69	23	26	469
All grass	73	75	73	102	34	42	75	26	31	842
All crops and grass	76	82	80	87	49	56	65	39	44	1706

Source: British Survey of Fertiliser Practice 2003.

Table SC1.4 Use of lime, Scotland 2003

	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	13
Winter wheat	1.4	-	1.7	-	-	3.1	5.0	-	3.7	-	-	4.3	9	155
Spring barley	11.2	-	5.8	-	0.2	17.2	4.2	-	3.9	-	3.7	4.1	70	387
Winter barley	7.0	-	4.1	-	-	11.0	4.1	-	4.0	-	-	4.1	7	79
Oats	-	-	-	-	-	-	-	-	-	-	-	-	1	32
Rye/Triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	-	-	0	0
Seed potatoes	-	-	-	-	-	-	-	-	-	-	-	-	0	4
Early potatoes	-	-	-	-	-	-	-	-	-	-	-	-	0	1
2nd Early/Maincrop potatoes	-	-	-	-	-	-	-	-	-	-	-	-	0	23
Sugar beet	-	-	-	-	-	-	-	-	-	-	-	-	0	0
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	-	-	0	12
Winter oilseed rape	-	-	-	-	-	-	-	-	-	-	-	-	4	56
Linseed	-	-	-	-	-	-	-	-	-	-	-	-	0	1
Forage maize	-	-	-	-	-	-	-	-	-	-	-	-	0	3
Rootcrops for stockfeed	1.8	-	6.0	-	0.9	8.7	4.9	-	4.9	-	4.9	4.9	5	36
Leafy forage crops	-	-	-	-	-	-	-	-	-	-	-	-	3	22
Arable silage/Other fodder crop	-	-	-	-	-	-	-	-	-	-	-	-	1	12
Peas - human consumption	-	-	-	-	-	-	-	-	-	-	-	-	1	5
Peas - animal consumption	-	-	-	-	-	-	-	-	-	-	-	-	0	5
Beans - animal consumption	-	-	-	-	-	-	-	-	-	-	-	-	2	5
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	-	-	0	3
Vegetables (other)	-	-	-	-	-	-	-	-	-	-	-	-	0	5
Soft fruit	-	-	-	-	-	-	-	-	-	-	-	-	0	4
Top fruit	-	-	-	-	-	-	-	-	-	-	-	-	0	0
Other tillage	-	-	-	-	-	-	-	-	-	-	-	-	0	1
All tillage	7.1	-	4.8	-	0.1	12.0	4.3	-	4.0	-	3.8	4.2	104	864
Grass under 5 years	3.5	-	1.1	-	0.6	5.2	2.5	-	4.1	-	3.2	2.8	25	373
Grass 5 years and over	1.3	-	0.9	-	2.6	4.8	2.0	-	2.9	-	1.2	1.7	15	469
All grass	2.1	-	1.0	-	1.9	5.0	2.3	-	3.3	-	1.4	2.1	40	842
All crops and grass	3.9	-	2.4	-	1.3	7.6	3.6	-	3.9	-	1.5	3.3	144	1706

Source: British Survey of Fertiliser Practice 2003.

Table SC1.5 Percentage of crop area by field application rate - N, Scotland 2003

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	4	0	0	0	7	0	16	38	11	10	0	13	-	-	-	-	-	-	13
Winter wheat	0	1	0	0	4	1	8	8	15	35	23	4	1	-	-	-	-	-	155
Spring barley	0	1	2	10	24	42	16	2	1	1	-	-	-	-	-	-	-	-	387
Winter barley	0	0	1	5	0	4	18	24	25	17	5	-	-	-	-	-	-	-	79
Oats	2	0	3	26	13	41	6	11	-	-	-	-	-	-	-	-	-	-	32
Rye/Triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Seed potatoes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Early potatoes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
2nd Early/Maincrop potatoes	4	0	0	0	10	0	27	3	14	30	6	0	6	0	1	-	-	-	23
Sugar beet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Spring oilseed rape	0	0	5	20	9	27	18	0	22	-	-	-	-	-	-	-	-	-	12
Winter oilseed rape	0	0	1	0	1	2	2	11	7	18	33	12	3	10	-	-	-	-	56
Linseed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Forage maize	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
Rootcrops for stockfeed	1	0	2	35	39	21	0	0	0	2	-	-	-	-	-	-	-	-	36
Leafy forage crops	23	0	2	35	13	17	2	8	-	-	-	-	-	-	-	-	-	-	22
Arable silage/Other fodder crop	44	7	0	28	8	10	2	-	-	-	-	-	-	-	-	-	-	-	12
Peas - human consumption	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
Peas - animal consumption	90	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
Beans - animal consumption	67	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
Vegetables (other)	25	0	0	12	6	48	0	0	0	10	-	-	-	-	-	-	-	-	5
Soft fruit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Top fruit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Other tillage	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
All tillage	2	1	1	8	16	26	13	7	6	10	6	2	0	1	-	-	-	-	864
Grass under 5 years	10	2	4	19	10	9	11	7	8	7	6	2	2	2	0	1	-	-	373
Grass 5 years and over	19	0	7	26	12	7	10	6	3	4	2	2	0	0	1	-	-	-	469
All grass	16	1	6	24	11	8	10	6	4	5	3	2	1	1	1	1	-	-	842
All crops and grass	11	1	4	18	13	15	11	6	5	7	5	2	1	1	1	1	-	-	1706

Source: British Survey of Fertiliser Practice 2003.

Table SC1.6 Percentage of crop area by field application rate - P_2O_5, Scotland 2003

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	7	0	24	63	6	-	-	-	-	-	-	-	-	-	-	-	-	-	13
Winter wheat	13	1	10	36	37	3	-	-	-	-	-	-	-	-	-	-	-	-	155
Spring barley	2	5	20	57	15	0	1	-	-	-	-	-	-	-	-	-	-	-	387
Winter barley	10	6	5	28	40	9	1	-	-	-	-	-	-	-	-	-	-	-	79
Oats	4	2	40	44	7	3	-	-	-	-	-	-	-	-	-	-	-	-	32
Rye/Triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Seed potatoes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Early potatoes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
2nd Early/Maincrop potatoes	4	0	0	0	6	37	13	13	17	4	0	6	-	-	-	-	-	-	23
Sugar beet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Spring oilseed rape	0	0	38	56	0	7	-	-	-	-	-	-	-	-	-	-	-	-	12
Winter oilseed rape	5	0	8	45	31	11	-	-	-	-	-	-	-	-	-	-	-	-	56
Linseed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Forage maize	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
Rootcrops for stockfeed	1	2	5	7	26	23	23	5	4	3	-	-	-	-	-	-	-	-	36
Leafy forage crops	23	6	36	22	6	7	-	-	-	-	-	-	-	-	-	-	-	-	22
Arable silage/Other fodder crop	44	0	29	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12
Peas - human consumption	55	0	13	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
Peas - animal consumption	59	0	0	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
Beans - animal consumption	0	0	49	35	0	16	-	-	-	-	-	-	-	-	-	-	-	-	5
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
Vegetables (other)	25	0	0	0	57	0	0	17	-	-	-	-	-	-	-	-	-	-	5
Soft fruit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Top fruit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Other tillage	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
All tillage	6	4	16	47	21	3	1	1	-	-	-	-	-	-	-	-	-	-	864
Grass under 5 years	18	20	41	15	5	1	-	-	-	-	-	-	-	-	-	-	-	-	373
Grass 5 years and over	28	28	30	10	2	1	1	-	-	-	-	-	-	-	-	-	-	-	469
All grass	25	25	34	12	3	1	-	-	-	-	-	-	-	-	-	-	-	-	842
All crops and grass	18	17	27	25	10	2	1	-	-	-	-	-	-	-	-	-	-	-	1706

Source: British Survey of Fertiliser Practice 2003.

Table SC1.7 Percentage of crop area by field application rate - K_2O, Scotland 2003

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	7	5	13	36	39	-	-	-	-	-	-	-	-	-	-	-	-	-	13
Winter wheat	5	4	5	25	37	19	5	-	-	-	-	-	-	-	-	-	-	-	155
Spring barley	1	2	15	41	30	9	1	-	-	-	-	-	-	-	-	-	-	-	387
Winter barley	9	4	5	21	37	21	3	-	-	-	-	-	-	-	-	-	-	-	79
Oats	4	2	32	40	19	3	-	-	-	-	-	-	-	-	-	-	-	-	32
Rye/Triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Seed potatoes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Early potatoes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
2nd Early/Maincrop potatoes	4	0	0	0	6	0	0	4	34	3	10	9	3	4	22	-	-	-	23
Sugar beet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Spring oilseed rape	0	0	33	33	27	7	-	-	-	-	-	-	-	-	-	-	-	-	12
Winter oilseed rape	7	0	6	48	21	18	1	-	-	-	-	-	-	-	-	-	-	-	56
Linseed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Forage maize	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
Rootcrops for stockfeed	1	2	3	26	26	18	16	8	-	-	-	-	-	-	-	-	-	-	36
Leafy forage crops	23	6	35	22	1	3	6	3	-	-	-	-	-	-	-	-	-	-	22
Arable silage/Other fodder crop	44	0	29	24	2	-	-	-	-	-	-	-	-	-	-	-	-	-	12
Peas - human consumption	55	0	0	45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
Peas - animal consumption	59	0	0	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
Beans - animal consumption	0	0	49	51	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
Vegetables (other)	25	0	0	0	0	59	10	0	6	-	-	-	-	-	-	-	-	-	5
Soft fruit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Top fruit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Other tillage	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
All tillage	5	2	13	35	30	12	2	0	1	-	-	-	-	-	-	-	-	-	864
Grass under 5 years	21	19	28	13	8	6	3	1	-	-	-	-	-	-	-	-	-	-	373
Grass 5 years and over	30	27	26	6	6	3	1	-	-	-	-	-	-	-	-	-	-	-	469
All grass	27	24	27	9	7	4	2	-	-	-	-	-	-	-	-	-	-	-	842
All crops and grass	19	16	22	18	15	7	2	-	-	-	-	-	-	-	-	-	-	-	1706

Source: British Survey of Fertiliser Practice 2003.

Table SC2.1 Average fertiliser practice by grassland utilisation, Scotland 2003

	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	80	69	66	19	105	30	30	84	21	20	485
Grazed - mown	94	93	92	66	148	39	57	140	36	52	199
All grazings	83	75	72	30	117	33	38	97	25	28	684
Cut for seed - grazed	-	-	-	-	-	-	-	-	-	-	0
Cut for seed - not grazed	-	-	-	-	-	-	-	-	-	-	0
All cut for seed	-	-	-	-	-	-	-	-	-	-	0
Cut for silage - grazed	94	94	94	69	151	40	59	143	38	55	173
Cut for silage - not grazed	92	79	79	42	161	49	71	148	39	56	123
All cut for silage	94	89	89	60	154	43	62	144	38	55	296
Cut for hay - grazed	97	92	84	53	118	28	33	115	26	28	35
Cut for hay - not grazed	75	68	68	8	122	39	44	92	27	30	44
All cut for hay	88	82	77	34	119	32	37	105	26	29	79
All mowings	93	88	87	55	150	42	60	139	36	52	356
All grass	84	75	73	31	122	34	42	102	26	31	842

Source: British Survey of Fertiliser Practice 2003.

Table SC2.2 Percentage of grass area by field application rate - N, Scotland 2003

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	20	0	7	31	10	7	7	6	2	3	2	2	1	0	1	-	-	-	485
Grazed - mown	6	2	2	12	13	9	16	8	8	8	8	2	1	3	2	2	-	-	199
All grazings	17	1	6	27	11	8	9	6	3	4	3	2	1	1	1	1	-	-	684
Cut for seed - grazed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Cut for seed - not grazed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
All cut for seed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Cut for silage - grazed	6	3	2	11	14	10	14	8	8	8	8	2	1	3	2	2	-	-	173
Cut for silage - not grazed	8	0	2	5	9	10	19	7	14	8	8	6	3	1	-	-	-	-	123
All cut for silage	6	2	2	9	12	10	16	8	10	8	8	3	1	3	1	1	-	-	296
Cut for hay - grazed	3	0	3	42	2	1	20	6	7	5	9	-	-	-	-	-	-	-	35
Cut for hay - not grazed	25	0	0	8	21	10	15	11	7	2	2	-	-	-	-	-	-	-	44
All cut for hay	12	0	2	27	10	5	18	8	7	4	6	-	-	-	-	-	-	-	79
All mowings	7	2	2	10	12	9	17	8	10	7	7	3	2	2	1	1	-	-	356
All grass	16	1	5	24	11	8	10	6	4	5	3	2	1	1	1	1	-	-	842

Source: British Survey of Fertiliser Practice 2003.

Table SC2.3 Percentage of grass area by field application rate - P_2O_5, Scotland 2003

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	31	29	31	6	1	1	1	-	-	-	-	-	-	-	-	-	-	-	485
Grazed - mown	7	21	42	24	6	1	-	-	-	-	-	-	-	-	-	-	-	-	199
All grazings	25	27	34	10	2	1	1	-	-	-	-	-	-	-	-	-	-	-	684
Cut for seed - grazed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Cut for seed - not grazed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
All cut for seed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Cut for silage - grazed	6	20	42	26	6	1	-	-	-	-	-	-	-	-	-	-	-	-	173
Cut for silage - not grazed	21	9	34	23	11	2	-	-	-	-	-	-	-	-	-	-	-	-	123
All cut for silage	11	16	39	25	8	1	-	-	-	-	-	-	-	-	-	-	-	-	296
Cut for hay - grazed	8	35	51	4	3	-	-	-	-	-	-	-	-	-	-	-	-	-	35
Cut for hay - not grazed	32	25	20	17	7	-	-	-	-	-	-	-	-	-	-	-	-	-	44
All cut for hay	18	31	37	9	5	-	-	-	-	-	-	-	-	-	-	-	-	-	79
All mowings	12	18	38	23	7	1	-	-	-	-	-	-	-	-	-	-	-	-	356
All grass	25	25	34	12	3	1	-	-	-	-	-	-	-	-	-	-	-	-	842

Source: British Survey of Fertiliser Practice 2003.

Table SC2.4 Percentage of grass area by field application rate - K_2O, Scotland 2003

	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	34	29	27	4	3	2	-	-	-	-	-	-	-	-	-	-	-	-	485
Grazed - mown	8	16	30	19	10	9	6	1	-	-	-	-	-	-	-	-	-	-	199
All grazings	28	26	28	8	5	4	2	-	-	-	-	-	-	-	-	-	-	-	684
Cut for seed - grazed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Cut for seed - not grazed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
All cut for seed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Cut for silage - grazed	6	15	31	20	11	10	7	1	-	-	-	-	-	-	-	-	-	-	173
Cut for silage - not grazed	21	6	30	13	25	10	2	2	0	0	1	-	-	-	-	-	-	-	123
All cut for silage	11	12	27	17	16	10	5	2	-	-	-	-	-	-	-	-	-	-	296
Cut for hay - grazed	16	30	36	13	5	-	-	-	-	-	-	-	-	-	-	-	-	-	35
Cut for hay - not grazed	32	24	18	16	7	3	-	-	-	-	-	-	-	-	-	-	-	-	44
All cut for hay	23	28	28	14	6	1	-	-	-	-	-	-	-	-	-	-	-	-	79
All mowings	13	14	26	17	14	9	4	4	-	-	-	-	-	-	-	-	-	-	356
All grass	27	24	27	9	7	4	2	2	-	-	-	-	-	-	-	-	-	-	842

Source: British Survey of Fertiliser Practice 2003.

Table SC3.0 Product and nutrient use by month of application, Scotland 2003.

(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	5	23	39	21	6	2	3	217
Straight P	0	0	0	0	0	9	9	76	6	0	0	0	1
Straight K	0	1	0	0	0	37	43	17	2	0	0	0	7
Compounds	4	2	1	0	0	2	29	35	9	9	5	4	518
All fertilisers	3	1	1	0	0	3	27	36	13	8	5	3	743

(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	3	25	39	15	9	5	3	177
P_2O_5	6	3	1	0	1	4	36	31	7	5	3	3	61
K_2O	6	2	2	0	1	6	34	29	7	7	3	3	72
Total	3	1	1	0	0	4	29	35	12	7	4	3	310

Note: product use refers to the total tonnage of the products used by farmers in the survey year 2003;
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 2003.

Table SC3.1 Product type as percentage of all product used by crop group, Scotland 2003

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	0.7	1.4	0.0	0.0	1.7	0.0	1.0	0.1	0.0	0.1	0.0	0.1	0.5
Urea	0.7	5.4	0.0	0.0	3.1	0.0	2.5	0.6	0.1	0.5	0.0	0.6	1.5
Ammonium Nitrate	20.6	49.5	4.2	0.0	41.4	4.9	31.2	16.5	27.8	14.0	0.0	17.3	23.9
UAN	1.0	0.9	0.5	0.0	0.2	0.0	0.8	0.1	0.0	0.4	0.0	0.2	0.5
Other Straight N	3.5	5.3	0.5	0.0	16.4	0.0	5.0	0.5	1.0	0.5	0.0	0.6	2.7
Triple Superphosphate	0.2	0.1	0.0	0.0	0.0	0.3	0.2	0.2	0.0	0.0	0.0	0.1	0.1
Single Superphosphate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Straight P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Muriate of Potash	1.0	1.5	5.0	0.0	1.2	0.2	1.3	0.0	0.0	0.1	0.0	0.1	0.7
Other Straight K	0.6	0.4	0.7	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.2
NP	1.9	0.6	4.8	0.0	2.4	0.2	1.6	4.2	3.8	2.0	0.0	4.2	2.9
NK	1.2	0.9	0.0	0.0	0.8	0.0	1.0	1.6	1.4	4.2	0.0	2.3	1.7
PK	2.0	15.4	1.5	0.0	4.2	7.2	6.9	2.7	1.2	1.9	0.0	2.6	4.6
Very High N	4.5	1.0	0.0	0.0	0.0	0.5	2.6	43.8	23.8	37.5	83.8	40.3	22.3
High N	14.0	2.0	0.0	0.0	1.5	24.2	8.4	25.7	35.5	29.4	16.2	25.6	17.4
High P	0.7	1.0	0.0	0.0	0.0	15.5	1.1	0.0	0.0	0.0	0.0	0.0	0.6
High K	11.8	0.6	46.0	0.0	0.4	19.5	8.7	0.2	0.8	2.0	0.0	1.0	4.6
Low N	11.5	13.8	10.6	0.0	18.2	13.2	12.9	1.1	1.1	1.9	0.0	1.4	6.9
Low P	3.8	0.3	26.2	0.0	1.5	1.3	3.3	1.7	1.0	4.2	0.0	2.4	2.8
Equal NPK	20.5	0.0	0.0	0.0	6.9	13.1	11.1	1.1	2.5	1.3	0.0	1.2	6.0
Total Product ('000 tonnes)	**175**	**122**	**16**	**0**	**32**	**10**	**355**	**320**	**29**	**165**	**0**	**388**	**743**

N.B: Precise estimates of quantities by product type cannot be derived from the data collected (at field level) on 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 2003.

Table SC3.2 Use of product type by crop group, Scotland 2003

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	31.8	44.5	0.0	0.0	14.2	0.0	90.6	5.6	0.0	3.7	0.0	9.4	4
Urea	10.3	58.7	0.0	0.0	9.0	0.0	78.0	16.8	0.4	8.1	0.0	22.0	11
Ammonium Nitrate	20.3	33.9	0.4	0.0	7.5	0.3	62.3	29.3	4.4	12.9	0.0	37.7	178
UAN	43.7	29.3	2.1	0.0	1.2	0.0	76.3	6.9	0.0	16.7	0.0	23.7	4
Other Straight N	30.3	31.7	0.4	0.0	26.1	0.0	88.6	7.4	1.4	4.0	0.0	11.4	20
Triple Superphosphate	41.4	9.3	0.0	0.0	0.0	2.5	53.1	46.9	0.0	0.0	0.0	46.9	1
Single Superphosphate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Other Straight P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Muriate of Potash	34.8	36.2	16.0	0.0	7.8	0.4	95.2	1.4	0.0	3.7	0.0	4.8	5
Other Straight K	63.5	30.5	6.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	2
NP	15.3	3.4	3.5	0.0	3.5	0.1	25.7	62.5	4.9	15.3	0.0	74.3	22
NK	17.2	8.4	0.0	0.0	2.1	0.0	27.8	41.3	3.3	55.6	0.0	72.2	12
PK	9.9	54.5	0.7	0.0	3.9	2.2	71.2	24.6	1.0	9.0	0.0	28.8	34
Very High N	4.8	0.7	0.0	0.0	0.0	0.0	5.5	84.7	4.1	37.5	0.2	94.5	165
High N	18.9	1.9	0.0	0.0	0.4	1.9	23.1	63.2	7.8	37.3	0.1	76.9	129
High P	30.1	28.7	0.0	0.0	0.0	39.3	98.1	0.0	0.0	1.9	0.0	1.9	4
High K	59.9	2.0	21.0	0.0	0.4	5.9	89.2	2.3	0.7	9.5	0.0	10.8	34
Low N	39.3	32.8	3.3	0.0	11.4	2.7	89.5	7.1	0.6	6.2	0.0	10.5	51
Low P	31.3	1.7	19.6	0.0	2.4	0.6	55.6	25.8	1.3	32.9	0.0	44.4	21
Equal NPK	80.9	0.0	0.0	0.0	5.0	3.1	89.1	7.8	1.6	4.7	0.0	10.9	44
All Fertilisers	**23.7**	**16.5**	**2.1**	**0.0**	**4.3**	**1.4**	**48.0**	**42.7**	**3.8**	**22.0**	**0.1**	**52.0**	**743**

N.B: Precise estimates of quantities by product type cannot be derived from the data collected (at field level) on 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 2003.

Table SC3.3 Product use by month of application, Scotland 2003.

row %	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	total Product ('000 tonnes)
Calcium Ammonium Nitrate	0.0	32.2	27.8	40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4
Urea	0.0	7.3	41.7	40.9	8.6	1.0	0.5	0.0	0.0	0.0	0.0	0.0	11
Ammonium Nitrate	0.0	3.3	21.2	39.0	22.4	7.0	2.7	3.3	0.5	0.5	0.0	0.0	178
UAN	0.0	0.4	5.0	10.3	56.8	16.1	11.4	0.0	0.0	0.0	0.0	0.0	4
Other straight N	0.0	12.3	34.5	42.2	9.1	2.0	0.0	0.0	0.0	0.0	0.0	0.0	20
Triple Superphosphate	0.0	9.3	7.6	77.3	5.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1
Single Superphosphate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Other Straight P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Muriate of Potash	0.0	37.0	39.9	21.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5
Other straight K	0.0	37.2	52.0	6.0	0.0	0.0	0.0	0.0	0.0	4.8	0.0	0.0	2
NP	0.0	2.4	43.5	31.5	3.1	9.6	4.6	2.7	0.0	2.6	0.0	0.0	22
NK	0.0	1.5	14.0	21.3	18.8	36.8	2.2	5.4	0.0	0.0	0.0	0.0	12
PK	5.1	14.4	32.1	6.0	4.9	0.0	0.3	2.0	13.6	9.7	11.7	0.0	34
Very High N	0.0	0.3	12.5	38.4	13.8	15.6	11.4	6.2	1.9	0.0	0.0	0.0	165
High N	0.0	1.0	24.3	48.5	11.1	7.7	5.1	2.3	0.0	0.0	0.0	0.0	129
High P	0.0	0.0	30.1	7.4	33.8	0.0	0.0	0.0	22.9	5.8	0.0	0.0	4
High K	0.0	1.1	58.6	29.8	7.1	2.6	0.6	0.1	0.0	0.0	0.0	0.0	34
Low N	0.1	7.2	36.0	20.5	1.3	2.0	0.8	6.2	18.4	7.1	0.0	0.5	51
Low P	0.0	0.0	39.0	41.1	5.8	11.0	3.2	0.0	0.0	0.0	0.0	0.0	21
Equal NPK	0.0	0.0	60.0	29.1	3.7	0.6	0.5	2.8	3.3	0.0	0.0	0.0	44
All Fertilisers	**0.2**	**3.3**	**27.3**	**36.1**	**12.6**	**8.1**	**4.5**	**3.4**	**2.7**	**1.2**	**0.5**	**0.0**	**743**

N.B: Precise estimates of quantities by product type cannot be derived from the data collected (at field level) on 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 2003.

Table SC4.1 Average fertiliser practice, North East Scotland 2003

	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	-	-	-	-	-	-	-	-	-	-	2
Winter wheat	96	90	90	13	180	71	104	172	64	94	17
Spring barley	100	95	94	49	101	59	63	101	56	59	37
Winter barley	100	100	100	9	156	72	82	156	72	82	13
Oats	100	100	100	0	91	36	49	91	36	49	5
Rye/Triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	0
Seed potatoes	-	-	-	-	-	-	-	-	-	-	0
Early potatoes	-	-	-	-	-	-	-	-	-	-	0
2nd Early/Maincrop potatoes	-	-	-	-	-	-	-	-	-	-	0
Sugar beet	-	-	-	-	-	-	-	-	-	-	0
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	4
Winter oilseed rape	100	100	100	0	178	58	77	178	58	77	9
Linseed	-	-	-	-	-	-	-	-	-	-	0
Forage maize	-	-	-	-	-	-	-	-	-	-	1
Rootcrops for stockfeed	-	-	-	-	-	-	-	-	-	-	3
Leafy forage crops	-	-	-	-	-	-	-	-	-	-	3
Arable silage/Other fodder crop	-	-	-	-	-	-	-	-	-	-	3
Peas - human consumption	-	-	-	-	-	-	-	-	-	-	1
Peas - animal consumption	-	-	-	-	-	-	-	-	-	-	0
Beans - animal consumption	-	-	-	-	-	-	-	-	-	-	1
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	0
Vegetables (other)	-	-	-	-	-	-	-	-	-	-	1
Soft fruit	-	-	-	-	-	-	-	-	-	-	1
Top fruit	-	-	-	-	-	-	-	-	-	-	0
Other tillage	-	-	-	-	-	-	-	-	-	-	0
All tillage	99	95	95	31	126	60	72	124	57	68	101
Grass under 5 years	95	90	90	17	131	37	42	124	33	38	49
Grass 5 years and over	81	75	72	33	120	35	41	97	26	29	79
All grass	85	79	77	28	124	35	41	105	28	32	128
All crops and grass	88	83	82	29	124	43	51	110	36	41	229

Source: British Survey of Fertiliser Practice 2003.

Table SC4.2 Average fertiliser practice, South East Scotland 2003

	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	-	-	-	-	-	-	-	-	-	-	4
Winter wheat	100	88	100	11	206	67	82	206	59	82	51
Spring barley	100	98	100	39	102	58	67	102	58	67	136
Winter barley	100	88	88	26	171	72	80	171	63	70	43
Oats	100	97	97	29	108	51	58	108	49	57	17
Rye/Triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	0
Seed potatoes	-	-	-	-	-	-	-	-	-	-	2
Early potatoes	-	-	-	-	-	-	-	-	-	-	0
2nd Early/Maincrop potatoes	-	-	-	-	-	-	-	-	-	-	4
Sugar beet	-	-	-	-	-	-	-	-	-	-	0
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	2
Winter oilseed rape	100	94	91	11	235	72	72	235	67	66	33
Linseed	-	-	-	-	-	-	-	-	-	-	0
Forage maize	-	-	-	-	-	-	-	-	-	-	1
Rootcrops for stockfeed	97	97	97	43	82	98	84	79	95	82	18
Leafy forage crops	51	51	51	6	77	36	40	39	19	20	5
Arable silage/Other fodder crop	47	47	47	35	60	54	54	28	26	26	7
Peas - human consumption	-	-	-	-	-	-	-	-	-	-	2
Peas - animal consumption	-	-	-	-	-	-	-	-	-	-	3
Beans - animal consumption	-	-	-	-	-	-	-	-	-	-	3
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	0
Vegetables (other)	-	-	-	-	-	-	-	-	-	-	1
Soft fruit	-	-	-	-	-	-	-	-	-	-	2
Top fruit	-	-	-	-	-	-	-	-	-	-	0
Other tillage	-	-	-	-	-	-	-	-	-	-	0
All tillage	98	94	96	29	142	65	74	139	60	71	334
Grass under 5 years	90	76	76	35	132	36	46	119	27	35	147
Grass 5 years and over	81	68	68	30	105	34	37	85	23	26	151
All grass	84	71	71	32	115	35	41	97	25	29	298
All crops and grass	89	79	80	31	126	48	55	112	38	44	632

Source: British Survey of Fertiliser Practice 2003.

Table SC4.3 Average fertiliser practice, South West Scotland 2003

	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	93	100	100	7	197	56	61	183	56	61	7
Winter wheat	100	82	90	15	201	71	75	201	58	68	75
Spring barley	99	100	99	33	106	58	73	105	58	72	136
Winter barley	100	86	97	21	169	70	80	169	60	78	17
Oats	-	-	-	-	-	-	-	-	-	-	4
Rye/Triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	0
Seed potatoes	-	-	-	-	-	-	-	-	-	-	0
Early potatoes	-	-	-	-	-	-	-	-	-	-	1
2nd Early/Maincrop potatoes	93	93	93	15	199	125	213	185	116	198	11
Sugar beet	-	-	-	-	-	-	-	-	-	-	0
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	2
Winter oilseed rape	100	100	100	15	206	71	80	206	71	80	12
Linseed	-	-	-	-	-	-	-	-	-	-	0
Forage maize	-	-	-	-	-	-	-	-	-	-	1
Rootcrops for stockfeed	100	100	100	53	82	120	96	82	120	96	8
Leafy forage crops	76	76	76	31	83	64	75	63	49	57	7
Arable silage/Other fodder crop	-	-	-	-	-	-	-	-	-	-	0
Peas - human consumption	-	-	-	-	-	-	-	-	-	-	2
Peas - animal consumption	-	-	-	-	-	-	-	-	-	-	2
Beans - animal consumption	-	-	-	-	-	-	-	-	-	-	1
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	3
Vegetables (other)	-	-	-	-	-	-	-	-	-	-	2
Soft fruit	-	-	-	-	-	-	-	-	-	-	0
Top fruit	-	-	-	-	-	-	-	-	-	-	0
Other tillage	-	-	-	-	-	-	-	-	-	-	1
All tillage	97	93	95	26	142	66	80	138	62	76	292
Grass under 5 years	96	93	81	45	163	43	64	156	40	51	117
Grass 5 years and over	84	78	76	36	130	33	39	109	26	30	159
All grass	88	83	77	39	142	36	47	124	30	37	276
All crops and grass	92	87	85	34	142	50	63	130	43	53	568

Source: British Survey of Fertiliser Practice 2003.

Table SC5.1 Average fertiliser practice on general cropping farms, Scotland 2003

	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	93	93	0	176	56	63	176	52	59	11
Winter wheat	100	87	95	11	201	69	80	201	60	76	128
Spring barley	100	98	98	33	113	61	73	113	60	72	228
Winter barley	100	87	89	14	182	72	82	182	63	73	53
Oats	100	100	100	23	114	54	64	114	54	64	16
Rye/Triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	0
Seed potatoes	-	-	-	-	-	-	-	-	-	-	3
Early potatoes	-	-	-	-	-	-	-	-	-	-	0
2nd Early/Maincrop potatoes	96	96	96	25	180	147	239	173	142	230	21
Sugar beet	-	-	-	-	-	-	-	-	-	-	0
Spring oilseed rape	100	100	100	19	103	58	67	103	58	67	9
Winter oilseed rape	100	95	92	9	227	72	76	227	68	70	52
Linseed	-	-	-	-	-	-	-	-	-	-	0
Forage maize	-	-	-	-	-	-	-	-	-	-	0
Rootcrops for stockfeed	97	97	97	81	75	108	119	72	104	115	11
Leafy forage crops	-	-	-	-	-	-	-	-	-	-	2
Arable silage/Other fodder crop	-	-	-	-	-	-	-	-	-	-	0
Peas - human consumption	0	45	45	0	0	51	57	0	23	26	5
Peas - animal consumption	-	-	-	-	-	-	-	-	-	-	3
Beans - animal consumption	-	-	-	-	-	-	-	-	-	-	4
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	1
Vegetables (other)	-	-	-	-	-	-	-	-	-	-	4
Soft fruit	-	-	-	-	-	-	-	-	-	-	4
Top fruit	-	-	-	-	-	-	-	-	-	-	0
Other tillage	-	-	-	-	-	-	-	-	-	-	1
All tillage	99	93	95	23	150	68	81	148	63	77	556
Grass under 5 years	91	76	73	10	152	43	57	138	32	42	86
Grass 5 years and over	93	81	74	3	102	35	34	95	28	25	90
All grass	92	78	74	6	127	39	46	117	30	34	176
All crops and grass	97	90	91	19	145	62	74	141	56	67	732

Source: British Survey of Fertiliser Practice 2003.

Table SC5.2 Average fertiliser practice on dairy farms, Scotland 2003

	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	-	-	-	-	-	-	-	-	-	-	0
Winter wheat	-	-	-	-	-	-	-	-	-	-	3
Spring barley	100	100	100	78	72	49	56	72	49	56	16
Winter barley	-	-	-	-	-	-	-	-	-	-	1
Oats	-	-	-	-	-	-	-	-	-	-	0
Rye/Triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	0
Seed potatoes	-	-	-	-	-	-	-	-	-	-	0
Early potatoes	-	-	-	-	-	-	-	-	-	-	0
2nd Early/Maincrop potatoes	-	-	-	-	-	-	-	-	-	-	0
Sugar beet	-	-	-	-	-	-	-	-	-	-	0
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	0
Winter oilseed rape	-	-	-	-	-	-	-	-	-	-	0
Linseed	-	-	-	-	-	-	-	-	-	-	0
Forage maize	-	-	-	-	-	-	-	-	-	-	2
Rootcrops for stockfeed	-	-	-	-	-	-	-	-	-	-	0
Leafy forage crops	-	-	-	-	-	-	-	-	-	-	0
Arable silage/Other fodder crop	-	-	-	-	-	-	-	-	-	-	1
Peas - human consumption	-	-	-	-	-	-	-	-	-	-	0
Peas - animal consumption	-	-	-	-	-	-	-	-	-	-	0
Beans - animal consumption	-	-	-	-	-	-	-	-	-	-	0
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	0
Vegetables (other)	-	-	-	-	-	-	-	-	-	-	0
Soft fruit	-	-	-	-	-	-	-	-	-	-	0
Top fruit	-	-	-	-	-	-	-	-	-	-	0
Other tillage	-	-	-	-	-	-	-	-	-	-	0
All tillage	95	95	95	85	87	50	55	82	47	52	23
Grass under 5 years	100	99	99	70	201	46	72	201	46	72	42
Grass 5 years and over	98	96	94	68	163	41	50	160	40	48	72
All grass	99	97	96	69	172	42	56	169	41	53	114
All crops and grass	98	97	95	70	165	43	56	162	42	53	137

Source: British Survey of Fertiliser Practice 2003.

Table SC5.3 Average fertiliser practice on mixed farms, Scotland 2003

	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	-	-	-	-	-	-	-	-	-	-	2
Winter wheat	96	84	95	13	203	77	103	196	65	98	24
Spring barley	99	100	99	47	99	57	62	98	57	61	143
Winter barley	100	100	100	58	138	72	82	138	72	82	25
Oats	96	92	92	32	77	47	48	74	43	45	16
Rye/Triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	0
Seed potatoes	-	-	-	-	-	-	-	-	-	-	1
Early potatoes	-	-	-	-	-	-	-	-	-	-	1
2nd Early/Maincrop potatoes	-	-	-	-	-	-	-	-	-	-	2
Sugar beet	-	-	-	-	-	-	-	-	-	-	0
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	3
Winter oilseed rape	-	-	-	-	-	-	-	-	-	-	4
Linseed	-	-	-	-	-	-	-	-	-	-	1
Forage maize	-	-	-	-	-	-	-	-	-	-	1
Rootcrops for stockfeed	100	100	100	49	87	111	85	87	111	85	25
Leafy forage crops	75	75	75	42	81	40	42	61	30	32	20
Arable silage/Other fodder crop	49	49	49	39	74	54	55	36	26	27	11
Peas - human consumption	-	-	-	-	-	-	-	-	-	-	0
Peas - animal consumption	-	-	-	-	-	-	-	-	-	-	2
Beans - animal consumption	-	-	-	-	-	-	-	-	-	-	1
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	2
Vegetables (other)	-	-	-	-	-	-	-	-	-	-	1
Soft fruit	-	-	-	-	-	-	-	-	-	-	0
Top fruit	-	-	-	-	-	-	-	-	-	-	0
Other tillage	-	-	-	-	-	-	-	-	-	-	0
All tillage	95	95	96	43	109	61	67	104	58	64	285
Grass under 5 years	89	81	77	31	123	35	44	109	28	34	245
Grass 5 years and over	75	65	64	25	98	29	33	74	19	21	307
All grass	80	70	68	27	108	31	37	86	22	26	552
All crops and grass	83	75	73	30	108	38	44	89	29	32	837

Source: British Survey of Fertiliser Practice 2003.

Table SC5.4 Average fertiliser practice on farms in Less Favoured Areas, Scotland 2003

	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	94	100	100	11	169	51	60	160	51	60	9
Winter wheat	100	84	92	5	211	68	77	211	57	71	60
Spring barley	99	100	100	44	106	57	67	106	57	67	114
Winter barley	100	99	99	14	170	64	69	170	63	69	25
Oats	100	100	100	1	100	46	47	100	46	47	11
Rye/Triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	0
Seed potatoes	-	-	-	-	-	-	-	-	-	-	3
Early potatoes	-	-	-	-	-	-	-	-	-	-	0
2nd Early/Maincrop potatoes	94	94	94	29	177	134	226	167	126	212	11
Sugar beet	-	-	-	-	-	-	-	-	-	-	0
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	3
Winter oilseed rape	100	100	100	0	215	60	65	215	60	65	20
Linseed	-	-	-	-	-	-	-	-	-	-	0
Forage maize	-	-	-	-	-	-	-	-	-	-	1
Rootcrops for stockfeed	100	100	100	45	81	111	104	81	111	104	13
Leafy forage crops	100	100	100	49	108	45	55	108	45	55	6
Arable silage/Other fodder crop	-	-	-	-	-	-	-	-	-	-	3
Peas - human consumption	-	-	-	-	-	-	-	-	-	-	4
Peas - animal consumption	-	-	-	-	-	-	-	-	-	-	4
Beans - animal consumption	-	-	-	-	-	-	-	-	-	-	2
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	2
Vegetables (other)	75	75	75	10	116	104	121	87	77	91	5
Soft fruit	-	-	-	-	-	-	-	-	-	-	2
Top fruit	-	-	-	-	-	-	-	-	-	-	0
Other tillage	-	-	-	-	-	-	-	-	-	-	0
All tillage	97	94	96	24	150	64	76	145	61	73	298
Grass under 5 years	87	71	70	24	143	41	47	125	29	33	98
Grass 5 years and over	84	78	77	27	109	29	32	92	22	24	131
All grass	85	76	75	26	119	32	36	101	24	27	229
All crops and grass	90	84	84	25	134	48	56	121	40	48	527

Source: British Survey of Fertiliser Practice 2003.

Table SC5.3 Average fertiliser practice on mixed farms, Scotland 2003

	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	-	-	-	-	-	-	-	-	-	-	2
Winter wheat	96	84	95	13	203	77	103	196	65	98	24
Spring barley	99	100	99	47	99	57	62	98	57	61	143
Winter barley	100	100	100	58	138	72	82	138	72	82	25
Oats	96	92	92	32	77	47	48	74	43	45	16
Rye/Triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	0
Seed potatoes	-	-	-	-	-	-	-	-	-	-	1
Early potatoes	-	-	-	-	-	-	-	-	-	-	1
2nd Early/Maincrop potatoes	-	-	-	-	-	-	-	-	-	-	2
Sugar beet	-	-	-	-	-	-	-	-	-	-	0
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	3
Winter oilseed rape	-	-	-	-	-	-	-	-	-	-	4
Linseed	-	-	-	-	-	-	-	-	-	-	1
Forage maize	-	-	-	-	-	-	-	-	-	-	1
Rootcrops for stockfeed	100	100	100	49	87	111	85	87	111	85	25
Leafy forage crops	75	75	75	42	81	40	42	61	30	32	20
Arable silage/Other fodder crop	49	49	49	39	74	54	55	36	26	27	11
Peas - human consumption	-	-	-	-	-	-	-	-	-	-	0
Peas - animal consumption	-	-	-	-	-	-	-	-	-	-	2
Beans - animal consumption	-	-	-	-	-	-	-	-	-	-	1
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	2
Vegetables (other)	-	-	-	-	-	-	-	-	-	-	1
Soft fruit	-	-	-	-	-	-	-	-	-	-	0
Top fruit	-	-	-	-	-	-	-	-	-	-	0
Other tillage	-	-	-	-	-	-	-	-	-	-	0
All tillage	95	95	96	43	109	61	67	104	58	64	285
Grass under 5 years	89	81	77	31	123	35	44	109	28	34	245
Grass 5 years and over	75	65	64	25	98	29	33	74	19	21	307
All grass	80	70	68	27	108	31	37	86	22	26	552
All crops and grass	83	75	73	30	108	38	44	89	29	32	837

Source: British Survey of Fertiliser Practice 2003.

Table SC5.4 Average fertiliser practice on farms in Less Favoured Areas, Scotland 2003

	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	94	100	100	11	169	51	60	160	51	60	9
Winter wheat	100	84	92	5	211	68	77	211	57	71	60
Spring barley	99	100	100	44	106	57	67	106	57	67	114
Winter barley	100	99	99	14	170	64	69	170	63	69	25
Oats	100	100	100	1	100	46	47	100	46	47	11
Rye/Triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	0
Seed potatoes	-	-	-	-	-	-	-	-	-	-	3
Early potatoes	-	-	-	-	-	-	-	-	-	-	0
2nd Early/Maincrop potatoes	94	94	94	29	177	134	226	167	126	212	11
Sugar beet	-	-	-	-	-	-	-	-	-	-	0
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	3
Winter oilseed rape	100	100	100	0	215	60	65	215	60	65	20
Linseed	-	-	-	-	-	-	-	-	-	-	0
Forage maize	-	-	-	-	-	-	-	-	-	-	1
Rootcrops for stockfeed	100	100	100	45	81	111	104	81	111	104	13
Leafy forage crops	100	100	100	49	108	45	55	108	45	55	6
Arable silage/Other fodder crop	-	-	-	-	-	-	-	-	-	-	3
Peas - human consumption	-	-	-	-	-	-	-	-	-	-	4
Peas - animal consumption	-	-	-	-	-	-	-	-	-	-	4
Beans - animal consumption	-	-	-	-	-	-	-	-	-	-	2
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	2
Vegetables (other)	75	75	75	10	116	104	121	87	77	91	5
Soft fruit	-	-	-	-	-	-	-	-	-	-	2
Top fruit	-	-	-	-	-	-	-	-	-	-	0
Other tillage	-	-	-	-	-	-	-	-	-	-	0
All tillage	97	94	96	24	150	64	76	145	61	73	298
Grass under 5 years	87	71	70	24	143	41	47	125	29	33	98
Grass 5 years and over	84	78	77	27	109	29	32	92	22	24	131
All grass	85	76	75	26	119	32	36	101	24	27	229
All crops and grass	90	84	84	25	134	48	56	121	40	48	527

Source: British Survey of Fertiliser Practice 2003.

SECTION D

SUPPLEMENTARY SURVEY ANALYSIS ON THE USE OF ORGANIC MANURES

Introduction

General and supplementary information is collected for each farm holding that is surveyed. The supplementary questions vary each year. Whilst the British Survey of Fertiliser Practice is principally concerned with the application of manufactured fertilisers some information on the use of organic manures is also collected each year. In the 2003 survey more detailed information on timing of organic manure applications was collected and additional questions were asked about farm imports and exports of manures.

D1. Farms handling organic manures

Organic manures applied to agricultural land may be produced on farm by livestock as slurries, farm yard manure (FYM) and poultry manures. Or they may be imported from other sources such as treated sewage sludges (also called bio-solids) and some industrial 'wastes' such as paper waste or blood from abattoirs. Of the 1375 farmers in the survey 960 used organic manures on at least one field on the farm, the details are shown in Table D1.1.

Table D1.1 Numbers and percentage (%) of farmers using each main type of manure

manure type	none	cattle fym	cattle slurry	pig fym	pig slurry	layer manure	broiler / turkey manure	sewage sludge	other
Number	415	801	278	40	21	24	31	18	43
%	30	58	20	3	2	2	2	1	3

Note some farmers may use more than one type of manure

Of the 415 farmers who did not spread manure, three had had livestock manure, but exported it all, so that there was none left to spread. Details of manure exports are given in Table D1.2.

Table D1.2 Number of farmers exporting manures, showing quantity exported

manure type	cattle fym	cattle slurry	pig fym	pig slurry	sheep fym	duck fym	layer manure	broiler/turkey manure	total
No. of farms exporting manure type	18	3	1	1	1	1	1	2	26*
Amount exported (tonnes or m^3)	8450	1100	7000	300	200	200	200	100	17550
Average per farm (tonnes or m^3)	470	370	7000	300	200	200	200	50	675

*Note: some farmers exported more than one type of manure.

This indicates that only 26 (2%) of the farmers surveyed exported manures and that cattle FYM is exported most often, although the amount exported is similar to that for pig FYM where one farm exports a large amount .

Table D1.3a Number of farmers importing farm manures (solid and liquid), showing quantity imported

manure type	cattle fym	pig fym	cattle slurry	pig slurry	sheep fym	duck fym	layer manure	broiler/turkey manure	total
No. of farms importing manure type	23	10	5	2	0	1	10	25	65
Amount imported (tonnes or m^3)	10950	5050	750	100	0	200	3650	8400	29200
Average per farm (tonnes or m^3)	480	500	150	50	0	200	365	340	450

Table D1.3b Number of farmers importing non-farm manures (solid and liquid), showing quantity imported

manure type	sewage sludge				composted green manure	other	total
	digested liquid	digested cake	thermally dried	lime stabilised			
No. of farms importing manure type	4	5	5	1	3	7	23
Amount imported (tonnes or m^3)	8250	6450	1300	2300	5000	1150	24500
Average per farm (tonnes or m^3)	2060	1290	260	2300	1670	160	1070

Note: some farmers imported more than one type of manure

D2. Use of organic manures

At a field level farmers were asked how often fields received a dressing of organic manures. Of the 10,258 fields on farms which used manures, 3,087 fields (30%) never received manure; for those that had received manure in the past, the average frequency of application is shown in Table D2.1.

Table D2.1 Average number of years between organic manure applications

	1 year	2 years	3 years	4 years	5 years	6 years	>6 years	Never	Don't know
% of fields	15	6	7	8	7	4	16	30	6

For 2,619 fields which received organic manures in the 2002/03 season, data were collected on manure type and, for the largest application, the month in which it was made. The percentages of these fields receiving each of the main types of manure is shown in Table D2.2.

Table D2.2 Percentage of fields receiving each organic manure type

manure type	cattle fym	cattle slurry	pig fym	pig slurry	layer manure	broiler / turkey manure	sewage sludge	other
%	68	29	3	3	2	2	1	3

Note: some fields may receive more than one type of manure.

Table D2.3 Typical rates of manure application

manure type	units	typical application rates		
		low	medium	high
manure:				
pig	tonnes/ha	<15	15-30	>30
cattle/sheep		<15	15-30	>30
poultry layer		<6	6-11	>11
broiler/turkey litter		<4	4-7	>7
slurry:				
pig	m^3/ha	<25	25-45	>45
dairy/beef/sheep		<35	35-65	>65
sewage sludge:				
liquid digested	m^3/ha	<55	55-100	>100
cake digested	tonnes/ha	<15	15-25	>25
thermally dried		<4	4-7	>7
lime-stabilised		<15	15-25	>25
other:				
strainer box	m^3/ha	<70	70-135	>135
weeping wall		<55	55-100	>100
dirty water		<440	440-800	>800

Table D2.4 Number of fields receiving low, medium or high rates of each organic manure type

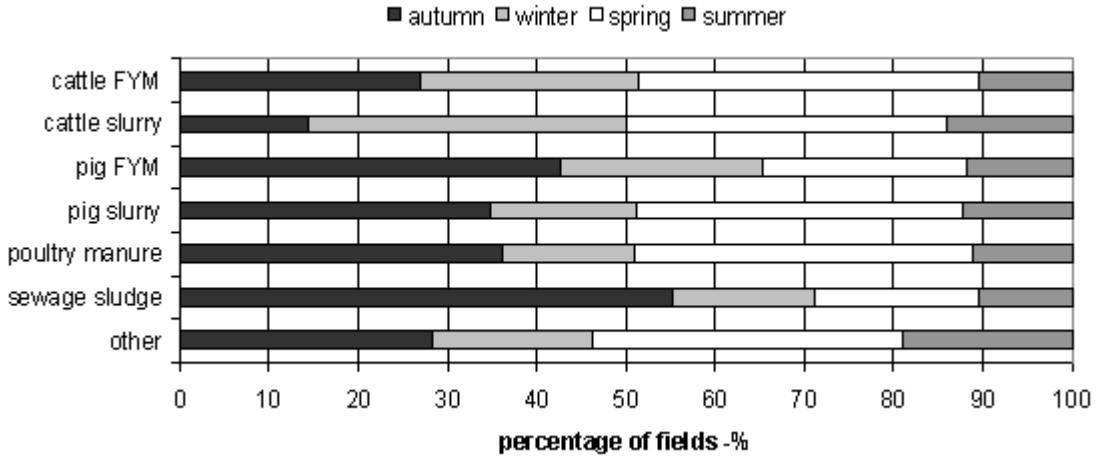
manure type	cattle fym	cattle slurry	pig fym	pig slurry	layer manure	broiler / turkey manure	sewage sludge	other	total
Low	768	435	31	50	28	13	14	64	1403
Medium	1103	449	43	45	36	31	22	30	1759
High	242	70	27	26	2	6	2	12	387
Total	2113	954	101	121	66	50	38	106	3549

The rate of application of manure was described as 'low', 'medium' or 'high' using the values given in Table D2.3. and the results are shown in Table D2.4.

Over all manure types 40% of applications were described as low and 50% as medium. Pig manure (FYM and slurry) were most often applied at high rates but this still represented only about 25% of the total applications of pig manure. Poultry manures and sewage sludge were rarely applied at high rates.

The time of year in which manure was applied is shown in Figure D2.1. In general spring and autumn were the seasons when most fields receive manures. However for cattle slurry more applications were made in the winter than the autumn. Sewage sludges were most often applied in the autumn.

Figure D2.1 Percentage of fields receiving each organic manure type by season



D3. Fertiliser value of organic manures

Organic manures are valuable sources of the major plant nutrients (nitrogen, phosphorus and potassium) and where used applications of manufactured fertiliser can be reduced[16]. In the Survey farmers were not asked directly whether they had made an adjustment to fertiliser inputs because of manure use, however an indication of possible adjustments has been derived by comparing fields which received manure with those which did not. Table D3.1 shows the overall fertiliser rates for the main tillage crops in Great Britain with and without manure inputs. Organic farms, which use no mineral fertilisers, have been excluded from the Table.

Table D3.1 Overall field rate of fertiliser application to tillage crops in Great Britain, with and without applications of organic manure.

	nitrogen		phosphate		potash	
	with manure	no manure	with manure	no manure	with manure	no manure
Winter wheat	191	199	34	40	56	46
Spring barley	96	115	47	44	55	59
Winter barley	132	151	39	42	54	60
2nd early or maincrop potatoes	165	144	126	132	249	193
Sugar beet	104	104	32	35	98	89
Spring oilseed rape	128	136	37	26	45	37
Winter oilseed rape	191	207	23	42	27	45
Forage maize	45	72	44	29	58	88
Field peas (harvested dry)	7	4	10	20	32	37
Field beans (harvested dry)	0	3	29	29	32	28

There was a reduction in nitrogen application where manures were used for most crops, changes in phosphate and potash rates were more variable. The largest nitrogen reduction occurred with forage maize (this was also the only crop where the number of fields receiving organic manures was greater than the number without).

N use on combinable crops was also consistently lower, but for potatoes it was higher where manures were used. The largest reduction in phosphate use occurred with oilseed rape. For potash the largest reduction was to forage maize. The results for arable crops are similar to those for the period 1994-1996 as reported by Chalmers[17] (2001).

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[16] Anon. (2000). Fertiliser Recommendations for Agricultural and Horticultural Crops. MAFF Reference Book 209 (Seventh edition). London: The Stationery Office.

[17] Chalmers, A.G. (2001). A review of fertiliser, lime and organic manure use on farm crops in Great Britain from 1983 to 1997. *Soil Use and Management* **17**, 254-262.

Data for grassland are presented separately because grass is managed differently according to the amount of production required. Thus intensive milk production requires large volumes of grass which is likely to receive higher inputs of both manure and mineral fertilisers than beef or sheep systems. Table D3.2 shows the average field rate of fertiliser applied to grassland in different management systems (as defined by the 'Robust farm types') with and without applications of manure. Average field rates have been used for grassland because grass fields often receive no mineral fertiliser, not because of manure use, but because the amount of grass production required does not warrant fertiliser input.

Table D3.2 Average field rate of fertiliser application on grassland in England & Wales and in Scotland, with and without applications of organic manure.

	nitrogen		phosphate		potash		no.fields	
	with manure	no manure	with manure	no manure	with manure	no manure	with manure	no manure
ENGLAND & WALES								
Dairy								
Grass less than five years old	202	197	31	38	67	62	161	60
Grass five years and over	155	158	31	32	48	39	319	197
All Grass	168	165	31	33	54	44	480	257
Cattle and sheep								
Grass less than five years old	115	103	31	33	39	39	93	87
Grass five years and over	85	70	28	28	31	26	536	596
All Grass	88	72	29	29	32	27	629	683
Other Livestock								
Grass less than five years old	200	121	34	30	61	30	30	185
Grass five years and over	113	176	26	36	36	52	40	93
All Grass	140	136	29	32	44	36	70	278
SCOTLAND								
Dairy								
Grass less than five years old	192	221	51	37	75	65	27	15
Grass five years and over	159	171	40	45	50	50	52	18
All Grass	167	183	42	43	56	54	79	33
Mixed								
Grass less than five years old	151	110	43	31	57	38	68	161
Grass five years and over	125	88	34	28	46	28	78	202
All Grass	136	96	37	29	50	32	146	363

In England and Wales 65% of grass fields in the dairy sector had received manure. The difference in the average fertiliser rate on dairy grassland with or without manure was relatively small (never more than +/- 10 kg/ha). Smaller dressings of mineral fertiliser were made for nitrogen on older grass and for phosphate on both types of grass. On cattle and sheep farms the number of fields receiving manure was similar to those not receiving manure. There was little difference in manure use on the average rate of phosphate and potash fertiliser whether or not manure was used.

Nitrogen usage was higher where manures had been used. For mixed livestock farms the number of fields receiving manures was fewer than the fields without manure; this was most notable for short term grass (<five years old) where only 14% received manure. Differences in mineral fertiliser inputs in relation to manure use was most variable in this farm type and probably reflects its mixed nature, containing farms with both arable and grass crops, together with a wide range of livestock types which may include dairy, beef, sheep, pigs and poultry.

In Scotland (as in England and Wales) fields on dairy farms are more likely to receive manure than those on other farm types with 71% of grass fields on dairy farms receiving manure compared with 29% on mixed farms. Short term grass which had received manure also got more phosphate and potash. This may indicate that short term grass is the most productive and thus receives more nutrients to maintain soil reserves. Nitrogen inputs were lower where manure was used on both young and old grass. As in England and Wales the data for mixed farms are difficult to interpret due to the varied nature of the farms covered.

In recent years there has been a great deal of promotional activity aimed at encouraging farmers to make adjustments to fertiliser inputs where manures are used. Thus some of the differences between mineral fertiliser inputs categorised as with or without manures are less than might have been expected, although the extent to which individual farmers have accounted for the nutrients in the manures cannot be judged. However when making these comparisons there are a number of factors which should be taken into account:

- the data presented for 'with/without' manure are not a paired comparison of otherwise identical fields.
- fields which have not received manures may be on farms which have no manure and are thus managed in a different way.
- in grassland systems fields which have not received manures may be managed differently (eg grazed only) compared with manured field which may be cut more than once as well as grazed.
- for tillage crops the overall fertiliser rate means that some fields are included which have received no fertiliser. For the 'with manure' data it may indicate that the manure was judged to supply all the fertiliser which was required.
- for grassland the average fertiliser rate has been used so as to avoid distorting the data by inclusion of 'unmanaged' grass which receives no fertiliser although this has the effect of excluding any fields on which no fertiliser was applied because the manure was considered sufficient, thus obscuring a substitution effect.
- the data set of fields where manures are used includes fields which may have received only a very small amount of manure (see section D2). On those fields receiving large dressings there may be a greater adjustment in mineral fertiliser.
- where reductions in phosphate and potash fertiliser have not been made this may indicate a desire to build up soil reserves of these nutrients.
- about a third of cattle/pig FYM applications were reported as <15 t/ha and about a third were applied in the autumn. A 15 t/ha dressing of cattle FYM applied to cereal stubble in the autumn will only supply 5-9 kg/ha of available nitrogen depending on soil type.

APPENDIX 1 - SURVEY STATISTICS

App 1.1 SAMPLING VARIATION

Table App 1.1 Standard errors of application rates for the major crops in 2003

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	4.0	3.7	1.3	1.9	1.5	3.8	3.6	4.1	1.9	1.4	1980
oilseed rape	0.5	1.6	1.5	2.1	2.5	1.3	1.3	3.2	1.1	1.1	460
winter barley	4.1	3.6	0.7	2.9	2.2	4.5	3.0	3.2	1.4	1.2	605
spring barley	2.0	2.9	1.5	1.2	1.5	2.8	1.5	1.0	1.7	2.6	822
m/c potatoes	15.6	4.3	11.6	5.9	10.7	11.3	9.8	8.0	5.7	9.0	138
sugar beet	5.1	5.3	3.3	5.3	6.3	5.7	5.8	7.5	2.9	1.3	208
all tillage crops	2.6	2.4	0.7	1.2	1.1	2.3	2.0	2.1	1.3	1.3	5395
all grass	4.3	2.0	3.4	0.7	1.4	5.0	2.3	5.6	0.9	2.2	3826

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	4.3	3.9	1.4	2.1	1.7	4.1	3.9	5.3	2.1	1.5	1825
oilseed rape	0.6	2.2	1.8	2.2	2.3	1.1	1.2	3.8	1.3	1.4	392
winter barley	3.9	3.5	1.2	3.4	2.4	4.3	2.9	3.9	1.3	1.1	526
spring barley	1.3	6.2	5.1	2.0	1.2	3.3	4.2	5.6	2.6	2.7	435
m/c potatoes	14.4	4.4	10.1	7.4	9.6	9.7	10.8	6.8	6.6	7.4	115
sugar beet	5.1	5.3	3.3	5.3	6.3	5.7	5.8	6.5	2.9	1.3	208
all tillage crops	3.0	3.0	1.9	1.4	1.3	2.6	2.8	3.3	1.4	1.4	4531
all grass	4.1	1.8	3.8	0.8	1.2	4.4	2.8	5.6	0.8	1.8	2984

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	6.3	8.3	2.1	7.4	7.0	7.0	8.4	6.3	3.1	4.4	155
oilseed rape	19.3	22.8	3.5	9.3	7.7	19.3	14.3	2.1	6.7	3.3	568
winter barley	3.2	0.1	3.1	3.2	1.8	3.7	3.6	4.8	3.2	2.2	79
spring barley	1.3	0.0	1.3	1.3	0.7	1.5	1.5	2.0	1.3	0.9	387
m/c potatoes	13.4	14.1	0.7	21.6	28.3	18.3	27.3	3.3	18.1	22.5	23
all tillage crops	9.4	8.9	0.5	2.1	2.4	8.4	10.4	4.4	1.6	1.9	864
all grass	1.2	6.5	5.2	1.8	2.4	5.5	4.3	2.1	1.1	0.4	842

App 1.2 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 2003 there were four replicates for England and Wales; in Scotland there were two, these being systematically subdivided post survey.

App 1.3 AN ALTERNATIVE APPROACH TO ESTIMATION OF OVERALL RATES

Table App 1.2 Re-estimation of overall total fertiliser use (kg/ha), Great Britain 2003

		straight nitrogen	compound nitrogen	total nitrogen	total phosphate	total potash
all tillage		129	21	149	40	54
	revised estimate	126	22	148	41	57
all grass		30	53	83	18	22
	revised estimate	30	53	83	18	22
all crops and grass		74	39	113	28	36
	revised estimate	71	40	111	28	37

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 2003).

App 1.4 RESPONSE RATE

Tables App 1.3 and App 1.4 summarise information regarding the response received to the main and reserve samples.

Table App 1.3 Response to main and reserve samples in 2003

	2003	(% total)
Issued from main sample	1647	(100)
Non-response[1]	472	(29)
Response to main sample	1175	(71)
Issued from reserve sample 1	472	(29)
Non-response[1]	358	(22)
Response to reserve sample 1	114	(7)
Issued from reserve sample 2	358	(22)
Non-response[1]	291	(18)
Response to reserve sample 2	67	(4)
Issued from reserve sample 3	291	(18)
Non-response[1]	269	(16)
Response to reserve sample 3	22	(1)
Achieved sample response	1378	(84)

Table App 1.4 Response to main and reserve samples for 1999-2003

Net response rate	1999 %	2000 %	2001 %	2002 %	2003 %
Overall achieved rate	64	94	89	91	84
Refusal rate[1]	36	7	11	9	16

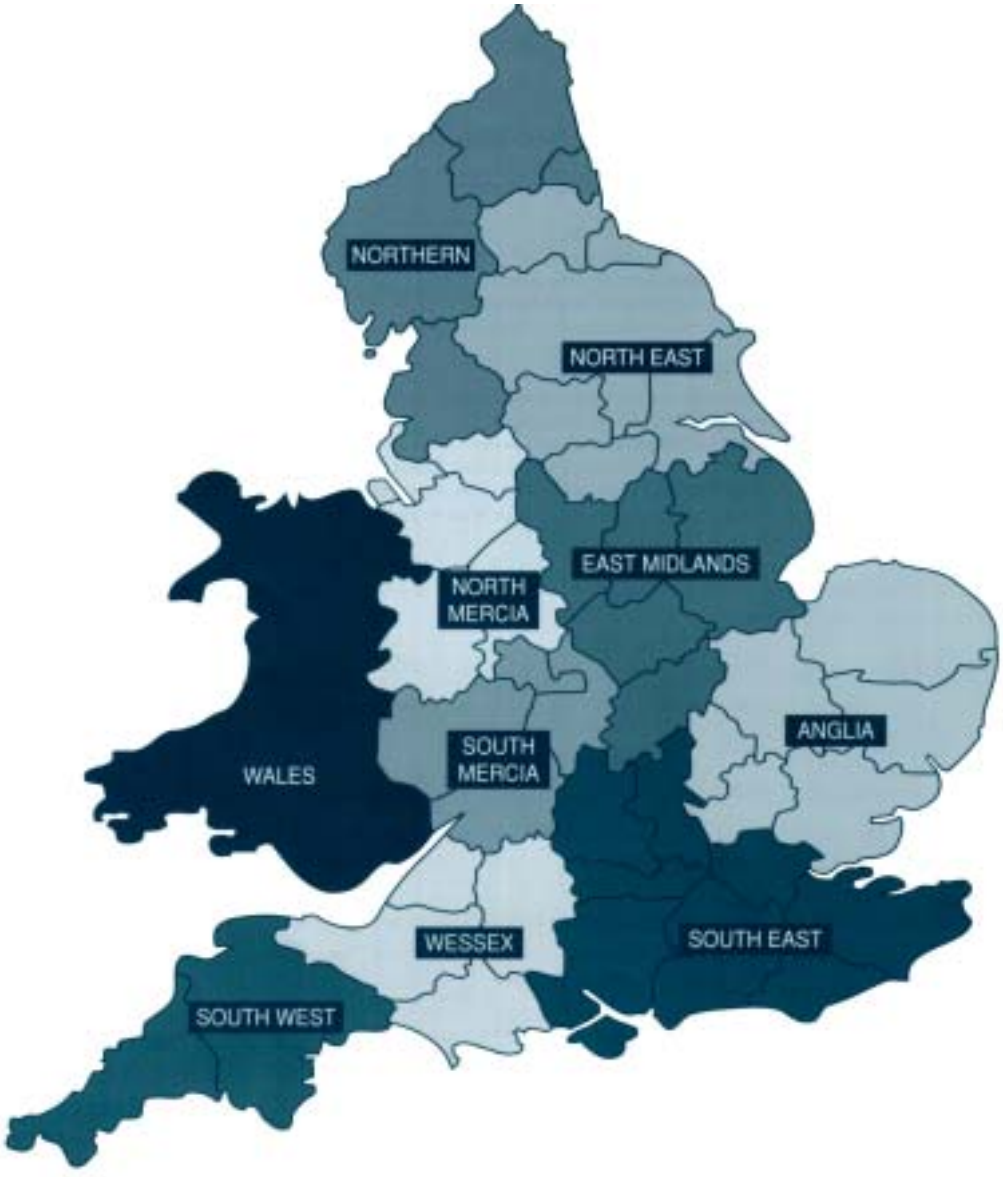
Net response rate	1999 %	2000 %	2001 %	2002 %	2003 %
Main sample	66	67	72	77	71
Reserve sample(s)	56	45	28	23	29

Main reasons for refusal	1999 %	2000 %	2001 %	2002 %	2003 %
Too busy	35	31	23	31	38
Not interested	26	10	8	9	16
Do not do surveys	10	7	3	5	10
Want payment	2	2	1	1	1
Too much paperwork (IACS)	1	3	2	1	3
Other[1]	26	49	63	54	32

[1] includes non-contact

APPENDIX 2

App 2.1 BSFP REGIONS[18] IN ENGLAND AND WALES



[18] 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 MAFF administrative regions.

App 2.2 COMPARISON OF BSFP AND DEFRA COUNTIES

Approximate English counties within BSFP and Defra Regions[19]

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

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

App 2.3 ENGLISH COUNTIES WITHIN BSFP AND DEFRA REGIONS

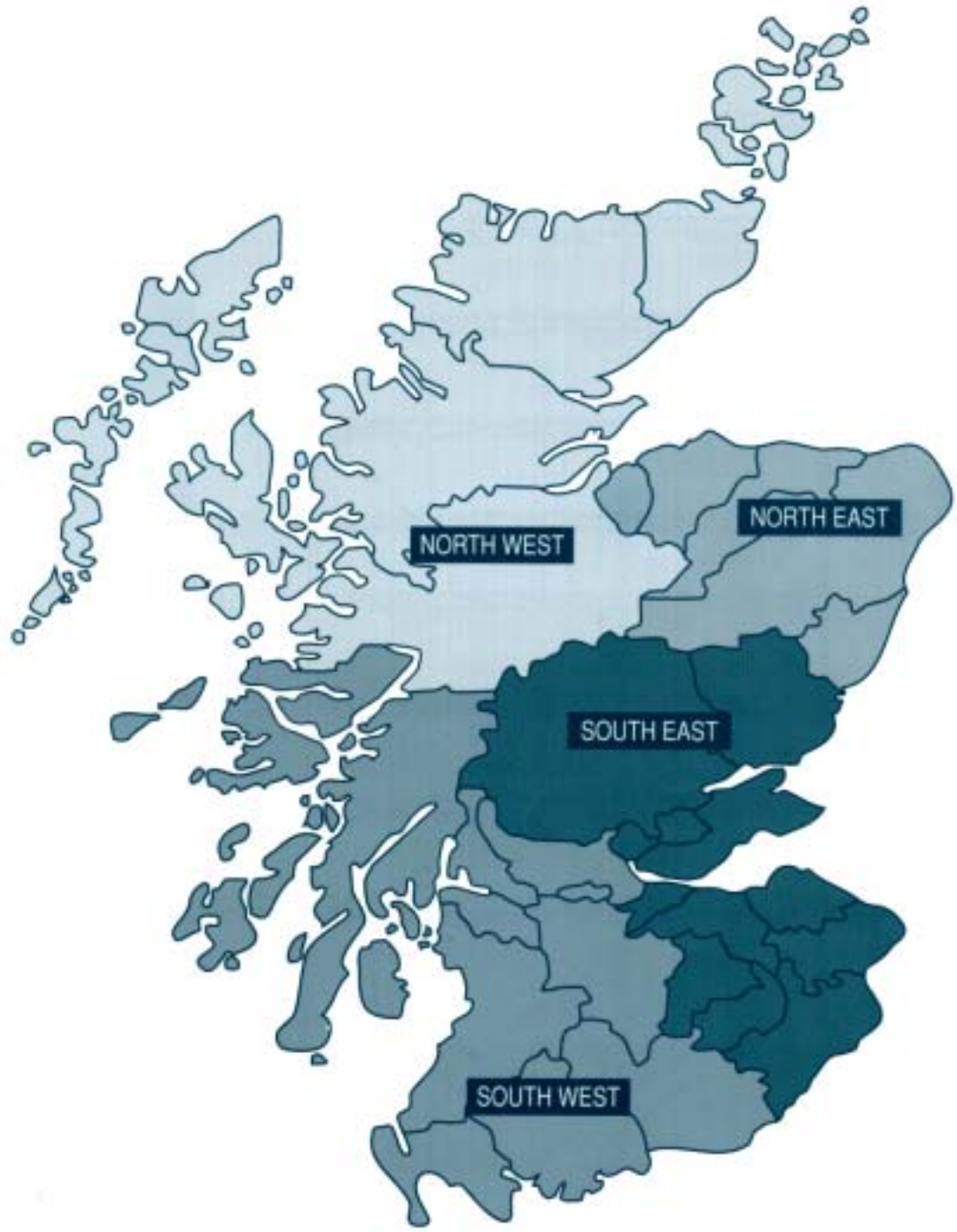
List of English counties indicating the BSFP and Defra Regions[20] within which they fall

	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

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

APPENDIX 3

App 3.1 BSFP REGIONS[21] IN SCOTLAND



[21] 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 SOAFD administrative regions.

APPENDIX 4

App 4.1 UK FARM CLASSIFICATION SYSTEM

UK farm classification system (Revised 1994): composition of robust, main and other types by constituent EC type[22].

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 Farm and Animal Health Economics Division, Ergon House, Horseferry Road, London SW1P 2AL. 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 Farm and Animal Health Economics Division, Ergon House, Horseferry Road, London SW1P 2AL.

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

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

APPENDIX 5

APP 5.1 RSSS REPORT 2003 EXECUTIVE SUMMARY

The Representative Soil Sampling Scheme (RSSS) has been used to monitor the pH and nutrient status of agricultural soils in England and Wales (E&W) since 1969. Each year soil samples have been taken to 150 mm depth from 4 fields at each of 180-240 farms. These farms were a representative sub-sample of farms within E&W. Each soil sample was analysed in duplicate for pH in water, pH in $CaCl_2$, available phosphorus (P), potassium (K) and magnesium (Mg). In order to provide a large enough sample to reliably estimate change over time, data from 5 years are amalgamated for analysis. The last complete cycle (the 6th) covered the period 1995/6-1999/2000. This report is for the years 2001/2-2002/3. However, rather than attempt to determine trends from incomplete data, this report examines in detail data on the use of lime and organic manures on fields within the RSSS recorded since questions on those topics were first asked in 1985.

Between 22 and 30% of the sites sampled have never been limed and over 40% have not been limed for at least 5 years. About a third of all fields sampled have been limed within the last 4 years. More arable (between 30 and 36%) than grass (16-25%) fields have never been limed. Mown grass is more likely to have been limed (79-87%) than other grass (62-79%) with 26-32% of those applications in the last 4 years compared with 16-25% for other grass. For arable crops the results show differences in liming policy which reflect the known variation in susceptibility to acidity of these crops. Sugarbeet and winter barley are susceptible to acidity and 43-56% of sugarbeet and 38-45% of winter barley fields had been limed within the last 4 years, with 17-27% (sugarbeet) and 8-15% (winter barley) in the previous year. Only 6-7% of fields had been limed in the year prior to potatoes. This is consistent with the fact that potatoes can tolerate acid soils and recent lime application can increase levels of potato scab.

Between 66 and 70% of the fields sampled have received a dressing of organic manures at some time and about a third of fields had received organic manures in the previous year. Farmers reported that 55-59% of arable fields had received a dressing of manure at some time. For ley/arable rotations the proportion of fields receiving manures was much greater at 81-97%, whilst for all-grass rotations 73-76% of fields received manures. Between 60-68% of mown grass fields had had manure in the previous year, while for other grass types the proportion of fields was less at 25-31%. For arable fields, spring-sown crops provide farmers with a 'window of opportunity' for manure spreading, this is reflected in the greater proportion of applications in the year prior to planting sugarbeet (about a third) and potatoes (37-65%) compared with 7-20% of winter wheat/barley and oilseed rape crops.