THE BRITISH SURVEY OF

Fertiliser Practice

FERTILISER USE ON FARM CROPS
FOR CROP YEAR 2002

defra

SCOTTISH EXECUTIVE
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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 2002 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 2002, 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.

August 2003

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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 Fertiliser Manufacturers' Association.

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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 2002 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 2002 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 2001/2002 cropping season are also discussed in the report.

Nitrogen

- Although the total nitrogen use on all crops and grassland was very similar in 2002 at 117 kg/ha compared with 116 kg/ha in 2001, it represents a further decline in nitrogen to grassland offset by an increase in the amount applied to tillage crops. The amount of nitrogen applied to grassland has continued to fall throughout the period 1998-2002. This decline is mainly associated with a drop in the overall application rate of straight nitrogen. 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.

- Overall rates of total nitrogen increased on all crops except spring barley. The rates applied were the highest in the five year period (1998-2002). Although some of this increase could be attributed to the increase in the use of straight nitrogen for all crops except spring barley the use of compound nitrogen also increased for winter cereals and oilseed rape. The return to levels similar to those in 2000 suggest that the low rates used in 2001 were a reflection of the difficult farming conditions in 2000/2001 and not the start of a trend towards lower rates.

- Estimated total nitrogen use on grassland continued to show a decline with a drop of 5 kg/ha from the previous year. This was due to a further decline in overall application rates of straight nitrogen (-7 kg/ha). Compound nitrogen use returned to pre-2001 levels. This total nitrogen rate (89 kg/ha) was the lowest reported for both the last five years (mean: 100 kg/ha) and also for the whole survey period since 1983.

Phosphate

- Overall phosphate use on tillage crops increased slightly (+1 kg/ha) in 2002, to 44 kg/ha. Phosphate use on grassland also increased by 1 kg/ha compared with the previous year to 20 kg/ha. Over the last five years phosphate use on all crops and grassland has dropped by 4 kg/ha, from 35 to 31 kg/ha. Overall the area receiving phosphate fertiliser increased by 2% in 2002 compared with the previous year, at 62% it was equal to the five year average. The area receiving phosphate fertiliser has been relatively steady on grassland (five year mean 60%) but has varied between 63 and 73 % for tillage crops (five year mean 66%).

Potash

- Potash use on tillage crops increased by 5 kg/ha to 57 kg/ha in 2002, halting the gradual decline in usage over the 1998-2001 period. The overall rate of potash on grassland increased slightly (+1 kg/ha) in 2002, to 25 kg/ha. Over the last five years, potash use on all crops and grassland has dropped by 5 kg/ha, to 40 kg/ha. Overall, the area receiving potash fertiliser increased by 1% to 62% in 2002 compared with the previous year. The area receiving potash fertiliser has varied between 64 and 74 % for tillage crops (five year mean 67%) and between 58% to 63% for grassland (five year mean 60%).

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 have generally remained static or even declined on oilseed rape until 2002 when there was an increase in the area receiving fertilisers.

- Average application rates also increased on all crops except winter wheat. These rates are generally higher than the recommended practice of 25-40 kg/ha SO_3, applied as a water soluble form in early spring, for potentially sulphur-deficient cereal crops but more or less in line with the recommended 50-75 kg/ha for oilseed rape.

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. During the last five years (1998-2002) the average has decreased to 124 kg/ha, reflecting the downward trend observed on both 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. The 2001 rate of 43 kg/ha was the lowest since Great Britain records 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 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. 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 change to spring barley, which has a lower fertiliser requirement.

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 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 2002 Survey regarding the storage and handling of manufactured fertilisers.

A1.1 HISTORY

The survey has been in existence, in various forms, since 1942 for England and Wales. It was extended to Scotland in 1983. Historical data from 1942 to 1997 have been summarised in several reviews spanning this period of time[4, 5, 6, 7].

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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A2 SURVEY METHODOLOGY

A2.1 SAMPLE

The basis of the sample framework is the Agricultural Census[8]. 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, then a higher proportion of these holdings are sampled. The process of selecting the actual holdings to be surveyed involves two steps. First the holdings in each cell are ordered by geographic location (using the County, Parish, Holding (CPH) identifier). This enables a high degree of geographic dispersion in the sample. The number of farms to be surveyed is then drawn at random from these stratified groups. This process leads to a *sought* sample (a total of 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 departments 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.

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

Table A2.1 Derivation of the stratified random sample for the 2002 survey, England and Wales

	farm holdings in population in 2000	total crops and grass in 2000 (column %)	notional sampling fraction[a] (%)	target sample size	achieved sample size	achieved sample fraction[b] (%)
England and Wales						
Livestock						
(DEFRArobust types 4-7)						
crops & grass area						
20-50 ha	20307	8.0	0.47	96	102	0.50
51-100 ha	15964	13.3	1.00	159	144	0.90
101-200 ha	8340	13.1	1.88	157	140	1.68
200+ ha	2849	12.7	5.34	152	136	4.77
Crops & mixed						
(DEFRArobust types 1,2,8)						
crops & grass area						
20-50 ha	9237	3.7	0.48	44	42	0.45
51-100 ha	9406	8.0	1.02	96	83	0.88
101-200 ha	8963	14.7	1.96	176	162	1.81
200+ ha	6218	26.1	5.04	313	261	4.2
Horticulture						
(DEFRArobust type 3)						
crops & grass area						
20-50 ha	619	0.2	1.94	12	11	1.78
51-100 ha	165	0.1	4.85	9	6	3.64
101-200 ha	83	0.1	9.64	9	4	4.82
200+ ha	23	0.1	17.39	5	2	8.70
Total for England and Wales	82174	100.0		1228	1093	1.16

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

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

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

Table A2.2 Derivation of the stratified random sample for the 2002 survey, Scotland

	farm holdings in population in 2000	total crops and grass in 2000 (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	1135	2.5	0.54	6	4	0.35
51-100 ha	1513	7.0	1.19	18	18	1.19
101-200 ha	1492	13.3	2.22	33	31	2.08
200+ ha	683	14.0	5.11	35	28	4.25
Livestock & mixed						
(SEERAD robust types 4-8)						
crops & grass area						
20-50 ha	3245	7.0	0.54	18	21	0.62
51-100 ha	3646	16.6	1.14	41	45	1.23
101-200 ha	2574	22.4	2.17	56	52	2.02
200+ ha	917	17.3	4.72	43	40	4.36
Total for Scotland	15205	100.0		250	239	1.57

A2.2 DATA COLLECTION

Data collection was undertaken by Produce Studies Ltd, between June and November 2002. 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 2002 considered a number of questions relating to the storage and handling of manufactured fertilisers.

A2.3 DATA PROCESSING

The data processing and analysis were undertaken by the Rural Business Unit at the University of Cambridge. Some idea of the complexity of the survey can be given through the amount of data that has to be input and processed. In 2002 the 1,332 farms recorded represented one per cent of the total crops and grass area in Britain. This equated to almost 9,000 fields and nearly 19,000 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

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

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

geographic region, etc. This enables the survey to present a comprehensive picture of fertiliser use in Britain. The longevity of the survey also means that it is invaluable for demonstrating the changing trends in fertiliser use.

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

A2.4 DEFINITIONS OF TERMS

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

2 The **survey year** ran from autumn 2001 to autumn 2002, corresponding to the 2002 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 as **Other Straight N**.

6. For each fertiliser nutrient, the **average field rate** (of application) is defined as the sum of nutrient applied divided by the total area of those fields which received any dressing of the nutrient. Crop area without any application of the nutrient is excluded from the calculation of the average field rates of application. These field-specific application rates provide direct evidence on the level and variation in farming practice.

7. The term **dressing cover** is used to describe the proportion of crop area treated with any dressing of the fertiliser nutrient in question, and is stated as a percentage.

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

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

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

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

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

England and Wales:

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

Scotland:

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

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

England and Wales:

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

Scotland:

table number	*farm type(s) as given in table title*	*robust types*
SC5.1	general cropping farms	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 Defra administrative regions, which were revised in 1996 to take account of changes to county boundaries and nomenclature resulting from the introduction of Unitary Local Authorities between April 1995 and April 1998[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 CROPAREAS 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 2000/01 and 2001/02, and illustrates percentage changes in relative cropping areas over the past five years. There were nearly 10.4 million hectares of managed agricultural land in Britain in 2002, of which 4.5 million hectares (44%) were cultivated for tillage cropping and the remainder, 5.8 million hectares, were grassland (excluding rough grazing).

The total tillage area was slightly higher (2.5%) in 2002, mainly due to a reduction in the area of set aside. The area of wheat increased by 356,800 ha (22%) and the area of winter barley by 83,100 ha (18%). This was partly offset by the decreased area of spring barley 221,500 ha (30%) and represents a partial return to pre-2001 levels where winter cropping was affected by the difficult weather conditions in autumn 2000. The total area for these three crops remained lower than 2000 but higher than 1999, a year in which autumn cropping was also affected by adverse weather.

Total cereal area was up by 9% after a 10% fall the previous year. Less land was entered as set aside giving a decrease of 24%. The decline in linseed area seen over the previous two years continued as the area dropped by 18,100 ha (60%), this follows a large increase in 1999 when the economic returns for this crop were more favourable. The total oilseed rape area decreased by 46,100 ha (11%), whilst the area of peas/beans also decreased by nearly 10%. Other tillage crop categories showed little change in area (less than 5%), compared to 2001. The total area of managed grassland decreased by 140,700 ha (2.4%) mainly due to an increase in the area of older grassland, less than one fifth of grassland was less than 5 years old in 2001.

Table A3.1 Cropping and grassland areas ('000 ha) Great Britain, 2000/2001 - 2001/2002

Crops	2000/2001 '000s ha	2001/2002 '000s ha	% change since 2001	% change since 1997	2001/2002 crop areas as % of total tillage area
Wheat	1632	1989	21.9	-2.0	-43.7
Barley - winter	459	542	18.1	-34.8	11.9
- spring	752	530	-29.5	8.3	11.7
Total cereals[1]	***2974***	***3207***	***7.8***	***-7.5***	***70.4***
Oilseed rape - total	403	357	-11.4	-19.2	7.8
Sugar beet	177	169	-4.5	-13.8	3.7
Potatoes[2]	144	151	5.1	-4.2	3.3
Linseed	30	12	-60.4	n/a	0.3
Peas/beans[3]	275	249	-9.5	26.4	5.5
Maize/other fodder	188	177	-5.7	-1.5	3.9
Vegetables	118	122	3.8	-2.0	2.7
Total tillage[4]	***4443***	***4552***	***2.5***	***-8.2***	***100.0***
Set-aside[5]	897	608	-23.7	98.7	13.4

Grassland					2001/2002 grass areas as % of total grass area
Less than 5 years old	1065	1094	2.7	-9.1	18.8
5 years and older	4884	4715	-3.5	2.4	81.2
Total grass[6]	***5949***	***5808***	***-2.4***	***0.6***	***100***
Total crops and grass[7]	***10392***	***10361***	***-0.3***	***-3.8***	

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

Source: Annual Defra/SEERAD/NAWAD June Census data

The total tillage area was 406,650 ha less (-8.2%) in 2002, compared to 1997. The total area of cereals was reduced by 7.5% in 2002 compared with 1997, the biggest change occurring in winter barley which was nearly 290,000 ha less in 2002. The oilseed rape area was slightly lower (-19%) as was the area of sugar beet (-13%) in 2002 than in 1997. Peas and beans showed an increase of 26%. The other tillage crop categories all showed slight decreases in their cropping areas between 1997 and 2002.

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

- *A very wet autumn can delay the establishment of winter sown crops, or alter the ratio of winter to spring sown crops, with their different fertiliser requirements.*
- *Prolonged wet weather can increase leaching losses of some nutrients, particularly nitrogen and sulphur. Weather conditions also affect other aspects of soil chemistry and nutrient availability.*
- *Adverse weather conditions may disrupt planned farming activities, such as fertiliser spreading.*
- *Growing conditions determine plant growth and hence affect nutrient requirements.*

In contrast to the previous year, autumn 2001 gave favourable planting conditions for autumn sown crops. After a dry, cold December the remainder of the winter of 2001/2002 was characterised by mild, damp weather. Autumn-sown crops emerged from the winter in good condition. An exceedingly wet February finally gave way to warm and sunny weather in the second half of March allowing stock to be turned out in many areas and spring land work to commence.

Excess winter rainfall was higher than average (see Figures A3.1 and A3.2) and farmers were advised not to use the 'low' winter rainfall tables when calculating residual soil nitrogen supply. It was the sunniest April over England and Wales since 1990, although low night temperatures kept plant growth in check. By May many farmers were crying out for rain which duly arrived in the latter half of the month. At this stage conditions were ideal for arable crops and a bumper harvest was predicted.

Although yields in England and Wales were substantially better than in 2001, the bumper harvest did not materialise[9]. The lack of sunshine in June and July was considered responsible for poor grain fill. Harvest was difficult in some areas, particularly in the east of England where thunderstorms swept across the region. The quality of late harvested wheat crops was impaired resulting in a premium for high Hagberg milling wheats combined before the rain. The predominance of wet weather throughout the summer meant that grass was plentiful for livestock producers, although hay and silage making conditions were often difficult.

[9] Defra, SEERAD, DARDNI and NAWAD. *Agriculture in the United Kingdom 2002.* London: The Stationery Office.

Figure A3.1 Excess winter rainfall (to 29th January 2003) (mm)

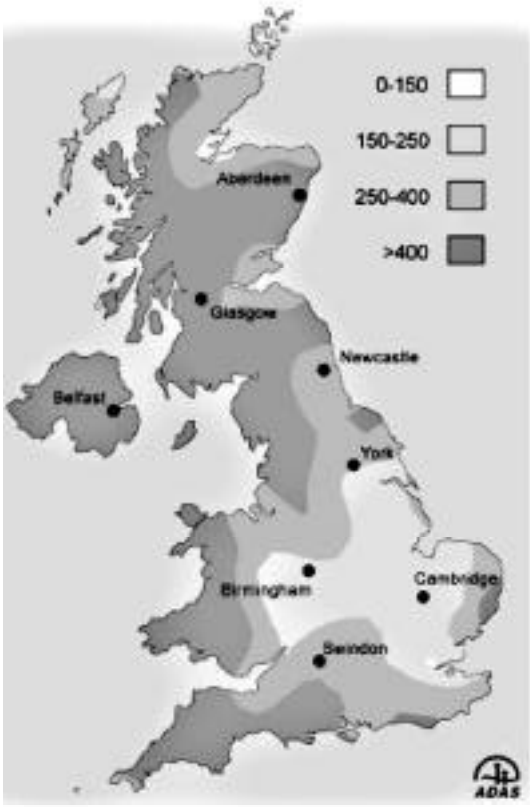
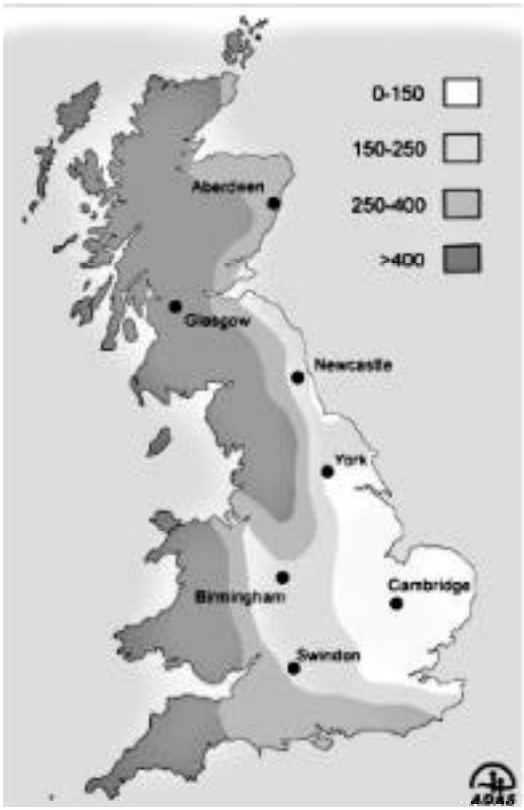


Figure A3.2 Average excess winter rainfall (whole winter to end March) (mm)



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 1998 to 2002. 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 2001/2002 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 last 15 years data 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 2002 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) AReview 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 2002 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 1998 - 2002

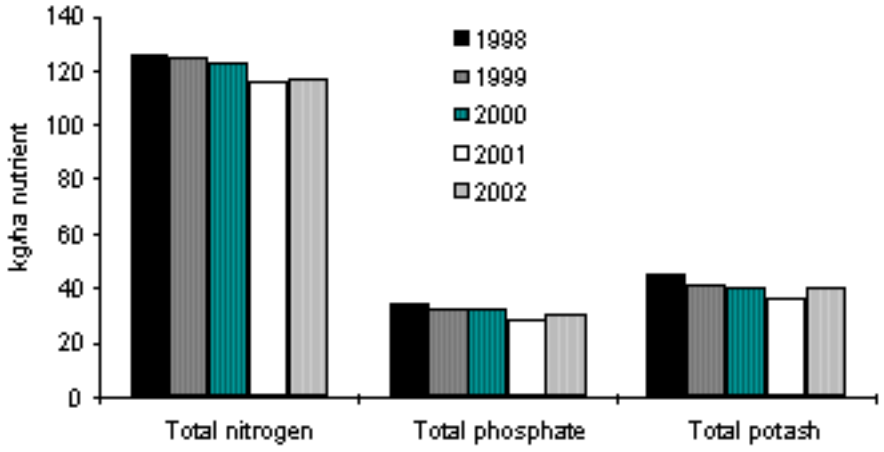


Table B1.1 Overall nitrogen use (kg/ha), Great Britain 1998 - 2002

Total nitrogen

	tillage crops	*grass*	*all crops and grass*
1998	144	109	126
1999	141	110	125
2000	149	99	123
2001	145	94	116
2002	152	89	117

Straight nitrogen

	tillage crops	*grass*	*all crops and grass*
1998	123	53	87
1999	121	52	85
2000	130	43	85
2001	118	39	74
2002	128	32	76

Compound nitrogen

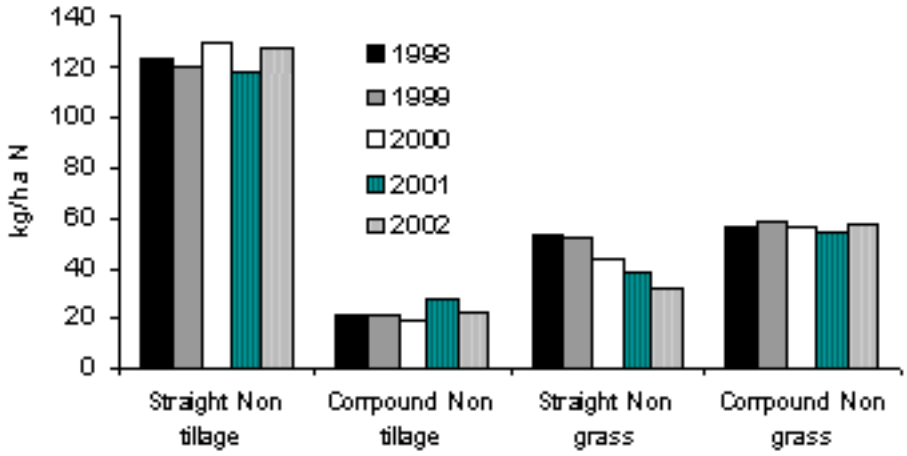
	tillage crops	*grass*	*all crops and grass*
1998	21	56	39
1999	21	58	40
2000	19	56	38
2001	27	55	42
2002	22	57	42

B1.1.1 NITROGEN

All Crops and Grassland

Although the total nitrogen use on all crops and grassland was very similar in 2001 at 116 kg/ha compared with 117 kg/ha in 2002 (Figure B1.1), it represents a further decline in nitrogen to grassland offset by an increase in the amount applied to tillage crops (Table B1.1). The amount of nitrogen applied to grassland has continued to fall throughout the period 1998-2002 (Table B1.1). This decline is mainly associated with a drop in the overall application rate of straight nitrogen (Figure B1.2). The use of compound nitrogen 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 1998 - 2002



Tillage Crops

Overall total nitrogen use (152 kg/ha) increased by 7 kg/ha to give the highest level in the 5 year period. Use of straight and compound nitrogen were similar to pre-2001 levels. 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.

Grassland

Estimated total nitrogen use on grassland continued to show a decline with a drop of 5 kg/ha from the previous year. This was due to a further decline in overall application rates of straight nitrogen (-7 kg/ha). Compound nitrogen use returned to pre-2001 levels. This total nitrogen rate (89 kg/ha) was the lowest reported for both the last five years (mean: 100 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 increased slightly (+ 1 kg/ha) in 2002, to 44 kg/ha (Table B1.2). Phosphate use on grassland also increased by 1 kg/ha compared with the previous year to 20 kg/ha. Over the last five years phosphate use on all crops and grassland has dropped by 4 kg/ha, from 35 kg/ha to 31 kg/ha. Overall, the area receiving phosphate fertiliser increased by 2% in 2002 compared with the previous year; at 62% it was equal to the five year average. The area receiving phosphate fertiliser has been relatively steady on grassland (five year mean 60%) but has varied between 63% and 73% for tillage crops (five year mean 66%).

Table B1.2 Overall phosphate and potash use (kg/ha), Great Britain 1998 - 2002

Total phosphate

	tillage crops	*grass*	*all crops and grass*
1998	51	21	35
1999	45	20	32
2000	47	20	32
2001	43	19	29
2002	44	20	31

Total potash

	tillage crops	*grass*	*all crops and grass*
1998	64	29	45
1999	57	28	42
2000	55	26	40
2001	52	24	37
2002	57	25	40

Potash

Potash use on tillage crops increased by 5 kg/ha to 57 kg/ha in 2002, halting the gradual decline in usage over the 1998-2001 period. The overall rate of potash on grassland increased slightly (+1 kg/ha) in 2002, to 25 kg/ha. Over the last five years, potash use on all crops and grassland has dropped by 5 kg/ha, to 40 kg/ha. Overall, the area receiving potash fertiliser increased by 1% to 62% in 2002 compared with the previous year. The area receiving potash fertiliser has varied between 64% and 74% for tillage crops (five year mean 67%) and between 58% to 63% for grassland (five year mean 60%).

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 2002 are presented in Section C. Longer term trends in overall application rates of nitrogen, phosphate and potash since 1983 are summarised in Section B2.

Small apparent changes in fertiliser use on individual crops should be treated with a degree of caution as these estimates are based on a smaller number of farms and fields than the aggregate estimates for all tillage crops. Information on 'sampling errors', which help in 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 1998 - 2002

Total nitrogen

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1998	182	92	135	188	188	109
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

Straight nitrogen

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1998	171	40	120	49	170	88
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

Compound nitrogen

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1998	11	52	15	139	18	22
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

Total phosphate

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1998	48	42	51	184	50	49
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

Total potash

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1998	53	58	66	276	48	121
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

[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 1998 - 2002

Total nitrogen

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1998	183	95	136	193	188	111
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

Straight nitrogen

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1998	176	74	127	123	177	102
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

Compound nitrogen

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1998	47	67	46	164	45	73
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

Total phosphate

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1998	68	51	66	195	66	68
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

Total potash

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1998	77	64	80	291	68	139
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

[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 increased on all crops except spring barley. The rates applied were the highest in the five year period (1998-2002). Although some of this increase could be attributed to the increase in the use of straight nitrogen for all crops except spring barley the use of compound nitrogen also increased for winter cereals and oilseed rape. The return to levels similar to those in 2000 suggest that the low rates used in 2001 were a reflection of the difficult farming conditions in 2000/2001 and not the start of a trend towards lower rates.

Winter wheat

The overall rate of total nitrogen on winter wheat increased by 8 kg/ha in 2002, to 193 kg/ha, the highest level in the five year period (Table B1.3). The average field rate at 197 kg/ha was also the highest for the period. Overall, the use of both straight and compound nitrogen increased to 178 kg/ha and 15 kg/ha respectively (means for 1998-2002 are 174 kg/ha and 12 kg/ha). Although the overall use of compound nitrogen showed a slight increase (+1 kg/ha) in 2002 compared with the previous year, this appears to be due to an increase in the area receiving compound nitrogen as the average rate declined by 7 kg/ha. However, it was still higher (at 63 kg/ha) than the five year mean (57 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 1998 - 2002

Total nitrogen

	winter wheat		*spring barley*		*winter barley*	
	milling	*non-milling*	*malting*	*non-malting*	*malting*	*non-malting*
1998	192	180	100	89	116	146
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

The mean difference of 21 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.*

The non-milling crop continues to be the major crop area (Table B1.6) with the proportion returning to near the 5 year average of 72% in 2002 after a fall in 2001.

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

Table B1.6 Percentage distribution (% crop area) of cereal crop areas by market use, Great Britain 1998 - 2002, as estimated from the Survey

	winter wheat		*spring barley*		*winter barley*	
	milling	*non-milling*	*malting*	*non-malting*	*malting*	*non-malting*
1998	26	74	52	48	33	67
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

Spring barley

Overall use of total nitrogen on spring barley declined slightly to 110 kg/ha in 2002. The mean for the five year period 1998-2002 period is 104 kg/ha. There was no change in the overall rate of straight nitrogen; the compound nitrogen rate has declined throughout the period reaching a low value of 43 kg/ha in 2002.

Further analysis of the data by crop type (Table B1.5) shows an increase in the average rate applied to the spring malting crop during the last 2 years. For non-malting crops nitrogen application rate increased to a maximum of 103 kg/ha in 2000. In the last two years it has levelled off at about 100-101 kg/ha.

Estimated nitrogen rates on malting crops have been consistently slightly higher on malting than non-malting crops, with a mean difference of 11 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. During the mid 1990s the proportion of malting barley was fairly steady at nearly two thirds of the total acreage. The level dropped to only 52% in 1998 and made a temporary recovery to 66% in 1999, the proportion of area grown then declined over the next 2 years. In 2002 it increased from 54% up to 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 increased in 2002 to the highest level (154 kg/ha) for the 1998-2002 period (mean 144 kg/ha). The use of straight nitrogen has fluctuated during the period and at 132 kg/ha in 2002 is slightly higher than the five year mean of 128 kg/ha. The overall compound nitrogen rate declined from 1998 to 2000 reaching a low of 12 kg/ha since then levels have increased reaching a high of 22 kg/ha in 2002.

Nitrogen requirements for winter barley, as with the spring sown crop, depend on a range of agronomic factors, including the intended market for the grain. Field average rates of nitrogen increased on both malting crops (+12 kg/ha) and on non-malting crops (+ 8 kg/ha) to the highest level for the five year period on both crops at 149 kg/ha and 159 kg/ha respectively (Table B1.5)

The higher application rates of nitrogen (five-year mean of +19 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). In 2001 and 2002 the proportion returned to the pre-2000 levels.

Maincrop potatoes

Overall total nitrogen use on maincrop potatoes increased by 7 kg/ha to 158 kg/ha in 2002, slightly below the five year mean of 163 kg/ha, with the highest level for the period of 188 kg/ha occurring in 1998 (Table B1.3). Most of the nitrogen input for maincrop potatoes is applied in compound form, in 2002 only 68% of the total input was applied in this way compared with an average of 76% for the period.

Oilseed rape

Overall total nitrogen use on oilseed rape, as a combined category for both the autumn and spring sown crop, increased by 6 kg/ha to 199 kg/ha (Table B1.3). This represents the highest level for the 1998-2002 period (mean 194 kg/ha). The overall compound nitrogen rate declined from 1998 to 2000 reaching a low of 15 kg/ha since then levels have increased returning to the 1998 level of 18 kg/ha in 2002. However, straight nitrogen remains 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 hardly changed during 1998-2002 (mean: 204 kg/ha), after increasing in 2001 to 209 kg/ha the level decreased by 2 kg/ha in 2002. 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 205 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 1998 - 2002

Total nitrogen (kg/ha)

	winter oilseed rape	*spring oilseed rape*
1998	204	115
1999	204	161
2000	203	133
2001	209	151
2002	207	137

Percentage distribution (%)

	winter oilseed rape	*spring oilseed rape*
1998	83	17
1999	95	5
2000	90	10
2001	81	19
2002	91	9

Most of the oilseed rape area is autumn, rather than spring sown (Table B1.7). However, the proportion of spring sown oilseed rape doubled in 2000 according to survey estimates, up to 10% of the total crop area, after a sharp drop in 1999. There was a further increase in 2001 to 19%, probably due to the difficult conditions in autumn 2000 as the area has declined to 9% in 2002. 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 increased slightly (+3 kg/ha) in 2002 to 106 kg/ha. This is close to the five year mean of 104 kg/ha. Most of the nitrogen input for sugar beet is applied as straight nitrogen. Use of straight and compound nitrogen has fluctuated during the five year period with five year means of 86 kg/ha and 18 kg/ha respectively.

B1.2.2 PHOSPHATE AND POTASH

Phosphate

The very small increase (+1 kg/ha) in overall phosphate use on tillage crops in 2002 can be partly attributed to the increase in use on some of the major arable crops (Table B1.3). The mean rate of overall phosphate use on the major arable crops declined steadily from 71 kg/ha in 1998 to 56 kg/ha in 2001 with an increase (+2 kg/ha) in 2002. Average field rates on these crops have fluctuated during the period and the main reason for the decline in overall rates appears to be a reduction in the area receiving phosphate fertiliser, except in 2001 when the increased area of spring crops and problems associated with the wet autumn in 2000 had a major impact.

Overall phosphate rates decreased slightly for winter wheat (-1 kg/ha) and increased slightly on spring barley (+2 kg/ha) and winter barley (+1 kg/ha) in 2002, to 41, 45 and 46 kg/ha respectively. The rate for winter wheat equalled the 1999 rate which was the lowest recorded value in the period 1998 to 2002. The field average rate increased by 3 kg/ha on winter wheat and by 2 kg/ha on spring barley but declined by 1 kg/ha on winter barley in 2002. A reduction in the area receiving phosphate fertiliser (-3%) for winter wheat gave rise to the reduction in overall amount.

After falls in both the average field rate and dressing cover in 2001, the estimated average field rate of phosphate on maincrop potatoes again declined significantly in 2002 although the dressing cover returned to the level of 1999 and 2000. The combined effect resulted in a further fall of 4 kg/ha in the overall application rate of phosphate, which has now decreased steadily over the last five years from 184 kg/ha in 1998 down to 123 kg/ha in 2002. This reduction results from a combination of the fall in dressing cover from a steady average of 94% between 1992 and 1998 to 87% in 2002, and the fall in average application rate from an average 192 kg/ha between 1992 and 2000 to 141 kg/ha in 2002. The decrease indicates that farmers are responding to recent reductions in the recommended rates for this crop.

The overall application rate of phosphate on oilseed rape increased to 50 kg/ha; a return to the previous high value for the period in 1998. The average field rate was also higher at 71 kg/ha as was the area receiving phosphate which was up to 73% in 2002.

The recorded overall rate of phosphate on sugar beet increased in 2002 by 7 kg/ha to 43 kg/ha. This was associated with the highest average field rate for the period of 82 kg/ha and an increase in area receiving phosphate fertiliser. Estimated usage has tended to fluctuate during the last five years with the highest overall rate (52 kg/ha) in 1999 and the lowest (36 kg/ha) in 2001 (mean: 44 kg/ha).

Potash

Overall potash use on tillage crops increased by 5 kg/ha in 2002, mainly due to increased application rates on the major arable crops (notably maincrop potatoes and sugar beet). The mean rate of overall potash use on the major arable crops declined steadily from 104 kg/ha in 1998 to 77 kg/ha in 2001 with an increase (+13 kg/ha) in 2002. As discussed above for phosphate, average field rates of potash on these crops have fluctuated during the period and the main reason for the decline in overall rates appears to be a reduction in the area receiving potassium-containing fertiliser.

After decreases on winter wheat and spring barley and an increase on winter barley in 2001 the overall potash use showed slight increases on winter wheat (+2 kg/ha) and spring barley (+5 kg/ha) in 2002 but a decrease for winter barley (-2 kg/ha), with recorded overall rates of 47, 56 and 62 kg/ha, respectively (Table B1.3). The average field rates showed a similar pattern

with increases for winter wheat and spring barley and a decrease for winter barley (Table B1.4).

The overall potash rate on maincrop potatoes showed an increase of 37 kg/ha in 2002, to 221 kg/ha, due mainly to a major increase in the area receiving potash fertiliser (from 79% to 94%). This is the first increase in overall rate since the high level of 276 kg/ha recorded in 1998.

Overall potash use on oilseed rape increased by 8 kg/ha to 50 kg/ha, this follows a steady decline since 1999. The average field rate also increased to 77 kg/ha and the dressing cover increased by 4%. Potash use in 2002 was consequently the highest for the five year period.

For sugar beet, after the decline in 2001 to 78 kg/ha, (the lowest recorded rate since 1983 when current record series began) there was an increase of 26 kg/ha in 2002 to give an overall rate of 104 kg/ha. This increase was caused in part by increases in the field average rate (+5 kg/ha) but mainly by an increase in the dressing cover from 63% to 81% compared to 2001.

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 bulk fertilisers, often applied by contractors, is less reliably reported by farmers than for self-applied, bagged products, where constituent details are given on the fertiliser bag.

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 shown a large increase; markedly to 13-14% for cereals and 30% for oilseed rape. Since then, however, dressing covers for sulphur had generally remained static or even declined on oilseed rape until 2002 when there was an increase in the area receiving fertilisers.

Average application rates also increased on all crops except winter wheat. These rates are generally higher than the recommended practice of 25-40 kg/ha SO_3, applied as a water soluble form in early spring, for potentially sulphur-deficient cereal crops but more or less in line with the recommended 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 1998 - 2002

Dressing cover (%)

	winter wheat	*winter barley*	*spring barley*	*oilseed rape*
1998	15	13	13	30
1999	14	14	12	31
2000	15	16	18	29
2001	18	19	15	26
2002	28	27	25	47

Average field rate (kg/ha SO_3)

	winter wheat	*winter barley*	*spring barley*	*oilseed rape*
1998	38	36	27	51
1999	34	45	28	66
2000	49	45	39	68
2001	51	48	36	61
2002	48	54	40	78

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 understanding 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.

Table B1.9 Dressing cover (% area) of sulphur on cereals and oilseed rape by region, 1999 - 2002

		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
Scotland*	***1999***	32	29	14	47
	2000	45	29	22	55
	2001	34	35	19	56
	2002	51	54	28	72

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 1998 - 2002

	straight nitrogen	*compound nitrogen*	*total nitrogen*	*total phosphate*	*total potash*
1998	53	56	109	21	29
1999	52	58	110	20	28
2000	43	56	99	20	26
2001	39	55	94	19	24
2002	32	57	89	20	25

The 5 kg/ha drop in overall total nitrogen use on grassland in 2002 was mainly related to a decrease in average field rate (-10 kg/ha) (Table B1.11), the dressing cover for total nitrogen showing a very slight increase (+1%) in 2002 compared with 2001. Over the last five years, the dressing cover for straight nitrogen has shown a gradual decline from a level of 43% in 1998 down to 28% in 2002. The area receiving compound nitrogen has fluctuated during the period, a slight increase to 59% occurred in 2002, (period mean: 61%). The corresponding average field rates have not shown any consistent change during this period. The straight nitrogen rate dropped in 2002 to 113 kg/ha, its lowest level in the 1998-2002 period (mean: 125 kg/ha).

Average field rates and dressing covers for phosphate and potash (which were at their lowest for the five year period in 2001) showed a slight recovery in 2002. The net effect of this is to give a slight increase (+1) in the overall rates (20 kg/ha for phosphate and 25 kg/ha for potash).

Table B1.11 Dressing cover (%) and average application rate (kg/ha) of fertiliser on grassland, Great Britain 1998 - 2002

Dressing cover (%)

	straight nitrogen	*compound nitrogen*	*total nitrogen*	*total phosphate*	*total potash*
1998	43	60	79	62	63
1999	39	61	79	61	61
2000	35	67	75	60	59
2001	31	57	72	58	58
2002	28	59	73	60	59

Average field rate (kg/ha)

	straight nitrogen	*compound nitrogen*	*total nitrogen*	*total phosphate*	*total potash*
1998	125	93	138	33	46
1999	134	96	138	33	46
2000	123	84	133	34	45
2001	128	96	133	32	42
2002	113	97	122	33	42

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 2002 are presented in Section C tables. The Survey estimates for annual distributions of the total grassland area between grazing and cutting management regimes since 1998 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 1998 - 2002

	grazed[a]	*silage*[b]	*hay*[b]
1998	94	36	12
1999	96	34	13
2000	93	33	13
2001	91	38	10
2002	92	31	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. In 2002 the area of silage appears to have decreased and this may tie in with data from the December census which reports that silage production is down by 3.3%.

[a] May also be cut.

[b] May also be grazed.

Table B1.13 Nitrogen application rates (kg/ha) by grassland utilisation, Great Britain 1998 - 2002

Total nitrogen

	overall application rate				*average field rate*		
	grazed[a]	*silage*[b]	*hay*[b]		*grazed*[a]	*silage*[b]	*hay*[b]
1998	107	168	82	***1998***	136	176	101
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

Straight nitrogen

	overall application rate				*average field rate*		
	grazed[a]	*silage*[b]	*hay*[b]		*grazed*[a]	*silage*[b]	*hay*[b]
1998	52	79	44	***1998***	125	130	100
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

Compound nitrogen

	overall application rate				*average field rate*		
	grazed[a]	*silage*[b]	*hay*[b]		*grazed*[a]	*silage*[b]	*hay*[b]
1998	55	89	39	***1998***	92	118	71
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

After remaining relatively constant at the start of the period, overall total nitrogen rates have since shown a net decrease for both grazed and silage categories, whilst rates for hay have fluctuated. The reduction in overall application rate of total nitrogen for grazed grass and silage was mainly due to the reduction in average field rate. For hay the average field rate increased significantly (+20 kg/ha). In 2001 the dressing cover was reduced significantly for all types of grassland probably due to Foot and Mouth. The area receiving nitrogen fertiliser recovered somewhat in 2002 being only 2% down on 2000 figures for grazed grass but remained 4% down for silage and 9% down for hay.

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 2002 than in the previous year. Compound nitrogen use increased in 2002 for grazed grass and hay but decreased slightly for silage.

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. Nitrogen fertiliser practice showed the same pattern of change at farm type level, for both dairy and beef/sheep farms.

B1.3.2 PHOSPHATE AND POTASH

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

Table B1.14 Phosphate and potash use (kg/ha) by grassland utilisation, Great Britain 1998 - 2002

Total phosphate

	overall application rate				*average field rate*		
	grazed[a]	*silage*[b]	*hay*[b]		*grazed*[a]	*silage*[b]	*hay*[b]
1998	20	30	19	***1998***	33	40	32
1999	20	27	16	***1999***	33	39	29
2000	20	30	18	***2000***	33	40	33
2001	18	27	15	***2001***	31	38	28
2002	19	30	20	***2002***	32	42	37

Total potash

	overall application rate				*average field rate*		
	grazed[a]	*silage*[b]	*hay*[b]		*grazed*[a]	*silage*[b]	*hay*[b]
1998	28	54	23	***1998***	44	67	39
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

For hay the downward trend of the previous four years was halted with an increase to 20 kg/ha associated with an increase in the average field rate (Table B1.14). On silage overall phosphate continued to fluctuate. The overall phosphate rate on grazed grass after a stable period at 20 kg/ha for three years showed a slight recovery (+1 kg/ha) after it dropped to 18 kg/ha in 2001.

For cut grass the downward trend of the previous four years was halted with increases of 2 kg/ha and 6 kg/ha for silage and hay respectively in 2002. These increases were associated with increases in the average field rate. There was no change in the either the overall rate or the average rate for grazed grass.

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

[a] May also be cut.

[b] May also be grazed.

B1.3.3 SULPHUR

The risk of sulphur deficiency in grassland is increasing and 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), and increased, most notably on silage in 2002. Otherwise there has been no real change in the proportion of grassland receiving sulphur fertiliser either in the last five years (means: 8% for silage grass and 3% for grazed and hay grass) or indeed since 1993, when information on sulphur applications was first collected in the Survey.

The significant proportion of heavier textured soil types which occur in the main grassland farming areas, and inputs of 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 1998 - 2002

Dressing cover (%)

	grazed[a]	*silage*[b]	*hay*[b]	*all grass*
1998	3	6	4	3
1999	3	7	2	4
2000	4	9	4	5
2001	2	5	2	2
2002	5	12	4	6

Average field rate (kg/ha SO_3)

	grazed[a]	*silage*[b]	*hay*[b]	*all grass*
1998	32	39	32	34
1999	55	62	34	56
2000	40	44	41	41
2001	34	33	30	31
2002	42	48	57	44

Estimated average field rates of sulphur application for each sward management category did not show any consistent changes during 1998-2002, resulting in five year means of 41, 45 and 39 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

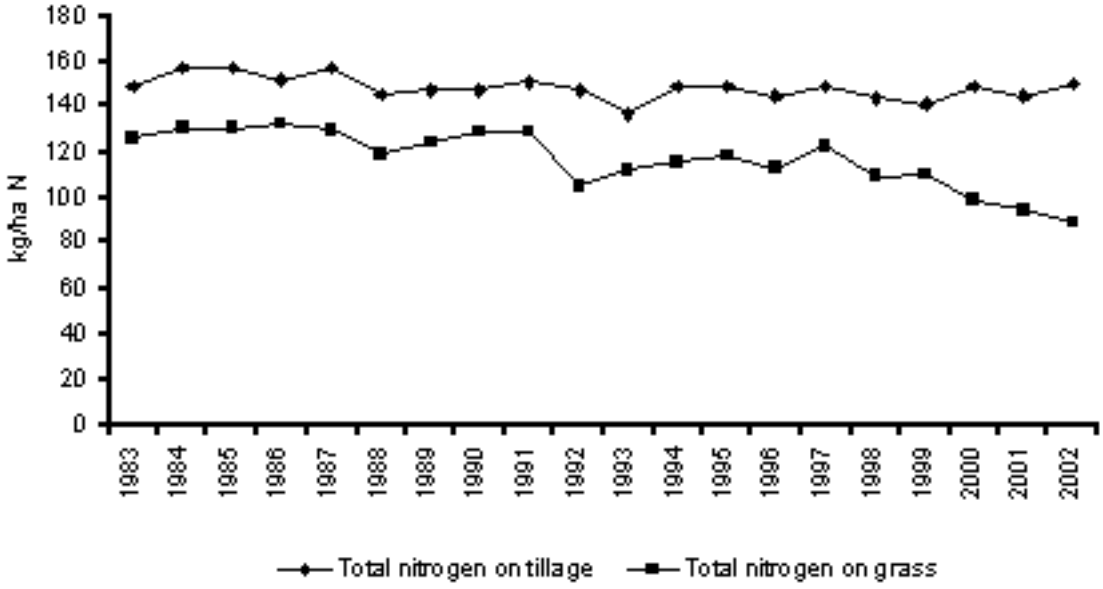
Table B2.1 Total overall nitrogen application rates (kg/ha), Great Britain 1983 - 2002

	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

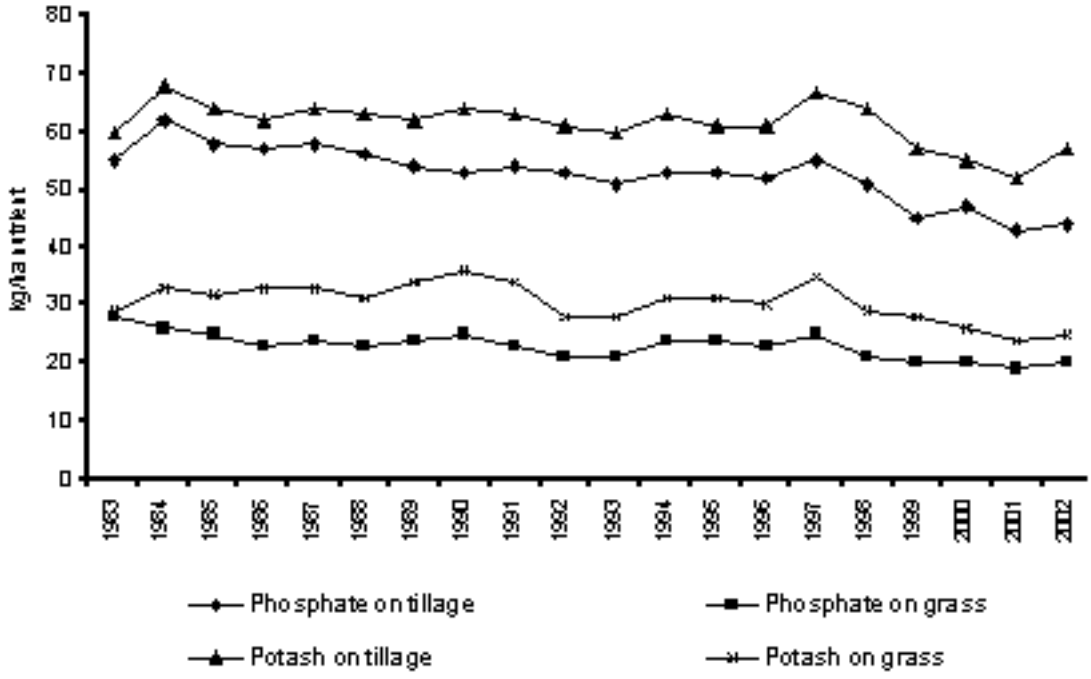
Overall total nitrogen rates for tillage crops and grassland in Great Britain since 1983 are summarised in Table B2.1 and presented graphically in Figure B2.1(a). Overall nitrogen use has been consistently higher on tillage crops than on grassland ever since the British survey started.

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 - 2002**

(a)



(b)



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 in both 1991, when there was a temporary increase to 151 kg/ha, and in 1993, when the application rate fell sharply to 137 kg/ha.

Overall nitrogen use showed another, smaller drop in 1998-99 before reaching levels of 149 kg/ha in 2000, 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 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 occurred in 1998 through to 2002. The overall nitrogen rate of 89 kg/ha on grassland in 2002 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. During the last five years (1998-2002) the average has decreased to 124 kg/ha, reflecting the downward trend observed on both 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 - 2002

	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

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 2001 rate of 43 kg/ha was the lowest since Great Britain records began in 1983. Reductions in dressing cover and a much higher proportion of spring barley in 2001 were major factors in the most recent drop in phosphate use on tillage crops (see Sections B1.1.2 and B1.2.2).

The overall rate of phosphate on grassland was highest in 1983, at 28 kg/ha, and then application remained relatively stable at 23-25 kg/ha between 1985-1997, apart from a temporary recorded drop to 21 kg/ha in 1992-1993. However, overall phosphate use has decreased gradually since 1997 to a level of 19 kg/ha in 2001, the lowest recorded since 1983. The five-year means have been 25 kg/ha in 1983-1987, 23 kg/ha in 1988-1992, 23 kg/ha in 1993-1997 and 20 kg/ha for the period 1998-2002.

Overall potash use on tillage crops had declined slightly between 1983-1997, with a five-year mean of 64 kg/ha in 1983-1987, 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 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. 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 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 1983-2002. 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 1989-1991 and in 1997. Annual potash use over the last five years has been consistently lower (mean: 26 kg/ha) than overall application rates in earlier years and represents a net decline of 6 kg/ha since 1983-1987 (mean: 32 kg/ha).

B2.1.3 FERTILISER USE ON MAJOR TILLAGE CROPS

Overall application rates of total nitrogen, phosphate and potash on the main arable crops in Great Britain since 1983 are shown in Figure B2.2.

Nitrogen

Between 1983-1987 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 1993-1997. For the five years since then, the mean has dropped slightly to 187 kg/ha. For winter barley the mean since 1988 has settled at about 10 kg/ha less than the peak of 153 kg/ha in 1983-1987. 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 reflected economic change associated 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.

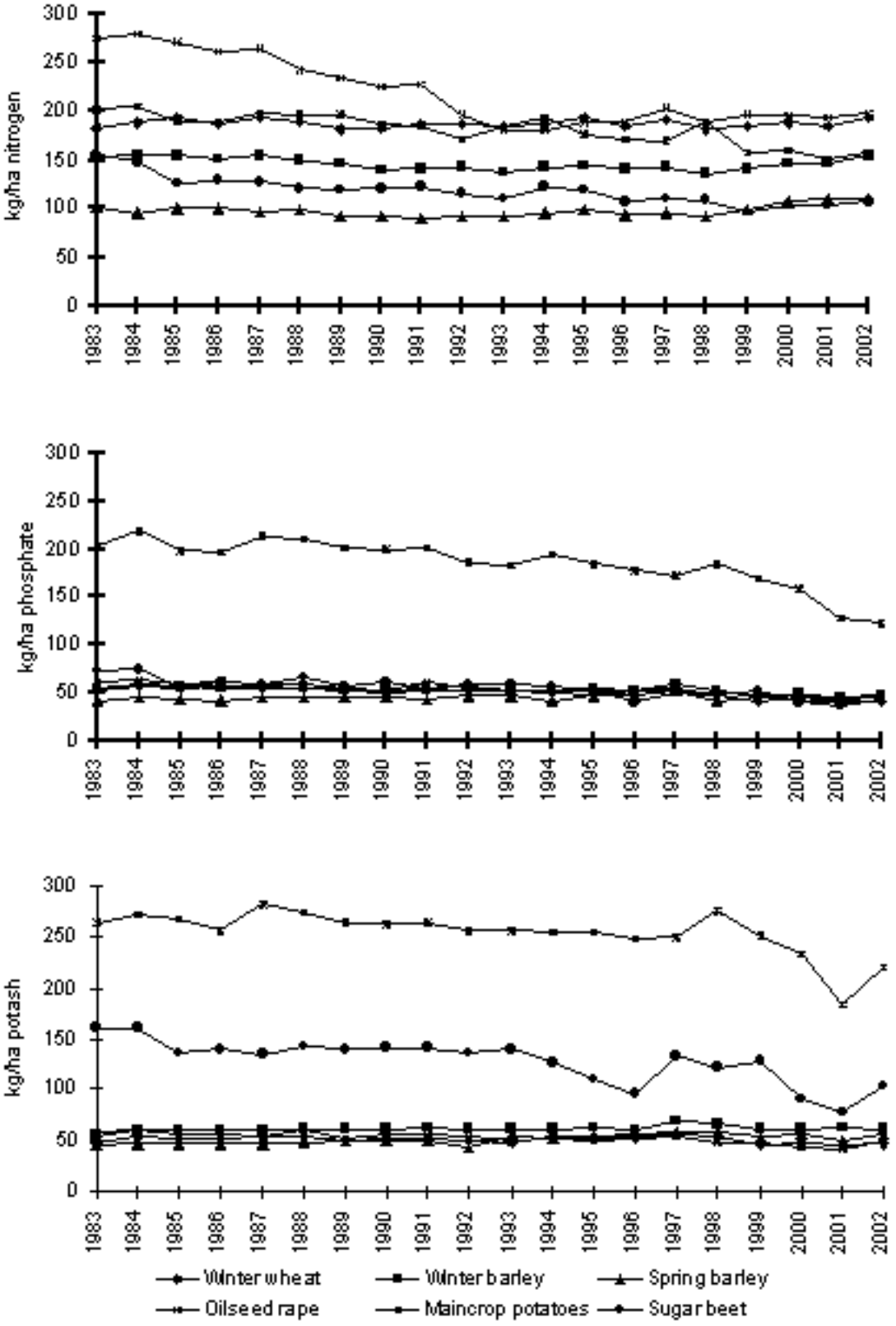
Since the early 1980s, overall nitrogen use on maincrop potatoes has tended to decrease, despite some large variability in estimated annual rates; mean usage was 197, 187, 179 and 163 kg/ha for the periods 1983-1987, 1988-1992, 1993-1997 and 1998-2002 respectively. Sugar beet has also shown a decline (137, 120 113 and 104 kg/ha) over the same periods. The trend towards less nitrogen input on sugar yield reflects 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 shows 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). In contrast, however, phosphate use has risen slightly on spring barley between 1983-1997, but has declined since then. Overall phosphate use has also declined on oilseed rape, maincrop potatoes and sugar beet with means for 1983-1987 of 61, 206 and 64 kg/ha respectively declining to 46, 152 and 44 kg/ha for the period 1998-2002.

On winter wheat the mean overall potash rates were very similar for each of the five year periods 1983-87, 1988-92 and 1993-97 at 52, 52 and 53 kg/ha respectively. For the five year period 1998-2002 there has been a reduction to 48 kg/ha. For barley the same periods have seen an increase in potash use from 59 kg/ha (winter barley) and 47 kg/ha (spring barely) 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 46, 233 and 104 kg/ha in 1998-2002.

Figure B2.2 **Overall application rates (kg/ha) of (a) total nitrogen, (b) phosphate and (c) potash on major arable crops, Great Britain 1983 - 2002**



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 around 5%-8% in England and Wales and 38%-64% in Scotland (Table B2.3). 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 of 91% in 2001 and 80% in 2002 should be treated with caution. The average field rate has decreased since 1985, and was fairly steady between 1991-2001 with a mean rate for Great Britain of about 43 kg/ha. The rate has increased in 2002 largely due to the increase in rates in England and Wales. 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 - 2002 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
Scotland	***1999***	35	54
	2000	35	45
	2001	32	64
	2002	38	64
Great Britain	***1999***	6	10
	2000	7	11
	2001	7	14
	2002	8	16

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
Scotland	***1999***	72	45
	2000	55	38
	2001	91[a]	39
	2002	80[b]	31
Great Britain	***1999***	35	43
	2000	33	42
	2001	43	43
	2002	41	47

[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

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

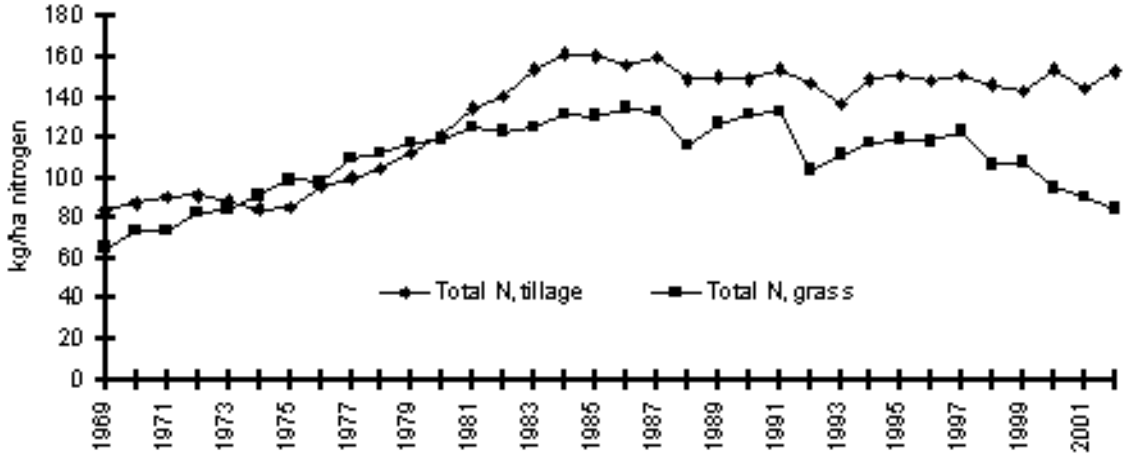
The falls in nitrogen use on tillage crops in the 1988, 1999 and 2001 seasons can be largely attributed to the reduced cropping areas of winter cereal and winter oilseed rape due, except for oilseed rape in 1999, to very wet autumns which restricted drilling opportunities. For example in England in 2001 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 high cost/benefit ratio, reliability in producing a consistent response and its potential to support high stocking rates and high output. Nitrogen recommendations for grassland were reduced in the early 1990s, in light of further research findings, which could also partly account for the lower use of nitrogen in recent years. The further, large fall in nitrogen use in 2000 was associated with a reduction in livestock numbers in the dairy, beef and sheep sectors. 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. In 2002 there was a partial recovery (+3%) in the area of grass receiving nitrogen.

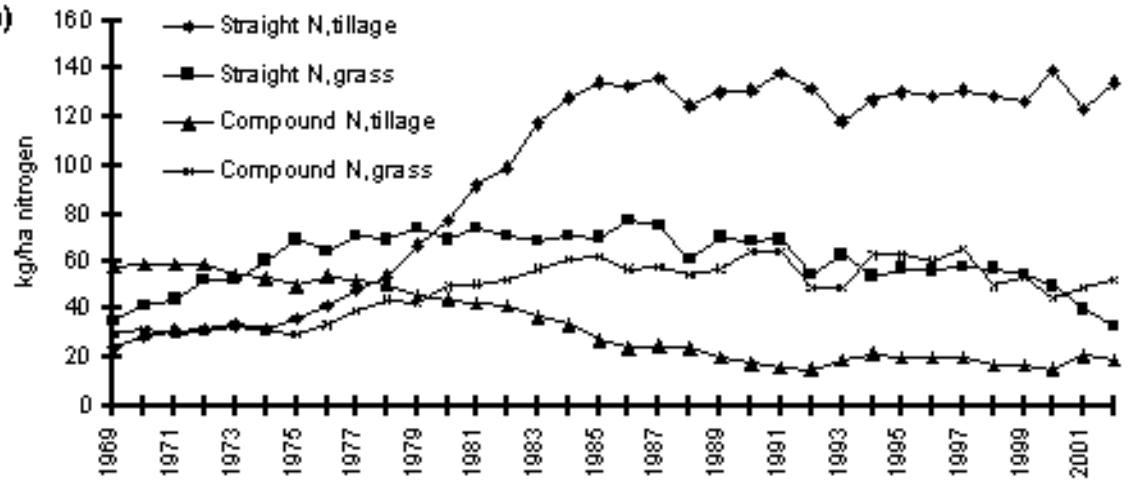
Most nitrogen fertiliser on tillage crops in England and Wales is now applied in straight form following the large steady increase in straight nitrogen application rate which occurred between 1975-1985, combined with a decrease in compound nitrogen use between 1970-1992 (Figure B2.3(b)). The pattern 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.

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 - 2002**

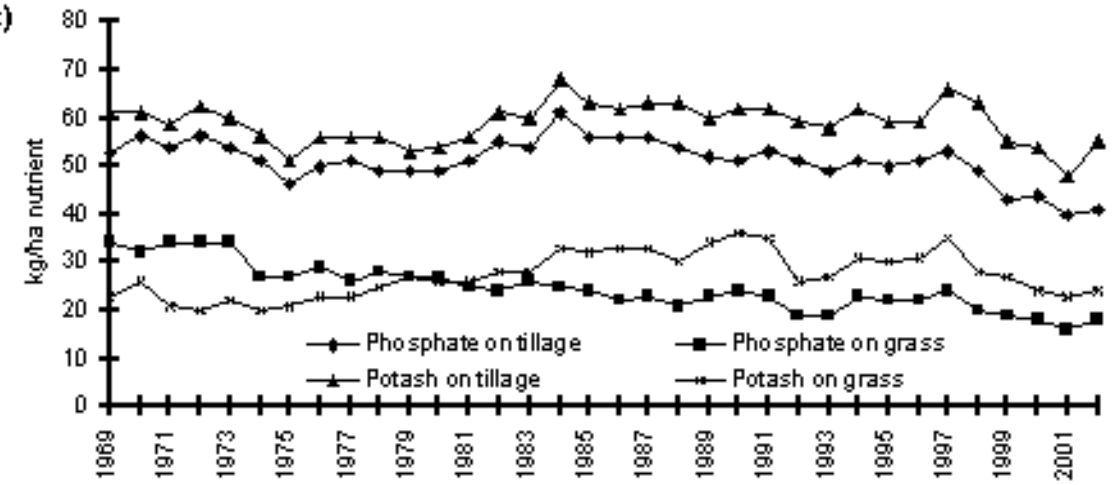
(a)



(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 three years, meant that application rates were down to, 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 in 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.

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 three years at 24 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 1983-1988 and 1995-2002, but were relatively stable in the intervening years (Figure B 2.5 (a)). Total nitrogen rates on tillage crops in Scotland are about 10-15% lower than those in England and Wales. This is 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. The rate on tillage has increased at the start of the new millennium reaching 147 kg/ha in 2001, the highest level since records began in 1983, but showed a slight decline again in 2002.

Before 1985, more nitrogen was applied to tillage crops in compound than in straight form (Figure B2.5(b)). Subsequently, about 60-65% of the total nitrogen input for tillage crops has been applied in straight form, in 2002 this increased to 70%; the corresponding proportion in England and Wales is about 90%. Compound nitrogen has consistently been the main form of nitrogen fertiliser used on grassland, with relatively little change in application rate since 1983, apart from a marked drop in 1996 and higher recorded usage in 1997-99 and 2002, 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.

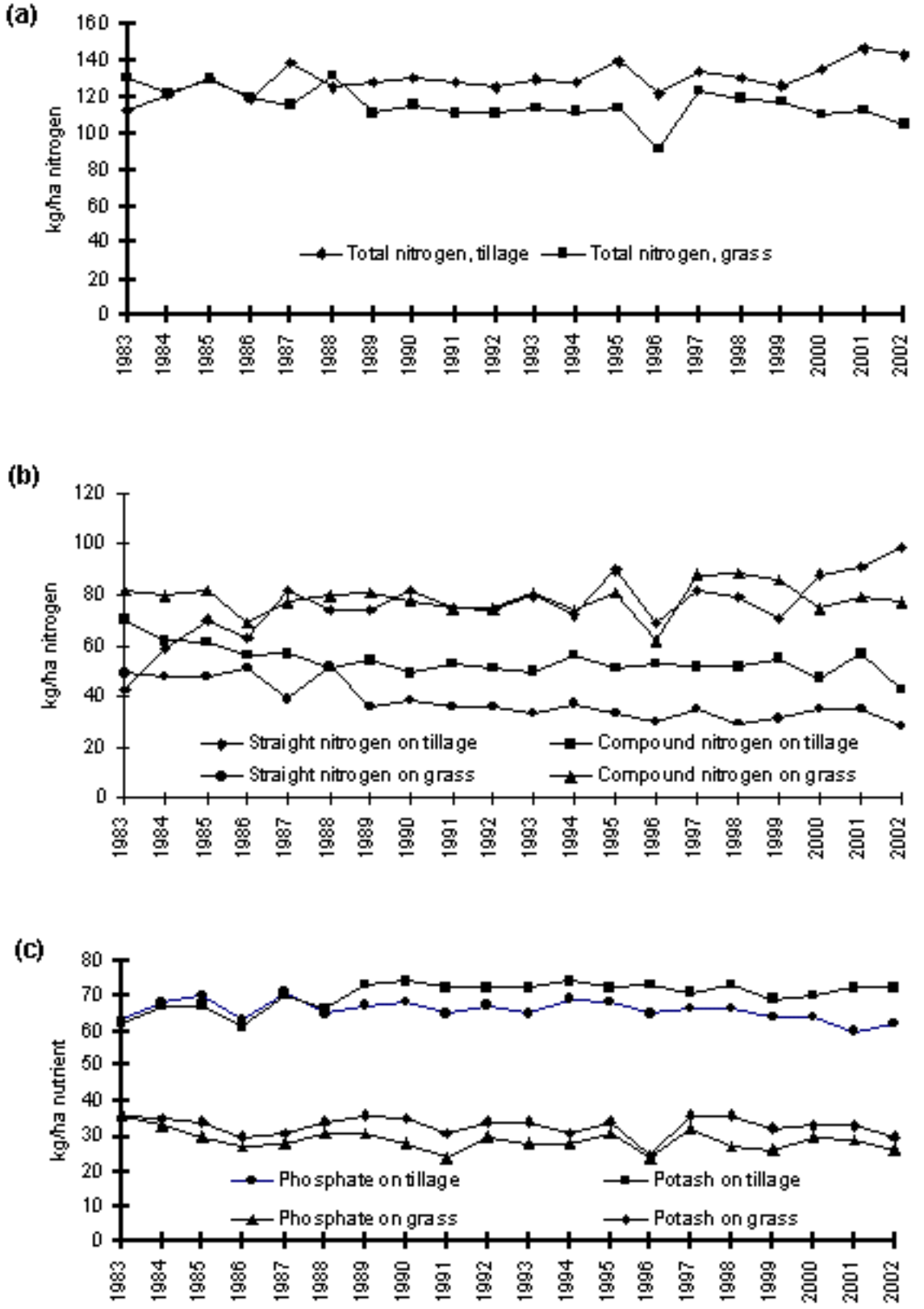
B2.3.2 PHOSPHATE AND POTASH USE

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 rates of phosphate and potash on grassland declined from 1983-1986. 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.

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

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 - 2002**



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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.

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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 2002

	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	91	38	44	10	136	48	51	124	18	22	58
Winter wheat	98	60	59	14	197	69	80	193	41	47	2363
Spring barley	97	79	83	25	113	57	68	110	45	56	747
Winter barley	99	72	78	17	156	64	80	154	46	62	751
Oats	95	72	75	15	115	59	74	109	42	56	249
Rye/Triticale/Durum wheat	65	47	57	38	155	67	82	101	31	47	28
Seed potatoes	85	100	100	40	114	170	201	97	170	201	8
Early potatoes	100	85	85	21	215	158	266	215	134	226	17
2nd Early/Maincrop potatoes	92	87	94	28	172	141	235	158	123	221	167
Sugar beet	95	52	81	27	112	82	129	106	43	104	225
Spring oilseed rape	90	43	47	22	137	62	79	123	27	37	43
Winter oilseed rape	100	73	66	7	207	68	71	207	50	47	400
Linseed	77	38	38	2	77	46	59	59	17	22	20
Forage maize	77	67	64	88	61	64	111	47	43	71	130
Rootcrops for stockfeed	80	72	77	63	86	96	97	69	69	75	74
Leafy forage crops	98	49	53	69	91	55	59	89	27	31	32
Arable silage/Other fodder crop	67	61	73	39	63	58	67	42	35	49	29
Peas - human consumption	8	31	38	4	72	61	80	6	19	30	70
Peas - animal consumption	12	59	64	18	48	58	73	6	34	47	134
Beans - animal consumption	8	36	38	10	53	66	76	4	24	29	214
Vegetables (brassicae)	99	86	97	21	249	64	171	247	55	166	29
Vegetables (other)	58	43	50	8	102	78	131	59	34	66	88
Soft fruit	52	53	54	0	101	60	166	53	32	90	18
Top fruit	76	33	43	2	76	45	90	58	15	39	44
Other tillage	54	48	51	16	103	78	105	56	37	54	74
All tillage	91	64	66	18	167	69	86	152	44	57	6012
Grass under 5 years	85	70	71	46	167	43	62	142	30	44	1102
Grass 5 years and over	70	57	57	41	109	30	36	76	17	21	2663
All grass	73	60	59	42	122	33	42	89	20	25	3765
All crops and grass	81	62	62	31	145	50	64	117	31	40	9777

Source: British Survey of Fertiliser Practice 2002.

Table GB1.2 Use of straight fertiliser, Great Britain 2002

	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	90	0	9	132	0	24	119	0	2	58
Winter wheat	94	7	8	189	91	94	178	6	8	2363
Spring barley	70	1	6	94	48	86	66	0	5	747
Winter barley	88	4	11	150	104	102	132	4	11	751
Oats	75	3	6	112	91	85	84	3	5	249
Rye/Triticale/Durum wheat	58	0	17	138	0	81	80	0	14	28
Seed potatoes	0	0	12	0	0	188	0	0	23	8
Early potatoes	77	4	38	131	55	176	101	2	67	17
2nd Early/Maincrop potatoes	51	3	24	101	97	205	52	3	49	167
Sugar beet	87	2	31	105	192	115	91	4	36	225
Spring oilseed rape	83	3	11	113	87	78	94	3	9	43
Winter oilseed rape	98	4	5	189	80	95	185	3	5	400
Linseed	57	0	0	47	0	0	27	0	0	20
Forage maize	24	3	34	89	87	137	21	3	47	130
Rootcrops for stockfeed	18	2	10	118	25	101	21	1	10	74
Leafy forage crops	27	0	0	71	0	0	19	0	0	32
Arable silage/Other fodder crop	27	0	7	62	0	75	17	0	5	29
Peas - human consumption	7	2	9	78	72	94	5	1	8	70
Peas - animal consumption	5	1	13	75	87	75	4	1	10	134
Beans - animal consumption	4	6	8	91	90	96	4	5	8	214
Vegetables (brassicae)	55	0	10	213	0	98	117	0	10	29
Vegetables (other)	54	3	13	82	109	126	44	3	16	88
Soft fruit	35	0	2	116	0	193	41	0	4	18
Top fruit	66	5	21	81	131	111	53	7	23	44
Other tillage	26	0	1	88	0	94	23	0	1	74
All tillage	79	4	10	162	92	107	129	4	11	6012
Grass under 5 years	45	1	1	126	92	83	57	1	1	1102
Grass 5 years and over	24	0	0	107	79	84	26	0	0	2663
All grass	28	0	0	113	85	84	32	0	0	3765
All crops and grass	52	2	5	147	92	106	76	2	5	9777

Source: British Survey of Fertiliser Practice 2002.

Table GB1.3 Use of compound fertiliser, Great Britain 2002

	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	30	38	37	48	48	55	14	18	20	58
Winter wheat	24	54	53	63	66	75	15	36	40	2363
Spring barley	69	78	78	63	56	64	43	44	50	747
Winter barley	36	69	68	61	61	75	22	42	51	751
Oats	40	69	72	64	57	70	26	39	50	249
Rye/Triticale/Durum wheat	29	47	47	70	67	70	20	31	33	28
Seed potatoes	85	100	88	114	170	203	97	170	179	8
Early potatoes	80	85	78	143	155	202	114	132	158	17
2nd Early/Maincrop potatoes	84	87	78	129	139	222	108	121	173	167
Sugar beet	19	51	53	81	77	128	15	39	68	225
Spring oilseed rape	24	45	47	81	62	67	19	28	31	43
Winter oilseed rape	36	69	62	50	72	76	18	50	47	400
Linseed	24	38	38	50	46	59	12	17	22	20
Forage maize	67	64	27	38	63	53	25	40	14	130
Rootcrops for stockfeed	64	70	71	73	98	92	47	69	65	74
Leafy forage crops	50	49	53	86	55	59	43	27	31	32
Arable silage/Other fodder crop	63	61	66	73	58	66	46	35	44	29
Peas - human consumption	1	29	29	14	60	75	0	17	22	70
Peas - animal consumption	7	58	54	29	58	68	2	34	37	134
Beans - animal consumption	4	31	30	16	62	70	1	19	21	214
Vegetables (brassicae)	71	86	89	180	64	174	128	55	155	29
Vegetables (other)	22	40	38	68	74	129	15	30	49	88
Soft fruit	17	53	53	73	60	160	12	32	85	18
Top fruit	16	28	28	25	32	57	4	9	16	44
Other tillage	39	49	50	85	78	105	33	38	53	74
All tillage	34	60	58	66	67	80	23	40	46	6012
Grass under 5 years	69	70	70	122	42	61	84	29	43	1102
Grass 5 years and over	57	57	56	89	29	36	51	17	20	2663
All grass	59	59	59	97	32	42	57	19	25	3765
All crops and grass	48	60	59	87	48	59	42	29	35	9777

Source: British Survey of Fertiliser Practice 2002.

Table GB1.4 Use of lime, Great Britain 2002

	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	.	.	.	.	.	.	.	.	.	.	.	.	2	58
Winter wheat	4.0	0.4	0.8	0.4	0.4	5.9	2.5	2.0	2.2	1.2	0.8	2.2	107	2363
Spring barley	6.5	.	2.0	0.1	0.8	9.4	2.5	.	2.1	1.0	0.8	2.3	80	747
Winter barley	3.1	1.1	1.6	0.3	0.7	6.8	3.9	2.4	2.3	1.4	1.3	2.9	55	751
Oats	1.9	2.0	0.2	.	.	4.1	2.3	3.7	2.6	.	.	3.0	13	249
Rye/Triticale/Durum wheat	.	.	.	.	.	.	.	.	.	.	.	.	2	28
Seed potatoes	.	.	.	.	.	.	.	.	.	.	.	.	0	8
Early potatoes	.	.	.	.	.	.	.	.	.	.	.	.	0	17
2nd Early/Maincrop potatoes	.	.	.	.	.	.	.	.	.	.	.	.	1	167
Sugar beet	12.6	1.8	4.0	7.9	1.8	27.9	3.4	2.3	1.8	1.4	2.9	2.5	58	225
Spring oilseed rape	.	.	.	.	.	.	.	.	.	.	.	.	4	43
Winter oilseed rape	9.1	0.2	2.2	0.4	.	11.9	2.0	0.4	1.9	1.0	.	2.0	38	400
Linseed	.	.	.	.	.	.	.	.	.	.	.	.	0	20
Forage maize	13.8	1.4	2.5	.	0.8	18.4	1.6	2.5	2.0	.	1.1	1.7	23	130
Rootcrops for stockfeed	12.9	.	3.2	.	0.7	16.9	2.6	.	2.6	.	0.2	2.5	13	74
Leafy forage crops	7.7	.	8.1	.	3.2	18.9	2.1	.	2.6	.	2.2	2.3	5	32
Arable silage/Other fodder crop	10.3	.	21.9	.	.	32.3	2.5	.	2.5	.	.	2.5	7	29
Peas - human consumption	4.0	1.3	.	.	0.8	6.2	2.1	3.7	.	.	2.2	2.5	5	70
Peas - animal consumption	1.9	1.5	0.4	.	0.5	4.2	1.8	2.8	2.6	.	2.2	2.2	8	134
Beans - animal consumption	3.3	0.3	0.1	0.6	1.4	5.7	3.0	2.5	1.9	0.8	1.6	2.4	13	214
Vegetables (brassicae)	.	.	.	.	.	.	.	.	.	.	.	.	4	29
Vegetables (other)	.	.	.	.	.	.	.	.	.	.	.	.	4	88
Soft fruit	.	.	.	.	.	.	.	.	.	.	.	.	1	18
Top fruit	.	5.3	.	.	10.3	15.6	.	1.8	.	.	2.7	2.4	9	44
Other tillage	.	.	.	.	.	.	.	.	.	.	.	.	2	74
All tillage	4.9	0.6	1.3	0.6	0.6	8.0	2.6	2.3	2.1	1.3	1.4	2.3	454	6012
Grass under 5 years	1.8	0.2	1.1	.	1.9	5.0	2.2	1.1	2.3	.	1.8	2.0	77	1102
Grass 5 years and over	1.0	0.3	0.6	.	0.7	2.6	2.0	1.4	2.4	.	2.3	2.1	85	2663
All grass	1.1	0.3	0.7	.	0.9	3.1	2.1	1.4	2.4	.	2.1	2.1	162	3765
All crops and grass	2.8	0.4	1.0	0.3	0.7	5.3	2.5	2.0	2.2	1.3	1.9	2.2	616	9777

Source: British Survey of Fertiliser Practice 2002.

Table GB2.1 Average fertiliser practice by grassland utilisation, Great Britain 2002

	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	68	56	54	28	104	27	28	71	15	15	1838
Grazed - mown	81	66	68	66	139	40	57	112	26	39	1527
All grazings	73	60	59	41	117	32	40	85	19	23	3365
Cut for seed - grazed	.	.	.	.	.	.	.	.	.	.	0
Cut for seed - not grazed	.	.	.	.	.	.	.	.	.	.	4
All cut for seed	.	.	.	.	.	.	.	.	.	.	4
Cut for silage - grazed	85	70	72	72	147	41	60	125	29	43	1153
Cut for silage - not grazed	94	76	81	68	194	46	78	181	35	63	258
All cut for silage	86	71	74	71	155	42	63	133	30	47	1411
Cut for hay - grazed	68	52	53	46	101	35	43	69	18	23	438
Cut for hay - not grazed	72	60	60	37	124	47	52	89	28	31	92
All cut for hay	69	53	54	45	105	37	44	72	20	24	530
All mowings	82	67	69	65	146	40	60	119	27	41	1863
All grass	73	60	59	42	122	33	42	89	20	25	3765

Source: British Survey of Fertiliser Practice 2002.

Table GB3.0 Product and nutrient use by month of application, Great Britain 2002.

(a) Product use

row %	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total Product ('000 tonnes)
Straight N	1	0	0	0	0	4	29	40	17	4	3	1	2158
Straight P	16	11	9	3	4	5	24	15	8	0	1	3	44
Straight K	4	4	10	2	8	15	30	18	5	2	0	2	98
Compounds	6	4	3	1	1	4	24	27	13	7	5	5	2270
All fertilisers	4	2	2	0	1	4	27	33	15	6	4	3	4569

(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	27	38	17	6	4	3	1116
P_2O_5	2	1	0	0	0	2	24	35	16	8	7	4	294
K_2O	2	1	0	0	0	2	23	33	17	10	8	5	378
Total	1	1	0	0	0	3	26	36	17	7	5	3	1788

Note: product use refers to the total tonnage of the products used by farmers in the survey year 2002;
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 2002.

Table GB3.1 Product type as percentage of all product used by crop group, Great Britain 2002

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	1.1	1.8	0.3	1.1	3.9	0.9	1.7	0.2	0.6	0.7	6.0	0.4	1.2
Urea	1.5	7.5	0.4	1.4	13.8	1.4	6.5	2.2	1.1	2.3	3.3	2.3	4.9
Ammonium Nitrate	31.6	44.0	9.8	28.4	36.1	17.6	38.5	23.2	27.2	20.5	20.4	23.1	32.7
UAN	5.1	9.6	1.7	2.3	8.2	0.9	7.9	0.5	0.2	0.5	10.1	0.5	5.1
Other Straight N	1.4	5.9	0.6	0.4	7.8	2.5	5.0	0.5	0.1	0.6	0.1	0.5	3.3
Triple Superphosphate	0.1	1.3	0.4	0.5	0.8	1.8	1.1	0.2	0.2	0.3	0.0	0.3	0.8
Single Superphosphate	0.2	0.1	0.0	0.6	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1
Other Straight P	0.0	0.2	0.2	0.1	0.0	0.3	0.2	0.0	0.0	0.1	0.0	0.0	0.1
Muriate of Potash	1.4	1.6	6.5	1.4	0.8	8.9	2.1	0.2	0.0	0.3	0.0	0.2	1.4
Other Straight K	0.4	0.2	1.5	19.6	0.7	2.2	1.2	0.0	0.0	0.1	0.0	0.0	0.8
NP	1.0	0.8	2.4	0.3	1.8	5.8	1.2	3.1	0.9	1.6	0.9	2.9	1.8
NK	1.2	2.0	0.6	0.8	0.6	4.3	1.8	6.3	3.4	13.8	0.0	7.5	3.9
PK	7.0	13.9	4.4	30.3	12.6	26.8	13.8	2.2	3.9	2.5	9.7	2.2	9.4
Very High N	3.1	3.6	1.3	0.2	2.3	1.8	3.1	33.2	22.3	28.8	4.5	32.5	14.2
High N	14.4	1.3	1.2	0.0	0.3	4.4	2.6	24.2	30.6	22.2	18.3	3.4	10.5
High P	0.6	0.2	3.9	0.1	0.6	1.7	0.5	0.3	0.7	0.1	0.0	0.3	0.4
High K	5.8	1.1	44.0	6.0	1.2	8.4	4.3	0.8	2.0	1.9	20.1	1.0	3.0
Low N	7.1	3.9	10.8	2.3	5.1	3.3	4.6	0.4	0.1	0.6	0.0	0.5	3.0
Low P	3.6	0.2	5.8	3.7	0.2	5.8	1.2	1.3	5.4	2.6	0.0	1.4	1.3
Equal NPK	13.3	0.7	4.3	0.5	3.2	1.4	2.4	1.1	1.2	0.7	6.5	1.1	1.9
Total Product ('000 tonnes)	**287**	**1917**	**142**	**114**	**249**	**129**	**2839**	**1536**	**148**	**816**	**5**	**1730**	**4569**

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 2002.

Table GB3.2 Use of product type by crop group, Great Britain 2002

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	5.5	60.5	0.9	2.2	17.1	2.0	88.2	6.3	1.6	9.7	0.5	11.8	56
Urea	1.9	63.7	0.2	0.7	15.3	0.8	82.6	14.5	0.7	8.2	0.1	17.4	224
Ammonium Nitrate	6.1	56.4	0.9	2.2	6.0	1.5	73.2	23.7	2.7	11.1	0.1	26.8	1494
UAN	6.2	78.7	1.1	1.1	8.7	0.5	96.3	3.2	0.1	1.6	0.2	3.7	234
Other Straight N	2.7	75.6	0.6	0.3	13.1	2.1	94.4	4.9	0.1	2.9	0.0	5.6	150
Triple Superphosphate	1.1	71.3	1.4	1.7	5.8	6.4	87.7	8.5	1.0	6.5	0.0	12.3	36
Single Superphosphate	21.0	53.2	0.0	24.2	0.0	0.0	98.4	1.6	0.0	0.0	0.0	1.6	3
Other Straight P	2.1	70.9	5.5	3.1	0.0	6.7	88.3	6.8	0.0	11.7	0.0	11.7	5
Muriate of Potash	6.3	50.0	14.8	2.5	3.1	18.4	95.1	4.2	0.0	3.9	0.0	4.9	62
Other Straight K	3.1	12.9	5.8	63.5	5.2	7.9	98.4	1.4	0.0	1.6	0.0	1.6	36
NP	3.5	19.1	4.1	0.4	5.2	8.8	41.2	54.6	1.4	14.4	0.0	58.8	84
NK	2.0	21.7	0.5	0.5	0.8	3.0	28.5	53.1	2.7	62.3	0.0	71.5	180
PK	4.6	61.8	1.5	8.1	7.3	8.0	91.3	7.6	1.3	4.6	0.1	8.7	430
Very High N	1.4	10.6	0.3	0.0	0.9	0.4	13.5	78.7	5.1	36.1	0.0	86.5	651
High N	8.6	5.1	0.3	0.0	0.2	1.2	15.5	77.5	9.5	37.8	0.2	84.5	480
High P	9.6	17.5	28.9	0.5	7.2	11.2	74.9	22.8	5.4	2.3	0.0	25.1	19
High K	12.0	15.7	44.9	5.0	2.2	7.8	87.6	8.3	2.1	10.8	0.7	12.4	139
Low N	14.7	54.5	11.0	1.9	9.2	3.1	94.4	4.4	0.1	3.5	0.0	5.6	139
Low P	17.2	7.7	13.6	7.1	0.6	12.4	58.6	33.0	13.0	34.2	0.0	41.4	61
Equal NPK	44.0	15.4	7.0	0.6	9.4	2.0	78.5	19.5	2.1	6.2	0.3	21.5	86
All Fertilisers	**6.3**	**41.9**	**3.1**	**2.6**	**5.5**	**2.9**	**62.2**	**33.2**	**3.2**	**17.6**	**17.6**	**37.8**	**4569**

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 2002.

Table GB3.3 Product use by month of application, Great Britain 2002.

row %	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	total Product ('000 tonnes)
Calcium Ammonium Nitrate	0.0	5.8	67.1	17.9	4.3	1.9	1.6	0.6	0.6	0.0	0.2	0.0	56
Urea	0.3	6.4	41.1	39.5	10.4	0.6	0.7	0.5	0.6	0.0	0.0	0.0	224
Ammonium Nitrate	0.2	2.6	26.1	42.1	18.7	4.9	2.5	1.9	0.6	0.3	0.1	0.0	1494
UAN	0.0	3.1	26.6	44.5	20.2	1.3	3.4	0.0	0.5	0.4	0.0	0.0	234
Other straight N	0.2	11.0	32.0	28.7	11.1	5.7	10.9	0.0	0.4	0.0	0.1	0.0	150
Triple Superphosphate	0.1	5.4	27.5	11.2	8.8	0.5	1.1	3.6	18.6	11.6	8.7	2.9	36
Single Superphosphate	0.0	0.0	1.6	73.2	0.0	0.0	0.0	0.0	0.0	24.2	1.0	0.0	3
Other Straight P	32.3	4.7	12.0	8.5	10.4	0.0	0.0	2.8	6.4	0.0	19.2	3.8	5
Muriate of Potash	4.5	11.5	35.4	21.3	4.9	1.8	0.0	0.5	5.8	2.9	10.3	1.0	62
Other Straight K	14.0	22.4	19.8	11.6	4.5	1.4	0.0	4.4	2.0	7.3	10.0	2.5	36
NP	0.0	2.9	43.5	27.5	9.5	3.8	0.3	2.0	6.2	4.0	0.2	0.1	84
NK	0.5	0.1	17.7	14.1	23.1	23.7	12.7	7.5	0.5	0.1	0.0	0.0	180
PK	4.2	11.0	19.5	7.6	0.9	0.6	0.5	5.4	21.2	15.7	11.1	2.3	430
Very High N	0.0	1.6	20.2	33.3	16.9	11.1	9.1	6.3	1.4	0.0	0.1	0.0	651
High N	0.3	2.7	21.3	39.3	21.8	5.0	6.0	3.0	0.5	0.2	0.0	0.0	480
High P	0.0	0.0	42.6	30.9	8.3	0.8	1.9	3.2	6.9	0.2	5.1	0.0	19
High K	1.2	4.6	41.2	34.5	8.3	4.4	0.0	0.5	0.0	3.0	1.6	0.8	139
Low N	0.0	4.9	31.2	17.1	4.4	0.0	0.3	3.6	16.1	14.2	7.9	0.3	139
Low P	0.0	5.5	26.2	37.7	7.0	17.0	3.7	0.7	0.6	1.4	0.3	0.0	61
Equal NPK	3.1	2.4	30.5	39.5	6.7	2.6	2.2	5.7	5.1	2.2	0.0	0.0	86
All Fertilisers	**0.8**	**4.2**	**26.5**	**33.2**	**14.7**	**5.5**	**4.0**	**3.0**	**3.5**	**2.5**	**1.8**	**0.3**	**4569**

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 2002.

Table EW1.1 Total fertiliser use, England and Wales 2002

	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	97	35	41	9	138	47	51	134	16	21	54
Winter wheat	98	58	57	14	196	70	80	192	41	46	2201
Spring barley	95	61	69	18	113	45	61	107	27	42	400
Winter barley	99	70	75	16	150	63	79	149	44	59	649
Oats	95	68	72	12	119	61	79	113	41	57	199
Rye/Triticale/Durum wheat	63	44	55	40	157	67	84	99	29	46	26
Seed potatoes	.	.	.	.	.	.	.	.	.	.	3
Early potatoes	100	85	85	21	215	158	266	215	134	226	17
2nd Early/Maincrop potatoes	93	86	94	30	178	148	246	166	127	231	151
Sugar beet	95	52	81	27	112	82	128	106	43	104	225
Spring oilseed rape	88	35	39	18	133	66	81	117	23	32	30
Winter oilseed rape	100	71	63	6	205	72	77	205	51	49	362
Linseed	76	36	36	3	77	49	62	59	18	22	19
Forage maize	78	67	55	87	61	64	111	48	43	61	127
Rootcrops for stockfeed	80	68	77	73	95	76	100	76	52	77	40
Leafy forage crops	62	36	41	73	87	53	61	54	19	25	20
Arable silage/Other fodder crop	64	53	77	34	101	57	66	65	30	51	15
Peas - human consumption	8	33	40	4	72	61	80	6	20	32	66
Peas - animal consumption	13	58	64	19	49	58	74	6	34	47	126
Beans - animal consumption	8	36	38	10	55	66	76	4	24	29	211
Vegetables (brassicae)	99	86	97	21	249	64	171	247	55	166	29
Vegetables (other)	59	42	50	8	103	79	132	61	33	66	85
Soft fruit	48	51	52	0	219	55	164	105	28	85	14
Top fruit	76	33	43	2	76	45	90	58	15	39	44
Other tillage	56	40	43	14	100	68	105	56	27	45	66
All tillage	90	60	62	17	170	69	89	153	41	55	5179
Grass under 5 years	82	64	65	57	179	46	70	147	29	46	724
Grass 5 years and over	68	55	55	43	108	29	36	73	16	20	2276
All grass	70	56	56	45	121	32	42	85	18	24	3000
All crops and grass	79	58	59	32	147	50	65	116	29	38	8179

Source: British Survey of Fertiliser Practice 2002.

Table EW1.2 Use of straight fertiliser, England and Wales 2002

	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	92	0	9	132	0	24	121	0	2	54
Winter wheat	93	7	8	188	91	93	175	6	7	2201
Spring barley	74	1	10	109	48	82	81	0	8	400
Winter barley	88	4	11	145	104	96	128	4	11	649
Oats	83	3	8	114	94	84	95	3	7	199
Rye/Triticale/Durum wheat	55	0	18	141	0	81	78	0	15	26
Seed potatoes	.	.	.	.	.	.	.	.	.	3
Early potatoes	77	4	38	131	55	176	101	2	67	17
2nd Early/Maincrop potatoes	54	3	25	101	97	205	55	3	51	151
Sugar beet	87	2	31	105	192	115	91	4	36	225
Spring oilseed rape	80	3	7	119	87	92	95	3	6	30
Winter oilseed rape	98	4	5	193	80	99	189	3	5	362
Linseed	58	0	0	82	0	0	48	0	0	19
Forage maize	25	3	34	89	87	137	22	3	47	127
Rootcrops for stockfeed	30	4	18	127	25	101	38	1	18	40
Leafy forage crops	29	0	0	67	0	0	19	0	0	20
Arable silage/Other fodder crop	35	0	13	67	0	35	23	0	5	15
Peas - human consumption	8	2	10	78	72	94	6	1	9	66
Peas - animal consumption	6	1	14	75	87	75	5	1	11	126
Beans - animal consumption	4	6	8	91	90	96	4	5	8	211
Vegetables (brassicae)	55	0	10	213	0	98	117	0	10	29
Vegetables (other)	54	4	13	83	109	126	45	4	16	85
Soft fruit	36	0	0	117	0	0	42	0	0	14
Top fruit	66	5	21	81	131	111	53	7	23	44
Other tillage	25	0	2	80	0	94	20	0	2	66
All tillage	81	5	11	166	92	106	134	5	12	5179
Grass under 5 years	51	1	2	135	76	75	69	1	2	724
Grass 5 years and over	24	0	0	110	80	83	26	0	0	2276
All grass	28	0	1	117	78	78	33	0	1	3000
All crops and grass	53	3	5	152	91	105	81	3	5	8179

Source: British Survey of Fertiliser Practice 2002.

Table EW1.3 Use of compound fertiliser, England and Wales 2002

	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	26	35	34	44	47	55	11	16	19	54
Winter wheat	21	51	50	71	66	75	15	34	38	2201
Spring barley	43	60	60	63	45	56	27	27	34	400
Winter barley	28	65	66	72	61	75	20	40	50	649
Oats	29	65	68	66	60	74	19	39	50	199
Rye/Triticale/Durum wheat	25	44	44	82	67	71	21	29	31	26
Seed potatoes	.	.	.	.	.	.	.	.	.	3
Early potatoes	80	85	78	143	155	202	115	132	158	17
2nd Early/Maincrop potatoes	82	97	87	98	85	125	80	82	109	151
Sugar beet	19	51	53	81	77	128	15	39	68	225
Spring oilseed rape	22	38	40	86	64	73	19	24	29	30
Winter oilseed rape	31	67	59	54	73	76	17	49	45	362
Linseed	22	36	36	48	49	62	11	18	22	19
Forage maize	68	65	27	38	63	53	26	41	14	127
Rootcrops for stockfeed	52	64	66	72	78	90	37	50	59	40
Leafy forage crops	41	36	41	84	53	61	34	19	25	20
Arable silage/Other fodder crop	56	53	63	73	57	63	41	30	40	15
Peas - human consumption	1	31	31	14	60	75	0	19	23	66
Peas - animal consumption	8	57	53	29	58	69	2	33	37	126
Beans - animal consumption	4	30	30	16	62	71	1	19	21	211
Vegetables (brassicae)	71	86	89	180	64	174	128	55	155	29
Vegetables (other)	22	40	38	69	74	131	15	30	50	85
Soft fruit	14	51	51	61	55	164	9	28	84	14
Top fruit	16	28	28	25	32	57	4	9	16	44
Other tillage	37	40	41	96	68	105	36	27	43	66
All tillage	26	55	53	73	67	83	19	37	44	5179
Grass under 5 years	62	63	65	128	45	69	79	28	45	724
Grass 5 years and over	55	55	55	86	29	36	47	16	20	2276
All grass	56	56	56	93	32	42	52	18	24	3000
All crops and grass	42	55	56	87	48	61	37	26	34	8179

Source: British Survey of Fertiliser Practice 2002.

Table EW1.4 Use of lime, England and Wales 2002

	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	54
Winter wheat	4.2	0.4	0.5	0.4	0.4	5.9	2.5	2.0	2.1	1.2	0.8	2.2	94	2201
Spring barley	3.7		0.1	0.1	1.7	5.6	2.6		1.9	1.0	0.8	2.0	24	400
Winter barley	2.3	1.3	1.2	0.3	0.9	5.9	4.8	2.4	2.1	1.4	1.3	3.0	42	649
Oats	1.5	2.5	.	.	.	4.1	2.3	3.7	.	.	.	3.2	10	199
Rye/Triticale/Durum wheat	.	.	.	.	.	.	.	.	.	.	.	.	2	26
Seed potatoes	.	.	.	.	.	.	.	.	.	.	.	.	0	3
Early potatoes	.	.	.	.	.	.	.	.	.	.	.	.	0	17
2nd Early/Maincrop potatoes	.	.	.	.	.	.	.	.	.	.	.	.	1	151
Sugar beet	12.6	1.8	4.0	7.9	1.8	27.9	3.4	2.3	1.8	1.4	2.9	2.5	58	225
Spring oilseed rape	.	.	.	.	.	.	.	.	.	.	.	.	4	30
Winter oilseed rape	9.3	0.2	0.6	0.4		10.5	2.0	0.4	1.6	1.0	.	1.9	32	362
Linseed	.	.	.	.	.	.	.	.	.	.	.	.	0	19
Forage maize	13.2	1.4	0.9	.	0.8	16.3	1.6	2.5	2.6	.	1.1	1.7	20	127
Rootcrops for stockfeed	21.2	.	2.1	.	1.4	24.7	2.6		2.6	.	0.2	2.5	10	40
Leafy forage crops	.	.	.	.	.	.	.	.	.	.	.	.	2	20
Arable silage/Other fodder crop	.	.	.	.	.	.	.	.	.	.	.	.	3	15
Peas - human consumption	4.3	1.4	.	.	0.9	6.5	2.1	3.7	.	.	2.2	2.5	5	66
Peas - animal consumption	2.0	1.5	.	.	0.5	4.0	1.8	2.8	.	.	2.2	2.2	7	126
Beans - animal consumption	3.3	0.3	0.1	0.6	1.4	5.8	3.0	2.5	1.9	0.8	1.6	2.4	13	211
Vegetables (brassicae)	.	.	.	.	.	.	.	.	.	.	.	.	4	29
Vegetables (other)	.	.	.	.	.	.	.	.	.	.	.	.	4	85
Soft fruit	.	.	.	.	.	.	.	.	.	.	.	.	1	14
Top fruit	.	5.3	.	.	10.3	15.6	.	1.8	.	.	2.7	2.4	9	44
Other tillage	.	.	.	.	.	.	.	.	.	.	.	.	2	66
All tillage	4.7	0.7	0.7	0.7	0.6	7.4	2.6	2.3	2.0	1.3	1.4	2.3	348	5179
Grass under years	1.9	0.3	1.3	.	2.8	6.3	2.2	1.1	2.4	.	1.8	2.0	60	724
Grass 5 years and over	0.9	0.3	0.5	.	0.8	2.5	1.9	2.0	2.5	.	2.3	2.2	71	2276
All grass	1.0	0.3	0.6	.	1.1	3.1	2.0	1.8	2.5	.	2.1	2.1	131	3000
All crops and grass	2.8	0.5	0.7	0.3	0.9	5.2	2.5	2.2	2.2	1.3	1.9	2.2	479	8179

Source: British Survey of Fertiliser Practice 2002.

Table EW1.5 Percentage of crop area by field application rate - N, England and Wales 2002

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	3	0	1	12	23	9	12	16	9	8	4	3							54
Winter wheat	2	0	1	2	4	3	6	17	18	21	14	7	3	2	1				2201
Spring barley	5	1	5	10	20	17	26	11	2	2	1								400
Winter barley	1	0	1	2	7	13	23	29	16	4	2	1	0	1					649
Oats	5	0	3	5	20	29	22	14	0	1	0	1							199
Rye/Triticale/Durum wheat	37	0	2	0	3	24	11	15	0	0	0	0	0	0	0	1			26
Seed potatoes																			3
Early potatoes	0	0	0	5	15	4	6	15	5	3	23	0	0	15	10				17
2nd Early/Maincrop potatoes	7	10	0	4	2	5	7	9	11	15	14	9	7						151
Sugar beet	5	0	12	8	18	22	23	6	2	1	0	2	0	1	1	1			225
Spring oilseed rape	12	0	3	1	9	16	39	8	4	1	4	2							30
Winter oilseed rape	0	0	0	3	2	3	4	11	19	21	20	10	3	4					362
Linseed	24	3	2	42	21	8													19
Forage maize	22	35	4	9	5	17	5	0	3										127
Rootcrops for stockfeed	20	0	18	20	5	9	18	1	2	7									40
Leafy forage crops	37	0	17	16	14	3	0	6	0	0	6								20
Arable silage/Other fodder crop	36	0	1	18	17	10	8	0	10	0	0	1							15
Peas - human consumption	92	4	0	0	2	0	0	2											66
Peas - animal consumption	87	8	1	0	0	0	3	0	1										126
Beans - animal consumption	92	4	1	1	0	0	0	1											211
Vegetables (brassicae)	2	0	0	0	0	0	0	9	3	9	0	48	0	5	24				29
Vegetables (other)	41	2	15	5	7	14	7	1	1	2	0	4	1						85
Soft fruit	50	3	0	15	2	0	31												14
Top fruit	24	28	0	6	13	9	8	12											44
Other tillage	44	17	7	9	2	1	3	9	2	2	2	0	2						66
All tillage	10	2	2	3	6	8	10	15	13	13	9	5	2	1	1				5179
Grass under 5 years	18	0	5	7	9	6	8	7	6	8	6	4	7	2	1	2	2		724
Grass 5 years and over	32	1	14	15	10	5	7	4	2	3	2	2	1	1	0	1			2276
All grass	30	1	12	14	10	6	9	5	3	3	2	2	2	1	0	1	1		3000
All crops and grass	21	1	7	9	8	7	7	10	8	8	5	3	2	1	1	1			8179

Source: British Survey of Fertiliser Practice 2002.

Table EW1.6 Percentage of crop area by field application rate - P_2O_5, England and Wales 2002

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	65	1	16	18	1														54
Winter wheat	42	1	10	25	16	3	1												2201
Spring barley	39	9	26	20	6														400
Winter barley	31	3	18	31	14	2	0	0	0	0	0	1							649
Oats	32	1	18	30	15	4													199
Rye/Triticale/Durum wheat	56	0	8	17	20														26
Seed potatoes																			3
Early potatoes	15	5	0	5	3	24	7	7	14	0	3	17							17
2nd Early/Maincrop potatoes	14	1	9	8	11	5	10	9	13	4	6	3	2	3	0	0	1		151
Sugar beet	48	4	14	12	7	8	0	2	3	0	0	1	0	0	1				225
Spring oilseed rape	65	3	10	10	5	6	0	1											30
Winter oilseed rape	29	1	11	39	15	3	1												362
Linseed	64	9	0	27															19
Forage maize	33	4	14	32	10	3	0	1	1										127
Rootcrops for stockfeed	32	0	12	29	6	14	4	1	1	1									40
Leafy forage crops	64	0	21	3	6	6													20
Arable silage/Other fodder crop	47	13	20	8	4	0	0	10											15
Peas - human consumption	67	0	17	7	3	3	3												66
Peas - animal consumption	42	3	13	33	10	1													126
Beans - animal consumption	64	1	8	17	5	2	2	1											211
Vegetables (brassicae)	14	0	28	42	5	11	0	0	0	1									29
Vegetables (other)	58	0	7	14	13	1	3	0	0	1									85
Soft fruit	49	0	38	0	13														14
Top fruit	67	15	1	8	3	0	5												44
Other tillage	60	9	6	6	4	11	3	1											66
All tillage	40	2	13	25	13	3	1	1	1										5179
Grass under 5 years	36	16	26	15	3	2	0	0	0	1									724
Grass 5 years and over	45	25	24	4	1														2276
All grass	44	23	25	6	1	1													3000
All crops and grass	42	13	19	15	7	2	1	1											8179

Source: British Survey of Fertiliser Practice 2002.

Table EW1.7 Percentage of crop area by field application rate - K_2O, England and Wales 2002

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	59	4	16	4	16														54
Winter wheat	44	1	7	18	19	7	3	1											2201
Spring barley	31	5	23	17	14	9	1												400
Winter barley	25	2	12	20	27	9	3	1											649
Oats	28	0	15	18	19	11	5	3											199
Rye/Triticale/Durum wheat	45	0	8	9	30	0	0	8											26
Seed potatoes																			3
Early potatoes	15	0	5	0	0	0	0	3	3	11	0	29	5	13	0	17			17
2nd Early/Maincrop potatoes	6	1	1	4	5	1	2	12	6	6	7	7	4	13	8	5	5	6	151
Sugar beet	19	6	5	8	9	10	14	11	6	1	7	2	1						225
Spring oilseed rape	61	1	10	7	10	3	0	7											30
Winter oilseed rape	37	0	9	28	18	3	1												362
Linseed	64	0	9	15	12														19
Forage maize	45	5	8	5	8	9	4	10	0	0	4	2	0	0	1				127
Rootcrops for stockfeed	23	0	6	21	8	25	1	11	4										40
Leafy forage crops	59	2	24	3	0	6	0	6											20
Arable silage/Other fodder crop	23	13	30	0	25	0	0	0	0	10									15
Peas - human consumption	60	0	7	12	8	10	3												66
Peas - animal consumption	36	0	7	28	19	7	2												126
Beans - animal consumption	62	1	5	15	9	4	2	1	1										211
Vegetables (brassicae)	3	0	2	0	7	3	0	13	62	5	5								29
Vegetables (other)	50	0	2	11	6	8	3	9	1	3	1	2	1	3					85
Soft fruit	49	0	1	0	0	13	0	0	37										14
Top fruit	57	0	16	0	0	14	2	11											44
Other tillage	57	9	6	6	2	4	5	2	1	9									66
All tillage	38	2	9	17	17	7	3	2	1	1	1	0	0	1					5179
Grass under 5 years	35	8	17	17	9	6	5	2	0	1									724
Grass 5 years and over	45	20	24	6	2	1	1	1											2276
All grass	44	18	23	7	2	1	1												3000
All crops and grass	41	10	16	12	10	4	2	2	1										8179

Source: British Survey of Fertiliser Practice 2002.

Table EW2.1 Average fertiliser practice by grassland utilisation, England and Wales 2002

	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	65	53	51	31	104	26	28	68	14	14	1423
Grazed - mown	79	63	65	68	134	38	55	106	24	36	1292
All grazings	70	57	56	45	117	31	40	82	18	22	2715
Cut for seed - grazed	.	.	.	.	.	.	.	.	.	.	0
Cut for seed - not grazed	.	.	.	.	.	.	.	.	.	.	4
All cut for seed	.	.	.	.	.	.	.	.	.	.	4
Cut for silage - grazed	83	68	70	75	142	39	58	119	27	41	958
Cut for silage - not grazed	92	71	79	70	200	45	84	185	32	66	171
All cut for silage	85	68	71	74	151	40	62	128	27	44	1129
Cut for hay - grazed	66	50	51	46	100	34	42	66	17	21	392
Cut for hay - not grazed	67	54	54	40	127	52	65	85	28	30	69
All cut for hay	66	50	51	45	104	37	44	69	19	23	461
All mowings	80	63	66	67	141	39	58	113	25	38	1521
All grass	70	56	56	45	121	32	42	85	18	24	3000

Source: British Survey of Fertiliser Practice 2002.

Table EW2.2 Percentage of grass area by field application rate - N, England and Wales 2002

	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	35	1	16	16	8	4	6	4	2	3	1	2	0	1	0	1	1		1423
Grazed - mown	21	0	7	14	13	7	9	6	5	4	4	3	3	1	0	1			1292
All grazings	30	1	13	15	10	5	7	5	3	3	2	2	1	1	0	1			2715
Cut for seed - grazed																			0
Cut for seed - not grazed																			4
All cut for seed																			4
Cut for silage - grazed	17	0	7	13	13	8	10	7	6	5	5	3	3	1	1	1			958
Cut for silage - not grazed	8	0	5	4	9	9	9	6	3	7	8	5	9	5	1	6	4	2	171
All cut for silage	15	0	7	11	12	8	10	7	6	5	5	4	4	2	1	2	1	1	1129
Cut for hay - grazed	34	0	11	18	12	8	7	3	2	2	1	0	2	0	0	1			392
Cut for hay - not grazed	33	3	3	5	10	6	22	2	7	7	1	0	0	0	0	0	0	1	69
All cut for hay	34	1	10	16	11	8	9	3	3	2	1	0	2	0	0	1			461
All mowings	20	0	7	12	13	8	9	6	5	4	4	3	3	1	0	1	1		1521
All grass	29	1	12	14	10	6	7	5	3	3	2	2	2	1	0	1	1		3000

Source: British Survey of Fertiliser Practice 2002.

Table EW2.3 Percentage of grass area by field application rate - P_2O_5, England and Wales 2002

	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	47	25	23	3															1423
Grazed - mown	37	20	28	10	2	1	0	1	1										1292
All grazings	43	24	25	6	1	1													2715
Cut for seed - grazed																			0
Cut for seed - not grazed																			4
All cut for seed																			4
Cut for silage - grazed	32	22	30	11	3	1	0	1	1										958
Cut for silage - not grazed	29	22	31	9	3	2	0	2	0	3									171
All cut for silage	32	22	30	10	3	1	0	1	1	1									1129
Cut for hay - grazed	50	18	23	6	1	1	0	1											392
Cut for hay - not grazed	46	19	19	7	1	1	0	0	0	7									69
All cut for hay	50	18	23	6	1	1	0	1	0	1									461
All mowings	37	21	28	10	2	1	0	1											1521
All grass	43	24	25	6	1	1													3000

Source: British Survey of Fertiliser Practice 2002.

Table EW2.4 Percentage of grass area by field application rate - K_2O, England and Wales 2002

	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	49	23	23	3	1														1423
Grazed - mown	35	12	24	14	6	3	3	1	1	1									1292
All grazings	44	19	23	7	3	1	1												2715
Cut for seed - grazed																			0
Cut for seed - not grazed																			4
All cut for seed																			4
Cut for silage - grazed	30	12	24	16	7	4	3	1	1	1									958
Cut for silage - not grazed	21	9	22	12	8	4	8	11	1	4									171
All cut for silage	29	12	24	15	7	4	4	3	1	1									1129
Cut for hay - grazed	49	14	25	7	1	1	2	0	0	1									392
Cut for hay - not grazed	46	14	23	8	1	0	1	0	0	7									69
All cut for hay	49	14	24	7	1	1	2	0	0	2									461
All mowings	34	12	24	13	6	3	3	2	1	1									1521
All grass	43	19	23	7	3	2	1	1											3000

Source: British Survey of Fertiliser Practice 2002.

Table EW3.0 Product and nutrient use by month of application, England and Wales 2002.

(a) Product use

row %	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total Product ('000 tonnes)
Straight N	1	0	0	0	0	4	30	39	16	4	3	1	1845
Straight P	17	12	10	3	4	5	23	15	7	0	1	3	42
Straight K	4	5	11	2	9	16	29	16	5	2	0	2	92
Compounds	7	5	3	1	1	5	25	24	13	6	5	5	1743
All fertilisers	4	3	2	0	1	5	28	31	15	5	4	3	3721

(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	29	37	17	6	4	2	914
P_2O_5	12	8	6	1	2	7	25	20	9	3	3	5	233
K_2O	9	7	6	1	3	8	26	19	10	5	3	4	306
Total	4	3	2	0	1	5	28	30	14	5	4	3	1452

Note: product use refers to the total tonnage of the products used by farmers in the survey year 2002;
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 2002.

Table EW3.1 Product type as percentage of all product used by crop group, England and Wales 2002

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	2.3	2.0	0.4	1.1	3.8	1.0	2.0	0.2	0.7	0.9	6.0	0.4	1.4
Urea	2.8	8.3	0.4	1.4	14.8	1.6	7.5	2.5	1.1	2.6	3.4	2.6	5.7
Ammonium Nitrate	40.7	42.0	10.4	28.4	35.4	18.4	37.7	25.0	28.9	21.6	20.6	24.9	33.1
UAN	7.2	10.1	1.8	2.3	8.6	1.0	8.5	0.6	0.0	0.5	10.2	0.6	5.6
Other Straight N	2.2	6.2	0.6	0.4	8.0	2.6	5.4	0.6	0.1	0.6	0.1	0.6	3.7
Triple Superphosphate	0.2	1.5	0.4	0.5	0.9	2.0	1.3	0.2	0.1	0.2	0.0	0.2	0.9
Single Superphosphate	0.5	0.1	0.0	0.6	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1
Other Straight P	0.1	0.2	0.2	0.1	0.0	0.3	0.2	0.0	0.0	0.1	0.0	0.0	0.1
Muriate of Potash	2.3	1.6	6.5	1.4	0.8	9.7	2.2	0.2	0.0	0.4	0.0	0.2	1.5
Other Straight K	0.9	0.3	1.5	19.6	0.8	2.4	1.5	0.0	0.0	0.1	0.0	0.0	1.0
NP	0.4	0.9	2.2	0.3	1.9	6.3	1.2	3.0	0.8	1.7	0.0	2.7	1.8
NK	1.1	2.0	0.7	0.8	0.4	4.6	1.8	7.6	3.8	16.4	0.0	9.0	4.4
PK	11.2	14.9	4.5	30.3	13.4	27.5	15.3	2.3	4.3	2.6	9.7	2.4	10.7
Very High N	4.3	4.0	1.4	0.2	2.7	1.6	3.4	29.8	20.8	26.0	4.6	29.1	12.6
High N	13.4	1.3	1.2	0.0	0.3	3.8	1.9	24.3	30.0	21.4	18.5	23.5	9.7
High P	0.4	0.1	4.1	0.1	0.6	0.2	0.4	0.3	0.8	0.0	0.0	0.3	0.4
High K	4.2	1.2	43.6	6.0	1.3	7.8	4.3	0.8	2.2	1.8	20.3	1.0	3.1
Low N	1.9	2.6	10.4	2.3	3.5	2.5	3.1	0.3	0.0	0.6	0.0	0.4	2.1
Low P	1.1	0.1	5.3	3.7	0.2	6.3	1.0	1.2	5.2	2.0	0.0	1.1	1.0
Equal NPK	3.2	0.5	4.4	0.5	2.6	0.6	1.1	1.0	1.0	0.6	6.6	1.0	1.0
Total Product ('000 tonnes)	131	1669	134	115	218	118	2386	1194	129	646	5	1335	3721

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 2002.

Table EW3.2 Use of product type by crop group, England and Wales 2002

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	5.7	61.8	0.9	2.4	15.8	2.1	88.7	5.5	1.7	10.3	0.5	11.3	53
Urea	1.7	65.1	0.2	0.8	15.2	0.9	84.0	13.6	0.6	7.7	0.1	16.0	213
Ammonium Nitrate	4.3	56.9	1.1	2.7	6.3	1.8	73.0	24.0	3.0	11.2	0.1	27.0	1233
UAN	4.5	80.0	1.2	1.2	8.9	0.6	96.4	3.1	0.0	1.3	0.2	3.6	210
Other Straight N	2.1	76.2	0.6	0.3	12.8	2.3	94.3	4.9	0.1	2.9	0.0	5.7	136
Triple Superphosphate	0.6	75.6	1.5	1.8	6.1	6.8	92.5	6.4	0.5	3.5	0.0	7.5	34
Single Superphosphate	21.0	53.2	0.0	24.2	0.0	0.0	98.4	1.6	0.0	0.0	0.0	1.6	3
Other Straight P	2.1	70.9	5.5	3.1	0.0	6.7	88.3	6.8	0.0	11.7	0.0	11.7	5
Muriate of Potash	5.3	48.2	15.7	2.8	2.9	20.5	95.4	3.8	0.0	4.0	0.0	4.6	56
Other Straight K	3.1	12.9	5.8	63.5	5.2	7.9	98.4	1.4	0.0	1.6	0.0	1.6	36
NP	0.7	21.9	4.4	0.5	6.2	11.4	45.1	52.4	1.5	16.5	0.0	54.9	66
NK	0.9	20.6	0.5	0.6	0.5	3.3	26.5	54.8	3.0	64.3	0.0	73.5	164
PK	3.7	62.5	1.5	8.8	7.4	8.2	92.1	6.9	1.4	4.1	0.1	7.9	397
Very High N	1.2	14.2	0.4	0.1	1.2	0.4	17.5	75.6	5.7	35.7	0.0	82.5	470
High N	4.9	6.2	0.5	0.0	0.2	1.2	12.9	80.3	10.7	38.3	0.2	87.1	360
High P	3.6	13.0	40.7	0.7	10.1	2.0	70.1	27.3	7.0	0.0	0.0	29.9	14
High K	4.7	17.1	50.4	6.0	2.5	7.9	88.6	7.9	2.4	9.8	0.8	11.4	116
Low N	3.1	55.8	17.5	3.4	9.7	3.7	93.3	4.9	0.0	4.4	0.0	6.7	79
Low P	3.7	5.3	18.9	11.4	1.0	19.8	60.1	39.1	17.8	33.6	0.0	39.9	38
Equal NPK	10.6	22.3	15.3	1.3	14.8	1.7	66.0	32.0	3.3	9.8	0.8	34.0	39
All Fertilisers	**3.5**	**44.8**	**3.6**	**3.1**	**5.9**	**3.2**	**64.1**	**31.7**	**3.4**	**17.1**	**0.1**	**35.9**	**3721**

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 2002.

Table EW3.3 Product use by month of application, England and Wales 2002.

row %	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	total Product ('000 tonnes)
Calcium Ammonium Nitrate	0.0	5.3	65.9	19.0	4.6	2.0	1.7	0.6	0.6	0.0	0.2	0.0	53
Urea	0.3	6.7	41.3	38.8	10.5	0.6	0.7	0.5	0.7	0.0	0.0	0.0	213
Ammonium Nitrate	0.2	3.0	27.2	40.7	17.9	5.4	2.8	1.9	0.6	0.1	0.1	0.0	1233
UAN	0.0	3.3	27.1	44.3	19.4	1.3	3.6	0.0	0.6	0.4	0.0	0.0	210
Other straight N	0.2	10.6	32.9	26.9	10.7	6.1	12.0	0.1	0.4	0.0	0.1	0.0	136
Triple Superphosphate	0.1	5.7	26.2	11.1	7.4	0.5	0.7	3.8	19.9	12.3	9.2	3.0	34
Single Superphosphate	0.0	0.0	1.6	73.2	0.0	0.0	0.0	0.0	0.0	24.2	1.0	0.0	3
Other Straight P	32.3	4.7	12.0	8.5	10.4	0.0	0.0	2.8	6.4	0.0	19.2	3.8	5
Muriate of Potash	5.1	12.6	35.0	18.7	5.3	1.6	0.0	0.6	5.1	3.2	11.6	1.1	56
Other Straight K	14.0	22.4	19.8	11.6	4.5	1.4	0.0	4.4	2.0	7.3	10.0	2.5	36
NP	0.0	3.8	45.6	22.2	9.0	4.5	0.4	2.1	6.7	5.3	0.3	0.1	66
NK	0.5	0.1	16.8	13.1	23.8	24.1	13.0	8.0	0.5	0.2	0.0	0.0	164
PK	4.3	11.4	19.2	6.3	0.8	0.6	0.4	5.8	21.8	15.7	11.2	2.5	397
Very High N	0.0	2.1	24.2	31.8	16.9	8.7	8.6	5.8	1.7	0.0	0.1	0.0	470
High N	0.4	3.5	20.8	36.5	24.5	4.2	6.1	3.1	0.7	0.2	0.0	0.0	360
High P	0.0	0.0	57.4	28.3	1.8	0.4	1.0	4.1	6.9	0.0	0.0	0.0	14
High K	0.0	4.7	46.8	30.7	7.5	3.9	0.0	0.5	0.0	3.1	1.9	0.9	116
Low N	0.0	5.5	38.9	13.3	3.5	0.0	0.0	4.5	8.4	13.4	12.6	0.0	79
Low P	0.0	8.9	17.2	36.7	10.6	19.6	2.8	0.4	1.0	2.2	0.5	0.0	38
Equal NPK	7.0	5.3	18.8	34.8	11.1	1.4	3.9	8.7	8.8	0.3	0.0	0.0	39
All Fertilisers	**0.9**	**4.8**	**27.6**	**31.2**	**14.6**	**5.2**	**4.0**	**3.0**	**3.6**	**2.5**	**2.0**	**0.4**	**3721**

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 2002.

Table EW4.1 Average fertiliser practice on tillage and grassland by BSFP region, 2002

		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	87	61	69	38	186	62	91	162	37	63	210
	All grass	58	32	32	51	150	31	58	86	10	19	181
	All crops & grass	70	45	48	45	170	50	79	119	22	38	393
Anglia	All tillage	89	54	48	8	171	78	98	153	42	47	1252
	All grass	62	23	28	2	82	30	30	51	7	8	89
	All crops & grass	86	51	46	8	167	77	95	144	39	44	1350
Northern	All tillage	96	78	86	26	155	68	77	149	52	66	230
	All grass	67	60	60	45	98	25	33	66	15	20	544
	All crops & grass	72	63	64	42	111	34	43	80	21	28	777
North East	All tillage	91	56	66	16	176	72	97	160	40	64	1127
	All grass	66	48	51	50	133	37	50	88	18	25	349
	All crops & grass	80	52	59	28	162	60	82	130	31	49	1490
North Mercia	All tillage	92	73	80	39	154	76	97	141	56	78	144
	All grass	74	51	50	62	165	45	55	121	23	28	170
	All crops & grass	79	57	59	55	161	56	71	126	32	42	314
South Mercia	All tillage	89	63	63	15	178	64	80	159	40	50	321
	All grass	69	42	45	24	131	30	40	90	12	18	170
	All crops & grass	80	53	55	19	161	52	66	128	28	36	497
East Midland	All tillage	90	60	59	12	173	68	84	156	41	49	909
	All grass	67	39	37	34	133	32	41	90	13	15	235
	All crops & grass	84	55	53	18	165	62	76	139	34	40	1151
South East	All tillage	90	61	65	11	170	58	76	152	35	49	661
	All grass	55	39	37	24	132	42	54	72	16	20	244
	All crops & grass	75	52	53	16	159	53	70	120	28	37	913
South West	All tillage	83	71	71	38	134	60	74	111	42	53	226
	All grass	58	32	32	51	150	31	58	86	10	19	181
	All crops & grass	85	70	72	59	144	41	58	122	29	42	570
Wales	All tillage	92	87	81	66	100	69	86	92	60	70	99
	All grass	79	75	74	44	98	29	35	78	22	26	623
	All crops & grass	80	76	74	45	98	31	38	78	24	28	724

Source: British Survey of Fertiliser Practice 2002.

Table EW5.1 Average fertiliser practice on dairy farms, England and Wales 2002

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring wheat	.	.	.	.	.	.	.	.	.	.	3
Winter wheat	89	63	70	40	164	55	71	146	35	50	85
Spring barley	76	67	69	71	88	37	46	67	25	32	50
Winter barley	98	79	85	71	111	45	60	109	36	51	51
Oats	.	.	.	.	.	.	.	.	.	.	4
Rye/Triticale/Durum wheat	.	.	.	.	.	.	.	.	.	.	4
Seed potatoes	.	.	.	.	.	.	.	.	.	.	0
Early potatoes	.	.	.	.	.	.	.	.	.	.	0
2nd Early/Maincrop potatoes	.	.	.	.	.	.	.	.	.	.	4
Sugar beet	.	.	.	.	.	.	.	.	.	.	2
Spring oilseed rape	.	.	.	.	.	.	.	.	.	.	3
Winter oilseed rape	.	.	.	.	.	.	.	.	.	.	2
Linseed	.	.	.	.	.	.	.	.	.	.	0
Forage maize	77	65	63	89	61	65	112	47	42	71	68
Rootcrops for stockfeed	52	48	70	100	141	50	95	73	24	67	9
Leafy forage crops	54	47	54	88	125	65	79	68	31	43	7
Arable silage/Other fodder crop	.	.	.	.	.	.	.	.	.	.	4
Peas - human consumption	.	.	.	.	.	.	.	.	.	.	1
Peas - animal consumption	.	.	.	.	.	.	.	.	.	.	2
Beans - animal consumption	.	.	.	.	.	.	.	.	.	.	1
Vegetables (brassicae)	.	.	.	.	.	.	.	.	.	.	0
Vegetables (other)	.	.	.	.	.	.	.	.	.	.	0
Soft fruit	.	.	.	.	.	.	.	.	.	.	0
Top fruit	.	.	.	.	.	.	.	.	.	.	0
Other tillage	.	.	.	.	.	.	.	.	.	.	3
All tillage	82	65	69	67	115	55	82	94	36	57	303
Grass under 5 years	82	62	65	82	204	40	76	167	25	49	236
Grass 5 years and over	79	58	62	66	164	36	52	130	21	32	578
All grass	80	59	63	70	175	37	59	140	22	37	814
All crops and grass	80	60	64	70	167	40	62	134	24	40	1117

Source: British Survey of Fertiliser Practice 2002.

Table EW5.2 Average fertiliser practice on cattle and sheep farms, England and Wales 2002

	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	91	70	71	70	202	76	75	184	53	53	22
Spring barley	92	86	86	58	77	42	45	71	36	39	35
Winter barley	95	77	92	28	156	61	80	148	47	74	38
Oats	88	65	65	56	101	53	53	89	34	34	13
Rye/Triticale/Durum wheat	.	.	.	.	.	.	.	.	.	.	1
Seed potatoes	.	.	.	.	.	.	.	.	.	.	0
Early potatoes	.	.	.	.	.	.	.	.	.	.	1
2nd Early/Maincrop potatoes	.	.	.	.	.	.	.	.	.	.	3
Sugar beet	.	.	.	.	.	.	.	.	.	.	0
Spring oilseed rape	.	.	.	.	.	.	.	.	.	.	0
Winter oilseed rape	.	.	.	.	.	.	.	.	.	.	0
Linseed	.	.	.	.	.	.	.	.	.	.	0
Forage maize	.	.	.	.	.	.	.	.	.	.	2
Rootcrops for stockfeed	100	94	100	53	98	89	84	98	84	84	11
Leafy forage crops	34	34	34	92	72	43	43	24	15	15	5
Arable silage/Other fodder crop	.	.	.	.	.	.	.	.	.	.	4
Peas - human consumption	.	.	.	.	.	.	.	.	.	.	0
Peas - animal consumption	.	.	.	.	.	.	.	.	.	.	0
Beans - animal consumption	.	.	.	.	.	.	.	.	.	.	0
Vegetables (brassicae)	.	.	.	.	.	.	.	.	.	.	0
Vegetables (other)	.	.	.	.	.	.	.	.	.	.	0
Soft fruit	.	.	.	.	.	.	.	.	.	.	0
Other tillage	.	.	.	.	.	.	.	.	.	.	1
All tillage	91	75	80	54	154	64	71	140	48	57	136
Grass under 5 years	84	73	74	56	122	41	50	102	30	37	181
Grass 5 years and over	60	60	58	41	75	25	28	45	15	16	1006
All grass	66	61	59	42	79	26	29	52	16	17	1187
All crops and grass	67	61	60	43	83	28	32	56	17	19	1323

Source: British Survey of Fertiliser Practice 2002.

Table EW5.3 Average fertiliser practice on other livestock/mixed farms, England and Wales 2002

	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	95	17	17	0	96	23	29	91	4	5	7
Winter wheat	99	60	62	27	188	64	82	186	38	51	407
Spring barley	93	54	65	14	109	44	54	101	24	35	73
Winter barley	97	64	68	31	147	60	75	143	38	51	143
Oats	89	53	57	17	107	63	69	95	33	39	56
Rye/Triticale/Durum wheat	26	26	26	13	88	44	44	23	11	11	6
Seed potatoes	.	.	.	.	.	.	.	.	.	.	0
Early potatoes	.	.	.	.	.	.	.	.	.	.	1
2nd Early/Maincrop potatoes	95	71	90	57	195	144	261	185	102	235	15
Sugar beet	86	16	38	56	121	183	166	104	29	63	24
Spring oilseed rape	.	.	.	.	.	.	.	.	.	.	4
Winter oilseed rape	100	62	60	25	199	67	76	199	42	46	55
Linseed	.	.	.	.	.	.	.	.	.	.	1
Forage maize	81	73	33	85	49	61	93	40	45	31	44
Rootcrops for stockfeed	65	68	81	56	73	49	83	47	33	67	7
Leafy forage crops	.	.	.	.	.	.	.	.	.	.	3
Arable silage/Other fodder crop	.	.	.	.	.	.	.	.	.	.	2
Peas - human consumption	51	49	44	0	21	109	106	11	53	47	6
Peas - animal consumptio	4	41	59	27	134	48	72	5	20	42	21
Beans - animal consumption	18	65	57	11	26	59	58	5	38	33	41
Vegetables (brassicae)	100	67	91	70	166	104	159	166	70	145	7
Vegetables (other)	80	29	80	28	236	90	95	189	26	76	10
Soft fruit	.	.	.	.	.	.	.	.	.	.	2
Top fruit	.	.	.	.	.	.	.	.	.	.	0
Other tillage	57	32	32	23	102	102	119	58	33	38	7
All tillage	91	59	61	30	160	64	83	146	38	51	942
Grass under 5 years	92	70	63	17	192	57	70	177	40	44	151
Grass 5 years and over	63	37	38	18	114	31	39	72	11	15	317
All grass	69	44	43	18	136	40	49	94	18	21	468
All crops and grass	81	52	53	24	151	55	70	122	29	37	1410

Source: British Survey of Fertiliser Practice 2002.

Table EW5.4 Average fertiliser practice on cropping/horticultural farms, England and Wales 2002

	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	34	41	1	145	51	54	145	17	22	44
Winter wheat	98	57	55	9	198	70	79	194	40	43	1687
Spring barley	99	60	69	9	119	47	66	118	28	46	242
Winter barley	100	69	75	6	153	66	81	153	46	61	417
Oats	98	73	78	6	124	61	83	122	45	65	126
Rye/Triticale/Durum wheat	82	41	64	7	122	63	71	100	26	45	15
Seed potatoes	.	.	.	.	.	.	.	.	.	.	3
Early potatoes	100	83	83	11	221	155	271	221	129	225	15
2nd Early/Maincrop potatoes	93	87	94	27	176	147	244	164	128	229	129
Sugar beet	96	55	84	23	11	80	127	11	44	107	199
Spring oilseed rape	87	34	39	18	134	64	80	117	22	31	23
Winter oilseed rape	100	72	63	4	206	72	77	206	52	49	305
Linseed	81	75	37	37	77	49	62	62	37	23	18
Forage maize	78	74	63	76	103	74	139	80	55	88	13
Rootcrops for stockfeed	100	72	73	66	82	92	121	82	66	88	13
Leafy forage crops	78	28	37	22	79	25	31	62	7	11	5
Arable silage/Other fodder crop	64	61	97	3	90	45	60	58	27	58	5
Peas - human consumption	6	32	40	5	101	56	78	6	18	31	59
Peas - animal consumption	14	60	64	17	36	59	74	5	35	47	103
Beans - animal consumption	7	32	35	9	65	68	80	5	22	28	169
Vegetables (brassicae)	98	92	98	6	273	56	175	268	52	172	22
Vegetables (other)	57	43	48	7	92	78	136	52	34	65	75
Soft fruit	42	44	44	0	117	49	188	49	22	83	12
Top fruit	76	33	43	2	76	45	90	58	15	39	44
Other tillage	60	43	48	10	102	68	108	61	29	52	55
All tillage	90	59	61	10	176	71	91	158	42	56	3798
Grass under 5 years	75	54	56	17	162	57	77	122	31	43	156
Grass 5 years and over	64	34	34	11	107	38	42	68	13	14	375
All grass	67	40	40	12	123	45	55	82	18	22	531
All crops and grass	87	57	58	10	171	69	88	149	39	51	4329

Source: British Survey of Fertiliser Practice 2002.

Table SC1.1 Total fertiliser use, Scotland 2002

	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	34	103	53	58	103	53	58	4
Winter wheat	99	92	96	12	214	73	84	212	67	81	162
Spring barley	98	96	96	31	113	65	72	111	62	69	347
Winter barley	98	90	94	22	194	66	86	190	59	81	102
Oats	92	90	88	25	102	50	60	94	45	53	50
Rye/Triticale/Durum wheat	.	.	.	.	.	.	.	.	.	.	2
Seed potatoes	100	100	100	41	110	166	202	110	166	202	5
Early potatoes	.	.	.	.	.	.	.	.	.	.	0
2nd Early/Maincrop potatoes	81	97	97	9	96	78	121	78	76	117	16
Sugar beet	.	.	.	.	.	.	.	.	.	.	0
Spring oilseed rape	100	83	83	30	153	55	75	153	46	62	13
Winter oilseed rape	100	90	93	11	221	72	73	221	65	68	38
Linseed	.	.	.	.	.	.	.	.	.	.	1
Forage maize	.	.	.	.	.	.	.	.	.	.	3
Rootcrops for stockfeed	78	78	78	52	76	116	94	59	90	73	34
Leafy forage crops	84	84	84	57	101	57	57	85	48	48	12
Arable silage/Other fodder crop	70	70	70	45	87	58	68	61	41	48	14
Peas - human consumption	.	.	.	.	.	.	.	.	.	.	4
Peas - animal consumption	2	66	66	5	28	61	62	1	40	41	8
Beans - animal consumption	.	.	.	.	.	.	.	.	.	.	3
Vegetables (brassicae)	.	.	.	.	.	.	.	.	.	.	0
Vegetables (other)	.	.	.	.	.	.	.	.	.	.	3
Soft fruit	.	.	.	.	.	.	.	.	.	.	4
Top fruit	.	.	.	.	.	.	.	.	.	.	0
Other tillage	46	90	90	25	119	99	106	55	89	95	8
All tillage	95	92	64	25	150	67	77	143	62	72	833
Grass under 5 years	90	83	82	25	143	39	50	129	32	41	378
Grass 5 years and over	81	68	66	30	115	32	38	93	22	25	387
All grass	84	73	71	28	125	35	42	105	26	30	765
All crops and grass	88	80	80	27	135	49	58	119	39	46	1598

Source: British Survey of Fertiliser Practice 2002.

Table SC1.2 Use of straight fertiliser, Scotland 2002

	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	35	0	0	97	0	0	34	0	0	4
Winter wheat	97	0	9	193	0	112	187	0	10	162
Spring barley	65	0	2	79	0	110	51	0	2	347
Winter barley	88	0	14	180	0	126	158	0	18	102
Oats	47	2	1	98	78	112	46	2	1	50
Rye/Triticale/Durum wheat	.	.	.	.	.	.	.	.	.	2
Seed potatoes	0	0	14	0	0	188	0	0	26	5
Early potatoes	.	.	.	.	.	.	.	.	.	0
2nd Early/Maincrop potatoes	5	0	10	73	0	188	4	0	19	16
Sugar beet	.	.	.	.	.	.	.	.	.	0
Spring oilseed rape	95	0	34	138	0	65	131	0	22	13
Winter oilseed rape	98	0	3	195	0	50	191	0	2	38
Linseed	.	.	.	.	.	.	.	.	.	1
Forage maize	.	.	.	.	.	.	.	.	.	3
Rootcrops for stockfeed	4	0	0	42	0	0	2	0	0	34
Leafy forage crops	22	0	0	84	0	0	18	0	0	12
Arable silage/Other fodder crop	19	0	0	50	0	0	10	0	0	14
Peas - human consumption	.	.	.	.	.	.	.	.	.	4
Peas - animal consumption	0	0	0	0	0	0	0	0	0	8
Beans - animal consumption	.	.	.	.	.	.	.	.	.	3
Vegetables (brassicae)	.	.	.	.	.	.	.	.	.	0
Vegetables (other)	.	.	.	.	.	.	.	.	.	3
Soft fruit	.	.	.	.	.	.	.	.	.	4
Top fruit	.	.	.	.	.	.	.	.	.	0
Other tillage	30	0	0	123	0	0	37	0	0	8
All tillage	72	0	5	137	78	116	99	0	6	833
Grass under 5 years	34	1	1	101	143	141	34	1	1	378
Grass 5 years and over	26	1	0	93	78	113	24	1	0	387
All grass	29	1	0	96	105	135	28	1	0	765
All crops and grass	45	0	2	121	103	117	54	0	2	1598

Source: British Survey of Fertiliser Practice 2002.

Table SC1.3 Use of compound fertiliser, Scotland 2002

	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	100	100	100	70	53	58	70	53	58	4
Winter wheat	68	87	93	33	69	73	22	60	68	162
Spring barley	93	96	94	63	63	69	59	60	65	347
Winter barley	79	90	84	38	65	75	30	59	63	102
Oats	80	88	88	61	49	56	49	43	49	50
Rye/Triticale/Durum wheat	.	.	.	.	.	.	.	.	.	2
Seed potatoes	100	100	84	110	166	204	110	166	171	5
Early potatoes	.	.	.	.	.	.	.	.	.	0
2nd EarlyMaincrop potatoes	81	97	86	91	78	113	74	76	97	16
Sugar beet	.	.	.	.	.	.	.	.	.	0
Spring oilseed rape	34	83	83	64	55	49	22	46	41	13
Winter oilseed rape	83	90	90	37	72	76	31	65	68	38
Linseed	.	.	.	.	.	.	.	.	.	1
Forage maize	.	.	.	.	.	.	.	.	.	3
Rootcrops for stockfeed	78	78	78	73	116	94	57	90	73	34
Leafy forage crops	75	84	84	88	57	57	66	48	48	12
Arable silage/Other fodder crop	70	70	70	73	58	68	51	41	48	14
Peas - human consumption	.	.	.	.	.	.	.	.	.	4
Peas - animal consumption	2	66	66	28	61	62	1	40	41	8
Beans - animal consumption	.	.	.	.	.	.	.	.	.	3
Vegetables (brassicae)	.	.	.	.	.	.	.	.	.	0
Vegetables (other)	.	.	.	.	.	.	.	.	.	3
Soft fruit	.	.	.	.	.	.	.	.	.	4
Top fruit	.	.	.	.	.	.	.	.	.	0
Other tillage	46	90	90	41	99	106	19	89	95	8
All tillage	81	91	91	53	66	72	43	60	66	833
Grass under 5 years	83	83	81	114	38	49	95	32	40	378
Grass 5 years and over	67	68	66	102	32	37	68	22	24	387
All grass	72	73	71	107	34	42	77	25	30	765
All crops and grass	76	80	79	84	48	55	64	38	43	1598

Source: British Survey of Fertiliser Practice 2002.

Table SC1.4 Use of lime, Scotland 2002

	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	4
Winter wheat	.	.	5.2	.	.	5.2	.	.	2.3	.	.	2.3	13	162
Spring barley	9.1	.	3.8	.	.	12.9	2.5	.	2.1	.	.	2.4	56	347
Winter barley	7.8	.	4.4	.	.	12.1	2.4	.	2.6	.	.	2.4	13	102
Oats	.	.	.	.	.	.	.	.	.	.	.	.	3	50
Rye/Triticale/Durum wheat	.	.	.	.	.	.	.	.	.	.	.	.	0	2
Seed potatoes	.	.	.	.	.	.	.	.	.	.	.	.	0	5
Early potatoes	.	.	.	.	.	.	.	.	.	.	.	.	0	0
2nd Early/Maincrop potatoes	.	.	.	.	.	.	.	.	.	.	.	.	0	16
Sugar beet	.	.	.	.	.	.	.	.	.	.	.	.	0	0
Spring oilseed rape	.	.	.	.	.	.	.	.	.	.	.	.	0	13
Winter oilseed rape	8.0	.	15.3	.	.	23.3	2.1	.	2.0	.	.	2.1	6	38
Linseed	.	.	.	.	.	.	.	.	.	.	.	.	0	1
Forage maize	.	.	.	.	.	.	.	.	.	.	.	.	3	3
Rootcrops for stockfeed	.	.	.	.	.	.	.	.	.	.	.	.	3	34
Leafy forage crops	.	.	.	.	.	.	.	.	.	.	.	.	3	12
Arable silage/Other fodder crop	.	.	.	.	.	.	.	.	.	.	.	.	4	14
Peas - human consumption	.	.	.	.	.	.	.	.	.	.	.	.	0	4
Peas - animal consumption	.	.	.	.	.	.	.	.	.	.	.	.	1	8
Beans - animal consumption	.	.	.	.	.	.	.	.	.	.	.	.	0	3
Vegetables (brassicae)	.	.	.	.	.	.	.	.	.	.	.	.	0	0
Vegetables (other)	.	.	.	.	.	.	.	.	.	.	.	.	0	3
Soft fruit	.	.	.	.	.	.	.	.	.	.	.	.	0	4
Top fruit	.	.	.	.	.	.	.	.	.	.	.	.	0	0
Other tillage	.	.	.	.	.	.	.	.	.	.	.	.	0	8
All tillage	6.3	.	5.1	.	.	11.4	2.4	.	2.2	.	.	2.3	106	833
Grass under 5 years	1.5	.	0.8	.	.	2.3	2.3	.	2.0	.	.	2.2	17	378
Grass 5 years and over	1.4	.	1.3	.	.	2.7	2.1	.	2.3	.	.	2.2	14	387
All grass	1.4	.	1.1	.	.	2.5	2.2	.	2.2	.	.	2.2	31	765
All crops and grass	3.3	.	2.6	.	.	5.9	2.4	.	2.2	.	.	2.3	137	1598

Source: British Survey of Fertiliser Practice 2002.

Table SC1.5 Percentage of crop area by field application rate - N, Scotland 2002

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																			4
Winter wheat	1	0	0	1	5	3	2	6	20	26	21	3	8	1	0	1	1	1	162
Spring barley	2	0	3	12	23	30	20	2	0	1	5	1							347
Winter barley	2	0	0	11	0	2	3	16	29	6	15	5	4	8					102
Oats	8	0	5	23	19	14	18	12	1										50
Rye/Triticale/Durum wheat																			2
Seed potatoes	0	0	0	31	0	41	28												5
Early potatoes																			0
2nd Early/Maincrop potatoes	19	0	0	56	0	0	6	5	3	6	4								16
Sugar beet																			0
Spring oilseed rape	0	0	0	0	14	10	5	53	10	0	7								13
Winter oilseed rape	0	0	0	5	4	0	0	5	19	5	27	17	14	0	0	0	0	3	38
Linseed																			1
Forage maize																			3
Rootcrops for stockfeed	22	0	9	23	40	3	3												34
Leafy forage crops	16	0	8	10	0	41	12	13											12
Arable silage/Other fodder crop	30	0	23	2	19	7	6	13											14
Peas - human consumption																			4
Peas - animal consumption	98	0	2																8
Beans - animal consumption																			3
Vegetables (brassicae)																			0
Vegetables (other)																			3
Soft fruit																			4
Top fruit																			0
Other tillage	54	0	17	0	15	0	0	0	0	0	14								8
All tillage	5	0	2	11	14	17	11	6	9	7	10	3	3	1					833
Grass under 5 years	10	0	5	14	9	11	17	6	7	6	5	3	2	3	1	0	0	1	378
Grass 5 years and over	19	1	12	19	11	7	9	4	5	6	2	1	0	1	0	0	0	1	387
All grass	16	1	10	18	11	9	11	5	6	6	3	2	1	2					765
All crops and grass	12	1	7	15	12	12	11	5	7	6	6	2	2	2					1598

Source: British Survey of Fertiliser Practice 2002.

Table SC1.6 Percentage of crop area by field application rate - P_2O_5, Scotland 2002

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																			4
Winter wheat	8	3	11	36	34	7	1	0	1										162
Spring barley	4	2	26	45	19	3	1												347
Winter barley	10	8	15	32	27	7	1												102
Oats	10	3	45	29	12	1													50
Rye/Triticale/Durum wheat																			2
Seed potatoes	0	0	0	0	0	0	44	15	0	41									5
Early potatoes																			0
2nd Early/Maincrop potatoes	3	2	52	10	0	2	18	3	0	6	4								16
Sugar beet																			0
Spring oilseed rape	17	12	10	57	4														13
Winter oilseed rape	10	5	4	45	22	10	4												38
Linseed																			1
Forage maize																			3
Rootcrops for stockfeed	22	0	6	3	22	8	19	11	6	3									34
Leafy forage crops	16	0	16	51	8	9													12
Arable silage/Other fodder crop	30	2	30	15	16	7													14
Peas - human consumption																			4
Peas - animal consumption	34	0	3	63															8
Beans - animal consumption																			3
Vegetables (brassicae)																			0
Vegetables (other)																			3
Soft fruit																			4
Top fruit																			0
Other tillage	10	0	17	30	0	28	0	0	0	16									8
All tillage	8	3	21	39	22	5	2												833
Grass under 5 years	17	24	37	15	4	1	1												378
Grass 5 years and over	32	29	28	8	3	0	1												387
All grass	27	27	31	10	3	1	1												765
All crops and grass	20	18	27	21	10	2	1												1598

Source: British Survey of Fertiliser Practice 2002.

Table SC1.7 Percentage of crop area by field application rate - K_2O, Scotland 2002

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																			4
Winter wheat	4	3	7	24	44	9	4	0	5										162
Spring barley	4	1	20	37	28	7	0	1	0	0	0	0	0	1					347
Winter barley	6	1	12	17	39	16	1	3	2										102
Oats	12	0	41	31	11	1	4												50
Rye/Triticale/Durum wheat																			2
Seed potatoes	0	0	0	0	0	0	0	0	16	84									5
Early potatoes																			0
2nd Early/Maincrop potatoes	3	2	41	15	5	0	0	0	12	4	3	3	0	6	0	0	0	4	16
Sugar beet																			0
Spring oilseed rape	17	0	36	9	6	18	15												13
Winter oilseed rape	7	5	4	38	30	8	4	4											38
Linseed																			1
Forage maize																			3
Rootcrops for stockfeed	22	0	3	14	31	13	10	6											34
Leafy forage crops	16	0	15	57	0	11													12
Arable silage/Other fodder crop	30	2	24	19	16	2	0	0	7										14
Peas - human consumption																			4
Peas - animal consumption	34	0	0	63	3														8
Beans - animal consumption																			3
Vegetables (brassicae)																			0
Vegetables (other)																			3
Soft fruit																			4
Top fruit																			0
Other tillage	10	0	0	31	15	28	0	0	0	16									8
All tillage	6	1	16	30	31	9	2	2	1	1									833
Grass under 5 years	18	21	31	13	8	5	2	1	1										378
Grass 5 years and over	34	26	24	7	5	1	1	1											387
All grass	29	24	27	9	6	2	1	1											765
All crops and grass	20	16	23	17	15	5	1	1	1										1598

Source: British Survey of Fertiliser Practice 2002.

Table SC2.1 Average fertiliser practice by grassland utilisation, Scotland 2002

	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	68	64	17	103	29	29	83	20	18	415
Grazed - mown	91	86	87	52	166	47	66	152	40	57	235
All grazings	83	72	70	26	121	34	40	100	25	28	650
Cut for seed - grazed	.	.	.	.	.	.	.	.	.	.	0
Cut for seed - not grazed	.	.	.	.	.	.	.	.	.	.	0
All cut for seed	.	.	.	.	.	.	.	.	.	.	0
Cut for silage - grazed	92	86	87	54	172	47	68	159	41	60	195
Cut for silage - not grazed	97	88	87	62	177	46	63	171	41	55	87
All cut for silage	93	87	87	56	174	47	67	162	41	59	282
Cut for hay - grazed	90	82	82	45	113	37	45	102	30	37	46
Cut for hay - not grazed	96	92	88	24	114	32	42	110	30	37	23
All cut for hay	92	85	84	38	113	36	44	104	30	37	69
All mowings	93	86	87	53	166	46	64	154	40	56	342
All grass	84	73	71	28	125	35	42	105	26	30	765

Source: British Survey of Fertiliser Practice 2002.

Table SC2.2 Percentage of grass area by field application rate - N, Scotland 2002

	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	20	1	14	23	11	8	7	3	4	4	2	1	0	1	0	0	0	1	415
Grazed - mown	8	0	1	5	10	9	24	8	8	7	6	3	4	4	2	0	0	1	235
All grazings	17	1	11	19	11	8	11	4	5	5	3	1	1	2	1	0	0	1	650
Cut for seed - grazed																			0
Cut for seed - not grazed																			0
All cut for seed																			0
Cut for silage - grazed	8	0	1	4	9	9	24	7	8	8	7	3	4	5	2	0	0	1	195
Cut for silage - not grazed	3	2	0	2	4	12	12	7	19	18	11	8	0	2					87
All cut for silage	7	0	0	4	7	10	21	7	11	11	8	4	3	4	1	0	0	1	282
Cut for hay - grazed	10	0	2	12	30	4	24	11	4	4									46
Cut for hay - not grazed	4	0	0	18	21	10	24	17	7										23
All cut for hay	8	0	1	13	27	6	24	13	5	2									69
All mowings	7	0	1	5	9	10	21	8	10	9	7	4	3	4	1	0	0	1	342
All grass	16	1	10	18	11	9	11	5	6	5	3	2	1	2	0	0	0	1	765

Source: British Survey of Fertiliser Practice 2002.

Table SC2.3 Percentage of grass area by field application rate - P_2O_5, Scotland 2002

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	32	35	25	5	3														415
Grazed - mown	14	10	44	23	5	2													235
All grazings	28	29	29	10	3														650
Cut for seed - grazed																			0
Cut for seed - not grazed																			0
All cut for seed																			0
Cut for silage - grazed	14	9	45	23	5	2	2												195
Cut for silage - not grazed	12	10	44	24	5	3	0	2	0	0	0	1							87
All cut for silage	13	9	45	23	5	2	1												282
Cut for hay - grazed	18	29	33	17	1	1													46
Cut for hay - not grazed	8	26	55	1	6	3													23
All cut for hay	15	28	40	12	3	1													69
All mowings	14	11	44	22	5	2	1												342
All grass	26	27	31	11	3	1	1												765

Source: British Survey of Fertiliser Practice 2002.

Table SC2.4 Percentage of grass area by field application rate - K_2O, Scotland 2002

	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	36	32	25	5	3														415
Grazed - mown	13	7	31	20	12	6	5	4	1	1									235
All grazings	30	26	26	8	5	2	1	1											650
Cut for seed - grazed																			0
Cut for seed - not grazed																			0
All cut for seed																			0
Cut for silage - grazed	12	6	30	19	13	6	6	5	1	1									195
Cut for silage - not grazed	13	10	29	14	19	12	0	4											87
All cut for silage	13	7	30	18	14	8	4	4	1										282
Cut for hay - grazed	18	23	26	19	14														46
Cut for hay - not grazed	12	13	43	15	16														23
All cut for hay	16	20	31	18	15														69
All mowings	13	8	31	18	14	7	4	4	1										342
All grass	29	25	27	9	6	2	1	1											765

Source: British Survey of Fertiliser Practice 2002.

Table SC3.0 Product and nutrient use by month of application, Scotland 2002.

(a) Product use

row %	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total Product ('000 tonnes)
Straight N	1	1	0	0	0	2	23	48	22	3	1	1	313
Straight P	0	0	0	0	0	0	48	12	32	0	8	0	2
Straight K	11	0	0	0	0	3	39	42	2	3	0	0	6
Compounds	5	3	1	0	0	1	21	38	12	9	6	4	527
All fertilisers	3	2	1	0	0	1	22	42	15	7	4	3	848

(b) Nutrient use

row %	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total Nutrient ('000 tonnes)
N	1	1	0	0	0	1	21	44	17	7	4	3	202
P_2O_5	8	6	2	0	0	2	25	35	9	5	3	3	61
K_2O	8	5	2	0	1	2	24	35	9	7	4	3	72
Total	4	3	1	0	0	1	23	41	14	7	4	3	337

Note: product use refers to the total tonnage of the products used by farmers in the survey year 2002;
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 2002.

Table SC3.1 Product type as percentage of all product used by crop group, Scotland 2002

column %	spring cereal	winter cereal	potatoes	sugar beet	oilseed rape	other tillage	all tillage	grass for grazing	grass for hay	grass for silage	grass not spec	all grass	all crops and grass
Calcium Ammonium Nitrate	0.0	0.5	0.0	0.0	4.1	0.0	0.6	0.2	0.0	0.0	0.0	0.2	0.4
Urea	0.3	1.8	0.0	0.0	5.8	0.0	1.5	1.1	1.0	1.2	0.0	1.2	1.4
Ammonium Nitrate	24.0	56.9	1.0	0.0	41.3	8.6	42.4	17.0	16.3	16.3	0.0	17.2	30.7
UAN	3.2	6.6	0.0	0.0	6.3	0.0	5.1	0.3	1.1	0.5	0.0	0.3	2.9
Other Straight N	0.8	3.8	0.7	0.0	6.8	1.1	2.9	0.2	0.0	0.3	0.0	0.2	1.6
Triple Superphosphate	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.0	0.7	0.0	0.5	0.2
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	0.6	1.7	5.3	0.0	0.8	0.3	1.3	0.1	0.0	0.1	0.0	0.1	0.8
Other Straight K	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
NP	1.6	0.7	6.4	0.0	1.2	0.0	1.1	3.7	1.2	0.9	100.0	3.4	2.2
NK	1.3	2.1	0.0	0.0	1.7	0.0	1.7	1.8	0.5	4.0	0.0	2.2	1.9
PK	3.4	7.0	4.2	0.0	6.9	18.4	6.0	1.6	1.1	2.1	0.0	1.5	3.9
Very High N	2.1	0.8	0.0	0.0	0.0	3.4	1.3	45.2	32.4	39.3	0.0	44.3	21.3
High N	15.3	0.9	0.0	0.0	0.6	12.3	6.1	24.2	34.6	25.6	0.0	23.3	14.1
High P	0.9	0.6	0.0	0.0	0.0	17.9	1.1	0.1	0.0	0.3	0.0	0.2	0.7
High K	7.2	0.8	49.5	0.0	0.4	15.4	4.2	0.8	1.2	2.3	0.0	1.0	2.7
Low N	11.5	12.7	17.3	0.0	16.3	12.2	12.6	10.7	0.4	0.8	0.0	0.6	7.0
Low P	5.8	1.1	13.4	0.0	0.0	0.0	2.8	1.6	6.2	4.8	0.0	2.5	2.7
Equal NPK	21.7	1.9	2.1	0.0	7.6	10.4	9.3	1.3	3.1	0.9	0.0	1.4	5.6
Total Product ('000 tonnes)	**156**	**248**	**8**	**0**	**31**	**10**	**454**	**342**	**19**	**170**	**0**	**395**	**848**

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 2002.

Table SC3.2 Use of product type by crop group, Scotland 2002

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	2.1	39.5	0.0	0.0	38.1	0.0	79.7	20.0	0.0	15.4	0.0	20.3	3
Urea	4.6	37.9	0.0	0.0	15.6	0.0	58.2	30.7	1.7	37.1	0.0	41.8	12
Ammonium Nitrate	14.4	54.2	0.0	0.0	5.0	0.3	74.0	22.2	1.2	0.0	0.0	26.0	260
UAN	20.7	66.8	0.0	0.0	8.0	0.0	95.6	3.8	0.9	16.7	0.0	4.4	24
Other Straight N	9.2	69.3	0.4	0.0	15.6	0.9	95.4	4.5	0.0	0.0	0.0	4.6	14
Triple Superphosphate	8.1	0.0	0.0	0.0	0.0	0.0	8.1	44.2	9.1	3.7	0.0	91.9	2
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	15.4	65.7	6.8	0.0	4.0	0.4	92.3	7.0	0.0	41.9	0.0	7.7	6
Other Straight K	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
NP	13.1	9.3	2.8	0.0	2.0	0.0	27.2	61.6	1.1	3.3	0.2	72.8	19
NK	12.8	32.1	0.0	0.0	3.3	0.0	48.1	36.5	0.6	7.6	0.0	51.9	16
PK	16.3	52.5	1.1	0.0	6.5	5.9	82.3	16.9	0.6	55.7	0.0	17.7	33
Very High N	1.8	1.2	0.0	0.0	0.0	0.2	3.2	86.9	3.5	0.0	0.0	96.8	181
High N	20.0	1.9	0.0	0.0	0.2	1.1	23.1	69.0	5.6	7.8	0.0	76.9	120
High P	24.2	28.5	0.0	0.0	0.1	33.9	86.8	5.4	0.0	2.3	0.0	13.2	6
High K	48.8	8.3	17.5	0.0	0.6	6.9	82.2	10.2	0.9	36.4	0.0	17.8	23
Low N	30.1	52.8	2.4	0.0	8.5	2.1	95.9	3.7	0.1	35.2	0.0	4.1	59
Low P	39.7	11.6	4.8	0.0	0.0	0.0	56.2	23.1	5.2	2.7	0.0	43.8	23
Equal NPK	71.0	9.8	0.4	0.0	5.0	2.3	88.4	9.4	1.2	3.3	0.0	11.6	48
All Fertilisers	**18.4**	**29.2**	**1.0**	**0.0**	**3.7**	**1.2**	**53.5**	**40.0**	**2.3**	**19.9**	**0.0**	**46.5**	**848**

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 2002.

Table SC3.3 Product use by month of application, Scotland 2002.

row %	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	total Product ('000 tonnes)
Calcium Ammonium Nitrate	0.0	13.8	86.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3
Urea	0.0	1.1	38.2	51.2	8.4	1.1	0.0	0.0	0.0	0.0	0.0	0.0	12
Ammonium Nitrate	0.0	0.8	20.9	48.7	22.4	2.8	0.9	1.5	0.7	1.1	0.1	0.0	260
UAN	0.0	1.5	23.0	47.0	26.3	1.0	1.1	0.0	0.0	0.0	0.0	0.0	24
Other straight N	0.0	15.4	22.0	46.4	14.8	1.5	0.0	0.0	0.0	0.0	0.0	0.0	14
Triple Superphosphate	0.0	0.0	47.7	12.3	31.9	0.0	8.1	0.0	0.0	0.0	0.0	0.0	2
Muriate of Potash	0.0	2.7	39.0	41.7	1.7	3.5	0.0	0.0	11.5	0.0	0.0	0.0	6
NP	0.0	0.0	36.5	.44.9	11.4	1.4	0.0	1.5	4.4	0.0	0.0	0.0	19
NK	0.0	0.0	26.8	24.4	16.2	19.9	9.5	2.3	0.9	0.0	0.0	0.0	16
PK	2.2	5.5	24.1	23.9	2.6	0.6	2.1	1.1	13.0	14.8	10.2	0.0	33
Very High N	0.0	0.3	9.6	37.0	16.9	17.5	10.3	7.8	0.7	0.0	0.0	0.0	181
High N	0.0	0.0	23.0	.47.7	13.5	7.4	5.8	2.5	0.0	0.1	0.0	0.0	120
High P	0.0	0.0	15.8	30.8	23.8	1.9	3.9	0.0	5.4	0.7	17.7	0.0	6
High K	6.4	4.2	15.4	51.8	12.3	6.4	0.0	0.8	0.0	2.6	0.0	0.0	23
Low N	0.0	4.0	21.0	22.1	5.8	0.1	0.6	2.4	26.5	15.3	1.7	0.7	59
Low P	0.0	0.0	40.7	39.2	1.2	12.7	5.1	1.2	0.0	0.0	0.0	0.0	23
Equal NPK	0.0	0.0	39.9	43.3	3.3	3.5	0.8	3.3	2.1	3.7	0.0	0.0	48
All Fertilisers	**0.3**	**1.3**	**21.6**	**41.7**	**15.3**	**6.9**	**3.8**	**3.0**	**3.1**	**2.3**	**0.7**	**0.0**	**848**

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 2002.

Table SC4.1 Average fertiliser practice, North East Scotland 2002

	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	.	.	.	.	.	.	.	.	.	.	1
Winter wheat	91	78	89	11	249	86	101	228	67	90	21
Spring barley	100	92	92	46	125	58	65	125	54	60	26
Winter barley	100	88	88	9	190	76	82	190	67	72	8
Oats	.	.	.	.	.	.	.	.	.	.	3
Rye/Triticale/Durum wheat	.	.	.	.	.	.	.	.	.	.	0
Seed potatoes	.	.	.	.	.	.	.	.	.	.	0
Early potatoes	.	.	.	.	.	.	.	.	.	.	0
2nd Early/Maincrop potatoes	.	.	.	.	.	.	.	.	.	.	1
Sugar beet	.	.	.	.	.	.	.	.	.	.	0
Spring oilseed rape	.	.	.	.	.	.	.	.	.	.	2
Winter oilseed rape	100	68	100	28	308	73	66	308	50	66	6
Linseed	.	.	.	.	.	.	.	.	.	.	0
Forage maize	.	.	.	.	.	.	.	.	.	.	1
Rootcrops for stockfeed	.	.	.	.	.	.	.	.	.	.	4
Leafy forage crops	.	.	.	.	.	.	.	.	.	.	4
Arable silage/Other fodder crop	.	.	.	.	.	.	.	.	.	.	2
Peas - human consumption	.	.	.	.	.	.	.	.	.	.	1
Peas - animal consumption	.	.	.	.	.	.	.	.	.	.	1
Beans - animal consumption	.	.	.	.	.	.	.	.	.	.	0
Vegetables (brassicae)	.	.	.	.	.	.	.	.	.	.	0
Vegetables (other)	.	.	.	.	.	.	.	.	.	.	0
Soft fruit	.	.	.	.	.	.	.	.	.	.	3
Top fruit	.	.	.	.	.	.	.	.	.	.	0
Other tillage	.	.	.	.	.	.	.	.	.	.	0
All tillage	95	84	89	32	173	67	75	165	56	67	84
Grass under 5 years	93	72	72	31	166	49	59	154	35	43	40
Grass 5 years and over	82	74	75	36	145	38	47	119	28	35	40
All grass	85	73	74	35	152	42	51	130	31	37	80
All crops and grass	88	77	79	34	159	50	59	141	38	46	164

Source: British Survey of Fertiliser Practice 2002.

Table SC4.2 Average fertiliser practice, South East Scotland 2002

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring wheat	.	.	.	.	.	.	.	.	.	.	3
Winter wheat	100	94	94	15	212	72	90	212	67	85	39
Spring barley	99	98	98	36	108	68	71	107	67	69	129
Winter barley	98	85	95	23	200	70	91	195	59	87	47
Oats	88	86	83	31	106	50	55	93	43	45	27
Rye/Triticale/Durum wheat	.	.	.	.	.	.	.	.	.	.	1
Seed potatoes	.	.	.	.	.	.	.	.	.	.	2
Early potatoes	.	.	.	.	.	.	.	.	.	.	0
2nd Early/Maincrop potatoes	.	.	.	.	.	.	.	.	.	.	1
Sugar beet	.	.	.	.	.	.	.	.	.	.	0
Spring oilseed rape	.	.	.	.	.	.	.	.	.	.	2
Winter oilseed rape	100	89	89	12	215	67	72	215	60	65	23
Linseed	.	.	.	.	.	.	.	.	.	.	1
Forage maize	.	.	.	.	.	.	.	.	.	.	1
Rootcrops for stockfeed	100	100	100	47	81	118	81	81	118	81	14
Leafy forage crops	65	65	65	8	83	45	50	54	30	32	5
Arable silage/Other fodder crop	89	89	89	45	111	71	83	99	63	74	8
Peas - human consumption	.	.	.	.	.	.	.	.	.	.	3
Peas - animal consumption	.	.	.	.	.	.	.	.	.	.	4
Beans - animal consumption	.	.	.	.	.	.	.	.	.	.	1
Vegetables (brassicae)	.	.	.	.	.	.	.	.	.	.	0
Vegetables (other)	.	.	.	.	.	.	.	.	.	.	2
Soft fruit	.	.	.	.	.	.	.	.	.	.	0
Top fruit	.	.	.	.	.	.	.	.	.	.	0
Other tillage	36	88	88	12	129	108	113	47	96	100	6
All tillage	95	92	93	28	149	69	78	142	63	72	319
Grass under 5 years	90	83	83	23	125	36	39	112	29	32	174
Grass 5 years and over	83	68	64	28	106	34	35	88	23	22	173
All grass	85	73	71	26	113	35	36	96	25	26	347
All crops and grass	89	80	78	27	126	48	53	112	38	42	666

Source: British Survey of Fertiliser Practice 2002.

Table SC4.3 Average fertiliser practice, South West Scotland 2002

	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	100	100	100	10	207	71	78	206	70	77	80
Spring barley	95	93	93	29	116	56	66	111	52	61	124
Winter b arley	96	94	94	17	150	58	84	144	55	79	33
Oat	100	100	100	22	93	47	56	93	47	56	11
Rye/Triticale/Durum wheat	.	.	.	.	.	.	.	.	.	.	1
Seed potatoes	.	.	.	.	.	.	.	.	.	.	3
Early potatoes	.	.	.	.	.	.	.	.	.	.	0
2nd Early/Maincrop potatoes	96	96	96	2	79	70	106	75	67	102	7
Sugar beet	.	.	.	.	.	.	.	.	.	.	0
Spring oilseed rape	100	82	82	0	142	53	104	124	43	86	7
Winter oilseed rape	100	100	100	0	201	81	87	201	81	87	9
Linseed	.	.	.	.	.	.	.	.	.	.	0
Forage maize	.	.	.	.	.	.	.	.	.	.	1
Rootcrops for stockfeed	54	54	54	52	64	114	90	35	62	49	9
Leafy forage crops	.	.	.	.	.	.	.	.	.	.	2
Arable silage/Other fodder crop	.	.	.	.	.	.	.	.	.	.	3
Peas - human consumption	.	.	.	.	.	.	.	.	.	.	0
Peas - animal consumption	.	.	.	.	.	.	.	.	.	.	3
Beans - animal consumption	.	.	.	.	.	.	.	.	.	.	2
Vegetables (brassicae)	.	.	.	.	.	.	.	.	.	.	0
Vegetables (other)	.	.	.	.	.	.	.	.	.	.	1
Soft fruit	.	.	.	.	.	.	.	.	.	.	1
Top fruit	.	.	.	.	.	.	.	.	.	.	0
Other tillage	.	.	.	.	.	.	.	.	.	.	2
All tillage	95	94	94	21	145	63	75	138	59	70	299
Grass under 5 years	100	97	94	36	172	42	63	171	41	60	103
Grass 5 years and over	87	76	73	35	124	30	41	109	23	30	123
All grass	91	83	80	35	141	35	50	129	29	39	226
All crops and grass	93	88	86	28	143	49	63	133	43	54	525

Source: British Survey of Fertiliser Practice 2002.

Table SC5.1 Average fertiliser practice on general cropping farms, Scotland 2002

	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	99	93	98	11	218	74	85	216	69	83	142
Spring barley	98	95	95	19	125	64	76	123	61	72	187
Winter barley	98	90	95	16	199	68	88	195	61	84	78
Oats	88	86	83	25	126	58	66	111	50	55	32
Rye/Triticale/Durum wheat	.	.	.	.	.	.	.	.	.	.	1
Seed potatoes	.	.	.	.	.	.	.	.	.	.	3
Early potatoes	.	.	.	.	.	.	.	.	.	.	0
2nd Early/Maincrop potatoes	80	97	97	9	86	69	108	69	67	105	15
Sugar beet	.	.	.	.	.	.	.	.	.	.	0
Spring oilseed rape	100	83	83	30	154	54	75	154	45	62	12
Winter oilseed rape	100	88	92	8	233	77	79	233	68	73	33
Linseed	.	.	.	.	.	.	.	.	.	.	0
Forage maize	.	.	.	.	.	.	.	.	.	.	0
Rootcrops for stockfeed	81	81	81	47	80	114	110	65	92	89	10
Leafy forage crops	.	.	.	.	.	.	.	.	.	.	0
Arable silage/Other fodder crop	.	.	.	.	.	.	.	.	.	.	3
Peas - human consumption	.	.	.	.	.	.	.	.	.	.	4
Peas - animal consumption	0	49	49	8	0	62	65	0	30	32	5
Beans - animal consumption	.	.	.	.	.	.	.	.	.	.	2
Vegetables (brassicae)	.	.	.	.	.	.	.	.	.	.	0
Vegetables (other)	.	.	.	.	.	.	.	.	.	.	2
Soft fruit	.	.	.	.	.	.	.	.	.	.	3
Top fruit	.	.	.	.	.	.	.	.	.	.	0
Other tillage	36	88	88	12	129	108	113	46	95	99	6
All tillage	95	92	94	16	168	69	82	160	63	77	540
Grass under 5 years	86	65	66	11	140	43	52	120	28	34	92
Grass 5 years and over	75	59	58	8	102	31	34	77	18	20	62
All grass	81	63	63	9	125	38	44	101	24	28	154
All crops and grass	92	85	87	15	160	64	76	147	54	66	694

Source: British Survey of Fertiliser Practice 2002.

Table SC5.2 Average fertiliser practice on dairy farms, Scotland 2002

	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	.	.	.	.	.	.	.	.	.	.	1
Winter wheat	.	.	.	.	.	.	.	.	.	.	1
Spring barley	100	100	100	80	82	53	55	82	53	55	9
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	88	88	88	80	88	50	52	77	44	46	15
Grass under 5 years	100	100	100	75	227	54	74	227	54	74	38
Grass 5 years and over	98	97	96	78	184	43	57	180	42	55	58
All grass	99	98	98	77	195	46	62	193	45	61	96
All crops and grass	98	97	97	77	189	46	61	185	45	59	111

Source: British Survey of Fertiliser Practice 2002.

Table SC5.3 Average fertiliser practice on mixed farms, Scotland 2002

	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	.	.	.	.	.	.	.	.	.	.	1
Winter wheat	100	82	82	22	166	64	78	166	52	64	19
Spring barley	97	97	97	51	92	61	61	89	59	59	151
Winter barley	97	88	88	49	164	60	77	159	53	68	23
Oats	99	96	96	27	66	38	43	65	36	41	18
Rye/Triticale/Durum wheat	.	.	.	.	.	.	.	.	.	.	1
Seed potatoes	.	.	.	.	.	.	.	.	.	.	2
Early potatoes	.	.	.	.	.	.	.	.	.	.	0
2nd Early/Maincrop potatoes	.	.	.	.	.	.	.	.	.	.	1
Sugar beet	.	.	.	.	.	.	.	.	.	.	0
Spring oilseed rape	.	.	.	.	.	.	.	.	.	.	1
Winter oilseed rape	100	100	100	31	132	35	48	132	35	48	5
Linseed	.	.	.	.	.	.	.	.	.	.	1
Forage maize	.	.	.	.	.	.	.	.	.	.	1
Rootcrops for stockfeed	76	76	76	55	73	118	85	55	90	65	24
Leafy forage crops	84	84	84	57	101	57	57	85	48	48	12
Arable silage/Other fodder crop	82	82	82	48	84	52	53	69	43	43	10
Peas - human consumption	.	.	.	.	.	.	.	.	.	.	0
Peas - animal consumption	.	.	.	.	.	.	.	.	.	.	3
Beans - animal consumption	.	.	.	.	.	.	.	.	.	.	1
Vegetables (brassicae)	.	.	.	.	.	.	.	.	.	.	0
Vegetables (other)	.	.	.	.	.	.	.	.	.	.	1
Soft fruit	.	.	.	.	.	.	.	.	.	.	1
Top fruit	.	.	.	.	.	.	.	.	.	.	0
Other tillage	.	.	.	.	.	.	.	.	.	.	2
All tillage	95	93	93	47	103	62	65	98	58	60	278
Grass under 5 years	90	86	83	21	128	36	44	115	31	37	248
Grass 5 years and over	77	63	59	23	97	29	31	75	18	18	267
All grass	81	70	67	22	108	32	36	87	22	24	515
All crops and grass	84	74	71	26	107	38	43	90	28	31	793

Source: British Survey of Fertiliser Practice 2002.

Table SC5.4 Average fertiliser practice on farms in Less Favoured Areas, Scotland 2002

	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	98	87	97	5	222	71	85	218	62	82	55
Spring barley	95	90	90	33	118	57	67	112	51	60	75
Winter barley	100	98	98	6	184	77	85	184	75	83	32
Oats	99	96	90	18	124	52	53	123	50	48	16
Rye/Triticale/Durum wheat	.	.	.	.	.	.	.	.	.	.	0
Seed potatoes	.	.	.	.	.	.	.	.	.	.	2
Early potatoes	.	.	.	.	.	.	.	.	.	.	0
2nd Early/Maincrop potatoes	.	.	.	.	.	.	.	.	.	.	4
Sugar beet	.	.	.	.	.	.	.	.	.	.	0
Spring oilseed rape	.	.	.	.	.	.	.	.	.	.	1
Winter oilseed rape	100	92	100	8	236	60	60	236	55	60	15
Linseed	.	.	.	.	.	.	.	.	.	.	0
Forage maize	.	.	.	.	.	.	.	.	.	.	1
Rootcrops for stockfeed	89	89	89	39	81	137	99	72	122	88	13
Leafy forage crops	.	.	.	.	.	.	.	.	.	.	3
Arable silage/Other fodder crop	.	.	.	.	.	.	.	.	.	.	1
Peas - human consumption	.	.	.	.	.	.	.	.	.	.	3
Peas - animal consumption	.	.	.	.	.	.	.	.	.	.	3
Beans - animal consumption	.	.	.	.	.	.	.	.	.	.	0
Vegetables (brassicae)	.	.	.	.	.	.	.	.	.	.	0
Vegetables (other)	.	.	.	.	.	.	.	.	.	.	2
Soft fruit	.	.	.	.	.	.	.	.	.	.	3
Top fruit	.	.	.	.	.	.	.	.	.	.	0
Other tillage	36	88	88	12	129	108	113	46	95	99	6
All tillage	94	90	93	17	169	68	78	159	61	73	237
Grass under 5 years	91	83	81	24	142	39	55	130	32	45	84
Grass 5 years and over	87	71	71	38	107	30	34	94	21	24	108
All grass	88	74	74	34	117	33	40	103	24	30	192
All crops and grass	91	81	82	27	140	49	59	127	40	48	429

Source: British Survey of Fertiliser Practice 2002.

SECTION D

SUPPLEMENTARY SURVEY ANALYSIS ON THE STORAGE AND HANDLING OF MANUFACTURED FERTILISERS

Introduction

General and supplementary information is collected for each farm holding that is surveyed. The supplementary questions vary each year. In 2002, 1,331 farmers were asked a number of questions relating to the storage and handling of manufactured fertilisers.

Codes of Practice

There are Codes of Good Practice published by the Fertiliser Manufacturers Association (FMA) and produced in consultation with the EA England, EA Wales, SEPA and Environmental and Heritage Service Northern Ireland. These provide guidance on avoiding pollution from fertiliser handling and storage. These codes cover topics such as the safe storage, handling and security of manufactured fertilisers, they also give information on the correct procedures in the event of an accident or other incident such as theft/vandalism. They are aimed at fertiliser manufacturers, hauliers and suppliers as well as farmers. Farmers were asked about their knowledge of these guidelines and about how they actually stored and handled fertilisers.

Firstly farmers were asked about their awareness of the existence of codes (Table D1.1). Most were aware of the codes. In England and Wales 1107 farmers were then asked whether they had a copy of the FMA Code of Practice for the prevention of water pollution from the storage and handling of fertilisers. Similarly in Scotland 239 farmers were asked about the Prevention of Environmental Pollution from Agricultural Activities (PEPFAA) code issued by the Scottish Executive on the storage and handling of solid or liquid fertilisers. The results (Table D1.2) show that more farmers possessed the codes on solid fertilisers than on liquid. This is probably a reflection of the more common use of solid than liquid fertilisers (only 12% of farmers used liquids)

Table D1.1 Percentage of farmers aware of published codes of practice for storage and handling of manufactured fertilisers

	yes %	no %
Aware	90	10

Table D1.2 Percentage of farmers possessing FMA codes of practice on storage and handling of manufactured fertilisers

	total number of farmers	yes %	no %	don't know %
England and Wales	1107			
Solid fertilisers		66	18	16
Liquid fertilisers		38	38	24
Scotland	239			
Solid fertilisers		79	11	10
Liquid fertilisers		48	31	21

Farmers in England and Wales were also asked whether they had a copy of the Code of Good Agricultural Practice for the Protection of Water published by Defra.

Table D1.3 Percentage of farmers in England and Wales possesing a copy of the Defra Code of Good Agricultural Practice for the Protection of Water

	yes %	no %	don't know %
Possess copy	79	11	10

Storage of ammonium nitrate-based fertilisers

Farmers were asked about the maximum tonnage of ammonium nitrate-based fertilisers with the yellow 'oxidising' diamond symbol as either straight nitrogen or as high nitrogen compound they stored in one place at any one time (Table D1.4). The oxidising symbol is used on all ammonium nitrate-based fertilisers which have more that 28% nitrogen to indicate their hazard risk. They are not combustible in themselves but can assist other materials to burn so need to be stored safely. The majority of farmers (92%) stored less that 100 tonnes at any one time.

Table D1.4 On farm storage of nitrogen fertiliser with the 'oxiding' symbol

amount stored (tonnes)	total number of farmers	% of farmers
<50	1051	79
50-99	167	13
100-149	71	5
150-199	21	2
200-249	11	1
>250	10	1

Storage of liquid fertilisers

Only 154 (12%) of farmers surveyed used liquid fertilisers. These farmers were asked about their storage facilities. Of the 154 using liquids, 90 (58%) stored the liquid fertiliser on their farm. The farmers using and storing liquids can be categorised according to their farm type (Table D1.5). See Appendix 4 for full description of farm types.

Table D1.5 Storage of liquid fertiliser by farm type

robust type	number using liquids	number with storage for liquids
1. Cereals	70	47
2. General cropping	42	23
3. Horticulture	4	1
4. Pigs and poultry	1	1
5. Dairy	3	0
6. Cattle and sheep (LFA)	5	2
7. Cattle and sheep (lowland)	2	1
8. Mixed	27	15
Total	154	90

This shows that use of liquids is mainly by cereal, general cropping and mixed farms (ie those with both cropping and livestock), liquids are rarely used by grassland only farms.

Nearly 75% of those with storage had fewer than three tanks, only 10% had more than five tanks (Table D1.6).

Table D1.6 On farm storage of liquid fertiliser

number of tanks	total	%
<3	67	74
3-5	14	16
>5	9	10

The majority of tanks (82%) were fixed (Table D1.7).

Table D1.7 Type of tank used for on farm storage of fertiliser

tank type	total
Fixed	134
Mobile	30
Total	164

Farmers were asked how often they checked tanks for corrosion, 97% of tanks were checked at least once a year (Table D1.8). They were also asked about security of tanks and 91% of tanks were secured against accidental spillage or unauthorised use by for example a lock or immobilisation on mobile tanks.

Table D1.8 Frequency of tank condition check

frequency	%
More than once a year	50
Once a year	47
Less than once a year	1
Hardly ever/never	2

Incidents involving stored fertilisers

Farmers were asked whether they had ever had any incidents involving stored fertilisers due to vandalism, fire or theft (Table D1.9). There were 10 incidents of theft or vandalism with solid fertiliser and 1 incident (theft) with liquids. There was one incident involving fire.

Table D1.9 Number of farm incidents involving stored fertiliser

type	solid fertiliser		liquid fertiliser	
	yes	no	yes	no
Vandalism	7	1324	0	154
Fire	1	1330	0	154
Theft	3	1328	1	153

APPENDIX 1 - SURVEY STATISTICS

App 1.1 SAMPLING VARIATION

Table App 1.1 Standard errors of application rates for the major crops in 2002

Great Britain

	standard error for overall application rate (kg/ha)					standard error for average field rates (kg/ha)					Fields in sample
	total N	strt N	comp N	total P_2O_5	total K_2O	total N	strt N	comp N	total P_2O_5	total K_2O	
winter wheat	2.3	1.1	1.3	1.6	1.8	1.5	1.8	5.1	1.8	1.0	2363
oilseed rape	5.8	5.3	2.1	2.5	2.8	4.2	3.1	2.1	3.1	4.8	443
winter barley	4.1	2.7	1.9	4.4	2.4	4.3	3.2	2.0	3.1	1.1	751
spring barley	4.5	4.3	2.5	4.4	5.3	4.4	4.0	1.1	3.3	3.7	747
m/c potatoes	10.2	6.9	7.2	9.3	10.1	9.7	7.6	9.3	10.2	11.3	167
sugar beet	3.0	3.5	2.0	4.9	9.3	1.8	4.1	11.9	8.3	11.0	225
all tillage crops	3.5	2.8	1.3	1.8	2.3	2.6	2.1	2.5	1.1	2.1	6012
all grass	1.5	2.3	1.8	0.8	0.6	1.1	5.3	1.9	1.4	0.8	3765

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	2.2	0.9	1.4	1.7	2.0	1.4	1.8	4.5	2.0	0.8	2201
oilseed rape	6.3	6.0	2.4	3.0	3.2	5.4	4.8	4.4	4.0	6.1	392
winter barley	1.9	1.7	2.2	4.4	2.7	2.4	2.7	2.6	3.3	0.6	649
spring barley	4.9	3.5	2.8	3.2	5.6	4.4	1.2	3.6	2.1	4.1	400
m/c potatoes	5.9	5.3	7.4	10.1	2.6	7.6	7.2	10.9	12.3	8.0	151
sugar beet	3.0	3.6	2.0	4.9	9.3	1.8	4.1	12.0	8.4	11.1	225
all tillage crops	3.4	2.3	1.1	1.6	2.4	2.3	2.0	2.0	1.3	2.8	5179
all grass	1.8	2.5	3.0	0.8	0.7	1.6	6.1	2.9	1.4	0.4	3000

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	3.8	6.7	1.8	2.2	7.4	2.1	2.9	0.3	2.1	9.0	162
oilseed rape	1.9	2.7	0.9	1.8	5.7	1.9	0.1	6.0	4.5	10.8	51
winter barley	20.3	25.7	2.7	3.4	9.7	20.5	1.2	3.7	3.8	8.8	102
spring barley	3.6	1.3	4.8	8.9	8.2	1.5	2.3	1.6	7.2	6.3	347
m/c potatoes	8.8	2.6	11.3	15.9	18.9	17.5	48.5	12.2	19.5	24.2	16
all tillage crops	8.6	9.2	0.8	4.6	1.1	8.3	5.4	0.7	3.5	0.1	833
all grass	4.6	2.7	1.9	1.0	2.0	5.4	12.4	3.6	1.8	3.2	765

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 2002 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 2002

		straight nitrogen	compound nitrogen	total nitrogen	total phosphate	total potash
all tillage		129	23	152	44	57
	revised estimate	126	23	149	44	58
all grass		32	57	89	20	25
	revised estimate	32	57	89	19	25
all crops and grass		76	42	117	31	40
	revised estimate	73	42	115	30	39

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 2001).

This year, the adjusted estimates for straight nitrogen vary from those reported in Section B more than in previous years and this leads to a change in overall estimated use. Examination of the data highlights that this is caused by the fact that our sample contained a greater proportion of winter wheat (a relatively high user of straight nitrogen) than reported in the June 2001 census. These differences may be a result of the fact that the very wet autumn of 2000 severely affected winter wheat plantings.

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 2002

	2002	(% total)
Issued from main sample	1470	(100)
Non-response[1]	343	(23)
Response to main sample	1128	(77)
Issued from reserve sample 1	343	(23)
Non-response[1]	228	(15)
Response to reserve sample 1	115	(8)
Issued from reserve sample 2	228	(16)
Non-response[1]	168	(12)
Response to reserve sample 2	60	(4)
Issued from reserve sample 3	168	(11)
Non-response[1]	139	(9)
Response to reserve sample 3	29	(2)
Achieved sample response	1332	(91)

Table App 1.4 Response to main and reserve samples for 1998-2002

Net response rate	1998 %	1999 %	2000 %	2001 %	2002 %
Overall achieved rate	64	64	94	89	91
Refusal rate[1]	36	36	7	11	9

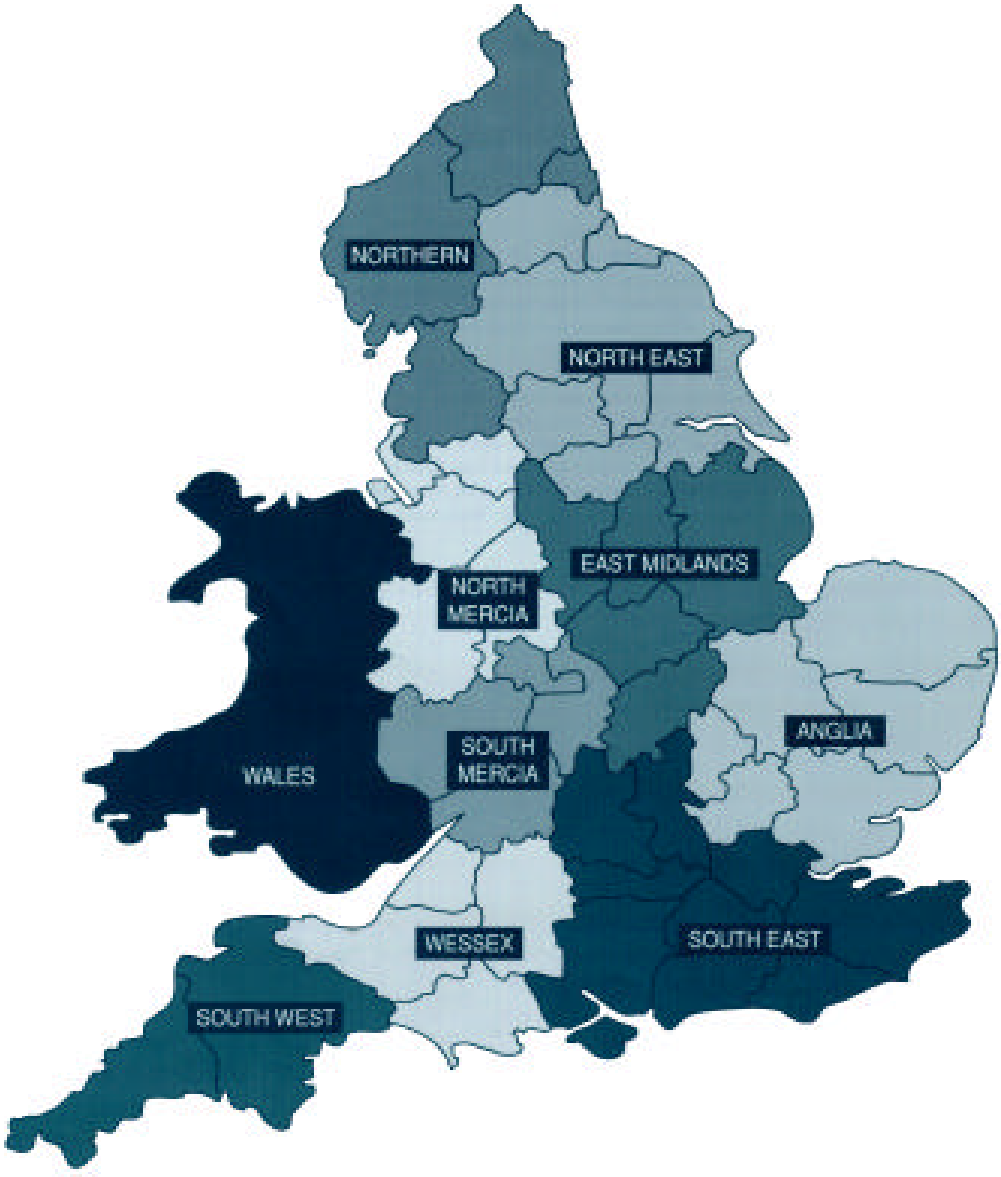
Net response rate	1998 %	1999 %	2000 %	2001 %	2002 %
Main sample	69	66	67	72	77
Reserve sample(s)	47	56	45	28	23

Main reasons for refusal	1998 %	1999 %	2000 %	2001 %	2002 %
Too busy	38	35	31	23	31
Not interested	32	26	10	8	9
Do not do surveys	10	10	7	3	5
Want payment	4	2	2	1	1
Too much paperwork (IACS)	3	1	3	2	1
Other[1]	13	26	49	63	54

[1] includes non-contact

APPENDIX 2

App 2.1 BSFP REGIONS[16] IN ENGLAND AND WALES



[16] 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 BSFPregions marked above are based on the 1995 Defra administrative regions.

App 2.2 COMPARISON OF BSFPAND DEFRACOUNTIES

Approximate English counties within BSFP and Defra Regions[17]

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

[17] 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 BSFPAND DEFRAREGIONS

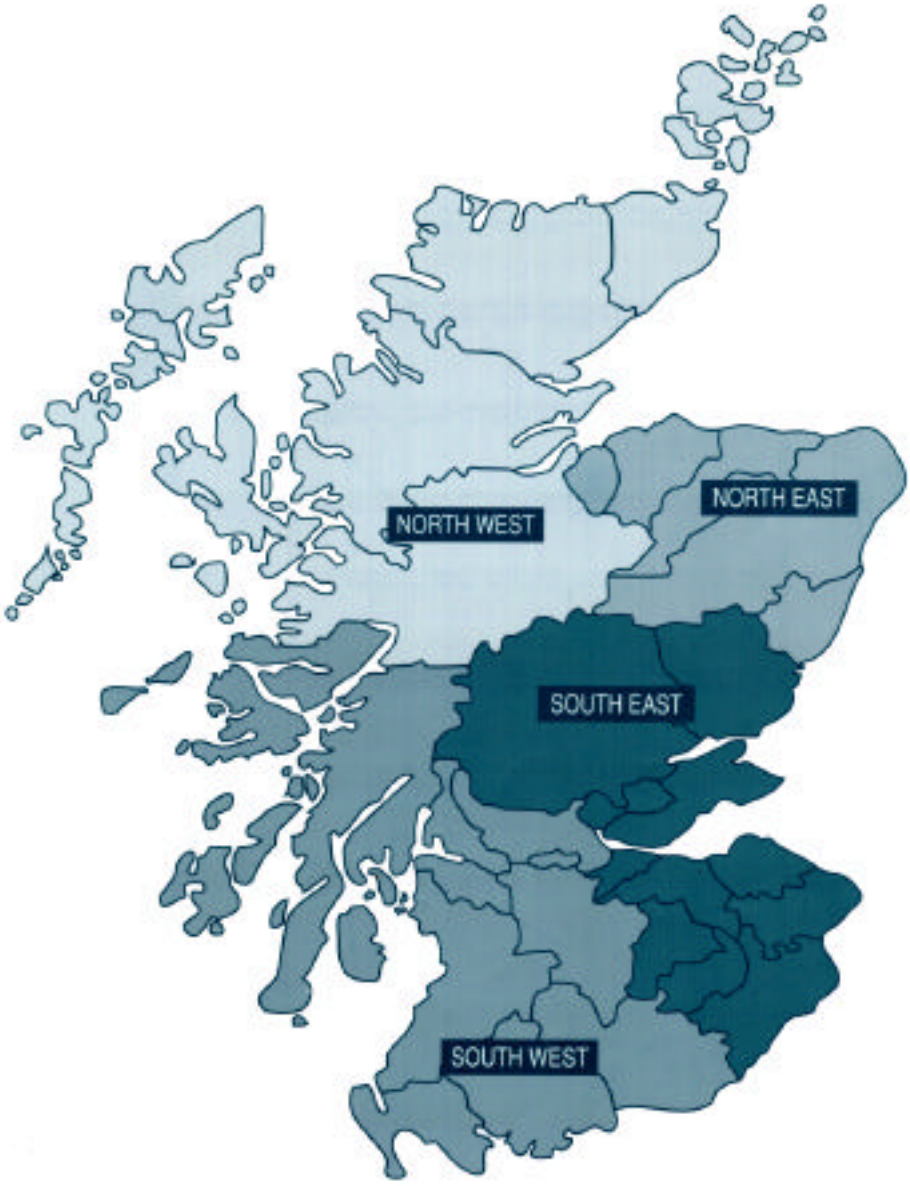
List of English counties indicating the BSFP and Defra Regions[18] within which they fall

	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

[18] 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[19] IN SCOTLAND



[19] 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 BSFPregions marked above are based on the 1995 SEERAD 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[20].

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

[a] 1985 EC Typology described in Commission Decision 85/377/EEC as amended with minor modifications to adapt it to UK conditions. These minor modifications are indicated by the EC farm type number being shown in square brackets. Definitions of these additional farm types are available from Defra 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 SW1P2AL.

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

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