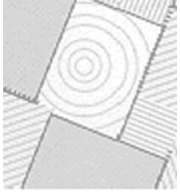
THE BRITISH SURVEY OF

Fertiliser Practice

FERTILISER USE ON FARM CROPS
FOR CROP YEAR 2001

DEFRA
Department for
Environment,
Food & **Rural Affairs**

SCOTTISH EXECUTIVE
Environment and Rural Affairs Department



First published 2002

British Library Cataloguing in Publication Data.

A catalogue record for this book is available from the British Library.

ISBN 1 86190 123 2

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

Gary Beckwith

Department for Environment, Food and Rural Affairs
Fertilisers Branch
Area 4D, Ergon House
Horseferry Road
London SW1P 2AL

Tel: +44 (0) 20 7238 5810
Fax: +44 (0) 20 7238 6069

FOREWORD

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

The 2001 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 2001, the Survey was co-ordinated by the Rural Business Unit at the University of Cambridge, which was also responsible for the survey design, statistical analysis and quality control monitoring. Produce Studies Ltd carried out the farm interviews.

November 2002

Carol Elaine Rush

We are very sad to announce the death of Carol Rush during the final stages of the work on this report. We would like to acknowledge our debt of gratitude for her unstinting efforts, not only on the British Survey of Fertiliser Practice, but in many other areas of the work of the Rural Business Unit at Cambridge. She will be greatly missed by all.

ACKNOWLEDGEMENTS

The sponsors gratefully acknowledge the co-operation of all farmers taking part in the 2001 British Survey of Fertiliser Practice.

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

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

The authors would also like to thank Ian Barrie for his agro-meteorology advice.

Gillian Goodlass[1]

Carol Rush[2]

Sarah Wilshin[2]

[1] ADAS High Mowthorpe, Duggleby, Malton, North Yorkshire YO17 8BP

[2] Department of Land Economy, Rural Business Unit, The University of Cambridge, 19 Silver Street, Cambridge CB3 9EP.

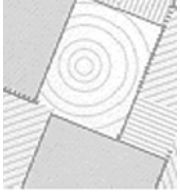
CONTENTS

SECTION C

SECTION D

APPENDICES

LIST OF TABLES AND FIGURES



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 2001 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 2001 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 2000/2001 cropping season are also discussed in the report.

Nitrogen

- Total nitrogen use on all crops and grassland decreased by 7 kg/ha in 2001 to 116 kg/ha This overall rate of total nitrogen was the lowest recorded not only over the last five years but also since the British survey started in 1983. The decline in total nitrogen use during 1997-2001 was mainly associated with a drop in the overall application rate of straight nitrogen especially on grassland. The increase in compound nitrogen on tillage land in 2001 probably reflects the effects of the wet autumn on crop management. It is unclear how much of the reduction in nitrogen use on grassland is due to the effects of Foot and Mouth disease.

- Overall rates of total nitrogen decreased on all crops except spring barley and oilseed rape. There was an increase in the use of compound nitrogen for winter cereal crops at the expense of straight nitrogen. This decreased use of nitrogen fertiliser, together with changes in cropping area, particularly of spring barley, contributed to the 4 kg/ha decrease in overall nitrogen rate for all tillage crops, as a single grouping, to 145 kg/ha. It is unclear whether this is a entirely a reflection of the difficult farming conditions in 2000/2001 or a return to the lower rates of 1998 and 1999.

- Estimated total nitrogen use on grassland continued to show a decline with a drop of 5 kg/ha from the previous year. There were lower overall application rates of both straight nitrogen (-4 kg/ha) and, to a lesser extent, compound nitrogen (-1 kg/ha). This total nitrogen rate was the lowest reported for both the last five years (mean: 107 kg/ha) and also for the whole survey period since 1983. Foot and Mouth disease is likely to be one of the causes of reduced applications to grassland and the impact is discussed more fully in Section B1.3.1.

Phosphate

- Overall phosphate use on tillage crops declined by 4 kg/ha in 2001, to 43 kg/ha. Both the area receiving this fertiliser nutrient and the average field rates declined in 2001, by 3% and 3 kg/ha respectively. Phosphate use on grassland was slightly lower (-1 kg/ha) than in 2000, at 19 kg/ha. The combined effects of these changes resulted in a net drop of 10 kg/ha in phosphate use on all crops and grassland over the last five years.

Potash

- Potash use on tillage crops decreased by 3 kg/ha to 52 kg/ha in 2000, continuing the gradual decline in usage recorded since the high level in 1997. This lower overall usage reflected a drop in average field rate. The overall rate of potash on grassland also decreased by 2 kg/ha in 2001, to 24 kg/ha, resulting in a net decline of 11 kg/ha in application rate over the last five years. During this period, potash use on all crops and grassland has dropped by 3 kg/ha, to 37 kg/ha, because of the combined decreases on both tillage crops and on grassland.

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, despite the steadily increasing risk of deficiency which may now be affecting 30-50% of arable land in Great Britain, according to modelling estimates.

- In 2001, the proportion of each cereal crop which was dressed with a sulphur-containing fertiliser increased by 3% for winter cereals and dropped by 3% for spring barley from a high of 18% in the previous year. Average application rates also increased on winter cereals (48-51 kg/ha) but decreased on spring barley (36 kg/ha). Oilseed rape showed a similar pattern to spring barley with both lower proportions of the crop receiving sulphur and at a lower application rate (61 kg/ha). 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. Estimated dressing covers decreased slightly in 2000 possibly due to Foot and Mouth disease. Otherwise there has been no real change in the proportion of grassland receiving sulphur fertiliser either in the last five years (means: 7% for silage grass and 3% for grazed and hay grass) or indeed since 1993, when information on sulphur applications was first collected in the Survey.

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 (1997-2001) the average has decreased to 125 kg/ha, reflecting the downward trend observed on both grassland and, to a lesser extent, on tillage crops. The overall nitrogen rate of 94 kg/ha on grassland in 2001 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.

- Phosphate use on tillage crops has gradually declined and the 2001 rate of 42 kg/ha is the lowest since Great Britain records began in 1983. It is also the lowest recorded year for phosphate on grassland.

- Potash use is the lowest level recorded since 1983 and represents a 23% fall from the peak value of 68 kg/ha in 1984. Overall potash use on grassland has been more variable, but has also shown a net decline between 1983 and 2001.

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 2001 Survey regarding the use of revised fertiliser recommendations.

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.

---

[3] DEFRA, SOAEFD and the Welsh Office *Agricultural Census Statistics UK 2000*.

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

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

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

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

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 eight for Scotland, shown in Tables A2.1 and A2.2. Holdings less than 20 hectares in size are excluded from the BSFP sample. The process of random stratification results in more precise estimates than those which would be obtained by simple random sampling. The 'robust' farm types (coded 1-8) identified for each farm group classification in Tables A2.1 and A2.2 are defined in Section A2.4.

The fraction of farm holdings sampled from each cell is proportional to the total area of crops and grass (see Column 3, Tables A2.1 and A2.2). An exception to this is that in England and Wales a deliberate policy of over sampling is undertaken for the horticultural group to ensure sufficient numbers for a robust estimate to be made. The notional sampling fraction presented in Tables A2.1 and A2.2 indicates the percentage of the total population of holdings that are sampled in each cell. As the larger farms cover a greater area, then a higher proportion of these holdings are sampled. The process of selecting the actual holdings to be surveyed involves two steps. First the holdings in each cell are ordered by geographic location (using the County, Parish, Holding (CPH) identifier). This enables a high degree of geographic dispersion in the sample. The number of farms to be surveyed is then drawn at random from these stratified groups. This process leads to a *sought* sample (a total of 1297 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.

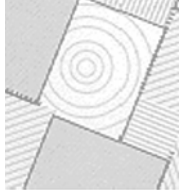


Table A2.1 Derivation of the stratified random sample for the 2001 survey, England and Wales

	farm holdings in population in 1999	total crops and grass in 1999 (column %)	notional sampling fraction[a] (%)	target sample size	achieved sample size	achieved sample fraction[b] (%)
England and Wales						
Livestock						
(DEFRA robust types 4-7)						
crops & grass area						
20-50 ha	23322	9.3	0.48	112	110	0.47
51-100 ha	16728	13.7	0.98	164	149	0.89
101-200 ha	7861	12.0	1.83	144	137	1.74
200+ ha	2620	11.9	5.46	143	135	5.15
Crops & mixed						
(DEFRA robust types 1,2,8)						
crops & grass area						
20-50 ha	10324	4.1	0.47	49	46	0.45
51-100 ha	10279	8.6	1.00	103	90	0.88
101-200 ha	9164	14.9	1.95	179	144	1.57
200+ ha	5955	24.8	5.00	298	216	3.63
Horticulture						
(DEFRA robust type 3)						
crops & grass area						
20-50 ha	732	0.3	1.64	12	12	1.64
51-100 ha	200	0.2	4.00	8	7	3.50
101-200 ha	80	0.2	12.50	10	8	10.00
200+ ha	29	0.1	20.69	6	3	10.34
Total for England and Wales	87294	100.0		1228	1057	1.12

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*.

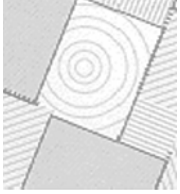


Table A2.2 Derivation of the stratified random sample for the 2001 survey, Scotland

	farm holdings in population in 1999	total crops and grass in 1999 (column %)	notional sampling fraction[a] (%)	target sample size	achieved sample size	achieved sample fraction[b] (%)
Scotland						
Cereal/general cropping/horticulture						
(SEERAD robust types 1-3)						
crops & grass area						
20-50 ha	1281	2.7	0.53	7	7	0.55
51-100 ha	1501	6.8	1.14	17	16	1.07
101-200 ha	1416	12.4	2.19	31	34	2.40
200+ ha	634	12.6	4.96	31	24	3.79
Livestock & mixed						
(SEERAD robust types 4-8)						
crops & grass area						
20-50 ha	3703	7.9	0.53	20	20	0.54
51-100 ha	4018	18.1	1.12	45	46	1.14
101-200 ha	2695	23.0	2.14	58	58	2.15
200+ ha	867	16.5	4.74	41	35	4.04
Total for Scotland	16115	100.0		250	240	1.49

A2.2 DATA COLLECTION

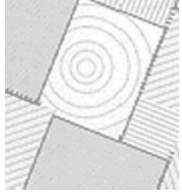
Data collection was undertaken by Produce Studies Ltd, between August and November 2001. The timing of the survey was delayed due to the effects of Foot and Mouth disease. This year, approximately 80% of the records were completed over the telephone because of the restrictions on visiting farms. In addition 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 2001 considered a number of questions relating to their use of the recently published revision of DEFRA's fertiliser recommendations.

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 2001 the 1297 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.

[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*.



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

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

A2.4 DEFINITIONS OF TERMS

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

2 The **survey year** ran from autumn 2000 to autumn 2001, corresponding to the 2001 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 2000. 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.

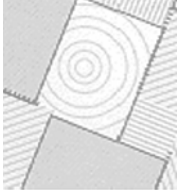
4. In the report, **tillage** is defined as all crops except grass, forestry, glasshouse crops and land designated as 'set-aside' under the Arable Area Payments scheme. **Grass** refers to all forms of grassland which may be grazed, conserved or grown for seed production; rough grazing is excluded.

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 CROP AREAS AND WEATHER CONDITIONS

Annual changes in relative cropping areas, as well as any changes in fertiliser practice for individual crops, may affect nutrient application rates when aggregated across the main crop groupings. Table A3.1 provides a summary of Census estimates for areas of individual major crops, crop groupings and total tillage and grassland categories in 1999/2000 and 2000/01, 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 2001, of which 4.4 million hectares (43%) were cultivated for tillage cropping and the remainder, 5.9 million hectares, were grassland (excluding rough grazing).

The total tillage area was slightly lower (-4.4%) in 2001, mainly due to a large increase in the area of set aside. The winter cereal areas decreased by 449,100 ha (21%) for winter wheat and 124,600 ha (21%) for winter barley. This was largely due to the difficult weather conditions in autumn 2000. The lack of winter cereals was partly offset by the increased area of spring barley 240,500 ha (47%) but the total area for these three crops remained lower than both 2000 and 1999, a year in which autumn cropping was also affected by adverse weather. Total cereal area was down by 10%. Extra land was entered as set aside giving an increase of 37%. The decline observed in 2000 continued in 2001 as the linseed area dropped by 41,400 ha (58%), this follows a large increase in 1999 when the economic returns for this crop were more favourable. The total oilseed rape area increased by 70,800 ha (21%), in England the winter sown area increased by 16% and the spring sown area by 111%. There was a large increase in the areas of peas/beans (68,000 ha). Other tillage crop categories showed little change in area, compared to 2000. The total area of managed grassland increased by 262,740 ha (4.6%) 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.

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

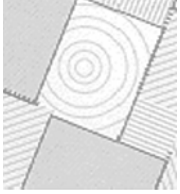


Table A3.1 Cropping and grassland areas ('000 ha) Great Britain, 1999/2000 - 2000/2001

Crops	1999/2000 '000s ha	2000/2001 '000s ha	% change since 2000	% change since 1996	2000/2001 crop areas as % of total tillage area
Wheat	2081	1632	-21.6	-17.1	36.7
Barley - winter	584	459	-21.4	-38.1	10.3
- spring	512	752	47.0	52.7	16.9
Total cereals[1]	*3307*	*2974*	*-10.1*	*-10.3*	*66.9*
Oilseed rape - total	332	403	21.3	13.1	9.1
Sugar beet	173	177	2.5	-11.0	4.0
Potatoes[2]	145	144	-0.6	-14.8	3.2
Linseed	71	30	-58.0	-38.5	0.7
Peas/beans[3]	208	276	32.7	54.8	6.2
Maize/other fodder	161	188	17.0	5.1	4.2
Vegetables	117	118	0.9	-9.8	2.7
Total tillage[4]	*4648*	*4443*	*-4.4*	*-5.5*	*100.0*
Set-aside[5]	583	797	36.8	57.1	17.9

Grassland					2000/2001 grass areas as % of total grass area
Less than 5 years old	1094	1065	-2.6	-11.6	17.9
5 years and older	4593	4884	6.3	3.4	82.1
Total grass[6]	*5686*	*5949*	*4.6*	*0.3*	*100*
Total crops and grass[7]	*10334*	*10392*	*0.6*	*-2.2*	

[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 257,800 ha less (-5.5%) in 2001, compared to 1996. The total oilseed rape area was slightly higher (13%) in 2001 than in 1996. In England the area of spring crop was higher than at any time over the last five years. This is probably a reflection of the difficult autumn weather conditions. The other tillage crop categories all showed net decreases, ranging from -2 to -39% in their cropping areas between 1996 and 2001, apart from peas and beans (+55%).

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

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

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

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

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

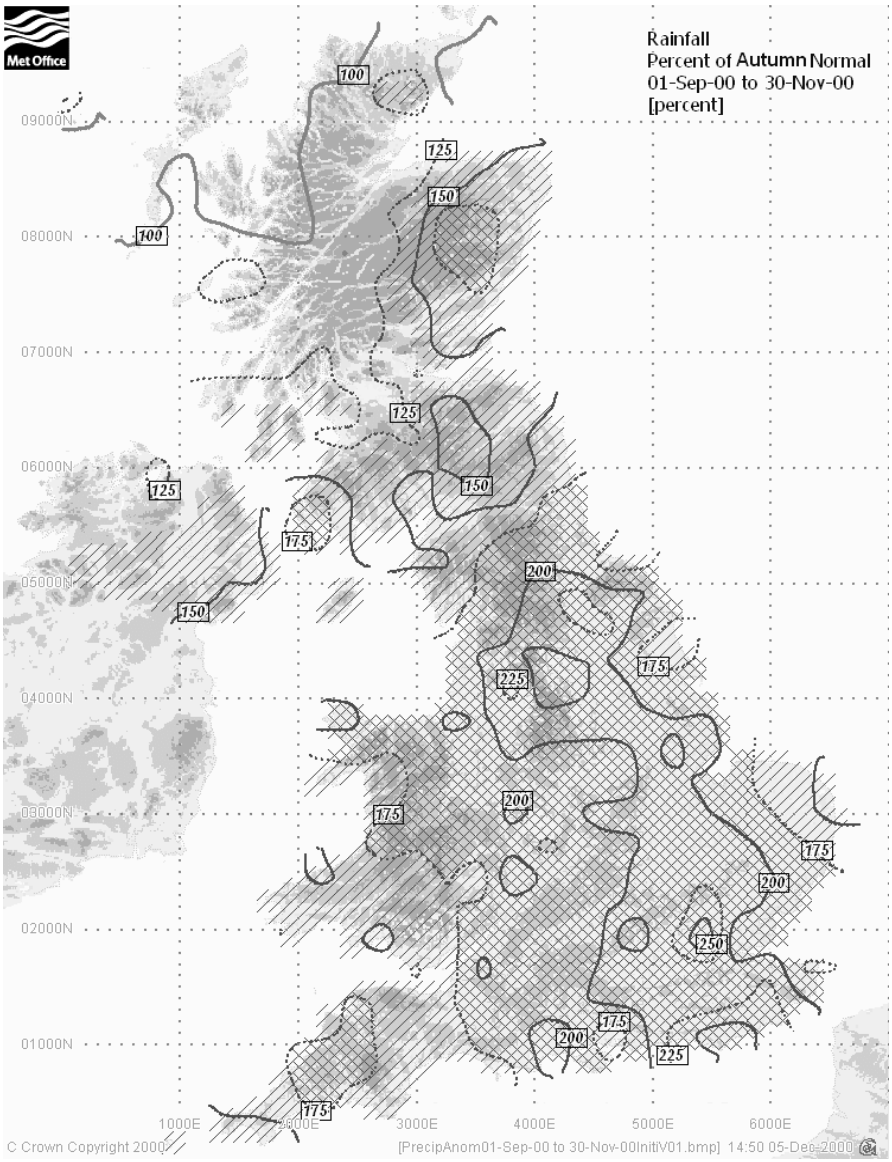
The 2000/01 season was characterised by an exceptionally wet autumn period, which started with above average, but not extreme, rainfall in September (133 mm). The wet weather continued into October which recorded a total of 188 mm (211% of normal). Similar, but slightly lower totals were noted in 1987 (184 mm) and 1967 (166 mm), but one has to go back to 1903 to find a greater total - 218 mm. In terms of departure from normal, exceptional values are seen in the south east (Sussex and Kent) which recorded in excess of 300% of normal totals. Most of the remaining areas of England recorded in the region of 200% of normal. By the end of October most parts of the country had returned to field capacity conditions. Only small pockets around The Wash maintained small deficits. Wet conditions continued during November (182 mm) and December (124 mm) and there was widespread flooding.

The individual months during the autumn period produced high, but not unprecedented, rainfall totals. What was remarkable was the compounding effects of three consecutive months with well above normal rainfall totals. In combination, the three autumn months (September, October and November) produced rainfall totals over the country of 503 mm which were unprecedented in modern times. The England and Wales Precipitation record, which starts in 1766 has recorded no greater falls over the same three month period. The next highest value of 456 mm occurred during 1852. In addition, the impact of the rain was exacerbated by relatively low soil moisture deficits at the start of September.

The departure from normal map (Figure A3.1) shows that most arable areas recorded between 175 and 250% of normal rainfall. In terms of percent of normal rainfall, the driest parts were found along the Norfolk coast, up through Humberside to Cleveland.

With the wettest autumn for over 230 years, localised flooding and widespread waterlogging, autumn drilling was delayed, or abandoned and crop growth was affected by cold wet conditions. March and April 2001 were also wet in some areas hindering spring field work. Cereal yields at harvest were lower than average with winter wheat around 12% lower than in 2000.

Figure A3.1 **Rainfall for September to November 2000 expressed as % of normal**



A3.2 FOOT AND MOUTH DISEASE

In addition to the weather difficulties farming activities in the 2000/01 season were also affected by Foot and Mouth disease. The outbreak began on 20th February 2001, the last case was identified in September and the UK was finally declared free of the disease on 14th January 2002. There were 2030 confirmed cases and over 4 million head of livestock were destroyed for disease control purposes and a further 1.8 million for welfare reasons. The worst affected areas were South West Scotland, Northern England, Eastern Wales and Devon. The implications for fertiliser use are two-fold. Firstly, there was the direct effect on farmers with no livestock who did not need to apply fertiliser in order to produce grass for either cutting or grazing. Secondly, there was the indirect effect of movement restrictions, which may have affected transport and application of fertilisers.

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 1997 to 2001. 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 2000/2001 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 2001 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 fifth 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. However, this year the adjusted estimates for straight nitrogen vary from those reported in Section B more than in previous years, possibly due to the interviewing difficulties caused by Foot and Mouth disease.

---

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

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

B1 2001 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 1997 - 2001

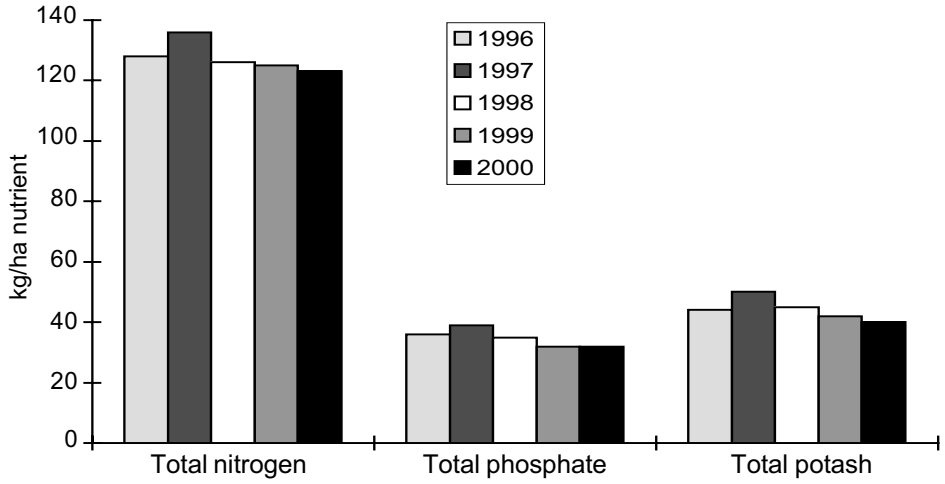


Table B1.1 Overall nitrogen use (kg/ha), Great Britain 1997 - 2001

Total nitrogen

	tillage crops	*grass*	*all crops and grass*
1997	149	123	136
1998	144	109	126
1999	141	110	125
2000	149	99	123
2001	145	94	116

Straight nitrogen

	tillage crops	*grass*	*all crops and grass*
1997	126	54	88
1998	123	53	87
1999	121	52	85
2000	130	43	85
2001	118	39	74

Compound nitrogen

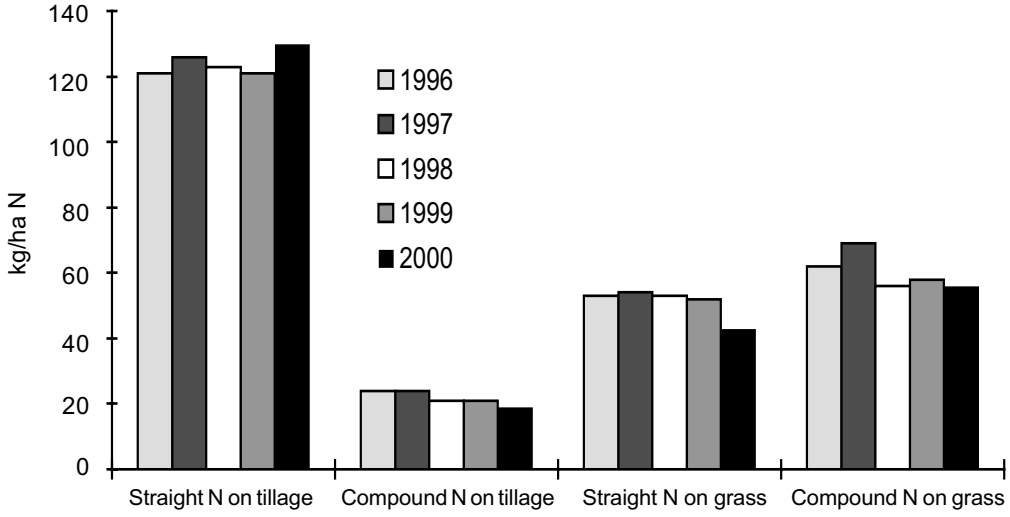
	tillage crops	*grass*	*all crops and grass*
1997	24	69	47
1998	21	56	39
1999	21	58	40
2000	19	56	38
2001	27	55	42

B1.1.1 NITROGEN

All Crops and Grassland

Total nitrogen use on all crops and grassland decreased by 7 kg/ha in 2001 to 116 kg/ha (Table B1.1, Figure B1.1). This overall rate of total nitrogen was the lowest recorded not only over the last five years but also since the British survey started in 1983 (see section B2.1.1). The decline in total nitrogen use during 1997-2001 was mainly associated with a drop in the overall application rate of compound nitrogen especially on grassland. The increase in compound N on tillage land in 2001 probably reflects the effects of the wet autumn on crop management. It is unclear how much of the reduction in nitrogen use on grassland is due to the effects of Foot and Mouth disease.

Figure B1.2 Overall straight and compound nitrogen use (kg/ha), Great Britain 1997 - 2001

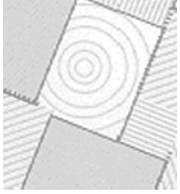


Tillage Crops

Overall total nitrogen use (145 kg/ha) fell by 4 kg/ha from the high level in 2000. This was mainly due to the greater area of spring crops with lower nitrogen requirement. Less straight nitrogen was used and more compound nitrogen. The latter increase, probably due to changed cropping patterns as a result of the wet autumn, halted a trend of steady decline in compound use on tillage land. In 2001 21% less winter cereals were grown and 47% more spring barley than in 2000. Over recent years changes in relative cropping areas, 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 (94 kg/ha) continued to show a decline with a drop of 5 kg/ha from the previous year. There were lower overall application rates of both straight nitrogen (-4 kg/ha) and, to a lesser extent, compound nitrogen (-1 kg/ha). This total nitrogen rate was the lowest reported for both the last five years (mean: 107 kg/ha) and also for the whole survey period since 1983. Foot and Mouth disease is likely to be one of the causes of reduced applications to grassland and the impact is discussed more fully in Section B1.3.1.



B1.1.2 PHOSPHATE AND POTASH

Phosphate

Overall phosphate use on tillage crops declined by 4 kg/ha in 2001, to 43 kg/ha (Table B1.2). Both the area receiving this fertiliser nutrient and the average field rates declined in 2001, by 3% and 3 kg/ha respectively. Phosphate use on grassland was slightly lower (-1 kg/ha) than in 2000, at 19 kg/ha. The combined effects of these changes resulted in a net drop of 10 kg/ha in phosphate use on all crops and grassland over the last five years.

Table B1.2 Overall phosphate and potash use (kg/ha), Great Britain 1997 - 2001

Total phosphate

	tillage crops	*grass*	*all crops and grass*
1997	55	25	39
1998	51	21	35
1999	45	20	32
2000	47	20	32
2001	43	19	29

Total potash

	tillage crops	*grass*	*all crops and grass*
1997	67	35	50
1998	64	29	45
1999	57	28	42
2000	55	26	40
2001	52	24	37

Potash

Potash use on tillage crops decreased by 3 kg/ha to 52 kg/ha in 2001, continuing the gradual decline in usage recorded since the high level in 1997. This lower overall usage reflected a drop in average field rate. The overall rate of potash on grassland also decreased by 2 kg/ha in 2001, to 24 kg/ha, resulting in a net decline of 11 kg/ha in application rate over the last five years. During this period, potash use on all crops and grassland has dropped by 3 kg/ha, to 37 kg/ha, because of the combined decreases on both tillage crops and on grassland.

B1.2 FERTILISER USE ON MAJOR TILLAGE CROPS

Overall and average field rates of fertiliser application for major tillage crops in Great Britain over the past five years are summarised in Tables B1.3 and B1.4. More detailed statistics for 2001 are presented in Section C. Longer term trends in overall application rates of nitrogen, phosphate and potash since 1983, are summarised in Section B2.

Small apparent changes in fertiliser use on individual crops should be treated with a degree of caution as these estimates are based on a smaller number of farms and fields than the aggregate estimates for all tillage crops. Information on 'sampling errors', which help in judging whether apparent changes may be real or attributable to sampling variation alone, is given in Appendix 1.1.

Table B1.3 Overall fertiliser use (kg/ha) on major tillage crops, Great Britain 1997 - 2001

Total nitrogen

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1997	192	95	143	169	203	110
1998	182	92	135	188	188	109
1999	185	99	141	158	197	97
2000	188	107	146	160	195	104
2001	185	111	145	151	193	103

Straight nitrogen

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1997	179	40	127	30	182	85
1998	171	40	120	49	170	88
1999	174	53	127	27	180	78
2000	177	62	134	32	180	91
2001	171	66	127	37	176	83

Compound nitrogen

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1997	13	54	15	139	21	25
1998	11	52	15	139	18	22
1999	11	46	14	131	17	19
2000	11	45	12	128	15	13
2001	14	45	19	115	17	20

Total phosphate

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1997	53	51	58	173	51	50
1998	48	42	51	184	50	49
1999	41	45	47	169	46	52
2000	44	47	48	159	41	39
2001	42	43	45	127	41	36

Total potash

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1997	56	59	70	249	55	133
1998	53	58	66	276	48	121
1999	46	54	61	251	48	128
2000	47	56	61	234	43	91
2001	45	51	64	184	42	78

[a] Figures for maincrop potatoes include second earlies.

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

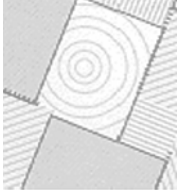


Table B1.4 Average field rates (kg/ha) on major tillage crops, Great Britain 1997 - 2001

Total nitrogen

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1997	193	96	144	184	204	112
1998	183	95	136	193	188	111
1999	189	101	142	178	202	104
2000	193	112	150	174	195	108
2001	189	114	149	175	196	106

Straight nitrogen

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1997	185	71	138	101	194	100
1998	176	74	127	123	177	102
1999	182	85	134	93	188	93
2000	185	96	142	73	190	105
2001	184	95	143	96	186	100

Compound nitrogen

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1997	49	69	49	160	50	82
1998	47	67	46	164	45	73
1999	57	68	54	164	47	85
2000	49	65	44	156	47	75
2001	70	72	62	155	59	93

Total phosphate

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1997	68	57	65	186	64	63
1998	68	51	66	195	66	68
1999	72	54	62	192	71	75
2000	69	58	65	187	70	76
2001	66	55	65	163	64	76

Total potash

	winter wheat	*spring barley*	*winter barley*	*maincrop potatoes*[a]	*oilseed rape*[b]	*sugar beet*
1997	75	64	78	267	71	143
1998	77	64	80	291	68	139
1999	78	62	77	287	76	153
2000	77	66	80	265	75	142
2001	72	64	82	231	68	124

[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 decreased on all crops except spring barley and oilseed rape. There was an increase in the use of compound nitrogen for winter cereal crops at the expense of straight nitrogen. This decreased use of nitrogen fertiliser, together with changes in cropping area, particularly of spring barley (see Section A3.1), contributed to the 4 kg/ha decrease in overall nitrogen rate for all tillage crops, as a single grouping, to 145 kg/ha. It is unclear whether this is entirely a reflection of the difficult farming conditions in 2000/2001 or a return to the lower rates of 1998 and 1999.

Winter wheat

The overall rate of total nitrogen on winter wheat declined by 3 kg/ha in 2001, to 185 kg/ha, the same level as in 1999 (Table B1.3). Total nitrogen use in 2001 was slightly lower (-1 kg/ha) than the five year mean of 186 kg/ha for 1997-2001. The reduction in straight nitrogen use to 171 kg/ha compared with a mean for 1997-2001 of 174 kg/ha and corresponding increase in compound use of 14 kg/ha compared with mean of 12 kg/ha appears to represent a major change although it was possible that some P and K was applied with N in the spring because of the difficult autumn weather.

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 1997 - 2001

Total nitrogen

	winter wheat		*spring barley*		*winter barley*	
	milling	*non-milling*	*malting*	*non-malting*	*malting*	*non-malting*
1997	209	190	98	91	126	151
1998	192	180	100	89	116	146
1999	204	183	103	99	125	149
2000	211	184	105	103	135	154
2001	209	182	119	100	137	151

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) although the proportion was the lowest at 69% for the last five years.

---

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

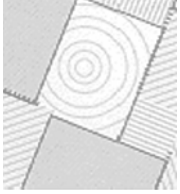


Table B1.6 Percentage distribution (% crop area) of cereal crop areas by market use, Great Britain 1997 - 2001, as estimated from the Survey

	winter wheat		*spring barley*		*winter barley*	
	milling	*non-milling*	*malting*	*non-malting*	*malting*	*non-malting*
1997	16	84	65	35	33	67
1998	26	74	52	48	33	67
1999	28	72	66	34	34	66
2000	28	72	59	41	27	73
2001	31	69	54	46	31	69

Spring barley

Overall use of total nitrogen on spring barley increased by 4 kg/ha to 111 kg/ha in 2001. This total nitrogen rate was the highest over the 1997-2001 period (mean: 101 kg/ha). There was a continued increase in the overall rate of straight nitrogen; the compound nitrogen rate after a decline during 1997 to 1999 has remained at 45 kg/ha during 2000 and 2001.

Further analysis of the data by crop type shows a continued rise in the average rate applied to the spring malting crop. The 119 kg/ha rate is the highest during the period 1997-2001. For non-malting crops the rate had also shown a steady increase over the period 1998 to 2000 but in 2001 it dropped from 103 to 100 kg/ha.

Estimated nitrogen rates on malting crops have been consistently slightly higher on malting than non-malting crops, with a mean difference of 9 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 survey indicated a further decrease in 2001, to 54%, in the proportion of spring barley grown for malting. 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 has declined each year since then. In 2001 the total area of spring barley increased at the expense of both winter wheat and winter barley almost certainly due to weather conditions (see table A3.1).

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

Winter barley

Overall total nitrogen use on winter barley decreased slightly (-1 kg/ha) to 145 kg/ha in 2001. The total nitrogen rate has fluctuated over the last five years (mean: 142 kg/ha) with no clear trend. The use of straight nitrogen has also fluctuated and at 127 kg/ha in 2001 is at the same level as the five year mean. The overall compound nitrogen rate, however, was higher (19 kg/ha) than the mean (15 kg/ha).

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 slightly on malting crops by 2 kg/ha and decreased on non-malting crops by 3 kg/ha.

The higher application rates of nitrogen (five-year mean of +22 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 the proportion returned to the pre-2000 levels.

Maincrop potatoes

Overall total nitrogen use on maincrop potatoes has reduced by 9 kg/ha to 151 kg/ha in 2001, the five year mean is 165 kg/ha, with the highest level for the period of 188 kg/ha occurring in 1998. About 75% of the total fertiliser nitrogen input for maincrop potatoes is applied in compound form, as a seedbed dressing, whereas the straight nitrogen dressings tend to be applied as a top dressing on irrigated crops at tuber initiation stage.

Oilseed rape

Overall total nitrogen use on oilseed rape, as a combined category for both the autumn and spring sown crop, decreased slightly in 2001, down by 2 kg/ha to 193 kg/ha (Table B1.3). This slight drop was associated with a decrease in the overall application rate of straight nitrogen, while compound nitrogen use increased slightly, back up to the 1999 level of 17 kg/ha. 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 1998-2000 (mean: 204 kg/ha), then increased slightly in 2001 to 209 kg/ha. 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 207 kg/ha for winter oilseed rape, compared to130 kg/ha for spring oilseed rape (excluding 1999).

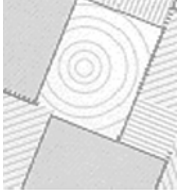


Table B1.7 Average field application rates of nitrogen (kg/ha) on winter and spring oilseed rape and percentage distribution (%) of crop areas, Great Britain 1997 - 2001

Total nitrogen (kg/ha)

	winter oilseed rape	*spring oilseed rape*
1997	215	120
1998	204	115
1999	204	161
2000	203	133
2001	209	151

Percentage distribution (%)

	winter oilseed rape	*spring oilseed rape*
1997	88	12
1998	83	17
1999	95	5
2000	90	10
2001	81	19

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%, however it is unclear how much of this is due to the difficult conditions in autumn 2000. 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

Estimated overall nitrogen use on sugar beet reduced slightly (-1 kg/ha) in 2001 to 103 kg/ha. This is close to the five year mean of 105 kg/ha. Use of straight nitrogen has fluctuated during the five year period, whereas compound nitrogen showed a steady decline from 25 kg/ha in 1997 to 13 kg/ha in 2000; in 2001 compound use increased to 20 kg/ha.

B1.2.2 PHOSPHATE AND POTASH

Phosphate

The small decrease (-4 kg/ha) in overall phosphate use on tillage crops in 2001 can be partly attributed to the decrease in use on each of the major arable crops (Table B1.3). It is also due to the reduced area of winter cereals compared to the area of spring barley, which has a lower phosphate requirement. Except for 2000 there has been a gradual decline throughout the five year period from 55 kg/ha in 1997 to 43 kg/ha in 2001 (mean 48 kg/ha). 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.

Overall phosphate rates decreased slightly for cereals, -2 kg/ha on winter wheat, -4 kg/ha on spring barley and -3 kg/ha on winter barley in 2001, to 42, 43 and 45 kg/ha respectively. The rate for winter barley was the lowest recorded in the period 1997 to 2000. The field average rate decreased by 3 kg/ha on winter wheat and spring barley but remained the same on winter barley in 2001. However a reduction in the area receiving phosphate fertiliser (-5%) for winter barley gave rise to the reduction in overall amount.

The lower phosphate (also potash) use on cereal crops in 1999-2000 may reflect a continuing fertiliser policy on some farms to make cost savings in fertiliser inputs, in response to the current economic difficulties facing the agricultural industry. The reduction in area of winter cereals receiving fertiliser may also relate to the wet autumn of 2000 in which many areas were flooded. As a result some crops were patchy and not considered worthy of full amounts of fertiliser. In other cases farmers may have used the limited windows of opportunity for field work to drill crops rather than to apply seedbed fertilisers.

Estimated overall use of phosphate on maincrop potatoes dropped significantly by 32 kg/ha in 2001, to 127 kg/ha, reflecting decreases in both average field rate and dressing cover. Except for 1998 overall phosphate use appears to have decreased steadily over the last five years and this medium term trend can mainly be attributed to a decline in the percentage crop area receiving any application of phosphate-containing fertiliser.

The overall application rate of phosphate on oilseed rape remained at 41 kg/ha. The average field rate was lower at 64 kg/ha, however the main reason for the recent low rates is a cutback in the percentage crop area receiving phosphate.

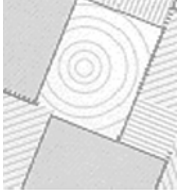
The recorded overall rate of phosphate on sugar beet dropped in 2001, by 3 kg/ha to 36 kg/ha, due to a decrease in dressing cover for this nutrient. Estimated usage has tended to fluctuate during the last five years (mean: 45 kg/ha).

Potash

Overall potash use on tillage crops was 3 kg/ha lower in 2001, at 52 kg/ha, mainly because of decreased application rates on maincrop potatoes and sugar beet. As 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 phosphate fertiliser

Overall potash use showed slight decreases on winter wheat (-2 kg/ha) and spring barley (-5 kg/ha) in 2001 but an increase for winter barley (+3 kg/ha), with recorded overall rates of 45, 51 and 64 kg/ha, respectively (Table B1.3). The average field rates showed a similar pattern with decreases for winter wheat and spring barley and an increase for winter barley (Table B1.4).

The overall potash rate on maincrop potatoes showed a major drop of 50 kg/ha in 2001, to



184 kg/ha, due to a decrease in both the average field rate and the area receiving fertiliser. This is the fourth annual reduction in rate from the high level of 276 kg/ha recorded in 1998.

Overall potash use on oilseed rape showed a further decline to 42 kg/ha. The average field rate declined to 68 kg/ha and the dressing cover to less than two thirds of the total area. Potash use in 2001 was consequently the lowest for the five-year period.

Overall potash use on sugar beet dropped by 13 kg/ha in 2001, to 78 kg/ha, the lowest recorded rate since 1983 when records began. This decrease was caused by reductions in both field average rate (-18 kg/ha) and dressing cover, compared to 2000.

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

B1.2.3 SULPHUR

The risk of sulphur deficiency in crops such as oilseed rape, cereals and intensively cut grass, which have a high sulphur requirement, has increased appreciably over the last decade. Sulphur reserves have become depleted in some soil types, particularly sandy and shallow soils, because of the continuing reduction in sulphur dioxide emissions from industrial sources and consequent decline in atmospheric deposition of sulphur over the last thirty years[14]. Sulphur application is now an essential agronomic requirement for susceptible crops grown in some parts of Great Britain.

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

In 2001, the proportion of each cereal crop which was dressed with a sulphur-containing fertiliser increased by 3% for winter cereals and dropped by 3% for spring barley from a high of 18% in the previous year. Average application rates also increased on winter cereals (48-51 kg/ha) but decreased on spring barley (39-36 kg/ha). Oilseed rape showed a similar pattern to spring barley with both lower proportions of the crop receiving sulphur and at a lower application rate (61 kg/ha)

These rates compare with the recommended practice of 25-40 kg/ha SO_3, applied as a water soluble form in early spring, for potentially sulphur-deficient cereal crops and 50-75 hg/ha for oilseed rape[15] .

---

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

[15] MAFF (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 1997 - 2001

Dressing cover (%)

	winter wheat	*winter barley*	*spring barley*	*oilseed rape*
1997	13	13	14	30
1998	15	13	13	30
1999	14	14	12	31
2000	15	16	18	29
2001	18	19	15	26

Average field rate (kg/ha SO_3)

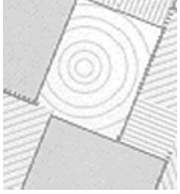
	winter wheat	*winter barley*	*spring barley*	*oilseed rape*
1997	38	40	39	63
1998	38	36	27	51
1999	34	45	28	66
2000	49	45	39	68
2001	51	48	36	61

A higher proportion of cereal and oilseed crops are treated with sulphur in Scotland than in England and Wales (Table B1.9). This regional difference reflects the greater risk of sulphur deficiency in Scotland, due to 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 - 2001

		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
Scotland*	*1999*	32	29	14	47
	2000	45	29	22	55
	2001	34	35	19	56

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



B1.3 FERTILISER USE ON GRASSLAND

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

Table B1.10 Overall fertiliser use (kg/ha) on grassland, Great Britain 1997 - 2001

	straight nitrogen	*compound nitrogen*	*total nitrogen*	*total phosphate*	*total potash*
1997	54	69	123	25	35
1998	53	56	109	21	29
1999	52	58	110	20	28
2000	43	56	99	20	26
2001	39	55	94	19	24

The 5 kg/ha drop in overall total nitrogen use on grassland in 2001 reflected decreases in dressing cover (-3%) (Table B1.11). For both straight nitrogen and compound nitrogen, the dressing cover decreased by 4% and 10% respectively, whilst the average field rate increased to 128 kg/ha for straight nitrogen and 96 kg/ha for compound nitrogen. This gave a small drop in overall rate of both straight and compound nitrogen rate (4 and 1 kg/ha respectively). Over the last five years, dressing covers have shown a gradual decline. The corresponding average field rates have not shown any consistent change during this period, although the compound nitrogen rate dropped in 2000 to its lowest level in the 1997-2001 period. An additional factor to consider in 2001 is the impact of Foot and Mouth disease. This may have affected fertiliser use in two ways; by negating the need to apply fertiliser for grass growth where there were no livestock and by limiting the access for spreading machinery in restricted areas.

Average field rates and dressing covers for phosphate and potash were the lowest for the five year period and continue the overall downward trend observed over this time. The net effect of this is to give the lowest overall rates (19 kg/ha for phosphate and 24 kg/ha for potash) for the five year period and since the start of records for Great Britain in 1983.

Table B1.11 Dressing cover (%) and average application rate (kg/ha) of fertiliser on grassland, Great Britain 1997 - 2001

Dressing cover (%)

	straight nitrogen	*compound nitrogen*	*total nitrogen*	*total phosphate*	*total potash*
1997	42	68	86	70	69
1998	43	60	79	62	63
1999	39	61	79	61	61
2000	35	67	75	60	59
2001	31	57	72	58	58

Average field rate (kg/ha)

	straight nitrogen	*compound nitrogen*	*total nitrogen*	*total phosphate*	*total potash*
1997	129	101	142	36	51
1998	125	93	138	33	46
1999	134	96	138	33	46
2000	123	84	133	34	45
2001	128	96	133	32	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 2001 are presented in Section C tables. The Survey estimates for annual distributions of the total grassland area between grazing and cutting management regimes since 1997 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 1997 - 2001

	grazed[a]	*silage*[b]	*hay*[b]
1997	91	35	13
1998	94	36	12
1999	96	34	13
2000	93	33	13
2001	91	38	10

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

[a] May also be cut.

[b] May also be grazed.

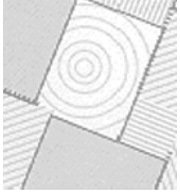


Table B1.13 Nitrogen application rates (kg/ha) by grassland utilisation, Great Britain 1997 - 2001

Total nitrogen

	overall application rate				average field rate		
	grazed[a]	silage[b]	hay[b]		grazed[a]	silage[b]	hay[b]
1997	119	179	85	*1997*	138	185	99
1998	107	168	82	*1998*	136	176	101
1999	108	168	72	*1999*	137	180	101
2000	97	147	86	*2000*	130	163	110
2001	91	142	63	*2001*	130	165	85

Straight nitrogen

	overall application rate				average field rate		
	grazed[a]	silage[b]	hay[b]		grazed[a]	silage[b]	hay[b]
1997	53	72	33	*1997*	129	134	94
1998	52	79	44	*1998*	125	130	100
1999	51	76	31	*1999*	133	139	98
2000	48	59	42	*2000*	127	135	104
2001	40	52	23	*2001*	130	131	81

Compound nitrogen

	overall application rate				average field rate		
	grazed[a]	silage[b]	hay[b]		grazed[a]	silage[b]	hay[b]
1997	66	107	52	*1997*	98	130	77
1998	55	89	39	*1998*	92	118	71
1999	57	92	41	*1999*	94	125	77
2000	49	88	44	*2000*	72	94	86
2001	51	90	40	*2001*	95	127	75

Over the last five years, overall total nitrogen rates have shown a net decrease for all three management categories. The overall application rate of total nitrogen was lower for all categories of grass in 2001 due to the reduced area receiving fertiliser nitrogen. Compared with 2000 the dressing cover was reduced by 5, 4 and 14% for grazed grass, silage and hay. For hay the average field rate was also reduced.

The overall use of straight nitrogen on grazed grass has declined steadily over the last five years, mainly as a result of reductions in the dressing cover. The rates for cut grass are more variable but both were lower in 2001 then in the previous year. Compound nitrogen use increased in 2001 for grazed grass and silage but declined for hay. The fall in nitrogen use on grassland in 2000 was attributed to decreases in livestock numbers and economic pressures. In 2001 Foot and Mouth disease 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 both younger (less than five years old) and older grassland by 29% and 13%, respectively, to 137 and 81 kg/ha, mainly beause of decreases in dressing cover. Nitrogen fertiliser practice showed the same pattern of change at farm type level, for both dairy and beef/sheep farms.

[a] May also be cut.

[b] May also be grazed.

B1.3.2 PHOSPHATE AND POTASH

Table B1.14 Phosphate and potash use (kg/ha) by grassland utilisation, Great Britain 1997 - 2001

Total phosphate

	overall application rate				average field rate		
	grazed[a]	silage[b]	hay[b]		grazed[a]	silage[b]	hay[b]
1997	24	36	24	*1997*	35	44	34
1998	20	30	19	*1998*	33	40	32
1999	20	27	16	*1999*	33	39	29
2000	20	30	18	*2000*	33	40	33
2001	18	27	15	*2001*	31	38	28

Total potash

	overall application rate				average field rate		
	grazed[a]	silage[b]	hay[b]		grazed[a]	silage[b]	hay[b]
1997	32	64	28	*1997*	47	75	41
1998	28	54	23	*1998*	44	67	39
1999	27	51	20	*1999*	44	67	37
2000	25	47	21	*2000*	43	62	42
2001	23	45	18	*2001*	40	59	35

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

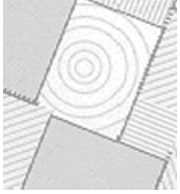
On cut grass overall phosphate use continued to fluctuate as in 2001 the rate returned to 1999 levels of 27 and 15 kg/ha for silage and hay, respectively, due mainly to decreases in average field rate. The overall phosphate rate on grazed grass after a stable period at 20 kg/ha for three years dropped to 18 kg/ha, due to a combination of reduced dressing cover and field application rates.

The downward trend of the previous four years continued on both grazed and cut grass as overall potash rate declined in 2001 to 23, 45 and 18 kg/ha for grazed grass, silage and hay respectively. This was mainly due to a reduction in average field rates (Table B1.14) but also dressing cover 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

Sulphur deficiency, causing loss of herbage yield and/or quality, is a potential risk on some soil types where grassland is cut intensively for silage, but deficiency is unlikely where swards are used mainly for grazing or single hay cuts. Potential yield losses of silage due to sulphur deficiency on coarse textured or shallow soils in low sulphur deposition areas are most likely to occur in second and subsequent cuts, rather than first cut, unless the deficiency is very severe. The Survey data confirm that, as expected, a higher proportion of grassland cut for silage is treated with sulphur compared to grazed grass or grass used for hay cutting (Table B1.15). Estimated dressing covers decreased slightly in 2001, possibly due to Foot and Mouth disease. Otherwise there has been no real change in the proportion of grassland receiving sulphur fertiliser either in the last five years (means: 7% for silage grass and 3% for grazed and hay grass) or indeed since 1993, when information on sulphur applications was first collected in the Survey.

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

Table B1.15 Dressing cover (% area) and average application rate (kg/ha SO_3) of sulphur on grassland, Great Britain 1997 - 2001

Dressing cover (%)

	grazed [a]	*silage* [b]	*hay* [b]	*all grass*
1997	4	8	5	5
1998	3	6	4	3
1999	3	7	2	4
2000	4	9	4	5
2001	2	5	2	2

Average field rate (kg/ha SO_3)

	grazed [a]	*silage* [b]	*hay* [b]	*all grass*
1997	34	43	27	38
1998	32	39	32	34
1999	55	62	34	56
2000	40	44	41	41
2001	34	33	30	31

Estimated average field rates of sulphur application for each sward management category did not show any consistent changes during 1997-2001, resulting in five year means of 39, 44 and 33 kg/ha SO_3 for grazed, silage and hay grassland, respectively (Table B1.15). The mean annual application rate for silage grass is very similar to the recommended rate of 40 kg/ha SO_3 for each susceptible silage cut.

B2 LONGER TERM TRENDS

B2.1 LONGER TERM TRENDS FOR GREAT BRITAIN

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

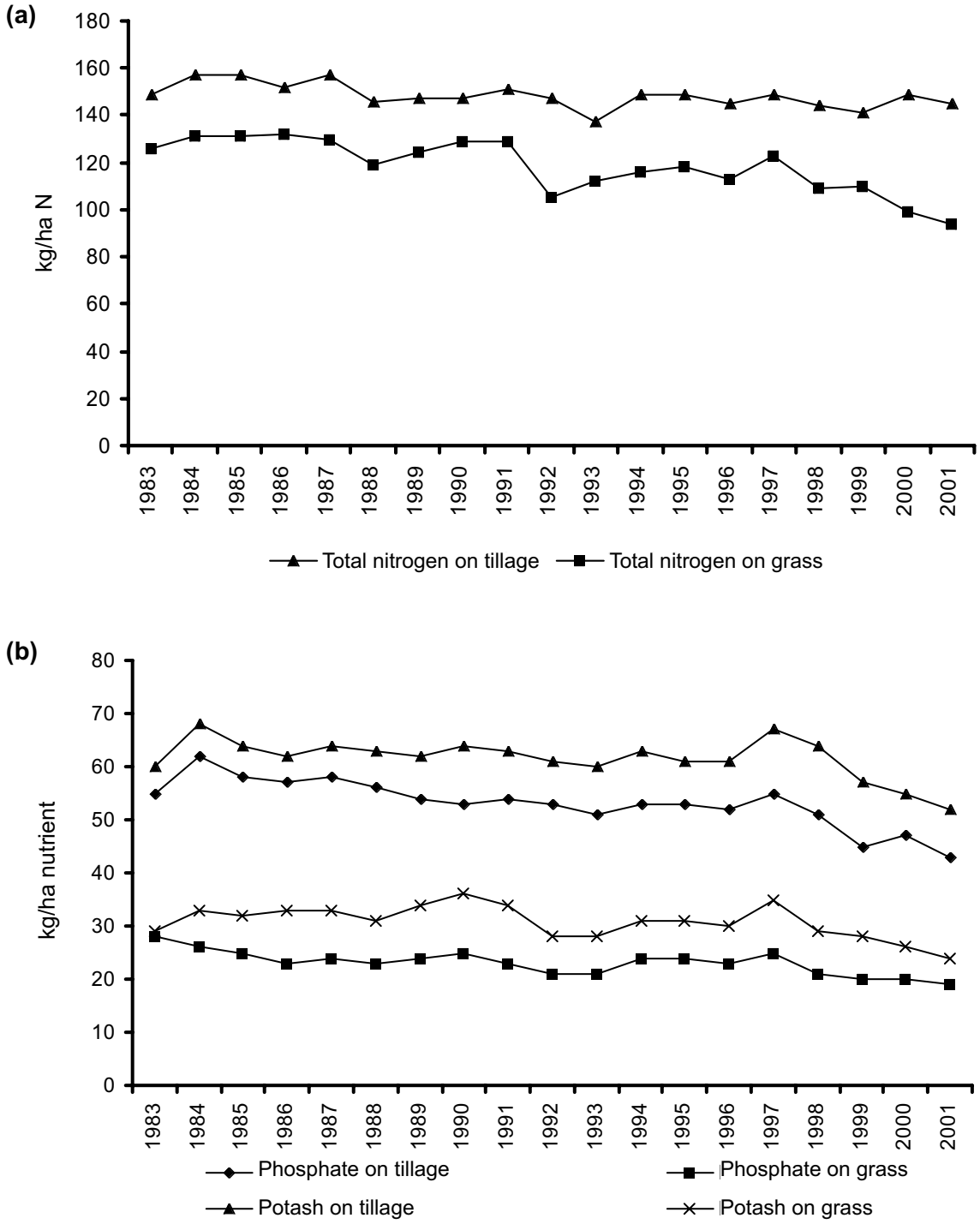
B2.1.1 NITROGEN USE

Table B2.1 Total overall nitrogen application rates (kg/ha), Great Britain 1983 - 2001

	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

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 - 2001



The maximum overall rate of nitrogen on tillage crops was recorded in the mid 1980s, at 157 kg/ha. Overall nitrogen use dropped in 1988 and, since then, has remained at a lower level with annual rates mostly in the range 145-149 kg/ha. However, larger fluctuations in overall nitrogen rates was recorded in both 1991, when there was a temporary increase to 151 kg/ha, and in 1993, when the application rate fell sharply to 137 kg/ha. Overall nitrogen use showed another, smaller drop in 1998-99 before apparently recovering in 2000.

The downward shift in total nitrogen use on tillage crops since the mid 1980s was caused by the combined effects of changes in:

(i) the relative cropping areas of the major arable crops, as influenced by seasonal weather and market economic factors, (ii) the widespread introduction of set-aside in 1993 and (iii) the nitrogen application rates for particular crops (see Figure B2.2 (a)). Most of total nitrogen fertiliser used on tillage crops each year has, since 1983, been applied in straight form.

Overall nitrogen use on grassland also peaked in the mid 1980s, at about 131 kg/ha, and then dropped very sharply to 119 kg/ha in 1988 before largely recovering over the following three years. Subsequent nitrogen use has, however, declined as a result of the net effects of a very significant drop in overall application rate in 1992 and, despite some recovery over the following five years, further falls in 1998 and again in 2000. The overall nitrogen rate of 94 kg/ha on grassland in 2001 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 (1997-2001) the average has decreased to 125 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 - 2001

	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

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 47 kg/ha for the four year period 1998-2001. The 2001 rate of 42 kg/ha is the lowest since Great Britain records began in 1983. Reductions in dressing cover and a much higher proportion of spring barley 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 and 1997, apart from a temporary recorded drop to 21 kg/ha in 1992-93. However, overall phosphate use decreased gradually since then to a level of 19 kg/ha in 2001, the lowest recorded since 1983. Mean annual use over the last four years (20 kg/ha) represents a net decline of 5 kg/ha in overall phosphate rate, compared to the 1983-87 mean.

Overall potash use on tillage crops had declined slightly, on average by 3 kg/ha between 1983-87 (mean: 64 kg/ha) and 1992-96 (mean: 61 kg/ha). The overall application rate appeared to recover in 1997, but has since dropped each year to a low of 52 kg/ha in 2001. This is the lowest level recorded since 1983 and represents a 23% fall from the peak value of 68 kg/ha in 1984. The most recent falls, like phosphate use on tillage, have been associated principally with a change to spring barley in 2001, which has a lower fertiliser requirement.

The pattern of overall potash use on grassland has been more variable, compared to tillage crops, but has also shown a net decline between 1983 and 2001. Overall potash rates were relatively stable at 31-33 kg/ha during the mid-late 1980s but, since then, have tended to decline despite temporary recorded increases in 1989-91 and in 1997. Annual potash use over the last four years has been consistently lower (mean: 27 kg/ha) than overall application rates in earlier years and represents a net decline of 5 kg/ha since 1983-87 (mean: 32 kg/ha).

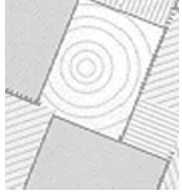
B2.1.3 FERTILISER USE ON MAJOR TILLAGE CROPS

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

Nitrogen

Between 1983-87 the five year mean for winter wheat was 189 kg/ha. Over the following five years it declined to 185 kg/ha, increasing to 188 kg/ha for the period 1993 to 1997. For the four years since then, the mean has dropped again to 185 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 1983-87. For spring barley the mean for the 1998-2001 four year period at 102 kg/ha is higher than each of the previous five years cycles (99, 92 and 95 kg/ha) and the values for 2000 and 2001 the highest since records started in 1983.

Nitrogen use on oilseed rape decreased between 1984 and 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 and 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 rape, which has 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, with the value for 2001 being equivalent to the four year mean (1998-2001) at 193 kg/ha.



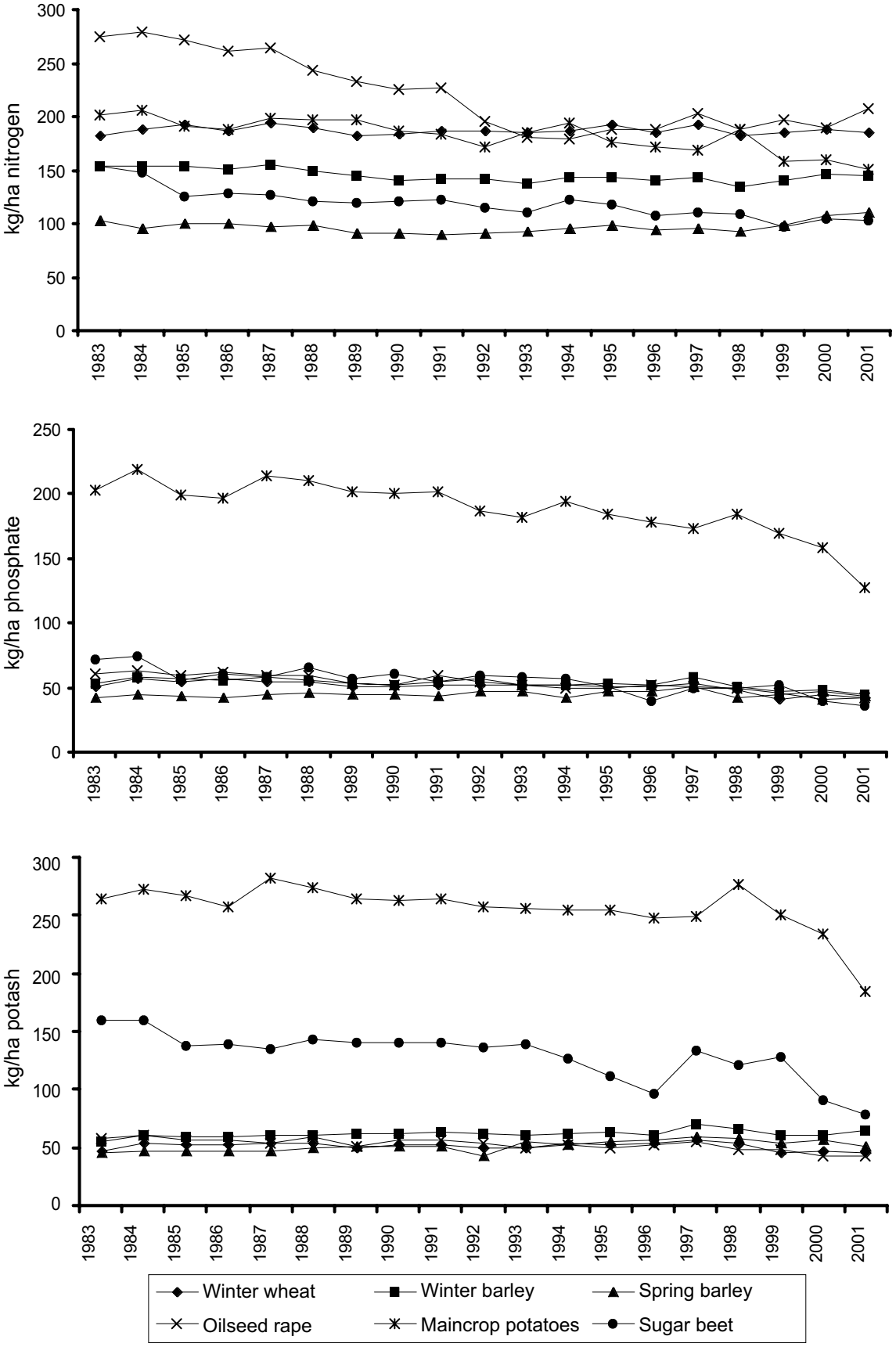
Since the early 1980s, overall nitrogen use on maincrop potatoes has tended to decrease, despite some large variability in estimated annual rates; mean usage was 197, 187, 179 and 164 kg/ha for the periods 1983-1987, 1988-1992, 1993-1997 and 1998-2001 respectively. Sugar beet has also shown a decline (137, 120 113 and 103 kg/ha) over the same periods. The trend towards less nitrogen use on sugar beet reflected greater industry and farmer awareness about the adverse effects of 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 four year period 1998-2001 shows a drop to below 50 kg/ha for the first time in both crops. In contrast, however, phosphate use has risen slightly on spring barley between 1983 and 1997, but has declined since then. Overall phosphate use has also declined on oilseed rape, maincrop potatoes and sugar beet with means for 1983-87 of 61, 206 and 64 kg/ha respectively declining to 45, 160 and 44 kg/ha for the period 1998-2001.

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 four year period 1998-2001 there has been a reduction to 48 kg/ha. For barley the same periods have seen an increase in potash use on winter barley from 59-63 kg/ha, and a slight decrease on spring barley from 47-45 kg/ha between 1998-2001. The corresponding means for oilseed rape, maincrop potatoes and sugar beet show decreases from 57, 269 and 146 kg/ha in 1983-1987 to 45, 236 and 105 kg/ha in 1998-2001.

Figure B2.2 **Overall application rates (kg/ha) of (a) total nitrogen, (b) phosphate and (c) potash on major arable crops, Great Britain 1983 - 2001**



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 6% in England and Wales and 32-64% 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 (34 fields, less than 2% of all fields sampled) the value of 91% in 2001 should be considered unreliable. The average field rate has decreased since 1985, resulting in a mean rate for Great Britain of about 42 kg/ha. Autumn nitrogen at 30 kg/ha is recommended for winter oilseed rape, unless the soil has a high nitrogen fertility, as the crop normally requires more nitrogen than winter cereals during the autumn growth period. However, the economic benefits are usually small and this is reflected in current fertiliser practice.

The survey results may 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 - 2001 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
Scotland	*1999*	35	54
	2000	35	45
	2001	32	64
Great Britain	*1999*	6	10
	2000	7	11
	2001	7	14

Winter oilseed rape - dressing cover and application rate

		dressing cover	*application rate*
England and Wales	*1999*	32	42
	2000	36	43
	2001	36	44
Scotland	*1999*	72	45
	2000	55	38
	2001	91[a]	39
Great Britain	*1999*	35	43
	2000	33	42
	2001	43	43

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

B2.2 LONGER TERM TRENDS FOR ENGLAND AND WALES

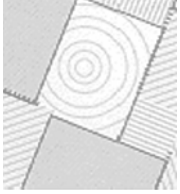
The earlier surveys for England and Wales, which together now account for around 83% (8.6 million ha) of the agricultural land in Britain, provide a longer time series than for Great Britain, based on the present survey design.

B2.2.1 NITROGEN USE

Overall total nitrogen rates, which had been increasing prior to 1969, continued to rise on both tillage crops and grassland until the mid 1980s (Figure B2.3(a)). The more rapid increase in nitrogen use on tillage crops than on grassland over this period can be attributed, in part, to the steadily improving yield potential of new cereal cultivars and also to the introduction and subsequent expansion of oilseed rape cropping. Nitrogen use on both tillage crops and grassland then remained quite steady for several years but application rates have subsequently shown net decreases since the late 1980s. The decline since 1988 was characterised, particularly on grassland, by a repeated pattern of sharp decreases and partial recovery. Mean overall nitrogen use on tillage crops was 94 kg/ha during the 1970s, increasing to 149 kg/ha during the 1980s (155 kg/ha for the 1985-1989 period). During the 1990s rates have fluctuated from 137 to 154 kg/ha with an average of 148 kg/ha. The corresponding means for grassland are 94, 127 and 117 kg/ha for the 1970s, 1980s and 1990s. Rates on grass crops have continued to fall in the first two years of the new millennium but results for 2001 may have been influenced by the Foot and Mouth disease epidemic.

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.

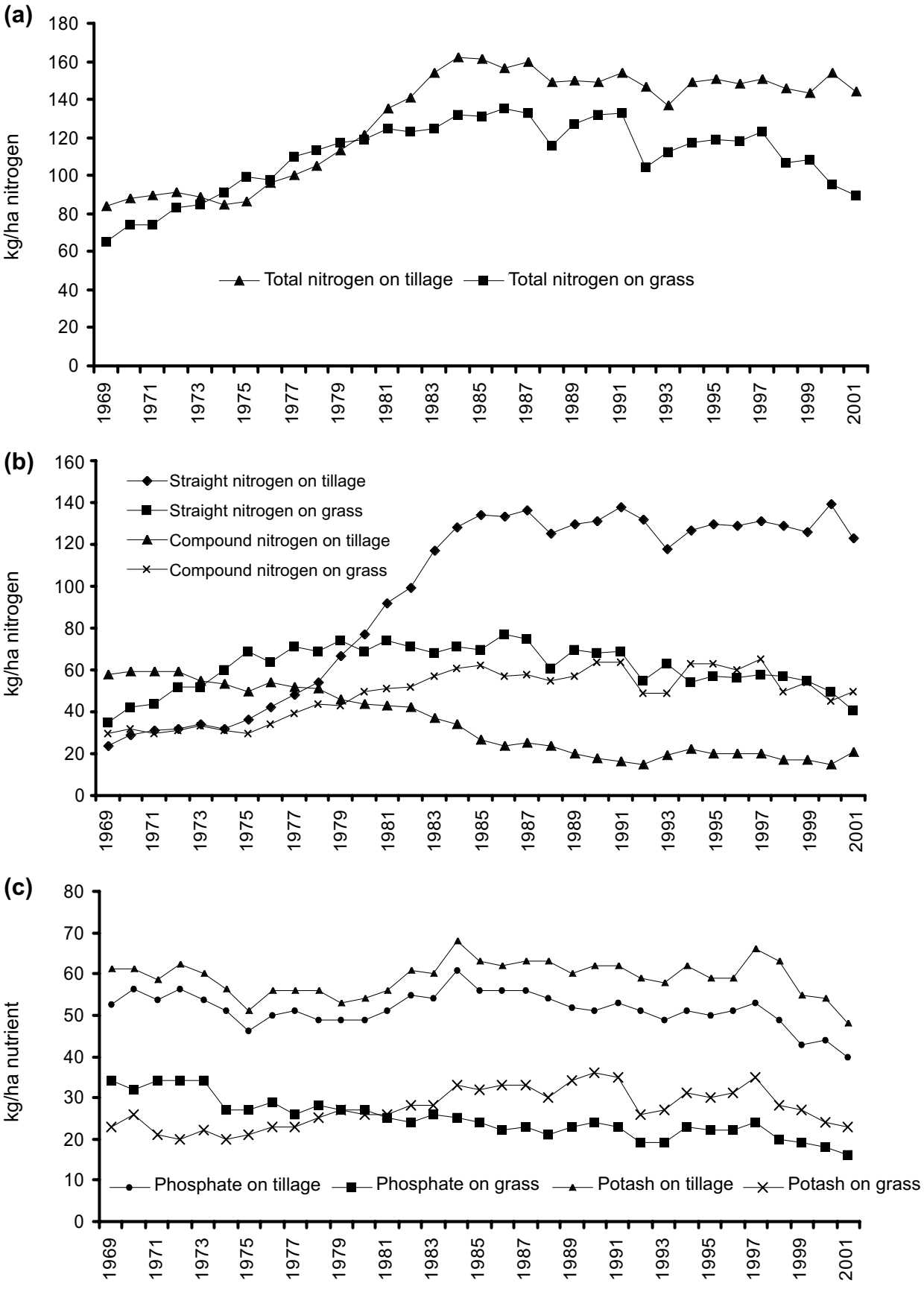
The sharp drop in nitrogen use on grassland in both 1988 and 1992 may have partly reflected the influence of seasonal weather pattern on grass growth and related nitrogen requirements. The increased use of fertiliser nitrogen on grassland during the 1980s had been accentuated by its high cost/benefit 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 disease 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.

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

Figure B2.3 **Overall application rates (kg/ha) of (a) total nitrogen, (b) straight and compound nitrogen and (c) phosphate and potash on tillage crops and grassland, England and Wales 1969 - 2001**



B2.2.3 PHOSPHATE AND POTASH USE

Overall application rates of phosphate and potash on tillage crops have shown a broadly similar pattern of annual changes in overall use, over the last thirty years (Figure B2.3.(c)). The 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 two 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 1992, then recovered slightly before dropping back to 19 kg/ha in 1999. Levels have continued to decline over the last two years and, at 16 kg/ha, are currently at their lowest recorded level.

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 in the main 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 to 24 and 23 kg/ha in 2000 and 2001 respectively.

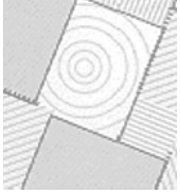
B2.3 LONGER TERM TRENDS FOR SCOTLAND

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

B2.3.1 NITROGEN USE

Recorded annual overall rates of total nitrogen on both grass and tillage crops in Scotland tended to fluctuate during 1983-88 and 1995-2001, 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 during the last two years reaching 147 kg/ha in 2001, the highest level since records began in 1983.

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



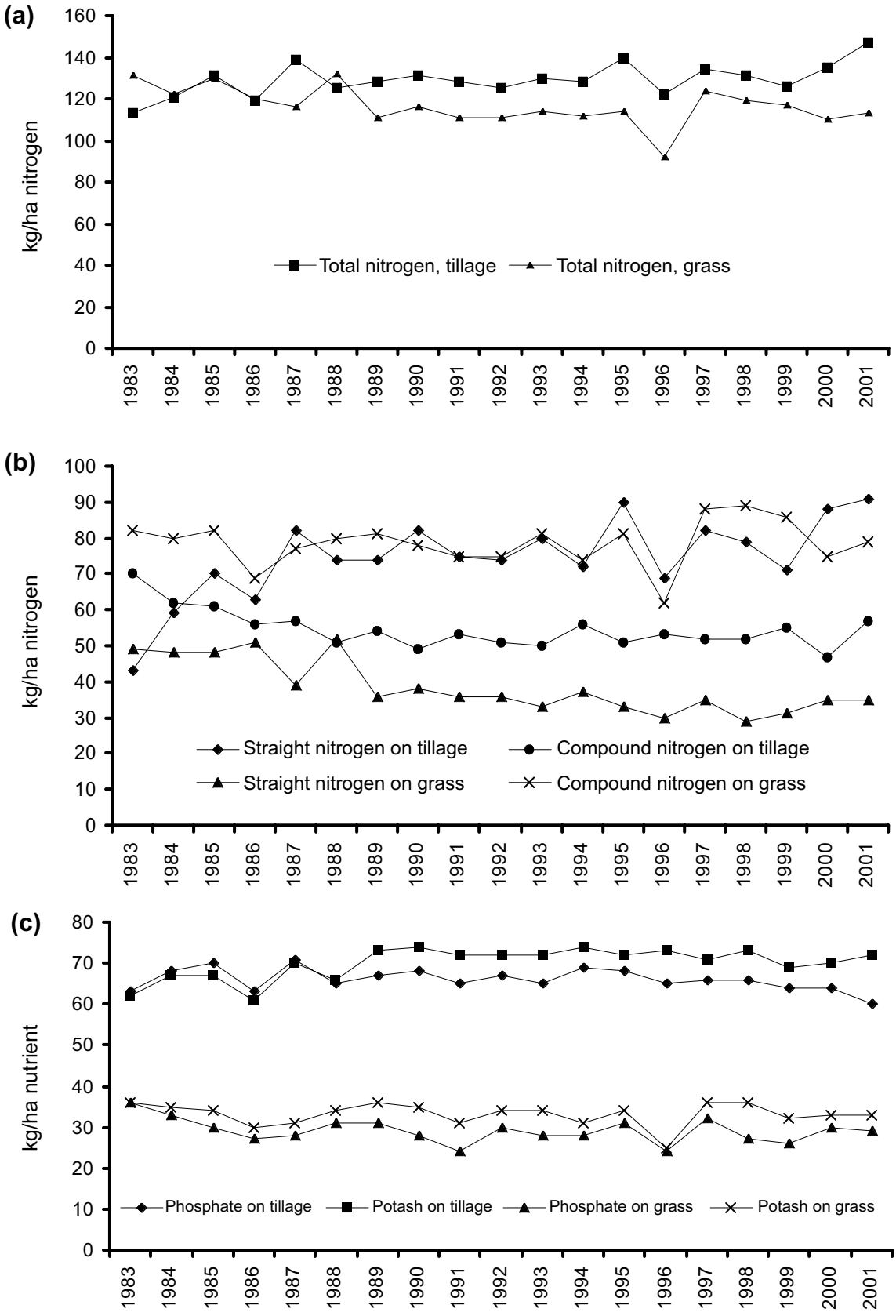
B2.3.2 PHOSPHATE AND POTASH USE

Overall rates of phosphate and potash on tillage crops tended to fluctuate between 1983 and 1988 but were relatively stable from 1989 to 1998 (Figure B2.5(c)). In the last two years phosphate use has decreased and potash use has increased.

Overall rates of phosphate and potash on grassland declined from 1983 to 1986. Since then rates have fluctuated from year to year but the average has remained fairly static at 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 B2.5 **Overall application rates (kg/ha) of (a) total nitrogen, (b) straight and compound nitrogen and (c) phosphate and potash on tillage crops and grassland, Scotland 1983 - 2001**



SECTION C - TABLES

CONTENTS

GREAT BRITAIN TABLES 2001

ENGLAND AND WALES TABLES 2001

Note: 1. Row percentages may not sum to exactly to 100 due to rounding.
2. No estimates are shown for crops with less than 5 fields in the sample. Nevertheless, some estimates are based on very few fields in the sample and should be treated with great caution.
3. FYM refers to any form of organic manure applied.

SCOTLAND TABLES 2001

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 2001

	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	98	39	35	9	143	55	60	140	22	21	149
Winter wheat	98	63	62	12	189	66	72	185	42	45	1673
Spring barley	97	78	80	30	114	55	64	111	43	51	953
Winter barley	97	70	78	19	149	65	82	145	45	64	596
Oats	92	77	76	13	119	59	70	109	45	54	202
Rye/Triticale/Durum wheat	79	31	47	12	91	53	68	72	16	32	22
Seed potatoes	79	71	71	38	181	161	199	143	114	142	9
Early potatoes	90	90	88	45	190	148	210	172	134	184	24
2nd Early/Maincrop potatoes	86	78	79	36	175	163	231	151	127	184	193
Sugar beet	97	47	63	25	106	76	124	103	36	78	191
Spring oilseed rape	96	63	61	4	151	57	64	145	36	39	87
Winter oilseed rape	99	64	62	9	209	66	69	207	42	42	326
Linseed	88	45	45	4	69	43	56	60	19	25	16
Forage maize	70	52	55	85	75	58	76	53	30	42	110
Rootcrops for stockfeed	85	72	77	61	85	84	108	72	60	84	67
Leafy forage crops	74	71	71	66	84	45	45	62	32	32	38
Arable silage/other fodder crop	56	39	50	52	164	58	76	92	22	38	37
Peas - human consumption	4	27	31	16	78	70	66	3	19	20	60
Peas - animal consumption	7	40	54	11	30	60	63	2	24	34	128
Beans - animal consumption	5	40	35	8	48	56	63	2	22	22	196
Vegetables (brassicae)	84	74	77	27	188	83	154	157	61	118	46
Vegetables (other)	51	60	56	18	86	77	92	44	46	51	67
Soft fruit	84	17	49	25	97	21	91	82	4	45	13
Top fruit	84	35	34	6	76	55	70	64	19	24	62
Other tillage	69	44	47	7	120	71	101	82	31	47	70
All tillage	89	64	66	19	163	67	79	145	43	52	5335
Grass under 5 years	80	63	65	48	172	40	58	137	25	37	1076
Grass 5 years and over	69	56	56	42	122	30	38	84	17	21	2588
All grass	71	58	58	43	133	32	42	94	19	24	3664
All crops and grass	79	60	61	32	148	48	59	116	29	37	8999

Source: British Survey of Fertiliser Practice 2001.

Table GB1.2 Use of straight fertiliser, Great Britain 2001

	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	91	4	2	141	142	104	127	6	2	149
Winter wheat	93	7	7	184	73	74	171	5	6	1673
Spring barley	70	2	4	95	79	78	66	1	3	953
Winter barley	88	5	13	143	75	94	127	4	12	596
Oats	67	7	8	116	62	67	78	5	6	202
Rye/Triticale/Durum wheat	65	0	17	96	0	98	63	0	17	22
Seed potatoes	9	0	0	40	0	0	4	0	0	9
Early potatoes	1	0	21	43	0	186	1	0	39	24
2nd Early/Maincrop potatoes	38	2	14	96	134	174	37	2	24	193
Sugar beet	83	4	20	100	54	107	83	2	22	191
Spring oilseed rape	88	5	6	136	95	75	119	5	4	87
Winter oilseed rape	95	6	8	200	68	72	189	4	6	326
Linseed	73	0	0	71	0	0	52	0	0	16
Forage maize	30	5	16	75	64	102	23	3	17	110
Rootcrops for stockfeed	20	1	10	78	60	99	15	1	10	67
Leafy forage crops	7	0	0	122	0	0	9	0	0	38
Arable silage/other fodder crop	33	0	4	99	0	151	32	0	6	37
Peas - human consumption	2	5	9	87	124	58	2	6	5	60
Peas - animal consumption	3	1	16	50	123	55	2	2	9	128
Beans - animal consumption	2	6	2	46	56	77	1	3	1	196
Vegetables (brassicae)	23	0	7	142	0	79	32	0	5	46
Vegetables (other)	46	0	7	56	0	146	26	0	10	67
Soft fruit	73	0	21	79	0	164	58	0	34	13
Top fruit	73	1	0	84	59	0	61	1	0	62
Other tillage	44	0	0	121	0	0	53	0	0	70
All tillage	75	5	8	156	75	88	118	4	7	5335
Grass under 5 years	47	1	2	133	103	98	62	1	2	1076
Grass 5 years and over	27	0	0	125	54	75	34	0	0	2588
All grass	31	0	1	128	77	92	39	0	1	3664
All crops and grass	50	2	4	146	75	88	74	2	4	8999

Source: British Survey of Fertiliser Practice 2001.

Table GB1.3 Use of compound fertiliser, Great Britain 2001

	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	22	35	34	54	47	57	12	17	19	149
Winter wheat	20	57	56	70	65	70	14	37	39	1673
Spring barley	62	76	77	72	55	62	45	42	48	953
Winter barley	30	66	67	62	62	77	19	41	52	596
Oats	46	71	73	68	58	66	31	41	48	202
Rye/Triticale/Durum wheat	20	31	31	47	53	52	9	16	16	22
Seed potatoes	79	71	71	176	161	199	139	114	142	9
Early potatoes	90	90	84	190	148	173	171	134	146	24
2nd Early/Maincrop potatoes	74	77	71	155	163	223	115	125	159	193
Sugar beet	21	42	43	93	78	130	20	33	56	191
Spring oilseed rape	33	57	56	77	54	62	26	31	34	87
Winter oilseed rape	31	58	55	56	65	67	17	38	37	326
Linseed	15	45	45	56	43	56	8	19	25	16
Forage maize	48	50	43	63	55	58	30	27	25	110
Rootcrops for stockfeed	68	70	72	83	84	103	57	59	74	67
Leafy forage crops	67	71	71	80	45	45	53	32	32	38
Arable silage/other fodder crop	42	39	46	139	58	69	59	22	32	37
Peas - human consumption	2	22	22	70	58	70	2	13	15	60
Peas - animal consumption	4	39	38	13	58	67	0	23	25	128
Beans - animal consumption	4	34	33	44	56	62	2	19	21	196
Vegetables (brassicae)	70	74	72	178	83	156	124	61	113	46
Vegetables (other)	41	60	54	44	77	78	18	46	42	67
Soft fruit	29	17	29	84	21	38	24	4	11	13
Top fruit	16	34	34	18	55	70	3	19	24	62
Other tillage	33	44	47	89	71	101	30	31	47	70
All tillage	34	60	59	78	65	76	27	39	45	5335
Grass under 5 years	62	62	63	124	39	56	76	24	35	1076
Grass 5 years and over	56	56	56	88	30	38	50	17	21	2588
All grass	57	57	58	96	32	41	55	18	24	3664
All crops and grass	47	58	58	90	47	57	42	28	33	8999

Source: British Survey of Fertiliser Practice 2001.

Table GB1.4 Use of lime, Great Britain 2001

	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	1.0	.	.	1.6	0.7	3.2	2.5	.	.	3.7	3.7	3.1	7	149
Winter wheat	1.9	0.4	0.4	0.1	0.7	3.4	1.7	2.0	2.3	3.7	2.2	1.9	56	1673
Spring barley	5.0	0.1	2.9	.	0.6	8.7	2.1	2.5	1.9	.	3.7	2.2	79	953
Winter barley	4.2	.	1.0	.	0.6	5.9	2.2	.	2.1	.	1.6	2.1	42	596
Oats	.	.	.	.	.	.	.	.	.	.	.	.	3	202
Rye/Triticale/Durum wheat	.	.	.	.	.	.	.	.	.	.	.	.	1	22
Seed potatoes	.	.	.	.	.	.	.	.	.	.	.	.	0	9
Early potatoes	.	.	.	.	.	.	.	.	.	.	.	.	0	24
2nd Early/Maincrop potatoes	.	.	.	.	.	.	.	.	.	.	.	.	0	193
Sugar beet	7.5	3.4	4.1	4.1	4.4	23.5	2.4	2.5	1.7	2.7	4.7	2.8	40	191
Spring oilseed rape	8.4	.	.	.	0.8	9.2	2.5	.	.	.	5.9	2.8	5	87
Winter oilseed rape	4.2	1.0	2.9	3.8	0.5	12.5	2.1	2.4	1.6	4.4	3.3	2.8	36	326
Linseed	.	.	.	.	.	.	.	.	.	.	.	.	0	16
Forage maize	8.9	0.2	0.4	.	1.9	11.5	2.8	2.5	1.2	.	3.7	2.3	12	110
Rootcrops for stockfeed	.	.	.	.	.	.	.	.	.	.	.	.	4	67
Leafy forage crops	6.6	1.1	2.5	.	.	10.2	2.0	1.2	3.7	.	.	2.3	5	38
Arable silage/other fodder crop	.	.	.	.	.	.	.	.	.	.	.	.	1	37
Peas - human consumption	.	.	.	.	.	.	.	.	.	.	.	.	3	60
Peas - animal consumption	.	.	.	.	.	.	.	.	.	.	.	.	1	128
Beans - animal consumption	7.6	0.3	0.6	.	0.9	9.4	1.6	2.5	2.5	.	0.3	1.0	11	196
Vegetables (brassicae)	.	.	.	.	.	.	.	.	.	.	.	.	3	46
Vegetables (other)	.	.	.	.	.	.	.	.	.	.	.	.	4	67
Soft fruit	.	.	.	.	.	.	.	.	.	.	.	.	0	13
Top fruit	2.6	.	.	.	0.6	3.2	2.2	.	.	.	1.2	2.0	14	62
Other tillage	.	.	.	.	.	.	.	.	.	.	.	.	1	70
All tillage	3.4	0.5	1.3	0.4	0.8	6.4	2.0	2.6	1.9	3.8	3.0	2.3	328	5335
Grass under 5 years	2.6	0.2	0.8	.	1.0	4.6	2.0	1.8	2.4	.	2.2	2.1	58	1076
Grass 5 years and over	1.1	0.1	0.3	.	0.5	1.9	1.8	2.5	2.2	.	2.0	1.7	59	2588
All grass	1.4	0.1	0.4	.	0.6	2.4	1.9	2.1	2.3	.	1.1	1.8	117	3664
All crops and grass	2.3	0.2	0.8	0.2	0.7	4.2	2.0	2.5	2.0	3.8	2.0	2.1	445	8999

Source: British Survey of Fertiliser Practice 2001.

Table GB2.1 Average fertiliser practice by grassland utilisation, Great Britain 2001

	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	64	52	50	30	119	29	31	76	15	16	1780
Grazed - mown	81	67	70	64	146	35	53	118	23	37	1434
All grazings	70	57	57	42	130	31	40	91	18	23	3214
Cut for seed grazed	.	.	.	.	.	.	.	.	.	.	0
Cut for seed not grazed	.	.	.	.	.	.	.	.	.	.	4
All cut for seed	.	.	.	.	.	.	.	.	.	.	4
Cut for silage grazed	87	71	76	69	161	37	57	140	26	43	993
Cut for silage not grazed	82	66	71	61	181	44	69	149	29	49	283
All cut for silage	86	70	75	67	165	38	59	142	27	45	1276
Cut for hay grazed	64	53	53	52	83	28	35	53	15	18	398
Cut for hay not grazed	66	55	55	25	105	33	35	69	18	19	70
All cut for hay	64	54	53	49	85	28	35	55	15	18	468
All mowings	81	67	70	63	152	36	55	123	24	39	1748
All grass	71	58	58	43	133	32	42	94	19	24	3664

Table GB3.0 Product and nutrient by month of application, Great Britain 2001.
Source: British Survey of Fertiliser Practice 2001.

(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	19	36	29	7	4	2	2064
Straight P	13	5	20	9	5	13	5	13	8	3	1	5	48
Straight K	3	2	11	6	1	7	12	18	7	31	1	2	77
Compounds	5	4	3	0	2	5	15	34	19	5	4	4	2580
All fertilisers	3	2	2	0	1	5	17	34	21	7	4	3	4769

(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	4	20	36	22	8	5	3	1112
P_2O_5	9	6	3	1	3	7	16	31	13	4	3	4	297
K_2O	7	6	3	2	3	9	15	28	13	6	3	4	383
Total	4	3	1	1	1	6	18	33	20	7	4	3	1792

Note: product use refers to the total tonnage of the products used by farmers in the survey year 2001;
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 2001.

Table GB3.1 Product type as percentage of all product used by crop group, Great Britain 2001

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	0.8	1.2	0.0	0.0	1.9	0.5	1.0	0.5	0.2	1.0	0.0	0.7	0.9
Urea	2.6	7.6	0.2	0.9	13.8	2.9	6.2	2.5	0.8	1.8	0.0	2.2	4.5
Ammonium Nitrate	38.4	53.5	6.1	31.0	49.6	18.5	43.7	25.7	21.0	21.4	35.7	25.2	35.6
Other Straight N	2.2	4.8	1.9	0.8	3.6	1.6	3.6	0.6	0.2	0.6	0.0	0.7	2.3
Triple Superphosphate	0.9	1.3	0.2	0.3	1.3	1.6	1.2	0.1	0.1	0.0	4.1	0.1	0.7
Single Superphosphate	0.1	0.0	0.4	0.6	0.1	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.1
Other Straight P	0.1	0.1	0.0	5.1	0.1	0.6	0.4	0.1	0.0	0.0	0.0	0.1	0.2
Muriate of Potash	1.0	1.5	2.5	1.6	1.3	3.2	1.6	0.2	0.0	0.3	2.0	0.2	1.0
Other Straight K	0.2	0.1	1.5	12.7	0.1	1.0	0.8	0.4	1.8	0.0	0.0	0.3	0.6
NP	1.0	0.9	3.2	0.1	0.9	2.4	1.2	2.6	1.0	1.8	19.9	2.7	1.9
NK	1.5	3.3	1.9	3.1	3.2	5.0	3.0	5.8	2.6	10.8	0.0	6.3	4.4
PK	9.3	15.4	4.5	30.1	11.2	22.7	14.4	1.9	2.4	2.1	8.2	2.0	9.0
Very High N	4.5	3.4	0.3	0.8	3.6	8.3	3.6	30.4	30.3	26.7	4.2	30.7	15.6
High N	14.5	1.1	15.0	0.3	0.7	9.6	4.8	25.6	37.9	29.1	16.4	25.1	13.7
High P	0.7	0.1	8.4	0.2	0.8	0.7	0.9	0.3	0.0	0.2	0.0	0.3	0.6
High K	6.7	1.6	41.8	8.9	1.0	6.2	5.8	1.0	0.1	1.5	0.0	1.0	3.7
Low N	5.7	3.2	4.9	2.0	3.9	11.2	4.3	0.6	0.5	0.7	6.8	0.6	2.7
Low P	1.5	0.1	3.3	1.5	0.2	1.2	0.7	0.5	0.3	0.7	0.0	0.5	0.6
Equal NPK	8.2	0.6	3.8	0.0	2.6	2.5	2.4	1.2	0.7	1.0	2.7	1.3	1.9
Total Product ('000 tonnes)	**431**	**1477**	**183**	**115**	**255**	**209**	**2670**	**1850**	**173**	**1038**	**8**	**2099**	**4769**

NB: 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 2001.

Table GB3.2 Use of product type by crop group, Great Britain 2001

row %	spring cereal	winter cereal	potatoes	sugar beet	oilseed rape	other tillage	all tillage	grass for grazing	grass for hay	grass for silage	grass not spec	all grass	total product ('000 tonnes)
Calcium Ammonium Nitrate	8.6	42.5	0.0	0.1	11.6	2.4	65.1	23.2	1.0	25.3	0.0	34.9	43
Urea	5.2	52.7	0.2	0.5	16.6	2.9	78.1	21.5	0.7	8.9	0.0	21.9	213
Ammonium Nitrate	9.8	46.6	0.7	2.1	7.5	2.3	68.8	28.1	2.1	13.1	0.2	31.2	1697
Other Straight N	8.4	63.7	3.1	0.9	8.3	3.0	87.3	10.7	0.4	5.8	0.0	12.7	111
Triple Superphosphate	12.2	60.5	1.3	1.2	10.2	10.1	95.4	3.4	0.6	1.3	1.0	4.6	33
Single Superphosphate	9.7	12.5	18.6	16.8	4.0	15.8	77.4	22.6	0.0	1.8	0.0	22.6	4
Other Straight P	2.0	18.7	0.0	51.5	2.3	10.2	84.7	14.7	0.1	3.4	0.0	15.3	11
Muriate of Potash	8.9	47.1	9.4	3.7	6.8	14.0	89.9	7.5	0.0	6.4	0.3	10.1	48
Other Straight K	2.9	6.9	9.4	49.4	0.7	7.2	76.4	23.6	10.4	1.5	0.0	23.6	29
NP	5.0	15.6	6.5	0.2	2.7	5.7	35.8	54.3	2.0	21.4	1.7	64.2	89
NK	3.1	22.8	1.7	1.7	3.9	4.9	38.0	51.0	2.2	52.7	0.0	62.0	212
PK	9.3	53.2	1.9	8.1	6.7	11.1	90.3	8.1	1.0	5.2	0.1	9.7	427
Very High N	2.6	6.7	0.1	0.1	1.2	2.4	13.1	75.8	7.1	37.3	0.0	86.9	742
High N	9.6	2.4	4.2	0.1	0.3	3.1	19.6	72.2	10.0	46.1	0.2	80.4	655
High P	10.2	7.0	50.7	0.6	6.8	4.7	80.0	20.0	0.0	7.5	0.0	20.0	30
High K	16.4	13.5	43.6	5.8	1.4	7.4	88.1	10.7	0.1	9.1	0.0	11.9	175
Low N	19.1	36.1	6.9	1.8	7.7	18.1	89.7	8.3	0.6	5.6	0.4	10.3	130
Low P	21.4	6.6	20.6	5.9	1.7	8.8	65.0	30.6	2.0	24.3	0.0	35.0	30
Equal NPK	39.3	10.3	7.8	0.0	7.4	5.9	70.7	23.6	1.3	11.1	0.2	29.3	90
All Fertilisers	**9.0**	**31.0**	**3.8**	**2.4**	**5.4**	**4.4**	**56.0**	**38.8**	**3.6**	**21.8**	**0.2**	**44.0**	**4769**

NB: 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 2001.

Table GB3.3 Product use by month of application, Great Britain 2001.

row %	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	total Product ('000 tonnes)
Calcium Ammonium Nitrate	0.0	2.7	21.7	38.8	22.6	5.3	5.5	2.8	0.6	0.0	0.0	0.0	43
Urea	0.4	7.4	27.1	35.8	20.6	3.3	3.5	0.4	0.5	1.2	0.0	0.0	213
Ammonium Nitrate	0.1	4.0	21.9	34.5	24.0	7.2	4.2	2.7	1.2	0.2	0.1	0.0	1697
Other straight N	0.5	8.8	11.6	20.0	35.7	7.0	14.1	1.3	0.6	0.0	0.3	0.0	111
Triple Superphosphate	4.8	6.3	12.0	19.7	7.0	0.5	1.2	9.6	19.4	7.9	4.7	7.1	33
Single Superphosphate	0.0	16.8	27.9	20.4	1.7	0.0	17.5	0.0	15.6	0.0	0.0	0.0	4
Other Straight P	4.9	0.0	15.6	32.4	3.8	2.5	0.0	4.3	4.1	7.4	17.0	8.0	11
Muriate of Potash	13.1	11.5	16.5	22.9	10.1	1.8	1.0	1.5	5.7	3.4	7.9	4.4	48
Other Straight K	6.6	12.5	7.0	34.5	1.3	0.0	0.0	2.2	0.7	0.1	13.6	21.4	29
NP	0.2	13.9	28.3	35.7	10.3	3.6	2.2	1.2	3.5	0.9	0.3	0.0	89
NK	0.2	3.5	12.4	20.3	22.6	25.1	7.6	5.3	2.1	0.1	0.0	0.8	212
PK	6.9	12.8	11.8	12.2	6.8	0.5	1.1	5.8	19.2	15.5	6.0	1.4	427
Very High N	0.0	2.8	15.4	37.0	17.6	12.1	7.4	5.5	1.4	0.7	0.1	0.0	742
High N	0.1	1.2	13.6	46.8	22.2	7.2	5.8	2.1	0.8	0.1	0.0	0.0	655
High P	0.0	0.8	5.7	39.8	20.1	0.0	0.1	10.2	14.6	2.0	6.7	0.0	30
High K	0.8	6.3	29.7	42.9	15.6	0.5	0.5	0.8	0.2	2.6	0.0	0.0	175
Low N	4.4	8.9	17.4	26.9	20.3	0.7	1.2	3.3	8.3	7.2	1.4	0.0	130
Low P	0.0	0.4	16.5	51.0	10.8	20.0	0.0	1.3	0.0	0.0	0.0	0.0	30
Equal NPK	0.0	4.2	20.9	50.9	13.1	1.6	1.9	1.9	2.9	0.7	0.1	1.7	90
All Fertiliser	**1.1**	**4.9**	**17.3**	**34.0**	**19.8**	**7.2**	**4.6**	**3.3**	**3.2**	**2.1**	**2.0**	**0.4**	**4769**

NB: 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 2001.

Table EW1.1 Total fertiliser use, England and Wales 2001

	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	98	39	34	10	142	56	60	140	22	20	140
Winter wheat	97	62	60	12	188	66	71	183	41	42	1533
Spring barley	95	63	68	19	110	47	57	105	30	38	587
Winter barley	97	68	75	17	144	64	83	139	44	62	507
Oats	91	74	72	10	117	62	77	106	46	55	150
Rye/Triticale/Durum wheat	80	31	48	11	91	53	68	72	16	33	21
Seed potatoes	.	.	.	.	.	.	.	.	.	.	2
Early potatoes	100	100	74	30	174	163	253	174	163	187	20
2nd Early/Maincrop potatoes	87	76	76	38	185	174	239	160	133	182	156
Sugar beet	97	47	63	25	106	76	124	103	36	78	191
Spring oilseed rape	95	58	56	2	156	55	64	149	32	36	76
Winter oilseed rape	98	61	58	10	209	66	69	206	40	40	292
Linseed	88	45	45	4	69	43	56	60	19	25	16
Forage maize	70	52	55	85	75	59	77	53	30	42	107
Rootcrops for stockfeed	75	48	60	74	91	67	112	68	32	67	38
Leafy forage crops	69	62	62	81	86	44	45	59	27	28	18
Arable silage/other fodder crop	5	12	22	32	59	60	99	3	7	21	14
Peas - human consumption	4	25	29	16	84	72	67	3	18	20	58
Peas - animal consumption	7	41	54	10	30	60	63	2	25	34	123
Beans - animal consumption	5	40	35	9	50	56	63	2	22	22	193
Vegetables (brassicae)	84	77	80	27	188	83	154	157	64	123	46
Vegetables (other)	53	65	60	22	88	75	92	46	48	55	61
Soft fruit	82	10	45	28	82	13	99	68	1	44	12
Top fruit	84	35	34	6	76	55	70	64	19	24	62
Other tillage	68	43	46	5	112	71	102	76	31	46	68
All tillage	87	60	61	16	166	67	79	144	40	48	4491
Grass under 5 years	74	53	58	50	183	38	60	137	20	35	685
Grass 5 years and over	66	53	54	42	122	29	37	81	16	20	2097
All grass	67	53	55	44	133	31	41	90	16	23	2782
All crops and grass	76	56	57	31	150	48	59	114	27	34	7273

Source: British Survey of Fertiliser Practice 2001.

Table EW1.2 Use of straight fertiliser, England and Wales 2001

	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	91	5	2	142	142	104	129	7	2	140
Winter wheat	94	7	7	191	72	68	180	5	5	1533
Spring barley	76	2	7	105	83	75	80	2	5	587
Winter barley	88	6	11	138	75	99	121	5	11	507
Oats	75	10	11	111	62	67	84	6	7	150
Rye/Triticale/Durum wheat	66	0	17	96	0	98	63	0	17	21
Seed potatoes	.	.	.	.	.	.	.	.	.	2
Early potatoes	2	0	21	43	0	186	1	0	40	20
2nd Early/Maincrop potatoes	45	2	14	99	134	178	45	3	25	156
Sugar beet	84	4	20	100	54	107	83	2	22	191
Spring oilseed rape	91	6	6	138	95	75	125	6	5	76
Winter oilseed rape	95	6	7	201	68	68	190	4	5	292
Linseed	73	0	0	71	0	0	52	0	0	16
Forage maize	31	5	17	75	64	102	23	3	17	107
Rootcrops for stockfeed	40	3	20	78	60	99	31	2	20	38
Leafy forage crops	15	0	0	122	0	0	18	0	0	18
Arable silage/other fodder crop	0	0	9	0	0	151	0	0	14	14
Peas - human consumption	2	5	9	87	124	58	2	6	5	58
Peas - animal consumption	3	1	16	50	123	55	2	2	9	123
Beans - animal consumption	2	6	2	46	56	77	1	3	1	193
Vegetables (brassicae)	23	0	7	142	0	79	32	0	6	46
Vegetables (other)	46	0	8	60	0	146	28	0	12	61
Soft fruit	79	0	22	79	0	164	62	0	37	12
Top fruit	73	1	0	84	59	0	61	1	0	62
Other tillage	45	0	0	121	0	0	54	0	0	68
All tillage	77	6	9	160	75	87	123	4	8	4491
Grass under 5 years	47	1	3	146	73	80	69	1	2	685
Grass 5 years and over	27	0	0	131	55	70	35	0	0	2097
All grass	30	0	1	135	63	78	40	0	0	2782
All crops and grass	51	3	4	152	74	86	77	2	4	7273

Source: British Survey of Fertiliser Practice 2001.

Table EW1.3 Use of compound fertiliser, England and Wales 2001

	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	18	34	32	57	46	57	11	16	18	140
Winter wheat	21	55	54	82	64	69	17	36	37	1533
Spring barley	40	61	63	61	45	52	24	28	33	587
Winter barley	23	64	65	77	62	79	18	39	51	507
Oats	33	66	68	70	61	70	23	40	48	150
Rye/Triticale/Durum wheat	20	31	31	47	53	52	9	16	16	21
Seed potatoes	.	.	.	.	.	.	.	.	.	2
Early potatoes	100	100	76	173	163	194	173	163	147	20
2nd Early/Maincrop potatoes	73	74	69	158	175	228	115	130	157	156
Sugar beet	22	43	43	93	78	130	20	33	56	191
Spring oilseed rape	30	52	51	78	51	61	23	27	31	76
Winter oilseed rape	25	55	52	64	65	67	16	36	35	292
Linseed	15	45	45	56	43	56	8	19	25	16
Forage maize	48	49	43	62	55	58	29	27	25	107
Rootcrops for stockfeed	41	45	48	91	67	98	37	30	47	38
Leafy forage crops	54	62	62	75	44	45	40	27	28	18
Arable silage/other fodder crop	5	12	12	59	60	60	3	7	7	14
Peas - human consumption	2	20	20	82	58	71	1	12	14	58
Peas - animal consumption	4	39	38	13	58	67	0	23	25	123
Beans - animal consumption	3	34	33	47	56	62	2	19	21	193
Vegetables (brassicae)	70	77	75	178	83	156	124	64	117	46
Vegetables (other)	42	65	58	44	75	76	19	48	44	61
Soft fruit	22	10	22	22	13	33	5	1	7	12
Top fruit	16	34	34	18	55	70	3	19	24	62
Other tillage	32	43	46	70	71	102	22	31	46	68
All tillage	26	55	54	81	65	76	21	36	41	4491
Grass under 5 years	53	53	56	128	37	58	68	20	33	685
Grass 5 years and over	54	53	54	85	29	37	46	15	20	2097
All grass	54	53	54	92	30	41	49	16	22	2782
All crops and grass	41	54	54	89	46	56	37	25	30	7273

Source: British Survey of Fertiliser Practice 2001.

Table EW1.4 Use of lime, England and Wales 2001

	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	1.1	.	.	1.8	0.8	3.7	2.5	.	.	3.7	3.7	3.1	7	140
Winter wheat	2.0	0.5	0.3	0.1	0.7	3.5	1.7	2.0	2.4	3.7	2.2	1.9	52	1533
Spring barley	2.6	.	0.6	.	0.6	3.8	1.9	.	2.6	.	3.7	2.3	27	587
Winter barley	4.2	.	0.6	.	0.8	5.6	2.2	.	2.1	.	1.6	2.1	32	507
Oats	.	.	.	.	.	.	.	.	.	.	.	.	3	150
Rye/Triticale/Durum wheat	.	.	.	.	.	.	.	.	.	.	.	.	1	21
Seed potatoes	.	.	.	.	.	.	.	.	.	.	.	.	0	2
Early potatoes	.	.	.	.	.	.	.	.	.	.	.	.	0	20
2nd Early/Maincrop potatoes	.	.	.	.	.	.	.	.	.	.	.	.	0	156
Sugar beet	7.5	3.4	4.1	4.1	4.4	23.5	2.4	2.5	1.7	2.7	4.7	2.8	40	191
Spring oilseed rape	9.4	.	.	.	0.9	10.2	2.5	.	.	.	5.9	2.8	5	76
Winter oilseed rape	3.9	1.2	1.6	4.2	0.5	11.5	2.0	2.4	1.4	4.4	3.3	2.9	30	292
Linseed	.	.	.	.	.	.	.	.	.	.	.	.	0	16
Forage maize	9.1	0.2	0.4	.	1.9	11.7	2.8	2.5	1.2	.	3.7	2.3	12	107
Rootcrops for stockfeed	.	.	.	.	.	.	.	.	.	.	.	.	4	38
Leafy forage crops	.	.	.	.	.	.	.	.	.	.	.	.	3	18
Arable silage/other fodder crop	.	.	.	.	.	.	.	.	.	.	.	.	0	14
Peas - human consumption	.	.	.	.	.	.	.	.	.	.	.	.	3	58
Peas - animal consumption	.	.	.	.	.	.	.	.	.	.	.	.	1	123
Beans - animal consumption	7.6	0.3	0.6	.	0.6	9.4	1.6	2.5	2.5	.	0.3	1.0	11	193
Vegetables (brassicae)	.	.	.	.	.	.	.	.	.	.	.	.	3	46
Vegetables (other)	.	.	.	.	.	.	.	.	.	.	.	.	2	61
Soft fruit	.	.	.	.	.	.	.	.	.	.	.	.	0	12
Top fruit	2.6	.	.	.	0.6	3.2	2.2	.	.	.	1.2	2.0	14	62
Other tillage	.	.	.	.	.	.	.	.	.	.	.	.	1	68
All tillage	3.1	0.6	0.6	0.5	0.9	5.7	2.0	2.6	1.9	3.8	2.9	2.3	251	4491
Grass under 5 years	3.5	0.2	0.7	.	1.4	5.8	2.0	1.8	3.0	.	2.4	2.2	46	685
Grass 5 years and over	1.3	0.1	0.3	.	0.8	2.4	1.8	2.5	2.3	.	2.0	1.7	52	2097
All grass	1.7	0.1	0.3	.	0.9	2.9	1.9	2.1	2.5	.	1.1	1.8	98	2782
All crops and grass	2.3	0.3	0.5	0.2	0.9	4.2	1.9	2.5	2.2	3.8	1.9	2.1	349	7273

Source: British Survey of Fertiliser Practice 2001.

Table EW1.5 Percentage of crop area by field application rate - N, England and Wales 2001

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	2	0	6	7	9	10	20	22	16	6	2								140
Winter wheat	3	1	2	2	3	4	9	15	20	18	9	5	4	3	1				1533
Spring barley	5	2	5	14	18	24	20	5	4	2	1								587
Winter barley	3	0	2	7	11	12	25	23	12	2	2	1	1						507
Oats	9	0	3	9	15	30	18	13	3	0	1								150
Rye/Triticale/Durum wheat	20	13	6	3	21	28	6	0	0	0	0	0	3						21
Seed potatoes																			2
Early potatoes	0	0	0	13	17	0	4	6	23	21	5	0	0	0	7	3			20
2nd Early/Maincrop potatoes	13	1	0	2	5	8	11	14	11	21	5	5	0	1	3	1			156
Sugar beet	3	1	11	11	20	28	17	3	1	1	1	1	2						191
Spring oilseed rape	5	0	4	6	7	18	12	28	5	2	0	4	0	6	2				76
Winter oilseed rape	2	1	2	2	4	2	8	8	18	27	12	8	4	2					292
Linseed	12	5	10	40	7	27													16
Forage maize	30	14	11	12	17	10	3	2	0	1	0	1							107
Rootcrops for stockfeed	25	6	7	24	20	3	6	5	4										38
Leafy forage crops	31	0	0	26	26	6	11												18
Arable silage/other fodder crop	70	2	4	2	0	8	14												14
Peas - human consumption	96	0	2	0	3	0													58
Peas - animal consumption	93	4	2	0	0	1													123
Beans - animal consumption	95	2	3	0	0	0	0	0	1										193
Vegetables (brassicae)	3	0	14	9	2	3	15	0	4	3	17	20	2	8					46
Vegetables (other)	47	9	6	6	6	7	0	12	4	1	1								61
Soft fruit	18	7	4	31	7	15	18												12
Top fruit	16	16	5	1	29	9	21	1	0	0	2								62
Other tillage	32	6	9	9	12	4	6	18	0	3	3								68
All tillage	13	2	3	5	7	11	13	13	12	10	4	3	2	2	1				4491
Grass under 5 years	26	1	3	7	8	10	6	8	8	6	5	6	2	3	1				685
Grass 5 years and over	34	1	10	16	7	9	5	6	2	4	2	3	1	1					2097
All grass	33	1	8	13	7	10	5	6	3	5	3	3	1	1	1				2782
All crops and grass	24	2	4	8	7	10	10	9	8	7	4	3	2	1	1				7273

Source: British Survey of Fertiliser Practice 2001.

Table EW1.6 Percentage of crop area by field application rate - P_2O_5, England and Wales 2001

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	61	7	14	11	3	3	1												140
Winter wheat	37	3	11	27	17	3	1												1533
Spring barley	37	11	27	19	5	2													587
Winter barley	32	5	13	31	14	2	0	1	0	0	1								507
Oats	26	5	15	29	18	6	0	0	1										150
Rye/Triticale/Durum wheat	69	4	10	10	8														21
Seed potatoes																			2
Early potatoes	0	0	0	4	17	14	5	5	10	31	4	2	1	6	1				20
2nd Early/Maincrop potatoes	24	0	2	2	2	6	8	11	12	8	9	9	1	6	0	0	1		156
Sugar beet	53	4	10	16	5	4	4	3	0	1	1								191
Spring oilseed rape	42	3	17	33	4	0	1												76
Winter oilseed rape	39	3	8	27	18	4	1												292
Linseed	55	0	42	0	0	3													16
Forage maize	48	8	5	26	7	3	3												107
Rootcrops for stockfeed	52	0	12	19	4	12	1												38
Leafy forage crops	38	6	19	18	19														18
Arable silage/other fodder crop	88	0	3	7	0	1	1												14
Peas - human consumption	75	0	8	9	7	0	0	0	0	0	1								58
Peas - animal consumption	59	2	8	19	7	2	2	1											123
Beans - animal consumption	60	0	9	20	10	0	1												193
Vegetables (brassicae)	23	6	11	43	2	0	5	0	8	0	0	0	0	2					46
Vegetables (other)	35	5	8	12	21	10	1	6	0	0	0	0	1						61
Soft fruit	90	10																	12
Top fruit	65	6	1	19	7	2													62
Other tillage	57	4	12	8	11	3	1	5											68
All tillage	40	5	11	25	13	3	1	1	1										4491
Grass under 5 years	47	13	26	9	4	2													685
Grass 5 years and over	47	22	21	8	2														2097
All grass	47	20	22	8	2	1													2782
All crops and grass	44	13	15	17	8	2	1												7273

Source: British Survey of Fertiliser Practice 2001.

Table EW1.7 Percentage of crop area by field application rate - K_2O, England and Wales 2001

row %	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	Fields in sample
									kg/ha										
Spring wheat	66	3	13	8	7	1	0	1	1										140
Winter wheat	40	4	9	20	20	5	1	1											1533
Spring barley	32	5	24	19	16	3	0	1											587
Winter barley	25	3	9	19	25	15	2	2	2										507
Oats	28	4	13	15	23	7	7	2	0	0	1								150
Rye/Triticale/Durum wheat	52	6	6	22	8	2	0	4											21
Seed potatoes																			2
Early potatoes	26	0	0	0	3	1	11	0	0	4	13	11	16	0	6	4	4	1	20
2nd Early/Maincrop potatoes	24	0	0	2	2	3	3	3	6	11	8	3	7	13	5	8	2	1	156
Sugar beet	37	3	3	8	10	7	11	6	8	1	6	1	1						191
Spring oilseed rape	44	0	14	25	16	1	1												76
Winter oilseed rape	42	3	9	20	23	3	1												292
Linseed	55	0	14	28	0	3													16
Forage maize	45	5	16	14	11	1	0	5	1	0	1	1							107
Rootcrops for stockfeed	40	1	5	12	14	5	3	9	10	0	1								38
Leafy forage crops	38	2	21	25	8	6													18
Arable silage/other fodder crop	78	0	4	11	0	3	3	2											14
Peas - human consumption	71	0	10	5	12	1	1												58
Peas - animal consumption	46	0	12	16	15	10	0	0	1										123
Beans - animal consumption	65	4	7	12	8	2	1												193
Vegetables (brassicae)	20	3	5	0	13	1	3	18	25	5	6								46
Vegetables (other)	40	6	3	14	6	16	3	2	0	6	0	1	1						61
Soft fruit	55	3	4	15	3	20													12
Top fruit	66	2	0	1	29	0	0	2											62
Other tillage	54	3	6	7	10	6	4	4	0	0	5	0	1						68
All tillage	39	3	11	18	18	6	1	2	1	1	1								4491
Grass under 5 years	42	14	16	7	11	3	3	2	1	1									685
Grass 5 years and over	46	20	25	3	4	1	1												2097
All grass	45	18	23	5	5	2	1	1											2782
All crops and grass	43	7	16	13	13	4	1	2	1										7273

Source: British Survey of Fertiliser Practice 2001.

Table EW2.1 Average fertiliser practice by grassland utilisation, England and Wales 2001

	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	60	47	46	31	121	28	30	73	13	14	1289
Grazed - mown	84	69	73	66	141	32	50	119	22	36	1138
All grazings	69	55	56	43	130	30	39	90	16	22	2427
Cut for seed grazed	.	.	.	.	.	.	.	.	.	.	0
Cut for seed not grazed	.	.	.	.	.	.	.	.	.	.	0
All cut for seed	.	.	.	.	.	.	.	.	.	.	0
Cut for silage grazed	86	70	76	70	158	34	55	136	24	41	790
Cut for silage not grazed	76	54	60	59	186	43	73	141	23	44	190
All cut for silage	84	67	73	68	162	35	57	137	23	42	980
Cut for hay grazed	61	52	50	53	81	27	32	50	14	16	348
Cut for hay not grazed	59	43	43	14	87	27	30	52	12	13	40
All cut for hay	61	51	50	50	81	27	32	50	14	16	388
All mowings	79	63	68	64	148	34	53	117	21	36	1368
All grass	67	53	55	44	133	31	41	90	16	23	2782

Source: British Survey of Fertiliser Practice 2001.

Table EW2.2 Percentage of grass area by field application rate - N, England and Wales 2001

row %	kg/ha																		Fields in sample
	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	
Grazed - not mown	40	1	11	14	8	4	6	3	3	3	2	1	0	1	1	0	1	1	1289
Grazed - mown	20	3	7	11	10	8	9	4	4	6	5	3	2	2	1	1	0	1	1138
All grazings	33	2	10	13	9	6	7	3	3	4	3	2	1	2	1	1	1	1	2427
Cut for seed grazed																			0
Cut for seed not grazed																			0
All cut for seed																			0
Cut for silage grazed	14	2	6	10	10	9	10	5	6	8	6	4	3	3	2	2	0	1	790
Cut for silage not grazed	24	0	3	7	8	6	8	8	5	4	8	5	3	1	6	1	1	2	190
All cut for silage	16	2	6	10	9	9	9	5	5	7	6	4	3	3	2	1	0	1	980
Cut for hay grazed	39	5	10	16	13	5	6	2	1	1	1								348
Cut for hay not grazed	41	2	23	8	4	2	13	7											40
All cut for hay	39	5	12	15	12	5	7	3	1	1	1								388
All mowings	21	3	7	11	10	8	9	5	4	6	5	3	2	2	2	1	0	1	1368
All grass	33	1	8	13	7	10	5	6	3	5	3	3	1	1	1				2782

Source: British Survey of Fertiliser Practice 2001.

Table EW2.3 Percentage of grass area by field application rate - P_2O_5, England and Wales 2001

row %	kg/ha 0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	Fields in sample
Grazed - not mown	53	22	20	4	1														1289
Grazed - mown	35	23	30	10	2														1138
All grazings	46	22	24	6	2														2427
Cut for seed grazed																			0
Cut for seed not grazed																			0
All cut for seed																			0
Cut for silage grazed	30	23	32	11	3														790
Cut for silage not grazed	10	4	3	3	1	1													190
All cut for silage	33	22	29	12	3	1													980
Cut for hay grazed	48	21	25	6															348
Cut for hay not grazed	57	24	13	7															40
All cut for hay	49	21	24	6															388
All mowings	37	22	28	10	2	1													1368
All grass	47	20	22	8	2	1													2782

Source: British Survey of Fertiliser Practice 2001.

Table EW2.4 Percentage of grass area by field application rate - K_2O, England and Wales 2001

row %	kg/ha 0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	Fields in sample
Grazed - not mown	53	21	19	4	2	1													1289
Grazed - mown	31	16	27	10	6	4	3	1	1										1138
All grazings	45	19	22	6	4	2	1												2427
Cut for seed grazed																			0
Cut for seed not grazed																			0
All cut for seed																			0
Cut for silage grazed	24	16	28	12	8	5	4	2	1										790
Cut for silage not grazed	40	13	11	12	6	6	9	1	1	1									190
All cut for silage	27	15	25	12	8	5	5	2	1										980
Cut for hay grazed	49	18	24	6	1		1												348
Cut for hay not grazed	57	10	27	7															40
All cut for hay	50	17	24	6	1		1												388
All mowings	32	16	25	10	6	4	4	1	1										1368
All grass	45	18	23	5	5	2	1	1											2782

Source: British Survey of Fertiliser Practice 2001.

Table EW3.0 Product and nutrient use by month of application, England and Wales 2001.

(a) Product use

row %	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total Product ('000 tonnes)
Straight N	1	0	0	0	0	5	22	34	24	7	5	2	1782
Straight P	16	6	15	7	5	6	14	16	6	0	2	7	45
Straight K	4	3	12	13	13	13	14	19	6	1	1	1	64
Compounds	6	4	1	1	2	6	17	27	18	8	4	5	1830
All fertilisers	4	2	1	1	1	6	19	30	21	7	5	4	3722

(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	5	20	33	23	8	5	3	884
P_2O_5	10	7	3	1	4	9	17	24	14	3	2	5	215
K_2O	8	7	4	3	4	11	16	21	13	6	3	4	289
Total	4	3	1	1	2	7	19	29	20	7	4	4	1389

Note: product use refers to the total tonnage of the products used by farmers in the survey year 2001;
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 2001.

Table EW3.1 Product type as percentage of all product used by crop group, England and Wales 2001

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	1.5	1.4	0.0	0.0	2.2	0.6	1.3	0.7	0.3	1.5	0.0	1.0	1.1
Urea	4.3	8.3	0.3	0.9	15.5	3.6	7.3	2.8	0.9	2.3	0.1	2.5	5.4
Ammonium Nitrate	47.9	52.8	7.0	31.0	48.8	20.9	45.2	29.5	26.0	25.9	24.0	29.4	38.8
Other Straight N	2.0	4.9	2.0	0.8	3.3	1.4	3.8	0.7	0.3	0.7	0.0	0.8	2.6
Triple Superphosphate	1.6	1.5	0.3	0.3	1.5	2.0	1.4	0.1	0.2	0.0	0.0	0.1	0.9
Single Superphosphate	0.2	0.0	0.5	0.6	0.1	0.4	0.1	0.1	0.0	0.0	0.1	0.1	0.1
Other Straight P	0.0	0.1	0.0	5.1	0.0	0.7	0.4	0.0	0.0	0.0	0.0	0.0	0.3
Muriate of Potash	1.8	1.5	2.8	1.6	1.3	4.2	1.8	0.2	0.0	0.4	0.3	0.3	1.2
Other Straight	0.2	0.0	1.8	12.7	0.0	1.3	0.9	0.0	0.0	0.0	0.0	0.0	0.5
NP	0.4	1.0	3.4	0.1	1.0	3.1	1.2	2.3	1.3	2.0	1.4	2.5	1.7
NK	2.1	3.4	2.3	3.1	3.3	5.7	3.3	7.5	3.5	14.4	21.5	8.2	5.3
PK	12.9	16.0	4.7	30.1	12.0	28.6	16.1	2.0	3.2	2.5	2.0	2.1	10.4
Very High N	5.3	3.7	0.4	0.8	4.1	8.4	3.9	28.4	24.4	24.7	26.2	27.7	13.5
High N	13.0	1.0	15.8	0.3	0.6	8.0	3.8	22.0	38.4	21.6	12.3	21.9	11.1
High P	1.0	0.1	8.3	0.2	0.5	0.3	0.8	0.2	0.0	0.2	0.0	0.2	0.6
High K	2.8	1.6	38.2	8.9	1.0	4.7	4.9	1.2	0.0	1.8	2.2	1.1	3.3
Low N	2.0	1.8	5.7	2.0	2.7	3.3	2.3	0.5	0.6	0.7	4.0	0.6	1.6
Low P	0.1	0.1	2.1	1.5	0.1	1.6	0.4	0.5	0.2	0.8	5.1	0.5	0.5
Equal NPK	0.9	0.6	4.5	0.0	2.3	1.2	1.1	1.1	0.6	0.6	0.6	1.1	1.1
Total Product ('000 tonnes)	**241**	**1316**	**155**	**115**	**226**	**161**	**2213**	**1361**	**124**	**725**	**52**	**1510**	**3723**

NB: 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 2001.

Table EW3.2 Use of product type by crop group, England and Wales 2001

row %	spring cereal	winter cereal	potatoes	sugar beet	oilseed rape	other tillage	all tillage	grass for grazing	grass for hay	grass for silage	grass not spec	all grass	total product ('000 tonnes)
Calcium Ammonium Nitrate	8.6	42.5	0.0	0.1	11.6	2.4	65.1	23.2	1.0	25.3	0.0	34.9	43
Urea	5.1	54.5	0.2	0.5	17.5	2.9	80.7	18.8	0.6	8.2	0.0	19.3	200
Ammonium Nitrate	8.0	48.1	0.8	2.5	7.6	2.3	69.3	27.8	2.2	13.0	0.9	30.7	1445
Other Straight N	5.1	67.9	3.3	1.0	7.9	2.3	87.5	10.1	0.4	5.1	0.0	12.5	95
Triple Superphosphate	11.7	60.7	1.3	1.2	10.3	10.2	95.5	3.2	0.7	1.1	0.0	4.5	32
Single Superphosphate	9.7	12.5	18.6	16.8	4.0	15.8	77.4	22.6	0.0	1.8	1.8	22.6	4
Other Straight P	0.0	19.5	0.0	62.3	0.0	12.4	94.2	5.2	0.1	1.9	0.0	5.8	9
Muriate of Potash	9.5	45.8	9.8	4.0	6.5	15.2	90.8	6.4	0.0	6.6	0.3	9.2	44
Other Straight K	2.1	0.7	13.8	72.4	0.0	10.5	99.6	0.4	0.0	0.4	0.0	0.4	20
NP	1.7	20.0	8.1	0.2	3.4	7.7	41.1	49.8	2.6	22.1	1.1	58.9	64
NK	2.6	22.6	1.8	1.8	3.8	4.7	37.3	52.1	2.2	53.0	5.7	62.7	197
PK	8.0	54.3	1.9	8.9	7.0	11.8	91.9	6.9	1.0	4.6	0.3	8.1	389
Very High N	2.5	9.7	0.1	0.2	1.8	2.7	17.0	76.9	6.0	35.5	2.7	83.0	504
High N	7.6	3.1	5.9	0.1	0.3	3.1	20.1	72.5	11.5	37.9	1.6	79.9	413
High P	11.2	5.7	61.0	0.9	4.9	2.3	86.1	13.9	0.0	6.2	0.0	13.9	21
High K	5.4	17.4	48.1	8.3	1.8	6.1	87.1	12.9	0.0	10.4	0.9	12.9	123
Low N	8.0	39.5	14.5	3.8	9.8	8.8	84.5	11.7	1.3	7.9	3.4	15.5	61
Low P	1.6	10.6	18.1	9.6	0.7	14.3	54.9	38.0	1.1	32.3	14.6	45.1	18
Equal NPK	5.5	20.0	17.2	0.0	12.6	4.9	60.3	38.5	1.9	10.0	0.8	39.7	41
All Fertilisers	**6.5**	**35.3**	**4.2**	**3.1**	**6.1**	**4.3**	**59.4**	**36.6**	**3.3**	**19.5**	**1.4**	**40.6**	**3723**

NB: 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 2001.

Table EW3.3 Product use by month of application, England and Wales 2001.

row %	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	total Product ('000 tonnes)
Calcium Ammonium Nitrate	0.0	2.7	21.7	38.8	22.6	5.3	5.5	2.8	0.6	0.0	0.0	0.0	43
Urea	0.4	7.7	26.1	35.7	21.1	3.5	3.5	0.3	0.5	1.3	0.0	0.0	200
Ammonium Nitrate	0.1	4.1	21.9	34.7	23.7	7.2	4.3	2.6	1.2	0.2	0.0	0.0	1445
Other straight N	0.6	9.4	9.2	19.5	35.2	7.4	16.6	1.5	0.7	0.0	0.0	0.0	95
Triple Superphosphate	4.8	6.3	11.3	20.0	6.8	0.3	1.2	9.7	19.6	8.0	4.7	7.2	32
Single Superphosphate	0.0	16.8	27.9	20.4	1.7	0.0	17.5	0.0	15.6	0.0	0.0	0.0	4
Other Straight P	5.9	0.0	16.4	2.4	4.6	0.9	0.0	2.4	2.9	0.0	54.7	9.7	9
Muriate of Potash	14.2	11.0	16.5	22.9	8.4	1.2	1.1	1.6	6.2	3.7	8.6	4.6	44
Other Straight K	9.7	18.4	7.9	9.8	1.9	0.0	0.0	0.4	0.3	0.2	19.9	31.4	20
NP	0.2	18.3	26.5	30.0	12.5	3.9	2.0	0.8	4.2	1.2	0.4	0.0	64
NK	0.2	3.8	12.0	18.6	22.6	26.2	7.7	5.7	2.2	0.1	0.0	0.9	197
PK	7.0	11.9	11.1	12.1	6.8	0.5	1.2	6.2	19.7	15.7	6.2	1.6	389
Very High N	0.0	4.0	19.2	31.9	18.1	10.6	6.9	6.2	1.9	1.0	0.1	0.0	504
High N	0.2	1.9	16.1	36.1	29.0	7.6	5.4	2.7	0.9	0.2	0.0	0.0	413
High P	0.0	0.6	8.1	46.7	18.8	0.0	0.1	13.9	10.0	1.7	0.0	0.0	21
High K	1.1	8.6	33.6	37.1	14.7	0.4	0.8	0.5	0.0	3.1	0.0	0.0	123
Low N	8.4	14.8	25.9	20.0	15.8	1.1	2.0	3.6	2.9	3.6	2.1	0.0	61
Low P	0.0	0.7	23.6	37.8	5.6	32.6	0.0	0.1	0.0	0.0	0.0	0.0	18
Equal NPK	0.0	7.6	23.0	36.1	16.5	1.6	2.7	2.9	4.6	1.0	0.0	3.8	40
All Fertilisers	**1.3**	**5.7**	**19.4**	**30.3**	**20.5**	**7.2**	**4.6**	**3.5**	**3.5**	**2.3**	**1.1**	**0.6**	**3722**

NB: 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 2001.

Table EW4.1 Average fertiliser practice on tillage and grassland by DEFRA region, 2001

		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	82	60	73	27	177	57	83	146	34	61	178
	All grass	60	41	42	33	125	28	41	75	12	17	187
	All crops & grass	68	47	53	31	148	41	62	100	20	33	365
Anglia	All tillage	89	49	43	9	163	79	89	145	39	38	1185
	All grass	61	27	27	2	108	42	52	66	11	14	119
	All crops & grass	87	47	42	9	160	77	87	140	37	36	1304
Northern	All tillage	86	73	80	21	138	66	73	118	48	58	199
	All grass	62	53	55	48	117	29	34	72	15	19	426
	All crops & grass	66	56	59	43	121	37	43	80	21	25	625
North East	All tillage	88	61	67	17	161	63	83	141	39	55	773
	All grass	70	56	57	32	132	32	41	93	18	23	332
	All crops & grass	80	59	63	23	150	51	67	121	30	42	1105
North Mercia	All tillage	84	68	71	40	128	52	80	108	35	57	216
	All grass	76	52	55	59	175	32	50	133	16	27	215
	All crops & grass	79	57	60	53	159	39	61	125	22	37	431
South Mercia	All tillage	87	64	65	15	147	61	70	128	39	46	278
	All grass	55	36	36	26	175	39	50	96	14	18	103
	All crops & grass	73	52	53	19	156	55	64	114	28	34	381
East Midland	All tillage	86	51	51	7	179	75	84	154	38	43	737
	All grass	50	39	37	35	138	29	31	69	11	12	185
	All crops & grass	77	48	48	14	172	65	74	133	31	35	922
South East	All tillage	89	71	74	13	181	64	69	160	46	51	646
	All grass	51	30	31	21	145	39	48	74	12	15	261
	All crops & grass	72	53	55	16	170	58	64	123	31	35	907
South West	All tillage	84	75	75	48	120	62	74	101	46	55	181
	All grass	81	61	67	60	172	32	50	139	19	33	277
	All crops & grass	82	64	69	57	160	40	56	131	25	38	458
Wales	All tillage	81	78	82	42	103	55	62	84	43	51	98
	All grass	74	67	67	51	110	28	39	81	19	26	677
	All crops & grass	74	68	67	50	110	30	40	81	20	27	775

Source: British Survey of Fertiliser Practice 2001.

Table EW5.1 Average fertiliser practice on dairy farms, England and Wales 2001

	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	64	33	33	82	110	49	54	71	16	18	9
Winter wheat	95	65	68	46	174	52	67	165	34	46	48
Spring barley	90	58	72	45	74	41	55	66	24	40	65
Winter barley	95	79	82	69	132	47	59	125	38	48	34
Oats	58	38	38	27	106	25	26	62	9	10	8
Rye/Triticale/Durum wheat	.	.	.	.	.	.	.	.	.	.	2
Seed potatoes	.	.	.	.	.	.	.	.	.	.	0
Early potatoes	.	.	.	.	.	.	.	.	.	.	1
2nd Early/Maincrop potatoes	.	.	.	.	.	.	.	.	.	.	2
Sugar beet	.	.	.	.	.	.	.	.	.	.	2
Spring oilseed rape	.	.	.	.	.	.	.	.	.	.	3
Winter oilseed rape	.	.	.	.	.	.	.	.	.	.	3
Linseed	.	.	.	.	.	.	.	.	.	.	0
Forage maize	73	52	58	86	62	63	74	46	33	43	57
Rootcrops for stockfeed	63	54	71	62	102	40	72	64	22	51	11
Leafy forage crops	.	.	.	.	.	.	.	.	.	.	4
Arable silage/other fodder crop	.	.	.	.	.	.	.	.	.	.	4
Peas - human consumption	.	.	.	.	.	.	.	.	.	.	2
Peas - animal consumption	.	.	.	.	.	.	.	.	.	.	2
Beans - animal consumption	.	.	.	.	.	.	.	.	.	.	1
Vegetables (brassicae)	.	.	.	.	.	.	.	.	.	.	1
Vegetables (other)	.	.	.	.	.	.	.	.	.	.	0
Soft fruit	.	.	.	.	.	.	.	.	.	.	0
Top fruit	.	.	.	.	.	.	.	.	.	.	0
Other tillage	.	.	.	.	.	.	.	.	.	.	1
All tillage	83	59	67	62	104	51	62	86	30	41	260
Grass under 5 years	77	54	60	69	211	33	62	163	18	37	266
Grass 5 years and over	85	61	65	70	180	32	51	152	20	33	491
All grass	83	59	64	69	188	33	53	155	19	34	757
All crops and grass	83	59	64	69	177	35	54	147	21	35	1017

Source: British Survey of Fertiliser Practice 2001.

Table EW5.2 Average fertiliser practice on cattle and sheep farms, England and Wales 2001

	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	87	67	71	63	162	78	87	141	52	62	16
Spring barley	95	76	80	35	102	40	45	97	30	36	53
Winter barley	87	89	93	43	119	58	69	104	52	64	23
Oats	55	59	64	13	79	66	70	43	39	45	12
Rye/Triticale/Durum wheat	.	.	.	.	.	.	.	.	.	.	3
Seed potatoes	.	.	.	.	.	.	.	.	.	.	0
Early potatoes	.	.	.	.	.	.	.	.	.	.	1
2nd Early/Maincrop potatoes	100	100	52	52	172	195	228	172	195	119	6
Sugar beet	.	.	.	.	.	.	.	.	.	.	0
Spring oilseed rape	.	.	.	.	.	.	.	.	.	.	0
Winter oilseed rape	.	.	.	.	.	.	.	.	.	.	2
Linseed	.	.	.	.	.	.	.	.	.	.	0
Forage maize	58	100	88	100	86	55	57	50	55	50	5
Rootcrops for stockfeed	100	82	100	100	125	107	159	125	88	159	6
Leafy forage crops	65	65	65	81	72	31	31	47	20	20	8
Arable silage/other fodder crop	.	.	.	.	.	.	.	.	.	.	1
Peas - human consumption	.	.	.	.	.	.	.	.	.	.	0
Peas - animal consumption	.	.	.	.	.	.	.	.	.	.	0
Beans - animal consumption	.	.	.	.	.	.	.	.	.	.	3
Vegetables (brassicae)	.	.	.	.	.	.	.	.	.	.	0
Vegetables (other)	.	.	.	.	.	.	.	.	.	.	2
Soft fruit	.	.	.	.	.	.	.	.	.	.	0
Top fruit	.	.	.	.	.	.	.	.	.	.	0
Other tillage	.	.	.	.	.	.	.	.	.	.	0
All tillage	80	70	73	42	118	57	65	94	40	47	142
Grass under 5 years	71	62	64	43	134	37	50	94	23	32	165
Grass 5 years and over	59	53	53	39	85	26	29	50	14	15	999
All grass	60	54	53	39	89	27	30	53	14	16	1164
All crops and grass	60	54	54	39	90	28	32	54	15	17	1306

Source: British Survey of Fertiliser Practice 2001.

Table EW5.3 Average fertiliser practice on other livestock/mixed farms, England and Wales 2001

	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	46	46	13	187	98	64	181	45	29	20
Winter wheat	95	50	55	26	180	64	60	170	32	33	283
Spring barley	94	62	66	31	106	44	48	100	27	31	112
Winter barley	92	56	64	38	146	70	73	135	39	47	99
Oats	80	64	64	13	104	49	44	84	31	29	33
Rye/Triticale/Durum wheat	.	.	.	.	.	.	.	.	.	.	3
Seed potatoes	.	.	.	.	.	.	.	.	.	.	1
Early potatoes	.	.	.	.	.	.	.	.	.	.	1
2nd Early/Maincrop potatoes	46	45	53	58	181	193	210	83	87	111	19
Sugar beet	80	8	41	68	93	71	94	75	5	38	22
Spring oilseed rape	100	48	49	3	144	67	55	144	33	27	18
Winter oilseed rape	100	34	41	16	186	59	58	186	20	24	55
Linseed	67	43	43	0	39	25	25	26	11	11	5
Forage maize	62	51	50	84	94	48	77	58	24	38	35
Rootcrops for stockfeed	25	25	25	100	99	105	105	25	26	26	5
Leafy forage crops	.	.	.	.	.	.	.	.	.	.	3
Arable silage/other fodder crop	5	12	22	30	59	60	99	3	7	21	7
Peas - human consumption	8	38	8	40	40	213	64	3	81	5	6
Peas - animal consumption	15	42	57	20	11	71	79	2	30	45	17
Beans - animal consumption	2	39	38	2	50	56	58	1	22	22	35
Vegetables (brassicae)	.	.	.	.	.	.	.	.	.	.	4
Vegetables (other)	27	41	41	40	39	86	64	11	36	27	11
Soft fruit	.	.	.	.	.	.	.	.	.	.	2
Top fruit	.	.	.	.	.	.	.	.	.	.	0
Other tillage	.	.	.	.	.	.	.	.	.	.	3
All tillage	83	50	55	30	152	63	64	126	32	35	799
Grass under 5 years	65	39	42	37	168	47	56	109	18	24	112
Grass 5 years and over	59	43	44	23	112	31	36	66	14	16	215
All grass	61	42	43	27	127	35	41	77	15	18	327
All crops and grass	72	46	49	28	141	50	53	101	23	26	1126

Source: British Survey of Fertiliser Practice 2001.

Table EW5.4 Average fertiliser practice on cropping/horticultural farms, England and Wales 2001

	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	38	32	5	136	49	59	136	19	19	110
Winter wheat	98	64	61	8	190	67	72	186	42	44	1186
Spring barley	97	64	66	10	116	49	60	112	31	40	357
Winter barley	99	70	77	6	141	64	87	139	45	67	351
Oats	98	79	76	8	119	66	85	117	52	65	97
Rye/Triticale/Durum wheat	93	17	43	8	75	78	90	70	13	39	13
Seed potatoes	.	.	.	.	.	.	.	.	.	.	1
Early potatoes	100	84	100	16	193	180	288	193	150	288	17
2nd Early/Maincrop potatoes	92	81	84	36	185	174	244	170	141	205	129
Sugar beet	98	52	71	22	107	75	126	105	39	89	167
Spring oilseed rape	94	61	58	3	156	53	66	146	33	39	55
Winter oilseed rape	98	66	60	8	211	66	70	208	44	42	232
Linseed	92	45	45	5	73	46	63	67	21	28	11
Forage maize	81	36	32	73	124	66	151	101	24	49	10
Rootcrops for stockfeed	90	40	49	68	75	64	131	67	26	64	16
Leafy forage crops	.	.	.	.	.	.	.	.	.	.	3
Arable silage/other fodder crop	.	.	.	.	.	.	.	.	.	.	2
Peas - human consumption	3	24	31	13	86	56	68	3	13	21	50
Peas - animal consumption	5	40	54	8	33	62	63	2	25	34	104
Beans - animal consumption	6	41	34	9	50	55	65	3	22	22	154
Vegetables (brassicae)	89	86	89	21	211	87	166	187	74	147	41
Vegetables (other)	59	71	65	16	95	73	98	56	52	64	48
Soft fruit	81	7	39	31	84	13	72	68	1	28	10
Top fruit	84	35	34	6	76	55	70	64	19	24	62
Other tillage	68	41	43	3	109	74	106	74	30	46	64
All tillage	88	61	62	10	169	69	84	150	42	52	3290
Grass under 5 years	85	61	64	11	160	41	70	135	25	45	142
Grass 5 years and over	64	46	45	8	103	34	40	65	15	18	392
All grass	68	49	49	8	118	36	49	81	18	24	534
All crops and grass	86	60	60	10	164	65	80	140	39	48	3824

Source: British Survey of Fertiliser Practice 2001.

Table SC1.1 Total fertiliser use, Scotland 2001

	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	48	48	6	146	51	61	146	24	29	9
Winter wheat	99	82	93	9	229	70	80	227	58	75	140
Spring barley	99	97	97	45	120	62	70	119	61	68	366
Winter barley	98	83	97	35	181	66	77	178	55	75	89
Oats	93	88	93	22	127	50	55	118	44	51	52
Seed potatoes	95	64	64	36	163	150	194	154	97	124	7
2nd Early/Maincrop potatoes	91	93	93	27	138	125	203	127	116	189	37
Spring oilseed rape	100	100	100	18	114	66	65	114	66	65	11
Winter oilseed rape	100	91	97	5	210	66	70	210	60	68	34
Rootcrops for stockfeed	94	94	94	48	80	92	106	75	87	100	29
Leafy forage crops	79	79	79	52	83	45	45	66	36	36	20
Arable silage/other fodder crop	96	59	72	67	168	58	71	161	34	51	23
Peas - animal consumption	9	9	9	57	14	60	60	1	5	5	5
Vegetables (other)	57	36	36	0	31	98	92	18	36	33	6
All tillage	97	89	93	34	151	67	77	147	60	72	844
Grass under 5 years	90	82	79	42	154	44	54	139	36	43	391
Grass 5 years and over	82	73	69	37	122	35	40	100	25	27	491
All grass	85	76	72	39	133	38	45	113	29	33	882
All crops and grass	90	81	81	37	141	51	60	127	41	49	1726

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

Source: British Survey of Fertiliser Practice 2001.

Table SC1.2 Use of straight fertiliser, Scotland 2001

	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	94	0	0	133	0	0	125	0	0	9
Winter wheat	97	2	10	213	93	130	205	1	12	140
Spring barley	62	1	1	78	61	107	48	0	1	366
Winter barley	92	1	26	169	75	82	155	0	21	89
Oats	41	0	0	146	0	0	60	0	0	52
Seed potatoes	11	0	0	40	0	0	4	0	0	7
2nd Early/Maincrop potatoes	12	0	5	44	0	102	5	0	5	37
Spring oilseed rape	60	0	0	109	0	0	66	0	0	11
Winter oilseed rape	97	4	13	188	75	90	183	3	12	34
Rootcrops for stockfeed	6	0	0	73	0	0	4	0	0	29
Leafy forage crops	23	0	0	81	0	0	19	0	0	20
Arable silage/other fodder crop	58	0	0	99	0	0	57	0	0	23
Peas - animal consumption	17	0	0	45	0	0	8	0	0	5
Vegetables (other)	25	0	0	26	0	0	6	0	0	6
All tillage	68	1	6	134	74	99	91	1	6	844
Grass under 5 years	43	1	1	103	185	185	45	1	2	391
Grass 5 years and over	30	0	0	97	49	91	29	0	0	491
All grass	35	0	1	100	128	156	35	1	1	882
All crops and grass	49	1	3	119	96	107	58	1	3	1726

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

Source: British Survey of Fertiliser Practice 2001.

Table SC1.3 Use of compound fertiliser, Scotland 2001

	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	48	48	48	44	51	61	21	24	29	9
Winter wheat	51	81	83	42	70	75	22	56	62	140
Spring barley	90	97	96	78	62	70	71	60	67	366
Winter barley	70	82	80	33	66	67	23	54	54	89
Oats	89	88	93	65	50	55	58	44	51	52
Seed potatoes	74	64	64	201	150	194	149	97	124	7
2nd Early/Maincrop potatoes	85	93	89	143	125	208	121	116	184	37
Spring oilseed rape	66	100	100	73	66	65	48	66	65	11
Winter oilseed rape	80	97	84	34	66	67	27	58	56	34
Rootcrops for stockfeed	94	94	94	80	92	106	75	87	100	29
Leafy forage crops	79	79	79	83	45	45	66	36	36	20
Arable silage/other fodder crop	72	59	72	143	58	71	103	34	51	23
Peas - animal consumption	9	9	9	14	60	60	1	5	5	5
Vegetables (other)	25	36	36	45	98	92	11	36	33	6
All tillage	79	89	89	72	66	75	57	59	67	844
Grass under 5 years	80	82	78	118	42	52	95	34	40	391
Grass 5 years and over	70	72	69	100	35	40	70	25	27	491
All grass	73	76	72	107	38	44	79	28	32	882
All crops and grass	75	81	79	92	50	58	70	41	46	1726

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

Source: British Survey of Fertiliser Practice 2001.

Table SC1.4 Use of lime, Scotland 2001

	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	.	.	.	.	.	.	.	.	.	.	.	.	0	9
Winter wheat	.	.	.	.	.	.	.	.	.	.	.	.	4	140
Spring barley	8.1	0.3	6.0	.	0.6	15.0	2.2	2.5	1.9	.	3.7	2.1	52	366
Winter barley	4.3	.	3.5	.	.	7.8	2.2	.	2.1	.	.	2.2	10	89
Oats	.	.	.	.	.	.	.	.	.	.	.	.	0	52
Seed potatoes	.	.	.	.	.	.	.	.	.	.	.	.	0	7
2nd Early/Maincrop potatoes	.	.	.	.	.	.	.	.	.	.	.	.	0	37
Spring oilseed rape	.	.	.	.	.	.	.	.	.	.	.	.	0	11
Winter oilseed rape	7.0	.	14.7	.	.	21.7	2.5	.	1.9	.	.	2.1	6	34
Rootcrops for stockfeed	.	.	.	.	.	.	.	.	.	.	.	.	0	29
Leafy forage crops	.	.	.	.	.	.	.	.	.	.	.	.	2	20
Arable silage/other fodder crop	.	.	.	.	.	.	.	.	.	.	.	.	1	23
Peas - animal consumption	.	.	.	.	.	.	.	.	.	.	.	.	0	5
Vegetables (other)	.	.	.	.	.	.	.	.	.	.	.	.	2	6
All tillage	5.0	.	4.6	.	0.3	10.0	2.2	.	1.9	.	3.7	2.1	77	844
Grass under 5 years	0.6	.	1.2	.	0.2	2.0	2.5	.	1.7	.	0.3	1.8	12	391
Grass 5 years and over	0.1	.	0.5	.	.	0.6	3.0	.	1.8	.	.	2.0	7	491
All grass	0.3	.	0.7	.	0.1	1.1	2.6	.	1.7	.	0.3	1.9	19	882
All crops and grass	2.2	.	2.3	.	0.2	4.7	2.3	.	1.9	.	2.9	2.1	96	1726

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

Source: British Survey of Fertiliser Practice 2001.

Table SC1.5 Percentage of crop area by field application rate - N, Scotland 2001

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	0	0	0	0	10	15	58	10	5	2									9
Winter wheat	1	4	0	3	3	2	6	10	26	14	12	12	4	3					140
Spring barley	1	1	3	15	23	30	20	1	4	2									366
Winter barley	2	1	2	3	8	3	9	13	25	21	9	4							89
Oats	7	0	7	16	42	10	3	1	0	5	3	5							52
Seed potatoes	5	0	0	0	0	11	60	15	0	0	9								7
2nd Early/Maincrop potatoes	8	6	5	12	3	0	16	28	9	8	5								37
Spring oilseed rape	0	10	5	5	25	0	34	17	0	5									11
Winter oilseed rape	0	2	0	4	5	7	0	5	7	11	25	25	5	3					34
Rootcrops for stockfeed	6	0	4	33	45	7	0	5											29
Leafy forage crops	21	9	0	16	24	22	8												20
Arable silage/other fodder crop	4	4	5	26	27	1	1	1	2	19	0	5	5						23
Peas - animal consumption	91	9																	5
Vegetables (other)	43	0	0	42	5	10													6
All tillage	2	2	3	11	18	17	16	6	8	7	4	4	1	1					844
Grass under 5 years	10	3	6	7	10	16	9	13	8	6	5	3	2	2	1				391
Grass 5 years and over	18	1	10	15	12	8	13	6	7	6	3	1	1	1					491
All grass	15	2	8	11	11	11	11	9	8	6	4	1	1	1	1				882
All crops and grass	10	2	5	12	14	13	14	7	8	6	4	2	1	1	1				1726

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

Source: British Survey of Fertiliser Practice 2001.

Table SC1.6 Percentage of crop area by field application rate - P_2O_5, Scotland 2001

row %	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	Fields in sample
									kg/ha										
Spring wheat	52	7	10	25	6														9
Winter wheat	17	7	3	32	37	4													140
Spring barley	3	4	21	54	15	0	0	3											366
Winter barley	17	7	18	21	28	7	0	0	1										89
Oats	12	3	44	35	4	1													52
Seed potatoes	36	0	0	0	0	0	59	0	0	5									7
2nd Early/Maincrop potatoes	7	6	5	9	0	21	24	22	3	0	4								37
Spring oilseed rape	0	0	23	48	29														11
Winter oilseed rape	9	1	23	27	38	2													34
Rootcrops for stockfeed	6	0	10	3	58	7	11	3	1	1									29
Leafy forage crops	21	10	41	28															20
Arable silage/other fodder crop	41	4	11	39	0	0	5												23
Peas - animal consumption	91	0	0	9															5
Vegetables (other)	64	0	35	0	0	0	0	0	0	0	0	1							6
All tillage	11	5	18	41	20	2	2	1											844
Grass under 5 years	18	23	35	18	4	2	1												391
Grass 5 years and over	27	30	30	10	2	1	0	0	0	0	1	1							491
All grass	24	27	32	13	3	1	1												882
All crops and grass	19	16	25	25	11	2	1	1											1726

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

Source: British Survey of Fertiliser Practice 2001.

Table SC1.7 Percentage of crop area by field application rate - K_2O, Scotland 2001

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	52	7	0	25	16														9
Winter wheat	7	7	4	29	32	15	0	6											140
Spring barley	3	4	17	46	22	3	1	0	0	0	3								366
Winter barley	3	1	18	26	32	12	1	1	4										89
Oats	7	3	40	39	8	3													52
Seed potatoes	36	0	0	0	0	0	17	13	0	33									7
2nd Early/Maincrop potatoes	7	4	4	4	5	7	0	4	10	9	22	17	0	8					37
Spring oilseed rape	0	0	28	27	45														11
Winter oilseed rape	3	18	4	23	41	12													34
Rootcrops for stockfeed	6	0	12	14	23	5	34	1	2	2									29
Leafy forage crops	21	12	45	22															20
Arable silage/other fodder crop	28	4	11	36	0	15	5												23
Peas - animal consumption	91	0	0	9															5
Vegetables (other)	64	0	0	0	26	0	10												6
All tillage	7	5	15	36	23	7	2	2	1	1	2	1							844
Grass under 5 years	21	20	18	20	14	3	2	1	1										391
Grass 5 years and over	31	30	22	8	3	3	2	1	0	0	1	1							491
All grass	28	25	20	13	9	3	2	1											882
All crops and grass	19	16	17	24	15	4	2	1	1	0	1	1							1726

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

Source: British Survey of Fertiliser Practice 2001.

Table SC2.1 Average fertiliser practice by grassland utilisation, Scotland 2001

	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	81	71	66	28	111	33	33	90	23	22	490
Grazed - mown	93	82	82	58	172	48	68	160	39	56	249
All grazings	84	74	70	36	128	37	43	107	27	30	739
Cut for seed grazed	.	.	.	.	.	.	.	.	.	.	0
Cut for seed not grazed	.	.	.	.	.	.	.	.	.	.	0
All cut for seed	.	.	.	.	.	.	.	.	.	.	0
Cut for silage grazed	92	81	80	60	182	50	69	167	40	55	200
Cut for silage not grazed	100	97	98	68	171	45	63	171	44	62	91
All cut for silage	94	87	86	63	178	48	67	168	42	57	291
Cut for hay grazed	93	73	84	38	101	30	61	94	22	51	49
Cut for hay not grazed	85	85	85	55	138	41	41	117	35	35	30
All cut for hay	90	77	84	43	113	34	54	102	27	46	79
All mowings	94	86	86	60	171	46	65	160	40	56	370
All grass	85	76	72	39	133	38	45	113	29	33	882

Source: British Survey of Fertiliser Practice 2001.

Table SC2.2 Percentage of grass area by field application rate - N, Scotland 2001

row %	kg/ha																		Fields in sample
	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	
Grazed - not mown	19	2	11	16	13	11	12	5	6	3	2								490
Grazed - mown	15	0	3	7	10	10	11	14	10	8	7	4	4	5	0	2	1		249
All grazings	16	2	9	14	11	11	12	8	7	5	3	2	1	1	0	1	1		739
Cut for silage grazed	5	0	3	7	8	19	11	15	11	9	7	5	5	6	0	2	1		200
Cut for silage not grazed	2	1	0	3	11	6	23	16	12	16	8	2	0	0	0	2			91
All cut for silage	4	0	1	4	9	18	15	15	11	11	7	4	3	4	0	2	1	1	291
Cut for hay grazed	7	0	5	20	24	14	14	4	5	1	6								49
Cut for hay not grazed	11	0	0	7	17	20	10	11	17	4	1	2							30
All cut for hay	9	0	3	15	21	16	12	7	10	2	4	1							79
All mowings	4	0	1	6	10	17	15	14	11	10	7	4	3	3	0	1	1	1	370
All grass	14	1	8	14	13	10	12	8	7	5	5	2	2	1	0	1	1		882

Source: British Survey of Fertiliser Practice 2001.

Table SC2.3 Percentage of grass area by field application rate - P_2O_5, Scotland 2001

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	29	34	25	10	1	1													490
Grazed - mown	17	12	38	20	9	2	1												249
All grazings	26	29	28	12	3	1													739
Cut for silage grazed	15	11	37	23	10	2	2												200
Cut for silage not grazed	3	10	53	24	8	0	2												91
All cut for silage	11	10	43	23	9	1	2												291
Cut for hay grazed	26	20	47	5	1	1													49
Cut for hay not grazed	11	26	17	37	8	1													30
All cut for hay	20	22	35	18	4	1													79
All mowings	12	11	24	20	19	6	4	2	1										370
All grass	24	27	30	14	3	1	1												882

Source: British Survey of Fertiliser Practice 2001.

Table SC2.4 Percentage of grass area by field application rate - K_2O, Scotland 2001

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	34	33	20	10	1	1	1												490
Grazed - mown	16	10	18	22	19	6	4	3	1										249
All grazings	29	28	20	13	5	2	2	1											739
Cut for silage grazed	16	9	15	23	21	7	5	3											200
Cut for silage not grazed	3	9	38	15	20	7	3	2	2										91
All cut for silage	12	9	23	21	21	7	4	2	1										291
Cut for hay grazed	16	12	41	17	4	8	1												49
Cut for hay not grazed	11	26	32	22	8														30
All cut for hay	14	18	37	19	6	1	5												79
All mowings	12	13	42	22	8	1	2												370
All grass	27	26	21	13	7	2	2	1											882

Source: British Survey of Fertiliser Practice 2001.

Table SC3.0 Product and nutrient use by month of application, Scotland 2001.

(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	3	23	33	26	7	4	3	281
Straight P	8	35	4	0	0	0	20	6	5	11	0	11	2
Straight K	1	0	0	1	0	5	8	69	9	3	0	4	13
Compounds	3	2	1	0	0	2	12	52	14	8	5	2	748
All fertilisers	2	1	1	0	0	2	15	47	17	7	5	2	1045

(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	2	17	45	18	9	5	3	227
P_2O_5	5	4	1	0	1	4	13	50	13	5	3	2	81
K_2O	4	3	1	0	1	3	12	50	14	6	4	2	94
Total	3	2	1	0	0	2	15	47	16	7	5	3	402

Note: product use refers to the total tonnage of the products used by farmers in the survey year 2001;
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 2001.

Table SC3.1 Product type as percentage of all product used by crop group, Scotland 2001

column %	spring cereal	winter cereal	potatoes	sugar beet	oilseed rape	other tillage	all tillage	grass for grazing	grass for hay	grass for silage	grass not spec	all grass	all crops and grass
Calcium Ammonium Nitrate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Urea	0.5	2.1	0.0	0.0	1.4	0.7	1.1	1.7	0.6	0.8	0.0	1.4	1.3
Ammonium Nitrate	26.3	58.9	1.2	0.0	55.5	10.4	36.6	15.2	8.6	11.1	11.8	14.4	24.1
Other Straight N	2.4	4.0	1.2	0.0	5.8	2.3	3.1	0.5	0.0	0.3	0.0	0.4	1.6
Triple Superphosphate	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
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	0.1	0.2	0.0	0.0	0.9	0.0	0.2	0.2	0.0	0.1	0.0	0.2	0.2
Muriate of Potash	0.0	1.5	0.7	0.0	1.4	0.0	0.7	0.2	0.0	0.0	0.0	0.1	0.4
Other Straight K	0.2	1.2	0.0	0.0	0.7	0.0	0.5	1.4	6.2	0.1	0.0	1.2	0.9
NP	1.8	0.7	2.1	0.0	0.9	0.2	1.2	3.3	0.2	1.5	5.2	3.3	2.4
NK	0.8	2.2	0.0	0.0	2.6	2.4	1.5	1.1	0.5	2.1	1.8	1.3	1.4
PK	4.6	9.9	3.7	0.0	5.4	2.8	6.3	1.6	0.4	1.4	3.4	1.6	3.7
Very High N	3.5	0.6	0.0	0.0	0.0	8.3	2.5	35.8	45.0	31.4	48.3	38.5	22.8
High N	16.5	1.9	10.4	0.0	1.7	15.3	9.9	35.5	36.7	46.8	18.6	33.4	23.2
High P	0.4	0.6	8.7	0.0	3.4	1.9	1.3	0.6	0.0	0.3	0.0	0.5	0.9
High K	11.6	1.4	61.7	0.0	0.6	11.1	10.2	0.6	0.3	1.0	0.0	0.8	5.0
Low N	10.4	14.1	0.0	0.0	13.2	37.7	14.1	0.7	0.0	0.8	1.3	0.7	6.6
Low P	3.2	0.0	10.2	0.0	1.2	0.0	2.0	0.4	0.8	0.4	0.0	0.4	1.1
Equal NPK	17.5	0.8	0.2	0.0	5.4	6.9	8.6	1.1	0.8	1.9	9.7	1.8	4.8
Total Product ('000 tonnes)	**190**	**161**	**28**	**0**	**30**	**48**	**457**	**488**	**50**	**311**	**22**	**589**	**1045**

NB: 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 2001.

Table SC3.2 Use of product type by crop group, Scotland 2001

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	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
Urea	6.6	25.4	0.0	0.0	3.0	2.7	37.8	62.2	2.1	18.2	0.0	62.2	13
Ammonium Nitrate	19.9	37.8	0.1	0.0	6.6	2.0	66.3	29.4	1.7	13.7	1.0	33.7	252
Other Straight N	27.6	39.2	2.0	0.0	10.6	6.8	86.2	13.8	0.0	5.8	0.0	13.8	16
Triple Superphosphate	43.2	42.0	0.0	0.0	0.0	0.0	85.2	14.8	0.0	14.8	0.0	14.8	0
Single Superphosphate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Other Straight P	11.4	14.8	0.0	0.0	13.5	0.0	39.7	60.3	0.0	10.2	0.0	60.3	2
Muriate of Potash	1.4	62.3	4.8	0.0	10.7	0.0	79.3	20.7	0.0	3.8	0.0	20.7	4
Other Straight K	4.5	20.2	0.0	0.0	2.1	0.0	26.8	73.2	32.8	3.9	0.0	73.2	9
NP	13.8	4.4	2.3	0.0	1.0	0.4	22.0	66.2	0.3	19.5	4.7	78.0	25
NK	10.0	24.7	0.0	0.0	5.3	8.0	47.9	36.1	1.7	44.9	2.7	52.1	15
PK	23.0	41.6	2.7	0.0	4.2	3.5	75.0	20.1	0.5	11.2	2.0	25.0	38
Very High N	2.8	0.4	0.0	0.0	0.0	1.7	4.9	73.3	9.4	40.9	4.5	95.1	238
High N	13.0	1.3	1.2	0.0	0.2	3.0	18.7	71.5	7.5	60.0	1.7	81.3	242
High P	7.8	10.0	26.6	0.0	11.1	10.3	65.9	34.1	0.0	10.4	0.0	34.1	9
High K	42.5	4.4	32.8	0.0	0.3	10.3	90.4	5.6	0.3	5.9	0.0	9.6	52
Low N	28.9	33.1	0.0	0.0	5.8	26.4	94.3	5.3	0.0	3.5	0.4	5.7	69
Low P	52.8	0.4	24.6	0.0	3.2	0.0	81.1	18.9	3.5	11.6	0.0	18.9	11
Equal NPK	66.7	2.5	0.1	0.0	3.2	6.6	79.2	11.2	0.8	11.8	4.3	20.8	50
All Fertilisers	**18.2**	**15.4**	**2.6**	**0.0**	**2.8**	**4.6**	**43.7**	**46.7**	**4.7**	**29.7**	**2.1**	**56.3**	**1045**

NB: 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 2001.

Table SC3.3 Product use by month of application, Scotland 2001.

row %	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	total Product ('000 tonnes)
Calcium Ammonium Nitrate	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
Urea	0.0	1.9	42.0	37.1	12.9	0.9	3.0	2.2	0.0	0.0	0.0	0.0	13
Ammonium Nitrate	0.0	3.4	22.1	33.3	25.7	7.3	3.9	2.9	1.0	0.1	0.4	0.0	252
Other straight N	0.0	5.3	25.5	23.0	39.1	4.9	0.0	0.0	0.0	0.0	2.3	0.0	16
Triple Superphosphate	0.0	0.0	58.3	0.0	26.9	14.8	0.0	0.0	0.0	0.0	0.0	0.0	0
Single Superphosphate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Other Straight P	0.0	0.0	11.4	7.1	0.0	10.2	0.0	13.5	9.4	43.0	5.4	0.0	2
Muriate of Potash	0.0	17.0	17.1	23.1	30.8	9.5	0.0	0.0	0.0	0.0	0.0	2.6	4
Other Straight K	0.0	0.0	5.0	87.5	0.0	0.0	0.0	6.0	1.5	0.0	0.0	0.0	9
NP	0.0	2.8	33.1	50.4	4.6	2.9	2.5	2.2	1.6	0.0	0.0	0.0	25
NK	0.0	0.0	17.9	43.4	23.2	10.2	5.3	0.0	0.0	0.0	0.0	0.0	15
PK	5.5	22.0	19.4	13.3	6.3	0.0	0.0	1.8	13.9	13.8	4.0	0.0	38
Very High N	0.0	0.1	7.4	47.6	16.8	15.3	8.5	4.0	0.3	0.0	0.0	0.0	238
High N	0.0	0.0	9.5	65.3	10.7	6.6	6.5	0.9	0.6	0.0	0.0	0.0	242
High P	0.0	1.4	0.1	23.7	23.3	0.0	0.0	1.5	25.1	2.7	22.2	0.0	9
High K	0.0	0.8	20.4	56.8	17.7	0.8	0.0	1.7	0.6	1.3	0.0	0.0	52
Low N	0.8	3.7	9.9	33.1	24.2	0.4	0.4	3.0	13.2	10.5	0.8	0.0	69
Low P	0.0	0.0	5.2	72.5	19.1	0.0	0.0	3.2	0.0	0.0	0.0	0.0	11
Equal NPK	0.0	1.4	19.3	62.8	10.4	1.7	1.3	1.0	1.5	0.4	0.2	0.0	50
All Fertilisers	**0.3**	**2.2**	**14.7**	**46.9**	**17.4**	**7.3**	**4.6**	**2.4**	**2.2**	**1.4**	**0.5**	**0.0**	**1045**

NB: 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 2001.

Table SC4.1 Average fertiliser practice, North East Scotland 2001

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Winter wheat	94	76	97	23	227	103	123	213	78	119	15
Spring barley	100	100	100	55	119	78	89	119	78	89	134
Winter barley	100	76	99	47	191	71	78	191	54	77	43
Oats	93	80	94	42	82	80	67	76	64	63	13
Winter oilseed rape	100	89	100	8	220	89	81	220	79	81	10
Rootcrops for stockfeed	92	92	92	53	84	85	106	77	78	98	16
All tillage	91	87	94	32	131	71	84	119	62	79	262
Grass under 5 years	97	91	89	30	130	39	50	126	35	45	127
Grass 5 years and over	96	81	81	12	124	34	36	119	28	29	127
All grass	97	86	85	21	127	37	43	123	32	37	254
All crops and grass	97	87	93	35	129	66	79	125	57	73	516

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

Source: British Survey of Fertiliser Practice 2001.

Table SC4.2 Average fertiliser practice, South East Scotland 2001

	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	45	44	0	177	74	86	177	33	38	8
Winter wheat	100	84	90	9	219	88	90	219	74	81	107
Spring barley	97	94	94	13	140	77	86	136	72	81	155
Winter barley	100	90	92	15	209	90	107	209	81	98	40
Oats	93	93	93	13	112	48	58	104	45	54	8
2nd Early/Maincrop potatoes	95	95	94	23	175	148	188	166	141	177	29
Spring oilseed rape	100	100	100	25	123	65	68	123	65	68	8
Winter oilseed rape	100	92	94	13	267	118	124	267	109	117	16
Rootcrops for stockfeed	100	100	100	14	72	141	96	72	141	96	7
Arable silage/other fodder crop	74	70	70	40	68	53	53	50	37	37	5
Other tillage	54	53	53	25	96	75	82	52	40	43	32
All tillage	77	71	73	13	129	78	84	99	55	61	417
Grass under 5 years	76	62	55	23	146	55	73	111	34	40	111
Grass 5 years and over	67	51	48	15	118	36	41	79	18	20	124
All grass	72	57	52	19	132	46	57	94	26	29	235
All crops and grass	76	70	71	15	130	75	80	99	53	57	652

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

Source: British Survey of Fertiliser Practice 2001.

Table SC4.3 Average fertiliser practice, South West Scotland 2001

	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	98	96	80	49	49	80	49	48	28
Arable silage/other fodder crop	100	100	100	100	173	48	48	173	48	48	11
All tillage	82	65	72	81	113	56	50	93	36	36	59
Grass under 5 years	97	94	94	68	197	55	61	191	52	57	62
Grass 5 years and over	84	80	74	60	139	40	48	117	32	36	157
All grass	91	87	84	64	168	48	55	153	42	47	219
All crops and grass	84	78	85	67	121	63	58	102	49	49	278

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

Source: British Survey of Fertiliser Practice 2001.

Table SC5.1 Average fertiliser practice on general cropping farms, Scotland 2001

	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	43	43	0	150	46	46	150	20	20	7
Winter wheat	99	82	81	8	235	71	72	233	58	58	116
Spring barley	99	99	99	21	114	65	76	112	64	75	187
Winter barley	100	81	98	37	189	67	77	189	54	75	59
Oats	92	79	92	7	147	45	54	135	36	50	16
2nd Early/Maincrop potatoes	94	93	93	28	158	132	202	148	123	189	37
Spring oilseed rape	100	100	100	30	117	69	67	117	69	67	10
Winter oilseed rape	100	91	97	9	209	65	69	209	59	67	33
Rootcrops for stockfeed	66	66	66	28	67	99	103	44	65	68	7
Other tillage	73	60	73	4	179	52	71	131	31	52	15
All tillage	85	73	81	16	158	65	78	134	47	63	487
Grass under 5 years	85	54	54	7	152	43	48	129	23	26	85
Grass 5 years and over	91	68	69	5	99	33	35	90	22	24	78
All grass	88	61	62	6	126	38	42	111	23	26	163
All crops and grass	86	72	78	14	154	62	74	132	45	58	650

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

Source: British Survey of Fertiliser Practice 2001.

Table SC5.2 Average fertiliser practice on dairy farms, Scotland 2001

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring barley	100	100	100	91	82	53	55	82	53	55	12
Arable silage/other fodder crop	100	100	100	100	161	45	45	161	45	45	11
All tillage	71	85	85	96	65	47	64	46	40	54	16
Grass under 5 years	100	100	100	88	214	46	61	214	46	61	56
Grass 5 years and over	95	91	91	74	177	41	51	168	37	46	65
All grass	96	96	96	80	166	48	56	159	46	54	121
All crops and grass	81	90	90	83	99	47	60	80	39	54	137

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

Source: British Survey of Fertiliser Practice 2001.

Table SC5.3 Average fertiliser practice on mixed farms, Scotland 2001

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Winter wheat	100	86	86	30	182	66	78	182	57	68	22
Spring barley	99	94	94	57	99	58	61	98	55	58	164
Winter barley	96	85	91	59	147	73	86	141	62	79	21
Oats	91	91	91	42	68	49	51	62	45	46	21
2nd Early/Maincrop potatoes	100	100	100	62	94	17	22	94	17	22	6
Rootcrops for stockfeed	100	100	100	59	82	92	107	82	92	107	22
All tillage	81	85	85	44	114	60	67	92	51	57	307
Grass under 5 years	90	86	82	34	136	41	54	123	36	44	258
Grass 5 years and over	79	70	65	28	109	34	37	86	24	24	340
All grass	85	78	74	30	123	38	46	105	30	34	598
All crops and grass	89	81	84	36	125	55	65	111	45	55	905

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

Source: British Survey of Fertiliser Practice 2001.

Table SC5.4 Average fertilser practice on farms in Less Favoured Areas, Scotland 2001

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Winter wheat	100	100	100	7	213	75	75	213	75	75	14
Spring barley	100	100	100	28	118	48	50	118	48	50	25
Winter barley	100	93	100	11	207	57	65	207	53	65	9
Oats	95	95	95	20	85	38	44	81	36	42	6
Rootcrops for stockfeed	100	100	100	33	103	73	54	103	73	54	5
All tillage	81	86	87	20	134	64	67	109	55	58	84
Grass under 5 years	96	90	87	51	162	44	60	156	40	52	32
Grass 5 years and over	88	71	68	46	137	33	38	121	23	26	54
All grass	92	81	78	49	150	39	49	138	32	38	86
All crops and grass	91	95	95	34	149	68	72	136	65	68	170

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

Source: British Survey of Fertiliser Practice 2001.

SECTION D

SUPPLEMENTARY SURVEY ANALYSIS ON USE OF REVISED FERTILISER RECOMMENDATIONS

Introduction

General and supplementary information is collected for each farm holding that is surveyed. The supplementary questions vary each year. In 2001, 1297 farmers were asked a number of questions relating to their use of the recently published revision of DEFRA's fertiliser recommendations[16].

Fertiliser Recommendations for Agricultural and Horticultural Crops (RB209)

The new (seventh edition) of DEFRA's fertiliser recommendations book known as RB209 was launched in December 2000. A series of conferences were held during the winter across England and Wales to promote the new edition and to explain the background to the changes. The launch of the revised book was widely publicised in the farming press and a number of press articles were written. Advertisements for the conferences were placed in five major farming journals as well as local press for each venue. Flyers were circulated via members of groups such as PDA, FMA, ADAS crop centres and FACTS registered advisors.

Farmers in the Survey were asked whether they were aware of the publication and if so that there was a new edition. Half of those questioned (50.5%) were aware of RB209 and of these 213 (32.5%) knew about the revision. The means by which farmers learnt about the revised edition varied (Table D1.1) with mailed flyers, advisors/consultants, press adverts and press articles being the most common sources of information.

Table D1.1 Percentage of farmers using each source of information about the new revision

mailed flyer	DEFRA website	other website	advisor/ consultant	press advert	press article	other
27.2	1.9	2.8	24.4	21.1	21.6	2.8

Note: more than one source may have been used on some farms

Of the 213 who knew about the revision 165 were crops and mixed farms (27% of total crops and mixed farms) and 45 were livestock farms (7% of total livestock farms in survey). These groups obtained information about the revision in different ways as the following breakdown of the percentage of the four most common means of receiving information shows (Table D1.2). Mailed flyers were most common for livestock farmers and least for the crops and mixed group.

Table D1.2 Percentage of farmers using the most common means of receiving information about the revision by farm type

farm type	mailed flyer	advisor/ consultant	press advert	press article
crops and mixed	19	28	23	24
livestock	56	11	16	16

[16] MAFF (2000) *Fertiliser Recommendations for Agricultural and Horticultural crops*. MAFF reference book 209 (seventh edition). London: The Stationery Office.

In addition to publicity about the book, conferences about the new recommendations were held at 8 venues (Newark, Swindon, Bury St Edmunds, Scotch Corner, Essex, Worcester, Peterborough (vegetables) and Devon (grass)) during December 2000 to February 2001. Of the farmers in the Survey, 82 had heard about these but only eight actually attended one of them.

The new edition contains several new features including a radical new soil nitrogen supply methodology and a modified index calculation for potassium recommendations. There is more background information and explanatory text, with colour coding for ease of use. The physical size and design of the publication has also changed. Farmers in the Survey were asked whether they found the revised edition easier to use than the previous version (Table D1.3). The majority (88%) of those responding found it the same or easier to use than before.

Table D1.3 Farmers opinions on ease of use (number of farms)

easier than before	the same	more difficult than before
36	65	14

Estimating fertiliser application rates

Farmers were asked about the methods that they used to decide on fertiliser application rates (Table D1.4).

Table D1.4 Percentage of farmers using different methods to decide on fertiliser application rates

published tables	computer system	advisor/ consultant	press/ trade	own judgement	other
5.2	2.8	40.6	8.6	74.0	0.8

Note: more than one method may be used on some farms

The majority (74%) used their own judgement, based on their knowledge and experience of their own farm. Information from advisors and consultants was the next most common method. This pattern of use is similar to that recorded in 1999[17] . Although published tables were not generally a popular method, of those farmers who were aware of the revised RB209, 88 (41%) had used the new recommendations.

Record keeping

Farmers in the Survey were asked about what records they kept of fertiliser use. The results (Table D1.5) show that over a fifth (22%) keep no records at all. This is significant in the light of the expected increase in the areas designated as Nitrate Vulnerable Zones, in which record keeping is an obligatory requirement. Keeping records is also an obligatory part of many Quality Assurance schemes and 15% of farmers were using this method. Computerised systems were used by 21% of farmers in the Survey. Some farmers used more than one method.

[17] Chalmers, A.G., Hounsome, B., Lang, B., Renwick, A., and Rush, C. (2000). *The British Survey of Fertiliser Practice: Fertiliser use on Farm Crops 1999*. The BSFP Authority, London. ISBN 0853100853.

Table D1.5 Percentage of farmers using different methods of record keeping for fertiliser use

QA scheme forms	computerised system	other records	no records
14.6	21.1	53.2	21.6

Note: more than one method may be used on some farms

England and Wales

For those farmers in England and Wales the survey data can be examined on the basis of farm type (Table D1.6) and the size of the crops and grass area.

Table D1.6 Farmer awareness of fertiliser recommendations book (RB209) in England and Wales

Crops & Grass area	No. in survey	aware of RB209	%	aware of revision	%
DEFRA robust types 4-7					
Livestock					
20-50 ha	96	27	28.3	4	4
51-100 ha	159	47	29.5	10	6
101-200 ha	157	49	31.3	8	5
200+ ha	152	46	30.2	13	9
DEFRA robust types 1, 2 & 8					
Crops & mixed					
20-50 ha	44	22	49.9	6	14
51-100 ha	96	44	45.8	10	10
101-200 ha	176	93	52.8	37	21
200+ ha	313	171	54.6	88	28
DEFRA robust types 3					
Horticulture					
20-50 ha	12	4	33.3		
51-100 ha	8	5	62.5	1	
101-200 ha	8	4	50.0	1	
200+ ha	4	3	75.0		
DEFRA robust types 3					
Total for England & Wales	**1225**	**515**	**42.0**	**178**	**15**

Wales is greatest in the crops and mixed group. It is possible that awareness of RB209 and its revision has increased in the livestock sector since the Survey was carried out, as a number of meetings have been held by Grassland Societies post Foot and Mouth disease during the early part of 2002. There is a tendency for the larger farms to be more aware of the recommendations and the revision than the small farms. This is especially true for the crops and mixed farm type where only 11% of those with 100 ha or less were aware of the revision compared with 26% of those with more than 100 ha. There are insufficient horticultural enterprises in the data set for comment on awareness in this sector.

APPENDIX 1 - SURVEY STATISTICS

App 1.1 SAMPLING VARIATION

Table App 1.1 Standard errors of application rates for the major crops in 2001

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	5.6	6.8	8.9	2.8	1.4	5.1	6.5	9	2	1.1	1673
oilseed rape	7.9	1.3	5	2.4	3.2	3.5	2.3	5.8	1.8	2.2	413
winter barley	2.2	2.7	3.3	5.4	4	2	3.3	3.8	3.6	3.5	596
spring barley	3.9	3.7	1.9	4.7	4.9	2.9	2.5	2.2	3.9	4.1	953
m/c potatoes	10.3	17.4	16.3	10.5	17.3	8.1	11.8	7.4	10.2	11.6	193
sugar beet	4	2.7	2.9	2.4	6	5.4	4.8	2.8	5.7	12.2	191
all tillage crops	3.8	2.7	5	2.3	1.7	4.3	2.2	5.3	3.5	3.9	5335
all grass	3.7	2.4	3.8	0.8	1	4.4	2.9	3.4	0.9	1.4	3664

England and Wales

	standard error for overall application rate (kg/ha)					standard error for average field rates (kg/ha)					fields in sample
	total N	strt N	comp N	total P_2O_5	total K_2O	total N	strt N	comp N	total P_2O_5	total K_2O	
winter wheat	4.5	5.7	10.3	3.1	1.5	4.3	5.6	10.5	1.8	0.9	1533
oilseed rape	2.2	1.7	8.2	1.5	2.3	3	2.8	9.7	1.4	2.9	368
winter barley	3.1	3.8	5.9	5.9	5.2	2.8	4.6	7	4.1	3.9	507
spring barley	6.7	6.3	2.5	3.3	1.9	4.5	4.4	1	2.7	1.2	587
m/c potatoes	20.5	19.2	17.4	13.5	20.9	7.5	14.3	7	9.7	11.7	156
sugar beet	4	2.7	2.9	2.4	6	5.4	4.8	2.8	5.7	12.2	191
all tillage crops	5.7	3.6	5.6	1.9	1.8	5.3	3.2	5.1	2.7	2.4	4491
all grass	4.4	3.3	4.7	0.6	0.2	3.9	4.9	3.2	0.6	1.5	2782

Scotland

	standard error for overall application rate (kg/ha)					standard error for average field rates (kg/ha)					fields in sample
	total N	strt N	comp N	total P_2O_5	total K_2O	total N	strt N	comp N	total P_2O_5	total K_2O	
winter wheat	6.7	20.1	12.8	1.5	8.6	8.2	19.6	14	4.4	10.1	140
oilseed rape	0.7	12.9	8.7	6.8	8.3	0.7	12.9	8.7	4.8	7.6	44
winter barley	1.1	0.3	4.6	5.5	5	2	0.6	4.6	5.3	2.4	89
spring barley	5.5	6.4	1.2	3.6	7.2	4.9	5.3	1.3	1.6	7	366
m/c potatoes	14.6	6.1	17.7	13.3	17.6	10.8	6.9	14.9	17.8	16.2	37
all tillage crops	4.6	3	9	2.1	0.6	8.4	2.5	12.4	9.4	9.1	844
all grass	7.7	2.3	8.3	2.1	3.4	7.4	2.1	8.9	1.9	3.1	882

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 2001 there were four replicates for England and Wales; in Scotland there were two, these being systematically subdivided post survey.

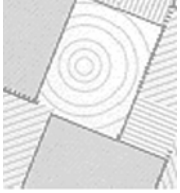
App 1.3 AN ALTERNATIVE APPROACH TO ESTIMATION OF OVERALL RATES

Table App 1.2 Re-estimation of overall total fertiliser use (kg/ha), Great Britain 2001

		straight nitrogen	compound nitrogen	total nitrogen	total phosphate	total potash
all tillage		118	27	145	43	52
	revised estimate	113	27	140	44	54
all grass		39	55	94	19	24
	revised estimate	39	55	93	18	24
all crops and grass		74	42	116	29	37
	revised estimate	68	44	114	28	36

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 2001

	2001	(% total)
Issued from main sample	1462	(100)
Non-response[1]	408	(28)
Response to main sample	1054	(72)
Issued from reserve sample 1	408	(28)
Non-response[1]	261	(18)
Response to reserve sample 1	147	(10)
Issued from reserve sample 2	261	(18)
Non-response[1]	207	(14)
Response to reserve sample 2	54	(4)
Issued from reserve sample 3	207	(14)
Non-response[1]	165	(11)
Response to reserve sample 3	42	(3)
Achieved sample response	1297	(89)

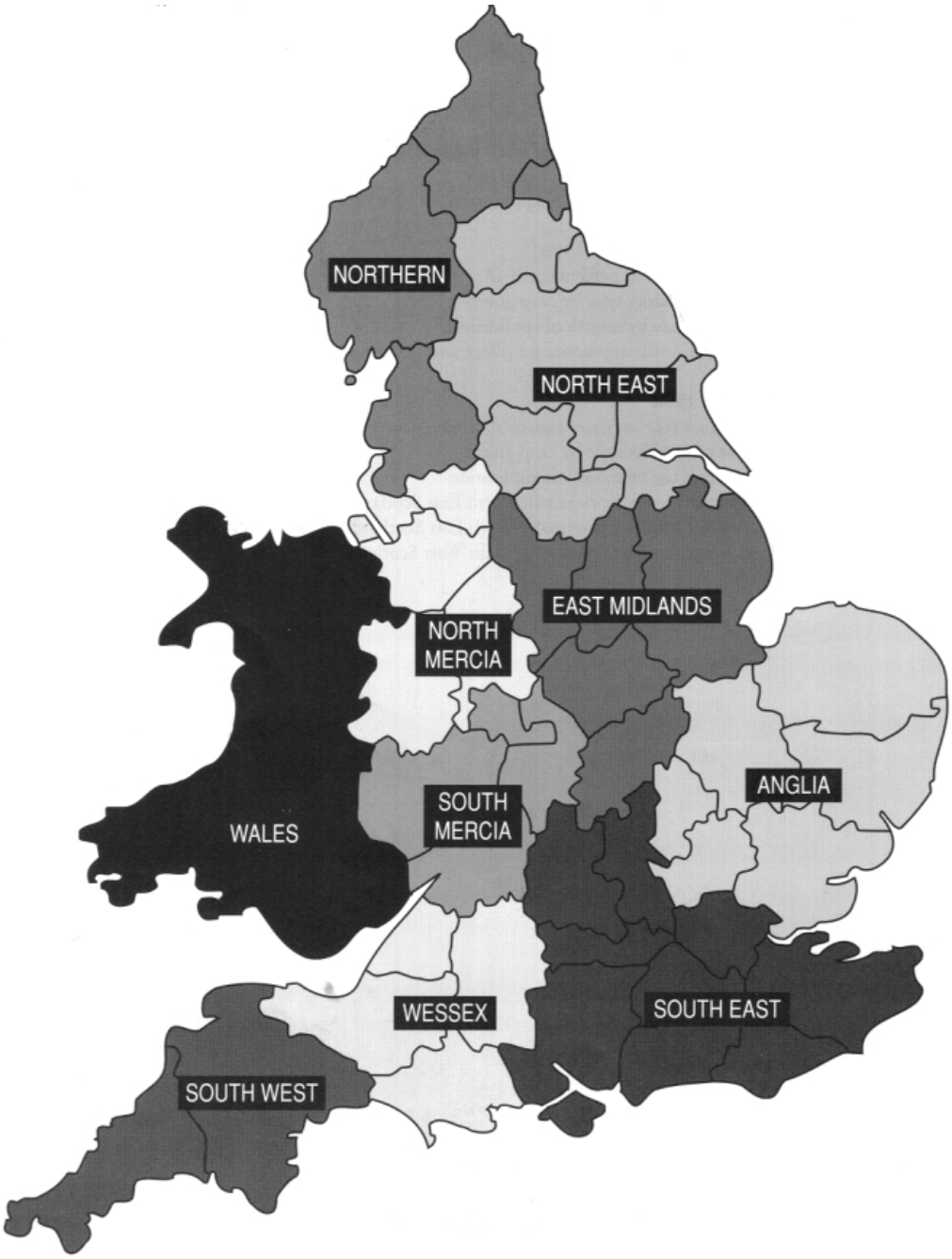
Table App 1.4 Response to main and reserve samples for 1997-2001

Net response rate	1997 %	1998 %	1999 %	2000 %	2001 %
Overall achieved rate	66	64	64	94	89
Refusal rate[1]	31	36	36	7	11
Net response rate	**1997 %**	**1998 %**	**1999 %**	**2000 %**	**2001 %**
Main sample	69	69	66	67	72
Reserve sample(s)	55	47	56	45	28
Main reasons for refusal	**1997 %**	**1998 %**	**1999 %**	**2000 %**	**2001 %**
Too busy	28	38	35	31	23
Not interested	32	32	26	10	8
Do not do surveys	4	10	10	7	3
Want payment	2	4	2	2	1
Too much paperwork (IACS)	2	3	1	3	2
Other[1]	32	13	26	49	63

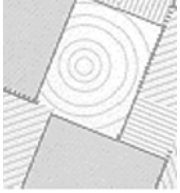
[1] includes non-contact

APPENDIX 2

App 2.1 BSFP REGIONS[18] IN ENGLAND AND WALES



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



App 2.2 COMPARISON OF BSFP AND DEFRA COUNTIES

Approximate English counties within BSFP and DEFRA Regions[19]

BSFP REGIONS

NORTHERN
8 Cumbria
21 Lancashire
31 Northumberland
30 Tyne and Wear

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

NORTH MERCIA
6 Cheshire
44 Greater Manchester
25 Merseyside
35 Shropshire
37 Staffordshire

SOUTH MERCIA
14 Gloucestershire
17 Hereford and Worcester
43 Warwickshire
46 West Midlands

EAST MIDLANDS
9 Derbyshire
22 Leicestershire
24 Lincolnshire
29 Northamptonshire
32 Nottinghamshire

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

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

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

SOUTH-WEST
7 Cornwall
10 Devon

DEFRA REGIONS

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

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

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

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

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

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

App 2.3 ENGLISH COUNTIES WITHIN BSFP AND DEFRA REGIONS

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

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

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

APPENDIX 3

App 3.1 BSFP REGIONS[21] IN SCOTLAND

[21] SEERAD administrative regions have been revised since April 1996 as a result of changes to county boundaries and nomenclature bought about by the introduction of unitary local authorities. The BSFP regions marked above are based on the 1995 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[22].

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

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

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

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

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