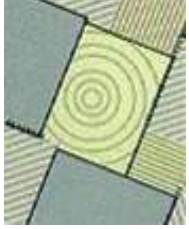
THE BRITISH SURVEY OF

Fertiliser Practice

FERTILISER USE ON FARM CROPS
FOR CROP YEAR 2019



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National Statistics Status
National Statistics status means that our statistics meet the highest standards of trustworthiness, quality and public value, and it is our responsibility to maintain compliance with these standards.

The continued designation of these statistics as National Statistics was confirmed in 2012 following a full assessment by the UK Statistics Authority against the Code of Practice for Statistics.

Since the last review of these statistics in 2012, we have continued to comply with the Code of Practice for Statistics, and have made improvements including:

•Incremental improvements to the sample selection to optimise coverage for key survey data items
•Improvements to the wording of questions in light of feedback from interviewers
•Flexible use of the survey platform to collect additional data to meet needs of data users (the modular questions)

Once statistics have been designated as National Statistics it is a statutory requirement that the Code of Practice shall continue to be observed.

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

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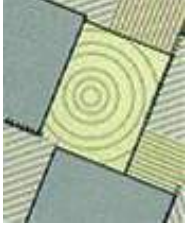
https://www.gov.uk/government/collections/fertiliser-usage



FOREWORD

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

The 2019 Survey was funded by the Department for Environment, Food and Rural Affairs (Defra) and the Scottish Government. 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 2019, the Survey was co-ordinated by Kynetec, who was responsible for the survey design, data collection, statistical analysis and quality control monitoring.

Data uses and comparison to the EU

The information in this publication is widely used by the UK government and the EU, industry and researchers and collects data on trends in usage and application rates of nitrogen, phosphate, potash, sulphur, organic manures and lime on agricultural crops and grassland in Great Britain.

The Survey data provide important evidence to assess greenhouse gas emissions from agriculture, informing the ammonia and greenhouse gas inventories and for the development of possible mitigation measures. Additionally, the data provide information on fertiliser use in NVZs (nitrate vulnerable zones) and for developing and assessing the impact of policy on water quality, particularly the Nitrates Directive (Council Directive 91/676/EEC). The data have also been used for indicators on nutrient balances, other indicators relating to environmental impacts and other cross cutting work looking at links between fertiliser use and productivity (benchmarking) and economic performance. Industry and government use the data to monitor best practice.

Information on all of these topics are available from the Gov.UK website and includes information on, greenhouse gas emissions, agriculture and climate change, NVZs and soil nutrient balances soil-nutrient-balances which are of particular relevance.

The data contribute to the meeting of certain legislative obligations at a national and EU level. Information on the use of fertilisers across the EU is available from the Eurostat website. It includes a summary report with a comparison of the usage and links to detailed data for the individual countries.

Other information

Defra also run other surveys which may be of relevance to fertiliser use and related practices through its Farm Practices Survey for England, which is available on the Defra website.

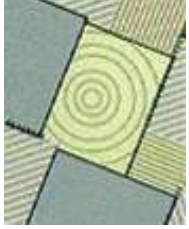
Contact information and feedback

Contact details are available at the front of this publication for feedback or for questions about the information provided.

Data revisions

See section A2.6 for details of revisions made in 2019.

June 2020



ACKNOWLEDGEMENTS

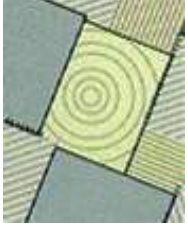
The sponsors gratefully acknowledge the co-operation of all farmers taking part in the 2019 British Survey of Fertiliser Practice.

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

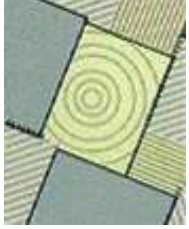
The agronomic interpretation of the Survey results benefited from advice from Chris Dawson (Chris Dawson and Associates), agronomic consultant to the Agricultural Industries Confederation (AIC).

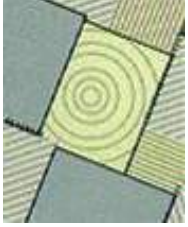
Kate Benford[1]

[1] Kynetec (UK) Ltd., Weston Court, Weston, Newbury, Berkshire RG20 8JE

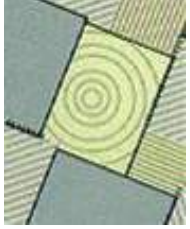


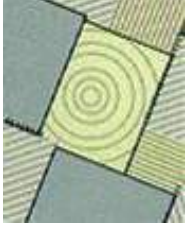
CONTENTS

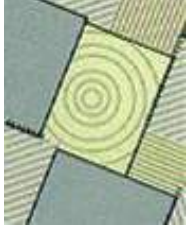




LIST OF TABLES AND FIGURES







EXECUTIVE SUMMARY

The British Survey of Fertiliser Practice is an annual, nationally representative interview survey based on the selection of a random stratified sample of farms from mainland Britain. The main purpose of the survey is to estimate average application rates of nitrogen, phosphate and potash used for agricultural crops and grassland. The data provide important evidence to assess greenhouse gas emissions from agriculture and for developing possible mitigation measures. Information is also collected on applications of sulphur fertilisers, organic manures and lime.

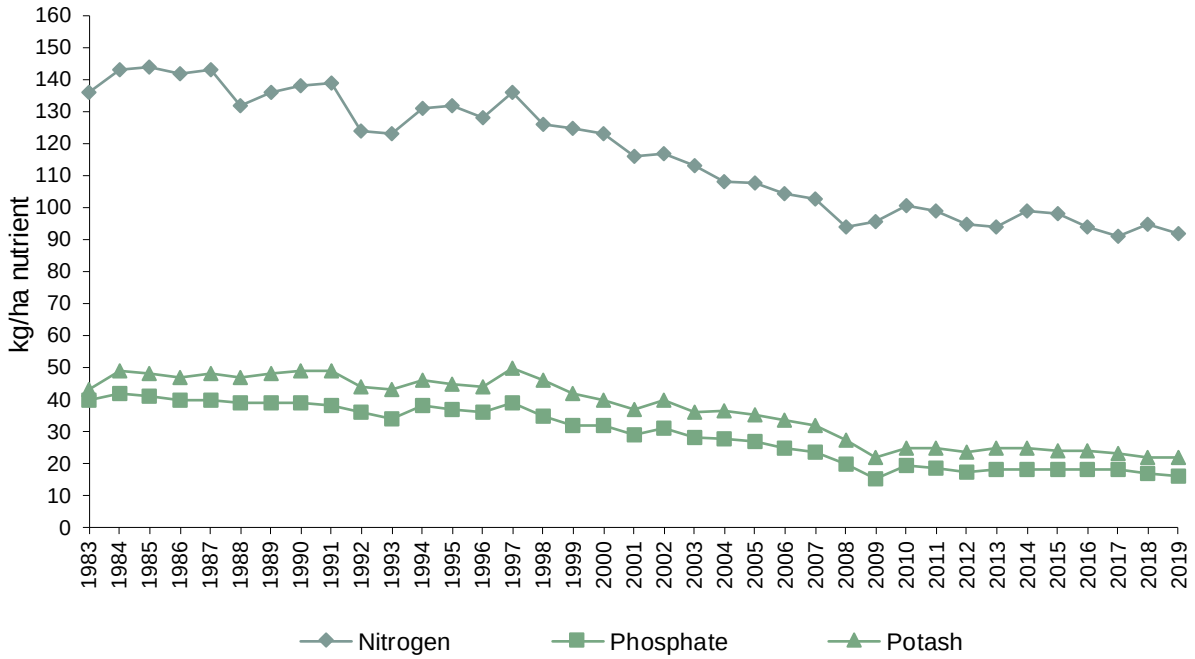
The main findings from the 2019 Survey on the use of the nutrients nitrogen, phosphorus, potassium and sulphur in Great Britain are summarised below (Table ES1).

Cropping patterns can influence fertiliser rates and dressing covers observed. In 2019 there was a 1.2% decrease in the total area of tillage crops planted, with the areas of spring barley and winter oilseed rape both down on the previous year. Conversely, the cropped areas of winter wheat and winter barley increased by 1% and 13% respectively. The weather is discussed more fully in Section A3.1 with a more detailed overview of the data in Section B and crop level information summarised in tables GB1.1-1.3 of Section C.

Table ES1 Nutrient dressing cover, current and five-year mean overall application rates for all crops and grass, Great Britain 2019

	All Tillage	All Grass	All Crops and Grass
Total Nitrogen - N			
Overall application rate, 2019 (kg/ha)	137	54	92
Mean overall application rate, 2015-2019 (kg/ha)	141	55	94
Crop area receiving dressing, 2019 (%)	91	58	73
Average field rate, 2019 (kg/ha)	150	93	125
Total Phosphate - P_2O_5			
Overall application rate, 2019 (kg/ha)	26	8	16
Mean overall application rate, 2015-2019 (kg/ha)	28	8	17
Crop area receiving dressing, 2019 (%)	48	37	42
Average field rate, 2019 (kg/ha)	54	21	38
Total Potash - K_2O			
Overall application rate, 2019 (kg/ha)	34	11	22
Mean overall application rate, 2015-2019 (kg/ha)	37	12	23
Crop area receiving dressing, 2019 (%)	50	39	44
Average field rate, 2019 (kg/ha)	69	29	50
Total Sulphur - SO_3			
Overall application rate, 2019 (kg/ha)	35	5	18
Mean overall application rate, 2015-2019 (kg/ha)	33	4	17
Crop area receiving dressing, 2019 (%)	62	14	36
Average field rate, 2019 (kg/ha)	56	33	51

Figure ES1 Overall fertiliser use (kg/ha) on all crops and grass, Great Britain 1983 - 2019

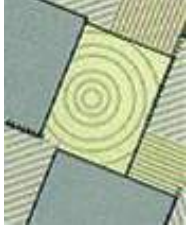


Nitrogen

- Nitrogen usually has a large immediate effect on crop growth, yield and quality. Most agricultural soils in Great Britain contain too little naturally occurring plant-available nitrogen to meet the needs of a crop so supplementary nitrogen applications must be made each year.
- The 3 kg/ha decrease in total nitrogen use on all crops and grassland in 2019 resulted from a 5 kg/ha decrease in the overall rate on tillage crops to 137 kg/ha and a 3 kg/ha decrease on grass to 54 kg/ha. These changes reverse the increases recorded in 2018. The overall nitrogen rate on tillage crops in 2019 falls outside the 140-150 kg/ha range for the majority of the 30 years of the survey.
- Nitrogen levels applied to grassland have been consistently lower than tillage crops. Whereas overall nitrogen rates on tillage have remained relatively constant, since 2000 the overall applications made to grass have seen a significant decline. However, this trend changed after 2009 and since then the overall nitrogen rate on grassland has remained relatively steady. The decline in cattle numbers is thought to have contributed to this reduction in the nitrogen rate on grassland, possibly in conjunction with some improvement in manure use efficiency. Please refer to table B2.1
- Overall application rates of nitrogen decreased for the majority of the major tillage crops in 2019. The overall nitrogen rate on winter wheat and spring barley decreased by 1 kg/ha (to 185 kg/ha) and 6 kg/ha (to 95 kg/ha), respectively. The overall rate for winter barley was unchanged at 143 kg/ha, whereas the overall application rate for total nitrogen on oilseed rape decreased 8 kg/ha to 180 kg/ha, relative to 2018.

Phosphate and potash

- Phosphate and potash are applied in fertilisers and manures, particularly to replace the quantities removed in harvested crops. Most British soils can hold large quantities of these nutrients for crop uptake over several years. Consequently, the timing of maintenance application tends to be less time critical compared to nitrogen or sulphur.
- Overall rates of phosphate and potash applied to tillage crops are about three times those used on grassland. However, there is greater use of applied manures on grassland (48% for grass <5 years old, 34% for grass of 5 years or more) than on tillage crops (26% cover) and grazed grassland also receives manure as it is grazed.



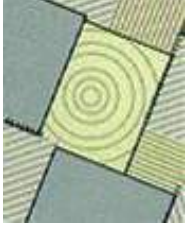
- Overall phosphate usage on tillage crops declined gradually between 1984 and 1996. Thereafter the decline in rates became more marked until 2009, after which there was some recovery and relative stability until 2018, when a 3 kg/ha decrease to 27 kg/ha was recorded. In 2019 there was a 1 kg/ha decrease to 26 kg/ha. The overall rate of phosphate on grassland was highest in 1983, at 28 kg/ha, and remained relatively stable between 1984 and 1998. Overall application rates have declined more rapidly between 1999 and 2009, but remained relatively stable since then, with a rate of 8 kg/ha in 2019.
- Overall potash application rates on tillage crops declined slightly between 1983 and 1997, with the rates in the 60-68 kg/ha range. Like phosphate, overall application rates reduced at a greater rate after this time, dropping to their lowest levels of 33 kg/ha in 2009 when fertiliser prices were high. Between 2014 and 2018 overall potash application rates were have been apparently stable in the range 35-40 kg/ha, albeit with a 1 kg/ha decrease to 34 kg/ha in 2019.
- Whilst the pattern of use of potash on grassland has been more variable, this has also shown a net decline between 1983 and 2008. Overall potash rates were relatively stable at 31-33 kg/ha during the mid-late 1980s but, since then, tended to decline, although have now achieved some stability in the range of 11-12 kg/ha since 2015.
- It is of note that in Scotland the phosphate and potash application rates on tillage land have largely been maintained, relative to the decline seen in England & Wales, and although there has been a reduction in dressing covers and overall rates since 2004, they were relatively stable again on tillage by 2010. However, there was a significant reduction in dressing cover and overall rate of phosphate and potash on grassland between 2004 and 2011, although more recent data indicate a return to stability.

Sulphur

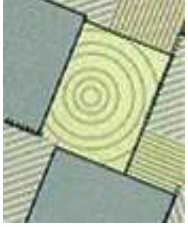
- Sulphur is an essential plant nutrient and is a component of most proteins as well as activating certain enzyme systems. In the past sulphur demand was satisfied through atmospheric deposition but this contribution is now hardly significant. Therefore, there is a need for sulphur application to crops and grass; with crops such as oilseed rape being particularly sensitive to sulphur deficiency. Elemental sulphur can also be used as a soil acidifier for potatoes which can offer some protection against scab although sulphur as a nutrient is usually applied in the sulphate form.
- The Survey has collected detailed information on sulphur (SO_3) fertiliser use since 1993, when only 3-6% of the cereal crop areas and 8% of the oilseed rape area received a sulphur application. By 1997, these proportions had increased markedly to 13-14% for cereals and 30% for oilseed rape. Dressing covers for sulphur generally remained static until 2002, and then increased steadily to 2007. Dressing covers reduced in 2008 and 2009 for all cereals except winter barley. In 2019, sulphur dressing covers in cereals were in the 59%-72% range.
- The 82% dressing cover for winter oilseed rape was 2% higher than observed in 2018, and 12% higher than observed in 2016.
- In 2019, 36% of all crops and grass received a dressing of sulphur; this figure was 62% for tillage crops, unchanged from 2018. On tillage crops the overall application rate for sulphur was 35 kg/ha, 2 kg/ha above the five-year average between 2015-2019 of 33 kg/ha. Applications on grass increased by 1 kg/ha in 2019 at 5 kg/ha, as did dressing cover by 2%, with 14% of grass receiving a sulphur dressing.

Organic manures

- Historically, the Survey has focussed on the application of manufactured fertilisers although in recent years (since 2007) it has also collected information on the use of organic manures. The nutrient levels in organic manures vary according to the type of manure but provide a valuable source of nitrogen, phosphorus and potassium. Where used, applications of manufactured fertiliser can usually be reduced.
- In 2019, around 67% of farms used organic manures on at least one field on the farm. Cattle manure from beef and dairy farms is by far the largest volume of manure type generated in Great Britain. In 2019, 59% of cattle manure and 89% of slurry applications were made to grassland, reflecting the practice of utilising the manure on the farm on which it is produced.



- Fields of winter-sown crops mainly receive a manure dressing in August and September, prior to drilling, whereas spring-sown and grass fields are dressed predominantly in spring and summer.



SECTION A

THE BRITISH SURVEY OF FERTILISER PRACTICE

A1 INTRODUCTION AND STRUCTURE OF THE REPORT

The British Survey of Fertiliser Practice (BSFP) is the primary source of data on organic and inorganic fertiliser use in Great Britain. The results from the Survey are used by the British fertiliser industry, by Government and by the wider agricultural and environmental community. 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. It includes estimates of total fertiliser use which are given in Table B2.7. These data are derived from BSFP findings, confidential trade and sales data and HMRC import/export statistics. 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 plus information on timing of applications. Figures for estimates of 'total', 'straight' and 'compound' nutrient rates are presented in separate tables. Section D provides an analysis of the application of organic manures and manufactured fertilisers. Section E contains more general information on farm practices such as spreader checking, record keeping and soil testing. Datasets for key data series are available via the Defra website.

A1.1 HISTORY

The survey has been in existence, in various forms, since 1942 for England & Wales. It was extended to Scotland in 1983. Historical data from 1942 to 1997 have been summarised in several reviews spanning this period.[2, 3, 4, 5]

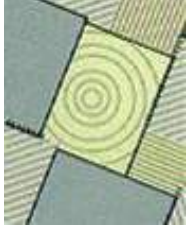
The current methods of survey design and implementation are the result of adaptation of the original design from Rothamsted Experimental Station, undertaken by Edinburgh Data Library at the University of Edinburgh between 1992 and 1998. From 1999 until 2003 design and analysis was undertaken by the Rural Business Unit at the University of Cambridge and from 2004 by Kynetec (formerly GfK Kynetec), who also retained responsibility for conducting the fieldwork. Under government rules, the contract for the survey was retendered in 2018 and Kynetec were awarded the contract again.

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

[3] 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.

[4] 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.

[5] 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 International Fertiliser Society* **437**.



A2 SURVEY METHODOLOGY

A2.1 SAMPLE

This survey is based on a sample of holdings in order to reduce burdens and manage resources. The Survey sample is selected from the population of agricultural holdings compiled using the June Agricultural Survey (a sample survey conducted annually which records information on farm size, cropping, stocking and employment). In each year, two samples are extracted from the June Survey, one for England & Wales and one for Scotland. Holdings less than 20 hectares in size are excluded from the BSFP sample. These smaller farms account for a significant proportion of the number of holdings but a much smaller proportion of the area of crops and grass. At Great Britain level, holdings below this size account for 4% of the total crop area and 9% of the total grass area. Further information is provided in Appendix 1.3. Using this threshold reduces the number of farms which need to be sampled so reducing burdens and costs without significant adverse impact on the quality of the data. The data for the medium and large farms will be representative of the very small farms which are excluded, meaning that the overall figures are representative of all farms. Standard errors are reported in Appendix 1.1.

In England & 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.

These higher-level farm types are based on groupings of the standard UK (and EU) farm classifications (called 'robust' types). Farms with a robust type of 'Other' (robust type 10) are not included in the sample. See A2.7 paragraph 9 for more details.

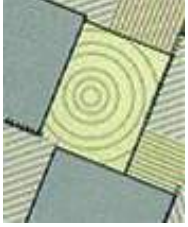
In 2019, the target sample size is 1,500 farms. This sample size has been designed in order to achieve a statistically representative sample at the national level. The farms are allocated to each of the combinations of farm type and size in proportion to the total area of crops and grass recorded in the June Survey (the latest available data). The exception to this is that in England & Wales where the number of farms in the horticultural group are sampled at a higher rate to ensure sufficient numbers for a robust estimate to be made. See Tables A2.1 and A2.2 for the number of farms selected.

Three reserves are selected for each farm in the main sample. The reserves will be the nearest holding (using the County/Parish/Holding (CPH) number) and of the same farm type and size. The survey is voluntary. 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.

This resulted in an achieved sample size of 1,327 holdings in 2019. This is a 2% increase on the sample size from last year. More information on response rates is given in Appendix 1, in Tables App 1.2 and App 1.3. It should be noted that the underlying sample design is constructed to measure manufactured fertiliser usage and may not wholly represent the population of farmers using organic manures so some of these data, especially where sample sizes are small, need to be treated with appropriate caution.

To help improve the survey response and to reduce the year-on-year variability, a core of respondents completes the survey each year. This was introduced in 2000 when approximately one third of the sample agreed to stay in the survey for a number of years. Between 2006 and 2007 a review of the panel structure was undertaken to ensure that the proportion of respondents who had participated on the panel for five consecutive years or more constituted no more than 20% of the total sample. In 2019, 75% of the panel had responded in the previous year. The profile of the Survey panel in terms of farm size was 71% >200ha, 80% 100-200ha, 76% 50-100ha and 79% >20-50ha.

The sample responses are raised to be representative of the national population by using the inverse of the achieved sampling fraction (i.e. the number of holdings in the population divided by the achieved sample size in each strata) as the weight. The validity of the derived weights is assessed by calculating a weighted crop area for the most extensively grown crops by this method and comparing this to the latest available crop area



estimates from the June Survey. Standard errors are calculated for key results (major crops) using standard survey statistical methodology (Appendix 1).

Table A2.1 Derivation of the stratified random sample for the 2019 survey, England & Wales

	farm holdings in population in 2019	total crops and grass in 2019 (column %)	notional sampling fraction[1] (%)	target sample size	achieved sample size	achieved sample fraction[2] (%)
England & Wales						
Livestock & mixed						
(Robust types: specialist pigs, specialist poultry, dairy, cattle and sheep (LFA & lowland), mixed)						
crops & grass area						
20-50 ha	16,064	6.1	0.47	75	67	0.42
51-100 ha	13,975	11.3	1.00	140	125	0.89
101-200 ha	9,684	15.1	1.93	186	171	1.77
200+ ha	4,786	20.2	5.20	249	251	5.24
Total livestock & mixed	44,509	52.6	1.46	650	614	1.38
Crops						
(Robust types: cereals, general cropping)						
crops & grass area						
20-50 ha	7,351	2.8	0.47	35	25	0.34
51-100 ha	6,782	5.5	1.00	68	51	0.75
101-200 ha	5,953	9.6	1.99	118	93	1.56
200+ ha	5,926	27.9	5.82	345	305	5.15
Total crops	26,012	45.8	2.17	565	474	1.82
Horticulture						
(Robust type: horticulture)						
crops & grass area						
20-50 ha	665	0.2	0.83	6	5	0.75
51-100 ha	414	0.3	1.81	7	5	1.21
101-200 ha	212	0.3	3.64	8	4	1.89
200+ ha	118	0.6	12.11	14	10	8.47
Total horticulture	1,409	1.5	2.48	35	24	1.70
Total for England & Wales	71,930	100		1,250	1,112	1.55

[1] The *notional sampling fraction* is found by expressing the *target sample size* as a percentage of the *farm holdings in population in 2019*

[2] The *achieved sampling fraction* is found by expressing the *achieved sample size* as a percentage of the *farm holdings in population in 2019*

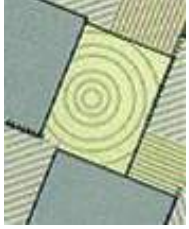


Table A2.2 Derivation of the stratified random sample for the 2019 survey, Scotland

	farm holdings in population in 2019	total crops and grass in 2019 (column %)	notional sampling fraction[1] (%)	target sample size	achieved sample size	achieved sample fraction[2] (%)
Scotland						
Cereal/general						
(Robust types: cereals, general cropping, horticulture)						
crops & grass area						
20-50 ha	707	1.4	0.49	3	2	0.28
51-100 ha	906	3.8	1.05	10	8	0.88
101-200 ha	956	7.9	2.06	20	18	1.88
200+ ha	585	11.7	5.02	29	26	4.44
Total cereal/general	3,154	24.8	1.97	62	54	1.71
Livestock & mixed						
(Robust types: specialist pigs, specialist poultry, dairy, cattle and sheep (LFA & lowland), mixed, general cropping;forage)						
crops & grass area						
20-50 ha	4,390	8.3	0.47	21	17	0.39
51-100 ha	3,638	15.0	1.03	38	31	0.85
101-200 ha	2,941	23.4	1.99	59	53	1.80
200+ ha	1,496	28.5	4.76	71	60	4.01
Total livestock & mixed	12,465	75.2	1.51	188	161	1.29
Total for Scotland	15,619	100		250	215	1.38

[1] The *notional sampling fraction* is found by expressing the *target sample size* as a percentage of the *farm holdings in population in 2019*

[2] The *achieved sampling fraction* is found by expressing the *achieved sample size* as a percentage of the *farm holdings in population in 2019*

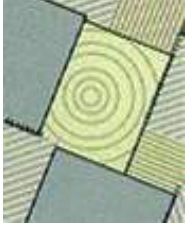
A2.2 DATA COLLECTION

Data collection was undertaken between July 2019 and February 2020 mainly through face to face interview with individual farmers. In addition to collecting information on the fertiliser use on each field, the recorder collected general information on the holding and the use of lime and organic manures and slurries.

Official quantities of nitrogen, phosphate and potash fertiliser consumed annually in the UK since 1966 are shown in Table B2.7. These data are based on BSFP findings, HMRC import/export statistics and confidential trade and sales data which are contributed by AIC industry members who represent approximately 90% of the market. They are compiled by the Agricultural Industries Confederation in conjunction with Defra. Further information is provided in Section A2.5.

A2.3 DATA QUALITY ASSURANCE

Experienced and knowledgeable field staff are used to collect the required information. They make use of information from a variety of different records kept by farmers. Farm diaries are the most common method used on farm. Further information is provided in Section E. At data entry, any omitted responses, figures outside pre-agreed limits or other discrepancies are flagged for checking and followed up, often by contacting the survey respondent. Total crop areas reported under this survey are checked against information held in the June Survey. Additionally, 10% of interviews undertaken will be subject to a call back by an independent reviewer to check responses to individual questions as part of data quality assurance arrangements. The aggregated figures are checked for consistency and trend analysis against historic data and are subject to independent expert peer review.



A2.4 ACCURACY AND RELIABILITY OF THE INFORMATION

The use of sampling in this survey means that there will be certain limitations associated with the data. The sampling methodology used is described more fully in Section A2.1 but essentially uses a random stratified sampling strategy approach, with an element of a core panel, to obtain a representative sample. A response rate of 48% was achieved in 2019. Sampling errors arise because even with careful selection, the sample cannot be exactly representative of all the population. The size of the sampling error will depend on the size of the sample (the larger the sample the smaller the error) but also on the variance of the data. An indication of the extent to which the sample result deviates from the population can be obtained from measuring the standard error associated with the data.

A fuller description of this standard statistical measure with the sampling variation/standard errors for the main arable crops, all tillage crops and all grass are reported in Appendix 1, Table App1.1. These can be used to help judge whether apparent changes may be real or attributable to sampling variation alone. The standard errors are relatively small for the grouped 'all tillage' and 'all crops and grass', and for the main arable crops of wheat, oilseed rape and barley. The standard errors are higher for sugar beet and potatoes where sample sizes (crop area, number of respondents) are smaller.

Figures reported for some of the smaller crops, where the sample size is relatively low, need to be treated with appropriate caution. Sample size information is provided in the tables in Section C and help to provide an indication of reliability. For crops where the sample size is relatively small it is advisable to use data from several years and to assess trends over a longer period rather than just considering year on year changes.

For potatoes in particular, part of the reason for apparent fluctuations in estimates of nutrient application rates may be because fewer numbers of fields of potatoes are covered by the Survey than would be expected from a sample survey. This is because fields of potatoes on respondent's farms may be let out and grown by a third party, so it is not possible to record information in the Survey. Furthermore, fields of potatoes grown by a respondent, but not on his own farm, are not captured in the Survey.

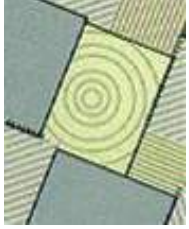
The statistics on the pattern of fertiliser practice reported for Great Britain largely reflect practice in England and Wales due to its greater area of total crops and grassland: about 9.37 million hectares in England and Wales and about 1.85 million hectares in Scotland. The estimates of the average 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 overall application rate considers both the average field rate and the proportion of the crop area treated, giving an overview of the crop in total. The definitions of the terms used are set out in Section A2.7 of this report.

Additionally, the survey design has been constructed to measure use of manufactured fertilisers, thus may not be wholly representative of manure use. Some of these data, especially where sample sizes are small, need to be treated with caution.

A2.5 METHODOLOGY FOR TOTAL FERTILISER USE

Official quantities of nitrogen, phosphate and potash fertiliser consumed annually in the UK since 1965 are shown in Table B2.7. These data are based on BSFP findings, HMRC import data and confidential trade and sales data which are contributed by AIC industry members who represent approximately 90% of the market. They are compiled by the Agricultural Industries Confederation with input and peer review by an expert group convened by the AIC and in liaison with Defra.

It would be possible to use BSFP data alone to estimate total fertiliser use by taking the average rate for each individual crop and multiplying by the June crop area estimate and summing these to give an overall usage. However, the relatively low coverage of the BSFP survey for some crops, means that the alternative approach of combining BSFP data with trade and sales data provides more robust total usage estimates than using BSFP data alone. This method also considers use on small farms (<20 ha) and use in Northern Ireland.



The AIC survey their relevant members (16 businesses) monthly to collect information on fertiliser deliveries. The BSFP fertiliser statistics published and used in the industry and agricultural sector are by fertiliser year (growing season, July to June), not by calendar year. They are available at the AIC website.

Individual returns are quality assured by trend analysis against historic data and also against the aggregate trend. Any omitted data or anomalous figures outside trend or other pre-defined limits are checked and followed up, usually by contacting the survey respondent.

The AIC also purchase monthly HMRC trade statistics on imports and exports of fertilisers; these data are actively used and scrutinised, and where appropriate challenged by the trade. Twice a year, in December and June, and on an annual basis, aggregated figures for total fertiliser deliveries for the main types of fertiliser are calculated, together with nutrient contents. These are assessed with the import and export figures to derive the base total fertiliser usage figures. The N:P:K ratio from the BSFP survey is compared with the AIC derived figures to confirm the nutrient quantities relative to each other. Further small adjustments may be made based on other confidential information on stocks or non-fertiliser use of imported urea.

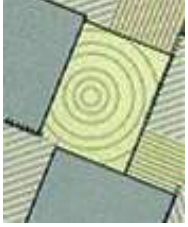
These AIC usage figures are compared to usage figures derived from BSFP and June crop area figures and the relationship between the ratios of N, P and K from both sets of data are checked and compared. Any inconsistencies or anomalies identified in the data are identified and followed up and any necessary corrections are made to ensure comparability and consistency across all data.

Each year the AIC figures are reviewed, and quality assured for credibility and consistency across sources by a group of experts contributing knowledge on production, use and trade. The final agreed aggregated total UK usage figures are subject to independent peer review and checked for consistency and trend analysis, considering known agronomic and market factors.

The total fertiliser use is then split by country. The figures for Northern Ireland are taken from their fertiliser survey and the remaining GB figures are split between England plus Wales and Scotland by applying the proportions derived from the BSFP data. The NI Survey provides data by quarter, amalgamated by calendar year.

A2.6 REVISIONS

The figures presented in this report are finalised. We will provide information on any further revisions we make to the report or the datasets if any inaccuracies or errors occur.



A2.7 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 2018 to autumn 2019, corresponding to the 2019 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 2018. 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 and fertilisers) were recorded separately. Agricultural land which had been set-aside under the Basic 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 collected by the survey, but is not included in the calculations of this report.

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

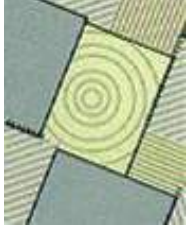
5. The abbreviation **N** is used for nitrogen; **P_2O_5** for phosphate; **K_2O** for potash, **SO_3** for sulphur and **FYM** for all types of organic manure e.g. slurries and solid manures. The phrase **total use** includes both straight (single nutrient) and compound (multi nutrient) products. Fertiliser products containing nitrogen and sulphur only are classified with straight nitrogen. Rates are expressed in terms of the equivalent nutrient content, taking into account the nutrient content in the product used. The nutrient content of the common fertiliser products including the dry matter content and nutrient content of various organic manures used are given in the Nutrient Management Guide (RB209) which is available at https://ahdb.org.uk/nutrient-management-guide-rb209.

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 and is calculated based on the sown area rather than the total field area. 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). The application rate is calculated based on the sown area rather than the total field area.

   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 result of 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 EU system, aggregates a wide range of defined farm types into ten 'robust' types:
   (1) Cereals
   (2) General Cropping
   (3) Horticulture
   (4) Specialist Pigs
   (5) Specialist Poultry
   (6) Dairy
   (7) Cattle and Sheep (LFA)
   (8) Cattle and Sheep (lowland)
   (9) Mixed
   (10) Other

   Prior to 2004, the UK agricultural departments amalgamated the robust types 'Specialist Pigs' and 'Specialist Poultry' as the single robust type 'Pigs and Poultry'. 2006 was the first year that the BSFP adopted the revised classification following analysis that showed this would not lead to under-representation of either of these farm types through marginalisation. The composition of 'robust' types is presented in greater detail in Appendix 3. The sampling framework outlined in Section A2.1 can be related to robust types as set out below.

   Revisions to the definitions of farm types can be found at the following link:

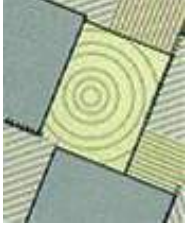
   https://www.gov.uk/structure-of-the-agricultural-industry-survey-notes-and-guidance

   Data presented in tables GB4.1 to GB4.5 are derived from the robust types shown below.

table number	*robust group in table title*	*robust type name*	*robust number*
GB4.1	cereal farms	Cereals	1
GB4.2	general cropping	General cropping and horticulture	2, 3
GB4.3	dairy farms	Dairy	6
GB4.4	other livestock	LFA and lowland grazing livestock	7, 8
GB4.5	mixed farms	Mixed	9

   These robust type groupings are also used in tables D2.3b, D3.2 and E1.2b. Due to the small number of specialist pigs and poultry farms interviewed in the survey, data collected from these robust types have not been presented in any of the tables listed above.

10. Regional analysis of the Survey data for England was classified in two ways in 2019. Table EW4.1a is based on the **Government Office Regions** (GORs) in common with other Defra surveys. Table EW4.1b is based on the former MAFF 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. These revised regions, termed **BSFP regions**, have been the basis for regional analysis within the survey historically and are detailed in Appendix 2.



A2.8 TYPES OF FERTILISER

Of the 16 essential plant nutrients, the four key ones required in relatively large amounts for crops to achieve their optimal yield potential are nitrogen, phosphorus, potassium and sulphur. Where nutrients are not available in sufficient quantity in the soil, fertiliser products are applied to supply the nutrient needs of the plant. Plant roots take up the nutrients dissolved in the water in the soil. The nutrients must be in the correct chemical form so that they are in a suitable water-soluble form for plants to be able to use them.

There are two broad types of fertiliser. Manufactured fertilisers tend to be relatively concentrated and supply essential nutrients in a mineral form which are immediately available for plant use. The other type is organic fertilisers which can be plant or animal based such as manure, slurry, compost or poultry litter. They are in their natural form or have undergone minimal processing. They are usually less concentrated than manufactured fertilisers, and often the nutrients they contain may need further breaking down in the soil by bacteria and other soil organisms before they are in a form available to plants. The chemical composition can vary greatly, and they tend to be slower acting and less predictable in their action.

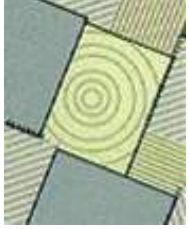
Nitrogen is important for building DNA and proteins in plants. It encourages growth of stems and leaves by promoting protein and chlorophyll. Provided there are adequate supplies of water and other nutrients, nitrogen usually has a large effect on crop growth, yield and quality. Whatever the source, to be usable by plants, it must be in the form of inorganic ammonium or nitrate ions. The main forms of inorganic nitrogen fertilisers are ammonium nitrate, urea, ammonium phosphates and ammonium sulphate.

Phosphorus is essential for photosynthesis and respiration. It promotes early root formation and growth and enhances seed and fruit production. It is also important for energy production and storage. In the context of fertilisers, it is measured and defined as P_2O_5. Phosphate fertilisers include ammonium phosphate and superphosphate. The majority of phosphorus in most soil is in essentially insoluble forms, and unavailable to plants. Phosphorus is very immobile in soil, and the forms that are created and their availability, are dependent on factors such as the soil pH, temperature and moisture. Plant roots take up nearly all phosphorus as either the primary or secondary orthophosphate anion ($H_2PO_4^-$ or HPO_4^{-2}, respectively). Generally, the maximum availability of phosphorus occurs in soils within a pH range of 6.0-7.0.

Potassium contributes to many plant functions apart from managing the water status, including shoot and root tip growth, cell extension, photosynthesis and the reduction of drought and disease stress. It is used in the process of building and transporting starches, sugars and proteins, so is important for grain and fruit yield. Potassium chloride (commonly called muriate of potash) is the most common form of potassium fertiliser used in agriculture. Other forms include potassium sulphate, potassium magnesium sulphate and potassium nitrate. In the context of fertilisers, it is measured and defined as K_2O. It is usually taken up from the soil in greater quantities than the other main fertilisers. Crops which are harvested green such as grass and green vegetables will remove relatively large quantities of potassium from the soil.

Sulphur is an essential plant nutrient. It is a component of most proteins and it activates certain enzyme systems. In the past sulphur demand was satisfied through atmospheric deposition. With the significant decline of sulphur from the atmosphere, there is a need for sulphur application to crops and grass and it is often applied together with nitrogen fertilisers. Crops such as oilseed rape are particularly sensitive to sulphur deficiency and consequently require a relatively high input of sulphur.

More details are provided in the Nutrient Management Guide (RB209). Agriculture and Horticulture Development Board (AHDB). https://ahdb.org.uk/nutrient-management-guide-rb209



A3 GENERAL TRENDS AND ISSUES

A3.1 CROP AREAS AND WEATHER CONDITIONS

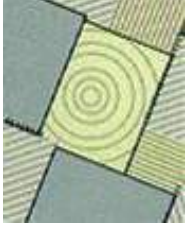
Annual changes in relative cropping areas, as well as any changes in fertiliser practice for individual crops, may affect nutrient application rates when aggregated across the main crop groupings. Table A3.1 provides a summary of June Agricultural Survey estimates for areas of individual major crops, crop groupings and total tillage and grassland categories in 2017/18 and 2018/19 and illustrates percentage changes in relative cropping areas over the past five years. There were about 11 million hectares of managed agricultural land in Britain in 2019, of which 4.6 million hectares (41%) were cultivated for tillage cropping and the remainder, 6.6 million hectares, were grassland (excluding rough grazing).

The Basic Payment Scheme was introduced in 2015 and replaced the Single Farm Payment, (introduced in 2005 to replace all the previous main Common Agricultural Policy (CAP) payment schemes with a single payment.) To obtain this single payment, farmers must demonstrate compliance with a number of measures designed to protect the environment. One potential impact of cross-compliance, and of environmental schemes, is that margins of fields will remain un-cropped. In this report, as was the case for the last 10 years, all calculations of fertiliser rates have been made based on sown area rather than field size.

Table A3.1 Cropping and grassland areas ('000 ha) in Great Britain, 2018 – 2019

Crops	June 2018 '000s ha	June 2019 '000s ha	% change since 2018	% change since 2014	2019 crop areas as % of total tillage area
Wheat	1,790	1,808	1.0	-6.6	39.1
Barley – winter	388	444	12.6	5.0	9.6
– spring	748	698	-7.2	9.2	15.1
Total cereals[1]	*3,148*	*3,181*	*1.0*	*1.2*	*68.8*
Oilseed rape – total	*599*	*529*	*-13.2*	*-27.6*	*11.4*
Oilseed rape – winter	592	524	-13.0	-26.0	11.3
Oilseed rape – spring	7	5	-40.0	-200.0	0.1
Sugar beet	116	108	-7.4	-7.4	2.3
Potatoes[2]	138	140	1.4	2.9	3.0
Linseed	25	15	-66.7	0.0	0.3
Peas/beans[3]	199	177	-12.4	22.6	3.8
Maize/other fodder	304	320	5.0	20.3	6.9
Vegetables	116	113	-2.7	-29.2	2.4
Total tillage[4]	*4,680*	*4,623*	*-1.2*	*-0.8*	*100.0*
Bare fallow[5]	270	234	-15.4	32.1	
Grassland					2019 grass areas as % of total grass area
Less than 5 years old	1,020	1,045	2.4	-19.5	15.9
5 years and older	5,551	5,547	-0.1	6.5	84.1
Total grass[6]	*6,570*	*6,592*	*0.3*	*2.4*	*100.0*
Total crops and grass[7]	*11,250*	*11,215*	*-0.3*	*1.1*	

[1] including minor cereals (oats, rye, triticale, mixed corn).
[2] early + maincrop potatoes.
[3] harvested dry for animal consumption or, for peas, human consumption.
[4] including other crops, but not fruit, protected cropping, ornamentals or bare fallow.
[5] Historically including set-aside.
[6] managed grassland, excluding rough grazing.
[7] total tillage + total grassland.
Source: Annual Defra/Scottish Government/Welsh Assembly Government (WAG) June Agricultural Survey data



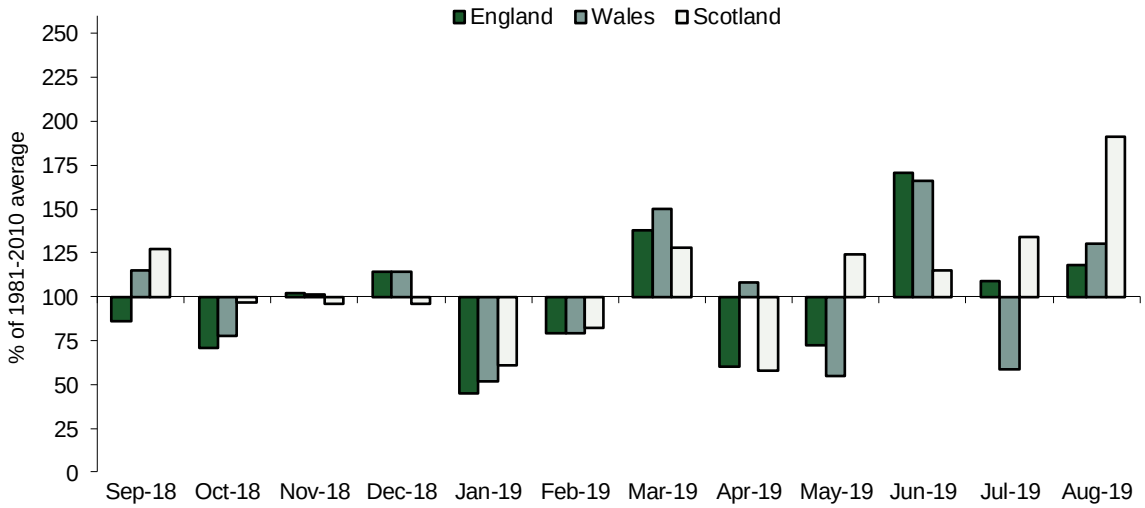
Comparing the 2018 and 2019 cropping years, the area sown to cereals remains largely consistent. The rise of spring barley in recent years was reversed with an increase in the winter crop observed. Oilseed rape has declined in part due to difficulty in managing pests on this crop. A decrease in the sugar beet area was observed in 2019. The forage maize area continues to increase, apparently due to it being used as a feedstock for anaerobic digestion biogas plants.

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

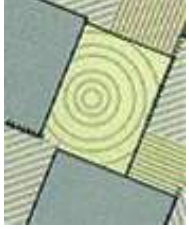
- A very wet (or very dry) autumn might delay the establishment of winter sown crops or alter the ratio of winter to spring sown crops, with their different fertiliser requirements.
- Prolonged wet weather can increase leached losses of some nutrients, particularly nitrogen and sulphur. Weather conditions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

September 2018 saw temperatures averaging out to the seasonal norm in most areas. It was wetter than average across many western and northern areas, but drier elsewhere. In October the UK overall had 82% of average rainfall for the month. November soon became unsettled and mild with temperatures 1.1 degrees celsius above average. Overall, the winter was milder than average, although in January the temperature dropped with sharp frosts and snowfall that continued into February. After a cold start February became predominantly mild with record breaking daytime temperatures. February saw rainfall totals near or below average with 82% of average rainfall overall. The first half of March was wet, windy and unsettled with low pressure bringing persistent heavy rain and strong winds. The second half of the month was much more settled with dry weather though remaining cooler, cloudier and wetter in the far north west. Early May was cool with warmer spells later in the month. The start of June was generally wet in most areas and cooler than average. Latter June and July were more settled with some warm spells. June rainfalls were above average across most areas with double the average in many parts of England and Wales. Numerous thundery outbreaks occurred in the second half of July making the month somewhat wetter than average overall. August was very wet over Scotland and the far north of England with rainfall 153% of average. The majority of August was unsettled and showery although it became hotter and drier later in the month, especially in south eastern areas.

Figure A3.1 Monthly rainfall as a percentage of the long-term average[6]



[6] https://www.metoffice.gov.uk/climate/uk/summaries



SECTION B

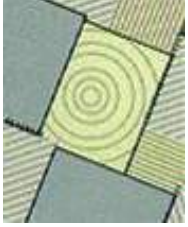
COMMENTARY ON FERTILISER USE IN GREAT BRITAIN

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 2015-19. Comments on longer term trends are made in Section B2.

The estimates of overall application rates from the survey relate to usage on farms during the 2018-19 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 overall application rate considers both the average field rate and the proportion of the crop area treated, giving an overview of the crop as a whole. The definitions of the terms used are set out in Section A of this report.

The statistics on the pattern of fertiliser practice reported for Great Britain largely reflect practice in England & Wales due to its greater area of total crops and grassland: about 9.4 million hectares in England & 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 & Wales or in Scotland can refer to tables presented in Section C. A summary of data from earlier years is available in Chalmers 2001[7] and historic data for the key data series are also available on the Defra web site.

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

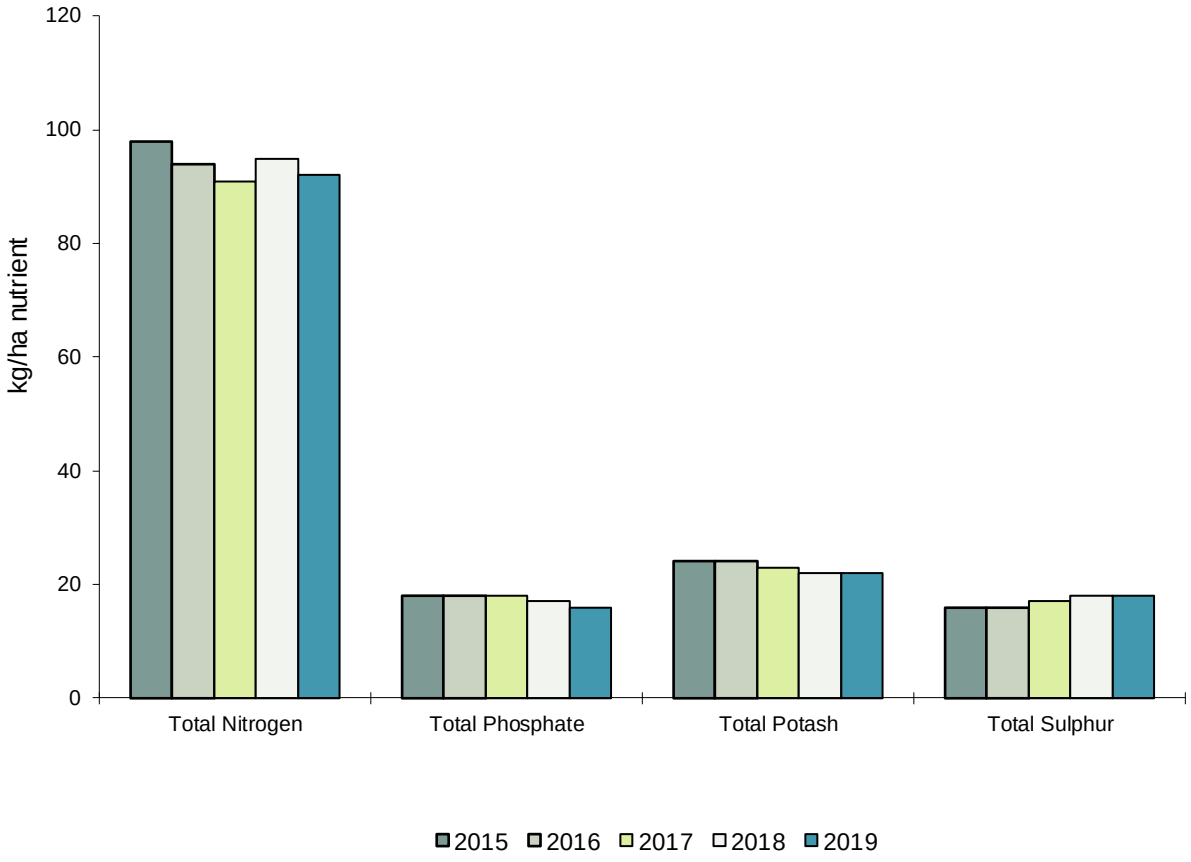


B1 2019 RESULTS FOR GREAT BRITAIN AND CHANGES IN RECENT YEARS

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

Overall rates of total nitrogen, phosphate, potash and sulphur in Great Britain over the last five years are illustrated in Figure B1.1. The 2019, overall rate of nitrogen for all crops and grass is 92 kg/ha, a decrease of 3 kg/ha from 2018. Overall rates for phosphate, potash and sulphur in 2019 were 16 kg/ha, 22 kg/ha and 18kg/ha respectively. Application rates for straight and compound nitrogen applied on crops and grassland are also presented in Table B1.1.

Figure B1.1 Overall fertiliser use (kg/ha) on all crops and grass, Great Britain 2015 – 2019



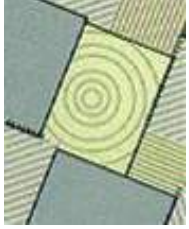
B1.1.1 Nitrogen

All crops and grassland

Table B1.1 Overall nitrogen use (kg/ha), Great Britain 2015 – 2019

Total nitrogen

	tillage crops	*grass*	*all crops and grass*
2015	146	56	98
2016	141	56	94
2017	137	54	91
2018	142	57	95
2019	137	54	92



Straight nitrogen

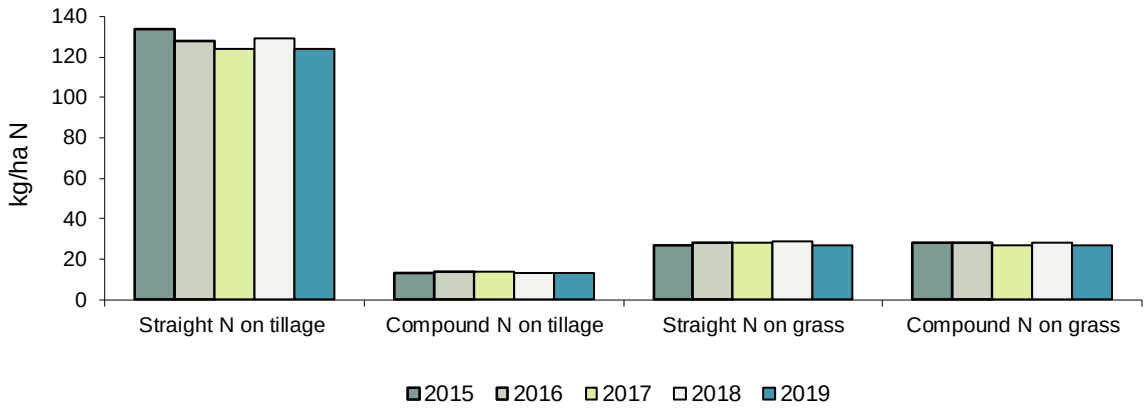
	tillage crops	*grass*	*all crops and grass*
2015	134	27	77
2016	128	28	73
2017	124	28	70
2018	129	29	74
2019	124	27	71

Compound nitrogen

	tillage crops	*grass*	*all crops and grass*
2015	13	28	21
2016	14	28	21
2017	14	27	21
2018	13	28	21
2019	13	27	20

Overall, the 3 kg/ha decrease in the rate of nitrogen in 2019 (Figure B1.1) was caused by a 5 kg/ha decrease on all tillage and 3 kg/ha decrease on grass. When compared with 2018, the rate of straight N decreased by 3 kg/ha for tillage crops and grass (Figure B1.2). The rate of compound N also decreased by 1 kg/ha on all crops and grass, but the overall rate of use on all crops and grass continues to be stable at 20-21 kg/ha over the five-year period, 2015-2019.

Figure B1.2 Overall straight and compound nitrogen use (kg/ha), Great Britain 2015 – 2019

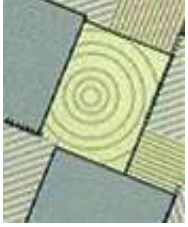


Tillage crops

Straight N continues to be the main source of nitrogen on tillage crops, with the proportion of tillage area receiving a straight nitrogen dressing at 84% in 2019. This was unchanged from 2018. The average field rate of straight N on tillage crops decreased by 5 kg/ha to 149 kg/ha. This resulted in a 5 kg/ha decrease in the overall application rate of straight N which was 124 kg/ha in 2019.

There are a several reasons for the dominance of straight nitrogen over the use of nitrogen in compound fertilisers, with the principal one being the large area of winter-sown crops. As is shown in Table A3.1, about 60% of the tillage area is sown to winter cereals and winter oilseed rape. These crops will receive most of any necessary dressings of phosphate and potash in the seedbed or during the autumn and winter, leaving just the nitrogen (and sulphur) to be applied, usually as more than one dressing, during the busy spring period of active crop growth. The need for precise timing of nitrogen applications has also contributed to a separation of nitrogen applications from those of phosphate and potash for spring-sown crops, especially spring cereals and sugar beet. Thus, a continuing increase in the use of straight nitrogen now applies to most spring-sown crops for agronomic and environmental reasons, as well as for the optimisation of logistics and the efficient use of time in the spring. The exception is maincrop potatoes where compound nitrogen accounted for 64% of dressing cover in 2019.

In the context of this report and elsewhere, straight nitrogen includes nitrogen plus sulphur fertiliser products. The term “straight nitrogen” denotes a nitrogen-containing product without any associated phosphate or potash.



Grassland

In 2019, the overall N application rate on grass decreased by 3 kg to 54 kg/ha. Whilst the proportion of grass receiving a dressing of straight N remained unchanged at 27% versus 2018, the average field rate decreased by 3 kg/ha to 103 kg/ha. In contrast, the crop area dressed with compound N decreased 1% to 38% and the average field rate declined by 2 kg/ha to 70 kg/ha. Overall this resulted in a small decrease (of 1 kg/ha) to 27 kg/ha in the overall application rate in 2019.

B1.1.2 Phosphate, Potash and Sulphur

Phosphate

Table B1.2a shows overall phosphate applications for the past five years. Compared with 2018, the overall rate of use on tillage crops decreased to 26 kg/ha. This resulted from an unchanged dressing cover of 48% and a decreased average field rate of 54 kg/ha of phosphate on all tillage crops in 2019. For grassland, whilst the overall rate was unchanged (8 kg/ha), the dressing cover decreased by 1% to 37% and the average field rate reduced to 21 kg/ha. The five year means for overall phosphate rates for tillage crops and grass were 28 kg/ha and 8 kg/ha, respectively.

Table B1.2a Overall phosphate and potash use (kg/ha), Great Britain 2015 – 2019

Total phosphate

	tillage crops	*grass*	*all crops and grass*
2015	29	9	18
2016	29	9	18
2017	30	8	18
2018	27	8	17
2019	26	8	16

Total potash

	tillage crops	*grass*	*all crops and grass*
2015	38	12	24
2016	39	12	24
2017	37	12	23
2018	35	12	22
2019	34	11	22

Potash

On tillage crops, the small decline in the overall potash rate was caused by a 5 kg/ha reduction in the average field rate to 69 kg/ha as dressing cover increased 2% to 50% in 2019. On grassland, dressing cover (39%) and overall rate of use (11 kg/ha) were both slight reductions, whilst the average field rate was unchanged at 29 kg/ha. The five year means for overall potash rates for tillage crops and grass were 37 and 12 kg/ha, respectively.

Sulphur

Table B1.2b shows overall sulphur (SO_3) applications for the past five years. In 2019, the overall application rate of sulphur on tillage crops was unchanged at 35 kg/ha and increased on grass by 1 kg/ha to 5 kg/ha. The proportion of the tillage area receiving a sulphur dressing was unchanged at 62%. However, average field rate decreased by 1 kg/ha to 56 kg/ha, leaving the overall rate at 35 kg/ha. The overall rate of sulphur on grass increased slightly to 5 kg/ha. The low overall rate of sulphur on grass is caused by a combination of lower dressing cover percentages and average field rates on grass than on tillage crops.

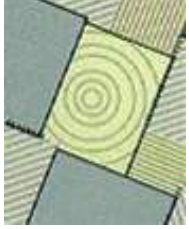


Table B1.2b Overall sulphur use (kg/ha SO_3), Great Britain 2015 – 2019

Total sulphur

	tillage crops	*grass*	*all crops and grass*
2015	31	3	16
2016	31	3	16
2017	34	3	17
2018	35	4	18
2019	35	5	18

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 B1.3a and B1.3b. Dressing cover percentages for the same period are shown in Table B1.4. More detailed statistics for 2019 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 caution as these estimates are based on a smaller number of farms and fields than the aggregate estimates for all tillage crops. Information on sampling errors, which help in judging whether apparent changes may be real or attributable to sampling variation alone, is given in Appendix 1.

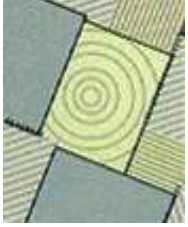


Table B1.3a Overall fertiliser use (kg/ha) on major tillage crops, Great Britain 2015 – 2019

Total nitrogen	winter wheat	spring barley	winter barley	maincrop potatoes [1]	oilseed rape [2]	sugar beet
2015	190	105	147	157	193	98
2016	188	104	146	134	180	97
2017	185	100	149	136	180	92
2018	186	101	143	143	188	82
2019	185	95	143	150	180	74

Straight nitrogen	winter wheat	spring barley	winter barley	maincrop potatoes [1]	oilseed rape [2]	sugar beet
2015	184	72	139	56	185	88
2016	182	71	137	36	171	86
2017	177	70	140	39	170	83
2018	179	74	137	42	179	73
2019	178	70	135	81	170	69

Compound nitrogen	winter wheat	spring barley	winter barley	maincrop potatoes [1]	oilseed rape [2]	sugar beet
2015	6	33	8	102	8	10
2016	6	33	9	98	9	11
2017	6	30	8	97	10	10
2018	7	27	6	101	9	9
2019	8	25	9	69	10	6

Total phosphate	winter wheat	spring barley	winter barley	maincrop potatoes [1]	oilseed rape [2]	sugar beet
2015	28	32	30	111	30	23
2016	27	33	29	110	29	17
2017	29	32	30	114	33	17
2018	26	31	27	101	27	18
2019	24	30	27	89	29	17

Total potash	winter wheat	spring barley	winter barley	maincrop potatoes [1]	oilseed rape [2]	sugar beet
2015	34	44	41	186	31	64
2016	33	46	41	186	29	51
2017	36	43	40	206	31	46
2018	31	42	34	208	27	44
2019	31	39	37	164	27	50

Total sulphur	winter wheat	spring barley	winter barley	maincrop potatoes [1,3]	oilseed rape [2]	sugar beet
2015	34	21	29		60	26
2016	36	24	34		59	28
2017	40	24	40		64	39
2018	41	25	34		61	25
2019	42	24	38		63	31

[1] Figures for maincrop potatoes include second earlies.
[2] Single crop grouping for the combined winter and spring oilseed rape areas.
[3] Sulphur rates on potatoes are not shown as some growers apply additional sulphur to acidify the soil for this crop. **These applications cannot be separated from those intended as a fertiliser nutrient.**

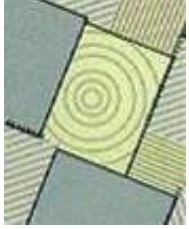


Table B1.3b Average field rates (kg/ha) on major tillage crops, Great Britain 2015 – 2019

Total nitrogen	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [1]	*oilseed rape* [2]	*sugar beet*
2015	193	107	149	166	193	100
2016	192	106	148	142	183	99
2017	188	103	152	136	181	96
2018	189	104	146	144	190	83
2019	187	97	145	153	181	78

Straight nitrogen	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [1]	*oilseed rape* [2]	*sugar beet*
2015	189	95	144	118	186	96
2016	190	95	144	101	177	89
2017	184	93	147	91	174	88
2018	185	96	143	99	182	78
2019	183	87	141	147	173	80

Compound nitrogen	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [1]	*oilseed rape* [2]	*sugar beet*
2015	58	65	58	144	35	47
2016	51	64	61	118	39	50
2017	80	56	67	119	34	42
2018	60	56	50	116	37	49
2019	62	50	55	107	34	31

Total phosphate	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [1]	*oilseed rape* [2]	*sugar beet*
2015	64	48	55	145	63	59
2016	60	50	56	125	57	48
2017	64	49	60	130	58	40
2018	60	50	61	114	57	41
2019	57	48	53	112	57	47

Total potash	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [1]	*oilseed rape* [2]	*sugar beet*
2015	73	62	68	230	70	98
2016	71	68	70	213	67	88
2017	75	62	74	226	64	78
2018	70	66	74	218	65	79
2019	67	61	68	185	61	88

Total sulphur	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [1,3]	*oilseed rape* [2]	*sugar beet*
2015	55	44	56		83	62
2016	56	42	59		84	49
2017	58	44	60		84	74
2018	56	45	50		77	39
2019	59	41	55		77	49

[1] Figures for maincrop potatoes include second earlies.
[2] Single crop grouping for the combined winter and spring oilseed rape areas.
[3] Sulphur rates on potatoes are not shown as some growers apply additional sulphur to acidify the soil for this crop. **These applications cannot be separated from those intended as a fertiliser nutrient.**

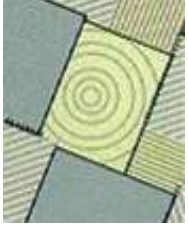


Table B1.4 Dressing cover (% area) on major tillage crops, Great Britain 2015 – 2019

Total nitrogen	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [1]	*oilseed rape* [2]	*sugar beet*
2015	99	98	99	95	100	98
2016	98	98	99	94	98	98
2017	99	97	98	100	100	96
2018	98	97	98	100	99	98
2019	99	98	99	98	99	95

Straight nitrogen	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [1]	*oilseed rape* [2]	*sugar beet*
2015	98	75	97	47	99	92
2016	96	75	95	35	97	97
2017	96	75	95	43	98	94
2018	97	77	95	43	98	93
2019	97	80	96	55	98	87

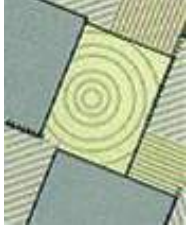
Compound nitrogen	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [1]	*oilseed rape* [2]	*sugar beet*
2015	10	51	13	70	23	21
2016	11	52	15	83	23	22
2017	10	54	12	82	28	23
2018	11	47	12	87	25	18
2019	12	50	16	64	29	18

Total phosphate	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [1]	*oilseed rape* [2]	*sugar beet*
2015	44	67	54	76	47	40
2016	45	65	52	88	51	35
2017	46	66	50	88	57	43
2018	42	63	44	88	47	43
2019	42	63	50	79	52	37

Total potash	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [1]	*oilseed rape* [2]	*sugar beet*
2015	46	70	60	81	44	65
2016	46	67	58	87	43	58
2017	47	70	54	91	48	59
2018	44	64	46	95	41	56
2019	46	64	54	88	44	57

Total sulphur	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [1]	*oilseed rape* [2]	*sugar beet*
2015	62	48	52	23	73	42
2016	63	56	57	29	70	58
2017	69	55	66	20	76	53
2018	73	56	67	27	80	63
2019	72	59	70	32	82	63

[1] Figures for maincrop potatoes include second earlies.
[2] Single crop grouping for the combined winter and spring oilseed rape areas.



B1.2.1 Nitrogen

In 2019, overall rates of total nitrogen (Table B1.3a) decreased for all major crops except winter barley which was unchanged and potatoes which increased by 7 kg/ha over 2018. Average field rates (Table B1.3b) followed a similar pattern with decreases on all of the major crops except potatoes. Rates for potatoes are more variable than other arable crops; the standard errors for total nitrogen for the average field rate was 8.6 and 5.4 for potatoes and sugar beet, respectively (see Appendix 1.1.). For all major arable crops dressing cover approached 100% (Table B1.4).

Winter wheat

The field cropping information collected in the Survey enables separate estimates to be made of nitrogen fertiliser use on milling and non-milling (seed/feed) categories of winter wheat (Table B1.5). The difference between the rates applied to milling and non-milling wheats reflect differences in crop husbandry and nitrogen management practices.

Table B1.5 Average field application rates (kg/ha) of nitrogen on cereals by market use, Great Britain 2015 – 2019

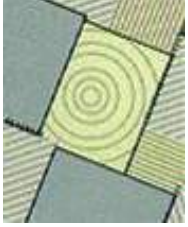
Total nitrogen

	winter wheat		*spring barley*		*winter barley*	
	milling	*non-milling*	*malting*	*non-malting*	*malting*	*non-malting*
2015	213	184	112	101	136	153
2016	206	185	112	100	127	153
2017	204	179	108	97	134	157
2018	207	180	108	99	126	152
2019	201	179	100	94	129	149

Nitrogen fertiliser requirements for winter wheat depend on the intended market end use (grain N levels), as well as upon soil type and the residual soil nitrogen fertility from previous cropping and manure practice
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 potentially lower yielding varieties of milling wheat, are often grown as a first winter wheat after a break crop, such as oilseed rape. This is to exploit the potential yield and residual soil nitrogen benefits from the crop rotation, and to avoid any risk of lower grain protein concentrations because of high yield diluting the grain nitrogen concentration for first wheat in the rotation. The average field application rate on milling wheat decreased by 6 kg/ha to 201 kg/ha, and the rate on non-milling wheat decreased by 1 kg/ha compared with 2018. The non-milling crop continues to dominate the wheat crop area (Table B1.6) with 64% of the crop year (5-year mean: 66%).

Table B1.6 Percentage distribution (% crop area) of cereal crop areas by market use, Great Britain 2015 – 2019, as estimated from the Survey

	winter wheat		*spring barley*		*winter barley*	
	milling	*non-milling*	*malting*	*non-malting*	*malting*	*non-malting*
2015	30	70	55	45	23	77
2016	34	66	53	47	19	81
2017	36	64	54	46	22	78
2018	34	66	57	43	21	79
2019	36	64	60	40	18	82



Spring barley

Overall use of total nitrogen on spring barley decreased by 6 kg/ha to 95 kg/ha. By comparison, the five-year mean (2015-19) is 101 kg/ha. The rate of straight N decreased by 4 kg/ha to 70 kg/ha whilst the overall application rate of compound N decreased by 2 kg/ha compared with 2018 to 25 kg/ha. The average field rate for straight N decreased by 9 kg/ha and the rate for compound N decreased by 6 kg/ha compared with 2018. The percentage of the spring barley area receiving a dressing of straight N increased by 3% to 80%, and dressing cover with compound N increased by 3% to 50% (Table B1.4).

Further analysis of the data by crop type (Table B1.5) shows the average field rate applied to malting was reduced by 8 kg/ha to 100 kg/ha with a reduction of 5 kg/ha to 94 kg/ha for non-malting crops. In the case of the spring malting crop the five-year mean is 108 kg/ha, whilst for non-malting crops the mean is 98 kg/ha.

Estimated nitrogen rates on spring barley crops has been consistently slightly higher on malting than non-malting crops. 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 could 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 in the range recommended for mineral soil types with low nitrogen residues (70 - 120 kg/ha)[8]. Feed crops on the other hand are often grown within mixed rotations, which tend to have a higher soil nitrogen fertility, with consequently less need for nitrogen fertiliser.

The proportion of spring barley grown for malting has fluctuated during the last five years (Table B1.6). The mean for the period 2015-19 is 56%, with the lowest proportion recorded in 2013 at 51%.

Winter barley

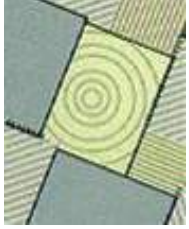
In the period 2002-08 overall total nitrogen use on winter barley decreased from year to year, down to 132 kg/ha in 2008. This rate then increased albeit with some fluctuations to 2017, but in 2018 the rate decreased by 6 kg/ha to 143 kg/ha. This overall total N rate was unchanged in 2019. The rate of straight nitrogen, which is used on 96% of the winter barley crop area, decreased by 2 kg/ha to 135 kg/ha in 2019, lower than the five year (2015-19) mean of 138 kg/ha. The compound nitrogen overall rate increased by 3 kg/ha to 9 kg/ha.

As with the spring sown crop, nitrogen requirements for winter barley depend on a range of agronomic factors, included the intended market for the grain. Average field rates of nitrogen on malting crops increased by 3 kg/ha over 2018 to 129 kg/ha, close to the five-year mean of 130 kg/ha. For non-malting crops, the average field rate decreased by 3 kg/ha to 149 kg/ha (Table B1.5), below the five-year average of 153 kg/ha.

The higher application rates of nitrogen (five-year mean of +20 kg/ha) on non-malting, compared to malting winter barley crops, reflect typical agronomic practice, and the gap between malting and non-malting crops was comparable with previous years. 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.

The proportion of crop area grown for malting was 18% in 2019, 3% lower than 2018, with the five-year mean calculated as 21%. (Table B1.6).

[8] Anon. (2018). Nutrient Management Guide (RB209). Agriculture and Horticulture Development Board (AHDB). https://ahdb.org.uk/nutrient-management-guide-rb209



Maincrop potatoes

Total nitrogen use on maincrop potatoes has fluctuated over the last five years. Part of the reason for recent apparent fluctuations in the estimates of nutrient application rates may be because proportionally fewer fields of potatoes are covered by the Survey. This is because fields of potatoes on respondent's farms may be let out and grown by a third party, so it is not possible to record information in the Survey. Furthermore, fields of potatoes grown by a respondent, but not on the farm being surveyed, are not captured in the Survey.

In 2019, the overall rate of nitrogen increased by 7 kg to 150 kg/ha, which is above the five-year mean of 144 kg/ha (Table B1.3a).

Oilseed rape

In 2019, overall total nitrogen and average field rate use on oilseed rape, as a combined category for both the autumn and spring sown crop, decreased by 8 kg/ha (to 180 kg/ha) and 9 kg/ha (to 181 kg/ha), respectively; five-year means of 184 kg/ha and 186 kg/ha, respectively (Table B1.3a, B1.3b). Whilst crop area dressed with straight N remain unchanged, and increased by 4% for compound N (Table B1.4), the change in overall N of 8 kg/ha (to 180 kg/ha) was caused by decreases in average field rates for straight N and compound N of 9 kg/ha and 3 kg/ha, respectively (Table B1.3b).

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 decreased by 9 kg/ha to 182 kg/ha. Compared with the previous year, the rate for the spring crop increased by 29 kg/ha to 120 kg/ha. In a normal year spring rape represents only about 1-2% of the total oilseed rape area, so the average field rate for total nitrogen on these spring-sown crops should be treated with extreme caution.

Table B1.7 Average field application rates of nitrogen (kg/ha) on winter and spring oilseed rape, Great Britain 2015 – 2019

Total nitrogen (kg/ha)

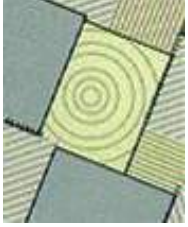
	winter oilseed rape	*spring oilseed rape**
2015	193	115
2016	184	132
2017	181	116
2018	191	91
2019	182	120

* Spring oilseed rape data are more variable due to smaller crop area

.

Sugar beet

The overall nitrogen use on sugar beet decreased by 8 kg/ha in 2019 to 74 kg/ha, considerably below the five-year mean (89 kg/ha). Use of straight N, by far the most widely used form of nitrogen in this crop (five-year mean: 93% of the dressed area), was down 4 kg/ha to 69 kg/ha (Table B1.3a, B1.4). The average field rate of straight N increased to 80 kg/ha, whereas the average rate of the less used compound N decreased by 18 kg/ha to 31 kg/ha (Table B1.3b) which is by far the lowest recorded over the five year period.



B1.2.2 Phosphate and Potash

Phosphate

In 2019, the overall rate of phosphate decreased on all the major crops except oilseed rape and winter barley which was unchanged (Table B1.3a). Except oilseed rape and sugar beet, where the average field rate increased by 6 kg/ha, average field rates for other major crops decreased by 1 to 8 kg/ha, the latter for winter barley (Table B1.3b). In 2019, the overall phosphate rate declined 1 kg/ha to 26 kg/ha (Table B1.2a), below the 2015-19 five-year average (28 kg/ha). Despite some variation in 2019, the evidence still generally suggests that a declining trend in overall usage of phosphate (and potash), noted since the late 1990s, may have ceased (Table B1.2a, Figure B2.4).

Potash

Overall, potash use on tillage crops decreased in 2019 by 1 kg/ha, to 34 kg/ha. Whilst this is below the 2015-2019 five-year average of 37 kg/ha (Table B1.2a) the decline was not due to a change in dressing cover which increased 3% to 50% but a reduction in the average field rate of 5 kg/ha to 69 kg/ha (Section C, GB1.1). For major tillage crops, the overall rate of potash decreased for spring barley and potatoes, increased for winter barley and sugar beet and was unchanged for winter wheat and oilseed rape. Dressing covers increased on winter wheat, winter barley, oilseed rape and sugar beet. Dressing cover with potash was unchanged on spring barley and decreased on potatoes (Table B1.4). Potash average field rates decreased on all the major tillage crops except sugar beet. As noted for nitrogen, part of the reason for recent apparent fluctuations in nutrient application rates for potatoes may be because of the many fields which are grown by third parties and are not recorded, thereby reducing the robustness of the estimates.

B1.2.3 Sulphur

The Survey has collected detailed information on sulphur fertiliser use since 1993, when only 3-6% of the cereal crop area 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. Dressing covers for sulphur then generally remained fairly static until 2002 when the areas increased steadily until 2007. 2008 saw reductions in dressing covers for cereals at 35%-43%, a pattern that continued in 2009, except in winter barley where sulphur dressing cover increased to 45%. In 2019, sulphur dressing cover decreased slightly on winter wheat, but increased on other tillage crops (Table B1.8). The average field rates for tillage crops were generally lower than in 2018.

Table B1.8 Dressing cover (% area) and average application rate (kg/ha SO_3) of sulphur on cereals and oilseed rape, Great Britain 2015 – 2019

Dressing cover (%)

	winter wheat	*winter barley*	*spring barley*	*oilseed rape*	*all tillage*
2015	62	52	48	73	52
2016	63	57	56	70	54
2017	69	66	55	76	57
2018	73	67	56	80	62
2019	72	70	59	82	62

Average field rate (kg/ha SO_3)

	winter wheat	*winter barley*	*spring barley*	*oilseed rape*	*all tillage*
2015	55	56	44	83	59
2016	56	59	42	84	58
2017	58	60	44	84	60
2018	56	50	45	77	57
2019	59	55	41	77	56

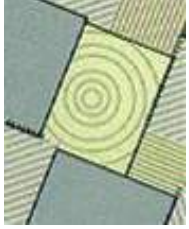


Table B1.9 shows the proportion of major tillage crops receiving a sulphur dressing in England & Wales compared with Scotland. Historically, a higher proportion of cereal and oilseed rape crops were treated with sulphur in Scotland than in England & Wales. This may have been due to the greater awareness of the risk of sulphur deficiency in Scotland due to historically extremely low levels of atmospheric sulphur deposition, compared to most other areas of Britain. Dressing covers are now much more closely aligned, and in some cases exceed those recorded in Scotland. Spring barley is an example of this trend, with this possibly being due to the manure which is more commonly applied to this crop in Scotland being assumed to satisfy the sulphur demand. 38% of Scottish spring barley received manure in 2019 compared with 24% in England and Wales.

Table B1.9 Dressing cover (% area) of sulphur on cereals and oilseed rape by region, 2015 – 2019

		winter wheat	*winter barley*	*spring barley*	*oilseed rape*
England & Wales	*2015*	61	51	53	82
	2016	65	56	57	71
	2017	69	66	59	77
	2018	72	66	58	79
	2019	72	70	60	82
Scotland*	*2015*	65	58	41	72
	2016	49	63	54	59
	2017	68	64	49	66
	2018	79	80	53	88
	2019	69	71	57	73

* Greater variability in the Scottish data may be due to smaller sample sizes.

B1.3 FERTILISER USE ON GRASSLAND

Overall fertiliser usage on grassland in Great Britain in the last five years, as previously shown (Tables B1.1 and B1.2), is summarised again in Table B1.10. The corresponding estimates of dressing cover and average field rates for each nutrient are shown in Table B1.11.

Table B1.10 Overall fertiliser use (kg/ha) on grassland, Great Britain 2015 – 2019

	straight nitrogen	*compound nitrogen*	*total nitrogen*	*total phosphate*	*total potash*	*total sulphur*
2015	27	28	56	9	12	3
2016	28	28	56	9	12	3
2017	28	27	54	8	12	3
2018	29	28	57	8	12	4
2019	27	27	54	8	11	5

In 2019, dressing cover for total nitrogen on grass decreased 1% to 58% (Table B1.11). The long-term trend has been for declining dressing cover for total nitrogen and the proportion receiving a dressing is the same as the previous low level reported in 2008. As in previous years, a higher proportion of grass received compound N as opposed to straight N, but the average field rate for compound N was 68% of the straight N rate of 103 kg/ha.

The overall application rates for phosphate and potash were at 8 kg/ha and 11 kg/ha, respectively (Table B1.10).

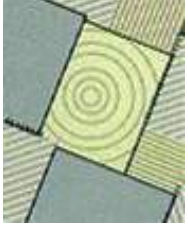


Table B1.11 Dressing cover (%) and average application rate (kg/ha) of fertiliser on grassland, Great Britain 2015 – 2019

Dressing cover (%)

	straight nitrogen	*compound nitrogen*	*total nitrogen*	*total phosphate*	*total potash*	*total sulphur*
2015	27	41	60	41	42	10
2016	27	39	58	38	39	9
2017	27	37	56	37	38	10
2018	27	39	59	38	40	12
2019	27	38	58	37	39	14

Average field rate (kg/ha)

	straight nitrogen	*compound nitrogen*	*total nitrogen*	*total phosphate*	*total potash*	*total sulphur*
2015	100	70	93	22	30	31
2016	105	71	97	23	31	35
2017	103	73	97	23	31	35
2018	106	72	96	22	29	37
2019	103	70	93	21	29	33

The proportion of the grass area receiving a straight nitrogen dressing was the same as in 2015 at 27% and the compound N dressing cover decreased by 1% to 38% in 2019 (Table B1.11). The dressing cover percentage of phosphate and potash on grass decreased by 1% since 2018 to 37% and 39%, respectively. The five-year means are 38% and 40%, respectively. The sulphur dressing cover increased to a high of 14%.

In 2019, the average field rates for phosphate decreased by 1 kg/ha to 21 kg/ha and potash was unchanged at 29 kg/ha. The sulphur average field rate decreased by 4 kg/ha to 33 kg/ha, just below the five-year average of 34 kg/ha.

B1.3.1 Nitrogen

Cutting and grazing management

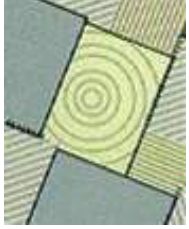
Fertiliser requirements for grassland vary according to the type of livestock enterprise, intensity of production and the associated cutting and grazing regimes used for sward management. Fertiliser use on dairy, other livestock and mixed farms in Great Britain in 2019 are presented in Section C. The Survey estimates of annual distributions of the total grassland area between grazing and cutting management regimes since 2015 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, although these may still be the best available estimates of grassland utilisation by area.

Table B1.12 Grassland utilisation (% of grass area), Great Britain 2015 – 2019

	grazed [1]	*silage* [2]	*hay* [2]
2015	90	29	11
2016	92	28	9
2017	93	29	10
2018	93	31	10
2019	93	31	10

Nearly all grassland is grazed at some stage during the season (Table B1.12) and the proportion in 2019 is slightly above the five-year mean of 92%.

[1] May also be cut
[2] May also be grazed



Fertiliser usage for the different cutting and grazing categories is presented in Table B1.13. The differences in average field rates for nitrogen illustrate the influence of grassland management practice on fertiliser inputs with rates being lowest generally in grass cut for hay, higher in grass which is grazed and higher still in grass cut for silage.

Table B1.13 Nitrogen application rates (kg/ha) by grassland utilisation, Great Britain 2015 – 2019

Total nitrogen

	overall application rate				*average field rate*		
	grazed [1]	*silage* [2]	*hay* [2]		*grazed* [1]	*silage* [2]	*hay* [2]
2015	51	100	37	*2015*	87	121	75
2016	52	103	38	*2016*	93	127	75
2017	52	100	44	*2017*	94	126	83
2018	53	104	50	*2018*	91	126	79
2019	50	100	44	*2019*	89	118	76

Straight nitrogen

	overall application rate				*average field rate*		
	grazed [1]	*silage* [2]	*hay* [2]		*grazed* [1]	*silage* [2]	*hay* [2]
2015	24	49	17	*2015*	95	114	76
2016	26	53	20	*2016*	102	119	93
2017	26	51	27	*2017*	100	120	91
2018	25	55	18	*2018*	100	125	84
2019	24	51	19	*2019*	97	117	82

Compound nitrogen

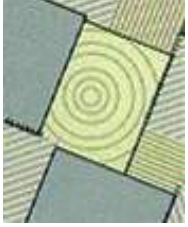
	overall application rate				*average field rate*		
	grazed [1]	*silage* [2]	*hay* [2]		*grazed* [1]	*silage* [2]	*hay* [2]
2015	26	51	21	*2015*	67	91	64
2016	26	50	18	*2016*	69	95	55
2017	26	49	17	*2017*	71	96	64
2018	28	48	33	*2018*	71	95	72
2019	26	49	25	*2019*	69	88	65

In 2019, the overall total nitrogen rates decreased for all grass categories; grazed by 3 kg/ha to 50 kg/ha, silage by 4 kg/ha to 100 kg/ha, and hay by 6 kg/ha to 44 kg/ha. Rates reported on grass cut for hay need to be treated with caution due to the relatively small numbers of grass fields being managed this way (Table B1.13).

The average field rates of straight nitrogen decreased for all categories of grass. The five-year means for overall straight nitrogen rate are 25, 52 and 20 kg/ha for grazed grass, silage and hay, respectively. Compound nitrogen average field rates also all decreased in 2019. The five year means for the overall compound nitrogen rates are 26, 49 and 23 kg/ha for grazed grass, silage and hay, respectively.

The fall in nitrogen use over the long term on grassland until 2008 is likely to be related in part to decreases in ruminant livestock numbers which may have reduced herbage production requirements. Since that date, the rate of nitrogen application to grassland has remained relatively constant, with the 2019 overall nitrogen rate being 54 kg/ha, just under the five-year average.

[1] May also be cut
[2] May also be grazed



B1.3.2 Phosphate and Potash

Phosphate and potash requirements for grassland depend, as for nitrogen, on the system of sward management with overall application and field rates for both phosphate and potash being higher in grass cut for silage.

Table B1.14 Phosphate and potash use (kg/ha) by grassland utilisation, Great Britain 2015 – 2019

Total phosphate

	overall application rate				*average field rate*		
	grazed [1]	*silage* [2]	*hay* [2]		*grazed* [1]	*silage* [2]	*hay* [2]
2015	8	15	8	*2015*	21	27	23
2016	8	14	8	*2016*	22	28	23
2017	8	14	8	*2017*	23	28	27
2018	8	14	11	*2018*	22	28	23
2019	8	14	9	*2019*	21	26	23

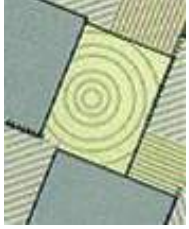
Total potash

	overall application rate				*average field rate*		
	grazed [1]	*silage* [2]	*hay* [2]		*grazed* [1]	*silage* [2]	*hay* [2]
2015	11	25	11	*2015*	27	42	33
2016	11	24	9	*2016*	29	46	27
2017	11	23	8	*2017*	29	43	29
2018	11	23	14	*2018*	28	41	31
2019	11	22	10	*2019*	28	39	25

In 2019, the overall phosphate rate was unchanged for grazed and silage but decreased by 2 kg/ha for hay. The corresponding five-year means for grazed grass, silage and hay were 8, 14 and 9 kg/ha, respectively. The average field rate for grazed grass decreased by 1 kg/ha, by 2 kg/ha for silage and hay was unchanged in 2019. Overall, the long-term decline in application rates on grazed grass appears to have levelled out.

Overall potash rates in 2019 remained static for grazed grass (11 kg/ha since 2015) decreased by 1 kg/ha for silage and 4 kg/ha for grass cut for hay. The average field rate of potash was unchanged on grazed grass, decreased by 2 kg/ha on silage grass and by 6 kg/ha on grass cut for hay.

[1] May also be cut
[2] May also be grazed



B1.3.3 Sulphur

In 2019, 14% of the total grassland area received a sulphur dressing (mean 11% for 2015-19 period). Of this, a higher proportion of grassland cut for silage is treated with sulphur compared to grazed grass or grass cut for hay (Table B1.15). Estimated dressing covers have fluctuated slightly in the past five years, with between 3 and 6% increases for all grass categories in 2019.

The significant proportion of heavier textured soil types which occur in the main grassland farming areas, together with assumed inputs of sulphur from slurry applications to silage fields, are among possible influences on the consistently low level of sulphur fertiliser use on grassland.

Table B1.15 Sulphur use on grassland, Great Britain 2015 – 2019

Dressing cover (%)

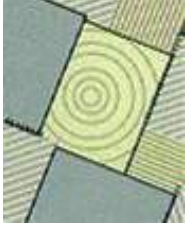
	grazed [1]	*silage* [2]	*hay* [2]	*all grass*
2015	9	17	6	10
2016	9	16	5	9
2017	9	16	9	10
2018	11	19	12	12
2019	14	25	16	14

Average application rate per year (kg/ha SO_3)

	grazed [1]	*silage* [2]	*hay* [2]	*all grass*
2015	30	34	37	31
2016	35	37	41	35
2017	33	41	42	35
2018	37	41	29	37
2019	33	37	30	33

Estimated average field rates of sulphur application peaked for grazed and silage grass in 2007 at 45 kg/ha and 47 kg/ha, respectively and for hay in 2008 at 47 kg/ha. In 2019, compared to 2018 values, average field rates decreased for grazed and silage by 4 kg/ha and increased by 1 kg/ha for hay grass. The five-year means are 34, 38 and 36 kg/ha SO_3 for grazed, silage and hay grassland, respectively (Table B1.15). Note that the average application rates in Table B1.15 are annual totals, not rates per cut.

[1] May also be cut
[2] May also be grazed



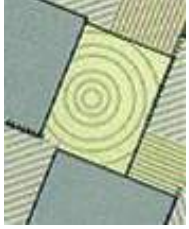
B2 LONGER TERM TRENDS FOR GREAT BRITAIN

B2.1 NITROGEN USE

The British Survey of Fertiliser Practice commenced as an integrated British survey in 1992. Before then, the annual Survey of Fertiliser Practice had been completed separately for England & Wales and for Scotland. Some survey statistics from those earlier surveys have since been collated to report an aggregated series for nutrient use in Great Britain since 1983, when the survey in Scotland started.

Table B2.1 **Total overall nitrogen application rates (kg/ha), England & Wales 1979 - 2019 and Scotland and Great Britain 1983 – 2019**

	tillage crops			*grass*			*all crops and grass*		
	England & Wales	*Scotland*	*Great Britain*	*England & Wales*	*Scotland*	*Great Britain*	*England & Wales*	*Scotland*	*Great Britain*
1979	113	-	-	117	-	-	121	-	-
1980	121	-	-	119	-	-	120	-	-
1981	135	-	-	125	-	-	130	-	-
1982	141	-	-	123	-	-	132	-	-
1983	154	113	149	125	131	126	139	124	136
1984	162	121	157	132	127	131	147	125	143
1985	161	131	157	131	130	131	146	130	144
1986	156	119	152	135	120	132	146	120	142
1987	160	139	157	133	116	130	147	125	143
1988	149	125	146	116	132	119	133	129	132
1989	150	128	147	127	111	124	139	118	136
1990	149	131	147	132	116	129	141	122	138
1991	154	128	151	133	111	129	143	117	139
1992	147	125	145	104	111	106	126	116	125
1993	137	130	137	112	114	112	124	119	124
1994	149	128	147	117	112	116	133	118	130
1995	151	140	149	119	114	118	134	124	132
1996	148	122	145	118	100	115	133	108	128
1997	151	134	149	123	124	123	137	128	136
1998	146	131	144	107	119	109	127	124	126
1999	143	126	141	108	117	110	126	121	125
2000	154	135	149	95	110	99	124	118	123
2001	144	147	145	90	113	94	114	127	116
2002	153	143	150	85	105	89	116	119	117
2003	152	135	149	79	102	83	112	114	113
2004	150	133	148	73	93	77	108	107	108
2005	149	132	147	72	84	75	109	102	108
2006	145	119	142	69	86	72	106	98	104
2007	148	119	144	64	72	65	106	89	103
2008	141	109	137	52	66	55	97	81	94
2009	140	111	137	54	69	57	98	84	95
2010	149	113	145	62	64	63	105	80	101
2011	150	119	146	57	59	57	103	79	99
2012	147	121	144	54	60	55	98	79	95
2013	138	124	136	57	68	59	95	87	94
2014	149	127	146	58	67	60	101	87	99
2015	149	130	146	53	67	56	100	89	98
2016	145	118	141	53	69	56	96	86	94
2017	141	118	137	51	68	54	92	86	91
2018	145	118	142	54	67	57	97	85	95
2019	141	109	137	51	67	54	94	82	92



The aggregated data for Great Britain follow a similar pattern to that observed for England & Wales because a large proportion of both the tillage and grassland areas in Britain are in England & Wales. Overall total nitrogen rates for tillage crops and grassland in England & Wales since 1974 and in Scotland and Great Britain since 1983 are summarised in Table B2.1. The data for Great Britain are presented graphically in Figure B2.1. Overall, nitrogen use has been consistently higher on tillage crops than on grassland ever since the British survey started.

Apart from a dip in 1992-93 due to major changes in the CAP, the overall rate of total nitrogen on tillage land stayed within the range 140-150 kg/ha with some wider fluctuations caused by factors such as changes in the crop mix and area or changes in nitrogen applications to specific crops (see Figure B2.3). The estimate for 2019 falls outside of this range, with the overall rate of nitrogen on tillage crops for Great Britain being 137 kg/ha. The low rate recorded in 2013 was related to the weather and subsequent cropping patterns for that year.

Nitrogen levels applied to grassland have always been lower than tillage crops. From 1983 until 1999, the difference was fairly constant, averaging 27 kg/ha. Since 2000, the overall applications made to grass fell consistently relative to those made to tillage crops, but during the last five years the average difference in overall nitrogen rate has remained relatively constant at 86 kg/ha. The recent decline in cattle numbers is thought to have contributed to this reduction in the nitrogen rate on grassland, possibly in conjunction with some improvement in manure use efficiency, encouraged by a higher nitrogen fertiliser price.

Data on straight and compound nitrogen for Great Britain are not available for the period 1983-91 when the survey in Scotland was separate from the one in England & Wales. Figure B2.2 shows the overall rates of straight and compound nitrogen on tillage crops and grassland. Most of the total nitrogen fertiliser used on tillage crops each year has been applied in straight form. On grassland, since 2009, the overall rates of straight and compound nitrogen have been similar.

Figure B2.1 Overall application rates (kg/ha) of total nitrogen on tillage crops and grassland, Great Britain 1983 – 2019

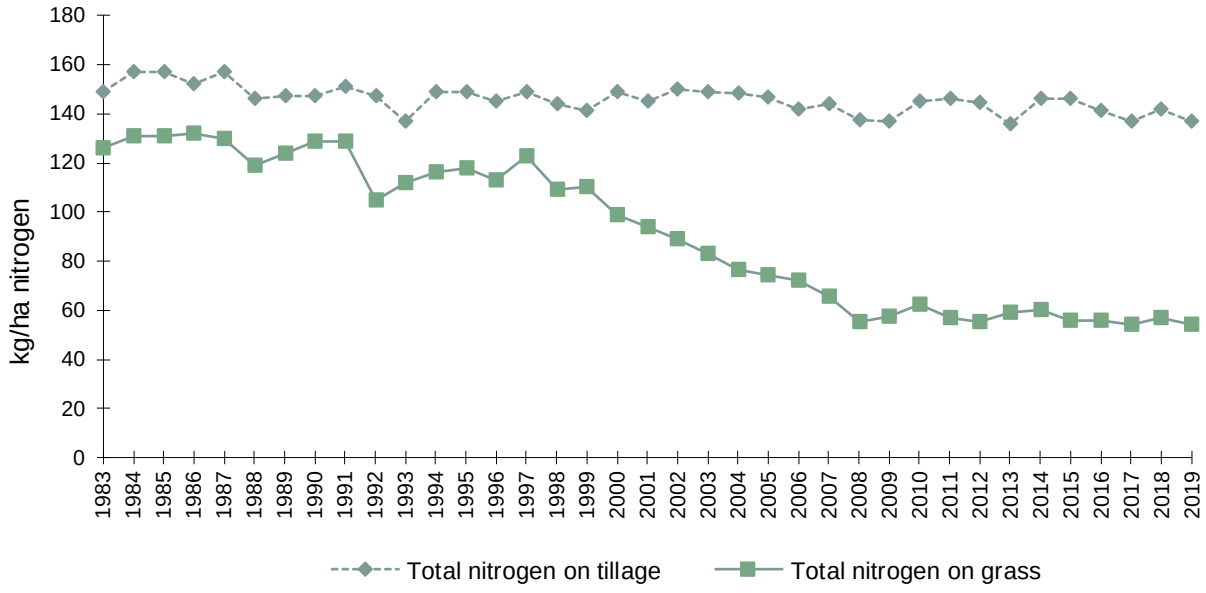
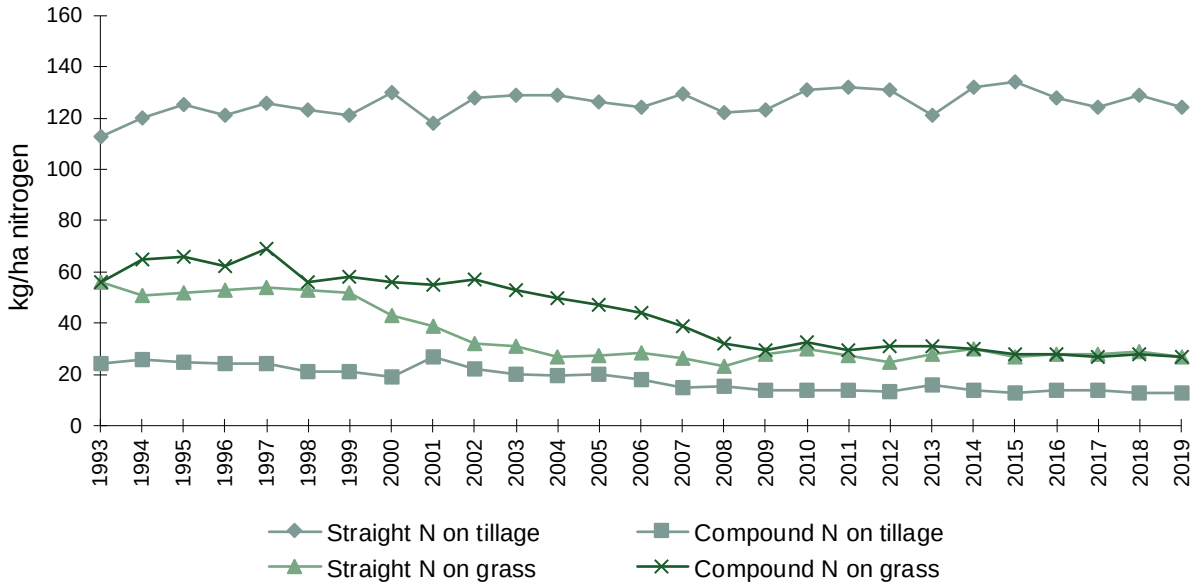


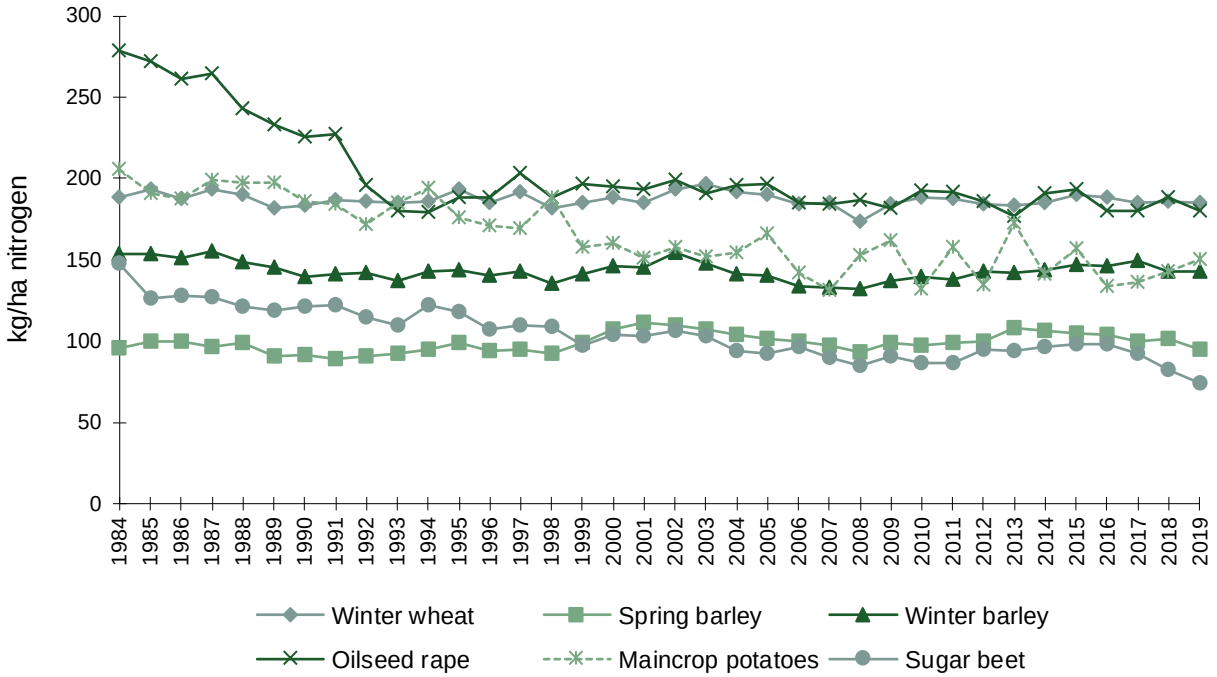
Figure B2.2 **Overall application rates (kg/ha) of straight and compound nitrogen on tillage crops and grassland, Great Britain 1993 – 2019**

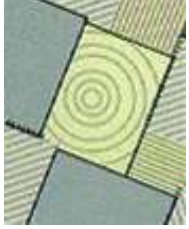


B2.1.1 Nitrogen use on major tillage crops

Overall application rates of total nitrogen on the main arable crops in Great Britain since 1984 are shown in Figure B2.3.

Figure B2.3 **Overall application rates (kg/ha) of total nitrogen on major arable crops, Great Britain 1984 – 2019**





B2.1.2 Autumn and winter applications of nitrogen fertiliser

The British Survey of Fertiliser Practice is able to monitor the extent to which recommended agronomic advice is adopted. By analysing the timing of fertiliser applications, it is possible to assess the extent to which autumn and winter nitrogen is applied. The standard advice is that autumn nitrogen is not required for winter cereals, as economic yield benefits are rare and such applications are vulnerable to leaching loss. The Great Britain values have remained below 10% of the crop area treated for both winter cereal crops since 2003, with the dressing cover being 5% or below for both in 2019. The area receiving autumn nitrogen is too low for data relating to average field application to be used. 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.

Table B2.2 **Dressing cover (% area) of autumn or winter-applied (August to January) nitrogen on winter cereals and winter oilseed rape and average application rate (kg/ha) for winter oilseed rape, England & Wales 1988 – 1998 and Great Britain 1999 – 2019**

	winter wheat	*winter barley*	*winter oilseed rape*	
	dressing cover	*dressing cover*	*dressing cover*	*application rate*
England & Wales				
1988	28	31	64	45
1989	18	25	52	45
1990	10	16	45	42
1991	11	12	49	46
1992	8	10	50	44
1993	8	8	41	42
1994	12	16	44	39
1995	11	13	48	38
1996	11	12	51	37
1997	12	11	44	36
1998	7	12	34	38
Great Britain				
1999	6	10	35	43
2000	7	11	33	42
2001	7	14	43	43
2002	8	16	41	47
2003	5	9	42	39
2004	6	9	35	40
2005	4	9	42	40
2006	5	7	28	34
2007	3	5	27	41
2008	3	6	31	33
2009	2	3	26	31
2010	2	7	29	33
2011	2	3	35	29
2012	2	5	31	27
2013	2	4	32	28
2014	2	5	32	29
2015	2	3	38	32
2016	3	4	35	31
2017	3	3	42	30
2018	5	4	41	31
2019	3	5	36	28

B2.2 PHOSPHATE, POTASH AND SULPHUR USE

Historic annual overall rates of phosphate, potash and sulphur on tillage crops and on grassland in Great Britain illustrated in Figure B2.4a and B2.4b, using the data presented in Tables B2.3, B2.4 and B2.5.

Figure B2.4a **Overall application rates (kg/ha) phosphate and potash on tillage crops and grassland, Great Britain 1983 – 2019**

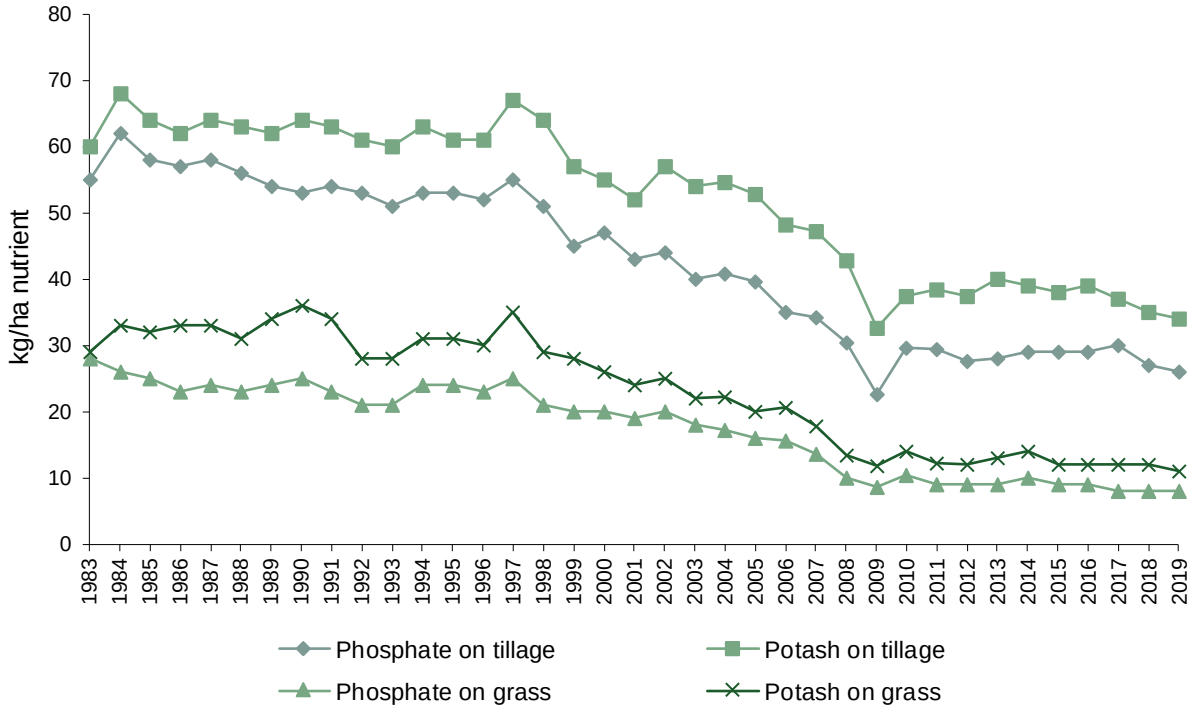
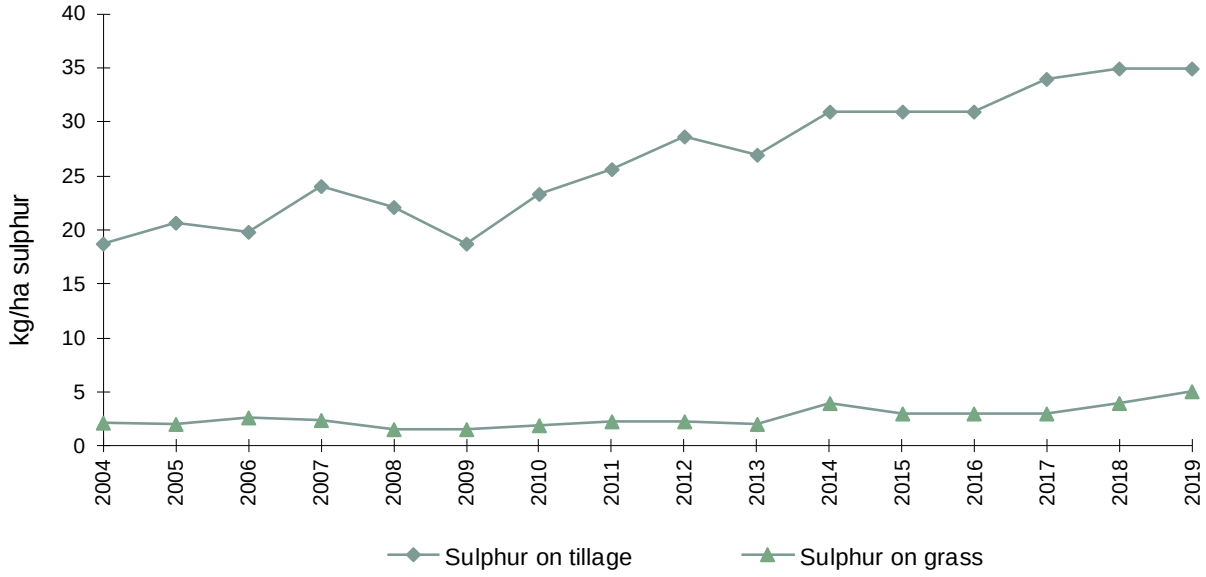
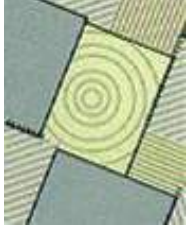


Figure B2.4b **Overall application rates (kg/ha) sulphur (SO_3) on tillage crops and grassland, Great Britain 2004 – 2019**





Overall phosphate use on tillage crops declined gradually between 1984 and 1996, from 62 kg/ha to 52 kg/ha. Thereafter the decline in rates became more marked to 2010, with the dip in use in 2009 being caused by a major price increase for the nutrient. The data suggest that, since 2010, overall application rates of phosphate and potash have remained relatively constant. Overall phosphate rates on tillage crops have been consistently higher than those recorded on grass.

The overall rate of phosphate on grassland was highest in 1983, at 28 kg/ha, and then application remained relatively stable at 21-26 kg/ha between 1984 and 1998. Overall application rates have declined more rapidly in the period between 1999 and 2009, where the rates were 20 kg/ha and 9 kg/ha, respectively. Since then, the overall rates have remained stable at 8-10 kg/ha.

Overall potash use on tillage crops declined slightly between 1983 and 1997, with the rates in the 60-68 kg/ha range. Like phosphate, overall application rates reduced at a greater rate after this time to 33 kg/ha in 2009. The potash rate in 2009 was the lowest since 1983 and again was thought to be a reaction to the price of the nutrient. Since then, the overall rates of potash on tillage have been in the 34-40 kg/ha range.

Compared to tillage crops, the pattern of overall potash use on grassland has been more variable. A net decline was shown between 1983 and 2009, since then the rate has remained within the range of 11-14 kg/ha.

Overall sulphur use on tillage crops has increased steadily since 2004, but has plateaued since 2017 at 34-35 kg/ha. On grassland the use of sulphur is much lower, but it too has increased, albeit it at a much lower rate. In 2004 the overall application rate was 2 kg/ha and by 2019 this had risen to 5 kg/ha.

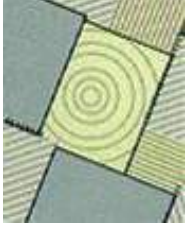


Table B2.3 Overall phosphate application rates (kg/ha), England & Wales 1970 - 2019 and Scotland and Great Britain 1983 – 2019

	tillage crops			*grass*			*all crops and grass*		
	England & Wales	*Scotland*	*Great Britain*	*England & Wales*	*Scotland*	*Great Britain*	*England & Wales*	*Scotland*	*Great Britain*
1970	56	-	-	32	-	-	-	-	-
1971	54	-	-	34	-	-	-	-	-
1972	56	-	-	34	-	-	-	-	-
1973	54	-	-	34	-	-	-	-	-
1974	51	-	-	27	-	-	39	-	-
1975	46	-	-	27	-	-	34	-	-
1976	50	-	-	29	-	-	38	-	-
1977	51	-	-	26	-	-	37	-	-
1978	49	-	-	28	-	-	39	-	-
1979	49	-	-	27	-	-	38	-	-
1980	49	-	-	27	-	-	37	-	-
1981	51	-	-	25	-	-	38	-	-
1982	55	-	-	24	-	-	39	-	-
1983	54	63	55	26	36	28	39	47	40
1984	61	68	62	25	33	26	42	48	42
1985	56	70	58	24	30	25	40	46	41
1986	56	63	57	22	27	23	40	42	40
1987	56	71	58	23	28	24	39	45	40
1988	54	65	56	21	31	23	38	45	39
1989	52	67	54	23	31	24	38	45	39
1990	51	68	53	24	28	25	38	43	39
1991	53	65	54	23	24	23	38	40	38
1992	51	67	54	19	30	22	35	43	38
1993	49	65	52	19	28	21	33	41	35
1994	51	69	53	23	28	24	37	43	38
1995	50	68	53	22	31	24	36	45	37
1996	51	65	52	22	26	23	36	40	36
1997	53	69	55	24	32	25	38	46	39
1998	49	66	51	20	27	21	34	43	35
1999	43	64	45	19	27	20	31	42	32
2000	44	60	47	18	30	20	31	42	32
2001	40	60	43	16	29	19	27	41	29
2002	41	62	44	18	26	20	29	39	31
2003	37	61	40	16	26	18	26	39	28
2004	38	63	41	15	27	17	25	40	28
2005	37	56	40	15	22	16	25	35	27
2006	32	53	35	14	22	16	23	33	25
2007	32	53	34	12	19	14	22	32	23
2008	28	50	30	9	16	10	18	28	20
2009	19	49	23	7	15	9	13	27	15
2010	27	50	30	9	16	10	18	27	19
2011	27	50	29	8	14	9	17	25	19
2012	25	50	28	8	14	9	16	25	17
2013	25	51	28	8	14	9	16	27	18
2014	26	50	29	8	15	10	17	26	18
2015	26	51	29	8	13	9	17	27	18
2016	26	50	29	7	14	9	16	27	18
2017	26	54	30	7	16	8	15	29	18
2018	24	50	27	7	13	8	15	26	17
2019	23	44	26	7	13	8	15	24	16

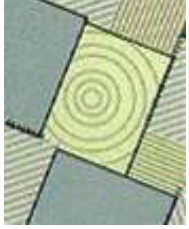


Table B2.4 Overall potash application rates (kg/ha), England & Wales 1970 - 2019 and Scotland and Great Britain 1983 – 2019

	tillage crops			*grass*			*all crops and grass*		
	England & Wales	*Scotland*	*Great Britain*	*England & Wales*	*Scotland*	*Great Britain*	*England & Wales*	*Scotland*	*Great Britain*
1970	61	-	-	26	-	-	-	-	-
1971	59	-	-	21	-	-	-	-	-
1972	63	-	-	20	-	-	-	-	-
1973	60	-	-	22	-	-	-	-	-
1974	56	-	-	20	-	-	36	-	-
1975	51	-	-	21	-	-	34	-	-
1976	56	-	-	23	-	-	37	-	-
1977	56	-	-	23	-	-	39	-	-
1978	56	-	-	25	-	-	41	-	-
1979	53	-	-	27	-	-	40	-	-
1980	54	-	-	26	-	-	40	-	-
1981	56	-	-	26	-	-	41	-	-
1982	61	-	-	28	-	-	44	-	-
1983	60	62	60	28	36	29	44	46	43
1984	68	67	68	33	35	33	50	49	49
1985	63	67	64	32	34	32	48	47	48
1986	62	61	62	33	30	33	48	43	47
1987	63	70	64	33	31	33	48	47	48
1988	63	66	63	30	34	31	47	47	47
1989	60	73	62	34	36	34	48	51	48
1990	62	74	64	36	35	36	49	50	49
1991	62	72	63	35	31	34	49	47	49
1992	59	72	63	26	34	28	43	48	45
1993	58	72	60	27	34	29	42	47	43
1994	62	74	63	31	31	31	46	46	46
1995	59	72	61	30	34	31	44	48	45
1996	59	73	61	31	28	30	45	44	44
1997	66	74	67	35	36	35	50	50	50
1998	63	73	64	28	36	29	45	51	46
1999	55	71	57	27	32	28	41	48	42
2000	54	67	55	24	33	26	39	47	40
2001	48	72	52	23	33	24	34	49	37
2002	55	72	57	24	30	25	38	46	40
2003	51	73	54	20	31	22	34	46	36
2004	52	72	55	21	30	22	35	46	37
2005	51	65	53	19	26	20	34	40	35
2006	46	68	48	19	28	21	32	42	33
2007	44	69	47	17	23	18	30	40	32
2008	40	67	43	12	20	13	26	37	27
2009	29	64	33	10	20	12	19	35	22
2010	33	67	38	13	19	14	23	35	25
2011	35	65	39	11	16	12	23	32	25
2012	34	68	37	11	17	12	22	33	23
2013	36	68	40	11	19	13	22	36	25
2014	35	67	39	12	20	14	23	35	25
2015	33	65	38	11	17	12	22	34	24
2016	34	68	39	10	20	12	21	36	24
2017	31	71	37	9	21	12	20	39	23
2018	29	73	35	10	18	12	19	38	22
2019	30	60	34	9	20	11	19	34	22

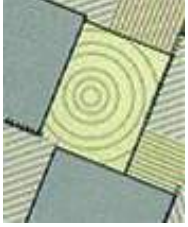
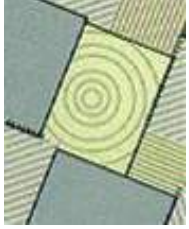


Table B2.5 Overall sulphur (SO_3) application rates (kg/ha), Great Britain 2004 – 2019

	tillage crops			*grass*			*all crops and grass*		
	England & Wales	*Scotland*	*Great Britain*	*England & Wales*	*Scotland*	*Great Britain*	*England & Wales*	*Scotland*	*Great Britain*
2004	19	18	19	2	2	2	10	8	9
2005	21	18	21	2	3	2	11	8	11
2006	20	18	20	2	4	3	11	9	11
2007	23	17	24	3	2	2	14	7	13
2008	23	16	22	1	2	2	12	7	11
2009	19	15	19	1	2	2	10	7	10
2010	24	18	23	2	3	2	13	8	12
2011	26	21	26	2	2	2	14	8	13
2012	29	25	29	2	3	2	15	10	14
2013	27	25	27	3	2	2	14	10	13
2014	31	28	31	4	3	4	17	11	16
2015	31	33	31	3	3	3	17	14	16
2016	32	24	31	3	4	3	17	11	16
2017	35	27	34	3	4	3	18	12	17
2018	36	30	35	5	4	4	19	13	18
2019	37	25	35	4	6	5	20	13	18

Overall rates of phosphate and potash applied to tillage crops are approximately three times those used on grassland. However, there is greater use of applied manures on grassland (36% cover) than on tillage crops (26% cover) and grazed grassland also receives manure as it is grazed.

Annual overall rates of sulphur on tillage crops and on grassland in Great Britain since 2004 are presented in Table B2.5 and are illustrated in Figure B2.4b.



Dressing covers of phosphate and potash on tillage and grass for the period 2004-19 are presented in Tables B2.6a and B2.6b. On tillage crops the phosphate dressing cover has declined in all countries since 2004. However, the decline in England and Wales has been much higher (33% reduction) in comparison to Scotland where the reduction was 7% for the period. Despite this long-term trend dressing covers have been relatively stable in the last 5 years. On grass, phosphate dressing covers have also declined since 2004, but these too have stabilised in more recent years.

Potash dressing covers follow a similar pattern to phosphate, with a marked decline on tillage crops in England and Wales since 2004 followed by stabilisation during the last 5 years.

Table B2.6a Phosphate dressing covers (%), Great Britain 2004 – 2019

	tillage crops			*grass*			*all crops and grass*		
	England & Wales	*Scotland*	*Great Britain*	*England & Wales*	*Scotland*	*Great Britain*	*England & Wales*	*Scotland*	*Great Britain*
2004	61	93	65	55	77	59	58	83	61
2005	60	88	63	50	75	55	55	80	59
2006	52	89	57	52	75	56	52	79	57
2007	50	86	54	47	67	51	48	74	52
2008	46	88	52	37	61	42	42	71	47
2009	34	86	40	33	59	38	34	69	39
2010	45	87	50	37	64	43	41	71	46
2011	45	82	49	36	58	41	41	66	45
2012	42	87	47	37	57	41	39	67	44
2013	43	86	48	38	59	42	40	68	45
2014	44	85	49	36	61	41	40	69	45
2015	43	85	49	35	65	41	39	72	45
2016	44	85	49	32	63	38	37	70	43
2017	44	91	50	30	65	38	36	75	43
2018	41	87	48	33	57	38	37	68	42
2019	43	83	48	32	58	37	37	67	42

Table B2.6b Potash dressing covers (%), Great Britain 2004 – 2019

	tillage crops			*grass*			*all crops and grass*		
	England & Wales	*Scotland*	*Great Britain*	*England & Wales*	*Scotland*	*Great Britain*	*England & Wales*	*Scotland*	*Great Britain*
2004	63	93	67	56	75	59	59	82	63
2005	61	90	65	51	71	55	56	78	60
2006	56	91	60	52	71	56	54	78	58
2007	54	90	58	47	65	51	51	74	54
2008	50	90	55	38	61	42	44	71	48
2009	37	88	43	34	61	39	35	71	41
2010	44	89	50	39	63	44	42	72	47
2011	46	84	50	38	57	42	42	66	46
2012	42	90	47	38	58	42	40	68	44
2013	46	87	51	39	59	43	42	69	47
2014	45	86	50	37	63	43	41	70	46
2015	45	88	50	35	65	42	40	73	46
2016	44	87	50	33	64	39	38	72	44
2017	44	91	50	31	66	38	37	75	43
2018	41	88	47	35	59	40	38	69	43
2019	44	83	50	34	60	39	39	68	44

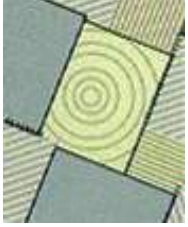
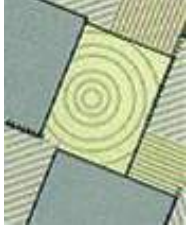


Table B2.6c Sulphur dressing covers (%), Great Britain 2004 – 2019

	tillage crops			*grass*			*all crops and grass*		
	England & Wales	*Scotland*	*Great Britain*	*England & Wales*	*Scotland*	*Great Britain*	*England & Wales*	*Scotland*	*Great Britain*
2004	32	39	33	5	9	6	17	20	18
2005	35	36	35	5	9	6	19	19	19
2006	38	41	38	6	12	7	21	22	21
2007	42	36	42	5	6	5	24	17	23
2008	41	32	40	4	6	5	22	15	21
2009	35	36	35	5	7	5	20	17	20
2010	39	43	40	5	9	6	22	20	22
2011	42	42	42	6	7	6	24	19	23
2012	47	46	47	6	10	7	26	22	25
2013	47	41	47	8	8	8	26	19	25
2014	52	47	51	11	9	11	30	21	29
2015	53	48	52	9	12	10	31	25	30
2016	55	49	54	9	11	9	30	24	29
2017	58	53	57	9	12	10	32	27	31
2018	62	58	62	11	12	12	35	28	34
2019	63	58	62	13	20	14	36	33	36

Sulphur dressing covers have increased since 2004 on tillage crops in all countries. At the start of the period they were generally higher in Scotland than in England and Wales. In the last five years sulphur dressing covers have plateaued, and in 2019, on tillage are higher in England and Wales. Dressing covers on grass are lower than those observed on tillage crops. They have increased since 2004 and are still higher in England and Wales than Scotland.



B2.2.1 Phosphate, potash and sulphur use on major tillage crops

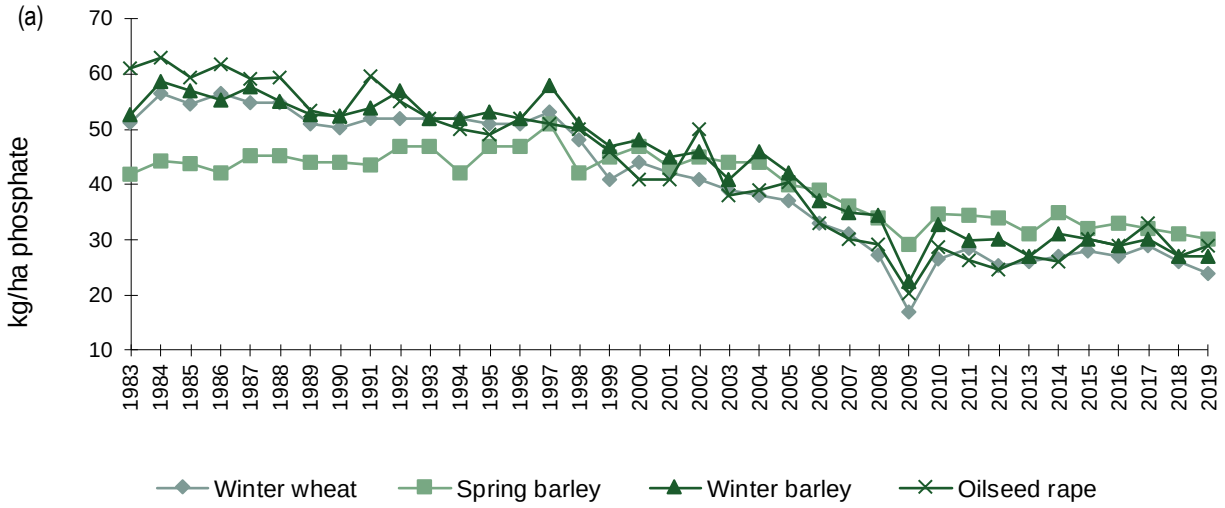
Overall application rates of phosphate and potash on the main arable crops in Great Britain since 1983 are shown in Figure B2.5.

Phosphate use on most major tillage crops has shown a gradual net decline over the survey period. Overall application rates of phosphate have gradually declined on winter wheat and, less consistently, on winter barley since the mid-1980s (Figure B2.5(a)). By 1999, the overall phosphate rate had fallen below 50 kg/ha for both crops. From 2000 to 2007 rates were fairly stable in the 31-44 kg/ha range for winter wheat and 35-48 kg/ha for winter barley. The year 2009 saw more marked decreases in overall rates (-10 kg/ha for winter wheat and -13 kg/ha for winter barley). In 2010 overall phosphate rates recovered and have stabilised since then. Phosphate use on spring barley was stable between 1983 and 2004 in the range of 42-51 kg/ha. In 2005 the overall rate was 40 kg/ha, which had declined to 30 kg/ha by 2019.

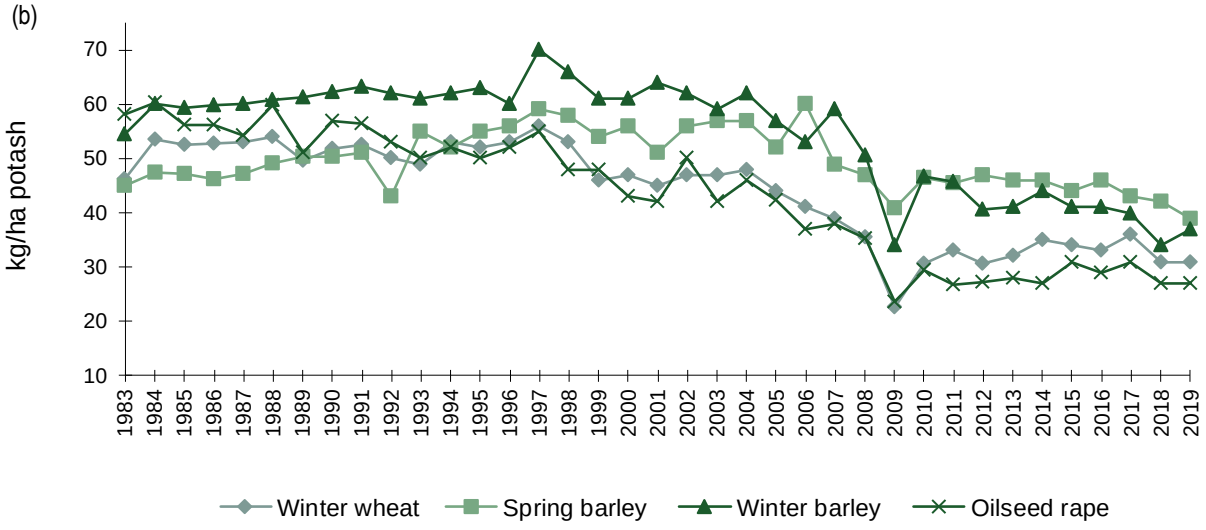
Overall phosphate use has also declined steadily on oilseed rape and sugar beet. Like other crops, the phosphate overall rate dipped in 2009, and to date the rate on sugar beet has not regained the rate reported in 2008, which was 31 kg/ha.

On winter wheat, the overall potash rates were consistent between 1983 and 2005, in the range 44-56 kg/ha. Thereafter the rate declined, with a 2009 dip to 23 kg/ha, with modest recoveries since that point. For barley the rates were in the range of 49-61 kg/ha between 1983 and 2008. The rates in 2009 were 41 kg/ha for spring barley and 34 kg/ha for winter barley. In the years since 2009 the overall potash rates have been in the range 40-47 kg/ha. Overall potash rates have fluctuated more on oilseed rape, sugar beet and on potatoes than on the cereal crops. They do follow the general pattern of a dip in rates in 2009, and subsequent stabilisation.

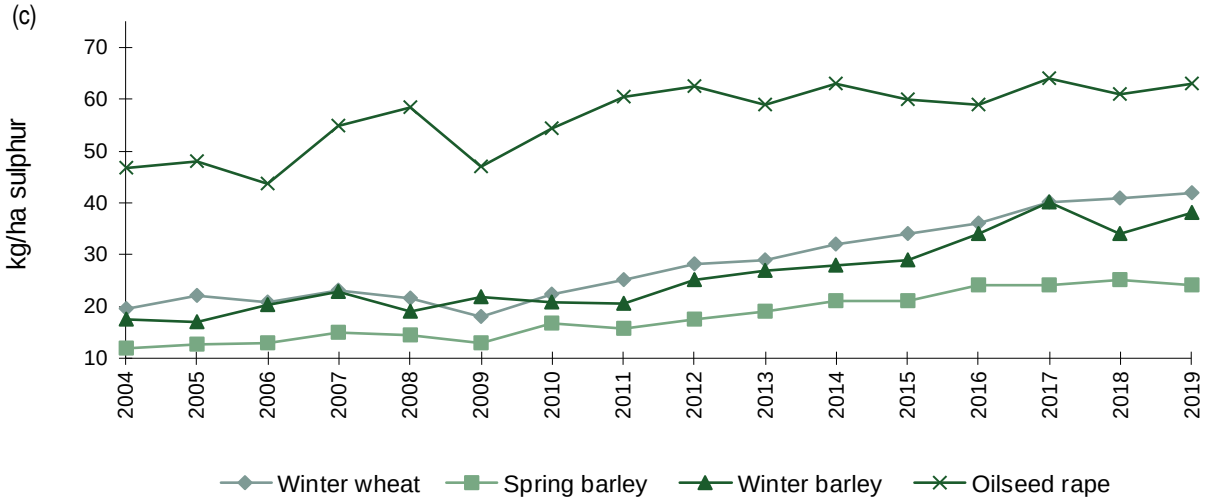
Figure B2.5 **Overall application rates (kg/ha) of (a) phosphate, (b) potash, (c) sulphur on major arable crops, and (d) phosphate and potash on sugar beet and potatoes Great Britain 1983 – 2019**



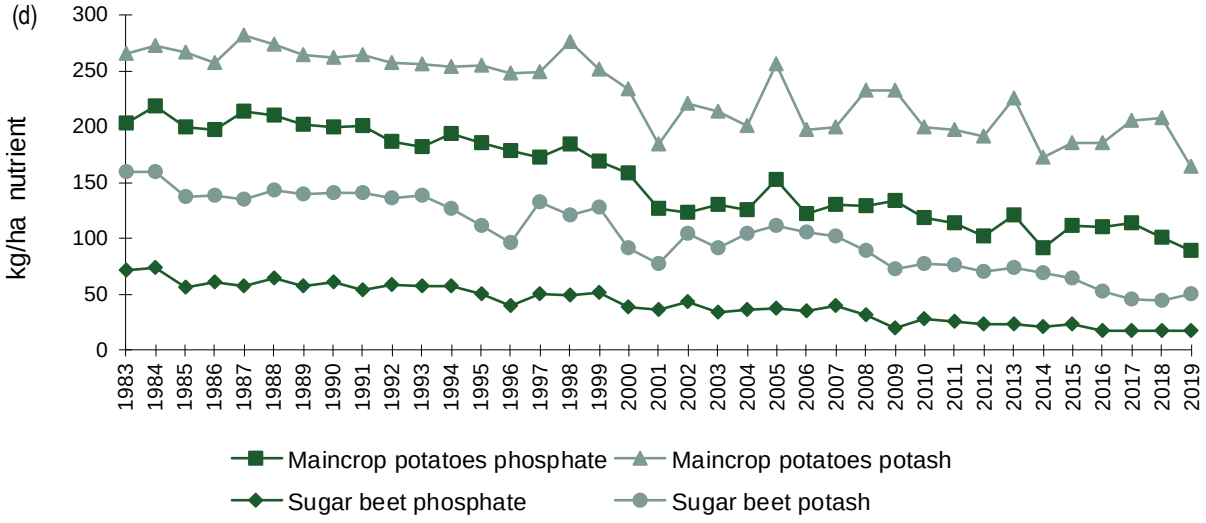
(b)

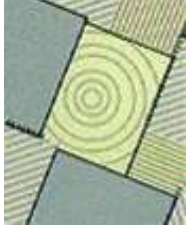

kg/ha potash
70
60
50
40
30
20
10
1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019
Winter wheat
Spring barley
Winter barley
Oilseed rape

(c)


kg/ha sulphur
70
60
50
40
30
20
10
2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019
Winter wheat
Spring barley
Winter barley
Oilseed rape

(d)

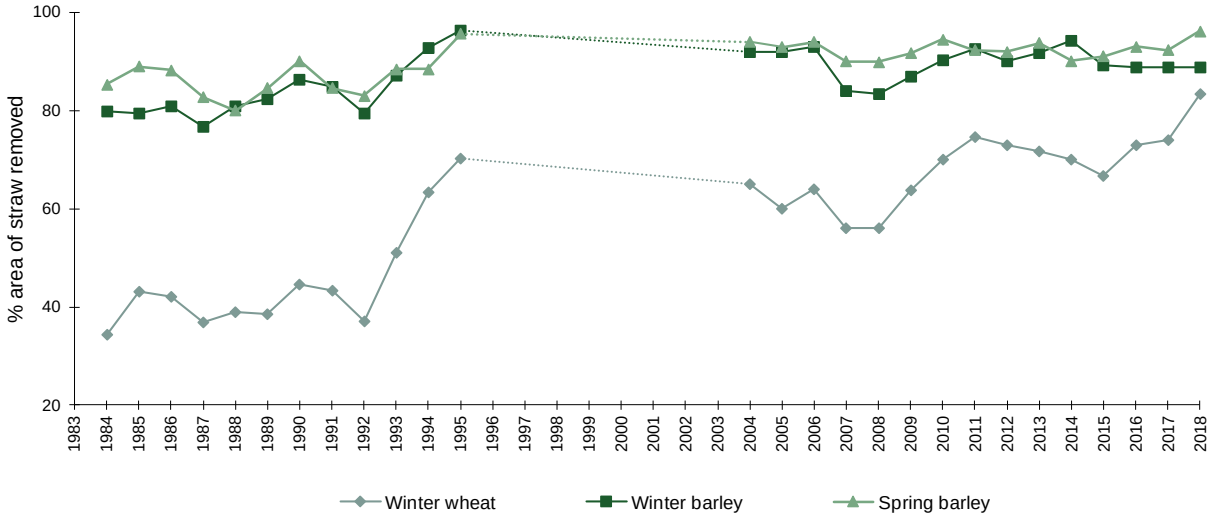

kg/ha nutrient
300
250
200
150
100
50
0
1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019
Maincrop potatoes phosphate
Maincrop potatoes potash
Sugar beet phosphate
Sugar beet potash



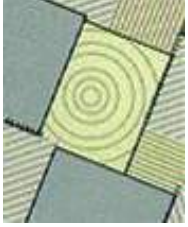
B2.3 STRAW REMOVAL

Estimates of the percentage of straw removed from wheat and barley fields are shown in Figure B2.6. Wheat and barley straw contains a significant quantity of nutrients, especially potassium. The removal of straw from the field after harvest also removes these nutrients, which would otherwise be returned to the soil when the straw is incorporated. These straws contain on average 1.2-1.5 kg P_2O_5 (phosphate) per tonne, and 9.5-12.5 kg K_2O (potash) per tonne, and it is estimated that for every tonne of cereal grain harvested 0.5 tonnes of straw can be baled and removed from the field. Thus, the removal of wheat or barley straw will increase the removal of phosphate by about 10% more than if the grain alone were removed, while the amount of potash removed would be approximately doubled. Data collected as part of the 2019 survey related to the fate of the straw from the 2018 harvest so is reported against 2018. In 2018, 83% of the winter wheat straw was removed from the fields, with the percentages for winter and spring barley much higher at 89% and 96% respectively.

Figure B2.6 **Percentage of straw removed from wheat and barley fields, England & Wales harvest years 1985 – 1995, Great Britain harvest years 2004 - 2018**



Data for the period 1984-95 were sourced from MAFF/Defra straw disposal surveys, those for the period 2004-17 from this survey. No data are available for the period 1996-2003. The straw burning ban was introduced in 1993. This resulted in a significant increase in the percentage of straw removed, up to 70% and 96% for wheat and barley respectively, for the 1995 harvest.

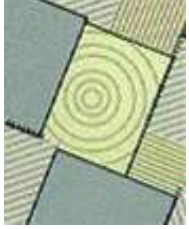


B2.4 TOTAL QUANTITIES OF NITROGEN, PHOSPHATE AND POTASH, UK

Table B2.7 Quantities of major nutrients used, United Kingdom 1966-2019

	Nitrogen kt N				Phosphate kt P_2O_5				Potash kt K_2O			
Harvest year	*England & Wales*	*Scotland*	*N. Ireland*	*UK*	*England & Wales*	*Scotland*	*N. Ireland*	*UK*	*England & Wales*	*Scotland*	*N. Ireland*	*UK*
1966	491	76	23	590	332	81	22	435	335	61	18	413
1967	573	85	27	685	359	79	23	460	354	61	19	434
1968	625	93	29	748	367	81	21	469	362	62	18	441
1969	639	108	35	781	362	84	22	467	363	65	19	447
1970	653	108	34	796	366	81	23	470	356	63	20	438
1971	732	119	43	894	397	84	24	504	373	65	21	459
1972	751	120	48	919	371	76	24	470	336	60	19	416
1973	759	132	56	947	373	85	25	482	333	63	21	417
1974	784	139	57	980	357	72	21	449	347	55	19	421
1975	788	143	54	984	306	69	18	393	302	59	16	377
1976	851	144	65	1,059	315	69	19	404	322	59	17	398
1977	879	146	68	1,093	316	69	21	406	330	59	20	409
1978	924	156	75	1,155	316	72	22	410	328	64	20	412
1979	941	160	85	1,186	321	73	22	416	333	65	21	419
1980	1,031	156	81	1,268	342	75	24	440	361	65	22	447
1981	1,100	159	76	1,335	344	73	24	441	367	66	21	454
1982	1,180	160	76	1,416	357	65	24	446	394	67	22	483
1983	1,227	161	82	1,470	359	65	24	448	409	68	23	500
1984	1,316	183	89	1,588	391	69	28	488	457	73	29	559
1985	1,298	186	96	1,580	375	71	23	469	441	72	28	541
1986	1,297	176	99	1,572	341	65	28	434	415	66	29	510
1987	1,370	193	111	1,674	340	65	27	432	429	70	29	528
1988	1,251	180	94	1,525	341	70	24	435	419	76	29	524
1989	1,223	193	98	1,514	334	65	26	425	420	74	29	523
1990	1,275	194	113	1,582	323	63	28	414	409	73	33	515
1991	1,224	193	98	1,515	321	61	24	406	393	71	28	492
1992	1,105	166	94	1,365	295	55	21	371	351	64	26	441
1993	968	142	109	1,219	286	50	24	360	344	57	29	430
1994	986	133	129	1,248	312	51	28	391	361	59	38	458
1995	1,064	156	128	1,348	325	53	27	405	378	64	34	476
1996	1,048	157	128	1,333	302	62	30	394	370	65	36	471
1997	1,156	172	112	1,440	325	63	24	412	405	65	31	501
1998	1,111	158	106	1,375	308	56	19	383	397	64	26	487
1999	1,015	152	117	1,284	274	50	23	347	365	59	27	451
2000	1,005	150	113	1,268	237	59	21	317	322	61	26	409
2001	876	180	106	1,162	201	57	21	279	274	69	26	369
2002	915	187	95	1,197	209	55	19	283	297	70	24	391
2003	853	170	108	1,131	203	60	19	282	283	66	26	375
2004	875	150	100	1,125	205	57	16	278	288	65	22	375
2005	834	150	77	1,061	192	55	12	259	267	67	18	352
2006	780	153	70	1,003	173	51	11	235	243	66	16	325
2007	802	126	80	1,008	169	46	9	224	241	59	17	317
2008	800	127	74	1,001	160	49	6	215	244	68	13	325
2009	767	124	57	948	91	34	4	129	148	52	8	208
2010	813	127	76	1,016	134	44	6	184	182	57	12	251
2011	824	124	74	1,022	145	42	5	192	213	59	11	283
2012	809	125	66	1,000	140	43	5	188	193	56	10	259
2013	781	139	79	999	141	46	7	194	194	60	13	267
2014	838	151	71	1,060	146	48	7	201	206	65	13	284
2015	819	155	75	1,049	142	48	6	196	196	64	12	272
2016	801	155	71	1,026	139	51	7	197	188	69	13	270
2017	806	157	78	1,041	133	54	8	195	185	77	14	276
2018	804	147	82	1,033	131	48	9	188	174	72	16	262
2019e	*810*	*150*	*79*	*1,038*	*132*	*46*	*7*	*186*	*184*	*69*	*14*	*267*

Note: Years are harvest (e.g. 2019 refers to the 2018/19 cropping year) rather than calendar years. Data for 2019 are estimates.

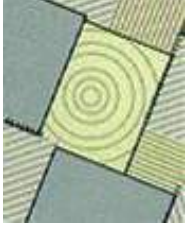


Quantities of nitrogen, phosphate and potash used in the UK since 1966 are shown in Table B2.6. These data are based on BSFP findings and trade and sales data. They are compiled by the Agricultural Industries Confederation in conjunction with Defra using the methodology described in Section A2.5. They are the official figures for fertiliser usage.

Total nitrogen use in the UK increased from 590,000 tonnes in 1966 up to 1,674,000 tonnes in 1987 before declining gradually to 1,001,000 tonnes in 2008. The drop in 2009 was related to high fertiliser prices. Between 2010 and 2019 nitrogen use has remained relatively stable. From the peak in 1987, nitrogen use since has fallen by approximately 40%.

Phosphate use in the UK has fallen since the mid-1980s but since 2007 this decline has slowed, and total phosphate use has been more stable between 2010 and 2019, between 184,000 – 201,000 tonnes. However, use is still approximately half that compared to use between 1965 and 1985. The low use of 129,000 tonnes in 2009 was price related.

Potash use in the UK was highest in the mid-1980s through to 1999, after which there has been a more sustained decline. Potash use between 2010 and 2019 has been between 251,000 – 284,000 tonnes, which is around half that used at its peak. The low use of 208,000 tonnes in 2009 was price related.



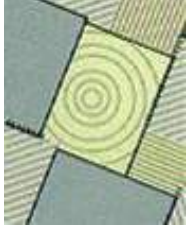
SECTION C – TABLES

CONTENTS

GREAT BRITAIN TABLES 2019

ENGLAND AND WALES TABLES 2019

Note: 1. Row percentages may not sum to exactly to 100 due to rounding.
2. No estimates are shown for crops with fewer 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 2019

Table GB1.1 Total fertiliser use, Great Britain 2019

	Crop area receiving dressing (%)					Average field rate (kg/ha)				Overall application rate (kg/ha)				Fields in sample
	N	P_2O_5	K_2O	SO_3	FYM	N	P_2O_5	K_2O	SO_3	N	P_2O_5	K_2O	SO_3	
Spring wheat	91	49	43	44	30	125	34	44	59	113	17	19	26	60
Winter wheat	99	42	46	72	24	187	57	67	59	185	24	31	42	1279
Spring barley	98	63	64	59	29	97	48	61	41	95	30	39	24	675
Winter barley	99	50	54	70	26	145	53	68	55	143	27	37	38	520
Oats	91	43	47	51	23	102	48	68	46	92	21	32	23	258
Rye/triticale/Durum wheat	91	52	58	71	16	122	41	72	52	112	21	42	37	28
Potatoes (seed or earlies)	100	100	100	33	14	105	144	178	-	105	144	178	-	7
Potatoes (maincrop)	98	79	88	32	45	153	112	185	-	150	89	164	-	56
Sugar beet	95	37	57	63	38	78	47	88	49	74	17	50	31	94
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Winter oilseed rape	99	51	44	82	23	182	57	61	77	180	29	27	63	410
Linseed	100	50	28	45	20	65	56	58	56	65	28	16	25	22
Forage maize	81	55	32	27	85	69	56	70	26	56	30	23	7	154
Rootcrops for stockfeed	91	61	67	19	56	75	60	75	38	68	37	50	7	50
Leafy forage crops	84	80	81	21	20	77	46	53	33	65	37	43	7	41
Arable silage/other fodder crops	37	24	22	18	55	100	40	53	38	37	10	12	7	116
Peas - human consumption	2	20	20	1	2	-	78	82	-	-	16	16	-	42
Peas - animal consumption	0	27	43	17	0	-	48	56	56	-	13	24	10	25
Beans - animal consumption	0	32	31	4	3	-	47	58	72	-	15	18	3	172
Vegetables (brassicae)	78	41	69	8	22	95	42	120	-	74	17	83	-	14
Vegetables (other)	73	74	76	37	11	93	49	85	44	68	36	65	16	26
Soft Fruit	94	38	99	61	0	72	-	114	38	68	-	112	23	10
Top Fruit	87	81	89	44	1	76	28	84	-	66	23	75	-	12
Other tillage	36	7	13	31	2	73	66	111	29	26	4	15	9	44
All tillage	91	48	50	62	26	150	54	69	56	137	26	34	35	4119
Grass under 5 years old	84	47	51	27	48	120	29	45	39	100	14	23	11	892
Grass 5 years and over	53	35	37	11	34	85	19	25	31	45	7	9	4	2334
All grass	58	37	39	14	36	93	21	29	33	54	8	11	5	3226
All crops and grass	73	42	44	36	32	125	38	50	51	92	16	22	18	7345

Source: British Survey of Fertiliser Practice 2019

NB: Sulphur rates on potatoes are not shown as some growers apply additional sulphur to acidify the soil for this crop. **These applications cannot be separated from those intended as a fertiliser nutrient.**

Table GB1.2 Use of straight fertiliser, Great Britain 2019

	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	87	20	17	116	36	51	101	7	9	60
Winter wheat	97	14	18	183	57	68	178	8	12	1279
Spring barley	80	8	12	87	49	66	70	4	8	675
Winter barley	96	14	18	141	53	75	135	7	14	520
Oats	82	13	19	98	48	78	81	6	15	258
Rye/triticale/Durum wheat	89	0	6	122	-	-	109	-	-	28
Potatoes (seed or earlies)	0	0	33	-	-	-	-	-	-	7
Potatoes (maincrop)	55	18	40	147	-	223	81	-	90	56
Sugar beet	87	5	30	80	88	108	69	4	32	94
Spring oilseed rape	-	-	-	-	-	-	-	-	-	4
Winter oilseed rape	98	11	19	173	53	66	171	6	13	410
Linseed	100	7	8	53	-	-	53	-	-	22
Forage maize	46	8	10	79	57	103	36	4	11	154
Rootcrops for stockfeed	39	5	12	97	-	75	38	-	9	50
Leafy forage crops	25	5	4	76	-	-	19	-	-	41
Arable silage/other fodder crops	26	6	4	99	48	80	26	3	3	116
Peas - human consumption	0	11	11	-	84	81	-	9	9	42
Peas - animal consumption	0	8	24	-	-	65	-	-	15	25
Beans - animal consumption	0	15	15	-	42	54	-	6	8	172
Vegetables (brassicae)	47	2	25	-	-	-	-	-	-	14
Vegetables (other)	45	0	8	82	-	-	37	-	-	26
Soft Fruit	59	0	61	77	-	130	45	-	79	10
Top Fruit	81	34	32	71	-	-	57	-	-	12
Other tillage	32	4	11	77	-	101	24	-	11	44
All tillage	84	12	17	149	56	77	124	6	13	4119
Grass under 5 years old	49	1	3	119	89	102	58	1	3	892
Grass 5 years and over	22	0	0	96	69	80	21	0	0	2334
All grass	27	0	1	103	78	94	27	0	1	3226
All crops and grass	52	5	8	136	57	78	71	3	6	7345

Source: British Survey of Fertiliser Practice 2019

Table GB1.3 Use of compound fertiliser, Great Britain 2019

	Crop area receiving dressing (%)				Average field rate (kg/ha)				Overall application rate (kg/ha)				Fields in sample
	N	P_2O_5	K_2O	SO_3	N	P_2O_5	K_2O	SO_3	N	P_2O_5	K_2O	SO_3	
Spring wheat	25	29	26	10	49	33	39	19	12	10	10	2	60
Winter wheat	12	29	28	7	62	56	66	43	8	17	19	3	1279
Spring barley	50	56	52	21	50	48	59	30	25	27	31	6	675
Winter barley	16	36	36	7	55	54	63	31	9	19	23	2	520
Oats	22	31	29	8	51	47	59	23	11	15	17	2	258
Rye/triticale/Durum wheat	7	52	52	7	-	41	73	-	-	21	38	-	28
Potatoes (seed or earlies)	100	100	67	20	105	144	-	-	105	144	-	-	7
Potatoes (maincrop)	64	61	53	5	107	102	140	71	69	62	74	3	56
Sugar beet	18	32	29	16	31	41	60	36	6	13	17	6	94
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	-	-	4
Winter oilseed rape	29	42	25	6	34	57	56	33	10	24	14	2	410
Linseed	41	42	19	12	28	61	55	-	12	26	11	-	22
Forage maize	54	48	23	14	37	54	52	20	20	26	12	3	154
Rootcrops for stockfeed	54	56	63	9	55	60	65	20	30	34	41	2	50
Leafy forage crops	73	75	77	15	63	41	51	22	46	31	39	3	41
Arable silage/other fodder crops	12	18	18	2	90	37	46	24	11	7	8	0	116
Peas - human consumption	2	12	12	0	-	56	66	-	-	6	8	-	42
Peas - animal consumption	0	19	19	1	-	38	45	-	-	7	9	-	25
Beans - animal consumption	0	18	17	1	-	52	59	-	-	9	10	-	172
Vegetables (brassicae)	44	39	44	6	58	42	107	-	26	16	47	-	14
Vegetables (other)	58	74	68	31	53	49	78	-	31	36	53	-	26
Soft Fruit	38	38	38	0	-	-	-	-	-	-	-	-	10
Top Fruit	50	57	57	44	-	21	55	-	-	12	31	-	12
Other tillage	4	3	5	2	39	-	79	-	2	-	4	-	44
All tillage	24	37	33	10	52	53	64	34	13	20	21	3	4119
Grass under 5 years old	48	46	48	15	87	27	41	32	42	13	20	5	892
Grass 5 years and over	36	35	36	8	66	19	24	23	24	7	9	2	2334
All grass	38	37	38	9	70	21	28	25	27	8	11	2	3226
All crops and grass	32	37	36	9	64	35	43	29	20	13	15	3	7345

Source: British Survey of Fertiliser Practice 2019

Table GB1.4 Use of lime, Great Britain 2019

	Crop area receiving dressing (%)						Average application rate (tonnes of product/ha)							
	Limestone (ground, screened)	Chalk	Magnesian limestone	Sugar beet lime	Other	All	Limestone (ground, screened)	Chalk	Magnesian limestone	Sugar beet lime	Other	All	Fields limed	Fields in sample
Spring wheat	12.1	-	1.9	-	-	13.9	2.5	-	3.5	-	-	2.6	9	60
Winter wheat	5.4	1.6	1.1	0.2	0.4	8.6	4.2	4.9	5.4	7.9	1.0	4.4	116	1279
Spring barley	6.2	0.1	1.6	-	2.1	9.9	4.9	5.5	5.1	-	1.6	4.2	76	675
Winter barley	6.8	0.8	1.5	0.1	1.9	11.0	4.9	3.9	5.8	5.0	0.4	4.2	56	520
Oats	4.0	0.2	0.4	0.2	-	4.7	4.5	5.0	4.8	5.0	-	4.6	17	258
Rye/triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	-	-	1	28
Potatoes (seed or earlies)	-	-	-	-	-	-	-	-	-	-	-	-	0	7
Potatoes (maincrop)	-	-	-	-	-	-	-	-	-	-	-	-	0	56
Sugar beet	12.4	2.9	0.6	11.4	1.6	28.9	5.6	3.9	2.0	6.1	1.8	5.3	27	94
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	-	-	0	4
Winter oilseed rape	4.9	1.6	2.0	0.2	0.5	9.1	4.0	3.9	5.3	5.7	1.3	4.1	43	410
Linseed	-	-	-	-	-	-	-	-	-	-	-	-	1	22
Forage maize	12.3	0.4	0.3	1.5	1.1	15.6	3.8	5.0	5.0	10.0	0.2	4.3	27	154
Rootcrops for stockfeed	11.6	1.4	-	-	6.6	19.6	3.2	2.0	-	-	3.0	3.0	11	50
Leafy forage crops	13.2	-	-	1.7	2.3	17.2	5.1	-	-	5.0	0.5	4.5	9	41
Arable silage/other fodder crops	2.2	0.1	-	0.6	0.2	3.0	5.0	4.3	-	10.0	0.8	5.6	11	116
Peas - human consumption	-	-	-	-	-	-	-	-	-	-	-	-	2	42
Peas - animal consumption	-	-	-	-	-	-	-	-	-	-	-	-	0	25
Beans - animal consumption	-	-	-	-	-	-	-	-	-	-	-	-	4	172
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	-	-	2	14
Vegetables (other)	-	-	-	-	-	-	-	-	-	-	-	-	3	26
Soft Fruit	-	-	-	-	-	-	-	-	-	-	-	-	0	10
Top Fruit	-	-	-	-	-	-	-	-	-	-	-	-	1	12
Other tillage	-	-	-	-	-	-	-	-	-	-	-	-	0	44
All tillage	5.5	1.0	1.1	0.4	0.9	9.1	4.4	4.6	5.3	6.6	1.1	4.3	416	4119
Grass under 5 years old	4.9	0.2	0.5	-	0.6	6.2	4.2	5.0	4.6	-	1.8	4.0	83	892
Grass 5 years and over	3.1	0.1	0.3	0.0	0.3	3.8	4.3	4.8	4.8	5.0	2.9	4.2	134	2334
All grass	3.4	0.1	0.3	0.0	0.3	4.2	4.3	4.9	4.7	5.0	2.5	4.2	217	3226
All crops and grass	4.4	0.5	0.7	0.2	0.6	6.4	4.4	4.6	5.1	6.5	1.6	4.3	633	7345

Source: British Survey of Fertiliser Practice 2019

Table GB2.1 Average fertiliser practice by grassland utilisation, Great Britain 2019

	Crop area receiving dressing (%)					Average field rate (kg/ha)				Overall application rate (kg/ha)				Fields in sample
	N	P_2O_5	K_2O	SO_3	FYM	N	P_2O_5	K_2O	SO_3	N	P_2O_5	K_2O	SO_3	
Grazed not mown	45	30	30	9	19	73	16	19	28	33	5	6	2	1510
Grazed mown	77	52	55	23	62	106	26	37	36	82	13	20	8	1436
All grazings	57	38	39	14	35	89	21	28	33	50	8	11	4	2946
Cut for silage - grazed	84	56	60	26	69	112	26	39	37	95	15	24	10	1035
Cut for silage - not grazed	87	39	42	23	72	144	25	40	40	126	10	17	9	186
All cut for silage	85	53	57	25	69	118	26	39	37	100	14	22	9	1221
Cut for hay - grazed	59	42	43	16	44	76	22	25	28	44	9	11	4	437
Cut for hay - not grazed	55	21	23	15	21	75	29	33	47	41	6	8	7	70
All cut for hay	58	40	41	16	41	76	23	25	30	44	9	10	5	507
All mowings	77	49	52	23	62	111	26	37	37	86	13	20	8	1682
All grass	58	37	39	14	36	93	21	29	33	54	8	11	5	3226

Source: British Survey of Fertiliser Practice 2019

Table GB3.0 Product use by month of application, Great Britain 2019

(a) Product use

row %	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Straight N	0	0	0	0	0	10	32	37	14	3	2	1
Straight P	15	11	19	1	1	16	23	9	3	0	0	4
Straight K	3	6	11	1	7	22	31	14	3	1	1	0
Compounds	5	5	2	0	1	4	19	33	15	7	4	5
All fertilisers	2	2	1	0	0	8	27	35	14	4	3	3

(b) Nutrient use

row %	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Nitrogen	1	0	0	0	0	8	29	38	16	5	3	2
Phosphate	9	10	7	0	1	8	20	25	9	3	2	7
Potash	6	8	6	0	2	10	22	27	9	4	3	3
Sulphur	0	0	0	0	1	19	43	26	7	2	1	1
Total	2	2	2	0	0	9	28	34	13	4	2	2

Note: All fertilisers includes other straight fertilisers (e.g. trace elements)

'Product' refers to the total tonnage of the products used by the farmers in the survey year 2019.

'Nutrient' 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 (straight N) contains typically 34.5 kg of N).

Estimates of total nutrients are shown in Section B, Table B2.6.

Source: British Survey of Fertiliser Practice 2019

Table GB3.1 Product type as percentage of all product used by crop group, Great Britain 2019

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 specified	all grass	all crops and grass
Ammonium Nitrate	34.9	44.0	6.5	24.7	41.3	16.7	38.8	27.6	25.8	31.1	7.9	29.9	36.5
Urea	6.7	9.4	0.8	1.5	10.6	4.5	8.4	4.5	2.8	4.7	6.1	4.8	7.5
Calcium Ammonium Nitrate (CAN)	1.8	2.1	0.0	1.8	1.2	2.6	1.9	2.5	1.4	2.3	0.0	2.2	2.0
Urea Ammonium Nitrate (UAN)	11.0	19.4	4.4	12.0	23.1	5.4	17.0	1.8	5.5	1.6	35.1	2.3	13.2
Other Straight N	2.1	1.0	1.6	1.1	1.4	1.0	1.3	1.0	2.1	0.5	0.0	0.9	1.2
Triple Superphosphate (TSP)	2.1	3.0	0.9	2.4	1.6	5.9	2.8	0.8	0.9	0.5	0.0	0.8	2.2
Other Straight P	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Muriate of Potash (MOP)	2.9	3.6	10.8	4.9	2.6	7.6	3.8	0.9	1.7	1.0	9.9	1.0	3.1
Other Straight K	0.3	0.4	1.4	19.3	0.4	2.1	1.0	0.2	0.0	0.0	0.0	0.2	0.8
PK	6.6	9.6	0.0	21.7	6.5	14.2	9.0	1.9	2.8	1.9	0.0	1.9	7.2
NK	1.9	1.1	3.2	1.1	0.8	4.5	1.5	5.8	2.8	8.0	5.1	5.9	2.6
Low N (<19% N)	16.7	3.2	65.3	5.7	7.9	24.0	9.2	3.9	3.4	3.6	18.2	4.0	7.8
High N (>=19% N)	12.4	2.9	4.8	2.3	1.8	10.0	4.8	49.0	50.7	44.6	17.7	46.1	15.6
Other	0.4	0.2	0.4	1.5	0.7	1.4	0.4	0.1	0.2	0.1	0.0	0.1	0.3
Total product ('000 tonnes)	**404**	**1595**	**66**	**51**	**371**	**118**	**2605**	**984**	**98**	**628**	**4**	**1115**	**3720**

Source: British Survey of Fertiliser Practice 2019

Table GB3.2 Use of product type by crop group, Great Britain 2019

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 specified	all grass	total product ('000 tonnes)
Ammonium Nitrate	12.8	69.1	0.5	1.3	14.3	2.0	75.1	82.6	7.5	57.8	0.1	24.9	1334
Urea	11.3	65.2	0.4	0.4	20.6	2.3	80.5	77.8	5.5	59.6	0.6	19.5	287
Calcium Ammonium Nitrate (CAN)	22.1	57.5	0.0	2.9	6.1	11.4	63.9	99.6	2.3	66.1	0.0	36.1	78
Urea Ammonium Nitrate (UAN)	9.8	67.6	2.0	1.4	17.8	1.5	96.8	65.1	13.9	38.1	12.6	3.2	534
Other Straight N	19.1	61.3	1.1	0.7	15.3	2.5	74.8	100.0	9.1	23.8	0.0	25.2	44
Triple Superphosphate (TSP)	12.8	61.0	5.4	1.4	10.1	9.3	93.0	95.6	7.3	41.2	0.0	7.0	71
Other Straight P	0.0	87.3	0.0	0.0	0.0	12.7	100.0	0.0	0.0	0.0	0.0	0.0	0
Muriate of Potash (MOP)	13.3	52.2	10.1	2.8	11.1	10.7	94.0	80.9	12.5	64.0	9.6	6.0	99
Other Straight K	7.1	31.3	1.2	41.2	10.1	9.1	93.2	100.0	0.0	5.8	0.0	6.8	28
PK	8.5	69.8	0.0	4.0	10.6	7.1	93.8	91.3	9.4	63.9	0.0	6.2	234
NK	21.4	39.5	4.9	1.4	10.6	22.2	33.0	82.0	3.4	83.0	0.1	67.0	84
Low N (<19% N)	40.3	18.7	14.2	1.4	12.5	13.0	88.4	83.0	9.0	67.7	1.7	11.6	252
High N (>=19% N)	39.8	44.9	2.5	0.7	4.5	7.5	16.3	93.4	10.6	52.5	0.0	83.7	666
Other	18.3	28.0	11.1	7.6	19.2	15.8	96.4	100.0	34.5	65.5	0.0	3.6	10
All Fertilisers	**15.5**	**61.2**	**2.5**	**2.0**	**14.2**	**4.5**	**70.0**	**88.3**	**8.8**	**56.3**	**0.4**	**30.0**	**3720**

Source: British Survey of Fertiliser Practice 2019

Table GB3.3 Product use by month of application, Great Britain 2019

row %	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	total product ('000 tonnes)
Ammonium Nitrate	0.1	7.4	30.8	38.0	15.2	4.1	2.6	1.5	0.2	0.1	0.0	0.0	1334
Urea	0.0	15.8	35.6	32.9	10.7	2.6	1.1	0.8	0.5	0.0	0.0	0.0	287
Calcium Ammonium Nitrate (CAN)	0.0	5.8	22.8	29.2	22.7	7.2	8.3	4.0	0.0	0.0	0.0	0.0	78
Urea Ammonium Nitrate (UAN)	0.0	11.5	33.0	41.0	11.7	1.7	0.3	0.3	0.3	0.0	0.0	0.1	534
Other Straight N	0.0	30.7	40.6	18.5	6.5	0.3	0.0	2.9	0.4	0.0	0.0	0.0	44
Triple Superphosphate (TSP)	0.8	15.9	22.8	9.2	2.5	0.1	0.0	4.0	14.6	10.5	18.6	0.9	71
Other Straight P	0.0	0.0	0.0	79.7	0.0	0.0	0.0	0.0	0.0	20.3	0.0	0.0	0
Muriate of Potash (MOP)	4.8	20.2	29.6	16.1	3.4	0.9	1.2	0.4	3.8	6.3	12.8	0.5	99
Other Straight K	12.7	27.0	38.4	7.4	1.1	0.0	0.0	0.4	0.9	4.4	2.9	4.7	28
PK	2.0	8.0	12.9	9.0	1.5	0.3	1.0	13.3	19.5	23.6	8.4	0.4	234
NK	0.0	7.8	9.6	27.5	24.6	18.2	9.2	1.2	1.9	0.0	0.0	0.0	84
Low N (<19% N)	0.6	4.5	26.9	40.4	7.6	0.9	1.1	7.7	5.0	4.3	1.0	0.0	252
High N (>=19% N)	0.0	1.6	18.9	39.7	21.9	9.7	5.6	1.6	0.4	0.1	0.4	0.0	666
Other	7.3	5.2	39.5	12.4	11.0	0.0	0.0	0.0	0.0	14.7	10.0	0.0	10
All Fertilisers	**0.5**	**8.3**	**27.3**	**34.6**	**13.8**	**4.3**	**2.6**	**2.5**	**2.2**	**2.3**	**1.4**	**0.1**	**3720**

Source: British Survey of Fertiliser Practice 2019

Table GB4.1 Average fertiliser practice on cereal farms, Great Britain 2019

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring wheat	94	59	48	15	142	32	39	134	19	19	24
Winter wheat	100	45	46	21	193	57	64	193	26	29	694
Spring barley	100	59	57	19	101	51	60	100	30	34	257
Winter barley	99	49	50	13	150	54	69	148	26	34	225
Oats	100	45	47	11	101	49	68	101	22	32	106
Rye/triticale/Durum wheat	100	14	38	8	123	-	-	123	-	-	8
Potatoes (seed or earlies)	-	-	-	-	-	-	-	-	-	-	4
Potatoes (maincrop)	100	68	81	15	141	85	158	141	58	128	9
Sugar beet	94	42	58	40	80	49	76	75	21	44	29
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	3
Winter oilseed rape	99	52	43	19	186	58	61	185	30	26	268
Linseed	100	48	23	16	69	58	61	69	28	14	15
Forage maize	84	52	26	66	84	68	112	70	35	29	26
Rootcrops for stockfeed	-	-	-	-	-	-	-	-	-	-	3
Leafy forage crops	-	-	-	-	-	-	-	-	-	-	1
Arable silage/other fodder crops	37	22	22	57	113	-	39	42	-	9	23
Peas - human consumption	0	0	6	6	-	-	-	-	-	-	11
Peas - animal consumption	0	29	46	0	-	48	57	-	14	26	17
Beans - animal consumption	0	33	29	0	-	44	53	-	14	15	111
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	3
Vegetables (other)	-	-	-	-	-	-	-	-	-	-	2
Soft Fruit	-	-	-	-	-	-	-	-	-	-	0
Top Fruit	-	-	-	-	-	-	-	-	-	-	1
Other tillage	77	19	43	1	93	-	97	71	-	42	14
All tillage	93	48	46	19	164	55	64	152	26	30	1854
Grass under 5 years old	67	30	35	13	109	32	45	73	10	16	113
Grass 5 years and over	41	15	15	9	88	27	37	36	4	6	278
All grass	47	19	20	10	95	29	41	44	5	8	391
All crops and grass	86	44	43	18	158	53	63	137	23	27	2245

The data in this table apply to farms in the 'cereals' robust group, as detailed in Appendix 3.

Source: British Survey of Fertiliser Practice 2019

Table GB4.2 Average fertiliser practice on general cropping and horticultural farms, Great Britain 2019

	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	81	22	23	19	96	-	69	77	-	16	15
Winter wheat	99	35	46	15	177	67	83	175	24	38	275
Spring barley	99	64	65	13	101	45	69	100	29	45	130
Winter barley	100	54	63	22	131	57	69	131	31	44	98
Oats	97	47	61	14	105	42	86	101	20	53	39
Rye/triticale/Durum wheat	95	38	38	3	127	-	-	121	-	-	9
Potatoes (seed or earlies)	-	-	-	-	-	-	-	-	-	-	2
Potatoes (maincrop)	99	80	90	58	156	119	173	153	95	156	35
Sugar beet	95	37	59	32	78	44	89	74	16	52	55
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	0
Winter oilseed rape	98	51	48	24	164	54	65	161	28	31	78
Linseed	-	-	-	-	-	-	-	-	-	-	3
Forage maize	68	27	40	42	69	-	-	46	-	-	12
Rootcrops for stockfeed	100	17	17	5	45	-	-	45	-	-	5
Leafy forage crops	-	-	-	-	-	-	-	-	-	-	3
Arable silage/other fodder crops	38	22	22	0	-	-	-	-	-	-	12
Peas - human consumption	4	28	22	0	-	87	109	-	24	24	24
Peas - animal consumption	0	23	34	0	-	-	-	-	-	-	7
Beans - animal consumption	0	34	38	4	-	56	74	-	19	29	30
Vegetables (brassicae)	75	30	64	25	107	-	-	81	-	-	8
Vegetables (other)	69	70	79	11	93	51	70	64	35	55	19
Soft Fruit	94	38	99	0	72	-	114	68	-	112	10
Top Fruit	87	83	92	1	71	27	83	62	23	76	9
Other tillage	30	5	5	0	58	-	-	18	-	-	16
All tillage	91	46	54	18	138	59	84	125	27	46	894
Grass under 5 years old	81	38	37	18	111	30	49	89	11	18	90
Grass 5 years and over	40	22	21	29	104	26	34	42	6	7	169
All grass	49	25	25	27	106	28	39	52	7	10	259
All crops and grass	79	40	46	20	132	54	78	105	22	36	1153

The data in this table apply to farms in the 'general cropping' and 'horticulture' robust groups, as detailed in Appendix 3.

Source: British Survey of Fertiliser Practice 2019

Table GB4.3 Average fertiliser practice on dairy farms, Great Britain 2019

	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	83	71	92	123	39	36	123	32	25	10
Winter wheat	100	27	31	53	165	43	52	165	12	16	63
Spring barley	82	44	48	94	66	30	31	54	13	15	33
Winter barley	100	47	47	76	135	42	70	135	20	33	23
Oats	38	7	7	72	120	-	-	46	-	-	9
Rye/triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	0
Potatoes (seed or earlies)	-	-	-	-	-	-	-	-	-	-	0
Potatoes (maincrop)	-	-	-	-	-	-	-	-	-	-	1
Sugar beet	-	-	-	-	-	-	-	-	-	-	1
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	0
Winter oilseed rape	-	-	-	-	-	-	-	-	-	-	4
Linseed	-	-	-	-	-	-	-	-	-	-	0
Forage maize	84	65	30	97	60	54	64	50	35	19	65
Rootcrops for stockfeed	68	46	55	94	-	-	-	-	-	-	6
Leafy forage crops	-	-	-	-	-	-	-	-	-	-	2
Arable silage/other fodder crops	23	8	8	96	93	-	-	22	-	-	35
Peas - human consumption	-	-	-	-	-	-	-	-	-	-	0
Peas - animal consumption	-	-	-	-	-	-	-	-	-	-	0
Beans - animal consumption	-	-	-	-	-	-	-	-	-	-	1
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	1
Vegetables (other)	-	-	-	-	-	-	-	-	-	-	1
Soft Fruit	-	-	-	-	-	-	-	-	-	-	0
Top Fruit	-	-	-	-	-	-	-	-	-	-	0
Other tillage	-	-	-	-	-	-	-	-	-	-	1
All tillage	83	43	34	79	113	46	55	93	19	19	256
Grass under 5 years old	91	30	37	82	152	27	50	138	8	19	166
Grass 5 years and over	79	36	40	67	130	21	34	102	8	14	324
All grass	82	34	39	71	137	23	39	113	8	15	490
All crops and grass	82	36	38	73	132	28	41	109	10	16	746

The data in this table apply to farms in the 'dairy' robust group, as detailed in Appendix 3.

Source: British Survey of Fertiliser Practice 2019

Table GB4.4 Average fertiliser practice on other livestock farms, Great Britain 2019

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring wheat	-	-	-	-	-	-	-	-	-	-	4
Winter wheat	96	57	59	59	143	45	60	138	26	35	43
Spring barley	96	83	84	56	79	45	50	75	37	42	119
Winter barley	94	66	66	65	145	46	63	136	30	42	63
Oats	73	61	59	51	88	49	57	64	30	34	41
Rye/triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	3
Potatoes (seed or earlies)	-	-	-	-	-	-	-	-	-	-	0
Potatoes (maincrop)	-	-	-	-	-	-	-	-	-	-	1
Sugar beet	-	-	-	-	-	-	-	-	-	-	0
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	0
Winter oilseed rape	-	-	-	-	-	-	-	-	-	-	1
Linseed	-	-	-	-	-	-	-	-	-	-	0
Forage maize	78	55	45	100	77	47	61	60	26	27	29
Rootcrops for stockfeed	86	81	81	61	90	60	73	78	49	59	24
Leafy forage crops	80	88	87	19	69	45	49	56	40	42	26
Arable silage/other fodder crops	53	44	44	42	76	35	48	40	16	21	27
Peas - human consumption	-	-	-	-	-	-	-	-	-	-	0
Peas - animal consumption	-	-	-	-	-	-	-	-	-	-	0
Beans - animal consumption	-	-	-	-	-	-	-	-	-	-	1
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	1
Vegetables (other)	-	-	-	-	-	-	-	-	-	-	3
Soft Fruit	-	-	-	-	-	-	-	-	-	-	0
Top Fruit	-	-	-	-	-	-	-	-	-	-	0
Other tillage	-	-	-	-	-	-	-	-	-	-	3
All tillage	88	70	70	59	101	46	56	89	32	39	389
Grass under 5 years old	82	64	64	51	101	26	36	84	17	23	368
Grass 5 years and over	50	38	39	34	71	18	22	35	7	8	1258
All grass	53	41	42	35	76	19	24	40	8	10	1626
All crops and grass	55	43	44	37	78	22	27	43	9	12	2015

The data in this table apply to farms in the 'LFA grazing livestock' and 'lowland grazing livestock' robust groups, as detailed in Appendix 3.

Source: British Survey of Fertiliser Practice 2019

Table GB4.5 Average fertiliser practice on mixed farms, Great Britain 2019

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring wheat	88	24	34	66	115	-	-	101	-	-	6
Winter wheat	98	47	50	44	179	51	64	176	24	32	178
Spring barley	96	68	72	48	98	49	64	94	33	46	134
Winter barley	100	40	49	47	151	53	67	151	21	33	103
Oats	75	37	38	45	107	49	54	80	18	21	60
Rye/triticale/Durum wheat	91	84	84	16	119	-	-	109	-	-	8
Potatoes (seed or earlies)	-	-	-	-	-	-	-	-	-	-	1
Potatoes (maincrop)	97	97	97	33	167	112	286	163	109	278	9
Sugar beet	100	29	37	86	87	-	-	87	-	-	8
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	1
Winter oilseed rape	100	48	42	48	180	63	64	180	30	27	50
Linseed	-	-	-	-	-	-	-	-	-	-	4
Forage maize	84	47	26	100	68	45	48	57	21	12	21
Rootcrops for stockfeed	98	63	92	87	71	79	77	70	49	71	11
Leafy forage crops	83	83	83	16	95	68	68	79	57	56	9
Arable silage/other fodder crops	19	38	38	33	-	-	-	-	-	-	14
Peas - human consumption	0	47	47	0	-	-	-	-	-	-	6
Peas - animal consumption	-	-	-	-	-	-	-	-	-	-	1
Beans - animal consumption	0	21	25	21	-	37	62	-	8	16	27
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	1
Vegetables (other)	-	-	-	-	-	-	-	-	-	-	1
Soft Fruit	-	-	-	-	-	-	-	-	-	-	0
Top Fruit	-	-	-	-	-	-	-	-	-	-	2
Other tillage	17	0	8	8	-	-	-	-	-	-	10
All tillage	90	51	54	45	140	52	71	127	26	38	665
Grass under 5 years old	86	51	59	30	119	36	60	102	18	36	151
Grass 5 years and over	56	39	41	17	78	22	25	44	9	10	282
All grass	63	42	45	20	91	26	36	58	11	16	433
All crops and grass	76	46	49	32	119	40	54	90	18	27	1098

The data in this table apply to farms in the 'mixed' robust group, as detailed in Appendix 3.

Source: British Survey of Fertiliser Practice 2019

Table EW1.1 Total fertiliser use, England & Wales 2019

	Crop area receiving dressing (%)					Average field rate (kg/ha)				Overall application rate (kg/ha)				Fields in sample
	N	P_2O_5	K_2O	SO_3	FYM	N	P_2O_5	K_2O	SO_3	N	P_2O_5	K_2O	SO_3	
Spring wheat	89	48	42	43	27	129	36	45	61	115	17	19	26	52
Winter wheat	100	39	43	72	24	189	57	65	59	188	22	28	43	1193
Spring barley	98	45	46	60	24	101	47	57	46	98	21	26	27	482
Winter barley	99	46	51	70	24	144	52	67	55	143	24	34	38	458
Oats	93	39	44	54	20	104	47	69	47	97	18	30	25	211
Rye/triticale/Durum wheat	86	23	33	53	25	115	45	55	43	99	11	18	23	23
Potatoes (seed or earlies)	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Potatoes (maincrop)	97	76	88	36	48	153	113	170	-	149	86	150	-	51
Sugar beet	95	37	56	63	37	78	47	84	49	74	17	47	31	92
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Winter oilseed rape	99	50	42	82	23	184	58	61	78	183	29	26	64	385
Linseed	100	50	28	45	20	65	56	58	56	65	28	16	25	22
Forage maize	81	55	32	27	85	69	56	70	26	56	30	23	7	154
Rootcrops for stockfeed	89	55	61	21	57	79	51	73	39	71	28	44	8	41
Leafy forage crops	82	49	55	36	43	78	33	49	-	64	16	27	-	18
Arable silage/other fodder crops	31	21	18	17	58	100	46	62	42	31	9	11	7	102
Vining peas (for human consumption)	3	23	22	2	3	-	85	87	-	-	19	19	-	37
Field peas (harvested dry)	0	27	43	17	0	-	48	56	56	-	13	24	10	25
Field beans (harvested dry)	0	32	31	4	2	-	47	58	75	-	15	18	3	169
Vegetables (brassicae)	75	43	75	6	25	97	42	121	-	73	18	91	-	12
Vegetable Other	71	72	74	34	11	96	49	69	-	68	36	51	-	25
Soft Fruit	94	38	99	61	0	72	-	114	38	68	-	112	23	10
Top Fruit	87	81	89	44	1	76	28	84	-	66	23	75	-	12
Other tillage	39	7	15	34	2	73	66	111		29	5	16	10	40
All tillage	91	43	44	63	25	156	55	68	58	141	23	30	37	3622
Grass less than five years old	81	37	41	24	49	121	29	43	40	98	11	18	10	682
Grass five years and over	49	31	32	11	35	86	19	24	32	42	6	8	3	1967
All grass	54	32	34	13	37	94	21	27	35	51	7	9	4	2649
All crops and grass	71	37	39	36	31	131	39	50	54	94	15	19	20	6271

Source: British Survey of Fertiliser Practice 2019

NB: Sulphur rates on potatoes are not shown as some growers apply additional sulphur to acidify the soil for this crop. **These applications cannot be separated from those intended as a fertiliser nutrient.**

Table EW1.2 Use of straight fertiliser, England & Wales 2019

	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	86	23	19	121	36	51	105	8	10	52
Winter wheat	97	14	19	186	57	68	181	8	13	1193
Spring barley	90	11	18	95	51	66	86	6	12	482
Winter barley	96	15	20	141	53	75	135	8	15	458
Oats	88	13	20	101	47	82	88	6	17	211
Rye/triticale/Durum wheat	83	0	9	118	-	-	97	-	-	23
Potatoes (seed or earlies)	-	-	-	-	-	-	-	-	-	4
Potatoes (maincrop)	58	21	40	152	-	202	88	-	81	51
Sugar beet	87	5	30	79	88	101	69	4	30	92
Spring oilseed rape	-	-	-	-	-	-	-	-	-	4
Winter oilseed rape	99	10	20	176	53	66	173	6	13	385
Linseed	100	7	8	53	-	-	53	-	-	22
Forage maize	46	8	10	79	57	103	36	4	11	154
Rootcrops for stockfeed	45	6	14	98	-	75	44	-	11	41
Leafy forage crops	33	0	6	-	-	-	-	-	-	18
Arable silage/other fodder crops	26	8	5	104	48	80	27	4	4	102
Peas - human consumption	0	14	14	-	84	81	-	12	11	37
Peas - animal consumption	0	8	24	-	-	65	-	-	15	25
Beans - animal consumption	0	15	15	-	42	54	-	6	8	169
Vegetables (brassicae)	41	0	25	-	-	-	-	-	-	12
Vegetables (other)	48	0	8	82	-	-	39	-	-	25
Soft Fruit	59	0	61	77	-	130	45	-	79	10
Top Fruit	81	34	32	71	-	-	57	-	-	12
Other tillage	35	4	12	77	-	101	27	-	12	40
All tillage	86	13	19	154	56	76	132	7	14	3622
Grass under 5 years old	55	1	3	122	80	98	68	1	3	682
Grass 5 years and over	23	0	0	98	67	79	22	0	0	1967
All grass	28	0	1	105	72	91	29	0	1	2649
All crops and grass	55	6	9	141	57	77	78	4	7	6271

Source: British Survey of Fertiliser Practice 2019

Table EW1.3 Use of compound fertiliser, England & Wales 2019

	Crop area receiving dressing (%)				Average field rate (kg/ha)				Overall application rate (kg/ha)				Fields in sample
	N	P_2O_5	K_2O	SO_3	N	P_2O_5	K_2O	SO_3	N	P_2O_5	K_2O	SO_3	
Spring wheat	21	25	22	11	51	35	39	19	10	9	9	2	52
Winter wheat	10	25	25	5	68	55	62	47	7	14	15	3	1193
Spring barley	26	34	28	9	48	46	50	33	12	16	14	3	482
Winter barley	13	31	32	5	59	52	61	27	8	16	19	1	458
Oats	16	27	24	5	50	45	56	28	8	12	14	1	211
Rye/triticale/Durum wheat	3	23	23	3	-	45	51	-	-	11	12	-	23
Potatoes (seed or earlies)	-	-	-	-	-	-	-	-	-	-	-	-	4
Potatoes (maincrop)	59	55	53	5	104	99	129	68	61	55	68	3	51
Sugar beet	17	32	28	16	28	41	60	37	5	13	17	6	92
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	-	-	4
Winter oilseed rape	28	40	23	5	34	57	55	38	10	23	13	2	385
Linseed	41	42	19	12	28	61	55	-	12	26	11	-	22
Forage maize	54	48	23	14	37	54	52	20	20	26	12	3	154
Rootcrops for stockfeed	46	49	57	9	58	50	59	20	27	25	34	2	41
Leafy forage crops	49	49	49	20	58	33	37	-	29	16	18	-	18
Arable silage/other fodder crops	6	13	13	1	67	44	55	-	4	6	7	-	102
Peas - human consumption	3	12	12	0	-	62	71	-	-	7	8	-	37
Peas - animal consumption	0	19	19	1	-	38	45	-	-	7	9	-	25
Beans - animal consumption	0	17	16	1	-	52	58	-	-	9	10	-	169
Vegetables (brassicae)	50	43	50	6	58	42	107	-	29	18	53	-	12
Vegetables (other)	55	72	66	27	53	49	58	-	29	36	38	-	25
Soft Fruit	38	38	38	0	-	-	-	-	-	-	-	-	10
Top Fruit	50	57	57	44	-	21	55	-	-	12	31	-	12
Other tillage	4	3	5	2	39	-	79	-	2	-	4	-	40
All tillage	18	30	26	6	52	53	61	37	9	16	16	2	3622
Grass under 5 years old	37	36	38	11	81	27	38	31	30	10	15	3	682
Grass 5 years and over	32	31	32	7	63	19	23	22	20	6	7	1	1967
All grass	33	32	33	7	66	20	26	24	21	6	9	2	2649
All crops and grass	26	31	30	7	61	36	40	29	16	11	12	2	6271

Source: British Survey of Fertiliser Practice 2019

Table EW1.4 Use of lime, England & Wales 2019

	Crop area receiving dressing (%)						Average application rate (tonnes of product/ha)							
	Limestone (ground, screened)	Chalk	Magnesian limestone	Sugar beet lime	Other	All	Limestone (ground, screened)	Chalk	Magnesian limestone	Sugar beet lime	Other	All	Fields limed	Fields in sample
Spring wheat	11.8	-	2.2	-	-	14.0	2.1	-	3.5	-	-	2.3	6	52
Winter wheat	5.2	1.8	0.4	0.2	0.4	8.0	4.1	4.9	6.4	7.9	1.1	4.3	105	1193
Spring barley	3.9	0.2	0.2	-	1.1	5.4	5.4	5.5	4.6	-	0.7	4.4	36	482
Winter barley	6.4	0.9	0.9	0.1	0.7	9.0	4.7	3.9	5.0	5.0	0.6	4.3	42	458
Oats	2.8	0.2	-	0.2	-	3.3	4.2	5.0	-	5.0	-	4.3	10	211
Rye/triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	-	-	0	23
Potatoes (seed or earlies)	-	-	-	-	-	-	-	-	-	-	-	-	0	4
Potatoes (maincrop)	-	-	-	-	-	-	-	-	-	-	-	-	0	51
Sugar beet	12.7	2.9	0.6	11.6	0.8	28.6	5.6	3.9	2.0	6.1	3.4	5.5	26	92
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	-	-	0	4
Winter oilseed rape	5.0	1.7	1.1	0.3	0.0	8.1	3.8	3.9	5.3	5.7	0.4	4.1	37	385
Linseed	-	-	-	-	-	-	-	-	-	-	-	-	1	22
Forage maize	12.3	0.4	0.3	1.5	1.1	15.6	3.8	5.0	5.0	10.0	0.2	4.3	27	154
Rootcrops for stockfeed	13.6	1.7	-	-	7.7	22.9	3.2	2.0	-	-	3.0	3.0	11	41
Leafy forage crops	15.3	-	-	5.0	-	20.3	5.4	-	-	5.0	-	5.3	5	18
Arable silage/other fodder crops	2.4	0.1	-	0.7	0.3	3.5	5.0	4.3	-	10.0	0.8	5.6	10	102
Peas - human consumption	-	-	-	-	-	-	-	-	-	-	-	-	1	37
Peas - animal consumption	-	-	-	-	-	-	-	-	-	-	-	-	0	25
Beans - animal consumption	-	-	-	-	-	-	-	-	-	-	-	-	4	169
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	-	-	2	12
Vegetables (other)	-	-	-	-	-	-	-	-	-	-	-	-	3	25
Soft Fruit	-	-	-	-	-	-	-	-	-	-	-	-	0	10
Top Fruit	-	-	-	-	-	-	-	-	-	-	-	-	1	12
Other tillage	-	-	-	-	-	-	-	-	-	-	-	-	0	40
All tillage	5.1	1.2	0.5	0.5	0.5	7.8	4.3	4.6	5.4	6.6	1.0	4.4	327	3622
Grass under 5 years old	3.7	0.3	0.1	-	0.4	4.5	4.5	5.0	2.9	-	0.3	4.1	52	682
Grass 5 years and over	3.0	0.1	0.2	0.0	0.1	3.5	4.2	4.8	5.3	5.0	0.3	4.2	95	1967
All grass	3.1	0.2	0.2	0.0	0.2	3.6	4.3	4.9	5.1	5.0	0.3	4.2	147	2649
All crops and grass	4.1	0.7	0.3	0.2	0.3	5.6	4.3	4.6	5.3	6.6	0.8	4.3	474	6271

Source: British Survey of Fertiliser Practice 2019

Table EW1.5 Percentage of crop area by field application rate - Nitrogen, England & Wales 2019

	kg/ha																		Fields in
row %	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	sample
Spring wheat	11	0	10	0	17	11	17	19	10	0	5	-	-	-	-	-	-	-	52
Winter wheat	0	0	1	3	3	7	9	16	15	18	13	9	3	2	-	-	-	-	1193
Spring barley	2	1	10	13	18	27	21	7	-	-	-	-	-	-	-	-	-	-	482
Winter barley	1	0	3	7	5	14	21	23	18	5	1	1	-	-	-	-	-	-	458
Oats	7	1	4	8	25	32	16	6	-	-	-	-	-	-	-	-	-	-	211
Rye/triticale/Durum wheat	14	0	0	14	5	39	17	6	5	-	-	-	-	-	-	-	-	-	23
Potatoes (seed or earlies)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Potatoes (maincrop)	3	0	0	0	21	13	10	14	11	23	3	3	-	-	-	-	-	-	51
Sugar beet	5	5	16	30	18	15	6	3	-	-	-	-	-	-	-	-	-	-	92
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Winter oilseed rape	1	0	1	1	3	12	8	13	18	18	19	5	1	-	-	-	-	-	385
Linseed	0	0	18	48	34	-	-	-	-	-	-	-	-	-	-	-	-	-	22
Forage maize	19	16	9	24	15	6	8	2	-	-	-	-	-	-	-	-	-	-	154
Rootcrops for stockfeed	11	7	30	18	9	10	4	4	0	8	-	-	-	-	-	-	-	-	41
Leafy forage crops	18	0	32	10	15	10	15	-	-	-	-	-	-	-	-	-	-	-	18
Arable silage/other fodder crops	69	0	1	8	9	4	4	6	-	-	-	-	-	-	-	-	-	-	102
Peas - human consumption	97	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	37
Peas - animal consumption	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25
Beans - animal consumption	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	169
Vegetables (brassicae)	25	10	0	13	0	30	15	6	-	-	-	-	-	-	-	-	-	-	12
Vegetables (other)	29	10	11	3	0	34	6	0	7	-	-	-	-	-	-	-	-	-	25
Soft Fruit	6	1	0	61	0	32	-	-	-	-	-	-	-	-	-	-	-	-	10
Top Fruit	13	0	44	6	24	0	0	13	-	-	-	-	-	-	-	-	-	-	12
Other tillage	61	0	17	2	8	8	0	1	2	-	-	-	-	-	-	-	-	-	40
All tillage	9	1	4	6	7	13	12	13	11	10	8	5	1	1	-	-	-	-	3622
Grass under 5 years old	19	3	10	12	12	7	7	10	7	5	3	3	1	-	-	-	-	-	682
Grass 5 years and over	51	3	12	11	7	5	4	3	1	1	1	-	-	-	-	-	-	-	1967
All grass	46	3	12	11	8	5	4	4	2	2	1	1	-	-	-	-	-	-	2649
All crops and grass	29	2	8	9	8	9	8	8	6	6	4	3	1	-	-	-	-	-	6271

Source: British Survey of Fertiliser Practice 2019

Table EW1.6 Percentage of crop area by field application rate - Phosphate, England & Wales 2019

	kg/ha																		Fields in
row %	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	sample
Spring wheat	52	24	10	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-	52
Winter wheat	61	5	13	14	6	1	1	-	-	-	-	-	-	-	-	-	-	-	1193
Spring barley	55	8	16	15	5	1	-	-	-	-	-	-	-	-	-	-	-	-	482
Winter barley	54	5	15	19	7	-	-	-	-	-	-	-	-	-	-	-	-	-	458
Oats	61	5	16	11	6	-	-	-	-	-	-	-	-	-	-	-	-	-	211
Rye/triticale/Durum wheat	77	0	15	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23
Potatoes (seed or earlies)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Potatoes (maincrop)	24	0	12	1	24	5	5	22	2	1	0	0	2	2	-	-	-	-	51
Sugar beet	63	17	7	5	7	0	1	1	-	-	-	-	-	-	-	-	-	-	92
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Winter oilseed rape	50	6	18	13	9	1	0	2	-	-	-	-	-	-	-	-	-	-	385
Linseed	50	7	8	22	12	-	-	-	-	-	-	-	-	-	-	-	-	-	22
Forage maize	45	4	19	21	6	3	1	1	-	-	-	-	-	-	-	-	-	-	154
Rootcrops for stockfeed	45	14	9	21	5	5	-	-	-	-	-	-	-	-	-	-	-	-	41
Leafy forage crops	51	15	32	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18
Arable silage/other fodder crops	79	2	10	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	102
Peas - human consumption	77	3	3	7	4	2	0	0	0	0	0	3	-	-	-	-	-	-	37
Peas - animal consumption	73	8	10	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25
Beans - animal consumption	68	4	16	8	5	-	-	-	-	-	-	-	-	-	-	-	-	-	169
Vegetables (brassicae)	57	27	0	1	15	-	-	-	-	-	-	-	-	-	-	-	-	-	12
Vegetables (other)	28	20	34	2	0	17	-	-	-	-	-	-	-	-	-	-	-	-	25
Soft Fruit	62	2	0	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10
Top Fruit	19	58	6	10	0	6	-	-	-	-	-	-	-	-	-	-	-	-	12
Other tillage	93	1	3	0	0	3	-	-	-	-	-	-	-	-	-	-	-	-	40
All tillage	57	6	14	14	6	1	1	1	-	-	-	-	-	-	-	-	-	-	3622
Grass under 5 years old	63	18	14	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	682
Grass 5 years and over	69	23	7	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1967
All grass	68	22	8	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2649
All crops and grass	63	15	11	7	3	1	-	-	-	-	-	-	-	-	-	-	-	-	6271

Source: British Survey of Fertiliser Practice 2019

NB: Outliers can be observed in these tables where dressings have been made as part of a rotational manuring policy.

Table EW1.7 Percentage of crop area by field application rate - Potash, England & Wales 2019

	kg/ha																		Fields in
row %	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	sample
Spring wheat	58	2	27	9	4	-	-	-	-	-	-	-	-	-	-	-	-	-	52
Winter wheat	57	4	9	16	9	4	1	1	-	-	-	-	-	-	-	-	-	-	1193
Spring barley	54	6	15	16	5	3	0	0	1	-	-	-	-	-	-	-	-	-	482
Winter barley	49	4	9	22	10	5	0	1	-	-	-	-	-	-	-	-	-	-	458
Oats	56	4	11	10	9	7	1	2	-	-	-	-	-	-	-	-	-	-	211
Rye/triticale/Durum wheat	67	0	15	10	8	-	-	-	-	-	-	-	-	-	-	-	-	-	23
Potatoes (seed or earlies)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Potatoes (maincrop)	12	0	0	1	23	6	7	2	5	28	3	3	2	6	0	0	1	-	51
Sugar beet	44	3	12	13	10	7	6	2	2	0	1	-	-	-	-	-	-	-	92
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Winter oilseed rape	58	6	9	15	8	4	0	1	-	-	-	-	-	-	-	-	-	-	385
Linseed	72	0	7	18	0	0	3	-	-	-	-	-	-	-	-	-	-	-	22
Forage maize	68	5	9	7	2	4	4	0	1	-	-	-	-	-	-	-	-	-	154
Rootcrops for stockfeed	39	10	7	17	11	12	0	5	-	-	-	-	-	-	-	-	-	-	41
Leafy forage crops	45	8	39	3	0	0	0	6	-	-	-	-	-	-	-	-	-	-	18
Arable silage/other fodder crops	82	2	4	8	3	0	1	-	-	-	-	-	-	-	-	-	-	-	102
Peas - human consumption	78	4	4	6	2	2	0	0	0	0	0	0	3	-	-	-	-	-	37
Peas - animal consumption	57	11	18	4	0	8	2	-	-	-	-	-	-	-	-	-	-	-	25
Beans - animal consumption	69	4	9	12	3	2	-	-	-	-	-	-	-	-	-	-	-	-	169
Vegetables (brassicae)	25	27	0	1	0	0	0	25	15	0	0	0	6	-	-	-	-	-	12
Vegetables (other)	26	10	37	2	0	17	0	8	-	-	-	-	-	-	-	-	-	-	25
Soft Fruit	1	0	2	0	36	36	0	25	-	-	-	-	-	-	-	-	-	-	10
Top Fruit	11	0	48	0	8	6	2	24	-	-	-	-	-	-	-	-	-	-	12
Other tillage	85	0	0	3	5	2	0	3	2	-	-	-	-	-	-	-	-	-	40
All tillage	56	4	10	15	8	4	1	1	-	-	-	-	-	-	-	-	-	-	3622
Grass under 5 years old	59	15	12	8	3	1	1	1	-	-	-	-	-	-	-	-	-	-	682
Grass 5 years and over	68	21	8	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1967
All grass	66	20	9	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2649
All crops and grass	61	13	9	9	4	2	1	1	-	-	-	-	-	-	-	-	-	-	6271

Source: British Survey of Fertiliser Practice 2019

NB: Outliers can be observed in these tables where dressings have been made as part of a rotational manuring policy.

Table EW1.8 Percentage of crop area by field application rate - Sulphur, England & Wales 2019

	kg/ha																		Fields in
row %	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	sample
Spring wheat	57	12	10	2	5	13	-	-	-	-	-	-	-	-	-	-	-	-	52
Winter wheat	28	6	26	23	10	5	0	1	-	-	-	-	-	-	-	-	-	-	1193
Spring barley	40	15	21	15	6	1	1	-	-	-	-	-	-	-	-	-	-	-	482
Winter barley	30	8	32	18	6	2	1	1	1	0	0	1	-	-	-	-	-	-	458
Oats	46	7	28	14	6	-	-	-	-	-	-	-	-	-	-	-	-	-	211
Rye/triticale/Durum wheat	47	9	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23
Potatoes (seed or earlies)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Potatoes (maincrop)	64	23	1	6	1	5	-	-	-	-	-	-	-	-	-	-	-	-	51
Sugar beet	37	23	22	8	4	2	2	0	0	0	2	-	-	-	-	-	-	-	92
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Winter oilseed rape	18	5	16	18	24	12	3	3	1	0	0	1	-	-	-	-	-	-	385
Linseed	55	12	14	8	0	10	-	-	-	-	-	-	-	-	-	-	-	-	22
Forage maize	73	16	7	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	154
Rootcrops for stockfeed	79	9	8	1	4	-	-	-	-	-	-	-	-	-	-	-	-	-	41
Leafy forage crops	64	15	5	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18
Arable silage/other fodder crops	83	5	7	0	4	-	-	-	-	-	-	-	-	-	-	-	-	-	102
Peas - human consumption	98	0	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	37
Peas - animal consumption	83	0	6	9	0	2	-	-	-	-	-	-	-	-	-	-	-	-	25
Beans - animal consumption	96	0	0	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	169
Vegetables (brassicae)	94	0	0	0	0	0	0	6	-	-	-	-	-	-	-	-	-	-	12
Vegetables (other)	66	1	26	0	6	-	-	-	-	-	-	-	-	-	-	-	-	-	25
Soft Fruit	39	0	61	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10
Top Fruit	56	44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12
Other tillage	66	19	10	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40
All tillage	37	8	22	17	9	4	1	1	-	-	-	-	-	-	-	-	-	-	3622
Grass under 5 years old	76	9	8	5	2	-	-	-	-	-	-	-	-	-	-	-	-	-	682
Grass 5 years and over	89	6	3	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1967
All grass	87	6	4	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2649
All crops and grass	64	7	12	9	5	2	-	-	-	-	-	-	-	-	-	-	-	-	6271

Source: British Survey of Fertiliser Practice 2019

Table EW2.1 Average fertiliser practice by grassland utilisation, England & Wales 2019

	Crop area receiving dressing (%)					Average field rate (kg/ha)				Overall application rate (kg/ha)				Fields in sample
	N	P_2O_5	K_2O	SO_3	FYM	N	P_2O_5	K_2O	SO_3	N	P_2O_5	K_2O	SO_3	
Grazed not mown	40	24	25	7	19	76	17	19	31	30	4	5	2	1191
Grazed mown	73	46	49	20	63	100	24	32	35	73	11	16	7	1200
All grazings	52	32	33	12	35	88	21	26	34	46	7	9	4	2391
Cut for silage - grazed	82	51	54	23	71	106	25	34	36	87	12	18	8	831
Cut for silage - not grazed	87	38	41	23	73	145	24	39	40	126	9	16	9	175
All cut for silage	83	48	51	23	71	114	25	35	37	95	12	18	9	1006
Cut for hay - grazed	56	40	40	16	45	75	23	24	28	42	9	10	4	404
Cut for hay - not grazed	54	18	21	14	20	74	23	28	39	40	4	6	5	66
All cut for hay	56	37	38	16	42	75	23	24	29	42	8	9	5	470
All mowings	74	44	46	20	63	108	24	33	36	80	11	16	7	1431
All grass	54	32	34	13	37	94	21	27	35	51	7	9	4	2649

Source: British Survey of Fertiliser Practice 2019

Table EW2.2 Percentage of grass area by field application rate - Nitrogen, England & Wales 2019

	kg/ha																	Fields in
row %	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	sample
Grazed not mown	60	2	14	9	5	3	2	2	1	1	-	-	-	-	-	-	-	-	1191
Grazed mown	27	3	11	16	13	8	7	7	3	2	2	1	1	-	-	-	-	-	1200
All grazings	48	3	13	11	8	5	4	4	2	1	1	1	-	-	-	-	-	-	2391
Cut for silage - grazed	18	4	11	16	13	8	7	10	4	3	3	1	1	-	-	-	-	-	831
Cut for silage - not grazed	13	1	6	10	13	11	10	6	7	7	10	4	3	1	-	-	-	-	175
All cut for silage	17	3	10	15	13	9	8	9	5	4	4	2	1	-	-	-	-	-	1006
Cut for hay - grazed	44	4	11	14	12	6	4	3	-	-	-	-	-	-	-	-	-	-	404
Cut for hay - not grazed	46	0	5	25	16	2	6	-	-	-	-	-	-	-	-	-	-	-	66
All cut for hay	44	4	11	16	13	6	4	3	-	-	-	-	-	-	-	-	-	-	470
All mowings	26	3	10	15	13	8	7	7	4	3	3	1	1	-	-	-	-	-	1431
All grass	46	3	12	11	8	5	4	4	2	2	1	1	-	-	-	-	-	-	2649

Source: British Survey of Fertiliser Practice 2019

Table EW2.3 Percentage of grass area by field application rate - Phosphate, England & Wales 2019

	kg/ha																		Fields in
row %	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	sample
Grazed not mown	76	20	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1191
Grazed mown	54	27	14	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1200
All grazings	68	22	8	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2391
Cut for silage - grazed	49	30	15	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	831
Cut for silage - not grazed	62	23	10	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	175
All cut for silage	52	29	14	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1006
Cut for hay - grazed	60	22	15	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	404
Cut for hay - not grazed	82	10	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	66
All cut for hay	63	21	14	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	470
All mowings	56	26	14	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1431
All grass	68	22	8	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2649

Source: British Survey of Fertiliser Practice 2019

Table EW2.4 Percentage of grass area by field application rate - Potash, England & Wales 2019

	kg/ha																		Fields in
row %	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	sample
Grazed not mown	75	19	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1191
Grazed mown	51	24	15	6	2	1	-	-	-	-	-	-	-	-	-	-	-	-	1200
All grazings	67	21	8	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2391
Cut for silage - grazed	46	26	15	8	3	1	0	1	-	-	-	-	-	-	-	-	-	-	831
Cut for silage - not grazed	59	16	14	8	0	3	-	-	-	-	-	-	-	-	-	-	-	-	175
All cut for silage	49	24	15	8	2	1	-	-	-	-	-	-	-	-	-	-	-	-	1006
Cut for hay - grazed	60	22	15	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	404
Cut for hay - not grazed	79	12	7	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	66
All cut for hay	62	21	14	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	470
All mowings	54	22	14	7	2	1	-	-	-	-	-	-	-	-	-	-	-	-	1431
All grass	66	20	9	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2649

Source: British Survey of Fertiliser Practice 2019

Table EW2.5 Percentage of grass area by field application rate - Sulphur, England & Wales 2019

	kg/ha																		Fields in
row %	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	sample
Grazed not mown	93	5	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1191
Grazed mown	80	9	7	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1200
All grazings	88	6	3	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2391
Cut for silage - grazed	77	9	8	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	831
Cut for silage - not grazed	77	7	10	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	175
All cut for silage	77	9	9	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	1006
Cut for hay - grazed	84	10	5	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	404
Cut for hay - not grazed	86	4	8	0	0	1	-	-	-	-	-	-	-	-	-	-	-	-	66
All cut for hay	84	9	5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	470
All mowings	80	8	8	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	1431
All grass	87	6	4	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2649

Source: British Survey of Fertiliser Practice 2019

Table EW3.0 Product use by month of application, England & Wales 2019

(a) Product use

row %	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Straight N	0	0	0	0	0	10	34	37	13	3	2	1
Straight P	15	11	20	1	1	17	22	8	2	0	0	3
Straight K	3	6	11	2	7	23	33	11	2	0	1	0
Compounds	6	6	3	0	1	5	21	28	15	6	4	6
All fertilisers	2	2	2	0	1	9	30	32	13	4	2	3

(b) Nutrient use

row %	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Nitrogen	0	0	0	0	0	9	31	37	14	4	3	2
Phosphate	9	11	9	0	1	10	21	19	8	2	1	8
Potash	6	9	8	1	3	13	25	20	9	3	2	3
Sulphur	0	0	0	0	1	21	45	23	6	1	1	1
Total	2	2	2	0	1	11	31	31	12	3	2	2

Note: All fertilisers includes other straight fertilisers (e.g. trace elements)

'Product' refers to the total tonnage of the products used by the farmers in the survey year 2019.

'Nutrient' 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 (straight N) contains typically 34.5 kg of N).

Estimates of total nutrients are shown in Section B, Table B2.6.

Source: British Survey of Fertiliser Practice 2019

Table EW3.1 Product type as percentage of all product used by crop group, England & Wales 2019

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 specified	all grass	all crops and grass
Ammonium Nitrate	40.6	45.5	7.3	25.5	41.6	18.3	40.9	31.1	26.6	34.6	9.7	33.4	39.1
Urea	8.1	9.5	0.9	1.5	10.9	4.9	8.8	5.3	3.2	5.5	7.5	5.6	8.0
Calcium Ammonium Nitrate (CAN)	1.1	1.5	0.0	1.9	1.1	2.3	1.4	2.4	1.7	2.1	0.0	2.1	1.6
Urea Ammonium Nitrate (UAN)	13.8	19.6	4.4	11.4	23.3	6.0	17.8	2.1	6.3	1.8	42.9	2.8	14.2
Other Straight N	2.7	1.0	1.9	1.1	1.5	1.1	1.3	1.2	2.4	0.5	0.0	1.0	1.3
Triple Superphosphate (TSP)	2.7	3.2	1.0	2.5	1.5	5.9	3.0	0.7	1.1	0.5	0.0	0.6	2.4
Other Straight P	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Muriate of Potash (MOP)	3.7	3.8	10.5	4.1	2.7	8.7	4.1	0.8	1.9	0.9	12.1	1.0	3.4
Other Straight K	0.4	0.5	1.6	19.9	0.5	2.1	1.1	0.2	0.0	0.0	0.0	0.1	0.9
PK	8.0	9.0	0.0	21.9	6.4	15.3	9.0	2.2	3.2	2.2	0.0	2.2	7.4
NK	1.4	1.1	3.6	0.5	0.7	4.5	1.4	6.1	3.2	8.6	6.2	6.1	2.5
Low N (<19% N)	5.5	2.0	64.4	5.8	7.1	21.2	6.3	3.2	2.4	2.8	0.0	3.2	5.5
High N (>=19% N)	11.6	3.0	4.0	2.4	1.9	7.9	4.3	44.5	47.8	40.3	21.7	41.7	13.3
Other	0.4	0.2	0.4	1.6	0.8	1.6	0.5	0.1	0.2	0.1	0.0	0.1	0.4
Total product ('000 tonnes)	**252**	**1441**	**56**	**50**	**352**	**106**	**2256**	**685**	**87**	**463**	**4**	**810**	**3066**

Source: British Survey of Fertiliser Practice 2019

Table EW3.2 Use of product type by crop group, England & Wales 2019

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 specified	all grass	total product ('000 tonnes)
Ammonium Nitrate	10.5	70.7	0.5	1.4	14.8	2.0	76.9	79.9	8.3	58.0	0.1	23.1	1213
Urea	10.5	64.9	0.4	0.4	21.5	2.4	81.2	75.1	6.3	63.4	0.6	18.8	261
Calcium Ammonium Nitrate (CAN)	14.1	58.7	0.0	4.1	7.7	15.3	63.7	99.5	3.2	66.4	0.0	36.3	55
Urea Ammonium Nitrate (UAN)	9.4	67.0	2.0	1.4	18.7	1.5	96.5	64.6	14.1	37.6	12.8	3.5	479
Other Straight N	21.6	54.1	1.4	0.8	19.0	3.1	72.3	100.0	10.0	20.9	0.0	27.7	37
Triple Superphosphate (TSP)	12.2	62.1	5.6	1.4	9.7	9.0	94.5	94.1	9.8	39.8	0.0	5.5	67
Other Straight P	0.0	84.0	0.0	0.0	0.0	16.0	100.0	0.0	0.0	0.0	0.0	0.0	0
Muriate of Potash (MOP)	12.7	53.8	8.3	2.4	11.4	11.3	95.8	70.7	19.1	55.9	14.8	4.2	91
Other Straight K	6.6	31.6	1.2	41.6	10.2	8.7	93.9	100.0	0.0	6.6	0.0	6.1	28
PK	9.1	66.7	0.0	4.6	11.6	8.0	93.6	90.6	10.6	64.8	0.0	6.4	200
NK	9.2	45.7	6.3	0.4	11.4	26.9	33.0	77.9	4.4	85.6	0.1	67.0	65
Low N (<19% N)	13.0	18.1	23.1	2.7	21.7	21.4	87.4	78.1	12.8	60.7	0.0	12.6	130
High N (>=19% N)	27.2	58.9	1.4	1.0	6.3	5.3	18.2	90.1	14.2	53.6	0.1	81.8	430
Other	15.1	28.9	11.5	7.9	20.0	16.5	96.3	100.0	34.5	65.5	0.0	3.7	10
All Fertilisers	**11.1**	**63.9**	**2.5**	**2.2**	**15.6**	**4.7**	**73.6**	**84.5**	**10.7**	**57.2**	**0.4**	**26.4**	**3066**

Source: British Survey of Fertiliser Practice 2019

Table EW3.3 Product use by month of application, England & Wales 2019

row %	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	total product ('000 tonnes)
Ammonium Nitrate	0.1	7.8	32.3	37.3	14.6	3.7	2.5	1.5	0.2	0.1	0.0	0.0	1213
Urea	0.0	16.2	37.2	32.4	9.0	2.5	1.2	0.9	0.5	0.0	0.0	0.0	261
Calcium Ammonium Nitrate (CAN)	0.0	6.9	23.4	26.4	18.6	8.9	10.2	5.7	0.0	0.0	0.0	0.0	55
Urea Ammonium Nitrate (UAN)	0.0	12.1	34.8	39.5	10.8	1.9	0.3	0.3	0.1	0.0	0.0	0.2	479
Other Straight N	0.0	20.9	47.8	21.6	5.3	0.3	0.0	3.5	0.5	0.0	0.0	0.0	37
Triple Superphosphate (TSP)	0.8	16.8	22.3	8.1	2.1	0.1	0.0	3.1	15.0	11.1	19.6	1.0	67
Other Straight P	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Muriate of Potash (MOP)	5.2	21.1	31.7	11.6	2.8	0.5	1.2	0.4	4.1	6.9	13.9	0.6	91
Other Straight K	12.9	27.5	38.4	6.8	0.7	0.0	0.0	0.4	0.9	4.5	3.0	4.8	28
PK	2.4	8.2	14.0	9.7	1.6	0.2	1.2	12.9	17.8	22.3	9.3	0.5	200
NK	0.0	10.1	9.4	23.7	24.1	19.0	10.2	1.1	2.4	0.0	0.0	0.0	65
Low N (<19% N)	1.1	7.7	28.4	26.1	9.5	1.0	1.4	12.9	6.6	3.3	2.0	0.0	130
High N (>=19% N)	0.0	2.5	23.9	37.1	21.0	7.8	4.6	2.0	0.6	0.2	0.4	0.0	430
Other	7.6	5.4	41.1	12.9	7.4	0.0	0.0	0.0	0.0	15.3	10.4	0.0	10
All Fertilisers	**0.5**	**9.4**	**29.9**	**32.5**	**12.7**	**3.7**	**2.3**	**2.6**	**2.2**	**2.2**	**1.7**	**0.1**	**3066**

Source: British Survey of Fertiliser Practice 2019

Table EW4.1a Average fertiliser practice on tillage and grassland by GOR, England & Wales 2019

		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	
North West	All tillage	95	26	60	43	145	32	77	138	8	46	94
	All grass	57	32	36	47	106	17	26	60	6	9	302
	All crops and grass	62	31	39	46	114	19	37	71	6	15	396
North East	All tillage	87	69	68	25	166	61	72	144	42	49	184
	All grass	38	29	30	19	69	30	33	26	9	10	216
	All crops and grass	53	41	42	21	118	46	53	63	19	22	400
Eastern	All tillage	90	39	36	12	147	49	61	132	19	22	775
	All grass	32	13	14	7	72	25	29	24	3	4	103
	All crops and grass	84	36	34	12	143	48	60	120	17	20	878
Yorkshire and the Humber	All tillage	94	41	47	27	166	59	81	155	24	38	636
	All grass	53	40	42	43	85	18	24	45	7	10	346
	All crops and grass	75	41	45	34	140	40	57	106	16	26	982
West Midlands	All tillage	94	31	45	37	149	49	79	141	15	35	333
	All grass	61	27	29	37	97	25	34	59	7	10	205
	All crops and grass	78	29	37	37	129	38	62	101	11	23	538
East Midlands	All tillage	92	43	37	21	170	66	64	156	28	24	537
	All grass	56	14	16	29	113	24	29	63	3	5	182
	All crops and grass	81	34	31	23	158	60	58	127	21	18	719
South West	All tillage	87	54	49	45	136	50	63	118	27	30	604
	All grass	57	30	31	47	100	19	25	57	6	8	651
	All crops and grass	67	38	37	46	116	33	42	77	13	15	1255
South East	All tillage	91	43	51	21	171	58	65	156	25	33	358
	All grass	34	15	16	18	99	26	33	33	4	5	225
	All crops and grass	67	31	36	19	156	51	59	104	16	21	583
Wales	All tillage	82	60	55	66	110	50	68	90	30	37	101
	All grass	64	52	51	38	83	21	26	53	11	14	419
	All crops and grass	65	52	51	40	85	23	29	56	12	15	520

Source: British Survey of Fertiliser Practice 2019

Table EW4.1b Average fertiliser practice on tillage and grassland by BSFP region, England & Wales 2019

		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	84	51	43	46	136	48	59	114	24	26	306
	All grass	48	16	17	46	104	24	29	50	4	5	266
	All crops and grass	63	30	28	46	121	40	48	76	12	13	572
Anglia	All tillage	90	39	36	12	147	49	61	132	19	22	775
	All grass	32	13	14	7	72	25	29	24	3	4	103
	All crops and grass	84	36	34	12	143	48	60	120	17	20	878
Northern	All tillage	85	54	60	39	158	59	73	134	31	44	181
	All grass	48	31	34	36	89	21	27	43	6	9	419
	All crops and grass	54	34	39	36	107	31	39	58	11	15	600
North East	All tillage	94	45	51	26	164	58	80	154	26	40	695
	All grass	53	41	43	40	81	19	24	43	8	10	397
	All crops and grass	75	33	47	33	136	41	56	102	18	26	1092
North Mercia	All tillage	94	25	49	41	144	46	75	135	12	37	185
	All grass	67	29	30	46	115	26	36	77	7	11	163
	All crops and grass	77	28	37	44	128	33	55	99	9	21	348
South Mercia	All tillage	95	33	41	32	163	49	79	154	16	32	235
	All grass	37	17	18	24	79	19	33	29	3	6	115
	All crops and grass	71	27	31	29	145	41	68	103	11	22	350
East Midland	All tillage	92	43	37	21	170	66	64	156	28	24	537
	All grass	56	14	16	29	113	24	29	63	3	5	182
	All crops and grass	81	34	31	23	158	60	58	127	21	18	719
South East	All tillage	91	43	51	21	171	58	65	156	25	33	358
	All grass	34	15	16	18	99	26	33	33	4	5	225
	All crops and grass	67	31	36	19	156	51	59	104	16	21	583
South West	All tillage	91	70	70	46	122	53	69	111	37	48	249
	All grass	66	43	45	49	100	17	24	66	7	11	360
	All crops and grass	72	49	51	49	106	28	37	76	14	19	609
Wales	All tillage	82	60	55	66	110	50	68	90	30	37	101
	All grass	64	52	51	38	83	21	26	53	11	14	419
	All crops and grass	65	52	51	40	85	23	29	56	12	15	520

Source: British Survey of Fertiliser Practice 2019

Table SC1.1 Total fertiliser use, Scotland 2019

	Crop area receiving dressing (%)					Average field rate (kg/ha)				Overall application rate (kg/ha)				Fields in sample
	N	P_2O_5	K_2O	SO_3	FYM	N	P_2O_5	K_2O	SO_3	N	P_2O_5	K_2O	SO_3	
Winter wheat	96	80	81	69	21	163	61	83	56	157	49	67	39	86
Spring barley	98	93	93	57	38	92	49	64	32	90	45	60	18	193
Winter barley	99	76	73	71	39	152	59	76	52	150	45	56	37	62
Oats	80	61	60	36	40	89	51	63	41	72	31	38	15	47
Potatoes	100	100	93	17	21	140	117	256	-	140	117	237	-	8
Winter oilseed rape	100	79	73	73	25	144	54	61	56	144	43	45	41	25
Other crops	68	58	60	34	22	98	42	74	46	67	25	44	15	76
All tillage	94	83	83	58	32	116	53	73	43	109	44	60	25	497
Grass less than five years old	90	71	76	34	46	117	29	47	37	105	20	35	13	210
Grass five years and over	68	54	55	15	30	81	19	26	26	55	10	15	4	367
All grass	73	58	60	20	34	92	22	33	31	67	13	20	6	577
All crops and grass	81	67	68	33	33	102	36	50	38	82	24	34	13	1074

Source: British Survey of Fertiliser Practice 2019

NB: Sulphur rates on potatoes are not shown as some growers apply additional sulphur to acidify the soil for this crop. **These applications cannot be separated from those intended as a fertiliser nutrient.**

Table SC1.2 Use of straight fertiliser, Scotland 2019

	Crop area receiving dressing (%)			Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Winter wheat	96	4	6	148	49	82	142	2	5	86
Spring barley	64	1	3	69	-	64	44	-	2	193
Winter barley	95	3	6	139	-	-	132	-	-	62
Oats	59	11	12	79	-	-	47	-	-	47
Potatoes	32	0	43	-	-	-	-	-	-	8
Winter oilseed rape	95	15	11	134	-	-	128	-	-	25
Other crops	41	2	3	98	-	-	40	-	-	76
All tillage	72	3	5	106	49	105	75	2	6	497
Grass less than five years old	34	1	3	105	-	112	36	-	4	210
Grass five years and over	18	0	0	84	-	-	15	-	-	367
All grass	22	0	1	92	116	103	20	0	1	577
All crops and grass	40	1	3	101	58	105	40	1	3	1074

Source: British Survey of Fertiliser Practice 2019

Table SC1.3 Use of compound fertiliser, Scotland 2019

	Crop area receiving dressing (%)				Average field rate (kg/ha)				Overall application rate (kg/ha)				Fields in sample
	N	P_2O_5	K_2O	SO_3	N	P_2O_5	K_2O	SO_3	N	P_2O_5	K_2O	SO_3	
Winter wheat	35	77	77	28	42	61	80	35	15	47	62	10	86
Spring barley	91	92	90	42	51	49	64	28	46	45	58	12	193
Winter barley	43	73	71	22	43	59	71	38	18	43	51	8	62
Oats	49	50	48	20	51	49	67	17	25	25	32	3	47
Potatoes	100	100	49	17	111	117	204	-	111	117	101	-	8
Winter oilseed rape	46	64	62	26	34	55	61	17	16	35	38	4	25
Other crops	40	56	57	10	68	40	68	24	27	23	38	2	76
All tillage	66	80	78	32	51	53	70	29	34	43	54	9	497
Grass less than five years old	74	70	73	25	94	28	44	33	70	19	32	8	210
Grass five years and over	55	54	55	13	73	19	26	25	40	10	14	3	367
All grass	59	58	59	16	79	21	31	28	47	12	18	4	577
All crops and grass	62	66	66	22	69	35	47	29	42	23	31	6	1074

Source: British Survey of Fertiliser Practice 2019

Table SC1.4 Use of lime, Scotland 2019

	Crop area receiving dressing (%)						Average application rate (tonnes of product/ha)							
	Limestone (ground, screened)	Chalk	Magnesian limestone	Sugar beet lime	Other	All	Limestone (ground, screened)	Chalk	Magnesian limestone	Sugar beet lime	Other	All	Fields limed	Fields in sample
Winter wheat	6.8	-	9.0	-	1.0	16.7	5.0	-	4.8	-	0.3	4.6	11	86
Spring barley	9.9	-	3.9	-	3.6	17.4	4.5	-	5.1	-	2.1	4.1	40	193
Winter barley	10.3	-	5.9	-	11.4	27.6	5.7	-	6.9	-	0.2	3.7	14	62
Oats	8.9	-	1.9	-	-	10.8	5.0	-	4.8	-	-	5.0	7	47
Potatoes	-	-	-	-	-	-	-	-	-	-	-	-	0	8
Winter oilseed rape	2.2	-	17.1	-	8.0	27.3	10.0	-	5.2	-	1.4	4.4	6	25
Other crops	3.8	-	-	-	5.2	9.1	4.9	-	-	-	0.3	2.2	11	76
All tillage	8.2	-	5.2	-	3.8	17.2	4.8	-	5.2	-	1.2	4.1	89	497
Grass less than five years old	7.7	-	1.2	-	1.2	10.1	4.0	-	5.0	-	3.0	4.0	31	210
Grass five years and over	3.4	-	0.5	0.1	1.0	5.0	4.5	-	3.5	5.0	4.2	4.3	39	367
All grass	4.4	-	0.6	0.1	1.0	6.2	4.3	-	4.2	5.0	3.9	4.2	70	577
All crops and grass	5.8	-	2.3	0.1	2.0	10.1	4.6	-	5.0	5.0	2.1	4.2	159	1074

Source: British Survey of Fertiliser Practice 2019

Table SC1.5 Percentage of crop area by field application rate - Nitrogen, Scotland 2019

	kg/ha																	Fields in
row %	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	sample
Winter wheat	4	2	1	5	5	8	3	32	18	15	7	-	-	-	-	-	-	-	86
Spring barley	2	4	8	17	25	31	11	2	-	-	-	-	-	-	-	-	-	-	193
Winter barley	1	0	2	5	6	6	23	20	34	3	-	-	-	-	-	-	-	-	62
Oats	20	9	3	14	18	21	15	1	-	-	-	-	-	-	-	-	-	-	47
Potatoes	0	3	0	19	0	0	36	5	37	-	-	-	-	-	-	-	-	-	8
Winter oilseed rape	0	0	6	10	15	16	0	18	14	10	12	-	-	-	-	-	-	-	25
Other crops	32	1	10	4	16	24	11	3	-	-	-	-	-	-	-	-	-	-	76
All tillage	6	3	6	12	17	21	10	10	8	4	2	-	-	-	-	-	-	-	497
Grass less than five years old	10	3	7	16	15	10	10	10	10	5	2	0	2	-	-	-	-	-	210
Grass five years and over	32	2	16	21	8	9	3	4	2	1	0	1	-	-	-	-	-	-	367
All grass	27	3	14	20	10	9	5	6	4	2	0	1	1	-	-	-	-	-	577
All crops and grass	19	3	11	17	12	13	7	7	5	3	1	-	-	-	-	-	-	-	1074

Source: British Survey of Fertiliser Practice 2019

Table SC1.6 Percentage of crop area by field application rate - Phosphate, Scotland 2019

	kg/ha																	Fields in
row %	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	sample
Winter wheat	20	2	26	31	11	10	-	-	-	-	-	-	-	-	-	-	-	-	86
Spring barley	7	14	34	38	7	-	-	-	-	-	-	-	-	-	-	-	-	-	193
Winter barley	24	6	23	29	14	2	0	0	0	2	-	-	-	-	-	-	-	-	62
Oats	39	9	21	18	11	3	-	-	-	-	-	-	-	-	-	-	-	-	47
Potatoes	0	0	11	0	5	32	36	16	-	-	-	-	-	-	-	-	-	-	8
Winter oilseed rape	21	8	26	21	24	-	-	-	-	-	-	-	-	-	-	-	-	-	25
Other crops	42	19	24	5	8	2	-	-	-	-	-	-	-	-	-	-	-	-	76
All tillage	17	11	29	30	9	3	1	-	-	-	-	-	-	-	-	-	-	-	497
Grass less than five years old	29	34	30	3	3	1	-	-	-	-	-	-	-	-	-	-	-	-	210
Grass five years and over	46	40	11	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	367
All grass	42	39	15	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	577
All crops and grass	33	29	20	12	4	1	-	-	-	-	-	-	-	-	-	-	-	-	1074

Source: British Survey of Fertiliser Practice 2019

NB: Outliers can be observed in these tables where dressings have been made as part of a rotational manuring policy.

Table SC1.7 Percentage of crop area by field application rate - Potash, Scotland 2019

	kg/ha																		Fields in
row %	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	sample
Winter wheat	19	2	9	17	26	20	5	1	-	-	-	-	-	-	-	-	-	-	86
Spring barley	7	7	19	34	26	6	-	-	-	-	-	-	-	-	-	-	-	-	193
Winter barley	27	6	7	22	18	19	2	-	-	-	-	-	-	-	-	-	-	-	62
Oats	40	7	16	12	20	4	-	-	-	-	-	-	-	-	-	-	-	-	47
Potatoes	7	0	3	0	0	0	0	16	0	36	0	0	0	5	0	0	32	-	8
Winter oilseed rape	27	6	20	29	10	8	1	-	-	-	-	-	-	-	-	-	-	-	25
Other crops	40	15	6	17	13	1	5	0	0	0	0	0	2	2	-	-	-	-	76
All tillage	17	7	14	26	23	10	2	0	0	1	-	-	-	-	-	-	-	-	497
Grass less than five years old	24	26	21	13	9	3	1	3	-	-	-	-	-	-	-	-	-	-	210
Grass five years and over	45	33	14	6	1	1	-	-	-	-	-	-	-	-	-	-	-	-	367
All grass	40	31	16	8	3	1	0	1	-	-	-	-	-	-	-	-	-	-	577
All crops and grass	32	23	15	14	10	4	1	1	-	-	-	-	-	-	-	-	-	-	1074

Source: British Survey of Fertiliser Practice 2019

Table SC1.8 Percentage of crop area by field application rate - Sulphur, Scotland 2019

	kg/ha																		Fields in
row %	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	sample
Winter wheat	31	9	17	31	5	2	5	-	-	-	-	-	-	-	-	-	-	-	86
Spring barley	43	32	16	7	3	-	-	-	-	-	-	-	-	-	-	-	-	-	193
Winter barley	29	2	37	18	10	2	2	-	-	-	-	-	-	-	-	-	-	-	62
Oats	64	17	5	9	2	2	-	-	-	-	-	-	-	-	-	-	-	-	47
Potatoes	83	0	0	12	5	-	-	-	-	-	-	-	-	-	-	-	-	-	8
Winter oilseed rape	27	13	23	11	21	5	-	-	-	-	-	-	-	-	-	-	-	-	25
Other crops	66	8	17	5	0	0	5	-	-	-	-	-	-	-	-	-	-	-	76
All tillage	42	20	17	13	4	1	2	-	-	-	-	-	-	-	-	-	-	-	497
Grass less than five years old	66	12	18	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	210
Grass five years and over	85	8	6	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	367
All grass	80	9	9	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	577
All crops and grass	67	13	12	5	2	1	1	-	-	-	-	-	-	-	-	-	-	-	1074

Source: British Survey of Fertiliser Practice 2019

NB: Outliers can be observed in these tables where dressings have been made as part of a rotational manuring policy.

Table SC2.1 Average fertiliser practice by grassland utilisation, Scotland 2019

	Crop area receiving dressing (%)					Average field rate (kg/ha)				Overall application rate (kg/ha)				Fields in sample
	N	P_2O_5	K_2O	SO_3	FYM	N	P_2O_5	K_2O	SO_3	N	P_2O_5	K_2O	SO_3	
Grazed not mown	64	49	50	13	21	68	16	20	22	43	8	10	3	319
Grazed mown	93	76	81	33	60	126	30	48	37	117	22	39	12	236
All grazings	73	58	60	19	34	91	22	32	31	67	12	19	6	555
Cut for silage - grazed	92	75	81	35	63	130	30	50	38	120	23	41	13	204
Cut for silage - not grazed	100	74	88	43	47	117	30	50	-	117	22	44	-	11
All cut for silage	93	75	81	35	63	130	30	50	37	120	23	41	13	215
Cut for hay - grazed	99	86	86	15	30	82	20	30	28	81	18	26	4	33
Cut for hay - not grazed	-	-	-	-	-	-	-	-	-	-	-	-	-	4
All cut for hay	97	86	86	17	31	84	24	33	45	81	21	28	8	37
All mowings	93	76	81	34	60	126	30	49	38	117	23	40	13	251
All grass	73	58	60	20	34	92	22	33	31	67	13	20	6	577

Source: British Survey of Fertiliser Practice 2019

Table SC2.2 Percentage of grass area by field application rate - Nitrogen, Scotland 2019

	kg/ha																		Fields in
row %	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	sample
Grazed not mown	36	4	19	23	7	4	2	3	1	-	-	-	-	-	-	-	-	-	319
Grazed mown	7	0	4	14	14	19	11	11	9	6	1	2	2	-	-	-	-	-	236
All grazings	27	3	14	20	10	9	5	5	4	2	0	1	1	-	-	-	-	-	555
Cut for silage - grazed	8	0	4	12	14	19	11	11	10	6	1	2	2	-	-	-	-	-	204
Cut for silage - not grazed	0	0	0	8	40	15	0	34	0	2	-	-	-	-	-	-	-	-	11
All cut for silage	7	0	3	12	14	19	11	12	10	6	1	2	2	-	-	-	-	-	215
Cut for hay - grazed	1	0	12	30	21	23	10	3	-	-	-	-	-	-	-	-	-	-	33
Cut for hay - not grazed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
All cut for hay	3	0	11	27	23	21	13	3	-	-	-	-	-	-	-	-	-	-	37
All mowings	7	0	4	14	15	19	11	11	9	6	1	2	1	-	-	-	-	-	251
All grass	27	3	14	20	10	9	5	6	4	2	0	1	1	-	-	-	-	-	577

Source: British Survey of Fertiliser Practice 2019

Table SC2.3 Percentage of grass area by field application rate - Phosphate, Scotland 2019

	kg/ha																		Fields in
row %	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	sample
Grazed not mown	51	42	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	319
Grazed mown	24	32	35	5	3	-	-	-	-	-	-	-	-	-	-	-	-	-	236
All grazings	42	39	15	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	555
Cut for silage - grazed	25	30	36	6	3	-	-	-	-	-	-	-	-	-	-	-	-	-	204
Cut for silage - not grazed	26	43	8	19	3	-	-	-	-	-	-	-	-	-	-	-	-	-	11
All cut for silage	25	30	36	6	3	-	-	-	-	-	-	-	-	-	-	-	-	-	215
Cut for hay - grazed	14	63	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33
Cut for hay - not grazed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
All cut for hay	14	57	25	0	3	-	-	-	-	-	-	-	-	-	-	-	-	-	37
All mowings	24	32	35	6	3	-	-	-	-	-	-	-	-	-	-	-	-	-	251
All grass	42	39	15	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	577

Source: British Survey of Fertiliser Practice 2019

Table SC2.4 Percentage of grass area by field application rate - Potash, Scotland 2019

	kg/ha																		Fields in
row %	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	sample
Grazed not mown	50	36	11	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	319
Grazed mown	19	21	26	20	7	4	1	2	-	-	-	-	-	-	-	-	-	-	236
All grazings	40	32	16	7	3	1	0	1	-	-	-	-	-	-	-	-	-	-	555
Cut for silage - grazed	19	19	26	20	8	4	1	2	-	-	-	-	-	-	-	-	-	-	204
Cut for silage - not grazed	12	28	8	32	17	2	-	-	-	-	-	-	-	-	-	-	-	-	11
All cut for silage	19	19	26	20	8	4	1	2	-	-	-	-	-	-	-	-	-	-	215
Cut for hay - grazed	14	47	20	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33
Cut for hay - not grazed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
All cut for hay	14	43	22	18	3	-	-	-	-	-	-	-	-	-	-	-	-	-	37
All mowings	19	21	25	20	8	4	1	2	-	-	-	-	-	-	-	-	-	-	251
All grass	40	31	16	8	3	1	0	1	-	-	-	-	-	-	-	-	-	-	577

Source: British Survey of Fertiliser Practice 2019

Table SC2.5 Percentage of grass area by field application rate - Sulphur, Scotland 2019

	kg/ha																		Fields in
row %	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	sample
Grazed not mown	87	8	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	319
Grazed mown	67	11	18	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	236
All grazings	81	9	9	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	555
Cut for silage - grazed	65	11	19	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	204
Cut for silage - not grazed	57	25	15	0	2	-	-	-	-	-	-	-	-	-	-	-	-	-	11
All cut for silage	65	12	19	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	215
Cut for hay - grazed	85	6	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33
Cut for hay - not grazed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
All cut for hay	83	6	8	0	0	3	-	-	-	-	-	-	-	-	-	-	-	-	37
All mowings	66	11	18	2	2	1	-	-	-	-	-	-	-	-	-	-	-	-	251
All grass	80	9	9	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	577

Source: British Survey of Fertiliser Practice 2019

Table SC3.0 Product use by month of application, Scotland 2019

(a) Product use

row %	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Straight N	1	0	0	0	0	7	17	44	22	5	2	1
Straight P	8	3	0	0	0	0	30	29	10	0	0	21
Straight K	0	0	0	0	0	9	8	67	11	5	1	0
Compounds	3	4	0	0	0	1	14	44	17	9	5	3
All fertilisers	2	3	0	0	0	3	15	45	19	7	4	2

(b) Nutrient use

row %	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Nitrogen	1	1	0	0	0	3	15	46	22	8	4	1
Phosphate	7	7	1	0	0	2	17	43	11	4	3	5
Potash	6	7	1	0	0	2	15	46	11	6	3	3
Sulphur	1	1	0	0	0	9	23	45	14	5	2	1
Total	3	3	0	0	0	3	16	45	17	7	4	2

Note: All fertilisers includes other straight fertilisers (e.g. trace elements)

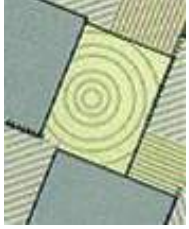
'Product' refers to the total tonnage of the products used by the farmers in the survey year 2019.

'Nutrient' 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 (straight N) contains typically 34.5 kg of N).

Estimates of total nutrients are shown in Section B, Table B2.6.

Source: British Survey of Fertiliser Practice 2019



SECTION D

USE OF ORGANIC MANURES – GREAT BRITAIN, 2019

Introduction

Whilst the British Survey of Fertiliser Practice has focussed historically on the application of manufactured fertilisers, in the last 12 years it has also collected increasingly detailed information on the use of organic manures. In previous years, farmers were asked where their manure applications fell within pre-specified 'high', 'medium' and 'low' ranges. From 2007, and to better quantify the organic manure data, farmers were asked to provide a specific rate of application which could then be weighted in the same way as the manufactured fertiliser data to deliver a national picture of organic manure usage. However, it should be remembered that the underlying sample design is constructed to measure manufactured fertiliser usage and may not represent the population of farmers using organic manures as robustly.

D1 FARMS HANDLING ORGANIC MANURES

Organic manures applied to agricultural land may be produced on farm by livestock as slurries, farmyard manure (FYM) and poultry manures, or imported from other sources such as treated sewage sludges (also called bio-solids) and some industrial 'wastes' such as compost, paper waste or brewery effluent.

Of the 1327 farms in the survey 951 used organic manures on at least one field on the farm. Once the data are weighted to reflect the population of farms this equates to 67%. The details are shown in Table D1.1a.

Table D1.1a Numbers and percentage (%) of farms using each type of manure in Great Britain, 2019

	none	*cattle FYM*	*cattle slurry*	*pig FYM*	*pig slurry*	*layer manure*	*broiler/ turkey litter*	*other FYM*	*other farm*	*bio-solids*	*other non-farm*	*total with manure*
Farms in sample	376	704	255	39	12	28	43	78	3	52	43	951
Farms in population	28,707	43,595	14,968	1,596	378	1,144	1,827	5,429	92	1,899	2,021	57,818
Farms in population %	33%	50%	17%	2%	0%	1%	2%	6%	0%	2%	2%	67%
Volume (Mt; Mm^3)	n/a	38.3	44.1	2.1	0.5	0.8	0.7	1.9	1.0	2.8	4.5	96.7
Volume %	n/a	40%	46%	2%	1%	1%	1%	2%	1%	3%	5%	100%

Note: some farmers may use more than one type of manure. Mt; Mm^3 are Million tonnes and cubic metres.

Table D1.1b Percentage (%) of farms using each type of manure in Great Britain, 2015 – 2019

	none	*cattle FYM*	*cattle slurry*	*pig FYM*	*pig slurry*	*layer manure*	*broiler/ turkey litter*	*other FYM*	*other*
2015	35	50	16	1	1	2	2	6	3
2016	35	51	16	2	1	2	2	6	4
2017	37	47	16	2	1	1	1	5	4
2018	32	51	17	2	0	1	2	7	4
2019	33	50	17	2	0	1	2	6	4

Cattle manure from beef and dairy farms is by far the largest volume of manure type generated in Great Britain. The percentage of farms using cattle FYM and cattle slurry has been reasonably consistent over the last 5 years with use in 2019 being 50% and 17% of farms, respectively.

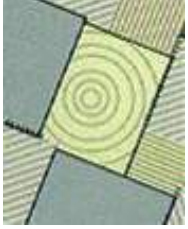


Table D1.1c Dressing cover of organic manure in Great Britain, 2015 - 2019

	all tillage	*grass 5 years and over*	*grass under 5 years old*
2015	23	29	53
2016	23	31	48
2017	25	31	46
2018	27	33	52
2019	26	35	47

Dressing covers of organic manure on tillage appear to have increased slightly in the past few years from 23% in 2015 to 26% in 2019. The proportion of grass receiving a dressing of manure is higher for both categories, at 35% of grass 5 years and over and 47% on grass under 5 years old in 2019.

Not all the manure generated by a farm is necessarily retained for use by that farm and excess manure/slurry can be exported for use elsewhere.

The number and percentage of farms using each type of slurry application method in Great Britain are shown in Table D1.2. This table takes account of all applications whether they are made by the farmers themselves or contractors. These data serve as a guide only and are calculated as an expression of the number of farms adopting a proportion of each application method, where slurry was applied. The data do not account for the proportion of each farm's total cultivatable area receiving slurry, or any variation in the rate at which slurry may have been applied using different application methods. Notwithstanding these considerations; it is clear that broadcast application remains the most widespread method adopted for both types of slurry.

Table D1.2 Number and percentage (%) of farms using each type of application method by slurry type, Great Britain 2019

			percentage of farms						
	farms in sample	*farms in population*	*broadcast*	*band spread*	*shallow injection*	*deep injection*	*rain gun*	*rotating boom*	*non-broadcast*
Cattle slurry	255	14,968	76	13	8	4	1	0	25
Pig slurry	12	378	31	43	20	0	0	0	63
Grand Total	266	15,291	76	14	8	4	1	0	26

Note: some farms may apply both types of slurry. Grass fields have been excluded from this table.

Whilst some of these application methods (e.g. shallow injection or deep injection) apply slurry below the surface of the field, the majority require secondary cultivation to incorporate the manure/slurry into the soil. Assessment of how often organic manures are incorporated into the soil is complicated by the fact that some farmers make more than one application or apply more than one type of manure and may incorporate each of these differently. As manure on grass fields is seldom incorporated (unless they are destined for re-seeding), grass fields have been excluded from the incorporation analysis.

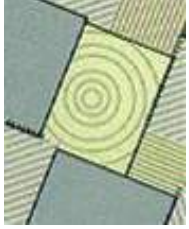


Table D1.3 gives estimates of the volume and area of manure/slurry incorporation on tillage fields by manure type and immediacy of incorporation. Farmyard manure is the most extensively incorporated at 95% of the volume with 81% of it incorporated within a week of spreading on tillage fields. Cattle slurry makes up 99% of all slurry volume (Table D2.3a) and 89% of cattle slurry was applied to grassland. This helps to explain why cattle slurry is less likely to be incorporated at 17% of the volume (Table D1.3). Data on pig slurry need to be treated with caution due to the relatively low number of farms using manure of this type. Table D2.3a suggests that pig slurry was only applied to arable land, specifically winter sown crops, often using band spreading or shallow injection (Table D1.2).

Table D1.3 Percentage (%) of organic manure incorporated (volume and area) on tillage fields by incorporation time and manure/slurry type, Great Britain 2019

	incorporation time after spreading										*total*	
	not incorporated		*within 6 hours*		*between 6 and 24 hours*		*between 1 and 7 days*		*more than 1 week*		*applied area*	*volume applied*
	%area	*%vol*	*%area*	*%vol*	*%area*	*%vol*	*%area*	*%vol*	*%area*	*%vol*	*'000 ha*	*'Mt; Mm³*
FYM	5	5	7	9	39	40	32	32	16	14	835	18.3
Cattle slurry	19	17	6	7	25	27	42	45	8	4	157	5.0
Pig slurry	27	28	12	7	24	30	9	8	28	28	13	0.5
Poultry FYM	2	2	22	22	28	41	28	23	20	12	140	1.2
Other	22	27	33	29	27	25	15	13	3	6	238	5.6
Total	**10**	**11**	**13**	**13**	**34**	**35**	**30**	**30**	**13**	**11**	**1,382**	**30.6**

Farmers were asked to indicate what proportion of their livestock manures had been spread by a contractor (Table D1.4a). The percentage of farmers using a contractor to spread at least some of their FYM was 30% in 2019. Where contractors were used, they were applying between 87% and 96% of the manure on average.

Table D1.4a Use of contractors to spread manure/slurry in current season, Great Britain 2019

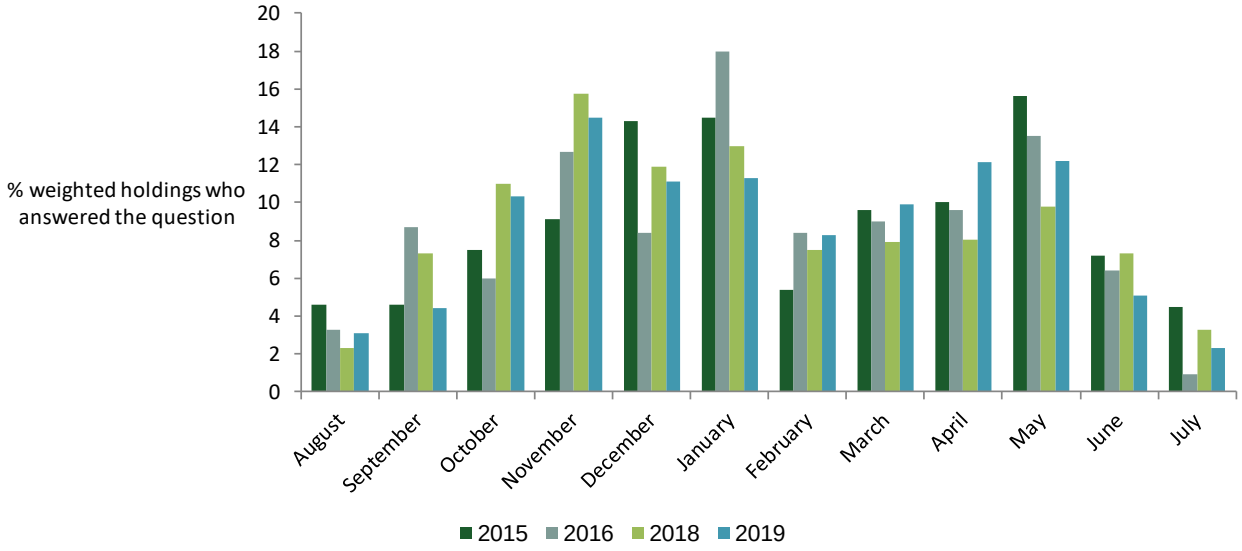
	% of farms using a contractor	*% volume applied by contractor*	*average % of contractor-applied manure, where contractor is used*
FYM	36	30	89
Cattle slurry	26	21	87
Other	47	56	96
Total	**30**	**29**	**90**

Use of contractors to spread manures is fairly consistent over the 5-year period 2015-2019, on 30-34% of farms (Table 1.4b), as was the average amount spread, at 83-92%.

Table D1.4b Use of contractors to spread manure/slurry, Great Britain 2015 - 2019

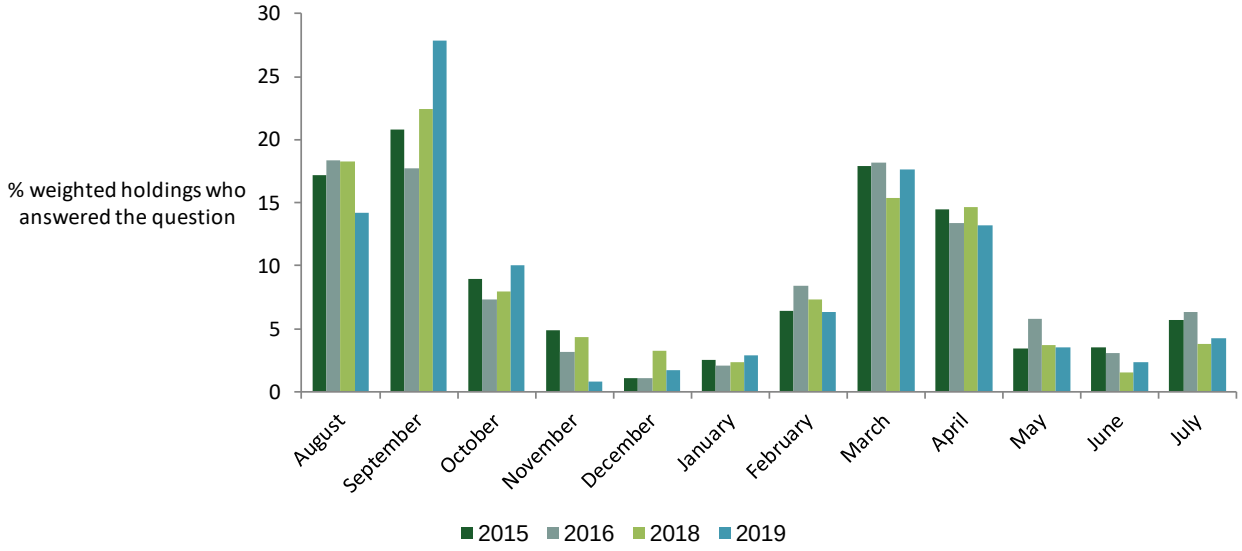
	% of farms using a contractor	*% volume applied by contractor*	*average % of contractor-applied manure, where contractor is used*
2015	34	33	89
2016	34	32	83
2017	33	30	92
2018	30	30	90
2019	30	29	90

Figure D1.5a Temporary field heaps of manure, month of establishment, Great Britain 2015 - 2016, and 2018 - 2019



In the 2015, 2016, 2018 and 2019 surveys, farmers were asked when they established temporary heaps of solid manure in their fields (Figure D1.5a) and the month in which they subsequently spread most of the manure (Figure D1.5b). The peak months for establishment across the four years were November, January and May with around 15% farms creating them at each of these timings. In 2019, the peak months for establishment were November and May with 15% and 12% of farms, respectively. In all four survey years, the peaks for spreading the manure were August, September and March, with more than 50% of farms spreading most manure during these months. This pattern reflects the practice of applying a dressing of manure before establishing winter or spring sown tillage crops.

Figure D1.5b Temporary field heaps of manure, month most spread, Great Britain 2015 - 2016 and 2018 - 2019



Note – Historical data collected in the 2015, 2016 and 2018 BSFP Surveys

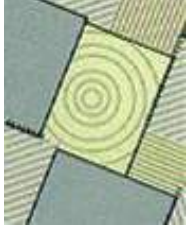
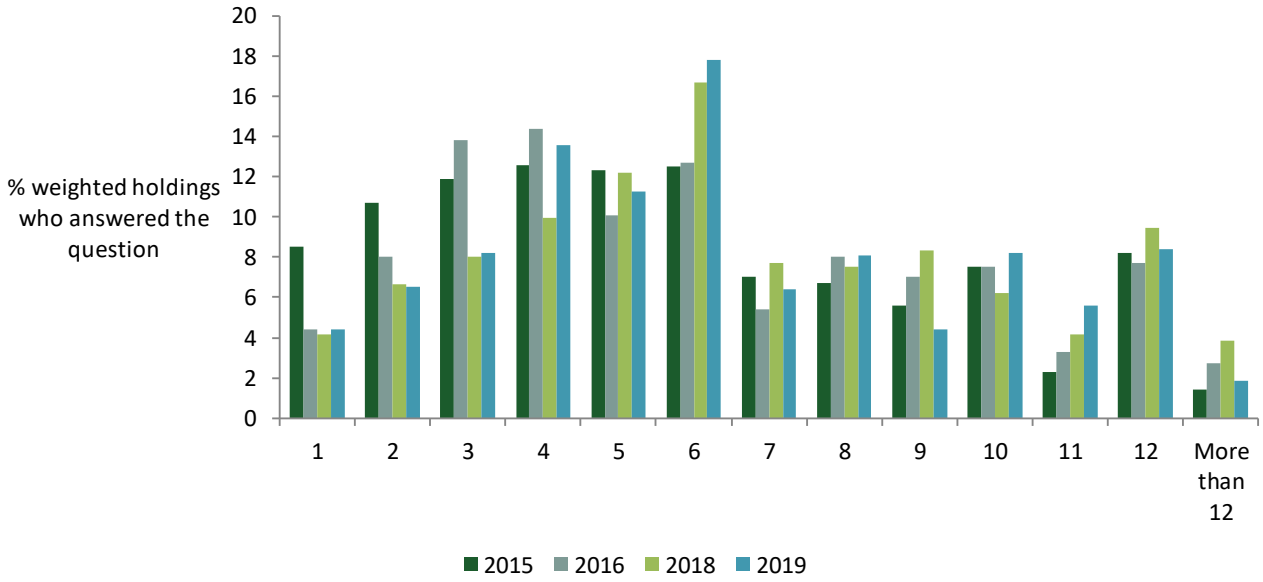


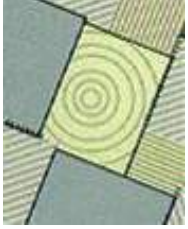
Figure D1.5c Temporary field heaps of manure, duration of storage in months, Great Britain 2015 - 2016 and 2018 - 2019



Note – Historical data collected in the 2015 and 2016 BSFP Surveys

Farmers were also asked on average the duration in months that manure was stored in this way (Figure D1.5c). Storage for 3-6 months accounted for the practice on 47-51% of farms across the four years surveyed. When all types of manure are considered, in three of the four years only 10% of farms were storing for 12 months or more, and 13% of farms in 2018. The recommendation from the Food Standards Agency (FSA) is that manure should be stacked for 8 weeks to reduce the risk of spreading antibiotic-resistant bacteria[9]. Where manure is to be applied to land before growing ready-to-eat crops such as salad leaves, the FSA recommend that manure should be stored for at least 6 months prior to use to kill microbial pathogens, with no fresh additions being made to the store during this period.

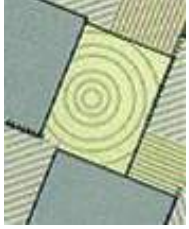
[9] Guidance on the handling of slurry and manure to help reduce the spread of antibiotic resistance can be found at the following link: https://www.gov.uk/guidance/handling-of-manure-and-slurry-to-reduce-antibiotic-resistance



D2 USE OF ORGANIC MANURES

Recent and current fertiliser recommendations are consistent in their advice to farmers to take note of the nutrient contributions from manures when calculating fertiliser input requirements. When making comparisons of the data presented in this report several factors should be considered:

- the extent to which individual farmers have accounted for the nutrients in the manures cannot be judged from these data,
- the data presented for 'with/without' manure are not a paired comparison of otherwise identical fields,
- fields which have not received manures may be on farms which have no manure and are thus managed in a different way,
- in grassland systems, fields which have not received manures may be managed differently (e.g. grazed only) compared with manured fields which may be cut more than once as well as grazed,
- for tillage crops, the overall fertiliser rate means that some fields are included which have received no fertiliser. For the 'with manure' data, it may indicate that the manure was judged to supply all the fertiliser required,
- for grassland, the average fertiliser rate has been used to avoid distorting the data by inclusion of 'unmanaged' grass, which receives no fertiliser, although this has the effect of excluding any fields on which no fertiliser was applied because the manure was considered sufficient, thus obscuring a substitution effect,
- the dataset of fields where manures are used includes fields which may have received only a very small amount of manure (see section D3). On those fields receiving large dressings, there may be a greater adjustment in mineral fertiliser,
- where reductions in phosphate and potash fertiliser have not been made, this may indicate a desire to build up soil reserves of these nutrients.



The proportion of the sown area, of all crops, receiving each of the main types of manure is shown in Table D2.1a, with cattle FYM and cattle slurry being the most extensively applied manures.

Table D2.1a Percentage (%) of sown area receiving each organic manure type, Great Britain 2015 - 2019

	cattle FYM	*cattle slurry*	*pig FYM*	*pig slurry*	*layer hen manure*	*broiler/ turkey litter*	*other FYM*	*other farm*	*bio-solids*	*other non-farm*
2015	14	8	0.8	0.4	1.2	0.8	1.3	0.2	0.9	0.6
2016	16	8	0.7	0.4	0.8	0.9	1.1	0.2	0.8	0.5
2017	16	8	0.7	0.4	0.7	0.6	0.8	0.3	1.3	0.6
2018	17	9	0.6	0.2	0.6	0.7	1.4	0.1	1.2	1.3
2019	17	9	0.9	0.1	0.7	1.0	1.3	0.1	1.2	1.3

Note: some areas may receive more than one type of manure

Table D2.1b Percentage (%) distribution of each organic manure type on manured sown area, Great Britain 2015 – 2019

	cattle FYM	*cattle slurry*	*pig FYM*	*pig slurry*	*layer hen manure*	*broiler/ turkey litter*	*other FYM*	*other farm*	*bio-solids*	*other non-farm*
2015	53	30	2.8	1.4	4.3	3.0	4.9	0.9	3.3	2.3
2016	57	30	2.4	1.6	3.0	3.2	3.9	0.7	3.0	1.8
2017	57	30	2.5	1.6	2.4	2.1	3.0	1.0	4.7	2.2
2018	57	30	2.1	0.6	2.0	2.2	4.6	0.4	4.0	4.3
2019	57	29	2.9	0.4	2.3	3.5	4.4	0.2	4.1	4.5

Note: some areas may receive more than one type of manure

The percentage of the sown area receiving an application of cattle FYM in 2019 was 17%, which is slightly above the five-year average (16%). Cattle FYM and cattle slurry were applied to 86% of the sown area receiving organic manure in 2019 (Table D2.1b).

The levels of nutrient in organic manures vary according to which type of manure is being applied as well as factors such as the size, age, gender, and market for the animals being farmed. Furthermore, the concentration of nutrients is dependent on the proportion of bedding, the length of time that the manure has been stored and, in the case of slurries particularly, diluting factors such as rainwater or dirty water which affect the proportion of dry matter. The British Survey of Fertiliser Practice does not ask detailed questions on the animals producing manures or the nutrient analysis of any organic applications made, but it is possible to use typical values for different manure types to estimate the likely nutrient levels delivered. Details of these values are given in Table D2.2.

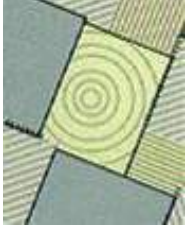


Table D2.2 Typical dry matter and nutrient content of different organic manure types[10]

	dry matter (%)	*total N (kg/t; kg/m³)*	*total P_2O_5 (kg/t; kg/m³)*	*total K_2O (kg/t; kg/m³)*
Cattle FYM	25	6.0	3.2	9.4
Pig FYM	25	7.0	6.0	8.0
Sheep FYM	25	7.0	3.2	8.0
Duck FYM	25	6.5	5.5	7.5
Layer hen manure	40	19.0	12.0	15.0
Poultry litter	60	28.0	17.0	21.0
Cattle slurry	6	2.6	1.2	2.5
Pig slurry	4	3.6	1.5	2.2
Biosolids: Digested cake	25	11.0	11.0	0.6
Biosolids: Thermally dried	95	40.0	55.0	2.0
Biosolids: Lime stabilised	25	8.5	7.0	0.8
Biosolids: Composted	40	11.0	10.0	3.0
Compost-green	60	7.5	3.0	6.8
Compost-green/food	60	11.0	4.9	8.0

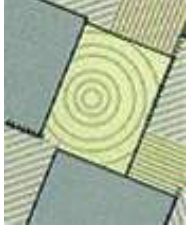
In Table D2.3, crops receiving manure applications have been classified as either “winter-sown”, “spring-sown” or “grass” and their average treated areas and manure application rates shown.

Table D2.3a Treated areas and average manure field application rates to winter-sown and spring-sown crops and grassland by manure type, Great Britain 2019

	cattle FYM	*cattle slurry*	*pig FYM*	*pig slurry*	*layer manure*	*broiler/ turkey litter*	*other FYM*	*other farm manure*	*bio-solids*	*other non-farm*
Winter sown										
Treated area %	12.0	1.3	1.7	0.3	0.8	2.3	0.6	-	3.2	2.3
Treated area (ha)	356,124	38,073	51,224	9,887	23,766	67,517	18,142	-	96,109	66,954
Avg manure rate (t; m^3/ha)	22	27	25	36	10	6	20	-	22	27
Volume (Mt; Mm^3)	7.8	1.0	1.3	0.4	0.2	0.4	0.4	-	2.1	1.8
Fields in sample	362	41	37	14	17	45	19	0	57	46
Spring sown										
Treated area %	23.4	7.6	2.2	0.1	1.8	1.2	0.8	-	2.1	2.7
Treated area (ha)	360,674	116,960	34,406	935	27,687	18,917	12,063	-	32,563	41,451
Avg manure rate (t; m^3/ha)	22	34	22	26	15	6	19	-	21	24
Volume (Mt; Mm^3)	7.8	3.9	0.8	0.0	0.4	0.1	0.2	-	0.7	1.0
Fields in sample	396	95	36	6	21	16	19	0	22	36
Grass										
Treated area %	25.9	24.8	0.2	0.0	0.4	0.5	2.1	0.4	-	1.4
Treated area (ha)	1,426,552	1,363,997	8,494	1,166	22,806	26,972	116,778	22,612	-	76,320
Avg manure rate (t; m^3/ha)	16	29	3	32	7	5	11	43	-	22
Volume (Mt; Mm^3)	22.6	39.0	0.0	0.0	0.2	0.1	1.3	1.0	-	1.7
Fields in sample	681	508	5	9	12	16	74	5	3	26

Note: This table excludes crops that cannot be classified as either winter- or spring-sown, such as permanent crops.

[10]Anon. (2018). Nutrient Management Guide (RB209). Agriculture and Horticulture Development Board (AHDB). https://ahdb.org.uk/nutrient-management-guide-rb209



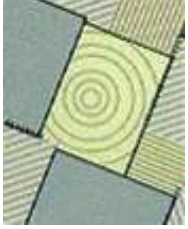
The majority of cattle manure and slurry applications were made to grassland, reflecting the practice of utilising the manure within the farm on which it is produced. Conversely, non-farm manures such as biosolids appear to be favoured on winter-sown tillage land. The profile of the % treated area and average manure rates are broadly similar to those reported for 2018.

Table D2.3b Cattle FYM treated areas and average manure field application rates to winter-sown and spring-sown crops and grassland by farm type, Great Britain 2019

Cattle FYM	*Cereals*	*Dairy*	*General cropping*	*Mixed*	*Other livestock*	*All farm types*
Winter sown						
Treated area %	39.2	8.7	13.0	27.4	11.0	100.0
Treated area (ha)	139,603	31,076	46,280	97,738	39,269	356,124
Avg manure rate (t; m^3/ha)	22	21	23	21	20	22
Volume (Mt; Mm^3)	3.1	0.7	1.1	2.1	0.8	7.8
Fields in sample	109	58	29	102	58	362
Spring sown						
Treated area %	16.2	17.3	12.2	31.8	22.2	100.0
Treated area (ha)	58,555	62,392	43,845	114,843	80,147	360,674
Avg manure rate (t; m^3/ha)	19	23	25	20	22	22
Volume (Mt; Mm^3)	1.1	1.4	1.1	2.4	1.7	7.8
Fields in sample	41	87	48	91	127	396
Grass						
Treated area %	0.4	12.9	4.4	6.0	76.3	100.0
Treated area (ha)	6,315	183,924	62,689	85,792	1,087,832	1,426,552
Avg manure rate (t; m^3/ha)	22	15	12	19	16	16
Volume (Mt; Mm^3)	0.1	2.8	0.7	1.6	17.2	22.6
Fields in sample	6	91	23	43	518	681

Note: Only cattle FYM was applied in sufficient volume to warrant reporting by farm type. The treated area percentages may not add to 100% in “All farm types” as pig and poultry farms have been excluded.

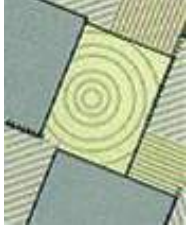
Table D2.3b shows a breakdown of the cattle FYM applications by robust farm type. Cereal farms have the most extensive treatments of cattle FYM on winter sown crops at 39.2% of the treated area. On grass 76.3% of the area treated with cattle FYM is on ‘Other Livestock’ robust classification farms.



The time of year when manure was applied is shown in Table D2.4 as a proportion of fields receiving manure applications. Once again, the crops have been classified as either “winter sown”, “spring sown” or “grass”. This segmentation highlights the prevalence of applications in August and September for winter- sown crops (prior to drilling), or between February and April for spring-sown and grass fields, with treatments in the summer months (May to July) also important for the latter. When comparing percentage values of different manures, it is important to recognise the very different quantities involved, as indicated by the percentages of treated areas at the foot of the table.

Table D2.4 Percentage (%) of each organic manure type applied, by sowing season and timing, Great Britain 2019

	cattle FYM	*cattle slurry*	*pig FYM*	*pig slurry*	*layer manure*	*broiler/ turkey litter*	*other FYM*	*other farm manure*	*bio-solids*	*other non-farm*
Winter sown										
August	2.8	0.3	17	57	12	16	5.8	0.0	22	12
September	12	1.5	30	1.5	20	28	5.7	0.0	42	5.0
October	1.8	0.4	4.7	0.0	0.0	6.6	0.5	0.0	0.0	1.1
Winter (Nov, Dec, Jan)	0.1	0.0	1.6	0.0	0.0	0.0	0.5	0.0	0.0	0.1
Spring (Feb, Mar, Apr)	0.7	0.6	0	24	0.0	1.8	0.0	0.0	7.5	18
Summer (May, Jun, Jul)	0.2	0.0	0.3	0.0	0.0	7.5	0.0	0.0	1.0	4.5
Spring sown										
August	1.1	1.2	0.0	0.7	4.4	0.0	0.3	0.0	1.9	2.2
September	0.5	0.4	0.7	0.0	15	0.0	1.3	0.0	6.1	0.6
October	0.8	0.0	0.3	0.0	0.0	0.0	0.2	0.0	2.7	0.0
Winter (Nov, Dec, Jan)	2.2	0.2	12	0.0	0.0	0.0	0.3	0.0	2.3	4.2
Spring (Feb, Mar, Apr)	11	4.7	23	6.9	17	15	5.8	0.0	9.1	16
Summer (May, Jun, Jul)	0.9	1.5	0.5	0.1	0.3	1.8	0.2	0.0	2.6	0.7
Grass										
August	5.1	5.5	0.4	0.0	0.0	0.5	7.5	0.0	0.0	0.3
September	7.2	1.4	0.0	2.8	10	10	8.9	0.0	0.0	1.9
October	5.9	3.5	0.0	0.0	0.0	3.8	10	0.0	0.5	0.0
Winter (Nov, Dec, Jan)	8.2	7.6	0.0	0.0	8.9	5.7	9.2	0.0	0.0	4.4
Spring (Feb, Mar, Apr)	28	45	8.6	6.0	6.4	3.3	34	51	1.6	20
Summer (May, Jun, Jul)	12	26	0.0	1.0	5.0	0.7	10	49	0.1	10
% of total treated area	49	33	2.2	0.3	1.8	2.7	3.5	0.3	3.1	3.9



D3 FERTILISER VALUE OF ORGANIC MANURES

Organic manures are valuable sources of the major plant nutrients nitrogen, phosphorus and potassium and, where used, applications of manufactured fertiliser can theoretically be reduced[11]. In the survey, farmers were not asked directly whether they had made an adjustment to fertiliser inputs because of manure use. However, an indication of possible adjustments has been derived by comparing fields that received manure with those that did not. Organic fields, which use no mineral fertilisers, have been excluded from these comparisons, since they would distort the influence of manures on mineral application rates. Table D3.1a shows the dressing cover, average field rate and overall fertiliser rates for the main tillage crops in Great Britain, with and without manure inputs.

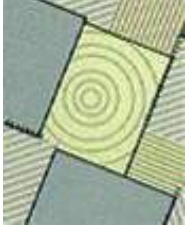
Table D3.1a Dressing cover (%) and application rates (kg/ha) of manufactured fertiliser to tillage crops in Great Britain, with and without applications of organic manure, 2019

	nitrogen		*phosphate*		*potash*		*fields in sample*	
dressing cover (%)	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*
Winter wheat	100	100	23	49	32	51	313	958
Spring barley	98	99	62	65	69	63	218	440
Winter barley	97	99	43	52	48	56	142	377
Potatoes (maincrop)	97	100	89	74	97	83	22	29
Sugar beet	94	95	29	42	46	63	40	54
Winter oilseed rape	99	99	33	57	26	49	102	308

	nitrogen		*phosphate*		*potash*		*fields in sample*	
average field rate (kg/ha)	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*
Winter wheat	170	192	51	58	64	68	313	958
Spring barley	85	102	43	50	55	64	218	440
Winter barley	128	151	47	55	63	70	142	377
Potatoes (maincrop)	163	146	117	107	180	190	22	29
Sugar beet	80	77	41	49	96	84	40	54
Winter oilseed rape	164	187	46	59	47	64	102	308

	nitrogen		*phosphate*		*potash*		*fields in sample*	
overall application rate (kg/ha)	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*
Winter wheat	170	191	12	28	20	34	313	958
Spring barley	83	102	27	32	38	40	218	440
Winter barley	124	150	20	29	30	39	142	377
Potatoes (maincrop)	159	146	104	79	175	158	22	29
Sugar beet	76	74	12	21	45	53	40	54
Winter oilseed rape	162	186	15	34	12	31	102	308

[11]Anon. (2018). Nutrient Management Guide (RB209). Agriculture and Horticulture Development Board (AHDB). https://ahdb.org.uk/nutrient-management-guide-rb209

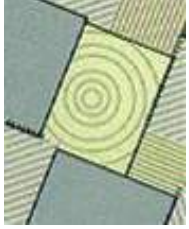


For all the major tillage crops except potatoes and sugar beet, the overall rate of nitrogen from manufactured mineral fertiliser was higher on fields where organic manures were not applied in 2019. The difference in overall application rates of nitrogen ranged from 19 kg/ha for spring barley to 21 kg/ha and 26 kg/ha for winter wheat and winter barley, respectively. The data for potatoes and sugar beet should be treated with caution as these are derived from a small number of fields. The survey does not collect reasons why manufactured fertiliser application rates may vary when used with or without organic manures. It is possible that certain fields are being managed to achieve a desired nutrient status and a strategy of this sort may require unusually high or low applications of specific nutrients. Where only a small number of fields are surveyed, such a strategy may exert an influential bias on the overall figures for a crop in the report.

Table D3.1b Overall application rates (kg/ha) of manufactured fertiliser application to tillage crops in Great Britain, with and without applications of organic manure, 2015 - 2019

	2015		*2016*		*2017*		*2018*		*2019*	
nitrogen (kg/ha)	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*
Winter wheat	179	196	177	193	175	191	170	193	170	191
Spring barley	95	111	93	112	92	106	94	106	83	102
Winter barley	147	148	135	150	128	155	125	149	124	150
Potatoes (maincrop)	126	178	124	140	137	136	141	145	159	146
Sugar beet	92	105	93	100	80	103	83	80	76	74
Winter oilseed rape	174	197	153	187	164	184	174	193	162	186
	2015		*2016*		*2017*		*2018*		*2019*	
phosphate (kg/ha)	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*
Winter wheat	18	32	16	30	15	33	14	30	12	28
Spring barley	30	34	30	34	32	33	32	32	27	32
Winter barley	18	33	19	32	27	31	20	29	20	29
Potatoes (maincrop)	114	111	124	100	127	110	81	110	104	79
Sugar beet	18	30	-	23	11	22	13	21	12	21
Winter oilseed rape	14	33	11	34	20	37	12	32	15	34
	2015		*2016*		*2017*		*2018*		*2019*	
potash (kg/ha)	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*
Winter wheat	31	35	24	35	25	39	19	35	20	34
Spring barley	42	45	46	47	46	43	46	42	38	40
Winter barley	27	45	23	46	39	40	25	37	30	39
Potatoes (maincrop)	163	202	191	182	213	204	212	207	175	158
Sugar beet	66	61	64	42	43	49	36	51	45	53
Winter oilseed rape	24	32	13	33	22	33	15	30	12	31

Differences in overall application rates with and without manures for nitrogen, phosphate and potash for the period 2015 to 2019 are shown in table D3.1b above. The application of higher rates on unmanured fields holds true for nitrogen for all major tillage crops throughout the period. The higher rates are most noticeable for spring barley at 15% on average for the period, with winter oilseed rape at 13%, winter barley at 12% and the differential for winter wheat at 10% over manured fields. Overall rates for phosphate and potash in winter wheat show a similar relationship over the five-year period at 51% and 33%, respectively over manured fields. Other crops show greater variability between manured and unmanured field rates for the different nutrients which may in part be due to the smaller number of fields of each of these crops in the survey causing higher statistical variability.



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

Table D3.2 Average field rates (kg/ha) of manufactured fertiliser application on grassland with and without applications of organic manure by robust type group, Great Britain 2019

	nitrogen (kg/ha)		*phosphate (kg/ha)*		*potash (kg/ha)*		*fields in sample*	
	with manure	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*
Cereals								
Grass under 5 years old *	61	118	-	36	-	51	11	102
Grass 5 years and over *	126	82	-	27	-	39	15	256
All grass	102	94	17	30	18	44	26	358
Dairy								
Grass under 5 years old	152	150	26	31	47	62	120	35
Grass 5 years and over	134	121	23	17	39	24	190	99
All grass	140	128	24	19	41	33	310	134
General cropping								
Grass under 5 years old *	188	96	-	31	-	49	7	78
Grass 5 years and over *	147	77	30	24	32	36	28	121
All grass	155	85	28	27	34	41	35	199
Mixed								
Grass under 5 years old *	156	103	47	32	81	53	33	108
Grass 5 years and over *	110	69	27	21	29	24	49	213
All grass	127	79	33	24	47	32	82	321
Other livestock								
Grass under 5 years old	115	88	25	28	38	34	172	169
Grass 5 years and over	77	65	18	17	24	20	536	637
All grass	84	69	19	19	26	22	708	806
All farm types								
Grass under 5 years old	137	104	27	30	45	44	343	496
Grass 5 years and over	99	73	20	18	27	22	827	1340
All grass	109	80	21	21	31	27	1170	1836

Note: The values in “All farm types” exceed the sum of the components in the table as it also includes pig and poultry farms

* Note small number of fields receiving manures (typically fewer than 16 fields).

As in the previous three years, when looking at all farm types taken together the rates of nitrogen, phosphate and potash fertiliser were usually higher on fields where manures were also used. Mineral fertiliser rates were also consistently higher on short term grass than permanent grassland. The data for certain robust groups, notably cereals, general cropping and mixed farms are derived from relatively few fields, so need to be treated with due caution.

As so many fields on dairy farms receive manure, a separate analysis was carried out to examine the influence of grass management (Table D3.3a). All grazing land also receives manure, it is just that it is not applied as a dressing in our context.

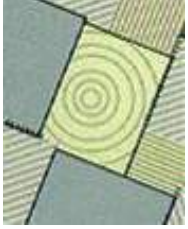


Table D3.3a Average field rates (kg/ha) of manufactured fertiliser application on dairy grassland with and without applications of organic manure, Great Britain 2019

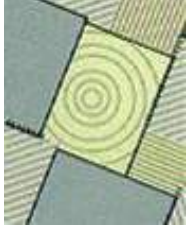
	nitrogen (kg/ha)		*phosphate (kg/ha)*		*potash (kg/ha)*		*fields in sample*	
	with manure	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*
All cut for hay	117	83	-	20	-	24	16	15
All cut for silage	150	156	25	33	46	62	226	27
All grazings	136	120	24	19	42	29	257	126

Application rates of mineral fertilisers are generally higher for grass to be cut for silage. Average field rates on grazed grass are higher on those fields receiving a dressing of manure.

Table D3.3b Average field rates (kg/ha) of manufactured fertiliser application on dairy grassland with and without applications of organic manure, Great Britain 2015 – 2019

all cut for hay	*nitrogen (kg/ha)*		*phosphate (kg/ha)*		*potash (kg/ha)*		*fields in sample*	
	with manure	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*
2015	117	107	34	23	32	24	17	13
2016	106	-	13	-	15	-	15	3
2017	123	89	-	-	-	-	11	11
2018	132	83	33	-	38	-	19	16
2019	117	83	-	20	-	24	16	15
all cut for silage	*nitrogen (kg/ha)*		*phosphate (kg/ha)*		*potash (kg/ha)*		*fields in sample*	
	with manure	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*
2015	157	141	26	29	50	50	246	67
2016	159	170	28	30	54	69	196	51
2017	163	137	24	16	56	32	199	28
2018	153	135	26	20	46	37	201	45
2019	150	156	25	33	46	62	226	27
all grazings	*nitrogen (kg/ha)*		*phosphate (kg/ha)*		*potash (kg/ha)*		*fields in sample*	
	with manure	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*
2015	143	122	25	20	41	30	280	186
2016	150	144	27	25	44	41	245	135
2017	155	136	24	19	46	25	211	122
2018	138	111	24	19	37	22	230	162
2019	136	120	24	19	42	29	257	126

Over the 5-year period 2015-19, mineral fertiliser application rates whilst variable are higher for grass cut for silage than any other grass management system. Data for grass cut for hay should be treated with caution as the number of fields managed this way is low. It is notable that the average field rates for phosphate and potash on unmanured fields of grass cut for silage have recovered from the relatively low rates recorded in 2016 and 2017.



SECTION E

SPREADING PRECISION, RECORD KEEPING, SOIL TESTING AND CATTLE HOUSING

Farmers were asked a series of questions about the care taken in application of fertilisers and manures and in record keeping. The results are presented in this section.

In 2019, 43% of farmers, who were using a spreader, indicated they check the accuracy of mineral fertiliser spreaders by using catch trays on an annual basis (Table E1.1). Farmers checking more frequently than this total 5%, checking at each change of fertiliser. Sixteen percent of farmers never check their spreaders for accuracy and a further 5% of farmers considered that spreader accuracy did not need to be checked.

Table E1.1 **Frequency of spread pattern checks using catch trays, percentage (%) of those farms with a spreader, Great Britain 2015 – 2019**

	No spreader	*It is factory set & doesn't need checking*	*At each change of fertiliser type*	*Less than once a year*	*Once a year*	*Never checked*	*Contract applied*	*Other*
2015	12	9	4	12	37	24	13	1
2016	14	8	5	14	36	22	14	1
2017	13	6	6	14	38	23	13	1
2018	13	5	4	18	40	20	11	1
2019	13	5	5	15	43	16	14	1

Practices of checking are generally consistent over the five-year period 2015-2019, but there is an indication that more farmers are checking their spreaders once a year. Contractors were used on 13% of farms on average over this time.

Table E1.2a **Record keeping methods for fertiliser and manure applications on farms where each respective nutrient type was applied during the 2018/19 crop year, Great Britain 2019**

	manufactured fertilisers				*organic manures*			
	farms	*farms %*	*area (ha)*	*area %*	*farms*	*farms %*	*area (ha)*	*area %*
Computer program	19,402	28.7	3,728,187	42.2	10,887	19.8	2,353,446	33.9
Farm diary	37,197	54.9	4,515,969	51.2	33,435	60.7	3,951,187	56.9
Farm notebook/pocketbook	11,665	17.2	1,282,656	14.5	9,881	18.0	1,072,643	15.4
File record sheet (file in the office)	13,925	20.6	1,694,777	19.2	10,552	19.2	1,326,522	19.1
Other paper record	1,906	2.8	198,999	2.3	1,573	2.9	190,075	2.7
No records kept	2,639	3.8	173,212	1.9	2,773	4.8	278,434	3.9

Note: more than one method may be used

Farm diaries continue to be the most common method for recording both fertiliser and manure use (Table E1.2a). Computers were used for recording fertiliser applications on 29% of farms, representing 42% in area terms. No records were kept on 4% of farms and this figure falls to 2% when considered on an area basis. Computerised record keeping is slightly less common for organic manures at 20% of farms.

Table E1.2b shows the approach to record keeping on different types of farms. For manufactured fertilisers use of computers is highest on 'cereals' farms at 51%, and lower at 19% on 'dairy' and 11% on 'other livestock' farms, where a higher proportion use farm diaries. Farms of all types favour diaries for recording applications of organic manures. The method of record keeping for 'all farm types' is broadly similar for both manufactured and organic fertilisers.

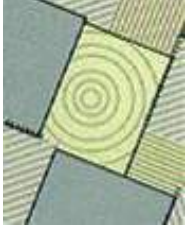


Table E1.2b Record keeping methods for fertiliser and manure applications on farms here each nutrient type was applied during the 2018/19 crop year, by farm type, Great Britain 2019

	manufactured fertilisers		*organic manures*	
Cereals	*farms*	*farms %*	*farms*	*farms %*
Computer program	8,258	50.6	3,323	43.9
Farm diary	6,787	41.6	3,912	51.7
Farm notebook/pocketbook	2,361	14.5	984	13.0
File record sheet (file in the office)	3,963	24.3	1,692	22.4
Other paper record	357	2.2	302	4.0
No records kept	430	2.6	514	6.4
	manufactured fertilisers		*organic manures*	
Dairy	*farms*	*farms %*	*farms*	*farms %*
Computer program	1,262	18.8	1,350	19.1
Farm diary	4,005	59.7	4,478	63.5
Farm notebook/pocketbook	1,663	24.8	1,496	21.2
File record sheet (file in the office)	1,128	16.8	1,038	14.7
Other paper record	96	1.4	96	1.4
No records kept	202	2.9	398	5.3
	manufactured fertilisers		*organic manures*	
General cropping	*farms*	*farms %*	*farms*	*farms %*
Computer program	4,320	45.9	1,807	33.7
Farm diary	4,159	44.2	2,856	53.3
Farm notebook/pocketbook	1,156	12.3	1,028	19.2
File record sheet (file in the office)	2,678	28.5	1,199	22.4
Other paper record	69	0.7	0	0.0
No records kept	271	2.8	42	0.8
	manufactured fertilisers		*organic manures*	
Mixed	*farms*	*farms %*	*farms*	*farms %*
Computer program	2,379	28.0	1,690	21.9
Farm diary	5,011	58.9	4,615	59.7
Farm notebook/pocketbook	1,134	13.3	1,119	14.5
File record sheet (file in the office)	2,148	25.2	2,249	29.1
Other paper record	454	5.3	512	6.6
No records kept	0	0.0	278	3.5
	manufactured fertilisers		*organic manures*	
Other livestock	*farms*	*farms %*	*farms*	*farms %*
Computer program	3,026	11.4	2,560	9.5
Farm diary	17,101	64.5	17,439	64.5
Farm notebook/pocketbook	5,351	20.2	5,254	19.4
File record sheet (file in the office)	3,986	15.0	4,351	16.1
Other paper record	930	3.5	664	2.5
No records kept	1,736	6.1	1,541	5.4
	manufactured fertilisers		*organic manures*	
All farm types	*farms*	*farms %*	*farms*	*farms %*
Computer program	19,402	28.7	10,887	19.8
Farm diary	37,197	54.9	33,435	60.7
Farm notebook/pocketbook	11,665	17.2	9,881	18.0
File record sheet (file in the office)	13,925	20.6	10,552	19.2
Other paper record	1,906	2.8	1,573	2.9
No records kept	2,639	3.8	2,773	4.8

Note: more than one method may be used

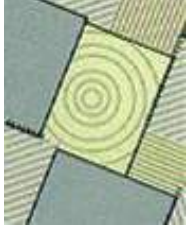


Table E1.2c Record keeping methods percentage (%) of farms, for fertiliser and manure applications on farms where each respective nutrient type was applied in the crop year, Great Britain 2015-2019

		computer program	*farm diary*	*farm notebook/pocket-book*	*file record sheet (file in the office)*	*other paper record*	*no records kept*
manufactured fertilisers	*2015*	23.2	54.6	19.7	19.4	3.4	3.8
	2016	23.3	52.6	22.4	20.7	3.0	4.3
	2017	22.6	49.7	24.0	21.7	2.1	4.1
	2018	25.1	54.5	18.2	17.8	5.2	2.1
	2019	28.7	54.9	17.2	20.6	2.8	3.8
organic manures	*2015*	17.0	54.3	20.9	18.4	3.5	12.7
	2016	15.4	60.0	21.8	17.0	3.4	9.9
	2017	16.7	55.8	23.8	18.9	2.7	8.3
	2018	17.9	59.8	16.6	15.8	5.5	5.6
	2019	19.8	60.7	18.0	19.2	2.9	4.8

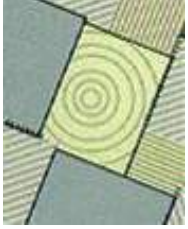
Note: more than one method may be used

Recording methods for manufactured fertilisers show some variations across the five-year period 2015-19, with farm diaries remaining the most widely used recording method. For organic manures, records of some type were kept on 87-95% of farms for the five-year period.

Table E1.3 Soil testing percentage (%) of tillage and grass area, Great Britain 2015 - 2019

	tillage area %				*grass area %*			
	Standard P, K, Mg, pH	*Nitrogen*	*pH (lime only)*	*Precision Farming purposes*	*Standard P, K, Mg, pH*	*Nitrogen*	*pH (lime only)*	*Precision Farming purposes*
2015	25	10	10	6	5	2	3	0
2016	24	9	8	5	6	2	3	1
2017	27	11	7	6	6	1	3	1
2018	26	11	7	7	7	2	3	1
2019	29	15	8	7	7	2	4	2

Table E1.3 shows the percentage of the tillage and grass area that was soil tested for the cropping years 2015 – 2019. It is usual practice, especially for tillage fields to test a sub-set of them in any given year. Standard P, K, Mg, pH was the most commonly used soil test for the period, with an average of 29% of the tillage area and 7% of the grass area. All types of soil tests were more prevalent on tillage than on grass.



In 2019 farmers were asked whether they had cattle on farm during the winter of 2018/9 and a series of questions about how they were housed. 59% of farms indicated that they had cattle on their farms at that point and their breakdown of age classes is shown in Table E1.4. Total numbers outwintered were low with the percentages below 10% for all classes of cattle.

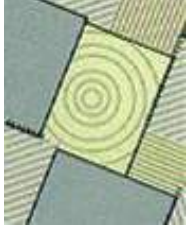
Table E1.4 Numbers of cattle on farm and (%) outwintered, Great Britain 2019

	Total number on farm (millions)	*Number outwintered (millions)*	*% outwintered*
Cattle aged 2 years and over	3.9	0.3	8.5
Cattle 1-2 years	2.6	0.2	7.2
Calves under 1 year old	2.2	0.1	3.0

Table E1.5 shows the types of housing used on farm and the average duration of housing during the winter of 2018/9. For cattle aged 2 years and over the most common types of housing were cubicles and straw bedded housing. On average cattle were in these types of housing for 5.8 and 5.5 months respectively. For cattle aged 1-2 years 75% were in straw bedded housing and they were on average housed for 5.6 months. Calves were most commonly housed in groups (86%) and they were inside for, on average, 5.8 months.

Table E1.5 Numbers of cattle housed by type and duration of housing, Great Britain 2019

Cattle aged 2 years and over	*Total number housed (millions)*	*% housed*	*Average months housed*
Cubicle housing	1.75	45	5.8
Straw bedded housing	1.62	42	5.5
Slatted sheds	0.13	3	5.7
Other housing	0.02	1	5.1
Total housed	3.52	91	5.6
Cattle 1-2 years	*Total number housed (millions)*	*% housed*	*Average months housed*
Cubicle housing	0.36	14	6.0
Straw bedded housing	1.94	75	5.6
Slatted sheds	0.11	4	6.1
Other housing	0.01	0	4.1
Total housed	2.41	93	5.7
Calves under 1 year old	*Total number housed (millions)*	*% housed*	*Average months housed*
Individual pens	0.11	5	5.5
Group housing	1.90	86	5.8
Other housing	0.13	6	6.1
Total housed	2.13	97	5.8



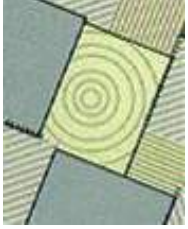
APPENDIX 1 - SURVEY STATISTICS

APP 1.1 SAMPLING VARIATION

Table App 1.1 Standard errors of application rates for the major crops in 2019

Great Britain	standard errors for overall application rates (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 SO_3*	*total N*	*strt N*	*comp N*	*total P_2O_5*	*total K_2O*	*total SO_3*	
winter wheat	2.3	2.6	1.1	1.3	1.5	1.5	2.2	2.3	4.9	1.5	1.6	1.5	1279
oilseed rape	2.9	3.1	1.3	1.8	2.0	2.4	2.8	2.8	3.5	1.9	2.5	2.3	414
winter barley	2.3	2.7	1.4	1.5	2.0	1.8	2.2	2.3	4.7	1.6	2.1	2.0	520
spring barley	1.8	2.2	1.4	1.2	1.6	1.3	1.6	1.8	2.0	1.4	1.7	1.7	675
m/c potatoes	9.4	9.9	10.0	10.2	15.4	5.0	7.6	16.4	8.6	9.7	13.7	12.9	56
sugar beet	5.0	5.5	1.8	3.8	7.0	5.8	4.9	5.2	5.4	6.1	8.1	7.9	94
all tillage crops	2.0	2.3	1.0	0.9	1.2	1.0	1.9	2.0	1.8	1.0	1.5	1.4	4119
all grass	1.7	1.5	1.1	0.4	0.5	0.4	1.9	2.5	1.7	0.8	1.3	1.8	3226
England & Wales	standard errors for overall application rates (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 SO_3*	*total N*	*strt N*	*comp N*	*total P_2O_5*	*total K_2O*	*total SO_3*	
winter wheat	2.4	2.7	1.2	1.3	1.5	1.6	2.3	2.4	5.6	1.6	1.7	1.6	1193
oilseed rape	2.9	3.1	1.4	1.8	2.1	2.5	2.8	2.8	3.9	2.1	2.7	2.4	389
winter barley	2.5	2.9	1.5	1.5	2.1	2.0	2.3	2.4	5.7	1.6	2.3	2.2	458
spring barley	2.1	2.5	1.4	1.3	1.7	1.6	1.9	2.0	2.8	1.8	2.3	2.0	482
m/c potatoes	10.2	10.8	10.8	11.2	15.6	5.2	8.2	17.4	9.5	10.8	13.9	14.1	51
sugar beet	5.1	5.5	1.6	3.9	6.5	5.9	4.9	5.2	4.2	6.3	7.2	8.0	92
all tillage crops	2.2	2.5	1.0	0.9	1.3	1.1	2.1	2.1	2.3	1.2	1.7	1.5	3622
all grass	1.9	1.7	1.0	0.4	0.5	0.5	2.2	2.8	1.9	1.0	1.5	2.1	2649
Scotland	standard errors for overall application rates (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 SO_3*	*total N*	*strt N*	*comp N*	*total P_2O_5*	*total K_2O*	*total SO_3*	
winter wheat	7.8	8.0	4.6	5.0	5.4	4.5	7.1	7.3	9.0	4.7	4.5	4.6	86
oilseed rape	12.6	12.8	4.8	6.4	8.5	7.9	12.6	12.0	6.2	5.5	8.2	7.9	25
winter barley	7.2	7.9	4.7	5.9	6.3	4.9	6.5	7.1	7.4	5.7	5.3	4.7	62
spring barley	3.3	3.7	2.9	2.4	2.9	2.0	3.0	3.1	2.8	2.2	2.5	2.9	193
all potatoes	19.0	23.4	18.8	16.0	35.4	11.8	19.0	38.2	16.2	13.1	24.5	19.8	14
all tillage crops	3.7	4.5	2.9	2.1	3.1	2.1	3.5	4.2	2.7	1.8	2.8	2.9	450
all grass	4.2	3.2	3.5	1.2	1.7	1.4	3.8	6.0	3.7	1.8	2.6	4.8	533

The standard errors quoted in Table App 1.1 are a measure of the standard deviation of the mean and are used to judge the accuracy of the results for each cell in the table. This is a standard statistical process where the standard deviation of each cell is calculated first and then divided by the square root of the number of data points within that cell. Approximate 95% confidence limits will be the quoted value +/- 2 standard errors.



APP 1.2 RESPONSE RATE

Tables App 1.2 and App 1.3 summarise information regarding the response received to the main and reserve samples.

Table App 1.2 Response to main and reserve samples in 2019

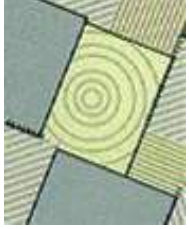
	2019	*% total*
Target sample	1500	100
2018 panellists agreeing to re-contact in 2019	1221	81
Achieved 'Main' sample from 2018 panel	991	66
Achieved additional 'Main' sample	138	9
Achieved '1st reserve' sample	103	7
Achieved '2nd reserve' sample	58	4
Achieved '3rd reserve' sample	37	2
Total achieved	**1327**	**88**
Total number of refusals/non-contact	1453	
Total number of farms approached	***2780***	

Table App 1.3 Response to main and reserve samples for 2015 - 2019

Net response rate	*2015 %*	*2016 %*	*2017 %*	*2018 %*	*2019 %*
Overall achieved rate	90	87	89	87	88
Achieved % of total contact attempts	53	46	45	42	48
Main sample	81	80	77	76	85
Reserve sample(s)	19	20	23	24	15
Main reason for refusal	*2015 %*	*2016 %*	*2017 %*	*2018 %*	*2019*
Too busy	17	10	11	11	11
Not interested	14	12	13	16	13
Do not do surveys	4	5	6	6	6
Want payment	0	0	0	1	0
Too much paperwork	1	1	1	1	0
Non-contact	45	50	43	44	42
Other[a]	20	22	25	22	27

[a] includes answerphone/screening, contracted out, contributed enough, farm sold/not farming, ill health, retired, and wrong telephone number.

Farms in the >200ha size band are oversampled by 25%, which has the effect of increasing response rates.

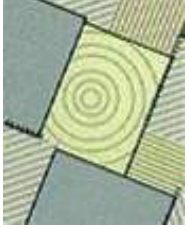


APP 1.3 INFORMATION ON HOLDINGS BELOW 20 HECTARES

Holdings of less than 20 hectares in size are excluded from the BSFP sample. These smaller farms account for a significant proportion of the number of holdings but a much smaller proportion of the area of crops and grass. Although in recent years the total number of farms in Great Britain has been nearly 200,000, many of these are relatively small. Holdings below 20 hectares accounted for less than 7% of the total crop area and around 13% of the total grass area. Further detailed information for Great Britain is provided in the table below on the equivalent crop or grassland areas and number of holdings for those holdings where the total size of the farm is below 20 hectares. It should be noted that 2017 was the latest available year of data from the June Survey of Agriculture when designing the sample for the 2019 survey.

June 2017	Total GB area (ha)	Total no. of GB holdings with area >0 ha	Area on GB holdings of <20ha	No. of GB holdings with <20ha	Proportion of GB area on holdings <20ha	Proportion of GB holdings with <20ha	No. of GB holdings with zero area	Total no. of GB holdings
Total croppable area[a]	5,937,400	87,127	239,344	36,382	4%	43%	111,406	195,533
of which crops	4,937,324	66,341	192,484	28,571	4%	43%	129,192	195,533
of which temporary grass < 5 years old	1,000,076	50,922	246,605	35,511	25%	70%	144,611	195,533
Total grass	6,474,858	165,167	583,424	94,819	9%	57%	30,366	195,533
grass < 5 years old	1,000,076	50,922	246,605	35,511	25%	70%	144,611	195,533
grass ≥ 5 years old	5,474,782	160,382	588,782	98,009	11%	61%	35,151	195,533

(a) includes bare fallow land

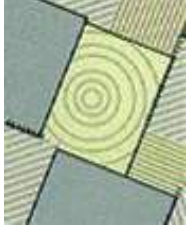


APPENDIX 2

APP 2.1 ENGLISH COUNTIES WITHIN BSFP AND DEFRA REGIONS

List of English counties indicating the BSFP and Government Office Regions within which they fall.

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



APPENDIX 3

APP 3.1 UK FARM CLASSIFICATION SYSTEM

UK farm classification system (Revised 2004): composition of robust, main and other types by constituent EC type.

Robust types	Main types		Constituent EC types [1]
1 Cereals	1	Cereals	[1312]
2 General Cropping	2	General Cropping	[1412], 142, 143, [1443], 602, 603, 604, [6052]
3 Horticulture	3	Specialist fruit	3211
	4	Specialist glass	2012, 2022, 2032
	5	Specialist Hardy Nursery Stock	[3401]
	6	Other horticulture	2011, 2013, 2021, 2023, 2031,2033, 2034, 311, 312, 313, 314, [3402], 601, 6061, 6062
4 Specialist Pigs	7	Specialist pigs	5011, 5012, 5013
5 Specialist Poultry	8	Specialist poultry	5021, 5022, 5023
6 Dairy	9	Dairy (LFA)	411, 412 (LFA)
	10	Dairy (lowland)	411, 412 (non-LFA)
7 LFA Grazing Livestock	11	Specialist sheep (SDA)	441 (SDA)
	12	Specialist beef (SDA)	421,422 (SDA)
	13	Mixed Grazing Livestock (SDA)	431, 432, 442, 443, [4443], [4444] (SDA)
	14	Various Grazing Livestock (DA)	421, 422, 431, 432, 441, 442, 443, [4443], [4444] (DA)
8 Lowland Grazing Livestock [2]	15	Various Grazing Livestock (lowland)	421, 422, 431, 432, 441, 442, 443, [4443], [4444] (non-LFA)
9 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, 8232
	20	Mixed livestock	5031, 5032, 711, [7122], 721, 722, 723
10 Other [3]	21	Specialist set-aside	[1311]
	22	Specialist grass and forage	[1411], [1444], [4442], [6051], [7121], [8131], [8141]
	23	Specialist horses	[4441]
	24	Non-classifiable holdings: fallow	[91]
	25	Non-classifiable holdings: other	[92]

[1] 2004 EC Typology described in Commission Decision 85/377/EEC as amended by Commission Decisions 94/376/EC, 96/393/EC and 99/725/EC with minor modifications to adapt it to United Kingdom conditions. For a full list of EC types see here. These minor modifications are indicated by the EC farm type number being shown in square brackets. Definitions for these modified EC farm types are available from the Defra contact shown at the front of this publication. EC types 132, 133, 1441, 1442, 3212, 3213, 322, 323, 330, and 8231 have not been allocated in the classification, since these types of production do not occur in the United Kingdom at a significant level.

[2] Definitions of LFA (Less Favoured Area), lowland, SDA (Severely Disadvantaged Area), and DA (Disadvantaged Area) farms are available on request from the Defra contact shown at the front of this publication.

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