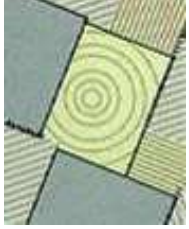
THE BRITISH SURVEY OF

Fertiliser Practice

FERTILISER USE ON FARM CROPS
FOR CROP YEAR 2017



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The United Kingdom Statistics Authority has designated these statistics as National Statistics, in accordance with the Statistics and Registration Service Act 2007 and signifying compliance with the Code of Practice for Official Statistics.

Designation can be broadly interpreted to mean that the statistics:

- meet identified user needs;
- are well explained and readily accessible;
- are produced according to sound methods; and
- are managed impartially and objectively in the public interest.

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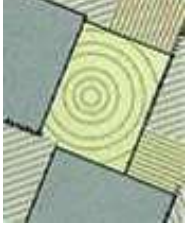
https://www.gov.uk/government/collections/fertiliser-usage



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 2017 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 2017, 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 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.

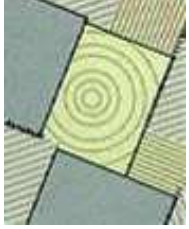
Contact information and feedback

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 2017.

June 2018



ACKNOWLEDGEMENTS

The sponsors gratefully acknowledge the co-operation of all farmers taking part in the 2017 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).

Warrick Steptoe[1]

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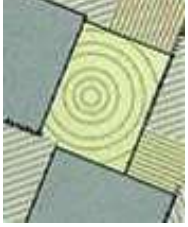

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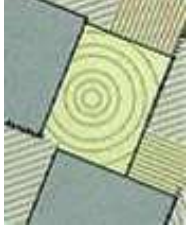

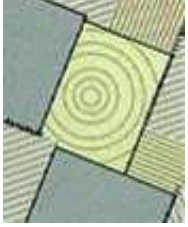

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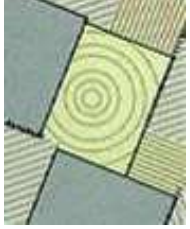
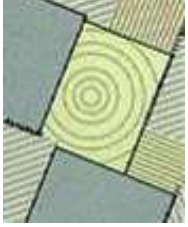
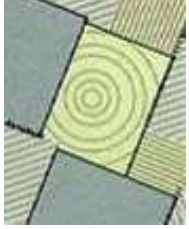






EXECUTIVE SUMMARY

The British Survey of Fertiliser Practice is an annual, nationally representative 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.

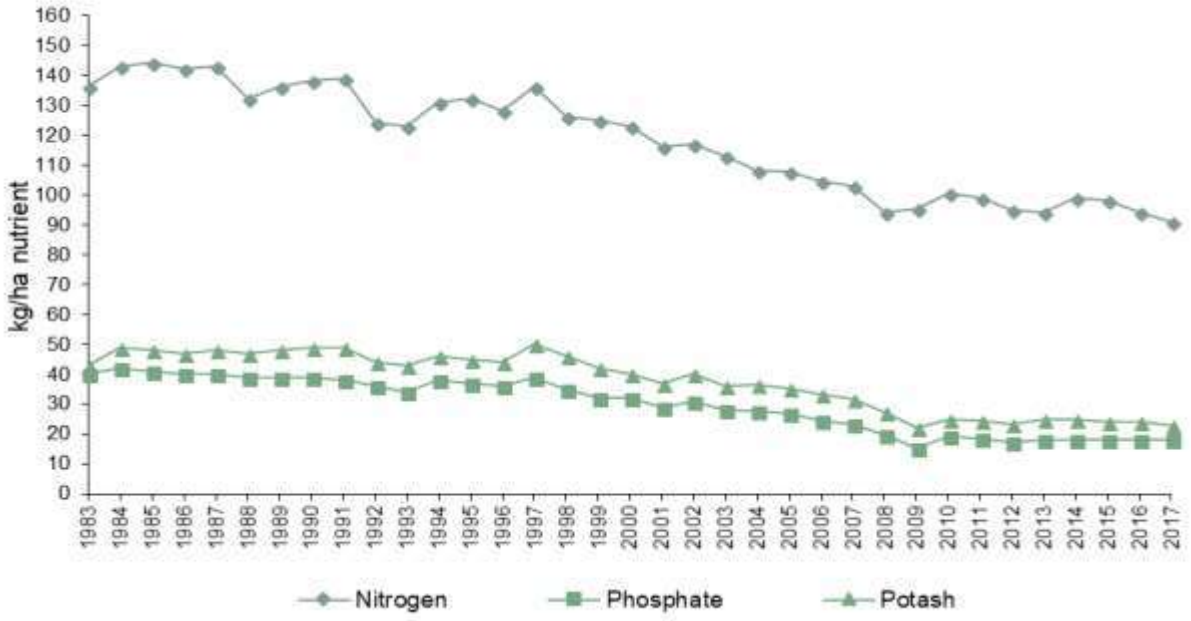
The main findings from the 2017 Survey on the use of the nutrients nitrogen, phosphorus, potassium and sulphur in Great Britain are summarised below (Table ES1).

Cropping patterns can influence fertiliser rates and dressing covers observed. In 2017 there was a 1.1% decrease in the total area of tillage crops planted, with the areas of winter wheat and winter oilseed rape both down on the previous year. Conversely, the area of legumes grown increased by 14%. 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 2017

	All Tillage	All Grass	All Crops and Grass
Total Nitrogen - N			
Overall application rate, 2017 (kg/ha)	137	54	91
Mean overall application rate, 2013-2017 (kg/ha)	141	57	95
Crop area receiving dressing, 2017 (%)	89	56	71
Average field rate, 2017 (kg/ha)	154	97	128
Total Phosphate - P_2O_5			
Overall application rate, 2017 (kg/ha)	30	8	18
Mean overall application rate, 2013-2017 (kg/ha)	29	9	18
Crop area receiving dressing, 2017 (%)	50	37	43
Average field rate, 2017 (kg/ha)	59	23	41
Total Potash - K_2O			
Overall application rate, 2017 (kg/ha)	37	12	23
Mean overall application rate, 2013-2017 (kg/ha)	39	13	121
Crop area receiving dressing, 2017 (%)	50	38	43
Average field rate, 2017 (kg/ha)	74	31	53
Total Sulphur - SO_3			
Overall application rate, 2017 (kg/ha)	34	3	17
Mean overall application rate, 2013-2017 (kg/ha)	31	3	16
Crop area receiving dressing, 2017 (%)	57	10	31
Average field rate, 2017 (kg/ha)	60	35	55

Figure ES1 Overall fertiliser use (kg/ha) on all crops and grass, Great Britain 1983 - 2017

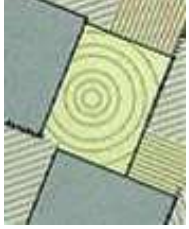


Nitrogen

- 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 2017 resulted from a further 4 kg/ha decrease in the overall rate on tillage crops to 137 kg/ha and a 2 kg/ha decrease on grass to 54 kg/ha, compared with 2016. The rate on tillage crops has fallen typically within the 140-150 kg/ha range for the majority of the 30 years of the survey. The previous lows for 2008 and 2009 were attributed mainly to the high fertiliser prices.
- 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 2017. The overall nitrogen rate on winter wheat and spring barley decreased by 3 kg/ha (to 185 kg/ha) and 4 kg/ha (to 100 kg/ha), respectively. The overall rate for winter barley increased 3 kg/ha (to 149 kg/ha), whereas the application rate for nitrogen on oilseed rape following a fall of 10kg/ha in 2016, figures for 2017 remained unchanged at 180 kg/ha.

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. This may help to explain the trend seen for overall declining dressing cover on combinable crops, especially in England.
- 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 (46% for grass <5 years old, 31% for grass of 5 years or more) than on tillage crops (25% cover) and grazed grassland also receives manure as it is grazed.



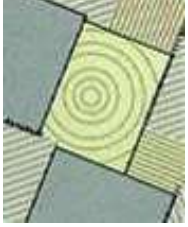
- Overall phosphate usage on tillage crops declined gradually between 1984 and 1996. Thereafter the decline in rates became more marked until 2009, after which there was some recovery and relative stability, with an overall rate of 30 kg/ha in 2017. The overall rate of phosphate on grassland was highest 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 2017.
- 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 2013 and 2017 overall potash application rates have been apparently stable in the range 37-40 kg/ha.
- 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 12-14 kg/ha since 2008.
- 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, and although there has been a slight reduction in dressing covers and overall rates since 2003 they are relatively stable again on tillage by 2017. 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 has reduced significantly. 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 2017, sulphur dressing covers in cereals were in the 55%-69% range.
- The 76% dressing cover for winter oilseed rape was a 6% higher than observed in 2016.
- In 2017, 31% of all crops and grass received a dressing of sulphur; this figure was 57% for tillage crops, 3% higher than in 2016. On tillage crops the overall application rate for sulphur was 34 kg/ha, an increase of 4 kg/ha compared with mean use between 2012-2016 of 30 kg/ha. Applications on grass were unchanged in 2017 at 3 kg/ha, this low overall rate is caused by the low dressing cover, with only 10% 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 2017, around 63% 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. 58% of cattle manure and 93% 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 B2.6. 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.

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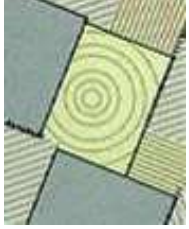
[2] Yates, F. and Boyd, D.A. (1965). Two decades of Surveys of Fertiliser Practice. *Outlook on Agriculture* **5**, 203-210.

[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 10% 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.

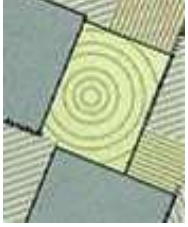
The target sample size is 1300 farms. This sample size has been designed in order to achieve a statistically representative sample at the national level. The farms are allocated to each of the combinations of farm type and size in proportion to the total area of crops and grass recorded in the June Survey (the latest available data). The exception to this is that in England & Wales 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 1,160 holdings in 2017. This is a 1% 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 2017, 65% of the panel had responded in the previous year. The profile of the panel in terms of farm size was 61% >200ha, 74% 100-200ha, 66% 50-100ha and 62% >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 2017 survey, England & Wales

	farm holdings in population in 2017	total crops and grass in 2017 (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 & low land), mixed)						
crops & grass area						
20-50 ha	17,294	6.6	0.33	56	46	0.27
51-100 ha	14,779	12.2	0.73	108	99	0.67
101-200 ha	10,199	16.1	1.58	161	146	1.43
200+ ha	4,584	18.1	4.89	224	232	5.06
Total livestock & mixed	46,856	53.0	1.17	549	523	1.12
Crops						
(Robust types: cereals, general cropping)						
crops & grass area						
20-50 ha	7,895	3.0	0.39	31	23	0.29
51-100 ha	6,442	5.3	0.79	51	37	0.57
101-200 ha	5,905	9.7	1.50	89	66	1.12
200+ ha	5,890	27.4	5.75	338	299	5.08
Total crops	26,132	45.4	1.95	509	425	1.63
Horticulture						
(Robust type: horticulture)						
crops & grass area						
20-50 ha	771	0.3	0.79	6	7	0.91
51-100 ha	448	0.4	1.76	8	4	0.89
101-200 ha	217	0.3	3.32	7	4	1.84
200+ ha	128	0.6	10.78	14	8	6.25
Total horticulture	1,564	1.6	2.24	35	23	1.47
Total for England & Wales	74,552	100		1,093	971	1.30

[1] The *notional sampling fraction* is found by expressing the *target sample size* as a percentage of the *farm holdings in population in 2017*

[2] The *achieved sampling fraction* is found by expressing the *achieved sample size* as a percentage of the *farm holdings in population in 2017*

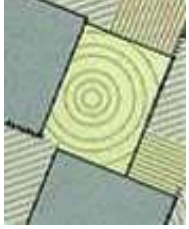


Table A2.2 Derivation of the stratified random sample for the 2017 survey, Scotland

	farm holdings in population in 2017	total crops and grass in 2017 (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	747	1.4	0.35	3	2	0.27
51-100 ha	953	3.9	0.92	9	7	0.73
101-200 ha	1,023	8.2	1.33	14	13	1.27
200+ ha	613	11.8	4.81	30	26	4.24
Total cereal/general	3,336	25.4	1.63	54	48	1.44
Livestock & mixed						
(Robust types: specialist pigs, specialist poultry, dairy, cattle and sheep (LFA & low land), mixed, general cropping;forage)						
crops & grass area						
20-50 ha	4,591	8.5	0.41	19	16	0.35
51-100 ha	3,836	15.6	0.78	30	28	0.73
101-200 ha	3,024	23.7	1.40	42	39	1.29
200+ ha	1,448	26.9	4.65	67	58	4.01
Total livestock & mixed	12,899	74.6	1.23	158	141	1.09
Total for Scotland	16,235	100		213	189	1.16

A2.2 DATA COLLECTION

Data collection was undertaken between October 2017 and April 2018 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.

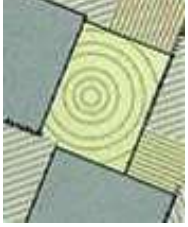
Official quantities of nitrogen, phosphate and potash fertiliser consumed annually in the UK since 1965 are shown in Table B2.6. These data are based on BSFP findings, HMRC import/export statistics and confidential trade and sales data which are contributed by AIC industry members who represent approximately 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.

[1] The *notional sampling fraction* is found by expressing the *target sample size* as a percentage of the *farm holdings in population in 2016*

[2] The *achieved sampling fraction* is found by expressing the *achieved sample size* as a percentage of the *farm holdings in population in 2016*



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 associated with this. 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 45% was achieved in 2017. 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 all tillage crops, all crops and 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.

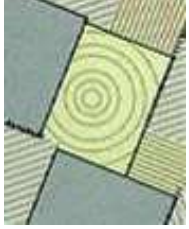
The statistics on the pattern of fertiliser practice reported for Great Britain largely reflect practice in England and Wales due to its greater area of total crops and grassland: about 9.2 million hectares in England and Wales and about 1.9 million hectares in Scotland. The estimates of the average 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 so may not be wholly representative of manure use so 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 B2.6. 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 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.

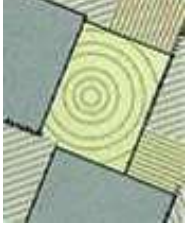
These AIC usage figures are compared to usage figures derived from BSFP and June crop area figures and the relationship between the ratios of N, P and K from both sets of data are checked and compared. Any inconsistencies or anomalies identified in the data are identified and followed up and any necessary 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 2016 to autumn 2017, corresponding to the 2017 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 2015. 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 Single 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 Single Payment Scheme. **Grass** refers to all forms of grassland which may be grazed, conserved or grown for seed production; rough grazing is excluded.

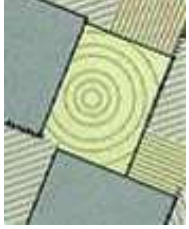
5. The abbreviation **N** is used for nitrogen; **P_2O_5** for phosphate; **K_2O** for potash, **SO_3** for sulphur and **FYM** for all types of organic manure e.g. slurries and solid manures. The phrase **total use** includes both straight (single nutrient) and compound (multi nutrient) products. Fertiliser 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 Fertiliser Manual, RB 209 which is available on the Defra website.

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:

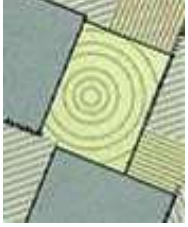
   https://www.gov.uk/structure-of-the-agricultural-industry-survey-notes-and-guidance

   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 2017. 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 maximum 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.

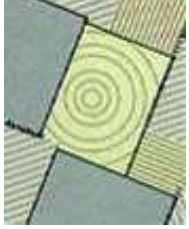
Nitrogen is important for building DNA and proteins in plants. It encourages growth of stems and leaves by promoting protein and chlorophyll. Provided there are adequate supplies of water and other nutrients, nitrogen usually has a large effect on crop growth, yield and quality. Whatever the source, 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 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 and 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/projects/RB209.aspx



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 2015/16 and 2016/17 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 2017, of which just under 4.6 million hectares (41%) were cultivated for tillage cropping and the remainder, 6.5 million hectares, were grassland (excluding rough grazing).

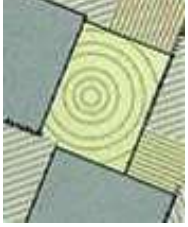
The Single Farm Payment was introduced on 1 January 2005, replacing all the previous main Common Agricultural Policy (CAP) payment schemes with a single payment. To obtain this single payment, farmers must demonstrate compliance with a number of measures designed to protect the environment. One potential impact of cross-compliance, and of environmental schemes, is that margins of fields will remain un-cropped. In this report, as was the case in 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, 2016 – 2017

Crops	June 2016 '000s ha	June 2017 '000s ha	% change since 2016	% change since 2012	2017 crop areas as % of total tillage area
Wheat	1815	1783	-1.8	-10.0	38.2
Barley – winter	432	416	-3.7	9.7	8.9
– spring	669	740	10.7	24.0	15.9
Total cereals[1]	*3099*	3149	1.6	1.4	67.5
Oilseed rape – total	579	562	-3.0	-25.5	12.0
Oilseed rape – winter	569	549	-3.5	-25.3	11.8
Oilseed rape – spring	10	8	-16.6	-55.7	0.2
Sugar beet	86	111	29.1	-7.5	2.4
Potatoes[2]	135	141	4.2	-3.0	3.0
Linseed	27	26	-3.7	-7.1	0.6
Peas/beans[3]	227	259	14.0	117.4	5.5
Maize/other fodder	269	273	1.5	23.6	5.9
Vegetables	146	151	3.4	23.8	3.2
Total tillage[4]	*4609*	4558	-1.1	-2.7	100.0
Set-aside and bare fallow[5]	260	239	-8.2	56.9	
Grassland					2017 grass areas as % of total grass area
Less than 5 years old	995	1000	0.5	-18.2	15.4
5 years and older	5466	5475	0.2	6.2	84.6
Total grass[6]	*6461*	*6475*	0.2	1.6	*100.0*
Total crops and grass[7]	*11069*	*11033*	-0.3	-0.2	

[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 bare fallow or set-aside.
[5] the obligatory set-aside rate for the 2015 and 2016 Single Payment Years was set at 0%.
[6] managed grassland, excluding rough grazing.
[7] total tillage + total grassland.

Source: Annual Defra/Scottish Government/Welsh Assembly Government (WAG) June Agricultural Survey data



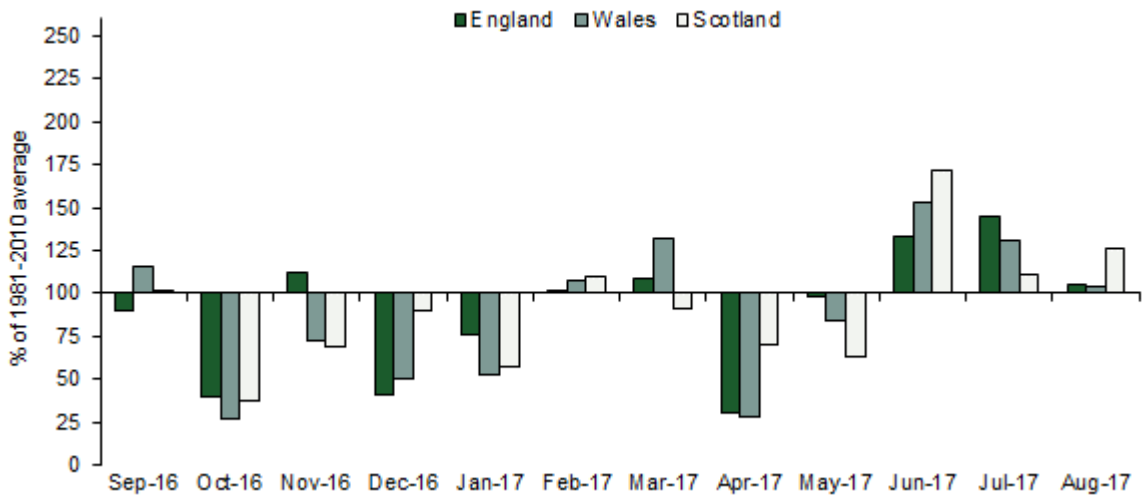
Comparing the 2016 and 2017 cropping years, the most marked change was the continued reduction in the area of winter-drilled cereals and oilseed rape, in favour of spring-drilled alternatives; most notably barley, combining beans and sugar beet. It is thought the swing towards spring cropping is an effort to tackle increasing agronomic challenges, including black-grass control. However, the sugar beet area also benefited from the lifting of European Union (EU) sugar quotas in October 2017. The total area under tillage crops decreased by 1.1% in 2017. The total area of uncropped land (bare fallow and set-aside) also decreased by 8%, with the obligatory set aside area remaining at zero in all three countries.

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

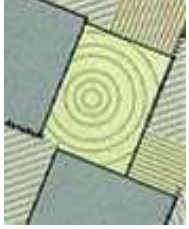
- A very wet (or very dry) autumn might delay the establishment of winter sown crops or alter the ratio of winter to spring sown crops, with their different fertiliser requirements.
- Prolonged wet weather can increase leached losses of some nutrients, particularly nitrogen and sulphur. Weather conditions 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 2016 was a notably warm, if slightly wet month (equal-second warmest September in the series from 1910), with unusually high temperatures for the time of year in south-east England, and a changeable but rather warm west to south-westerly type near both ends of the month. October was very dry and often quiet and anticyclonic with frequent easterly winds, and it was an exceptionally sunny month in north-west Scotland. Temperatures were mostly near average. November was dry, often cold and sunny, especially in the north, but had an unsettled spell mid-month, particularly in the south. Winter was rather dry and mild, until the second half of February. After this the weather was mild and quite disturbed. December and February were both mild months, but January was a little colder than average towards the south-east. December was very dry over southern England, whereas January was particularly dry in northern and western areas. Rainfall in February was largely near or just above average. It was generally warmer than average during March and early April, but the second half of April was cooler, with some cold nights and numerous late frosts. April was also much drier than average for most areas, but parts of north-west Scotland were wet. May was somewhat wet and predominantly warm, especially early and late in the month. The summer was rather wet, with rainfall above average for the UK in each individual month. It was also slightly warmer than average, but that is largely due to a warm June, as from mid-July onwards the weather was often on the cool side with an unsettled westerly regime.

Figure A3.1 Monthly rainfall as a % 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 2013-17. 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 2016-17 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 9.6 million hectares in England & Wales and about 1.9 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.

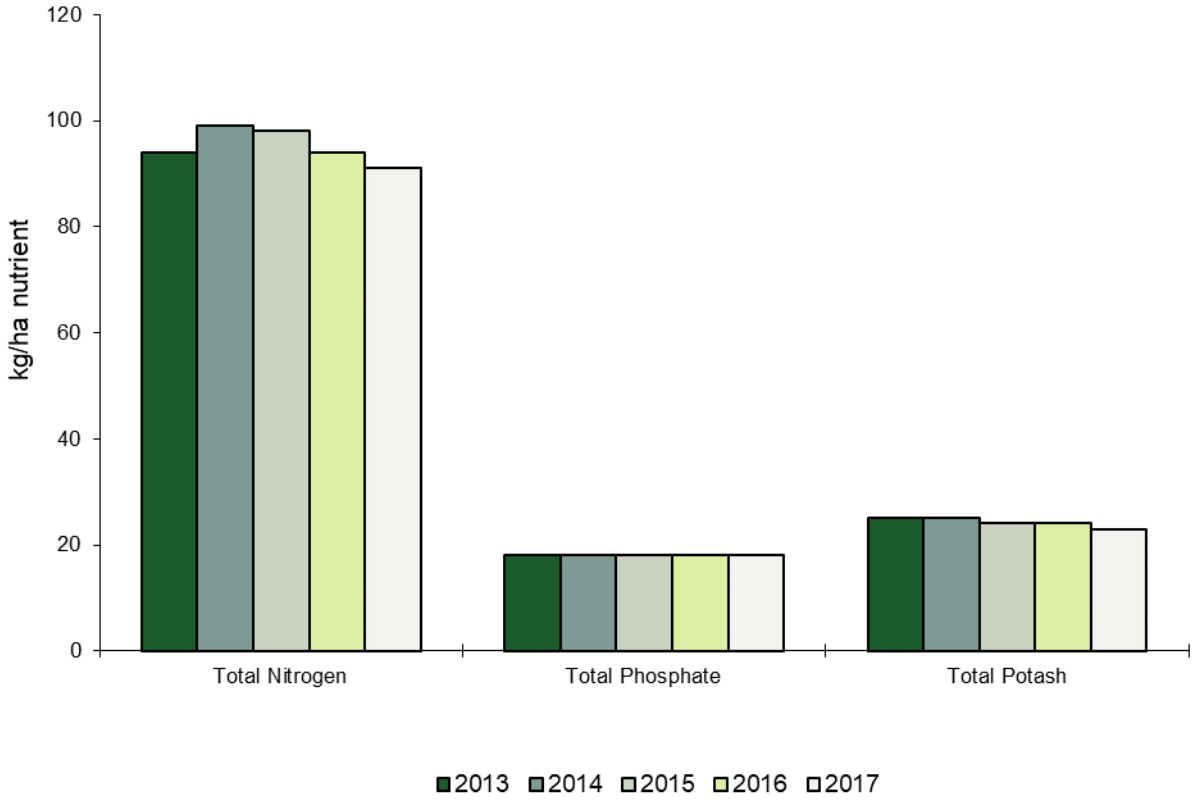
[7] Chalmers A. G. (2001) A Review of fertiliser, lime and organic manure use on farm crops in Great Britain from 1983 to 1997. *Soil Use and Management* **17**, 254-262.

B1 2017 RESULTS FOR GREAT BRITAIN AND CHANGES IN RECENT YEARS

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

Overall rates of total nitrogen, phosphate and potash in Great Britain over the last five years are illustrated in Figure B1.1. The 2017 overall rate for all crops and grass is 91 kg/ha, a decrease of 3 kg/ha from 2016. Overall rates for phosphate and potash in 2017 were 18 kg/ha and 23 kg/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 2013 – 2017

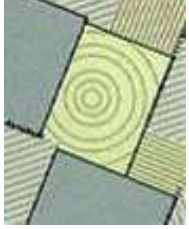


B1.1.1 Nitrogen

All crops and grassland

Table B1.1 Overall nitrogen use (kg/ha), Great Britain 2013 – 2017
Total nitrogen

	tillage crops	*grass*	*all crops and grass*
2013	136	59	94
2014	146	60	99
2015	146	56	98
2016	141	56	94
2017	137	54	91



Straight nitrogen

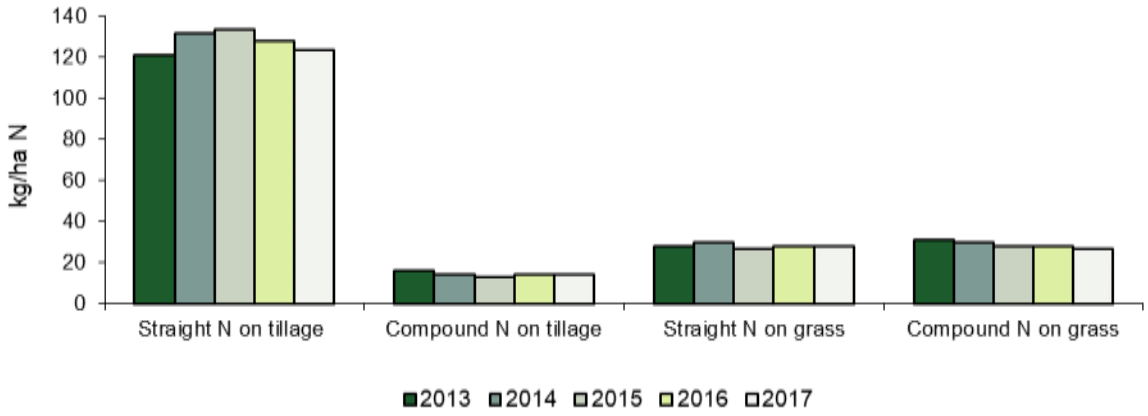
	tillage crops	*grass*	*all crops and grass*
2013	121	28	69
2014	132	30	76
2015	134	27	77
2016	128	28	73
2017	124	28	70

Compound nitrogen

	tillage crops	*grass*	*all crops and grass*
2013	16	31	24
2014	14	30	23
2015	13	28	21
2016	14	28	21
2017	14	27	21

Overall, there was a 3 kg/ha decrease in total nitrogen use on all crops and grassland (Figure B1.1). This was caused by a further 4 kg/ha decrease in use on tillage crops and a reduction in rates on grass, when compared with use in 2016. On tillage crops, overall application rates for straight N declined by 4 kg/ha but were unchanged on grass at 28 kg/ha. Whilst the rate of compound N decreased by 1 kg/ha on grass the overall rate of use on all crops and grass continues to be stable at 21-24 kg/ha over the five-year period, 2013-2017.

Figure B1.2 Overall straight and compound nitrogen use (kg/ha), Great Britain 2013 – 2017

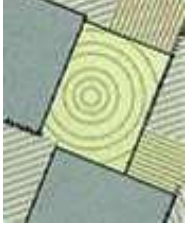


Tillage crops

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 81% in 2017. As in 2016, the decrease in overall application rate was caused by both a reduction of dressing cover as well as a decrease in the average field rate, which was 152 kg/ha in 2017.

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 other nutrients 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 82% of dressing cover in 2017.

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 2017, the overall N application rate on grass declined by 2 kg to 54 kg/ha. This was due to a decrease in the average rate of straight N (down 2 kg/ha) and a reduction (down 2%) in the proportion of grass receiving a dressing of compound N to 37%. This was more than enough to offset a 2 kg/ha increase in average field rate of compound N to 73 kg/ha.

B1.1.2 Phosphate, Potash and Sulphur

Phosphate

Table B1.2a shows overall phosphate applications for the past five years. Compared with 2016, the overall rate of use on tillage increased slightly to 30 kg/ha, resulting from a 1% increase in proportion receiving a dressing (to 50%) with the average field rate remaining unchanged (59 kg/ha). For grassland the overall rate was down slightly, impacted by a reduction in dressing cover (37%) with the field rate unchanged (23 kg/ha). The five year means for overall phosphate rates for tillage crops and grass were 29 and 9 kg/ha, respectively.

Table B1.2a Overall phosphate and potash use (kg/ha), Great Britain 2013 – 2017

Total phosphate

	tillage crops	*grass*	*all crops and grass*
2013	28	9	18
2014	29	10	18
2015	29	9	18
2016	29	9	18
2017	30	8	18

Total potash

	tillage crops	*grass*	*all crops and grass*
2013	40	13	25
2014	39	14	25
2015	38	12	24
2016	39	12	24
2017	37	12	23

Potash

On tillage crops, a decrease in the overall potash rate was caused by 3 kg/ha reduction in average field rate to 74 kg/ha, the proportion of the area receiving a dressing remaining unchanged at 50%. On grassland, dressing cover also decreased slightly by 1% to 38%, enough to reduce the overall rate of use to 8 kg/ha, average field rates remaining static.

Sulphur

Table B1.2b shows overall sulphur (SO_3) applications for the past five years. In 2017, the overall application rate of sulphur on tillage crops increased by 3 kg/ha in 2017 but remained unchanged on grass. For the second consecutive year, the proportion of the tillage area receiving a sulphur dressing also increased in 2017 by 3% to 57%. The average field rate on tillage crops increased in 2017 to 60 kg/ha. The overall rate of sulphur on grass was unchanged at 35 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.

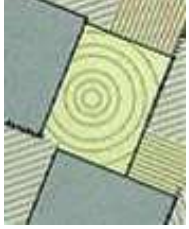


Table B1.2b Overall sulphur use (kg/ha SO_3), Great Britain 2013 – 2017
Total sulphur

	tillage crops	*grass*	*all crops and grass*
2013	27	2	13
2014	31	4	16
2015	31	3	16
2016	31	3	16
2017	34	3	17

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 2017 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.

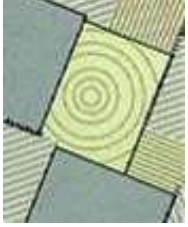


Table B1.3a Overall fertiliser use (kg/ha) on major tillage crops, Great Britain 2013 – 2017

Total nitrogen	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [1]	*oilseed rape* [2]	*sugar beet*
2013	183	108	142	173	177	94
2014	185	106	144	141	191	96
2015	190	105	147	157	193	98
2016	188	104	146	134	180	97
2017	185	100	149	136	180	92

Straight nitrogen	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [1]	*oilseed rape* [2]	*sugar beet*
2013	177	77	130	56	169	87
2014	179	70	134	62	186	85
2015	184	72	139	56	185	88
2016	182	71	137	36	171	86
2017	177	70	140	39	170	83

Compound nitrogen	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [1]	*oilseed rape* [2]	*sugar beet*
2013	7	31	12	116	8	7
2014	6	36	10	79	5	10
2015	6	33	8	102	8	10
2016	6	33	9	98	9	11
2017	6	30	8	97	10	10

Total phosphate	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [1]	*oilseed rape* [2]	*sugar beet*
2013	26	31	27	121	27	24
2014	27	35	31	91	26	21
2015	28	32	30	111	30	23
2016	27	33	29	110	29	17
2017	29	32	30	114	33	17

Total potash	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [1]	*oilseed rape* [2]	*sugar beet*
2013	32	46	41	225	28	74
2014	35	46	44	173	27	69
2015	34	44	41	186	31	64
2016	33	46	41	186	29	51
2017	36	43	40	206	31	46

Total sulphur	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [1,3]	*oilseed rape* [2]	*sugar beet*
2013	29	19	27		59	27
2014	32	21	28		63	26
2015	34	21	29		60	26
2016	36	24	34		59	28
2017	40	24	40		64	39

[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.**

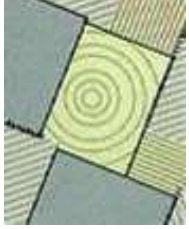


Table B1.3b Average field rates (kg/ha) on major tillage crops, Great Britain 2013 – 2017

Total nitrogen	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [1]	*oilseed rape* [2]	*sugar beet*
2013	186	110	145	179	178	96
2014	188	110	146	151	192	97
2015	193	107	149	166	193	100
2016	192	106	148	142	183	99
2017	188	103	152	136	181	96

Straight nitrogen	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [1]	*oilseed rape* [2]	*sugar beet*
2013	182	95	139	99	170	93
2014	186	94	141	106	187	90
2015	189	95	144	118	186	96
2016	190	95	144	101	177	89
2017	184	93	147	91	174	88

Compound nitrogen	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [1]	*oilseed rape* [2]	*sugar beet*
2013	61	64	67	149	37	48
2014	63	67	57	119	28	48
2015	58	65	58	144	35	47
2016	51	64	61	118	39	50
2017	80	56	67	119	34	42

Total phosphate	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [1]	*oilseed rape* [2]	*sugar beet*
2013	62	50	55	143	60	61
2014	59	53	58	120	59	61
2015	64	48	55	145	63	59
2016	60	50	56	125	57	48
2017	64	49	60	130	58	40

Total potash	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [1]	*oilseed rape* [2]	*sugar beet*
2013	74	67	73	255	68	110
2014	74	68	74	226	69	104
2015	73	62	68	230	70	98
2016	71	68	70	213	67	88
2017	75	62	74	226	64	78

Total sulphur	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [1,3]	*oilseed rape* [2]	*sugar beet*
2013	55	43	54		82	65
2014	57	45	50		82	57
2015	55	44	56		83	62
2016	56	42	59		84	49
2017	58	44	60		84	74

[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.

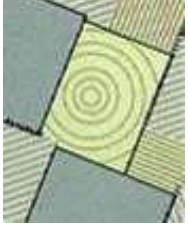


Table B1.4 Dressing cover (% area) on major tillage crops, Great Britain 2013 – 2017

Total nitrogen	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [1]	*oilseed rape* [2]	*sugar beet*
2013	99	98	98	97	99	99
2014	98	97	99	93	100	98
2015	99	98	99	95	100	98
2016	98	98	99	94	98	98
2017	99	97	98	100	100	96

Straight nitrogen	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [1]	*oilseed rape* [2]	*sugar beet*
2013	97	81	94	57	99	94
2014	96	75	95	58	99	95
2015	98	75	97	47	99	92
2016	96	75	95	35	97	97
2017	96	75	95	43	98	94

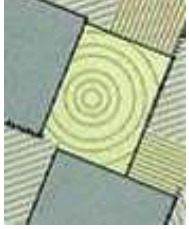
Compound nitrogen	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [1]	*oilseed rape* [2]	*sugar beet*
2013	11	48	18	78	21	16
2014	10	54	18	66	16	21
2015	10	51	13	70	23	21
2016	11	52	15	83	23	22
2017	10	54	12	82	28	23

Total phosphate	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [1]	*oilseed rape* [2]	*sugar beet*
2013	43	63	49	84	45	40
2014	45	67	53	76	45	34
2015	44	67	54	76	47	40
2016	45	65	52	88	51	35
2017	46	66	50	88	57	43

Total potash	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [1]	*oilseed rape* [2]	*sugar beet*
2013	43	68	57	88	41	67
2014	46	68	60	77	39	67
2015	46	70	60	81	44	65
2016	46	67	58	87	43	58
2017	47	70	54	91	48	59

Total sulphur	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [1]	*oilseed rape* [2]	*sugar beet*
2013	53	43	50	26	72	42
2014	57	47	57	17	76	45
2015	62	48	52	23	73	42
2016	63	56	57	29	70	58
2017	69	55	66	20	76	53

[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

Except for winter barley and potatoes, overall rates of total nitrogen (Table B1.3a) decreased between 2016 and 2017. The overall rate of total nitrogen on winter wheat decreased by 3 kg/ha, spring barley by 4 kg/ha and 5 kg/ha for sugar beet. Average field rates (Table B1.3b) generally followed a similar pattern, though notably rates of total nitrogen on oilseed rate and maincrop potatoes also decreased to 181 kg/ha and 136 kg/ha, respectively. In both cases dressing cover approached 100% influencing overall nitrogen usage. Rates for potatoes are more variable; the standard error for total nitrogen for the average field rate was 9.5 (see Appendix 1.1 for details).

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 2013 – 2017

Total nitrogen

	winter wheat		*spring barley*		*winter barley*	
	milling	*non-milling*	*malting*	*non-malting*	*malting*	*non-malting*
2013	208	177	110	110	131	151
2014	208	182	112	106	140	147
2015	213	184	112	101	136	153
2016	206	185	112	100	127	153
2017	204	179	108	97	134	157

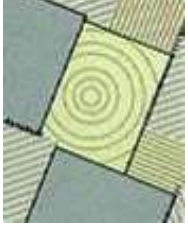
Nitrogen fertiliser requirements for winter wheat depend on the intended market end use (grain N levels), as well as upon soil type and the residual soil nitrogen fertility from previous cropping and manure practice Milling varieties are often grown as a second wheat and often receive extra nitrogen, 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 a further 2 kg/ha over 2016 to 204 kg/ha and the rate on non-milling wheat by 6 kg/ha. The non-milling crop continues to dominate the wheat crop area (Table B1.6) with 64% of the crop year (5-year mean: 69%).

Table B1.6 Percentage distribution (% crop area) of cereal crop areas by market use, Great Britain 2013 – 2017, as estimated from the Survey

	winter wheat		*spring barley*		*winter barley*	
	milling	*non-milling*	*malting*	*non-malting*	*malting*	*non-malting*
2013	30	70	51	49	29	71
2014	25	75	57	43	36	64
2015	30	70	55	45	23	77
2016	34	66	53	47	19	81
2017	36	64	54	46	22	78

Spring barley

Overall use of total nitrogen on spring barley decreased by a further 4 kg/ha to 100 kg/ha. By comparison, the five-year mean (2013-17) is 105 kg/ha. Then rate of straight N declined 1 kg/ha to 70 kg/ha and the



overall application rate of compound N by 3 kg/ha to 30 kg/ha. The average field rate for both straight and compound N followed a similar pattern, with the latter rate decreasing by 8 kg/ha to 56 kg/ha. The percentage of the spring barley area receiving a dressing of straight N was unchanged at 75%, whereas dressing cover with compound N again increased slightly (by 2%) to 54% (Table B1.4).

Further analysis of the data by crop type (Table B1.5) shows decreases in the average rate applied to malting and non-malting crops. In the case of the spring malting crop the five-year mean is 111 kg/ha, whilst for non-malting crops the mean is 103 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 generally 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. In 2013 the average field rate of nitrogen was the same on malting and non-malting crops, which was unusual, with the difference in rates in 2017 being more in line with normal practice.

The proportion of spring barley grown for malting has fluctuated during the last five years (Table B1.6). The mean for the period 2013-17 is 54%, with the lowest proportion recorded in 2013 at 51%.

Winter barley

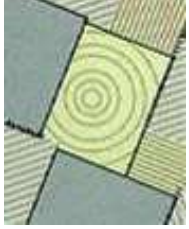
In the period 2002-08 overall total nitrogen use on winter barley decreased from year to year, down to 132 kg/ha in 2008. This rate has increased albeit with some fluctuations to 149 kg/ha in 2017. The straight nitrogen rate increased by 3 kg/ha 10 140 kg/ha in 2017, whereas the compound nitrogen rate, which is used on only 12% of the winter barley crop area, decreased by 1 kg/ha to 8 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 7 kg/ha over 2016 to 134 kg/ha, equalling the five-year mean. For non-malting crops, the average field rate also increased by 4 kg/ha to 157 kg/ha (Table B1.5), with the five-year average being 152 kg/ha.

The higher application rates of nitrogen (five-year mean of +18 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 22% in 2017, some 3% higher than 2016, with the five-year mean calculated as 26%. (Table B1.6).

[8] Anon. (2018). Nutrient Management Guide (RB209). Agriculture and Horticulture Development Board (AHDB). https://ahdb.org.uk/projects/RB209.aspx



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 2017, the overall rate of nitrogen increased by 2 kg to 136 kg/ha, still below the five-year mean of 148 kg/ha (Table B1.3a). This increase resulted from changes in the dressing cover of straight N (up 8% to 43% of the crop area), whereas average field rates of straight N decreased by 10 kg to 91 kg/ha (Table B1.3b, B1.4), compared to the previous year. Overall and average field rates for compound N, with a dressed area of 82%, remain unchanged compared with 2016.

Oilseed rape

In 2017, overall total nitrogen and average field rate use on oilseed rape, as a combined category for both the autumn and spring sown crop, remained relatively unchanged; five-year means of 184 kg/ha and 185 kg/ha, respectively (Table B1.3a, B1.3b). Increases in the crop area dressed with straight N and especially compound N (Table B1.4) masked decreases in the average field rates of 3 kg/ha and 5 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 oilseed rape decreased for the second consecutive year to 181 kg/ha. Compared with the previous year, the rate for the spring crop decreased by 16 kg/ha to 116 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 2013 – 2017

Total nitrogen (kg/ha)

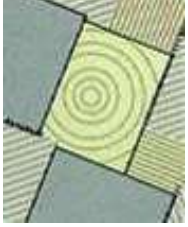
	winter oilseed rape	*spring oilseed rape**
2013	188	121
2014	192	154
2015	193	115
2016	184	132
2017	181	116

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

.

Sugar beet

The overall nitrogen use on sugar beet decreased by 5 kg/ha in 2017 to 92 kg/ha, below the five-year mean (95 kg/ha). Use of straight N, by far the most widely used form of nitrogen in this crop (five-year mean: 86% of the dressed area), was down 3 kg/ha to 83 kg/ha (Table B1.3a, B1.4). The average field rate of straight N decreased to 88 kg/ha, whereas the average rate of the less used compound N decreased by 8 kg/ha to 42 kg/ha (Table B1.3b).



B1.2.2 Phosphate and Potash

Phosphate

In 2017, the overall rate of phosphate increased on all the major crops except spring barley (Table B1.3a). Except sugar beet, where the average field rate decreased 8 kg/ha to 40 kg/ha and spring barley where the rate decreased by 1 kg/ha to 49 kg/ha, average field rates for other crops increased by 1 to 4 kg/ha (Table B1.3b). With an overall phosphate rate of 30 kg/ha for tillage crops, in line with the 2013-17 five-year average (29 kg/ha), this is further evidence 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 2017 by 2 kg/ha, to 37 kg/ha. Whilst this is below the 2013-2017 five-year average of 39 kg/ha (Table B1.2a) the proportion of the crop area receiving a dressing was again unchanged at 50%. Of the tillage crops, for wheat and oilseed rape the overall rate of potash increased by 3 kg/ha and 2 kg/ha, respectively (Table B1.3a) as did the dressed area (Table B1.4). The decrease in overall potash use in spring barley and sugar beet is linked to a decline in average field rates in these crops (Table B1.3b). An increase in the average field rate for potash on winter barley to 74 kg/ha was impacted by a decrease in the crop dressing cover percentage. The reverse pattern was found for oilseed rape (Table B3.1b, B1.4). As noted for nitrogen, part of the reason for recent apparent fluctuations in values for 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 2017, sulphur dressing covers on cereals were in the 55-69% range. In winter barley the 9% increase in dressing cover is above the five-year average, 56%. For winter wheat the same figures are 6% and 61%, respectively (Table B1.8). The average field rates for tillage crops were higher than in 2016.

Table B1.8 Dressing cover (% area) and average application rate (kg/ha SO_3) of sulphur on cereals and oilseed rape, Great Britain 2013 – 2017

Dressing cover (%)

	winter wheat	*winter barley*	*spring barley*	*oilseed rape*	*all tillage*
2013	53	50	43	72	47
2014	57	57	47	76	51
2015	62	52	48	73	52
2016	63	57	56	70	54
2017	69	66	55	76	57

Average field rate (kg/ha SO_3)

	winter wheat	*winter barley*	*spring barley*	*oilseed rape*	*all tillage*
2013	55	54	43	82	58
2014	57	50	45	82	60
2015	55	56	44	83	59
2016	56	59	42	84	58
2017	58	60	44	84	60

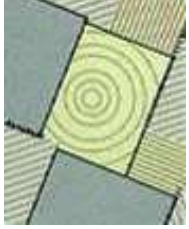


Table B1.9 shows the proportion of major tillage crops receiving a sulphur dressing in England & Wales compared with Scotland. Historically, a higher proportion of cereal and oilseed rape crops were treated with sulphur in Scotland than in England & Wales. This may have been due to the greater awareness 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. Arable farmers in England & Wales became more aware of the need to apply sulphur and there has been an increase in the percentage dressing cover figures for all major tillage crops. By 2017, dressing covers in England & Wales have now exceeded those in Scotland (Table B1.9).

Table B1.9 Dressing cover (% area) of sulphur on cereals and oilseed rape by region, 2013 – 2017

		winter wheat	*winter barley*	*spring barley*	*oilseed rape*
England & Wales	*2013*	53	50	46	73
	2014	56	58	50	77
	2015	61	51	53	82
	2016	65	56	57	71
	2017	69	66	59	77
Scotland*	*2013*	45	45	39	53
	2014	61	46	43	69
	2015	65	58	41	72
	2016	49	63	54	59
	2017	68	64	49	66

* 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 2013 – 2017

	straight nitrogen	*compound nitrogen*	*total nitrogen*	*total phosphate*	*total potash*	*total sulphur*
2013	28	31	59	9	13	2
2014	30	30	60	10	14	4
2015	27	28	56	9	12	3
2016	28	28	56	9	12	3
2017	28	27	54	8	12	3

In 2017, dressing cover for total nitrogen on grass decreased to 56% (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 71% of the straight N rate of 103 kg/ha.

The overall application rate for phosphate decreased by 1 kg/ha to 8 kg/ha, whereas the potash rate remained unchanged (Table B1.10).

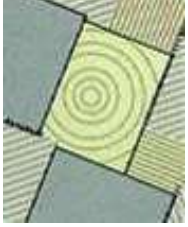


Table B1.11 Dressing cover (%) and average application rate (kg/ha) of fertiliser on grassland, Great Britain 2013 – 2017

Dressing cover (%)

	straight nitrogen	*compound nitrogen*	*total nitrogen*	*total phosphate*	*total potash*	*total sulphur*
2013	28	42	62	42	43	8
2014	29	41	62	41	43	11
2015	27	41	60	41	42	10
2016	27	39	58	38	39	9
2017	27	37	56	37	38	10

Average field rate (kg/ha)

	straight nitrogen	*compound nitrogen*	*total nitrogen*	*total phosphate*	*total potash*	*total sulphur*
2013	100	74	96	22	29	33
2014	104	72	96	24	32	33
2015	100	70	93	22	30	31
2016	105	71	97	23	31	35
2017	103	73	97	23	31	35

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 again decreased by 2% to 39% in 2017 (Table B1.11). The dressing cover percentage of phosphate and potash on grass decreased by 1% to 37% and 38%, respectively in 2017. The five-year means are 40% and 41%, respectively.

In 2017, the average field rates for phosphate and potash remained unchanged at 23 kg/ha and 31 kg/ha, respectively.

B1.3.1 Nitrogen

Cutting and grazing management

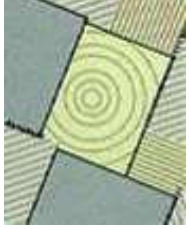
Fertiliser requirements for grassland vary according to the type of livestock enterprise, intensity of production and the associated cutting and grazing regimes used for sward management. Fertiliser use on dairy, other livestock and mixed farms in Great Britain in 2017 are presented in Section C. The Survey estimates of annual distributions of the total grassland area between grazing and cutting management regimes since 2012 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 2013 – 2017

	grazed [1]	*silage* [2]	*hay* [2]
2013	90	28	12
2014	88	29	11
2015	90	29	11
2016	92	28	9
2017	93	29	10

Nearly all grassland is grazed at some stage during the season (Table B1.12) and the proportion in 2017 is slightly above the five-year mean of 91%.

[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 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 2013 – 2017

Total nitrogen

	overall application rate				*average field rate*		
	grazed [1]	*silage* [2]	*hay* [2]		*grazed* [1]	*silage* [2]	*hay* [2]
2013	55	106	44	*2013*	91	124	77
2014	54	104	44	*2014*	90	124	76
2015	51	100	37	*2015*	87	121	75
2016	52	103	38	*2016*	93	127	75
2017	52	100	44	*2017*	94	126	83

Straight nitrogen

	overall application rate				*average field rate*		
	grazed [1]	*silage* [2]	*hay* [2]		*grazed* [1]	*silage* [2]	*hay* [2]
2013	26	50	21	*2013*	94	112	78
2014	26	52	22	*2014*	98	119	79
2015	24	49	17	*2015*	95	114	76
2016	26	53	20	*2016*	102	119	93
2017	26	51	27	*2017*	100	120	91

Compound nitrogen

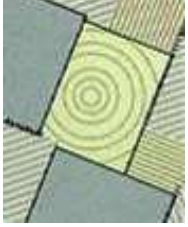
	overall application rate				*average field rate*		
	grazed [1]	*silage* [2]	*hay* [2]		*grazed* [1]	*silage* [2]	*hay* [2]
2013	29	57	23	*2013*	71	96	64
2014	28	52	22	*2014*	70	94	64
2015	26	51	21	*2015*	67	91	64
2016	26	50	18	*2016*	69	95	55
2017	26	49	17	*2017*	71	96	64

In 2017, the overall total nitrogen rate for the grazed category remained unchanged at 52 kg/ha, decreased for silage by 3 kg/ha to 100 kg/ha, and increased for hay by 6 kg/ha to 44 kg/ha. Rates reported on grass cut for hay needs 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 increased slightly for silage but decreased by 2 kg/ha for each of the grazed grass and hay categories in 2017. In contrast, compound nitrogen average rates increased for all grass categories. The five year means for the overall compound nitrogen rate are 27, 52 and 20 kg/ha for grazed grass, silage and hay, respectively.

The fall in nitrogen use over the long term on grassland is likely to be related in part to decreases in ruminant livestock numbers which may have reduced herbage production requirements.

[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 2013 – 2017

Total phosphate

	overall application rate				*average field rate*		
	grazed [1]	*silage* [2]	*hay* [2]		*grazed* [1]	*silage* [2]	*hay* [2]
2013	9	16	8	*2013*	21	28	22
2014	9	15	9	*2014*	23	28	27
2015	8	15	8	*2015*	21	27	23
2016	8	14	8	*2016*	22	28	23
2017	8	14	8	*2017*	23	28	27

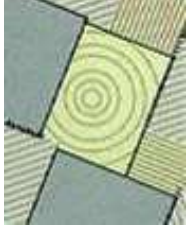
Total potash

	overall application rate				*average field rate*		
	grazed [1]	*silage* [2]	*hay* [2]		*grazed* [1]	*silage* [2]	*hay* [2]
2013	11	27	11	*2013*	27	44	29
2014	12	26	14	*2014*	29	44	36
2015	11	25	11	*2015*	27	42	33
2016	11	24	9	*2016*	29	46	27
2017	11	23	8	*2017*	29	43	29

In 2017, the overall phosphate rate was unchanged across all three grass categories. The corresponding five-year means for grazed grass, silage and hay were 8, 15 and 8 kg/ha, respectively. As in 2016, the slight increase in average field rates on grazed grass suggests that the long-term decline in application rates may be coming to an end.

Overall potash rates in 2017 decreased by 1 kg/ha on grass cut for silage grass and hay, with the rate on grazed grass the same as in 2016. The average field rate of potash decreased by 3 kg/ha on grazed grass, increased by 2 kg/ha on grass cut for hay, and remained unchanged for grazed grass.

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



B1.3.3 Sulphur

In 2017, 10% of the total grassland area received a sulphur dressing (mean 10% for 2013-17 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 slight increase in grass for hay in 2017.

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 2013 – 2017

Dressing cover (%)

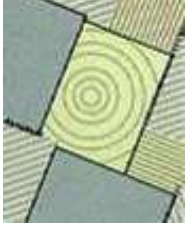
	grazed [1]	*silage* [2]	*hay* [2]	*all grass*
2013	7	16	8	8
2014	10	18	11	11
2015	9	17	6	10
2016	9	16	5	9
2017	9	16	9	10

Average application rate per year (kg/ha SO_3)

	grazed [1]	*silage* [2]	*hay* [2]	*all grass*
2013	31	37	32	33
2014	32	34	28	33
2015	30	34	37	31
2016	35	37	41	35
2017	33	41	42	35

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 2017 average field rates increased for grass cut for silage and hay by 4 kg/ha and 1 kg/ha, whereas the rate declined for grazed grass by 2 kg/ha, to 33 kg/ha. The five-year means are 32, 37 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



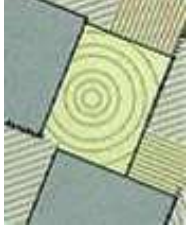
B2 LONGER TERM TRENDS FOR GREAT BRITAIN

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 1978 - 2017 and Scotland and Great Britain 1983 – 2017

	tillage crops			*grass*			*all crops and grass*		
	England & Wales	*Scotland*	*Great Britain*	*England & Wales*	*Scotland*	*Great Britain*	*England & Wales*	*Scotland*	*Great Britain*
1978	105	-	-	113	-	-	114	-	-
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



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 2017 falls outside 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 to 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 84 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 – 2017

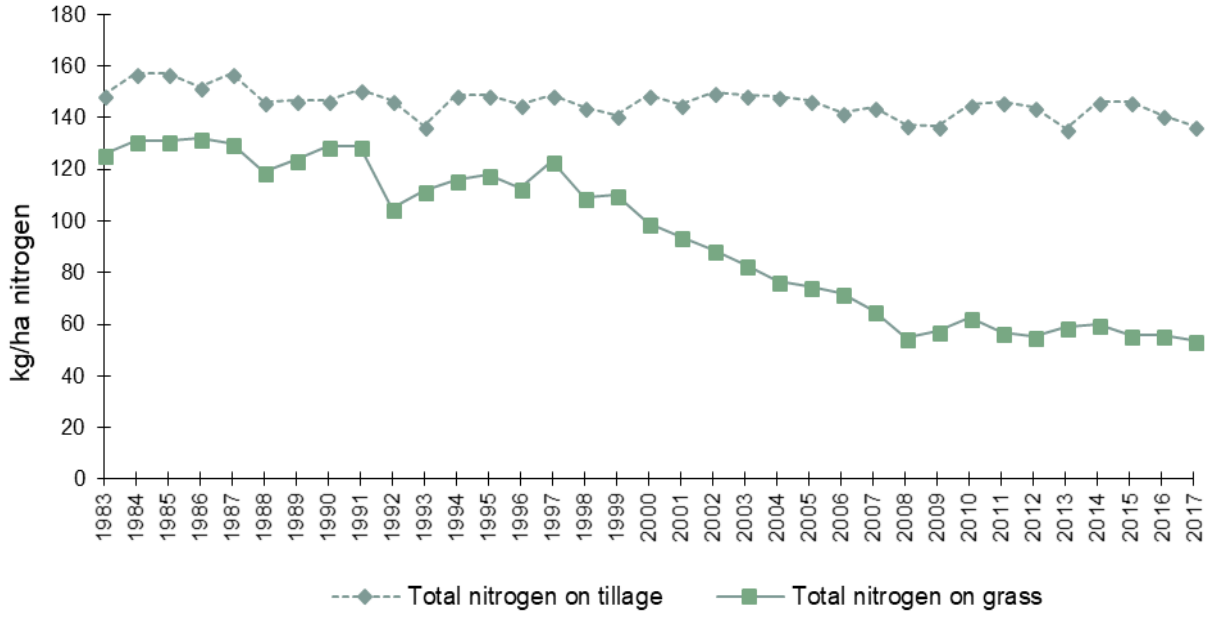
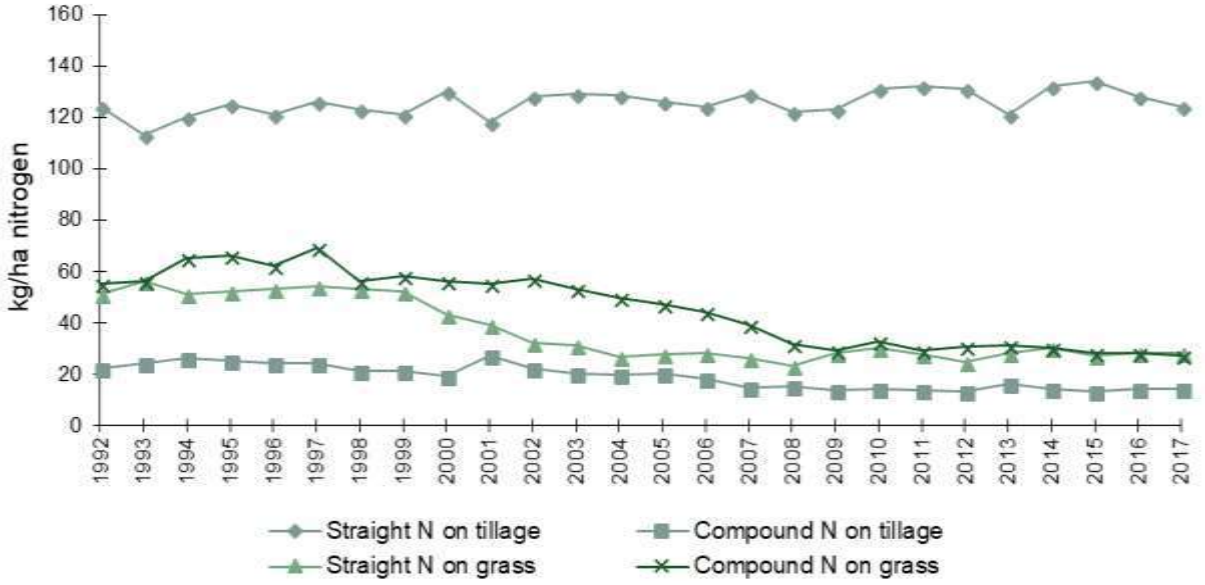


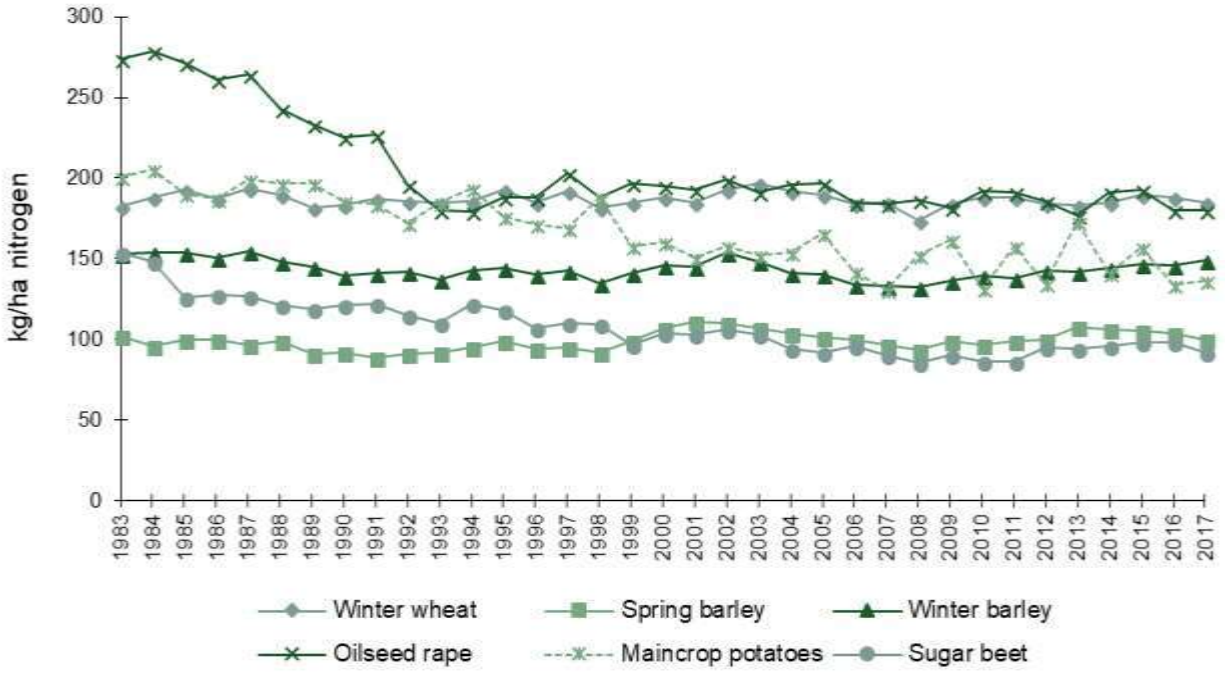
Figure B2.2 Overall application rates (kg/ha) of straight and compound nitrogen on tillage crops and grassland, Great Britain 1992 – 2017

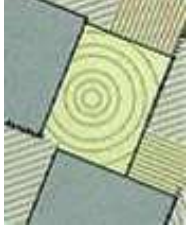


B2.1.1 Nitrogen use on major tillage crops

Overall application rates of total nitrogen on the main arable crops in Great Britain since 1983 are shown in Figure B2.3.

Figure B2.3 Overall application rates (kg/ha) of total nitrogen on major arable crops, Great Britain 1983 – 2017





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 only 3% for both in 2017. 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.

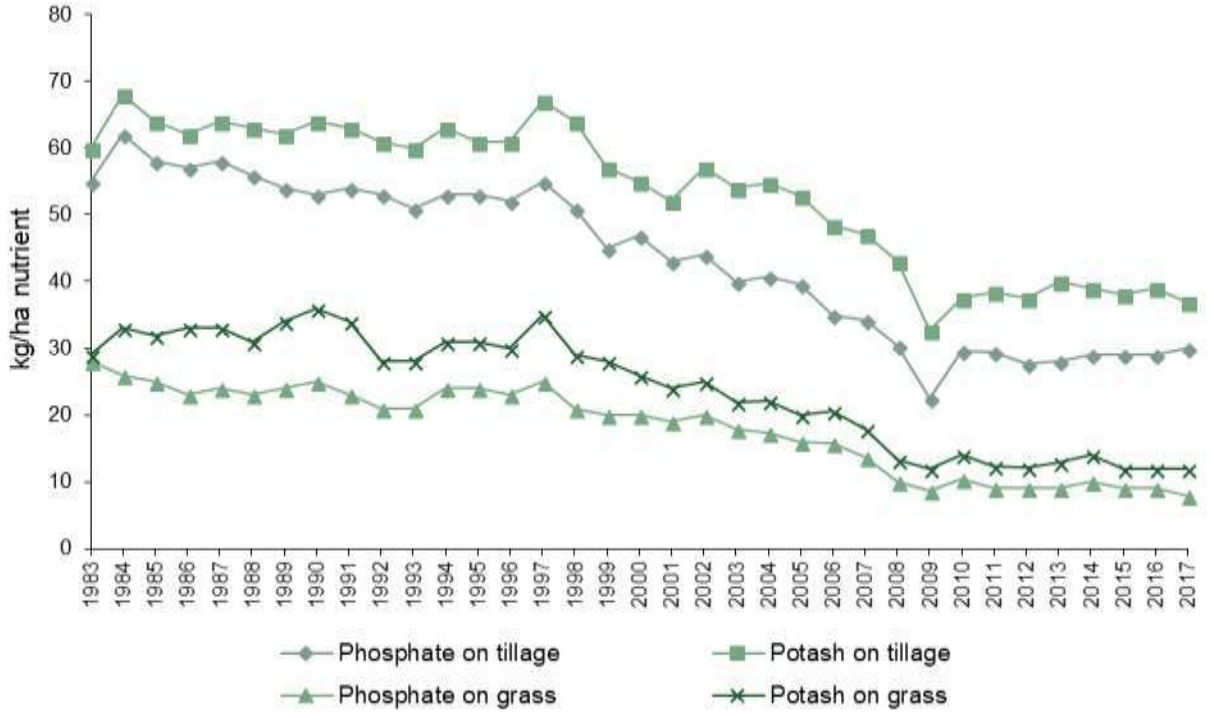
Table B2.2 Dressing cover (% area) of autumn or winter-applied (August to January) nitrogen on winter cereals and winter oilseed rape and average application rate (kg/ha) for winter oilseed rape, England & Wales 1987 – 1998 and Great Britain 1999 – 2017

	winter wheat	*winter barley*	*winter oilseed rape*	
	dressing cover	*dressing cover*	*dressing cover*	*application rate*
England & Wales				
1987	36	43	74	53
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

B2.2 PHOSPHATE AND POTASH USE

Annual overall rates of phosphate and potash on tillage crops and on grassland in Great Britain since 1983 are illustrated in Figure B2.4, using the data presented in Tables B2.3 and B2.4.

Figure B2.4 Overall application rates (kg/ha) phosphate and potash on tillage crops and grassland, Great Britain 1983 – 2017



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 37-40 kg/ha range.

The pattern of overall potash use on grassland has been more variable, compared to tillage crops, but has also shown a net decline between 1983 and 2017. Overall potash rates were relatively stable at 31-33 kg/ha during the mid-late 1980s and in the last five years have been in the 12-14 kg/ha range.

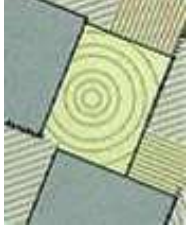


Table B2.3 Overall phosphate application rates (kg/ha), England & Wales 1969 - 2017 and Scotland and Great Britain 1983 – 2017

	tillage crops			*grass*			*all crops and grass*		
	England & Wales	*Scotland*	*Great Britain*	*England & Wales*	*Scotland*	*Great Britain*	*England & Wales*	*Scotland*	*Great Britain*
1969	53	-	-	34	-	-	-	-	-
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

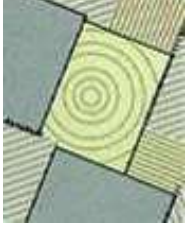
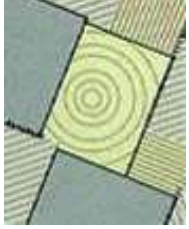


Table B2.4 Overall potash application rates (kg/ha), England & Wales 1969 - 2017 and Scotland and Great Britain 1983 – 2017

	tillage crops			*grass*			*all crops and grass*		
	England & Wales	*Scotland*	*Great Britain*	*England & Wales*	*Scotland*	*Great Britain*	*England & Wales*	*Scotland*	*Great Britain*
1969	61	-	-	23	-	-	-	-	-
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



Overall rates of phosphate and potash applied to tillage crops are nearly three times those used on grassland. However, there is greater use of applied manures on grassland (34% cover) than on tillage crops (25% cover) and grazed grassland also receives manure as it is grazed.

Dressing covers of phosphate and potash on tillage and grass for the period 2004-17 are presented in Tables B2.5a and B2.5b. 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 (28% reduction) in comparison to Scotland where the reduction was 2% 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 B2.5a Phosphate dressing covers (%), Great Britain 2004 – 2017

	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

Table B2.5b Potash dressing covers (%), Great Britain 2004 – 2017

	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

B2.2.1 Phosphate and potash use on major tillage crops

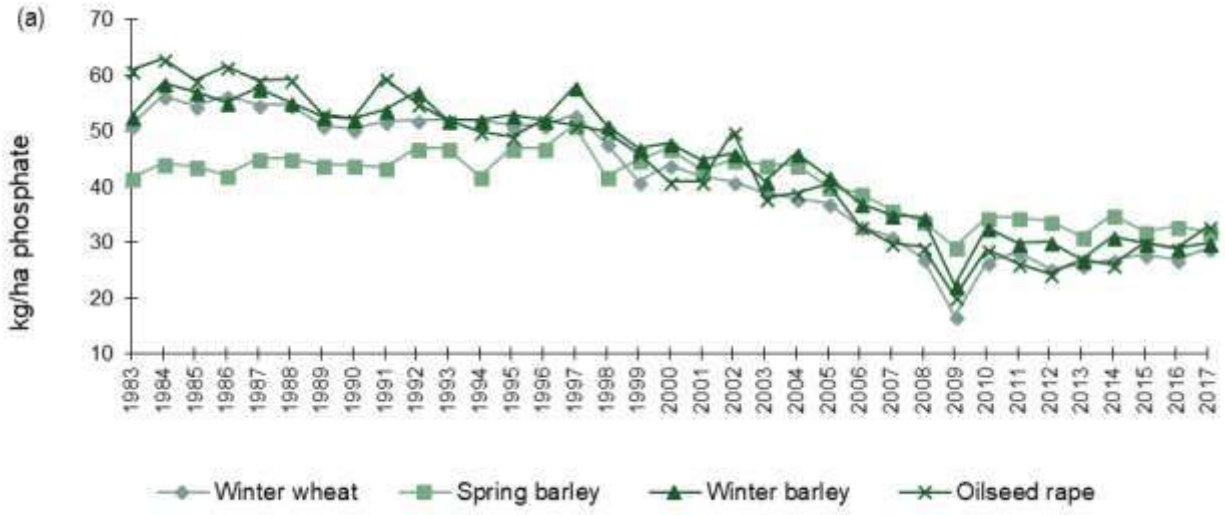
Overall application rates of phosphate and potash on the main arable crops in Great Britain since 1983 are shown in Figure B2.5.

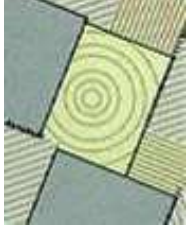
Phosphate use on most major tillage crops has shown a gradual net decline over the survey period. Overall application rates of phosphate have gradually declined on winter wheat and, less consistently, on winter barley since the mid-1980s (Figure B2.5(a)). By 1999, the overall phosphate rate had fallen 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 32 kg/ha by 2017.

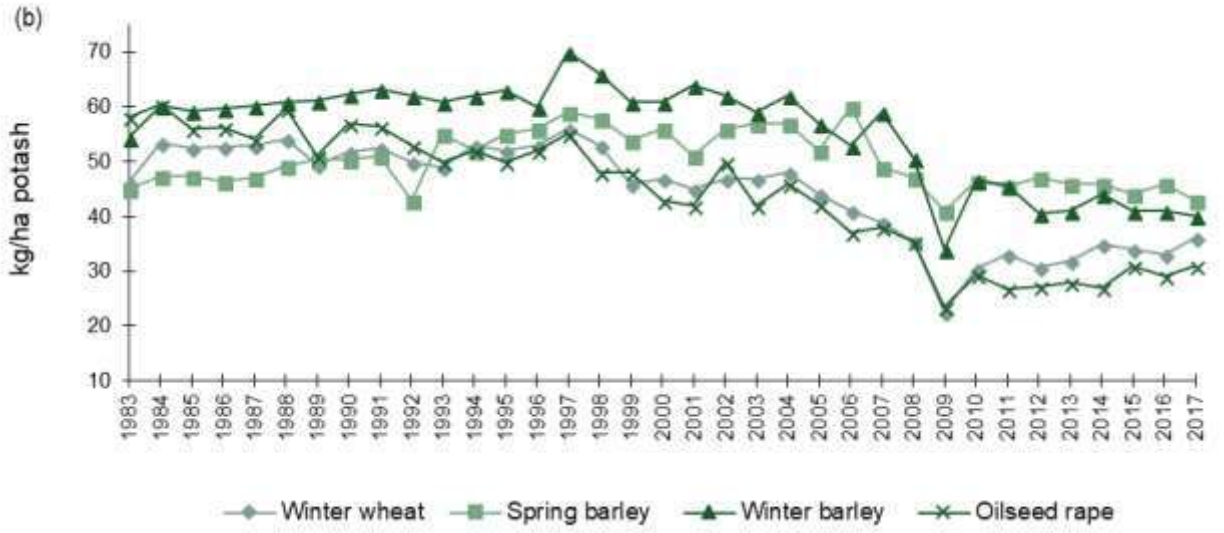
Overall phosphate use has also declined steadily on oilseed rape and sugar beet. Like other crops, the phosphate overall rate dipped in 2009, and to date the rate on sugar beet has not regained the rate reported in 2008, which was 31 kg/ha.

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 and (b) potash on major arable crops, and (c) phosphate and potash on sugar beet and potatoes Great Britain 1983 – 2017






(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
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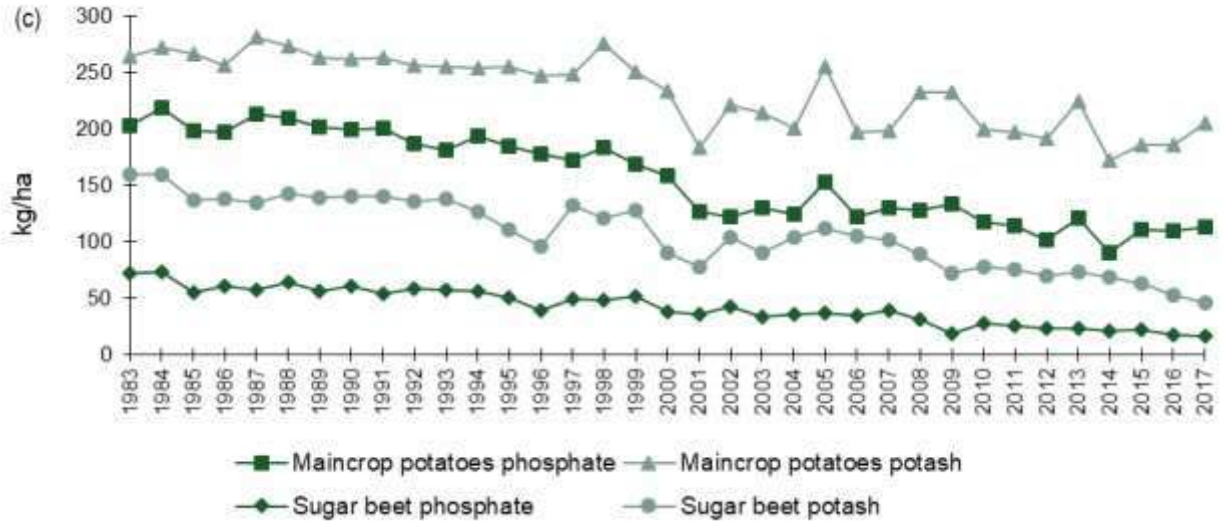
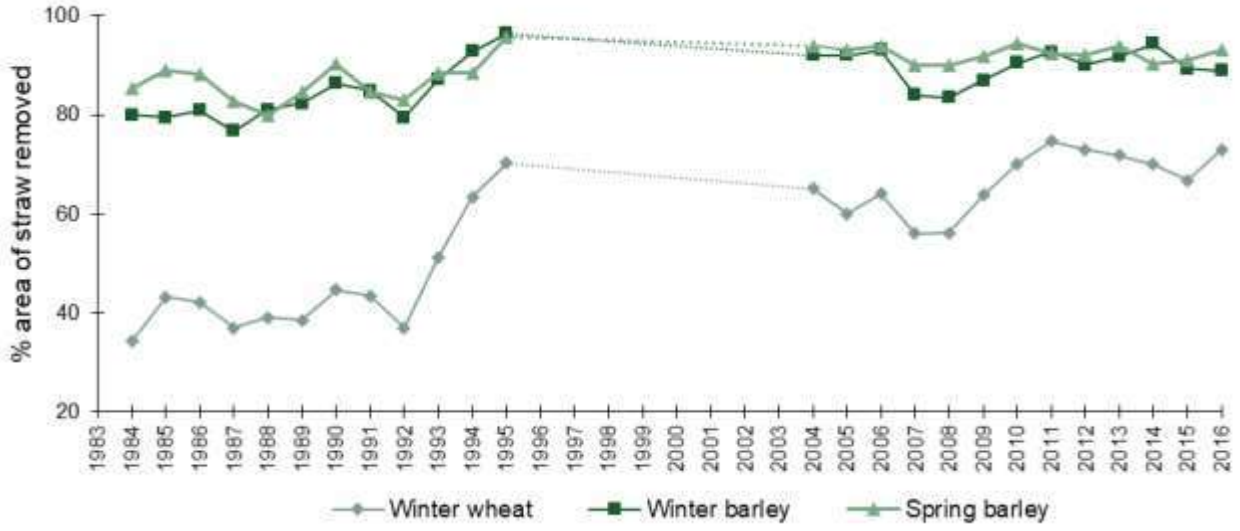
2011
2012
2013
2014
2015
2016
2017
Winter wheat
Spring barley
Winter barley
Oilseed rape


(c)
kg/ha
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
Maincrop potatoes phosphate
Maincrop potatoes potash
Sugar beet phosphate
Sugar beet potash

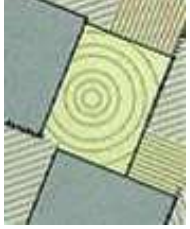
B2.3 STRAW REMOVAL

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 2017 survey related to the fate of the straw from the 2016 harvest so is reported against 2016. In 2016, 73% of the winter wheat straw was removed from the fields, with the percentages for winter and spring barley much higher at 89 and 93%, respectively.

Figure B2.6 Percentage of straw removed from wheat and barley fields, England & Wales harvest years 1985 – 1995, Great Britain harvest years 2004 - 2016



Data for the period 1984-95 were sourced from MAFF/Defra straw disposal surveys, those for the period 2004-16 from this survey. No data are available for the period 1996-03. 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.

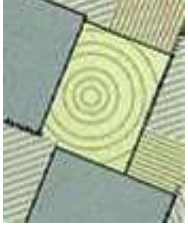


B2.4 TOTAL QUANTITIES OF NITROGEN PHOSPHATE AND POTASH, UK

Table B2.6 Quantities of major nutrients used, United Kingdom 1965-2017

Harvest year	Nitrogen kt N				Phosphate kt P_2O_5				Potash kt K_2O			
	England & Wales	Scotland	N. Ireland	UK	England & Wales	Scotland	N. Ireland	UK	England & Wales	Scotland	N. Ireland	UK
1965	473	72	20	565	369	88	23	479	346	62	17	425
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
2017e	806	157	78	1,040	136	55	8	198	192	80	14	286

Note: Years are harvest (e.g. 2017 refers to the 2016/17 cropping year) rather than calendar years. Data for 2017 are estimates.

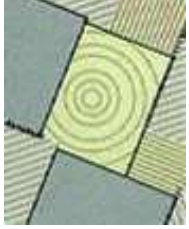


Quantities of nitrogen, phosphate and potash used in the UK since 1965 are shown in Table B2.6. These data are based on BSFP findings and trade and sales data. They are compiled by the Agricultural Industries Confederation in conjunction with Defra using the methodology described in Section A2.5. They are the official figures for fertiliser usage.

Total nitrogen use in the UK increased from 565 thousand tonnes in 1965 up to 1674 thousand tonnes in 1987 before declining gradually to 1001 thousand tonnes in 2008. The drop in 2009 was related to high fertiliser prices. Between 2010 and 2017 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 2017 at 184-201 thousand tonnes, but use is still approximately half that compared to use between 1965 and 1985. The low use of 129 thousand 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 2017 has been between 251-286 thousand tonnes, which is around half that used at its peak. The low use of 208 thousand tonnes in 2009 was price related.



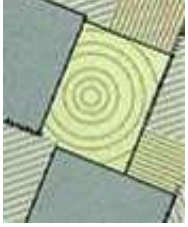
SECTION C – TABLES

CONTENTS

GREAT BRITAIN TABLES 2017

ENGLAND AND WALES TABLES 2017

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 2017

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.

Table GB1.1 Total fertiliser use, Great Britain 2017

	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	N	P_2O_5	K_2O	
Spring wheat	98	50	39	57	13	132	57	43	129	28	17	78
Winter wheat	99	46	47	69	22	188	64	75	185	29	36	1249
Spring barley	97	66	70	55	31	103	49	62	100	32	43	618
Winter barley	98	50	54	66	22	152	60	74	149	30	40	441
Oats	79	42	39	44	22	101	50	64	79	21	25	208
Rye/triticale/Durum wheat	78	26	26	57	32	128	-	-	99	-	-	20
Potatoes (seed or earlies)	97	88	76	24	37	108	110	164	105	97	124	16
Potatoes (maincrop)	100	88	91	20	26	136	130	226	136	114	206	70
Sugar beet	96	43	59	53	46	96	40	78	92	17	46	81
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	-	4
Winter oilseed rape	100	57	48	77	18	181	58	64	180	33	31	437
Linseed	91	28	32	43	19	85	57	51	77	16	16	29
Forage maize	81	56	24	20	82	72	60	80	58	33	19	143
Rootcrops for stockfeed	84	52	63	25	45	82	56	74	68	29	47	43
Leafy forage crops	87	59	67	34	37	91	53	57	79	31	38	34
Arable silage/other fodder crops	28	18	19	13	33	104	42	63	29	8	12	81
Peas - human consumption	0	27	36	2	0	-	79	73	-	21	26	35
Peas - animal consumption	0	39	44	16	0	-	51	63	-	20	28	33
Beans - animal consumption	1	33	34	3	8	-	51	61	-	17	21	223
Vegetables (brassicae)	100	100	100	12	5	94	72	149	94	72	149	10
Vegetables (other)	27	42	20	13	6	85	54	180	23	23	37	26
Soft Fruit	97	0	46	44	0	76	-	-	74	-	-	8
Top Fruit	78	33	30	13	0	93	-	-	73	-	-	24
Other tillage	38	23	30	16	32	79	47	101	30	11	30	37
All tillage	89	50	50	57	25	154	59	74	137	30	37	3948
Grass under 5 years old	82	51	53	19	46	128	30	44	105	15	24	840
Grass 5 years and over	51	34	35	8	31	86	21	26	44	7	9	1873
All grass	56	37	38	10	34	97	23	31	54	8	12	2713
All crops and grass	71	43	43	31	30	128	41	53	91	18	23	6661

Source: British Survey of Fertiliser Practice 2017

Table GB1.2 Use of straight fertiliser, Great Britain 2017

	Crop area receiving dressing (%)			Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring wheat	94	21	15	126	80	56	119	16	8	78
Winter wheat	96	16	18	184	69	80	177	11	15	1249
Spring barley	75	6	12	93	68	64	70	4	7	618
Winter barley	95	13	17	147	62	77	140	8	13	441
Oats	70	8	7	96	56	62	67	4	4	208
Rye/triticale/Durum wheat	78	0	0	128	-	-	99	-	-	20
Potatoes (seed or earlies)	18	2	7	80	-	-	14	-	-	16
Potatoes (maincrop)	43	6	33	91	-	199	39	-	65	70
Sugar beet	94	11	26	88	67	101	83	7	26	81
Spring oilseed rape	-	-	-	-	-	-	-	-	-	4
Winter oilseed rape	98	16	17	175	62	76	171	10	13	437
Linseed	91	8	15	82	-	43	75	-	6	29
Forage maize	57	5	11	73	64	111	41	3	12	143
Rootcrops for stockfeed	36	7	14	88	-	137	32	-	19	43
Leafy forage crops	45	5	6	88	-	-	40	-	-	34
Arable silage/other fodder crops	14	1	2	104	-	-	15	-	-	81
Peas - human consumption	0	14	27	-	88	61	-	12	16	35
Peas - animal consumption	0	19	24	-	51	71	-	10	17	33
Beans - animal consumption	0	12	13	-	54	64	-	6	8	223
Vegetables (brassicae)	81	4	9	72	-	-	58	-	-	10
Vegetables (other)	14	25	12	-	49	80	-	12	10	26
Soft Fruit	96	0	45	-	-	-	-	-	-	8
Top Fruit	65	11	8	106	-	-	69	-	-	24
Other tillage	20	0	7	86	-	-	17	-	-	37
All tillage	81	13	16	152	66	80	124	8	13	3948
Grass under 5 years old	48	2	3	123	49	62	60	1	2	840
Grass 5 years and over	22	0	0	94	69	81	21	0	0	1873
All grass	27	1	1	103	55	71	28	0	1	2713
All crops and grass	51	6	7	138	65	79	70	4	6	6661

Source: British Survey of Fertiliser Practice 2017

Table GB1.3 Use of compound fertiliser, Great Britain 2017

	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	24	29	24	42	41	34	10	12	8	78
Winter wheat	10	30	30	80	59	69	8	18	21	1249
Spring barley	54	60	59	56	47	60	30	28	36	618
Winter barley	12	37	38	67	57	70	8	21	27	441
Oats	21	35	34	58	48	61	12	17	21	208
Rye/triticale/Durum wheat	0	26	26	-	-	-	-	-	-	20
Potatoes (seed or earlies)	88	88	70	104	108	157	91	95	110	16
Potatoes (maincrop)	82	82	77	119	133	183	97	109	141	70
Sugar beet	23	33	39	42	30	51	10	10	20	81
Spring oilseed rape	-	-	-	-	-	-	-	-	-	4
Winter oilseed rape	29	43	33	34	55	54	10	24	18	437
Linseed	5	21	18	-	66	57	-	14	10	29
Forage maize	51	50	14	33	59	49	17	30	7	143
Rootcrops for stockfeed	55	46	50	66	51	55	37	23	27	43
Leafy forage crops	54	54	61	72	53	57	39	29	35	34
Arable silage/other fodder crops	15	17	17	92	42	61	14	7	11	81
Peas - human consumption	0	13	13	-	71	75	-	9	10	35
Peas - animal consumption	0	20	20	-	51	53	-	10	11	33
Beans - animal consumption	0	21	21	-	49	60	-	10	12	223
Vegetables (brassicae)	94	96	96	38	73	147	36	71	141	10
Vegetables (other)	18	18	13	52	60	-	9	11	-	26
Soft Fruit	2	0	2	-	-	-	-	-	-	8
Top Fruit	22	22	22	-	-	-	-	-	-	24
Other tillage	19	23	23	68	47	85	13	11	19	37
All tillage	24	38	36	59	55	67	14	21	24	3948
Grass under 5 years old	49	48	51	91	29	43	45	14	22	840
Grass 5 years and over	34	34	34	67	20	25	23	7	9	1873
All grass	37	37	37	73	22	30	27	8	11	2713
All crops and grass	31	37	37	68	37	46	21	14	17	6661

Source: British Survey of Fertiliser Practice 2017

Table GB1.4 Use of lime, Great Britain 2017

	Crop area receiving dressing (%)						Average application rate (tonnes of product/ha)							
	Ground limestone	Ground chalk	Magnesian limestone	Sugar beet lime	Other	All	Ground limestone	Ground chalk	Magnesian limestone	Sugar beet lime	Other	All	Fields limed	Fields in sample
Spring wheat	7.6	-	-	-	-	7.6	3.5	-	-	-	-	3.5	8	78
Winter wheat	5.5	0.5	1.0	0.1	0.8	7.8	4.0	3.1	4.9	4.5	0.6	3.7	89	1249
Spring barley	6.1	0.1	1.3	0.2	1.6	9.3	4.7	5.0	4.6	4.0	0.6	4.0	76	618
Winter barley	6.8	0.1	0.7	0.1	1.2	8.9	4.3	5.0	5.0	3.8	0.3	3.8	42	441
Oats	1.5	1.2	-	0.1	1.2	4.0	3.8	4.9	-	3.8	0.9	3.3	13	208
Rye/triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	-	-	0	20
Potatoes (seed or earlies)	-	-	-	-	-	-	-	-	-	-	-	-	0	16
Potatoes (maincrop)	-	-	-	-	-	-	-	-	-	-	-	-	1	70
Sugar beet	2.2	4.7	-	9.4	0.8	17.1	0.5	3.1	-	6.0	0.3	4.2	20	81
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	-	-	0	4
Winter oilseed rape	5.7	0.2	0.7	0.4	0.6	7.5	3.5	4.8	5.4	7.8	0.7	3.7	39	437
Linseed	-	-	-	-	-	-	-	-	-	-	-	-	2	29
Forage maize	9.0	-	-	-	0.2	9.2	4.3	-	-	-	0.4	4.2	17	143
Rootcrops for stockfeed	14.5	3.9	2.9	-	-	21.3	4.4	4.9	2.5	-	-	4.3	7	43
Leafy forage crops	12.0	-	-	-	12.2	24.2	5.0	-	-	-	0.5	2.8	7	34
Arable silage/other fodder crops	-	-	-	-	-	-	-	-	-	-	-	-	4	81
Peas - human consumption	-	-	-	-	-	-	-	-	-	-	-	-	3	35
Peas - animal consumption	-	-	-	-	-	-	-	-	-	-	-	-	1	33
Beans - animal consumption	-	-	-	-	-	-	-	-	-	-	-	-	2	223
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	-	-	3	10
Vegetables (other)	-	-	-	-	-	-	-	-	-	-	-	-	4	26
Soft Fruit	-	-	-	-	-	-	-	-	-	-	-	-	0	8
Top Fruit	-	-	-	-	-	-	-	-	-	-	-	-	3	24
Other tillage	-	-	-	-	-	-	-	-	-	-	-	-	1	37
All tillage	5.5	0.4	0.8	0.3	1.0	8.1	4.2	3.7	4.9	5.7	0.6	3.8	342	3948
Grass under 5 years old	5.6	0.0	0.8	0.3	0.5	7.2	3.9	3.1	4.3	3.8	0.6	3.7	77	840
Grass 5 years and over	1.3	0.0	0.3	-	0.3	2.0	4.0	2.9	4.7	-	1.2	3.6	79	1873
All grass	2.1	0.0	0.4	0.0	0.3	2.9	3.9	2.9	4.6	3.8	1.1	3.7	156	2713
All crops and grass	3.6	0.2	0.6	0.2	0.6	5.2	4.1	3.6	4.8	5.4	0.7	3.8	498	6661

Source: British Survey of Fertiliser Practice 2017

Table GB2.1 Average fertiliser practice by grassland utilisation, Great Britain 2017

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Grazed not mown	47	32	33	18	75	19	21	35	6	7	1275
Grazed mown	71	46	47	59	118	28	41	84	13	19	1161
All grazings	55	37	37	32	94	23	29	52	8	11	2436
Cut for silage - grazed	78	52	53	67	124	28	42	97	15	22	878
Cut for silage - not grazed	84	42	52	73	132	25	47	112	11	24	186
All cut for silage	79	50	53	68	126	28	43	100	14	23	1064
Cut for hay - grazed	51	28	27	39	82	27	28	42	8	8	326
Cut for hay - not grazed	69	43	43	12	91	27	34	63	11	15	63
All cut for hay	53	30	29	35	83	27	29	44	8	8	389
All mowings	73	46	48	60	119	28	41	87	13	20	1403
All grass	56	37	38	34	97	23	31	54	8	12	2713

Source: British Survey of Fertiliser Practice 2017

Table GB3.0 Product use by month of application, Great Britain 2017

(a) Product use

row %	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Straight N	0	0	0	0	0	4	34	38	15	4	2	1
Straight P	8	11	9	1	0	9	25	25	7	0	0	4
Straight K	5	8	5	2	3	13	34	23	3	0	2	1
Compounds	7	4	1	0	0	4	19	34	16	6	4	4
All fertilisers	3	2	1	0	0	4	29	36	15	4	3	2

(b) Nutrient use

row %	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Nitrogen	1	0	0	0	0	3	29	40	17	5	3	2
Phosphate	9	7	5	1	1	6	23	30	11	3	2	5
Potash	6	7	3	1	1	7	25	30	11	4	2	3
Total	3	2	1	0	0	4	28	37	15	4	3	2

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

'Product' refers to the total tonnage of the products used by the farmers in the survey year 2017.

'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 2017

Table GB3.1 Product type as percentage of all product used by crop group, Great Britain 2017

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	34.0	45.4	8.0	25.3	40.6	17.8	38.9	30.4	36.4	31.8	15.5	32.0	37.3
Urea	7.5	13.1	3.1	6.2	15.8	5.2	11.5	5.5	8.3	5.0	0.0	5.7	10.1
Calcium Ammonium Nitrate (CAN)	0.5	0.6	0.0	1.7	0.9	3.7	0.8	1.7	2.2	1.4	0.0	1.5	1.0
Urea Ammonium Nitrate (UAN)	10.9	13.9	1.2	7.8	15.5	5.1	12.4	1.8	1.8	2.0	45.0	2.1	9.9
Other Straight N	1.1	1.8	6.4	0.7	3.2	1.0	2.1	1.1	0.5	1.2	0.0	0.9	1.8
Triple Superphosphate (TSP)	2.6	3.2	1.4	1.9	2.3	5.9	3.0	0.7	1.7	0.7	4.8	0.7	2.5
Other Straight P	0.1	0.2	0.0	1.0	0.5	0.2	0.2	0.2	0.0	0.2	0.0	0.2	0.2
Muriate of Potash (MOP)	2.8	3.3	11.9	1.7	2.8	8.6	3.8	0.7	0.6	0.8	8.3	0.8	3.1
Other Straight K	0.7	0.4	1.5	25.0	0.4	2.2	1.2	0.1	0.0	0.1	0.0	0.1	0.9
PK	6.1	10.5	1.2	16.8	5.6	14.7	9.1	2.5	2.9	2.2	0.0	2.3	7.5
NK	2.5	2.0	0.0	3.1	1.9	2.7	2.0	5.8	2.8	9.0	0.0	6.4	3.1
Low N (<19% N)	16.6	2.6	62.6	2.3	8.2	21.6	9.6	4.7	4.1	3.8	12.1	4.5	8.3
High N (>=19% N)	13.2	2.1	2.0	3.1	0.9	8.9	4.1	44.6	38.4	41.7	14.3	42.6	13.3
Other	1.4	0.9	0.8	3.3	1.4	2.4	1.2	0.2	0.4	0.2	0.0	0.2	0.9
Total product ('000 tonnes)	**449**	**1592**	**71**	**49**	**429**	**127**	**2716**	**1049**	**95**	**638**	**4**	**1186**	**3902**

Source: British Survey of Fertiliser Practice 2017

Table GB3.2 Use of product type by crop group, Great Britain 2017

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	14.2	65.7	0.4	1.1	16.4	2.1	72.7	83.7	9.8	55.0	0.2	27.3	1367
Urea	10.4	65.6	0.4	1.5	19.5	2.6	88.1	91.6	8.5	48.8	0.0	11.9	392
Calcium Ammonium Nitrate (CAN)	8.9	32.9	0.0	1.9	11.8	44.5	42.5	100.0	18.6	63.0	0.0	57.5	53
Urea Ammonium Nitrate (UAN)	12.3	65.7	0.2	0.8	18.9	2.1	95.5	87.6	3.5	50.4	7.0	4.5	418
Other Straight N	5.5	67.8	5.3	1.5	19.1	0.8	88.5	100.0	4.1	62.0	0.0	11.5	73
Triple Superphosphate (TSP)	13.3	63.1	0.8	1.5	13.8	7.5	94.6	87.3	13.5	48.1	6.1	5.4	85
Other Straight P	11.5	34.0	0.0	2.7	47.5	4.3	88.5	100.0	0.0	70.8	0.0	11.5	9
Muriate of Potash (MOP)	12.8	55.7	6.8	1.1	12.7	10.9	94.2	63.7	3.3	65.4	6.1	5.8	91
Other Straight K	6.9	32.5	2.0	38.4	12.7	7.5	96.4	50.2	0.0	80.4	0.0	3.6	31
PK	8.8	70.3	0.1	3.0	10.4	7.5	91.5	95.8	16.2	45.1	0.0	8.5	270
NK	33.0	42.1	0.0	2.7	13.5	8.7	41.5	72.7	1.3	83.8	0.0	58.5	95
Low N (<19% N)	40.7	12.4	20.2	1.1	14.8	10.7	87.8	87.0	7.6	49.4	0.5	12.2	288
High N (>=19% N)	43.4	44.8	2.2	0.8	1.7	7.2	16.2	92.0	6.8	50.5	0.1	83.8	694
Other	16.4	47.6	0.2	3.8	22.0	9.9	96.9	100.0	8.0	65.6	0.0	3.1	36
All Fertilisers	**16.5**	**58.6**	**2.6**	**1.8**	**15.8**	**4.7**	**69.6**	**88.4**	**8.0**	**53.8**	**0.3**	**30.4**	**3902**

Source: British Survey of Fertiliser Practice 2017

Table GB3.3 Product use by month of application, Great Britain 2017

row %	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	total product ('000 tonnes)
Ammonium Nitrate	0.1	3.1	30.3	39.5	16.6	4.7	3.3	1.4	0.6	0.4	0.0	0.1	1367
Urea	0.3	5.1	42.0	34.0	13.1	3.9	1.2	0.1	0.3	0.1	0.0	0.0	392
Calcium Ammonium Nitrate (CAN)	0.1	0.9	25.4	18.1	24.5	9.1	11.5	7.4	3.1	0.0	0.0	0.0	53
Urea Ammonium Nitrate (UAN)	0.0	3.4	34.7	45.3	14.1	1.2	0.3	0.7	0.2	0.1	0.0	0.0	418
Other Straight N	0.0	6.1	62.8	19.7	6.2	3.4	0.3	0.1	0.4	1.0	0.0	0.0	73
Triple Superphosphate (TSP)	0.3	9.7	25.3	25.8	7.1	0.4	0.5	0.9	8.5	11.4	9.0	1.1	85
Other Straight P	0.0	4.8	16.0	11.9	7.0	0.0	0.0	35.7	11.1	0.0	12.6	0.9	9
Muriate of Potash (MOP)	1.4	13.5	35.0	26.2	3.9	0.6	0.2	0.8	1.2	10.0	5.4	1.6	91
Other Straight K	7.3	13.4	31.6	13.7	1.7	0.0	8.4	0.0	14.6	2.2	4.7	2.3	31
PK	1.4	8.9	20.9	8.2	2.2	1.4	0.4	6.3	25.4	15.8	7.3	1.9	270
NK	0.0	2.0	15.9	22.1	23.7	19.7	9.3	6.8	0.5	0.0	0.0	0.0	95
Low N (<19% N)	0.3	3.0	23.4	45.9	11.8	0.6	1.0	5.7	5.4	2.9	0.0	0.0	288
High N (>=19% N)	0.0	2.2	17.5	40.7	21.7	8.4	6.4	2.4	0.8	0.0	0.0	0.0	694
Other	0.0	1.6	77.7	6.7	9.9	0.0	0.0	0.0	0.0	0.8	2.3	1.0	36
All Fertilisers	**0.3**	**4.0**	**29.1**	**35.8**	**14.9**	**4.5**	**3.0**	**2.2**	**3.0**	**2.0**	**0.9**	**0.2**	**3902**

Source: British Survey of Fertiliser Practice 2017

Table GB4.1 Average fertiliser practice on cereal farms, Great Britain 2017

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring wheat	97	52	36	6	134	65	48	130	34	17	48
Winter wheat	99	48	45	17	191	65	74	188	31	34	711
Spring barley	97	51	54	16	114	56	69	111	29	37	235
Winter barley	96	48	47	15	156	62	71	150	30	33	196
Oats	91	50	39	11	101	49	58	92	25	23	83
Rye/triticale/Durum wheat	72	0	0	29	95	-	-	69	-	-	7
Potatoes (seed or earlies)	-	-	-	-	-	-	-	-	-	-	0
Potatoes (maincrop)	100	83	93	51	141	165	285	141	137	264	16
Sugar beet	89	50	61	35	112	37	60	100	18	36	29
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	4
Winter oilseed rape	100	59	46	17	179	59	64	178	35	30	295
Linseed	90	25	30	15	83	64	52	75	16	16	24
Forage maize	95	79	16	75	84	60	-	79	47	-	17
Rootcrops for stockfeed	100	18	76	27	100	-	-	100	-	-	6
Leafy forage crops	-	-	-	-	-	-	-	-	-	-	3
Arable silage/other fodder crops	26	14	13	3	127	-	-	33	-	-	23
Peas - human consumption	0	29	43	0	-	62	72	-	18	31	20
Peas - animal consumption	0	41	44	0	-	48	59	-	20	26	22
Beans - animal consumption	1	33	34	6	-	49	60	-	17	20	152
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	0
Vegetables (other)	7	38	4	4	-	61	-	-	23	-	12
Soft Fruit	-	-	-	-	-	-	-	-	-	-	2
Top Fruit	-	-	-	-	-	-	-	-	-	-	0
Other tillage	57	20	25	17	62	-	-	35	-	-	17
All tillage	89	49	45	16	165	61	71	147	30	32	1922
Grass under 5 years old	71	12	19	26	129	45	70	92	5	13	106
Grass 5 years and over	43	15	13	5	94	34	34	41	5	4	275
All grass	48	14	14	8	103	35	42	50	5	6	381
All crops and grass	83	44	40	15	160	60	69	133	26	28	2303

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

Source: British Survey of Fertiliser Practice 2017

Table GB4.2 Average fertiliser practice on general cropping and horticultural farms, Great Britain 2017

	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	44	44	0	114	29	27	114	13	12	13
Winter wheat	98	40	51	21	183	68	82	180	27	42	238
Spring barley	100	72	81	17	97	41	63	97	29	51	107
Winter barley	100	50	71	8	141	63	86	141	32	61	75
Oats	64	18	21	8	113	65	78	72	11	16	25
Rye/triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	3
Potatoes (seed or earlies)	100	89	75	43	104	106	161	104	94	121	12
Potatoes (maincrop)	100	90	88	17	131	108	200	131	97	177	41
Sugar beet	100	37	58	51	87	41	82	87	15	48	46
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	0
Winter oilseed rape	98	56	57	18	191	53	63	188	30	36	76
Linseed	-	-	-	-	-	-	-	-	-	-	3
Forage maize	76	31	13	50	75	69	-	56	22	-	18
Rootcrops for stockfeed	-	-	-	-	-	-	-	-	-	-	4
Leafy forage crops	-	-	-	-	-	-	-	-	-	-	3
Arable silage/other fodder crops	-	-	-	-	-	-	-	-	-	-	4
Peas - human consumption	0	27	29	0	-	-	76	-	-	22	14
Peas - animal consumption	0	48	56	0	-	-	-	-	-	-	7
Beans - animal consumption	0	22	32	13	-	59	69	-	13	22	29
Vegetables (brassicae)	100	100	100	6	104	80	169	104	80	169	8
Vegetables (other)	-	-	-	-	-	-	-	-	-	-	4
Soft Fruit	100	0	47	0	76	-	-	76	-	-	5
Top Fruit	83	35	32	0	93	-	-	77	-	-	21
Other tillage	52	44	57	0	92	-	101	48	-	58	12
All tillage	92	50	58	18	142	59	85	131	29	50	768
Grass under 5 years old	84	63	70	17	99	37	50	83	23	35	63
Grass 5 years and over	42	30	30	19	86	24	33	36	7	10	136
All grass	50	37	39	18	91	28	39	46	11	15	199
All crops and grass	81	46	53	18	134	52	76	109	24	41	967

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 2017

Table GB4.3 Average fertiliser practice on dairy farms, Great Britain 2017

	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	86	86	53	122	-	-	122	-	-	6
Winter wheat	97	24	31	50	169	42	47	164	10	14	67
Spring barley	92	66	68	93	76	29	34	70	19	23	45
Winter barley	100	37	54	56	155	35	61	155	13	33	35
Oats	72	35	35	63	115	-	-	84	-	-	13
Rye/triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	1
Potatoes (seed or earlies)	-	-	-	-	-	-	-	-	-	-	2
Potatoes (maincrop)	-	-	-	-	-	-	-	-	-	-	0
Sugar beet	-	-	-	-	-	-	-	-	-	-	1
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	0
Winter oilseed rape	-	-	-	-	-	-	-	-	-	-	3
Linseed	-	-	-	-	-	-	-	-	-	-	0
Forage maize	70	49	34	97	63	64	57	44	31	19	66
Rootcrops for stockfeed	-	-	-	-	-	-	-	-	-	-	3
Leafy forage crops	-	-	-	-	-	-	-	-	-	-	3
Arable silage/other fodder crops	17	17	18	90	-	-	46	-	-	8	26
Peas - human consumption	-	-	-	-	-	-	-	-	-	-	0
Peas - animal consumption	-	-	-	-	-	-	-	-	-	-	0
Beans - animal consumption	0	26	33	0	-	-	-	-	-	-	6
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	1
Vegetables (other)	-	-	-	-	-	-	-	-	-	-	1
Soft Fruit	-	-	-	-	-	-	-	-	-	-	0
Top Fruit	-	-	-	-	-	-	-	-	-	-	0
Other tillage	-	-	-	-	-	-	-	-	-	-	0
All tillage	81	42	42	73	118	43	47	95	18	20	279
Grass under 5 years old	91	39	42	83	174	28	56	158	11	23	177
Grass 5 years and over	77	40	41	62	136	20	37	104	8	15	253
All grass	81	40	41	69	149	23	43	121	9	18	430
All crops and grass	81	40	42	70	143	26	44	116	11	18	709

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

Source: British Survey of Fertiliser Practice 2017

Table GB4.4 Average fertiliser practice on other livestock farms, Great Britain 2017

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring wheat	-	-	-	-	-	-	-	-	-	-	3
Winter wheat	94	22	39	67	137	44	69	128	10	26	37
Spring barley	96	87	90	64	83	47	53	79	41	47	97
Winter barley	96	50	54	64	135	54	75	129	27	41	44
Oats	70	47	47	49	86	36	41	60	17	19	38
Rye/triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	0
Potatoes (seed or earlies)	-	-	-	-	-	-	-	-	-	-	0
Potatoes (maincrop)	-	-	-	-	-	-	-	-	-	-	2
Sugar beet	-	-	-	-	-	-	-	-	-	-	1
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	0
Winter oilseed rape	-	-	-	-	-	-	-	-	-	-	2
Linseed	-	-	-	-	-	-	-	-	-	-	0
Forage maize	75	65	10	92	50	54	-	38	36	-	20
Rootcrops for stockfeed	79	74	62	31	68	53	53	54	39	33	16
Leafy forage crops	87	70	84	42	78	54	55	68	38	46	20
Arable silage/other fodder crops	37	51	51	39	69	56	52	26	29	26	17
Peas - human consumption	-	-	-	-	-	-	-	-	-	-	0
Peas - animal consumption	-	-	-	-	-	-	-	-	-	-	1
Beans - animal consumption	-	-	-	-	-	-	-	-	-	-	4
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	0
Vegetables (other)	-	-	-	-	-	-	-	-	-	-	1
Soft Fruit	-	-	-	-	-	-	-	-	-	-	0
Top Fruit	-	-	-	-	-	-	-	-	-	-	1
Other tillage	-	-	-	-	-	-	-	-	-	-	2
All tillage	87	65	65	62	97	52	62	85	34	40	306
Grass under 5 years old	79	63	63	40	103	29	37	81	18	23	332
Grass 5 years and over	46	35	35	31	71	20	23	33	7	8	943
All grass	50	38	39	32	77	21	26	38	8	10	1275
All crops and grass	52	39	40	34	79	24	29	41	10	12	1581

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 2017

Table GB4.5 Average fertiliser practice on mixed farms, Great Britain 2017

	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	24	24	45	178	-	-	168	-	-	8
Winter wheat	98	53	59	41	199	56	76	195	30	45	179
Spring barley	95	82	83	52	101	50	61	96	41	51	126
Winter barley	100	61	61	37	154	56	71	154	34	44	85
Oats	72	51	53	33	104	56	83	75	29	44	48
Rye/triticale/Durum wheat	81	52	52	34	-	-	-	-	-	-	8
Potatoes (seed or earlies)	-	-	-	-	-	-	-	-	-	-	2
Potatoes (maincrop)	100	79	100	6	130	175	265	130	139	264	11
Sugar beet	-	-	-	-	-	-	-	-	-	-	4
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	0
Winter oilseed rape	100	47	45	27	184	62	70	184	29	32	56
Linseed	-	-	-	-	-	-	-	-	-	-	2
Forage maize	100	46	34	71	82	46	106	82	21	37	21
Rootcrops for stockfeed	94	46	56	90	87	69	64	81	32	36	14
Leafy forage crops	77	64	64	36	-	-	-	-	-	-	5
Arable silage/other fodder crops	49	19	33	43	71	-	-	35	-	-	11
Peas - human consumption	-	-	-	-	-	-	-	-	-	-	1
Peas - animal consumption	-	-	-	-	-	-	-	-	-	-	3
Beans - animal consumption	0	41	38	12	-	54	62	-	22	24	31
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	1
Vegetables (other)	32	43	43	9	-	-	-	-	-	-	8
Soft Fruit	-	-	-	-	-	-	-	-	-	-	1
Top Fruit	-	-	-	-	-	-	-	-	-	-	2
Other tillage	2	2	2	83	-	-	-	-	-	-	6
All tillage	89	59	61	42	151	56	76	135	33	46	633
Grass under 5 years old	78	52	56	22	115	31	44	90	16	25	159
Grass 5 years and over	59	42	43	21	75	21	26	44	9	11	250
All grass	64	44	46	21	87	24	31	56	11	14	409
All crops and grass	75	51	53	30	122	41	54	91	21	29	1042

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

Source: British Survey of Fertiliser Practice 2017

Table EW1.1 Total fertiliser use, England & Wales 2017

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring wheat	97	47	35	11	131	58	43	128	27	15	74
Winter wheat	99	42	44	23	189	63	74	187	26	32	1179
Spring barley	96	44	49	25	108	47	55	103	20	27	452
Winter barley	97	46	50	21	152	58	72	149	27	36	403
Oats	79	36	35	20	101	50	60	81	18	21	170
Rye/triticale/Durum wheat	71	4	4	42	119	-	-	84	-	-	19
Potatoes (seed or earlies)	90	58	58	29	119	125	215	107	72	124	9
Potatoes (maincrop)	100	83	87	27	137	124	231	137	103	202	57
Sugar beet	96	42	58	47	95	40	74	91	17	43	79
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	4
Winter oilseed rape	100	56	46	19	182	58	63	181	32	29	411
Linseed	91	28	32	19	85	57	51	77	16	16	29
Forage maize	81	56	24	82	72	60	80	58	33	19	143
Rootcrops for stockfeed	81	45	57	46	82	50	77	67	22	44	34
Leafy forage crops	84	25	39	40	87	52	51	73	13	20	18
Arable silage/other fodder crops	22	11	12	34	92	34	42	20	4	5	75
Vining peas (for human consumption)	0	27	41	0	-	74	73	-	20	30	30
Field peas (harvested dry)	0	39	44	0	-	51	63	-	20	28	33
Field beans (harvested dry)	1	33	34	8	-	51	61	-	17	21	221
Vegetables (brassicae)	100	100	100	0	90	72	152	90	72	152	8
Vegetable Other	19	36	12	7	111	56	124	21	20	15	24
Soft Fruit	98	0	46	0	76	-	-	74	-	-	7
Top Fruit	78	33	30	0	93	-	-	73	-	-	24
Other tillage	39	24	31	33	79	47	101	31	11	31	35
All tillage	88	44	44	24	159	59	72	141	26	31	3538
Grass less than five years old	80	37	41	51	135	31	48	108	11	20	647
Grass five years and over	47	29	29	31	87	20	26	41	6	8	1594
All grass	52	30	31	34	98	22	30	51	7	9	2241
All crops and grass	69	36	37	29	134	42	53	92	15	20	5779

Source: British Survey of Fertiliser Practice 2017

Table EW1.2 Use of straight fertiliser, England & Wales 2017

	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	97	22	16	125	80	56	121	17	9	74
Winter wheat	97	16	18	186	67	79	180	11	15	1179
Spring barley	85	10	16	106	71	65	90	7	10	452
Winter barley	95	12	16	148	65	79	141	8	12	403
Oats	73	5	8	96	63	63	70	3	5	170
Rye/triticale/Durum wheat	71	0	0	119	-	-	84	-	-	19
Potatoes (seed or earlies)	61	6	25	80	-	-	49	-	-	9
Potatoes (maincrop)	52	8	33	91	-	203	48	-	68	57
Sugar beet	95	11	24	87	67	104	82	7	25	79
Spring oilseed rape	-	-	-	-	-	-	-	-	-	4
Winter oilseed rape	99	17	17	176	62	77	174	10	13	411
Linseed	91	8	15	82	-	43	75	-	6	29
Forage maize	57	5	11	73	64	111	41	3	12	143
Rootcrops for stockfeed	40	8	16	88	-	137	35	-	22	34
Leafy forage crops	62	0	2	95	-	-	59	-	-	18
Arable silage/other fodder crops	15	1	2	104	-	-	16	-	-	75
Peas - human consumption	0	12	31	-	-	61	-	-	19	30
Peas - animal consumption	0	19	24	-	51	71	-	10	17	33
Beans - animal consumption	0	12	13	-	54	64	-	6	8	221
Vegetables (brassicae)	79	0	6	-	-	-	-	-	-	8
Vegetables (other)	12	24	10	-	52	87	-	12	9	24
Soft Fruit	96	0	45	-	-	-	-	-	-	7
Top Fruit	65	11	8	106	-	-	69	-	-	24
Other tillage	20	0	7	86	-	-	17	-	-	35
All tillage	84	13	17	158	65	80	132	9	13	3538
Grass under 5 years old	55	2	3	131	59	76	72	1	2	647
Grass 5 years and over	23	0	1	100	74	79	23	0	0	1594
All grass	28	0	1	109	65	77	30	0	1	2241
All crops and grass	54	6	8	144	65	80	77	4	6	5779

Source: British Survey of Fertiliser Practice 2017

Table EW1.3 Use of compound fertiliser, England & Wales 2017

	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	20	25	19	33	38	33	6	9	6	74
Winter wheat	8	26	26	84	59	67	7	15	18	1179
Spring barley	24	33	34	55	39	50	13	13	17	452
Winter barley	10	34	35	71	56	68	7	19	24	403
Oats	16	31	30	64	47	55	11	15	16	170
Rye/triticale/Durum wheat	0	4	4	-	-	-	-	-	-	19
Potatoes (seed or earlies)	58	58	38	102	114	-	59	65	-	9
Potatoes (maincrop)	73	75	67	122	128	199	90	96	134	57
Sugar beet	23	31	37	37	30	49	8	9	18	79
Spring oilseed rape	-	-	-	-	-	-	-	-	-	4
Winter oilseed rape	26	41	30	27	53	51	7	22	16	411
Linseed	5	21	18	-	66	57	-	14	10	29
Forage maize	51	50	14	33	59	49	17	30	7	143
Rootcrops for stockfeed	48	37	41	66	42	52	32	15	22	34
Leafy forage crops	25	25	37	56	52	48	14	13	18	18
Arable silage/other fodder crops	8	10	10	48	32	34	4	3	4	75
Peas - human consumption	0	16	16	-	71	75	-	11	12	30
Peas - animal consumption	0	20	20	-	51	53	-	10	11	33
Beans - animal consumption	0	21	21	-	49	59	-	10	12	221
Vegetables (brassicae)	97	100	100	35	72	147	34	72	147	8
Vegetables (other)	13	13	7	-	-	-	-	-	-	24
Soft Fruit	2	0	2	-	-	-	-	-	-	7
Top Fruit	22	22	22	-	-	-	-	-	-	24
Other tillage	19	24	23	68	47	85	13	11	20	35
All tillage	16	31	28	55	55	64	9	17	18	3538
Grass under 5 years old	38	35	38	93	29	46	35	10	17	647
Grass 5 years and over	29	29	29	63	20	25	18	6	7	1594
All grass	30	30	30	68	22	29	21	6	9	2241
All crops and grass	23	30	29	64	37	44	15	11	13	5779

Source: British Survey of Fertiliser Practice 2017

Table EW1.4 Use of lime, England & Wales 2017

	Crop area receiving dressing (%)						Average application rate (tonnes of product/ha)							
	Ground limestone	Ground chalk	Magnesian limestone	Sugar beet lime	Other	All	Ground limestone	Ground chalk	Magnesian limestone	Sugar beet lime	Other	All	Fields limed	Fields in sample
Spring wheat	6.2	-	-	-	-	6.2	3.7	-	-	-	-	3.7	7	74
Winter wheat	4.8	0.5	0.2	0.1	0.3	5.9	4.4	3.1	6.2	4.5	0.5	4.2	74	1179
Spring barley	5.5	0.2	-	0.3	0.6	6.5	5.3	5.0	-	4.0	0.4	4.8	39	452
Winter barley	6.3	0.2	0.4	0.1	0.8	7.7	4.5	5.0	5.0	3.8	0.3	4.1	34	403
Oats	1.0	1.5	-	0.1	0.6	3.2	3.7	4.9	-	3.8	1.5	3.8	9	170
Rye/triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	-	-	0	19
Potatoes (seed or earlies)	-	-	-	-	-	-	-	-	-	-	-	-	0	9
Potatoes (maincrop)	-	-	-	-	-	-	-	-	-	-	-	-	0	57
Sugar beet	2.3	4.8	-	9.6	-	16.7	0.5	3.1	-	6.0	-	4.4	19	79
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	-	-	0	4
Winter oilseed rape	5.1	0.2	0.2	0.4	0.1	6.0	3.7	4.8	3.5	7.8	1.0	4.0	30	411
Linseed	-	-	-	-	-	-	-	-	-	-	-	-	2	29
Forage maize	9.0	-	-	-	0.2	9.2	4.3	-	-	-	0.4	4.2	17	143
Rootcrops for stockfeed	16.8	4.5	3.3	-	-	24.7	4.4	4.9	2.5	-	-	4.3	7	34
Leafy forage crops	-	-	-	-	-	-	-	-	-	-	-	-	0	18
Arable silage/other fodder crops	-	-	-	-	-	-	-	-	-	-	-	-	4	75
Peas - human consumption	-	-	-	-	-	-	-	-	-	-	-	-	1	30
Peas - animal consumption	-	-	-	-	-	-	-	-	-	-	-	-	1	33
Beans - animal consumption	-	-	-	-	-	-	-	-	-	-	-	-	2	221
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	-	-	3	8
Vegetables (other)	-	-	-	-	-	-	-	-	-	-	-	-	4	24
Soft Fruit	-	-	-	-	-	-	-	-	-	-	-	-	0	7
Top Fruit	-	-	-	-	-	-	-	-	-	-	-	-	3	24
Other tillage	-	-	-	-	-	-	-	-	-	-	-	-	1	35
All tillage	5.0	0.5	0.2	0.3	0.5	6.4	4.4	3.7	5.3	5.7	0.5	4.2	257	3538
Grass under 5 years old	5.2	0.0	0.1	0.4	0.7	6.4	3.8	3.1	4.8	3.8	0.6	3.5	54	647
Grass 5 years and over	1.3	0.1	0.1	-	0.2	1.8	4.3	2.9	5.0	-	1.1	3.9	52	1594
All grass	1.9	0.1	0.1	0.1	0.3	2.5	4.1	2.9	4.9	3.8	1.0	3.7	106	2241
All crops and grass	3.3	0.3	0.2	0.2	0.4	4.3	4.3	3.6	5.1	5.4	0.7	4.0	363	5779

Source: British Survey of Fertiliser Practice 2017

Table EW1.5 Percentage of crop area by field application rate - Nitrogen, England & Wales 2017

	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	3	0	7	5	13	17	23	16	7	6	2	2	-	-	-	-	-	-	74
Winter wheat	1	0	1	3	4	4	9	15	16	22	12	8	4	1	-	-	-	-	1179
Spring barley	4	3	6	11	15	27	21	11	1	-	-	-	-	-	-	-	-	-	452
Winter barley	3	0	1	3	6	15	21	20	21	8	2	1	-	-	-	-	-	-	403
Oats	21	1	6	10	19	24	13	5	1	-	-	-	-	-	-	-	-	-	170
Rye/triticale/Durum wheat	29	0	5	0	23	31	6	0	0	0	0	7	-	-	-	-	-	-	19
Potatoes (seed or earlies)	10	0	0	0	32	19	29	0	9	-	-	-	-	-	-	-	-	-	9
Potatoes (maincrop)	0	0	10	9	9	14	8	18	13	6	11	-	-	-	-	-	-	-	57
Sugar beet	4	2	8	15	22	35	6	8	-	-	-	-	-	-	-	-	-	-	79
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Winter oilseed rape	0	1	1	2	2	6	12	15	19	21	13	6	0	1	-	-	-	-	411
Linseed	9	0	7	14	51	20	-	-	-	-	-	-	-	-	-	-	-	-	29
Forage maize	19	14	9	26	13	7	8	3	-	-	-	-	-	-	-	-	-	-	143
Rootcrops for stockfeed	19	3	7	23	17	25	1	4	-	-	-	-	-	-	-	-	-	-	34
Leafy forage crops	16	0	30	13	3	18	21	-	-	-	-	-	-	-	-	-	-	-	18
Arable silage/other fodder crops	78	0	2	7	4	3	0	3	2	-	-	-	-	-	-	-	-	-	75
Peas - human consumption	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30
Peas - animal consumption	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33
Beans - animal consumption	99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	221
Vegetables (brassicae)	0	13	0	1	45	37	0	0	4	-	-	-	-	-	-	-	-	-	8
Vegetables (other)	81	2	0	7	5	0	0	0	0	0	5	-	-	-	-	-	-	-	24
Soft Fruit	2	0	2	49	0	44	3	-	-	-	-	-	-	-	-	-	-	-	7
Top Fruit	22	20	3	10	2	10	19	10	4	-	-	-	-	-	-	-	-	-	24
Other tillage	61	2	12	1	15	4	0	3	0	3	-	-	-	-	-	-	-	-	35
All tillage	12	1	2	6	7	10	12	12	12	13	7	4	2	1	-	-	-	-	3538
Grass under 5 years old	20	2	6	12	12	9	9	10	4	4	3	3	1	2	1	0	1	-	647
Grass 5 years and over	53	3	12	11	6	4	4	4	1	1	0	1	-	-	-	-	-	-	1594
All grass	48	3	11	12	6	4	5	5	2	1	1	1	0	1	-	-	-	-	2241
All crops and grass	31	2	7	9	7	7	8	8	6	7	4	3	1	1	-	-	-	-	5779

Source: British Survey of Fertiliser Practice 2017

Table EW1.6 Percentage of crop area by field application rate - Phosphate, England & Wales 2017

	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	53	10	5	10	21	-	-	-	-	-	-	-	-	-	-	-	-	-	74
Winter wheat	58	3	10	16	9	3	-	-	-	-	-	-	-	-	-	-	-	-	1179
Spring barley	56	9	16	13	4	1	-	-	-	-	-	-	-	-	-	-	-	-	452
Winter barley	54	3	12	21	7	2	-	-	-	-	-	-	-	-	-	-	-	-	403
Oats	64	7	9	16	2	1	1	-	-	-	-	-	-	-	-	-	-	-	170
Rye/triticale/Durum wheat	96	0	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19
Potatoes (seed or earlies)	42	0	6	0	14	0	32	0	0	0	6	-	-	-	-	-	-	-	9
Potatoes (maincrop)	17	5	2	15	21	4	5	5	17	2	0	4	3	-	-	-	-	-	57
Sugar beet	58	21	7	6	5	3	-	-	-	-	-	-	-	-	-	-	-	-	79
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Winter oilseed rape	44	7	17	19	8	4	0	0	1	-	-	-	-	-	-	-	-	-	411
Linseed	72	5	3	15	2	3	-	-	-	-	-	-	-	-	-	-	-	-	29
Forage maize	44	5	18	21	4	7	0	1	-	-	-	-	-	-	-	-	-	-	143
Rootcrops for stockfeed	55	5	25	0	11	4	-	-	-	-	-	-	-	-	-	-	-	-	34
Leafy forage crops	75	1	9	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18
Arable silage/other fodder crops	89	5	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	75
Peas - human consumption	73	3	10	0	4	6	5	-	-	-	-	-	-	-	-	-	-	-	30
Peas - animal consumption	61	3	12	18	6	-	-	-	-	-	-	-	-	-	-	-	-	-	33
Beans - animal consumption	67	4	12	12	3	1	-	-	-	-	-	-	-	-	-	-	-	-	221
Vegetables (brassicae)	0	13	11	43	0	0	34	-	-	-	-	-	-	-	-	-	-	-	8
Vegetables (other)	64	2	11	17	0	6	-	-	-	-	-	-	-	-	-	-	-	-	24
Soft Fruit	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7
Top Fruit	67	22	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24
Other tillage	76	3	15	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35
All tillage	56	5	12	16	7	2	-	-	-	-	-	-	-	-	-	-	-	-	3538
Grass under 5 years old	63	18	13	5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	647
Grass 5 years and over	71	20	7	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1594
All grass	70	20	8	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2241
All crops and grass	64	13	10	8	4	1	-	-	-	-	-	-	-	-	-	-	-	-	5779

Source: British Survey of Fertiliser Practice 2017

Table EW1.7 Percentage of crop area by field application rate - Potash, England & Wales 2017

	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	65	10	8	14	2	1	-	-	-	-	-	-	-	-	-	-	-	-	74
Winter wheat	56	4	7	13	12	5	1	1	1	-	-	-	-	-	-	-	-	-	1179
Spring barley	51	7	15	16	8	3	-	-	-	-	-	-	-	-	-	-	-	-	452
Winter barley	50	3	10	12	15	7	1	1	-	-	-	-	-	-	-	-	-	-	403
Oats	65	4	7	15	5	2	1	1	-	-	-	-	-	-	-	-	-	-	170
Rye/triticale/Durum wheat	96	0	0	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19
Potatoes (seed or earlies)	42	0	0	0	0	0	0	0	14	23	14	6	-	-	-	-	-	-	9
Potatoes (maincrop)	13	0	1	0	14	5	0	6	8	8	10	15	3	1	2	1	9	6	57
Sugar beet	42	15	6	4	8	13	12	-	-	-	-	-	-	-	-	-	-	-	79
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Winter oilseed rape	54	6	14	14	6	4	0	1	0	0	0	0	1	-	-	-	-	-	411
Linseed	68	5	5	18	5	-	-	-	-	-	-	-	-	-	-	-	-	-	29
Forage maize	76	3	5	5	6	0	0	2	2	1	-	-	-	-	-	-	-	-	143
Rootcrops for stockfeed	43	0	24	6	8	8	2	3	5	-	-	-	-	-	-	-	-	-	34
Leafy forage crops	61	1	22	12	3	2	-	-	-	-	-	-	-	-	-	-	-	-	18
Arable silage/other fodder crops	88	4	6	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	75
Peas - human consumption	59	1	11	13	5	12	-	-	-	-	-	-	-	-	-	-	-	-	30
Peas - animal consumption	56	1	7	24	12	-	-	-	-	-	-	-	-	-	-	-	-	-	33
Beans - animal consumption	66	5	9	9	7	4	0	1	-	-	-	-	-	-	-	-	-	-	221
Vegetables (brassicae)	0	13	0	4	0	39	0	0	11	0	0	34	-	-	-	-	-	-	8
Vegetables (other)	88	2	1	0	3	0	0	1	5	-	-	-	-	-	-	-	-	-	24
Soft Fruit	54	0	0	0	2	45	-	-	-	-	-	-	-	-	-	-	-	-	7
Top Fruit	70	0	0	8	22	-	-	-	-	-	-	-	-	-	-	-	-	-	24
Other tillage	69	0	6	6	2	10	0	1	2	0	3	-	-	-	-	-	-	-	35
All tillage	56	5	9	12	9	5	1	1	1	-	-	-	-	-	-	-	-	-	3538
Grass under 5 years old	59	13	12	7	4	3	-	-	-	-	-	-	-	-	-	-	-	-	647
Grass 5 years and over	71	18	8	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1594
All grass	69	18	9	2	2	1	-	-	-	-	-	-	-	-	-	-	-	-	2241
All crops and grass	63	12	9	7	5	2	0	1	-	-	-	-	-	-	-	-	-	-	5779

Source: British Survey of Fertiliser Practice 2017

Table EW2.1 Average fertiliser practice by grassland utilisation, England & Wales 2017

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Grazed not mown	41	25	25	17	77	18	20	32	5	5	1006
Grazed mown	68	39	40	60	115	27	38	78	11	15	1002
All grazings	50	30	30	32	95	22	28	48	7	9	2008
Cut for silage - grazed	75	45	46	69	121	27	39	91	12	18	737
Cut for silage - not grazed	83	35	44	79	136	22	50	112	8	22	148
All cut for silage	77	43	46	71	124	26	41	95	11	18	885
Cut for hay - grazed	46	24	24	37	83	28	28	39	7	7	304
Cut for hay - not grazed	69	42	42	12	91	28	35	63	12	15	61
All cut for hay	49	27	26	34	85	28	30	42	8	8	365
All mowings	70	39	41	61	117	26	39	82	10	16	1204
All grass	52	30	31	34	98	22	30	51	7	9	2241

Source: British Survey of Fertiliser Practice 2017

Table EW2.2 Percentage of grass area by field application rate - Nitrogen, England & Wales 2017

	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	59	3	14	10	4	3	3	2	1	1	0	1	-	-	-	-	-	-	1006
Grazed mown	32	3	7	14	10	6	7	10	3	1	2	2	0	1	-	-	-	-	1002
All grazings	50	3	11	11	6	4	4	5	2	1	1	1	0	1	-	-	-	-	2008
Cut for silage - grazed	25	3	6	15	11	6	9	11	4	2	2	2	1	2	-	-	-	-	737
Cut for silage - not grazed	17	2	6	14	11	8	10	10	4	8	1	6	1	3	-	-	-	-	148
All cut for silage	23	3	6	15	11	7	9	11	4	3	2	3	1	2	-	-	-	-	885
Cut for hay - grazed	54	3	8	13	7	4	2	8	-	-	-	-	-	-	-	-	-	-	304
Cut for hay - not grazed	31	1	5	15	25	12	7	1	2	2	-	-	-	-	-	-	-	-	61
All cut for hay	51	3	8	14	10	5	3	7	1	-	-	-	-	-	-	-	-	-	365
All mowings	30	3	7	14	11	6	7	10	3	2	1	2	0	1	-	-	-	-	1204
All grass	48	3	11	12	6	4	5	5	2	1	1	1	0	1	-	-	-	-	2241

Source: British Survey of Fertiliser Practice 2017

Table EW2.3 Percentage of grass area by field application rate - Phosphate, England & Wales 2017

	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	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1006
Grazed mown	61	21	13	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1002
All grazings	70	20	8	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2008
Cut for silage - grazed	55	25	15	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	737
Cut for silage - not grazed	65	24	8	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	148
All cut for silage	57	25	14	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	885
Cut for hay - grazed	76	12	8	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	304
Cut for hay - not grazed	58	16	24	0	1	-	-	-	-	-	-	-	-	-	-	-	-	-	61
All cut for hay	73	13	10	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	365
All mowings	61	22	13	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1204
All grass	70	20	8	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2241

Source: British Survey of Fertiliser Practice 2017

Table EW2.4 Percentage of crop area by field application rate - Potash, England & Wales 2017

	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	18	6	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1006
Grazed mown	60	17	13	5	3	1	-	-	-	-	-	-	-	-	-	-	-	-	1002
All grazings	70	18	8	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2008
Cut for silage - grazed	54	20	15	5	3	2	0	0	1	-	-	-	-	-	-	-	-	-	737
Cut for silage - not grazed	56	18	7	6	7	5	2	1	-	-	-	-	-	-	-	-	-	-	148
All cut for silage	54	19	14	5	4	2	0	0	1	-	-	-	-	-	-	-	-	-	885
Cut for hay - grazed	76	13	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	304
Cut for hay - not grazed	58	13	23	5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	61
All cut for hay	74	13	8	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	365
All mowings	59	17	13	5	3	2	-	-	-	-	-	-	-	-	-	-	-	-	1204
All grass	69	18	9	2	2	1	-	-	-	-	-	-	-	-	-	-	-	-	2241

Source: British Survey of Fertiliser Practice 2017

Table EW3.0 Product use by month of application, England & Wales 2017

(a) Product use

row %	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Straight N	0	0	0	0	0	4	36	38	14	4	2	1
Straight P	9	11	10	1	0	11	26	21	7	0	0	4
Straight K	5	9	6	2	3	14	36	19	3	0	3	0
Compounds	9	4	2	1	1	4	24	25	15	6	4	6
All fertilisers	3	2	1	0	0	4	33	33	14	4	3	2

(b) Nutrient use

row %	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Nitrogen	1	0	0	0	0	3	33	38	15	5	3	2
Phosphate	11	8	6	1	1	7	26	22	10	2	1	5
Potash	7	8	5	1	1	9	29	22	10	3	2	3
Total	3	2	2	0	0	5	31	34	14	4	3	2

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

'Product' refers to the total tonnage of the products used by the farmers in the survey year 2017.

'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 2017

Table EW3.1 Product type as percentage of all product used by crop group, England & Wales 2017

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	39.5	46.1	11.0	27.2	41.0	19.0	41.0	35.6	38.7	37.5	16.5	37.6	40.2
Urea	8.3	13.0	2.9	4.7	16.1	5.8	11.8	6.4	9.2	6.0	0.0	6.6	10.7
Calcium Ammonium Nitrate (CAN)	0.5	0.6	0.0	1.8	0.8	4.2	0.8	1.7	2.0	1.2	0.0	1.4	1.0
Urea Ammonium Nitrate (UAN)	14.2	14.7	1.5	8.4	16.1	5.5	13.7	1.9	1.8	2.2	47.9	2.3	11.2
Other Straight N	1.5	1.9	5.6	0.8	3.4	1.1	2.1	1.4	0.6	1.4	0.0	1.2	1.9
Triple Superphosphate (TSP)	3.3	3.2	1.9	2.0	2.5	6.3	3.2	0.8	1.9	0.8	5.1	0.9	2.7
Other Straight P	0.1	0.2	0.0	1.1	0.5	0.3	0.3	0.3	0.0	0.2	0.0	0.2	0.2
Muriate of Potash (MOP)	3.4	3.3	13.9	1.8	2.9	9.6	4.0	0.8	0.6	1.1	8.8	1.0	3.3
Other Straight K	0.7	0.5	2.1	23.8	0.4	2.5	1.3	0.1	0.0	0.2	0.0	0.1	1.0
PK	7.6	10.1	1.6	17.1	5.6	16.5	9.3	2.5	3.2	2.3	0.0	2.4	7.8
NK	1.8	1.8	0.0	2.4	0.7	2.5	1.6	6.6	2.8	9.9	0.0	7.2	2.8
Low N (<19% N)	6.1	1.9	57.8	2.5	7.6	17.5	6.4	3.9	3.2	3.0	6.5	3.7	5.8
High N (>=19% N)	11.1	1.9	0.6	2.8	0.7	6.5	3.2	37.9	35.6	33.9	15.2	35.3	10.1
Other	1.9	0.9	1.1	3.5	1.5	2.7	1.3	0.3	0.4	0.2	0.0	0.2	1.1
Total product ('000 tonnes)	**261**	**1449**	**41**	**45**	**403**	**117**	**2316**	**746**	**81**	**478**	**4**	**862**	**3179**

Source: British Survey of Fertiliser Practice 2017

Table EW3.2 Use of product type by crop group, England & Wales 2017

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	11.3	67.6	0.5	1.2	17.2	2.3	72.6	82.5	10.5	55.4	0.2	27.4	1238
Urea	9.0	65.3	0.1	1.3	21.3	2.9	88.0	90.6	9.5	51.6	0.0	12.0	348
Calcium Ammonium Nitrate (CAN)	5.0	33.1	0.0	2.1	11.8	47.9	56.3	100.0	8.7	47.2	0.0	43.7	37
Urea Ammonium Nitrate (UAN)	11.5	66.5	0.2	0.9	18.9	2.1	96.8	81.9	4.4	46.5	10.3	3.2	399
Other Straight N	5.3	68.9	3.1	1.6	20.3	0.9	88.0	100.0	4.2	61.5	0.0	12.0	70
Triple Superphosphate (TSP)	13.3	61.1	0.8	1.6	15.4	7.8	94.9	85.0	15.9	50.1	7.1	5.1	76
Other Straight P	11.7	32.5	0.0	2.8	48.6	4.4	88.3	100.0	0.0	70.8	0.0	11.7	9
Muriate of Potash (MOP)	11.8	56.3	5.5	1.2	13.2	12.0	93.8	62.1	3.5	68.3	6.4	6.2	82
Other Straight K	6.2	33.8	2.1	36.5	13.4	7.9	97.3	30.0	0.0	92.1	0.0	2.7	29
PK	8.5	68.0	0.1	3.3	11.5	8.6	93.9	93.1	26.6	38.5	0.0	6.1	228
NK	18.9	65.2	0.0	3.9	5.0	7.0	30.6	72.9	1.2	81.9	0.0	69.4	67
Low N (<19% N)	11.2	16.9	23.1	2.4	27.6	18.7	84.5	83.4	10.3	51.4	0.6	15.5	139
High N (>=19% N)	30.2	58.2	0.8	1.0	1.3	8.5	16.8	91.1	9.0	53.7	0.2	83.2	421
Other	15.5	48.2	0.3	3.9	22.2	10.0	96.9	100.0	8.0	65.6	0.0	3.1	36
All Fertilisers	**11.3**	**62.6**	**1.8**	**2.0**	**17.4**	**5.0**	**72.9**	**86.5**	**9.4**	**55.5**	**0.4**	**27.1**	**3179**

Source: British Survey of Fertiliser Practice 2017

Table EW3.3 Product use by month of application, England & Wales 2017

row %	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	total product ('000 tonnes)
Ammonium Nitrate	0.1	3.3	32.0	39.0	15.1	4.8	3.3	1.4	0.5	0.4	0.1	0.1	1238
Urea	0.3	5.7	45.2	32.5	10.8	3.7	1.3	0.1	0.3	0.1	0.0	0.0	348
Calcium Ammonium Nitrate (CAN)	0.1	1.2	30.5	12.9	20.9	7.7	14.8	7.4	4.4	0.0	0.0	0.0	37
Urea Ammonium Nitrate (UAN)	0.0	3.6	35.2	44.9	14.3	1.0	0.3	0.4	0.2	0.0	0.0	0.0	399
Other Straight N	0.0	6.5	61.4	20.3	6.4	3.6	0.3	0.2	0.4	1.1	0.0	0.0	70
Triple Superphosphate (TSP)	0.4	10.8	26.2	20.8	7.6	0.4	0.5	1.0	9.2	11.8	10.1	1.2	76
Other Straight P	0.0	4.9	16.3	12.1	7.2	0.0	0.0	36.5	9.3	0.0	12.9	0.9	9
Muriate of Potash (MOP)	1.6	14.1	36.4	23.0	3.7	0.7	0.3	0.5	0.8	11.1	6.1	1.8	82
Other Straight K	7.8	14.3	33.2	8.3	1.8	0.0	9.0	0.0	15.6	2.3	5.1	2.4	29
PK	1.6	7.6	21.7	8.5	1.2	1.7	0.4	7.3	25.8	13.3	8.6	2.3	228
NK	0.0	2.8	16.7	14.2	24.9	22.2	8.8	9.6	0.8	0.0	0.0	0.0	67
Low N (<19% N)	0.6	4.9	31.6	22.9	13.9	0.6	1.1	9.9	8.8	5.7	0.1	0.0	139
High N (>=19% N)	0.0	2.6	23.2	36.6	20.7	6.9	6.0	3.0	1.0	0.1	0.0	0.0	421
Other	0.0	1.6	78.5	5.7	10.0	0.0	0.0	0.0	0.0	0.8	2.4	1.0	36
All Fertilisers	**0.3**	**4.5**	**32.7**	**33.0**	**13.6**	**4.1**	**2.8**	**2.4**	**3.1**	**2.0**	**1.1**	**0.3**	**3179**

Source: British Survey of Fertiliser Practice 2017

Table EW4.1a Average fertiliser practice on tillage and grassland by GOR, England & Wales 2017

		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	94	33	59	48	145	55	104	136	18	61	116
	All grass	68	45	48	48	103	19	30	70	8	14	231
	All crops and grass	73	43	50	48	112	23	44	81	10	22	347
North East	All tillage	94	67	72	23	176	68	78	167	45	56	174
	All grass	32	25	27	15	77	31	29	25	8	8	187
	All crops and grass	49	36	39	17	129	50	53	63	18	21	361
Eastern	All tillage	88	39	33	16	151	57	58	132	22	19	586
	All grass	34	14	14	11	72	32	41	25	4	6	75
	All crops and grass	81	36	31	16	146	56	57	119	20	18	661
Yorkshire and the Humber	All tillage	93	49	52	20	177	61	84	166	30	43	727
	All grass	55	38	41	32	85	20	25	47	8	10	287
	All crops and grass	78	45	48	25	152	48	64	119	21	30	1014
West Midlands	All tillage	85	35	42	42	150	56	79	128	19	33	283
	All grass	58	26	28	33	93	19	34	53	5	9	188
	All crops and grass	69	30	33	37	122	37	56	84	11	19	471
East Midlands	All tillage	91	46	41	15	157	56	61	143	26	25	536
	All grass	38	11	12	26	90	25	25	34	3	3	172
	All crops and grass	72	34	30	19	144	53	56	105	18	17	708
South West	All tillage	81	48	48	36	140	58	70	114	27	33	553
	All grass	49	25	26	43	104	25	35	51	6	9	570
	All crops and grass	60	33	33	41	121	41	52	72	14	17	1123
South East	All tillage	86	39	39	18	176	58	69	151	22	27	472
	All grass	35	8	8	17	95	31	34	33	2	3	216
	All crops and grass	66	26	27	17	159	55	65	104	14	17	688
Wales	All tillage	84	60	62	53	132	59	75	111	35	47	91
	All grass	64	47	45	37	107	21	29	68	10	13	315
	All crops and grass	65	48	46	38	109	24	34	71	12	15	406

Source: British Survey of Fertiliser Practice 2017

Table EW4.1b Average fertiliser practice on tillage and grassland by BSFP region, England & Wales 2017

		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	86	45	47	37	145	56	67	125	25	32	302
	All grass	37	10	8	41	106	35	30	39	4	2	261
	All crops and grass	56	24	23	40	129	51	60	73	12	14	563
Anglia	All tillage	88	39	33	16	151	57	58	132	22	19	586
	All grass	34	14	14	11	72	32	41	25	4	6	75
	All crops and grass	81	36	31	16	146	56	57	119	20	18	661
Northern	All tillage	95	48	59	39	140	57	82	133	27	48	187
	All grass	58	44	48	37	85	20	26	49	9	13	335
	All crops and grass	64	45	50	37	98	26	37	63	12	18	522
North East	All tillage	94	52	55	21	178	62	83	167	32	45	789
	All grass	49	36	38	31	85	20	24	42	7	9	334
	All crops and grass	75	30	48	25	152	48	63	114	22	30	1123
North Mercia	All tillage	85	30	47	51	156	57	95	132	17	45	185
	All grass	68	28	29	43	120	25	44	81	7	13	145
	All crops and grass	73	28	35	46	133	35	66	97	10	23	330
South Mercia	All tillage	75	30	34	26	162	57	78	121	17	26	191
	All grass	40	13	15	16	81	19	28	32	3	4	100
	All crops and grass	58	22	25	21	134	46	63	77	10	15	291
East Midland	All tillage	91	46	41	15	157	56	61	143	26	25	536
	All grass	38	11	12	26	90	25	25	34	3	3	172
	All crops and grass	72	34	30	19	144	53	56	105	18	17	708
South East	All tillage	86	39	39	18	176	58	69	151	22	27	472
	All grass	35	8	8	17	95	31	34	33	2	3	216
	All crops and grass	66	26	27	17	159	55	65	104	14	17	688
South West	All tillage	85	70	67	44	121	62	77	103	43	51	199
	All grass	63	42	45	49	105	23	35	66	10	16	288
	All crops and grass	68	48	50	48	109	35	47	74	17	24	487
Wales	All tillage	84	60	62	53	132	59	75	111	35	47	91
	All grass	64	47	45	37	107	21	29	68	10	13	315
	All crops and grass	65	48	46	38	109	24	34	71	12	15	406

Source: British Survey of Fertiliser Practice 2017

Table SC1.1 Total fertiliser use, Scotland 2017

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Winter wheat	98	88	90	14	174	69	84	171	61	75	70
Spring barley	99	95	96	40	97	50	67	95	48	64	166
Winter barley	100	96	92	39	150	68	88	150	65	80	38
Oats	77	71	54	28	96	50	76	74	35	41	38
Potatoes	100	100	94	29	123	128	197	123	128	185	20
Winter oilseed rape	100	76	79	7	172	68	78	172	52	61	26
Other crops	76	82	79	21	121	52	92	92	43	72	52
All tillage	96	91	91	31	122	59	79	118	54	71	410
Grass less than five years old	87	82	83	34	113	29	40	98	24	33	193
Grass five years and over	69	59	60	29	83	21	28	57	13	17	279
All grass	74	65	66	30	92	24	32	68	16	21	472
All crops and grass	82	75	75	30	105	39	52	86	29	39	882

Source: British Survey of Fertiliser Practice 2017

Table SC1.2 Use of straight fertiliser, Scotland 2017

	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	94	20	19	154	86	85	145	17	16	70
Spring barley	61	1	6	70	-	62	43	-	4	166
Winter barley	97	25	30	135	46	68	130	12	21	38
Oats	59	19	3	94	-	-	56	-	-	38
Potatoes	15	0	20	87	-	191	14	-	39	20
Winter oilseed rape	82	0	23	146	-	-	120	-	-	26
Other crops	31	8	10	119	-	70	37	-	7	52
All tillage	67	8	11	107	69	79	72	5	9	410
Grass less than five years old	33	2	2	92	-	-	30	-	-	193
Grass five years and over	19	0	0	63	-	-	12	-	-	279
All grass	22	1	1	74	-	-	17	-	-	472
All crops and grass	39	3	4	94	63	75	37	2	3	882

Source: British Survey of Fertiliser Practice 2017

Table SC1.3 Use of compound fertiliser, Scotland 2017

	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	36	74	74	71	59	80	25	44	59	70
Spring barley	93	94	93	57	50	65	53	47	61	166
Winter barley	38	80	76	53	67	79	20	53	60	38
Oats	39	52	52	47	50	76	18	26	39	38
Potatoes	100	100	94	110	128	155	110	128	146	20
Winter oilseed rape	66	76	66	78	68	73	52	52	49	26
Other crops	61	74	74	91	51	88	56	37	65	52
All tillage	73	85	84	63	57	74	46	48	62	410
Grass less than five years old	76	80	81	90	29	41	68	23	33	193
Grass five years and over	59	59	60	77	21	27	45	13	16	279
All grass	63	65	66	81	24	32	51	15	21	472
All crops and grass	67	72	72	74	38	49	49	27	36	882

Source: British Survey of Fertiliser Practice 2017

Table SC1.4 Use of lime, Scotland 2017

	Crop area receiving dressing (%)						Average application rate (tonnes of product/ha)							
	Ground limestone	Ground chalk	Magnesian limestone	Sugar beet lime	Other	All	Ground limestone	Ground chalk	Magnesian limestone	Sugar beet lime	Other	All	Fields limed	Fields in sample
Winter wheat	13.6	-	10.4	-	7.2	31.2	2.5	-	4.6	-	0.7	2.8	15	70
Spring barley	6.8	-	3.1	-	3.0	12.9	4.0	-	4.6	-	0.6	3.4	37	166
Winter barley	12.7	-	4.2	-	5.9	22.7	2.8	-	5.0	-	0.3	2.6	8	38
Oats	-	-	-	-	-	-	-	-	-	-	-	-	4	38
Potatoes	-	-	-	-	-	-	-	-	-	-	-	-	1	20
Winter oilseed rape	15.6	-	7.7	-	7.8	31.1	2.1	-	6.3	-	0.6	2.8	9	26
Other crops	13.9	-	-	-	7.6	21.5	4.6	-	-	-	0.5	3.1	11	52
All tillage	9.0	-	4.9	-	4.4	18.3	3.3	-	4.8	-	0.6	3.1	85	410
Grass less than five years old	6.7	-	2.3	-	-	9.0	4.0	-	4.2	-	-	4.1	23	193
Grass five years and over	1.3	-	1.2	-	0.6	3.2	2.2	-	4.6	-	1.4	2.9	27	279
All grass	2.7	-	1.5	-	0.5	4.7	3.4	-	4.4	-	1.4	3.5	50	472
All crops and grass	5.0	-	2.7	-	1.9	9.6	3.3	-	4.7	-	0.7	3.2	135	882

Source: British Survey of Fertiliser Practice 2017

Table SC1.5 Percentage of crop area by field application rate - Nitrogen, Scotland 2017

	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	2	0	1	3	7	0	13	8	33	27	5	-	-	-	-	-	-	-	70
Spring barley	1	1	7	17	22	38	11	0	3	-	-	-	-	-	-	-	-	-	166
Winter barley	0	0	4	0	5	10	25	24	29	0	2	-	-	-	-	-	-	-	38
Oats	23	2	2	16	6	41	6	4	-	-	-	-	-	-	-	-	-	-	38
Potatoes	0	0	7	18	6	27	22	5	0	0	5	10	-	-	-	-	-	-	20
Winter oilseed rape	0	0	0	4	0	29	0	13	15	22	14	3	-	-	-	-	-	-	26
Other crops	24	4	5	9	5	18	7	14	9	2	4	-	-	-	-	-	-	-	52
All tillage	4	1	5	12	14	27	12	5	11	7	2	1	-	-	-	-	-	-	410
Grass less than five years old	13	1	6	20	14	17	7	5	8	3	4	2	-	-	-	-	-	-	193
Grass five years and over	31	2	15	23	8	6	6	3	1	4	1	-	-	-	-	-	-	-	279
All grass	26	2	12	23	10	9	6	3	3	4	2	-	-	-	-	-	-	-	472
All crops and grass	18	1	10	19	12	16	8	4	6	5	2	-	-	-	-	-	-	-	882

Source: British Survey of Fertiliser Practice 2017

Table SC1.6 Percentage of crop area by field application rate - Phosphate, Scotland 2017

	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	12	5	20	28	23	5	7	-	-	-	-	-	-	-	-	-	-	-	70
Spring barley	5	12	31	45	7	1	-	-	-	-	-	-	-	-	-	-	-	-	166
Winter barley	4	0	17	40	25	13	-	-	-	-	-	-	-	-	-	-	-	-	38
Oats	29	0	39	28	4	-	-	-	-	-	-	-	-	-	-	-	-	-	38
Potatoes	0	0	7	26	9	0	20	17	10	0	0	10	-	-	-	-	-	-	20
Winter oilseed rape	24	0	3	47	22	4	-	-	-	-	-	-	-	-	-	-	-	-	26
Other crops	18	13	22	31	4	12	-	-	-	-	-	-	-	-	-	-	-	-	52
All tillage	9	8	25	39	12	3	2	1	-	-	-	-	-	-	-	-	-	-	410
Grass less than five years old	18	40	27	13	2	-	-	-	-	-	-	-	-	-	-	-	-	-	193
Grass five years and over	41	41	15	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	279
All grass	35	40	18	5	2	-	-	-	-	-	-	-	-	-	-	-	-	-	472
All crops and grass	25	29	21	17	5	1	1	-	-	-	-	-	-	-	-	-	-	-	882

Source: British Survey of Fertiliser Practice 2017

Table SC1.7 Percentage of crop area by field application rate - Potash, Scotland 2017

	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	10	4	8	15	37	18	8	-	-	-	-	-	-	-	-	-	-	-	70
Spring barley	4	4	22	26	34	9	-	-	-	-	-	-	-	-	-	-	-	-	166
Winter barley	8	0	1	26	40	19	6	-	-	-	-	-	-	-	-	-	-	-	38
Oats	46	0	11	13	20	1	10	-	-	-	-	-	-	-	-	-	-	-	38
Potatoes	6	0	17	0	13	4	2	9	0	8	0	15	5	0	1	15	5	-	20
Winter oilseed rape	21	0	0	38	32	9	-	-	-	-	-	-	-	-	-	-	-	-	26
Other crops	21	9	10	13	18	12	11	0	0	3	0	0	0	0	3	-	-	-	52
All tillage	9	3	16	22	33	11	3	0	0	0	0	1	0	0	0	1	-	-	410
Grass less than five years old	17	31	26	14	8	1	0	1	-	-	-	-	-	-	-	-	-	-	193
Grass five years and over	40	38	14	3	2	3	-	-	-	-	-	-	-	-	-	-	-	-	279
All grass	34	36	17	6	4	3	-	-	-	-	-	-	-	-	-	-	-	-	472
All crops and grass	25	24	17	12	14	6	1	-	-	-	-	-	-	-	-	-	-	-	882

Source: British Survey of Fertiliser Practice 2017

Table SC2.1 Average fertiliser practice by grassland utilisation, Scotland 2017

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Grazed not mown	66	59	59	20	71	20	22	47	12	13	269
Grazed mown	90	81	82	57	129	31	48	116	25	39	159
All grazings	73	65	65	30	91	24	31	66	15	20	428
Cut for silage - grazed	90	80	81	59	135	32	50	121	26	41	141
Cut for silage - not grazed	93	80	93	37	116	33	39	107	26	37	38
All cut for silage	90	80	83	56	132	32	48	119	26	40	179
Cut for hay - grazed	97	60	61	56	74	24	25	72	14	15	22
Cut for hay - not grazed	-	-	-	-	-	-	-	-	-	-	2
All cut for hay	97	61	62	54	74	23	24	72	14	15	24
All mowings	91	81	83	54	127	31	46	115	25	38	199
All grass	74	65	66	30	92	24	32	68	16	21	472

Source: British Survey of Fertiliser Practice 2017

Table SC2.2 Percentage of grass area by field application rate - Nitrogen, Scotland 2017

	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	34	3	17	26	6	6	4	2	1	2	-	-	-	-	-	-	-	-	269
Grazed mown	10	0	3	12	18	16	11	7	7	9	4	2	-	-	-	-	-	-	159
All grazings	27	2	13	23	10	9	6	3	2	4	1	-	-	-	-	-	-	-	428
Cut for silage - grazed	10	0	3	9	17	18	12	8	8	10	5	2	-	-	-	-	-	-	141
Cut for silage - not grazed	7	0	1	24	20	16	9	0	13	0	9	-	-	-	-	-	-	-	38
All cut for silage	10	0	2	11	18	17	11	6	9	9	6	1	-	-	-	-	-	-	179
Cut for hay - grazed	3	0	7	35	47	4	4	-	-	-	-	-	-	-	-	-	-	-	22
Cut for hay - not grazed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
All cut for hay	3	0	7	34	48	4	4	-	-	-	-	-	-	-	-	-	-	-	24
All mowings	9	0	3	14	19	16	11	6	8	8	5	1	-	-	-	-	-	-	199
All grass	26	2	12	23	10	9	6	3	3	4	2	-	-	-	-	-	-	-	472

Source: British Survey of Fertiliser Practice 2017

Table SC2.3 Percentage of grass area by field application rate - Phosphate, Scotland 2017

	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	41	43	13	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	269
Grazed mown	19	37	28	11	4	-	-	-	-	-	-	-	-	-	-	-	-	-	159
All grazings	35	41	17	5	2	-	-	-	-	-	-	-	-	-	-	-	-	-	428
Cut for silage - grazed	20	36	28	12	4	-	-	-	-	-	-	-	-	-	-	-	-	-	141
Cut for silage - not grazed	20	16	59	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	38
All cut for silage	20	33	33	11	4	-	-	-	-	-	-	-	-	-	-	-	-	-	179
Cut for hay - grazed	40	37	17	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	22
Cut for hay - not grazed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
All cut for hay	39	38	17	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24
All mowings	19	35	32	11	4	-	-	-	-	-	-	-	-	-	-	-	-	-	199
All grass	35	40	18	5	2	-	-	-	-	-	-	-	-	-	-	-	-	-	472

Source: British Survey of Fertiliser Practice 2017

Table SC2.4 Percentage of grass area by field application rate - Potash, Scotland 2017

	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	41	40	13	3	1	2	-	-	-	-	-	-	-	-	-	-	-	-	269
Grazed mown	18	29	22	13	12	5	0	1	-	-	-	-	-	-	-	-	-	-	159
All grazings	35	37	16	5	4	3	-	-	-	-	-	-	-	-	-	-	-	-	428
Cut for silage - grazed	19	26	22	13	12	5	1	2	-	-	-	-	-	-	-	-	-	-	141
Cut for silage - not grazed	7	14	56	17	6	-	-	-	-	-	-	-	-	-	-	-	-	-	38
All cut for silage	17	25	27	14	11	5	0	1	-	-	-	-	-	-	-	-	-	-	179
Cut for hay - grazed	39	38	17	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	22
Cut for hay - not grazed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
All cut for hay	38	40	17	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	24
All mowings	17	28	26	13	11	4	0	1	-	-	-	-	-	-	-	-	-	-	199
All grass	34	36	17	6	4	3	-	-	-	-	-	-	-	-	-	-	-	-	472

Source: British Survey of Fertiliser Practice 2017

Table SC3.0 Product use by month of application, Scotland 2017

(a) Product use

row %	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Straight N	1	0	0	0	0	1	17	44	29	5	2	2
Straight P	5	7	0	0	0	0	18	67	3	0	0	0
Straight K	4	1	0	0	0	7	21	61	4	0	0	3
Compounds	3	3	0	0	0	2	12	49	18	7	5	1
All fertilisers	2	2	0	0	0	2	14	48	21	6	4	1

(b) Nutrient use

row %	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Nitrogen	1	0	0	0	0	1	12	48	25	7	5	1
Phosphate	5	5	0	0	0	4	14	51	13	4	3	3
Potash	4	5	0	0	0	4	15	51	13	5	3	1
Total	2	2	0	0	0	2	13	49	20	6	4	2

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

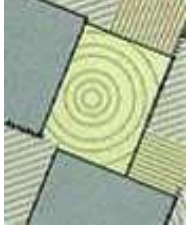
'Product' refers to the total tonnage of the products used by the farmers in the survey year 2017.

'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 2017



SECTION D

USE OF ORGANIC MANURES – GREAT BRITAIN, 2017

Introduction

Whilst the British Survey of Fertiliser Practice has focussed historically on the application of manufactured fertilisers, in recent 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 1,160 farms in the survey 796 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 63%. The details are shown in Table D1.1a.

Table D1.1a Numbers and percentage (%) of farms using each type of manure in Great Britain, 2017

	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	363	595	204	38	18	29	24	43	13	45	30	796
Farms in population	33,208	42,980	14,115	1,622	949	1,125	1,131	4,307	781	1,729	1,395	57,281
Farms in population %	37%	47%	16%	2%	1%	1%	1%	5%	1%	2%	2%	63%
Volume (Mt; Mm^3)	n/a	34.4	43.5	1.5	1.5	0.6	0.4	1.6	1.5	2.9	2.1	90.0
Volume %	n/a	38%	48%	2%	2%	1%	0%	2%	2%	3%	2%	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, 2013 – 2017

	none	*cattle FYM*	*cattle slurry*	*pig FYM*	*pig slurry*	*layer manure*	*broiler/ turkey litter*	*other FYM*	*other*
2013	35	51	17	2	1	3	2	5	4
2014	34	52	16	2	1	2	1	4	4
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

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 2017 being 47% and 16% of farms, respectively.

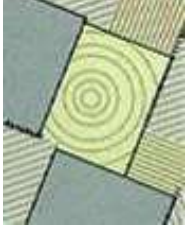


Table D1.1c Dressing cover of organic manure in Great Britain, 2013 - 2017

	all tillage	*grass 5 years and over*	*grass under 5 years old*
2013	23	35	47
2014	22	29	49
2015	23	29	53
2016	23	31	48
2017	25	31	46

Dressing covers of organic manure on tillage has been relatively stable over the five-year period 2013 – 2017. The proportion of grass receiving a dressing of manure is higher for both categories, at 31% of grass 5 years and over and 46% on grass under 5 years old in 2017.

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. 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 is by far 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 2017

			percentage of farms						
	farms in sample	*farms in population*	*broadcast*	*band spread*	*shallow injection*	*deep injection*	*rain gun*	*rotating boom*	*non-broadcast*
Cattle slurry	204	14,115	91	9	4	1	1	0	14
Pig slurry	18	949	54	33	21	0	0	2	56
Grand Total	**218**	**14,857**	**88**	**10**	**5**	**0**	**1**	**0**	**17**

Note: some farms may apply both types of slurry

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.

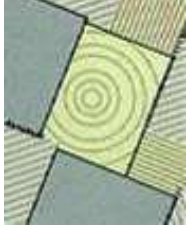


Table D1.3 gives estimates of the volume and area of manure/slurry incorporation on tillage fields by manure type and immediacy of incorporation. Farmyard manure is the most extensively incorporated at 97% of the volume with 84% of it incorporated within a week of spreading on tillage fields. Cattle slurry makes up 97% of all slurry volume (Table D2.3a) and 93% of cattle slurry was applied to grassland. This helps to explain why cattle slurry is less likely to be incorporated at 21% 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 87% of pig slurry was applied to arable land, which if applied to winter crops in the spring would not be incorporated.

Table D1.3 Percentage (%) of organic manure incorporated (volume and area) on tillage fields by incorporation time and manure/slurry type, Great Britain 2017

	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	3	9	10	39	42	33	32	14	13	753	16.5
Cattle slurry	22	21	19	26	18	18	23	18	19	16	102	3.2
Pig slurry	42	40	30	30	21	19	8	11	0	0	46	1.3
Poultry FYM	2	1	28	32	30	29	24	19	12	11	102	0.8
Other	15	15	34	33	38	41	12	8	2	2	217	5.3
Total	**9**	**9**	**16**	**18**	**36**	**38**	**26**	**24**	**12**	**10**	**1,220**	**27.0**

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 35% in 2017. Where contractors were used they were applying between 89% and 98% of the manure on average.

Table D1.4a Use of contractors to spread manure/slurry in current season, Great Britain 2017

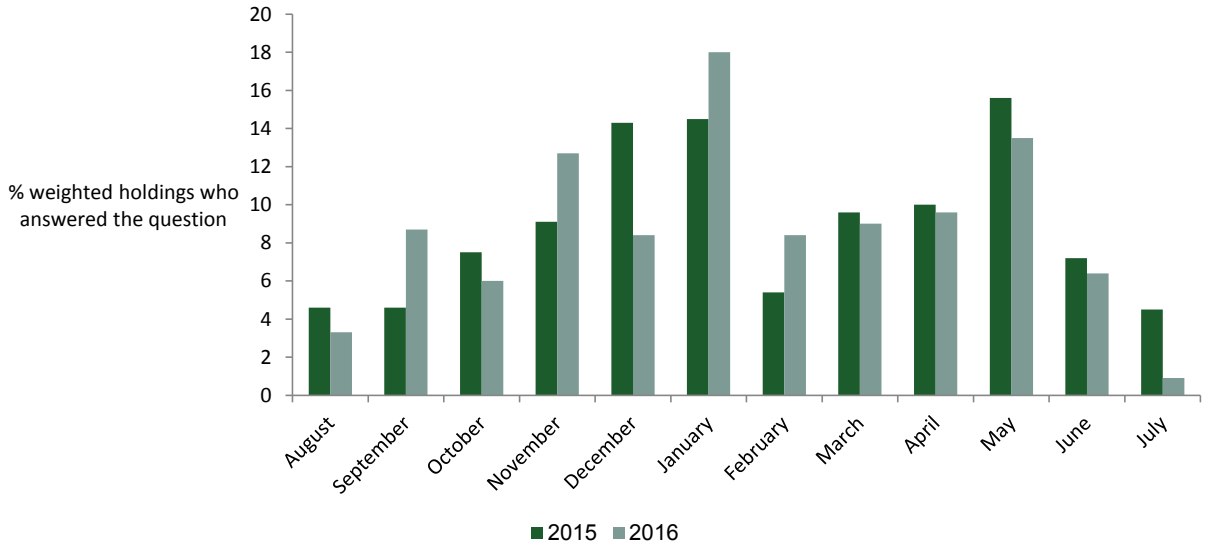
	% of farms using a contractor	*% volume applied by contractor*	*average % of contractor-applied manure, where contractor is used*
FYM	35	32	89
Cattle slurry	26	20	91
Other	71	66	98
Total	**33**	**30**	**92**

Use of contractors to spread manures is fairly consistent over the 5-year period 2013-2017, on 30-36% of farms (Table 1.4b), as was the average amount spread, at 87-92%.

Table D1.4b Use of contractors to spread manure/slurry, Great Britain 2013 - 2017

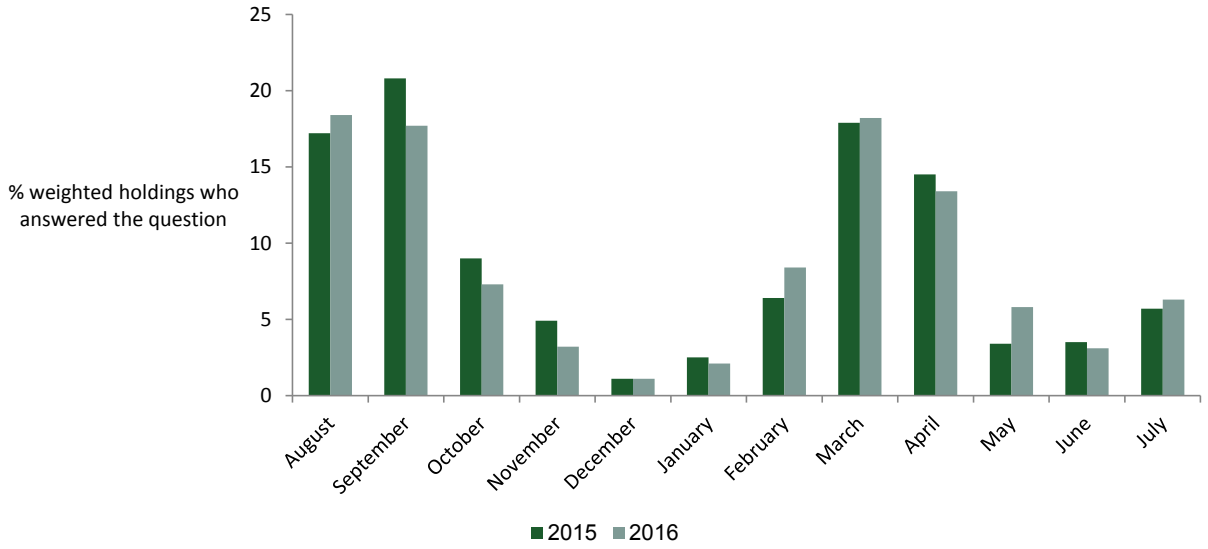
	% of farms using a contractor	*% volume applied by contractor*	*average % of contractor-applied manure, where contractor is used*
2013	30	30	88
2014	36	39	87
2015	34	33	89
2016	34	32	83
2017	33	30	92

Figure D1.5a Temporary field heaps of manure, month of establishment, Great Britain 2015 – 2016



In the 2015 and the 2016 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 in 2015 were December, January and May with between 14% and 16% of farms creating them at each of these timings. In 2016, the peak months for establishment were November, January and May with between 13% and 18% of farms starting them in these months. The peaks for spreading the manure were August, September and March across both years, 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



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

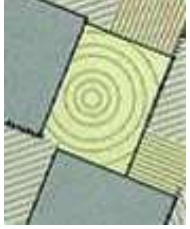
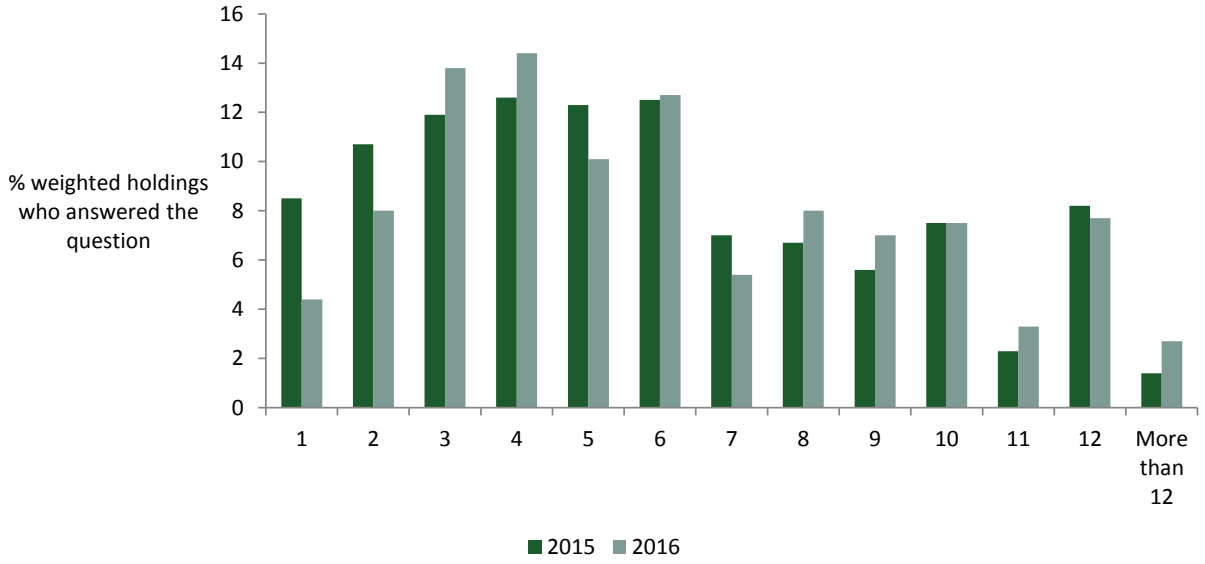
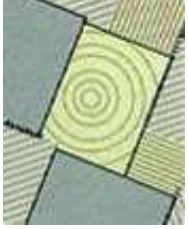


Figure D1.5c Temporary field heaps of manure, duration of storage in months, Great Britain 2015 – 2016



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

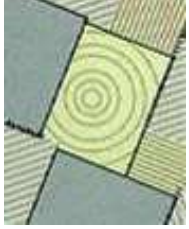
Farmers were also asked on average the duration in months that manure was stored in this way (Figure D1.5b). Storage for 3-6 months accounted for the practice on 49% of farms in 2015, with this figure being 51% in 2016. In 2015 and 2016, only 10% of farms were storing for 12 months or more, when all types of manure are considered. The recommendation from the Food Standards Agency is that manure should be stacked for 8 weeks to reduce the risk of spreading resistant bacteria.



D2 USE OF ORGANIC MANURES

In recent years there has been a great deal of promotional activity aimed at encouraging farmers to adjust fertiliser inputs where manures are used. 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 which was 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 D2). On those fields receiving large dressings, there may be a greater adjustment in mineral fertiliser,
- where reductions in phosphate and potash fertiliser have not been made, this may indicate a desire to build up soil reserves of these nutrients.



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 2013 - 2017

	cattle FYM	*cattle slurry*	*pig FYM*	*pig slurry*	*layer hen manure*	*broiler/ turkey litter*	*other FYM*	*other farm*	*bio-solids*	*other non-farm*
2013	16	9	1	1	1	1	1	0	1	0
2014	16	8	1	1	1	1	1	0	1	0
2015	14	8	1	0	1	1	1	0	1	1
2016	16	8	1	0	1	1	1	0	1	0
2017	16	8	1	0	1	1	1	0	1	1

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 2013 – 2017

	cattle FYM	*cattle slurry*	*pig FYM*	*pig slurry*	*layer hen manure*	*broiler/ turkey litter*	*other FYM*	*other farm*	*bio-solids*	*other non-farm*
2013	56	31	2	2	3	3	4	1	4	2
2014	59	30	2	2	3	2	3	1	4	2
2015	53	30	3	1	4	3	5	1	3	2
2016	57	30	2	2	3	3	4	1	3	2
2017	57	30	2	2	2	2	3	1	5	2

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

The percentage of the sown area receiving an application of cattle FYM in 2017 was 16%, which is consistent with the five-year average. Cattle FYM and cattle slurry were applied to 87% of the sown area receiving organic manure (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 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.

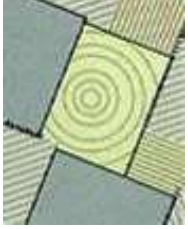


Table D2.2 Typical dry matter and nutrient content of different organic manure types[9]

	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

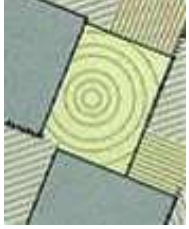
In Table D2.3, crops receiving manure applications have been classified as either “winter-sown”, “spring-sown” or “grass” and their average treated areas and manure application rates shown.

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 2017

	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 %	10.2	1.0	1.3	1.4	1.2	1.5	0.6	0.5	3.6	1.4
Treated area (ha)	298,749	28,590	39,390	41,937	35,201	43,210	18,277	13,878	104,414	41,047
Avg manure rate (t; m^3/ha)	22	28	18	28	8	6	18	43	21	28
Volume (Mt; Mm^3)	6.6	0.8	0.7	1.2	0.3	0.3	0.3	0.6	2.2	1.2
Fields in sample	291	38	31	24	27	25	15	11	62	34
Spring sown										
Treated area %	22.1	4.6	1.8	0.3	0.7	0.7	0.7	-	2.2	1.5
Treated area (ha)	353,678	72,834	28,325	4,410	10,893	11,063	11,426	-	35,825	23,443
Avg manure rate (t; m^3/ha)	22	32	25	21	11	7	17	-	18	25
Volume (Mt; Mm^3)	7.8	2.4	0.7	0.1	0.1	0.1	0.2	-	0.6	0.6
Fields in sample	373	69	34	5	12	10	15	4	29	24
Grass										
Treated area %	22.7	26.3	-	0.2	0.8	-	1.3	0.5	-	0.2
Treated area (ha)	1,311,398	1,523,268	-	12,045	46,625	-	74,387	27,527	-	12,888
Avg manure rate (t; m^3/ha)	15	26	-	22	3	-	14	25	-	24
Volume (Mt; Mm^3)	19.6	40.3	-	0.3	0.1	-	1.1	0.7	-	0.3
Fields in sample	542	402	2	20	9	2	26	5	2	11

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

[9]Anon. (2018). Nutrient Management Guide (RB209). Agriculture and Horticulture Development Board (AHDB). https://ahdb.org.uk/projects/RB209.aspx



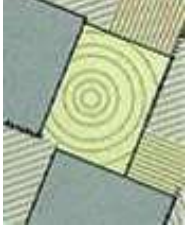
The majority of cattle manure and slurry applications were made to grassland, reflecting the practice of utilising the manure within the farm on which it is produced. Conversely, non-farm manures such as biosolids appear to be favoured on winter-sown tillage land. The profile of the % treated area and average manure rates are broadly similar to those reported for 2016.

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 2017

Cattle FYM	*Cereals*	*Dairy*	*General cropping*	*Mixed*	*Other livestock*	*All farm types*
Winter sown						
Treated area %	37.3	11.7	12.6	26.7	11.2	100.0
Treated area (ha)	111,565	35,007	37,776	79,769	33,358	298,749
Avg manure rate (t; m^3/ha)	22	25	22	23	19	22
Volume (Mt; Mm^3)	2.4	0.9	0.8	1.8	0.6	6.6
Fields in sample	87	54	28	72	47	291
Spring sown						
Treated area %	16.7	18.8	12.3	28.4	23.4	100.0
Treated area (ha)	59,183	66,506	43,629	100,555	82,827	353,678
Avg manure rate (t; m^3/ha)	25	26	22	18	23	22
Volume (Mt; Mm^3)	1.5	1.7	1.0	1.8	1.9	7.8
Fields in sample	51	87	40	79	112	373
Grass						
Treated area %	0.8	12.3	1.3	9.0	76.7	100.0
Treated area (ha)	10,210	161,315	16,880	117,558	1,005,435	1,311,398
Avg manure rate (t; m^3/ha)	15	15	8	15	15	15
Volume (Mt; Mm^3)	0.1	2.4	0.1	1.8	15.1	19.6
Fields in sample	10	65	10	51	406	542

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.

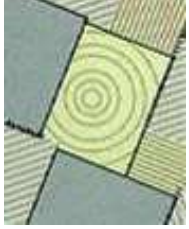
Table D2.3b shows a breakdown of the cattle FYM applications by robust farm type. Cereal farms have the most extensive treatments of cattle FYM on winter sown crops at 37.3% of the treated area. On grass 76.7% of the treated area (with cattle FYM) is on ‘Other Livestock’ robust classification farms.



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), whereas spring-sown and grass fields are treated predominantly between November and April.

Table D2.4 Percentage (%) of each organic manure type applied, by sowing season and timing, Great Britain 2017

	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	4	0	20	44	24	22	5	1	29	8
September	9	1	24	7	7	34	12	21	27	22
October	2	0	7	0	4	11	0	11	11	2
Winter (Nov, Dec, Jan)	0	0	0	0	0	3	0	0	1	10
Spring (Feb, Mar, Apr)	1	0	1	17	3	0	0	2	5	11
Summer (May, Jun, Jul)	0	0	1	0	0	0	0	0	0	1
Spring sown										
August	0	0	0	0	3	0	0	0	1	1
September	1	0	6	5	0	2	1	0	3	5
October	0	0	0	0	0	0	2	0	1	0
Winter (Nov, Dec, Jan)	3	0	6	0	2	0	3	0	3	1
Spring (Feb, Mar, Apr)	14	4	25	4	6	13	4	6	15	21
Summer (May, Jun, Jul)	1	0	1	0	1	2	1	3	0	2
Grass										
August	4	7	0	0	11	0	0	24	0	0
September	5	4	0	0	0	0	36	0	0	3
October	5	1	0	0	0	0	5	0	0	0
Winter (Nov, Dec, Jan)	9	8	0	4	0	13	0	7	0	0
Spring (Feb, Mar, Apr)	33	42	9	12	20	0	8	7	2	6
Summer (May, Jun, Jul)	9	30	0	7	19	0	21	18	0	9
% of total treated area	**49**	**35**	**2**	**1**	**2**	**2**	**3**	**1**	**4**	**2**



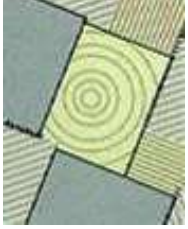
D3 FERTILISER VALUE OF ORGANIC MANURES

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[10]. 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, 2017

	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	99	100	28	51	36	51	304	934
Spring barley	98	99	73	65	78	68	210	394
Winter barley	90	100	53	49	57	53	110	328
Potatoes (maincrop)	100	100	98	85	100	88	18	51
Sugar beet	97	95	20	63	49	68	37	44
Winter oilseed rape	99	100	31	63	25	53	80	357
	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	177	191	54	65	70	76	304	934
Spring barley	94	107	44	51	59	64	210	394
Winter barley	142	155	51	62	69	76	110	328
Potatoes (maincrop)	137	136	129	130	213	231	18	51
Sugar beet	82	108	58	35	87	72	37	44
Winter oilseed rape	166	185	62	58	89	62	80	357
	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	175	191	15	33	25	39	304	934
Spring barley	92	106	32	33	46	43	210	394
Winter barley	128	155	27	31	39	40	110	328
Potatoes (maincrop)	137	136	127	110	213	204	18	51
Sugar beet	80	103	11	22	43	49	37	44
Winter oilseed rape	164	184	20	37	22	33	80	357

[10]Anon. (2018). Nutrient Management Guide (RB209). Agriculture and Horticulture Development Board (AHDB). https://ahdb.org.uk/projects/RB209.aspx



For all the major tillage crops except potatoes the overall rate of nitrogen from manufactured mineral fertiliser was higher on fields where organic manures were not applied in 2017. The difference in application rates of nitrogen ranged from 13 kg/ha for winter and spring barley to 26 kg/ha on sugar beet, although for sugar beet the fact that the data derive from a small number of fields should be considered. 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.

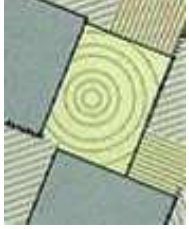
Table D3.1b Overall application rates (kg/ha) of manufactured fertiliser application to tillage crops in Great Britain, with and without applications of organic manure, 2013 - 2017

nitrogen (kg/ha)	*2013*		*2014*		*2015*		*2016*		*2017*	
	with manure	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*
Winter wheat	175	187	167	192	179	196	177	193	175	191
Spring barley	96	113	100	113	95	111	93	112	92	106
Winter barley	141	145	137	147	147	148	135	150	128	155
Potatoes (maincrop)	183	167	137	149	126	178	124	140	137	136
Sugar beet	87	103	89	101	92	105	93	100	80	103
Winter oilseed rape	161	187	175	195	174	197	153	187	164	184

phosphate (kg/ha)	*2013*		*2014*		*2015*		*2016*		*2017*	
	with manure	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*
Winter wheat	16	29	16	29	18	32	16	30	15	33
Spring barley	28	32	36	37	30	34	30	34	32	33
Winter barley	26	28	22	34	18	33	19	32	27	31
Potatoes (maincrop)	119	126	82	100	114	111	124	100	127	110
Sugar beet	15	34	7	33	18	30	-	23	11	22
Winter oilseed rape	21	28	11	29	14	33	11	34	20	37

potash (kg/ha)	*2013*		*2014*		*2015*		*2016*		*2017*	
	with manure	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*
Winter wheat	22	34	27	36	31	35	24	35	25	39
Spring barley	40	48	46	48	42	45	46	47	46	43
Winter barley	36	43	31	48	27	45	23	46	39	40
Potatoes (maincrop)	203	249	152	191	163	202	191	182	213	204
Sugar beet	72	76	62	75	66	61	64	42	43	49
Winter oilseed rape	15	30	20	28	24	32	13	33	22	33

Differences in overall application rates with and without manures for nitrogen, phosphate and potash for the period 2013 to 2017 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 winter wheat and spring barley at 9% and 14%, respectively over manured fields. Overall rates for phosphate and potash in winter wheat show a similar relationship over the five-year period at 47% and 28%, 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 grass fields often receive no mineral fertiliser, not because of manure use, but because the amount of grass production required does not warrant fertiliser input.

Table D3.2 Average field rates (kg/ha) of manufactured fertiliser application on grassland with and without applications of organic manure by robust type group, Great Britain 2017

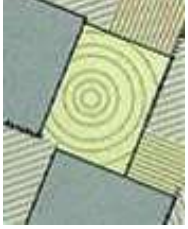
	nitrogen (kg/ha)		*phosphate (kg/ha)*		*potash (kg/ha)*		*fields in sample*	
	with manure	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*
Cereals								
Grass under 5 years old *	145	125	-	45	-	65	16	87
Grass 5 years and over *	86	94	-	32	-	32	13	254
All grass	124	101	-	34	78	39	29	341
Dairy								
Grass under 5 years old	177	167	28	22	57	47	124	33
Grass 5 years and over	140	128	21	19	43	21	135	94
All grass	154	137	23	19	48	25	259	127
General cropping								
Grass under 5 years old *	125	93	-	40	-	51	6	54
Grass 5 years and over *	158	80	-	24	-	33	14	110
All grass	140	84	19	29	37	40	20	164
Mixed								
Grass under 5 years old *	119	114	31	31	44	45	29	113
Grass 5 years and over *	87	71	19	23	22	27	34	197
All grass	95	85	22	25	27	33	63	310
Other livestock								
Grass under 5 years old	107	100	32	27	43	33	140	168
Grass 5 years and over	87	61	24	17	26	21	368	502
All grass	91	68	26	18	30	23	508	670
All farm types								
Grass under 5 years old	146	112	30	30	49	40	315	458
Grass 5 years and over	105	74	23	19	30	23	572	1165
All grass	117	82	25	22	35	27	887	1623

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 34 fields).

As in the 2016 survey, 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 2017

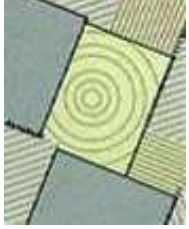
	nitrogen (kg/ha)		*phosphate (kg/ha)*		*potash (kg/ha)*		*fields in sample*	
	with manure	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*
All cut for hay	123	89	-	-	-	-	11	11
All cut for silage	163	137	24	16	56	32	199	28
All grazings	155	136	24	19	46	25	211	122

Application rates of mineral fertilisers are consistently 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 2013 – 2017

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*
2013	103	124	15	19	27	21	20	18
2014	114	255	20	22	43	54	26	13
2015	117	107	34	23	32	24	17	13
2016	106	-	13	-	15	-	15	3
2017	123	89	-	-	-	-	11	11
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*
2013	161	146	28	30	50	47	260	71
2014	164	148	26	26	55	53	238	69
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
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*
2013	141	124	24	24	40	32	313	195
2014	150	134	25	23	43	34	282	186
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

Over the 5-year period 2013-17, 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. Average field rates of phosphate are more stable, particularly on manured fields, in the range of 24-28 kg/ha for manured fields cut for silage and 24-27 kg/ha on all grazed fields. Potash average field rates for manured silage and grazed grass were in the range 50-56 kg/ha and 40-46 kg/ha, respectively.



SECTION E

E1 SPREADING PRECISION, RECORD KEEPING, SOIL TESTING, AND SECURITY

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 2017, 38% 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 6%, checking at each change of fertiliser. Twenty-three percent of farmers never check their spreaders for accuracy.

Table E1.1 Frequency of spread pattern checks using catch trays, percentage (%) of those farms with a spreader, Great Britain 2013 – 2017

	No spreader on farm	*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*
2013	10	8	4	11	39	26	11	2
2014	10	8	4	11	37	25	14	1
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

Practices of checking are generally consistent over the five-year period 2013-2017, with contractors 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 2016/17 crop year, Great Britain 2017

	manufactured fertilisers				*organic manures*			
	farms	*farms %*	*area (ha)*	*area %*	*farms*	*farms %*	*area (ha)*	*area %*
Computer program	15,816	22.6	3,150,622	35.5	8,838	16.7	1,885,608	28.0
Farm diary	34,708	49.7	4,052,308	45.7	29,442	55.8	3,396,534	50.5
Farm notebook/pocketbook	16,786	24.0	1,754,669	19.8	12,583	23.8	1,310,352	19.5
File record sheet (file in the office)	15,198	21.7	2,013,569	22.7	9,995	18.9	1,473,270	21.9
Other paper record	1,484	2.1	165,630	1.9	1,443	2.7	188,370	2.8
No records kept	2,958	4.1	214,134	2.4	4,806	8.3	420,432	5.9

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 23% of farms, but this equates to 36% 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 17% 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 43%, and lower at 13% on 'dairy' and 6% 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.

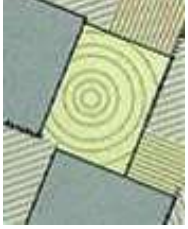


Table E1.2b Record keeping methods for fertiliser and manure applications on farms where each nutrient type was applied during the 2016/17 crop year, by farm type, Great Britain 2017

	manufactured fertilisers		*organic manures*	
Cereals	*farms*	*farms %*	*farms*	*farms %*
Computer program	8,147	42.5	3,052	37.1
Farm diary	7,363	38.4	4,001	48.6
Farm notebook/pocketbook	2,282	11.9	974	11.8
File record sheet (file in the office)	6,298	32.8	2,524	30.7
Other paper record	280	1.5	71	0.9
No records kept	0	0.0	164	2.0
	manufactured fertilisers		*organic manures*	
Dairy	*farms*	*farms %*	*farms*	*farms %*
Computer program	970	13.0	1,011	11.7
Farm diary	4,145	55.3	4,918	57.1
Farm notebook/pocketbook	2,278	30.4	2,275	26.4
File record sheet (file in the office)	1,465	19.6	2,146	24.9
Other paper record	212	2.8	212	2.5
No records kept	362	4.6	433	4.8
	manufactured fertilisers		*organic manures*	
General cropping	*farms*	*farms %*	*farms*	*farms %*
Computer program	2,977	33.6	1,357	31.3
Farm diary	4,370	49.3	2,129	49.1
Farm notebook/pocketbook	1,377	15.5	232	5.4
File record sheet (file in the office)	2,501	28.2	1,622	37.4
Other paper record	136	1.5	136	3.1
No records kept	0	0.0	342	7.3
	manufactured fertilisers		*organic manures*	
Mixed	*farms*	*farms %*	*farms*	*farms %*
Computer program	2,102	25.5	1,710	23.3
Farm diary	3,568	43.4	3,559	48.6
Farm notebook/pocketbook	2,477	30.1	1,987	27.1
File record sheet (file in the office)	1,718	20.9	1,453	19.8
Other paper record	171	2.1	267	3.6
No records kept	555	6.3	784	9.7
	manufactured fertilisers		*organic manures*	
Other livestock	*farms*	*farms %*	*farms*	*farms %*
Computer program	1,528	6.0	1,615	6.8
Farm diary	15,075	58.7	14,669	61.5
Farm notebook/pocketbook	8,351	32.5	7,094	29.8
File record sheet (file in the office)	3,175	12.4	2,209	9.3
Other paper record	540	2.1	612	2.6
No records kept	2,042	7.4	3,082	11.4
	manufactured fertilisers		*organic manures*	
All farm types	*farms*	*farms %*	*farms*	*farms %*
Computer program	15,816	22.6	8,838	16.7
Farm diary	34,708	49.7	29,442	55.8
Farm notebook/pocketbook	16,786	24.0	12,583	23.8
File record sheet (file in the office)	15,198	21.7	9,995	18.9
Other paper record	1,484	2.1	1,443	2.7
No records kept	2,958	4.1	4,806	8.3

Note: more than one method may be used

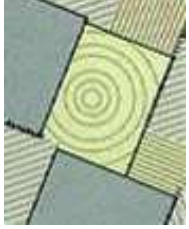


Table E1.2c Record keeping methods percentage (%) of farms, for fertiliser and manure applications on farms where each respective nutrient type was applied in the crop year, Great Britain 2013-2017

		computer program	*farm diary*	*farm notebook/pocket-book*	*file record sheet (file in the office)*	*other paper record*	*no records kept*
manufactured fertilisers	*2013*	21.2	49.2	23.6	19.8	2.8	5.7
	2014	20.6	50.2	24.6	18.8	4.3	5.1
	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
organic manures	*2013*	18.0	51.9	22.0	18.9	2.6	9.9
	2014	16.5	55.4	20.0	19.7	5.1	11.4
	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

Note: more than one method may be used

Recording methods for manufactured fertilisers show minor variations across the five-year period 2013-17, with farm diaries remaining the most widely used recording method. For organic manures, records of some type were kept on 87-92% of farms for the five-year period.

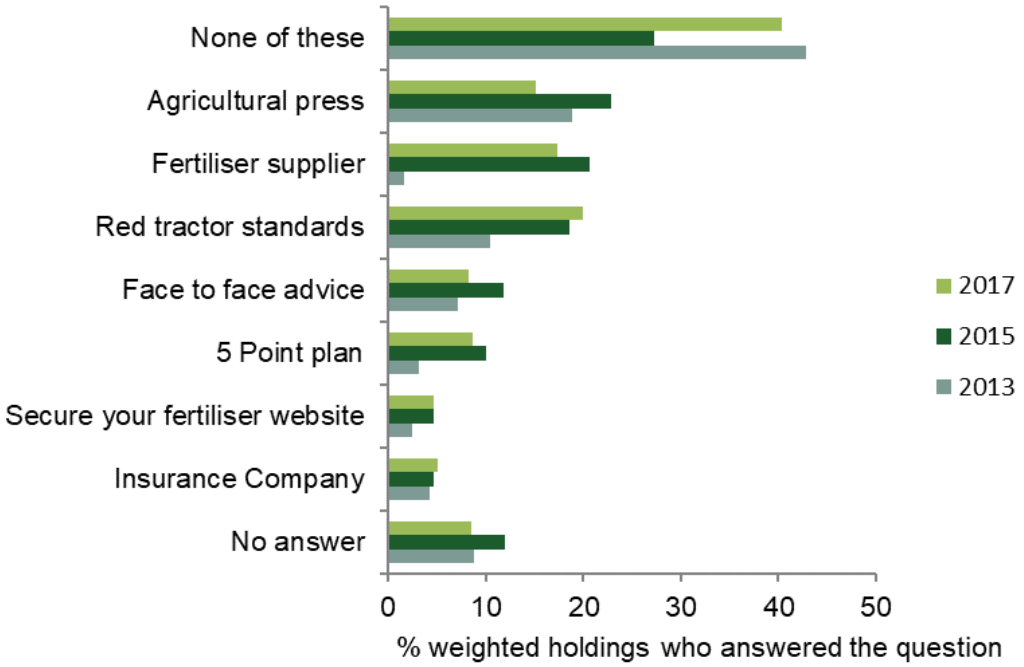
Table E1.3 Soil testing percentage (%) of tillage and grass area, Great Britain 2017

	tillage area %	*grass area %*
Standard P, K, Mg, pH	27	6
Nitrogen	11	1
pH (lime only)	7	3
Precison farming purposes	6	1

Table E1.3 shows the percentage of the tillage and grass area that was soil tested in the 2017 cropping year. 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 in 2017, at 27% of the tillage area and 6% of the grass area. All types of soil tests were more prevalent on tillage than on grass.

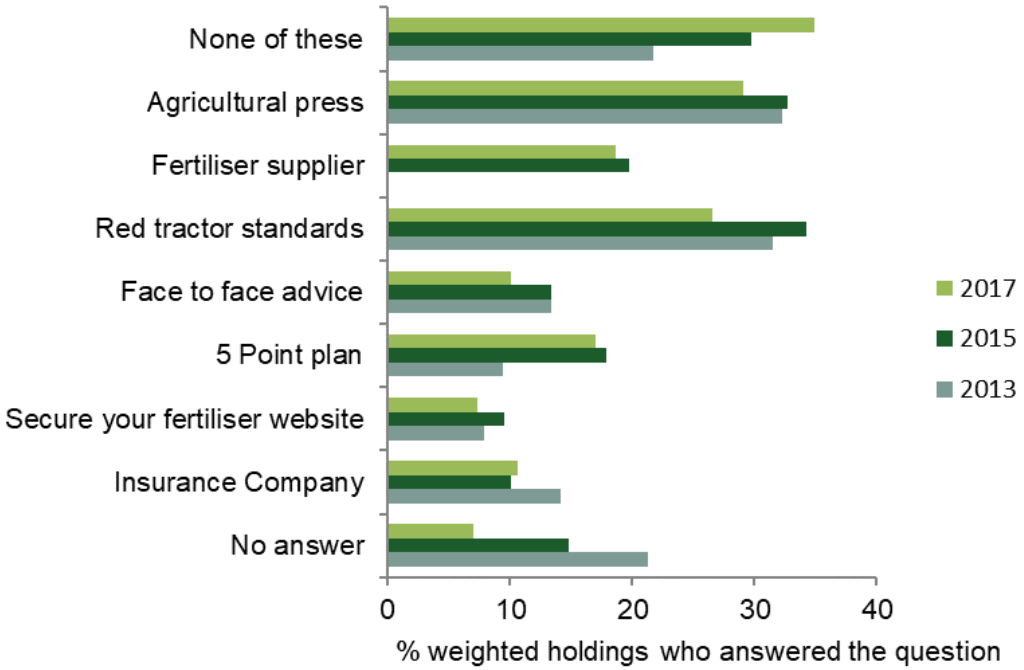
Soil testing questions have been asked since the 2014 survey, but the results are not shown here. The decision has been taken that the data need to be collected over a greater number of years, before publishing a time series.

Figure E1.4a Security guidance – unprompted awareness, Great Britain 2013, 2015 and 2017

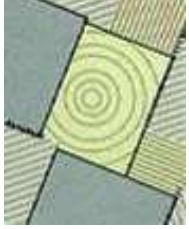


In 2013, 2015 and again in 2017, farmers were about what guidance they were aware of on storing fertilisers to minimise the risk of theft (Figure E1.4a). When asked without prompting, the agricultural press, fertiliser suppliers and red tractor standards were mentioned as consistent sources over the period.

Figure E1.4b Security guidance – prompted awareness, Great Britain 2013, 2015 and 2017



With prompting, the importance of the 5 Point plan (Secure Your Fertiliser leaflet), insurance company and face to face advice were also identified as sources. Fertiliser suppliers were not included as a guidance source in 2013.



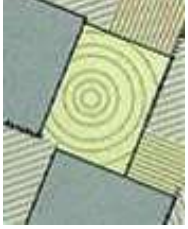
APPENDIX 1 - SURVEY STATISTICS

APP 1.1 SAMPLING VARIATION

Table App 1.1 Standard errors of application rates for the major crops in 2017

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	2.4	2.7	1.4	1.4	1.7	1.7	2.2	2.2	7.8	1.6	1.9	1.9	1249
oilseed rape	2.9	3.0	1.3	1.9	2.1	3.0	2.8	2.7	3.9	2.0	2.6	3.0	441
winter barley	2.4	2.8	1.4	1.9	2.4	2.1	2.3	2.4	6.5	2.2	2.3	2.4	441
spring barley	1.9	2.5	1.6	1.4	1.7	1.5	1.8	2.1	2.2	1.4	1.7	2.1	618
m/c potatoes	9.0	8.9	10.3	11.2	17.8	6.5	8.7	10.2	9.9	10.9	16.8	23.5	70
sugar beet	5.1	5.5	3.7	3.8	7.3	5.5	4.1	4.4	14.5	6.5	9.2	9.1	81
all tillage crops	2.1	2.4	1.1	1.0	1.3	1.2	1.9	2.0	2.1	1.2	1.7	1.6	3948
all grass	2.0	1.7	1.2	0.4	0.6	0.5	2.2	2.8	2.1	0.9	1.3	2.6	2713
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	2.5	2.7	1.2	1.4	1.8	1.8	2.3	2.3	8.6	1.7	2.0	2.0	1179
oilseed rape	3.0	2.9	0.8	1.9	2.2	3.1	2.9	2.7	2.1	2.2	2.8	3.1	415
winter barley	2.6	2.9	1.3	2.0	2.4	2.2	2.4	2.5	6.3	2.5	2.6	2.5	403
spring barley	2.4	2.9	1.6	1.5	1.8	1.8	2.1	2.3	3.4	2.0	2.2	2.5	452
m/c potatoes	9.9	10.3	11.8	12.6	19.6	7.5	9.5	10.8	11.4	12.3	17.8	25.4	57
sugar beet	4.9	5.3	2.5	3.9	6.8	5.3	3.9	4.4	9.6	7.0	8.7	9.5	79
all tillage crops	2.3	2.6	1.0	1.0	1.4	1.3	2.1	2.1	2.6	1.4	2.1	1.7	3538
all grass	2.2	2.0	1.2	0.4	0.7	0.5	2.5	3.1	2.5	1.1	1.6	3.1	2241
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	8.3	10.2	9.2	4.9	5.4	6.0	7.0	8.0	17.1	4.5	4.4	6.3	70
oilseed rape	12.0	16.8	13.3	6.8	7.5	12.7	12.0	12.7	17.3	4.2	4.4	12.3	26
winter barley	8.0	10.1	8.7	4.7	6.2	6.4	8.0	8.9	17.4	4.0	4.5	7.2	38
spring barley	3.2	4.0	3.1	2.1	2.7	2.2	3.1	3.6	3.0	2.0	2.5	3.3	166
all potatoes	14.3	7.4	14.1	17.1	30.5	10.3	14.3	32.3	14.1	17.1	30.1	26.9	20
all tillage crops	4.0	4.8	3.2	2.2	2.7	2.3	3.9	5.1	3.1	2.0	2.6	3.9	410
all grass	4.2	2.9	3.7	1.1	1.7	1.1	3.8	4.9	3.6	1.4	2.0	4.0	472

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 2017

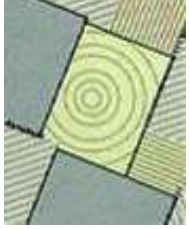
	2016	*% total*
Target sample	1308	100
2016 panellists agreeing to re-contact in 2017	1079	82
Achieved 'Main' sample from 2016 panel	748	57
Achieved additional 'Main' sample	140	11
Achieved '1st reserve' sample	120	9
Achieved '2nd reserve' sample	86	7
Achieved '3rd reserve' sample	66	5
Total achieved	**1160**	**89**
Total number of refusals/non-contact	1403	
Total number of farms approached	***2563***	

Table App 1.3 Response to main and reserve samples for 2013 - 2017

Net response rate	*2013 %*	*2014 %*	*2015 %*	*2016 %*	*2017 %*
Overall achieved rate	91	91	90	87	89
Achieved % of total contact attempts	51	52	53	46	45
Main sample	78	76	81	80	77
Reserve sample(s)	12	14	19	20	23
Main reason for refusal	*2013 %*	*2014 %*	*2015 %*	*2016 %*	*2017 %*
Too busy	25	22	17	10	11
Not interested	16	17	14	12	13
Do not do surveys	5	5	4	5	6
Want payment	1	0	0	0	0
Too much paperwork	1	1	1	1	1
Non-contact	32	41	45	50	43
Other[a]	20	13	20	22	25

[a] includes late submission, contracted out, contributed enough, farm sold/not farming, ill health, retired, and incorrect telephone number.

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

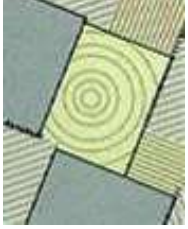


APP 1.3 INFORMATION ON HOLDINGS BELOW 20 HECTARES

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 4% of the total crop area and around 10% 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.

2015	Total area (ha)	Total no. holdings area >0	Area (ha) <20ha	No. of holdings with <20ha	Proportion of area <20ha	Proportion of holdings <20ha	No. of holdings with zero area	Total no. holdings
a) Crops	4,844,400	66,200	187,500	28,200	4%	43%	127,000	193,200
b) Temporary grass	1,016,800	53,100	257,700	37,500	25%	71%	140,100	193,200
c) Permanent grass ≥ 5 years old	5,428,000	154,400	618,100	87,900	11%	57%	38,800	193,200
Total croppable area (a)+(b)	5,861,200	87,500	245,300	39,200	4%	45%	105,700	193,200
Total grass (a)+(b)	6,444,800	161,300	615,100	87,500	10%	54%	31,900	193,200

Note: Includes bare fallow and uncropped land.

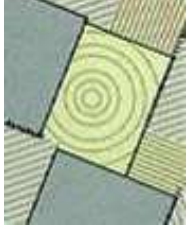


APPENDIX 2

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.