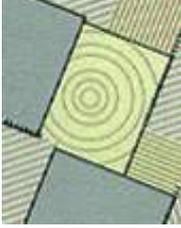


THE BRITISH SURVEY OF
**Fertiliser
Practice**

FERTILISER USE ON FARM CROPS
FOR CROP YEAR 2021



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National Statistics Status

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

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

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

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

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



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Results from the British Survey of Fertiliser Practice are published here:

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



FOREWORD

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

The 2021 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 2021, the Survey was co-ordinated by Kynetec, who were responsible for the survey design, data collection, statistical analysis and quality control monitoring.

Data uses

The information in this publication is widely used by the UK government, international organisations, industry and researchers. It contains 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 and the environment. 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, with publications on greenhouse gas emissions, agriculture and climate change, NVZs](#) and [soil nutrient balances](#) of particular relevance.

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.

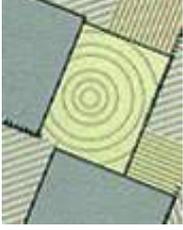
Contact information and feedback

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 2021.

July 2022



ACKNOWLEDGEMENTS

The sponsors gratefully acknowledge the co-operation of all farmers taking part in the 2021 British Survey of Fertiliser Practice.

This Survey was conducted in accordance with Government restrictions due to the Global Covid-19 pandemic.

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).

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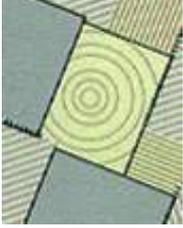
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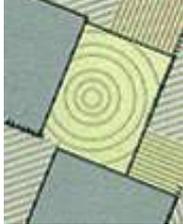


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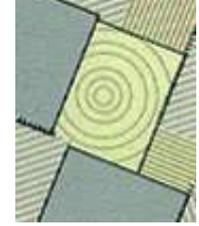


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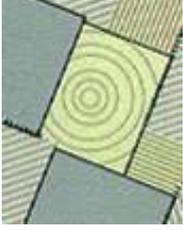


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EXECUTIVE SUMMARY

The British Survey of Fertiliser Practice (BSFP) 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 2021 Survey on the use of the nutrients nitrogen, phosphate, potash, and sulphur in Great Britain are summarised below (Table ES1).

Cropping patterns can influence fertiliser rates and dressing covers observed. In 2021 there was a 1.9% increase in the total area of tillage crops planted. In addition, there were 25% plus increases to the area planted to winter wheat and winter barley. This reversed the relatively low autumn plantings of the 2020 crop year, which was the fifth wettest winter on record since 1862. The area of winter oilseed rape continued to decline and the 2021 crop area represents a 47% reduction since 2016. 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 2021

	All Tillage	All Grass	All Crops and Grass
Total Nitrogen - N			
Overall application rate, 2021 (kg/ha)	130	51	87
Mean overall application rate, 2017-2021 (kg/ha)	133	54	90
Crop area receiving dressing, 2021 (%)	89	59	72
Average field rate, 2021 (kg/ha)	147	87	120
Total Phosphate - P₂O₅			
Overall application rate, 2021 (kg/ha)	22	7	14
Mean overall application rate, 2017-2021 (kg/ha)	26	8	16
Crop area receiving dressing, 2021 (%)	41	37	39
Average field rate, 2021 (kg/ha)	53	20	36
Total Potash - K₂O			
Overall application rate, 2021 (kg/ha)	28	11	18
Mean overall application rate, 2017-2021 (kg/ha)	33	11	21
Crop area receiving dressing, 2021 (%)	43	39	41
Average field rate, 2021 (kg/ha)	64	28	45
Total Sulphur - SO₃			
Overall application rate, 2021 (kg/ha)	30	5	16
Mean overall application rate, 2017-2021 (kg/ha)	33	4	17
Crop area receiving dressing, 2021 (%)	60	16	35
Average field rate, 2021 (kg/ha)	51	32	46

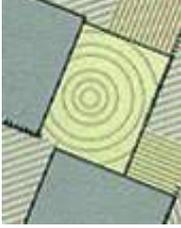
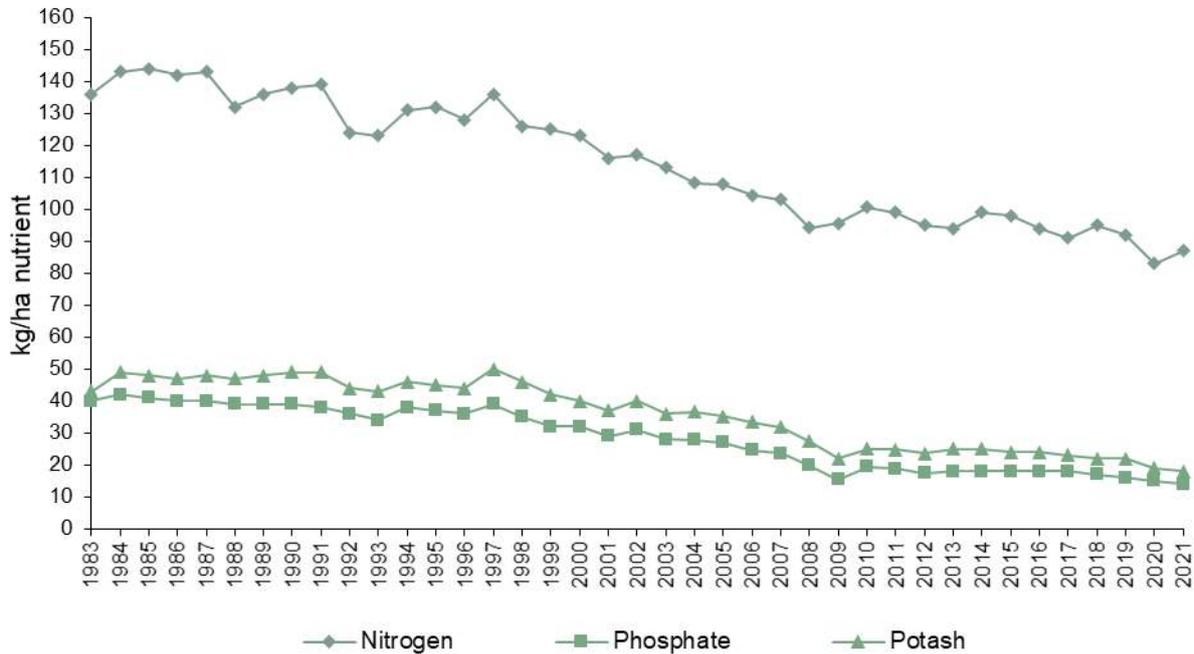


Figure ES1 Overall fertiliser use (kg/ha) on all crops and grass, Great Britain 1983 - 2021

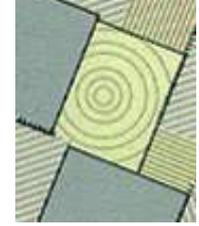


Nitrogen

- 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 4 kg/ha increase in total nitrogen use on all crops and grassland in 2021 resulted from a 9 kg/ha increase in the overall rate on tillage crops to 130 kg/ha and a 2 kg/ha decrease on grass to 51 kg/ha. These changes, especially for tillage crops, reflect a return to a more normal winter/spring cropping balance following a very wet autumn during the 2019-20 season.
- Mineral fertiliser nitrogen levels applied to grassland have been consistently lower than on 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
- In 2021 the overall rates of total nitrogen increased on winter wheat, winter barley and potatoes. Average field rates mainly increased on the major tillage crops except for spring barley, which was unchanged at 102 kg/ha. The overall nitrogen rate on winter wheat increased by 9 kg/ha to 186 kg/ha. The overall rate for oilseed rape decreased by 1 kg/ha (to 167 kg/ha), and for sugar beet by 2 kg/ha to 67 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.
- 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 (55% dressing cover for grass



<5 years old, 34% for grass of 5 years or more) than on tillage crops (26% cover) and grazed grassland also receives manure as it is grazed.

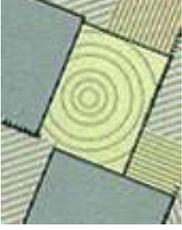
- Overall phosphate usage on tillage crops declined gradually between 1984 and 1996. Thereafter the decline in rates became more marked until 2009, after which there was some recovery and relative stability until 2018, when a 3 kg/ha decrease to 27 kg/ha was recorded. Overall phosphate rates on tillage have declined every year since to a figure of 22 kg/ha in 2021. 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 7 kg/ha in 2021.
- Overall potash application rates on tillage crops declined slightly between 1983 and 1997, with the rates in the 60-68 kg/ha range. Like phosphate, overall application rates reduced at a greater rate after this time, dropping to their lowest levels of 33 kg/ha in 2009 when fertiliser prices were high. Between 2014 and 2018 overall potash application rates were reasonably stable in the range 35-40 kg/ha, but declined again in 2021 by 1 kg/ha to 28 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 of 11-12 kg/ha since 2015.
- It is of note that in Scotland the phosphate and potash application rates on tillage land have largely been maintained, relative to the decline seen in England & Wales, and although there has been a reduction in dressing covers and overall rates since 2004, they were relatively stable again on tillage by 2010. However, there was a significant reduction in dressing cover and overall rate of phosphate and potash on grassland between 2004 and 2011, although more recent data indicate a return to stability.

Sulphur

- Sulphur is an essential plant nutrient and is a component of most proteins as well as activating certain enzyme systems. In the past, sulphur demand was satisfied through atmospheric deposition but this contribution is now hardly significant. Therefore, there is a need for sulphur application to crops and grass; with crops such as oilseed rape being particularly sensitive to sulphur deficiency. Elemental sulphur can also be used as a soil acidifier for potatoes which can offer some protection against common scab (*Streptomyces scabiei*) although sulphur as a nutrient is usually applied in the sulphate form.
- The Survey has collected detailed information on sulphur (SO₃) 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 2021, sulphur dressing covers in cereals were in the 55%-73% range.
- The 79% dressing cover for winter oilseed rape was 4% lower than observed in 2020, but 3% higher than reported in 2017.
- In 2021, 35% of all crops and grass received a dressing of sulphur; this figure was 60% for tillage crops. On tillage crops the overall application rate for sulphur was 30 kg/ha, 3 kg/ha below the five-year average between 2017-2021 of 33 kg/ha. Applications on grass were unchanged in 2021 at 5 kg/ha and dressing cover increased 2% to 16% of grass receiving a sulphur dressing in 2021.

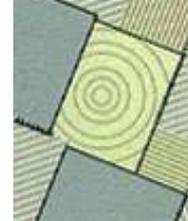
Organic manures

- 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 recycled source of nitrogen, phosphorus, potassium and sulphur. Where organic manures are used, applications of manufactured fertiliser can usually be reduced.



- In 2021, around 65% of farms used organic manures on at least one field on the farm. Cattle manure from beef and dairy farms is by far the largest volume of manure type generated in Great Britain. In 2021, 59% of cattle manure and 91% of cattle slurry applications were made to grassland, reflecting the practice of utilising the manure on the farm on which it is produced.

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



SECTION A

THE BRITISH SURVEY OF FERTILISER PRACTICE

A1 INTRODUCTION AND STRUCTURE OF THE REPORT

The British Survey of Fertiliser Practice (BSFP) is the primary source of data on organic and inorganic fertiliser use in Great Britain. The results from the Survey are used by the British fertiliser industry, by Government and by the wider agricultural and environmental community. It is essential that the claims made from the Survey are underpinned by an effective methodology. Section A2 describes this methodology, detailing measures undertaken to avoid bias and unreliability. National changes in relative cropping areas are discussed in Section A3.

Section B provides a commentary of recent changes in survey data and longer-term trends. It includes estimates of total fertiliser use which are given in Table B2.7. These data are derived from BSFP findings, confidential trade and sales data and HMRC import/export statistics. Section C presents the main tables of results from the Survey, grouped by geographic coverage. They include major crop groups, grassland, product types and farm types plus information on timing of applications. Figures for estimates of 'total', 'straight' and 'compound' nutrient rates are presented in separate tables. Section D provides an analysis of the application of organic manures and manufactured fertilisers. Section E contains more general information on farm practices such as spreader checking, record keeping and soil testing. Datasets for key data series are available via the [Fertiliser usage section of the GOV.UK 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} Since 1992 the Survey has reported amalgamated data for Great Britain, in addition to the results for England & Wales and for Scotland. Weighted results for the major combinable crops and grassland were also recalculated from the national surveys to provide additional data for these crops for Great Britain from 1983.

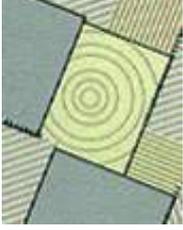
The current methods of survey design and implementation are the result of adaptation of the original design from Rothamsted Experimental Station, undertaken by Edinburgh Data Library at the University of Edinburgh between 1992 and 1998. From 1999 until 2003 design and analysis was undertaken by the Rural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

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

³ Church, B.M. and Lewis, D.A. (1977). Fertiliser use on farm crops, England and Wales: Information from the Survey of Fertiliser Practice, 1942-1976. *Outlook on Agriculture* **9**, 186-193.

⁴ Chalmers, A.G., Kershaw, C.D. and Leech, P.K. (1990). Fertiliser use on farm crops in Great Britain: Results from the Survey of Fertiliser Practice, 1969-1988. *Outlook on Agriculture* **19**, 269-278.

⁵ Chalmers, A.G., Renwick, A.W., Johnston, A.E. and Dawson, C.J. (1999). Design, development and use of a national survey of fertiliser applications. *Proceedings International Fertiliser Society* **437**.



A2 SURVEY METHODOLOGY

A2.1 SAMPLE

This Survey is based on a sample of holdings in order to reduce burdens and manage resources. The Survey sample is selected from the population of agricultural holdings compiled by Defra and Devolved Administrations using the June Survey of Agriculture and Horticulture (large sample surveys conducted annually at national level which record information on farm size, cropping, stocking and employment, to be referred to as the 'June Agricultural Survey'). In each year, two samples are extracted from the June Agricultural Survey, one for England & Wales and one for Scotland. Holdings with less than 20 hectares allotted to crops and grass (in total) 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. Using the 20 hectare threshold reduces the number of farms which need to be sampled so reducing burdens and costs without significant adverse impact on the survey coverage and hence the quality of the data. 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 farm classifications (called 'robust' types). Farms with a robust type of 'Other' (robust type 10) are not included in the sample. See A2.7 paragraph 9 for more details.

In 2021, the target sample size was 1,500 farms. This sample size has been designed in order to achieve a statistically representative sample at the national level. The number of farms to be sampled is allocated to each of the farm type and size combinations (strata) in proportion to the total area of crops and grass recorded in the June Agricultural Survey (using the latest available data). The exception to this is for horticultural farms in England and Wales, which 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.

Where possible, three reserve farms are selected for each farm in the main sample. The reserves will be the geographically nearest holdings (using the County/Parish/Holding (CPH) number) of the same farm type and size group as the farm they are matched to. 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 declines, then the second and if necessary, the third reserve is contacted. If all four farms decline, then no farm is recruited into the Survey for that particular sampling unit.

To help improve the Survey response and to reduce the year-on-year variability, a core of respondents completes the Survey each year. This approach 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 2021, 74% of the panel had responded in the previous year. The profile of the Survey panel in terms of farm size was 73% >200ha, 78% 100-200ha, 76% 50-100ha and 72% >20-50ha.

For the 2021 BSFP the achieved sample size was 1,310 holdings, a 1.9% decrease on the sample size from the 2020 survey. It should be noted that, due to Government restrictions in response to the Covid-19 pandemic, the vast majority of interviews for the 2021 BSFP were conducted via phone, with the remaining face to face interviews being conducted in line with Government protocols at the time of fieldwork. 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.



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 is 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 Agricultural 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 2021 Survey, England & Wales

	farm holdings in population in 2021	total crops and grass in 2021 (column %)	notional sampling fraction ¹ (%)	target sample size	achieved sample size	achieved sample fraction ² (%)
England & Wales						
Livestock & mixed						
(Robust types: specialist pigs, specialist poultry, dairy, cattle and sheep (LFA & lowland), mixed)						
crops & grass area						
20-50 ha	16,840	6.3	0.46	77	72	0.43
51-100 ha	13,780	11.1	0.99	137	120	0.87
101-200 ha	9,616	15.0	1.92	184	175	1.82
200+ ha	4,753	19.6	5.08	242	228	4.80
Total livestock & mixed	44,989	52.0	1.42	640	595	1.32
Crops						
(Robust types: cereals, general cropping)						
crops & grass area						
20-50 ha	7,940	2.9	0.46	36	44	0.55
51-100 ha	7,048	5.6	0.99	70	55	0.78
101-200 ha	6,068	9.7	1.98	120	123	2.03
200+ ha	6,060	28.3	5.76	349	257	4.24
Total crops	27,116	46.7	2.12	575	479	1.77
Horticulture						
(Robust type: horticulture)						
crops & grass area						
20-50 ha	638	0.2	0.91	6	5	0.78
51-100 ha	399	0.3	1.98	8	7	1.75
101-200 ha	220	0.4	4.10	9	4	1.82
200+ ha	100	0.5	12.26	12	6	6.00
Total horticulture	1,357	1.4	2.58	35	22	1.62
Total for England & Wales	73,462	100		1,250	1,096	1.49

¹ The *notional sampling fraction* is found by expressing the *target sample size* as a percentage of the *farm holdings in population in 2021*.

² The *achieved sampling fraction* is found by expressing the *achieved sample size* as a percentage of the *farm holdings in population in 2021*.

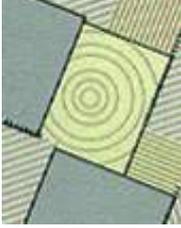


Table A2.2 Derivation of the stratified random sample for the 2021 Survey, Scotland

	farm holdings in population in 2021	total crops and grass in 2021 (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	716	1.4	0.48	3	7	0.98
51-100 ha	920	3.8	1.04	10	8	0.87
101-200 ha	936	7.6	2.04	19	14	1.50
200+ ha	598	12.1	5.04	30	23	3.85
Total cereal/general	3,170	24.9	1.96	62	52	1.64
Livestock & mixed						
(Robust types: specialist pigs, specialist poultry, dairy, cattle and sheep (LFA & lowland), mixed, general cropping; forage)						
crops & grass area						
20-50 ha	4,362	8.1	0.46	20	14	0.32
51-100 ha	3,526	14.4	1.02	36	29	0.82
101-200 ha	2,933	23.1	1.97	58	49	1.67
200+ ha	1,545	29.5	4.78	74	70	4.53
Total livestock & mixed	12,366	75.1	1.52	188	162	1.31
Total for Scotland	15,536	100		250	214	1.38

¹ The *notional sampling fraction* is found by expressing the *target sample size* as a percentage of the *farm holdings in population in 2021*.

² The *achieved sampling fraction* is found by expressing the *achieved sample size* as a percentage of the *farm holdings in population in 2021*.

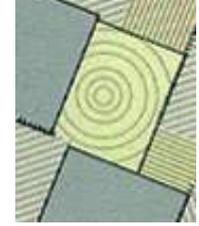
A2.2 DATA COLLECTION

To comply with English, Scottish and Welsh Government Covid-19 regulations, data collection was done between July 2021 and February 2022 almost exclusively via telephone interviews 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.

Estimated quantities of nitrogen, phosphate and potash fertiliser consumed annually in the UK since 1966 are shown in Table B2.7. These data are based on BSFP findings, HMRC import/export statistics and confidential trade and sales data which are contributed by Agricultural Industries Confederation (AIC) industry members who represent approximately 90% of the market. They are compiled by the AIC 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 Agricultural Survey. Additionally, 10% of interviews undertaken will be subject to a call back by an independent reviewer to check responses to individual questions as part of data quality assurance arrangements. The aggregated figures are checked for consistency and trend analysis against historic data and are subject to independent expert peer review.



A2.4 ACCURACY AND RELIABILITY OF THE INFORMATION

The use of sampling in this Survey means that there will be certain limitations associated with the data. The sampling methodology used is described more fully in Section A2.1 but essentially uses a random stratified sampling strategy approach, with an element of a core panel, to obtain a representative sample. A response rate of 43% was achieved in 2021. 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.

The standard errors are relatively small for the grouped 'all tillage' and 'all crops and grass', and for the main arable crops of wheat, oilseed rape and barley. The standard errors are higher for sugar beet and potatoes where sample sizes (crop area, number of respondents) are smaller. 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.

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 their own farm, are not captured in the Survey.

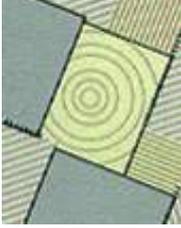
The statistics on the pattern of fertiliser practice reported for Great Britain largely reflect practice in England and Wales due to its greater area of total crops and grassland: about 9.1 million hectares in England and Wales and about 1.84 million hectares in Scotland. The estimates of the average field rates provide a better indication than overall application rates of actual usage levels and also of any annual variation in fertiliser practice on farms. The overall application rate considers both the average field rate and the proportion of the crop area treated, giving an overview of the crop in total. The definitions of the terms used are set out in Section A2.7 of this report.

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

A2.5 METHODOLOGY FOR ESTIMATES OF TOTAL UK FERTILISER USE

Estimated quantities of nitrogen, phosphate and potash fertiliser consumed annually in the UK since 1966 are shown in Table B2.7. These data are based on BSFP findings, HMRC import 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 AIC with input and peer review by an expert group convened by the AIC and in liaison with Defra.

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



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

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

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

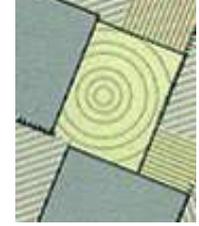
These AIC usage figures are compared to usage figures derived from BSFP and June Agricultural Survey crop area figures and the relationship between the ratios of N, P and K from both sets of data are checked and compared. Any inconsistencies or anomalies identified in the data are identified and followed 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.

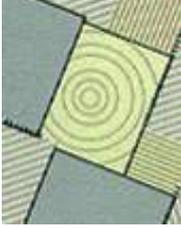
A2.6 REVISIONS

The figures presented in this report are finalised. The overall rate of compound nitrogen on winter wheat in 2017 in Table B1.3 was corrected. The change was from 6 kg/ha to 8 kg/ha. 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 2020 to autumn 2021, corresponding to the 2021 season or harvest year. The recording period for fertiliser applications varied for different crop and grass groups.
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 2020. For data collection and processing purposes, separate fields with identical cropping and fertiliser management on the same farm are blocked together as one 'field', to represent the total combined area of those fields. Areas within the same natural boundary receiving different treatments (crops and fertilisers) were recorded separately. Agricultural land which had been set-aside under the Basic Payment Scheme was recorded, but was not included in analyses unless it was used to grow an industrial crop. Fallow land other than set-aside has always been collected by the Survey, but is not included in the calculations of this report.
4. In the report, **tillage** is defined as all crops except grass, glasshouse crops and uncropped land designated as 'set-aside' under the Basic Payment Scheme. **Grass** refers to all forms of grassland which may be grazed, conserved, or grown for seed production; rough grazing is excluded.
5. The abbreviation **N** is used for nitrogen, **P₂O₅** for phosphate, **K₂O** for potash, **SO₃** for sulphur, and **FYM (Farm Yard Manure)** for all types of organic manure e.g., slurries and solid manures. The phrase **total use** includes both straight (single nutrient) and compound (multi nutrient) products. Fertiliser products containing nitrogen and sulphur only are classified with straight nitrogen. Rates are expressed in terms of the equivalent nutrient content, taking into account the nutrient content in the product used. The nutrient content of the common fertiliser products including the dry matter content and nutrient content of various organic manures used are given in the Nutrient Management Guide (RB209) which is available at <https://ahdb.org.uk/nutrient-management-guide-rb209>.
6. The **average field rate** is a measure of the fertiliser nutrient application rate over the sown area of fields that received some dressing of that nutrient. Average field rate is measured in kilograms of nutrient per hectare (kg/ha).
7. **Dressing cover** is the proportion of the sown area that has received any application of the nutrient or a manure and is expressed as a percentage.
8. The **overall application rate** is a measure of the fertiliser nutrient application rate over the sown area of all fields, irrespective of whether they received dressing of that nutrient or not. Overall application rate is measured in kilograms of nutrient per hectare (kg/ha). The overall application rate is calculated by multiplying the average field rate by the percent dressing cover. The overall application rate is always less than or equal to the average field rate due to the inclusion of any area that has not received an application of the nutrient in the calculation of the overall application rate.
9. **Sown area** is the area of a field that has been planted with a crop or grass. It excludes headlands, field margins, buffer strips and other agri-environment features.



10. The UK farm type 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

Individual farms are allocated a particular farm type according to the SGMs (Standard Gross Margins) applied to the farm's activity as recorded by the June Agricultural Survey. SGMs are a set of coefficients which estimate a £ value for one hectare of each crop or one head of livestock.

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:

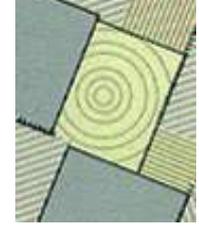
<https://www.gov.uk/structure-of-the-agricultural-industry-survey-notes-and-guidance>

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

<i>table number</i>	<i>robust group in table title</i>	<i>robust type name</i>	<i>robust number</i>
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.

11. Regional analysis of the Survey data for England was classified in two ways in 2021. 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 (Ministry of Agriculture, Fisheries and Food) administrative regions, which were revised in 1996 to take account of changes to county boundaries and nomenclature resulting from the introduction of Unitary Local Authorities between April 1995 and April 1998. These revised regions, termed **BSFP regions**, have been the basis for regional analysis within the Survey historically and are detailed in Appendix 2.



A2.8 TYPES OF FERTILISER

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

There are two broad types of fertiliser. Manufactured fertilisers tend to be relatively concentrated and supply essential nutrients in a mineral form which are immediately available for plant use. The other type is organic fertilisers which can be plant- or animal-based, such as manure, slurry, compost, or poultry litter. Organic fertilisers 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.

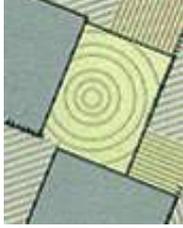
Nitrogen is important for building DNA and proteins in plants. It encourages growth of stems and leaves by promoting protein and chlorophyll. Provided there are adequate supplies of water and other nutrients, nitrogen usually has a large effect on crop growth, yield and quality. Whatever the source, 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 in this Report as P_2O_5 . Phosphate fertilisers include ammonium phosphate and superphosphate. The majority of phosphorus in most soil is in essentially insoluble forms, and unavailable to plants. Phosphorus is very immobile in soil, and the forms that are created and their availability, are dependent on factors such as the soil pH, temperature, and moisture. Plant roots take up nearly all phosphorus as either the primary or secondary orthophosphate anion ($H_2PO_4^-$ or HPO_4^{2-} , respectively). Generally, the maximum availability of phosphorus occurs in soils within a pH range of 6.0-7.0.

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

Sulphur is an essential plant nutrient. It is a component of most proteins and it activates certain enzyme systems. In the past sulphur demand was satisfied through atmospheric deposition. With the significant decline of sulphur from the atmosphere, there is a need for sulphur application to crops and grass and it is often applied together with nitrogen fertilisers. Crops such as oilseed rape are particularly sensitive to sulphur deficiency and consequently require a relatively high input of sulphur. It is measured and defined in this Report as SO_3 .

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



A3 GENERAL TRENDS AND ISSUES

A3.1 CROP AREAS AND WEATHER CONDITIONS

Annual changes in relative cropping areas, as well as any changes in fertiliser practice for individual crops, may affect nutrient application rates when aggregated across the main crop groupings. Table A3.1 provides a summary of June Agricultural Survey estimates for areas of individual major crops, crop groupings and total tillage and grassland categories in 2020 and 2021 and illustrates percentage changes in relative cropping areas over the past five years. In Great Britain in 2021, 11.0 million hectares were used for either tillage or grassland (excluding rough grazing). Of this, 41% (4.5 million hectares) was tillage cropping, with the remaining 59% (6.5 million hectares) being grassland.

The crop areas in Table A3.1 refer to the only the sown area of fields, as do the results of the BSFP. Field margins, buffer strips and other agri-environment features are included in 'Bare fallow' in Table A3.1.

Table A3.1 Cropping and grassland areas ('000 ha) in Great Britain, 2020 – 2021

Crops	June 2020 '000s ha	June 2021 '000s ha	% change since 2020	% change since 2016	2021 crop areas as % of total tillage area
Wheat	1,380	1,783	29.2	-1.8	39.9
Barley – winter	304	397	30.6	-8.1	8.8
– spring	1,063	732	-31.1	9.4	16.4
Total cereals¹	3,009	3,180	5.7	2.6	71.2
Oilseed rape – total	380	306	-19.5	-47.2	6.8
– winter	365	299	-18.1	-47.5	6.7
– spring	14	7	-50.0	-30.0	0.1
Sugar beet	111	95	-14.4	10.5	2.1
Potatoes ²	138	133	-3.6	-1.5	3.0
Linseed	33	41	24.2	51.9	0.9
Peas/beans ³	233	248	6.4	9.3	5.6
Maize/other fodder	330	316	-4.2	17.5	7.0
Vegetables	117	111	-5.1	-24.0	2.5
Total tillage⁴	4,386	4,468	1.9	-3.1	100
Bare fallow ⁵	362	264	-27.1	0.8	
Grassland					
Less than 5 years old	1,040	1,079	3.8	7.8	16.7
5 years and older	5,443	5,390	-1.0	-1.4	83.3
Total grass⁶	6,483	6,469	-0.2	0.1	100
Total crops and grass⁷	10,869	10,937	0.6	-1.2	

¹ including minor cereals (oats, rye, triticale, mixed corn).

² early + maincrop potatoes.

³ harvested dry for animal consumption or, for peas, human consumption.

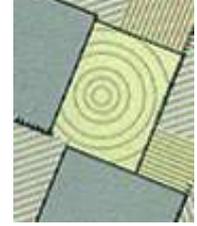
⁴ including other crops, but not fruit, protected cropping, ornamentals or bare fallow.

⁵ Historically including set-aside.

⁶ managed grassland, excluding rough grazing.

⁷ total tillage + total grassland.

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



Comparing the 2020 and 2021 cropping years, the area sown to cereals remains largely consistent. The marked swing away from spring barley (31%) was caused by a return to normal drilling conditions in the autumn of 2020, which was not the case in autumn 2019. Oilseed rape has continued to decline which is in part due to difficulty in managing pests on this crop. A decrease in bare fallow was observed (27%), against a backdrop of more favourable planting conditions than in 2019.

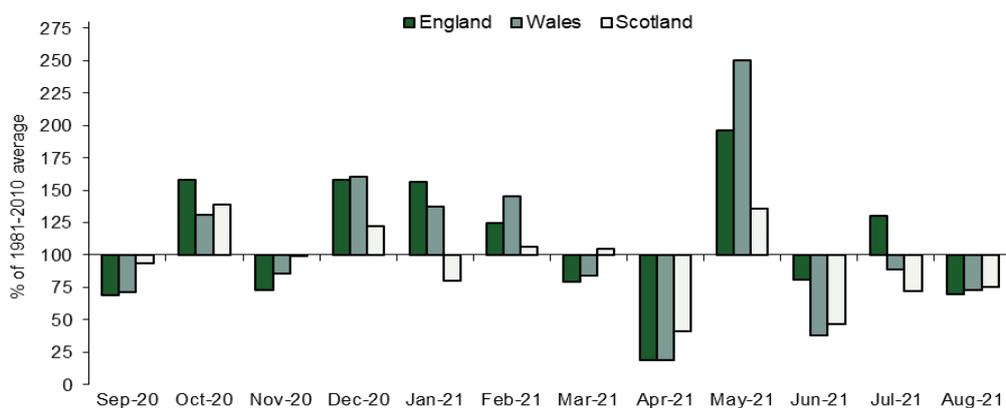
Unusual seasonal weather conditions can influence fertiliser usage in some years. For example:

- 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.

Autumn 2020 was slightly warmer than average. Much of September was dry with some short, unsettled spells. October was also unsettled with only brief spells of fine weather. September rainfalls were below average, overall the UK had 77% of average rainfall. October only saw short drier spells with the average rainfall figure 142% of the average. December was slightly milder than average, but was followed by a cold January with frequent frosts and snowfalls. February saw sharp contrasts and further snowfalls, but was slightly milder than average overall. December rainfall totals were well above average in most areas, overall the UK had 135% of average rainfall. February rainfall was above average in most places away from northern Scotland and an overall figure of 116% of average.

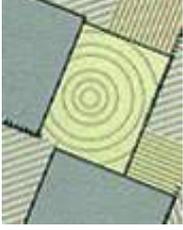
Overall, the spring was slightly colder than average with notable warm spells only at the end of March and May, and there were regular frosts in many areas. March rainfalls were below average in most places with 89% of average overall. April was predominantly dry with 28% of average rainfall for the UK. By contrast May was very wet, with heavy showers particularly in Wales and the South West. The rainfall figure overall was 171% of the average. The first half of June was generally settled and warm in most areas, but other periods were unsettled often with thunderstorms and localised downpours. Many areas were wet again in July, with twice average rainfall for some. Early August continued with the unsettled theme but then it became much drier. The UK had 59% of normal rainfall in June, 93% in July and 73% in August.⁶

Figure A3.1 Monthly rainfall as a percentage of the long-term average⁷



⁶ <https://www.metoffice.gov.uk/research/climate/maps-and-data/summaries/index>

⁷ <https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-temperature-rainfall-and-sunshine-anomaly-graphs>



SECTION B

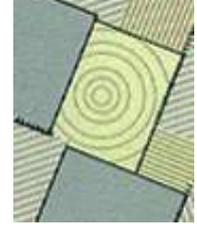
COMMENTARY ON FERTILISER USE IN GREAT BRITAIN

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 2017-21. 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 2021 growing season; they form a basis for estimating quantities of fertiliser used in Great Britain. 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 estimates of 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 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 9.1 million hectares in England & Wales and about 1.8 million hectares in Scotland. In what is otherwise a commentary on Britain as a whole, remarks on the separate regions are only made to highlight particular trends of interest. Readers interested in more detailed recent trends for individual crops in England & Wales or in Scotland can refer to tables presented in Section C. A summary of data from earlier years is available in Chalmers 2001⁸ and historic data for the key data series are also available at <https://www.gov.uk/government/collections/fertiliser-usage>.

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

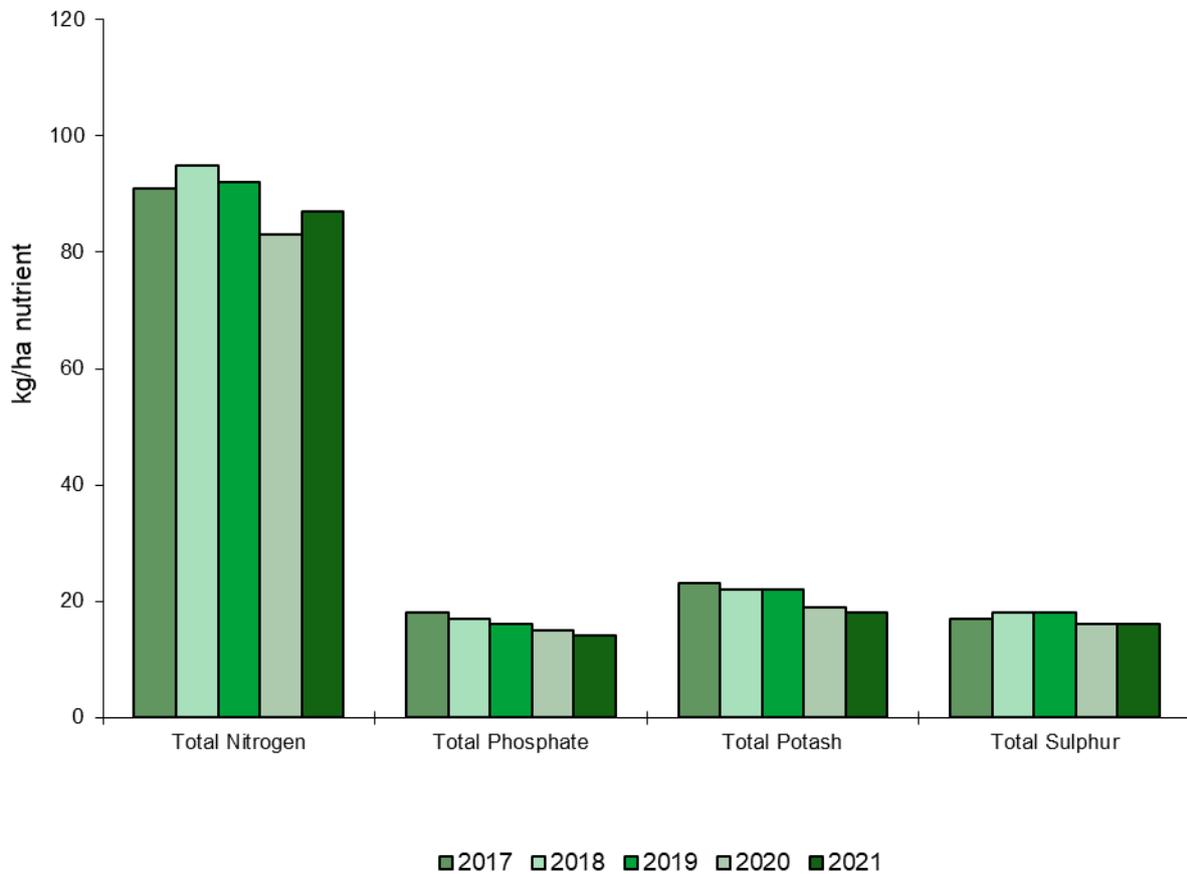


B1 2021 RESULTS FOR GREAT BRITAIN AND CHANGES IN RECENT YEARS

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

Overall application rates of total nitrogen, phosphate, potash and sulphur in Great Britain over the last five years are illustrated in Figure B1.1. The 2021, overall rate of nitrogen for all crops and grass is 87 kg/ha, an increase of 4 kg/ha from 2020. Overall rates for phosphate, potash and sulphur in 2021 were 14 kg/ha, 18 kg/ha and 16 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 2017 – 2021



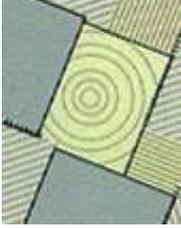
B1.1.1 Nitrogen

Overview of Nitrogen use on All crops and grassland

Table B1.1 Overall nitrogen use (kg/ha), Great Britain 2017 – 2021

Total nitrogen

	<i>tillage crops</i>	<i>grass</i>	<i>all crops and grass</i>
2017	137	54	91
2018	142	57	95
2019	137	54	92
2020	121	53	83
2021	130	51	87



Straight nitrogen

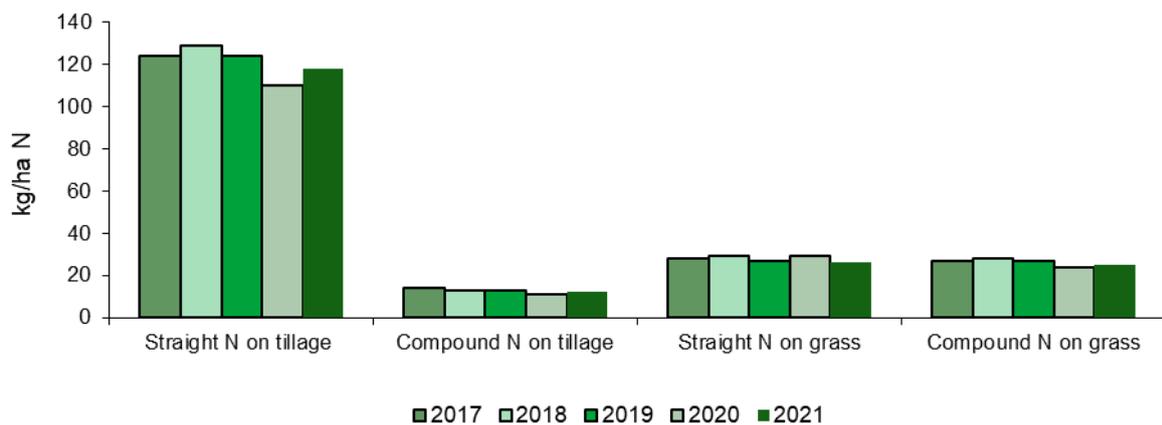
	tillage crops	grass	all crops and grass
2017	124	28	70
2018	129	29	74
2019	124	27	71
2020	110	29	65
2021	118	26	68

Compound nitrogen

	tillage crops	grass	all crops and grass
2017	14	27	21
2018	13	28	21
2019	13	27	20
2020	11	24	18
2021	12	25	19

Overall, the 4 kg/ha increase in the rate of nitrogen for all crops and grass in 2021 (Figure B1.1) was caused by a 9 kg/ha increase on all tillage crops and a 2 kg/ha decrease on grass. When compared with 2020, the rate of straight N increased by 8 kg/ha for tillage crops but decreased by 3 kg/ha for grass (Figure B1.2). The rate of compound N increased by 1 kg/ha on both tillage crops and grass. The mean rate of use of total N, straight N and compound N on all crops and grass over the five-year period (2017-2021), is 90 kg/ha, 70 kg/ha and 20 kg/ha, respectively.

Figure B1.2 Overall straight and compound nitrogen use (kg/ha), Great Britain 2017 – 2021



Overview of Nitrogen use on 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 82% in 2021. This was unchanged from 2020. The average field rate of straight N on tillage crops increased by 11 kg/ha to 145 kg/ha. This resulted in an 8 kg/ha increase in the overall application rate of straight N which was 118 kg/ha in 2021.

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 55% of the tillage area was sown to winter cereals and winter oilseed rape in 2021. These crops can receive most of any necessary dressings of phosphate and potash in the seedbed or during the autumn and winter, leaving just the nitrogen (and sulphur) to be applied, usually as more than one dressing, during the busy spring period of active crop growth. The need for precise timing of nitrogen applications has also contributed to a separation of nitrogen applications from those of phosphate and potash for spring-sown crops, especially spring cereals and sugar beet. Thus, a continuing increase in the use of straight nitrogen now applies to most spring-sown crops for agronomic and environmental reasons, as well as for the optimisation of logistics and the efficient use of time in the spring. The exception is maincrop potatoes where compound nitrogen accounted for 78% of dressing cover in 2021.



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.

Overview of Nitrogen use on Grassland

In 2021, the overall application rate for nitrogen on grass decreased by 2 kg to 51 kg/ha (Table B1.1). Whilst the proportion of grass receiving a dressing of straight N has remained stable at 27%-28% since 2015, the average field rate decreased by 13 kg/ha to 95 kg/ha in 2021. In contrast, the crop area dressed with compound N increased by 1% to 37% and the average field rate declined by 1 kg/ha to 66 kg/ha. Overall, this resulted in a 1 kg/ha increase to 25 kg/ha in the overall application rate of compound N on grass in 2021.

B1.1.2 Phosphate, Potash and Sulphur

Overview of Phosphate use

Table B1.2a shows overall phosphate applications for the past five years. Compared with 2020, the overall rate of use on tillage crops decreased to 22 kg/ha. This resulted from a 5% decrease in dressing cover to 41% and an increased average field rate of 53 kg/ha of phosphate on all tillage crops in 2021. For grassland, whilst the overall rate decreased to 7 kg/ha, the dressing cover increased by 2% to 37% and the average field rate decreased 2 kg/ha to 20 kg/ha. The five year means for overall phosphate rates for tillage crops and grass were 26 kg/ha and 8 kg/ha, respectively.

Table B1.2a Overall phosphate and potash use (kg/ha), Great Britain 2017 – 2021

	Total phosphate				Total potash		
	<i>tillage crops</i>	<i>grass</i>	<i>all crops and grass</i>		<i>tillage crops</i>	<i>grass</i>	<i>all crops and grass</i>
<i>2017</i>	30	8	18	<i>2017</i>	37	12	23
<i>2018</i>	27	8	17	<i>2018</i>	35	12	22
<i>2019</i>	26	8	16	<i>2019</i>	34	11	22
<i>2020</i>	24	8	15	<i>2020</i>	29	11	19
<i>2021</i>	22	7	14	<i>2021</i>	28	11	18

Overview of Potash use

On tillage crops, the decline in the overall potash rate was caused by a 2 kg/ha reduction in the average field rate to 64 kg/ha alongside a 1% decrease in dressing cover to 43% in 2021. On grassland, dressing cover increased by 2% to 39% and overall rate of use was unchanged at 11 kg/ha, whilst the average field rate decreased by 3 kg/ha to 28 kg/ha. The five year means for overall potash rates for tillage crops and grass were 33 and 11 kg/ha, respectively.

Overview of Sulphur use

Table B1.2b shows overall sulphur (SO₃) applications for the past five years. In 2021, the overall application rate of sulphur on tillage crops decreased by 1 kg/ha to 30 kg/ha. The proportion of the tillage area receiving a sulphur dressing increased by 1% to 60%. However, average field rate decreased by 2 kg/ha to 51 kg/ha. The overall rate of sulphur on grass was unchanged (5 kg/ha). The low overall rate of sulphur on grass is caused by a combination of lower dressing cover percentages and average field rates on grass than on tillage crops.

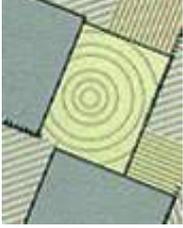


Table B1.2b Overall sulphur use (kg/ha SO₃), Great Britain 2017 – 2021

Total sulphur

	<i>tillage crops</i>	<i>grass</i>	<i>all crops and grass</i>
2017	34	3	17
2018	35	4	18
2019	35	5	18
2020	31	5	16
2021	30	5	16

B1.2 FERTILISER USE ON MAJOR TILLAGE CROPS

Overall application rates 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 2021 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.

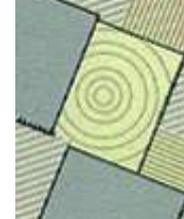


Table B1.3a Overall fertiliser use (kg/ha) on major tillage crops, Great Britain 2017 – 2021

Total nitrogen	<i>winter wheat</i>	<i>spring barley</i>	<i>winter barley</i>	<i>maincrop potatoes</i> ¹	<i>oilseed rape</i> ³	<i>sugar beet</i>
2017	185	100	149	136	180	92
2018	186	101	143	143	188	82
2019	185	95	143	150	180	74
2020	177	99	139	118	168	69
2021	186	98	140	125	167	67
Straight nitrogen	<i>winter wheat</i>	<i>spring barley</i>	<i>winter barley</i>	<i>maincrop potatoes</i> ¹	<i>oilseed rape</i> ³	<i>sugar beet</i>
2017	177	70	140	39	170	83
2018	179	74	137	42	179	73
2019	178	70	135	81	170	69
2020	172	80	131	27	158	58
2021	179	74	131	35	157	58
Compound nitrogen	<i>winter wheat</i>	<i>spring barley</i>	<i>winter barley</i>	<i>maincrop potatoes</i> ¹	<i>oilseed rape</i> ³	<i>sugar beet</i>
2017	8	30	8	97	10	10
2018	7	27	6	101	9	9
2019	8	25	9	69	10	6
2020	5	19	8	91	9	11
2021	7	24	9	89	9	8
Total phosphate	<i>winter wheat</i>	<i>spring barley</i>	<i>winter barley</i>	<i>maincrop potatoes</i> ¹	<i>oilseed rape</i> ³	<i>sugar beet</i>
2017	29	32	30	114	33	17
2018	26	31	27	101	27	18
2019	24	30	27	89	29	17
2020	24	25	26	91	27	22
2021	20	28	24	80	23	19
Total potash	<i>winter wheat</i>	<i>spring barley</i>	<i>winter barley</i>	<i>maincrop potatoes</i> ¹	<i>oilseed rape</i> ³	<i>sugar beet</i>
2017	36	43	40	206	31	46
2018	31	42	34	208	27	44
2019	31	39	37	164	27	50
2020	29	29	38	159	26	44
2021	25	34	31	153	26	44
Total sulphur	<i>winter wheat</i>	<i>spring barley</i>	<i>winter barley</i>	<i>maincrop potatoes</i> ^{1,2}	<i>oilseed rape</i> ³	<i>sugar beet</i>
2017	40	24	40		64	39
2018	41	25	34		61	25
2019	42	24	38		63	31
2020	42	24	36		64	33
2021	38	22	36		59	23

¹ Figures for maincrop potatoes include second earlies.

² 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.

³ Single crop grouping for the combined winter and spring oilseed rape areas.

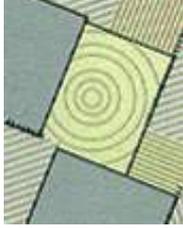


Table B1.3b Average field rates (kg/ha) on major tillage crops, Great Britain 2017 – 2021

Total nitrogen	<i>winter wheat</i>	<i>spring barley</i>	<i>winter barley</i>	<i>maincrop potatoes</i> ¹	<i>oilseed rape</i> ³	<i>sugar beet</i>
2017	188	103	152	136	181	96
2018	189	104	146	144	190	83
2019	187	97	145	153	181	78
2020	179	102	141	130	169	71
2021	188	102	143	132	168	74
Straight nitrogen	<i>winter wheat</i>	<i>spring barley</i>	<i>winter barley</i>	<i>maincrop potatoes</i> ¹	<i>oilseed rape</i> ³	<i>sugar beet</i>
2017	184	93	147	91	174	88
2018	185	96	143	99	182	78
2019	183	87	141	147	173	80
2020	176	94	137	94	161	66
2021	184	91	140	89	160	71
Compound nitrogen	<i>winter wheat</i>	<i>spring barley</i>	<i>winter barley</i>	<i>maincrop potatoes</i> ¹	<i>oilseed rape</i> ³	<i>sugar beet</i>
2017	80	56	67	119	34	42
2018	60	56	50	116	37	49
2019	62	50	55	107	34	31
2020	45	53	43	105	34	30
2021	55	51	56	115	42	28
Total phosphate	<i>winter wheat</i>	<i>spring barley</i>	<i>winter barley</i>	<i>maincrop potatoes</i> ¹	<i>oilseed rape</i> ³	<i>sugar beet</i>
2017	64	49	60	130	58	40
2018	60	50	61	114	57	41
2019	57	48	53	112	57	47
2020	55	47	50	107	54	42
2021	54	49	52	104	55	41
Total potash	<i>winter wheat</i>	<i>spring barley</i>	<i>winter barley</i>	<i>maincrop potatoes</i> ¹	<i>oilseed rape</i> ³	<i>sugar beet</i>
2017	75	62	74	226	64	78
2018	70	66	74	218	65	79
2019	67	61	68	185	61	88
2020	63	59	67	175	60	75
2021	62	61	62	170	64	64
Total sulphur	<i>winter wheat</i>	<i>spring barley</i>	<i>winter barley</i>	<i>maincrop potatoes</i> ^{1,2}	<i>oilseed rape</i> ³	<i>sugar beet</i>
2017	58	44	60		84	74
2018	56	45	50		77	39
2019	59	41	55		77	49
2020	57	43	47		77	47
2021	52	40	51		75	32

¹ Figures for maincrop potatoes include second earlies.

² 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.

³ Single crop grouping for the combined winter and spring oilseed rape areas.

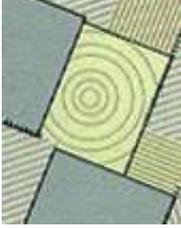


Table B1.4 Dressing cover (% area) on major tillage crops, Great Britain 2017 – 2021

Total nitrogen	<i>winter wheat</i>	<i>spring barley</i>	<i>winter barley</i>	<i>maincrop potatoes¹</i>	<i>oilseed rape²</i>	<i>sugar beet</i>
2017	99	97	98	100	100	96
2018	98	97	98	100	99	98
2019	99	98	99	98	99	95
2020	99	98	98	91	99	98
2021	99	96	98	94	99	91
Straight nitrogen	<i>winter wheat</i>	<i>spring barley</i>	<i>winter barley</i>	<i>maincrop potatoes¹</i>	<i>oilseed rape²</i>	<i>sugar beet</i>
2017	96	75	95	43	98	94
2018	97	77	95	43	98	93
2019	97	80	96	55	98	87
2020	98	85	95	29	99	88
2021	98	81	94	39	98	82
Compound nitrogen	<i>winter wheat</i>	<i>spring barley</i>	<i>winter barley</i>	<i>maincrop potatoes¹</i>	<i>oilseed rape²</i>	<i>sugar beet</i>
2017	10	54	12	82	28	23
2018	11	47	12	87	25	18
2019	12	50	16	64	29	18
2020	11	36	19	86	27	37
2021	12	47	16	78	22	30
Total phosphate	<i>winter wheat</i>	<i>spring barley</i>	<i>winter barley</i>	<i>maincrop potatoes¹</i>	<i>oilseed rape²</i>	<i>sugar beet</i>
2017	46	66	50	88	57	43
2018	42	63	44	88	47	43
2019	42	63	50	79	52	37
2020	44	52	52	85	50	52
2021	37	58	46	77	42	46
Total potash	<i>winter wheat</i>	<i>spring barley</i>	<i>winter barley</i>	<i>maincrop potatoes¹</i>	<i>oilseed rape²</i>	<i>sugar beet</i>
2017	47	70	54	91	48	59
2018	44	64	46	95	41	56
2019	46	64	54	88	44	57
2020	46	50	57	91	43	59
2021	40	56	51	90	41	68
Total sulphur	<i>winter wheat</i>	<i>spring barley</i>	<i>winter barley</i>	<i>maincrop potatoes¹</i>	<i>oilseed rape²</i>	<i>sugar beet</i>
2017	69	55	66	20	76	53
2018	73	56	67	27	80	63
2019	72	59	70	32	82	63
2020	73	54	76	14	83	69
2021	73	55	71	36	79	70

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 use on Major Tillage Crops

In 2021, overall rates of total nitrogen (Table B1.3a) increased on winter wheat, winter barley and potatoes. The overall rate decreased on oilseed rape, spring barley and potatoes to 167, 98, and 125 kg/ha respectively. Average field rates (Table B1.3b) mainly increased except spring barley which was unchanged at 102 kg/ha and oilseed rape where the overall rate of total nitrogen decreased by 1 kg/ha to 168 kg/ha. For all the major arable crops dressing cover approached 100% except maincrop potatoes and sugar beet, which tend to be more variable (Table B1.4).

Nitrogen use on 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.

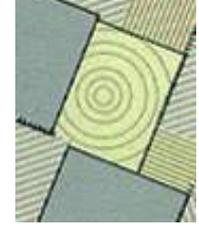
Table B1.5 Average field application rates (kg/ha) of nitrogen on cereals by market use, Great Britain 2017 – 2021

Total nitrogen	<i>winter wheat</i>		<i>spring barley</i>		<i>winter barley</i>	
	<i>milling</i>	<i>non-milling</i>	<i>malting</i>	<i>non-malting</i>	<i>malting</i>	<i>non-malting</i>
2017	204	179	108	97	134	157
2018	207	180	108	99	126	152
2019	201	179	100	94	129	149
2020	194	169	102	101	126	146
2021	202	180	101	104	128	146

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 due to a high yield diluting the grain nitrogen concentration for a first wheat in the rotation. The average field application rate on milling wheat increased by 8 kg/ha to 202 kg/ha, and the rate on non-milling wheat increased by 11 kg/ha to 180 kg/ha compared with 2020. This reverses the changes observed between 2019 and 2020. The non-milling crop continues to dominate the wheat crop area (Table B1.6) with 64% of the crop in 2021 (5-year mean: 63%).

Table B1.6 Percentage distribution (% crop area) of cereal crop areas by market use, Great Britain 2017 – 2021, as estimated from the Survey

	<i>winter wheat</i>		<i>spring barley</i>		<i>winter barley</i>	
	<i>milling</i>	<i>non-milling</i>	<i>malting</i>	<i>non-malting</i>	<i>malting</i>	<i>non-malting</i>
2017	36	64	54	46	22	78
2018	34	66	57	43	21	79
2019	36	64	60	40	18	82
2020	41	59	51	49	23	77
2021	36	64	58	42	18	82



Nitrogen use on Spring barley

Overall use of total nitrogen on spring barley decreased by 1 kg/ha to 98 kg/ha, which is just under the five-year mean (2017-2021) of 99 kg/ha. The rate of straight N decreased by 6 kg/ha to 74 kg/ha whilst the overall application rate of compound N increased by 5 kg/ha compared with 2020 to 24 kg/ha. The average field rate for straight N decreased by 3 kg/ha and the rate for compound N decreased by 2 kg/ha compared with 2020. The percentage of the spring barley area receiving a dressing of straight N decreased by 4% to 81%, and dressing cover with compound N increased by 11% to 47% (Table B1.4).

Further analysis of the data by crop type (Table B1.5) shows the average field rate applied to spring malting barley decreased by 1 kg/ha to 101 kg/ha and increased on spring non-malting barley by 3 kg/ha to 104 kg/ha. In the case of the spring malting crop the five-year mean is 104 kg/ha, whilst for non-malting crops the mean is 99 kg/ha.

Estimated nitrogen rates on spring barley crops have been consistently a little higher on malting than non-malting crops. This slightly higher use of nitrogen on malting than non-malting crops may seem anomalous, since lower rates of nitrogen are recommended for malting barley, under the same conditions of soil type and nitrogen fertility level, than for the feed varieties of barley. This recommendation is made to avoid the risk of high grain nitrogen content, which could adversely affect subsequent malt quality. However, malting crops are normally grown on soils with low nitrogen fertility and the average field rates of nitrogen reported for malting varieties in Table B1.5 are in the range recommended for mineral soil types with low nitrogen residues (70 - 120 kg/ha)⁹. Feed crops on the other hand are often grown within mixed rotations, which tend to have a higher soil nitrogen fertility, with consequently less need for nitrogen fertiliser.

The proportion of spring barley grown for malting has fluctuated during the last five years (Table B1.6). The mean for the period 2017-21 is 56%, with the lowest proportion recorded in 2020 at 51%.

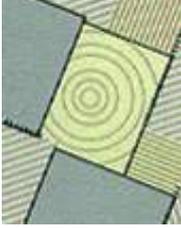
Nitrogen use on Winter barley

In the period 2002-08 the total nitrogen overall application rate on winter barley decreased from year to year, down to 132 kg/ha in 2008. This rate then increased albeit with some fluctuations to 2017, but in 2018 the rate decreased by 6 kg/ha to 143 kg/ha. In 2021, overall total N rate decreased by 1 kg/ha to 140 kg/ha. The rate of straight N, which was used on 94% of the winter barley crop area, was unchanged at 131 kg/ha in 2021, lower than the five year (2017-21) mean of 135 kg/ha. The compound N overall rate increased by 1 kg/ha to just above the five year mean of 8 kg/ha.

As with the spring sown crop, nitrogen requirements for winter barley depend on a range of agronomic factors, such as the intended market for the grain. Average field rates of nitrogen on winter malting crops increased by 2 kg/ha compared to 2020 to 128 kg/ha, below the five-year mean of 129 kg/ha. For winter non-malting crops, the average field rate was unchanged at 146 kg/ha (Table B1.5), again below the five-year average of 150 kg/ha.

The higher application rates of nitrogen (five-year mean of +21 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 winter barley area grown for malting was 18% in 2021, 5% lower than 2020, with the five-year mean calculated as 20%. (Table B1.6).

⁹ Anon. (2018). Nutrient Management Guide (RB209). Agriculture and Horticulture Development Board (AHDB). <https://ahdb.org.uk/nutrient-management-guide-rb209>



Nitrogen use on 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 in comparison to other crops. This is because fields of potatoes on respondents' 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 2021, the overall rate of nitrogen increased by 7 kg to 125 kg/ha, which is below the five-year mean of 134 kg/ha (Table B1.3a).

Nitrogen use on Oilseed rape

In 2021, overall total nitrogen and average field rate use on oilseed rape, as a combined category for both the autumn and spring sown crop, decreased by 1 kg/ha to 167 kg/ha and to 168 kg/ha respectively; five-year means of 177 kg/ha and 178 kg/ha respectively (Table B1.3a, B1.3b). The crop area dressed with straight N decreased by 1% (to 98%), and decreased by 5% for compound N (to 22%) (Table B1.4).

A more detailed breakdown of the data for oilseed rape (Table B1.7) shows that the average field rate of nitrogen on winter oilseed rape decreased by 4 kg/ha to 168 kg/ha. Compared with 2020, the rate for the spring crop increased by 40 kg/ha to 127 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 due to small sample size.

Table B1.7 Average field application rates of nitrogen (kg/ha) on winter and spring oilseed rape, Great Britain 2017 – 2021

Total nitrogen (kg/ha)

	<i>winter oilseed rape</i>	<i>spring oilseed rape</i> ¹
2017	181	116
2018	191	91
2019	182	120
2020	172	87
2021	168	127

¹ Spring oilseed rape data are more variable due to smaller crop area

Nitrogen use on Sugar beet

The overall nitrogen use on sugar beet decreased by 2 kg/ha in 2021 to 67 kg/ha, considerably below the five-year mean (77 kg/ha). Use of straight N, by far the most widely used form of nitrogen in this crop (five-year mean: 89% of the dressed area), was unchanged at 58 kg/ha (Table B1.3a, B1.4). The average field rate of straight N increased to 71 kg/ha, or 6 kg/ha below the five-year mean of 77 kg/ha, whereas the average rate of the less used compound N decreased by 2 kg/ha to 28 kg/ha (Table B1.3b).



B1.2.2 Phosphate and Potash use on Major Tillage Crops

Phosphate

In 2021, the overall rate of phosphate decreased for all the major tillage crops except spring barley which increased by 3 kg/ha to 28 kg/ha. (Table B1.3a). Average field rates decreased by 1-3 kg/ha on all crops except spring barley which increased by 2 kg/ha and oilseed rape which increased by 1 kg/ha. (Table B1.3b). In 2021, the overall phosphate rate on tillage crops declined a further 2 kg/ha to 22 kg/ha (Table B1.2a), below the 2017-21 five-year average (26 kg/ha).

Potash

Overall, potash use on tillage crops decreased in 2021 by 1 kg/ha to 28 kg/ha, below the 2017-2021 five-year average of 33 kg/ha (Table B1.2a). This decline was due to a reduction in dressing cover from 44% to 43% and in the average field rate from 66 kg/ha to 64 kg/ha. The overall application rate of potash declined on winter wheat, winter barley and potatoes, was unchanged on oilseed rape and sugar beet and increased on spring barley. (Table B1.3a). Dressing covers decreased for all the major tillage crops except spring barley and sugar beet. (Table B1.4). Average field rates of potash mainly decreased, except for spring barley with a 2 kg/ha increase and oilseed rape with a 4 kg/ha increase over 2020. (Table B1.3b).

B1.2.3 Sulphur use on Major Tillage Crops

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 2021, sulphur dressing cover increased very slightly overall, but with decreases observed on winter barley and oilseed rape. (Table B1.8). The average field rates for tillage crops were generally lower than in 2020, with winter barley being the exception.

Table B1.8 Dressing cover (% area) and average application rate (kg/ha SO₃) of sulphur on cereals and oilseed rape, Great Britain 2017 – 2021

Dressing cover (%)					
	<i>winter wheat</i>	<i>winter barley</i>	<i>spring barley</i>	<i>oilseed rape</i>	<i>all tillage</i>
2017	69	66	55	76	57
2018	73	67	56	80	62
2019	72	70	59	82	62
2020	73	76	54	83	59
2021	73	71	55	79	60
Average field rate (kg/ha SO₃)					
	<i>winter wheat</i>	<i>winter barley</i>	<i>spring barley</i>	<i>oilseed rape</i>	<i>all tillage</i>
2017	58	60	44	84	60
2018	56	50	45	77	57
2019	59	55	41	77	56
2020	57	47	43	77	53
2021	52	51	40	75	51

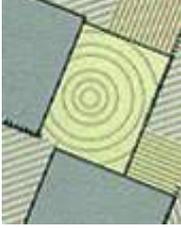


Table B1.9 shows the proportion of major tillage crops receiving a sulphur dressing in England & Wales compared with Scotland. Historically, a higher proportion of cereal and oilseed rape crops were treated with sulphur in Scotland than in England & Wales. This may have been due to the greater awareness of the risk of sulphur deficiency in Scotland due to historically extremely low levels of atmospheric sulphur deposition, compared to most other areas of Britain. Dressing covers are now much more closely aligned, and in some cases exceed those recorded in Scotland. Spring barley is an example of this trend, with this possibly being due to the manure which is more commonly applied to this crop in Scotland being assumed to satisfy the sulphur demand. In 2021, 42% of Scottish spring barley received manure compared with 26% in England and Wales.

Table B1.9 Dressing cover (% area) of sulphur on cereals, oilseed rape, all tillage and all crops and grass by region, 2017 – 2021

		<i>winter wheat</i>	<i>winter barley</i>	<i>spring barley</i>	<i>oilseed rape</i>	<i>all tillage</i>	<i>all crops and grass</i>
England & Wales	2017	69	66	59	77	58	32
	2018	72	66	58	79	62	35
	2019	72	70	60	82	63	36
	2020	73	75	53	83	58	34
	2021	73	71	56	79	60	36
Scotland ¹	2017	68	64	49	66	53	27
	2018	79	80	53	88	58	28
	2019	69	71	57	73	58	33
	2020	79	83	60	78	60	34
	2021	74	69	53	79	55	33

¹ 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 2017 – 2021

	<i>straight nitrogen</i>	<i>compound nitrogen</i>	<i>total nitrogen</i>	<i>total phosphate</i>	<i>total potash</i>	<i>total sulphur</i>
2017	28	27	54	8	12	3
2018	29	28	57	8	12	4
2019	27	27	54	8	11	5
2020	29	24	53	8	11	5
2021	26	25	51	7	11	5

In 2021, dressing cover for total nitrogen on grass increased by 3% to 59% (Table B1.11). The long-term trend has been for declining dressing cover for total nitrogen but the proportion receiving a dressing has recovered from 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 66 kg/ha while for straight N it was 95 kg/ha.

In 2021, the overall application rates for phosphate and potash were 7 kg/ha and 11 kg/ha, respectively (Table B1.10).



Table B1.11 Dressing cover (%) and average application rate (kg/ha) of fertiliser on grassland, Great Britain 2017 – 2021

Dressing cover (%)						
	<i>straight nitrogen</i>	<i>compound nitrogen</i>	<i>total nitrogen</i>	<i>total phosphate</i>	<i>total potash</i>	<i>total sulphur</i>
2017	27	37	56	37	38	10
2018	27	39	59	38	40	12
2019	27	38	58	37	39	14
2020	27	36	56	35	37	15
2021	28	37	59	37	39	16
Average field rate (kg/ha)						
	<i>straight nitrogen</i>	<i>compound nitrogen</i>	<i>total nitrogen</i>	<i>total phosphate</i>	<i>total potash</i>	<i>total sulphur</i>
2017	103	73	97	23	31	35
2018	106	72	96	22	29	37
2019	103	70	93	21	29	33
2020	108	67	96	22	31	33
2021	95	66	87	20	28	32

The proportion of the grass area receiving a straight nitrogen dressing slightly increased in 2021 to 28% and the compound N dressing cover was at 37% in 2021 (Table B1.11). The dressing cover of phosphate and potash on grass both increased by 2% from 2020 to 37% and 39%, respectively. The five-year means are also 37% and 39%, respectively. The sulphur dressing cover increased to a 5 year high of 16%.

In 2021, the average field rates for phosphate on grass decreased by 2 kg/ha to 20 kg/ha and for potash by 3 kg/ha to 28 kg/ha. The sulphur average field rate was decreased by 1 kg/ha to 32 kg/ha, below the five-year average of 34 kg/ha.

B1.3.1 Nitrogen use on Grassland

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 2021 are presented in Section C. The Survey estimates of annual distributions of the total grassland area between grazing and cutting management regimes since 2017 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.

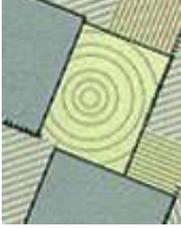
Table B1.12 Grassland utilisation (% of grass area), Great Britain 2017 – 2021

	<i>grazed</i> ¹	<i>silage</i> ²	<i>hay</i> ²
2017	93	29	10
2018	93	31	10
2019	93	31	10
2020	94	30	9
2021	95	30	10

Nearly all grassland is grazed at some stage during the season (Table B1.12) and the proportion in 2021 is slightly above the five-year mean of 94%.

¹ May also be cut

² May also be grazed



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

Table B1.13 Nitrogen application rates (kg/ha) by grassland utilisation, Great Britain 2017 – 2021

Total nitrogen

	overall application rate				average field rate		
	grazed ¹	silage ²	hay ²		grazed ¹	silage ²	hay ²
2017	52	100	44	2017	94	126	83
2018	53	104	50	2018	91	126	79
2019	50	100	44	2019	89	118	76
2020	50	102	39	2020	91	124	75
2021	48	96	43	2021	83	114	73

Straight nitrogen

	overall application rate				average field rate		
	grazed ¹	silage ²	hay ²		grazed ¹	silage ²	hay ²
2017	26	51	27	2017	100	120	91
2018	25	55	18	2018	100	125	84
2019	24	51	19	2019	97	117	82
2020	26	60	20	2020	102	128	94
2021	24	52	18	2021	91	109	81

Compound nitrogen

	overall application rate				average field rate		
	grazed ¹	silage ²	hay ²		grazed ¹	silage ²	hay ²
2017	26	49	17	2017	71	96	64
2018	28	48	33	2018	71	95	72
2019	26	49	25	2019	69	88	65
2020	24	42	19	2020	65	82	58
2021	24	43	24	2021	64	86	60

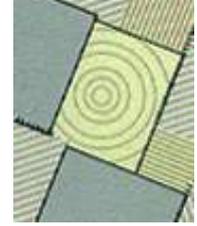
In 2021, the overall total nitrogen rates decreased by 2 kg/ha to 48 kg/ha for grazed grass and by 6 kg/ha for silage grass. The overall nitrogen rate on grass for hay increased by 4 kg/ha to 43 kg/ha. Rates reported on grass cut for hay need to be treated with caution due to the relatively small numbers of grass fields being managed this way (Table B1.13).

The average field rates of straight nitrogen decreased for all categories of grass. The five-year means for overall straight nitrogen rate are 25, 54 and 20 kg/ha for grazed grass, silage, and hay, respectively. Compound nitrogen average field rates were more variable in 2021. The five-year means for the overall compound nitrogen rates are 26, 46 and 24 kg/ha for grazed grass, silage, and hay, respectively.

The fall in nitrogen use over the long term on grassland until 2008 is likely to be related in part to decreases in ruminant livestock numbers which may have reduced herbage production requirements. Since then, the rate of nitrogen application to grassland has remained relatively constant, with the 2021 overall nitrogen rate being 51 kg/ha.

¹ May also be cut

² May also be grazed



B1.3.2 Phosphate and Potash use on Grassland

As for nitrogen, phosphate and potash requirements for grassland depend 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 2017 – 2021

Total phosphate

	overall application rate				average field rate		
	grazed ¹	silage ²	hay ²		grazed ¹	silage ²	hay ²
2017	8	14	8	2017	23	28	27
2018	8	14	11	2018	22	28	23
2019	8	14	9	2019	21	26	23
2020	8	13	8	2020	21	28	22
2021	7	12	8	2021	20	26	19

Total potash

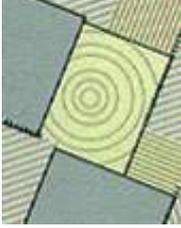
	overall application rate				average field rate		
	grazed ¹	silage ²	hay ²		grazed ¹	silage ²	hay ²
2017	11	23	8	2017	29	43	29
2018	11	23	14	2018	28	41	31
2019	11	22	10	2019	28	39	25
2020	11	23	9	2020	29	43	26
2021	10	22	12	2021	26	40	27

In 2021, the overall phosphate rate decreased by 1 kg/ha for grazed and silage grass. The corresponding five-year means for grazed grass, silage and hay were 8, 13 and 9 kg/ha, respectively. The average field rate for grazed grass decreased by 1 kg/ha, decreased by 2 kg/ha for silage and decreased by 3 kg/ha on grass cut for hay in 2021. Overall, the long-term decline in application rates on grazed grass appears to have levelled out.

Overall potash rates in 2021 decreased on grazed and silage grass by 1 kg/ha and increased by 3 kg/ha on that cut for hay. The average field rate of potash decreased by 3 kg/ha on grazed and silage grass but increased slightly on grass cut for hay.

¹ May also be cut

² May also be grazed



B1.3.3 Sulphur use on Grassland

In 2021, 16% of the total grassland area received a sulphur dressing (mean 13% for 2017-21 period). Of this, a higher proportion of grassland cut for silage is treated with sulphur compared to grazed grass or grass cut for hay (Table B1.15). Estimated dressing covers have fluctuated slightly in the past five years, with between 1 and 2% increases for grazed grass and silage grass, respectively and a 3% reduction in hay grass in 2021.

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 2017 – 2021
Dressing cover (%)

	<i>grazed</i> ¹	<i>silage</i> ²	<i>hay</i> ²	<i>all grass</i>	<i>all tillage</i>	<i>all crops and grass</i>
2017	9	16	9	10	57	31
2018	11	19	12	12	62	34
2019	14	25	16	14	62	36
2020	15	27	14	15	59	34
2021	15	25	17	16	60	35

Average application rate per year (kg/ha SO₃)

	<i>grazed</i> ¹	<i>silage</i> ²	<i>hay</i> ²	<i>all grass</i>	<i>all tillage</i>	<i>all crops and grass</i>
2017	33	41	42	35	60	55
2018	37	41	29	37	57	53
2019	33	37	30	33	56	51
2020	32	38	28	33	53	48
2021	32	38	37	32	51	46

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 2021, compared to 2020 values, average field rates were unchanged for grazed and silage grass and a 9 kg/ha increase observed for hay. The five-year means are 33, 39 and 33 kg/ha SO₃ 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

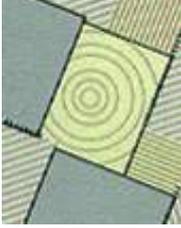


B2 LONGER TERM TRENDS IN FERTILISER USE FOR GREAT BRITAIN

B2.1 LONGER TERM TRENDS IN NITROGEN USE

Table B2.1 Total overall nitrogen application rates (kg/ha), England & Wales 1972 - 2021 and Scotland and Great Britain 1983 – 2021

	<i>tillage crops</i>			<i>grass</i>			<i>all crops and grass</i>		
	<i>England & Wales</i>	<i>Scotland</i>	<i>Great Britain</i>	<i>England & Wales</i>	<i>Scotland</i>	<i>Great Britain</i>	<i>England & Wales</i>	<i>Scotland</i>	<i>Great Britain</i>
1972	91	-	-	83	-	-	-	-	-
1973	89	-	-	85	-	-	-	-	-
1974	85	-	-	91	-	-	89	-	-
1975	86	-	-	99	-	-	93	-	-
1976	96	-	-	98	-	-	97	-	-
1977	100	-	-	110	-	-	111	-	-
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
2018	145	118	142	54	67	57	97	85	95
2019	141	109	137	51	67	54	94	82	92
2020	123	109	121	53	56	53	85	73	83
2021	134	103	130	48	63	51	89	77	87



The BSFP 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.

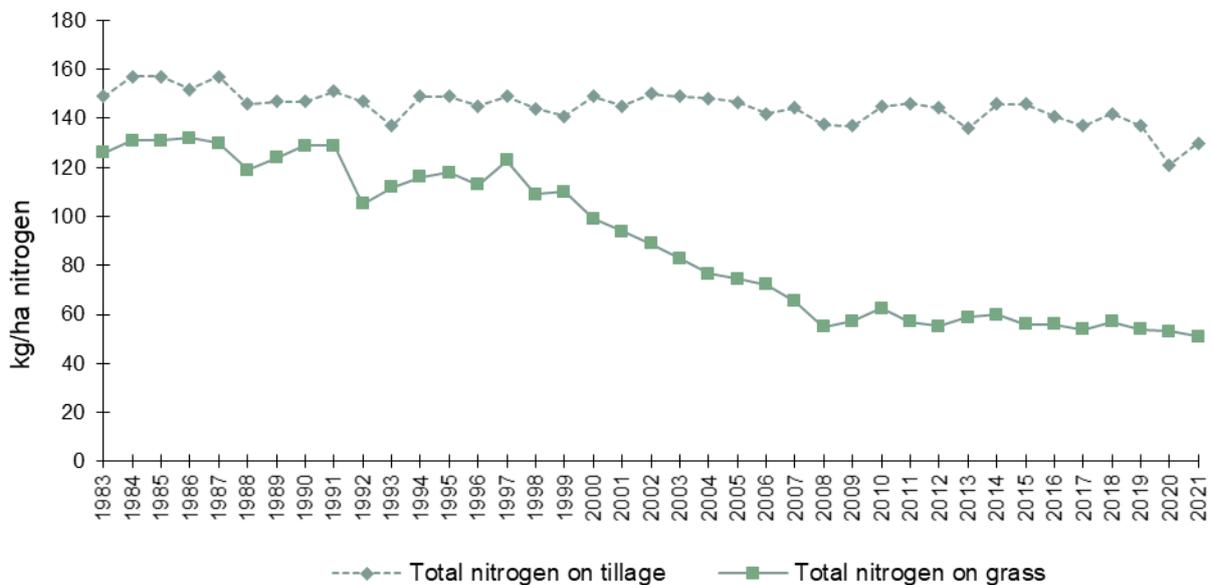
The aggregated data for Great Britain follow a similar pattern to that observed for England & Wales because a large proportion of both the tillage and grassland areas in Britain are in England & Wales. Overall total nitrogen rates for tillage crops and grassland in England & Wales since 1981 and in Scotland 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 the last three years have fallen outside of this range, with the overall rate of nitrogen on tillage crops for Great Britain being 130 kg/ha. This has recovered from 121 kg/ha in 2020, a rate which was related to the weather and subsequent cropping patterns for that year.

Nitrogen levels applied to grassland have always been lower than tillage crops. From 1983 until 1999, the difference was fairly constant, averaging 27 kg/ha. Since 2000, the overall applications made to grass fell consistently relative to those made to tillage crops. If the result from the 2020 survey is excluded, where the replacement of winter cereals and rape by spring barley (see Table A3.1) resulted in an overall nitrogen rate difference of 68 kg/ha, during the last five years the average difference in overall nitrogen rate has remained relatively constant at 83 kg/ha.

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 – 2021



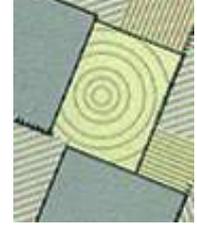
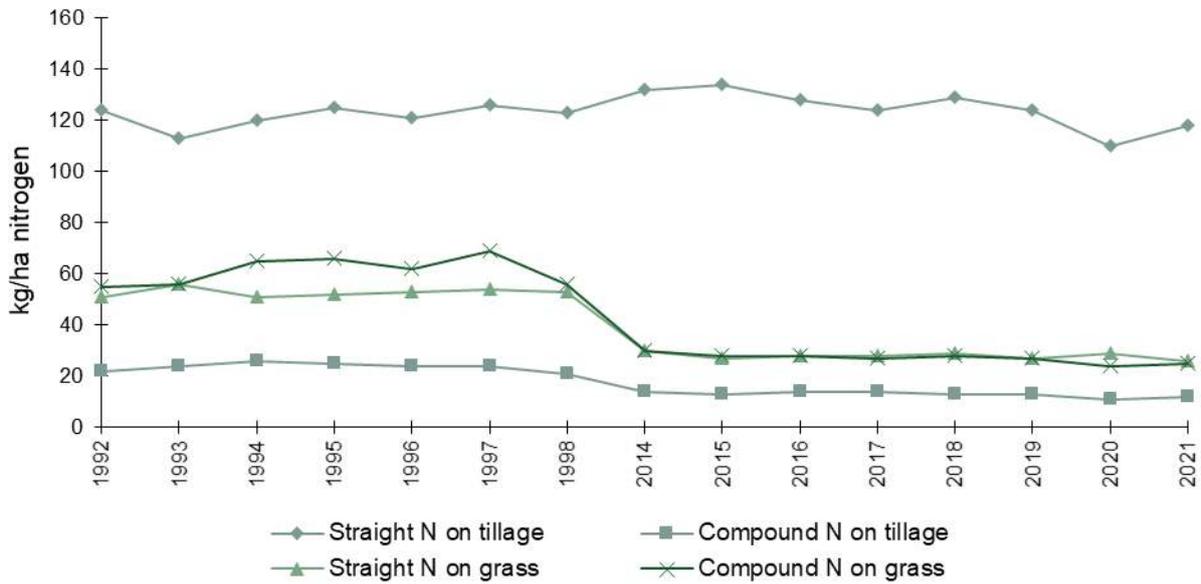


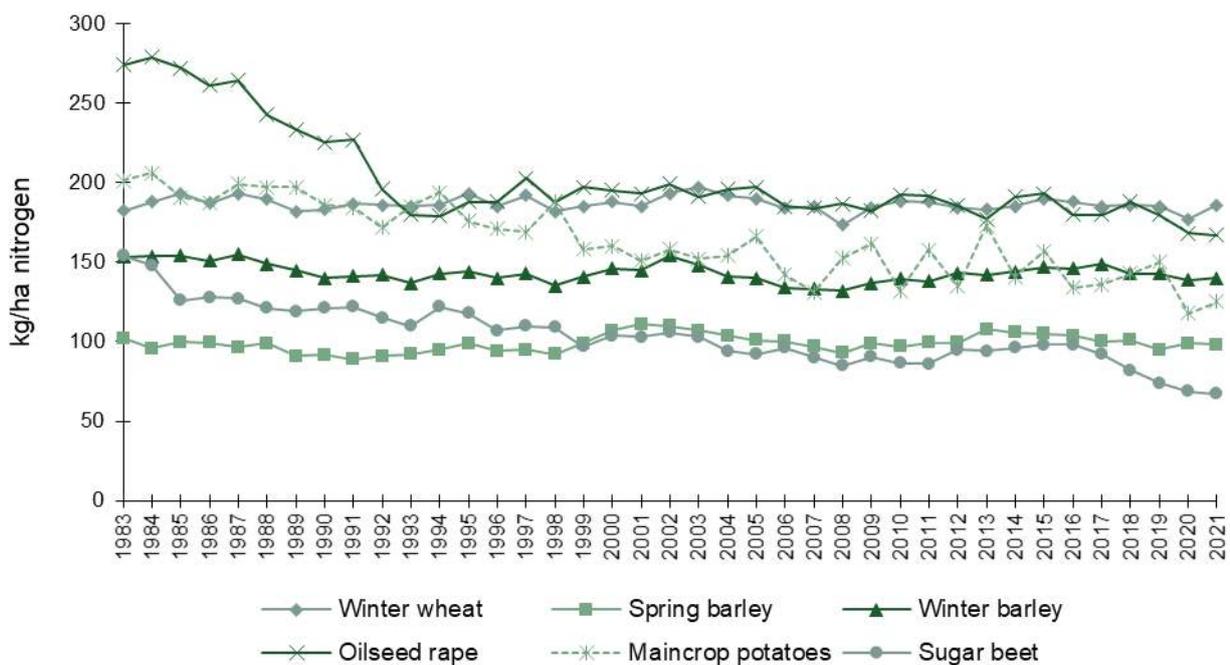
Figure B2.2 Overall application rates (kg/ha) of straight and compound nitrogen on tillage crops and grassland, Great Britain 1992 – 2021

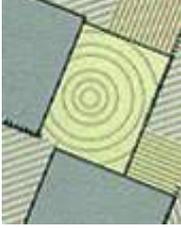


B2.1.1 Longer term trends in nitrogen use on major tillage crops

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 – 2021



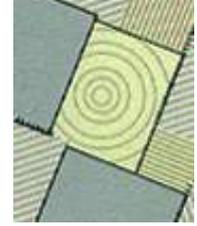


B2.1.2 Longer term trends in autumn and winter applications of nitrogen fertiliser

The BSFP is able to monitor the extent to which recommended agronomic advice is adopted. By analysing the timing of fertiliser applications, it is possible to assess the extent to which autumn and winter nitrogen is applied. The standard advice is that autumn nitrogen is not required for winter cereals, as economic yield benefits are rare and such applications are vulnerable to leaching loss. The Great Britain values have remained below 10% of the crop area treated for both winter cereal crops since 2003, with the dressing cover being 5 or below for both in 2021. 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 1990 – 1998 and Great Britain 1999 – 2021

	<i>winter wheat dressing cover</i>	<i>winter barley dressing cover</i>	<i>winter oilseed rape dressing cover</i>	<i>application rate</i>
<i>England & Wales</i>				
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
<i>Great Britain</i>				
1999	6	10	35	43
2000	7	11	33	42
2001	7	14	43	43
2002	8	16	41	47
2003	5	9	42	39
2004	6	9	35	40
2005	4	9	42	40
2006	5	7	28	34
2007	3	5	27	41
2008	3	6	31	33
2009	2	3	26	31
2010	2	7	29	33
2011	2	3	35	29
2012	2	5	31	27
2013	2	4	32	28
2014	2	5	32	29
2015	2	3	38	32
2016	3	4	35	31
2017	3	3	42	30
2018	5	4	41	31
2019	3	5	36	28
2020	5	7	36	32
2021	3	5	29	33



B2.2 LONGER TERM TRENDS IN PHOSPHATE, POTASH AND SULPHUR USE

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

Figure B2.4a Overall application rates (kg/ha) phosphate and potash on tillage crops and grassland, Great Britain 1983 – 2021

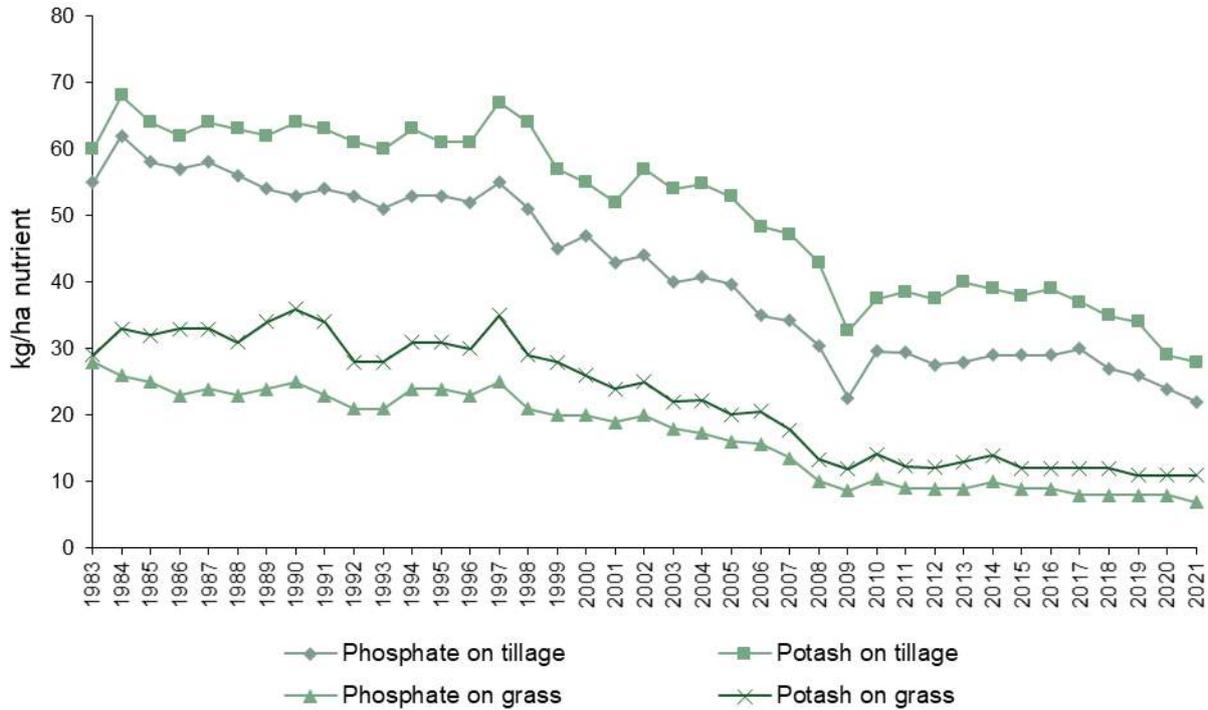
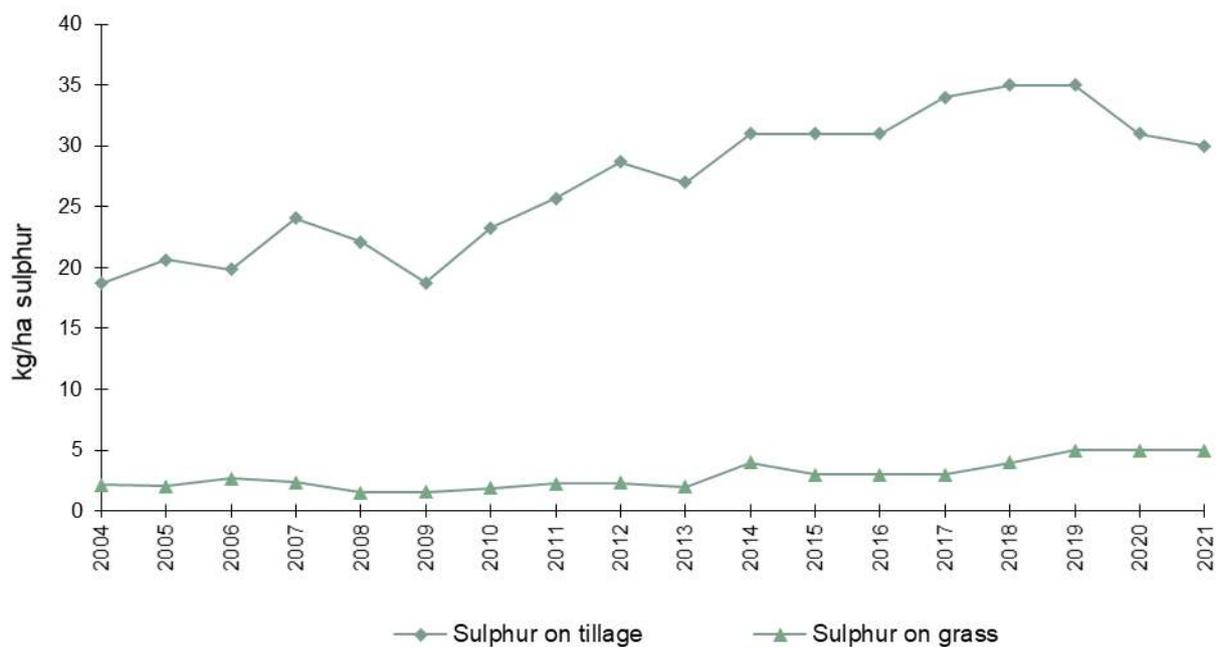
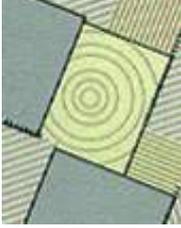


Figure B2.4b Overall application rates (kg/ha) of sulphur (SO₃) on tillage crops and grassland, Great Britain 2004 – 2021





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 at that time. The data suggest that, since 2010, overall application rates of phosphate and potash have remained relatively constant, although decreases of 2 kg/ha (to 22 kg/ha) and 1 kg/ha (to 28 kg/ha), respectively were recorded in 2021. 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 7-10 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 gradually declined to 28 kg/ha in 2021.

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

Overall sulphur use on tillage crops has increased steadily since 2004 but decreased by 4 kg/ha to 30 kg/ha in 2021. On grassland the use of sulphur is much lower, but it too has increased, albeit it at a much lower rate. In 2004 the overall application rate was 2 kg/ha and by 2021 this had risen to 5 kg/ha.



Table B2.3 Overall phosphate application rates (kg/ha), England & Wales 1972 - 2021 and Scotland and Great Britain 1983 – 2021

	<i>tillage crops</i>			<i>grass</i>			<i>all crops and grass</i>		
	<i>England & Wales</i>	<i>Scotland</i>	<i>Great Britain</i>	<i>England & Wales</i>	<i>Scotland</i>	<i>Great Britain</i>	<i>England & Wales</i>	<i>Scotland</i>	<i>Great Britain</i>
1972	56	-	-	34	-	-	-	-	-
1973	54	-	-	34	-	-	-	-	-
1974	51	-	-	27	-	-	39	-	-
1975	46	-	-	27	-	-	34	-	-
1976	50	-	-	29	-	-	38	-	-
1977	51	-	-	26	-	-	37	-	-
1978	49	-	-	28	-	-	39	-	-
1979	49	-	-	27	-	-	38	-	-
1980	49	-	-	27	-	-	37	-	-
1981	51	-	-	25	-	-	38	-	-
1982	55	-	-	24	-	-	39	-	-
1983	54	63	55	26	36	28	39	47	40
1984	61	68	62	25	33	26	42	48	42
1985	56	70	58	24	30	25	40	46	41
1986	56	63	57	22	27	23	40	42	40
1987	56	71	58	23	28	24	39	45	40
1988	54	65	56	21	31	23	38	45	39
1989	52	67	54	23	31	24	38	45	39
1990	51	68	53	24	28	25	38	43	39
1991	53	65	54	23	24	23	38	40	38
1992	51	67	54	19	30	22	35	43	38
1993	49	65	52	19	28	21	33	41	35
1994	51	69	53	23	28	24	37	43	38
1995	50	68	53	22	31	24	36	45	37
1996	51	65	52	22	26	23	36	40	36
1997	53	69	55	24	32	25	38	46	39
1998	49	66	51	20	27	21	34	43	35
1999	43	64	45	19	27	20	31	42	32
2000	44	60	47	18	30	20	31	42	32
2001	40	60	43	16	29	19	27	41	29
2002	41	62	44	18	26	20	29	39	31
2003	37	61	40	16	26	18	26	39	28
2004	38	63	41	15	27	17	25	40	28
2005	37	56	40	15	22	16	25	35	27
2006	32	53	35	14	22	16	23	33	25
2007	32	53	34	12	19	14	22	32	23
2008	28	50	30	9	16	10	18	28	20
2009	19	49	23	7	15	9	13	27	15
2010	27	50	30	9	16	10	18	27	19
2011	27	50	29	8	14	9	17	25	19
2012	25	50	28	8	14	9	16	25	17
2013	25	51	28	8	14	9	16	27	18
2014	26	50	29	8	15	10	17	26	18
2015	26	51	29	8	13	9	17	27	18
2016	26	50	29	7	14	9	16	27	18
2017	26	54	30	7	16	8	15	29	18
2018	24	50	27	7	13	8	15	26	17
2019	23	44	26	7	13	8	15	24	16
2020	21	41	24	7	12	8	13	21	15
2021	19	44	22	6	12	7	12	23	14

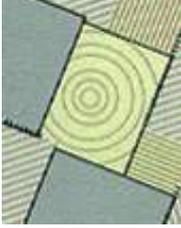


Table B2.4 Overall potash application rates (kg/ha), England & Wales 1972 - 2021 and Scotland and Great Britain 1983 – 2021

	<i>tillage crops</i>			<i>grass</i>			<i>all crops and grass</i>		
	<i>England & Wales</i>	<i>Scotland</i>	<i>Great Britain</i>	<i>England & Wales</i>	<i>Scotland</i>	<i>Great Britain</i>	<i>England & Wales</i>	<i>Scotland</i>	<i>Great Britain</i>
1972	63	-	-	20	-	-	-	-	-
1973	60	-	-	22	-	-	-	-	-
1974	56	-	-	20	-	-	36	-	-
1975	51	-	-	21	-	-	34	-	-
1976	56	-	-	23	-	-	37	-	-
1977	56	-	-	23	-	-	39	-	-
1978	56	-	-	25	-	-	41	-	-
1979	53	-	-	27	-	-	40	-	-
1980	54	-	-	26	-	-	40	-	-
1981	56	-	-	26	-	-	41	-	-
1982	61	-	-	28	-	-	44	-	-
1983	60	62	60	28	36	29	44	46	43
1984	68	67	68	33	35	33	50	49	49
1985	63	67	64	32	34	32	48	47	48
1986	62	61	62	33	30	33	48	43	47
1987	63	70	64	33	31	33	48	47	48
1988	63	66	63	30	34	31	47	47	47
1989	60	73	62	34	36	34	48	51	48
1990	62	74	64	36	35	36	49	50	49
1991	62	72	63	35	31	34	49	47	49
1992	59	72	63	26	34	28	43	48	45
1993	58	72	60	27	34	29	42	47	43
1994	62	74	63	31	31	31	46	46	46
1995	59	72	61	30	34	31	44	48	45
1996	59	73	61	31	28	30	45	44	44
1997	66	74	67	35	36	35	50	50	50
1998	63	73	64	28	36	29	45	51	46
1999	55	71	57	27	32	28	41	48	42
2000	54	67	55	24	33	26	39	47	40
2001	48	72	52	23	33	24	34	49	37
2002	55	72	57	24	30	25	38	46	40
2003	51	73	54	20	31	22	34	46	36
2004	52	72	55	21	30	22	35	46	37
2005	51	65	53	19	26	20	34	40	35
2006	46	68	48	19	28	21	32	42	33
2007	44	69	47	17	23	18	30	40	32
2008	40	67	43	12	20	13	26	37	27
2009	29	64	33	10	20	12	19	35	22
2010	33	67	38	13	19	14	23	35	25
2011	35	65	39	11	16	12	23	32	25
2012	34	68	37	11	17	12	22	33	23
2013	36	68	40	11	19	13	22	36	25
2014	35	67	39	12	20	14	23	35	25
2015	33	65	38	11	17	12	22	34	24
2016	34	68	39	10	20	12	21	36	24
2017	31	71	37	9	21	12	20	39	23
2018	29	73	35	10	18	12	19	38	22
2019	30	60	34	9	20	11	19	34	22
2020	25	56	29	10	18	11	17	30	19
2021	23	58	28	9	18	11	16	31	18

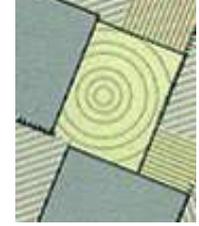


Table B2.5 Overall sulphur (SO₃) application rates (kg/ha), Great Britain 2004 – 2021

	<i>tillage crops</i>			<i>grass</i>			<i>all crops and grass</i>		
	<i>England & Wales</i>	<i>Scotland</i>	<i>Great Britain</i>	<i>England & Wales</i>	<i>Scotland</i>	<i>Great Britain</i>	<i>England & Wales</i>	<i>Scotland</i>	<i>Great Britain</i>
2004	19	18	19	2	2	2	10	8	9
2005	21	18	21	2	3	2	11	8	11
2006	20	18	20	2	4	3	11	9	11
2007	23	17	24	3	2	2	14	7	13
2008	23	16	22	1	2	2	12	7	11
2009	19	15	19	1	2	2	10	7	10
2010	24	18	23	2	3	2	13	8	12
2011	26	21	26	2	2	2	14	8	13
2012	29	25	29	2	3	2	15	10	14
2013	27	25	27	3	2	2	14	10	13
2014	31	28	31	4	3	4	17	11	16
2015	31	33	31	3	3	3	17	14	16
2016	32	24	31	3	4	3	17	11	16
2017	35	27	34	3	4	3	18	12	17
2018	36	30	35	5	4	4	19	13	18
2019	37	25	35	4	6	5	20	13	18
2020	31	29	31	5	6	5	17	14	16
2021	31	26	30	5	6	5	17	13	16

Overall rates of phosphate and potash applied to tillage crops are approximately three times those used on grassland. However, there is greater use of applied manures on grassland (37% cover) than on tillage crops (26% cover) and grazed grassland also receives manure as it is grazed.

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

Dressing covers of phosphate and potash on tillage and grass for the period 2004-21 are presented in Tables B2.6a and B2.6b. On tillage crops the phosphate dressing cover has declined in all countries since 2004. However, the decline in England and Wales has been much higher (40% reduction) in comparison to Scotland where the reduction was 10% 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 10 years.

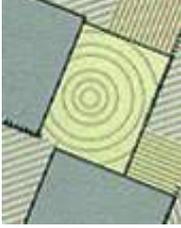


Table B2.6a Phosphate dressing covers (%), Great Britain 2004 – 2021

	<i>tillage crops</i>			<i>grass</i>			<i>all crops and grass</i>		
	<i>England & Wales</i>	<i>Scotland</i>	<i>Great Britain</i>	<i>England & Wales</i>	<i>Scotland</i>	<i>Great Britain</i>	<i>England & Wales</i>	<i>Scotland</i>	<i>Great Britain</i>
2004	61	93	65	55	77	59	58	83	61
2005	60	88	63	50	75	55	55	80	59
2006	52	89	57	52	75	56	52	79	57
2007	50	86	54	47	67	51	48	74	52
2008	46	88	52	37	61	42	42	71	47
2009	34	86	40	33	59	38	34	69	39
2010	45	87	50	37	64	43	41	71	46
2011	45	82	49	36	58	41	41	66	45
2012	42	87	47	37	57	41	39	67	44
2013	43	86	48	38	59	42	40	68	45
2014	44	85	49	36	61	41	40	69	45
2015	43	85	49	35	65	41	39	72	45
2016	44	85	49	32	63	38	37	70	43
2017	44	91	50	30	65	38	36	75	43
2018	41	87	48	33	57	38	37	68	42
2019	43	83	48	32	58	37	37	67	42
2020	40	85	46	31	53	35	35	63	40
2021	35	84	41	31	59	37	33	68	39

Table B2.6b Potash dressing covers (%), Great Britain 2004 – 2021

	<i>tillage crops</i>			<i>grass</i>			<i>all crops and grass</i>		
	<i>England & Wales</i>	<i>Scotland</i>	<i>Great Britain</i>	<i>England & Wales</i>	<i>Scotland</i>	<i>Great Britain</i>	<i>England & Wales</i>	<i>Scotland</i>	<i>Great Britain</i>
2004	63	93	67	56	75	59	59	82	63
2005	61	90	65	51	71	55	56	78	60
2006	56	91	60	52	71	56	54	78	58
2007	54	90	58	47	65	51	51	74	54
2008	50	90	55	38	61	42	44	71	48
2009	37	88	43	34	61	39	35	71	41
2010	44	89	50	39	63	44	42	72	47
2011	46	84	50	38	57	42	42	66	46
2012	42	90	47	38	58	42	40	68	44
2013	46	87	51	39	59	43	42	69	47
2014	45	86	50	37	63	43	41	70	46
2015	45	88	50	35	65	42	40	73	46
2016	44	87	50	33	64	39	38	72	44
2017	44	91	50	31	66	38	37	75	43
2018	41	88	47	35	59	40	38	69	43
2019	44	83	50	34	60	39	39	68	44
2020	39	84	44	33	54	37	35	64	40
2021	37	84	43	34	59	39	35	68	41

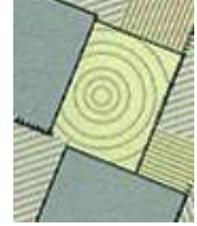
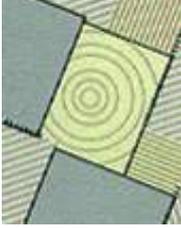


Table B2.6c Sulphur dressing covers (%), Great Britain 2004 – 2021

	<i>tillage crops</i>			<i>grass</i>			<i>all crops and grass</i>		
	<i>England & Wales</i>	<i>Scotland</i>	<i>Great Britain</i>	<i>England & Wales</i>	<i>Scotland</i>	<i>Great Britain</i>	<i>England & Wales</i>	<i>Scotland</i>	<i>Great Britain</i>
2004	32	39	33	5	9	6	17	20	18
2005	35	36	35	5	9	6	19	19	19
2006	38	41	38	6	12	7	21	22	21
2007	42	36	42	5	6	5	24	17	23
2008	41	32	40	4	6	5	22	15	21
2009	35	36	35	5	7	5	20	17	20
2010	39	43	40	5	9	6	22	20	22
2011	42	42	42	6	7	6	24	19	23
2012	47	46	47	6	10	7	26	22	25
2013	47	41	47	8	8	8	26	19	25
2014	52	47	51	11	9	11	30	21	29
2015	53	48	52	9	12	10	31	25	30
2016	55	49	54	9	11	9	30	24	29
2017	58	53	57	9	12	10	32	27	31
2018	62	58	62	11	12	12	35	28	34
2019	63	58	62	13	20	14	36	33	36
2020	58	60	59	14	21	15	34	34	34
2021	60	55	60	14	22	16	36	33	35

Sulphur dressing covers have increased since 2004 on tillage crops in all countries. At the start of the period, they were generally higher in Scotland than in England and Wales. In the last five years sulphur dressing covers have plateaued, although in 2021 they were slightly higher in England and Wales than Scotland. Dressing covers on grass are lower than those observed on tillage crops. They have increased since 2004 and in the last five years have tended to be higher in Scotland (mean 17 kg/ha) than in England and Wales (mean 12 kg/ha).



B2.2.1 Longer term trends in phosphate, potash and sulphur use on major tillage crops

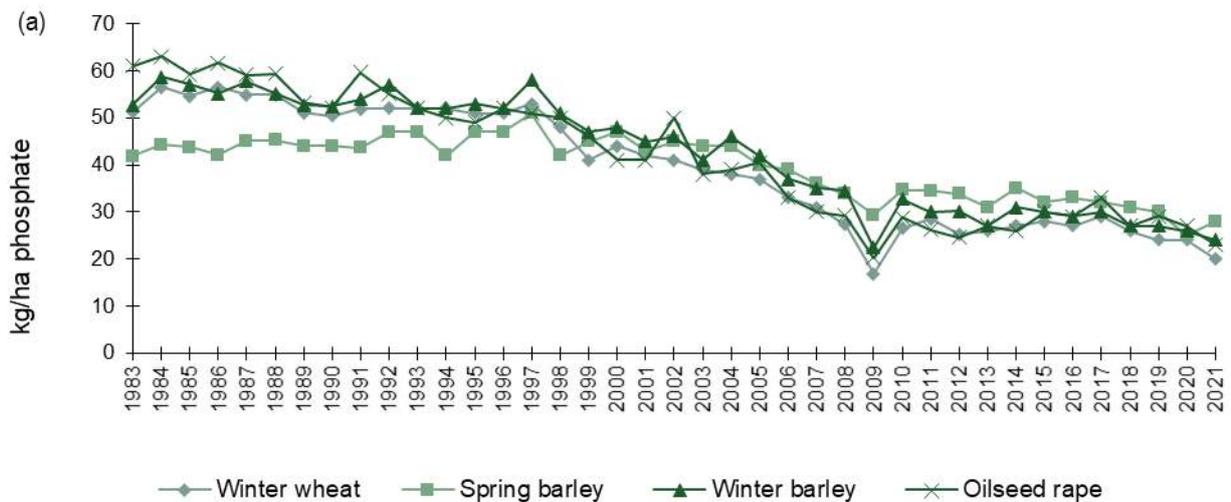
Overall application rates of phosphate and potash on the main arable crops in Great Britain since 1983 are shown in Figure B2.5.

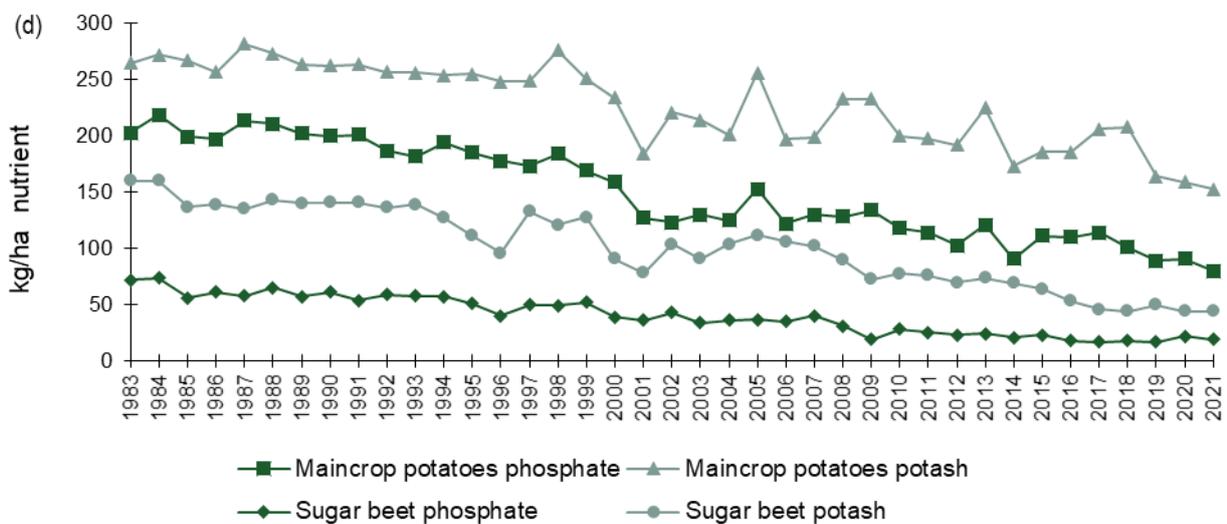
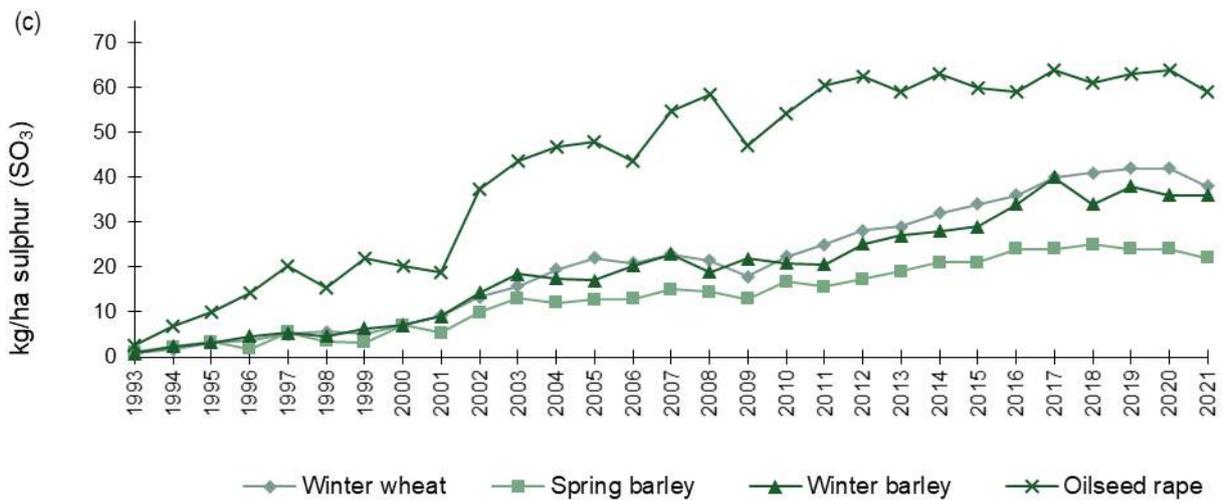
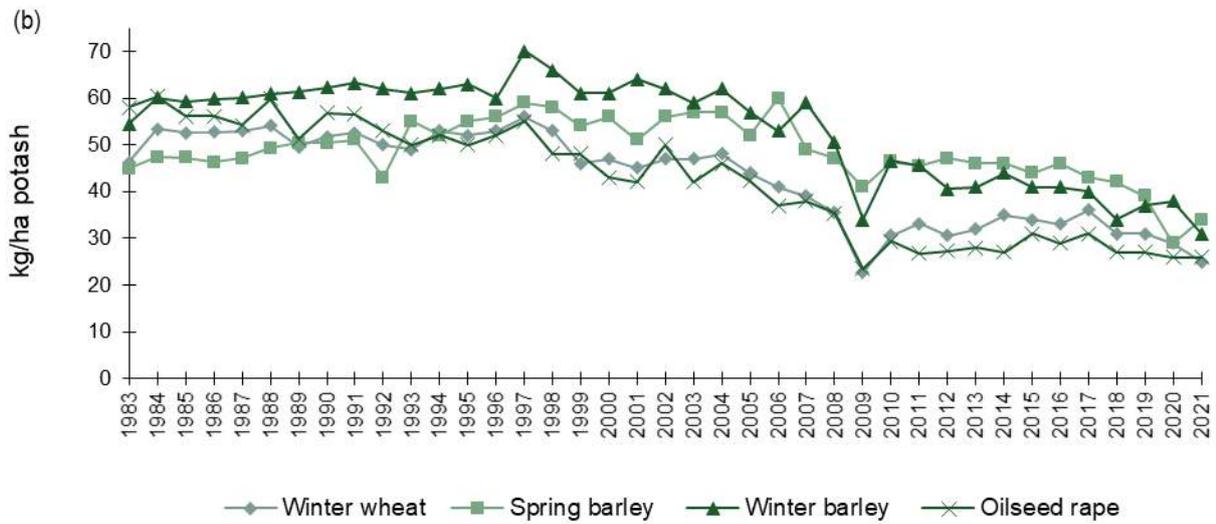
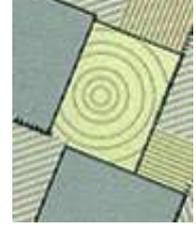
Phosphate use on the main combinable crops has shown a gradual net decline since 1983. (Figure B2.5(a)). The year 2009 saw more marked decreases in overall rates due to a spike in fertiliser prices (-10 kg/ha for winter wheat and -13 kg/ha for winter barley). In 2010 overall phosphate rates recovered and there was a period of relative stability between 2010 and 2017, but since then there appears to have been a resumption in the decline. Overall phosphate use has also declined steadily on potatoes and sugar beet.

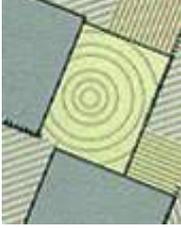
Potash use on the main combinable crops was relatively stable from 1983 to about the turn of the century. It then went through a period of decline to 2009, followed by relative stability between 2010 and 2017, before a return to apparent decline thereafter. Overall potash rates have also declined steadily on potatoes and sugar beet.

Overall application rates of sulphur (SO₃) on the main combinable crops has increased steadily since reporting of sulphur data began in 1983 (Figure B2.5c). This trend is a reflection of a continuing increase in the dressing cover of sulphur on these and other crops (Table B1.4), rather than increases in the average rates which have been relatively constant and close to the recommended rate for many years (Table B1.3b).

Figure B2.5 Overall application rates (kg/ha) of (a) phosphate, (b) potash, (c) sulphur (SO₃) on major arable crops, and (d) phosphate and potash on sugar beet and potatoes, Great Britain 1983 – 2021



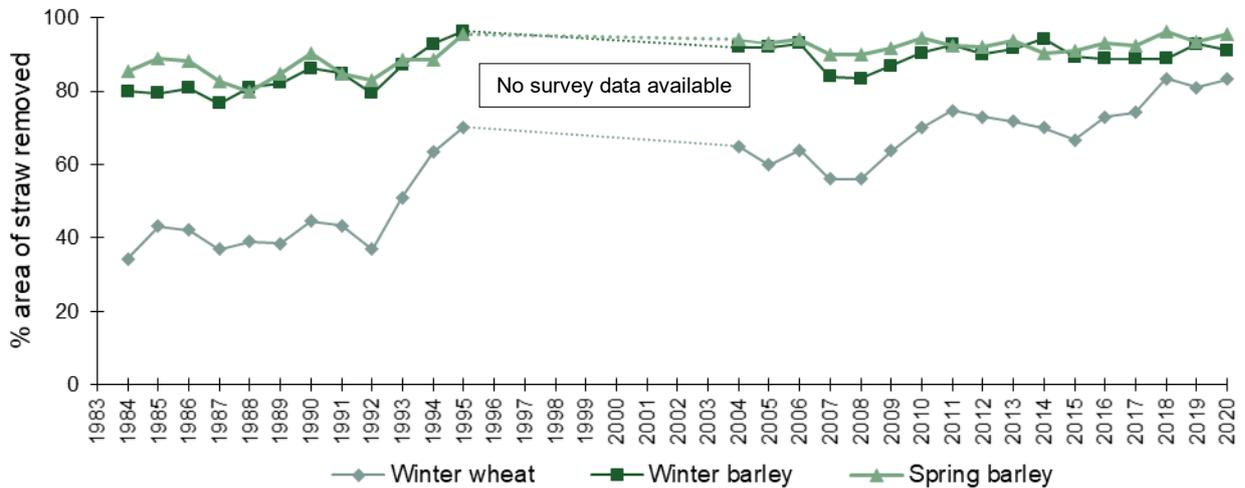




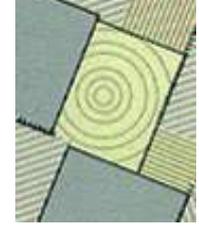
B2.3 LONGER TERM TRENDS IN STRAW REMOVAL

Estimates of the percentage of straw removed from wheat and barley fields are shown in Figure B2.6. Wheat and barley straw contain 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 P₂O₅ (phosphate) per tonne, and 9.5-12.5 kg K₂O (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 2021 Survey related to the fate of the straw from the 2020 harvest so is reported against 2020. In 2020, 83% of the winter wheat straw was removed from the fields, with the percentages for winter and spring barley higher still at 91% and 95% respectively.

Figure B2.6 Percentage of straw removed from wheat and barley fields, England & Wales harvest years 1984 – 1995, Great Britain harvest years 2004 - 2020



Data for the period 1984-95 were sourced from MAFF/Defra straw disposal surveys, those for the period 2004-19 from this Survey. No data are available for the period 1996-2003. The straw burning ban was introduced in 1993. This resulted in a significant increase in the percentage of straw removed, up to 70% and 96% for wheat and barley respectively, for the 1995 harvest.

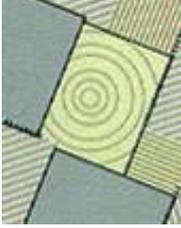


B2.4 TOTAL QUANTITIES OF NITROGEN, PHOSPHATE AND POTASH USED IN THE UK

Table B2.7 Quantities of major nutrients used, United Kingdom 1966-2021

Harvest year	Nitrogen kt N				Phosphate kt P ₂ O ₅				Potash kt K ₂ O			
	England & Wales	Scotland	N. Ireland	UK	England & Wales	Scotland	N. Ireland	UK	England & Wales	Scotland	N. Ireland	UK
1966	491	76	23	590	332	81	22	435	335	61	18	413
1967	573	85	27	685	359	79	23	460	354	61	19	434
1968	625	93	29	748	367	81	21	469	362	62	18	441
1969	639	108	35	781	362	84	22	467	363	65	19	447
1970	653	108	34	796	366	81	23	470	356	63	20	438
1971	732	119	43	894	397	84	24	504	373	65	21	459
1972	751	120	48	919	371	76	24	470	336	60	19	416
1973	759	132	56	947	373	85	25	482	333	63	21	417
1974	784	139	57	980	357	72	21	449	347	55	19	421
1975	788	143	54	984	306	69	18	393	302	59	16	377
1976	851	144	65	1,059	315	69	19	404	322	59	17	398
1977	879	146	68	1,093	316	69	21	406	330	59	20	409
1978	924	156	75	1,155	316	72	22	410	328	64	20	412
1979	941	160	85	1,186	321	73	22	416	333	65	21	419
1980	1,031	156	81	1,268	342	75	24	440	361	65	22	447
1981	1,100	159	76	1,335	344	73	24	441	367	66	21	454
1982	1,180	160	76	1,416	357	65	24	446	394	67	22	483
1983	1,227	161	82	1,470	359	65	24	448	409	68	23	500
1984	1,316	183	89	1,588	391	69	28	488	457	73	29	559
1985	1,298	186	96	1,580	375	71	23	469	441	72	28	541
1986	1,297	176	99	1,572	341	65	28	434	415	66	29	510
1987	1,370	193	111	1,674	340	65	27	432	429	70	29	528
1988	1,251	180	94	1,525	341	70	24	435	419	76	29	524
1989	1,223	193	98	1,514	334	65	26	425	420	74	29	523
1990	1,275	194	113	1,582	323	63	28	414	409	73	33	515
1991	1,224	193	98	1,515	321	61	24	406	393	71	28	492
1992	1,105	166	94	1,365	295	55	21	371	351	64	26	441
1993	968	142	109	1,219	286	50	24	360	344	57	29	430
1994	986	133	129	1,248	312	51	28	391	361	59	38	458
1995	1,064	156	128	1,348	325	53	27	405	378	64	34	476
1996	1,048	157	128	1,333	302	62	30	394	370	65	36	471
1997	1,156	172	112	1,440	325	63	24	412	405	65	31	501
1998	1,111	158	106	1,375	308	56	19	383	397	64	26	487
1999	1,015	152	117	1,284	274	50	23	347	365	59	27	451
2000	1,005	150	113	1,268	237	59	21	317	322	61	26	409
2001	876	180	106	1,162	201	57	21	279	274	69	26	369
2002	915	187	95	1,197	209	55	19	283	297	70	24	391
2003	853	170	108	1,131	203	60	19	282	283	66	26	375
2004	875	150	100	1,125	205	57	16	278	288	65	22	375
2005	834	150	77	1,061	192	55	12	259	267	67	18	352
2006	780	153	70	1,003	173	51	11	235	243	66	16	325
2007	802	126	80	1,008	169	46	9	224	241	59	17	317
2008	800	127	74	1,001	160	49	6	215	244	68	13	325
2009	767	124	57	948	91	34	4	129	148	52	8	208
2010	813	127	76	1,016	134	44	6	184	182	57	12	251
2011	824	124	74	1,022	145	42	5	192	213	59	11	283
2012	809	125	66	1,000	140	43	5	188	193	56	10	259
2013	781	139	79	999	141	46	7	194	194	60	13	267
2014	838	151	71	1,060	146	48	7	201	206	65	13	284
2015	819	155	75	1,049	142	48	6	196	196	64	12	272
2016	801	155	71	1,026	139	51	7	197	188	69	13	270
2017	806	157	78	1,041	133	54	8	195	185	77	14	276
2018	804	147	82	1,033	131	48	9	188	174	72	16	262
2019	810	150	79	1,038	132	46	7	186	182	68	14	267
2020	757	131	79	967	127	39	8	174	177	63	14	254
2021e	794	135	82	1,011	118	45	8	171	181	70	15	266

Note: Years are harvest (e.g. 2021 refers to the 2020/21 cropping year) rather than calendar years. Data for 2021 are estimates.



Estimates of quantities of nitrogen, phosphate and potash used in the UK since 1966 are shown in Table B2.6. These data are based on BSFP findings and trade and sales data. They are compiled by the AIC in conjunction with Defra using the methodology described in Section A2.5. Users should note that these figures relate to the whole of the UK, whereas the other figures presented in this report relate just to Great Britain.

Total nitrogen use in the UK increased from 590,000 tonnes in 1966 up to 1,674,000 tonnes in 1987 before declining gradually to 1,001,000 tonnes in 2008. The drop in 2009 was related to high fertiliser prices. Between 2010 and 2019 nitrogen use has remained relatively stable. The reduction in nitrogen use observed in 2020 was related to weather and cropping factors. From the peak in 1987, UK nitrogen use since has fallen by approximately 40%.

Phosphate use in the UK has fallen since the mid-1980s but since 2007 this decline slowed. The low use of 129,000 tonnes in 2009 was price related. Between 2010 and 2019 total phosphate use had been more stable, between 184,000 – 201,000 tonnes. Results for 2020 and the estimate for 2021 appear to show a further reduction of this nutrient, (174,000 tonnes of phosphate was used in 2020). At this level of usage volumes are only 40% of the annual average used between 1966 and 1995.

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 2021 has been between 251,000 – 284,000 tonnes, which is around half that used at its peak. The low use of 208,000 tonnes in 2009 was price related.



SECTION C – TABLES

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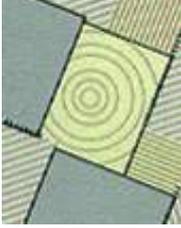
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Note: 1. Row percentages may not sum to exactly to 100 due to rounding.
2. No estimates are shown for crops with fewer than 5 fields in the sample. Nevertheless, some estimates are based on very few fields in the sample and should be treated with great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



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Table GB1.1 Total fertiliser use, Great Britain 2021

	Crop area receiving dressing (%)					Average field rate (kg/ha)				Overall application rate (kg/ha)				Fields in sample
	N	P ₂ O ₅	K ₂ O	SO ₃	FYM	N	P ₂ O ₅	K ₂ O	SO ₃	N	P ₂ O ₅	K ₂ O	SO ₃	
Spring wheat	98	28	27	54	15	141	44	51	59	138	12	14	32	94
Winter wheat	99	37	40	73	23	188	54	62	52	186	20	25	38	1202
Spring barley	96	58	56	55	31	102	49	61	40	98	28	34	22	677
Winter barley	98	46	51	71	24	143	52	62	51	140	24	31	36	467
Oats	91	36	33	55	26	107	48	57	43	98	17	19	24	249
Rye/triticale/Durum wheat	93	25	32	75	24	126	50	67	52	117	12	22	39	34
Potatoes (seed or earlies)	95	82	69	33	2	95	128	126	-	90	104	87	-	9
Potatoes (maincrop)	94	77	90	36	33	132	104	170	-	125	80	153	-	46
Sugar beet	91	46	68	70	35	74	41	64	32	67	19	44	23	82
Spring oilseed rape	92	30	44	62	6	127	-	-	78	116	-	-	49	7
Winter oilseed rape	100	42	41	80	32	168	55	65	75	168	23	26	59	241
Linseed	96	27	25	77	11	94	39	45	40	90	10	11	31	47
Forage maize	81	60	29	22	79	70	62	71	32	57	38	21	7	147
Rootcrops for stockfeed	91	67	80	23	51	71	47	61	36	65	31	49	8	61
Leafy forage crops	66	42	43	26	49	68	41	41	22	45	17	17	6	61
Arable silage/other fodder crops	42	27	27	18	57	103	34	41	44	43	9	11	8	98
Peas - human consumption	4	13	17	15	0	-	70	62	39	-	9	10	6	40
Peas - animal consumption	4	11	19	13	0	-	-	34	-	-	-	6	-	31
Beans - animal consumption	3	18	23	5	3	45	51	56	41	1	9	13	2	210
Vegetables (brassicae)	66	63	68	60	39	220	47	123	-	145	29	83	-	9
Vegetables (other)	64	35	31	15	5	135	69	152	51	86	24	47	8	35
Soft Fruit	97	12	47	45	0	67	-	71	-	65	-	33	-	14
Top Fruit	80	18	52	5	0	75	-	27	-	60	-	14	-	16
Other tillage	27	6	9	20	18	77	34	56	57	21	2	5	12	61
All tillage	89	41	43	60	26	147	53	64	51	130	22	28	30	3938
Grass under 5 years old	83	47	52	28	55	119	29	45	41	98	14	23	11	879
Grass 5 years and over	54	35	36	13	34	78	18	24	29	42	6	9	4	2300
All grass	59	37	39	16	37	87	20	28	32	51	7	11	5	3179
All crops and grass	72	39	41	35	32	120	36	45	46	87	14	18	16	7117

Source: British Survey of Fertiliser Practice 2021

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

Table GB1.2 Use of straight fertiliser, Great Britain 2021

	Crop area receiving dressing (%)			Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
Spring wheat	97	14	17	137	34	45	132	5	8	94
Winter wheat	98	12	19	184	56	65	179	7	12	1202
Spring barley	81	5	7	91	52	63	74	3	4	677
Winter barley	94	15	20	140	52	63	131	8	13	467
Oats	84	10	8	106	61	68	88	6	6	249
Rye/triticale/Durum wheat	89	6	16	127	-	69	114	-	11	34
Potatoes (seed or earlies)	2	0	21	-	-	-	-	-	-	9
Potatoes (maincrop)	39	5	26	89	-	210	35	-	55	46
Sugar beet	82	2	32	71	-	67	58	-	22	82
Spring oilseed rape	92	30	44	127	-	-	116	-	-	7
Winter oilseed rape	99	12	19	160	55	66	158	6	13	241
Linseed	94	0	8	88	-	-	83	-	-	47
Forage maize	49	6	14	79	64	104	39	4	14	147
Rootcrops for stockfeed	43	3	13	85	-	83	36	-	11	61
Leafy forage crops	36	6	0	60	-	-	22	-	-	61
Arable silage/other fodder crops	29	2	2	106	-	-	31	-	-	98
Peas - human consumption	0	4	11	-	-	53	-	-	6	40
Peas - animal consumption	4	2	10	-	-	-	-	-	-	31
Beans - animal consumption	0	3	10	-	56	57	-	2	5	210
Vegetables (brassicae)	65	0	5	-	-	-	-	-	-	9
Vegetables (other)	52	3	3	114	-	-	60	-	-	35
Soft Fruit	84	0	34	76	-	-	64	-	-	14
Top Fruit	80	0	3	61	-	-	48	-	-	16
Other tillage	26	1	5	70	-	79	18	-	4	61
All tillage	82	9	15	145	55	68	118	5	10	3938
Grass under 5 years old	50	1	3	111	76	88	56	1	2	879
Grass 5 years and over	23	0	1	89	40	57	21	0	1	2300
All grass	28	0	1	95	58	68	26	0	1	3179
All crops and grass	52	4	7	130	55	68	68	2	5	7117

Table GB1.3 Use of compound fertiliser, Great Britain 2021

	Crop area receiving dressing (%)				Average field rate (kg/ha)				Overall application rate (kg/ha)				Fields in sample
	N	P ₂ O ₅	K ₂ O	SO ₃	N	P ₂ O ₅	K ₂ O	SO ₃	N	P ₂ O ₅	K ₂ O	SO ₃	
Spring wheat	18	21	10	5	31	36	61	-	6	8	6	-	94
Winter wheat	12	25	22	7	55	52	58	37	7	13	13	2	1202
Spring barley	47	54	49	20	51	48	60	29	24	26	30	6	677
Winter barley	16	32	31	7	56	51	60	35	9	17	19	3	467
Oats	18	27	25	10	54	42	51	27	10	11	13	3	249
Rye/triticale/Durum wheat	3	19	19	3	-	51	58	-	-	9	11	-	34
Potatoes (seed or earlies)	95	82	50	24	91	128	-	-	86	104	-	-	9
Potatoes (maincrop)	78	72	69	17	115	106	141	99	89	76	97	17	46
Sugar beet	30	44	36	18	28	38	61	32	8	17	22	6	82
Spring oilseed rape	0	0	0	0	-	-	-	-	-	-	-	-	7
Winter oilseed rape	23	30	22	8	42	55	63	38	9	17	14	3	241
Linseed	19	27	16	7	35	39	41	-	7	10	7	-	47
Forage maize	58	55	15	5	31	61	41	11	18	34	6	1	147
Rootcrops for stockfeed	60	64	67	7	48	46	56	36	29	29	38	3	61
Leafy forage crops	39	40	43	19	60	35	41	25	23	14	17	5	61
Arable silage/other fodder crops	15	26	26	2	84	33	35	26	13	8	9	1	98
Peas - human consumption	4	10	6	6	-	59	-	-	-	6	-	-	40
Peas - animal consumption	0	9	9	0	-	-	-	-	-	-	-	-	31
Beans - animal consumption	2	15	14	1	40	50	56	-	1	7	8	-	210
Vegetables (brassicae)	61	63	63	46	-	47	127	-	-	29	79	-	9
Vegetables (other)	27	32	27	7	99	70	161	37	27	22	44	2	35
Soft Fruit	12	12	12	11	-	-	-	-	-	-	-	-	14
Top Fruit	41	18	49	0	28	-	24	-	11	-	12	-	16
Other tillage	5	5	4	0	54	34	32	-	2	2	1	-	61
All tillage	23	33	28	10	53	51	61	33	12	17	18	3	3938
Grass under 5 years old	48	45	50	15	88	28	42	32	42	12	21	5	879
Grass 5 years and over	35	35	35	8	61	18	23	20	21	6	8	2	2300
All grass	37	36	38	9	66	20	27	23	25	7	10	2	3179
All crops and grass	31	35	34	9	62	33	40	28	19	11	13	3	7117

Source: British Survey of Fertiliser Practice 2021

Table GB1.4 Use of lime, Great Britain 2021

	Crop area receiving dressing (%)						Average application rate (tonnes of product/ha)						Fields limed	Fields in sample
	Limestone (ground, screened)	Chalk	Magnesian limestone	Sugar beet lime	Other	All	Limestone (ground, screened)	Chalk	Magnesian limestone	Sugar beet lime	Other	All		
Spring wheat	-	-	-	-	-	-	-	-	-	-	-	-	1	94
Winter wheat	4.3	0.8	0.6	0.1	0.4	6.3	4.2	3.0	3.9	5.0	0.9	3.8	77	1202
Spring barley	9.7	0.4	2.4	0.2	1.0	13.7	4.3	4.5	3.9	5.0	0.6	4.0	70	677
Winter barley	6.7	0.8	1.6	0.3	0.2	9.5	4.4	3.1	4.8	7.5	1.2	4.4	40	467
Oats	4.1	0.5	-	-	-	4.6	4.4	5.2	-	-	-	4.5	16	249
Rye/triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	-	-	3	34
Potatoes (seed or earlies)	-	-	-	-	-	-	-	-	-	-	-	-	0	9
Potatoes (maincrop)	-	-	-	-	-	-	-	-	-	-	-	-	1	46
Sugar beet	22.0	2.9	-	8.3	1.7	34.9	4.5	5.0	-	5.5	0.3	4.5	21	82
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	-	-	1	7
Winter oilseed rape	6.6	0.4	0.7	0.4	0.5	8.7	3.7	3.0	6.5	5.0	0.5	3.7	22	241
Linseed	-	-	-	-	-	-	-	-	-	-	-	-	1	47
Forage maize	5.6	1.1	-	0.5	-	7.3	3.7	5.0	-	2.5	-	3.8	14	147
Rootcrops for stockfeed	18.7	-	-	-	1.3	20.0	5.1	-	-	-	0.3	4.7	12	61
Leafy forage crops	15.5	-	2.7	-	2.1	20.2	4.2	-	5.0	-	1.5	4.0	14	61
Arable silage/other fodder crops	11.4	0.9	-	-	1.3	13.6	4.8	6.8	-	-	0.6	4.5	9	98
Peas - human consumption	-	-	-	-	-	-	-	-	-	-	-	-	1	40
Peas - animal consumption	-	-	-	-	-	-	-	-	-	-	-	-	1	31
Beans - animal consumption	2.9	0.6	-	-	-	3.5	3.1	4.0	-	-	-	3.3	8	210
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	-	-	1	9
Vegetables (other)	2.7	2.6	-	-	-	5.3	3.8	4.1	-	-	-	3.9	5	35
Soft Fruit	-	-	-	-	-	-	-	-	-	-	-	-	1	14
Top Fruit	-	-	-	-	-	-	-	-	-	-	-	-	2	16
Other tillage	-	-	-	-	-	-	-	-	-	-	-	-	1	61
All tillage	6.1	0.7	0.9	0.4	0.5	8.6	4.2	3.7	4.2	5.3	0.7	4.0	322	3938
Grass under 5 years old	9.9	0.1	1.0	-	0.7	11.7	3.9	5.8	6.3	-	1.8	4.0	111	879
Grass 5 years and over	2.6	0.1	0.1	-	0.6	3.3	4.0	7.4	2.1	-	3.2	3.9	116	2300
All grass	3.7	0.1	0.3	-	0.6	4.6	4.0	7.0	4.5	-	2.9	3.9	227	3179
All crops and grass	4.8	0.4	0.6	0.2	0.5	6.4	4.1	4.1	4.3	5.3	2.0	4.0	549	7117

Table GB2.1 Average fertiliser practice by grassland utilisation, Great Britain 2021

	Crop area receiving dressing (%)					Average field rate (kg/ha)				Overall application rate (kg/ha)				Fields in sample
	N	P ₂ O ₅	K ₂ O	SO ₃	FYM	N	P ₂ O ₅	K ₂ O	SO ₃	N	P ₂ O ₅	K ₂ O	SO ₃	
Grazed not mown	47	31	32	11	21	67	16	18	25	31	5	6	3	1448
Grazed mown	76	47	51	24	63	102	25	36	38	78	11	18	9	1491
All grazings	57	37	38	15	36	83	20	26	32	48	7	10	5	2939
Cut for silage - grazed	83	49	54	26	68	109	26	39	38	91	13	21	10	1062
Cut for silage - not grazed	88	35	47	16	78	144	28	51	42	126	10	24	7	154
All cut for silage	84	47	53	25	70	114	26	40	38	96	12	22	10	1216
Cut for hay - grazed	57	42	42	16	47	69	18	23	39	39	7	10	6	473
Cut for hay - not grazed	71	35	48	27	11	94	27	49	30	66	9	24	8	69
All cut for hay	59	41	43	17	42	73	19	27	37	43	8	12	6	542
All mowings	77	45	50	24	63	107	25	38	38	83	11	19	9	1710
All grass	59	37	39	16	37	87	20	28	32	51	7	11	5	3179

Source: British Survey of Fertiliser Practice 2021

Table GB3.0 Product use by month of application, Great Britain 2021

(a) Product use

row %	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Straight N	0	0	0	0	0	5	31	39	16	5	2	1
Straight P	7	10	27	0	0	6	31	14	2	1	0	3
Straight K	3	1	14	1	1	9	42	19	7	2	0	1
Compounds	3	4	2	0	0	2	24	34	15	8	4	3
All fertilisers	1	2	1	0	0	4	29	36	15	6	3	2

(b) Nutrient use

row %	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Nitrogen	0	0	0	0	0	4	29	39	17	6	3	2
Phosphate	5	9	7	0	0	3	28	27	10	3	2	3
Potash	4	5	7	0	0	4	32	28	11	5	2	3
Sulphur	0	0	0	0	0	11	45	30	8	3	1	1
Total	1	2	2	0	0	5	31	35	14	5	2	2

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

'Product' refers to the total tonnage of the products used by the farmers in the survey year 2021.

'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 P₂O₅ and 10 kg of K₂O, 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.

Table GB3.1 Product type as percentage of all product used by crop group, Great Britain 2021

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	36.3	47.1	7.6	26.2	43.8	22.5	41.2	30.5	27.1	32.4	35.5	31.8	38.6
Urea	8.8	7.6	0.0	4.0	10.0	2.6	7.4	3.7	3.4	3.6	3.3	3.7	6.4
Calcium Ammonium Nitrate (CAN)	2.7	2.5	0.3	3.9	1.1	1.7	2.4	2.3	1.5	2.3	0.0	2.5	2.4
Urea Ammonium Nitrate (UAN)	14.1	19.4	6.0	8.5	23.4	8.6	17.3	2.9	6.1	2.3	6.4	2.7	13.3
Foliar Urea	1.5	1.4	0.0	2.0	0.9	5.3	1.7	0.2	0.0	0.3	0.0	0.2	1.3
Other Straight N	0.4	1.1	0.6	0.7	2.5	1.2	1.1	1.0	1.8	0.9	0.0	0.9	1.0
Triple Superphosphate (TSP)	1.7	2.6	1.0	2.2	1.9	2.7	2.3	0.4	0.6	0.6	0.0	0.5	1.8
Other Straight P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Muriate of Potash (MOP)	1.8	3.4	10.5	2.1	2.5	5.8	3.4	0.6	0.8	0.8	0.0	0.7	2.6
Other Straight K	0.6	0.5	6.2	18.1	0.8	2.1	1.2	0.2	0.5	0.2	3.1	0.2	0.9
PK	5.2	7.4	0.0	18.5	4.1	11.4	7.1	2.8	2.4	3.0	17.4	2.6	5.9
NK	0.4	0.4	6.9	1.1	0.7	2.2	0.8	4.6	3.2	8.3	0.0	5.9	2.2
Low N (<19% N)	15.3	2.7	53.1	10.0	6.6	24.1	8.7	4.1	3.0	3.8	6.2	3.9	7.4
High N (>=19% N)	10.8	3.8	7.4	2.5	1.4	8.9	5.4	46.6	49.6	41.5	28.1	44.3	16.1
Other	0.3	0.1	0.4	0.2	0.2	0.8	0.2	0.1	0.0	0.1	0.0	0.1	0.1
Total product ('000 tonnes)	485	1532	55	49	181	148	2450	965	100	598	3	1085	3535

Source: British Survey of Fertiliser Practice 2021

Table GB3.2 Use of product type by crop group, Great Britain 2021

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	17.3	70.0	0.4	1.1	7.6	3.6	75.0	85.5	6.5	59.3	0.4	25.0	1363
Urea	15.3	71.5	0.0	0.7	10.2	2.3	82.1	81.8	7.9	57.0	0.4	17.9	213
Calcium Ammonium Nitrate (CAN)	34.7	52.8	0.2	4.6	3.4	4.4	60.4	91.0	3.5	58.5	0.0	39.6	80
Urea Ammonium Nitrate (UAN)	14.3	72.3	0.3	1.1	9.0	3.0	94.4	90.9	25.5	54.5	0.7	5.6	492
Foliar Urea	14.7	56.2	0.0	1.9	3.1	24.0	97.2	100.0	0.0	97.2	0.0	2.8	63
Other Straight N	5.8	62.2	0.6	1.3	20.6	9.5	72.2	99.7	9.4	46.0	0.0	27.8	34
Triple Superphosphate (TSP)	14.2	69.9	0.7	1.4	7.9	5.9	93.9	65.5	7.8	68.3	0.0	6.1	55
Other Straight P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Muriate of Potash (MOP)	11.3	64.4	4.9	1.7	7.7	10.0	91.8	65.8	28.4	63.3	0.0	8.2	73
Other Straight K	5.2	27.5	11.2	32.3	6.0	17.8	89.6	91.6	18.5	42.4	2.5	10.4	32
PK	14.9	65.8	0.0	5.5	4.6	9.2	90.8	94.6	6.1	58.9	6.0	9.2	170
NK	11.8	33.0	25.0	2.4	11.5	16.3	24.1	61.0	4.4	86.6	0.0	75.9	74
Low N (<19% N)	47.5	16.9	15.4	3.1	5.0	12.1	87.9	92.0	8.7	58.9	0.2	12.1	250
High N (>=19% N)	36.8	42.8	4.0	1.0	2.8	12.7	17.5	94.3	10.9	48.2	0.1	82.5	630
Other	31.8	29.8	3.6	2.5	4.7	27.5	84.0	100.0	0.0	100.0	0.0	16.0	4
All Fertilisers	19.8	62.5	2.3	2.0	7.4	6.0	69.3	88.9	9.2	55.1	0.3	30.7	3535

Source: British Survey of Fertiliser Practice 2021

Table GB3.3 Product use by month of application, Great Britain 2021

row %	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	total product ('000 tonnes)
Ammonium Nitrate	0.1	3.9	29.2	39.4	17.4	5.5	2.8	1.3	0.3	0.1	0.0	0.0	1363
Urea	0.0	10.0	39.5	34.4	11.9	2.3	0.8	0.8	0.3	0.0	0.0	0.0	213
Calcium Ammonium Nitrate (CAN)	0.0	1.9	20.2	42.7	20.4	4.3	4.7	4.2	1.3	0.2	0.0	0.0	80
Urea Ammonium Nitrate (UAN)	0.0	7.4	35.9	40.7	12.3	2.4	0.5	0.7	0.1	0.0	0.0	0.0	492
Foliar Urea	0.0	0.0	27.1	30.0	15.2	24.1	3.6	0.0	0.0	0.0	0.0	0.0	63
Other Straight N	0.0	17.5	40.4	25.8	6.4	1.1	4.7	4.0	0.0	0.0	0.0	0.0	34
Triple Superphosphate (TSP)	0.0	5.5	31.2	13.6	2.2	0.6	0.1	3.3	6.7	10.1	26.7	0.0	55
Other Straight P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Muriate of Potash (MOP)	0.0	7.1	42.2	19.0	5.9	1.2	0.1	1.0	4.1	0.5	18.8	0.0	73
Other Straight K	1.8	13.3	42.4	19.9	10.5	4.1	1.0	1.1	0.3	0.8	2.8	2.0	32
PK	0.2	4.0	26.9	10.1	3.0	0.2	1.2	7.3	14.3	21.9	10.6	0.2	170
NK	0.0	6.0	14.2	21.7	21.9	26.7	4.7	4.8	0.0	0.0	0.0	0.0	74
Low N (<19% N)	0.2	2.9	35.2	39.6	9.2	2.5	0.5	2.3	2.7	3.9	1.0	0.0	250
High N (>=19% N)	0.0	1.0	19.8	39.7	20.6	9.6	6.2	2.6	0.2	0.1	0.2	0.0	630
Other	0.0	23.3	28.0	34.6	7.7	3.7	0.2	0.1	0.2	0.0	2.1	0.0	4
All Fertilisers	0.1	4.4	29.4	36.3	15.1	5.7	2.7	1.9	1.3	1.6	1.5	0.0	3535

Source: British Survey of Fertiliser Practice 2021

Table GB4.1 Average fertiliser practice on cereal farms, Great Britain 2021

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P ₂ O ₅	K ₂ O	FYM	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
Spring wheat	99	32	29	17	137	44	48	136	14	14	61
Winter wheat	100	36	38	20	196	55	59	195	20	22	625
Spring barley	99	48	46	29	109	53	64	107	26	30	268
Winter barley	98	39	44	17	147	56	65	145	22	29	192
Oats	96	33	28	23	109	47	50	105	16	14	113
Rye/triticale/Durum wheat	95	21	39	37	110	-	76	105	-	30	15
Potatoes (seed or earlies)	-	-	-	-	-	-	-	-	-	-	2
Potatoes (maincrop)	-	-	-	-	-	-	-	-	-	-	3
Sugar beet	98	48	57	25	77	51	77	75	24	44	27
Spring oilseed rape	91	34	50	7	122	-	-	111	-	-	6
Winter oilseed rape	99	38	38	32	170	59	71	169	22	27	148
Linseed	96	29	28	10	92	38	45	88	11	12	41
Forage maize	76	75	12	50	95	66	-	72	49	-	21
Rootcrops for stockfeed	90	18	61	39	87	-	-	79	-	-	8
Leafy forage crops	66	5	5	61	-	-	-	-	-	-	5
Arable silage/other fodder crops	58	30	30	39	109	23	36	63	7	11	28
Peas - human consumption	9	27	30	0	-	70	70	-	19	21	16
Peas - animal consumption	6	11	22	0	-	-	35	-	-	8	23
Beans - animal consumption	2	16	21	1	34	55	55	1	9	11	142
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	1
Vegetables (other)	72	37	31	1	149	54	167	108	20	52	16
Soft Fruit	-	-	-	-	-	-	-	-	-	-	0
Top Fruit	-	-	-	-	-	-	-	-	-	-	1
Other tillage	58	7	17	11	90	-	81	52	-	14	30
All tillage	90	37	37	21	158	54	62	143	20	23	1792
Grass under 5 years old	83	25	30	44	117	26	36	97	7	11	101
Grass 5 years and over	44	18	21	5	80	26	40	36	5	8	299
All grass	53	20	23	14	93	26	39	49	5	9	400
All crops and grass	85	34	35	20	153	52	60	130	18	21	2192

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

Source: British Survey of Fertiliser Practice 2021

Table GB4.2 Average fertiliser practice on general cropping and horticultural farms, Great Britain 2021

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P ₂ O ₅	K ₂ O	FYM	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
Spring wheat	91	24	31	3	170	-	-	155	-	-	15
Winter wheat	98	34	42	19	177	54	69	173	19	29	257
Spring barley	94	62	59	14	102	47	65	95	29	38	137
Winter barley	99	55	56	11	133	54	59	131	30	33	93
Oats	95	38	41	2	104	45	68	99	17	28	34
Rye/triticale/Durum wheat	100	23	23	0	140	-	-	140	-	-	7
Potatoes (seed or earlies)	100	85	70	2	96	119	130	96	101	91	7
Potatoes (maincrop)	93	76	88	32	129	99	165	120	75	146	37
Sugar beet	94	50	72	41	71	37	61	67	19	44	48
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	1
Winter oilseed rape	100	47	45	20	173	50	57	173	24	25	56
Linseed	-	-	-	-	-	-	-	-	-	-	4
Forage maize	81	30	38	62	75	49	56	61	15	21	28
Rootcrops for stockfeed	-	-	-	-	-	-	-	-	-	-	4
Leafy forage crops	50	16	16	0	-	-	-	-	-	-	5
Arable silage/other fodder crops	41	10	10	17	-	-	-	-	-	-	7
Peas - human consumption	0	4	8	0	-	-	-	-	-	-	19
Peas - animal consumption	-	-	-	-	-	-	-	-	-	-	4
Beans - animal consumption	2	24	30	0	-	42	61	-	10	18	34
Vegetables (brassicae)	66	62	67	39	-	-	-	-	-	-	7
Vegetables (other)	44	33	33	14	94	112	119	42	38	40	14
Soft Fruit	97	12	47	0	67	-	71	65	-	33	14
Top Fruit	81	19	53	0	75	-	27	61	-	14	14
Other tillage	20	7	9	6	70	-	35	14	-	3	19
All tillage	88	43	48	17	136	54	73	119	23	35	865
Grass under 5 years old	70	43	40	40	109	40	66	76	17	27	64
Grass 5 years and over	39	16	17	21	83	24	44	32	4	8	200
All grass	43	20	21	24	89	29	50	39	6	11	264
All crops and grass	75	36	40	19	128	50	70	96	18	28	1129

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 2021

Table GB4.3 Average fertiliser practice on dairy farms, Great Britain 2021

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P ₂ O ₅	K ₂ O	FYM	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
Spring wheat	-	-	-	-	-	-	-	-	-	-	4
Winter wheat	97	34	30	51	167	44	53	163	15	16	59
Spring barley	76	42	45	84	88	41	44	67	18	20	32
Winter barley	88	36	47	68	134	32	50	118	12	23	27
Oats	86	27	27	84	86	-	-	74	-	-	8
Rye/triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	2
Potatoes (seed or earlies)	-	-	-	-	-	-	-	-	-	-	0
Potatoes (maincrop)	-	-	-	-	-	-	-	-	-	-	0
Sugar beet	-	-	-	-	-	-	-	-	-	-	0
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	0
Winter oilseed rape	100	40	40	95	113	-	-	113	-	-	5
Linseed	-	-	-	-	-	-	-	-	-	-	0
Forage maize	84	65	32	96	62	56	61	52	36	19	52
Rootcrops for stockfeed	-	-	-	-	-	-	-	-	-	-	4
Leafy forage crops	71	9	24	89	-	-	-	-	-	-	7
Arable silage/other fodder crops	25	19	19	89	106	-	-	26	-	-	33
Peas - human consumption	-	-	-	-	-	-	-	-	-	-	0
Peas - animal consumption	-	-	-	-	-	-	-	-	-	-	1
Beans - animal consumption	-	-	-	-	-	-	-	-	-	-	4
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	0
Vegetables (other)	-	-	-	-	-	-	-	-	-	-	0
Soft Fruit	-	-	-	-	-	-	-	-	-	-	0
Top Fruit	-	-	-	-	-	-	-	-	-	-	0
Other tillage	-	-	-	-	-	-	-	-	-	-	3
All tillage	78	41	33	75	113	45	48	88	19	16	241
Grass under 5 years old	89	39	49	82	152	28	51	135	11	25	177
Grass 5 years and over	81	32	40	70	118	22	33	96	7	13	310
All grass	83	34	42	73	128	24	39	107	8	16	487
All crops and grass	82	35	40	73	126	29	40	103	10	16	728

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

Source: British Survey of Fertiliser Practice 2021

Table GB4.4 Average fertiliser practice on other livestock farms, Great Britain 2021

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P ₂ O ₅	K ₂ O	FYM	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
Spring wheat	-	-	-	-	-	-	-	-	-	-	1
Winter wheat	100	42	51	57	164	43	58	164	18	29	45
Spring barley	94	82	81	51	82	42	46	78	35	37	108
Winter barley	98	58	59	60	139	56	67	136	32	39	50
Oats	81	33	30	78	106	51	55	86	17	17	30
Rye/triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	1
Potatoes (seed or earlies)	-	-	-	-	-	-	-	-	-	-	0
Potatoes (maincrop)	-	-	-	-	-	-	-	-	-	-	2
Sugar beet	-	-	-	-	-	-	-	-	-	-	0
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	0
Winter oilseed rape	-	-	-	-	-	-	-	-	-	-	1
Linseed	-	-	-	-	-	-	-	-	-	-	0
Forage maize	68	60	16	97	58	77	69	40	46	11	22
Rootcrops for stockfeed	94	85	87	44	53	35	46	50	30	40	29
Leafy forage crops	71	75	70	46	70	40	39	50	30	28	35
Arable silage/other fodder crops	36	36	36	53	48	31	37	17	11	13	22
Peas - human consumption	-	-	-	-	-	-	-	-	-	-	0
Peas - animal consumption	-	-	-	-	-	-	-	-	-	-	0
Beans - animal consumption	-	-	-	-	-	-	-	-	-	-	2
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	1
Vegetables (other)	-	-	-	-	-	-	-	-	-	-	3
Soft Fruit	-	-	-	-	-	-	-	-	-	-	0
Top Fruit	-	-	-	-	-	-	-	-	-	-	0
Other tillage	-	-	-	-	-	-	-	-	-	-	3
All tillage	86	63	61	58	103	46	51	88	29	31	355
Grass under 5 years old	80	60	65	52	96	27	38	77	16	25	364
Grass 5 years and over	51	39	39	34	67	16	19	34	6	8	1239
All grass	54	41	42	36	71	18	22	38	7	9	1603
All crops and grass	56	43	43	37	74	20	25	41	9	11	1958

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

Table GB4.5 Average fertiliser practice on mixed farms, Great Britain 2021

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P ₂ O ₅	K ₂ O	FYM	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
Spring wheat	100	10	12	4	135	-	-	135	-	-	13
Winter wheat	98	47	48	36	178	56	73	175	26	35	196
Spring barley	94	69	69	42	98	49	65	93	34	45	122
Winter barley	98	51	58	36	150	49	66	147	25	38	94
Oats	79	46	43	26	107	52	66	84	24	29	63
Rye/triticale/Durum wheat	90	15	15	23	123	-	-	110	-	-	8
Potatoes (seed or earlies)	-	-	-	-	-	-	-	-	-	-	0
Potatoes (maincrop)	-	-	-	-	-	-	-	-	-	-	4
Sugar beet	38	7	69	17	91	-	-	35	-	-	6
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	0
Winter oilseed rape	100	55	50	33	157	58	54	157	32	27	28
Linseed	-	-	-	-	-	-	-	-	-	-	2
Forage maize	93	76	43	83	64	71	104	60	53	45	23
Rootcrops for stockfeed	99	70	79	85	90	75	86	89	52	67	16
Leafy forage crops	49	75	75	9	73	47	52	35	35	39	9
Arable silage/other fodder crops	41	34	34	65	-	-	-	-	-	-	8
Peas - human consumption	0	0	0	0	-	-	-	-	-	-	5
Peas - animal consumption	-	-	-	-	-	-	-	-	-	-	3
Beans - animal consumption	10	24	35	18	-	50	58	-	12	20	25
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	0
Vegetables (other)	-	-	-	-	-	-	-	-	-	-	2
Soft Fruit	-	-	-	-	-	-	-	-	-	-	0
Top Fruit	-	-	-	-	-	-	-	-	-	-	1
Other tillage	11	0	0	73	-	-	-	-	-	-	6
All tillage	89	51	52	37	140	54	70	124	27	36	634
Grass under 5 years old	84	43	47	35	123	33	55	103	14	26	165
Grass 5 years and over	61	37	40	18	72	19	26	44	7	10	234
All grass	67	39	42	23	89	23	35	59	9	15	399
All crops and grass	78	45	47	30	118	41	54	91	18	25	1033

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

Source: British Survey of Fertiliser Practice 2021

Table EW1.1 Total fertiliser use, England & Wales 2021

	Crop area receiving dressing (%)					Average field rate (kg/ha)					Overall application rate (kg/ha)				Fields in sample
	N	P ₂ O ₅	K ₂ O	SO ₃	FYM	N	P ₂ O ₅	K ₂ O	SO ₃	N	P ₂ O ₅	K ₂ O	SO ₃		
Spring wheat	98	27	25	56	15	141	43	51	59	139	12	13	33	91	
Winter wheat	99	35	38	73	23	190	54	61	52	188	19	23	38	1131	
Spring barley	95	38	35	56	26	106	47	57	42	101	18	20	23	496	
Winter barley	98	44	47	71	20	144	53	61	51	141	23	29	36	427	
Oats	95	32	27	61	21	109	49	54	43	104	15	15	26	204	
Rye/triticale/Durum wheat	92	26	28	73	19	125	50	60	54	115	13	17	39	30	
Potatoes (seed or earlies)	90	67	90	24	3	-	-	-	-	-	-	-	-	5	
Potatoes (maincrop)	93	75	88	27	32	124	110	160	-	116	83	140	-	41	
Sugar beet	91	46	68	70	35	74	41	64	32	67	19	44	23	82	
Spring oilseed rape	89	0	20	89	9	127	-	-	78	113	-	-	69	6	
Winter oilseed rape	100	37	37	79	33	170	56	63	76	170	21	23	60	216	
Linseed	96	27	25	77	11	94	39	45	40	90	10	11	31	47	
Forage maize	82	61	29	22	79	70	62	71	32	57	38	21	7	146	
Rootcrops for stockfeed	89	60	76	24	52	78	43	58	35	70	25	44	8	49	
Leafy forage crops	61	22	26	11	45	71	41	38	22	43	9	10	2	32	
Arable silage/other fodder crops	39	24	24	20	50	101	39	49	44	39	9	11	9	90	
Vining peas (for human consumption)	5	17	21	19	0	-	70	62	39	-	12	13	7	34	
Field peas (harvested dry)	4	11	19	13	0	-	-	34	-	-	-	6	-	31	
Field beans (harvested dry)	3	18	23	5	2	45	52	57	41	1	9	13	2	206	
Vegetables (brassicae)	64	66	66	63	36	-	47	127	-	-	31	84	-	8	
Vegetable Other	61	30	25	12	5	140	55	158	41	85	16	40	5	32	
Soft Fruit	97	12	47	45	0	67	-	71	-	65	-	33	-	14	
Top Fruit	80	18	52	5	0	75	-	27	-	60	-	14	-	16	
Other tillage	28	6	9	21	19	77	34	56		22	2	5	12	59	
All tillage	88	35	37	60	24	152	53	63	51	134	19	23	31	3493	
Grass less than five years old	79	37	43	27	55	122	30	44	44	97	11	19	12	687	
Grass five years and over	51	30	32	12	34	80	18	24	30	40	5	8	4	1969	
All grass	55	31	34	14	37	88	20	28	34	48	6	9	5	2656	
All crops and grass	71	33	35	36	31	126	36	45	48	89	12	16	17	6149	

Source: British Survey of Fertiliser Practice 2021

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

Table EW1.2 Use of straight fertiliser, England & Wales 2021

	Crop area receiving dressing (%)			Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
Spring wheat	97	12	15	137	31	44	133	4	6	91
Winter wheat	98	13	19	186	55	64	182	7	12	1131
Spring barley	88	7	8	100	54	66	88	3	5	496
Winter barley	94	16	20	141	52	63	133	8	13	427
Oats	90	11	9	108	62	68	98	7	6	204
Rye/triticale/Durum wheat	89	6	11	126	-	-	111	-	-	30
Potatoes (seed or earlies)	3	0	3	-	-	-	-	-	-	5
Potatoes (maincrop)	40	6	18	88	-	215	35	-	40	41
Sugar beet	82	2	32	71	-	67	58	-	22	82
Spring oilseed rape	89	0	20	127	-	-	113	-	-	6
Winter oilseed rape	99	12	21	164	56	66	163	7	14	216
Linseed	94	0	8	88	-	-	83	-	-	47
Forage maize	50	6	14	79	64	104	39	4	14	146
Rootcrops for stockfeed	51	4	16	85	-	83	43	-	13	49
Leafy forage crops	43	6	0	67	-	-	28	-	-	32
Arable silage/other fodder crops	33	2	2	109	-	-	36	-	-	90
Peas - human consumption	0	5	13	-	-	53	-	-	7	34
Peas - animal consumption	4	2	10	-	-	-	-	-	-	31
Beans - animal consumption	0	3	10	-	56	57	-	2	6	206
Vegetables (brassicae)	63	0	0	-	-	-	-	-	-	8
Vegetables (other)	52	4	4	118	-	-	61	-	-	32
Soft Fruit	84	0	34	76	-	-	64	-	-	14
Top Fruit	80	0	3	61	-	-	48	-	-	16
Other tillage	28	1	5	70	-	79	19	-	4	59
All tillage	84	10	16	150	55	67	125	5	10	3493
Grass under 5 years old	54	2	2	120	76	76	64	2	2	687
Grass 5 years and over	24	0	1	92	40	53	22	0	1	1969
All grass	28	1	1	99	58	59	28	0	1	2656
All crops and grass	54	5	8	136	55	66	74	3	5	6149

Table EW1.3 Use of compound fertiliser, England & Wales 2021

	Crop area receiving dressing (%)				Average field rate (kg/ha)				Overall application rate (kg/ha)				Fields in sample
	N	P ₂ O ₅	K ₂ O	SO ₃	N	P ₂ O ₅	K ₂ O	SO ₃	N	P ₂ O ₅	K ₂ O	SO ₃	
Spring wheat	18	21	11	5	31	36	61	-	6	8	6	-	91
Winter wheat	11	22	20	6	55	52	56	34	6	12	11	2	1131
Spring barley	23	32	27	9	55	44	54	35	13	14	14	3	496
Winter barley	13	29	27	5	59	52	60	31	8	15	16	2	427
Oats	13	21	18	9	51	40	46	25	7	8	9	2	204
Rye/triticale/Durum wheat	4	20	20	3	-	51	58	-	-	10	12	-	30
Potatoes (seed or earlies)	90	67	90	24	-	-	-	-	-	-	-	-	5
Potatoes (maincrop)	76	69	72	16	106	113	140	109	81	78	101	18	41
Sugar beet	30	44	36	18	28	38	61	32	8	17	22	6	82
Spring oilseed rape	0	0	0	0	-	-	-	-	-	-	-	-	6
Winter oilseed rape	16	25	16	5	40	54	60	36	6	14	10	2	216
Linseed	19	27	16	7	35	39	41	-	7	10	7	-	47
Forage maize	59	55	15	5	31	61	41	11	18	34	6	1	146
Rootcrops for stockfeed	52	56	60	5	51	41	52	-	26	23	31	-	49
Leafy forage crops	21	22	26	8	70	26	38	-	15	6	10	-	32
Arable silage/other fodder crops	9	21	21	2	42	39	42	23	4	8	9	1	90
Peas - human consumption	5	12	8	7	-	59	-	-	-	7	-	-	34
Peas - animal consumption	0	9	9	0	-	-	-	-	-	-	-	-	31
Beans - animal consumption	2	14	13	1	40	51	57	-	1	7	7	-	206
Vegetables (brassicae)	64	66	66	48	-	47	127	-	-	31	84	-	8
Vegetables (other)	21	26	22	7	115	54	172	37	24	14	37	3	32
Soft Fruit	12	12	12	11	-	-	-	-	-	-	-	-	14
Top Fruit	41	18	49	0	28	-	24	-	11	-	12	-	16
Other tillage	5	5	5	0	54	34	32	-	3	2	1	-	59
All tillage	16	26	22	6	53	51	59	35	9	13	13	2	3493
Grass under 5 years old	38	35	41	12	84	27	42	34	32	9	17	4	687
Grass 5 years and over	31	30	31	7	59	17	23	20	18	5	7	1	1969
All grass	32	31	33	7	63	19	26	23	20	6	9	2	2656
All crops and grass	25	28	27	7	60	33	39	28	15	9	11	2	6149

Source: British Survey of Fertiliser Practice 2021

Table EW1.4 Use of lime, England & Wales 2021

	Crop area receiving dressing (%)						Average application rate (tonnes of product/ha)						Fields limed	Fields in sample
	Limestone (ground, screened)	Chalk	Magnesian limestone	Sugar beet lime	Other	All	Limestone (ground, screened)	Chalk	Magnesian limestone	Sugar beet lime	Other	All		
Spring wheat	-	-	-	-	-	-	-	-	-	-	-	-	1	91
Winter wheat	3.6	0.9	0.4	0.1	0.5	5.5	4.3	3.0	3.1	5.0	0.9	3.7	66	1131
Spring barley	6.6	0.6	0.2	0.3	0.0	7.8	4.7	4.5	5.0	5.0	3.1	4.7	28	496
Winter barley	4.1	0.8	1.1	0.4	0.2	6.6	4.4	3.1	5.0	7.5	1.2	4.4	25	427
Oats	3.9	0.6	-	-	-	4.5	4.2	5.2	-	-	-	4.4	11	204
Rye/triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	-	-	3	30
Potatoes (seed or earlies)	-	-	-	-	-	-	-	-	-	-	-	-	0	5
Potatoes (maincrop)	-	-	-	-	-	-	-	-	-	-	-	-	1	41
Sugar beet	22.0	2.9	-	8.3	1.7	34.9	4.5	5.0	-	5.5	0.3	4.5	21	82
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	-	-	1	6
Winter oilseed rape	6.3	0.5	0.5	0.4	0.6	8.3	3.7	3.0	7.5	5.0	0.5	3.7	18	216
Linseed	-	-	-	-	-	-	-	-	-	-	-	-	1	47
Forage maize	5.7	1.2	-	0.5	-	7.3	3.7	5.0	-	2.5	-	3.8	14	146
Rootcrops for stockfeed	12.1	-	-	-	1.6	13.7	5.1	-	-	-	0.3	4.5	9	49
Leafy forage crops	11.9	-	-	-	3.1	15.0	5.1	-	-	-	1.5	4.3	7	32
Arable silage/other fodder crops	4.6	1.1	-	-	1.6	7.3	4.4	6.8	-	-	0.6	3.9	8	90
Peas - human consumption	-	-	-	-	-	-	-	-	-	-	-	-	0	34
Peas - animal consumption	-	-	-	-	-	-	-	-	-	-	-	-	1	31
Beans - animal consumption	2.9	0.7	-	-	-	3.6	3.1	4.0	-	-	-	3.3	8	206
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	-	-	1	8
Vegetables (other)	2.9	2.8	-	-	-	5.8	3.8	4.1	-	-	-	3.9	5	32
Soft Fruit	-	-	-	-	-	-	-	-	-	-	-	-	1	14
Top Fruit	-	-	-	-	-	-	-	-	-	-	-	-	2	16
Other tillage	-	-	-	-	-	-	-	-	-	-	-	-	1	59
All tillage	4.7	0.8	0.3	0.5	0.3	6.7	4.2	3.7	4.4	5.3	0.8	4.1	233	3493
Grass under 5 years old	7.2	0.1	0.7	-	1.0	9.0	4.0	5.8	6.8	-	1.8	4.1	76	687
Grass 5 years and over	2.1	0.1	0.1	-	0.4	2.7	3.9	7.4	2.0	-	4.3	3.9	88	1969
All grass	2.8	0.1	0.2	-	0.5	3.6	3.9	7.0	4.3	-	3.6	4.0	164	2656
All crops and grass	3.7	0.4	0.3	0.2	0.4	5.1	4.1	4.1	4.3	5.3	2.6	4.0	397	6149

Table EW1.5 Percentage of crop area by field application rate - Nitrogen, England & Wales 2021

row %	kg/ha																	Fields in sample	
	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-		400+
Spring wheat	2	0	2	8	15	14	24	15	16	3	-	-	-	-	-	-	-	-	91
Winter wheat	1	0	1	2	4	7	9	17	16	20	11	7	3	2	1	-	-	-	1131
Spring barley	5	0	8	9	18	31	22	6	1	-	-	-	-	-	-	-	-	-	496
Winter barley	2	0	3	4	9	12	25	19	19	7	1	-	-	-	-	-	-	-	427
Oats	5	1	3	6	21	42	13	10	-	-	-	-	-	-	-	-	-	-	204
Rye/triticale/Durum wheat	8	3	3	8	7	20	25	17	9	-	-	-	-	-	-	-	-	-	30
Potatoes (seed or earlies)	10	0	0	37	27	0	0	0	0	24	3	-	-	-	-	-	-	-	5
Potatoes (maincrop)	7	0	8	1	20	25	12	12	4	8	1	2	-	-	-	-	-	-	41
Sugar beet	9	11	16	19	19	19	5	2	-	-	-	-	-	-	-	-	-	-	82
Spring oilseed rape	11	0	0	0	0	62	9	18	-	-	-	-	-	-	-	-	-	-	6
Winter oilseed rape	0	1	1	2	3	15	11	14	24	16	10	1	1	-	-	-	-	-	216
Linseed	4	3	5	11	27	44	6	-	-	-	-	-	-	-	-	-	-	-	47
Forage maize	18	15	19	14	13	10	6	3	1	1	-	-	-	-	-	-	-	-	146
Rootcrops for stockfeed	11	1	16	40	7	7	11	5	1	1	-	-	-	-	-	-	-	-	49
Leafy forage crops	39	0	22	7	25	7	-	-	-	-	-	-	-	-	-	-	-	-	32
Arable silage/other fodder crops	61	3	5	8	3	4	7	9	0	2	-	-	-	-	-	-	-	-	90
Peas - human consumption	95	0	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	34
Peas - animal consumption	96	0	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	31
Beans - animal consumption	97	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	206
Vegetables (brassicae)	36	0	0	1	0	15	0	0	0	0	0	48	-	-	-	-	-	-	8
Vegetables (other)	39	0	5	0	2	10	35	2	0	0	0	7	-	-	-	-	-	-	32
Soft Fruit	3	16	26	5	10	39	1	-	-	-	-	-	-	-	-	-	-	-	14
Top Fruit	20	5	7	36	16	3	13	-	-	-	-	-	-	-	-	-	-	-	16
Other tillage	72	3	5	3	10	2	6	-	-	-	-	-	-	-	-	-	-	-	59
All tillage	12	1	4	5	9	14	13	12	10	10	5	3	1	1	-	-	-	-	3493
Grass under 5 years old	21	3	9	14	13	9	8	8	5	4	4	1	0	1	2	-	-	-	687
Grass 5 years and over	49	3	13	12	8	4	4	2	2	1	-	-	-	-	-	-	-	-	1969
All grass	45	3	13	13	8	5	4	3	2	1	1	1	-	-	-	-	-	-	2656
All crops and grass	29	2	9	9	8	9	8	7	6	5	3	2	1	1	-	-	-	-	6149

Source: British Survey of Fertiliser Practice 2021

Table EW1.6 Percentage of crop area by field application rate - Phosphate, England & Wales 2021

row %	kg/ha																	Fields in sample	
	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-		400+
Spring wheat	73	3	17	5	2	-	-	-	-	-	-	-	-	-	-	-	-	-	91
Winter wheat	65	4	14	11	4	1	-	-	-	-	-	-	-	-	-	-	-	-	1131
Spring barley	62	6	19	9	1	1	1	-	-	-	-	-	-	-	-	-	-	-	496
Winter barley	56	4	19	15	5	1	1	-	-	-	-	-	-	-	-	-	-	-	427
Oats	68	8	9	11	3	1	-	-	-	-	-	-	-	-	-	-	-	-	204
Rye/triticale/Durum wheat	74	3	12	10	2	-	-	-	-	-	-	-	-	-	-	-	-	-	30
Potatoes (seed or earlies)	33	0	0	40	27	-	-	-	-	-	-	-	-	-	-	-	-	-	5
Potatoes (maincrop)	25	0	2	2	36	12	6	5	9	1	1	-	-	-	-	-	-	-	41
Sugar beet	54	16	19	6	3	0	1	-	-	-	-	-	-	-	-	-	-	-	82
Spring oilseed rape	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
Winter oilseed rape	63	5	14	11	4	2	1	-	-	-	-	-	-	-	-	-	-	-	216
Linseed	73	9	7	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	47
Forage maize	39	5	12	31	6	6	-	-	-	-	-	-	-	-	-	-	-	-	146
Rootcrops for stockfeed	40	19	16	17	6	2	-	-	-	-	-	-	-	-	-	-	-	-	49
Leafy forage crops	78	8	4	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	32
Arable silage/other fodder crops	76	7	8	3	5	-	-	-	-	-	-	-	-	-	-	-	-	-	90
Peas - human consumption	83	0	4	10	0	0	3	-	-	-	-	-	-	-	-	-	-	-	34
Peas - animal consumption	89	2	4	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	31
Beans - animal consumption	82	3	6	6	2	1	-	-	-	-	-	-	-	-	-	-	-	-	206
Vegetables (brassicae)	34	0	50	1	15	-	-	-	-	-	-	-	-	-	-	-	-	-	8
Vegetables (other)	70	0	12	16	2	-	-	-	-	-	-	-	-	-	-	-	-	-	32
Soft Fruit	88	12	0	0	1	-	-	-	-	-	-	-	-	-	-	-	-	-	14
Top Fruit	82	5	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16
Other tillage	94	4	1	0	0	1	-	-	-	-	-	-	-	-	-	-	-	-	59
All tillage	65	5	14	11	4	1	-	-	-	-	-	-	-	-	-	-	-	-	3493
Grass under 5 years old	63	20	10	5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	687
Grass 5 years and over	70	23	6	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1969
All grass	69	22	7	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2656
All crops and grass	67	14	10	6	2	1	-	-	-	-	-	-	-	-	-	-	-	-	6149

Source: British Survey of Fertiliser Practice 2021

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

Table EW1.7 Percentage of crop area by field application rate - Potash, England & Wales 2021

row %	kg/ha																	Fields in sample	
	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-		400+
Spring wheat	75	7	8	4	2	4	-	-	-	-	-	-	-	-	-	-	-	-	91
Winter wheat	62	5	11	11	8	2	1	1	-	-	-	-	-	-	-	-	-	-	1131
Spring barley	65	4	13	9	6	3	-	-	-	-	-	-	-	-	-	-	-	-	496
Winter barley	53	3	13	19	9	2	1	1	-	-	-	-	-	-	-	-	-	-	427
Oats	73	7	6	7	5	1	-	-	-	-	-	-	-	-	-	-	-	-	204
Rye/triticale/Durum wheat	72	3	9	9	3	2	2	-	-	-	-	-	-	-	-	-	-	-	30
Potatoes (seed or earlies)	10	0	0	0	37	24	27	0	3	-	-	-	-	-	-	-	-	-	5
Potatoes (maincrop)	12	0	0	3	27	6	13	13	4	3	6	5	3	3	1	0	2	-	41
Sugar beet	32	5	24	20	5	10	4	-	-	-	-	-	-	-	-	-	-	-	82
Spring oilseed rape	80	11	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
Winter oilseed rape	63	4	7	16	7	1	1	0	1	-	-	-	-	-	-	-	-	-	216
Linseed	75	2	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	47
Forage maize	71	4	7	4	8	0	2	3	-	-	-	-	-	-	-	-	-	-	146
Rootcrops for stockfeed	24	9	26	7	23	9	1	2	-	-	-	-	-	-	-	-	-	-	49
Leafy forage crops	74	7	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32
Arable silage/other fodder crops	76	7	8	1	5	2	1	-	-	-	-	-	-	-	-	-	-	-	90
Peas - human consumption	79	4	5	5	2	3	1	-	-	-	-	-	-	-	-	-	-	-	34
Peas - animal consumption	81	7	7	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	31
Beans - animal consumption	77	4	4	8	6	1	-	-	-	-	-	-	-	-	-	-	-	-	206
Vegetables (brassicae)	34	0	2	1	0	48	0	0	15	-	-	-	-	-	-	-	-	-	8
Vegetables (other)	75	0	0	0	11	0	0	2	0	5	7	-	-	-	-	-	-	-	32
Soft Fruit	53	12	0	0	21	13	1	-	-	-	-	-	-	-	-	-	-	-	14
Top Fruit	48	36	13	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	16
Other tillage	91	4	3	1	1	0	0	0	1	-	-	-	-	-	-	-	-	-	59
All tillage	63	5	10	11	7	3	1	1	-	-	-	-	-	-	-	-	-	-	3493
Grass under 5 years old	57	18	11	6	5	1	1	0	0	1	-	-	-	-	-	-	-	-	687
Grass 5 years and over	68	21	8	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-	1969
All grass	66	20	8	3	1	1	-	-	-	-	-	-	-	-	-	-	-	-	2656
All crops and grass	65	13	9	6	4	2	-	-	-	-	-	-	-	-	-	-	-	-	6149

Source: British Survey of Fertiliser Practice 2021

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

Table EW1.8 Percentage of crop area by field application rate - Sulphur, England & Wales 2021

row %	kg/ha																	Fields in sample	
	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-		400+
Spring wheat	44	14	17	16	4	3	2	-	-	-	-	-	-	-	-	-	-	-	91
Winter wheat	27	8	30	22	10	2	0	1	-	-	-	-	-	-	-	-	-	-	1131
Spring barley	44	14	26	10	4	1	-	-	-	-	-	-	-	-	-	-	-	-	496
Winter barley	29	9	30	21	7	2	0	1	-	-	-	-	-	-	-	-	-	-	427
Oats	39	15	26	14	5	1	-	-	-	-	-	-	-	-	-	-	-	-	204
Rye/triticale/Durum wheat	27	8	28	26	6	4	-	-	-	-	-	-	-	-	-	-	-	-	30
Potatoes (seed or earlies)	76	0	0	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
Potatoes (maincrop)	73	7	5	3	4	1	2	0	0	0	0	5	-	-	-	-	-	-	41
Sugar beet	30	35	25	4	4	1	-	-	-	-	-	-	-	-	-	-	-	-	82
Spring oilseed rape	11	0	0	70	0	18	-	-	-	-	-	-	-	-	-	-	-	-	6
Winter oilseed rape	21	5	15	19	24	11	2	1	2	0	0	1	-	-	-	-	-	-	216
Linseed	23	23	36	9	1	8	-	-	-	-	-	-	-	-	-	-	-	-	47
Forage maize	78	13	4	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	146
Rootcrops for stockfeed	76	13	7	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	49
Leafy forage crops	89	9	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32
Arable silage/other fodder crops	80	6	8	0	6	-	-	-	-	-	-	-	-	-	-	-	-	-	90
Peas - human consumption	81	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	34
Peas - animal consumption	87	1	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	31
Beans - animal consumption	95	1	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	206
Vegetables (brassicae)	37	15	0	0	48	-	-	-	-	-	-	-	-	-	-	-	-	-	8
Vegetables (other)	88	0	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32
Soft Fruit	55	28	0	0	0	4	0	0	13	-	-	-	-	-	-	-	-	-	14
Top Fruit	95	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16
Other tillage	79	11	2	3	1	4	0	0	1	0	1	-	-	-	-	-	-	-	59
All tillage	40	10	24	16	7	2	0	1	-	-	-	-	-	-	-	-	-	-	3493
Grass under 5 years old	73	11	5	6	2	3	-	-	-	-	-	-	-	-	-	-	-	-	687
Grass 5 years and over	88	6	4	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1969
All grass	86	7	4	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2656
All crops and grass	64	8	13	9	4	1	-	-	-	-	-	-	-	-	-	-	-	-	6149

Source: British Survey of Fertiliser Practice 2021

Table EW2.1 Average fertiliser practice by grassland utilisation, England & Wales 2021

	Crop area receiving dressing (%)					Average field rate (kg/ha)				Overall application rate (kg/ha)				Fields in sample
	N	P ₂ O ₅	K ₂ O	SO ₃	FYM	N	P ₂ O ₅	K ₂ O	SO ₃	N	P ₂ O ₅	K ₂ O	SO ₃	
Grazed not mown	42	26	26	9	20	68	16	18	28	28	4	5	3	1186
Grazed mown	73	42	46	22	62	99	23	33	38	72	9	15	8	1249
All grazings	53	31	33	14	35	84	19	26	34	44	6	9	5	2435
Cut for silage - grazed	80	44	49	24	68	107	24	36	38	86	11	18	9	863
Cut for silage - not grazed	86	27	43	15	78	142	26	49	44	123	7	21	7	141
All cut for silage	81	41	48	22	70	113	25	38	39	92	10	18	9	1004
Cut for hay - grazed	55	39	40	16	47	66	17	21	38	36	7	9	6	428
Cut for hay - not grazed	68	31	44	28	11	92	24	47	27	63	7	20	8	62
All cut for hay	57	38	41	17	43	70	18	25	36	40	7	10	6	490
All mowings	74	39	45	21	62	105	23	35	38	78	9	16	8	1449
All grass	55	31	34	14	37	88	20	28	34	48	6	9	5	2656

Source: British Survey of Fertiliser Practice 2021

Table EW2.2 Percentage of grass area by field application rate - Nitrogen, England & Wales 2021

row %	kg/ha																	Fields in sample	
	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-		400+
Grazed not mown	58	4	14	11	5	3	2	1	1	-	-	-	-	-	-	-	-	-	1186
Grazed mown	27	3	11	18	13	8	6	5	4	3	1	1	0	0	1	-	-	-	1249
All grazings	47	3	13	13	8	4	4	3	2	1	1	-	-	-	-	-	-	-	2435
Cut for silage - grazed	20	2	9	17	15	10	8	6	6	3	2	1	0	0	1	-	-	-	863
Cut for silage - not grazed	14	0	6	5	17	5	16	15	10	1	3	1	0	5	2	-	-	-	141
All cut for silage	19	2	9	15	15	9	10	7	6	3	2	1	0	1	1	-	-	-	1004
Cut for hay - grazed	45	5	14	19	9	1	1	3	0	1	-	-	-	-	-	-	-	-	428
Cut for hay - not grazed	32	1	11	7	26	7	14	0	2	0	1	-	-	-	-	-	-	-	62
All cut for hay	43	5	14	18	12	2	3	2	1	1	-	-	-	-	-	-	-	-	490
All mowings	26	3	10	16	14	7	8	6	5	2	2	1	0	1	1	-	-	-	1449
All grass	45	3	13	13	8	5	4	3	2	1	1	1	-	-	-	-	-	-	2656

Source: British Survey of Fertiliser Practice 2021

Table EW2.3 Percentage of grass area by field application rate - Phosphate, England & Wales 2021

row %	kg/ha																	Fields in sample	
	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-		400+
Grazed not mown	74	21	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1186
Grazed mown	58	26	12	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1249
All grazings	69	23	7	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2435
Cut for silage - grazed	56	25	14	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	863
Cut for silage - not grazed	73	20	3	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	141
All cut for silage	59	25	12	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1004
Cut for hay - grazed	61	30	8	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	428
Cut for hay - not grazed	69	18	12	0	0	0	0	1	-	-	-	-	-	-	-	-	-	-	62
All cut for hay	62	28	9	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	490
All mowings	61	25	11	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1449
All grass	69	22	7	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2656

Source: British Survey of Fertiliser Practice 2021

Table EW2.4 Percentage of grass area by field application rate - Potash, England & Wales 2021

row %	kg/ha																	Fields in sample	
	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-		400+
Grazed not mown	74	20	5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1186
Grazed mown	54	22	14	5	2	1	-	-	-	-	-	-	-	-	-	-	-	-	1249
All grazings	67	21	8	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-	2435
Cut for silage - grazed	51	21	16	6	3	2	-	-	-	-	-	-	-	-	-	-	-	-	863
Cut for silage - not grazed	57	16	4	12	8	2	-	-	-	-	-	-	-	-	-	-	-	-	141
All cut for silage	52	21	14	7	3	2	-	-	-	-	-	-	-	-	-	-	-	-	1004
Cut for hay - grazed	60	26	11	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	428
Cut for hay - not grazed	56	19	12	2	1	10	-	-	-	-	-	-	-	-	-	-	-	-	62
All cut for hay	59	25	11	2	0	1	-	-	-	-	-	-	-	-	-	-	-	-	490
All mowings	55	21	13	6	3	2	-	-	-	-	-	-	-	-	-	-	-	-	1449
All grass	66	20	8	3	1	1	-	-	-	-	-	-	-	-	-	-	-	-	2656

Source: British Survey of Fertiliser Practice 2021

Table EW2.5 Percentage of grass area by field application rate - Sulphur, England & Wales 2021

row %	kg/ha																	Fields in sample	
	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-		400+
Grazed not mown	91	5	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1186
Grazed mown	78	9	6	4	1	1	-	-	-	-	-	-	-	-	-	-	-	-	1249
All grazings	86	7	4	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2435
Cut for silage - grazed	76	9	8	4	1	1	-	-	-	-	-	-	-	-	-	-	-	-	863
Cut for silage - not grazed	85	2	8	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	141
All cut for silage	78	8	8	4	1	1	-	-	-	-	-	-	-	-	-	-	-	-	1004
Cut for hay - grazed	84	8	3	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-	428
Cut for hay - not grazed	72	18	8	0	2	-	-	-	-	-	-	-	-	-	-	-	-	-	62
All cut for hay	83	9	4	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-	490
All mowings	79	9	7	4	1	1	-	-	-	-	-	-	-	-	-	-	-	-	1449
All grass	86	7	4	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2656

Source: British Survey of Fertiliser Practice 2021

Table EW3.0 Product use by month of application, England & Wales 2021

(a) Product use

row %	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Straight N	0	0	0	0	0	6	33	38	15	5	2	1
Straight P	6	11	28	0	0	6	30	13	2	0	0	3
Straight K	3	1	16	1	1	10	45	17	5	1	0	1
Compounds	4	5	3	0	0	3	25	32	14	7	4	4
All fertilisers	1	2	2	0	0	5	31	35	14	5	2	2

(b) Nutrient use

row %	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Nitrogen	0	0	0	0	0	5	30	39	16	5	3	1
Phosphate	6	11	10	0	0	4	28	23	9	2	2	4
Potash	4	6	9	0	0	5	32	24	9	5	2	3
Sulphur	0	0	0	0	0	12	46	29	7	3	1	1
Total	1	2	2	0	0	6	32	34	13	5	2	2

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

'Product' refers to the total tonnage of the products used by the farmers in the survey year 2021.

'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 P₂O₅ and 10 kg of K₂O, 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.

Table EW3.1 Product type as percentage of all product used by crop group, England & Wales 2021

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	41.2	47.5	8.5	26.2	44.2	24.8	42.9	34.8	29.9	37.2	35.5	36.2	41.2
Urea	11.1	8.0	0.0	4.0	10.7	3.0	8.0	4.1	3.9	3.8	3.3	4.1	7.0
Calcium Ammonium Nitrate (CAN)	2.2	2.2	0.4	3.9	0.7	1.6	2.0	1.6	0.9	1.8	0.0	2.0	2.0
Urea Ammonium Nitrate (UAN)	17.2	20.1	6.4	8.5	24.1	8.6	18.4	3.5	7.4	2.8	6.4	3.3	14.6
Foliar Urea	2.1	1.5	0.0	2.0	1.0	6.0	1.9	0.3	0.0	0.4	0.0	0.2	1.5
Other Straight N	0.6	1.1	0.8	0.7	2.8	1.4	1.2	0.9	1.0	0.7	0.0	0.8	1.1
Triple Superphosphate (TSP)	2.1	2.7	1.3	2.2	2.0	2.7	2.5	0.5	0.7	0.7	0.0	0.6	2.0
Other Straight P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Muriate of Potash (MOP)	2.2	3.5	12.0	2.1	2.6	6.5	3.6	0.5	0.7	0.6	0.0	0.5	2.9
Other Straight K	0.4	0.4	1.8	18.1	0.9	2.3	1.0	0.3	0.4	0.2	3.1	0.2	0.8
PK	5.4	6.8	0.0	18.5	4.4	12.3	6.9	3.0	2.2	3.1	17.4	2.8	5.9
NK	0.2	0.4	8.7	1.1	0.5	2.3	0.8	4.9	3.1	9.0	0.0	6.4	2.2
Low N (<19% N)	5.7	2.2	56.5	10.0	5.0	20.0	5.9	3.3	3.0	2.7	6.2	3.1	5.2
High N (>=19% N)	9.4	0.0	3.2	2.5	1.0	7.5	4.5	42.5	46.7	36.9	28.1	39.7	13.3
Other	0.3	0.1	0.5	0.2	0.2	0.9	0.2	0.0	0.0	0.1	0.0	0.0	0.2
Total product ('000 tonnes)	327	1437	40	49	161	137	2151	703	85	452	3	803	2954

Source: British Survey of Fertiliser Practice 2021

Table EW3.2 Use of product type by crop group, England & Wales 2021

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	15.3	71.8	0.3	1.2	7.5	3.9	76.2	83.9	7.1	59.3	0.4	23.8	1234
Urea	15.2	71.6	0.0	0.7	10.0	2.4	83.4	79.4	8.7	55.0	0.5	16.6	202
Calcium Ammonium Nitrate (CAN)	19.3	65.5	0.3	6.5	2.7	5.7	64.6	85.0	4.3	76.0	0.0	35.4	53
Urea Ammonium Nitrate (UAN)	13.4	73.6	0.3	1.1	8.8	2.8	94.4	90.4	26.9	54.9	0.8	5.6	470
Foliar Urea	14.7	56.2	0.0	1.9	3.1	24.0	97.2	100.0	0.0	97.2	0.0	2.8	63
Other Straight N	5.7	61.7	0.6	1.4	21.0	9.7	78.3	99.6	4.4	32.4	0.0	21.7	31
Triple Superphosphate (TSP)	13.5	70.5	0.8	1.5	7.7	6.0	93.8	64.2	8.1	67.2	0.0	6.2	52
Other Straight P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Muriate of Potash (MOP)	10.4	65.2	4.2	1.8	7.7	10.7	94.0	48.5	40.9	54.2	0.0	6.0	67
Other Straight K	2.7	27.3	2.1	39.4	7.3	21.2	88.4	97.3	13.6	44.0	2.7	11.6	27
PK	14.1	64.4	0.0	6.2	5.0	10.2	91.3	93.6	6.6	54.5	7.2	8.7	151
NK	0.9	38.4	29.2	2.8	10.3	18.5	24.4	61.0	4.1	87.5	0.0	75.6	63
Low N (<19% N)	19.7	24.8	24.0	6.0	5.4	20.2	87.1	92.4	14.3	58.1	0.3	12.9	128
High N (>=19% N)	32.5	49.3	1.2	1.5	1.9	13.6	18.4	95.1	13.5	48.6	0.1	81.6	409
Other	31.8	29.8	3.6	2.5	4.7	27.5	84.8	100.0	0.0	100.0	0.0	15.2	4
All Fertilisers	15.2	66.8	1.9	2.3	7.5	6.4	72.8	87.5	10.5	56.3	0.4	27.2	2954

Source: British Survey of Fertiliser Practice 2021

Table EW3.3 Product use by month of application, England & Wales 2021

row %	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	total product ('000 tonnes)
Ammonium Nitrate	0.1	4.0	30.4	38.9	16.9	5.3	2.7	1.2	0.4	0.1	0.0	0.0	1234
Urea	0.0	10.4	40.2	34.6	10.7	2.3	0.7	0.8	0.4	0.0	0.0	0.0	202
Calcium Ammonium Nitrate (CAN)	0.0	2.9	25.8	34.1	23.0	3.0	4.8	4.3	2.0	0.3	0.0	0.0	53
Urea Ammonium Nitrate (UAN)	0.0	7.6	36.9	40.0	11.9	2.1	0.5	0.8	0.1	0.0	0.0	0.0	470
Foliar Urea	0.0	0.0	27.1	30.0	15.2	24.1	3.6	0.0	0.0	0.0	0.0	0.0	63
Other Straight N	0.0	19.4	38.6	24.2	7.0	1.2	5.2	4.4	0.0	0.0	0.0	0.0	31
Triple Superphosphate (TSP)	0.0	5.8	30.4	13.1	1.7	0.3	0.1	3.3	6.4	10.6	28.2	0.0	52
Other Straight P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Muriate of Potash (MOP)	0.0	7.8	42.3	17.3	5.1	0.6	0.1	1.1	4.5	0.5	20.7	0.0	67
Other Straight K	2.2	15.9	51.0	16.0	3.6	3.0	1.2	0.0	0.4	1.0	3.3	2.4	27
PK	0.2	4.6	25.0	8.1	3.1	0.2	1.4	8.3	14.5	22.9	11.5	0.2	151
NK	0.0	7.1	13.1	24.2	19.8	27.1	5.1	3.6	0.0	0.0	0.0	0.0	63
Low N (<19% N)	0.4	4.6	37.0	36.3	8.0	1.8	0.6	2.7	2.8	4.1	1.6	0.0	128
High N (>=19% N)	0.0	0.8	22.3	40.6	19.4	7.9	5.3	3.0	0.3	0.1	0.3	0.0	409
Other	0.0	23.5	28.3	35.0	7.7	2.9	0.2	0.1	0.2	0.0	2.2	0.0	4
All Fertilisers	0.1	5.0	31.0	35.4	14.3	5.1	2.4	1.9	1.4	1.6	1.7	0.0	2954

Source: British Survey of Fertiliser Practice 2021

Table EW4.1a Average fertiliser practice on tillage and grassland by GOR, England & Wales 2021

		Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
		N	P ₂ O ₅	K ₂ O	FYM	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
North West	All tillage	92	31	55	38	143	38	84	131	12	46	83
	All grass	63	39	44	47	105	18	32	66	7	14	321
	All crops and grass	66	38	46	46	111	20	39	73	8	18	404
North East	All tillage	91	60	58	20	185	57	63	169	35	36	122
	All grass	30	17	17	22	80	25	32	24	4	5	192
	All crops and grass	44	27	26	22	129	41	47	57	11	12	314
Eastern	All tillage	92	37	35	14	148	52	59	136	19	21	751
	All grass	35	8	8	3	77	18	26	27	1	2	111
	All crops and grass	85	34	32	13	144	51	58	122	17	18	862
Yorkshire and the Humber	All tillage	93	36	40	22	164	63	77	152	23	31	663
	All grass	56	34	35	49	83	19	24	46	7	9	339
	All crops and grass	77	36	38	33	140	46	57	108	16	22	1002
West Midlands	All tillage	90	19	29	37	159	56	81	143	11	24	316
	All grass	57	25	29	32	94	24	29	53	6	8	209
	All crops and grass	71	22	29	34	129	36	52	93	8	15	525
East Midlands	All tillage	85	29	31	18	154	50	53	131	15	17	569
	All grass	40	12	15	25	95	27	38	38	3	6	193
	All crops and grass	71	24	26	20	143	46	50	102	11	13	762
South West	All tillage	79	46	45	47	125	50	54	99	23	25	564
	All grass	53	30	32	44	88	19	28	47	6	9	699
	All crops and grass	62	36	37	45	104	33	39	64	12	14	1263
South East	All tillage	89	33	34	22	165	51	65	147	17	22	320
	All grass	42	17	17	23	85	29	38	36	5	6	165
	All crops and grass	71	27	27	23	148	46	59	105	12	16	485
Wales	All tillage	87	51	55	52	118	46	60	103	24	33	105
	All grass	70	49	52	39	77	17	22	54	9	11	427
	All crops and grass	72	49	52	40	81	20	25	58	10	13	532

Source: British Survey of Fertiliser Practice 2021

Table EW4.1b Average fertiliser practice on tillage and grassland by BSFP region, England & Wales 2021

		Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
		N	P ₂ O ₅	K ₂ O	FYM	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
Wessex	All tillage	77	41	39	44	123	50	53	95	20	21	330
	All grass	45	16	17	40	98	19	32	44	3	6	298
	All crops and grass	59	27	26	42	112	39	45	66	11	12	628
Anglia	All tillage	92	37	35	14	148	52	59	136	19	21	751
	All grass	35	8	8	3	77	18	26	27	1	2	111
	All crops and grass	85	34	32	13	144	51	58	122	17	18	862
Northern	All tillage	89	52	63	29	150	47	72	133	25	46	121
	All grass	52	34	38	40	93	18	29	49	6	11	403
	All crops and grass	56	35	40	39	102	22	36	57	8	14	524
North East	All tillage	93	38	41	22	166	63	75	154	24	31	709
	All grass	54	33	34	46	83	20	25	45	7	9	390
	All crops and grass	76	19	38	32	140	46	56	107	16	21	1099
North Mercia	All tillage	92	24	32	48	157	58	86	144	14	27	184
	All grass	64	27	33	42	111	25	36	71	7	12	185
	All crops and grass	72	26	33	44	129	34	51	93	9	17	369
South Mercia	All tillage	89	19	33	28	158	52	72	140	10	23	198
	All grass	45	21	26	17	75	19	29	34	4	8	98
	All crops and grass	69	19	30	23	134	36	55	93	7	16	296
East Midland	All tillage	85	29	31	18	154	50	53	131	15	17	569
	All grass	40	12	15	25	95	27	38	38	3	6	193
	All crops and grass	71	24	26	20	143	46	50	102	11	13	762
South East	All tillage	89	33	34	22	165	51	65	147	17	22	320
	All grass	42	17	17	23	85	29	38	36	5	6	165
	All crops and grass	71	27	27	23	148	46	59	105	12	16	485
South West	All tillage	83	66	65	54	126	51	58	104	34	38	206
	All grass	58	43	44	48	84	19	27	49	8	12	386
	All crops and grass	63	47	48	49	95	28	35	60	13	17	592
Wales	All tillage	87	51	55	52	118	46	60	103	24	33	105
	All grass	70	49	52	39	77	17	22	54	9	11	427
	All crops and grass	72	49	52	40	81	20	25	58	10	13	532

Source: British Survey of Fertiliser Practice 2021

Table SC1.1 Total fertiliser use, Scotland 2021

	Crop area receiving dressing (%)					Average field rate (kg/ha)				Overall application rate (kg/ha)				Fields in sample
	N	P ₂ O ₅	K ₂ O	SO ₃	FYM	N	P ₂ O ₅	K ₂ O	SO ₃	N	P ₂ O ₅	K ₂ O	SO ₃	
Winter wheat	98	77	77	74	25	155	56	78	66	152	43	60	49	71
Spring barley	98	96	96	53	42	95	50	64	35	93	48	62	19	181
Winter barley	96	76	90	69	69	133	48	66	56	128	37	59	39	40
Oats	73	58	58	26	49	93	47	62	48	67	27	36	12	45
Potatoes	100	94	75	69	21	131	122	212	-	131	114	158	-	9
Winter oilseed rape	96	82	72	84	24	156	55	72	62	150	45	52	52	25
Other crops	56	50	55	21	47	98	48	56	35	54	24	31	7	74
All tillage	92	84	84	55	41	112	53	69	48	103	44	58	26	445
Grass less than five years old	91	69	73	29	55	113	28	46	34	102	20	34	10	192
Grass five years and over	70	56	55	20	32	73	18	23	25	51	10	13	5	331
All grass	75	59	59	22	37	85	21	30	28	63	12	18	6	523
All crops and grass	81	68	68	33	38	95	34	46	39	77	23	31	13	968

Source: British Survey of Fertiliser Practice 2021

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

Table SC1.2 Use of straight fertiliser, Scotland 2021

	Crop area receiving dressing (%)			Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
Winter wheat	92	10	15	140	71	90	129	7	14	71
Spring barley	68	2	4	70	-	54	48	-	2	181
Winter barley	83	2	18	127	-	65	106	-	12	40
Oats	51	3	4	84	-	-	43	-	-	45
Potatoes	21	0	59	-	-	194	-	-	115	9
Winter oilseed rape	93	6	7	124	-	-	116	-	-	25
Other crops	26	10	15	106	50	67	27	5	10	74
All tillage	68	4	9	96	54	87	66	2	8	445
Grass less than five years old	42	0	4	85	-	103	36	-	4	192
Grass five years and over	20	0	0	74	-	-	15	-	-	331
All grass	26	0	1	78	-	108	20	-	1	523
All crops and grass	40	1	4	88	54	91	35	1	4	968

Source: British Survey of Fertiliser Practice 2021

Table SC1.3 Use of compound fertiliser, Scotland 2021

	Crop area receiving dressing (%)				Average field rate (kg/ha)				Overall application rate (kg/ha)				Fields in sample
	N	P ₂ O ₅	K ₂ O	SO ₃	N	P ₂ O ₅	K ₂ O	SO ₃	N	P ₂ O ₅	K ₂ O	SO ₃	
Winter wheat	41	68	64	26	56	53	72	48	23	36	46	12	71
Spring barley	91	94	92	39	50	50	64	26	45	48	59	10	181
Winter barley	49	74	74	35	45	48	64	42	22	36	47	15	40
Oats	42	57	57	16	58	46	59	32	24	26	34	5	45
Potatoes	94	94	28	24	118	122	-	-	111	114	-	-	9
Winter oilseed rape	76	76	68	40	45	57	70	41	35	43	48	16	25
Other crops	37	40	40	9	73	48	53	28	27	19	21	3	74
All tillage	71	80	77	32	53	52	65	32	38	42	50	10	445
Grass less than five years old	70	69	72	22	94	28	42	29	66	20	30	6	192
Grass five years and over	55	56	55	13	66	18	22	19	36	10	12	2	331
All grass	59	59	59	15	74	21	28	23	43	12	16	3	523
All crops and grass	63	66	65	21	66	34	43	27	41	22	28	6	968

Source: British Survey of Fertiliser Practice 2021

Table SC1.4 Use of lime, Scotland 2021

	Crop area receiving dressing (%)						Average application rate (tonnes of product/ha)						Fields limed	Fields in sample
	Limestone (ground, screened)	Chalk	Magnesian limestone	Sugar beet lime	Other	All	Limestone (ground, screened)	Chalk	Magnesian limestone	Sugar beet lime	Other	All		
Winter wheat	16.1	-	5.0	-	-	21.1	4.1	-	5.0	-	-	4.3	11	71
Spring barley	15.5	-	6.5	-	2.7	24.8	3.9	-	3.9	-	0.5	3.6	42	181
Winter barley	35.9	-	6.9	-	-	42.8	4.4	-	4.3	-	-	4.4	15	40
Oats	4.9	-	-	-	-	4.9	5.1	-	-	-	-	5.1	5	45
Potatoes	-	-	-	-	-	-	-	-	-	-	-	-	0	9
Winter oilseed rape	-	-	-	-	-	-	-	-	-	-	-	-	4	25
Other crops	18.8	-	1.5	-	-	20.3	4.5	-	5.0	-	-	4.6	12	74
All tillage	15.9	-	5.1	-	1.5	22.4	4.1	-	4.1	-	0.5	3.9	89	445
Grass less than five years old	16.4	-	1.6	-	-	18.0	3.8	-	5.7	-	-	3.9	35	192
Grass five years and over	4.6	-	0.2	-	1.2	5.9	4.3	-	2.5	-	1.4	3.7	28	331
All grass	7.4	-	0.5	-	0.9	8.8	4.0	-	4.9	-	1.4	3.8	63	523
All crops and grass	10.3	-	2.1	-	1.1	13.4	4.1	-	4.3	-	1.0	3.9	152	968

Table SC1.5 Percentage of crop area by field application rate - Nitrogen, Scotland 2021

row %	kg/ha																	Fields in sample	
	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-		400+
Winter wheat	2	2	0	4	2	8	31	13	21	13	5	-	-	-	-	-	-	-	71
Spring barley	2	3	10	13	22	34	11	5	-	-	-	-	-	-	-	-	-	-	181
Winter barley	4	9	0	2	16	7	13	26	15	8	-	-	-	-	-	-	-	-	40
Oats	27	0	10	10	19	13	19	-	-	-	-	-	-	-	-	-	-	-	45
Potatoes	0	0	0	21	23	0	15	6	13	21	-	-	-	-	-	-	-	-	9
Winter oilseed rape	4	0	0	11	28	5	0	7	7	16	15	8	-	-	-	-	-	-	25
Other crops	44	2	8	6	6	14	17	1	1	-	-	-	-	-	-	-	-	-	74
All tillage	8	3	7	10	17	22	15	7	5	4	2	-	-	-	-	-	-	-	445
Grass less than five years old	9	3	10	18	13	14	9	9	6	4	3	3	-	-	-	-	-	-	192
Grass five years and over	30	4	18	22	8	8	6	1	2	1	-	-	-	-	-	-	-	-	331
All grass	25	4	16	21	9	9	6	3	3	2	1	1	-	-	-	-	-	-	523
All crops and grass	19	3	13	18	12	13	9	4	4	2	1	1	-	-	-	-	-	-	968

Source: British Survey of Fertiliser Practice 2021

Table SC1.6 Percentage of crop area by field application rate - Phosphate, Scotland 2021

row %	kg/ha																	Fields in sample	
	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-		400+
Winter wheat	23	7	19	37	8	6	0	1	-	-	-	-	-	-	-	-	-	-	71
Spring barley	4	12	31	42	11	-	-	-	-	-	-	-	-	-	-	-	-	-	181
Winter barley	24	13	20	29	15	-	-	-	-	-	-	-	-	-	-	-	-	-	40
Oats	42	15	16	18	8	2	-	-	-	-	-	-	-	-	-	-	-	-	45
Potatoes	6	0	13	0	36	0	0	25	10	9	-	-	-	-	-	-	-	-	9
Winter oilseed rape	18	6	16	47	5	8	-	-	-	-	-	-	-	-	-	-	-	-	25
Other crops	50	20	7	14	5	0	4	-	-	-	-	-	-	-	-	-	-	-	74
All tillage	16	11	24	35	10	1	0	1	-	-	-	-	-	-	-	-	-	-	445
Grass less than five years old	31	33	28	6	1	-	-	-	-	-	-	-	-	-	-	-	-	-	192
Grass five years and over	44	42	12	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	331
All grass	41	40	15	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	523
All crops and grass	32	30	18	14	4	1	-	-	-	-	-	-	-	-	-	-	-	-	968

Source: British Survey of Fertiliser Practice 2021

Table SC1.7 Percentage of crop area by field application rate - Potash, Scotland 2021

row %	kg/ha																	Fields in sample	
	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-		400+
Winter wheat	23	3	16	19	16	12	9	0	1	-	-	-	-	-	-	-	-	-	71
Spring barley	4	6	18	33	34	5	-	-	-	-	-	-	-	-	-	-	-	-	181
Winter barley	10	18	1	28	39	4	-	-	-	-	-	-	-	-	-	-	-	-	40
Oats	42	6	9	23	15	3	2	-	-	-	-	-	-	-	-	-	-	-	45
Potatoes	25	0	0	0	0	9	0	13	15	0	16	0	21	-	-	-	-	-	9
Winter oilseed rape	28	0	15	18	36	0	3	-	-	-	-	-	-	-	-	-	-	-	25
Other crops	45	16	8	15	6	5	5	-	-	-	-	-	-	-	-	-	-	-	74
All tillage	16	7	14	27	27	6	2	0	1	-	-	-	-	-	-	-	-	-	445
Grass less than five years old	27	24	23	14	5	4	2	1	-	-	-	-	-	-	-	-	-	-	192
Grass five years and over	45	35	15	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	331
All grass	41	32	17	6	2	1	1	-	-	-	-	-	-	-	-	-	-	-	523
All crops and grass	32	24	16	13	10	3	1	-	-	-	-	-	-	-	-	-	-	-	968

Source: British Survey of Fertiliser Practice 2021

Table SC1.8 Percentage of crop area by field application rate - Sulphur, Scotland 2021

row %	kg/ha																	Fields in sample	
	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-		400+
Winter wheat	26	2	14	34	19	0	1	3	-	-	-	-	-	-	-	-	-	-	71
Spring barley	47	24	22	4	2	0	2	-	-	-	-	-	-	-	-	-	-	-	181
Winter barley	31	7	29	22	4	4	3	-	-	-	-	-	-	-	-	-	-	-	40
Oats	74	1	18	4	3	-	-	-	-	-	-	-	-	-	-	-	-	-	45
Potatoes	31	0	35	13	0	0	0	21	-	-	-	-	-	-	-	-	-	-	9
Winter oilseed rape	16	5	42	15	6	8	8	-	-	-	-	-	-	-	-	-	-	-	25
Other crops	79	8	9	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	74
All tillage	45	15	21	11	5	1	2	1	-	-	-	-	-	-	-	-	-	-	445
Grass less than five years old	71	10	12	6	1	-	-	-	-	-	-	-	-	-	-	-	-	-	192
Grass five years and over	80	12	5	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	331
All grass	78	12	7	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	523
All crops and grass	67	13	12	5	3	0	1	-	-	-	-	-	-	-	-	-	-	-	968

Source: British Survey of Fertiliser Practice 2021

Table SC2.1 Average fertiliser practice by grassland utilisation, Scotland 2021

	Crop area receiving dressing (%)					Average field rate (kg/ha)				Overall application rate (kg/ha)				Fields in sample
	N	P ₂ O ₅	K ₂ O	SO ₃	FYM	N	P ₂ O ₅	K ₂ O	SO ₃	N	P ₂ O ₅	K ₂ O	SO ₃	
Grazed not mown	66	53	52	16	24	63	15	18	17	41	8	9	3	262
Grazed mown	93	70	74	36	66	113	30	45	39	105	21	33	14	242
All grazings	74	58	59	22	36	82	20	28	28	61	12	17	6	504
Cut for silage - grazed	95	70	74	38	68	115	31	46	39	109	22	34	15	199
Cut for silage - not grazed	100	99	81	24	82	153	31	60	-	153	31	49	-	13
All cut for silage	95	72	75	36	69	119	31	48	38	113	22	35	14	212
Cut for hay - grazed	82	72	73	19	42	92	24	36	45	75	17	26	9	45
Cut for hay - not grazed	98	79	98	20	11	112	39	63	-	109	31	61	-	7
All cut for hay	84	73	76	19	37	95	26	41	50	80	19	31	9	52
All mowings	94	72	74	35	66	116	30	47	39	109	22	35	14	261
All grass	75	59	59	22	37	85	21	30	28	63	12	18	6	523

Source: British Survey of Fertiliser Practice 2021

Table SC2.2 Percentage of grass area by field application rate - Nitrogen, Scotland 2021

row %	kg/ha																	Fields in sample	
	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-		400+
Grazed not mown	34	5	21	22	6	6	4	-	-	-	-	-	-	-	-	-	-	-	262
Grazed mown	7	1	7	19	17	16	11	8	8	4	2	-	-	-	-	-	-	-	242
All grazings	26	4	17	21	9	9	6	3	3	2	1	-	-	-	-	-	-	-	504
Cut for silage - grazed	5	0	7	19	16	16	11	8	9	5	3	-	-	-	-	-	-	-	199
Cut for silage - not grazed	0	0	1	25	1	14	18	0	13	2	8	18	-	-	-	-	-	-	13
All cut for silage	5	0	7	19	15	16	11	8	9	4	3	2	-	-	-	-	-	-	212
Cut for hay - grazed	18	3	5	17	22	13	19	2	1	-	-	-	-	-	-	-	-	-	45
Cut for hay - not grazed	2	0	0	11	34	0	33	2	18	-	-	-	-	-	-	-	-	-	7
All cut for hay	16	3	4	16	23	11	21	2	4	-	-	-	-	-	-	-	-	-	52
All mowings	6	0	6	19	16	16	12	7	9	4	3	2	-	-	-	-	-	-	261
All grass	25	4	16	21	9	9	6	3	3	2	1	1	-	-	-	-	-	-	523

Source: British Survey of Fertiliser Practice 2021

Table SC2.3 Percentage of grass area by field application rate - Phosphate, Scotland 2021

row %	kg/ha																	Fields in sample	
	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-		400+
Grazed not mown	47	45	7	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	262
Grazed mown	30	28	35	4	2	-	-	-	-	-	-	-	-	-	-	-	-	-	242
All grazings	42	40	15	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	504
Cut for silage - grazed	30	27	36	4	2	-	-	-	-	-	-	-	-	-	-	-	-	-	199
Cut for silage - not grazed	1	59	14	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13
All cut for silage	28	30	34	6	2	-	-	-	-	-	-	-	-	-	-	-	-	-	212
Cut for hay - grazed	28	35	35	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	45
Cut for hay - not grazed	21	11	36	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7
All cut for hay	27	32	35	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	52
All mowings	28	30	34	6	2	-	-	-	-	-	-	-	-	-	-	-	-	-	261
All grass	41	40	15	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	523

Source: British Survey of Fertiliser Practice 2021

Table SC2.4 Percentage of grass area by field application rate - Potash, Scotland 2021

row %	kg/ha																	Fields in sample	
	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-		400+
Grazed not mown	48	40	11	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	262
Grazed mown	26	18	30	14	5	3	2	1	-	-	-	-	-	-	-	-	-	-	242
All grazings	41	33	17	5	2	1	-	-	-	-	-	-	-	-	-	-	-	-	504
Cut for silage - grazed	26	19	30	14	6	3	2	1	-	-	-	-	-	-	-	-	-	-	199
Cut for silage - not grazed	19	2	15	54	9	-	-	-	-	-	-	-	-	-	-	-	-	-	13
All cut for silage	25	17	28	18	6	3	2	1	-	-	-	-	-	-	-	-	-	-	212
Cut for hay - grazed	27	17	40	12	2	0	0	1	-	-	-	-	-	-	-	-	-	-	45
Cut for hay - not grazed	2	11	36	33	0	0	18	-	-	-	-	-	-	-	-	-	-	-	7
All cut for hay	24	16	39	15	2	0	3	1	-	-	-	-	-	-	-	-	-	-	52
All mowings	26	17	29	17	6	2	2	1	-	-	-	-	-	-	-	-	-	-	261
All grass	41	32	17	6	2	1	1	-	-	-	-	-	-	-	-	-	-	-	523

Source: British Survey of Fertiliser Practice 2021

Table SC2.5 Percentage of grass area by field application rate - Sulphur, Scotland 2021

row %	kg/ha																Fields in sample		
	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-		375-	400+
Grazed not mown	84	13	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	262
Grazed mown	64	9	16	7	4	1	-	-	-	-	-	-	-	-	-	-	-	-	242
All grazings	78	12	6	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	504
Cut for silage - grazed	62	10	16	8	4	-	-	-	-	-	-	-	-	-	-	-	-	-	199
Cut for silage - not grazed	76	0	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13
All cut for silage	64	9	17	7	4	-	-	-	-	-	-	-	-	-	-	-	-	-	212
Cut for hay - grazed	81	5	10	1	0	3	-	-	-	-	-	-	-	-	-	-	-	-	45
Cut for hay - not grazed	80	0	2	0	18	-	-	-	-	-	-	-	-	-	-	-	-	-	7
All cut for hay	81	4	9	1	3	3	-	-	-	-	-	-	-	-	-	-	-	-	52
All mowings	65	8	16	6	4	1	-	-	-	-	-	-	-	-	-	-	-	-	261
All grass	78	12	7	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	523

Source: British Survey of Fertiliser Practice 2021

Table SC3.0 Product use by month of application, Scotland 2021

(a) Product use

row %	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Straight N	0	0	0	0	0	2	18	47	21	7	3	2
Straight P	12	2	0	0	0	0	44	22	10	7	0	3
Straight K	0	0	0	0	0	0	23	38	27	9	0	3
Compounds	2	2	0	0	0	1	23	38	18	9	5	2
All fertilisers	1	1	0	0	0	1	21	41	19	9	4	2

(b) Nutrient use

row %	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Nitrogen	0	0	0	0	0	1	18	42	21	10	5	2
Phosphate	3	4	0	0	0	1	29	38	13	6	3	2
Potash	2	3	0	0	0	1	30	37	15	7	3	2
Sulphur	0	1	0	0	0	3	36	35	15	5	3	2
Total	1	2	0	0	0	1	24	40	18	8	4	2

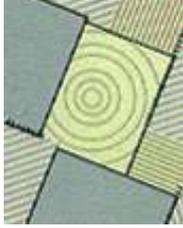
Note: All fertilisers includes other straight fertilisers (e.g. trace elements)

'Product' refers to the total tonnage of the products used by the farmers in the survey year 2021.

'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 P₂O₅ and 10 kg of K₂O, 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.



SECTION D

USE OF ORGANIC MANURES – GREAT BRITAIN, 2021

Introduction

Whilst the BSFP has focussed historically on the application of manufactured fertilisers, in the last 14 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, users should note 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 1,310 farms in the 2021 Survey, 898 used organic manures on at least one field on the farm, representing 65% of the Survey population. The details are shown in Table D1.1a.

Table D1.1a Numbers and percentage (%) of farms using each type of manure in Great Britain, 2021

	<i>none</i>	<i>cattle FYM</i>	<i>cattle slurry</i>	<i>pig FYM</i>	<i>pig slurry</i>	<i>layer manure</i>	<i>broiler/turkey litter</i>	<i>other FYM</i>	<i>other farm</i>	<i>bio-solids</i>	<i>other non-farm</i>	<i>total with manure</i>
Farms in sample	412	662	260	33	15	20	46	61	8	39	45	898
Farms in population	31,210	43,588	15,654	1,155	756	731	2,321	4,940	454	1,310	2,341	57,788
Farms in population %	35%	49%	18%	1%	1%	1%	3%	6%	1%	1%	3%	65%
Volume (Mt; Mm ³)	n/a	38.0	50.7	2.1	1.9	0.4	0.8	2.1	0.6	3.4	4.0	104.0
Volume %	n/a	37%	49%	2%	2%	0%	1%	2%	1%	3%	4%	100%

Note: some farmers may use more than one type of manure. Mt; Mm³ are Million tonnes and cubic metres.

Table D1.1b Percentage (%) of farms using each type of manure in Great Britain, 2017 – 2021

	<i>none</i>	<i>cattle FYM</i>	<i>cattle slurry</i>	<i>pig FYM</i>	<i>pig slurry</i>	<i>layer manure</i>	<i>broiler/turkey litter</i>	<i>other FYM</i>	<i>other</i>
<i>2017</i>	37.0	47.0	16.0	2.0	1.0	1.0	1.0	5.0	4.0
<i>2018</i>	32.0	50.7	17.0	1.7	0.4	1.3	1.5	6.7	4.2
<i>2019</i>	33.0	50.4	17.3	1.8	0.4	1.3	2.1	6.3	4.5
<i>2020</i>	35.0	49.0	16.4	2.0	0.4	0.8	2.4	5.7	4.8
<i>2021</i>	35.1	49.0	17.6	1.3	0.8	0.8	2.6	5.6	4.4

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 2021 being 49% and 18% of farms, respectively.



Table D1.1c Dressing cover of organic manure in Great Britain, 2017 - 2021

	<i>all tillage</i>	<i>grass 5 years and over</i>	<i>grass under 5 years old</i>
2017	25	31	46
2018	27	33	52
2019	26	35	47
2020	25	32	51
2021	26	34	55

Dressing cover of organic manure on tillage has averaged 26% in the five-year period 2017-2021. The proportion of grass receiving a dressing of manure is higher for both categories, at 34% of grass 5 years and over and 55% on grass under 5 years old in 2021.

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. Up to 2013 BSFP, the report included data on the quantities of manure which were imported onto farm or exported from farms and the number of farms involved. However, these were all consistently very low and led to the conclusion that this activity was too small to be of significance or to provide robust data and collection of these data was discontinued (see 2013 BSFP report, Tables D1.2, D1.3a&b)¹⁰.

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

Table D1.2 Number and percentage (%) of tillage farms using each type of application method by slurry type, Great Britain 2021

	<i>percentage of tillage farms</i>								
	<i>farms in sample</i>	<i>farms in population</i>	<i>broadcast</i>	<i>band spread</i>	<i>shallow injection</i>	<i>deep injection</i>	<i>rain gun</i>	<i>rotating boom</i>	<i>non-broadcast</i>
Cattle slurry	260	15,654	77	23	6	1	1	0	30
Pig slurry	15	756	69	16	9	0	15	0	38
Grand Total	273	16,273	77	23	6	1	1	0	30

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

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

¹⁰ <https://www.gov.uk/government/collections/fertiliser-usage>

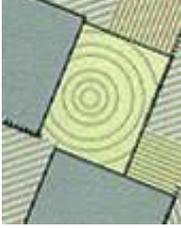


Table D1.3 gives estimates of the volume and area of manure/slurry incorporation on tillage fields by manure type and immediacy of incorporation. Farmyard manure is the most extensively incorporated at 96% of the volume with 89% of it incorporated within a week of spreading on tillage fields. Cattle slurry makes up 96% of all slurry volume (Table D2.3a) and 91% of cattle slurry was applied to grassland. Of the balance, the majority of cattle slurry applied to tillage fields is applied to spring-sown crops (Table D2.4). Data on pig slurry need to be treated with caution due to the relatively low number of farms using manure of this type. Table D2.3a suggests that pig slurry was effectively all applied to arable land, principally to winter sown crops.

Table D1.3 Percentage (%) of organic manure incorporated (volume and area) on tillage fields by incorporation time and manure/slurry type, Great Britain 2021

	<i>incorporation time after spreading</i>										<i>total</i>	
	<i>not incorporated</i>		<i>within 6 hours</i>		<i>between 6 and 24 hours</i>		<i>between 1 and 7 days</i>		<i>more than 1 week</i>		<i>applied area</i>	<i>volume applied</i>
	<i>%area</i>	<i>%vol</i>	<i>%area</i>	<i>%vol</i>	<i>%area</i>	<i>%vol</i>	<i>%area</i>	<i>%vol</i>	<i>%area</i>	<i>%vol</i>	<i>'000 ha</i>	<i>'Mt; Mm³</i>
FYM	5	4	21	20	30	31	36	38	8	7	778	18.5
Cattle slurry	34	31	15	12	21	19	18	21	11	17	139	4.8
Pig slurry	43	64	24	13	27	13	4	5	3	7	60	1.6
Poultry FYM	2	2	21	16	34	36	15	14	27	32	140	1.0
Other	16	23	47	43	12	14	14	11	10	9	268	6.4
Total	12	15	26	23	26	25	26	28	10	10	1,385	32.2

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 29% in 2021. Where contractors were used, they applied between 85% and 95% of the manure on average.

Table D1.4a Use of contractors to spread manure/slurry in current season, Great Britain 2021

	<i>% of farms using a contractor</i>	<i>% volume applied by contractor</i>	<i>average % of contractor-applied manure, where contractor is used</i>
FYM	32	26	85
Cattle slurry	24	24	87
Other	51	52	95
Total	29	28	88

Use of contractors to spread manures is fairly consistent over the 5-year period 2017-2021, with an average of 30% of farms (Table 1.4b) spreading an average amount of 90%.

Table D1.4b Use of contractors to spread manure/slurry, Great Britain 2017 - 2021

	<i>% of farms using a contractor</i>	<i>% volume applied by contractor</i>	<i>average % of contractor-applied manure, where contractor is used</i>
2017	33	30	92
2018	30	30	90
2019	30	29	90
2020	27	27	90
2021	29	28	88

Historical note: Over four seasons between 2015 and 2019, excluding 2017, the Survey collected data on the periods of storage, and the months of establishment and spreading of manure stored in field heaps. The results seen from these data were considered to be sufficiently indicative of the timings and use of outdoor manure storage that they provided adequate information without the need for continuing collection of these data. The results are available in the relevant previous editions of the Survey¹¹

¹¹ <https://www.gov.uk/government/collections/fertiliser-usage>



D2 USE OF ORGANIC MANURES

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

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

The proportion of the sown area, of all crops, including grassland, 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 2017 - 2021

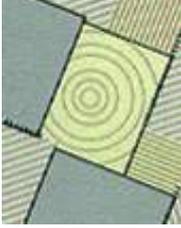
	<i>cattle FYM</i>	<i>cattle slurry</i>	<i>pig FYM</i>	<i>pig slurry</i>	<i>layer hen manure</i>	<i>broiler/turkey litter</i>	<i>other FYM</i>	<i>other farm</i>	<i>bio-solids</i>	<i>other non-farm</i>
2017	16	8.2	0.7	0.4	0.7	0.6	0.8	0.3	1.3	0.6
2018	17	8.9	0.6	0.2	0.6	0.7	1.4	0.1	1.2	1.3
2019	17	8.6	0.9	0.1	0.7	1.0	1.3	0.1	1.2	1.3
2020	15	8.3	0.7	0.2	0.6	0.9	1.1	0.1	1.6	1.3
2021	16	9.3	0.7	0.5	0.4	1.0	1.1	0.1	1.3	1.4

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 2017 – 2021

	<i>cattle FYM</i>	<i>cattle slurry</i>	<i>pig FYM</i>	<i>pig slurry</i>	<i>layer hen manure</i>	<i>broiler/turkey litter</i>	<i>other FYM</i>	<i>other farm</i>	<i>bio-solids</i>	<i>other non-farm</i>
2017	57	30	2.5	1.6	2.4	2.1	3.0	1.0	4.7	2.2
2018	57	30	2.1	0.6	2.0	2.2	4.6	0.4	4.0	4.3
2019	57	29	2.9	0.4	2.3	3.5	4.4	0.2	4.1	4.5
2020	55	30	2.5	0.6	2.0	3.1	3.9	0.2	5.6	4.5
2021	55	31	2.3	1.7	1.2	3.5	3.8	0.5	4.5	4.6

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



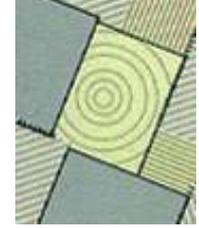
The percentage of the sown area receiving an application of cattle FYM in 2021 was 16%, which is the same as the five-year average (16%).

The levels of nutrient in organic manures vary according to which type of manure is being applied as well as factors such as the size, age, gender, and market for the animals being farmed. Furthermore, the concentration of nutrients is dependent on the proportion of bedding, the length of time that the manure has been stored and, in the case of slurries particularly, diluting factors such as rainwater or dirty water which affect the proportion of dry matter. The BSFP 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 types¹²

	<i>dry matter (%)</i>	<i>total N (kg/t; kg/m³)</i>	<i>total P₂O₅ (kg/t; kg/m³)</i>	<i>total K₂O (kg/t; kg/m³)</i>
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	12	15
Poultry litter	60	28	17	21
Cattle slurry	6.0	2.6	1.2	2.5
Pig slurry	4.0	3.6	1.5	2.2
Biosolids: Digested cake	25	11	11	0.6
Biosolids: Thermally dried	95	40	55	2.0
Biosolids: Lime stabilised	25	8.5	7.0	0.8
Biosolids: Composted	40	11	10	3.0
Compost-green	60	7.5	3.0	6.8
Compost-green/food	60	11	4.9	8.0

¹²Anon. (2018). Nutrient Management Guide (RB209). Agriculture and Horticulture Development Board (AHDB). <https://ahdb.org.uk/nutrient-management-guide-rb209>



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 2021

	<i>cattle FYM</i>	<i>cattle slurry</i>	<i>pig FYM</i>	<i>pig slurry</i>	<i>layer manure</i>	<i>broiler/turkey litter</i>	<i>other FYM</i>	<i>other farm manure</i>	<i>bio-solids</i>	<i>other non-farm</i>
Winter sown										
Treated area %	10.9	1.1	1.3	1.7	1.1	2.8	0.8	-	3.2	2.6
Treated area (ha)	296,500	30,827	35,029	45,694	29,682	77,407	22,078	-	87,827	69,816
Avg manure rate (t; m ³ /ha)	22	28	22	30	10	6	16	-	22	29
Volume (Mt; Mm ³)	6.6	0.9	0.8	1.4	0.3	0.5	0.4	-	1.9	2.0
Fields in sample	308	38	34	23	20	42	15	3	49	50
Spring sown										
Treated area %	20.3	5.9	1.7	0.8	0.3	1.5	0.9	-	2.7	2.9
Treated area (ha)	373,273	108,224	31,861	14,598	5,746	26,959	17,300	-	50,260	52,647
Avg manure rate (t; m ³ /ha)	24	36	41	15	7	8	24	-	24	18
Volume (Mt; Mm ³)	9.0	3.9	1.3	0.2	0.0	0.2	0.4	-	1.2	1.0
Fields in sample	400	84	33	7	10	27	15	0	17	32
Grass										
Treated area %	24.7	30.0	0.1	0.4	0.1	0.4	1.9	0.2	0.3	0.7
Treated area (ha)	1,390,070	1,689,788	8,082	23,427	5,363	20,021	109,837	12,715	15,495	37,932
Avg manure rate (t; m ³ /ha)	16	27	7	13	8	6	12	30	18	24
Volume (Mt; Mm ³)	22.2	46.0	0.1	0.3	0.0	0.1	1.3	0.4	0.3	0.9
Fields in sample	715	533	12	23	7	14	52	8	5	14

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

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, whilst non-farm manures such as biosolids appear to be favoured on winter-sown tillage land it is notable that a proportion was applied to spring-sown tillage and a small volume on grass in 2021. Overall, the profile of the % treated area and average manure rates are broadly similar to those reported for 2020.

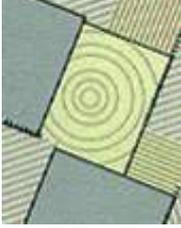


Table D2.3b shows a breakdown of the cattle FYM applications by robust farm type. Cereal farms have the most extensive treatments of cattle FYM on winter sown crops at 35.8% of the treated area. On grass 75.9% of the area treated with cattle FYM is on 'Other Livestock' robust classification farms. The time of year when manure was applied is shown in Table D2.4 as a proportion of fields receiving manure applications. Once again, the crops have been classified as either "winter sown", "spring sown" or "grass". This segmentation highlights the prevalence of applications in August and September for winter- sown crops (prior to drilling), or between February and April for spring-sown and grass fields, with treatments in the summer months (May to July) also important for the latter. When comparing percentage values of different manures, it is important to recognise the very different quantities involved, as indicated by the percentages of treated areas at the foot of the table.

Table D2.3b Cattle FYM treated areas and average manure field application rates to winter-sown and spring-sown crops and grassland by farm type, Great Britain 2021

Cattle FYM	<i>Cereals</i>	<i>Dairy</i>	<i>General cropping</i>	<i>Mixed</i>	<i>Other livestock</i>	<i>All farm types</i>
Winter sown						
Treated area %	35.8	9.8	16.0	24.9	13.4	100.0
Treated area (ha)	106,169	29,084	47,395	73,884	39,708	296,500
Avg manure rate (t; m ³ /ha)	22	22	21	23	24	22
Volume (Mt; Mm ³)	2.3	0.6	1.0	1.7	1.0	6.6
Fields in sample	91	41	37	84	54	308
Spring sown						
Treated area %	19.6	18.7	16.5	25.4	19.5	100.0
Treated area (ha)	73,156	69,698	61,499	94,992	72,736	373,273
Avg manure rate (t; m ³ /ha)	24	26	21	23	25	24
Volume (Mt; Mm ³)	1.8	1.8	1.3	2.2	1.8	9.0
Fields in sample	55	81	50	91	121	400
Grass						
Treated area %	1.0	10.8	5.0	7.1	75.9	100.0
Treated area (ha)	14,531	150,492	69,711	98,067	1,054,711	1,390,070
Avg manure rate (t; m ³ /ha)	17	17	19	19	15	16
Volume (Mt; Mm ³)	0.2	2.5	1.3	1.9	16.2	22.2
Fields in sample	12	79	30	54	536	715

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.

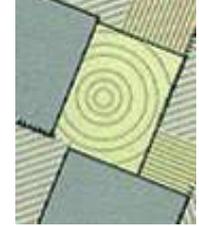


Table D2.4 Percentage (%) of each organic manure type applied by sowing season and timing, Great Britain 2021

	<i>cattle FYM</i>	<i>cattle slurry</i>	<i>pig FYM</i>	<i>pig slurry</i>	<i>layer manure</i>	<i>broiler/ turkey litter</i>	<i>other FYM</i>	<i>other farm manure</i>	<i>bio-solids</i>	<i>other non-farm</i>
Winter sown										
August	1.8	0.5	8.4	0.3	11.7	9.8	4.3	10.0	8.9	6.2
September	9.1	1.0	21.0	9.1	45.7	36.9	9.9	0.0	29.8	13.5
October	3.0	0.2	7.0	17.5	15.4	8.2	0.9	8.0	6.6	4.1
Winter (Nov, Dec, Jan)	0.1	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7
Spring (Feb, Mar, Apr)	0.5	0.2	0.0	23.7	0.0	6.1	2.0	4.6	1.3	20.5
Summer (May, Jun, Jul)	0.3	0.0	8.2	5.3	0.0	1.3	0.0	0.0	10.6	0.2
Spring sown										
August	0.1	0.7	0.5	0.0	0.0	1.0	0.0	0.0	0.0	1.8
September	0.9	0.3	2.0	0.0	0.7	0.0	0.3	0.0	1.4	0.0
October	0.1	0.2	0.6	0.0	0.0	1.7	0.0	0.0	0.0	3.4
Winter (Nov, Dec, Jan)	1.9	0.2	0.0	0.0	0.0	0.0	1.9	0.0	0.0	2.3
Spring (Feb, Mar, Apr)	13.8	3.7	38.3	11.2	12.0	18.0	10.9	0.0	29.6	22.7
Summer (May, Jun, Jul)	1.5	1.1	1.1	7.4	1.5	1.0	0.3	0.0	1.8	0.2
Grass										
August	5.5	7.3	0.0	0.0	0.4	0.0	6.1	0.0	1.9	2.3
September	4.7	3.6	0.0	0.0	0.0	0.0	15.5	0.0	0.0	0.0
October	5.3	1.9	4.7	0.0	0.0	0.0	11.6	0.0	0.0	0.0
Winter (Nov, Dec, Jan)	7.5	5.7	0.0	0.0	0.0	5.0	6.8	13.6	0.0	1.4
Spring (Feb, Mar, Apr)	33.0	41.4	0.0	6.8	0.0	7.1	18.7	34.9	3.7	16.9
Summer (May, Jun, Jul)	10.9	31.8	6.0	18.7	12.7	4.0	10.9	28.8	4.5	4.0
% of total treated area	46.3	35.8	1.7	1.8	0.9	2.9	3.0	0.4	3.6	3.6

Figure D2.1 Percentage (%) of treated GB areas receiving manure by manure type (3 year average 2019-2021) (an indication of relative quantities)

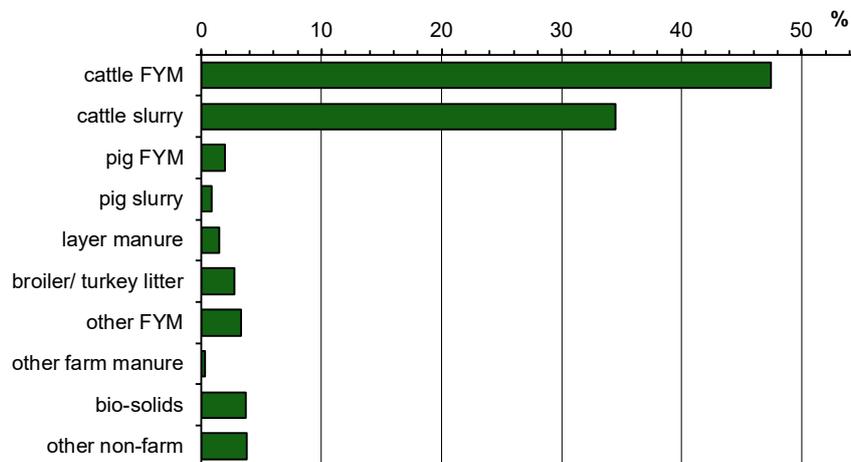


Figure D2.1 shows that cattle FYM and slurry form the overwhelming majority of British area of crops and grass receiving organic manures.

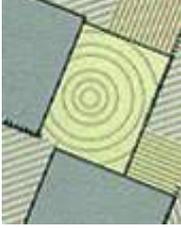


Figure D2.2a Timings and applications of cattle FYM on GB winter and spring sown crops & grass (3 year average 2019-2021)

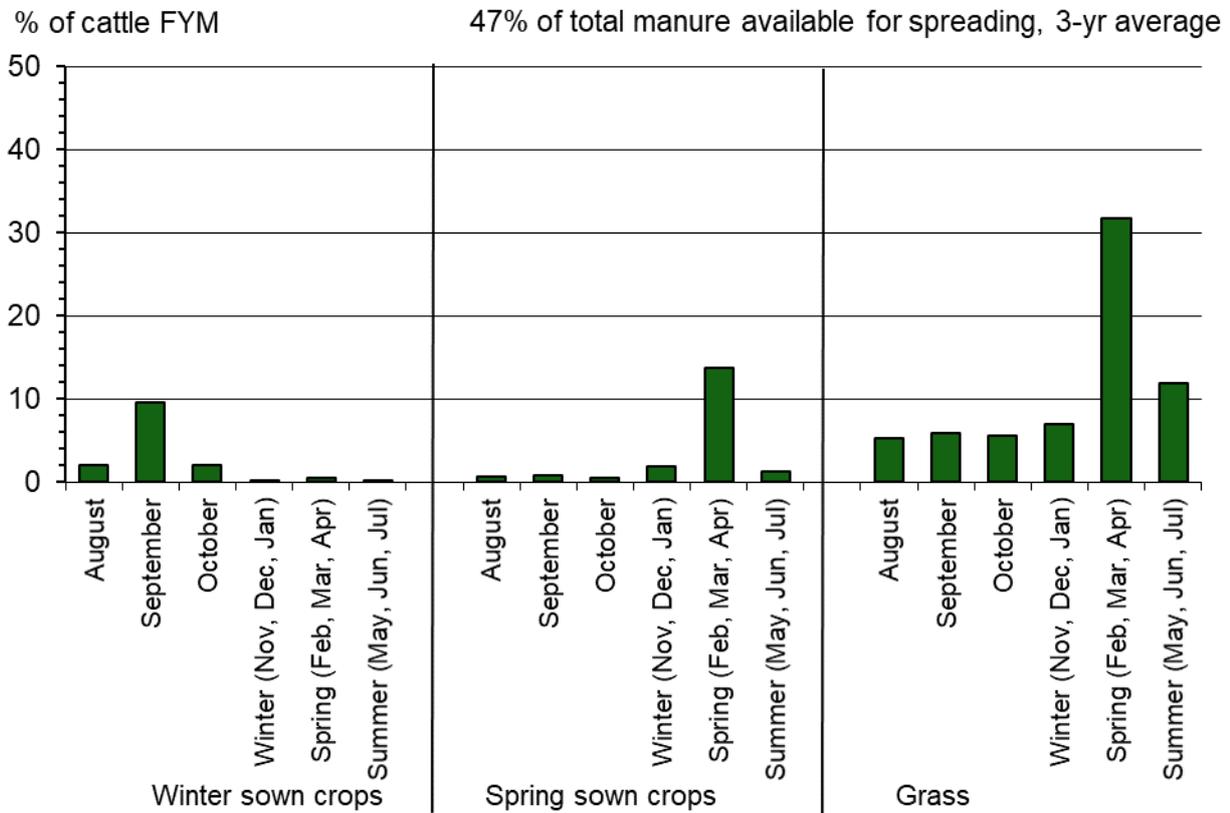
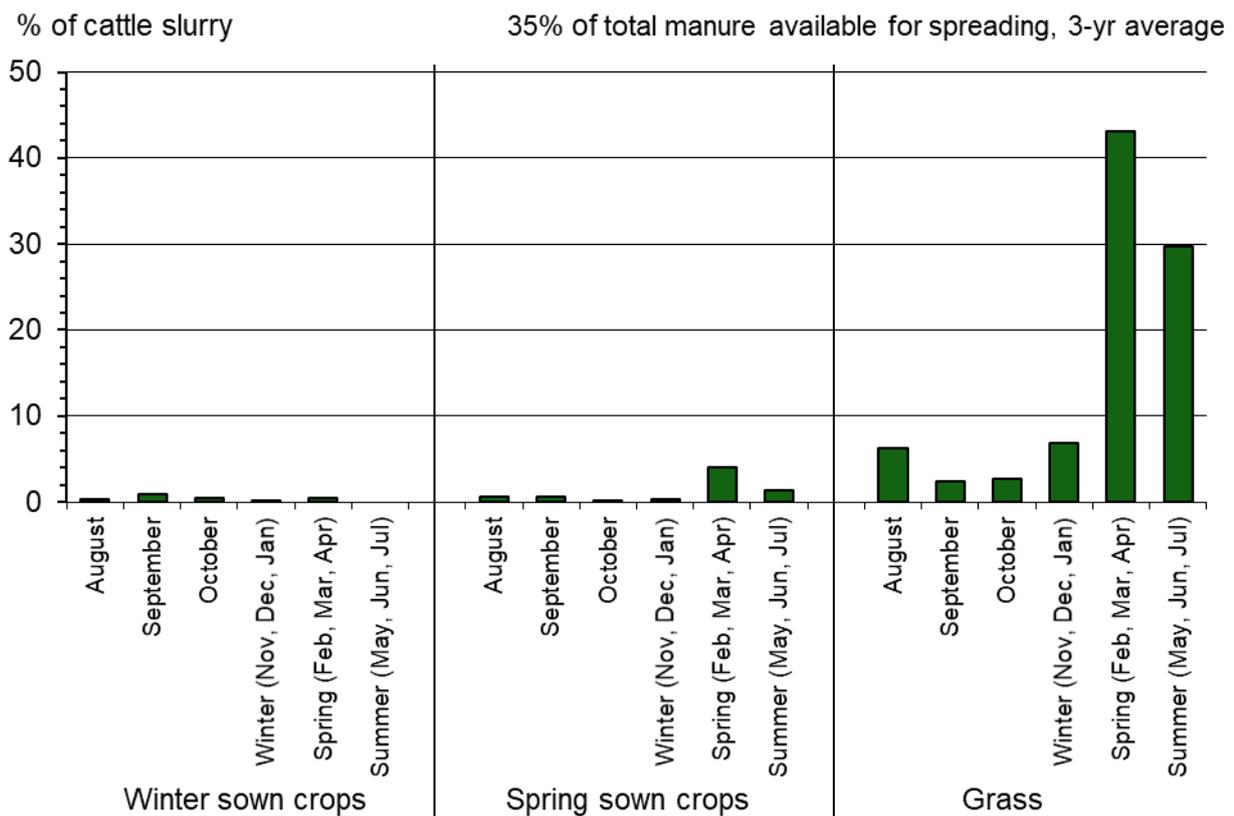


Figure D2.2b Timings and applications of cattle slurry on GB winter and spring sown crops & grass (3 year average 2019-2021)



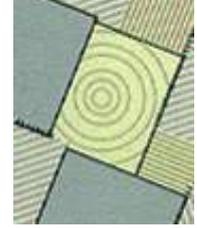


Figure D2.2c Timings and applications of pig FYM on GB winter and spring sown crops & grass (3 year average 2019-2021)

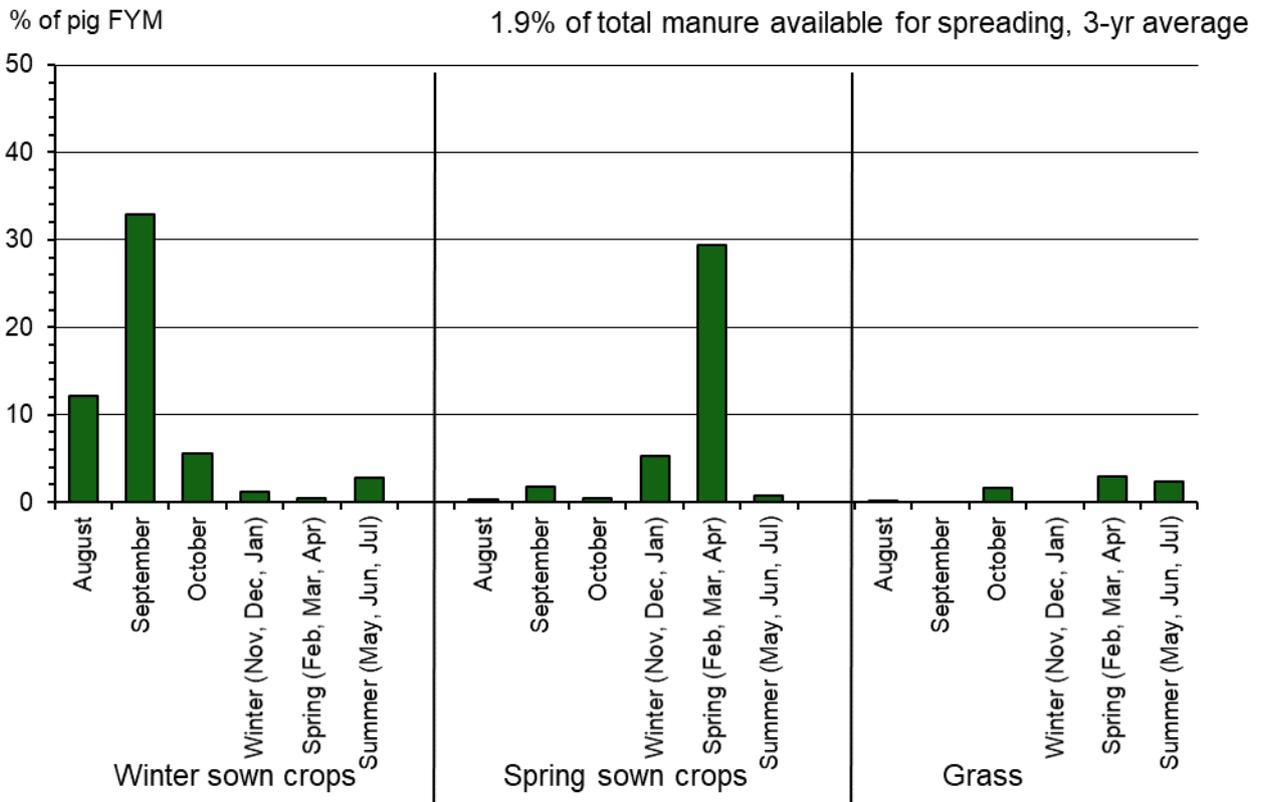
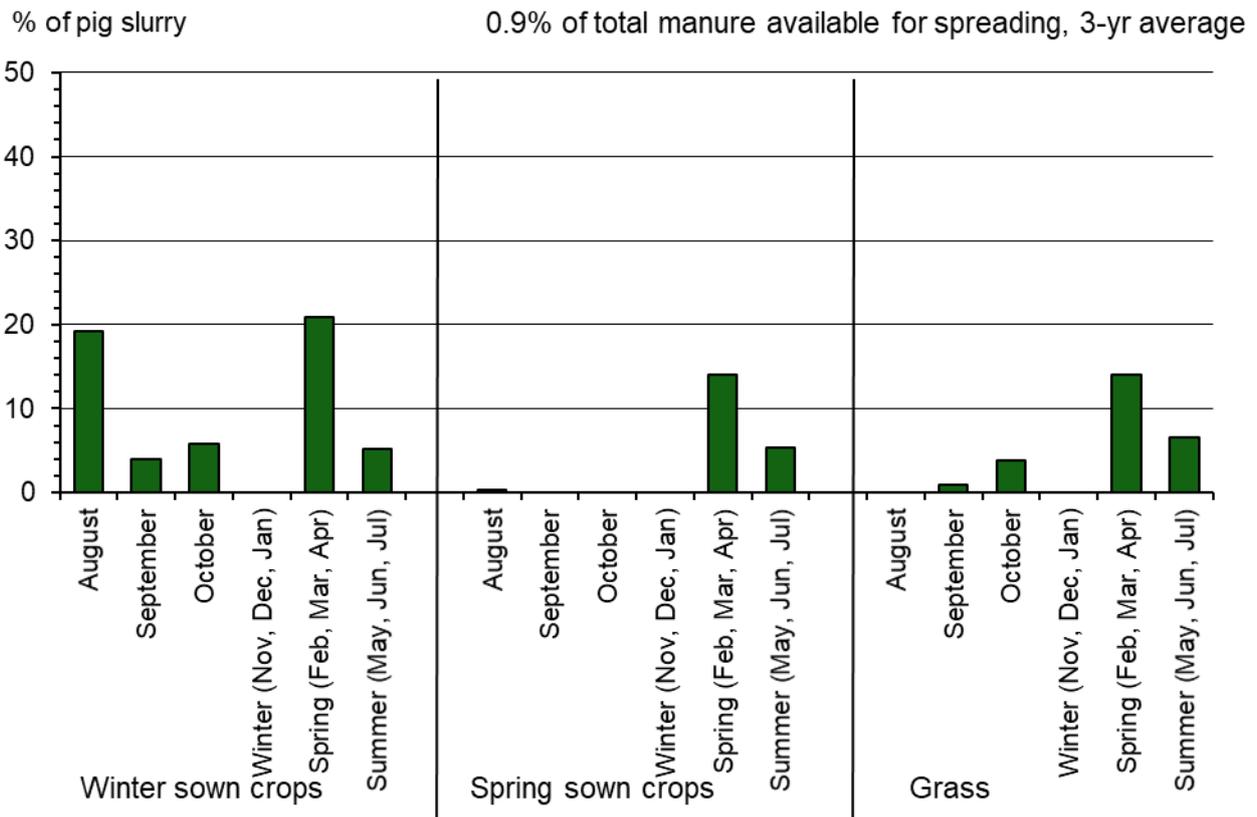


Figure D2.2d Timings and applications of pig slurry on GB winter and spring sown crops & grass (3 year average 2019-2021)



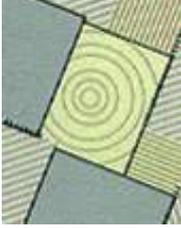


Figure D2.2e Timings and applications of layer manure on GB winter and spring sown crops & grass (3 year average 2019-2021)

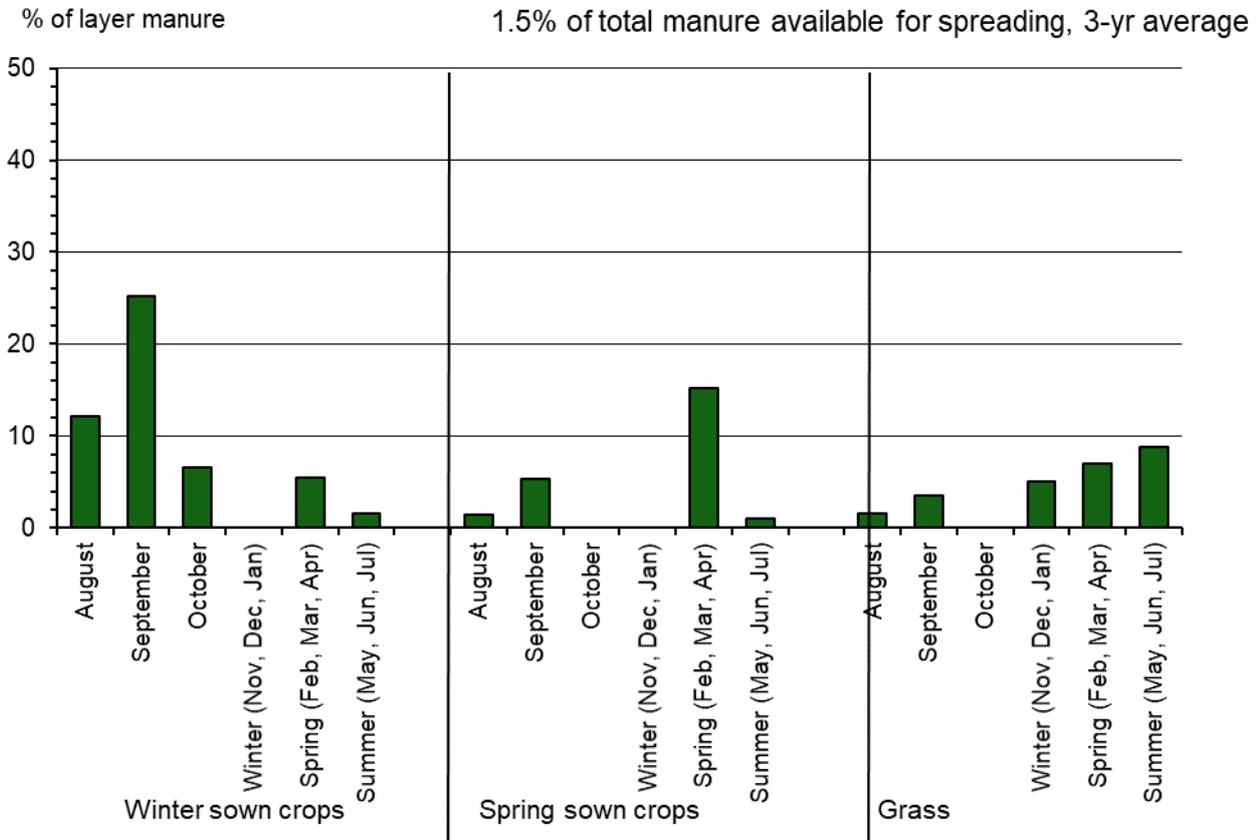
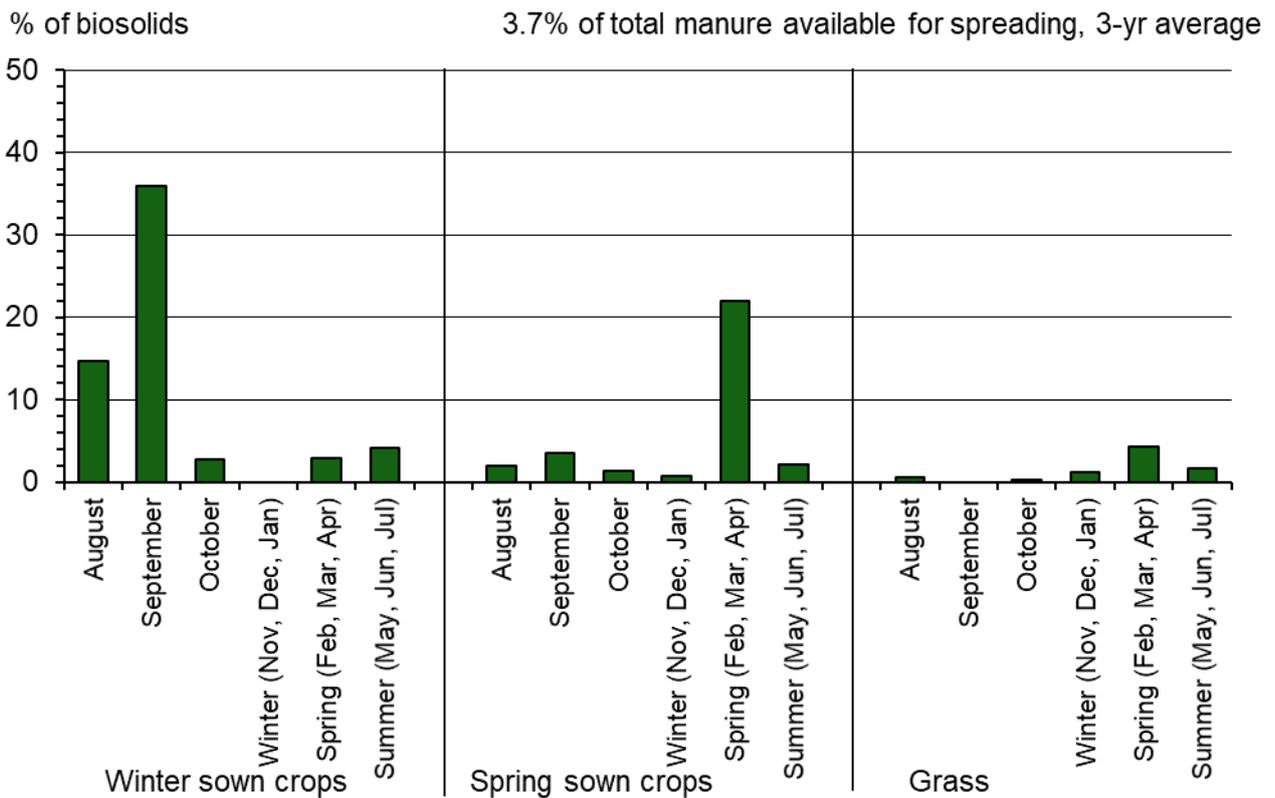
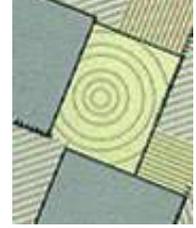
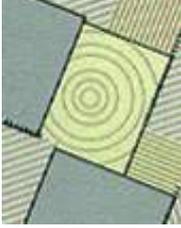


Figure D2.2f Timings and applications of biosolids on GB winter and spring sown crops & grass (3 year average 2019-2021)





Figures D2.2a-f are derived from the 3-year average of the GB data presented in Table D2.4 in 2019 to 2021. The proportions of each of these manure types spread onto the winter-sown and spring-sown crops and onto grassland crop groups are shown, together with the timings of applications. It is important to note that the actual quantities of each manure type available for spreading varies very significantly between manure types as illustrated in Figure D2.1; the proportion of the total available manure represented by each type is shown on the individual Figure D2.2 charts. The representation of the patterns of spreading of each manure type in this way is designed to facilitate the interpretation of the data in Table D2.4.



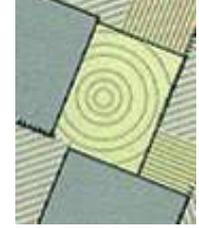
D3 FERTILISER VALUE OF ORGANIC MANURES

Organic manures are valuable sources of the major plant nutrients nitrogen, phosphorus, and potassium and, where used, applications of manufactured fertiliser can theoretically be reduced¹³. 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. Fields used in organic production systems, 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, 2021

	<i>nitrogen</i>		<i>phosphate</i>		<i>potash</i>		<i>fields in sample</i>	
	<i>with manure</i>	<i>without manure</i>	<i>with manure</i>	<i>without manure</i>	<i>with manure</i>	<i>without manure</i>	<i>with manure</i>	<i>without manure</i>
<i>dressing cover (%)</i>								
Winter wheat	98	100	26	40	32	43	314	878
Spring barley	99	97	56	60	56	58	209	445
Winter barley	97	99	43	48	53	51	115	347
Potatoes (maincrop)	85	100	47	92	71	100	22	23
Sugar beet	94	89	44	47	47	80	30	52
Winter oilseed rape	99	100	12	56	19	51	74	167
	<i>nitrogen</i>		<i>phosphate</i>		<i>potash</i>		<i>fields in sample</i>	
<i>average field rate (kg/ha)</i>	<i>with manure</i>	<i>without manure</i>	<i>with manure</i>	<i>without manure</i>	<i>with manure</i>	<i>without manure</i>	<i>with manure</i>	<i>without manure</i>
Winter wheat	167	194	48	55	55	64	314	878
Spring barley	95	105	47	49	59	62	209	445
Winter barley	133	146	44	54	55	64	115	347
Potatoes (maincrop)	135	131	94	106	191	163	22	23
Sugar beet	74	74	31	45	56	66	30	52
Winter oilseed rape	154	175	52	56	56	67	74	167
	<i>nitrogen</i>		<i>phosphate</i>		<i>potash</i>		<i>fields in sample</i>	
<i>overall application rate (kg/ha)</i>	<i>with manure</i>	<i>without manure</i>	<i>with manure</i>	<i>without manure</i>	<i>with manure</i>	<i>without manure</i>	<i>with manure</i>	<i>without manure</i>
Winter wheat	164	194	13	22	17	28	314	878
Spring barley	94	102	26	30	33	36	209	445
Winter barley	129	145	19	26	29	32	115	347
Potatoes (maincrop)	115	131	44	98	135	163	22	23
Sugar beet	69	66	14	21	26	53	30	52
Winter oilseed rape	152	175	6	31	10	34	74	167

¹³Anon. (2018). Nutrient Management Guide (RB209). Agriculture and Horticulture Development Board (AHDB). <https://ahdb.org.uk/nutrient-management-guide-rb209>

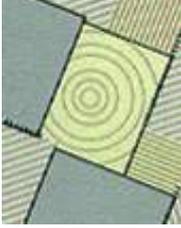


For all the major tillage crops, except sugar beet, the overall rate of nitrogen from manufactured mineral fertiliser was higher on fields where organic manures were not applied in 2021. The difference in overall nitrogen application rates, with and without manure, ranged from 8 kg/ha for spring barley, to 16 kg/ha for winter barley, to 23 kg/ha for winter oilseed rape and 30 kg/ha for winter wheat. The data for potatoes and sugar beet should be treated with caution as these are derived from a small number of fields. The Survey does not collect reasons why manufactured fertiliser application rates may vary when used with or without organic manures. It is possible that certain fields are being managed to achieve a desired nutrient status and a strategy of this sort may require unusually high or low applications of specific nutrients. Where only a small number of fields are surveyed, such a strategy may exert an influential bias on the overall figures for a crop in the report.

Table D3.1b Overall application rates (kg/ha) of manufactured fertiliser application to tillage crops in Great Britain, with and without applications of organic manure, 2017 - 2021

<i>nitrogen (kg/ha)</i>	2017		2018		2019		2020		2021	
	<i>with manure</i>	<i>without manure</i>								
Winter wheat	175	191	170	193	170	191	170	181	164	194
Spring barley	92	106	94	106	83	102	85	106	94	102
Winter barley	128	155	125	149	124	150	132	143	129	145
Potatoes (maincrop)	137	136	141	145	159	146	123	122	115	131
Sugar beet	80	103	83	80	76	74	82	62	69	66
Winter oilseed rape	164	184	174	193	162	186	141	180	152	175
<i>phosphate (kg/ha)</i>	2017		2018		2019		2020		2021	
	<i>with manure</i>	<i>without manure</i>								
Winter wheat	15	33	14	30	12	28	20	26	13	22
Spring barley	32	33	32	32	27	32	22	26	26	30
Winter barley	27	31	20	29	20	29	24	27	19	26
Potatoes (maincrop)	127	110	81	110	104	79	78	98	44	98
Sugar beet	11	22	13	21	12	21	21	23	14	21
Winter oilseed rape	20	37	12	32	15	34	13	32	6	31
<i>potash (kg/ha)</i>	2017		2018		2019		2020		2021	
	<i>with manure</i>	<i>without manure</i>								
Winter wheat	25	39	19	35	20	34	24	31	17	28
Spring barley	46	43	46	42	38	40	26	31	33	36
Winter barley	39	40	25	37	30	39	36	39	29	32
Potatoes (maincrop)	213	204	212	207	175	158	152	159	135	163
Sugar beet	43	49	36	51	45	53	25	56	26	53
Winter oilseed rape	22	33	15	30	12	31	17	29	10	34

Differences in overall application rates with and without manures for nitrogen, phosphate, and potash for the period 2017 to 2021 are shown in table D3.1b above. The application of lower rates on manured fields holds true for nitrogen for all major combinable crops throughout the period. The lower rates are consistent for spring barley, winter barley and winter oilseed rape at 14% on average for the period, with winter wheat at 11% less on manured fields. Overall rates for phosphate and potash in winter wheat show a similar relationship over the five-year period, respectively at 46% and 37% lower rates on manured fields. Other crops show greater variability between manured and unmanured field rates for the different nutrients which may in part be due to the smaller number of fields of each of these crops in the Survey causing higher statistical variability.



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

Table D3.2 Average field rates (kg/ha) of manufactured fertiliser application on grassland with and without applications of organic manure by robust type group, Great Britain 2021

	<i>nitrogen (kg/ha)</i>		<i>phosphate (kg/ha)</i>		<i>potash (kg/ha)</i>		<i>fields in sample</i>	
	<i>with manure</i>	<i>without manure</i>	<i>with manure</i>	<i>without manure</i>	<i>with manure</i>	<i>without manure</i>	<i>with manure</i>	<i>without manure</i>
Cereals								
Grass under 5 years old *	126	110	13	37	30	41	21	77
Grass 5 years and over *	112	76	-	28	-	42	11	276
All grass	122	85	12	29	30	42	32	353
Dairy								
Grass under 5 years old	154	144	27	30	50	53	124	41
Grass 5 years and over	122	111	23	21	35	26	171	106
All grass	133	119	24	24	40	33	295	147
General cropping								
Grass under 5 years old *	100	114	23	48	64	66	14	48
Grass 5 years and over *	102	76	32	22	39	46	28	154
All grass	102	84	28	29	50	51	42	202
Mixed								
Grass under 5 years old *	142	113	33	34	49	58	37	114
Grass 5 years and over *	85	69	23	18	37	23	35	182
All grass	111	81	27	22	42	32	72	296
Other livestock								
Grass under 5 years old	107	84	31	23	44	31	173	167
Grass 5 years and over	74	61	17	15	22	18	561	637
All grass	80	64	20	16	26	19	734	804
All farm types								
Grass under 5 years old	130	105	29	29	47	43	376	448
Grass 5 years and over	90	69	19	17	26	22	816	1363
All grass	100	76	21	19	31	26	1192	1811

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

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

As in the previous four years, when looking at all farm types taken together the rates of nitrogen, phosphate and potash fertiliser were usually higher on fields where manures were also used. Rates of phosphate on grass under 5 years old were the exception. Mineral fertiliser rates were 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.

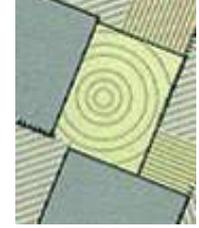


Table D3.3a Average field rates (kg/ha) of manufactured fertiliser application on dairy grassland with and without applications of organic manure, Great Britain 2021

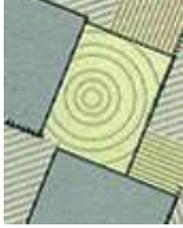
	nitrogen (kg/ha)		phosphate (kg/ha)		potash (kg/ha)		fields in sample	
	with manure	without manure	with manure	without manure	with manure	without manure	with manure	without manure
All cut for hay	112	81	38	15	33	20	24	12
All cut for silage	141	141	27	30	48	52	201	50
All grazings	130	117	24	24	39	32	252	136

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

Table D3.3b Average field rates (kg/ha) of manufactured fertiliser application on dairy grassland with and without applications of organic manure, Great Britain 2017 – 2021

<i>all cut for hay</i>	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
2017	123	89	-	-	-	-	11	11
2018	132	83	33	-	38	-	19	16
2019	117	83	-	20	-	24	16	15
2020	104	72	-	18	-	31	13	13
2021	112	81	38	15	33	20	24	12
<i>all cut for silage</i>	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
2017	163	137	24	16	56	32	199	28
2018	153	135	26	20	46	37	201	45
2019	150	156	25	33	46	62	226	27
2020	171	181	27	36	51	57	203	38
2021	141	141	27	30	48	52	201	50
<i>all grazings</i>	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
2017	155	136	24	19	46	25	211	122
2018	138	111	24	19	37	22	230	162
2019	136	120	24	19	42	29	257	126
2020	154	137	23	27	41	37	236	135
2021	130	117	24	24	39	32	252	136

Over the 5-year period 2017-21, mineral fertiliser application rates, whilst variable, are higher for grass cut for silage than other grass management systems. Data for grass cut for hay should be treated with caution as the number of fields managed this way is low. It is notable that the average field rates for phosphate and potash on unmanured fields of grass cut for silage have recovered from the relatively low rates recorded in 2017 and 2018.



SECTION E

FARMING PRACTICES

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 2021, 48% 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 percent of farmers never check their spreaders for accuracy and a further 4% of farmers considered that spreader accuracy did not need to be checked.

Table E1.1 Frequency of solid fertiliser spread pattern checks using catch trays, percentage (%) of those farms with a spreader, Great Britain 2017 – 2021

	No spreader	Contract applied	Factory set & doesn't need checking	At each change of fertiliser type	Less than once a year	Once a year	Never checked	Other
2017	13	11	7	6	16	44	26	1
2018	13	9	5	5	20	45	23	2
2019	13	12	5	6	18	50	19	1
2020	16	13	4	6	22	49	17	2
2021	15	11	4	6	22	48	20	0

Practices of checking are generally consistent over the five-year period 2017-2021; contractors were used on 11% of GB 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 2021 crop year, Great Britain 2021

	manufactured fertilisers				organic manures			
	farms	farms %	area (ha)	area %	farms	farms %	area (ha)	area %
Computer program	21,408	30.0	3,889,126	43.1	10,718	19.7	2,237,844	32.6
Farm diary	39,647	55.5	4,680,088	51.8	31,505	58.0	3,882,967	56.5
Farm notebook/pocketbook	10,816	15.1	1,169,337	12.9	8,211	15.1	908,810	13.2
File record sheet (file in the office)	14,274	20.0	1,735,972	19.2	11,079	20.4	1,382,537	20.1
Other paper record	1,593	2.2	145,033	1.6	1,396	2.6	110,914	1.6
No records kept	2,590	3.5	182,486	2.0	3,273	5.7	228,715	3.2

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 30% of farms, representing 43% in area terms. No records were kept on 3.5% of farms and this figure falls to 2% when considered on an area basis. Computerised record keeping is slightly less common for organic manures, occurring on 20% of relevant 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 55%, and lower at 13% on 'dairy' and 10% 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.

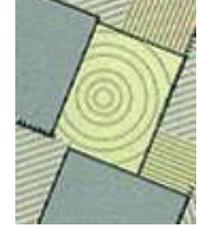


Table E1.2b Record keeping methods for fertiliser and manure applications on farms where each nutrient type was applied during the 2021 crop year, by farm type, Great Britain 2021

<i>Cereals</i>	<i>manufactured fertilisers</i>		<i>organic manures</i>	
	<i>farms</i>	<i>farms %</i>	<i>farms</i>	<i>farms %</i>
Computer program	9,684	55.4	4,053	54.8
Farm diary	8,022	45.9	3,462	46.8
Farm notebook/pocketbook	2,150	12.3	578	7.8
File record sheet (file in the office)	3,373	19.3	1,476	19.9
Other paper record	538	3.1	0	0.0
No records kept	50	0.3	371	4.8
<i>Dairy</i>	<i>manufactured fertilisers</i>		<i>organic manures</i>	
	<i>farms</i>	<i>farms %</i>	<i>farms</i>	<i>farms %</i>
Computer program	892	12.9	911	12.5
Farm diary	4,527	65.5	4,657	63.8
Farm notebook/pocketbook	932	13.5	932	12.8
File record sheet (file in the office)	1,181	17.1	1,393	19.1
Other paper record	60	0.9	60	0.8
No records kept	110	1.6	454	5.9
<i>General cropping</i>	<i>manufactured fertilisers</i>		<i>organic manures</i>	
	<i>farms</i>	<i>farms %</i>	<i>farms</i>	<i>farms %</i>
Computer program	5,088	53.5	1,770	31.2
Farm diary	4,142	43.6	2,742	48.4
Farm notebook/pocketbook	1,455	15.3	1,364	24.1
File record sheet (file in the office)	2,267	23.8	1,119	19.7
Other paper record	284	3.0	217	3.8
No records kept	128	1.3	180	3.1
<i>Mixed</i>	<i>manufactured fertilisers</i>		<i>organic manures</i>	
	<i>farms</i>	<i>farms %</i>	<i>farms</i>	<i>farms %</i>
Computer program	2,491	30.1	1,667	26.7
Farm diary	4,747	57.3	3,525	56.5
Farm notebook/pocketbook	636	7.7	581	9.3
File record sheet (file in the office)	2,358	28.5	2,057	33.0
Other paper record	226	2.7	204	3.3
No records kept	137	1.6	82	1.3
<i>Other livestock</i>	<i>manufactured fertilisers</i>		<i>organic manures</i>	
	<i>farms</i>	<i>farms %</i>	<i>farms</i>	<i>farms %</i>
Computer program	2,978	10.4	2,062	7.6
Farm diary	17,922	62.6	16,831	61.9
Farm notebook/pocketbook	5,507	19.2	4,642	17.1
File record sheet (file in the office)	4,998	17.5	5,012	18.4
Other paper record	485	1.7	916	3.4
No records kept	2,110	6.9	2,131	7.3
<i>All farm types</i>	<i>manufactured fertilisers</i>		<i>organic manures</i>	
	<i>farms</i>	<i>farms %</i>	<i>farms</i>	<i>farms %</i>
Computer program	21,408	30.0	10,718	19.7
Farm diary	39,647	55.5	31,505	58.0
Farm notebook/pocketbook	10,816	15.1	8,211	15.1
File record sheet (file in the office)	14,274	20.0	11,079	20.4
Other paper record	1,593	2.2	1,396	2.6
No records kept	2,590	3.5	3,273	5.7

Note: more than one method may be used.

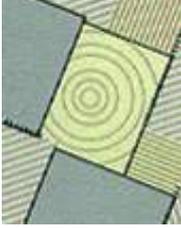


Table E1.2c Record keeping methods percentage (%) of farms, for fertiliser and manure applications on farms where each respective nutrient type was applied in the crop year, Great Britain 2017-2021

		computer program	farm diary	farm notebook/pocket-book	file record sheet (file in the office)	other paper record	no records kept
manufactured fertilisers	2017	22.6	49.7	24.0	21.7	2.1	4.1
	2018	25.1	54.5	18.2	17.8	5.2	2.1
	2019	28.7	54.9	17.2	20.6	2.8	3.8
	2020	28.5	45.1	15.4	25.4	4.7	3.1
	2021	30.0	55.5	15.1	20.0	2.2	3.5
organic manures	2017	16.7	55.8	23.8	18.9	2.7	8.3
	2018	17.9	59.8	16.6	15.8	5.5	5.6
	2019	19.8	60.7	18.0	19.2	2.9	4.8
	2020	20.5	53.2	15.1	24.3	5.3	6.8
	2021	19.7	58.0	15.1	20.4	2.6	5.7

Note: more than one method may be used.

Recording methods for manufactured fertilisers show some variations across the five-year period 2017-2021, with farm diaries remaining the most widely used recording method. For organic manures, records of some type were kept on 92-95% of farms for the five-year period.

Table E1.3 Soil testing percentage (%) of tillage and grass area, Great Britain 2017 - 2021

	tillage area %				grass area %			
	Standard P, K, Mg, pH	Nitrogen	pH (lime only)	Precision Farming purposes	Standard P, K, Mg, pH	Nitrogen	pH (lime only)	Precision Farming purposes
2017	27	11	7	6	6	1	3	1
2018	26	11	7	7	7	2	3	1
2019	29	15	8	7	7	2	4	2
2020	29	15	7	7	6	2	2	1
2021	32	15	6	10	7	1	3	1

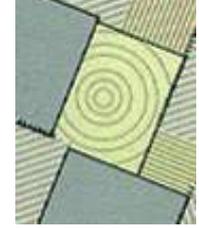
Table E1.3 shows the percentage of the tillage and grass area that was soil tested for the cropping years 2017–2021. It is usual practice, especially for tillage fields, to test a sub-set of them in any given year. Standard P, K, Mg, pH was the most commonly used soil test for the period, with an average of 29% of the tillage area and 7% of the grass area. All types of soil tests were more prevalent on tillage than on grass.

Table E1.4 Use (% weighted area) of urea fertilisers containing a urease inhibitor on tillage or grass fields, Great Britain 2018 – 2021

	Product contains a urease inhibitor	Product does not contain a urease inhibitor	Don't know
2018	6	94	-
2019	6	70	24
2020	10	70	21
2021	12	65	24

* 'Don't know' was not a response category in 2018.

Table E1.4 shows the use of liquid urea ammonium nitrate (UAN) or solid urea (straight nitrogen or nitrogen + sulphur) fertiliser products containing urease inhibitors, which reduce gaseous losses of ammonia (a known air pollutant). Measured in terms of weighted area (%), there was a 2% increase in the use of urease inhibitor containing fertilisers in 2021 to 12%. Whilst the overall level of inhibitors was low, it is double that recorded in 2018.



In 2016, 2018 and 2021 farmers were asked about the professional qualifications they or other relevant people on the farm held and the extent to which they keep them up to date with Continuous Professional Development. The results are shown in Table E1.5a.

Table E1.5a Professional qualifications held on respondent farms and Continuous Professional Development, Great Britain 2016, 2018 and 2021

Respondents' professional qualifications held - % farms	Kept up to date (CPD) where professional qualification held - % farms											
				Yes			No			Don't know		
	2016	2018	2021	2016	2018	2021	2016	2018	2021	2016	2018	2021
NRoSO	22	20	19	93	89	88	5	8	5	2	3	7
BASIS	7	8	10	81	67	73	15	29	18	4	4	10
FACTS	3	4	6	1	77	80	7	21	13	0	2	7
DairyPro	1	1	1	–	–	–	–	–	–	–	–	–
Professional Pig Register	0	0	0	–	–	–	–	–	–	–	–	–
Other	8	6	10	–	–	–	–	–	–	–	–	–
None of the above	68	69	64	–	–	–	–	–	–	–	–	–

The National Register of Sprayer Operators (NRoSO) continued to be the most popular professional qualification held on respondent farms in 2021 (19% of farms). Of those with a NRoSO accreditation, 88% of farms kept this up to date with Continuous Professional Development (CPD) although this was slightly lower than in 2016. Between 2018 and 2021 there was also a slight reduction in the proportion of farms on which no one held any of the qualifications listed.

Table E1.5b Professional advice sources received by number of farms, Great Britain 2016, 2018 and 2021

Professional advice sought	Received advice - % farms								
	All farms			Farms with tillage			Farms with grass		
	2016	2018	2021	2016	2018	2021	2016	2018	2021
Crop protection agronomist	51	55	51	81	88	84	46	48	46
Fertiliser advisor	37	33	29	51	48	39	34	29	26
Feed Advisor	23	21	17	24	24	18	26	22	19
Veterinary surgeon	47	50	44	44	47	42	53	55	49
Countryside or wildlife advisor	16	17	15	20	21	18	15	16	13
Land agent	15	15	15	18	19	20	15	13	14
Business advisor	12	14	13	15	16	15	12	13	13
Water advisor	13	14	11	17	18	13	13	13	10
None of the above	19	17	20	8	5	6	21	18	22
Other	5	4	3	4	4	3	6	5	3
Total number of farms	89,884	89,005	88,101	51,446	47,528	48,043	78,395	79,682	78,801

Respondents were asked about the sources of professional advice that they use (Table E1.5b). A crop protection agronomist was the most commonly used source, on 51%-55% of farms across 2016, 2018 and 2021. This figure increased to 81-88% when farms with tillage crops were considered. On farms with grass, a veterinary surgeon was the most prevalent source of advice at 53% (2016) and 55% (2018) and 49% (2021) of farms. Some farms will have both tillage crops and grass and will appear in both categories. Farmers who stated that they did not use any of the listed advice sources was 19% in 2016, 17% 2018, and 20% in 2021. Professional advice used on an area basis is presented in Table E1.5c.

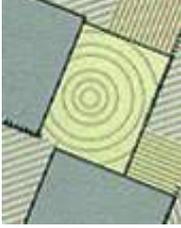


Table E1.5c Professional advice sources received by farm area, Great Britain 2016, 2018 and 2021

Professional advice sought	Received advice - % area								
	All farms			Farms with tillage			Farms with grass		
	2016	2018	2021	2016	2018	2021	2016	2018	2021
Crop protection agronomist	64	70	65	90	94	90	43	49	44
Fertiliser advisor	44	43	36	57	56	47	34	32	26
Feed Advisor	27	27	21	18	21	13	34	32	28
Veterinary surgeon	52	53	47	37	38	31	64	65	59
Countryside or wildlife advisor	22	24	19	28	29	23	17	19	16
Land agent	20	21	19	25	27	22	17	16	17
Business advisor	17	18	15	17	22	15	16	15	15
Water advisor	16	19	13	20	23	14	13	15	13
None of the above	11	10	11	4	2	5	17	15	17
Other	5	5	3	3	2	3	6	7	3
Total number of farms	10,292,341	10,368,447	10,281,895	4,619,130	4,642,073	4,643,715	5,673,211	5,726,374	5,638,181

Farmers were then questioned about the areas of expertise in which they had either taken advice or gained knowledge from their professional qualifications (Table E1.5d). In the three years when the question was asked around 40% of farms had taken advice or gained knowledge on crop nutrient management and of those 65%-72%, had implemented change as a result. Considering how influential that advice had been, 41% rated it as high in 2021, 52% as medium and 7% of low influence.

Table E1.5d Areas of expertise of professional advice: Advice received and its impact by number of farms, Great Britain 2016, 2018 and 2021

Professional advice sought	gained knowledge - % farms			having received advice - % farms			Level of influence of advice - % farms								
	2016	2018	2021	2016	2018	2021	High			Medium			Low		
							2016	2018	2021	2016	2018	2021	2016	2018	2021
Soil management or protection	40	37	35	64	80	69	41	40	42	50	53	50	9	6	8
Crop nutrient management	42	40	39	67	72	65	44	51	41	51	44	52	5	5	7
Crop planning or land use	27	26	25	63	77	70	43	50	42	48	43	47	9	7	12
Fertiliser application methods	25	21	20	61	82	66	30	50	46	48	45	49	21	5	5
Crop protection (agrochemicals)	52	52	52	70	74	66	59	65	63	37	31	32	4	4	4
Integrated pest management	22	21	18	65	82	71	46	44	47	43	45	44	11	11	9
Animal nutrition or diet formulation	28	29	25	77	68	70	43	49	45	49	40	44	9	11	12
Manure storage	9	11	11	64	79	58	41	49	44	47	38	44	12	13	12
Manure application method	6	7	8	71	78	62	30	49	34	54	40	55	16	11	11
Animal housing design ¹		7	7		94	75		46	32		41	58		13	10
None of the above	20	20	25												
Total number of farms	74,187	76,455	73,030	59,465	60,876	57,088									

¹ Question not included in 2016 survey

Table E1.5e describes potential areas where production efficiency improvements could be made. Farmers were given the opportunity to indicate whether they felt the individual areas were relevant to their farms. Managing soil structure was thought not relevant to 14% in 2021, a similar percentage to previous years. Of those who did consider soil structure to be relevant to efficiency, 53% indicated that they had made some progress towards improving production efficiency. In 2021 89% of farmers felt soil health, other than compaction was relevant to themselves and of those 58% indicated that they had made some progress and 24% believe that they have done all that they can do towards improving production efficiency.

Table E1.5e Potential efficiency improvements: Relevance and progress made by number of farms, Great Britain 2016, 2018 and 2021

Potential production efficiency improvements	Not relevant response - % of farms			Relevant response - % farms											
	2016	2018	2021	No interest			Not done yet			Made some progress			Done all I can do		
				2016	2018	2021	2016	2018	2021	2016	2018	2021	2016	2018	2021
Managing soil structure	16	13	14	11	6	7	8	13	12	51	54	53	31	27	28
Soil health, other than compaction ¹		10	11		5	5		14	13		59	58		22	24
Crop nutrient use efficiency	27	28	30	11	6	6	5	13	11	57	57	59	27	24	24
Crop agronomy	31	32	38	10	6	7	3	7	7	51	52	57	36	35	30
Crop genetics or variety selection	34	37	44	15	10	8	8	14	13	49	50	56	29	26	23
Whole farm/integrated farm management	21	21	18	19	15	15	11	20	19	44	42	44	26	23	22
Precision technologies	30	28	23	35	28	29	21	28	31	31	32	31	12	12	9
Animal feed conversion efficiency	32	34	36	13	7	8	13	16	21	48	53	49	25	24	23
Emission reduction from stored manure	45	44	41	26	12	12	28	37	41	19	27	33	27	23	15
Efficiency of nutrient recovery from manure	39	38	39	16	9	7	19	22	28	36	43	46	29	26	20

¹ Question not included in 2016 survey



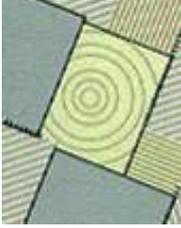
APPENDIX 1 - SURVEY STATISTICS

APP 1.1 SAMPLING VARIATION

Table App 1.1 Standard errors of application rates for the major crops in 2021

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 ₂ O ₅	total K ₂ O	total SO ₃	total N	strt N	comp N	total P ₂ O ₅	total K ₂ O	total SO ₃	
winter wheat	2.4	2.7	1.1	1.2	1.5	1.4	2.2	2.3	4.5	1.6	1.9	1.3	1202
oilseed rape	3.7	3.8	1.5	2.1	2.3	3.1	3.5	3.5	4.0	2.7	3.2	2.9	248
winter barley	2.4	3.0	1.6	1.6	2.0	1.7	2.2	2.4	5.2	1.8	2.2	1.7	467
spring barley	1.8	2.3	1.4	1.2	1.5	1.2	1.6	1.9	2.0	1.4	1.6	1.5	677
m/c potatoes	11.3	9.4	12.4	10.1	15.5	8.9	10.5	13.1	12.2	9.4	14.5	17.0	46
sugar beet	4.9	5.0	2.1	3.9	5.4	2.9	4.6	4.6	4.2	6.2	6.0	3.3	82
all tillage crops	2.0	2.2	1.0	0.9	1.1	0.9	1.9	2.0	1.8	1.3	1.6	1.1	3931
all grass	1.7	1.5	1.1	0.3	0.6	0.5	1.8	2.3	1.7	0.8	1.1	1.5	3179
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 ₂ O ₅	total K ₂ O	total SO ₃	total N	strt N	comp N	total P ₂ O ₅	total K ₂ O	total SO ₃	
winter wheat	2.5	2.8	1.2	1.2	1.5	1.4	2.3	2.4	5.3	1.7	2.0	1.3	1131
oilseed rape	3.7	3.8	1.4	2.3	2.4	3.3	3.6	3.6	5.3	3.2	3.6	3.1	222
winter barley	2.5	3.1	1.6	1.6	2.0	1.8	2.3	2.5	5.9	2.0	2.5	1.7	427
spring barley	2.1	2.5	1.5	1.3	1.5	1.4	1.9	2.0	3.1	1.9	2.2	1.7	496
m/c potatoes	12.2	9.6	12.8	10.9	16.7	8.9	11.4	13.8	12.7	10.1	15.9	19.4	41
sugar beet	4.9	5.0	2.1	3.9	5.4	2.9	4.6	4.6	4.2	6.2	6.0	3.3	82
all tillage crops	2.2	2.4	1.0	0.9	1.1	1.0	2.1	2.1	2.3	1.6	2.0	1.2	3486
all grass	1.9	1.7	1.0	0.4	0.6	0.5	2.0	2.5	1.9	0.9	1.3	1.7	2656
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 ₂ O ₅	total K ₂ O	total SO ₃	total N	strt N	comp N	total P ₂ O ₅	total K ₂ O	total SO ₃	
winter wheat	7.5	8.2	4.7	4.8	6.4	5.2	6.9	7.0	7.5	4.4	5.6	4.6	71
oilseed rape	14.6	14.4	5.0	5.6	7.4	8.3	13.7	13.3	5.2	4.6	6.5	8.0	26
winter barley	8.8	10.1	5.7	5.1	5.9	5.9	7.9	8.3	10.3	4.1	4.5	6.1	40
spring barley	3.4	3.7	2.7	2.1	2.6	2.1	3.1	3.4	2.5	1.9	2.4	2.9	181
all potatoes	21.0	21.4	24.8	26.2	38.3	20.2	21.0	52.8	24.0	23.6	25.9	26.7	9
all tillage crops	4.1	4.4	2.5	2.1	2.7	2.1	3.7	4.5	2.5	1.9	2.5	2.6	445
all grass	3.8	2.6	3.1	1.0	1.6	1.0	3.5	4.4	3.5	1.4	2.3	2.6	523

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 2021

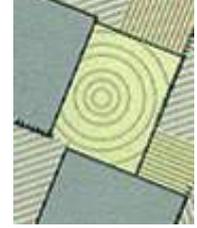
	2021	% total
Target sample	1500	100
2020 panellists agreeing to re-contact in 2021	1302	87
Achieved 'Main' sample from 2020 panel	974	65
Achieved additional 'Main' sample	124	8
Achieved '1 st reserve' sample	105	7
Achieved '2 nd reserve' sample	62	4
Achieved '3 rd reserve' sample	45	3
Total achieved	1310	87
Total number of refusals/non-contact	1725	
Total number of farms approached	3035	

Table App 1.3 Response to main and reserve samples for 2017 - 2021

<i>Net response rate</i>	2017	2018	2019	2020	2021
	%	%	%	%	%
Overall achieved rate	89	87	88	89	87
Achieved % of total contact attempts	45	42	48	50	43
Main sample	77	76	85	85	84
Reserve sample(s)	23	24	15	15	16
<i>Main reason for refusal</i>	2017	2018	2019	2020	2021
	%	%	%	%	%
Too busy	11	11	11	9	7
Not interested	13	16	13	10	11
Do not do surveys	6	6	6	3	3
Want payment	0	1	0	0	0
Too much paperwork	1	1	0	0	0
Non-contact	50	43	44	57	58
Other ^a	22	25	22	21	19

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

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

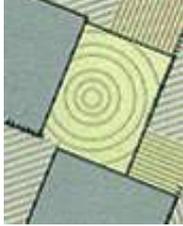


APPENDIX 2

APP 2.1 ENGLISH COUNTIES WITHIN BSFP AND DEFRA REGIONS

List of English counties indicating the BSFP and Government Office Regions (GOR) 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.