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The British Survey of Fertiliser Practice Fertiliser use on farm for the 2013 crop year

According to the arrangements approved by the UK Statistics Authority, Defra has published results of the 2013 British Survey of Fertiliser Practice. The survey, which is carried out annually, provides information on trends in usage and application rates of nitrogen, phosphate, potash, sulphur, organic manures and lime on the major crops and grass grown in mainland Britain.

This release gives key highlights of the 2013 survey with the full results and methodological details [here](#).

Key results

- The weather was a major influence on fertiliser use in the 2013 crop year. A very wet 2012 autumn made drilling difficult and impacted on survival of crops through the winter, resulting in a swing to spring sown crops which often require less fertiliser. The cold spring of 2013 then delayed fertiliser applications.
- The total nitrogen application rate on all crops and grassland reduced by 1 kg/ha between 2012 and 2013 to 94 kg/ha. Overall nitrogen rates on tillage crops over the last 25 years have been relatively constant in the range 145-150 kg/ha, but fell to 136 kg/ha in 2013 as a result of the factors outlined above. Nitrogen applied to grassland is lower than tillage but increased by 4 kg/ha in 2013 to 59 kg/ha; rates in 2012 were the lowest recorded since the survey began in 1983.
- Overall, phosphate and potash use on tillage crops and grassland was 18 and 25 kg/ha respectively. Rates have been more stable since 2010 although the longer term trend has been one of decline, mainly due to a significant reduction in the proportion of crops treated. The overall application rates of both phosphate and potash on tillage crops in Scotland have been maintained largely over the longer term.
- In 2013 sulphur was used on 43-53 % of cereal crops and 73% of oilseed rape, compared to just 3-6% and 8% respectively in 1993. Oilseed rape is particularly sensitive to sulphur deficiency.
- Around 68% of farms in the survey 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 used.

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Defra statistical releases, including details of future publication dates, and can be viewed on the Defra website at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/254892/Defra_statistical_release_calendar.pdf

1. Background

The British Survey of Fertiliser Practice (BSFP) is the primary source of data on organic and inorganic fertiliser use in Great Britain. Its main purpose is to estimate average application rates of nitrogen, phosphate and potash used for agricultural crops and grassland. Information is also collected on applications of sulphur fertilisers, organic manures and lime. The survey data are used by Government, industry and the wider agricultural community to monitor best practice, to assess potential environmental impacts and mitigation strategies and provide important evidence to inform greenhouse gas emissions from agriculture to inform policy.

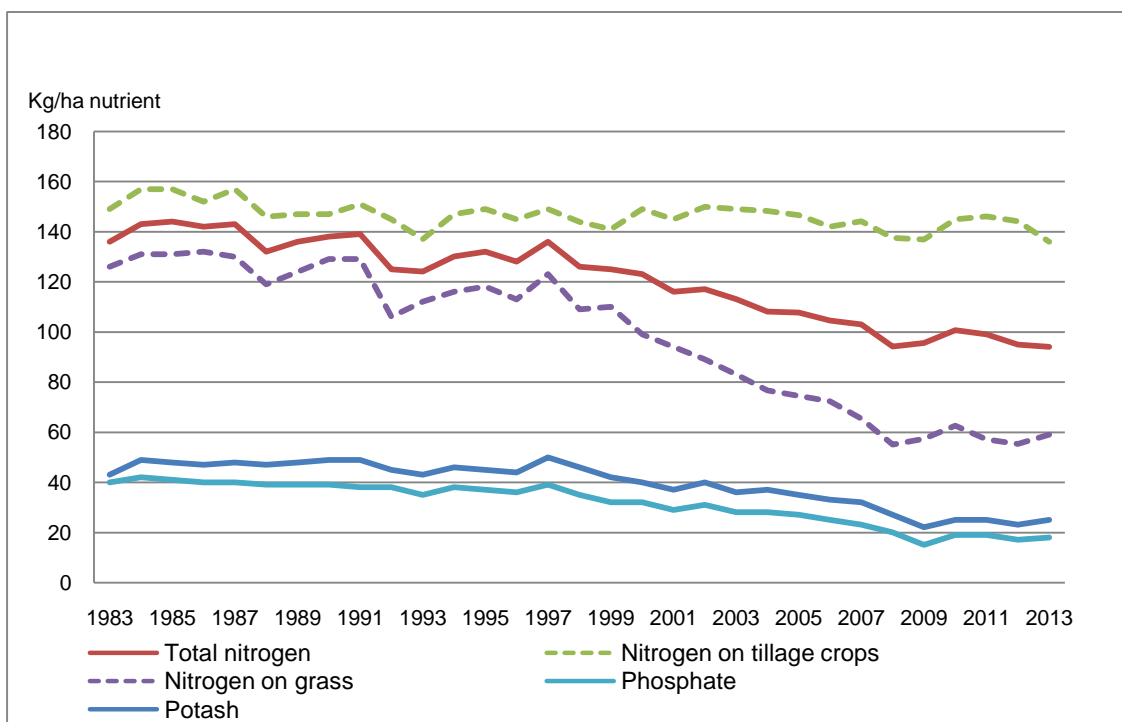
The BSFP is a voluntary annual survey targeted at a sample size of around 1,500 farms. All calculations of fertiliser rates are based on sown area of crops rather than field areas¹. Rates are expressed in terms of the equivalent nutrient content, taking into account the nutrient content in the product used.

The full Report with detailed methodological information plus separate key datasets are available on the Defra [website](#).

2. Overall fertiliser use on crops and grass in Great Britain

Figure 1 shows the overall application rates of nitrogen, phosphate and potash on crops and grass from 1983. In all cases there is a general downward trend. The 31% decline in total nitrogen over this time period is mainly due to the decline in use on grassland. This compares to a 42% reduction in overall rate for phosphate and a 42% decline for potash. The dip in use in 2009 is thought to have been caused by the major price increases for fertiliser. In all cases the rate of application on tillage crops is higher than the rate applied to grassland. In 2013 the overall rate for nitrogen on all crops and grass is 94 kg/ha. For phosphate and potash the overall rates in 2013 were 18 kg/ha and 25 kg/ha respectively.

Figure 1: Overall fertiliser use (kg/ha) on all crops and grass, Great Britain 1983 - 2013



¹ This reflects cross-compliance and environmental scheme measures where field margins remain uncropped.

3. Nitrogen

Most agricultural soils do not contain enough naturally occurring plant available nitrogen to meet the needs of a crop throughout the growing season, so supplementary nitrogen applications have to be made each year. Nitrogen usually has a large immediate effect on crop growth, yield and quality. Correct rate and timing of nitrogen fertiliser application is important to ensure crops make best use of the nitrogen applied and that there is minimum risk of an adverse environmental impact as a result of the application.

The 1 kg/ha decrease in total nitrogen use on all crops and grassland (Table 1) in 2013 to 94 kg/ha resulted from a large 8 kg/ha decrease in the overall rates on tillage crops. Apart from a dip in 1992-93 due to the introduction of set-aside, the overall rate of nitrogen on tillage crops has generally remained within the range 145-150 kg/ha. The rate of 136 kg/ha in 2013 is significantly below this. It is likely that the adverse weather in the autumn of 2012 and spring of 2013 was a factor in this. There was an overall 1.8% decrease in the total area of tillage crops planted and the wet conditions in autumn 2012 made drilling difficult. This led to an increased area of spring crops, especially spring barley which increased by 48% on 2012, and spring crops typically require lower rates of nitrogen. Partially failed crops and generally poorer tillage crops are likely to have contributed to this reduction in nitrogen use also.

Nitrogen rates on grassland have always been lower than tillage crops. Between 1983 and 1999 this was on average 27 kg/ha lower. However since 2000, rates on grassland have fallen consistently and over the last five years the average difference has been 83 kg/ha. Rates in 2012 were the lowest recorded but in 2013 the rate increased by 4 kg/ha to 59 kg/ha. A reduction in total cattle numbers (by 15% since 2000 to 8,256 thousand in 2013) is thought to have contributed to this, possibly in conjunction with some improvement in manure use efficiency. The majority of nitrogen fertiliser used on tillage crops is applied in straight form in contrast with grassland where compound nitrogen accounts for around two thirds of the total nitrogen applied.

Table 1: Overall nitrogen use (kg/ha), Great Britain 2009 - 2013

	Tillage crops	Grass	All crops and grass
2009	137	57	95
2010	145	63	101
2011	146	57	99
2012	144	55	95
2013	136	59	94

4. 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 in forms that are available for crop uptake over several years. Consequently managing the supply of these nutrients for optimum yield is based more on maintaining appropriate levels in the soil according to crop rotation needs and the timing of application tends to be less critical than that for nitrogen or sulphur.

Table 2 shows overall phosphate and potash applications for the past five years. The 2009 rates for both were the lowest recorded since this dataset began in 1983. Overall rates of phosphate and potash applied to tillage crops are more than three times those used on grassland. However there is greater use of applied manures on grassland (37% cover) than on tillage crops (23% cover) and grazed grassland also receives manure as it is grazed.

Table 2: Overall phosphate and potash use (kg/ha), Great Britain 2009 - 2013

Total phosphate				Total potash			
	Tillage crops	Grass	All crops and grass		Tillage crops	Grass	All crops and grass
2009	23	9	15	2009	33	12	22
2010	30	10	19	2010	38	14	25
2011	29	9	19	2011	39	12	25
2012	28	9	17	2012	37	12	23
2013	28	9	18	2013	40	13	25

Overall phosphate application rates 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 declining to an overall rate of 28 kg/ha in 2013. This is the second lowest rate since Great Britain records began. It is of note that in Scotland the phosphate and potash application rates on tillage land have largely been maintained, relative to the decline seen in England and Wales in 2013 was 51 kg/ha. The overall application rate of phosphate on grassland was highest in 1983, at 28 kg/ha, and then the application rate remained relatively stable at 21-26 kg/ha between 1984 and 1998. Overall application rates have declined more rapidly in the period since 1999, and in 2013 declined to the lowest rate at just 9 kg/ha.

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 in 2009 of 33 kg/ha when fertiliser prices were high. Between 2010 and 2013 overall potash application rates to tillage have been in the range 37-40 kg/ha. Whilst the pattern of use on grassland has been more variable, this has also shown a net decline between 1983 and 2013. Overall potash rates were relatively stable at 31-33 kg/ha during the mid-late 1990s but, since then, have tended to decline and have been in the range 12-14 kg/ha since 2008.

5. Sulphur

Sulphur is an essential plant nutrient. In the past demand was satisfied through atmospheric deposition but this has declined significantly. There is therefore a need for sulphur application to crops and grass, with crops such as oilseed rape being particularly sensitive to sulphur deficiency. This nutrient is often applied in the sulphate form together with nitrogen fertilisers.

Data on sulphur use have only been collected 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 has increased markedly to 13-14% for cereals and 30% for oilseed rape. In 2013 43-53% of cereals and 72% of oilseed rape received a dressing of sulphur. Applications on grass were consistent with 2012 at 2 kg/ha, this low overall rate is caused by the low dressing cover, with only 8% of grass receiving a sulphur dressing.

Table 3: Overall sulphur use (kg/ha), Great Britain 2009 - 2013

	Tillage crops	Grass	All crops and grass
2009	19	2	10
2010	23	2	12
2011	26	2	13
2012	29	2	14
2013	27	2	13

6. Organic manures

Historically, the Survey has focussed on the application of manufactured fertilisers although in recent years it has also collected information on the use and movement of organic manures². 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.

In 2013, around 68% of farms in the survey 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. The percentage of farms using cattle FYM has declined by 2% since 2009, whereas the use of cattle slurry has remained more consistent over the period and was used on 17% of farms in 2013. Not all of the manure generated by a farm is necessarily retained for use by that farm, the BSFP indicates that about 2% of farmers export manure.

In 2013 organic manure was applied to 23% of the area of tillage crops whereas this was 35% for grass five years and over and 47% for grass under five years old. The majority of cattle manure and slurry applications were made to grassland, reflecting the practice of utilising the manure on the farm on which it is produced. Broadcast application is by far the predominant method of application of slurry. Fields for winter sown crop are primarily treated in August and September, prior to drilling, whereas spring sown and grass fields are predominantly treated between November and April.

Table 4: Numbers and percentage (%) of farms using each type of manure in Great Britain, 2013

	None	Cattle FYM	Cattle slurry	Pig FYM	Pig Slurry	Layer manure	Broiler/turkey litter	Other FYM	Other farm	Bio-solids	Other non-farm	Total
Farms in sample	438	692	246	33	16	41	46	55	9	50	24	922
Farms in population	31,963	45,927	15,682	1,708	623	2,330	1,808	4,252	394	1,839	996	58,848
Farms in population %	35%	51%	17%	2%	1%	3%	2%	5%	0%	2%	1%	65%
Volume (Mt: Mm ³)	n/a	34.2	39.8	1.4	2.0	0.9	0.6	1.5	1.2	2.6	1.0	85.2
Volume %	n/a	40%	47%	2%	2%	1%	1%	2%	1%	3%	1%	100%

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

The nutrient levels in organic manures vary according to the type of manure but provide a valuable source of nitrogen, phosphorus and potassium. Where used, applications of manufactured fertiliser can usually be reduced. Farmers were not specifically asked whether they adjusted manufactured fertiliser inputs because of manure use, but an indication of this is possible by comparing fields that received manure with those that did not. For the major tillage crops, cereals, oilseed rape and sugar beet, the overall application rate of nitrogen was lower on fields which had received manure. This was also seen for phosphate use on winter wheat, sugar beet and winter oilseed rape and for potash use on winter barley, sugar beet and oilseed rape. The difference was more variable in other instances. This may in part be due to the relatively small sample size which causes higher statistical variability.

² The underlying sample design of the BSFP is constructed to measure manufactured fertiliser usage and therefore may not represent the population of farmers using organic manures as robustly.

Further information

Methodology

The BSFP is a voluntary annual survey with respondents selected from a population of agricultural holdings compiled using the June Agricultural Survey. The target sample size is around 1,500 farms; this sample size has been designed to achieve a statistically representative sample at the national level. Data collection is undertaken mainly through face to face interviews with individual farmers and in 2013 the response rate was 51%. The underlying sample design of the BSFP is constructed to measure manufactured fertiliser usage and therefore may not represent the population of farmers using organic manures as robustly. The standard errors are relatively small for tillage crops, all crops and the main arable crops of wheat, oilseed rape and barley. Detailed methodology is provided in the full Report.

All calculations of fertiliser rates are based on sown area of crops rather than field areas³ and results are expressed in terms of the equivalent nutrient. The overall application rate takes into account the proportion of the crop area treated and the actual field rate of application used.

Revisions

There are no data revisions to report for 2013.

Glossary of key terms

Tillage refers to all crops except grass, forestry, glasshouse crops and uncropped land.

Grass refers to all forms of grassland which may be grazed, conserved or grown for seed production; rough grazing is excluded.

Feedback

Feedback on the publication and the survey is welcome. Contact information for feedback or questions is provided on the front page of this statistical notice.

Other surveys of interest

Defra also run other surveys which may be of relevance and interest to fertiliser use and related practices through its Farm Practices Survey for England which is available of the Defra [website](#).

³ This reflects cross-compliance and environmental scheme measures where field margins remain uncropped.