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Water usage on farms: Results from the Farm Business Survey, England 2015/16

The Farm Business Survey (FBS) has collected data on the sources of water used on farms and the proportion of water used from each of these sources for each of the last three years. Volumes were not collected. The latest results cover the year ending spring 2016 (including the 2015 harvest). The overall findings are very similar to those from the 2013/14 and 2014/15 surveys. This data will not be collected in 2016/17. The key results are given below:

Water Sources

- Mains supply continues to be the most common source of water on farms (85% of farms in 2015/16), particularly for those in the east of the country and those outside Severely Disadvantaged Areas (SDA).
- 31% of farms abstracted water from rivers/streams/springs for immediate use. Usage was more likely on grazing livestock farms, farms in the South West and farms in Severely Disadvantaged Areas (SDA).
- 25% of farms used water from bore holes. Usage was more likely on specialist dairy, farms, larger farms and farms in the west of the country.

Average proportions of water used per farm by source

- In 2015/16 farms sourced, on average, two thirds of their water from the mains supply, 19% from bore holes and abstracted 12% from rivers/streams/springs for immediate use.
- Cereal farms, spare and part time (very small) farms and farms in the east of the country tended to source a greater proportion of their water from the mains supply than other farms.
- Dairy farms, larger farms and farms in the South West tended to source a greater proportion of their water from bore holes than other farms.
- LFA grazing livestock farms and farms in the north of England tended to abstract a greater proportion of the water that they used than other farms.

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Detailed results

Government sustainability strategies for the use of water highlight its importance for both business and residential users in terms of both resources and cost. They also reflect the need to adapt to climate change and other pressures (such as changing land use) and underpin an overall need to find ways of using water more efficiently and sustainably. Whilst agricultural use amounts to only 1%¹ of England's water usage, there are regional differences².

Water has a wide range of uses on farms including irrigation, spraying, drinking for livestock and washing down livestock buildings. Some farms abstract water from rivers and bore holes whilst others rely solely on the mains supply.

The 2009/10 Farm Business Survey (FBS) included a detailed water module. This collected a range of information on the source and utilisation of water, the economic cost of water and water related activities and behavioral attitudes among farmers to water management. The results of this module were published alongside results from the 2010 Irrigation survey³. In 2013/14, the FBS began to collect data on water sources and the proportion of water used from each source. Volumes were not collected.

Results from the 2009/10 survey are not directly comparable with those published since 2013/14 due to changes in the coverage of the survey and the classification of farms. Equivalent results for 2009/10 were presented alongside results for 2013/14 in the statistical notice for water usage published on the 20th October 2015⁴.

This release provides the main results from the 2015/16 FBS together with [confidence intervals](#). A full breakdown of results by farm type, farm size, farm tenure, region, farm economic performance and Less Favoured Area (LFA) status can be found at: <https://www.gov.uk/government/collections/farm-business-survey>

Regression models were fitted to the key results to help determine the main factors driving response in 2015/16. In each case six factors were considered - farm type, farm size, farm tenure, region, farm economic performance and LFA status.

Given the similarity in the published results for each year, this data will no longer be collected annually. We anticipate that the data will next be collected in 2017/18.

¹ Estimated abstractions from all surface and groundwaters by purpose and Environment Agency region: 2000 – 2013. For more information please see: <https://www.gov.uk/government/statistical-data-sets/env15-water-abstraction-tables>

² https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/435394/agindicator-da5-16jun15.pdf

³ <http://webarchive.nationalarchives.gov.uk/20130315143000/http://www.defra.gov.uk/statistics/foodfarm/farmmanage/fbs/publications/water-usage/>

⁴ <https://www.gov.uk/government/statistics/water-usage-on-farms-results-from-the-farm-business-survey-england-201314>

1. Weather

Weather conditions can influence water usage on farm. This section provides some background to the differing weather conditions that affected the 2013, 2014 and 2015 harvests.

2013/14 (2013 harvest)

Rainfall tended to be above average in autumn 2012, although there were marked regional variations. The wet weather meant that some farmers struggled to drill crops, disrupting cropping patterns for the 2013 harvest. The spring of 2013 was the coldest recorded since 1962 with heavy snow falls from mid to late January which hampered the establishment of spring sown crops and the recovery of poorly established winter sown crops. Summer 2013 was warmer and drier than average (with a prolonged heat wave in July). Parts of southern and south west England and East Anglia received less than half the average rainfall. The harvest began slightly later than usual (due to crop ripeness), but weather conditions were generally favourable with warm and settled weather in late August.

2014/15 (2014 harvest)

Autumn 2013 saw temperatures slightly above average. Favourable weather conditions enabled good establishment of winter crops for the 2014 harvest. The winter months, although featuring above average temperatures were exceptionally stormy and were the wettest since 1910, with major flooding occurring. The severe flooding in some regions resulted in sizeable areas of cereal crops being lost. Spring 2014 saw above average temperatures. The warm spring resulted in good grass growth with livestock being turned out earlier than usual in some regions. Summer 2014 was warmer than average, although August was the coldest since 1993. June and July were dry months for most of England, whilst August was wet.

2015/16 (2015 harvest)

Autumn 2014 was warmer than average, the third warmest on record since 1910, which aided the remaining harvest and the establishment of winter crops. Winter temperatures were around average although there were some significant regional wintry storms. Spring 2015 saw average temperatures, sunshine and rainfall; April was the sunniest on record since 1929. Summer 2015 temperatures were below average; June was drier but July and August were wetter than average. Harvesting of cereals started earlier in some regions with little need for crop drying. However, the wet conditions in August impacted on the harvest in other areas with increased downtime and crop drying. September was the coldest since 1994. Temperatures in November were well above average and good progress was made on drilling crops for the 2016 harvest.

2. Water sources

Key findings:

- Mains supply continues to be the most common source of water on farms (85% of farms in 2015/16), particularly for those in the east of the country and those outside Severely Disadvantaged Areas (SDA).
- 31% of farms abstracted water from rivers/streams/springs for immediate use. Usage was more likely on grazing livestock farms, farms in the South West and farms in Severely Disadvantaged Areas (SDA).
- 25% of farms used water from bore holes. Usage was more likely on specialist dairy, larger farms and farms in the west of England.

This section looks at the sources of water used on farms. The most common source of water continues to be the mains supply (85% of farms in 2015/16). 31% of farms abstracted water from rivers/streams/springs for immediate use in 2015/16. A quarter of farms used water from bore holes (Table 1). These results are very similar to those for 2013/14 and 2014/15.

Table 1: Percentage of farms using various water sources^(a), England

Water source	Percentage of farm businesses (%)			95% Confidence Interval (%)		
	2013/14	2014/15	2015/16	2013/14	2014/15	2015/16
Mains water	86	86	85	±2	±2	±2
Rivers, streams, springs for abstraction (immediate use)	28	29	31	±2	±2	±3
Bore holes	24	25	25	±2	±2	±2
Rainwater storage	7	7	8	±2	±1	±2
Rivers, streams, springs for abstraction (storage)	5	4	6	±1	±1	±1
Ponds/lakes/reservoirs	3	2	2	±1	±1	±1

Source: Farm Business Survey, England 2013/14, 2014/15 and 2015/16.

Based on responses from 1889 farm businesses in 2013/14, 1880 businesses in 2014/15 and 1805 businesses in 2015/16.

(a) Farm businesses could have more than one water source.

Figures 1 to 3 show the relationship between water sources and region, farm type and LFA status for 2015/16. To provide a better understanding of the underlying relationships between farm characteristics and water sources, we have fitted regression models. In each case six factors were considered - farm type, farm size, region, farm tenure, farm economic performance and LFA status.

Mains water

The use of mains water was significantly⁵ related to region, LFA status and tenure in 2015/16. Farms in the east of the country were more likely to use mains water than those in the west (Figure 1). Farms located in Severely Disadvantaged Areas (SDA) were less likely to use mains water (52% of farms in 2015/16, Figure 3) than those outside LFAs (89% of farms in 2015/16).

⁵ A generalised linear regression model was fitted to examine which factors (farm type, farm size, region, farm tenure, LFA status, and farm economic performance) were significant. Region, tenure and LFA status were significant at the 5% level in 2015/16.

Rivers, streams, springs for abstraction (immediate use)

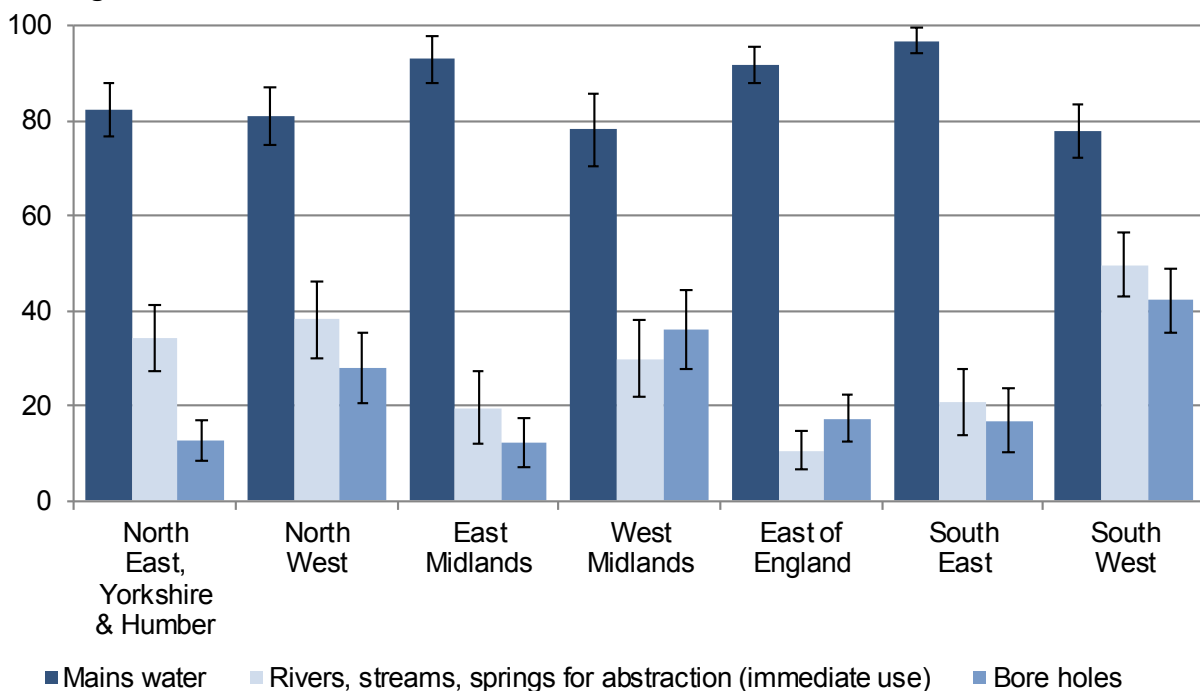
The use of abstracted water from rivers/streams/springs for immediate use was significantly⁶ related to farm type, region, LFA status and farm size in 2015/16. Usage was more likely on grazing livestock farms (Figure 2) than on other farm types and on farms in the South West (50% in 2015/16, Figure 1) and those located in the SDA (69% in 2015/16, Figure 3). After allowing for these factors, larger farms were more likely to abstract water than smaller farms.

Bore holes

The use of water from bore holes was significantly⁷ related to farm size, region, farm type and tenure in 2015/16. Farms in the west of the country and larger farms were more likely to use bore holes than those in other regions and smaller farms. Usage was more likely on specialist dairy farms than on other farm types.

Figure 1: Sources of water by region, England 2015/16

Percentage of farm businesses



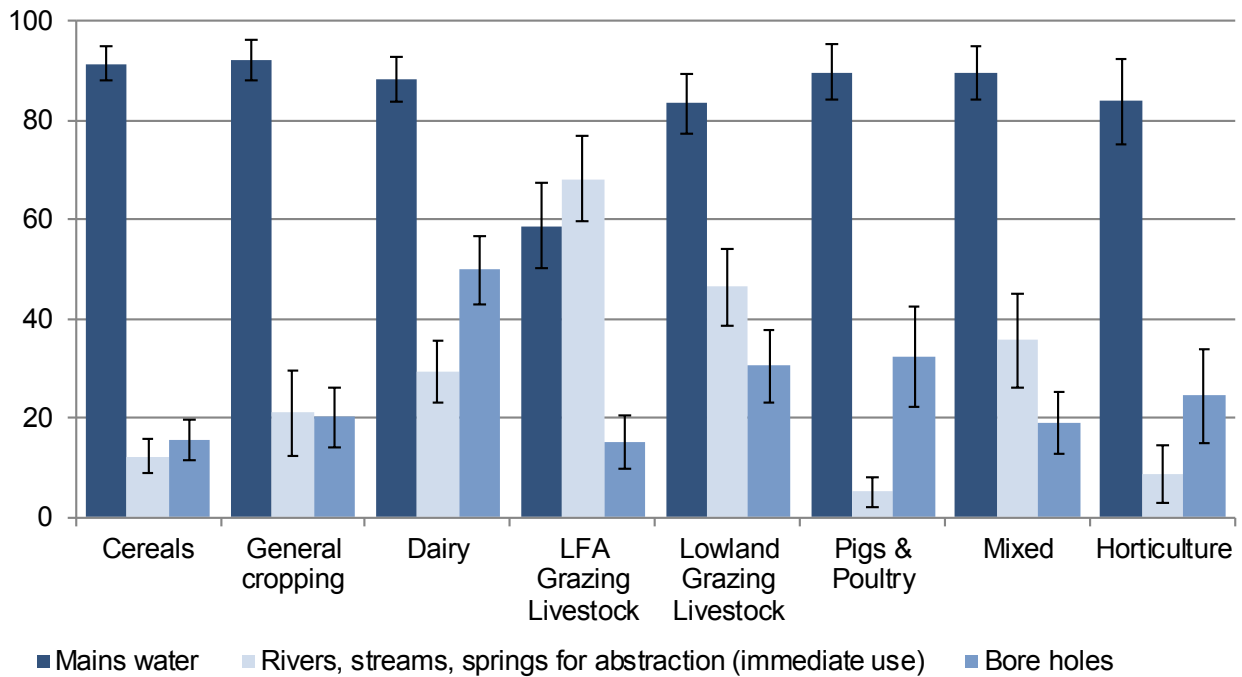
Source: Farm Business Survey.

⁶ A generalised linear regression model was fitted to examine which factors (farm type, farm size, region, farm tenure, LFA status, and farm economic performance) were significant. Farm type, size, region and LFA status were significant at the 5% level in 2015/16.

⁷ A generalised linear regression model was fitted to examine which factors (farm type, farm size, region, farm tenure, LFA status, and farm economic performance) were significant. Farm type, size, tenure and region were significant at the 5% level in 2015/16.

Figure 2: Sources of water by farm type, England 2015/16

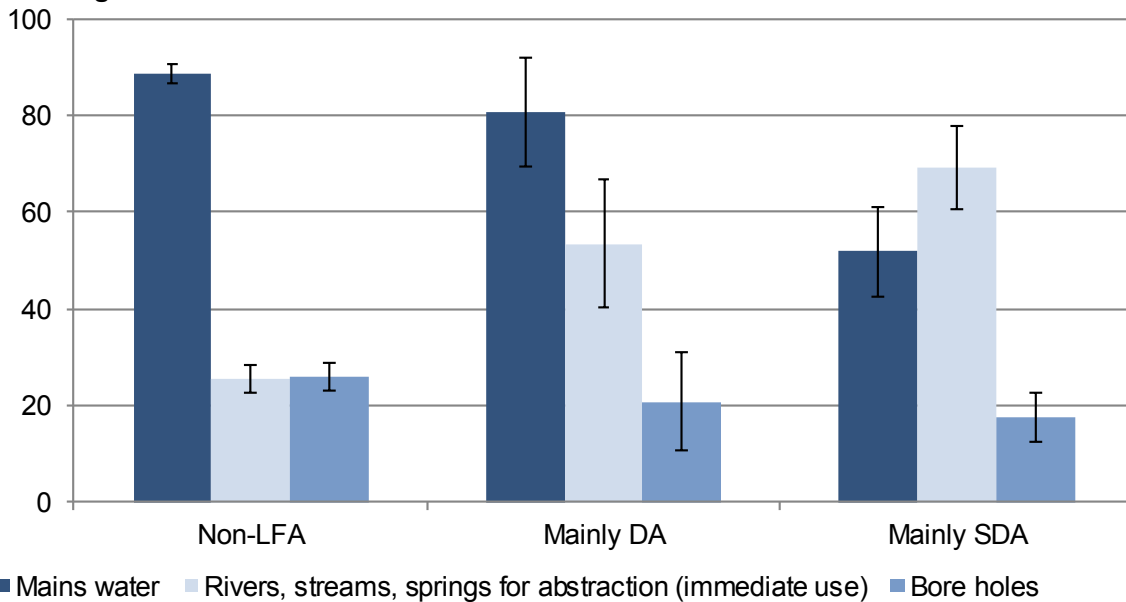
Percentage of farm businesses



Source: Farm Business Survey.

Figure 3: Sources of water by LFA status, England 2015/16

Percentage of farm businesses



Source: Farm Business Survey.

3. Proportions of water used per farm by source

Key findings:

- In 2015/16 farms sourced, on average, two thirds of their water from the mains supply, 19% from bore holes and abstracted 12% from rivers/streams/springs for immediate use.
- Cereal farms, spare and part time (very small) farms and farms in the east of the country tended to source a greater proportion of their water from the mains supply than other farms.
- Dairy farms, very large farms and farms in the South West tended to source a greater proportion of their water from bore holes than other farms.
- LFA grazing livestock farms and farms in the north of England tended to abstract a greater proportion of the water that they used than other farms.

Volumes of water have not been collected since the 2009/10 survey. Instead, farmers have been asked to provide the proportion of water that was used from each water source. In 2015/16 farms sourced, on average, two thirds of their water from the mains supply, 19% from bore holes and abstracted 12% from rivers/streams/springs for immediate use. These are very similar results to those in 2013/14 and 2014/15.

Table 2: Average proportion of water used^(a) per farm, England

Water source	Average proportion of water used (%)			95% Confidence Interval (%)		
	2013/14	2014/15	2015/16	2013/14	2014/15	2015/16
Mains water	66	66	65	±2	±2	±2
Bore holes	18	18	19	±2	±2	±2
Rivers, streams, springs for abstraction (immediate use)	12	12	12	±1	±1	±1
Rivers, streams, springs for abstraction (storage)	2	2	3	±1	±1	±1
Rainwater storage	2	1	2	±1	±1	±0
Ponds/lakes/reservoirs	1	1	1	±0	±0	±0

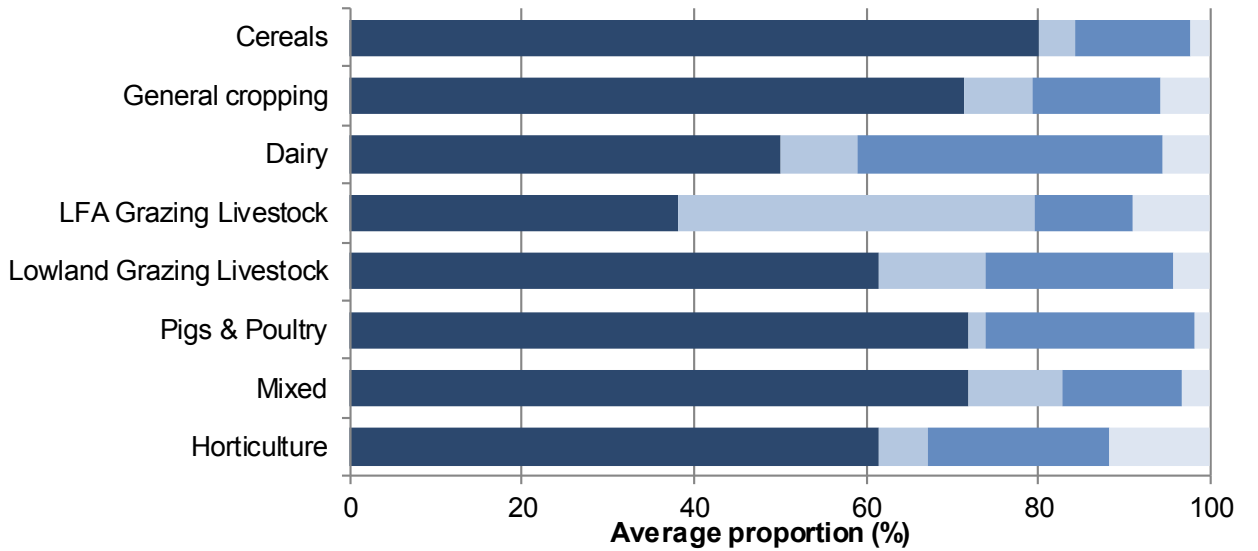
Source: Farm Business Survey, England 2013/14, 2014/15 and 2015/16.

Based on responses from 1843 farm businesses in 2013/14, 1862 businesses in 2014/15 and 1786 businesses in 2015/16.

(a) Farms that did not provide any data on the proportion of water used were excluded (as well as those farms that used no water in general).

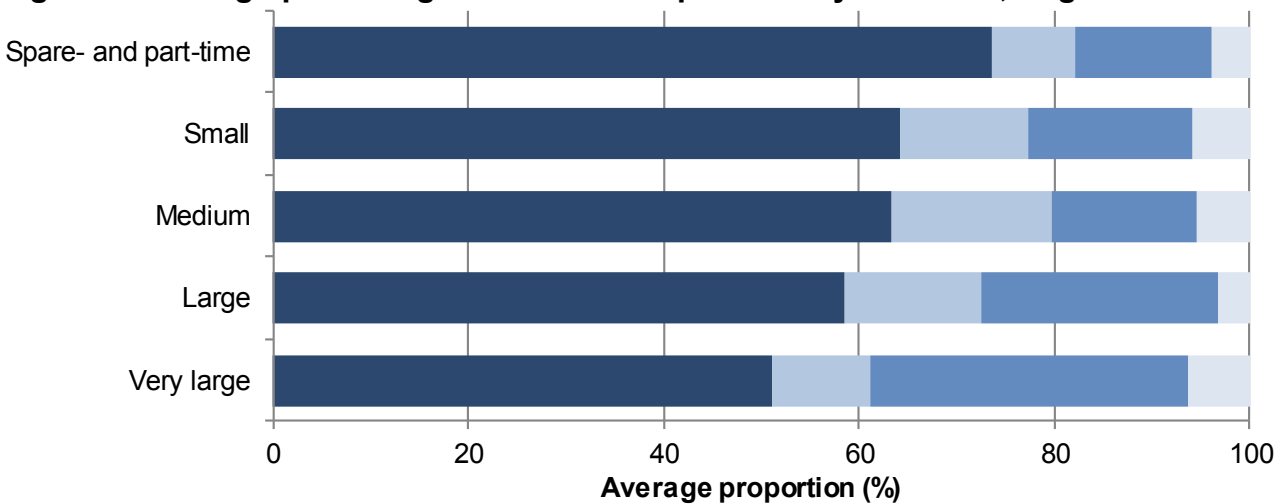
Figures 4 to 6 show the relationship between the average proportions of water used per farm from various water sources and farm type, farm size and region. Cereal farms, spare and part time (very small) farms and farms in the east of the country tended to source a greater proportion of their water from the mains supply than other farm types, larger farms and those in the west of the country. Dairy farms, very large farms and farms in the South West tended to source a greater proportion of their water from bore holes than other farm types, sizes and regions. LFA grazing livestock farms and farms in the north (North West, North East and Yorkshire & Humber) tended to abstract a greater proportion of the water that they used than other farm types and those in other regions.

Figure 4: Average percentage of water used per farm by farm type, England 2015/16



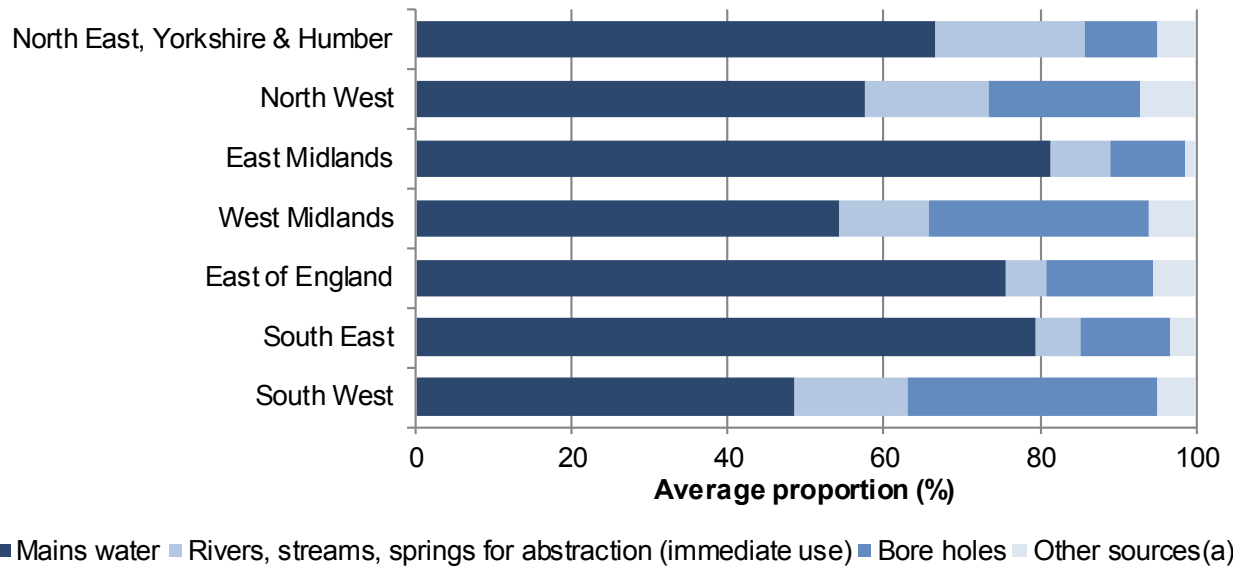
■ Mains water ■ Rivers, streams, springs for abstraction (immediate use) ■ Bore holes ■ Other sources(a)
 Source: Farm Business Survey.
 (a) Other sources includes: Rivers, streams, springs for abstraction (storage), Ponds/lakes/reservoirs, Rainwater storage

Figure 5: Average percentage of water used per farm by farm size, England 2015/16



■ Mains water ■ Rivers, streams, springs for abstraction (immediate use) ■ Bore holes ■ Other sources(a)
 Source: Farm Business Survey.
 (a) Other sources includes: Rivers, streams, springs for abstraction (storage), Ponds/lakes/reservoirs, Rainwater storage

Figure 6: Average percentage of water used per farm by region, England 2015/16



Source: Farm Business Survey.

(a) Other sources includes: Rivers, streams, springs for abstraction (storage), Ponds/lakes/reservoirs, Rainwater storage

Survey details

Survey content and methodology

The Farm Business Survey (FBS) is an annual survey providing information on the financial position and physical and economic performance of farm businesses in England. The sample of around 1,800 farm businesses covers all regions of England and all types of farming with the data being collected by face to face interview with the farmer. Results are weighted to represent the whole population of farm businesses that have at least 25,000 Euros of standard output⁸ as recorded in the annual June Survey of Agriculture and Horticulture. In 2015, this accounted for approximately 56,500 farm businesses.

For further information about the Farm Business Survey please see:

<https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs/series/farm-business-survey>

Since 2013/14, extra questions have been included in the survey to collect information on water usage on farm. The information collected covered water sources and the percentage of volumes of water used.

Full details of the information collected on water usage can be found here:

<https://www.gov.uk/guidance/farm-business-survey-technical-notes-and-guidance>

Data analysis

The results from the FBS relate to farms which have a standard output of at least 25,000 Euros. Initial weights are applied to the FBS records based on the inverse sampling fraction for each design stratum (farm type by farm size). These weights are then adjusted (calibration weighting⁹) so that they can produce unbiased estimators of a number of different target variables.

Accuracy and reliability of the results

We show 95% confidence intervals (95% CI) with the results. These show the range of values that may apply to the figures. They mean that we are 95% confident that this range contains the true value and are calculated as the standard errors multiplied by 1.96. The standard errors only give an indication of the sampling error. They do not reflect any other sources of survey errors, such as non-response bias. For the Farm Business Survey, the confidence limits shown are appropriate for comparing groups within the same year only; they should not be used for comparing with previous years since they do not allow for the fact that many of the same farms will have contributed to the Farm Business Survey in both years.

⁸ For a definition of standard output please see the UK classification document here:

<https://www.gov.uk/farm-business-survey-technical-notes-and-guidance>

⁹ Further information on calibration weighting can be found here:

<https://www.gov.uk/farm-business-survey-technical-notes-and-guidance>

Availability of results

This release contains headline results for each section. The full breakdown of results, by farm type, farm size, region, farm tenure, farm economic performance and Less Favoured Area status can be found at: <https://www.gov.uk/government/collections/farm-business-survey>

Defra statistical notices can be viewed on the Food and Farming Statistics pages on the Defra website at <https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs/about/statistics>. This site also shows details of future publications, with pre-announced dates.

Data Uses

Data from the main FBS are provided to the EU as part of the Farm Accountancy Data Network (FADN). The data have been used to help inform policy decisions (e.g. Reform of Pillar 1 and Pillar 2 of the Common Agricultural Policy) and to help monitor and evaluate current policies relating to agriculture in England (and the EU). It is also widely used by the industry for benchmarking and informs wider research into the economic performance of the agricultural industry.

User engagement

As part of our ongoing commitment to compliance with the Code of Practice for Official Statistics <http://www.statisticsauthority.gov.uk/assessment/code-of-practice/index.html>, we wish to strengthen our engagement with users of these statistics and better understand the use made of them and the types of decisions that they inform. Consequently, we invite users to make themselves known, to advise us of the use they do, or might, make of these statistics, and what their wishes are in terms of engagement. Feedback on this notice and enquiries about these statistics are also welcome.

Definitions

Farm Type

Where reference is made to the *type of farm* in this document, this refers to the 'robust type', which is a standardised farm classification system.

Farm Sizes

Farm sizes are based on the estimated labour requirements for the business, rather than its land area. The farm size bands used within the detailed results tables which accompany this publication are shown in the table below. Standard Labour Requirement (SLR) is defined as the theoretical number of workers required each year to run a business, based on its cropping and livestock activities.

Farm size	Definition
Spare & Part time	Less than 1 SLR
Small	1 to less than 2 SLR
Medium	2 to less than 3 SLR
Large	3 to less than 5 SLR
Very Large	5 or more SLR

Farm Economic performance

Economic performance for each farm is measured as the ratio between economic output (mainly sales revenue) and inputs (costs). The inputs for this calculation include an

adjustment for unpaid manual labour. The higher the ratio, the higher the economic efficiency and performance. The farms are then ranked and allocated to performance bands based on economic performance percentiles:

- **Low performance band** - bottom 25% of performers
- **Medium performance band** - middle 50% of performers
- **High performance band** - top 25% of performers

Severely Disadvantaged Areas and Less Favoured Areas

The *Severely Disadvantaged Areas* (SDA) are more environmentally challenging areas. They are largely upland in character and together with Disadvantaged Areas (DA) form the Less Favoured Areas (LFA) classification established¹⁰ in 1975 as a means to provide support to mountainous and hill farming areas.

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¹⁰ Council Directive 75/268/EEC.