

RESAS

Rural & Environmental Science
and Analytical Services



Scottish Government
Riaghaltas na h-Alba
gov.scot



Cereal and Oilseed Rape Harvest 2018 Final Estimates

Methodology



This document provides a summary of quality-related information on the Cereal and Oilseed Rape Harvest 2018 - Final Estimates.

The information is based on the European Statistical System (ESS) quality framework: Relevance; Accuracy; Timeliness and Punctuality; Accessibility and Clarity; and Comparability.

The Scottish Government adheres to the Code of Practice for Official Statistics and the National Statistician's guidance on quality. In addition, the Scottish Government provides its own guidance on quality, which is available to view at the Scottish Government's Statistics internet pages.

Further information on quality:

- [Code of Practice for Official Statistics](#)
- [National Statistician's Guidance on Quality](#)
- [Scottish Government's Corporate Policy Statement](#)
- [Scottish Government Guide to basic quality assurance](#)
- [European Statistics Code of Practice \(including quality framework\)](#)

Definitions

Area - the amount of area (in hectares) that was used to grow a particular crop, where the crop was intended for combine harvesting or the production of grain or oilseeds. This area may include some crops that were eventually not harvested, or whole-cropped.

Yield - Average yields (tonnes per hectare) represent the amount of cereal grain or oilseed that is extracted from one hectare of crop grown.

Production - the total tonnage of cereal grain and oilseed that is combine harvested from the planted area. This tonnage does not include the weight of straw, whole-cropped or other plant material, which is produced as a by-product or used for other purposes.

When discussing production and area we are referring to estimated totals. When discussing yield we are referring to estimated averages.

Whole cropped - Whole crop cereals are harvested whole (i.e. without extracting the grain) and are used as a source of animal feed or for industrial use.

Data Providers

The 2018 final estimates of production are based mainly on final yield results from the 2018 Cereal Production Survey (CPS) and final crop areas from the 2018 June Census.

The CPS is a disproportionate stratified random sample of around 630 farms in Scotland, stratified by region. The construction of the sample is based on the Neyman Allocation, which apportions larger sample sizes to the strata with the most variation in yields.

In 2018, the number of holdings submitting a return for spring barley was 282, winter barley was 91, wheat was 138, oats was 59 and oilseed rape was 78. For some regions relatively few returns were received for some crops.

Totals of sample production and sample crop area for each stratum (i.e. crop and region combination) are used to derive a sample estimate of yield. These yield values are applied to national crop areas from the 2018 June Agricultural Census to calculate national estimates of production.

Where sample sizes for strata are insufficient to calculate production results national average yield estimates for the crop are used to calculate estimates of production. Regional results for winter oats and spring oilseed rape were generally based on national averages.

The 2018 CPS was mainly carried out by ADAS on behalf of the Rural and Environment Science & Analytical Services (RESAS) within the Scottish Government (SG). RESAS carried out the survey for about 10 per cent of the total sample, relating to the less common crops where the same farms are often surveyed each year.

The survey was carried out by mail and by telephone. Returns were able to be submitted by post, online or by telephone. Completed returns were quality checked by ADAS, with further quality checking and analysis being carried out by RESAS.

The data undergo several validation processes as follows:

- checking for any obvious errors on the paper survey and online forms upon receipt
- cross checking against census area data and internal validation within survey forms to ensure totals match
- results are standardised to 14.5 per cent moisture content for cereals and nine per cent moisture content for oilseed rape, this ensures there is consistency in estimates of the amount of dry matter which can be extracted from cereal grain and oilseeds.
- assessing data for any extreme yield values and removing if necessary

Data quality and assurance measures used for 2018 June Census area data are contained in the methodology and quality assurance report from the 2018 June Agricultural Census.

<https://www.gov.scot/publications/results-june-2018-scottish-agricultural-census/>

New data on disposal estimates of barley, wheat and oats have been published this year in Table 6 of the publication. This table shows tonnage estimates of barley, wheat and oats and where the crops have been used for the 2017 harvest.

The disposals data was collected by postal survey at the end of each month during the year, though in the future they will be collected at just three points, November 2018, January 2019 and June 2019. The data collection was carried out by RESAS.

Farmers who have taken part in the CPS are asked how much of their crops have been used and where their crops have been used. As this data collection takes place from November 2018 until June 2019, disposal figures from the 2018 harvest cannot be published at this time.

Disposals data is published from the 2017 harvest as this data collection was completed in June 2018. Any crops from the 2017 harvest that have not been used are not carried over in to the 2018 harvest disposals figures.

Relevance

The degree to which the statistical product meets user needs for both coverage and content.

The cereal estimates are produced for a wide range of purposes. The statistics help the government to form, monitor and evaluate policy, and to assess the economic well-being of the cereal sector.

They are also required, by law, by the [Statistical Office of the European Communities](#) as the information is essential for management of the EU markets. These estimates are timed to enable provision of data for an EU regulatory deadline. The data is also used to provide information to the World Trade Organisation and the Food and Agriculture Organisation.

The production estimates feed into the [UK cereals balance sheet](#), which provides an independent, unbiased, timely and comprehensive picture of the supply and demand position of the UK cereal market. The balance sheet is also the prime tool for tracking new developments in the UK cereals industry and determining their impact on the market. The balance sheet is widely used by policy makers, the EU Commission and the wider cereals industry.

In January 2018, the classification of Nomenclature of territorial units for statistics (NUTS regions), which are set by Eurostat, were revised. This has meant that Scotland is now broken down into five NUTS 2 regions, rather than four NUTS 2 regions. More information can be found on the Eurostat website.

<https://ec.europa.eu/eurostat/web/nuts/background>

To bring these statistics in line with this new classification, Table 4 of the publication has been updated from previous years. It now shows the regional breakdown of production, yield and area for 2017 and 2018 for the five NUTS 2 regions of Scotland:

- North Eastern Scotland
- Highlands and Islands
- Eastern Scotland
- West Central Scotland
- Southern Scotland

User Feedback

Though we are not aware of any unmet user needs in relation to these statistics, the Scottish Government is always interested to here from users about what is most relevant to them and welcomes feedback from users of these statistics. Contact details are available from the [Agriculture Statistics contacts](#) webpage.

Details of both current and past user consultations are available on the [Agriculture Statistics consultations](#) webpage.

Accuracy

The closeness between an estimated result and the (unknown) true value.

The number of agricultural holdings surveyed in the 2018 CPS was 630. Returns were received from 386 holdings and the number of usable returns was 344, giving a response rate of usable returns of 55 per cent.

Although 344 holdings participated, many holdings grow more than one crop. The total number of returns received for all crops was 648.

The results from the CPS have a margin of error associated with them, reflecting the error resulting from sampling. Sampling error is the difference between the estimate derived from a sample survey and the true value that would result if a census of the whole population were taken under the same conditions.

The sampling error can be estimated and used to produce confidence intervals around the survey results. These intervals tell us the range of values within which the true value lies, with a given degree of confidence. The intervals below are 95 per cent confidence intervals; this means that if the sample survey was repeated a large number of times, 95 per cent of the resulting estimates would lie within the intervals around our sample estimates. For example, there is a 95 per cent chance that the true production value for all cereals in Scotland will lie within the range of 2.512 million tonnes \pm 186,000 tonnes.

Table 1 gives the 95 per cent confidence intervals for the 2018 CPS. These are also show on charts 1 and 2.

Table 1: 95 per cent confidence intervals for 2018 CPS

Crop	Number of Holdings (June Census)	Sample Size	Sampling %	Production ('000 tonnes)	Confidence Limits ('000 tonnes)	Confidence Limits (%)
Total Cereals ¹	8,174	570	6.97	2,512	\pm 186	\pm 7.52
Spring Barley	6,991	282	4.03	1,388	\pm 69	\pm 4.99
Winter Barley	1,620	91	5.62	268	\pm 18	\pm 6.6
Wheat	2,573	138	5.36	681	\pm 80	\pm 11.82
Oats	1,750	59	3.37	176	\pm 19	\pm 12.3
Oilseed Rape	1,108	78	7.04	126	\pm 12	\pm 9.71

¹ excludes Oilseed Rape

The charts highlight the main production estimates marked with the upper and lower bounds of the associated confidence intervals. Note that the chart have different scales, this is to allow the results to be viewed clearly.

Charts 1 and 2: Production estimates with 95 per cent confidence for 2018 CPS

Chart 1 - Production Estimates

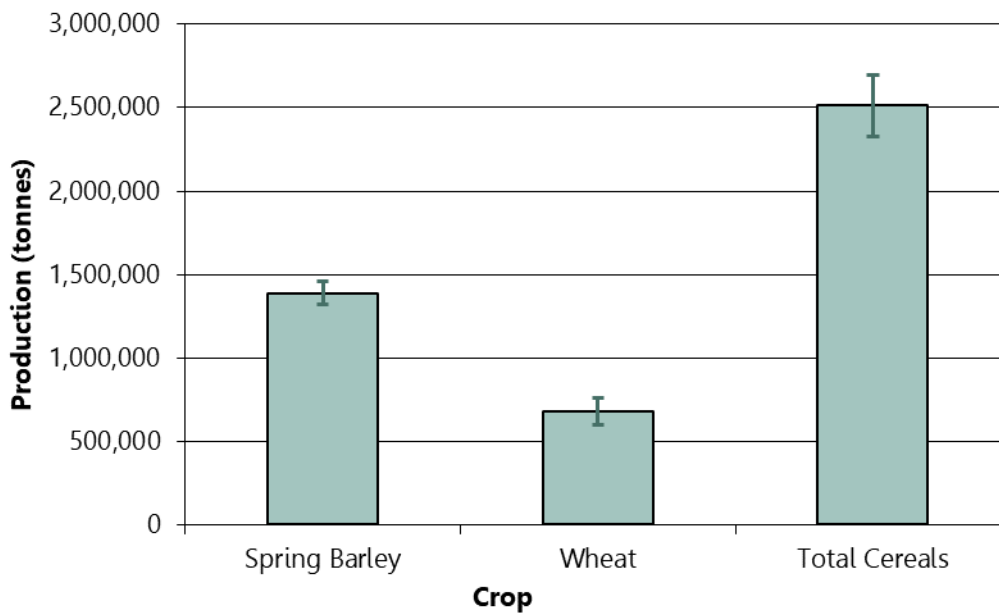
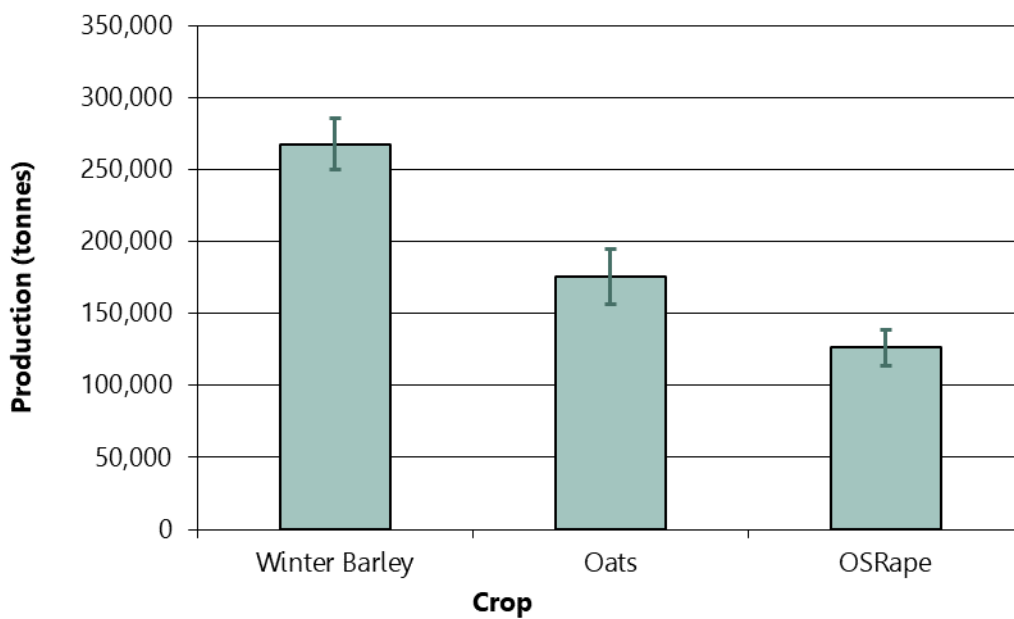


Chart 2 - Production Estimates



Comparison of first and final results

This section compares first estimates of the harvest to the final estimates of the harvest. First estimates of the Scottish cereal and oilseed rape harvest are derived at the annual Crop Report Meeting (CRM). A panel of experts from the Scottish cereal industry provide their estimates of the harvest yields, based on their initial soundings, and these are applied to provisional data for areas sown. More information on the methodology and results of the 2018 first estimates of the cereal and oilseed rape harvest can be found in the first estimates of the cereal and oilseed rape harvest release.

<https://www.gov.scot/publications/initial-estimate-scottish-cereal-oilseed-rape-harvest-2018/>

The purpose of this section is to quantify the size and direction of the differences between the two estimates in order to give an indication of the robustness of these first estimates.

The results from the CPS have a margin of error associated with them, reflecting the error resulting from sampling. The intervals were calculated as 95 per cent confidence intervals, meaning that there was a 95 per cent chance that the true population value was within the resulting interval, see table 1. The 2018 first estimates of overall production were within these limits for all crop types except for wheat.

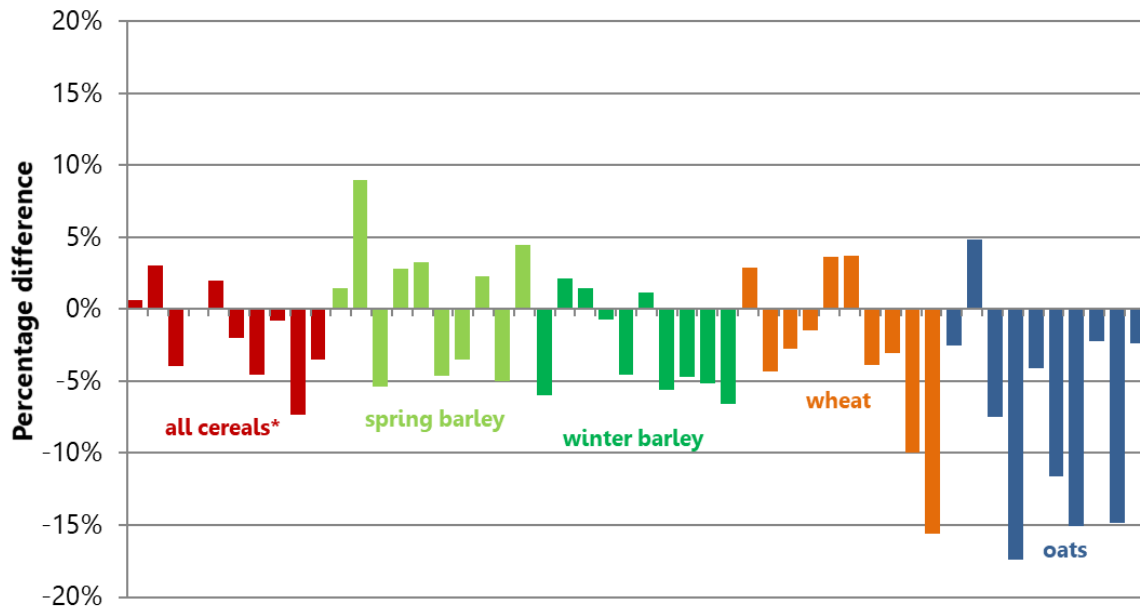
In previous years, the provisional June Agricultural Census area figures used to calculate the first production estimates have been slightly different from the final June Agricultural Census areas used to calculate the final production estimates. However, these differences have generally been small (less than one per cent) and are not a main contributor to differences in the production estimates.

The main reason for differences in the first and final production estimates are differences in first and final yield estimates. Chart 3 shows these differences for the last ten years. A full breakdown of the differences between the estimates is provided in Table 5 within the publication.

It can be seen from Chart 3 that in the last ten years the first estimate of the total cereal harvest has been within five per cent of the final estimate, 2017 was the only year where this percentage difference was higher. In the last two years, the difference between the first and final estimates for wheat yield have been 10 per cent or higher.

Differences in the first and final estimates are mainly due to fewer farm results being available for the CRM. This year's CRM took place on Tuesday 25th September 2018. When the meeting took place, the harvest was still underway in some areas of Scotland. In addition, the nature of the industry bodies involved in the production of first estimates means that the results are likely to be more representative of commercial cropping farms, and less representative of farms growing crops for on-farm uses. This is the reason why the first estimates tend to overestimate production and yields compared to the final Cereal Production Survey (CPS) estimates.

Chart 3: Cereal yield, percentage comparison of First v Final Estimates, 2009 to 2018 (Positive numbers mean the final estimate was higher than the first estimate)



* includes triticale up until 2016

2009-2018 for each crop year

Timeliness and Punctuality

Timeliness refers to the lapse of time between publication and the period to which the data refer.

Punctuality refers to the time lag between the actual and planned dates of publication.

To provide reliable estimates of the year-on-year changes in production, the CPS is carried out at the same time each year. The reference date for the CPS, the date at which respondents are asked for production information, is the 31st October each year.

Typically, at the end of October the vast majority of the Scottish cereal and oilseed rape harvest is complete, allowing for reliable estimates to be made, although respondents are also asked to make estimates for any crop still to be harvested.

The release of results is completed within six weeks of this date, to allow sufficient time for data collection, processing, quality assurance and compilation, preparation and dissemination of final results.

The results of the 2018 CPS were released on the scheduled date of 12th December 2018.

Accessibility and Clarity

Accessibility is the ease with which users are able to access the data. It also relates to the format(s) in which the data are available and the availability of supporting information.

Clarity refers to the quality and sufficiency of the metadata, illustrations and accompanying advice.

These statistics are made available online at the Scottish Government's statistics website in accessible formats (html and pdf versions are available). Data tables are made available in excel format to allow users to carry out further analysis. Farm-level datasets may be made available to recognised research organisations.

Methodological notes and additional notes to tables, identifying specific quality issues, are included in this document, which is available online and linked to from all National Statistics outputs containing cereal production estimates. Links to the UK Agriculture Statistics series of outputs are available from the Gov.uk website, www.gov.uk.

Comparability

The degree to which data can be compared over time and domain.

Results for England, Wales and Northern Ireland, also released in December, are based on results from surveys similar to that of the Scottish Cereal Production Survey. The latest results of the UK cereal and oilseed rape harvest, including Scottish estimates, are available from the Gov.uk website, www.gov.uk.

The EC regularly produces estimates of cereal and oilseed production as both totals of EU-27 countries and individual countries. Further information on EC cereal statistics is available at the following website:

http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Agricultural_products

Typically EC results are published later than Scottish or UK results due to the additional time required to collate, validate and analyse data from several countries. Users interested in comparing results between countries should evaluate the relevant methodologies of sources used.

Related publications

The first estimates of the 2018 Scottish cereal and oilseed rape harvest were published in October 2018 and can be accessed here: [Agriculture and Fisheries - Publications](#)

Cereal usage figures have been published in the Economic Report on Scottish Agriculture (ERSA). These were last published in June 2018, and can be accessed here: [Agriculture and Fisheries - Publications](#)

Results from all Scottish Government agricultural surveys can be accessed here: [Agriculture, Fisheries and Rural - Publications](#)