



Revisions to the June Survey crop areas

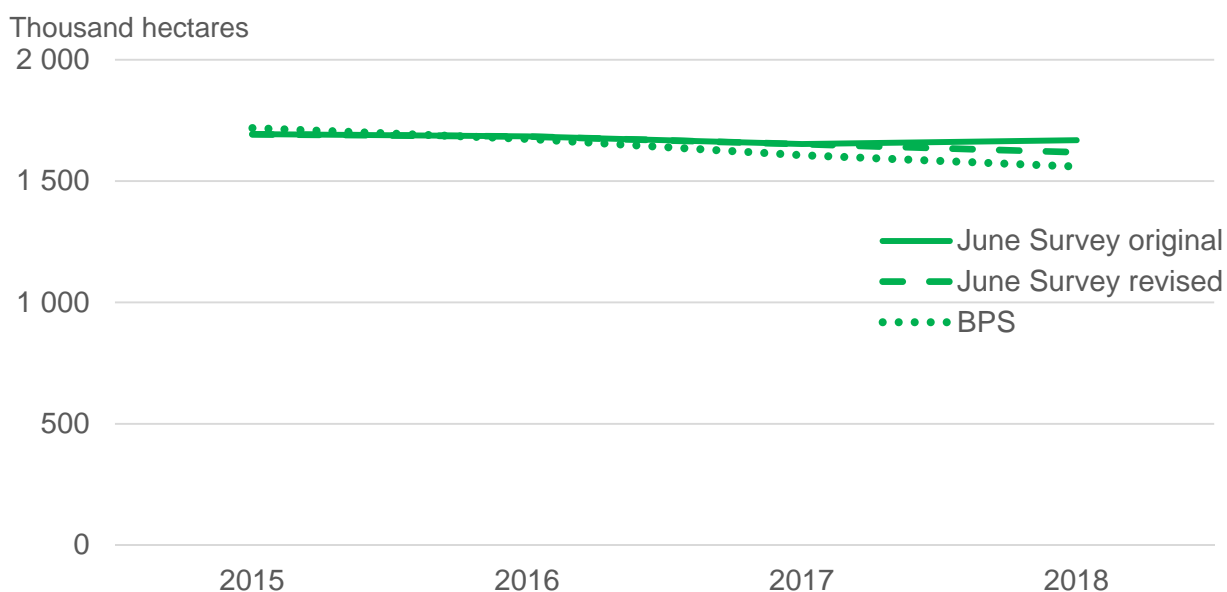
On 6 February 2019, Defra published crop areas for England sourced from the Basic Payment Scheme (BPS) alongside areas from the Defra June Survey of Agriculture. It was noted that, for some crops, the areas from the two data sources showed a greater divergence in 2018 than in previous years, particularly for wheat. This note documents the subsequent investigations and findings.

Summary of findings

The investigations confirm that robust procedures are in place for the June survey design, coverage and analysis, and that the techniques for dealing with non-response are appropriate and un-biased. There are valid reasons why the two data sources should differ slightly. Furthermore, uptake of the BPS has been falling which will lead to larger differences between the two data sources over time.

The greater divergence in areas for 2018 has been attributed to the provision of business, rather than holding, level responses from a sub-set of respondents to the 2018 June Survey. When the data for this sub-set of responses are corrected, the June Survey crop areas have been revised down. Wheat is the only crop significantly affected by the revisions (Figure 1). Revisions are minor for all other crops.

Figure 1: Wheat area from the Defra June Survey and BPS (England)



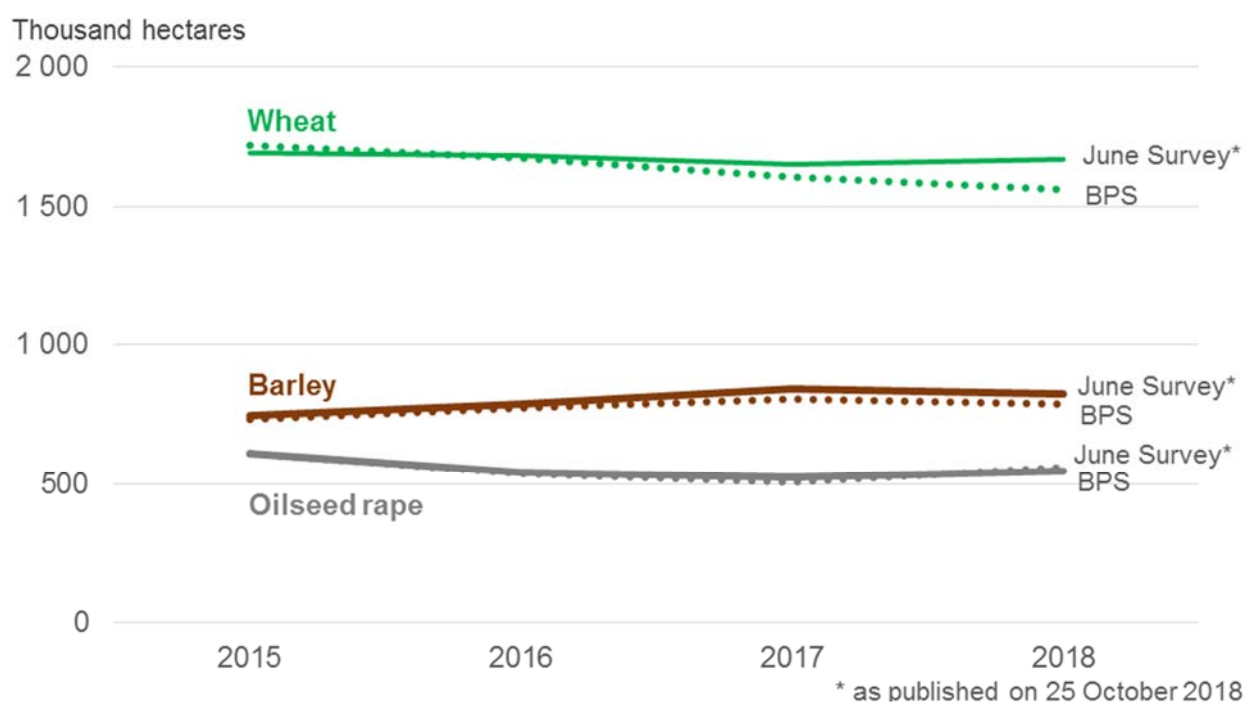
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Background

On 6 February 2019, Defra published crop areas for England sourced from the Basic Payment Scheme (BPS) alongside areas from the Defra June Survey of Agriculture. It was noted that, for some crops, particularly wheat, the areas from the two data sources showed a greater divergence in 2018 than in previous years (Figure 2).

Figure 2: Comparison of Basic Payment Scheme areas and June Survey areas (as published on 25 October 2018) for wheat, barley and oilseed rape



June Survey of Agriculture

Defra's annual June Survey has been the official source of crop areas since 1866. The survey also collects data on other land use, livestock numbers and labour. Until 1995, data were collected annually from all farm holdings. The data is now collected from a sample of farms in order to reduce both the cost to Government and the burden on farmers. The sample size is currently around 25,000 farm holdings per year (55,000 in 2016 to meet wider EU requirements), with the largest holdings sampled more regularly to ensure a good coverage of farmed area across England. The response rate is around 65-70%. A full census is held every decade to meet EU and UN requirements.

Basic Payment Scheme (BPS)

Since 2015, Basic Payment Scheme (BPS) claimants have been required to provide the areas and location of each individual crop grown by the farm business. This data is collected in order to verify the CAP crop diversification rules. Applications undergo a series of validation checks in the Rural Payment system. These checks include the size of the land parcels, the ownership of each parcel and the land cover. A proportion of claims are randomly selected for inspection to ensure they are claiming the correct land and crops.

Basic Payment Scheme claims are made at a business level. The vast majority of farm businesses are comprised of one holding. However, this is not always the case and there are a number of, particularly larger, businesses that have more than one farm holding.

Similarities and differences

There are genuine reasons why the crop areas from the two sources will not be identical:

- **Thresholds:** The June Survey includes a greater number of smaller farms than the Basic Payment Scheme.
- **Coverage:** There has been falling uptake of the Basic Payment Scheme since 2015. Horticulture, poultry and pig farms are much less likely than other farm types to claim BPS.
- **Survey vs administrative data:** By its very nature, there is an element of uncertainty associated with any sample survey. For wheat this is generally +/-2% of the published area and this is shown at the time of publication.

Thresholds

Farm businesses must have at least 5 hectares of eligible land in order to claim under the Basic Payment Scheme (BPS). The June Survey uses a threshold that is based on a wider range of farming activity than land area to ensure the inclusion of farm holdings that typically use land ineligible for BPS such as pigs, poultry and horticulture farms. Those holdings eligible for the June survey must meet at least one of these criteria: more than 5 hectares of agricultural land, 1 hectare of orchards, 0.5 hectares of vegetables or 0.1 hectares of protected crops, or more than 10 cows, 50 pigs, 20 sheep, 20 goats or 1,000 poultry.

Coverage

There has been a reduction in the number of businesses claiming BPS between 2015 and 2018, together with a reduction in the total area of crops covered by the scheme and hence the dataset. The total area of crops covered by the BPS has fallen by 2% since 2015 whilst the total area of grassland has fallen by 4% (Table 1).

Table 1: Number of claimants and eligible areas for the Basic Payment Scheme

	Number of Claimants	Total eligible area (Ha)	Crops (Ha)	Grass (Ha)
2015	87,563	8,809,000	3,869,000	4,940,000
2016	86,139	8,658,000	3,822,000	4,836,000
2017	85,414	8,578,000	3,809,000	4,769,000
2018	84,323	8,541,000	3,774,000	4,766,000

Survey vs Administrative data

The annual June Survey areas are calculated from a statistical survey of a random sample of around 25,000 farms (55,000 in 2016). Collecting data from a sample of farms minimises the cost to Government and the burden on farmers. As with all sample surveys, the calculated crop areas are subject to a degree of uncertainty and we publish the level of this uncertainty as “confidence intervals” with the crop area estimates. For the wheat area these confidence intervals are generally +/- 2% of the published estimate. The survey response rate is high, around 65-70%, and is closely monitored to ensure that any non-response is not concentrated in particular types of farm in order to minimise the possibility of bias.

Detailed Investigations

The following checks were undertaken. The outcome of each and any action taken for future surveys is provided. The investigations focussed on the wheat area, given the larger difference in crop areas.

1. 2018 June survey analysis

The results were recalculated by an independent analyst within the team to ensure all procedures were undertaken correctly. Very few farms (54) had any validation checks outstanding for arable crops at the time of analysis and the exclusion of data for these farms had minimal impact on the overall results. All refusals to complete the June survey and blank responses had been correctly removed from the analysis process. There were no more refusals or blank forms than in previous years.

Outcome: The analysis was performed correctly.

Action for 2019: No change. Each survey item is analysed individually by an analyst and then re-run and checked by another.

2. June Survey population

The population of all commercial agricultural holdings covered by the June Survey is produced each year using the Farm Survey Register and various administrative sources such as the Cattle Tracing System and the Sheep and Goat Inventory. A daily feed from the RPA's central register provides updates of new holdings and those that are no longer active. These sources allow us to limit the build-up of inactive holdings in the population but the process remains dependent on farmers updating their records with the RPA. The population was 107,000 holdings at the time of sampling in June 2018.

Outcome: The population was produced correctly for 2018.

Action for 2019: None. However, a register cleaning exercise may take place in advance of the full 2020 census to remove inactive holdings.

3. June Survey response rate

The June Survey sample is designed to be representative of all holdings in the population and is stratified by farm type and size. The sample size is usually around 25,000 holdings but rose to 55,000 holdings in 2013 and 2016 when detailed data was required to meet EU requirements. The response rate is generally high at around 70%. However, the response rate in 2018 was lower than expected at 63%. Feedback from farmers suggests this was due to uncertainty around Brexit and the difficult weather conditions at the time. Similar difficulties were faced in Wales.

Response is always monitored and there was no apparent bias in terms of the types or sizes of farms that did not respond. The lower response rate did not reduce the robustness of the results; confidence intervals were similar to previous years.

Outcome: Lower response rates did not have an impact on the robustness of the survey results.

Action for 2019: Increase sample size to compensate for lower response rates. Note that there will be a full census in 2020.

4. Late responses

Survey responses continue to be received from farmers many weeks after the survey data and often beyond the time that the results are calculated. In total, there were less than 400

additional responses received after “final” June results had been calculated and less than 150 of these had wheat in either 2017 or 2018. Overall, these holdings tended to have a larger increase in their wheat area than other farms. Re-running the results with these additional responses would have given an overall increase of 1.2% in the wheat area compared to the 1.0% seen in the published results.

Outcome: Including late responses would have further increased the 2018 wheat area by 0.2%.

Action for 2019: None.

5. Previous use of BPS data in June Survey results

Defra is required to publish crop areas in mid-August and early October each year to meet EU (and industry) requirements. Whilst BPS data has not been available early enough to feed into the production of these results, it has been used at a later stage. In 2016 and 2017, crop areas for non-responding and non-sampled holdings in the June Survey were taken from the BPS data for around 41,000 (2016) and 53,000 (2017) businesses thought to be comprised of one holding and used within our final holding level datasets. These final holding level datasets are used to validate (i.e. check for large changes) and analyse the subsequent year’s survey responses, thus improving accuracy. Results for 2017 and 2018 were recalculated excluding the 2016 and 2017 BPS data from the datasets. The results were similar to those published suggesting no bias had been introduced.

Outcome: Including BPS data for 2016 and 2017 to our holding level datasets has not caused bias in subsequent results.

Action for 2019: Early access has been requested to the 2019 BPS data. However, this data continues to be validated and updated until the final payments are made (from December) and it may still not be possible to use it to produce the August and October crop area estimates.

6. Comparison of responses

The fall in the BPS wheat area between 2017 and 2018 was found to be mainly due to reductions for those businesses that had made a claim in both years, rather than being due to businesses that had not claimed in 2018 (Table 2).

Table 2: Components of change for BPS wheat area

	<i>Businesses (no)</i>	2017 area (Th. ha)	2018 area (Th. ha)
Wheat in 2017 and 2018 (BPS both years)	22,531	1,545	1,513
Wheat in 2017 not 2018 (BPS both years)	2,834	45	0
Wheat in 2018 not 2017 (BPS both years)	2,380	0	36
Wheat in 2017 (BPS not claimed in 2018)	506	18	0
Wheat in 2018 (BPS not claimed in 2017)	291	0	12
		1,607	1,560

This led to a detailed comparison of the way in which farmers had provided their crop areas for both the BPS and the June Survey in 2018. This is not a straightforward process, not least because of the business (BPS) vs holding (June Survey) level nature of the two datasets. Unlike its predecessor, the Single Payment Scheme, the BPS does not collect details of individual holding numbers as part of the claim process for each business. The RPA has compiled a potential linking mechanism from available information held by the Agency which has allowed a reasonable comparison to be made.

Around three quarters of farm businesses claiming BPS are thought to be associated with just one holding. For the majority of this group, the data from the two sources was comparable. For example for almost two thirds (63%) of those with a wheat area, the 2018 June Survey wheat area matched the BPS area within +/-5%, and for three quarters, the wheat areas were within +/-10%. For those holdings with very different areas, this could be because the matching process is not perfect and without further information no action could be taken for these records.

For those businesses thought to have more than one associated holding, the investigation becomes more difficult because it is likely that not all of the holdings within each business will have been sampled for the June Survey and, even if sampled, may not have returned a form. We were able to look in detail at 1440 businesses (accounting for 3,841 holdings) where at least one of the holdings from the business had returned a June 2018 form. The findings were as follows:

- 600 businesses (1,838 holdings) had correctly returned June forms for just the sampled holding(s). This was evident because the June Survey responses were smaller than the BPS figures and in most cases the June responses matched the BPS area.
- 558 businesses (1,378 holdings) had returned June forms with markedly different values than the expected BPS areas. This could be due to the imperfect matching process and, with a lack of further information, no action could be taken for these records.
- 282 businesses (625 holdings) had returned a June form that recorded areas for the whole business instead of just the sampled holding. This was evident because the June survey responses were similar to the BPS areas. In these cases we could be more certain that there had been some over-recording of crop areas and we made adjustments to the results calculation process to account for this.

Outcome: The different reporting units (business vs holding) have the potential to confuse farmers. Comparing the two datasets is not simple, but there does appear to be have been an impact on the results from some inclusion of business instead of holding level responses. Where it is clear that this has occurred, action has been taken and the June Survey areas have been revised.

Action for 2019: All holdings sampled for June 2019 that are known to be part of a larger business have been asked to complete a survey form for each holding within the business. This will make businesses aware of the need to fill in a separate June survey form for each holding. There will be a validation check and should a business level return be provided, it will be queried with the farmer and dealt with appropriately in the calculation of results.

Results of the investigations

Figures 3 and 4 below show the revised English crop areas from the June Survey together with the corresponding BPS crop areas.

Figure 3: Comparison of Basic Payment Scheme areas and revised June Survey areas for wheat, barley and oilseed rape

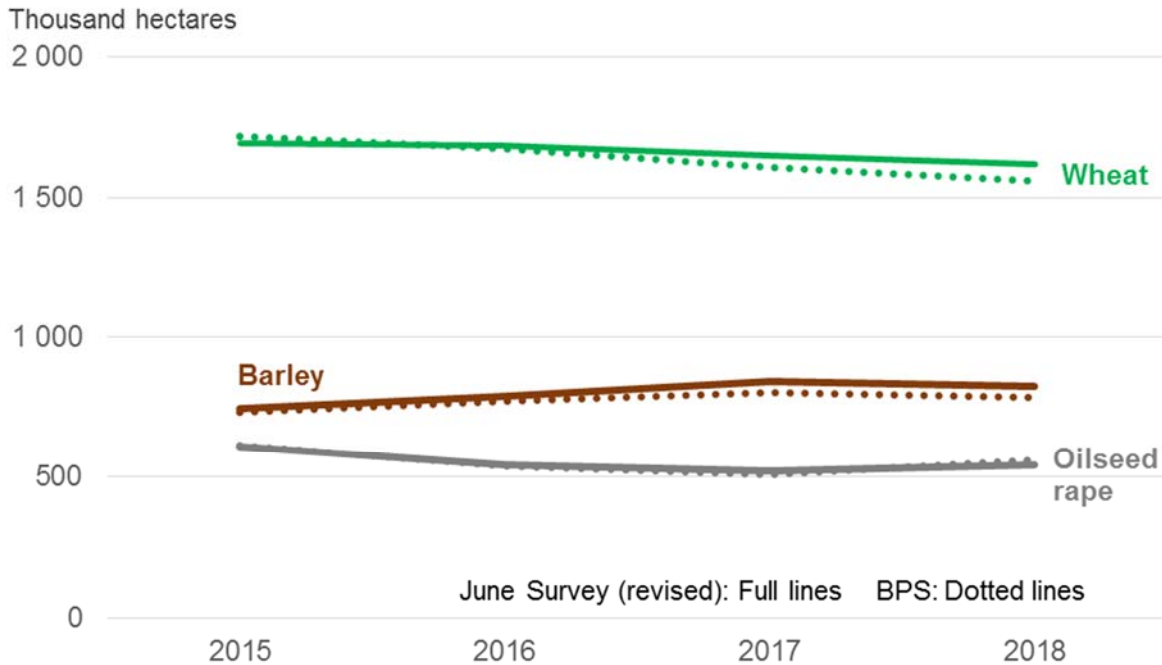


Figure 4: Comparison of Basic Payment Scheme areas and revised June Survey areas for maize, oats, peas, field beans and potatoes

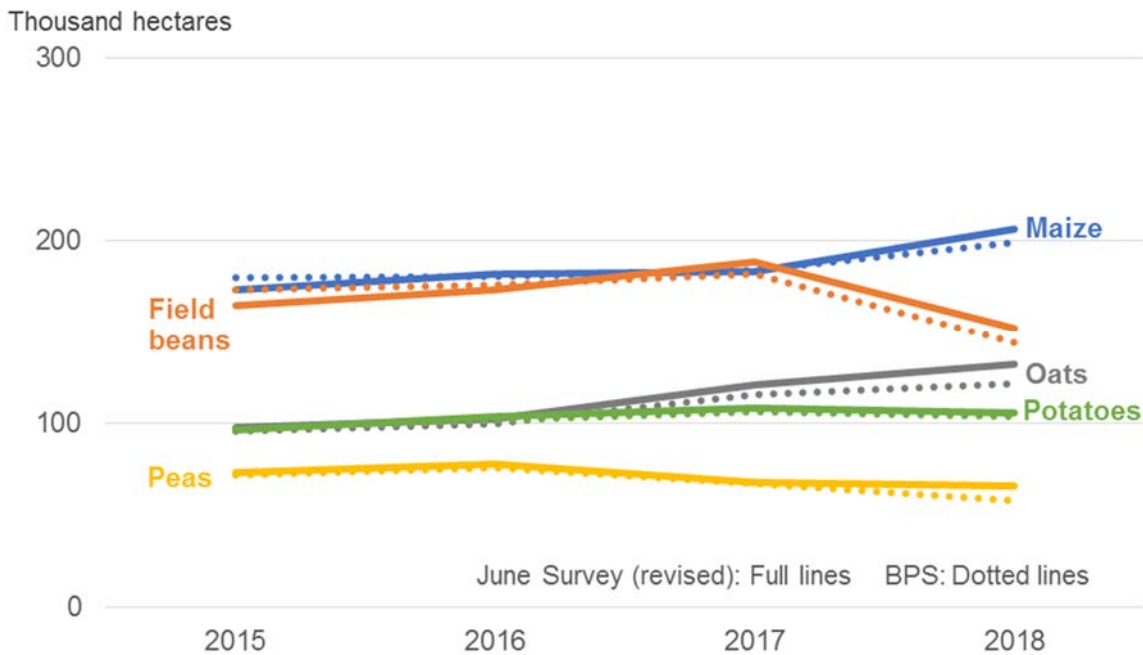


Table 2: English crop areas sourced from the Defra June Survey and BPS

Crop	Source	2015	2016	2017	2018	% change from 17-18
Wheat	BPS	1 719	1 674	1 607	1 560	-2.9%
	June Survey	1 693	1 684	1 652	1 668	1.0%
	June Survey revised				1 619	-2.0%
Winter Barley	BPS	361	369	347	324	-6.7%
	June Survey	376	376	361	343	-4.9%
	June Survey revised				336	-7.0%
Spring Barley	BPS	374	404	459	463	0.9%
	June Survey	373	416	482	482	0.1%
	June Survey revised				471	-2.2%
Oats	BPS	96	100	116	122	5.2%
	June Survey	98	102	121	134	11.0%
	June Survey revised				132	9.4%
Potatoes	BPS	97	102	106	104	-2.5%
	June Survey	96	104	108	107	-0.7%
	June Survey revised				106	-2.3%
Field beans	BPS	174	176	182	144	-20.7%
	June Survey	165	173	189	155	-17.9%
	June Survey revised				152	-19.4%
Peas	BPS	72	76	67	58	-14.0%
	June Survey	74	78	68	69	1.1%
	June Survey revised				66	-3.2%
Oilseed rape	BPS	613	539	507	559	10.4%
	June Survey	611	543	523	563	7.6%
	June Survey revised				545	4.2%
Maize	BPS	180	181	184	199	8.2%
	June Survey	173	182	183	209	14.2%
	June Survey revised				206	12.6%
Fallow	BPS	178	205	175	199	13.7%
	June Survey	179	216	200	230	14.9%
	June Survey revised				225	12.7%

Cereal and oilseed rape production estimates are calculated by combining average yields with June Survey areas. As a consequence, these have also been revised.

The following statistical releases have been updated to reflect the changes to the 2018 June Survey areas for England. All are available on the following webpage:

<https://www.gov.uk/government/collections/structure-of-the-agricultural-industry>.

- Farming Statistics – final land use, livestock populations and agricultural workforces at 1 June 2018, England (revised)
- Farming Statistics – final crop areas, yields, livestock populations and agricultural workforce at 1 June 2018, UK (revised)
- Farming Statistics – Crop areas in England (sources from Basic Payment Scheme data and the June Survey of Agriculture) 2015-2018 (revised)