

AGRICULTURE, ENVIRONMENT AND MARINE

Final estimates of the Scottish cereal and oilseed rape harvest 2015

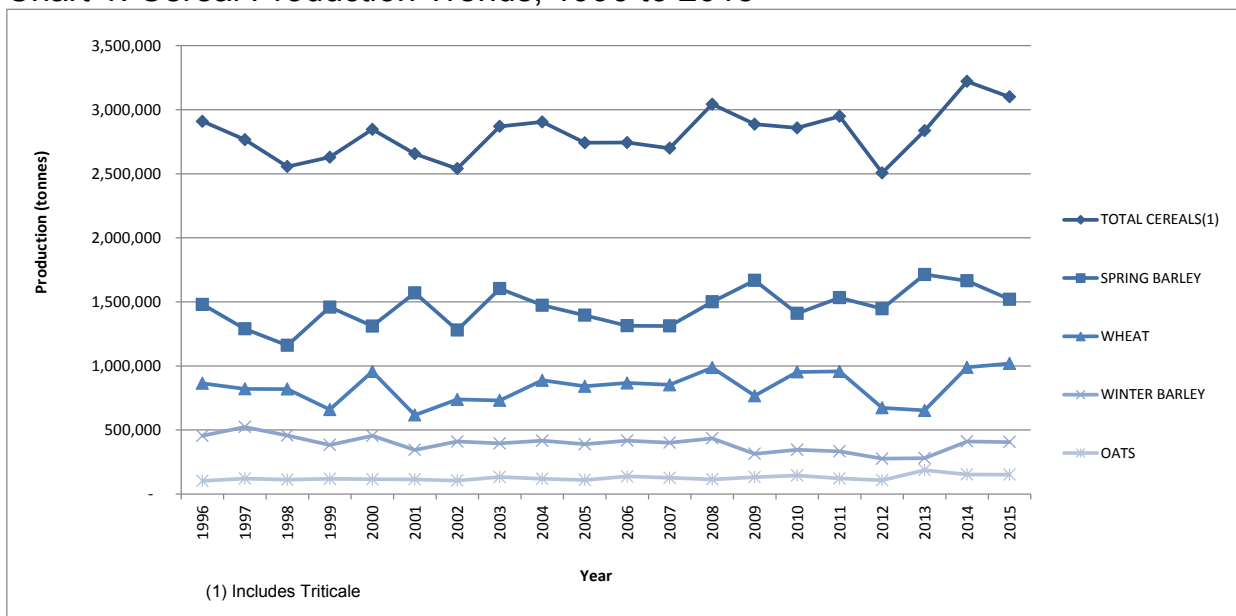
16th December 2015

Main Findings

Cereal production is estimated to have fallen by 121,000 tonnes between 2014 and 2015, to 3.1 million tonnes. The overall decrease in production this year is due to a four per cent decline in areas, which has been driven by reduced areas of barley. Overall estimates of yield have remained unchanged at seven tonnes per hectare. It is thought that the decline in the area of barley planted in 2015 is an effect of crop diversification rules introduced in the EC Common Agricultural Policy (CAP).

Yields for all cereals are lower than estimated in early (first) estimates released in October. The average cereal yield is 4.6 per cent lower than previously estimated.

Chart 1: Cereal Production Trends, 1996 to 2015



The figures released today were produced by independent statistical staff in accordance with professional standards set out in the Code of Practice for Official Statistics.

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Summary

This publication, released today by Scotland's Chief Statistician, contains final estimates of the 2015 cereal and oilseed rape harvest along with commentary and graphics on longer term trends. These final harvest estimates update the first estimates published in October.

Production Estimates

Cereal production is estimated to have fallen by 121,000 tonnes between 2014 and 2015, to 3.1 million tonnes. The overall decrease in production this year is due to a four per cent decline in areas, which has been driven by reduced areas of barley. Overall estimates of yield have remained unchanged at seven tonnes per hectare. It is thought that the decline in the area of barley planted in 2015 is an effect of crop diversification rules introduced in the EC Common Agricultural Policy (CAP).

Yields for all cereals are lower than estimated in early (first) estimates released in October. The average cereal yield is 4.6 per cent lower than previously estimated.

The recent 10 year average yield is six per cent above the previous decade's. Long term increases are likely to be due to improved efficiency in practices, development and use of high yielding varieties.

These estimates indicate that, compared with final estimates from the 2014 harvest:

- Spring barley production decreased by nine per cent to 1.5 million tonnes due to a seven per cent decrease in planted area and a two per cent decrease in the average yield.
- Winter barley production fell by one per cent to 406,000 tonnes due to a one per cent reduction in area. The average yield remained unchanged at 7.8 tonnes per hectare.
- Wheat production increased by three per cent to one million tonnes due to a three per cent increase in yield. Planted area remained unchanged.
- Oat production decreased by one per cent to 152,000 tonnes due to a three per cent decrease in yield. Planted area increased two per cent.
- Oilseed rape production increased by one per cent to 148,000 tonnes due to a four per cent increase in yield, despite a three per cent reduction in planted area.

Harvest Conditions

The 2015 harvest was late to start and, once underway, was halted several times by poor weather conditions. Weather conditions were not ideal for either planting in the spring or harvesting in the autumn. Industry experts have reported that yields for most crops are reasonable. Spring barley was harvested very late in the year (with harvesting underway in early September); with high moisture content reported at harvest and good nitrogen levels for distilling.

Wheat crops were generally late to mature and yields in the south have been especially good, though yields in the north are harder to estimate due to less data being available. Oilseed rape yields have been variable and the harvest is late with some skinning. Much of the oilseed rape crop is still to be harvested.

Comparison against provisional estimates

Yields for all cereals and oilseed rape have been revised downwards since the release of early estimates in October and this has resulted in lower estimates of production.

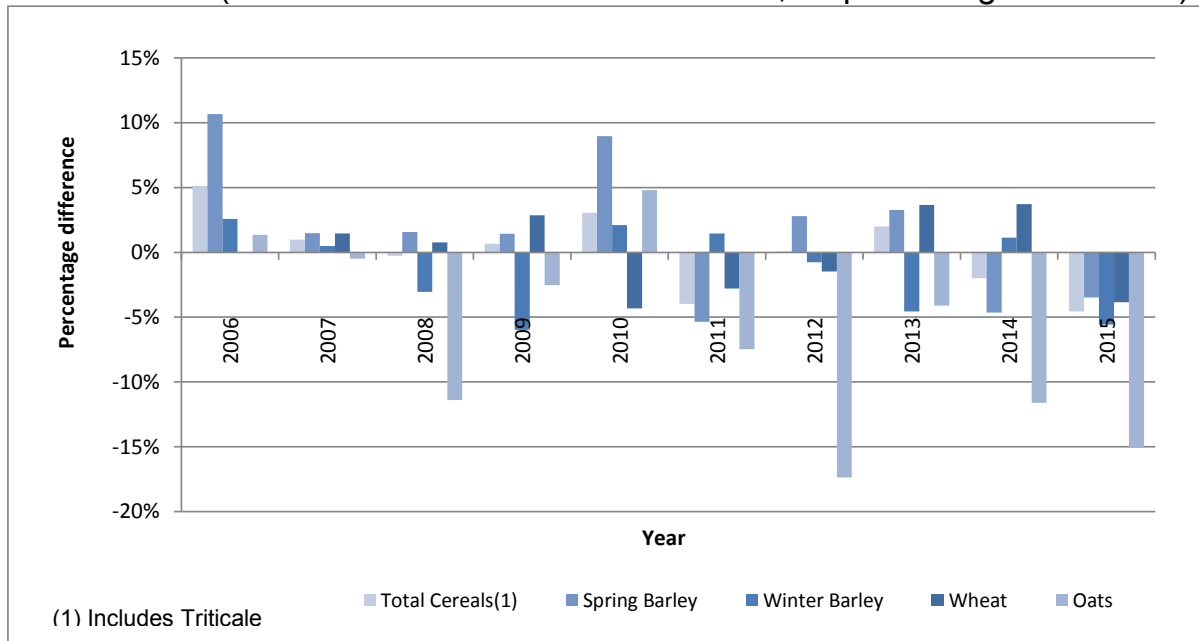
- Overall cereal production is estimated at 3.1 million tonnes; 145,000 tonnes below provisional estimates. A five per cent increase in yields was expected between 2014 and 2015, however yields have remained unchanged at 7.0 tonnes per hectare.
- The estimated decrease in production of spring barley (down nine per cent) is greater than suggested by provisional estimates (five per cent).
- Winter barley production was expected to rise by 19,000 tonnes, but has instead fallen by 5,000 tonnes compared to 2014.
- The increases in wheat and oilseed rape production (up three per cent and one per cent respectively) are smaller than suggested by provisional estimates (seven and two per cent).

Overall, the difference between provisional and final estimates is typically around five per cent or lower. Chart C (copied from the methodological and quality note) shows the differences in yields between the two estimates over the last ten years. Yield estimates of individual cereal crops do sometimes vary by more than five per cent.

This year the revision to overall cereal yield was 4.5 per cent. Notably, final yield estimates for all cereals are lower than provisional estimates.

In most years, the largest differences between provisional and final production estimates are for oats, with the largest difference being 17 per cent in 2012. This year the difference was 15 per cent.

Chart C: Cereal Production, Comparison of Provisional v Final Estimates, 2006 to 2015 (final estimates minus first estimates, as percentage difference)



Cereals¹

Production

Between 2014 and 2015, production is estimated to have fallen by 121,000 tonnes to 3.1 million tonnes. While the volume of production remains relatively high compared to previous years (production peaked in 2014 at 3.2 million tonnes), industry experts at the October Crop Report Meeting (CRM) reported concerns over quality and highlighted that grain skinning has been seen across the country in spring barley crops. These concerns were also reported by farmers during the collection of data for the final Cereal Production Survey (CPS) as were problems associated with disposal of the crops that would normally have been sold to merchants but were instead, in most cases, being fed to livestock.

Yield

The total cereal area fell slightly compared to 2014. When looking at cereals overall it is the reduced area that appears to have exerted a downward influence over production, though this is not uniform across the different cereal crops. The overall yield estimate for Scottish cereals has remained unchanged at its peak of 7.0 tonnes per hectare.

The long term trend of increasing yields remains, with the recent 10 year average of 6.6 tonnes per hectare, six per cent above the previous 10 year average. This long term increase is likely to be due to an improved efficiency in farming practices as well as development and use of higher yielding crop varieties.

Area

444,000 hectares of cereals were grown this year. Areas have ranged between 398,000 hectares in 2006 and 476,000 hectares in 1997. Cereal plantings have been influenced by various factors, including differing rates of compulsory set-aside between 1994 and 2008, relative competitiveness and profitability of cereals compared to other crops, as well as physical conditions at time of planting. The total cereal area includes 75 hectares of mixed grain.

Triticale

Triticale is a marginal crop in Scotland, grown on around 600 hectares. Because there are relatively few farms growing triticale, it is difficult to provide reliable yield estimates. However, for the same reason, variances in yield have little impact on overall cereal production. Triticale production is not discussed in this release, but is included in the overall cereal estimates.

¹ Includes triticale.

Charts

Chart 2 shows the areas estimated from the June Agricultural Census as bars and the estimated production and estimated average yield as lines. Area is presented in hundreds of hectares, production in thousands of tonnes and yield in tonnes per hectare.

In the same format as chart 2, chart 3 shows the year-on-year change of areas, total production and average yield. This allows the drivers of fluctuations in production to be more easily distinguished and gives a sense of the typical fluctuations from year to year. In chart 3 all measures are presented as the percentage change compared to the previous year.

In the following sections similar charts are used to display the results for each crop group, though the scales of the chart axes are not always the same.

Chart 2 - Total Cereals: Area, Yield and Production (includes triticale)

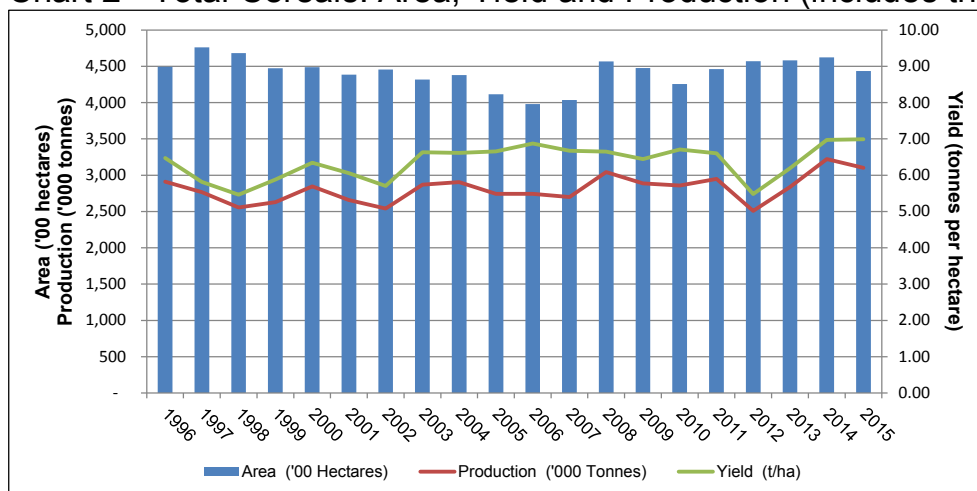
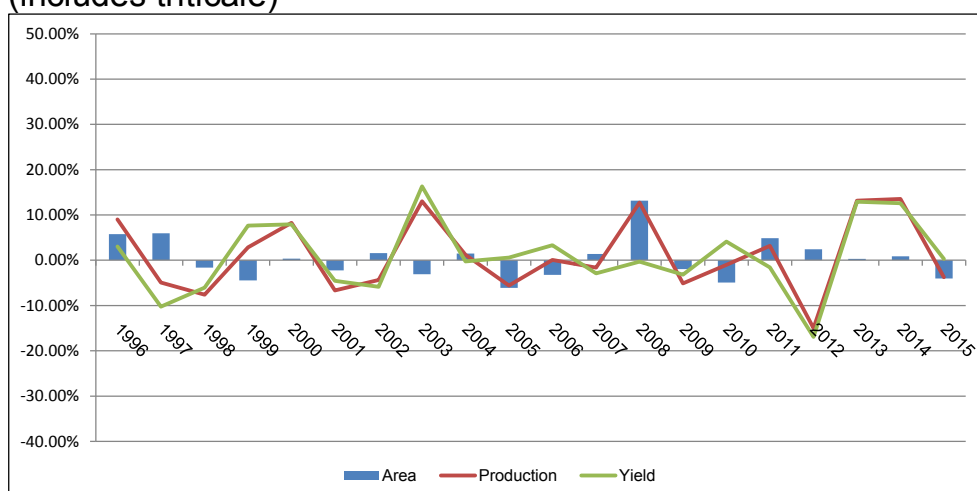


Chart 3 - Total Cereals Year-on-Year Change: Area, Yield and Production (includes triticale)



Barley

Barley is the predominant cereal crop grown in Scotland and, in 2014, contributed around a third of the UK barley production, particularly spring barley which accounted for just over half of the UK total (based on 2014 UK production figures). Despite a strong association with the Scottish whisky industry, as a key ingredient, most Scottish barley is used as animal feed.

Spring Barley Estimates (charts 4 and 5)

Over the last 20 years, spring barley production has been following a generally increasing trend. Production reached the highest level over the period in 2013, estimated at 1.71 million tonnes. However, since then production has fallen, by 49,000 tonnes in 2014 and a further 144,000 tonnes in 2015 to 1.52 million tonnes.

Grown areas decreased to similar levels as 2004, at 256,000 hectares. The average yield for spring barley in 2015 has been estimated at 5.9 tonnes per hectare, slightly below the 2014 peak of 6.1 tonnes per hectare. In the last 10 years yields for spring barley remained relatively stable until 2012; when yields experienced the largest change in a decade, with a fall of 14 per cent. This year's yields are estimated to have decreased by two per cent.

The longer term trend in yield is an increasing one, with the average over the most recent decade eight per cent higher than over the previous 10 years – when yields were both lower and more variable.

Winter Barley Estimates (charts 6 and 7)

2015 production is estimated to have decreased by one per cent to 406,000 tonnes. This year's estimated decrease is the result of a one per cent decrease in grown areas, as the average yield has remained unchanged at 7.8 tonnes per hectare.

Winter barley production follows a similar trend to grown areas; which peaked in 1997 and have been on a general decline since then. 52,000 hectares were grown in Scotland in 2015 which is comparable to the area grown in 2007.

The general trend in winter barley yields has been quite different. Relatively large fluctuations in yield gave way in 2001 to a period of steady increases, rising to a peak in 2006. While yields have declined since then, the recent 10 year average is seven per cent higher than that of the previous decade and, similarly to spring barley, also less variable. The average yield for winter barley in 2015 is estimated at 7.8 tonnes per hectare, maintaining the peak established in 2014.

Chart 4 - Spring Barley: Area, Yield and Production

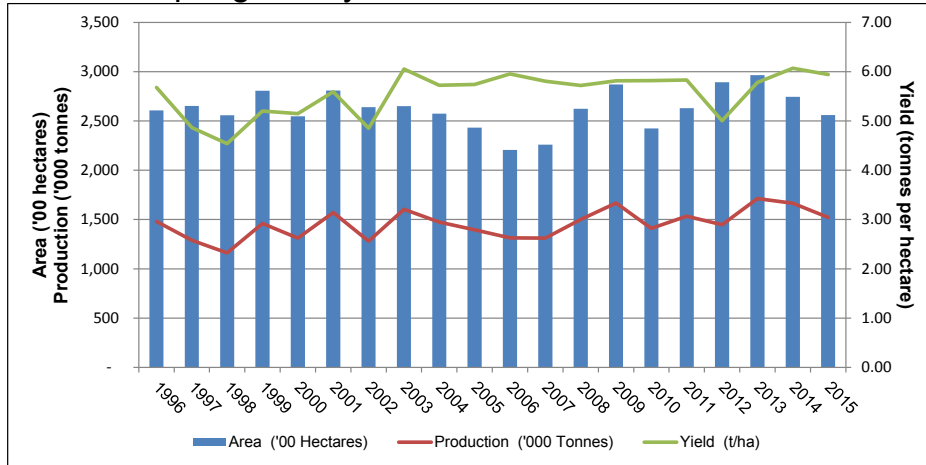


Chart 6 - Winter Barley: Area, Yield and Production

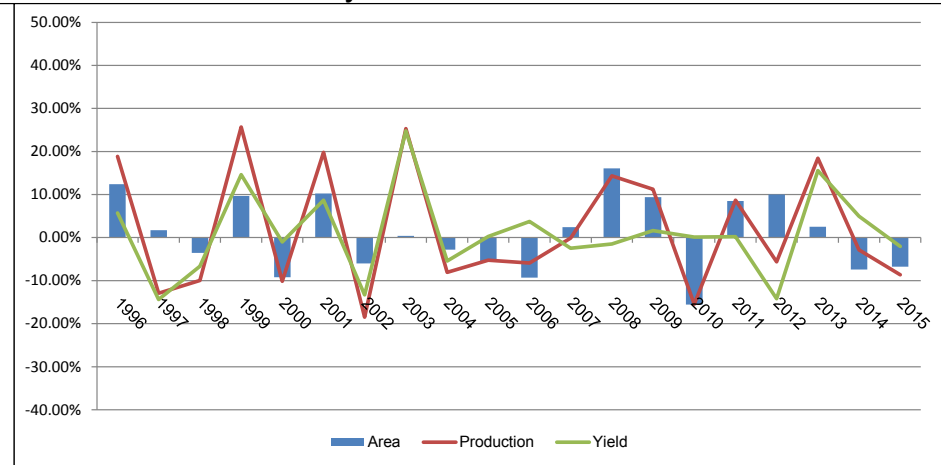


Chart 5 - Spring Barley Year-on-Year Change: Area, Yield and Production

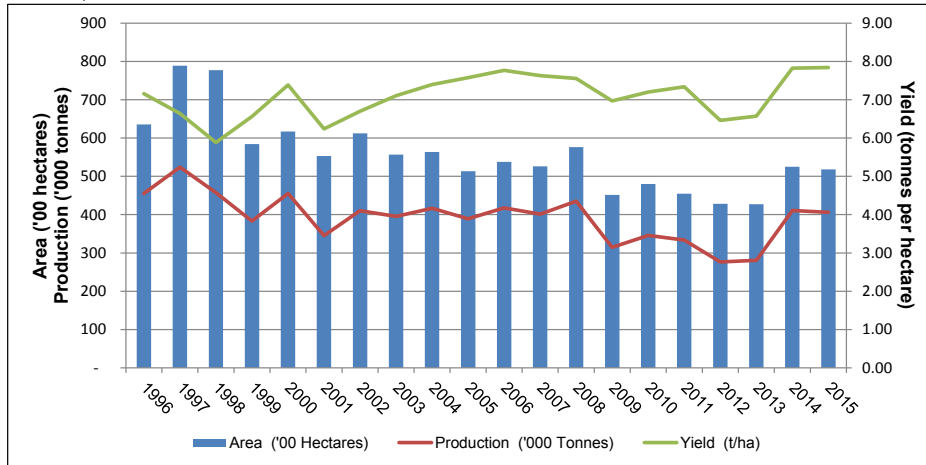
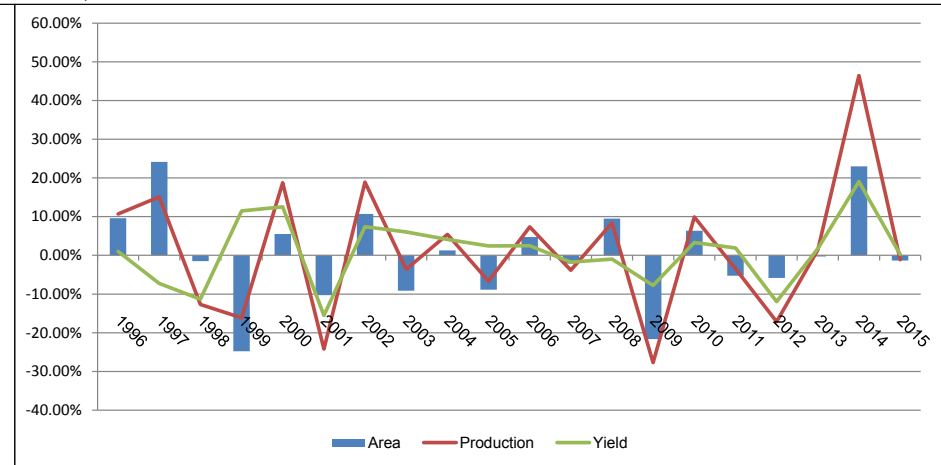


Chart 7 - Winter Barley Year-on-Year Change: Area, Yield and Production



Wheat

Scottish wheat is mostly soft wheats; used predominantly for distilling, but is also used for animal feed. Scotland imports hard wheats for milling (for bread making) as our climate does not suit hard wheat varieties.

Wheat Estimates (charts 8 and 9)

In 2012 and 2013 wheat production was particularly affected by poor growing conditions and fell by almost a third. Production in 2014 increased to similar levels seen in 2008, to 989,000 tonnes. In 2015, wheat production is estimated to have passed a million tonnes for the first time in 20 years, at 1.02 million tonnes. Wheat yields are estimated to have increased by three per cent while grown areas have remained largely unchanged.

110,000 hectares of wheat were grown this year. Areas have fluctuated considerably in the last 20 years, reaching a peak in 2011, with 2015 areas being comparable to that of 2000. Yields do not tend to fluctuate as much but are estimated to have increased to 9.3 tonnes per hectare in 2015.

In general, the higher variability in grown areas of wheat exerts a stronger influence over levels of production than relatively small fluctuations in yield. Areas, yields and production have been higher on average in the last decade than the previous one, by three per cent.

Chart 8 - Wheat: Area, Yield and Production

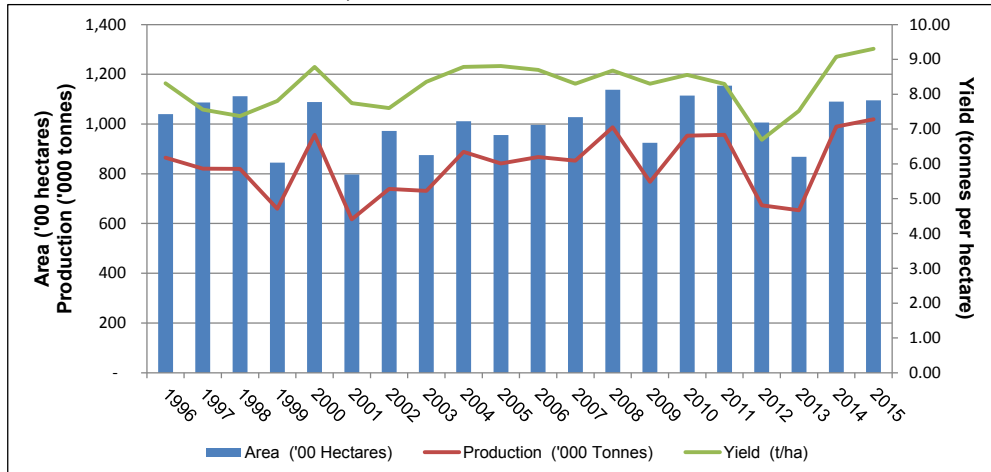
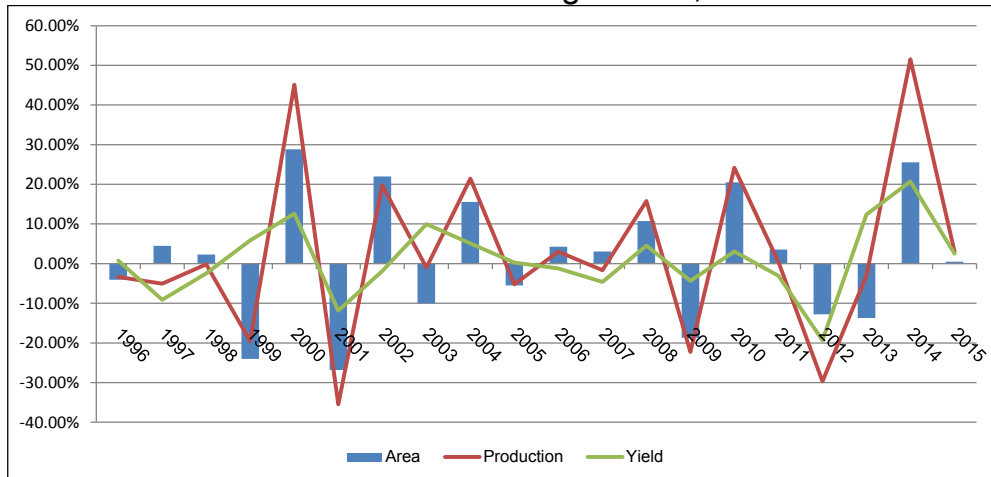


Chart 9 - Wheat Year-on-Year Change: Area, Yield and Production



Oats

The majority of oats grown in Scotland are used for milling and further processing for breakfast cereals, oatcakes, porridge oats and oatmeal for secondary processing outside Scotland. The majority of the remainder is used as specialist feed for horses.

Oats Estimates (charts 10 and 11)

Oat production is estimated to have decreased by one per cent this year due to a three per cent decrease in yield, despite a two per cent increase in grown areas. Production has fluctuated considerably in recent years, but particularly so in the last few years when it reached the highest level in the last 20 years, at 187,000 tonnes in 2013. The production is estimated to be 152,000 tonnes in 2015, an estimated decrease of 1,000 tonnes over the last year. Spring oats make up around two thirds of oat production.

This year's average yield is estimated at 5.9 tonnes per hectare, similar to the recent 10 year average (of 5.8), which has seen an eight per cent average increase compared to the previous decade.

Chart 10 - Oats: Area, Yield and Production

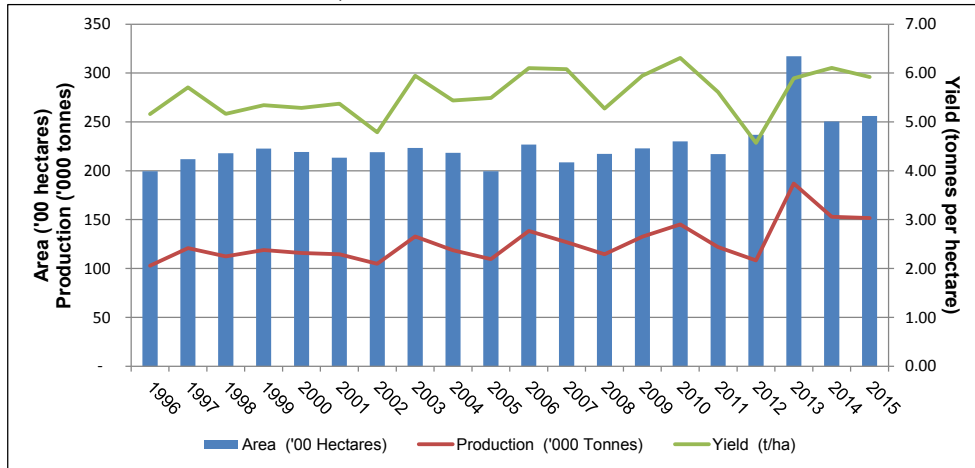
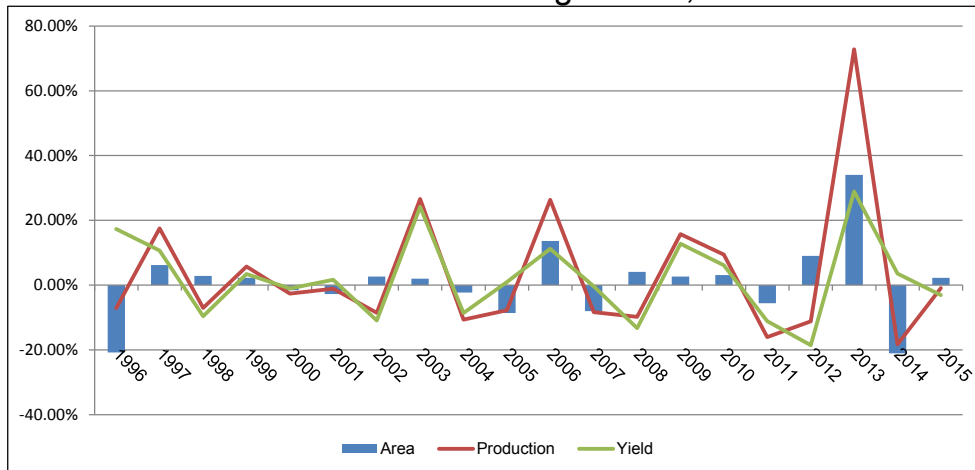


Chart 11 - Oats Year-on-Year Change: Area, Yield and Production



Oilseed Rape

The majority of Scottish oilseed rape is winter oilseed rape and is mainly exported for biofuels, with a very small amount processed in Scotland for edible oil.

Oilseed Rape Estimates (charts 12 and 13)

Estimated oilseed rape production in 2015 increased by one per cent to 148,000 tonnes. This was due to a four per cent increase in yield which is estimated at 4.1 tonnes per hectare. Grown areas have decreased by three per cent to 36,000 hectares.

Over the last 20 years, oilseed rape production has remained relatively stable. This is in part due to a balance between generally decreasing areas grown and general increases in yields achieved. Fluctuations in yield have been more marked in recent years and in particular in 2012, when poor growing conditions saw yields fall by almost a third. In 2015, yields improved to their highest level in 20 years.

Chart 12 – Oilseed Rape: Area, Yield and Production

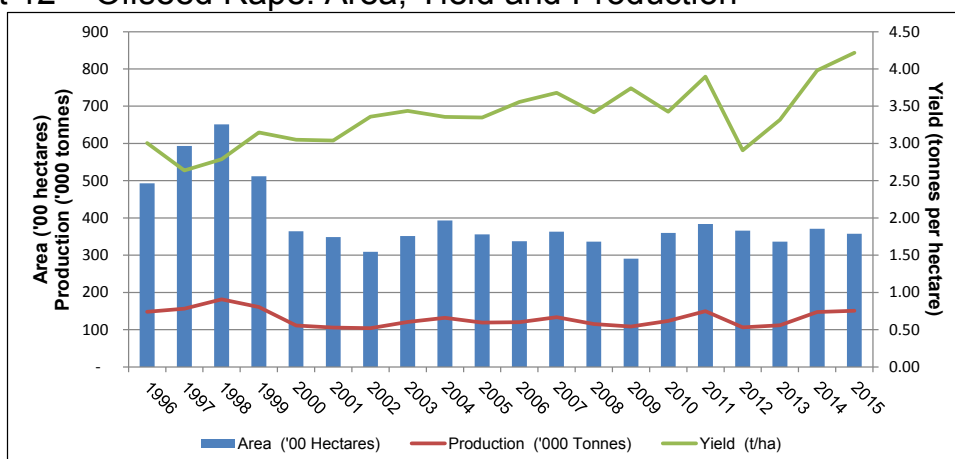
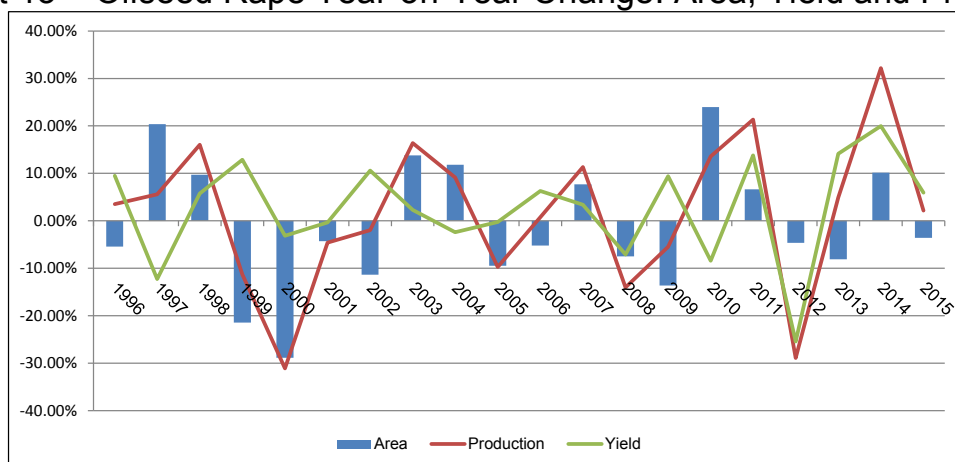


Chart 13 – Oilseed Rape Year-on-Year Change: Area, Yield and Production



Key Statistics: Changes in Cereal Production

2015 Cereal and Oilseed Rape Harvest Change Over the Year

mt = million tonnes
k = thousand

kt = thousand tonnes
t/ha = tonnes per hectare

Production

From: 1.66 mt



To: 1.52 mt

Spring Barley

Due to a 7% decrease in area and a 2% decrease in yield.
Grown area = 256 k hectares Average yield = 5.9 t/h

From: 411 kt



To: 406 kt

Winter Barley

Due to a 1% decrease in area. Yield remained unchanged.
Grown area = 52 k hectares Average yield = 7.8 t/h

To: 1.02 mt



From: 989 kt

Wheat

Due to a 3% increase in yield. Area remained unchanged.
Grown area = 110 k hectares Average yield = 9.3 t/h

From: 153 kt



To: 152 kt

Oats

Due to a 3% decrease in yield. Area increased by 2%.
Grown area = 26 k hectares Average yield = 5.9 t/h

From: 3.22 mt



To: 3.10 mt

Total Cereals

Due to a 4% decrease in Area. Yield remained unchanged.
Grown area = 444 k hectares Average yield = 7.0 t/h

To: 148.5 kt



From: 147.6 kt

Oilseed Rape

Due to a 4% increase in yield. Area decreased by 3%.
Grown area = 36 k hectares Average yield = 4.1 t/h

Relationship Between Area, Yield and Production

Cereal and oilseed rape crop areas represent the amount of area that has been used to grow a particular crop, which is intended for combine harvesting and the production of grain or oilseeds. Area estimates are derived from the June Agricultural Census and specifically exclude any areas of cereals which are not intended for combine harvesting. Whole crop cereals are harvested whole (i.e. without extracting the grain) and are used as a source of animal feed. 75 hectares of mixed grain are included in the overall cereal area.

Average yields are expressed in tonnes per hectare and represent the amount of cereal grain or oilseed that is extracted from one hectare of combine harvested area. As the moisture content of cereals and oilseeds can vary from year to year and farm to farm, depending on the level of rainfall, average yields are adjusted to a standard moisture content of 14.5 per cent for cereals and nine per cent for oilseeds. This adjustment ensures there is consistency in estimates of the amount of dry matter which can be extracted from cereal grain and oilseeds.

Production estimates are derived by multiplying crop areas (in hectares) and average yields (in tonnes per hectare). They represent 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 and other plant material which is produced as a by-product and utilised for other purposes.

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

Reference Tables

Table 1: Cereal Area, Yield and Production 2014 and 2015

Crop	2014			2015			% Change 2014/2015		
	Area (000 ha)	Yield (t/ha)	Production (000 t)	Area ² (000 ha)	Yield (t/ha)	Production (000 t)	Area	Yield	Production
Wheat	109	9.07	989	110	9.30	1,019	0.5%	2.5%	3.0%
Winter Barley	53	7.82	411	52	7.84	406	-1.3%	0.2%	-1.1%
Spring Barley	274	6.07	1,665	256	5.94	1,521	-6.7%	-2.1%	-8.7%
Total Barley	327	6.35	2,076	308	6.26	1,927	-5.9%	-1.4%	-7.2%
Oats	25	6.10	153	26	5.92	152	2.3%	-3.1%	-0.9%
Total Cereals¹	462	6.97	3,221	444	6.99	3,101	-4.0%	0.3%	-3.7%
Oilseed Rape	37	3.98	148	36	4.15	148	-3.4%	4.2%	0.6%

¹ Estimates for Total Cereals include Triticale.

² Area estimates are based on final June Census results.

Table 2: Cereal Area, Yield and Production 1996 to 2015

Year	TOTAL CEREALS ⁽¹⁾			SPRING BARLEY			WINTER BARLEY			WHEAT			OATS		
	Area (Hectare)	Yield (t/ha)	Production (Tonnes)	Area (Hectare)	Yield (t/ha)	Production (Tonnes)	Area (Hectare)	Yield (t/ha)	Production (Tonnes)	Area (Hectare)	Yield (t/ha)	Production (Tonnes)	Area (Hectare)	Yield (t/ha)	Production (Tonnes)
1996	449,298	6.48	2,909,649	260,726	5.68	1,480,776	63,566	7.16	455,093	103,974	8.32	864,552	19,950	5.16	102,909
1997	475,958	5.81	2,766,710	265,212	4.86	1,289,532	78,893	6.64	523,763	108,655	7.56	820,943	21,185	5.71	120,932
1998	468,154	5.46	2,556,349	255,822	4.54	1,160,886	77,705	5.89	457,320	111,172	7.37	819,316	21,784	5.16	112,470
1999	447,236	5.88	2,629,266	280,546	5.20	1,459,163	58,442	6.56	383,414	84,476	7.80	659,177	22,278	5.34	118,971
2000	448,720	6.34	2,846,939	254,718	5.15	1,311,105	61,678	7.38	455,349	108,853	8.79	956,432	21,927	5.28	115,874
2001	438,623	6.06	2,656,550	280,786	5.59	1,570,617	55,319	6.24	345,045	79,680	7.74	616,970	21,333	5.37	114,630
2002	445,512	5.70	2,540,349	263,914	4.85	1,279,984	61,234	6.70	410,268	97,192	7.60	738,662	21,907	4.79	104,897
2003	431,720	6.63	2,870,410	264,920	6.05	1,603,596	55,649	7.11	395,428	87,498	8.36	731,351	22,340	5.95	132,822
2004	438,039	6.61	2,904,878	257,462	5.72	1,473,709	56,348	7.40	416,719	101,126	8.78	888,156	21,831	5.44	118,688
2005	411,329	6.65	2,742,230	243,298	5.74	1,396,231	51,341	7.58	388,938	95,595	8.81	841,744	19,955	5.49	109,505
2006	398,050	6.87	2,744,088	220,639	5.95	1,313,527	53,762	7.76	417,444	99,681	8.70	867,053	22,682	6.10	138,391
2007	403,493	6.67	2,699,921	226,019	5.80	1,312,003	52,625	7.63	401,377	102,744	8.30	852,603	20,868	6.08	126,887
2008	456,547	6.65	3,043,330	262,322	5.72	1,500,118	57,612	7.55	435,085	113,797	8.68	987,256	21,720	5.27	114,515
2009	447,554	6.44	2,887,132	287,011	5.81	1,668,240	45,149	6.97	314,527	92,482	8.30	767,651	22,299	5.95	132,570
2010	425,496	6.71	2,857,814	242,364	5.82	1,410,270	48,010	7.20	345,615	111,436	8.55	953,239	23,000	6.31	145,117
2011	446,181	6.60	2,948,871	262,948	5.83	1,532,979	45,477	7.34	333,623	115,412	8.29	956,985	21,715	5.61	121,826
2012	456,902	5.48	2,507,016	289,222	5.00	1,446,950	42,816	6.46	276,511	100,637	6.69	673,288	23,672	4.57	108,249
2013	458,219	6.19	2,836,836	296,444	5.78	1,713,548	42,694	6.57	280,511	86,840	7.52	652,933	31,728	5.89	187,021
2014	462,123	6.97	3,221,284	274,377	6.07	1,664,905	52,507	7.82	410,765	109,023	9.07	989,347	25,050	6.10	152,924
2015	443,564	6.99	3,100,624	255,878	5.94	1,520,756	51,808	7.84	406,169	109,562	9.30	1,019,182	25,615	5.92	151,569

¹ Includes Triticale² Revisions have been made to estimates from 2003 to 2011.

Table 3: Oilseed rape Area, Yield and Production 1996 to 2015

Year	OILSEED RAPE		
	Area (Hectare)	Yield (t/ha)	Production (Tonnes)
1996	49,290	3.01	148,171
1997	59,341	2.64	156,479
1998	65,117	2.79	181,587
1999	51,173	3.15	161,070
2000	36,406	3.05	110,993
2001	34,850	3.04	105,893
2002	30,901	3.36	103,823
2003	35,163	3.44	120,847
2004	39,316	3.35	131,906
2005	35,591	3.35	119,117
2006	33,743	3.56	120,030
2007	36,334	3.68	133,657
2008	33,623	3.42	114,902
2009	29,043	3.74	108,605
2010	36,002	3.43	123,334
2011	38,388	3.90	149,627
2012	36,611	2.91	106,420
2013	33,653	3.32	111,652
2014	37,073	3.98	147,570
2015	35,797	4.15	148,491

Revisions have been made to estimates from 2003 to 2011.

Table 4: Regional Production Estimates by Crop 2006 to 2015

Crop	Region	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Change since 2014	Change since 2014 (%)
Total Cereals	North East	874,380	802,784	941,831	932,639	874,701	957,593	839,960	948,585	1,060,532	950,180	-110,352	-10.4
	North West	190,310	195,732	237,657	218,342	212,988	227,186	192,847	210,234	215,332	203,092	-12,240	-5.7
	South East	1,441,480	1,433,271	1,591,155	1,464,531	1,475,422	1,518,020	1,209,637	1,414,053	1,667,435	1,709,136	41,701	2.5
	South West	237,918	268,134	272,688	271,620	294,702	246,073	264,572	263,963	277,985	238,216	-39,769	-14.3
	All	2,744,088	2,699,921	3,043,330	2,887,132	2,857,814	2,948,871	2,507,016	2,836,836	3,221,284	3,100,624	-120,660	-3.7
Spring Barley	North East	520,380	475,657	588,277	629,606	551,615	644,595	584,727	691,714	709,866	622,998	-86,868	-12.2
	North West	128,214	141,813	172,649	167,527	153,393	169,638	149,283	157,325	159,443	150,010	-9,433	-5.9
	South East	526,594	529,130	585,758	690,933	533,713	576,634	529,601	689,542	642,499	625,805	-16,694	-2.6
	South West	138,339	165,404	153,434	180,174	171,549	142,112	183,338	174,968	153,096	121,944	-31,153	-20.3
	All	1,313,527	1,312,003	1,500,118	1,668,240	1,410,270	1,532,979	1,446,950	1,713,548	1,664,905	1,520,756	-144,149	-8.7
Winter Barley	North East	190,804	172,867	182,472	136,192	152,141	133,527	119,635	127,372	174,251	159,008	-15,243	-8.7
	North West	12,567	9,797	12,063	8,654	7,832	8,556	7,024	9,012	12,115	10,971	-1,144	-9.4
	South East	172,977	177,055	198,485	143,623	151,035	160,807	133,745	123,321	192,206	197,115	4,909	2.6
	South West	41,095	41,658	42,065	26,057	34,607	30,733	16,107	20,806	32,192	39,074	6,882	21.4
	All	417,444	401,377	435,085	314,527	345,615	333,623	276,511	280,511	410,765	406,169	-4,596	-1.1
Total Barley	North East	711,184	648,524	770,749	765,798	703,756	778,122	704,363	819,086	884,118	782,006	-102,112	-11.5
	North West	140,781	151,610	184,712	176,181	161,225	178,194	156,307	166,337	171,558	160,981	-10,578	-6.2
	South East	699,571	706,185	784,243	834,556	684,748	737,441	663,346	812,863	834,706	822,920	-11,785	-1.4
	South West	179,434	207,062	195,499	206,231	206,156	172,845	199,445	195,773	185,289	161,018	-24,270	-13.1
	All	1,730,971	1,713,380	1,935,204	1,982,767	1,755,885	1,866,602	1,723,461	1,994,059	2,075,670	1,926,925	-148,745	-7.2
Wheat	North East	129,485	126,737	146,841	141,131	144,675	154,766	122,012	100,154	152,263	140,273	-11,990	-7.9
	North West	32,478	30,409	36,877	26,692	36,759	34,806	26,334	30,246	32,184	27,527	-4,657	-14.5
	South East	662,884	652,212	742,307	552,817	703,342	711,691	479,249	478,853	733,227	790,884	57,657	7.9
	South West	42,205	43,246	61,231	47,012	68,463	55,722	45,693	43,680	71,673	60,498	-11,175	-15.6
	All	867,053	852,603	987,256	767,651	953,239	956,985	673,288	652,933	989,347	1,019,182	29,834	3.0
Spring Oats	North East	26,372	21,051	19,780	21,328	23,147	21,653	11,547	28,029	21,536	24,817	3,281	15.2
	North West	13,187	10,831	13,277	13,344	13,257	13,250	9,320	13,051	10,442	13,330	2,889	27.7
	South East	40,824	32,541	30,797	45,837	44,185	27,932	39,392	88,581	47,416	49,541	2,125	4.5
	South West	9,411	9,835	10,187	15,227	13,999	11,923	16,352	20,940	15,641	11,658	-3,983	-25.5
	All	89,794	74,258	74,041	95,735	94,588	74,759	76,611	150,601	95,034	99,346	4,312	4.5
Winter Oats	North East	5,003	5,071	3,422	2,184	2,342	2,241	1,525	1,126	2,565	3,000	436	17.0
	North West	3,683	2,683	2,669	1,241	1,655	916	872	582	1,126	1,229	103	9.2
	South East	35,828	39,559	30,359	31,228	41,893	39,765	27,036	32,563	50,332	44,514	-5,818	-11.6
	South West	4,083	5,317	4,023	2,183	4,639	4,144	2,205	2,150	3,867	3,480	-387	-10.0
	All	48,597	52,629	40,474	36,835	50,529	47,067	31,638	36,420	57,890	52,223	-5,667	-9.8
Total Oats	North East	31,375	26,121	23,202	23,512	25,489	23,894	13,072	29,154	24,100	27,817	3,717	15.4
	North West	16,870	13,514	15,946	14,584	14,912	14,167	10,192	13,632	11,567	14,559	2,992	25.9
	South East	76,652	72,101	61,157	77,065	86,078	67,698	66,428	121,144	97,748	94,055	-3,693	-3.8
	South West	13,494	15,152	14,210	17,409	18,638	16,067	18,557	23,090	19,508	15,138	-4,370	-22.4
	All	138,391	126,887	114,515	132,570	145,117	121,826	108,249	187,021	152,924	151,569	-1,354	-0.9
Triticale	North East	2,336	1,402	1,039	2,198	781	811	513	191	51	84	32	62.7
	North West	180	200	121	885	93	19	14	19	23	26	3	15.3
	South East	2,373	2,773	3,448	93	1,254	1,190	613	1,193	1,755	1,277	-478	-27.2
	South West	2,785	2,675	1,748	968	1,444	1,439	877	1,420	1,515	1,561	47	3.1
	All	7,674	7,050	6,356	4,144	3,573	3,459	2,018	2,822	3,344	2,948	-396	-11.8
Spring Oilseed Rape	North East	2,284	491	1,642	448	1,222	561	256	443	131	358	228	174.3
	North West	184	38	119	343	416	275	34	373	56	173	118	211.5
	South East	2,430	522	1,579	2,941	2,441	1,694	839	3,320	906	1,022	116	12.8
	South West	400	47	183	262	363	351	293	350	226	110	-116	-51.3
	All	5,298	1,098	3,523	3,994	4,441	2,881	1,421	4,487	1,319	1,664	345	26.2
Winter Oilseed Rape	North East	41,998	49,173	37,627	47,613	41,395	49,345	40,443	44,819	46,904	43,382	-3,523	-7.5
	North West	4,871	5,962	4,082	5,866	6,192	7,483	5,000	6,272	7,867	7,540	-327	-4.2
	South East	65,069	74,622	67,763	49,371	70,001	86,982	58,157	55,319	89,375	93,809	4,435	5.0
	South West	2,794	2,801	1,907	1,761	1,304	2,937	1,398	755	2,106	2,096	-10	-0.5
	All	114,732	132,559	111,380	104,611	118,893	146,746	104,998	107,166	146,251	146,827	576	0.4
Total Oilseed Rape	North East	44,282	49,664	39,268	48,061	42,617	49,906	40,698	45,263	47,035	43,740	-3,295	-7.0
	North West	5,055	6,000	4,202	6,210	6,608	7,758	5,034	6,645	7,923	7,714	-209	-2.6
	South East	67,499	75,144	69,342	52,312	72,442	88,676	58,996	58,639	90,281	94,831	4,551	5.0
	South West	3,194	2,849	2,090	2,023	1,667	3,288	1,691	1,105	2,332	2,206	-126	-5.4
	All	120,030	133,657	114,902	108,605	123,334	149,627	106,420	111,652	147,570	148,491	921	0.6

Table 5: Cereals - Comparison of Provisional and Final Estimates 2005 to 2014
(Percentage differences are of Final minus Provisional)

AREA

Year	TOTAL CEREALS			SPRING BARLEY			WINTER BARLEY			WHEAT			OATS		
	Provisional	Final	Percentage Difference	Provisional	Final	Percentage Difference	Provisional	Final	Percentage Difference	Provisional	Final	Percentage Difference	Provisional	Final	Percentage Difference
2006	398,330	398,050	-0.1%	221,280	220,639	-0.3%	53,620	53,762	0.3%	99,680	99,681	0.0%	22,520	22,682	0.7%
2007	401,410	403,493	0.5%	224,140	226,019	0.8%	52,860	52,625	-0.4%	101,790	102,744	0.9%	21,520	20,868	-3.0%
2008	455,830	456,547	0.2%	261,890	262,322	0.2%	57,520	57,612	0.2%	113,649	113,797	0.1%	21,670	21,720	0.2%
2009	447,554	447,554	0.0%	287,011	287,011	0.0%	45,149	45,149	0.0%	92,482	92,482	0.0%	22,299	22,299	0.0%
2010	424,492	425,496	0.2%	241,758	242,364	0.3%	47,939	48,010	0.1%	111,269	111,436	0.1%	22,299	23,000	3.1%
2011	446,181	446,181	0.0%	262,948	262,948	0.0%	45,477	45,477	0.0%	115,412	115,412	0.0%	21,715	21,715	0.0%
2012	456,901	456,902	0.0%	289,222	289,222	0.0%	42,816	42,816	0.0%	100,637	100,637	0.0%	23,672	23,672	0.0%
2013	458,219	458,219	0.0%	296,444	296,444	0.0%	42,694	42,694	0.0%	86,840	86,840	0.0%	31,728	31,728	0.0%
2014	461,477	462,123	0.1%	274,377	274,377	0.0%	52,507	52,507	0.0%	109,023	109,023	0.0%	25,050	25,050	0.0%
2015	443,127	443,564	0.1%	255,642	255,878	0.1%	51,770	51,808	0.1%	109,476	109,562	0.1%	25,613	25,615	0.0%

YIELD

Year	TOTAL CEREALS			SPRING BARLEY			WINTER BARLEY			WHEAT			OATS		
	Provisional	Final	Percentage Difference	Provisional	Final	Percentage Difference	Provisional	Final	Percentage Difference	Provisional	Final	Percentage Difference	Provisional	Final	Percentage Difference
2006	6.54	6.87	5.1%	5.38	5.95	10.7%	7.57	7.76	2.6%	8.70	8.70	0.0%	6.02	6.10	1.4%
2007	6.61	6.67	1.0%	5.72	5.80	1.5%	7.59	7.63	0.5%	8.18	8.30	1.4%	6.11	6.08	-0.5%
2008	6.67	6.65	-0.3%	5.63	5.72	1.6%	7.79	7.55	-3.1%	8.61	8.68	0.8%	5.95	5.27	-11.4%
2009	6.40	6.44	0.7%	5.73	5.81	1.4%	7.41	6.97	-6.0%	8.07	8.30	2.9%	6.10	5.95	-2.5%
2010	6.51	6.71	3.0%	5.34	5.82	9.0%	7.05	7.20	2.1%	8.94	8.55	-4.3%	6.02	6.31	4.8%
2011	6.88	6.60	-4.0%	6.16	5.83	-5.4%	7.23	7.34	1.5%	8.53	8.29	-2.8%	6.06	5.61	-7.5%
2012	5.48	5.48	0.1%	4.87	5.00	2.8%	6.51	6.46	-0.8%	6.79	6.69	-1.5%	5.53	4.57	-17.4%
2013	6.07	6.19	2.0%	5.60	5.78	3.3%	6.57	6.88	4.6%	7.25	7.52	3.6%	6.15	5.89	-4.1%
2014	7.11	6.97	-2.0%	6.36	6.07	-4.6%	7.74	7.82	1.1%	8.75	9.07	3.7%	6.91	6.10	-11.6%
2015	7.32	6.99	-4.6%	6.16	5.94	-3.5%	8.30	7.84	-5.6%	9.67	9.30	-3.8%	6.97	5.92	-15.1%

PRODUCTION

Year	TOTAL CEREALS			SPRING BARLEY			WINTER BARLEY			WHEAT			OATS		
	Provisional	Final	Percentage Difference	Provisional	Final	Percentage Difference	Provisional	Final	Percentage Difference	Provisional	Final	Percentage Difference	Provisional	Final	Percentage Difference
2006	2,605,600	2,744,088	5.3%	1,189,393	1,313,527	10.4%	406,081	417,444	2.8%	867,245	867,053	0.0%	135,534	138,391	2.1%
2007	2,653,398	2,699,921	1.8%	1,281,338	1,312,003	2.4%	401,066	401,377	0.1%	833,014	852,603	2.4%	131,425	126,887	-3.5%
2008	3,042,256	3,043,330	0.0%	1,474,441	1,500,118	1.7%	448,081	435,085	-2.9%	978,518	987,256	0.9%	128,937	114,515	-11.2%
2009	2,872,228	2,887,132	0.5%	1,645,541	1,668,240	1.4%	334,338	314,527	-5.9%	745,969	767,651	2.9%	135,970	132,570	-2.5%
2010	2,872,228	2,857,814	-0.5%	1,289,851	1,410,270	9.3%	337,987	345,615	2.3%	994,322	953,239	-4.1%	137,657	145,117	5.4%
2011	3,067,714	2,948,871	-3.9%	1,619,867	1,532,979	-5.4%	328,803	333,623	1.5%	984,421	956,985	-2.8%	131,668	121,826	-7.5%
2012	2,502,839	2,507,016	0.2%	1,407,715	1,446,950	2.8%	278,613	276,511	-0.8%	683,445	673,288	-1.5%	131,009	108,249	-17.4%
2013	2,781,049	2,836,836	2.0%	1,659,309	1,713,548	3.3%	293,944	280,511	-4.6%	629,963	652,933	3.6%	195,010	187,021	-4.1%
2014	3,282,301	3,221,284	-1.9%	1,745,867	1,664,905	-4.6%	406,166	410,765	1.1%	953,905	989,347	3.7%	173,022	152,924	-11.6%
2015	3,245,525	3,100,624	-4.5%	1,574,132	1,520,756	-3.4%	429,837	406,169	-5.5%	1,059,096	1,019,182	-3.8%	178,430	151,569	-15.1%

Methodology and Quality Note

This section provides a summary of information on these statistics against five dimensions of quality, 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 \(including quality framework\)](#)

Methodology

The 2015 final estimates of production are based mainly on final yield results from the 2015 Cereal Production Survey (CPS) and final crop areas from the 2015 June Census. The CPS is a disproportionate stratified random sample of around 450 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 2015, the number of holdings submitting a return for Spring Barley was 395, Winter Barley was 114, Wheat was 155, Oats was 104 and Oilseed Rape was 116. 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 June Agricultural Census to provide 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.

2015 regional results were based on national averages for: triticale and spring oilseed rape in the North East, North West and South West. Results were imputed from sample data for winter barley and winter oats in the North West.

The Cereal Production Survey is carried out by Rural Payments & Inspections Division (RPID) and Rural and Environment Science & Analytical Services (RESAS) within the Scottish Government (SG). The survey is carried out by telephone with forms mailed to farms on request. Completed returns are analysed by RESAS.

The data undergo several validation processes as follows; (i) checking for any obvious errors on the paper survey forms upon receipt, (ii) cross checking against Census area data and internal validation within survey forms to ensure totals match, (iii) results are standardised to 14.5 per cent moisture content for cereals and 9 per cent moisture content for oilseed rape (iv) assessing data for any extreme yield values and removing if necessary, (v) if required, area offices are contacted to ensure that data is correct.

Additional quality assurance is provided at the later stages by utilising expert knowledge within the Scottish Government.

Data quality and assurance measures used for June Census area data are contained in [Final Results From The 2015 June Agricultural Census](#).

Provisional Estimates – published on 14th October 2015

The provisional estimates are derived from yield values of individual growers collated by several industry bodies. These industry bodies meet to discuss and quality assure these estimates at the annual Crop Report Meeting, which in 2015 was attended by representatives from:

- Scottish Government, Rural and Environment Science and Analytical Services
- Rural Payments Agency
- Bairds Malt
- Openfield
- East of Scotland Farms
- Scotland's Rural College
- Agricultural Industries Confederation
- National Farmers Union Scotland
- The Agriculture and Horticulture Development Board (which now includes the Home Grown Cereals Authority)

First estimates from growers are collected by several means, by: area offices of the Scottish Government (SG) Rural Payments and Inspections Directorate (RPID); area offices of Scotland's Rural College (SRUC); agronomists working for commercial bodies; farming co-operatives; the National Farmers Union Scotland (NFUS), using electronic, paper based or telephone surveys.

Average yields from known harvested areas are collected from all regions in Scotland for each individual crop. For consistency, these average yields are

adjusted to a standard moisture content of 14.5 per cent for cereals and 9 per cent for oilseed rape.

Once all the yields have been collated, the industry bodies at the Crop Report Meeting carry out additional quality assurance by comparing resulting yields between different crops and regions within Scotland. This results in an agreed set of yield estimates which are then combined with June Agricultural Census area results to derive the harvest production estimates.

More information on the methodology and results of the 2014 first estimates of the cereal and oilseed rape harvest can be found in the [first estimates of the cereal and oilseed rape harvest](#) release.

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 early provisional estimates are timed to enable provision of data for an EU regulatory deadline. Specific regulations are listed on pages 3 to 5 of our [2014/16 annual statistics plan](#).

The production estimates also 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. The balance sheets are published by the Home Grown Cereals Authority (HGCA).

User Feedback

Though we are not aware of any unmet user needs in relation to these statistics, the Scottish Government is always interested to hear 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 CPS was 550 in 2015. Usable returns were received for 455 of these; a response rate of 83%. Although 455 holdings participated, many holdings grow more than one crop. The total number of returns received for all crops combined was 854, this equates to a sampling rate of 5.5 per cent overall. The 2015 CPS sample covered 5.9 per cent of the relevant planted areas in Scotland.

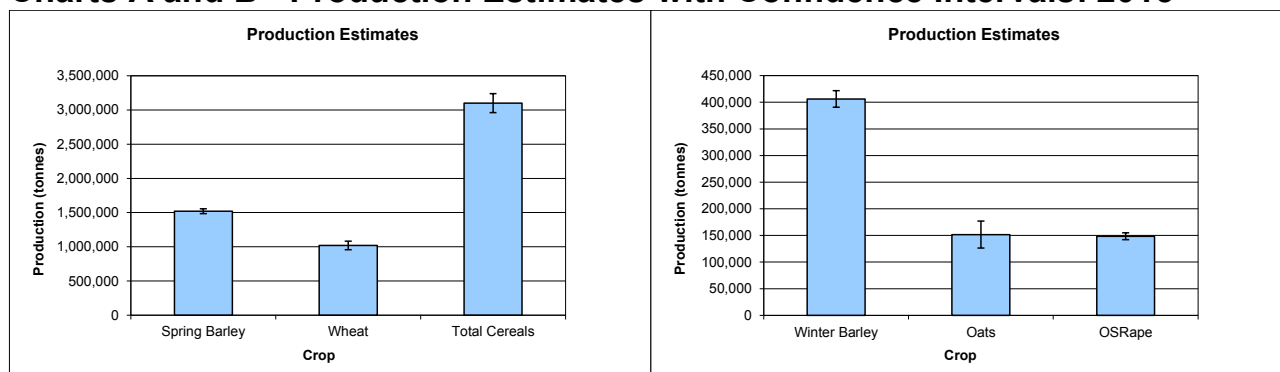
The results from the CPS have a margin of error associated with them, reflecting the error resulting from sampling. Sampling error is the difference between the estimate derived from a sample survey and the true value that would result if a census of the whole population were taken under the same conditions.

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% chance that the true production value for all cereals in Scotland will lie within the range of 3.1 million tonnes \pm 138,000 tonnes. Charts A and B, below, show the main production estimates marked with the upper and lower bounds of the associated confidence intervals. This is shown on two charts with different scales to allow results to be viewed clearly.

Table A – 95% Confidence Intervals for 2015 CPS Estimates

Crop	Number of Holdings (June Census)	Sample Size	Sampling %	Production ('000 tonnes)	Confidence Limits ('000 tonnes)	Confidence Limits (%)
Total Cereals ¹	8,867	774	8.73	3,101	\pm 138	\pm 4.5
Spring Barley	7,602	395	5.20	1,521	\pm 35	\pm 2.3
Winter Barley	2,073	114	5.50	406	\pm 16	\pm 3.95
Wheat	2,868	155	5.40	1,019	\pm 62	\pm 6.07
Oats	1,585	104	6.56	152	\pm 25	\pm 16.88
Oilseed Rape	1,217	80	6.57	148	\pm 6	\pm 4.35

Charts A and B - Production Estimates with Confidence Intervals: 2015



Area data are sourced from the June Agricultural Census and are assumed to be accurate as farmers face financial penalties for supplying incorrect information.

Comparison of provisional and final results

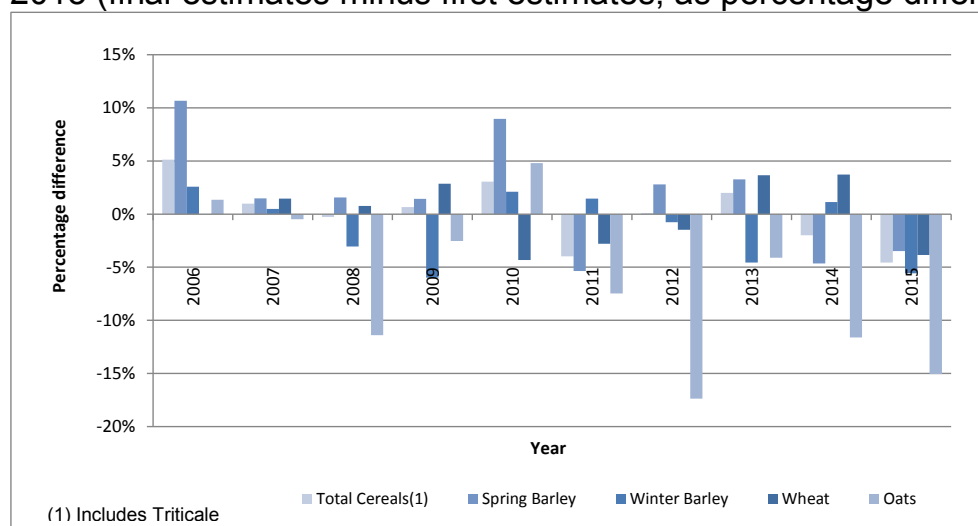
This section compares past provisional estimates of the harvest to the final estimates of the harvest. Provisional estimates are derived from averaged yield estimates of growers, collated through the cooperation of several organisations within the agricultural sector, applied to crop area estimates from the June Agricultural Census. Final estimates are derived from average yields from the Cereal Production Survey (CPS). 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 provisional estimates.

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 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.

The 2015 first estimates of overall production were within these limits, with the exception of spring and winter barley, which were slightly beyond these limits. This suggests that initial 2015 figures from the Crop Report Meeting provided a reasonable estimate of Scottish cereal production, but that production of spring barley (the largest Scottish cereal crop) and winter barley may have been overestimated initially.

It can be seen from Chart C that in the last 10 years the provisional estimate of the total cereal harvest has been within five per cent of the final estimate. In 2015 the difference between total cereal estimates from the two sources was 4.5 per cent. In most years, the largest differences between provisional and final production estimates are for oats, with the largest difference being 17 per cent in 2012. This year the difference was 15 per cent.

Chart C: Cereal Production, Comparison of Provisional v Final Estimates, 2006 to 2015 (final estimates minus first estimates, as percentage difference)

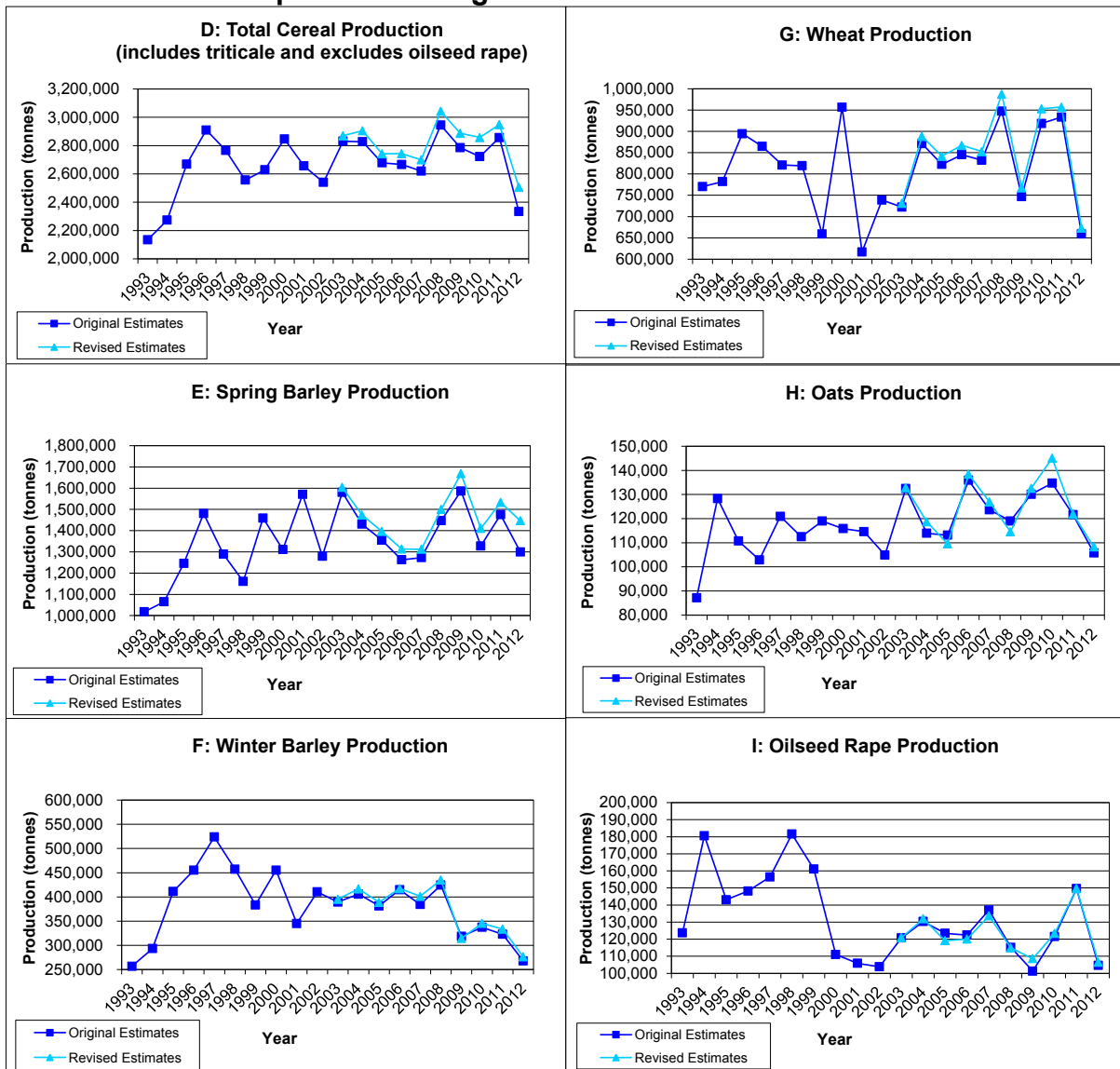


Revisions

Prior to 2012 the CPS sample was stratified by region and size group. To help ensure sufficient sample sizes for most crop types stratification by size group was replaced by crop type in 2012. Before 2012 production estimates were based on the mean average of individual yield values for each of the strata. This has been changed to provide more reliable results (see methodology section).

Results have been revised from 2003 onwards. At this time it is not possible to revise results prior to 2003. Charts D to I, below, show the impact of the revisions on the production estimates for the main crop groups. Note that the vertical axes of the charts do not start at zero; this is to highlight the variation between years and the differences between results of original and revised estimates.

Charts D to I - Comparison of Original and Revised Production Estimates



In 2012, the revised estimate of total cereal production was 172,000 tonnes (7%) higher than the original estimate. Since 2003 the difference between the resulting

estimates of the two methods has fluctuated between 1% and 7%. In 2012 the new revised estimates result in differences of: +147,000 tonnes (up 11%) for spring barley; +9,000 tonnes (up 3%) for winter barley; +14,000 tonnes (up 2%) for wheat; +2,000 tonnes (up 2%) for oats; and +2,000 tonnes (up 2%) for oilseed rape.

Timeliness and Punctuality

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

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.

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

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

The results of the 2015 CPS were released on the scheduled date of 16th December 2015.

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). All data tables are made available in excel format to allow users to carry out further analysis. 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 other UK Agriculture Statistics outputs are available at [Gov.UK website](#).

Comparability

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

Results for England, Wales and Northern Ireland are compiled on a comparable basis with Scottish estimates.

The EC regularly produces estimates of cereal and oilseed production both EU-27 countries and individual countries. Further information on EC cereal statistics is available at the [Eurostat website](#).

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.

Respondent Burden (the estimated overall cost to respondents)

The estimated respondent burden is calculated as the total number of survey responses (A), multiplied by the median time taken to respond to the survey (B), multiplied by the median average hourly wage of typical respondents (C).

(A x B x C)

(A) The 2015 Cereal Production Survey (CPS) surveyed 455 holdings.

The time taken to respond to the survey varies with each respondent. Scottish Government (SG) Rural Payments and Inspections Directorate (RPID) staff conducting the survey were asked to provide estimates of the average time taken to administer the telephone survey. Estimates were collected from each area office involved in the survey and the median time to respond in hours was calculated from these responses.

(B) The median time taken to respond to the survey is 0.083 hours.

Respondents to the CPS are usually farm owners themselves or farm managers. Both are usually full-time workers.

(C) The estimated median hourly pay rate for full-time employees in Scotland in 2015 was £13.45

(Further information on average hourly wages can be found in the [Annual Survey of Hours and Earnings](#), available on the Office for National Statistics (ONS) website.)

The respondent burden for CPS data collection in 2015 was

455 X 0.083 X £13.45

= £507.94

Related publications

[First estimates of the cereal and oilseed rape harvest 2015](#)

[Economic Report on Scottish Agriculture](#) (ERSA) contains Cereal usage figures derived from the CPS survey. These were last published in June 2014.

[Agriculture statistics publications](#) contains all published results from Scottish Government agricultural surveys.

A National Statistics publication for Scotland

The United Kingdom Statistics Authority has designated these statistics as National Statistics, in accordance with the Statistics and Registration Service Act 2007 and signifying compliance with the Code of Practice for Official Statistics.

Designation can be interpreted to mean that the statistics: meet identified user needs; are produced, managed and disseminated to high standards; and are explained well.

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How to access background or source data

The data collected for this <statistical bulletin / social research publication>:

- are available in more detail through Scottish Neighbourhood Statistics
- are available via an alternative route
- may be made available on request, subject to consideration of legal and ethical factors. Please contact Andrew.Walker@gov.scot for further information.
- cannot be made available by Scottish Government for further analysis as Scottish Government is not the data controller.

Complaints and suggestions

If you are not satisfied with our service or have any comments or suggestions, please write to the Chief Statistician, 3WR, St Andrews House, Edinburgh, EH1 3DG, Telephone: (0131) 244 0302, e-mail statistics.enquiries@scotland.gsi.gov.uk.

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ISBN: 978-1-78544-909-3

APS Group Scotland PPDAS61835 (12/15)

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