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Rural Business Research

Farm Business Survey

2016/2017

Crop Production in England

Ben Lang

RBR *independent research, data and analysis*

Rural Business Research

Crop Production in England 2016/2017

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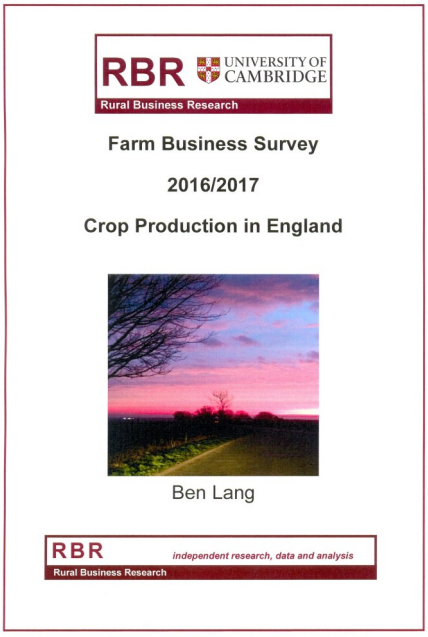
Crop Production in England 2016/2017
The full printed version of the report is now available and comprises:

- Overview of Profitability, Assets and Liabilities
- Agri-environment, Diversification, Basic payment
- Arable Farm Performance: Agriculture
- Crop Enterprise Performance
- Net Margin and Cost of Production Estimation
- Organic Arable Performance
- Weather, Economic Context and Policy



Appendix 1 Agricultural Output and Costs Comparison by Farm Type, District, Size and Performance (34 tables)

Appendix 2 Gross Margin Results for Comparison by Farm Type, District, Size and Performance - Non Organic (120 tables)

Price £25 including postage and packing

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Foreword to the Twelfth Series

This series of reports on the economics of agriculture and horticulture in England from *Rural Business Research (RBR)* represents the twelfth series of outputs that focus on providing independent data and analysis to the individual sectors of agriculture and horticulture. As farmers and growers look towards the future for their businesses, the policy landscape is beginning to emerge. The direction of policy travel for UK agriculture and horticulture will be more focused upon the market and the provision of specific environmental goods, and land-area based payments are likely to be reduced or removed in the future. The direction of policy travel has been accompanied with a guarantee that the Basic Payment will remain until at least 2022. These signals provide both an indication of policy outcomes and a time-frame within which businesses can begin to adapt to a new future. The UK's decision to leave the EU will of course have major implications for agriculture and horticulture; these impacts are likely to be bring both challenges and opportunities. While many factors remain uncertain, at the level of the individual business what is required is to position the business to meet the challenges that lie ahead while maximising the outcome of the opportunities that will present themselves. For individual businesses this begins with a need to understand current performance, and to place this within the context of the wider market environment and understand the relative strengths of the business against others within the sector. Within this series of reports, RBR seeks to help businesses to identify their relative strengths and challenges through independent data presented to highlight the key findings and data as appropriate to individual sectors of agriculture and horticulture. It is not possible to manage a process or activity successfully without knowing the underlying data or performance of the process or activity. This series of reports sets out to provide this information at this crucial planning stage for agriculture and horticulture.

The headline data from the Farm Business Survey (FBS) for the 2016/17 financial year, shows that average Farm Business Income (FBI) increased by 20% to £38,000 per farm, taking farm incomes upwards again after a period of six years of falling income levels. At £38,000 per farm FBI is still the second lowest average income from the previous six years. Examining results by farm type, on average, with the exception of Poultry farms, all farm types benefited from an increase in FBI in 2016/17. One of the main drivers for the increased FBI results was a generally lower cost base, with increases in the price of beef, sheep and combinable crops also playing an important part in the increased FBI results. The contribution of increased output from agri-environment, diversification activities and the Basic Payment were also features of the increased FBI result. The exchange rate movement that weakened the value of Sterling in the aftermath of the EU referendum result in 2016, that led to increased output prices during 2016/17, has recently moderated. Should Sterling gain momentum moving forward this will place downward pressure on output prices, but offer some input price advantage, in particular for imported inputs.

As we produce this twelfth series of independent reports, agricultural and horticultural businesses need to prepare for the future if they are to prosper as the market and policy landscapes change. Businesses that understand their costs of production and their relative strengths within a sector will be best placed to compete irrespective of what the future may bring. With this series of reports we aim to help inform agricultural and horticultural businesses about the economics of the sector in which they operate, in order to aid management decision making. It is of crucial importance to recognise that this valuable series of reports would not be possible without the direct support of our farmer and grower co-operators and the wider support of agricultural and horticultural businesses and sector stakeholders. Our thanks therefore go to the farmers and growers who assist us in this valuable work through their participation in the FBS.

Professor Paul Wilson
Chief Executive Officer, Rural Business Research
February 2018

www.ruralbusinessresearch.co.uk

ACKNOWLEDGEMENTS

Rural Business Research is very grateful to the farmers who have voluntarily provided records and information on which the FBS and this report are based.

Rural Business Research staff across England collected farm data. At the Rural Business Unit, Richard Dexter and Mark Reader designed the reporting system and Joy Meyrick and Stephen Horsley contributed to production of the report.

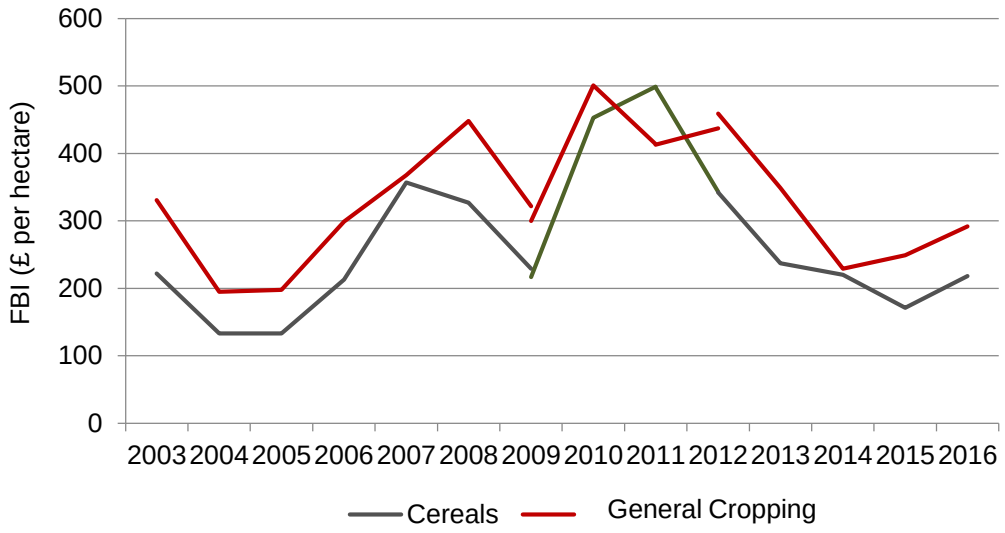
1.0 Summary of Profitability, Assets and Liabilities

- Farm Business Income (FBI) increased but lower than any time in preceding decade
- Farmers benefited from strong sterling when purchasing 2016 crop inputs
- Farmers benefited from weak currency in the 2016 harvest crop marketing season
- Except on farms with potatoes, crop output reduced due to lower yields
- Agri environment output reduced as legacy schemes expired
- Land prices continued their decline that started in 2014
- On average, liabilities on crop farms increased by two per cent
- On average, the net worth of crop farms reduced by one per cent

1.1 Time Series Farm Business Income on Cereals and General Cropping Farms

Farm Business Income (FBI) increased to £218 per hectare on Cereals farms (£171 in 2015) and to £292 on General Cropping farms (£249 in 2015). Figure 1.1 shows the long term FBI from 2005 to 2016.

Figure 1.1 Time Series FBI for Cereals and General Cropping Farms in England,



Cropping changes relating to sugar beet production partially explain the observed financial results year on year.

Tables 1.1 and 1.2 respectively summarise the average profitability of Cereals and General Cropping farms in 2014/15 and 2015/16 (£ per hectare unless stated).

Table 1.1 Cereals Farms - Farm Business Income

	2016	2017
Number of farms	360	353
Area of farm (ha)	208	198
Crop output	832	805
Livestock output	40	39
Agri-environment	35	24
Other output	239	272
BPS	166	198
Total Output	**1312**	**1,337**
Variable costs	498	464
Fixed costs	649	659
Total costs	**1147**	**1,123**
Profit on sale of assets	**7**	**3**
Farm Business Income	**172**	**218**
Less labour	19	20
Add interest	27	29
Less rental costs	116	116
Net Farm Income	**64**	**110**

Table 1.2 General Cropping Farms - Farm Business Income

	2015	2017
Number of farms	143	153
Area of farm (ha)	252	240
Crop output	1243	1,273
Livestock output	47	62
Agri-environment	43	28
Other output	259	241
BPS	160	190
Total Output	**1751**	**1,794**
Variable costs	624	659
Fixed costs	882	847
Total costs	**1510**	**1,506**
Profit on sale of assets	**3**	**4**
Farm Business Income	**248**	**292**
Less labour	0	7
Add interest	33	31
Less rental costs	117	113
Net Farm Income	**164**	**201**

1.2 Farm Business Income 2016/2017

- In the 23 June 2016 referendum, 52 per cent of votes cast were to leave the European Union. The UK Government subsequently triggered Article 50 on 29 March 2017. The unexpected outcome of the referendum triggered market reaction that included a reduction in the value of sterling which led, in turn, to an increase in 2016 crop prices.
- Farmers benefited from the strength of sterling whilst purchasing crop inputs, and later benefited from weak sterling during the post harvest crop marketing season.
- Although input prices also increased due to the weakening of sterling, many of these related to the 2018 harvest crop and were carried forward to the 2017/2018 financial year.
- On Cereals farms, crop output reduced by £27 per hectare to £805 per hectare due to a further switch to lower value spring cropping and lower yield, but crop prices increased.
- As agri environment schemes expired, their output reduced by £10 per hectare to £24 per hectare.

- Other output, including diversification, was higher on Cereals farms, but lower on General Cropping and differences are likely to be due to the specific farms included in the group this year.

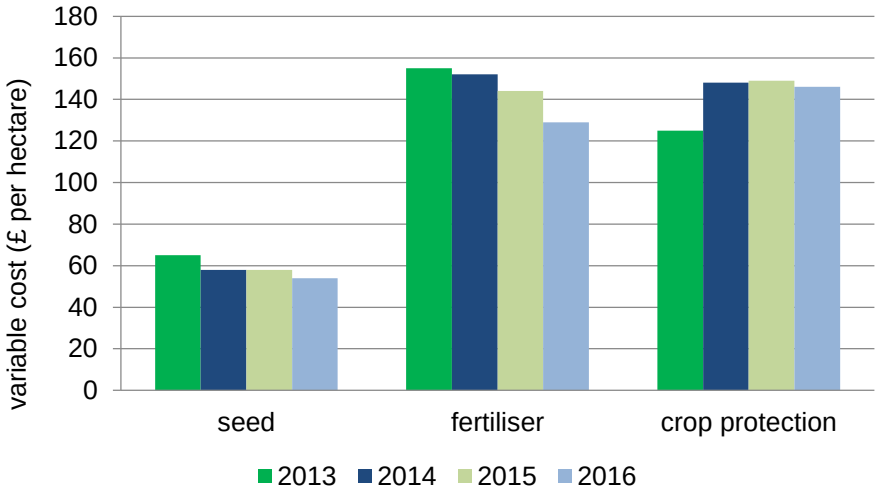
- Due to weakening of sterling, the Basic Payment receipt increased, by £32 per hectare, to £198 per hectare.

- The changes to output were similar on General Cropping farms, except that some General Cropping farms benefitted from improved performance of the potato crop. On the General Cropping farms, crop output increased by £30 per hectare, and output correspondingly increased by £43 per hectare.

Variable and Fixed Costs

Although the total costs reduced slightly on both Cereals and General Cropping farms, there was no clear trend, suggesting that the change was largely driven by changes in cropping. The headline changes to variable and fixed costs are summarised in figures 1.2 and 1.3.

Figure 1.2 Cereals Farms, Variable Costs 2013/2014 and 2016/17



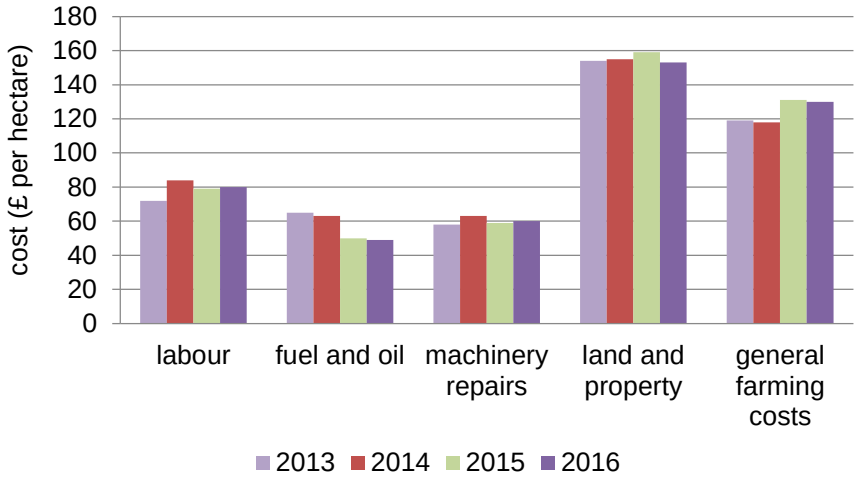
- The reduction in seed prices was driven by changes to cropping and the low crop prices from the 2015 harvest.

- The reduction in fertiliser expenditure was due to lower unit prices and changes in cropping; application rates to individual crops were similar to previous years.

- An increased volume of herbicides and fungicides was used in 2016, compared to 2014 when the data was last collected[1].

[1] Pesticide Usage Survey Report 271, Arable crops in the United Kingdom, Fera

Figure 1.3 Cereals Farms, Fixed Costs 2013/2014 and 2016/17



Although currency related costs were to increase in 2017, fixed costs on arable farms were broadly similar in 2016 to 2015.

1.3 Assets and Liabilities

Table 1.3 and 1.4 respectively show the Cereals Farms Balance Sheet and General Cropping Farms Balance Sheet for the 2016/2017 financial year.

The average change in the balance sheet during 2016 was a one per cent reduction in the net worth of Cereals and General Cropping businesses, due to a reduction in the value of land and increase in liabilities, but an increase in the value of Basic Payment Entitlement.

Table 1.3 Cereals Farms Balance Sheet (£/ha)

	Opening 2016	Closing 2016
Number of farms	353	353
Area of farms (ha)	198	198
Assets		
Land and buildings	11,887	11,824
Machinery	880	878
BPS entitlement	163	194
Other fixed assets	45	45
Other fixed assets	1,138	1,081
Liabilities	1,113	1,138
Net Worth	12,998	12,884

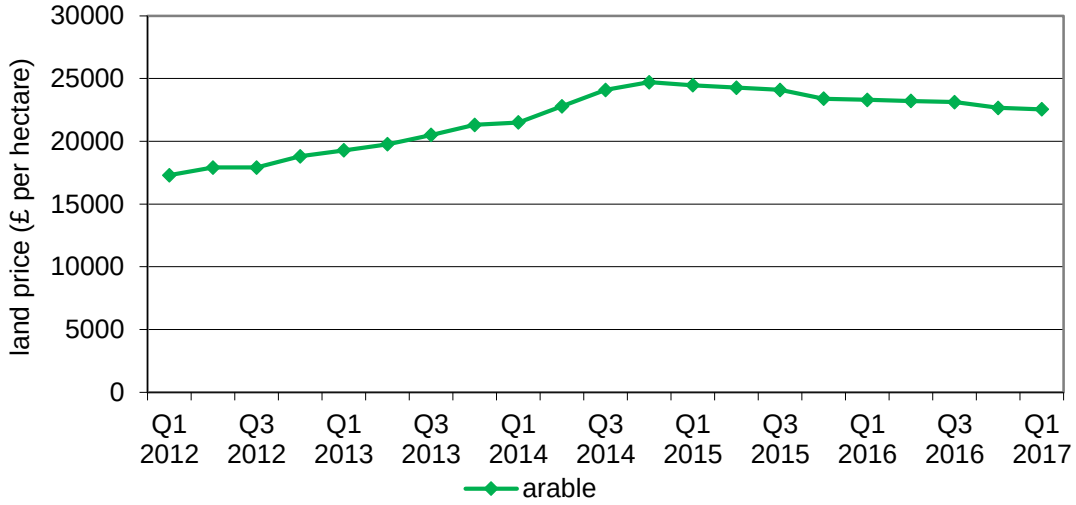
Table 1.4 General Cropping Farms Balance Sheet (£/ha)

	Opening 2016	Closing 2016
Number of farms	153	153
Area of farms (ha)	240	240
Assets		
Land and buildings	11,433	11,361
Machinery	843	852
BPS entitlement	156	188
Other fixed assets	85	84
Other fixed costs	1,173	1,115
Liabilities	1,243	1,269
Net Worth	12,448	12,331

Land

Having peaked at around £24,700 at the close of 2014, arable land prices continued to fall through 2016/2017. At March 2017, prices averaged around £22,200, about ten per cent below their peak. Figure 1.4 shows arable land values from 2012 to April 2017.

Figure 1.4 Arable land values from January 2012 to April 2017



Source: Reanalysed from surveyors' industry commentary

- By early 2017, the decline in land prices slowed due to the reduction of land offered onto the market[1]. Farmers comprised a reduced share of land buyers in late 2016[2].
- Particularly sharp falls in land values were observed in the East of England, as one agent suggested a 6.2 per cent reduction in land values during 2016[3].
- The value of commercial forestry land has increased in recent years due to higher values of firewood and timber[4]. Woodland values of around £8,000 were typical in mid 2016.

Basic Payment Entitlement

- The average market price of non SDA Basic Payment Entitlement in 2016 was £192 per hectare[5].
- At March 2017 English BPS Entitlement was advertised for sale at around £213 per hectare[6].
- At the end of the 2016 /2017 year, we valued Entitlements at £194 per hectare on Cereals farms and £188 per hectare on General Cropping farms. These values were within the ranges described above.

[1] Farmers Weekly Interactive, www.fwi.co.uk , 10 May 2017

[2] Farmers Weekly, 14 October 2016

[3] Market Survey, GB Agricultural Land, 2017, Savills

[4] Farmers Weekly, 5 August 2016

[5] UK Entitlement Trading Market Report – June 2016, Townsend Chartered Surveyors, www.townsendcharteredsurveyors.co.uk

[6] Townsend Chartered Surveyors, www.townsendcharteredsurveyors.co.uk

Machinery

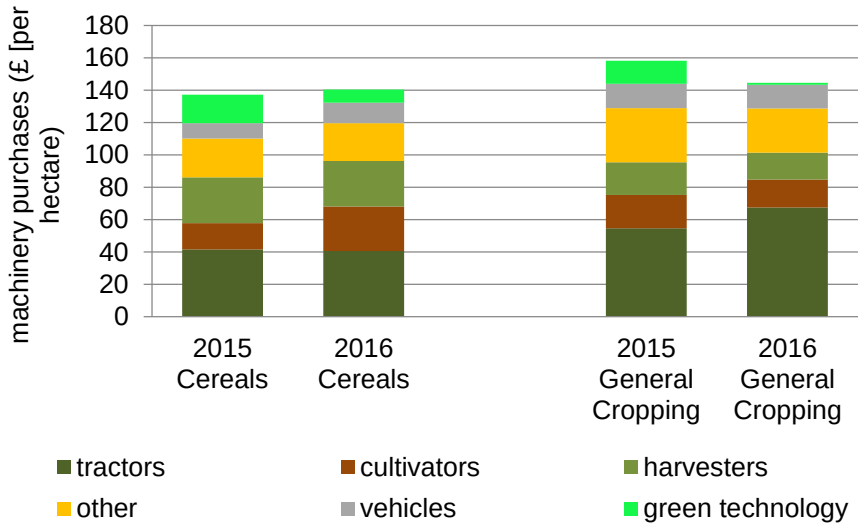
- On Cereals farms, the average investment in machinery was £140 per hectare and similar to previous seasons. At £145 per hectare, investment in machinery was lower than in recent years on General Cropping farms.

- Investment in green technology, such as solar power, reduced for a second year after peaking in 2013 and 2014.

- Relative to the previous year, the value of second hand agricultural machinery increased by an estimated 40 per cent in November 2016[1]. The reasons included reduced supply, due to fewer purchases of new machines, and export sales, driven by the weakening value of sterling.

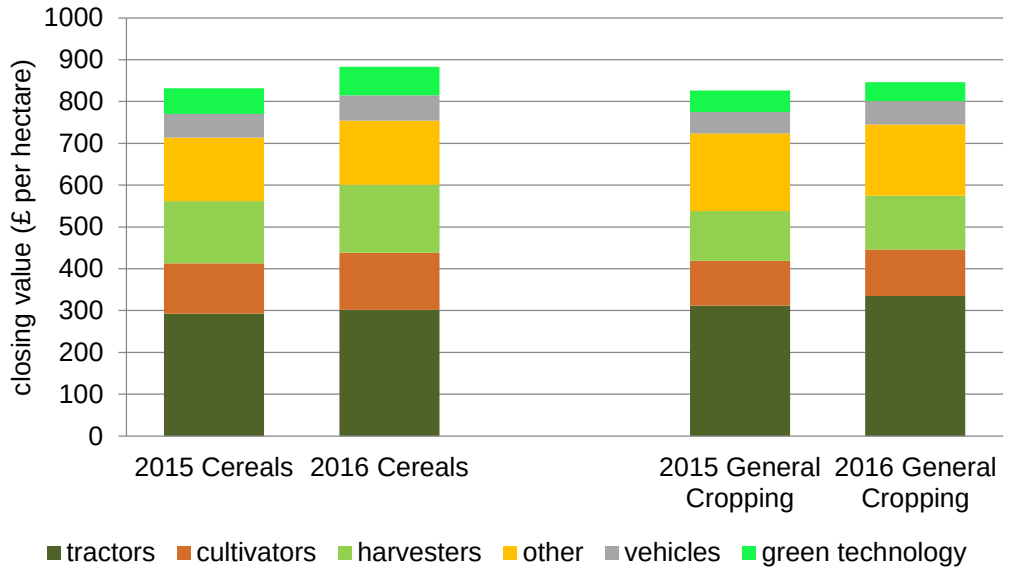
Machinery purchases and closing values are shown in figures 1.5 and 1.6 respectively.

Figure 1.5 Net Machinery Expenditure on Cereals and General Cropping Farms 2015/2016 and 2016/17



[1] Farmers Weekly Interactive, www.fwi.co.uk , 10 November 2016

Figure 1.6 Closing Valuation of Machinery on Cereals and General Cropping Farms 2015/2016 and 2016/17



Liabilities

Liabilities increased by about two per cent on both Cereals and General Cropping farms. Taking into account the change to the sample of farms between the years, the longer term borrowing trend is shown in Figures 1.7 and 1.8 below

Figure 1.7 Short and Long Term Closing Liabilities on Cereals Farms, 2004 to 2016

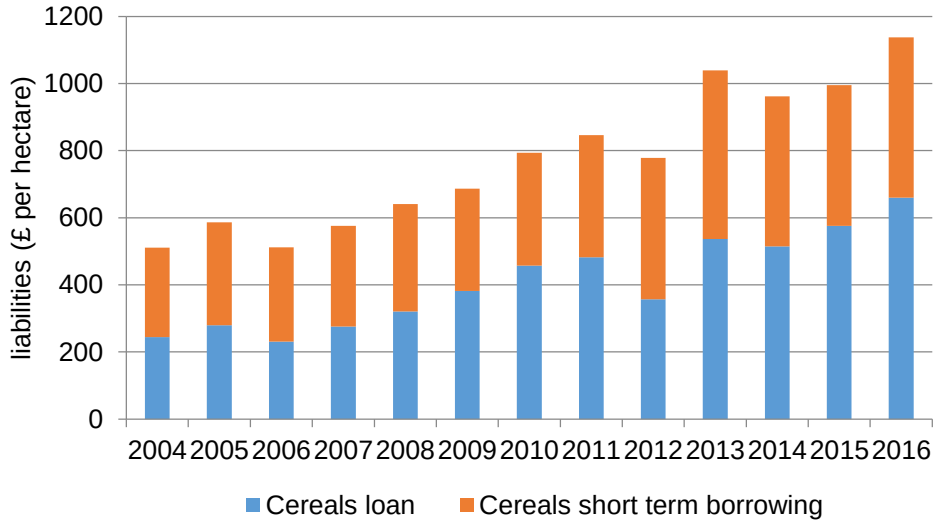
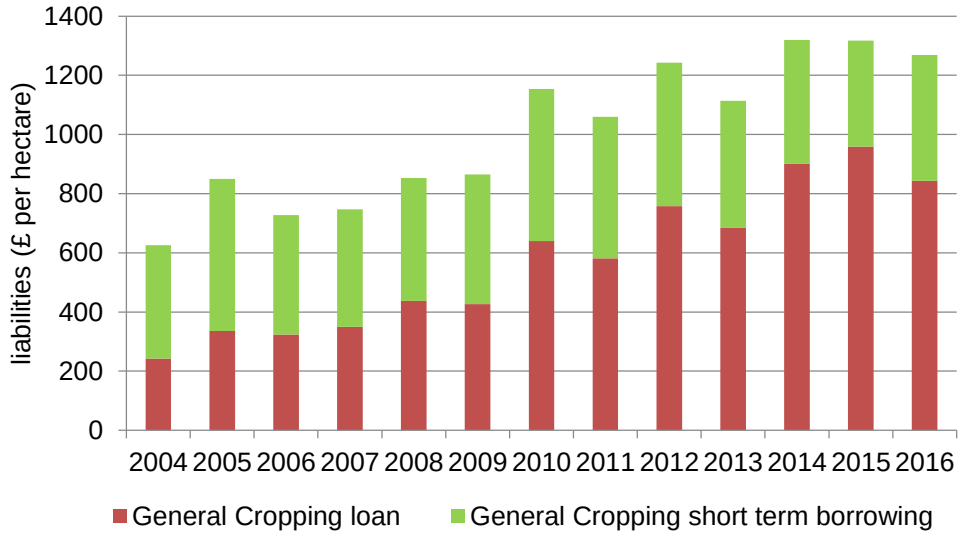


Figure 1.8 Short and Long Term Closing Liabilities on General Cropping Farms, 2004 to 2016



- In recent years, about 57 per cent of borrowing on Cereals farms has been in the form of loans, rather than short term agreements such as overdrafts or hire purchase.
- On General Cropping farms, loans account for around 70 per cent of borrowing.

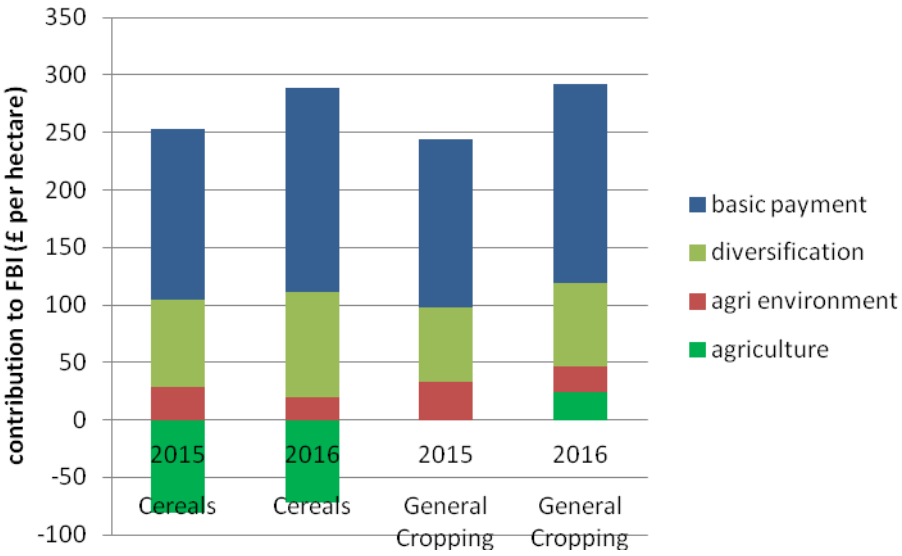
2.0 Agri-environment, Diversification and Single Payment Summary

- Agri-environment receipts reduced as ELS and HLS agreements expired
- Farmers cited onerous Countryside Stewardship application procedures as a barrier
- Renewable energy is now an important source of diversified income to farm businesses
- BPS output increased by 16.5 per cent due to weak sterling in September 2016

The results presented in this Chapter relate to **agri-environment scheme participation, diversification outside agriculture and the Basic Payment scheme**. The outputs, costs and net income attributable to these activities can be summed with that from agriculture to give FBI for the whole farm business. Whilst output and variable costs can be readily split between cost centres, some element of estimation is needed in order to share labour, machinery, property and overhead costs. Within the FBS, this is carried out on a consistent basis using an agreed approach[1].

The contribution to whole farm FBI of the four activities is summarised in figure 2.1.

Figure 2.1 Agriculture, Agri-environment, Diversification and Basic Payment Contribution to FBI, 2015 and 2016



- There is considerable variation between farms in the level of uptake of diversification and agri environment activity, so this profile is not necessarily representative of all businesses.
- On average, it is apparent that the main contribution to FBI in 2016 was again from the Basic Payment Scheme, followed by diversification.
- The contribution of agriculture to FBI was negative in both years on average.

[1] Appendix 2 (Item VI) Farm Accounts in England 2008/2009 Defra statistics https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/423700/fbs-fixedcostmethod-23apr15.pdf

2 Agri-environment, Diversification, Basic Payment

2.1 Agri-environment

The output, costs and contribution of agri environment scheme participation to FBI is shown in Table 2.1.

Table 2.1 Agri-environment Output and Costs, Cereals and General Cropping Farms 2015/2016 and 2016/2017

	Cereals		General Cropping	
	£ per hectare			
	2015	2016	2015	2016
Agri environment output	35	25	43	28
Agri environment costs	6	5	9	6
Agri environment FBI	29	20	33	22
Whole business FBI	172	218	248	292

- As Entry Level Stewardship (ELS) and Higher Level Stewardship (HLS) schemes expired agri environment receipts reduced.
- At £20 and £22 per hectare respectively, agri environment schemes contributed 9 and 8 per cent of FBI on Cereals and General Cropping farms.

2.2 Diversification

- Rental activity remained the main source of diversification output and recreation continued to be important.
- Energy generation has become especially important, accounting for £27 per hectare output on Cereals farms and £14 per hectare on General Cropping farms.

Table 2.2 shows the performance of diversified activities on arable farms in 2015 and 2016.

Table 2.2 Diversification Output and Costs, Cereals and General Cropping Farms, 2015/2016 and 2016/2017

	Cereals		General Cropping	
	£ per hectare			
	2015	2016	2015	2016
Diversification output	136	152	156	139
Of which:				
Rental	90	96	87	87
Recreation	8	10	27	19
Food processing and retailing	2	3	16	3
Tourism	7	5	5	11
Solar	-	11	-	9
Other energy	-	8	-	5
Other (includes energy in 2015)	28	19	19	5
Costs	61	61	86	66
Diversification FBI	75	91	70	73
Whole farm FBI	172	218	248	292

Solar and other farm energy

- About 29 per cent of Cereals farms and 33 per cent of General Cropping farms have output from renewable energy activity.

The percentage of farms with activity, and the output generated is shown in Table 2.3. Investment in green technology is shown in figure 2.2.

Figure 2.2 Annual Investment in Green Technology on Cereals and General Cropping Farms

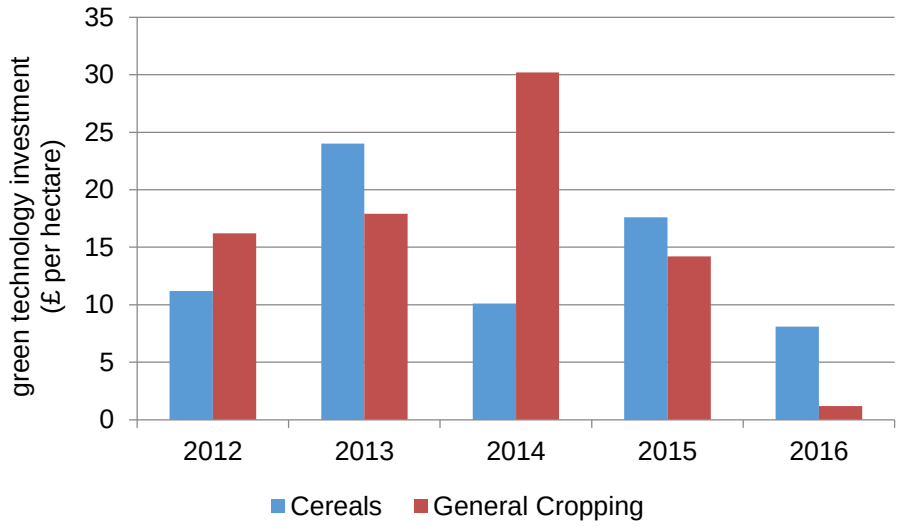


Table 2.3 Renewable Energy Output on Farms With Renewable Energy

	Cereals		General Cropping	
	Farms with Per cent	Output £ per farm	Farms with Per cent	Output £ per farm
Solar	21	10,300	19	11,500
Renewable Heat Initiative	6	12,300	7	11,700
Wind Turbine	3	33,000	too few farms to report	
Renewable rental	8		14	
All	29	12,600	33	14,200

- Farms invested directly in renewable energy and let out sites for generation, including wind turbines and solar parks.
- Of the direct investment, solar was the most popular, found on about 20 per cent of arable farms.
- A smaller proportion of farms had investment in wind turbines, but the output was greater, averaging about £33,000 per farm on Cereals farms.

2.3 Basic Payment Scheme (BPS)

Table 2.4 shows the output and costs of direct payments on arable farms in 2015 and 2016.

Table 2.4 Basic Payment Output and Costs 2015/2016 and 2016/2017, Cereals and General Cropping Farms

	Cereals		General Cropping	
	£ per hectare			
	2015	2016	2015	2016
Basic Payment	166	198	160	190
Costs	17	20	14	16
Contribution to FBI	149	178	146	173
Whole farm FBI	172	218	248	292

- Weakening of sterling against the euro in September resulted in a 16.5 per cent increase in the value of the 2016 Basic Payment.
- The contribution of BPS, net of costs, was £178 and £173 per hectare on Cereals and General Cropping farms respectively, representing 82 and 59 per cent of the whole farm FBI.
- BPS was paid at a rate of £149.38 per hectare with an additional £66.23 per hectare for Greening. After deduction of financial discipline at 1.35 per cent on sums exceeding 2000 euro, the rates were typically £147.36 per hectare with £65.33 per hectare for greening.

3.0 Agriculture Performance

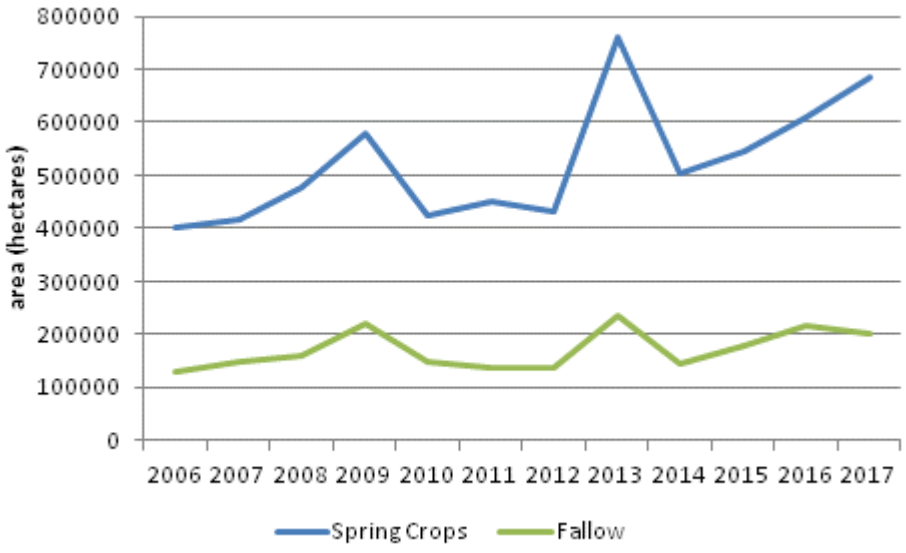
- The area of spring crops increased by 11 per cent in 2016
- 60,000 hectares of anaerobic digestion (AD) maize were grown
- Agriculture output of Cereals farms reduced but so did variable costs
- Potato area was the main driver of favourable General Cropping farm performance
- Fixed costs unchanged on Cereals and General Cropping farms

The results presented in this Chapter relate solely to the activity of **agriculture**. The outputs, costs and agricultural Farm Business Income (FBI) attributable to this activity can be summed with that from agri-environment scheme participation, diversification outside agriculture and the Basic Payment Scheme (BPS) to give results for the whole farm business. Whilst output and variable costs can be readily split between cost centres, some element of estimation is needed in order to share labour, machinery, property and overhead costs. Within the FBS, this is carried out on a consistent basis using an agreed approach[1].

3.1 Cropping and Crop Areas

The area of spring cropping continued to increase in 2016 as shown in figure 3.1.

Figure 3.1 Area of Spring Cropping and Fallow Land in England, 2006 to 2016



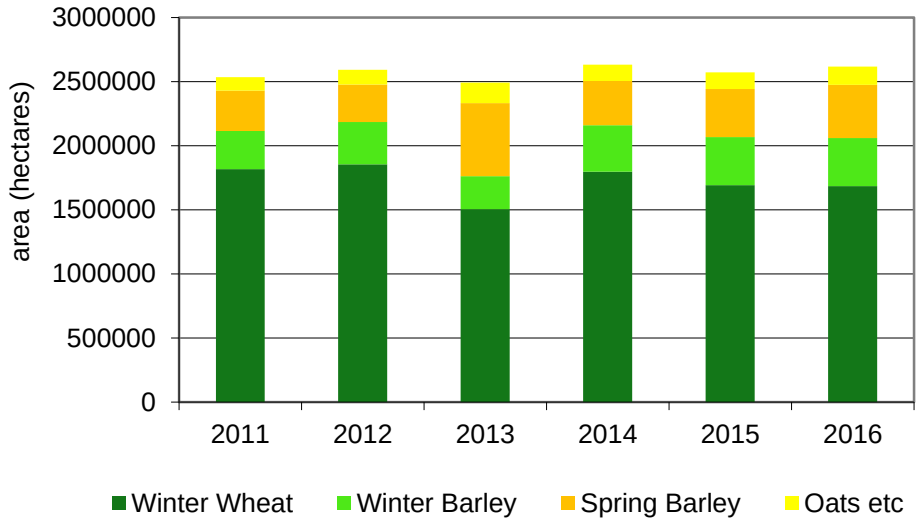
Source: Defra June Survey

- Spring crops accounted for 18 per cent of the total crop area.
- This area increased by 11 per cent in 2016, and was 29 per cent above the five-year average.

[1] Appendix 2 (Item VI) Farm Accounts in England 2008/2009 Defra statistics https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/423700/fbs-fixedcostmethod-23apr15.pdf

The areas of cereal crops, break crops and intensive crops are shown in figures 3.1, 3.2 and 3.3 below.

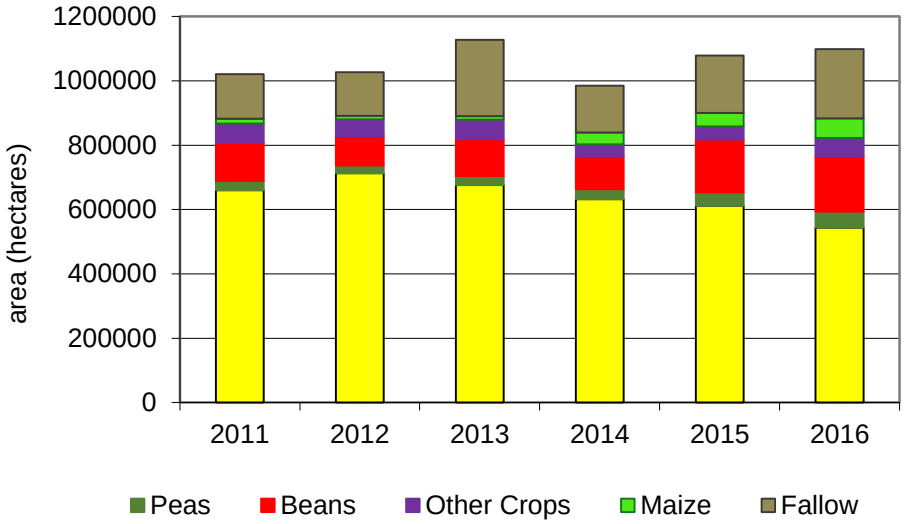
Figure 3.2 Cereal Crop Area, 2011 to 2016 in England



Source: Defra June Survey

- Overall, the cereal area increased to 2.62 million hectares and to two per cent above the five-year average.
- The area of break crops was close to the five-year average.
- The area of sugar beet and horticultural crops reduced by four and nine per cent respectively, whilst the area of potatoes increased by eight per cent in response to improved prices in 2016.
- At 1,684,000 hectares, the wheat area was three per cent below the five-year average.
- A substantial area of barley was again produced. Although the area of winter barley was unchanged on 2015, the area of spring barley increased by 12 per cent.
- There was a further expansion of other cereal production, including oats, to 142,000 hectares of land and 11 per cent above the five-year average.

Figure 3.3 Break Crop Area, 2011 to 2016 in England



Source: Defra June Survey

- The area of break crops was similar to the five-year average but there have been important recent changes in the areas of individual crops.

- The area of oilseed rape declined further, from its peak of 713,000 hectares in 2012 to 543,000 in 2016. Accordingly the area was eight per cent below the five year average. Low crop prices and the risk of cabbage stem flea beetle has deterred growers from producing oilseed rape across England, but especially in Suffolk, Bedfordshire, Cambridgeshire and Hertfordshire[1]. The area of oilseed rape grown in the East of England reduced by 23,000 hectares[2].

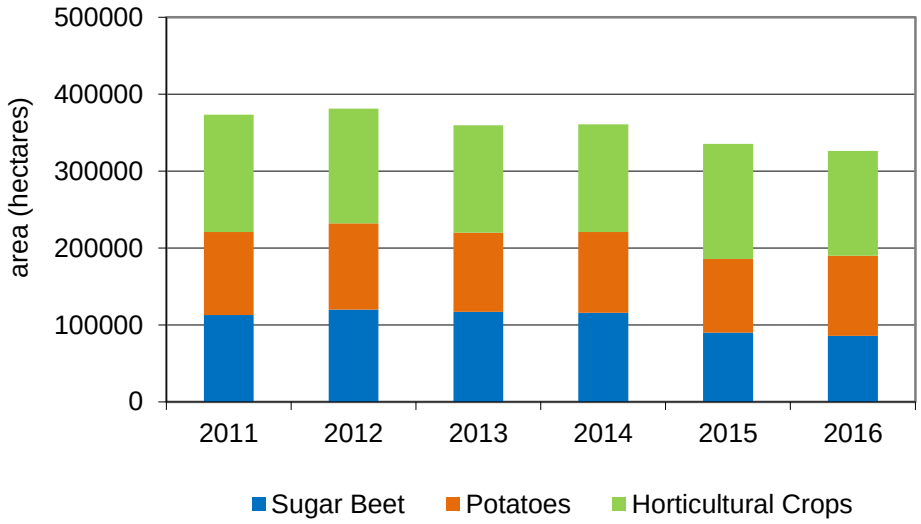
- Used by many growers to meet the Basic Payment Scheme (BPS) Environmental Focus Area Greening conditions, the area of peas and beans increased to 49 per cent above the five-year average, but the overall area was still lower than that grown in 2006.

- The area of uncropped land increased by 21 per cent to 216,000 hectares. In some cases, this increase may have been driven by difficulty with meeting the requirements of the BPS Three Crop Rule[3]. In response to low potential profitability of combinable break crops, and the need to control blackgrass, the areas of rotational fallow exceeded the area needed to meet Greening requirements on many farms.

- The area of maize has increased substantially due to the development of anaerobic digestion (AD). In 2016, 60,000 hectares were grown, an area that is four times greater than the 15,000 hectares grown in 2011. However, due to the high costs of crop transport, maize is typically grown intensively near to AD plants.

[1] Crops 5 March 2016
[2] Defra,Farming Statistics – provisional arable crop areas at 1 June 2016, England, 11 August 2016
[3] Farmers weekly Interactive, www.fwi.co.uk , 13 August 2016

Figure 3.4 Sugar Beet, Potato and Horticultural Crop Area 2011 to 2016 in England



Source: Defra June Survey

- The contracted area of sugar beet again reduced in 2016 to about 86,000 hectares, this is 13 per cent lower than the five-year average.
- The area of potatoes recovered to 104,000 hectares in response to improved crop prices in 2016. Although eight per cent higher than in 2015, the area was one per cent lower than the five-year average.
- The area of horticultural crops reduced to a low of 136,324 hectares, seven per cent lower than the five-year average.

Energy Crops

- Bioenergy crops were grown on 132,000 hectares of land (93,000 in 2015), comprising 2.2 per cent of the total arable area, included in the arable areas described above[1].
- Wheat for bioethanol remained the main crop grown for energy use, at 66,000 hectares (41,000 hectares in 2015). Maize, for AD electricity and gas generation (and a small amount of bioethanol production) increased by 53 per cent from 34,000 hectares in 2015 to 52,280 hectares in 2016.
- Sugar beet for bioethanol was grown on 3,000 hectares.
- There were 7,057 hectares of *Miscanthus* (6,905 hectares in 2015) and 2,962 hectares of short rotation coppice (2,885 hectares in 2015). In 2016, English oilseed rape was not used for UK biodiesel production (it is possible that exported crop was used to make biodiesel).

[1] Crops Grown for Bioenergy in England and the UK: 2016, Defra, 6 December 2017

3.2 Cereals Farms Performance (excluding organic farms)

- Agriculture contributed -£71 per hectare to the FBI of Cereals farms in England in 2016 (-£80 in 2015). Crop output was three per cent lower due to changes in individual crop performance and changes in cropping.

- Of the most commonly grown crops, the winter wheat gross margin increased but the gross margins of winter barley and winter oilseed rape reduced. Farmers grew an increased area spring crops which typically have lower margins than winter crops.

- An eight per cent reduction in variable costs ensured that gross margins increased by three per cent to £585 per hectare. At £659 per hectare, fixed costs were virtually unchanged, although the charge for rent was four per cent lower on average at £82 per hectare (the cost is spread over the whole farm and not just the rented area).

Cereals Farms – Performance Group

- The contribution of agriculture to FBI on top quartile Cereals farms was £208 per hectare and three per cent higher than the previous year. These farms were slightly smaller than average, but grew the largest areas of wheat and oilseed rape, but smallest area of spring barley. Although the group included a relatively high share of owner occupied land, rent was one of many fixed costs that were lower on the top quartile farms.

- The average contribution of agriculture to FBI on the bottom quartile farms was -£332 per hectare.

3.3 General Cropping Farms Performance (excluding organic farms)

- The average contribution of agriculture to FBI was £21 per hectare (-£3 in 2015). Part of the change is due to an increase in sample size, to 151 farms with a greater inclusion of livestock activity.

- Overall, crop output, of £1,262 per hectare, was two per cent higher than the previous year. Potatoes and sugar beet occupied four and six per cent of farm area respectively. Fixed costs, of £909 per hectare, were similar to the previous year and the rent charge, of £119 per hectare, was unchanged. The 2016 sample incurred higher contract charges but spent less on labour.

- Cropping ten per cent of their farms with potatoes, the top quartile group of farms attained a contribution of agriculture of £516 per hectare to FBI.

4 Crop Enterprise Performance

4.0 Crop Gross Margins

- Cereal prices and gross margins improved on previous year (but not winter barley)
- Milling premium just £6 per tonne due to variety choice and favourable wheat quality
- Cereal yields similar to five-year average
- Oilseed rape yields and gross margins low but improved price
- A Defra derogation permitted use of neonicotinoid seed dressing on 5% of the crop
- Ware potato gross margin of £5,366 per hectare was the highest since 1998

4.1 Crop Gross Margins (excluding organic crops)

Figure 4.1 shows the gross margin of non organic crops in 2015 and 2016.

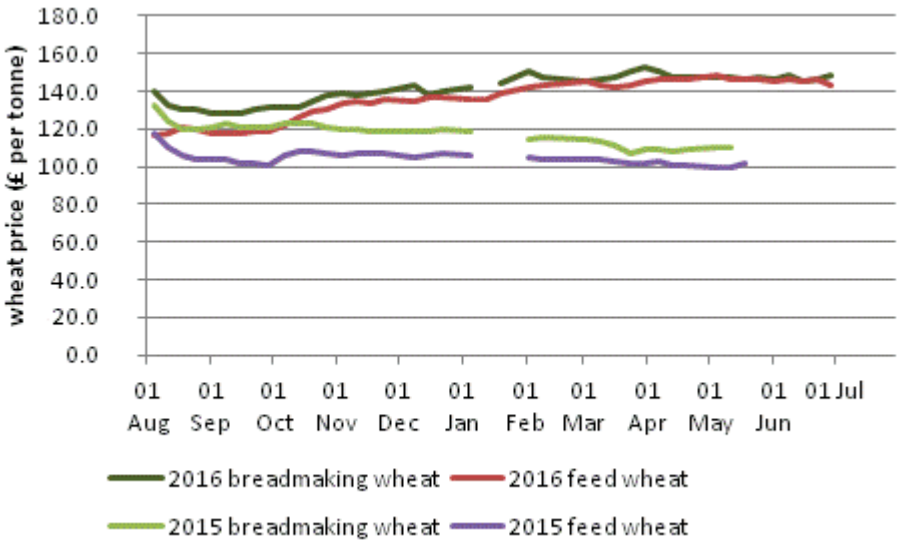
Figure 4.1 Combinable crop gross margins, 2015 and 2016

- The gross margin of potato and cereal crops (but not winter barley), increased in 2016 relative to 2015. The winter barley gross margin reduced, as did that of oilseeds, peas, beans and sugar beet.
- Cereal yields were close to five-year average levels, with the exception of winter barley which yielded six per cent below the five-year average. Cereal prices ranged from 12 to 22 per cent lower than the five-year average. Oilseed rape and bean yields were below the five-year average and the price of beans was also low.
- Sugar beet and potato yields were four per cent above the five-year average
- Seed and fertiliser expenditure were typically below recent levels, whilst crop protection costs increased for most crops.

4.2 Winter Wheat

- At £654 per hectare, the gross margin was15 per cent lower than the five-year average, but two per cent higher than the previous year's £641 per hectare.
- It was achieved with a yield of 8.4 tonnes per hectare, which was also the five-year average yield, but it followed the previous year's record of 9.8 tonnes per hectare. At £502 per hectare, the expenditure on variable costs was at its lowest since 2011.
- Expenditure on seed was four per cent lower than in 2015 at £66 per hectare.
- The share of milling wheat was the highest since 2010, possibly reflecting the introduction of high yielding milling varieties. There was a strong regional variation in wheat choice ranging from 51 per cent uptake of Group 1 milling varieties in the South East to 11 per cent in Yorkshire. The regional variation was probably influenced by the location of the Ensus bioethanol plant on Teeside and the Cerestar starch plant in Manchester[1].
- Fertiliser expenditure, of £186 per hectare, was seven per cent lower than the previous year, mainly due to the lower unit cost of fertiliser.
- Overall cop protection costs were £217 per hectare and about one per cent higher than in 2015. Herbicide expenditure was again driven by the need to manage blackgrass.
- The quality of wheat was especially high in 2016; 45 per cent of all wheat samples and 69 per cent of Group 1 and Group 2 wheat met milling standards in 2016[2]. Dry conditions at harvest minimised the requirement to dry grain.

Figure 4.2 Wheat Price 2015/2016 and 2016/2017



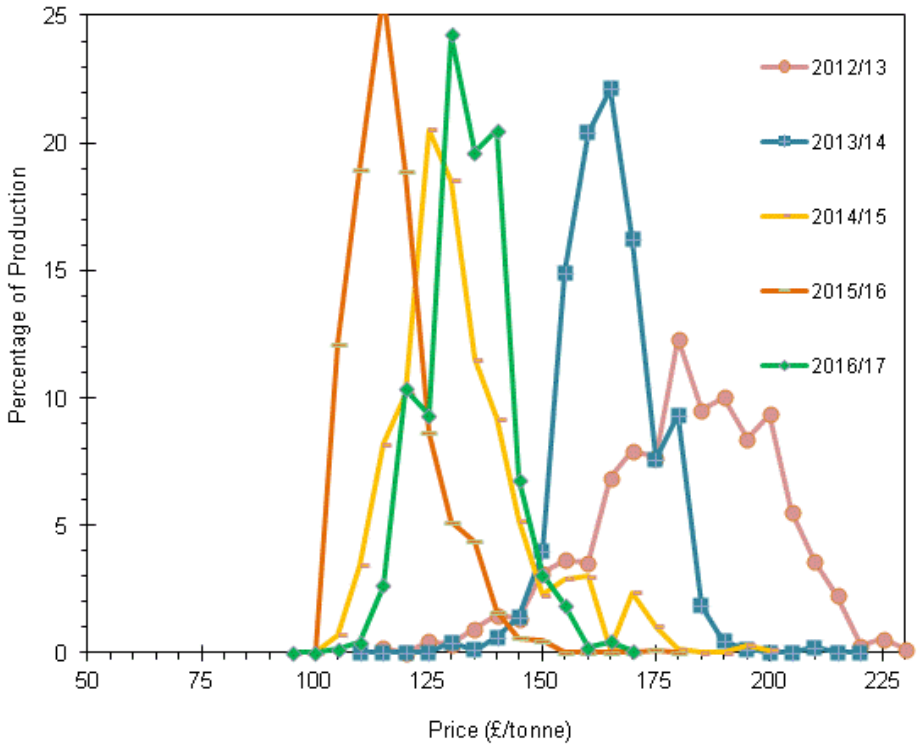
Source: AHDB

- The feed wheat price increased steadily from around £120 per tonne at harvest to £145 per tonne by June 2017. The actual prices received are shown in figure 4.3.

[1] Crops, 20 June 2015

[2] AHDB Quality Survey, 22 November 2016

Figure 4.3 Wheat Price Achieved 2012/2013 to 2016/2017



- In common with the three previous years, farmers sold their crop within a relatively small range of prices. The average prices received ranged from about £110 to £160 per tonne.

- Straw sales, and farm use, averaged £55 per hectare over all crops. At auction, standing straw prices in the South West were typically around £110 per hectare, and about 15 per cent higher than in 2015[1]. Livestock farmers were advised to secure supplies of bedding in October 2016.

- About six per cent of cereal and oilseed straw production was used for energy generation in 2016[2].

- Much milling wheat met quality specifications, and consequently price premiums fell. In January to March 2017, millers in Great Britain used 1.71 million tonnes of domestic wheat, 13 per cent more than in the same period in 2016. Milling premiums of around £11 per tonne were available in August 2016, but these had diminished to less that £1 per tonne by late spring 2017. Taking our sample of farms with entirely milling wheat, and no milling wheat, the average milling premium was £6 per tonne.

- The small sample of farms with entirely milling wheat achieved a relatively high gross margin of £689 per hectare due to a relatively high yield of 8.6 tonnes per hectare, as well as a small milling premium. As might be expected, the crop was grown with a relatively high expenditure on fertiliser of £206 per hectare.

- The top quartile of wheat producers achieved an average gross margin of £898 per hectare from crops with an average yield of 9.5 tonnes per hectare and with below average expenditure on seed, fertiliser and crop protection. Conversely, the bottom quartile group achieved an average gross margin of £379 per hectare with an

[1] Farmers Weekly Interactive, www.fwi.co.uk , 19 July 2016

[2] Crops Grown for Bioenergy in England and the UK: 2016, Defra, 6 December 2017

average yield of 7.1 tonnes per hectare and above average expenditure on all variable costs.

4.3 Spring Wheat

- Spring wheat continued to increase in popularity, and we recorded 85 crops in the 2016 FBS (78 in 2015 and less than 10 in 2008). Although the gross margin of £425 per hectare was eight per cent higher than in 2015, this was 25 per cent below the five-year average.

- The crop yield of 5.6 tonnes per hectare was four per cent higher than the five-year average. Although the average price, of £136 per hectare, was nine per cent higher than in 2015, this was 22 per cent lower than in previous year.

- Variable cost expenditure, of £358 per hectare was ten per cent lower than the five-year average, with reductions in expenditure on seed, fertiliser and crop protection.

4.4 Winter Barley

- Low yields and prices conspired to give the lowest winter barley gross margin since 2009, of £404 per hectare. Whilst other cereal yields were close to average levels, the winter barley yield, of 6.5 tonnes per hectare, was six per cent below the five-year average and 19 per cent below the previous year.

- At £112 per tonne, the average price was 19 per cent below the five-year average. One marketing company rejected 50 per cent of malting samples due to low specific weight. Malting barley premiums averaged around £10 to £15 per tonne for much of the marketing season[1].

- In common with other crops, expenditure on seed and fertiliser reduced, whilst expenditure on crop protection increased. Overall variable cost expenditure, of £419 per hectare, was two per cent below the five-year average.

4.5 Spring Barley

- In common with wheat and oat crops, the spring barley gross margin increased in 2016, due to a higher price but lower yield. The gross margin was £468 per hectare, 16 per cent below the five-year average, but the yield, of 5.9 tonnes per hectare, was one per cent above the five-year average.

- At £123 per tonne, the average price was 15 per cent below the five-year average, but ten per cent higher than in 2015.

- At £468 per hectare, variable cost expenditure was 16 per cent lower than the five-year average as seed, fertiliser and crop protection costs were all lower than in 2015.

- As spring barley became even more popular in 2016, growers were encouraged to enter contracts for production of malting barley. About 70 per cent of the malting crop was grown with a contract in 2016[2].

[1] Market Outlook, Gleadell, Autumn 2016

[2] Farmers Weekly, 4 December 2015

4.6 Winter and Spring Oats

- The winter oat gross margin, of £577 per hectare, was 12 per cent below the five-year average, but 17 per cent higher than in the previous year.
- The yield, of 5.9 tonnes per hectare was close to the five-year average, but the price, £122 per tonne, was 13 per cent below the five-year average.
- The expenditure on variable costs averaged £329 per hectare following a reduction in fertiliser expenditure.
- Across all cereal crops, spring oats gave the lowest gross margin, of £400 per hectare, 18 per cent lower than the five-year average.
- With a yield of 4.8 tonnes per hectare, spring oats were the only crop with a yield that was greatly below the five-year average (28 per cent lower).
- The variable cost expenditure averaged £275 per hectare, down from £288 in 2015, mainly due to the lower fertiliser price.

4.7 Winter Oilseed Rape

- The winter oilseed rape gross margin, of £527 per hectare was 25 per cent below the five-year average and nine per cent lower than in 2015. The average yield of 3.1 tonnes per hectare was 14 per cent lower than the five-year average.
- High quality food grade oilseed rape with high oleic acid, but low linoleic acid content (Holl), accounted for 40,000 hectares of the UK 2016 oilseed rape market[1].
- Defra approved a derogation for farmers to use neonicotinoid seed dressing on five per cent of the crop area in 2016[2]. Under emergency use legislation, this seed was available for use on 30,000 hectares in Suffolk, Cambridgeshire, Bedfordshire and Hertfordshire[3]. These were the four counties with the highest risk of attack from cabbage stem flea beetle, based on evidence from 2015. Growers were required to use certified seed, treated with clothianidin or thiamethoxam. Growers were also permitted emergency use of foliar applied acetamiprid (sold as InSyst) for autumn control of cabbage stem flea beetle[4].
- Among crops that did not have a neonicotinoid seed treatment, an estimated one per cent, equivalent to 6,000 hectares, of the UK oilseed rape crop was lost to cabbage stem flea beetle[5]. The problem was reported to be greatest in Buckinghamshire, Cambridgeshire, Essex, East Yorkshire, Suffolk, Lincolnshire, Northamptonshire, North Yorkshire, Hampshire and Bedfordshire, suggesting a wider geographical spread. However, our results by county and area suggest that actual performance was localised, with substantial differences in yield between adjacent areas. The spread was confirmed in pest assessments carried out by the Food and Environment Research Agency (FERA) as larvae populations were especially high in the North and South East of England[6].

[1] Farmers Weekly, 10 April 2015
[2] Farmers Weekly Interactive, www.fwi.co.uk , 22 July 2015
[3] Farmers Weekly Interactive, www.fwi.co.uk , 27 July 2015
[4] Farmers Weekly Interactive, www.fwi.co.uk , 17 August 2015
[5] Farmers Weekly Interactive, www.fwi.co.uk , 28 January 2016
[6] Farmers Weekly Interactive, www.fwi.co.uk , 8 April 2016

- Some crops started flowering as early as March and April at times of frost. Light leaf spot was the main foliar disease in 2016 with the highest incidence since the Crop Monitor survey began[1]. *Phoma* proved difficult to control due to rain at the critical late November to December spray timing and its incidence was the highest since 2008. Crops received an average of 3.1 fungicides in 2016 and 2.4 insecticide applications.

- The price, of £324 per tonne was 17 per cent higher than in 2015, but two per cent below the five-year average. Flooding in Argentina reduced soybean supply and caused oilseed rape prices to rise between March and June. Oilseed rape prices increased sharply in April 2016 to £265 per tonne for harvest movement as sterling weakened against the euro. At harvest, the price had risen to £280 per tonne on reports of a low yield in continental Europe, including France and Germany, and despite strong prospects for soybeans in the US[2]. By August, prices had reached £288 to £300 per tonne due to further weakening of sterling and reduced supply[3]. Oil content was low, ranging from 39 to 45 per cent, so farmers received a minimal oil premium. By mid August, the price had reached £303 per tonne[4]. Prices peaked at £315 per tonne before falling to £305 per tonne at the start of September[5]. Further falls in sterling and increased crude oil prices were drivers of further price increases in mid October to £330 per tonne[6].

4.8 Linseed

- The linseed crop had the lowest gross margin of all crops, of £310 per hectare. The crop had an average yield of 1.8 tonnes per hectare, and sold for an average of £349 per tonne.

4.9 Peas for Combining

- The pea gross margin shows considerable annual variability. Whilst peas achieved the highest combinable crop gross margins in 2009 and 2014, in 2016 the gross margin was 51 per cent lower than the five-year average at £335 hectare.

- The average yield of the pea crop was 2.9 tonnes per hectare and 16 per cent below the five-year average.

- The pea price averaged £229 per hectare and was 22 per cent lower than the five-year average and the lowest since 2010. Large blue peas were scarce and premiums were available for these varieties. However, the market for marrowfat peas was over supplied and values were depressed[7].

4.10 Winter and Spring Beans

- At £314 per hectare, the winter bean gross margin was virtually unchanged on the previous year. The average price, of £146 per tonne, was 33 per cent lower than the five-year average and the average yield of 3.8 per tonne was eight per cent below the

[1] Crop Monitor, www.cropmonitor.co.uk
[2] Farmers weekly Interactive, www.fwi.co.uk , 28 July 2016
[3] Farmers weekly Interactive, www.fwi.co.uk , 9 September 2016
[4] Farmers Weekly Interactive, www.fwi.co.uk , 18 August 2016
[5] FarmBrief, 1 September 2016
[6] Farmers Weekly Interactive, www.fwi.co.uk , 14 October 2016
[7] Market Outlook, Gleadell, Autumn 2016

five-year average and 14 per cent lower than in 2015. In early 2017, an exceptionally large Australian crop made exports of human consumption beans very difficult[1]. The crop was grown at the lowest cost since 2010, with reduced expenditure on seed, fertiliser and crop protection. Winter beans established well and developed favourably in the mild winter. Bruchid beetles were active in beans in mid May 2016[2].

- Spring beans gave better average performance than winter beans with a gross margin of £383 per hectare and yield of 4.3 tonnes per hectare. Spring bean quality was good and the average price of £154 per tonne was £6 per tonne higher than the winter bean crop.

4.11 Sugar Beet

- The average sugar beet gross margin, of £945 per tonne, was 25 per cent lower than the five-year average and eight per cent lower than in 2015.

- The average price achieved by growers, including haulage allowance, was £25 per clean tonne, and a little lower than the 2015 price of £26 per tonne.

- The 2016/2017 crop was the last to be produced under the EU sugar regime which ceased at 30 September 2017, the end of the marketing year. Ahead of this date, commentators anticipated that British Sugar would aim to increase production[3].

- The context for fixing the 2016 sugar beet price was oversupply of sugar in Europe and exceptional UK production back in 2014. British Sugar reduced prices and Entitlement for 2015 and 2016. Through reductions in Entitlement, combined with voluntary arrangements to reduce production, growers reduced production in 2015 by 20 per cent.

- The original 2016/2017 sugar beet price was £20.30 per tonne for both Contract Tonnage Entitlement (CTE) beet and Industrial Contract Entitlement (ICE)[4]. This was 15 per cent lower than the 2015 price of £24.00 per tonne and 36 per cent lower than the 2014 price of £31.67 per tonne. There was no further cut in CTE or ICE in 2016, but growers were permitted to contract to grow between 0 and 100 per cent of their Entitlement whilst retaining their right to produce in 2017/2018.

- As sterling weakened in the summer of 2016, British Sugar raised the sugar beet price by £1.32 per tonne, based on the September exchange rate, to £21.62 per tonne[5].

- At £837 per hectare, variable cost expenditure was five per cent below the five-year average and the lowest since 2011. Seed costs were similar to previous years, but expenditure on fertiliser, crop protection and other costs, which include haulage, were lower than the last two years.

- Cold and wet conditions created difficulties with seedbed preparation and crop establishment in all factory areas[6]. As a result, drilling took place over a prolonged period from 1 March to 26 May with a relatively late average drilling date of 7 April[7]. Some crops emerged slowly, making herbicide application timings difficult to achieve.

[1] Pulse Market Update, PGRO, February 2017
[2] Farmers weekly Interactive, www.fwi.co.uk , 13 May 2016
[3] Farm Brief, 13 February 2014
[4] NFU Press Release, 29 June 2015
[5] Farmers Weekly Interactive, www.fwi.co.uk , 4 October 2016
[6] British Sugar Beet Review, Summer 2016
[7] Growers Crop Declaration Data 2010 to 2016, British Sugar

- High rainfall in June slowed crop growth[1].

- The yield of clean beet, of 72 per tonne, was similar to the previous year and four per cent above the five-year average.

- The top quartile group of farms achieved an average yield of 81.8 tonnes per hectare and gross margin of £1,220 per hectare. These farms made above average expenditure on seed and fertiliser, but only average expenditure on crop protection. The bottom quartile group grew 50.4 tonnes per hectare to give a gross margin of £453 per hectare. Their seed and fertiliser expenditure was below average, but their crop protection and other crop costs, including haulage, were above average, although the higher price received probably included additional haulage allowance, offsetting the cost. The low-mid quartile group made the lowest expenditure on seed, fertiliser and crop protection.

4.12 Ware Potatoes

- The ware potato gross margin averaged £5,366 per hectare. This was 49 per cent higher than the five year average and the highest since 1998[2]. The 78 crops represented in the gross margin calculation span a wide range of production systems, so any comparison should be made with care.

- The average yield was 42 tonnes per hectare, and was four per cent higher than the five-year average, but eight per cent lower than the previous year.

- The overall expenditure on variable costs was five per cent below the five-year average at £2,116 per hectare. In comparison with the previous year, seed costs were higher, but fertiliser and crop protection costs were lower.

- Planting was later than in previous years. The wet spring weather created difficulties for potato planting in the North West and on heavy land in Yorkshire, although better progress was made in Cheshire[3].

- Growing conditions were not ideal due to high rainfall and dull conditions in June and July. These conditions favoured blight development and therefore comprehensive fungicide applications.

- From £172 per tonne in August 2016, the average weekly potato price increased to £182 per tonne in November[4] [5]. Prices increased to £228 in the approach to Christmas as AHDB estimated that UK production was five per cent lower than in 2015[6]. The average price achieved by farmers for all ware potatoes was £180 per tonne. This was twenty per cent higher than the five-year average price and 18 per cent higher than the previous year.

- The range of marketing and production systems for ware potatoes is very wide, and there is also a wide range of fixed cost expenditure and capital commitment. The top quartile ware potato gross margin group averaged £8,187 per hectare for crops averaging 49.1 tonnes per hectare, and sold for £214 per tonne. Their variable costs were £2,302 per hectare.

[1] Farmers Weekly Interactive, www.fwi.co.uk , 16 September 2016
[2] Ben Lang, Report on Farming in the Eastern Counties of England, University of Cambridge, 2003/2004
[3] Farmers Weekly Interactive, www.fwi.co.uk , 30 March 2016
[4] Potato Market Dynamics Report, AHDB Potatoes, 31 August 2016
[5] Potato Market Dynamics Report, AHDB Potatoes, 1 November 2016
[6] Potato Market Dynamics Report, AHDB Potatoes, 9 January 2017

- The bottom quartile group grew crops with an average yield of 34.6 tonnes per hectare, with an average price of £132 per tonne, to give a gross margin of £2,611 with variable costs of £2,611 per hectare.

4.13 Vining Peas

- The average vining pea gross margin was £623 per hectare for crops yielding £1.8 tonnes per hectare. In 2015, the gross margin was £972 per hectare and the average yield was 2.4 tonnes per hectare.

4.14 Maize and Rye for Anaerobic Digestion (AD)

- Greater uptake of energy crops has provided us with a sufficiently large sample to report their performance for the first time in 2016.
- The sample of 18 producers of maize for anaerobic digestion (AD maize) generated an average gross margin of £870 per hectare. This calculation takes no account of the relatively high establishment and harvesting costs, these operations are often carried out by contractors. This was higher than for any combinable crop, but lower than the gross margin of sugar beet or potatoes.
- The AD maize crop averaged 42 tonnes per hectare and sold (or transferred to an AD plant) for £32 per tonne.
- Seed fertiliser and crop protection costs averaged £137, £197 and £120 per hectare respectively.

4.15 *Miscanthus*

- The average gross margin for *Miscanthus* was £393 per hectare (£585 in 2015). The average yield was 9.5 tonnes per hectare (10.1 tonnes per hectare in 2015).

5 Net Margin and Cost of Production Estimation

5.0 Summary of Net Margin and Cost of Production Estimate

- Negative net margins of all crops except potatoes
- Overall costs in line with previous years despite reduced variable costs
- Net margins per hectare similar to previous years
- Cost of production at typical levels as yields close to average
- Previous year cost of production was unusually low due to high crop yields

5.1 Introduction

- In this fourth year of whole farms analysis, we present net margin and cost of production estimates for the main crops grown in England. The methodology for calculation of FBS net margins on a full economic basis is described at Appendix 3, and includes imputed costs for labour and owner occupied land. Organic crops are excluded from the analysis.

5.2 Results for 2016 (excluding organic crops)

Our estimates of net margin and cost of production for cereal and break crops are shown in tables 5.1 and 5.2 respectively.

Table 5.1 Calculation of Net Margin and Cost of Production for Cereal Crops, 2016

	winter wheat 649 farms	**spring wheat** 85 farms	**winter barley** 398 farms	**spring barley** 372 farms	**winter oats** 117 farms	**spring oats** 65 farms
Net margin (£ per ha)	-281	-410	-371	-342	-262	-269
Cost of production (£ per t)	171	212	184	191	173	197

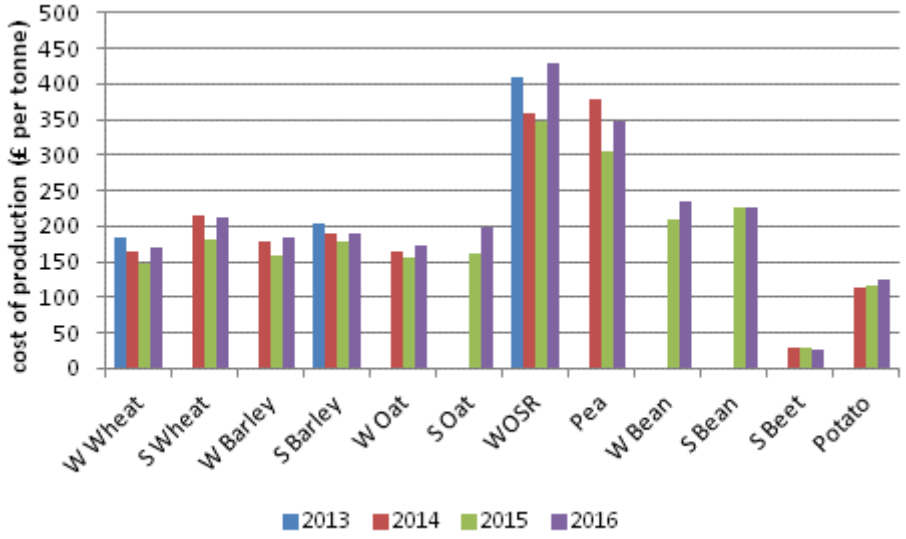
Table 5.2 Calculation of Net Margin and Cost of Production for Break Crops, 2016

	winter oilseed rape 352 farms	**peas** farms 60 farms	**winter beans** 66 farms	**spring beans** 152 farms	**sugar beet** 108 farms	**ware potatoes** 78 farms
Net margin (£ per ha)	-304	-339	-326	-311	-125	2,244
Cost of production (£ per t)	429	347	236	227	27	126

5.3 Comparison with Previous Years

Figure 5.1 shows the cost of production of the main crops in 2015 to 2016.

Figure 5.1 Cost of Production, Combinable Crops, 2013 to 2016



- In our emerging time series, the cost of production appears to have been more consistent than the crop price in recent years. The greatest variation in cost of production has been for oilseed rape and peas due to their greater yield variability.

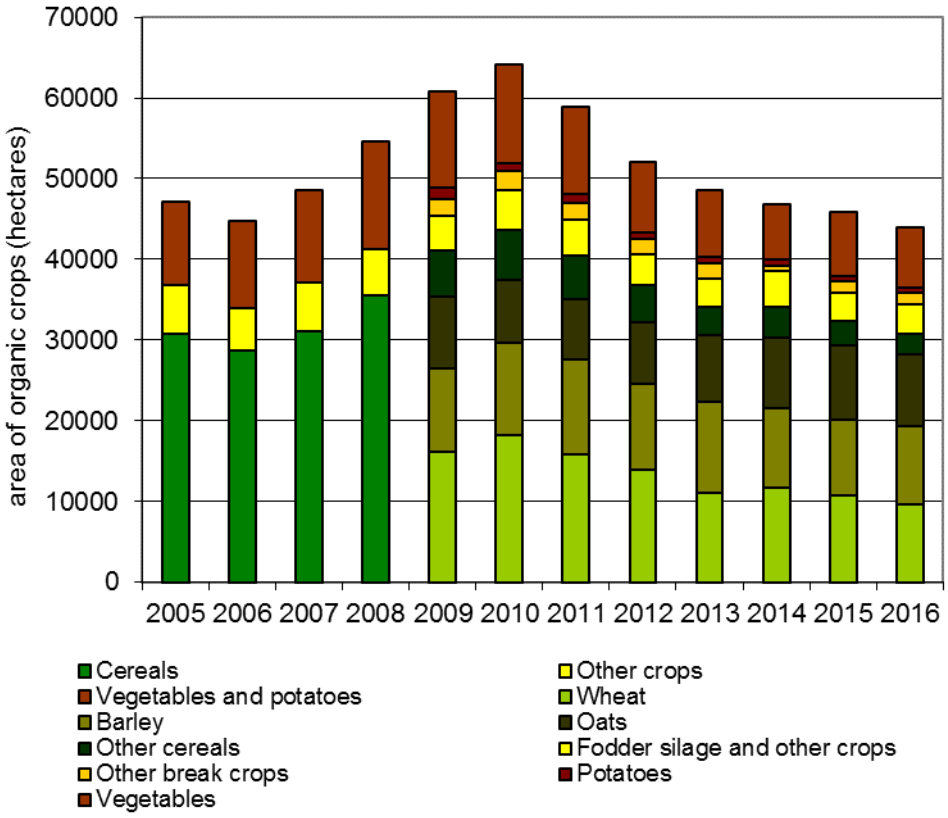
6.0 Organic Arable Performance

- fully organic crop area of 44,000 hectares, from 2010 peak of 64,111 hectares
- the number of organic crop producers has reduced by 17 per cent since 2009
- FBI from agriculture improved to -£8 per hectare
- disappointing 2016 harvest with organic crops showing variability in yield and quality.
- the organic price premium has increased for most crops
- exceptional performance of organic spring beans due mainly to high crop price

6.1 Market Overview and Organic Crop Areas

- The value of organic food sales increased, by 7.1 per cent, in 2016 relative to the previous year[1].
- UK arable farmers reduced their commitment to organic production. Figure 6.1 shows a sixth successive reduction in the area of fully organic arable production

Figure 6.1 Area of Organic Crops in England, 2005 to 2016



[1] Farmers Weekly Interactive, www.fwi.co.uk , 20 May 2016

6 Organic Arable Performance

- The area of fully organic crops in England reduced to 44,000 hectares, from a peak of 64,111 hectares in 2010. Overall, the area of organic crops was 13 per cent below the five-year average.

- Whilst the area of barley and forage crops increased a little, and the area of potatoes remained unchanged, the area of all other crops reduced. This was the first year of reduction of the oat area, which had previously increased between 2011 and 2015. The area of organic vegetables reduced, by 12 per cent, to 7,500 hectares.

- The relative popularity of barley and potatoes, and the decline in vegetable production replicated the trend for non organic cropping in 2016.

- The number of organic crop producers fell to 2,159, of which almost 50 per cent were located in the South West of England. Since 2009, the number of organic crop producers has reduced by 17 per cent. In 2016, the number of organic producers in the East of England and East Midlands increased slightly. These regions had previously seen the greatest reduction in crop producers, averaging a 22 per cent reduction.

6.2 The Sample of Organic Farms

- There were 13 organic Cereals and General Cropping farms in the Farm Business Survey in 2016 /2017 (18 in 2015 /2016). At 113 hectares, they were smaller than the average non organic farms. The land on organic farms was about 68 per cent owner occupied.

- Our observations of organic cropping were consistent with the national trends described above. The number of organic spring barley crops in the FBS increased to 37 in 2016 from 29 in 2015. There were fewer farms growing all of the other organic crops.

6.3 Organic Agriculture Performance

- The Farm Business Income derived from agriculture on organic farms averaged -£8 per hectare, representing an improvement on the -£60 per hectare generated in 2015 and -£91 per hectare in 2014. This result was broadly similar to non organic farms, with similar cropping.

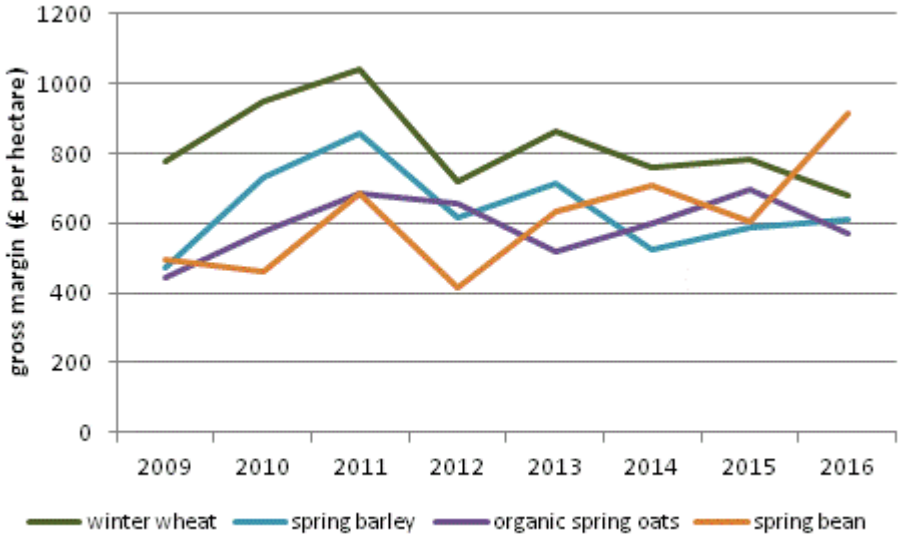
- Reflecting higher crop gross margins, crop output increased by 14 per cent to £838 per hectare, and output from livestock was also higher than in previous years. In comparison with non organic farms, other agricultural output, including contracting, is generally lower on organic farms.

- Fixed costs, which summed to £717 per hectare, were nine per cent higher than in 2015 and broadly similar to those on non organic farms.

6.4 Organic Crop Performance

Figure 6.2 shows the trend in organic gross margins in recent years.

Figure 6.2 Organic Gross Margins 2009 to 2016

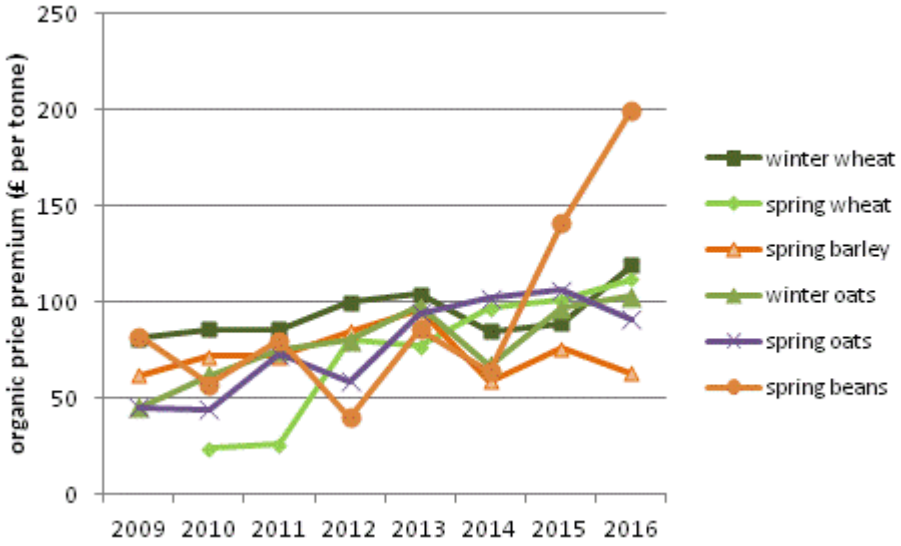


- The gross margins of organic cereal crops have remained at consistent levels since 2012, but were generally below average in 2016.

- The 2016 harvest was disappointing with organic crops showing variability in yield and quality. End users adjusted their specifications to accommodate the reduced quality of UK production. However, the exception was the organic spring bean crop which benefitted from reduced availability of imported protein crops.

Figure 6.3 shows the levels of organic price premiums since 2009.

Figure 6.3 Organic Price Premium, Wheat and Oats, 2009 to 2016



- Despite declining commodity prices in recent years, the organic price premium has increased for most crops. Winter wheat, winter oats, spring oats and spring beans saw the highest levels of organic premium since our records began in 2009. The

exceptional premium of the spring bean crop was due to scarce supplies of imported protein crops. The monthly prices described in the text below were sourced from the Saxon Organic Briefing, various months[1].

Winter and Spring Wheat

- The organic winter wheat gross margin averaged £681 per hectare. This was 18 per cent lower than the five-year average and 13 per cent lower than the previous year, but was still the highest organic cereal gross margin in 2016.
- The yield, of 3.1 tonnes per hectare, was the lowest organic winter wheat yield since 2012 and 20 per cent below the five-year average.
- At £250 per tonne, the price was close to the five-year average level. The organic wheat price started at £200 per tonne, rising to £205 per tonne in September and £215 in October to £222 in November. Feed crops were scarce by January, when the wheat price reached £230 per tonne and very scarce in February, when they reached £250 per tonne.
- Favourable milling premiums were available for crops with 10.0 to 11.5 per cent protein and a specific weight of 74 kilograms per hectolitre[2]. This amounted to £50 per tonne in November. As buyers reviewed their quality specifications, organic premiums of £35 per tonne were available in January.
- In the winter crop, variable costs were unchanged on the previous year, at £130 per hectare, but seed costs reduced by 16 per cent to £74 per hectare.
- The spring wheat gross margin, of £626 per hectare, was close to the five-year average, but 40 per cent higher than in 2015. Spring wheat achieved the second highest gross margin of the organic cereal crops grown in 2016. The yield and price were also close to the five-year average, but variable costs, of just £139 per hectare, were the lowest since 2010. Due to the particularly poor performance of the winter wheat crop in 2016, the spring crop performed comparatively well with a yield that was just three per cent lower, and with a similar sale price.

Spring Barley

- Organic spring barley gained in popularity in 2016, and 17 per cent of the grain output was used to feed livestock on the farm. The average gross margin was £609 per hectare and eight per cent below the five-year average, although similar to the £590 per hectare achieved in the previous year.
- Although the price, which averaged £186 per tonne, was 12 per cent below the five-year average, it was similar to the price achieved in the previous two years. Organic malting barley was in strong demand and achieved a £25 per tonne malting premium in September as buyers established availability of suitable crop. By January, this premium had edged up to £30 per tonne and was £40 per tonne in February.
- Lower seed costs accounted in an eight per cent reduction in variable costs to £131 per hectare, now 26 per cent below the five-year average.

[1] Saxon Organic Briefing, www.saxon-agriculture.co.uk , June 2016 to July 2017

[2] Market Outlook, Gleadell, Autumn 2016

Winter and Spring Oats

- Neither winter, nor spring oats, performed well in 2016, due to low yielding crops sold at near average prices. Winter oats had the lowest gross margin of all organic crops in 2016, at £513 per hectare this was 31 per cent lower than the five-year average.
- The average yield, of 2.5 tonnes per hectare, was the lowest since our records started in 2009 and 31 per cent below the five-year average.
- The crop sold at the five-year average price of £225 per tonne, although this was ten per cent higher than the 2015 price.
- In September 2016, organic feed wheat prices were around £190 per tonne. Milling oats were variable in specific weight and colour. Favourable premiums were available for crops that were not discoloured.
- The spring oat gross margin was £572 per tonne and nine per cent lower than the five-year average.
- At 2.9 tonnes per hectare, spring oats outyielded winter oats in 2016 by 14 per cent. The spring oat yield was last higher than the winter oat yield in 2013.
- The spring oat price, of £224 per hectare was the same as for the winter crop and two per cent lower than the five-year average.

Spring Beans

- A relatively small number of growers of organic spring beans produced an exceptional crop with a gross margin of £914 per hectare, which was 50 per cent above the five-year average.
- The yield, of 3.1 tonnes per hectare, was 20 per cent above the five-year average, and just lower than the 3.2 tonnes per hectare grown in 2014.
- Pulses were in demand due to the high price of imported organic protein crops. The crop price averaged £348 per tonne, which was 18 per cent above the five-year average. Prices started at £305 per tonne, rising to £325 per tonne in October. As end users struggled to source suitable imported organic protein prices increased to £360 per tonne in November. They settled at this value as imported protein became available at the end of 2016. However, prices increased again in early 2017 with January prices of £370 per tonne.
- At £165 per hectare, variable costs were seven per cent higher than the five-year average, but seed costs reduced to £94 per hectare.

7 Weather, Economic Context and Policy

7.0 Weather, Economic Context and Policy Summary

- the Prime Minister described Brexit policy aims in her January 2017 Lancaster House Speech
- sterling fell by 14 per cent against the euro in 2016
- a mild winter and dull early summer limited 2016 crop yields
- farmers were among the creditors of high profile failed trading businesses

7.1 Government

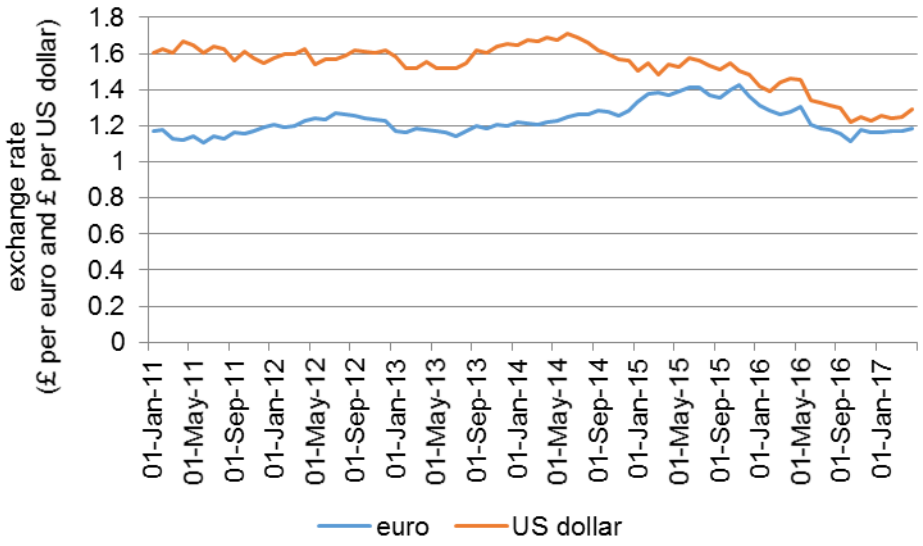
- The demands placed on Defra by the task of leaving the EU subsequently resulted in a substantial recruitment drive, for policy and communications staff, during 2017. Earlier in 2016, budget cuts at Defra resulted in a reduction in staff numbers of 911 in the year to March 2016[1]. Of these, 232 had previously worked on water and flood risk management.
- At the time of the 23 June referendum, in which 52 per cent of participants voted to leave the European Union. An online poll by Farmers Weekly indicated that 58 per cent of farmers had voted to leave the EU[2].
- In October 2016, the Chancellor of the Exchequer announced that the UK Government would fund EU schemes that farmers sign up to before Brexit[3]. This advice was welcomed by farming organisations, whose members had expressed concern about scheme funding in the context of Brexit.
- In January 2017, the Prime Minister set out aims for trade and the movement of people in her Lancaster House Speech.
- In July 2017, the Secretary of State for the Environment, Food and Rural Affairs set out policy for the future of farming support.[4] "This Government has pledged that when we leave the EU we will match the £3 billion that farmers currently receive in support from the CAP until 2022. And I want to ensure we go on generously supporting farmers for many more years to come. But that support can only be argued for against other competing public goods if the environmental benefits of that spending are clear."

7.2 Economic Environment

Figure 7.1 shows exchange rate of the euro and US dollar, relative to sterling.

[1] Farmers Weekly Interactive, www.fwi.co.uk , 22 July 2016
[2] Farmers Weekly Interactive, www.fwi.co.uk , 24 June 2016
[3] Farmers Weekly Interactive, www.fwi.co.uk , 3 October 2016
[4] Speech: The Unfrozen Moment - Delivering A Green Brexit, Michael Gove MP, Defra, 21 July 2017

Figure 7.1 Euro/Sterling Exchange Rate 2011 to 2017



Source: Bank of England

- Relative to the euro, sterling fell by 14 per cent in the 2016 calendar year. In August 2016, it reached its lowest value against the euro since March 2009.

- In response to the weakening of sterling, and in the context of forecasts of a weak medium term outlook, the Bank of England reduced its base rate to 0.25 per cent in August 2016[1]. Between March 2009 and August 2016, the rate was 0.5 per cent. The Bank of England also initiated an asset purchase programme of up to £10 billion of UK Corporate Bonds and expansion of the asset purchasing scheme for Government bonds of £60 billion.

- The price of nitrogen fertilisers fell sharply in May 2015 and consequently the marketing season started with prices that were £20 per tonne lower than in the previous year[2]. The trade experienced reduced demand for fertiliser at the start of the 2016 harvest season[3]. Ammonium nitrate reduced from around £235 per tonne in autumn 2015 to £225 in January falling further to £190 per tonne in May[4]. Potash prices reduced from around £220 per tonne in autumn 2015 to £220 per tonne in January 2016 whilst Triple super phosphate prices were £290 per tonne in autumn 2015, falling to £275 per tonne in January 2016.

7.3 Weather[5]

- September and October 2015 were settled, with dry sunny conditions that were ideal for crop establishment. November was unsettled as a series of autumn storms developed. December brought Storm Desmond and exceptional rainfall in Northern counties. The month was also mild and the third warmest winter and second wettest winter since records began in 1910.

[1] Monetary Purchase Summary, Bank of England, www.bankofengland.co.uk , 4 August 2016
[2] Farmers Weekly Interactive, www,fwi.co.uk , 20 May 2017
[3] Farm Brief, 16 July 2015
[4] AHDB Dairy, www.ahdb.org.uk
[5] Met Office, www.metoffice.gov.uk

- March was unusually wet in the South and East of England, April was also wet but May was particularly dry in the South.

- June was cloudy and wet, especially in East Anglia and the South East. July and August were drier than usual and August was sunnier than the long term average giving favourable conditions for harvesting of combinable crops.

- September and October were generally dry allowing favourable progress with the sugar beet and potato harvest in most areas, although there were local variations.

See Chapter 4 for more information on crop production and quality due to the prevailing weather.

7.4 Business

In difficult trading conditions, there were high profile business failures during the year:

- Poultry processor, and grain buyer Bernard Matthews went into administration in October 2016 owing £24 million to 900 businesses including farmers.
- In March 2017, Cambridgeshire grain merchant Wellgrain, established in 2003, went into administration owing £15 million to 286 creditors including banks, grain traders, hauliers and many farmers[1].
- Cambridgeshire vegetable trader Moorhouse & Mohan went into administration in October 2016, owing £1 million to a bank and to farmer creditors[2].

There was consolidation in the fertiliser supply chain:

- Bunn, the UK subsidiary of Koch fertiliser, closed plants at Fakenham and Howden.
- In May 2016, CF Industries signed a five year agreement to supply Frontier, displacing Yara from this role. This follows its purchase of the GrowHow fertiliser business in 2015.
- Agrium Inc. And Potash Corporation of Saskatchewan Inc. Announced their merger in September 2016[3].

The year saw mergers of some of the largest suppliers of seed breeding and crop protection, resulting in an appearance of senior executives from Bayer, Monsanto, Dow and DuPont before a US Senate Committee in October 2016:

- In September 2016, Bayer acquired Monsanto for £50 billion, creating the world's largest supplier of seed and crop protection materials[4]. The combined business had annual sales of £19.6 billion. The business has headquarters in St Louis, Missouri.
- The EU ordered an investigation into competition issues resulting from the proposed merger of Dow and DuPont in August 2016[5].
- The US Department of Justice attempted to prevent John Deere from acquiring technology Precision Planting from Monsanto subsidiary Climate Corporation in September 2016[6].

[1] Farmers Weekly Interactive, www.fwi.co.uk , 10 March 2017
[2] Farmers Weekly Interactive, www.fwi.co.uk , 14 September 2016
[3] Farm Business, www.farmbusiness.co.uk , 13 September 2016
[4] Farmers Weekly Interactive, www.fwi.co.uk , 14 September 2016
[5] Farmers Weekly Interactive, www.fwi.co.uk , 15 August 2016
[6] Farmers Weekly Interactive, www.fwi.co.uk , 15 August 2016

- There was further consolidation in the machinery supply chain in November 2016 as CNH, the parent company of New Holland, acquired the Kongskilde, Overum and JF cultivation and drill machinery ranges from Danish owned cooperative DLG[1].

- Environmental consultant RSK purchased ADAS in December 2016[2].

- In a planned move to expand in the South East of England, Frontier outbid trading rival Glencore to use the Tilbury grain terminal.

- The 18,000 tonne Yaregrain store at Cantley, Norfolk opened in May 2016. It forms part of a network of farmer owned grainstores that use Dewing Grain for crop marketing.

7.5 Renewable Energy

- The developers of a 299 MW Tees Renewable Energy Plant at Middlesborough announced plans to start construction with a view to commissioning the plant in 2010[3]. The plant, believed to be the world's largest new build biomass plant, will cost £900 million and will be funded by Australian investment bank Macquarie and Danish pension fund PKA.

- Three per cent of total road and non-road mobile machinery fuel was sourced from renewable fuel in the year to April 2017[4].

- Of the 1,221 million litres of sustainable biofuel used in road fuels in the UK in the year to April 2017, 12.6 per cent was sourced from UK grown wheat (7.6 per cent in the previous year) and 1.6 per cent was sourced from UK grown sugar beet (3.8 per cent in the previous year).

- The Ensus biofuel plant at Teeside reopened for a trial period in May 2016[5]. This development was not expected and wheat prices increased by ten per cent to meet the increased demand.

- Annual straw use for energy production was estimated at 800,000 tonnes, increasing to 1.05 million tonnes when the Snetterton, plant in Norfolk is fully on line[6].

- Drax announced that it would no longer use *Miscanthus* in electricity generation after the 2016 season[7]. Farmers with direct supply contracts were transferred to Terravesta, which also supplies Miscanthus to the Brigg Renewable Energy Power Plant.

- There were 208 farm fed anaerobic digesters in the UK in 2016, with a combined capacity of 122.8 mega watts[8]. 2.3 mega watts of capacity was provided from crops from an estimated 51,100 hectares.

[1] Farmers Weekly Interactive, www.fwi.co.uk , 1 November 2016
[2] Farmers Weekly Interactive, www.fwi.co.uk , 6 December 2016
[3] SeeNews, www.renewables.seenews.com 12 August 2016
[4] Renewable Transport Fuel Obligation statistics: period 9 2016 /17, report 4, Department for Transport, www.gov.uk , 3 August 2017
[5] Farmers Weekly Interactive, www.fwi.co.uk , 17 May 2016
[6] Farmers Weekly Interactive, www.fwi.co.uk , 11 May 2016
[7] Farmers Weekly Interactive, www.fwi.co.uk , 30 July 2016
[8] Farmers Weekly Interactive, www.fwi.co.uk , 12 May 2016

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