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Rural Business Research

Farm Business Survey

2019/2020

Crop Production in England

Ben Lang

RBR independent research, data and analysis
Rural Business Research

UNIVERSITY OF CAMBRIDGE

Crop Production in England 2019/2020

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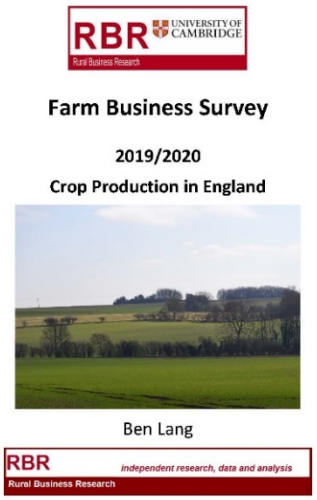
Crop Production in England 2019/2020
The full printed version of the report is now available and comprises:

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



Appendix 1 Agriculture Output and Costs Comparison by Farm Type, District, Size and Performance (27 tables)

Appendix 2 Gross Margin Results for Comparison by District, Size and Performance – Non Organic (132 tables)

Price £30 including postage and packing

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Foreword to the Fifteenth Series

Welcome to the fifteenth series of reports on the economics of agriculture and horticulture in England from *Rural Business Research (RBR).* At a time of change, uncertainty and opportunity, planning ahead on the basis of data and evidence is crucial. Some key points below outline the market, policy, physical and biological environments through which agriculture and horticulture have operated in the last 12 months. These also highlight the importance of our work on the Farm Business Survey (FBS) that is only achieved through the highly valued co-operation of participating agricultural and horticultural businesses.

The new Agriculture Act that received Royal Ascent in the closing weeks of 2020 now means that the sector no longer operates within the Common Agricultural Policy. The development of the Agriculture Act relied extensively on evidence from the FBS that demonstrated the reliance of key sectors on the Basic Payment Scheme (BPS) and the need for a longer 'transition period' than was initially proposed. The recently published Path to Sustainable Farming outlines the broad direction of the policy environment over the 2021-2027 period, as the phased decline in BPS support makes way for increased payments for public goods. There will be opportunities for businesses to be supported to increase farm efficiency and productivity, enhance animal welfare and reduce agriculture's 'carbon footprint'. The UK-EU trade agreement has been broadly welcomed by the industry. During the last 12 months our industry has endured an exceptionally wet winter of 19/20 that impacted crop establishment and gave way to a spring drought followed by a low yielding and sometimes difficult harvest. The impact of challenging weather and the Covid-19 pandemic have been felt in very diverse ways across agricultural and horticultural businesses. While the full impact of these challenges on the economics of agriculture and horticulture won't be collected and analysed until later in 2021, the FBS was once again drawn upon by Government to evidence the need for specific Covid-19 related support packages including the Dairy Response Fund.

For the 2019/20 financial year, which covers the 2019 harvest, average Farm Business Income (FBI), derived from our work on the FBS, fell to £46,000 per business, from £50,400 in 2018/19. Seldom are the fortunes of the different agricultural and horticultural sectors aligned. In 2019/20 Upland Grazing Livestock saw an increase of 47% in FBI, from a low base to a slightly higher one (£22,800); by contrast the average Mixed farm business income fell by 36% to £28,900. Generally lower cereal prices negatively impacted Cereals farm businesses, while livestock farms, in particular Pig and Poultry businesses, benefited from lower feed costs.

As with our previous editions of these reports, available at www.ruralbusinessresearch.co.uk, our core aim is to inform agricultural and horticultural businesses about the economics in their sector. This series of reports, and our work on the FBS more generally, would not be possible without the cooperation of the farmers and growers who participate in the FBS to ensure that the data we provide for policy making, and in our reports and free to use online data services at www.farmbusinesssurvey.co.uk, is truly representative of the sectors. Our sincere thanks therefore go to the farmers and growers for their most valuable contribution.

Professor Paul Wilson

Chief Executive Officer, Rural Business Research

February 2021

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 prepared. Many farmers kindly hosted social distanced or remote visits to minimise the risk of spreading Covid-19.

Rural Business Research staff across England collected farm data. At the Rural Business Unit, Mark Reader and Richard Dexter designed the reporting system and Hayley Sherlock and Stephen Horsley contributed to the production of the report and provided the cover photograph. Colleagues at the University of Nottingham carried out a quality assurance review of the report.

Survey practice, data sources and basis of farm type and farm size in the FBS

It is important to note that all surveys are subject to sampling error as they are not measuring the whole population, the FBS is no exception. It is common practice to publish 95% confidence intervals and error bars alongside any published estimated figures to give the reader an indication of the size of the sampling error. These signify that we are 95% confident that this range contains the true value. For simplicity within these reports, the confidence intervals have not always been published. Readers should be aware that the figures calculated from the FBS data have a level of uncertainty around them and that all figures are estimates. Generally, the smaller the sample size the greater the sampling error and the less confidence we have in the estimates. For details on the FBS confidence intervals, please refer to Defra FBS publications https://www.gov.uk/government/collections/farm-business-survey .

With the exception of the figures relating to total crop areas in England, all of the results presented in this report are means. The FBS data presented in this report is shown on a per hectare basis, calculated by dividing weighted mean data by the prevailing farm or crop area. Results can be directly compared with published Defra statistics but may be subject to small differences due to rounding.

In this report, figures 1.1, 2.1, 2.2 and 4.1 were derived from data published in FBS region reports (England) at www.farmbusinesssurvey.co.uk. Figures 3.1, 3.2, 3.3, 3.4, 3.5 and 6.1 were derived from Defra publications. From 2018/19, the classification of farms is based on 2013 standard output coefficients. For more information please see

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/365564/fbs-uk-farmclassification-2014-21oct14.pdf

1.0 Overview

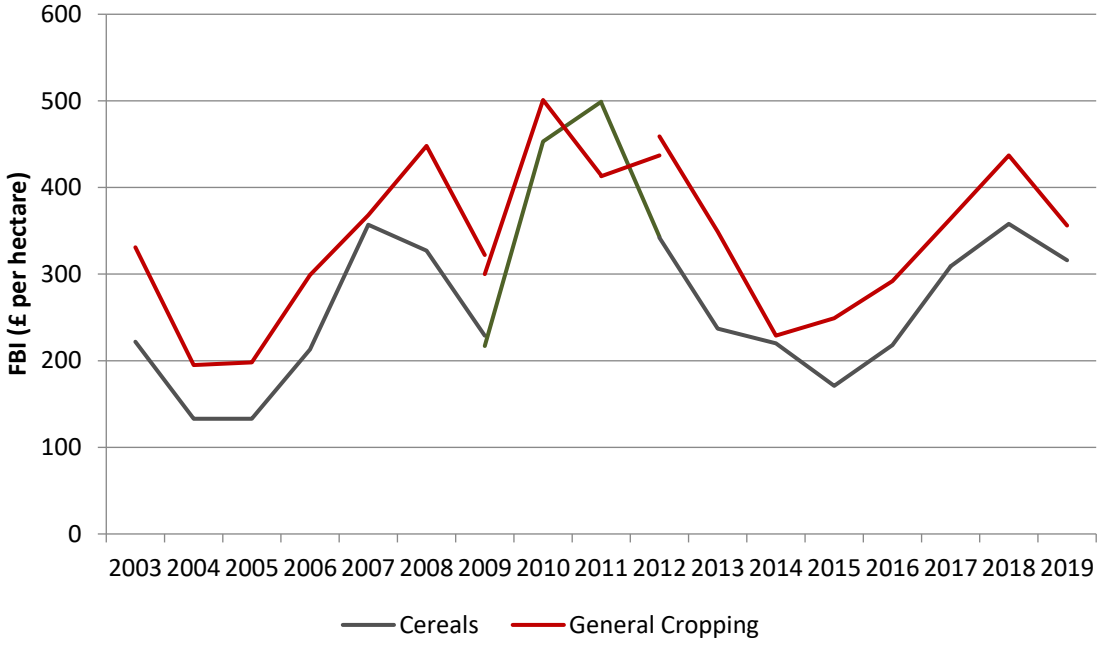
- FBI of Cereals and General Cropping farms, was £316 and £356 per hectare respectively
- Farmers reduced their area of oilseed rape, many increased production of winter barley
- The arable organic area increased to 45,100 hectares, the highest area since 2015
- Weakening of sterling favoured the sale price of crops but also increased input costs
- Variable costs increased on most arable farms
- The autumn and spring were favourable for crop production
- Harvest was wet, resulting in reductions in crop quality and the need to dry some crops
- Harvesting of potatoes and sugar beet was very difficult in the exceptionally wet autumn
- Covid-19 disrupted the food supply chain in March 2020.

The Farm Business Income (FBI) of Cereals and General Cropping farms in 2019, was £316 and £356 per hectare respectively. In comparison with the previous year, this represented a reduction in FBI of 11 and 9 per cent, respectively.

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

The longer term trend in farm incomes is shown in figure 1.1.

Figure 1.1 Time Series Farm Business Income (FBI) of Arable Farms, 2003 to 2020[1]



[1] FBS sourced from FBS region reports at www.farmbusinesssurvey.co.uk England, Cereals, General Cropping

1.2 Farm Business Income 2019/2020

Profit and loss accounts for arable farms are set out in Table 1.1.

Table 1.1 Farm Business Income of Cereals, and General Cropping farms, 2018[2]

	Cereals		General Cropping	
	2018	2019	2018	2019
Number of farms	352	343	152	133
Area of farm (ha)	188	199	244	237
Crop output (£/ha)	945	961	1,548	1,512
Livestock output (£/ha)	35	33	40	47
Agri-environment (£/ha)	18	26	21	32
Other output (£/ha)	299	303	219	224
BPS (£/ha)	211	210	203	200
Total Output (£/ha)	**1508**	**1533**	**2,031**	**2,015**
Variable costs (£/ha)	481	522	725	800
Fixed costs (£/ha)	674	698	873	862
Total costs (£/ha)	**1155**	**1220**	**1,599**	**1,662**
Profit on sale of assets (£/ha)	**6**	**4**	**4**	**3**
Farm Business Income (£/ha)	**358**	**316**	**437**	**356**
Net Farm Income (£/ha)	**250**	**211**	**340**	**257**

Crop output of £1,533 and £2,015 per hectare respectively on Cereals and General Cropping farms was similar to the previous year. The reduction in FBI was driven by an increase in costs of 6 and 4 per cent on Cereals and General Cropping farms respectively. Variable costs increased by 9 and 10 per cent respectively on Cereals and General Cropping farms.

Weather conditions were generally favourable for crop production, but very wet conditions in autumn 2019 created difficulties with the harvest of sugar beet and potatoes.

Throughout 2019, Brexit arrangements remained undefined and this added complexity to the tasks of business planning, cropping choices and crop marketing. In February 2019, the NFU warned of the impact of Brexit uncertainty on grain trading for crops moved after October 2019[3]. The original anticipated Brexit date was 29 March 2019. In mid-March 2019, the UK Government negotiated an extension of the Article 50 period to 31 October 2019. In August, sterling weakened, increasing both the sale value of crops and the purchase cost of imported farm inputs. The UK left the EU on 31 January 2020, moving to a transition period to 31 January 2021 in which most EU trading conditions remained in operation.

In March 2020, the impact of Covid-19 was just starting to become apparent on the marketing of 2019 crops and on spring harvested vegetables. Lockdown measures were introduced on 23 March 2020, in which food shops remained open, but all catering businesses were ordered to close. In the short term, retail demand surged. Data released by Nielsen suggested that shoppers bought an additional £1.9 billion of groceries in the four weeks to 21 March[4]. Households purchased additional supplies

[2] FBS sourced from FBS region reports at www.farmbusinesssurvey.co.uk

[3] Farm Business, www.farmbusiness.co.uk , 28 February 2019

[4] Financial Times, www.ft.com , 31 March 2020

ahead of lockdown and made additional purchases to replace expenditure usually made outside the home at catering establishments. Kantar reported the highest level of grocery sales ever made in a month in March 2020[5]. The demand for bread flour and biscuits was especially high. The impact of this change in household purchasing to farm businesses in the year to 5 April 2020 was limited. The main impact was to divert the supply of product, normally destined for foodservice outlets, to retail businesses. Farm shops reported increased sales. However, dedicated supply chains, such as the movement of processing potatoes to McCain for consumption in McDonald's restaurants, stopped when lockdown was introduced creating a shock to these dedicated supply chains.

1.3 Assets and Liabilities

The assets and liabilities of arable farms are shown in table 1.2.

Table 1.2 Opening and Closing Assets and Liabilities of Cereals, Roots and Vegetable farms, 2019[6]

	Cereals		General Cropping	
	Opening 2019	Closing 2019	Opening 2019	Closing 2019
Number of farms	343	343	133	133
Farm area (ha)	188	199	244	237
Assets				
Land & buildings	12,852	12,972	10,718	10,775
Machinery	911	914	881	922
BPS Entitlement	207	209	201	202
Other fixed assets	41	39	78	83
Current assets	1,320	1,242	1,270	1,297
Liabilities	1,233	1,182	1,436	1,459
Net Worth	14,098	14,195	11,720	11,820

On average, the change to the capital position of Cereals and General Cropping farms in 2019 was minimal. On Cereals farms, the average closing net worth was £14,195. On average, positive bank balances reduced, but the value of outstanding loans also reduced. On General Cropping farms, the average closing net worth was £11,820 per hectare. An increased closing value of machinery assets may have been partially funded through increased borrowing.

Land

Brexit uncertainty caused buyers to stall on land investment decisions and in the six months to June 2019, only 21,850 hectares were publicly marketed in England[7]. This was the lowest for five years. Prime arable land prices were around £21,500 in the summer. Sales were especially low in the East Midlands, East of England, West Midlands and Yorkshire and Humber[8].

[5] Farm Business, www.farmbusiness.co.uk , 31 March 2020
[6] FBS sourced from FBS region reports at www.farmbusinesssurvey.co.uk
[7] GB Farmland, Savills, Summer 2019
[8] Farm Business, www.farmbusiness.co.uk , 26 July 2019

As the low levels of purchasing activity continued, December prime arable land averaged about £21,530 per hectare[9]. In the year, just 34,400 hectares of land were marketed in England and just 4,450 hectares in the East of England.

Basic Payment Entitlement

A typical market value for England non-SDA BPS Entitlement in 2019 was £111.65 per hectare (£127.17 in 2018) for use in the 2020 claim year[10]. Trade commenced at around £155 to £160 per hectare in early December 2019. At April 2020, the price was around £100 per hectare.

The estimated value of BPS Entitlement used in the FBS was £209 and £202 per hectare respectively on Cereals and General Cropping farms. These values assumed that the Entitlement would be used to make at least one future BPS claim.

Machinery

At £914 per hectare, the average value of machinery on Cereals farms at the close of the year was little changed on the value at the start of the year. On average, farmers made a net investment in machinery of £121 per hectare, a value that was approximately the same as the depreciation of machinery in the year. Possibly driven by the favourable sale price of potatoes in 2018, on General Cropping farms, the value of machinery increased by around 5 per cent to £922 per hectare, and farms made an average net investment of £161 per hectare.

UK farmers purchased 11,805 tractors in the year to March 2020 (12,141 in the previous year)[11]. Although taxation costs are excluded from the calculation of FBI, the rate of Annual Investment Allowance (AIA) is a factor that some farmers will consider when planning machinery purchases. In 2019, the AIA provides 100 per cent allowance for qualifying expenditure on plant and machinery for up to £1 million[12]. In 2018, the AIA was set at £200,000. In March 2020 and in response to the Covid-19 pandemic, machinery manufacturers in Europe scaled back production, but prioritised the ongoing distribution of machinery parts[13].

Liabilities and Capital Grants

In spring 2020, Hitachi Business Capital Finance launched an Inputs Finance product offering loans of £5,000 to £500,000 with flexible repayment terms. A second round of the Countryside Productivity Small Grant Scheme, with total funding of £15 million, was available to farmers in 2019[14]. Grants of £3,000 to £12,000 were available towards the purchase of specified types of machinery. The 3,677 successful applicants were notified in October 2019[15]. In March 2020, following storms Ciara, Dennis and Jorge, Barclays offered an Adverse Weather fund of £50 million[16].

[9] The Farmland Market, Savills, January 2020
[10] Townsend Chartered Surveyors 2020 UK Market report, www.townsendcharteredsurveyors.co.uk
[11] Tractor Statistics, Agricultural Engineers Association, www.aea.uk.com
[12] Farmers Weekly Interactive, www.fwi.co.uk , 28 October 2019
[13] Farmers Weekly Interactive, www.fwi.co.uk , 31 March 2020
[14] Farm Business, www.farmbusiness.co.uk , 11 July 2019
[15] Defra, deframedia.blog.gov.uk , 28 October 2019
[16] Farm Business, www.farmbusiness.co.uk , 11 March 2020

2 Agri-environment, Diversification, Basic Payment: excludes agriculture

2.0 Agri-environment, Diversification and Basic Payment

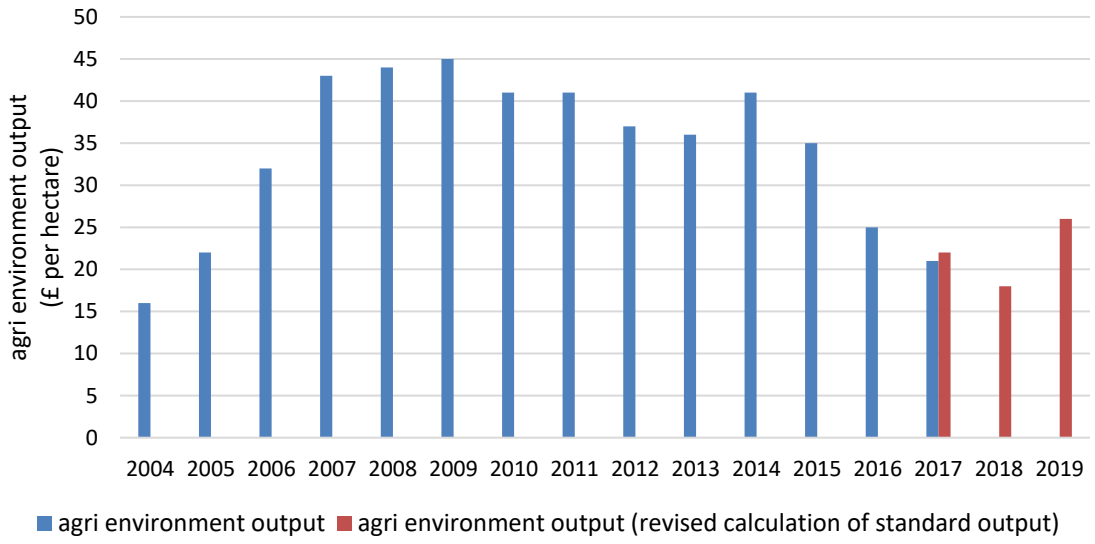
- Higher level agri environment schemes covered 1.8 million hectares in England
- At £25 per hectare on Cereals farms, agri environment output recovered to similar levels to 2016
- At £188 per hectare on Cereals farms, diversification output continued to increase
- BPS receipts were little changed on the previous year

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[17].

2.1 Agri-environment

Figure 2.1 shows the annual output from agri environment activity on Cereals farms in England.

Figure 2.1 Agri environment output, Cereals farms, 2004 to 2019[18].



With an average output of £26 per hectare on Cereals farms and £32 per hectare on General Cropping farms, agri environment activity contributed £22 per hectare and £25 per hectare to FBI, respectively on these farms in 2020. The output was higher than in 2018, due to changes in scheme participation and receipt of payments delayed from the previous year, and at a similar average level to 2016.

There were regional variations in agri environment output from an average of £56 per hectare on Cereals farms in the North East, to £12 per hectare on Cereals farms in Yorkshire and Humber. On General Cropping farms, agri environment output ranged from £39 per hectare in the East of England to £20 per hectare in the West Midlands (but sample sizes were insufficient for us to report results for the North West or South West).

[17] 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

[18] FBS sourced from FBS region reports at www.farmbusinesssurvey.co.uk England, Cereals

In 2019, the overall area of land covered by agri environment schemes was unchanged on the previous year, but farmers moved to targeted, or higher level, schemes. Higher level agri environment schemes, which include Higher Level Stewardship (HLS) and Countryside Stewardship (CSS) higher-tier and mid-tier, covered 1.8 million hectares of land in England, a 12 per cent increase from 2018[19]. Entry level schemes covered a further 1.98 million hectares, representing a nine per cent reduction on the previous year. Defra offered extensions to HLS agreements that were previously due to expire in 2020[20].

In August 2019, Defra selected 46 landowners, farmers, charities and NGOs to participate in trials of the Environmental Land Management Scheme (ELMS) that is scheduled to replace Common Agricultural Policy (CAP) support, during the seven year transition from 2021 to 2017[21].

2.2 Diversification

In 2019 /2020, diversification accounted for £98 per hectare of FBI on Cereals farms, and £80 per hectare on General Cropping farms. The diversification account for arable farms is summarised in table 2.1, and the time series of diversification is shown in figure 2.2.

Table 2.1 Diversification, Output and Costs, Cereals, Roots and Vegetables Farms 2018 and 2019

	Cereals		General Cropping	
	2018	2019	2018	2019
Diversification output	167	188	127	140
Of which:				
Rental (£/ha)	103	114	74	85
Recreation (£/ha)	14	12	11	13
Food processing and retailing (£/ha)	7	6	5	7
Tourism (£/ha)	6	15	12	15
Solar (£/ha)	9	11	10	11
Other energy (£/ha)	9	14	5	5
Other (£/ha)	20	17	10	5
Costs	70	89	52	60
Diversification FBI (£/ha)	97	98	74	80
Whole Business FBI (£/ha)	358	316	437	356

[19] Area of land in agri-environment schemes, JNCC, www.jncc.gov.uk , 15 October 2020
[20] Defra, Higher Level Stewardship (HLS) 2020 agreement extension, www.gov.uk , 12 September 2019
[21] Ends Report, www.endsreport.com , 6 August 2019

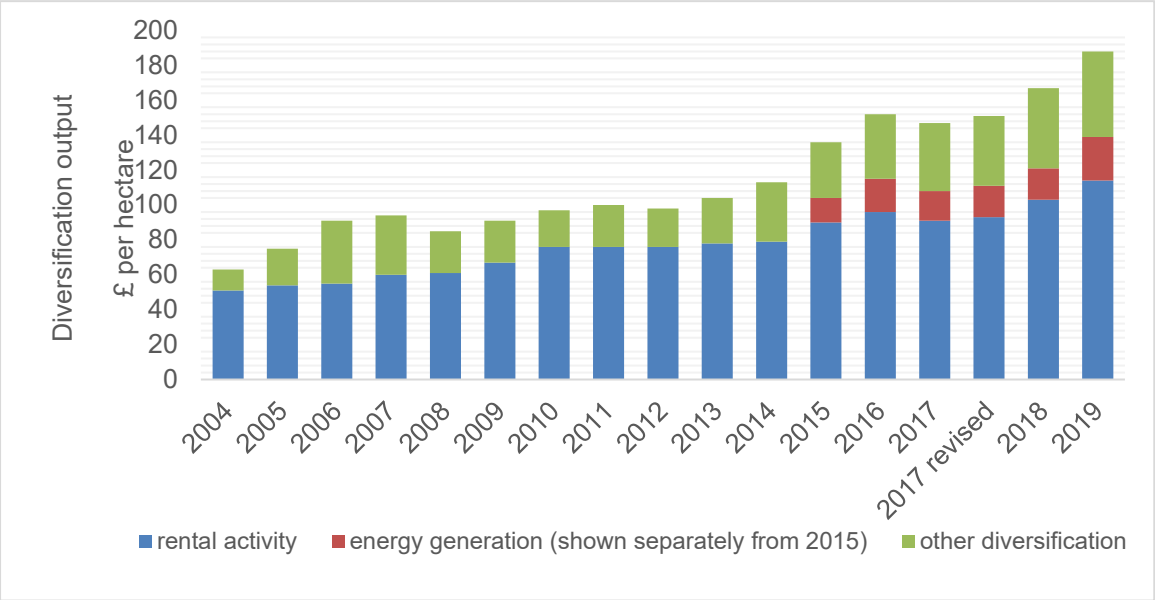


Figure 2.2 Diversification output, Cereals farms, 2004 to 2019[22]

On Cereals farms, the output from diversification has doubled in about ten years, to £188 per hectare in 2019 /2020. Output from rental activity averaged £114 per hectare and output from energy generation averaged £25 per hectare.

According to Defra's Farm Practices Survey, by October 2019, 16 per cent of Cereals holdings had invested in non-farming parts of their business (e.g. tourism or letting buildings) while 10 per cent of Cereals holdings had invested in adding value to agricultural produce (e.g. food processing, direct selling, farm shops, brewing)[23].

The Growth Programme, with total finding of £35 million was available to farmers in 2019[24]. Grants of £20,000 to £750,000 were available to create new jobs, boost tourism, and unlock growth in rural areas[25]. The three available options were for food processing, rural tourism infrastructure and new equipment and machinery.

2.3 Basic Payment Scheme (BPS)

The 2019 rate of BPS payment for land in England outside the Severely Disadvantaged Area (SDA), was set at £232.84 per hectare, including the Greening payment. This was based on an exchange rate of £0.89092 per euro. Financial Discipline was levied at 1.371 per cent. In 2018, the BPS payment rate was £231.70.

The average output from BPS was £210 per hectare on Cereals farms and £200 per hectare on General Cropping farms. After deduction of scheme costs, the contribution to FBI was £192 per hectare on Cereals farms and £183 per hectare on General Cropping farms.

[22] FBS sourced from FBS region reports at www.farmbusinesssurvey.co.uk England, Cereals
[23] Defra, Farm Practices Survey, October 2020
[24] Farm Business, www.farmbusiness.co.uk , 11 July 2019
[25] Farm Business, www.farmbusiness.co.uk , 5 November 2019

3 Arable Farm Performance: agriculture excluding diversification

3.0 Agriculture Performance

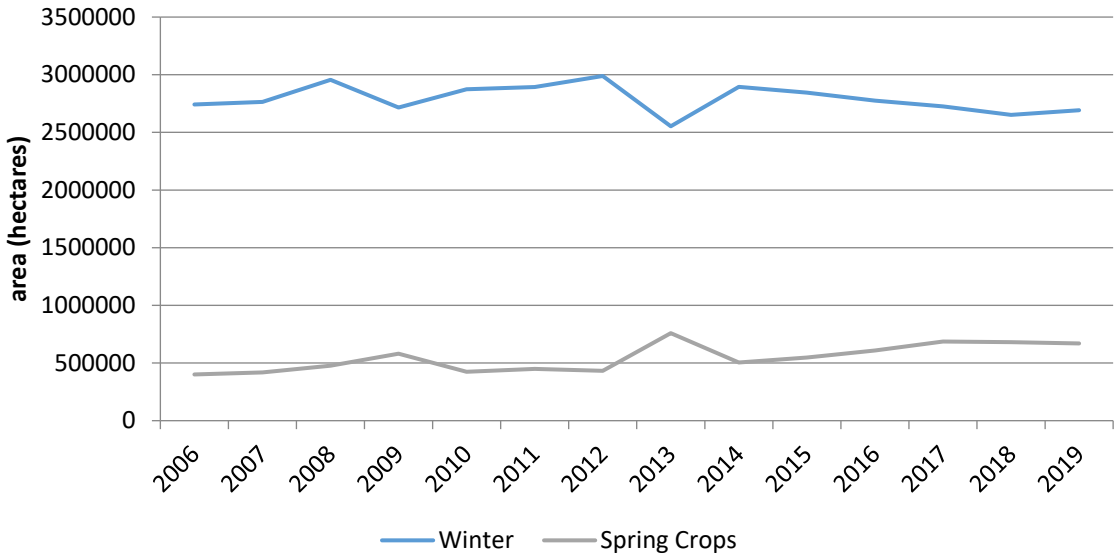
- The oilseed rape area of 492,000 hectares was 15 per cent below the five year average
- The winter barley area of 388,000 hectares was 15 per cent greater than in 2018
- The area of arable maize of 76,000 hectares was 41 per cent above the five year average
- The average contribution of agriculture to FBI on Cereals farms was £3 per hectare
- On Cereals farms, variable costs increased by 10 per cent to £413 per hectare
- Agriculture's contribution to farm FBI ranged from £286 for the top quartile group to -£297 per hectare for the bottom quartile group
- On General Cropping farms, the contribution of agriculture to FBI averaged £69 per hectare

The results presented in this Chapter relate solely to the activity of non-organic agriculture. The outputs, costs and agricultural FBI 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[26] .

3.1 Cropping and Crop Areas

Figure 3.1 shows a consistent balance of winter and spring cropping between 2017 and 2019, but prior to this, the spring crop area increased at the expense of the area of winter crops.

Figure 3.1 Area of Spring Cropping Land in England, 2006 to 2019[27]



[26] 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

[27] Defra, June Survey

In figures 3.2 to 3.4, we show the areas of cereal crops, break crops and root crops with vegetables.

Figure 3.2 Total Cereal Crop Area, 2011 to 2019, England[28]

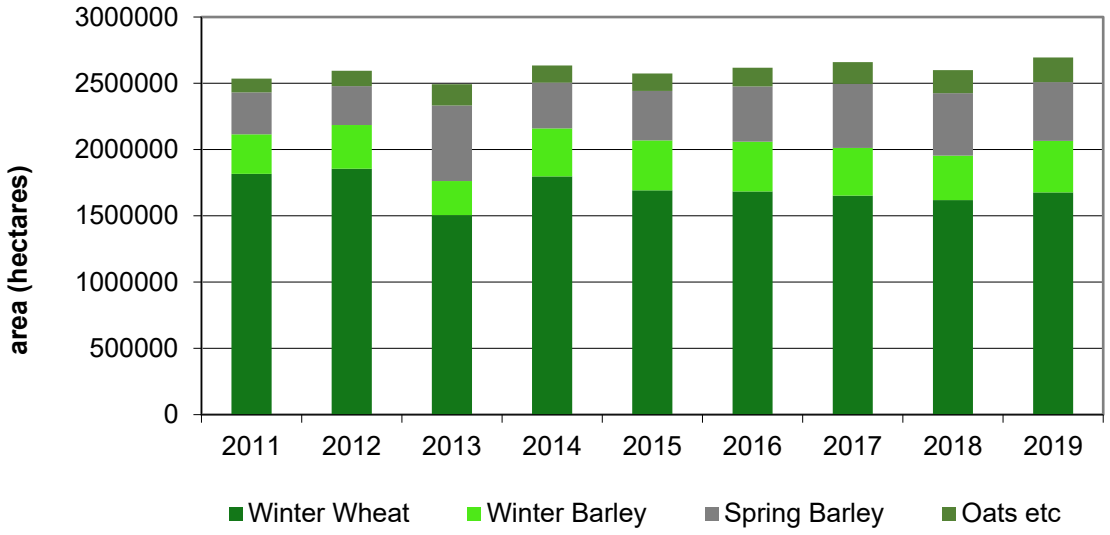
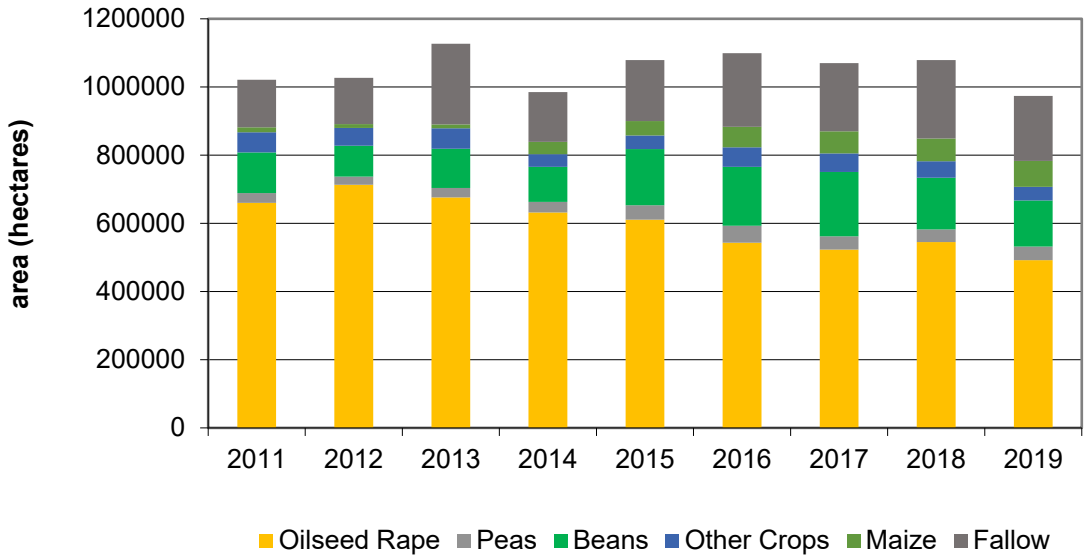


Figure 3.3 Total Break Crop Area, 2011 to 2019, England[29]



Farmers increased the production area of winter barley by 15 per cent to 388,000 hectares and the area of winter wheat by four per cent to 1,677,000 hectares in 2019. The area of oats and other cereals rose to 186,000 hectares, 26 per cent above the five year average.

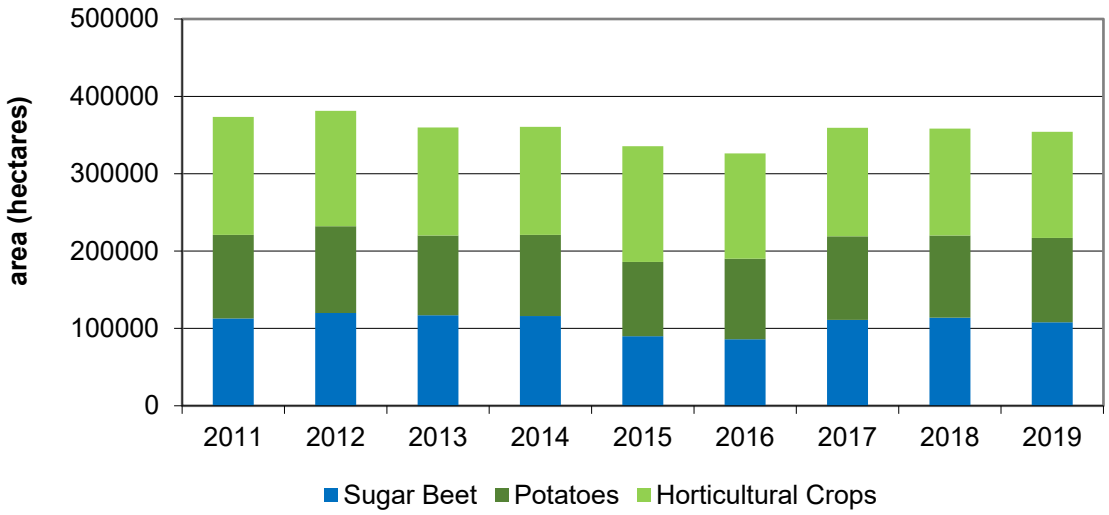
Many farmers faced concerns about the performance of oilseed rape, without the assurance that they could control Cabbage Stem Flea Beetle (CSFB), following the neonicotinoid ban. Surveys by AHDB and by United Oilseeds indicated that crop losses due to drought and CSFB were as high as ten per

[28] Defra, June Survey
[29] Defra, June Survey

cent of the final crop area[30] [31]. According to United Oilseeds, losses of 20 per cent were experienced in Bedfordshire, 19 per cent in Leicestershire and Northamptonshire and 17 per cent in Cambridgeshire. The area of this crop fell to 492,000 hectares, its lowest area since 2004 and from a peak of 713,000 hectares in 2012. The oilseed rape area was 15 per cent lower than the five year average and ten per cent lower than in 2018.

The area of peas recovered to 40,000 hectares but at 135,000 hectares, the area of beans was 14 per cent lower than the five year average. The area of arable maize crops increased to 76,000 hectares, 41 per cent higher than the five year average.

Figure 3.4 Total Potato, Sugar Beet and Vegetable Crop Area, 2011 to 2019, England[32]



The sugar beet area reduced by five per cent, to 108,000 hectares as farmers responded to the lower price and concerns about producing the crop without the use of neonicotinoid insecticides to control virus carrying aphids.

Farmers increased the area of potato production to 109,000 hectares, this was three per cent higher than 2018, a year of favourable potato prices.

According to Defra's Farm Practices Survey, by October 2019, 39 per cent of Cereals holdings had widened the variety of crops and enterprises on their land while 13 per cent of holdings had become more specialised in fewer crops or enterprises[33].

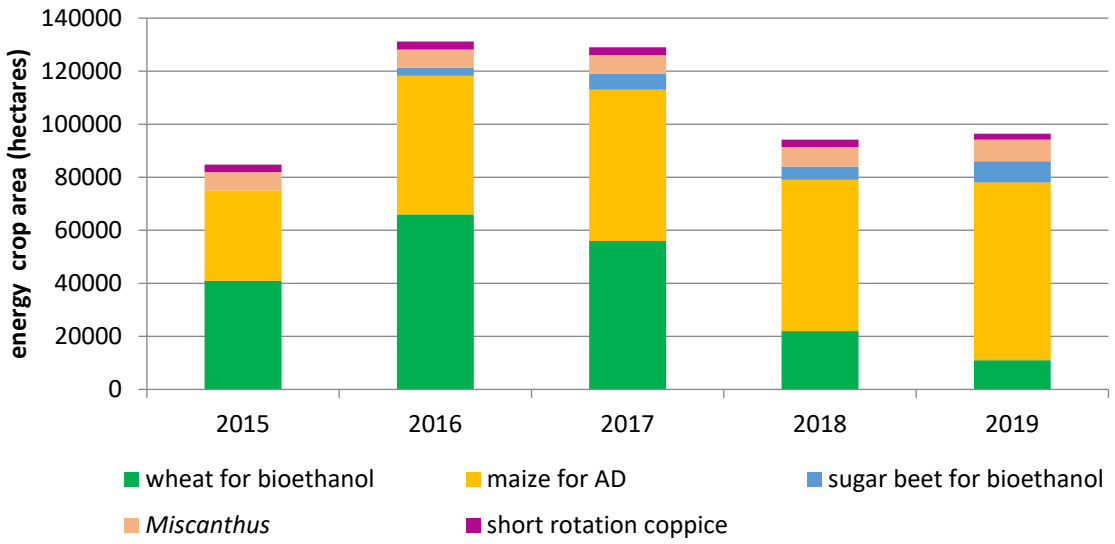
Approaching nine per cent of the total area of arable and horticultural crops were grown to the LEAF Marque Standard[34].

Energy Crops

The area of energy crops, which are included in the totals shown in figure 3.2 to 3.4, are set out in figure 3.5.

[30] Early UK plantings intentions for the 2019 harvest (Early Bird Survey), AHDB, 21 December 2018
[31] Farmers Weekly, 16 November 2018
[32] Defra, June Survey
[33] Defra, Farm Practices Survey, October 2019
[34] FarmBusiness, www.farmbusiness.co.uk 21 April 2020

Figure 3.5 Total Areas of Energy Crops Grown in the UK, 2015 to 2019[35]



The total area of arable land committed to energy crop production was just over 96,000 hectares. This area was similar to 2018, but 14 per cent below the four year average.

The area of crops used for road fuels was the lowest since 2011 and wheat destined for bioethanol production reduced to 11,000 hectares from 22,000 hectares having peaked at 66,000 hectares in 2016. The reduced area was due to scaled back production of bioethanol in UK plants. An estimated 8,000 hectares of land were used for sugar beet production for ethanol in 2019 and the area of this crop continues to expand. No oilseed rape was grown in the UK for biodiesel production in 2019.

The area of maize for anaerobic digestion (AD) increased to 67,000 hectares and this was 34 per cent above the four year average. Some 2.9 per cent of farms processed crops by AD in 2019 (3.6 per cent in 2018)[36].

As straw burning power station capacity increased, farmers grew a total of 8,170 hectares of *Miscanthus* in 2019, 16 per cent above the five year average. However the area of short rotation coppice was 23 per cent lower than the four year average, at 2,233 hectares.

3.2 Cereals Farms Performance (excluding organic farms)

The average contribution of agriculture to FBI on Cereals farms was £3 per hectare (£55 per hectare in 2018). Although crop production was profitable on average, it provided a minimal return. In comparison with the previous year, crop output increased by 2 per cent to £963 per hectare. Other agricultural output, including agricultural contracting reduced and as a result agricultural output was virtually unchanged on the previous year. Variable costs increased by 10 per cent to £413 per hectare, but fixed costs were broadly similar to 2018.

The top quartile group of Cereals farms, measured by FBI performance, achieved an FBI of £286 per hectare. These farms generated relatively high output, of £1,333 per hectare, and high gross margins of £913 while making above average variable cost expenditure of £420 per hectare. In comparison with the median group of Cereals farms, their paid labour costs were low but their machinery costs were very similar.

[35] Defra, Crops Grown for Bioenergy in the UK: 2019

[36] Greenhouse gas mitigation practices – Farm Practices Survey England 2020, Defra, 11 June 2020

Agriculture Output & Costs - Cereals - England

	2018/19	2019/20
Farms in Sample	343	336
Area of farm (hectares)	187.9	199.3
Owner occupied area (%)	69.0	68.0

AGRICULTURAL OUTPUT (£)	Per farm	Per hectare	Per farm	Per hectare
Crop output (excluding subsidies)	178,201	948	191,942	963
Livestock output (excluding subsidies)	6,517	35	6,666	33
Subsidies to agriculture	45	0	17	0
Other agricultural output (inc work on other farms)	24,833	132	22,877	115
TOTAL AGRICULTURAL OUTPUT	209,595	1,115	221,502	1,111
AGRICULTURAL COSTS				
VARIABLE COSTS (£)				
Crop specific costs	65,377	348	77,328	388
Livestock specific costs	3,944	21	4,190	21
Miscellaneous variable costs (inc work on other farms	1,540	8	869	4
TOTAL VARIABLE COSTS	70,861	377	82,387	413
GROSS MARGIN (£)	138,734	738	139,115	698
FIXED COSTS (£)				
Regular labour	11,741	62	13,421	67
Casual labour	1,908	10	2,122	11
Machinery fuel and oil	9,079	48	9,704	49
Other machinery costs (excl. fuel, oil, depreciation)	10,068	54	10,907	55
Machinery, glasshouse and other depreciation	21,171	113	23,698	119
Contract costs	17,140	91	18,727	94
Bank charges and professional fees	5,326	28	5,346	27
Water, electricity, & general	11,259	60	12,353	62
Net interest	5,266	28	5,429	27
Write-off of bad debts	7	0	7	0
Rent paid	16,463	88	16,495	83
Property maintenance	759	4	1,167	6
Depreciation of buildings and works	5,155	27	6,783	34
Miscellaneous fixed costs (inc work on other farms)	14,214	76	13,053	65
TOTAL FIXED COSTS (£)	129,555	689	139,211	698
Profit/ (Loss) on sale of assets	1,070	6	721	4
FARM BUSINESS INCOME (Agriculture - £)	10,248	55	624	3

CROPPING (mean area (hectares))	Hvst 2019/20 Winter crops	Hvst 2019/20 Spring crops
Wheat	69.6	1.7
Barley	15.0	14.8
Oats	2.7	2.7
Beans	3.1	5.2
Oilseed rape	23.0	0.3
Linseed		1.3
Peas for combining (dry)		1.7
All Potatoes (seed, early, ware, and processing)		0.1
Sugar beet		2.8
Horticultural crops		-

Agriculture Output & Costs - General cropping - England

	2018/19	2019/20
Farms in Sample	148	131
Area of farm (hectares)	250.4	245.3
Owner occupied area (%)	60.6	59.2

AGRICULTURAL OUTPUT (£)	Per farm	Per hectare	Per farm	Per hectare
Crop output (excluding subsidies)	384,447	1,536	371,709	1,515
Livestock output (excluding subsidies)	9,911	40	11,515	47
Subsidies to agriculture	7	0	50	0
Other agricultural output (inc work on other farms)	23,320	93	20,759	85
TOTAL AGRICULTURAL OUTPUT	417,685	1,668	404,034	1,647

AGRICULTURAL COSTS

VARIABLE COSTS (£)

Crop specific costs	125,974	503	135,123	551
Livestock specific costs	6,120	24	7,252	30
Miscellaneous variable costs (inc work on other farms	992	4	916	4
TOTAL VARIABLE COSTS	133,087	532	143,291	584
GROSS MARGIN (£)	284,598	1,137	260,743	1,063

FIXED COSTS (£)

Regular labour	37,408	149	33,941	138
Casual labour	15,960	64	21,494	88
Machinery fuel and oil	16,743	67	14,632	60
Other machinery costs (excl. fuel, oil, depreciation)	22,515	90	20,768	85
Machinery, glasshouse and other depreciation	33,323	133	34,057	139
Contract costs	31,357	125	31,818	130
Bank charges and professional fees	7,123	28	7,097	29
Water, electricity, & general	19,267	77	19,887	81
Net interest	7,790	31	8,734	36
Rent paid	33,949	136	32,868	134
Property maintenance	1,333	5	1,060	4
Depreciation of buildings and works	8,461	34	7,146	29
Miscellaneous fixed costs (inc work on other farms)	11,601	46	11,044	45
TOTAL FIXED COSTS (£)	246,830	986	244,545	997
Profit/ (Loss) on sale of assets	1,111	4	769	3
FARM BUSINESS INCOME (Agriculture - £)	38,880	155	16,967	69

CROPPING (mean area (hectares))	Hvst 2019/20 Winter crops	Hvst 2019/20 Spring crops
Wheat	59.5	0.4
Barley	12.4	17.9
Oats	1.7	1.6
Beans	0.9	1.4
Oilseed rape	16.7	-
Linseed		0.5
Peas for combining (dry)		0.7
All Potatoes (seed, early, ware, and processing)		10.0
Sugar beet		16.8
Horticultural crops		1.4

The contribution of agriculture to FBI on the bottom quartile group of farms was -£297 per hectare. These farms generated low output, averaging £953 per hectare and low gross margins, of £546 per hectare. Their variable cost expenditure was below average but their labour, machinery and utility costs were above average.

The contribution of agriculture to FBI was £137 per hectare in North Yorkshire and -£205 per hectare in Leicestershire*. Agricultural output was £1,204 per hectare in Lincolnshire.

*Due to the reduced sample size, we have reduced confidence in these results.

3.3 General Cropping Farms Performance (excluding organic farms)

On General Cropping farms, the contribution of agriculture to FBI averaged £69 per hectare, compared to £155 per hectare in 2018. Despite the lower potato price, General Cropping farms benefited from higher prices of other commodities and, at £1,647 per hectare, agricultural output was little changed on the previous year. Variable cost expenditure increased by ten per cent, and the whole farm gross margin of £1,063 per hectare, was six per cent lower than in 2018. With the exception of expenditure on paid labour, overall fixed costs were similar to 2018.

The range of General Cropping farm performance, and performance by county or area, reflects the cropping system of individual farms, so any comparison should be made with this in mind. The top quartile group of General Cropping farms achieved an average contribution of agriculture to FBI of £492 per hectare from an output of £2,553 per hectare. The FBI contribution of the bottom quartile group was -£288 per hectare, from an output of £1,502 per hectare.

In 2019, about 8,750 farmers in England who grew sugar beet in 1999 and 2000 were eligible to claim overpaid EU levy refunds with a total value of £3.4 million from British Sugar[37].

[37] British Sugar Beet Review, May 2018

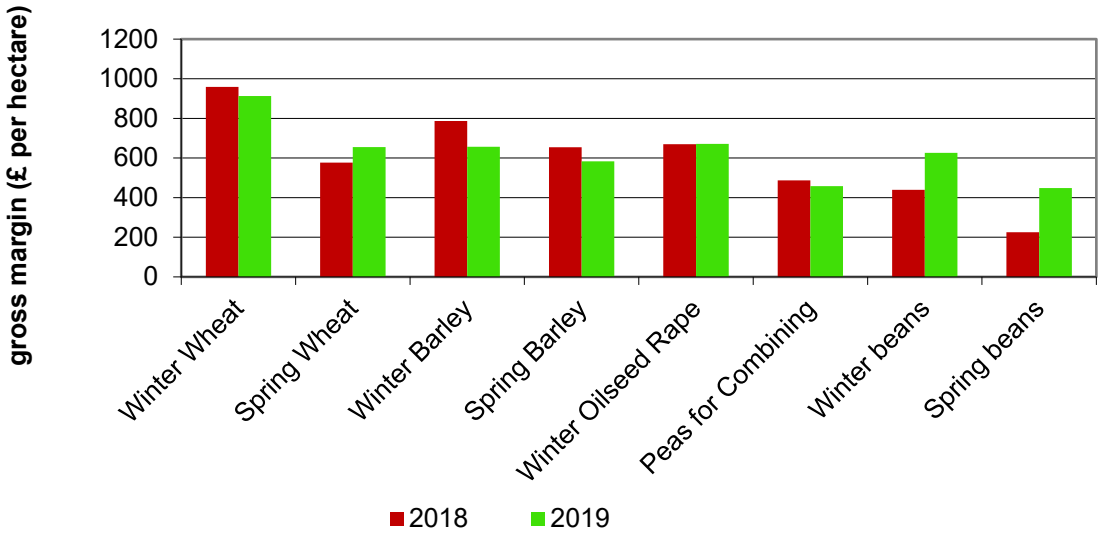
4.0 Crop Gross Margins

- In 2019, variable costs were high but yields and prices were above average
- The winter wheat gross margin was 22 per cent above the five year average
- The winter wheat yield was 9.5 tonnes per hectare, 7 per cent above the five year average
- Spring wheat, winter and spring beans performed especially well
- The winter oat gross margin reduced
- Oilseed rape had the second highest combinable crop gross margin after wheat
- The sugar beet gross margin was 17 per cent below the five year average

4.1 Crop Gross Margins (excluding organic crops)

Non organic gross margin results for all farms in England are shown in figure 4.1. Further detail for individual crops in England is detailed in this chapter with further geographical breakdown in Appendix 2. Some observations are based on sample sizes of less than 15 farms.

Figure 4.1 Combinable crop gross margins, 2018 and 2019[38]



The 2019 harvest was characterised by high variable costs and above average yields and prices, to give above average gross margins. In comparison with 2018, crop prices were generally lower. In comparison with previous years, spring wheat, winter and spring beans performed especially well, the winter oat gross margin reduced, and peas and sugar beet had low gross margins.

[38] FBS sourced from FBS farm business benchmarking at www.farmbusinesssurvey.co.uk Gross Margins

4.2 Winter Wheat

At £913 per hectare, the winter wheat gross margin was 22 per cent above the five year average, but five per cent lower than in 2019. The yield of 9.5 tonnes per hectare was seven per cent above the five year average. The weakening of sterling was apparent in both the higher crop price, of £147 per tonne and the high expenditure on variable costs.

Agronomy and Crop Development

In 2019, growers slightly increased their commitment to Group 3 wheats at the expense of Group 2 milling wheats.as shown in table 4.1[39]. Group 1 wheats accounted for 26 per cent of the crop area.

Table 4.1 Percentage allocation of area to nabim Group 1, 2015 to 2020, Great Britain

	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020
Group 1	18	24	27	25	26
Group 2	5	7	13	13	10
Group 3	9	5	5	8	11
Group 4	68	58	55	53	53

Source: AHDB

At £541 per hectare, variable cost expenditure was six per cent higher than the previous year, led by increased expenditure on fertiliser. As with most cereal crops, this was the highest variable cost expenditure of recent years. Winter wheat crops were established in good conditions. Cold conditions in early February reduced disease pressure. *Zymoseptoria tritici* and yellow rust levels were higher than in 2018, but mildew and brown rust incidence was lower[40].

Harvest, Yield, Quality and Marketing

An estimated 27 per cent of the Great Britain winter wheat crop was harvested by 13 August[41]. Wet conditions slowed progress, but significant progress was made with harvest in the week ending 27 August[42].

One Lincolnshire farmer grew wheat yielding an exceptional 16.3 tonnes per hectare in a yield competition[43].

The average crop price was £147 per tonne. In response to an expected Brexit date of 31 October 2019, traders made earlier purchases of grain and by early October, grain purchases were 38 per cent higher than the three year average[44]. In January 2020, prices increased as traders took account of increases on global markets and the poor condition of the growing 2020 crops[45]. On 15 January, feed wheat traded for around £150 per tonne.

[39] AHDB Planting Survey, 5 July 2019
[40] Defra Winter Wheat Commercial Crops Disease Survey 2019, crop Monitor
[41] AHDB Harvest Report, week ending 13 August 2019, ADAS
[42] AHDB Harvest Report, week ending 27 August 2019, ADAS
[43] Farmers Weekly Interactive, www.fwi.co.uk , 25 November 2019
[44] Farmers Weekly, 9 October 2019
[45] Farmers Weekly Interactive, www.fwi.co.uk , 15 January 2020

In July, standing straw sold for around £22 per hectare[46]. As farmers took account of anticipated reductions in straw from the ailing 2020 harvest, straw prices reached £70 to £75 per tonne[47].

Group 1 Milling Wheat Performance

The quality of milling wheat was generally less favourable in 2019 than in 2018, as shown in table 4.2.

Table 4.2 Cereal Quality Survey 2018 and 2019, Great Britain

	Specific Weight kg/hl 2018	Specific Weight kg/hl 2019	Hagbergs 2018	Hagbergs 2019	Protein % 2018	Protein % 2019
Group 1	78.5	77.8	335	317	13.0	13.0
Group 2	77.1	76.5	321	307	12.1	11.9
Group 3	76.9	76.1	285	274	11.6	11.4
Group 4	76.8	76.1	298	287	11.7	11.3
Bread standard		>76.0		>180		>12.5

Source: AHDB

Rain in late August reduced the quality of milling wheat. Group 1 milling wheat typically achieved adequate protein levels for milling. The sub sample of farms with only group 1 achieved a gross margin of £982 for crops that sold for £154 per tonne, and yielding an average of 9.8 tonnes per hectare. So these growers did not appear to incur a yield penalty. These growers made above average expenditure on fertiliser and crop protection, as might be expected for production of milling wheat.

Farm Performance

In comparison with some previous years, it appears that there was only limited variation in yield between counties and areas. Crops, averaging 10.3 tonnes per hectare were grown in East Sussex*. In Nottinghamshire, crops yielding 8.3 tonnes per hectare were grown giving a gross margin of £714 per hectare.

The crop price £154 in Buckinghamshire* and £140 per tonne on the South Norfolk and High Suffolk Clayland.

The average winter wheat gross margin in the Mid Severn Sandstone Plateau* was £1,067 per hectare where variable costs were only £456 per hectare, due to especially low expenditure on seed and crop protection.

Variable cost expenditure was £456 in the Mid Severn Sandstone Plateau* and £608 per hectare in Dunsmore and Feldon* (mainly located in Warwickshire). Fertiliser expenditure was £168 in The Fens and £235 per hectare in Durham and on the Southern Magnesian Limestone*.

The top quartile group of farms, by winter wheat gross margin, grew an average of 10.5 tonnes per hectare and achieved a gross margin of £1,163 per hectare. The bottom quartile gross margin group averaged 7.9 tonnes per hectare and their crops gave an average gross margin of £573 per hectare.

[46] Farmers Weekly Interactive, www.fwi.co.uk , 3 July 2019
[47] Farmers Weekly Interactive, www.fwi.co.uk , 17 February 2020

*Due to the reduced sample size, we have reduced confidence in these results.

4.3 Spring Wheat

The spring wheat gross margin averaged £655 per hectare and was 39 per cent above the five year average. The average crop yield was 6.7 tonnes per hectare, this was 12 per cent higher than the five year average. The crop was grown with the highest recorded spring wheat variable cost of £434 per hectare and 15 per cent above the five year average.

4.4 Triticale

The triticale gross margin was £691 per hectare. The crop yielded 5.4 tonnes per hectare and achieved a price of £144 per tonne, slightly below the winter wheat price. Variable costs averaged £336 per hectare.

4.5 Winter Barley

The winter barley gross margin averaged £657 per hectare. This was 19 per cent higher than the five year average, but lower than the exceptional 2018 gross margin of £787 per hectare. With an average yield of 7.9 tonnes per hectare the crop sold at an average price of £130 per tonne.

In 2019, farmers in Great Britain grew malting varieties on 56 per cent of their barley area, a figure that included a strong commitment to malting barley in Scotland[48]. In England the areas ranged from 72 per cent in the South East to 19 per cent in the North East.

In the mild, dry spring, barley crops were relatively short and many received no growth regulator[49].

Harvest started in the first week of the crop and an estimated 49 per cent of the crop was harvested in Great Britain by the end of July[50]. Heavy rain prior to harvest resulted in lodging in about seven per cent of crops. Rain in August reduced the quality of malting barley. At 15 January 2020, feed barley traded at around £123 per tonne[51].

In July 2019, barley straw sales of £82 to £90 per tonne were made in Cheshire[52]. Standing straw in Somerset sold for around £25.50 per hectare[53]. Barley straw reached £80 per tonne in South West England in February 2020[54].

Performance by Natural England Joint Character Area and County

Some of the variation in winter barley performance appears to relate to market outlet, from specialist malting to feed. For example, the average winter barley crops sold in Norfolk yielded only 6.5 tonnes per hectare, but sold for £144 per tonne and grown with an expenditure of only £153 per hectare on fertiliser. In contrast, a price of £123 per tonne, was received for winter barley crops in Cambridgeshire.

Crops grown in Suffolk yielded 9.1 tonnes per hectare, but with high overall expenditure on fertiliser and other variable costs.

[48] AHDB Planting Survey, 5 July 2019
[49] Arable Crop Report, ADAS, 30 May 2019
[50] AHDB Harvest Report, week ending 30 July 2019, ADAS
[51] Farmers Weekly Interactive, www.fwi.co.uk , 15 January 2020
[52] Farmers Weekly, 26 July 2019
[53] Farmers Weekly Interactive, www.fwi.co.uk , 3 July 2019
[54] Farmers Weekly Interactive, www.fwi.co.uk , 17 February 2019

High gross margins, averaging £849 per hectare, were achieved from crops grown in North Yorkshire. Low gross margins, of £542 per hectare, were attained from crops grown in Cornwall and the Isles of Scilly.

4.6 Spring Barley

The spring barley yield was exceptional at 6.6 tonnes per hectare and 11 per cent above the five year average. The gross margin was £583 per hectare and 12 per cent above the five year average. The spring barley price of £132 per tonne was close to average.

An estimated 23 per cent of the spring barley crop was drilled in January and February, but work continued into May when 10 per cent of the crop was drilled[55].

The British Survey of Fertiliser Practice shows reduced applications of nitrogen to spring barley crops in Great Britain. The average fertiliser application rate was 95 kilograms per hectare, eight per cent lower than the five year average[56]. This could be due to farmers making adjustments to application rates in the dry conditions.

In a yield competition, a spring barley grower in Norfolk achieved a yield of 10.7 tonnes per hectare[57].

Prices for baled straw of £90 to £100 per tonne were quoted in May[58]. Across all spring barley crops the average value of straw was £83 per hectare.

High yielding spring barley crops of 7.4 tonnes per hectare, were grown on the South Suffolk and North Essex Clay, and crops in neighbouring Essex yielded 7.3 tonnes per hectare. At 5.5 tonnes per hectare, low yielding crops were grown in the Cornish Killas. Their gross margin was £464 per hectare.

Crops in the East Riding of Yorkshire gave a high gross margin of £735 per hectare. Crops in North Yorkshire achieved a high average grain price of £145 per tonne.

A low price, of £124 per tonne was achieved for crops in South Norfolk and High Suffolk Clayland*, but several other areas and counties had an average price of £125 per hectare.

In Shropshire*, farmers grew spring barley with average variable costs expenditure of only £296 per hectare. In contrast the average expenditure was £450 per hectare in Wiltshire*.

*Due to the reduced sample size, we have reduced confidence in these results.

4.7 Winter and Spring Oats

Mainly driven by increased variable costs, the winter oat gross margin reduced to £573 per hectare; this was eight per cent below the five year average. The yield and price were similar to the five year average, but the oat price reduced after three years of growth.

The spring oat gross margin averaged £511 per hectare, 17 per cent higher than the five year average. The favourable performance was mainly attributable to the increased yield of 5.8 tonnes per hectare and nine per cent higher than the five year average.

[55] Arable Crop Report, ADAS, 30 May 2019
[56] British Survey of Fertiliser Practice, 2019
[57] AHDB Arable Focus Insight, Summer 2020
[58] Farmers Weekly Interactive, www.fwi.co.uk , 30 May 2018

The 2019 oat crop was the largest since the 1970s and the increase in supply apparently reduced the price, which averaged around £117 per tonne in December[59]. Specific weights averaged 51 kilograms per hectolitre[60].

4.8 Rye

Based on a small sample size of only ten farms, the average rye gross margin was £702 per hectare*. The crop yielded 8.2 tonnes per hectare and the average price was £135 per tonne.

*Due to the reduced sample size, of ten farms, we have reduced confidence in these results.

4.9 Winter Oilseed Rape

Despite inconsistency in yield performance between farms, oilseed rape had the second highest combinable crop gross margin after wheat, of £671 per hectare and eleven per cent higher than the five year average. The average yield was 3.4 tonnes per hectare and the crop price was £340 per tonne.

In autumn 2018, the Association of Independent Crop Consultants reported cabbage stem flea beetle (CSFB) damage on 74 per cent of fields surveyed[61]. Crop area was lost, as reported in Chapter 3. The greatest increases of CSFB activity were reported in the East Midlands, South West, South East and Yorkshire. Based on their experience in autumn 2018 and spring 2019, growers in Warwickshire, Oxfordshire, Buckinghamshire, Hertfordshire, Essex, Wiltshire, Berkshire, Hampshire, Surrey, west Sussex and East Sussex planned to reduce their oilseed rape area by at least 20 per cent in 2020.

The pattern and levels of autumn and spring fungal disease were similar in 2019 to 2018[62] [63] [64]. Warm conditions in February contributed to an exceptionally early migration of pollen beetle[65]. In the spring, ADAS assessed 19 per cent of oilseed rape crops as being in poor or very poor condition[66].

At harvest, about five per cent of the crop in Great Britain had lodged, up to nine per cent of crops on Yorkshire and Humber[67]. Oil levels were unusually low, with anecdotal reports of 43 to 44 per cent oil contents in July[68]. The average oilseed rape price was £317 per tonne. The favourable price was driven by weak sterling, low oilseed rape yields in continental Europe, high crude oil prices and political tension[69].

In Kent, one farmer achieved a yield of 7.2 tonnes per hectare in a yield competition[70].

The performance of the oilseed rape crop varied widely from county to county, and the main reason for the variation is likely to be related to crop damage from CSFB. High yielding crops, at 4.0 tonnes per hectare were grown in Kent* and in Shropshire*. The Shropshire crops sold for a price of £347 per tonne and gave a gross margin of £921 per hectare.

Low yielding crops, averaging 2.6 tonnes per hectare, were grown in Cambridgeshire*, and the crops in Leicestershire* yielded only 2.7 tonnes per hectare, but were grown with the high average expenditure on variable costs and gave a gross margin of only £325 per hectare.

[59] Farmers Weekly Interactive, www.fwi.co.uk , 3 December 2019
[60] AHDB Harvest Report, week ending 27 August 2019, ADAS
[61] Independent Agronomist, AICC, Summer 2019
[62] Winter oilseed rape disease survey, autumn assessment 2018 /2019, Crop Monitor
[63] Winter oilseed rape disease survey, spring assessment 2019, Crop Monitor
[64] Winter oilseed rape disease survey, summer assessment 2019, Crop Monitor
[65] Agronomist and Arable Farmer, 22 March 2019
[66] Arable Crop Report, ADAS, 30 May 2019
[67] AHDB Harvest Report, week ending 30 July 2019, ADAS
[68] Farmers Weekly, 19 July 2019
[69] Farmers Weekly, 26 July 2019
[70] Farmers Weekly Interactive, www.fwi.co.uk , 19 November 2019

*Due to the reduced sample size, we have reduced confidence in these results.

4.10 Linseed

The average linseed gross margin was £270 per hectare. The crop yield averaged 1.5 tonnes per hectare and price of £353 per tonne. Variable costs averaged £278 per hectare.

4.11 Peas for Combining

The pea gross margin averaged £458 per hectare, seven per cent below the five year average. The average price, of £244 per tonne for all varieties grown, was four per cent lower than the five year average and the variable costs were close to average.

In August, prices for blue peas, yellow peas and maple peas were around £270, £215 and £340 per tonne respectively[71]. Although early samples were of high quality, this changed with rain in August, and prices for marrowfats, blue peas, yellow peas and maple peas fell to around £315, £250, £210 and £300 respectively.

4.12 Winter and Spring Beans

The winter beans gross margin was £626 per hectare and 49 per cent above the five year average. The yield averaged 4.6 tonnes per hectare; this was 13 per cent above the five year average and the highest since 2008.

The spring beans gross margin was £448 per hectare and 24 per cent higher than the five year average. The yield averaged 3.8 tonnes per hectare; this was equal to the five year average.

In the autumn of 2018, merchants warned of spring seed shortages[72]. About 66 per cent of the spring bean crop was drilled by mid-March[73].

A grower in Kent reported an exceptional winter bean yield of 8 tonnes per hectare, in a competition organised by the Processors and Growers Research Organisation (PGRO)[74].

Bean quality was not consistently good, samples with stains and smudges were sold for feed and Bruchid damage ranged from 0 to 40 per cent. Generally, quality was higher in Lincolnshire and further north. In August, the feed bean price was around £185 per tonne[75]. After harvest, prices fell, then recovered to around £175 per tonne in September[76]. Human consumption beans, with no visual damage, sold for around £215 per tonne. In early 2020, as a result of increased export demand, feed beans sold for around £200 per tonne and human consumption beans reached £255 per tonne[77]. In March 2020, feed beans had reached £240 per tonne, but demand for human consumption beans had reduced and premiums dropped to around £20 per tonne[78].

[71] Pulse Market Update, www.pgro.org August /September 2019
[72] Farmers Weekly Interactive, www.fwi.co.uk , 9 November 2018
[73] Agronomist and Arable Farmer, 21 March 2019
[74] Farmers Weekly Interactive, www.fwi.co.uk , 23 January 2020
[75] Pulse Market Update, www.pgro.org August /September 2019
[76] Pulse Market Update, www.pgro.org September /October 2019
[77] Pulse Market Update, www.pgro.org January /February 2020
[78] Pulse Market Update, www.pgro.org February /March 2020

4.13 Sugar Beet

The sugar beet gross margin averaged £968 per hectare, 17 per cent below the five year average. The crop yield of 73.4 clean tonnes per hectare was close to long term average levels. The variable cost expenditure averaged £936 per hectare and was eight per cent above the five year average.

Contract and Price

The actual price achieved, including early and late delivery bonus and haulage allowance, was £26 per tonne, five per cent below the five year average.

For the 2019 /2020 sugar beet campaign, British Sugar and the NFU agreed a minimum price of £19.07 per tonne (22.50 per tonne in the previous year) for a single year contract[79]. Growers were offered a 15 per cent share of any uplift in sugar price from an EU white sugar price of €375 per tonne. In the previous year, the potential uplift payment was 10 per cent on a threshold price of €475 per tonne. There were other changes to the detail of contract terms including the permanent removal of crown tare deductions. The NFU estimated that the additional payment for crown tare sugar, in a crop of 6.61 per cent crown tare, to be £1.35 per tonne[80]. No new three-year deal was offered.

In April, the EU white sugar reached €379 per tonne, exceeding the reference price to trigger a bonus payment, on the 2019 one year contract, for the first time[81]. The bonus amounted to £0.007 per tonne.

The 2019 /2020 harvest year was the second year of three for farmers who had previously taken up the three year contract. The minimum price for the three year contract was £22.50 per tonne.

Agronomy and Crop Development

Although seed costs were unchanged on the previous year, fertiliser, crop protection and haulage all increased in price.

Small areas were drilled in late February but over 95 per cent of the crop in the Cantley factory area was drilled in the first few days of April[82]. Overall, crops were drilled earlier in 2019 than in 2018 and in favourable conditions.

Neonicotinoid seed dressings were not available to sugar beet producers in 2019 and there are no approved seed dressings that will control aphids, the carrier of virus yellows[83]. A Government emergency authorisation, in March 2019, of a three spray programme of thiacloprid (the active ingredient of Biscaya), flonicamid (the active ingredient of Teppeki) and a further application of thiacloprid, were approved for use in sugar beet to control aphid[84]. The first reports of virus yellows were made in July after the British Beet Research Organisation (BBRO) had caught 39,293 aphids across 63 sites (2,500 aphids in the equivalent time in 2018), but only 0.4 per cent were carrying virus[85]. About 1.8 per cent of the crop exhibited virus yellows symptoms (0.4 per cent in 2018). Proximity to brassica crops increased the incidence of aphids (but not necessarily virus) whilst rain events or north easterly wind reduced numbers caught in traps. In summary, growers escaped the anticipated yield loss from virus in 2019 (but not in 2020).

[79] British Sugar, www.britishsugar.co.uk , 13 September 2018
[80] British Farmer and Grower, December 2018
[81] British Sugar, www.britishsugar.co.uk , 30 June 2020
[82] British Sugar Beet Review, May 2019
[83] British Sugar Beet Review, January 2019
[84] British Sugar Beet Review, May 2019
[85] British Sugar Beet Review, January 2020

Yield and Gross Margin Performance

The 2019 /2020 sugar beet campaign was the longest on record (in Europe) and finally concluded in late April, after 208 days[86]. Much of the crop was harvested in very wet conditions. Harvesters faced difficulties with soil penetration and typically travelled at low forward speeds[87]. In early 2020, sugar contents averaged 16.7 to 16.8 per cent. Nationally, the tonnage of white sugar produced from the 2019 sugar beet harvest was 1.18 million tonnes (1.15 million tonnes in 2018)[88].

Sugar beet in Lincolnshire, where the average yield of clean beet was 80.3 tonnes per hectare, achieved a gross margin of £1,051 despite a particularly high spend on crop protection and seed.

Although grown with low expenditure on seed, fertiliser and crop protection, the Cambridgeshire crops yielded only 64.3 tonnes per hectare and gave a gross margin of only £725 per hectare, lower than the average winter wheat gross margin in the county.

Driven mainly by differences in yield, there was a range of performance of sugar beet production from the £1,363 per hectare gross margin achieved by the top quartile group (by gross margin) with crops averaging 86.4 tonnes per hectare to the bottom quartile group that achieved an average gross margin of £449 per hectare from crops averaging 56.1 tonnes per hectare.

4.14 Ware Potatoes

The potato gross margin averaged £3,814 per hectare, seven per cent below the five year average. The yield averaged 40.1 tonnes per hectare, four per cent below the five year average, and the price, of £154 per tonne was close to average. The variable cost expenditure averaged £2,362 per hectare, this was five per cent above the five year average.

The maincrop harvest started in very dry conditions in mid-September and 15 per cent of the crop was harvested by 24 September[89]. Following sustained rainfall in late September, soil conditions were extremely wet and the unsettled weather continued to mid-October. At 22 October, 70 per cent of the GB crop had been harvested[90]. At this date, 90 per cent of the crop in the East of England had been harvested but only 45 per cent in Yorkshire and Humber and the North West and 29 per cent in the North east. Self-propelled harvesters made better progress than trailed machines. Further slow progress continued and 89 per cent of the Great Britain crop was harvested at 12 November[91]. It became apparent that some areas of crop would not be harvested.

Comparisons of potato gross margin performance should be taken with care due to the range of marketing, processing and storage options taken by growers. In turn these differing production systems will vary greatly in their level of fixed cost expenditure. However, to give an idea of the range of performance, the highest quartile growers, by gross margin performance grew crops with average yield of 47.6 tonnes per hectare, with an average sale price of £176 per tonne, to give an average gross margin of £5,800 per hectare. The lowest gross margin group averaged 27.1 tonnes per hectare and sold crops at an average value of £109 per tonne, giving an average gross margin of £261 per hectare.

[86] British Sugar, 30 April 2020
[87] British Sugar Beet Review, January 2020
[88] Professional Update, Andersons, April 2020
[89] GB Potato lifting progress, ahdb.org.uk , 4 October 2019
[90] AHDB Potato lifting report, 22 October 2019
[91] AHDB Potato lifting report, 12 November 2019

4.15 Vining Peas

The average gross margin for vining peas was £953 per hectare (£652 in 2018). The average crop output was £1,306 per hectare £1,000 in 2018. The variable costs, which do not include the cost of harvesting the crop, averaged £354, following increases in seed and crop protection costs.

4.16 Maize for Anaerobic Digestion (AD)

The average gross margin for maize for AD was £927 per hectare (£700 in 2018). The average crop output was £1,375 per hectare £1,135 in 2018.

5.0 Summary of Net Margin and Cost of Production Estimate

- The net margin of all combinable crops was negative on average
- Winter wheat was the combinable crop with the most favourable performance
- The cost of production of most crops reduced in 2019 as yields recovered

5.1 Introduction

The allocation and apportionment of costs to individual crops allows us to prepare 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 2019 (excluding organic crops)

For all combinable crops, and for sugar beet, the average cost of production exceeded the average sale price with the result that the net margin was negative. With a net margin of -£144 per hectare, winter wheat was the combinable crop with the most favourable performance. On average, the potato crop was grown profitably, with a net margin of £930 per hectare.

In 2019, the cost of production of most crops reduced because yields recovered to long term average levels. The average winter wheat cost of production, at -£169 per tonne was close to the five year average. In the FBS, about 28 per cent of non-organic wheat producers and 34 per cent of wheat was produced at less than £150 per tonne[92].

5.3 Comparison with Previous Years

The cost of production of combinable crops was generally within five per cent of the five year average, but the exception was winter oilseed rape which was grown at higher cost in 2019, due to the below average yield.

[92] Defra, Farm Accounts in England, Results from the Farm Business Survey, 18 February 2021

6 Organic Arable Performance

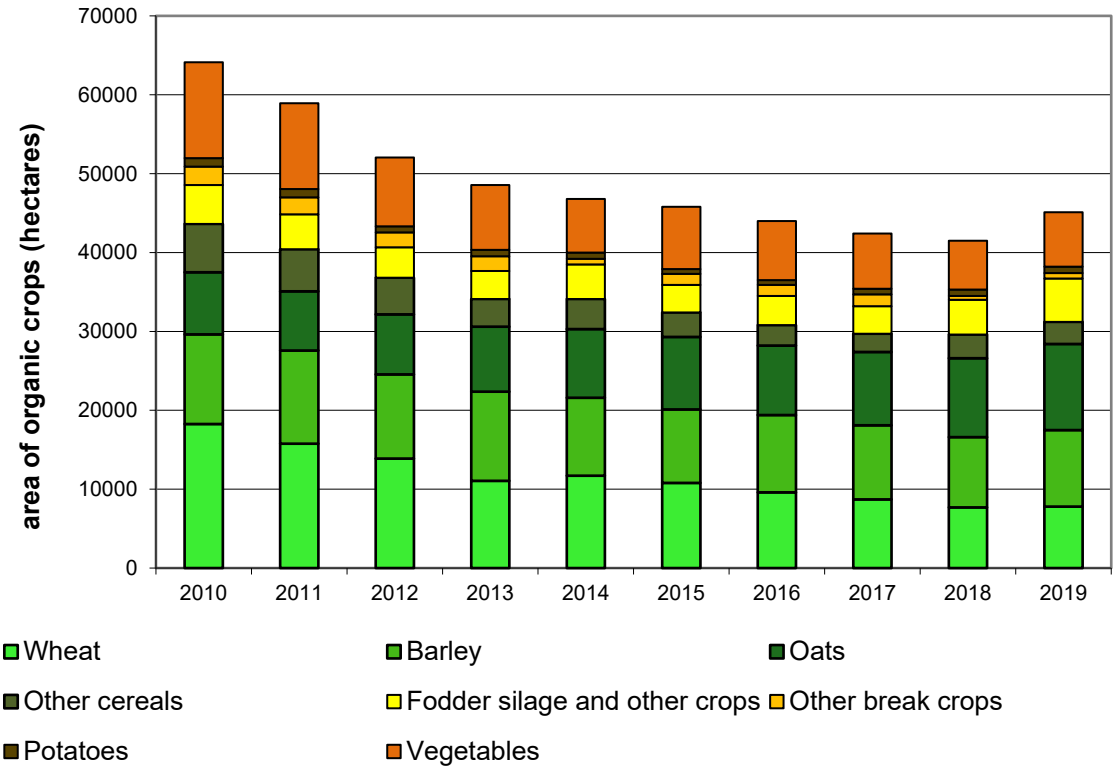
6.0 Organic Arable Performance

- The organic arable area increased to 45,100 hectares, the highest area since 2015.
- In 2019, organic yields, prices and gross margins were all above average
- The highest organic winter wheat and spring barley gross margins in at least ten years
- Oat prices and margins dipped from their exceptional performance in 2018

6.1 Market Overview and Organic Crop Areas

The trend in changing arable crop area in England is shown in figure 6.1.

Figure 6.1 Total Organic Arable Crop Area, 2010 to 2019[93]



Since its peak in 2010, the organic arable area declined until 2018, but then increased to 45,100 hectares in 2019. This was nearly nine per cent higher than in 2018, and the highest area since 2015. Farmers grew increased areas of organic barley and oats, both increased by nine per cent in comparison with the previous year. At 10,900 hectares organic oats accounted for 24 per cent of the

[93] Defra, Organic farming statistics United Kingdom 2019, 28 May 2020

area of all organic crops. At 6,900 hectares, organic vegetable crop production was 11 per cent higher that in 2018.

There were 2,224 organic crop producers in England in 2019 (2,181 in 2018).

6.2 Organic Crop Performance

There were too few specialist organic arable farms in the Farm Business Survey in 2019 to provide a report on the agriculture output and costs.

Organic combinable crops performed favourably in 2019 as yields, prices and gross margins were all above average. The winter wheat and spring barley gross margins were the highest recorded in ten years of analysis of organic performance in the FBS. Spring drilling conditions were favourable, but dry conditions were a concern for growers in spring 2019.

Winter Wheat*

The average organic winter wheat gross margin was £1,221 per hectare, 42 per cent above the five year average. The favourable performance was driven by the high yield, of 4.6 tonnes per hectare, previously achieved in 2011 and 2009. The crop price, of £283 per tonne was lower than the 2018 price of £303 per tonne, but still 13 per cent higher than the five year average.

By May 2019, the new crop feed price was around £255 per tonne, with milling premiums of £30 to £40 per tonne over feed[94]. Prices tended to drift downwards through June following reports of high crop availability. At harvest, feed prices of £240 per tonne were typically achieved, with milling premiums of around £30 per tonne for samples with 12 per cent protein[95].

*Due to the reduced sample size, we have reduced confidence in these results.

Spring Barley

The spring barley gross margin, of £873 per hectare, was 35 per cent higher than the five year average. At 3.6 tonnes per hectare, the yield was seven per cent above the five year average and last attained in 2015. The price of £263 was 22 per cent higher than the five year average.

At May 2019, the new crop feed price was around £245 per tonne, with malting premiums of £30 to £40 over feed[96]. As with wheat, prices reduced through June and at harvest feed barley traded for around £240 per tonne[97].

Winter and Spring Oats

The winter and spring oat gross margins were £1,266 and £850 respectively, still above average but below the peak in 2018. At £279 and £276 per tonne respectively their average prices were lower than in 2018 but higher than the five year average. At harvest, organic milling oats were traded for around £260 to £280 per tonne[98]. Oat seed prices increased, reflecting the high value of oats at harvest in 2018.

[94] Saxon Organic Briefing, May 2019
[95] Saxon Organic Briefing, August 2019
[96] Saxon Organic Briefing, May 2019
[97] Saxon Organic Briefing, August 2019
[98] Saxon Organic Briefing, August 2019

7.0 Weather, Economic Context and Policy

- To January 2020, Defra spent £891 million on Brexit preparations
- Sterling weakened in the year
- The Bank of England reduced the base lending rate to only 0.1 per cent

7.1 Government

George Eustice was promoted from Farming Minister to Secretary of State for Environment, Food and Rural Affairs. Victoria Prentis was appointed as Farming Minister in February 2020[99].

Between June 2016 and January 2020, Defra spent £891 million on Brexit preparations, including £111 million on preparations at the Rural Payments Agency (RPA)[100].

Regulation of Crop Protection

Further crop protection materials were withdrawn from use. Diquat, pymetrozine and thiram were no longer approved for use after the 2019 harvest year[101]. The outdoor use of metaldehyde was not permitted after spring 2020.

Meanwhile, private sector initiatives also operated during the year. Severn Trent Water's Farm to Tap Scheme provided funding to about 4,000 farmers across its catchment area[102]. The scheme funds activities such as a commitment to reduce the use of slug pellets.

Water Resources

From 31 December 2019, changes to the Water Resources Regulations required all abstractors, of more than 20 cubic metres per day, to hold an abstraction licence, meaning that more farmers would require a licence[103]. A not-for-profit business, Water Resources East was formed in 2019 to manage East Anglia's scarce water resources[104]. Anglian water, other water companies, the Environment agency, local authorities and organisations including the NFU are represented in the business.

7.2 Economic Environment

Sterling weakened in the year. The average value of sterling against the euro was €1.135 per £1 in the year to 5 April 2020 (€1.153 per £1 in the year to 5 April 2019) and 1.2258USD per £1 in the year to 5 April 2020 (1.3012 per £1 in the previous year[105].

[99] Farm Business, www.farmbusiness.co.uk , 14 February 2020
[100] The cost of EU Exit preparations, National Audit Office, 6 March 2020
[101] Farmers Weekly, www.fwi.co.uk , 19 November 2018
[102] Farmers Weekly, www.fwi.co.uk , 21 February 2020
[103] Agronomist and Arable Farmer, 29 August 2019
[104] British Farmer & Grower, August 2019
[105] Bank of England

In March 2020, the Bank of England monetary policy committee cut UK interest rates were cut to their lowest ever level of 0.1 per cent[106].

7.3 Weather

In the Eastern side of England, the autumn of 2018 and winter of 2018 /2019 were milder, warmer and sunnier than average. The spring of 2019 was generally mild and dry but March rainfall totals were above average for most areas.

The summer of 2019 was especially wet across the west and east midlands and in the north east and north west of England. Overall, England experienced its wettest June since 1910. August was warm, but unsettled.

Lincolnshire, South Yorkshire and Nottinghamshire experienced more wet weather into the autumn. About 1,100 hectares of arable and grassland flooded in autumn 2019. Defra provided Farming Recovery Fund grants, of £500 to £25,000, were made available to farmers in Yorkshire and the Midlands, who experienced floods[107].

Over the winter of 2019 /2020, weather conditions were generally mild and wet, although the north east was drier than usual. East Anglia experienced an especially mild winter.

February 2020 was the wettest February since 1862 and many places received three times their average February rainfall. As a result, there were floods in East and North Yorkshire, Gloucestershire, Worcestershire, Shropshire, Staffordshire, Nottinghamshire and Herefordshire, Defra announced £6 million of further funding through the Farming Recovery Fund[108].

7.4 Business

In contrast to previous years there were minimal changes to the supply chain in the year to March 2020.

Frontier Agriculture invested £3 million to upgrade a de-hulling facility in Nottingham to produce a binding agent from beans, for use in feeds on Scottish salmon farms[109]. The product provides a replacement for imported soya.

In December 2019, ICL Boulby of East Cleveland, the world's first and only producer of polyhalite completed its first year of production[110]. Polyhalite contains sulphur, potash, calcium and magnesium. The mine previously produced potash but the mineral had neared exhaustion.

7.5 Carbon Sequestration and Trading

The Forestry Commission launched the Woodland Carbon Guarantee in November 2019 and provided a guarantee of payment for carbon capture through growth of eligible newly planted woodland[111]. The first auction closed in February 2020 and was made for 18 contracts, covering 182 hectares of woodland. At an auction in June 2020, the price averaged £19.71 per unit for one tonne of sequestered carbon dioxide[112].

[106] BBC, www.bbc.co.uk/news , 19 March 2020
[107] FarmBusiness, www.farmbusiness.co.uk , 14 November 2019
[108] Defra press release, www.gov.uk , 20 March 2020
[109] Eastern Daily Press, 7 May 2019
[110] FarmBusiness, www.farmbusiness.co.uk , 3 December 2019
[111] Farm Business, www.farmbusiness.co.uk , 14 April 2020
[112] Townsend Chartered Surveyors 2020 UK Market report, www.townsendcharteredsurveyors.co.uk,

Appendix 3 Calculation of Net Margin and Cost of Production Estimation

To prepare an enterprise net margin, we estimate and deduct the share of fixed costs attributable to the enterprise. The method used is described below.

Definitions

Net Margin

The **net margin** of an enterprise equals gross margin less **adjusted fixed costs** allocated to the Enterprise[113]. The **adjusted fixed costs** are those fixed costs deducted to derive net margin. They include unpaid manual labour, including the farmer and spouse, and net field rent but exclude interest on any borrowings. Private costs of the farmer are excluded from the fixed costs.

Cost of Production

The **cost of production** is taken as the sum of the variable costs and the adjusted fixed costs divided by the crop yield.

In the FBS, the coefficients used to apportion costs are derived and applied at the aggregate level and therefore relate to the industry and not to an individual farm. Therefore, the approach described above differs from cost accounting in which costs are allocated to enterprises at the farm level, by collecting detailed allocation of labour use and machines to individual enterprises. The resulting net margins are estimates because some element of expert opinion is needed in the allocation of some costs.

Allocation and Apportionment of Costs to the Agriculture Cost Centre

Firstly, the costs that do not relate to agriculture can be removed from the calculation. Because the FBS record is a ring fenced management account of the whole farm business, there are known outputs and corresponding costs that relate to the agriculture, diversification, agri-environment and single payment cost centres. Therefore, no revenues or costs relating to the Single Payment are included in these calculations, hence the results presented are estimates of the costs of production reflecting market prices, input usage and output achieved for the crop alone.

The FBS net margin methodology was designed to be transparent and comprehensible to end users and is described here[114]. "The apportionment of land and property costs across the cost centres presented is based upon directly allocatable costs for diversified enterprises, with costs across agriculture, agri-environmental schemes and the single payment scheme apportioned on the basis of their respective gross margin contribution across these three cost centres. Apportionment of general farming costs and overhead machinery costs are based upon the respective output generated by each cost centre, weighted to reflect the degree to which each activity draws upon these costs."

Directly Attributable Output and Cost Allocation

To ascertain the net margin of an enterprise from an FBS record, all outputs and the costs that are directly attributable are allocated to the specific crop or livestock enterprise. In the case of crops, all outputs can be traced to the enterprise so allocation is straightforward. A number of costs can also be allocated to the enterprise and these include:

- Seed
- Crop specific contract work

[113] Definitions of Terms used in Farm Business Management, Defra 2010

[114] Appendix 2 (Item VI) Farm Accounts in England 2008/2009 Defra statistics

In the next stages, the remaining costs must be allocated or apportioned to individual enterprises.

Direct Allocation of Variable Costs and Allocatable Fixed Costs to the Enterprise

In the next stage of the exercise, the researcher allocates variable costs to individual enterprises:

- Fertiliser – allocation should be known to the farmer
- Crop protection – allocation should be known to the farmer
- Other crop costs – some known e.g. AHDB levy but others require allocation
- Drying and heating – readily estimated based on moisture removal

Apportionment of Labour, Machinery, Overhead and Occupancy Costs

Finally, externally generated input output coefficients are used to apportion the fixed cost elements to individual enterprises. Originally based on work carried out in 1999 the input-output coefficients were subsequently refined in 2006 to account for the removal of production linked subsidies following Common Agricultural Policy (CAP) changes in January 2005 and in a number of further studies in 2006, 2008 and 2012. These items include:

- Paid, unpaid and farmers' labour
- Non enterprise-specific contract and machinery rental
- Machinery repairs, fuel and depreciation
- Utilities
- Administrative costs
- Rent and rental value
- Property repairs and other occupancy costs.

The net margin is calculated by deduction of all of the costs from the enterprise output.

Estimation of Cost of Production

To calculate the cost of production, all of the costs (the variable costs, labour and imputed labour costs, machinery costs, occupancy costs including imputed rent and administrative costs) are summed. In the case of crops, these costs are divided by the production in tonnes to give a cost of production per tonne. Please note that interest (paid or received) is not included in the calculation.

Reports in this series:

Crop Production in England

Dairying Farming in England

Hill Farming in England

Horticulture Production in England (Horticultural Business Data)

Lowland Grazing Livestock Production in England

Pig Production in England

Poultry Production in England

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