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Farm Business Survey

2013/2014

Crop Production in England

Ben Lang

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Rural Business Research

independent research, data and analysis

Crop Production in England 2013/2014

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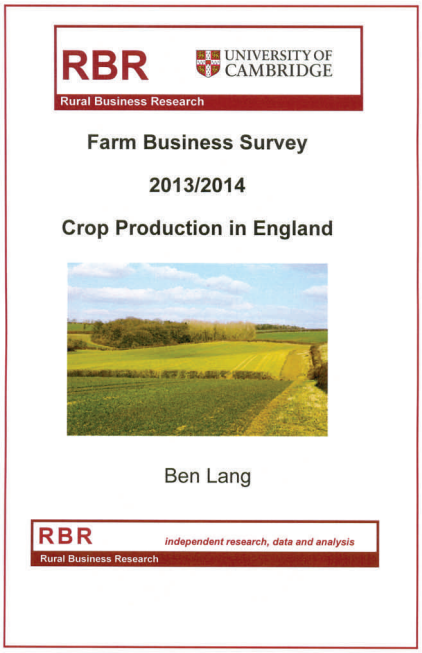
Crop Production in England 2013/2014
The full printed version of the report is now available and comprises:

- Overview of Profitability, Assets and Liabilities
- Arable Farm Performance: Agriculture
- Agri-environment, Diversification, Single Payment
- Crop Enterprise Performance
- Crop and Input Prices
- Net Margin and Cost of Production Estimation for Wheat, Barley and Oilseed Rape



Appendix 1 Agricultural Output and Costs Comparison by Farm Type, District, Size and Performance (33 tables)

Appendix 2 Gross Margin Results for Comparison by Farm Type, District, Size and Performance - Non Organic (122 tables)

Price £20 including postage and packing

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Foreword to the Ninth Series

As 2015 gets into swing the agricultural and horticultural sectors are met with both certainty and uncertainty at the same time. With respect to the revised Common Agricultural Policy (CAP) certainty, to some extent, now exists where it was previously lacking. For the most part, the process of implementation of the revised CAP is now available for farmers and their advisors to work with ahead of ensuring they submit their claims under the new Basic Payment Scheme (BPS) by the 15 May 2015 deadline. While this provides an element of certainty it also represents an evolution of policy that places increased emphasis on the management of the environment to attract the full BPS funding available per farm. Greening and Ecological Focus Areas (EFAs) represent new concepts and definitions to the industry, however, the rules of engagement are, by and large, now known.

However, while certainty exists with respect to policy, the wider agricultural and general economy continues to exhibit considerable uncertainty. The prices of many products, notably combinable crops and milk have been on a (largely downward) rollercoaster over the previous 12 months, while input costs driven in part by the falling cost of energy are exhibiting some considerable 'stickiness'. The wider political economy within Europe will also have an impact on the fortunes of agriculture and horticulture in the UK. As the European Central Bank has initiated a programme of Quantitative Easing (QE), the likely direction of travel for the Euro against Sterling will be downward – making UK exports more expensive to our European trading neighbours, decreasing the value of the BPS funding to UK farmers, but conversely reducing input costs from Europe. Within the UK, the economic recovery continues to hold on set against mixed signals, with many commentators now moving out any predictions of an interest rate rise to 2016 (at the earliest) as inflationary pressures have dissipated.

Against this wider background Rural Business Research (RBR) are proud to produce the ninth series of reports that focus on the economics of agriculture and horticulture. Our data are drawn from the 2013/14 financial year and hence relate to the 2013 harvest / production calendar. In the foreword to the eight series I noted the climatically atypical 2012/13 production year; the 2013 harvest was not immune to the knock-on impacts from '12/13 and the outcomes presented in these reports must be considered against this backdrop. In particular the impact on Cereal farms which have witnessed a fall in Farm Business Income (FBI) of 27% from 2012/13 to 2013/14 reflects a combination of lower yields and an increased area of spring cropping. Similar falls in FBI were witnessed in General Cropping (-24%), Less Favoured Area Grazing Livestock (-22%) and Mixed farms (-20%). Conversely the dairy sector witnessed a strong improvement in FBI during 2013/14 (+67%), flowing largely from increased milk prices - albeit that these price improvements have now gone into reverse. Horticulture witnessed an improved FBI of 31%, while Specialist Pigs and Specialist Poultry also saw increased income levels, flowing largely from improvements in output.

While certainty and uncertainty both exist, we continue to observe large variation between performance within and across farm types. Businesses seeking to position themselves for the future will need to closely examine the costs of production and benchmark their performance to identify areas for continued business success. RBR hopes that this ninth series of reports provides the basis for such analysis. I particularly thank all the FBS research programme co-operators in providing us with the opportunity to collect, analyse and present these data for the benefit of the industry as a whole.

Dr Paul Wilson
Chief Executive Officer, Rural Business Research
January 2015
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. RBR researchers, led by Paul Wilson, devised the methodology for estimation of net margins described in Chapter 6.

Executive Summary

The average Farm Business Income of Cereals farms reduced to £237 per hectare (£342 per hectare in 2012) and of General Cropping farms to £264 per hectare (£371 per hectare in 2012).

The main driver of this less favourable farm performance was a reduction in crop prices, but wet conditions in the autumn of 2012 resulted in a shift away from winter cropping to greater spring cropping. As a result, farmers grew an unusually small area of crops that produce relatively high gross margins and a greater area of spring crops that do not always yield well.

At only 1.5 million hectares, the winter wheat area was 19 per cent lower than in 2012, an area last seen in the early 1980s. Similarly, the winter barley area, at 257,000 hectares, was the lowest in recent history and 22 per cent lower than in 2012. In contrast, the spring barley area, at 570,000 hectares, was the largest area grown since 1988.

The net worth of Cereals and General Cropping farms increased by seven and nine per cent respectively as land values increased by around ten per cent. Cereals farms continued to invest in machinery giving an increase in value of eight per cent, although General Cropping farms did not invest to the same extent. Borrowing increased by 17 and 11 per cent respectively on Cereals and General Cropping farms. The closing value of machinery on Cereals farms was £795 per hectare at the end of the year and 59 per cent higher than at the close of 2008. On General Cropping farms, the closing value of machinery was 32 per cent higher than the equivalent value in 2008.

Our further analysis of the farm business according to cost centres for the activities of agriculture, agri environment, diversification and single payment reveals a negative FBI of -£25 per hectare from the agriculture cost centre on Cereals farms (£73 per hectare in 2012) but profitable activity on General Cropping farms of £88 per hectare (£197 per hectare in 2012).

Average receipts from agri environment schemes, averaged £36 and £35 respectively on Cereals and General Cropping farms. Receipts have fallen by about 20 per cent over the last four years from their peak in 2009. The 2013 payment rates were the lowest since 2006.

Cereal crop gross margins were close to their five year average, with the exception of winter wheat which exceeded average performance. Legumes performed well in comparison to their long term average whilst spring oilseed crops spring oilseed rape and linseed gave low gross margins. The sugar beet gross margin averaged £1,237 per hectare, eight per cent above the five year average. The crop yielded 66.1 clean tonnes per hectare, and among the highest recorded yields of the crop whilst the price averaged £33 per clean tonne. The potato crop generated a near-average gross margin of £3,525 in 2013. Although the yield of 39.6 was four per cent above the five year average, the price of £144 per tonne was three per cent lower than average.

Seed costs increased for every crop in 2013. Crop production was dominated by reduced winter plantings and corresponding reduced use of fertiliser and crop protection materials. Unit prices of fertilisers and crop protection products were generally lower than in 2012, but reduced volumes were purchased due to the generally shorter growing season and apparent reduced yield potential of crops.

In Chapter 6 we report on the development of new FBS net margin methodology brings a new approach to our understanding of crop production costs. In this edition of Crop Production in England, and following careful development of the new methodology, we publish net margins for selected arable crops for the first time. Taking the established method of calculation of gross margins, we attribute farm level fixed costs to enterprises to estimate a net margin for that enterprise. This concept is not new but previous methods have relied heavily on estimation.

The calculation of net margins provides some valuable information for the industry, although not always at the individual farm level. Our findings for the 2013 harvest year were that winter wheat, spring barley and winter oilseed rape all generated negative net margins. The results for 2013 were influenced by the reduced crop area in 2013 as fixed costs were spread over a reduced area of land and a reduced area of (relatively high value) winter crops.

Ben Lang

1 Overview of Profitability, Assets and Liabilities

1.0 The Whole Farm

The average Farm Business Income of Cereals farms reduced to £237 per hectare (£342 per hectare in 2012) and of General Cropping farms to £264 per hectare (£371 per hectare in 2012).

The main driver of reduced farm performance was a reduction in crop prices, but wet conditions in the autumn of 2012 resulted in a shift away from winter cropping to greater spring cropping. As a result, farmers grew an unusually small area of crops that produce relatively high gross margins and a greater area of spring crops, that do not always yield well.

Winter and spring crop yields recovered to usual levels.

The reduced crop prices reflected ready supply of most commodities. The lower prices for oilseed rape had largely been anticipated by growers who reduced production of the crop. Local variations to national price trends included the favourable premium for milling wheat, reflecting reduced production, especially later in the season. High production of oats relative to market demands following favourable performance of the crop in 2012 led to reduced prices.

With both favourable yields and prices sugar beet performed well whilst the potato crop gave a near average performance as the effects of higher yields were mitigated by lower prices.

Input costs increased in line with inflation and the substantial rises in energy costs seen in recent years were not repeated.

Reduced demand for fertiliser and crop protection products was the driver of lower unit prices for these inputs. Correspondingly, arable production made reduced use of natural resources in the year.

Despite reduced output, few farmers were in a position to reduce fixed costs for the duration of one season. Nevertheless, farmers continued to invest in machinery.

Land prices increased further and resulted in stronger balance sheets for the average arable farm in England.

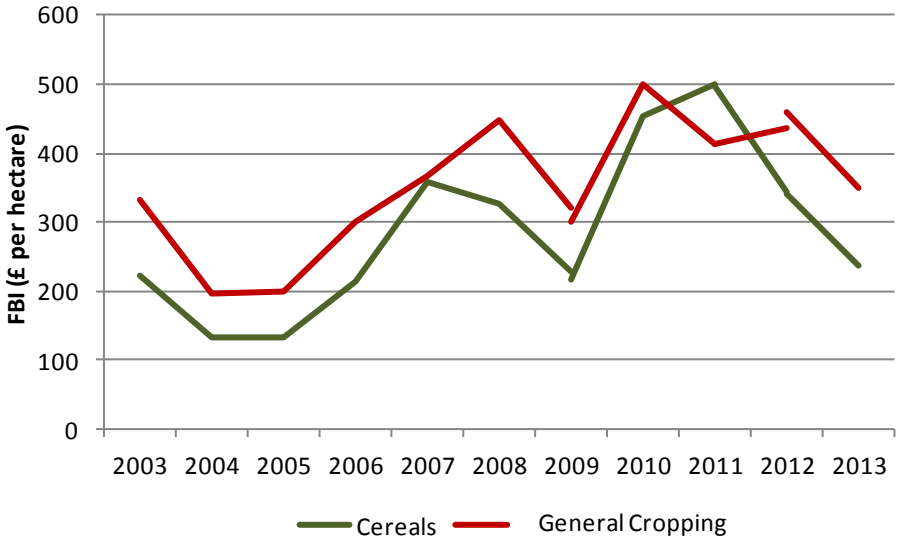
However, for those in financial difficulty, the low yields from the 2012 harvest and the low prices of the 2013 harvest caused significant cashflow problems.

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

The Figure below shows the Time Series FBI for Cereals and General Cropping Farms in England, 2003 to 2012

1 Overview of Profitability, Assets and Liabilities

The FBI of Cereals and General Cropping farms since 2003



Please note that there are changes in the data series in 2009, 2011 and 2012 due to changes in farm typology and weighting method

The Tables below respectively summarise the average profitability of Cereals and General Cropping farms in 2012/13 and 2013/14 (£ per hectare unless stated)

Cereals Farms - Farm Business Income

	2012	2013
Number of farms	346	342
Area of farm (ha)	198	210
Crop output	1031	903
Livestock output	35	37
Agri-environment	37	36
Other output	194	204
Single Payment	192	190
Total Output	**1490**	**1371**
Variable costs	526	489
Fixed costs	628	654
Total costs	**1155**	**1143**
Profit on sale of assets	**7**	**9**
Farm Business Income	**342**	**237**
Less labour	18	15
Add interest	21	23
Less rental costs	95	99
Net Farm Income	**249**	**147**

General Cropping Farms - Farm Business Income

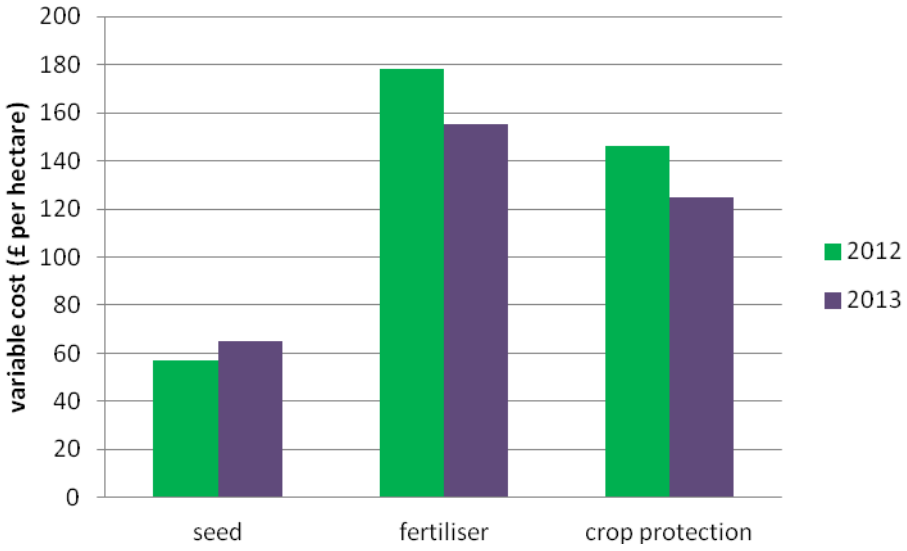
	2012	2013
Number of farms	162	161
Area of farm (ha)	194	194
Crop output	1603	1482
Livestock output	79	72
Agri-environment	37	35
Other output	209	237
Single Payment	184	185
Total Output	**2112**	**2011**
Variable costs	765	744
Fixed costs	894	922
Total costs	**1659**	**1667**
Profit on sale of assets	**6**	**5**
Farm Business Income	**459**	**349**
Less labour	21	11
Add interest	28	28
Less rental costs	96	101
Net Farm Income	**371**	**264**

1.2 Farm Business Income 2013/2014

Variable and Fixed Costs

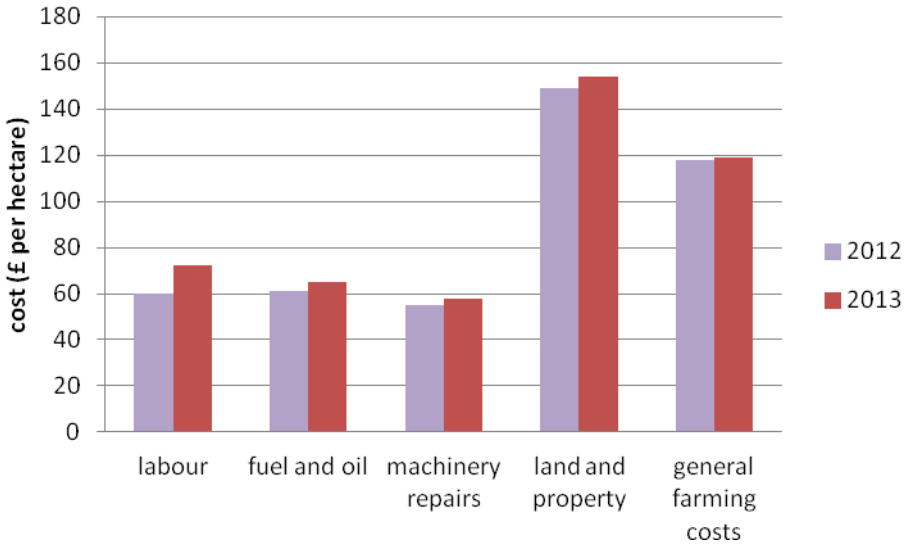
The expenditure on variable and fixed costs in 2012 and 2013 is set out respectively in Figures below.

Cereals Farms, Variable Costs 2012/2013 and 2013/14



Seed expenditure increased, reflecting the reduced availability of good quality seed from the 2012 harvest and limited supply of spring seed. Reduced unit prices and lower demand for fertiliser and crop protection led to reductions in expenditure on these inputs. The reduction in demand resulted from a small reduction in the crop area, a shift from winter to spring cropping, and late establishment of crops with perceived reduced yield potential.

Cereals Farms, Fixed Costs 2012/2013 and 2013/14



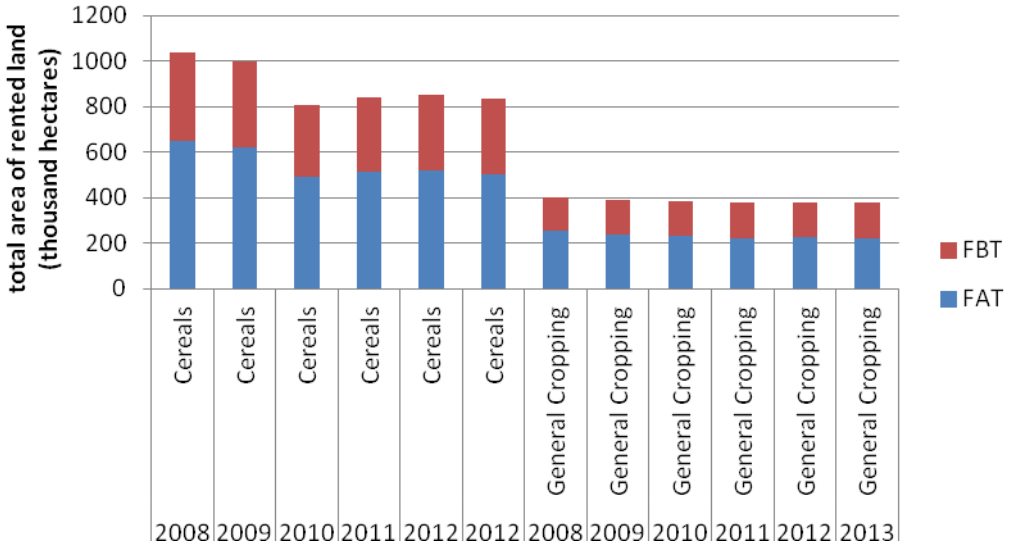
Incremental increases in fixed costs were muted in comparison with previous years due mainly to limited increases in energy costs.

The reduction in winter cropping resulted in a reduction in hours worked in Autumn 2012 but an increase of fieldwork in the Spring of 2013. Fieldwork was spread more evenly through the year, than in previous years.

Rent

The Figure below shows the area of rented on Full Agricultural Tenancies (FATs) and Farm Business Tenancies (FBTs) on Cereals and General Cropping farms in England.

Total Area of Land Rented on FAT and FBT Agreements in England, 2008 to 2013

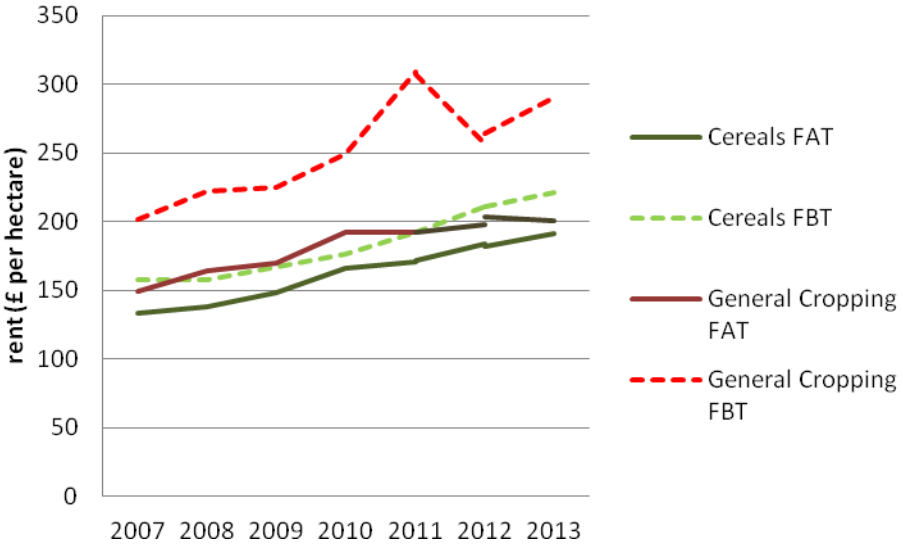


Source: Defra June Survey

In the long term, the area of land on FATs and FBTs is declining. The area of FATs continues to fall as no new agreements were made after 1995. On Cereals farms, the area of land on FBTs also reduced between 2008 and 2013. On General Cropping farms, the area of rented land fell between 2008 and 2013, but the area of land rented on FBTs increased as the area rented on FATs reduced.

The Figure below shows the average rent paid on Cereals and General Cropping farms on both FAT and FBT agreements in England. There were breaks in the data series after 2011 and after 2012.

Average Rent Paid on Land Rented on FAT and FBT Agreements in England, 2007 to 2013



Rents continued to rise on Cereals farms and FBT rents remained higher than FAT rents. In 2013, average FAT and FBT rents on Cereals farms were £191 and £221 per hectare respectively. Although FAT and FBT rents had appeared to converge in 2010, the more flexible FBT rents increased more quickly between 2011 and 2013.

On General Cropping farms, the average rents in 2013 were £201 per hectare for FAT agreements and £290 per hectare for FBT agreements. The considerable difference in rents according to agreement type is partly explained by the prevalence of short term agreements for rental of land for high value potato or vegetable production. In recent years, General Cropping FAT rents have tended to increase at a similar rate to those for FATs on Cereals farms, while General Cropping FBTs rents were more variable.

In September 2013 and ahead of the Michaelmas deadline, some tenants were contemplating serving rent review decreases[1]. Reducing crop prices and two relatively poor harvests in 2011 and 2012 were the driver of this decision.

In September 2013 and ahead of the Michaelmas deadline, some tenants were contemplating serving rent review decreases[2]. Reducing crop prices and two relatively poor harvests in 2011 and 2012 were the driver of this decision.

[1] Farmers Weekly Interactive, www.fwi.co.uk , 19 September 2013
[2] Farmers Weekly Interactive, www.fwi.co.uk , 19 September 2013

1.3 Assets and Liabilities

Table below respectively show the Cereals Farms Balance Sheet and General Cropping Farms Balance Sheet for the 2013/2014 financial year.

Cereals Farms Balance Sheet (£/ha)

	Opening 2013	Closing 2013
Number of farms	342	342
Area of farm (ha)	210	210
Assets		
Land and buildings	8,831	9,685
Machinery	736	793
SPS Entitlement	249	254
Other fixed assets	46	44
Current assets	1,171	1,144
Liabilities	888	1,040
Net Worth	10,146	10,880

General Cropping Farms Balance Sheet (£/ha)

	Opening 2013	Closing 2013
Number of farms	161	161
Area of farm (ha)	194	194
Assets		
Land and buildings	8,265	9,048
Machinery	821	871
SPS Entitlement	237	244
Other fixed assets	79	84
Current assets	1,221	1,225
Liabilities	1,102	1,114
Net Worth	9,521	10,358

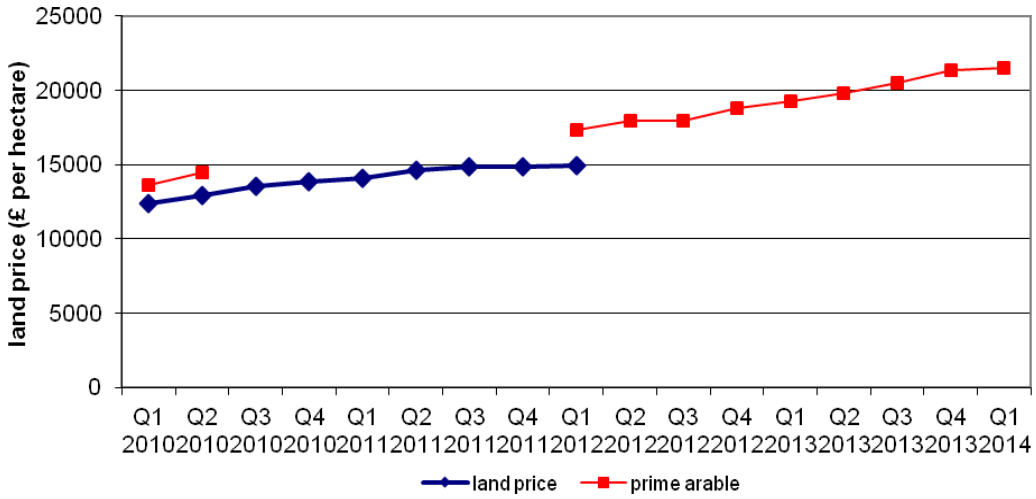
The net worth of Cereals and General Cropping farms increased by seven and nine per cent respectively as land values increased by around ten per cent. On Cereals farms, continued investment in machinery led to a net increase in value of eight per cent, although General Cropping farms did not invest to the same extent.

Borrowing increased by 17 and 11 per cent respectively on Cereals and General Cropping farms as farmers funded investment in land and machinery but also borrowed to overcome cashflow demands.

Land

The Figure below shows continuing increases in arable land values in 2010 to April 2014.

Price of Arable Land in England 2010 to April 2013



Source: Savills

The price of prime arable land increased by 11 per cent, to an average of £21,500 per hectare, over the year ending March 2014[1]. The year was characterised by strong demand for land, but especially large scale commercial farms[2]. Market commentators observed a divergence in land values; pasture values did not rise in the same way.

Supply of agricultural land was generally at levels seen in recent years. In 2013, 37,000 hectares of land were publicly marketed in England (35,900 in 2012)[3]. However, a reduced amount of land was brought to the market in the East of England with only 3,900 hectares publicly marketed between January and September 2013.

Buyers were split equally between existing farmers and new owners of agricultural land. Farmers purchased land for farm expansion, investment, and for sporting and residential purposes[4]. Demand was greatest in the East and North of England.

Single Payment Entitlement

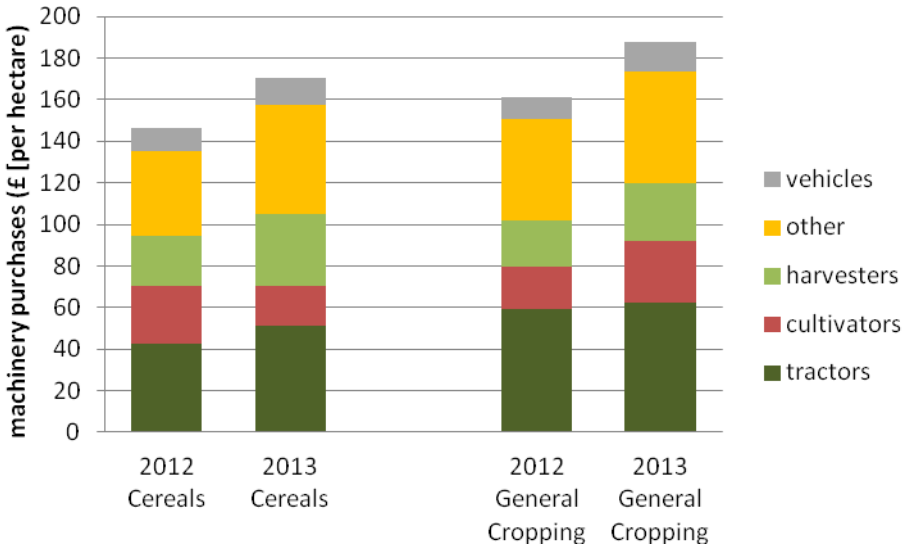
In November 2012, ahead of the 2013 FBS season, English non LFA Single Payment Entitlement traded at £200 to £210 per hectare[5] [6]. This was lower than the rates calculated in FBS opening valuations of £249 and £237 respectively for Cereals and General Cropping farms. The calculated values were based on the expected future income stream for the investment. The closing valuations, estimated in the same way, were £254 and £244 respectively for Cereals and General Cropping farms.

[1] Farmland Market, Savills, www.savills.co.uk
[2] Farmers Weekly Interactive, www.fwi.co.uk , 27 December 2013
[3] Market survey, UK Agricultural Land 2014, Savills
[4] Q3 Farmland Market, Savills, October 2013
[5] Farmers Weekly Interactive, www.fwi.co.uk , 8 November 2012
[6] Duncan Clark Farm Management, www.dcfm.com , February 2013

Machinery

Following the increase in commodity prices from 2007, farmers have tended to invest in machinery at rates that exceed the depreciation of the existing stock of machinery. As a result, there has been a trend towards increasing values of machinery assets on Cereals and General Cropping farms. The Figure below shows arable farm expenditure on machinery in 2012 and 2013 and following Figure shows the closing value of machinery on arable farms at the end of the same years.

Machinery Expenditure on Cereals and General Cropping Farms 2012/2013 and 2013/14

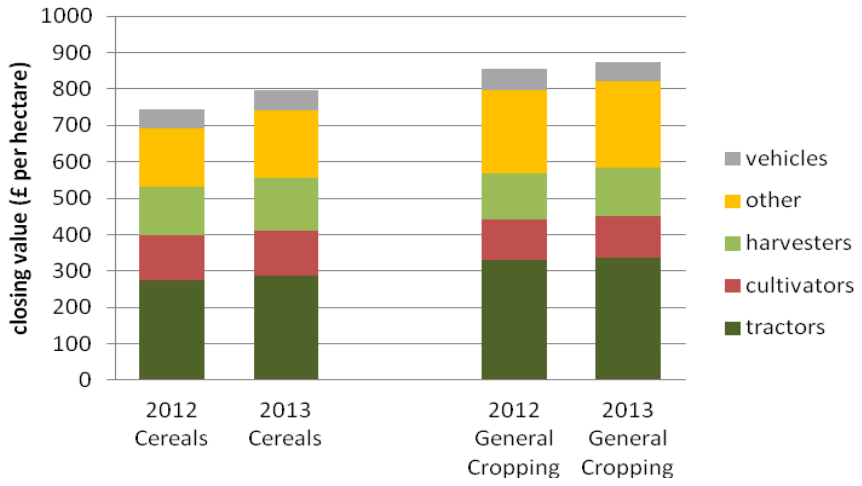


Whilst spending on machinery in 2012 was lower than in 2011, the trend into 2013 was towards greater machinery expenditure. The net investment in machinery on Cereals farms in 2013 was £171 per hectare (£146 per hectare in 2012). On General cropping farms, net expenditure increased to £188 per hectare in 2013 from £161 per hectare in 2012.

Changing cultivations, driven by the need to counter blackgrass, led to demand for traditional cultivation machinery. Auctioneers noted increased sales volume and prices of ploughs in machinery sales[1]. Farmers sought to increase drilling capacity, allowing drilling to be delayed into October[2].

[1] Farmers Weekly, 29 August 2014
[2] Farmers Weekly, 14 June 2013

Closing Valuation of Machinery on Cereals and General Cropping Farms 2012/2013 and 2013/14



The closing value of machinery on Cereals farms was £795 per hectare at the end of the year and 7.5 per cent higher than the previous year. Although there have been changes to the definition if Cereals farms in the intervening years, it is worth noting that the value of machinery was 59 per cent higher than at the close of 2008. On General Cropping farms, the closing value of machinery increased by a more muted two per cent to £874 per hectare at the close of the year. However, this was 32 per cent higher than the equivalent value in 2008.

The high value of modern machinery was one reason for high costs of rural crime in arable counties. At £2.7 million, Cambridgeshire incurred the greatest losses, followed by Lincolnshire, Essex, Kent, Lancashire, Suffolk, North Yorkshire and Leicestershire[1].

Liabilities

The average capital performance of arable farms set out above was favourable because increases in asset values exceed the increase in liabilities. Across the whole agricultural and forestry industry, bank lending to farmers increased by eight per cent in the year to 15.15 billion at the end of March 2014[2].

Farm observations made by researchers working on the FBS suggest that the cash flow situation of farmers was very mixed but more extreme than in previous years for farms experiencing difficulty.

On arable farms experiencing cash flow difficulties in 2013, the drivers were the reduced quantity and quality of production from the 2012 harvest and in some cases over commitment to forward selling from the 2012 harvest.

Credit for working capital that had previously been provided by ING was unavailable in the autumn of 2012. Whilst some arrangements were possible, the supply industry was generally reluctant to offer unsecured loans on inputs. Farmers took credit on less favourable terms than a conventional overdraft but without the need to renegotiate existing favourable terms with conventional banks. For example, Hutchinsons offered credit through Hitachi Capital Business Finance and Agrii offered a similar arrangement with Rabobank subsidiary De Lage Landen[3] [4].

[1] Farmers Weekly, 15 August 2014
[2] Bank of England, www.bankofengland.co.uk
[3] Hutchinsons, http://www.hlhltd.co.uk/
[4] Agrii, www.agrii.co.uk

2 Arable Farm Performance: Agriculture

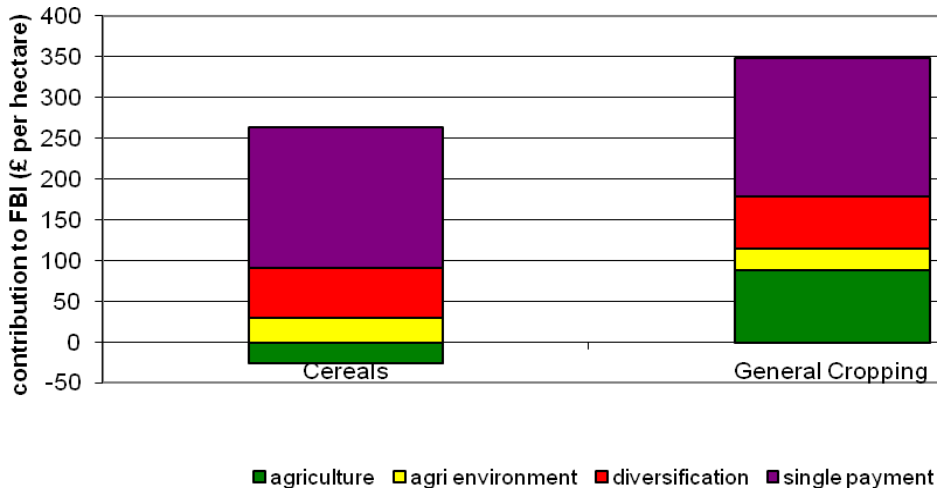
2.0 The Cost Centre Approach

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 Single Payment Scheme 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].

2.1 Agriculture, Agri-environment, Diversification and Single Payment

The following Figure shows the contribution from agriculture, agri-environment, diversification and single payment that sum to give the FBI for the average Cereals and General Cropping farm.

Contribution to Farm Business Income by Cost Centre on Cereals and General Cropping Farms 2013/14



The net effect of disrupted cropping, a reduction in crop prices but recovery of crop yields resulted in a negative FBI of -£25 per hectare from agriculture on Cereals Farms (£73 per hectare in 2012) but profitable activity on General Cropping farms of £88 per hectare (£197 per hectare in 2012).

Most farms changed their cropping in comparison with previous seasons. Wet weather in the autumn of 2012 resulted in a greatly reduced area of winter cereals and oilseed rape, partially mitigated by an increased area of spring barley

In the sample of farms participating in the Farm Business Survey, 11 per cent fewer grew winter wheat, 14 per cent fewer grew winter barley and nine per cent fewer grew winter oilseed rape. There was corresponding increase in the numbers growing spring combinable crops led by the 62 per cent increase in farmers growing spring barley. Individual farms also grew larger reduced areas of all winter crops and greater areas of spring cereal and oilseed crops.

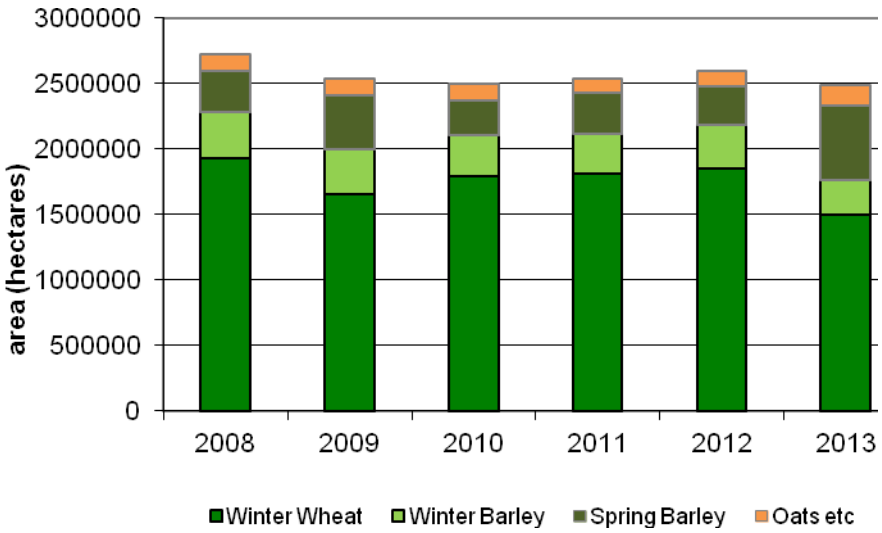
Crop yields recovered to levels that were similar to previous seasons. Crop prices reduced, for example, the winter wheat price was ten per cent lower than in 2013.

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

2.2 Cropping and Crop Areas

The following Figure shows changes in the cereals crop areas from the 2008 to 2013 harvest years. The second Figure shows the areas of break crops and third Figure shows the area of potatoes, sugar beet and horticultural crops over the same period.

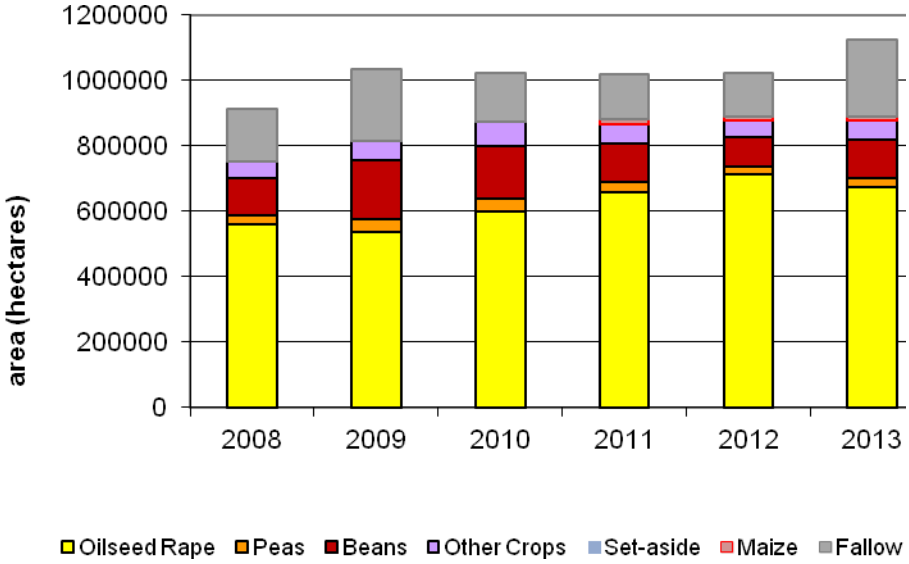
Cereal Crop Area, 2008 to 2013



Source: Defra, June Survey

At only 1.5 million hectares, the winter wheat area was 19 per cent lower than in 2012, an area last seen in the early 1980s. Similarly, the winter barley area, at 257,000 hectares, was the lowest in recent history and 22 per cent lower than in 2012. In contrast, the spring barley area, at 570,000 hectares, was the largest area grown since 1988. The area of other cereals, which include oats, rye and triticale, increased by 39 per cent to 160,000 hectares.

Break Crop Area, 2007 to 2013



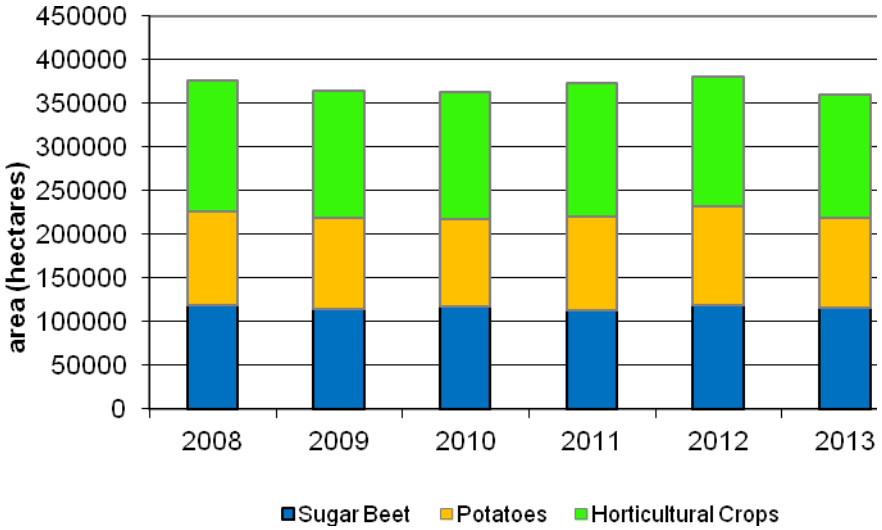
Source: Defra, June Survey

Reflecting lower oilseed prices, as well as difficult conditions for establishment, the area of oilseed rape declined by six per cent to 676,000 hectares. However, this was still the second highest oilseed rape area ever grown in England.

Farmers grew increased areas of peas, 28,000 hectares, and beans, 115,000 hectares as areas returned to levels seen in 2011. Nevertheless the areas of both crops were still around thirteen per cent lower than the five year average.

Some 237,000 hectares remained as fallow, a level 50 per cent higher than the five year average. This was probably due to the impact of the weather and that the area returned back to the longer term levels in 2014.

Sugar Beet, Potato and Horticultural Crop Area 2007 to 2013



Source: Defra, June Survey

In recent years, there has been a long term reduction in the area of sugar beet for sugar production, mitigated by a newly developed market for industrial sugar for ethanol production. Some 117,000 hectares of land were committed to sugar beet production in 2013, three per cent less than in 2012.

At 103,000 hectares, potato plantings were three percent lower than in 2012. The area of horticultural crops reduced by overall by seven per cent to 140,000 hectares.

2.3 Cereals Farms Performance

On the average cereals farm in England in 2013/2014, the Farm Business Income derived from the agriculture cost centre was -£25 per hectare.

The main reason for the less favourable financial performance was a 13 per cent reduction in crop output to £909 per hectare, partly mitigated by a ten per cent reduction in crop specific variable costs to £377 per hectare. These changes resulted from both reduced areas of the relatively high gross margin winter crops and from reduced crop prices. On Cereals farms, the average area of winter wheat reduced by 21 per cent to an average of about 60 hectares and there were also declines in the areas of winter barley and winter oilseed rape. The area of spring barley increased, by 265 per cent, to 19 hectares.

There was little change in livestock farming activity and other agricultural output (which includes agricultural contracting) which accounted for four and 11 per cent of agricultural output respectively.

There was an apparent sharp rise in regular and casual paid labour costs to £79 per hectare. Depreciation charges for both machinery and buildings increased following recent investment in these assets. There was minimal further change in fixed costs which increased by three per cent overall to £679 per hectare.

Cereals Farms - Tenure

For each tenure group, Cereals farms experienced similar changes in average performance including a reduction in crop output but minimal changes to fixed costs. As observed in previous years, the Mixed Tenure farms achieved a higher output to the other groups, but this difference was less pronounced than it may have been because all farms faced the problem of the reduction in area of higher value crops. The differences in performance reflected the levels of rent paid so Owner Occupiers, Mixed Tenure and Tenanted Farms achieved an FBI from agriculture of £21 per hectare, -£8 per hectare and -£152 per hectare. Before the deduction of rent, agricultural activity was profitable on average on all three farm groups.

Cereals Farms – County and Joint Character Area (JCA)

If there are at least ten farms in a county or JCA, we include them in this analysis. The highest FBI from agriculture, of £269 per hectare, was achieved in the Fens JCA which also had the highest agricultural output. Lincolnshire and the Fens JCA were among only a few areas that grew a greater area of winter crops in 2013 than in 2012; Wiltshire also grew more winter crops in 2013 and increased its FBI from agriculture.

The lowest FBI from agriculture was recorded on the Farms in Oxfordshire which had the lowest crop output, albeit with the lowest variable cost expenditure.

Cereals Farms – Performance Group

In a change to the presentation of results this year, performance bands are now calculated at the whole business level and ranked in groups relating to low medium and high performance levels.

The top quartile grouping of farms achieved an FBI from agriculture of £311 per hectare and grew an increased area of winter wheat, winter barley, spring barley and oilseed rape and correspondingly achieved the highest crop output albeit with the highest variable costs. The bottom quartile group incurred the highest fixed costs of £816 per hectare in comparison with £609 for the top quartile group. Although the lower quartile group tended to incur higher rent charges, the difference in fixed costs greatly exceeded this higher cost of rent.

2.4 General Cropping Farms Performance

The FBI from agriculture was £88 per hectare representing a £111 reduction in comparison with 2012/2013.

In common with the Cereals farms, the General Cropping farms grew a reduced area of winter crops and their total agricultural output reduced by six per cent to £1,689 per hectare. After a small reduction in variable costs, the gross margin of General Cropping farms reduced by eight per cent to £1,086 per hectare.

Overall fixed costs were virtually unchanged but rent and machinery expenditure increased whilst labour expenditure reduced.

2 Arable Farm Performance: Agriculture

General Cropping Farms - Tenure

With FBI from agriculture of £22 and £126 per hectare respectively, the Tenanted and Mixed Tenure General Cropping farms achieved similar levels of crop performance but the Tenanted farms carried higher levels of machinery and rent costs but spent less on paid labour.

With a crop output per hectare that was 30 per cent lower than on the Tenanted farms, the generally smaller, Owner Occupied farms tended to operate a low output low cost farming system that gave an average FBI for agriculture of -£17 per hectare.

General Cropping Farms – Performance Group

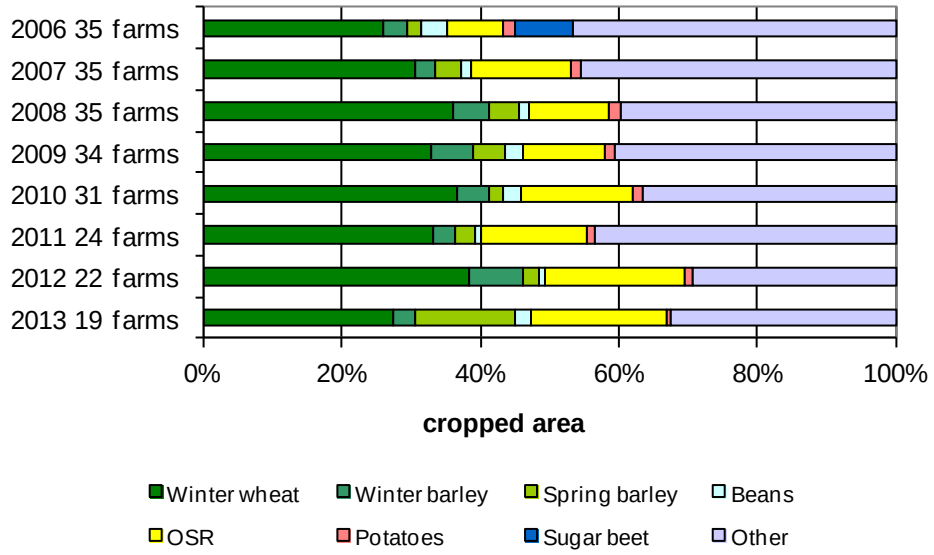
The top quartile group of farms grew greater areas of sugar beet, potatoes and winter wheat than the lower 75 per cent of farms, to give a total agricultural output averaging £2,358 per hectare. Their FBI from agriculture averaged £548 per hectare.

Whilst the bottom quartile and middle half of businesses achieved similar levels of output, the bottom quartile group carried high levels of expenditure on fixed costs and especially on machinery repairs, machinery depreciation and rent. The FBI per hectare from agriculture on these farms was -£218 per hectare.

Beet Discontinuers

The following Figure shows the results of our ongoing, long term analysis of farms that ceased sugar beet production after the 2006 harvest on the closure of the Allscot and York sugar beet factories.

Cropping on Farms Ceasing Sugar Beet Production after the 2006 Harvest



In common with most arable farms, this group greatly reduced the area of winter cereals but increased their area of spring barley. The oilseed rape area remains important to this group of farms which tend to grow a greater share than most other groups of farms.

3.0 The Cost Centre Approach

The results presented in this Chapter relate to **agri-environment scheme participation, diversification outside agriculture and the Single 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].

Overall the performance of all non agricultural activity was little changed on 2012. On average, arable farms experienced a small reduction in output from Single Payment and Agri environment activities but an equally small increase in output from rental activity. At £331 per hectare, 24 per cent of Cereals farm output was from non agricultural sources. General Cropping farms are more exposed to agriculture with 16 per cent of their output derived from non agricultural sources.

3.1 Agri-environment

The following Table shows the financial performance of the agri-environment cost centre.

Agri-environment Output and Costs, Cereals and General Cropping Farms 2012/2013 and 2013/2014

	Cereals		General Cropping	
	£ per hectare			
	2012	2013	2012	2013
Agri environment output	37	36	37	35
Agri environment costs	6	6	7	8
Agri environment FBI	32	30	29	27
Whole business FBI	342	237	459	349

Agri-environment receipts, from all schemes, averaged £36 and £35 respectively on Cereals and General Cropping farms. Receipts have fallen by about 20 per cent over the last four years from their peak in 2009 when payments were £9 per hectare higher. The 2013 payment rates were the lowest since 2006. Although we present average figures, in practice individual farms receive differing sums according to their scheme participation. The payment rate for Entry Level Stewardship remained at £30 per hectare for participating farms.

Some 6,655 hectares of land on 52,500 agreements on all farm types in England were committed to Environmental Stewardship including Entry Level Stewardship (ELS), Organic ELS, Uplands ELS and Higher Level Stewardship (HLS)[2]. A further 128 thousand hectares remained in legacy Environmentally Sensitive Areas and Countryside Stewardship environmental schemes in their penultimate year.

In December 2013, the Environmental Stewardship Scheme closed to new applicants pending the development of the New Environmental Land Management Scheme that was later named the Countryside Stewardship Scheme.

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

[2] Observatory monitoring framework, Defra, www.gov.uk , 2014

3 Agri-environment, Diversification, Single Payment

3.2 Diversification

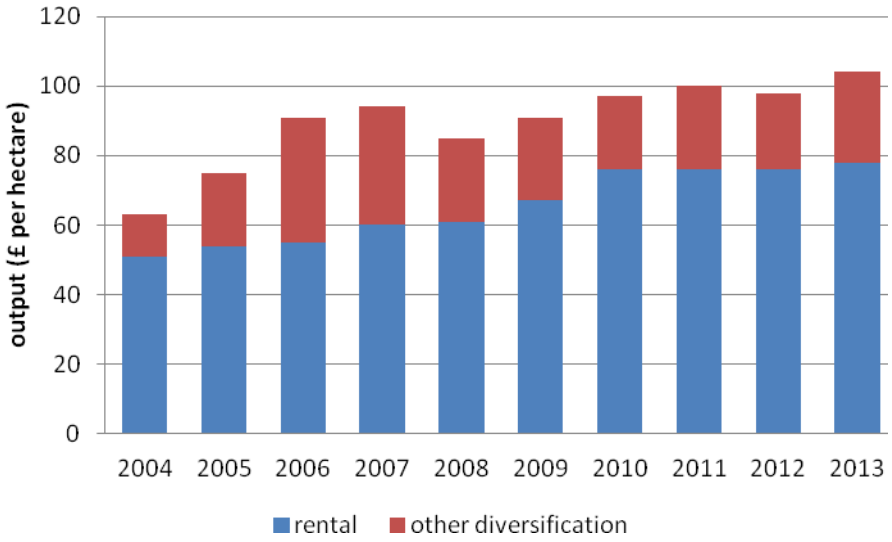
The following Table shows that Cereals and General Cropping farms received higher diversification income, and rental income. This trend was common across farms of all types.

Diversification Output and Costs, Cereals and General Cropping Farms, 2012/2013 and 2013/2014

	Cereals		General Cropping	
	£ per hectare			
	2012	2013	2012	2013
Diversification output	97	104	103	108
Of which:				
Rental	76	78	64	70
Recreation	9	8	6	3
Food processing and retailers	1	0	13	15
Tourism	3	4	10	8
Other	9	14	11	12
Costs	37	44	41	44
Diversification FBI	61	61	62	64
Whole farm FBI	342	237	459	349

The following Figure shows an ongoing trend of rising diversification output.

Diversification Output, from Rental and Other Sources on Cereals Farms, 2004 to 2013



Output from rental activity currently accounts for 75 per cent of all output from diversification on Cereals farms. At £78 per hectare in 2014, its value was little changed since 2010. Letting agents reported a healthy rental market but with rising expectations of prospective

tenants, especially of higher value properties commanding rents exceeding £2,000 per month[1].

Output from other diversification activity on Cereals farms was £26 per hectare in 2014. Having peaked at £36 per hectare in 2006, diversification has subsequently declined, tracking the performance of the wider economy.

3.3 Single Payment

A financial analysis of the performance of the Single Payment cost centre is shown in the following Table.

Single Payment Scheme Output and Costs, Cereals and General Cropping Farms 2012/2013 and 2013/2014

	Cereals		General Cropping	
	£ per hectare			
	2012	2013	2012	2013
Single Payment	192	190	184	185
Costs	16	18	13	15
Single Payment FBI	176	172	171	170
Whole farm FBI	342	237	459	349

For the second successive year, the Single Payment (SP) was calculated on the 'Regional Average' basis (with no historic element). The euro exchange rate used to calculate the SP was £0.83605 and combined UK and EU modulation was again levied at 19 per cent[2]. In addition, financial discipline was levied on payments of over 5,000 euro at a rate of 2.453658 per cent.

The resulting England lowland payment rate was £216.55 per hectare. This was higher than the recorded FBS receipt of £190 per hectare on Cereals farms and £185 on General Cropping farms as land is frequently rented on arrangements in which the landlord receives the Single Payment.

The Rural Payments Agency (RPA), published details of cross compliance breaches that resulted in the withholding of SP to the value of £2.33 million[3]. Many incidences were levied on cattle keepers for breaches relating to livestock movements and cattle passports, but other failures potentially applied to crop producers:

- SMR 2 Groundwater: failing to obtain a permit from the Environment Agency before carrying out, causing or knowingly permitting the discharge of any non-hazardous pollutant(s).
- SMR 4 Nitrate Vulnerable Zones (NVZs): failure to adhere to the requirements for keeping records of applications of Nitrogen.
- SMR 9 Restrictions on the use of plant protection products (PPPs): the farmer has used an approved product but has not complied with the conditions of approval or the farmer has used plant protection products in a manner that is not in accordance with the principles of good plant protection practice as set out in the Code of Practice.

[1] Farmers Weekly, 4 October 2014
[2] Farmers Weekly, 4 October 2013
[3] Cross compliance: 2013 inspection results, www.gov.uk , 5 September 2014

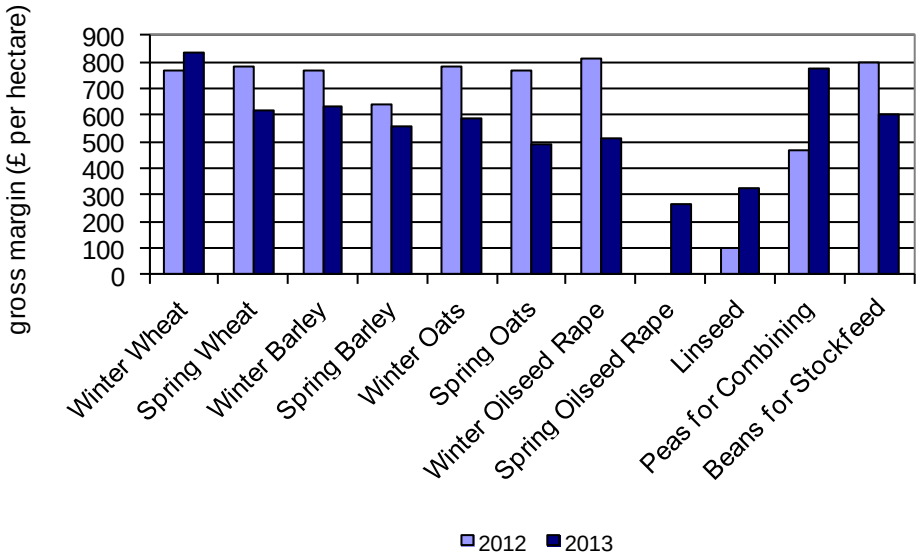
- GAEC 1 Soil Protection Review (SPR): the farmer has not conducted a Soil Protection Review 2010 and made it available to an inspector on request or the farmer has not adequately completed the Soil Protection Review 2010.
- GAEC 8 Public rights of way: a visible right of way has been wilfully obstructed. The surface of a visible, cross-field footpath or bridleway has been disturbed and has not been re-instated to meet the minimum width requirement and/or within the specified time(s).
- GAEC 11 Control of weeds: Reasonable steps not taken to prevent the spread of injurious weeds; Reasonable steps not taken to prevent the spread of specified invasive non-native weeds.
- GAEC 14 Protection of hedgerows and watercourses; the farmer has cultivated or applied fertilisers or pesticides in the protection zones around either hedgerows or watercourses.
- GAEC 15 Hedgerows; the farmer has removed a hedgerow or section of hedgerow without permission from the local authority.
- GAEC 18 Water abstraction: the farmer has failed to comply with the condition of an abstraction licence.

4.1 Crop Gross Margins

The wet conditions at drilling in the autumn of 2012 disrupted cropping in the 2013 harvest year, with the result that farmers grew a reduced area of winter crops with a corresponding increase in spring cropping. In years of more usual weather conditions, farmers typically maximise the area of first wheat in the rotation after a break crop. The weather of 2012 did not reliably provide this opportunity and, in many cases, they grew spring crops that are rarely grown at this premium stage of the rotation. Additionally, weather had a considerable influence on crop performance.

The gross margin performance of combinable crops in 2012 and 2013 is summarised in the Figure below:-

Gross Margins of Arable Crops 2012/2013 and 2013/2014



In 2011 and 2012, winter oilseed rape was the crop with the highest gross margin, exceeding that of winter wheat, but in 2013 it was less profitable than most cereals. Cereal crop gross margins were close to their five year average, with the exception of winter wheat which exceeded average performance. Legumes performed well in comparison to their long term average whilst spring oilseed rape and linseed gave low gross margins.

Seed costs increased for every crop in 2013. Crop production was dominated by reduced winter plantings and corresponding reduced use of fertiliser and crop protection materials. Unit prices of fertilisers and crop protection products were generally lower than in 2012, but reduced volumes were purchased due to the reduced length of the growing season and apparent reduced yield potential of crops[1].

Most arable producers recognised a need to improve blackgrass control on their farms. For those with heavy infestations, there was simply no choice and for those with lower incidence of the weed, there was renewed effort to ensure that the problem did not increase. Blackgrass populations reached such high levels as a result of ongoing winter cropping, over reliance on post emergence herbicides, loss of active ingredients, dry autumns and limited control in break crops such as oilseed rape[2].

[1] Defra, Agricultural Price Indices, www.gov.uk , 13 November 2014
[2] Crops, 6 September 2014

In the autumn of 2012, blackgrass germination was especially low, at ten per cent, offering only limited opportunities for reduction through the use of stale seedbeds[1]. Novel approaches to cropping included:

- The use of a spring crop
- the introduction of a fallow crop in a wheat, oilseed rape, wheat, fallow rotation[2].
- spraying off patches in growing crops with glyphosate to prevent the return of seed to the land[3]
- cutting cereals for wholecrop silage before the blackgrass seed matured.

4.2 Winter Wheat

The results for a reduced sample of winter wheat producers shows that the average winter wheat gross margin recovered to £834 per hectare in 2013 (£764 in 2012) and about 11 per cent higher than the five year average. Output rose by four per cent to £1,354 but improved yields of 8.0 tonnes per hectare were still below the five year average of 8.2 tonnes per hectare. The crop price was nine per cent lower than the exceptional £179 per hectare achieved in 2012, although fertiliser and crop protection costs were also lower at four and six per cent lower respectively. Overall, variable costs were three per cent lower than in 2012 although seed costs rose by 13 per cent to £78 per hectare. Reflecting recent price increases, variable costs exceeded the five year average by 17 per cent.

Agronomy and Crop Development

The late and poor quality harvest of 2012 reduced the availability of seed and the price increased as a result[4]. Some 43 per cent of the wheat crop is grown from home saved seed[5]. Drilling conditions were favourable in the East of England in September but quickly deteriorated.

The Table below shows the proportion of NABIM wheat varieties grown in 2012 in comparison with preceding years.

Wheat Share in Great Britain by NABIM Group: Per cent of Area Drilled

	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Group 1	17	17	17	17	14
Group 2	19	15	11	9	12
Group 3	13	11	15	21	15
Group 4	47	51	54	52	56

Group 1 - Varieties that produce consistent milling and baking performance
Group 2 - Varieties that have bread-making potential but are not suited to all grists
Group 3 - Varieties that are soft and suited to making biscuit, cake and other flours
Group 4 - These varieties are grown mainly as feed wheats

Sources: HGCA Grower Survey and nabim

[1] Farmers Weekly, 7 September 2012
[2] Farmers Weekly Interactive, www.fwi.co.uk , 11 February 2013
[3] Farmers Weekly, 23 May 2014
[4] Farmers Weekly, 3 August 2012
[5] Crops, 7 December 2013

Farmers reduced their share of Group 1 milling wheat by three percent on an already reduced wheat area, instead choosing to increase the share of group 4 wheat varieties.

Following one of the wettest winters on record, agronomists advised on the need for additional spring nitrogen[1]. Overall fertiliser use on wheat was little changed from the previous year[2].

With crops of differing potential and maturity, crop management was a demanding task in 2013. Many crops were drilled either late, or into poor seedbeds and as a result, were typically less developed and had lower plant populations and fewer numbers of tillers at the end of March[3]. A number of growers missed opportunities to apply autumn herbicides. *Septoria* was the main disease threat to wheat crops and an area South and East of the river Humber was identified as being at risk from the disease in April[4].

Harvest, Yield, Quality and Marketing

Harvest started later than usual, commencing at the end of July in the South West[5]. Heavy rainfall was a problem in August, by the end of August, only 40 per cent of the crop had been harvested[6]. At 8.0 tonnes per hectare, yields recovered on the previous year's 6.9 tonnes per per hectare but remaining below the longer term average.

The Table below shows the quality of wheat crops at the 2012 and 2013 harvests.

Cereal Quality Survey 2012 and 2013

	Specific weight Kg/hl 2012	Specific weight Kg/hl 2013	Hagbergs 2012	Hagbergs 2013	Protein % 2012	Protein % 2013
Group 1	70.7	77.8	245	339	13.3	13.0
Group 2	71.3	77.8	276	334	13.0	12.5
Group 3	68.9	76.2	225	285	12.4	11.7
Group 4	69.0	76.1	221	288	11.9	11.4

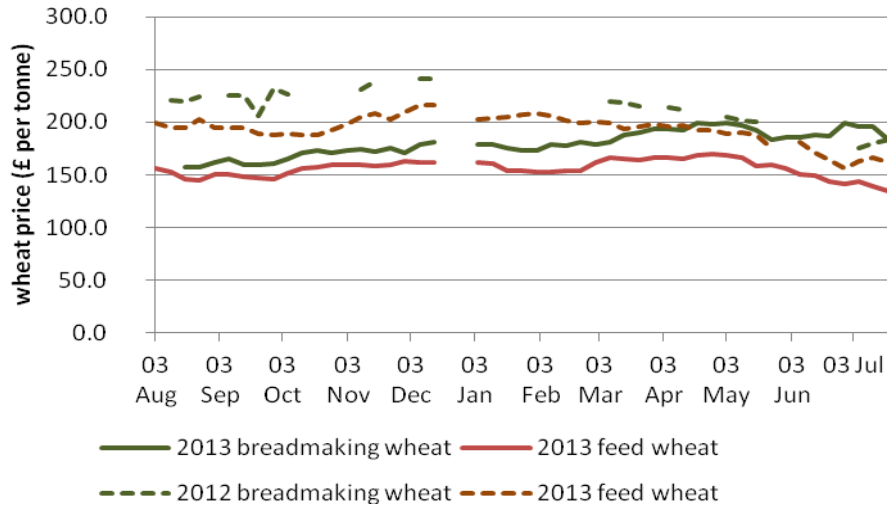
Source: HGCA Cereal Quality Survey 2012 and 2013

Milling quality was high with the hagberg falling weight of Group 1 varieties averaging 339 seconds. Protein levels averaged around 13 per cent and specific weights were also high.

Wheat production in 2013 harvest was the lowest in ten years, estimated at £12.1 million tonnes but world production increased by 1.4 per cent. So the prices determined on a world market, were consistently lower than in 2012. The Figure below reveals the progression of wheat prices from the 2013 harvest.

[1] Farmers Weekly Interactive, www.fwi.co.uk , 26 February 2013
[2] British Survey of Fertiliser Practice 2013
[3] ADAS Arable Crop Report March 2013, www.aplus.adas.co.uk , 28 March 2013
[4] Farmers Weekly, 3 May 2013
[5] ADAS Arable Crop Report July 2013, www.aplus.adas.co.uk , 2 August 2013
[6] Crop Management News, www.aplus.adas.co.uk , 29 August 2013

Wheat Price 2012/2013 and 2013/2014

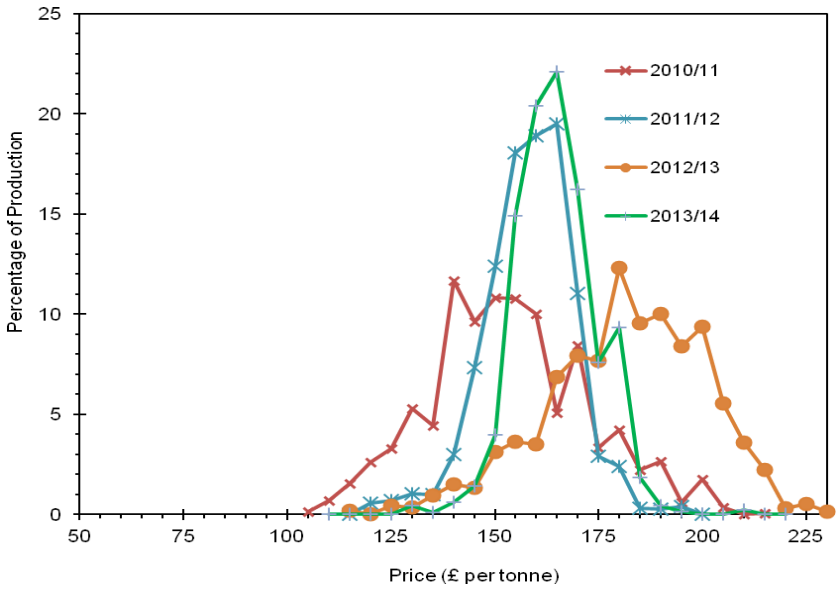


Source: Defra

The harvest price was as low as £144 per tonne in late August. Strong demand for grain was the driver of increased prices which peaked at about £163 in late November. Larger than expected crops in Canada and Australia were the background to low prices in December[1]. Demand eased through the winter and the wheat price drifted to £152 per tonne in February. Concerns about the US wheat crop, and uncertainty about the political situation in the Ukraine were drivers of the increasing wheat price to £170 per tonne in late April. The price reduced to £140 per tonne at the approach to the 2014 harvest.

The Figure below shows the distribution of the average prices achieved by FBS participant businesses. Each price point relates to the average price of grain produced by farms in the FBS. Against each price point, we plot the value of grain produced.

Wheat Price Achieved - FBS



[1] Financial times, www.ft.com , 6 December 2013

For the 2013 harvest, farmers achieved a relatively narrow range of prices and these tended to be a little higher than those of the 2011 harvest. In 2012, farmers received higher prices but there was a wider range between the highest and lowest prices.

Straw

Farm use and sales of straw comprised five per cent of the value of wheat output at £62 per hectare. At harvest, the average price of standing straw was £168 per hectare in the Gloucester area[1]. As less winter wheat was grown, it is likely that a greater proportion of the crop was sold or used on farm.

Group 1 Milling Wheat Performance

It is possible for us to calculate a gross margin for the group of farms that grew only Group 1 milling wheat. These farms achieved a gross margin of £746 per hectare, which was ten per cent lower than the gross margin of farms that grew no group 1 wheat. In 2013, the average price was £176 per tonne and the milling premium averaged £16 per tonne. But the apparent yield penalty was about 0.9 tonnes per hectare. The additional expenditure on fertiliser was about £40 per hectare.

Wheat achieving milling quality sold for a premium of around £14 per tonne at harvest through £20 per tonne in January and £30 per tonne in May and finally peaking at £50 per tonne in July[2].

Farm Performance

At 9.0 tonnes per hectare, the highest yielding crops were found in the free draining soils of the Fens Joint Character Area (JCA) where the crops averaged a gross margin of £999 per hectare. A farmer in North Lincolnshire grew a new UK wheat record yield, of 14.31 tonnes per hectare[3]. A farmer in Norfolk reported a milling wheat yield of 13.39 tonnes per hectare[4]. High yields were also recorded in the counties of Eastern England including Lincolnshire and Wiltshire, both produced an average yield of 8.7 tonnes per hectare, and Kent where the average recorded yield was 8.6 tonnes per hectare. Farms in the Humberhead Levels Limestone JCA grew low yields of 6.6 tonnes per hectare giving a gross margin of only £561 per hectare. Low yields were also recorded in counties with flooding problems and heavy soils including Oxfordshire and Nottinghamshire at 6.7 tonnes per hectare, but low yields were also recorded in Cheshire, Devon and Somerset.

The highest prices were achieved in counties producing milling wheat or in areas with a high demand for livestock feed including Durham, Essex, Hampshire, Kent, Nottinghamshire and Shropshire whilst the lowest price was the £155 per tonne recorded in Northamptonshire. The value of the crop sold was highest in Kent, whilst farms in Shropshire had the highest values of straw and grain fed on the farm. Farms in Cornwall, where the yield averaged an impressive 8.3 tonnes per hectare, produced crops with the highest value (including straw) but grown at exceptionally high expenditure on seed, fertiliser and crop protection.

There were considerable variations in variable cost expenditure. Seed costs ranged from £69 per hectare in Lincolnshire to £94 per hectare in Durham. The lowest fertiliser costs (£184

[1] Farmers Weekly, 19 July 2013
[2] HGCA
[3] Farmers Weekly Interactive, www.fwi.co.uk , 8 September 2013
[4] Farmers Weekly, 27 September 2013

per hectare) were achieved on the silt soils of the Fens JCA and the highest of £306 per hectare on the Southern Magnesian and South Devon JCA. Crop protection costs ranged from £152 per hectare in Durham to £232 per hectare in Wiltshire.

To gain further understanding of the variation in crop performance, we can consider a comparison of quartile groups by gross margin performance. The top quartile farms grew an average of 9.3 tonnes per hectare, sold at £166 per tonne and grown with expenditure of £504 on variable costs. These farms achieved a gross margin of £1,126. The bottom quartile farms grew 5.8 tonnes per hectare sold at an average of £161 per tonne. The variable costs on these farms averaged £562 per hectare and the gross margin was £426 per tonne. The main reason for the considerable range of performance was crop yield.

4.3 Spring Wheat

Spring wheat was grown on 84 FBS farms (31 in 2012). In many cases spring wheat will have been grown in place of an intended winter wheat crop. Among combinable crops, the gross margin of £621 per hectare was exceeded only by winter wheat, winter barley and beans.

The average yield was 5.7 tonnes per hectare and the crop sold for an average of £175 per tonne.

In a season of scarce spring seed availability, the average seed price was £103 per hectare. Fertiliser and crop protection costs, of £165 and £129 respectively, were the highest of all spring cereals but lower than most winter cereals.

4.4 Winter Barley

The sample of farms with winter barley reduced by 14 per cent. For growers able to establish the crop, it gave the second highest cereal gross margin of £635 per hectare. The average yield of 6.7 tonnes per hectare was close to the five year average, but the price of £146 per tonne exceeded that average by ten per cent.

Suppliers warned of possible shortages of winter barley seed and the price paid increased by 13 per cent to £80 per hectare. However, the reduction of the area drilled ensured that supplies were plentiful at the time of drilling[1]. Although similar to the previous year, variable costs were 20 per cent higher than the five year average.

In common with winter wheat, winter barley crops were typically drilled late and ongoing wet conditions led to reduced establishment and tillering[2].

Some 19 per cent of the winter barley crop was drilled with malting varieties. As recently as 2010, 40 per cent of the crop was in malting varieties. Harvest yields and quality generally exceeded farmers expectations based on the visual appearance of growing crops. Harvest started late with good harvest progress in the South and East in late July[3]. Cassata, the most commonly sampled variety produced a crop with an average nitrogen content of 1.65 per cent; Flagon had an average nitrogen of 1.58 per cent[4]. Harvest was virtually complete by the end of August.

[1] Farmers Weekly, 6 July 2012
[2] ADAS Arable Crop Report March 2013, www.aplus.adas.co.uk , 28 March 2013
[3] ADAS Arable Crop Report July 2013, www.aplus.adas.co.uk , 2 August 2013
[4] AHDB/HGCA 2013 Cereal Quality Survey Results, www.hgca.com , 7 November 2013

Performance by Natural England Joint Character Area and County

The highest gross margin performance group was achieved on the Lincolnshire farms. With a crop yielding 6.9 tonnes per hectare (a yield also achieved by farms in North Yorkshire), grown with the lowest variable cost spend of £372 per hectare, these farms gave a gross margin of £734 per hectare. The highest yielding crops were found in the South Norfolk and High Suffolk Clayland JCA. These crops yielded an average of 7.6 tonnes per hectare and their gross margin averaged £692 per hectare.

The lowest yielding crops were found in Devon and Cheshire where the gross margin was a mere £364 per hectare,

Seed prices ranged from £63 per hectare in the South Suffolk and North Essex Clayland JCA to £126 per hectare in Somerset. Fertiliser costs ranged from £145 per hectare in Lincolnshire to £231 per hectare in The Culm where crop protection costs were also high at £157 per hectare in contrast with the £120 per hectare spend in Northumberland.

4.5 Spring Barley

Some 475 FBS farms grew spring barley making this the second most widely grown crop in England after winter wheat. In the preceding years, more farms had grown winter barley and oilseed rape.

The gross margin was £561 per hectare and four per cent higher than the five year average. Despite the increase in production, the crop price was close to average at £143 per tonne and the yield was six per cent higher than the five year average at 5.8 tonnes per hectare. Variable costs were two per cent higher than in 2012 and 23 per cent higher than the five year average.

In 2013, spring barley was grown on an uncharacteristically wide range of soils as farmers had been unable to establish crops in the wet autumn. Even at prices of £450 per tonne, seed suppliers sold all of their available spring barley seed[1]. Drilling continued into May with an estimated 140,000 hectares drilled in the month[2]. The seed price averaged £75 per hectare.

Tipple, the most widely grown variety, produced a crop with an average nitrogen content of 1.69[3]. The nitrogen content of Concerto averaged 1.62 per cent. Given the growing conditions of the year, crop quality largely exceeded customer's expectations[4]. By the end of August, about 30 per cent of the crop had been harvested[5].

Null-Lox barley was pioneered by Carlserg and Heineken and lacks the lox enzyme that can cause off flavours. Growers on Null-Lox pool contracts received prices of at least £160 per tonne[6].

[1] Crops, 15 December 2012
[2] ADAS Arable Crop Report March 2013, www.aplu.adas.co.uk , 5 June 2013
[3] AHDB/HGCA 2013 Cereal Quality Survey Results, www.hgca.com , 7 November 2013
[4] Farmers Weekly Interactive, www.fwi.co.uk , 6 September 2013
[5] Crop Management News, www.aplus.adas.co.uk , 29 August 2013
[6] Crops, 9 March 2013 Crops, 12 April 2014

Performance by Natural England Joint Character Area and County

The highest spring barley gross margin of £709 was achieved in the Solway Basin JCA with a crop yielding 6.4 tonnes per hectare grown with variable costs of £317 per hectare. The highest yields were the 6.9 tonnes per hectare grown in The Fens and the 6.6 tonnes per hectare grown in Lincolnshire and Hampshire.

The lowest gross margin of £363 per hectare was the 4.9 tonnes per hectare crop grown in Suffolk.

Seed expenditure ranged from £49 per hectare in the South Devon JCA, which is likely to have included considerable use of home saved seed to £93 per hectare in the Cheshire, Shropshire and Staffordshire Plain JCA. Fertiliser expenditure ranged from £98 per hectare in The Fens JCA to £189 per Hectare in the South Devon JCA. Crop protection costs were lowest in East Cumbria at £72 per hectare and highest at £137 per hectare in Somerset.

4.6 Winter Oats

The winter oat gross margin reduced by 21 per cent, this was due mainly to the price reduction. Fewer farmers grew winter oats in 2013, but oversupply of spring oats resulted in a 21 per cent reduction in the oat price to £139 per tonne. Most oat millers contract their oat requirements, but greatly increased plantings of mainly spring varieties resulted in oversupply of oats in 2013[1].

At six tonnes per hectare, the winter oat yield was unchanged on 2012.

Growers spent less on fertiliser and crop protection than in 2012, but the seed price was 12 per cent higher at £65 per hectare.

4.7 Spring Oats

With a gross margin of £492 per hectare, spring oats were the poorest performing cereal in 2013. Some 91 FBS farms grew the crop in 2013 (25 in 2012), they grew an increased area and this yielded an above average 5.8 tonnes per hectare.

The resulting oversupply resulted in a price of only £131 per hectare.

The price of scarce spring oat seed was £75 per hectare (£70 in 2012). Overall, variable costs increased by three per cent. Crop protection costs went up a lot?

4.8 Winter Oilseed Rape

Oilseed rape had been the best performing combinable crop in 2011 and 2012, but in 2013, the gross margin fell to £510 per hectare, 32 per cent lower than the five year average. At £324 per tonne, the price was similar to the long term average, but crops of widely ranging plant populations brought below average yields of 3.1 tonnes per hectare. In common with other crops, seed prices increased while fertiliser and crop protection costs reduced.

According to a poll of 230 Farmers Weekly readers, of farms growing oilseed rape, 20 per cent established oilseed rape after ploughing[2]. Some 35 per cent of growers used non

[1] Crops, 9 March 2013 Crops, 7 December 2013

[2] Farmers Weekly, 24 January 2014

inversion tillage followed by drilling whilst a further 38 per cent used a single pass cultivator or subsoiler mounted seed applicator, and the remaining seven per cent direct drilled.

The area of hybrid varieties was estimated to have exceeded that of conventional varieties for 2013 harvest[1]. In the event, conventional varieties performed better than their hybrid alternatives in NIAB TAG trials[2]. Of open pollinating varieties, about 50 per cent are grown using home saved seed[3].

Numerous oilseed rape crops failed due to late drilling, wet soil conditions and poor seedbeds, slugs and pigeons and it was estimated that up to 20 per cent would have to be drilled with a different crop[4]. The crops in the poorest condition were those grown North and West of a line from Bristol to the Humber, but crops grown on dry soils in the South East were also poor[5]. Growers were faced with the difficult decision of whether to attempt to establish a replacement spring crop, but traders advised of the need to maintain area in the face of impending crop shortages[6]. Yields varied considerably between farms, and indeed within fields. Some early drilled crops yielded up to five tonnes per hectare, but these were not the norm[7].

There was a delayed start to harvest as only forward crops were harvested in July[8]. Lack of crop competition and late weed germination led to high weed populations in many crops. As August concluded, some 70 per cent of the crop had been harvested[9]. Harvest was difficult, and it was often necessary to desiccate and harvest fields sequentially due to the variable maturity of crops. Oil contents of around 40 to 44 per cent helped to compensate for some exceptionally low yields[10].

New crop oilseed rape traded for £315 to £320 per tonne in August as overseas supply of rapeseed and soya supply proved to be plentiful[11]. By the end of September, the crop traded for around £290 per tonne

Performance by Natural England Joint Character Area and County

The most favourable crop performance was the £686 per hectare gross margin crop grown in the South Norfolk and High Suffolk JCA, which yielded 3.8 tonnes per hectare. Crops yielding 3.5 tonnes per hectare were also grown in the Humberhead Levels Limestone JCA.

Oilseed rape crops grown in Warwickshire yielded an average of 2.0 tonnes per hectare and gave a gross margin of £135 per hectare. These crops incurred especially high seed costs of £96 per hectare.

[1] Farmers Weekly Interactive, www.fwi.co.uk , 14 December 2012
[2] Farming Monthly, September 2013
[3] Crops, 9 March 2013
[4] ADAS Arable Crop Report March 2013, www.aplu.adas.co.uk , 28 March 2013
[5] Farmers Weekly, 2 November 2012
[6] Farmers Weekly, 26 April 2013
[7] Farmers Weekly, 20 September 2013
[8] ADAS Arable Crop Report July 2013, www.aplus.adas.co.uk , 2 August 2013
[9] Crop Management News, www.aplus.adas.co.uk , 29 August 2013
[10] Crops, 7 September 2013
[11] Farmers Weekly, 5 July 2013

4.9 Spring Oilseed Rape

The spring oilseed rape did not perform well and generated a gross margin of only £268 per hectare. This was the lowest combinable crop gross margin in 2013. The price averaged £322 per tonne and the yield averaged 2.1 tonnes per hectare. Contrasting growing conditions resulted in higher yields of spring oilseed rape than for the winter crop on some farms[1].

As many more growers opted to produce spring oilseed rape, seed costs soared to £79 per hectare. Variable costs increased substantially and summed to £397 per hectare.

4.10 Linseed

Linseed was the only spring crop that was grown by fewer farmers in 2013 than 2012, due mainly to the previous year's very low gross margin. In 2013, the considerably higher gross margin of £329 was achieved at an increased yield of 1.7 tonnes per hectare. The price of £370 per tonne and the variable costs, of £312 were lower than in 2012.

4.11 Peas for Combining

Pea gross margins averaged £775 per hectare, 20 per cent higher than the five year average, mainly due to the price of £323 per tonne which was 25 per cent higher than average. The yield of 3.4 tonnes per hectare was below the average of 3.6 tonne per hectare. The yield increased relative to the poor performance of 2012 when the crop yielded only 2.4 tonnes per hectare.

[1] Farmers Weekly Interactive, www.fwi.co.uk , 6 June 2014

The seed price was barely changed at £145 per hectare. Suppliers reported low stocks of available seed as a result[1].

The cold wet conditions led to delayed drilling of pea crops, which require relatively warm soil conditions for establishment.

Pea moth was first apparent in June 2013, and there were also some incidences of pea aphid[2]. Pea moth activity was very high in July and aphid populations increased[3].

In September, peas traded for about £206 per tonne[4]. As harvest progressed, bypassed vining peas entered the market and feed peas traded from £175 per tonne[5]. In December, feed peas traded at £230 per tonne, marrowfat prices were £350 per tonne, with premiums of up to £40 per tonne for top quality samples, and micronising peas were £330 per tonne[6].

4.12 Beans Harvested Dry

In common with the pea crop, favourable bean prices, averaging £237 per tonne were the driver of a gross margin of £605 per hectare which still exceeded the five year average of £503 per hectare, although lower than 2012/13. The average yield was 3.8 tonnes per hectare and a little lower than the five year average of 3.9 tonnes per hectare. However, there were regional variations, for example crops in The Fens JCA yielded 5.1 tonnes per hectare.

Seed prices increased by 31 per cent to £105 per hectare.

Pea and bean weevils were active in winter beans in April[7]. Cool unsettled weather was the cause of downy mildew infection in some spring bean crops in May[8]. By June, bruchid beetles were active in winter and spring beans and these became more active as air temperatures reached threshold temperatures[9].

Bean quality was reported to be good with initial indications of small seed size. Prior to harvest, bean prices were typically around £50 to £60 above the prevailing feed wheat price and human consumption beans were rewarded with a £25 per tonne premium over feed beans[10]. High soya prices were the driver of sustained high prices after harvest[11]. Rain in September brought fears of reduced bean supply and prices increased by £12 per tonne to £220 per tonne, whilst the premium for human consumption beans fell to £20 per tonne[12]. The October feed bean price was £200 per tonne, with a premium for human consumption beans of £15 per tonne[13]. Favourable demand increased the feed bean price to £220 per tonne in November[14]. By December, feed prices had reached around £240 per tonne although there was uncertainty about the size of the harvest, and human consumption premiums started to fall, to around £10 per tonne following exports of 150,000 tonnes as

[1] Crops, 15 December 2015
[2] PGRO Crop Update, www.bepa.co.uk , 20 June 2013
[3] PGRO Crop Update, www.bepa.co.uk , 11 July 2013
[4] Farmers Weekly Interactive, www.fwi.co.uk , 25 September 2013
[5] Pulse Market Update, www.bepa.co.uk , 7 October 2013
[6] Farmers Weekly Interactive, www.fwi.co.uk , 12 December 2013
[7] PGRO Crop Update, www.bepa.co.uk , 18 April 2013
[8] PGRO Crop Update, www.bepa.co.uk , 15 May 2013
[9] PGRO Crop Update, www.bepa.co.uk , 20 June 2013
[10] Pulse Market Update, www.bepa.co.uk , 1 August 2013
[11] Pulse Market Update, www.bepa.co.uk , 5 September 2013
[12] Farmers Weekly Interactive, www.fwi.co.uk , 25 September 2013
[13] Pulse Market Update, www.bepa.co.uk , 7 October 2013
[14] Pulse Market Update, www.bepa.co.uk , 11 November 2013

market requirements were met[1]. The January price reached £245 per tonne but human consumption premiums were variable as merchants struggled to estimate the availability of stored crop[2]. By March, the feed bean price was £260 per tonne but the premium for human consumption was minimal[3].

4.13 Sugar Beet

The sugar beet gross margin averaged £1,237 per hectare, eight per cent above the five year average, but 21 per cent higher than in 2012/13.

The yield, of 66.1 clean tonnes per hectare, was four per cent above the five year average, and among the highest recorded yields of the crop. The effective price, inclusive of bonuses and transport allowance averaged £33 per clean tonne.

Although fertiliser and crop protection costs were similar to 2012 levels, the average seed price increased by eight per cent to £183 per hectare.

Contract and Price

Under the final year of the prevailing four year Inter Professional Agreement (IPA) between British Sugar and the NFU and using the beet pricing mechanism, the 2013/2014 sugar campaign price for Contract Tonnage Entitlement (CTE) beet was confirmed at £26.51 per tonne[4]. The price was intended to take account of increased growing costs, the forward price price of 2013 cereals as at June 2012, and the weaker sterling to euro exchange rate. Late delivery allowance was offered on a formula basis with an increased payment for storage. The minimum price of surplus beet was set at £20 per tonne.

A limited amount of Industrial Contract Entitlement beet (ICE) was paid at a rate of £25.51 per tonne. Growers who offered to grow this in 2012/2013 were invited to renew the Entitlement on an annual basis until 2014/2015. A limited amount of ICE tonnage would be made available to growers in 2013/2014.

In March 2013, the NFU and British Sugar announced that a £1.50 per tonne completion bonus would be payable to growers fulfilling their CTE and ICE contracts in 2013/2014[5]. For growers meeting this requirement, CTE was paid at £28.01 per tonne and ICE at £27.01 per tonne. Surplus beet was payable at £25 per tonne.

EU sugar processors identified that an excessive export levy had been paid to the EU between 2001/2002 and 2005/2006[6]. A UK refund of £13.4 million was shared between British Sugar and producers. This amounted to about £0.75 per tonne of contract. In our presentation of results, this sum falls outside the calculation of 2013 harvest gross margins and 2013/2014 Farm Business Income (FBI).

[1] Farmers Weekly Interactive, www.fwi.co.uk , 12 December 2013
[2] Pulse Market Update, www.bepa.co.uk , 31 January 2014
[3] Pulse Market Update, www.bepa.co.uk , 5 March 2014
[4] Farm Business, www.farmbusiness.cc , 13 June 2012
[5] NFU, www.nfuonline.com , 1 March 2013
[6] British Sugar, Personal Communication, 29 January 2014

Agronomy and Crop Development

After the very cold conditions in March, the greater part of the Newark factory area was drilled into favourable seedbed conditions during the first two weeks of April[1]. Dry conditions prevailed from the end of March to mid May and delayed emergence of some crops. Some crops were exposed to wind blow damage in the early summer. Weed control was difficult, especially in fields with plants at varying stages of development

Following drilling, emergence problems were identified in at least six varieties of sugar beet[2]. Despite favourable germination in laboratory tests, in some cases field emergence was as low as 50 per cent of the targeted 100,000 plants per hectare. Later in the season, problems were detected with some developing crops including malformed, 'fanged' beet[3]. Possible causes were soil compaction, nematodes or other pests. These were identified in crops in Lincolnshire, Norfolk and Suffolk[4]. Although found only on a minority of farms, the condition affected up to 60 per cent of plants in some fields. The British Beet Research Organisation (BBRO) carried out and commissioned work to investigate the cause of these observations. It did not identify a clear link between emergence problems and 'fanging' but cold stress at the time of drilling was likely to have been a major factor although the cause was probably a number of interacting factors[5]. BBRO recommended a combination of standard and cold germination testing for the future. New seed testing and evaluation arrangements were introduced for the following season[6].

Due to the cold prolonged winter of 2012/2013, there was unusually little aphid activity in the summer and no requirement to spray this pest. Accordingly the incidence of virus yellows was especially low[7].

Isolated hailstorms were a concern for some growers in Cambridgeshire in June 2013[8]. Otherwise, the crop generally developed well through the summer with adequate rain soil temperatures and sunshine[9]. Dry conditions were a concern as harvest approached with some crops showing drought stress.

Harvest, Yield, Quality and Gross Margin Performance

Dry conditions at the start of the campaign created difficulties for harvesting machinery. At the Wissington factory, sugar levels started at 16.6 per cent and rose to peak at 17.8 per cent in October[10]. At the Bury St Edmunds factory area, the sugar content averaged 17.3 per cent[11]. Favourable late growing conditions allowed unprecedented late season growth of sugar beet. At Newark, the sugar content averaged 18.1 per cent. The absence of severe winter weather allowed good progress with harvesting to the end of the campaign.

The highest yielding crops, at 70.8 tonnes per hectare, were those grown in Lincolnshire and in the South Norfolk and High Suffolk Clayland JCA. The lowest yielding crops, at 60.3 tonnes per hectare were grown in Norfolk. However in 2013, there was a wide range in variable costs from £1,069 per hectare in Lincolnshire to £726 per hectare in the South

[1] British Sugar Beet Review, Summer 2013
[2] Farmers Weekly, 17 May 2013
[3] Farmers Weekly, 2 August 2013
[4] Farmers Weekly, 4 October 2013
[5] British Sugar Beet Review, Winter 2013
[6] Crops, 8 February 2014
[7] British Sugar Beet Review, Spring 2014
[8] Farmers Weekly, 21 June 2013
[9] British Sugar Beet Review, Autumn 2013
[10] British Sugar Beet Review, Winter 2013
[11] British Sugar Beet Review, Spring 2014

Suffolk and North Essex Clayland JCA which also achieved the highest gross margin of £1,494 per hectare. Crops in Cambridgeshire gave a gross margin of £1,184 per hectare. These findings were broadly consistent with British Sugar's reports of exceptional yields on the silt and fen soils of the Wash but lower yields in North West Norfolk[1]. They reported an adjusted average crop yield was 69.73 tonnes per hectare, but 39 growers produced over 100 adjusted tonnes per hectare[2].

On the basis of quartile groups for gross margin performance, the top quartile group achieved a gross margin of £1,691 per hectare with a crop yielding an average of 75 tonnes per hectare. The bottom quartile group had a gross margin of £750 per tonne with a crop yielding 53.5 tonnes per hectare.

Contract Harvesting

In 2013, about 80 per cent of farmers used a contractor to harvest their sugar beet. The farms harvesting their own beet grew an average of 53 hectares but those using a contractor grew an average of 24 hectares.

Farms harvesting their own sugar beet are estimated to have spent £36 per hectare on contracting, including the allocation of costs such as hedge cutting to the sugar beet crop. The farms using a contractor to harvest the crop spent an average of £287 per hectare on contracting of all types allocated to this crop.

4.14 Ware Potatoes

In Great Britain as a whole, there were about 2,190 potato growers in 2013 (2,300 in 2012)[3]. The relentless trend of specialisation continued as there had been 3,390 producers in 2003 and 16,310 producers in 1993.

The potato crop generated a near average gross margin of £3,525 per hectare in 2013. The yield of 39.6 was four percent above the five year average whilst the price of £144 per tonne was three per cent lower than average. Variable costs averaged £2,177 and eight per cent higher than the five year average.

The cold wet weather of March delayed potato planting, and by 29 March, 4,000 hectares had been planted in comparison with 32,000 in the previous two years[4]. By 19 April, the area had had reached 40,000 hectares against 72,000 hectares in 2012 and 95,000 hectares in 2011[5]. More favourable progress was made in the East of England, but it was difficult to create favourable planting conditions on heavier soils.

Wet conditions in the West of England delayed harvest into November.

About 75 per cent of the potato crop is sold on a contract basis of which about 50 to 60 per cent is at an agreed price[6]. Potato prices had exceeded £200 per tonne until mid August 2013, the highest levels seen in recent times. From around £180 per tonne in mid August, prices drifted to £160 per tonne in early September and £140 per tonne in early October, after which prices rose steadily to £160 per tonne in early April. Demand for potatoes was reduced by hot sunny summer weather and relatively high prices. In the year to May 2014, the value

[1] British Sugar Beet Review, Spring 2014
[2] British Sugar Beet Review, Summer 2014
[3] Market Intelligence 2013-2014, Potato Council, September 2013
[4] Farmers Weekly Interactive, www.fwi.co.uk , 4 April 2013
[5] Farmers Weekly Interactive, www.fwi.co.uk , 24 April 2013
[6] Farmers Weekly Interactive, www.fwi.co.uk , 25 April 2013

of fresh potatoes purchased increased by 3.8 per cent but the volume declined by eight per cent[1].

Gross Margin Performance by Crop Irrigation Practice

About 22 per cent of producers irrigated their whole potato crop and a further five per cent irrigated part of the crop.

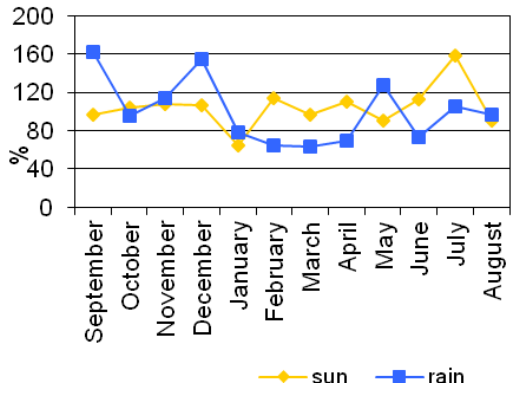
In a comparison of wholly irrigated and not irrigated potatoes, the irrigated potatoes generated a gross margin of £4,030 per hectare from a crop yielding 40.9 tonnes per hectare that sold for £152 per tonne. The potatoes that were not irrigated yielded 12 per cent less at 38.9 per tonne and sold at £141 per tonne to give a gross margin of £3,291 per hectare. Both crops were grown at similar levels of variable cost expenditure.

[1] Potato Council, www.potato.org.uk , 26 June 2014

5.1 Weather and the Exceptional Rainfall Leading to 2013 harvest

Monthly Sunshine and Rainfall Expressed as a Percentage of Average of 1981 to 2010

England NW and Wales N



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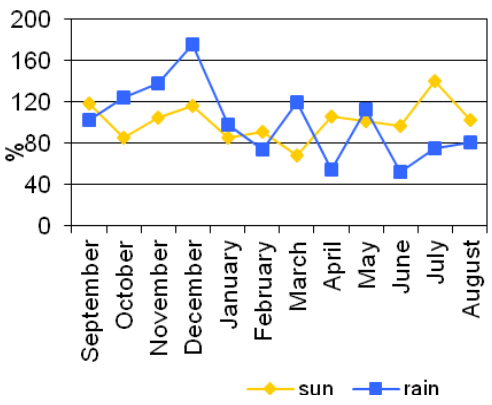

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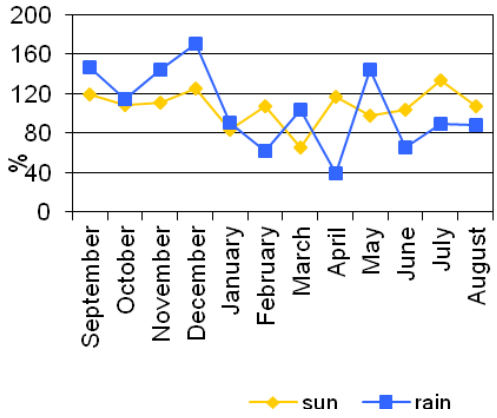
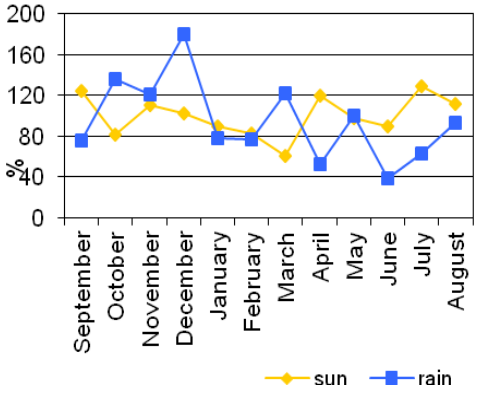
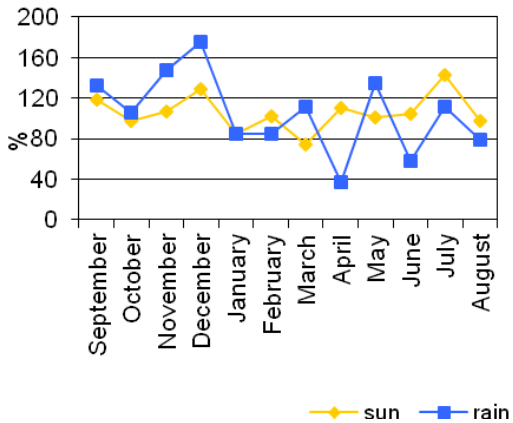


East Anglia



Midlands



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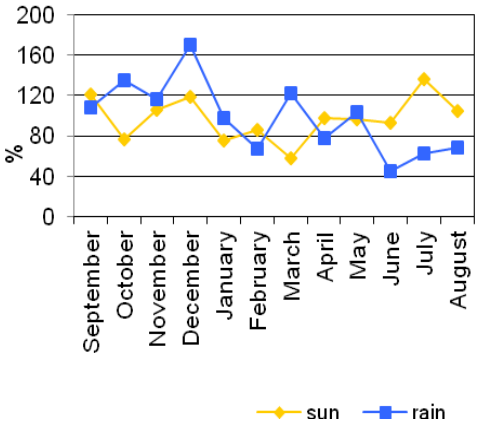


The 2013 harvest weather was dominated by exceptional rainfall in November and December 2012. This greatly disrupted autumn drilling, and delayed spring crop establishment and the resulting changes to cropping practice dominated crop performance in the year. March was a cold month and provided few opportunities for crop establishment. The growing season was generally relatively warm and dry although May was a wet month for many. Above average sunshine in July facilitated the cereal harvest and prolonged the growing season of root crops.

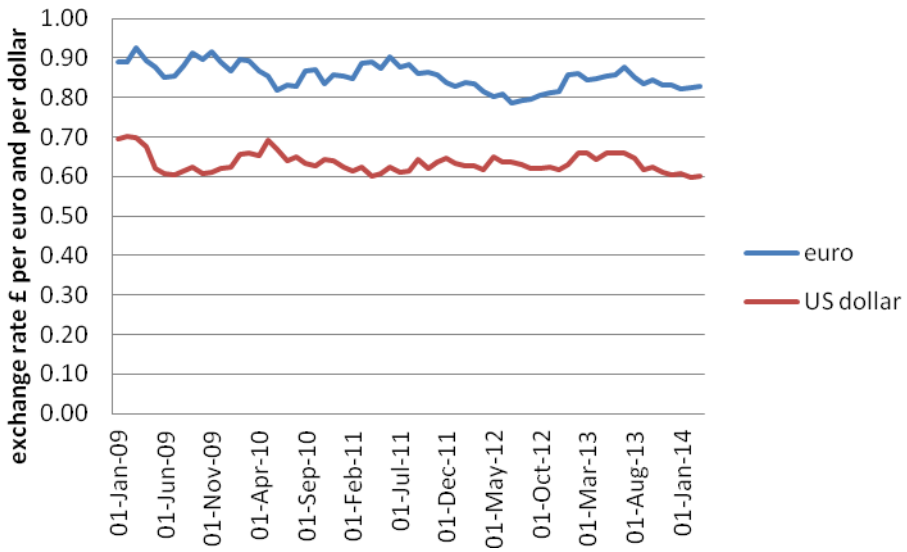
In December 2013, farmers in East Anglia and East Yorkshire experience a tidal surge which NFU Mutual decribed as the 'biggest tidal surge in 60 years'[1]. Hundreds of hectares of land were flooded in Holderness, near Howden and Welwick in Yorkshire and in North Lincolnshire. In early January, across the UK, NFU Mutual faced an estimated £40 million bill over 4,000 claims[2]. Whilst the greatest flooding problems occurred on the grassland of the Somerset Levels, arable land including the Thames Valley, areas bordering the River Severn, and the South West[3]. Defra made grants of up to £35,000 available from the Farming Recovery Fund to cover the costs of restoring productive land, drainage on flood damaged land and restoring field access[4]. NatWest and the Royal Bank of Scotland offered loans to flood hit farmers of up to £250,000 on an interest free basis for three months[5].

5.2 Economic Environment

Exchange Rates

The Figure below shows exchange rates from January 2009.

Euro/Sterling Exchange Rate 2008 to 2014



In the year to March 2014, sterling strengthened by two per cent against the euro and by six per cent against the US dollar.

[1] Farmers Weekly, 13 December 2013
[2] Farmers Weekly, 10 January 2014
[3] Farmers Weekly, 21 February 2014
[4] Farming Recovery Fund Phase 2, www.gov.uk , April 2014
[5] Farmers Weekly, 17 January 2014

Low interest rates persisted for the 2013 harvest year as the Bank of England base rate was unchanged since March 2009 at 0.5 per cent.

Crop Input Prices and Product Regulation

The 2012 crop production season had been characterised by high priced fertiliser and in the summer of 2012 there was reduced production capacity as a European nitric acid plant had been shut down. Despite the possibility of price increases, farmers were fully committed with harvest and drilling tasks and reluctant to make early purchases of ammonium nitrate in August 2012 when the price was around £300 per tonne. New season sales were reported at 65 to 70 per cent of usual volumes[1]. The reduced crop yields, and related delayed cashflow, were also cited as reasons for reduced buying activity[2]. In turn, the slow purchasing led to concerns about logistical capacity in the event that farmers further delayed fertiliser purchases[3]. Wet January weather exacerbated farmers' reluctance to purchase, especially in the West and North of England. Sales volumes eventually increased in the spring and early summer as ammonium nitrate prices reached £305 per tonne.

5.3 Business

There was limited corporate change in the agricultural supply industry in 2013/2014 but several changes among food manufacturers. COFCO Corporation has interests in grain, oil and food and is China's largest food business. In March 2014, it acquired a controlling interest in Netherlands based Nidera[4].

Premier Foods sold a controlling interest (a 51 per cent stake) in their bakery businesses which include the Hovis, Mothers Pride, Ormo, Granary and Nimble brands to US investment company the Gores Group[5]. The resulting new joint venture owned mills at Southampton, Manchester, Selby and Wellingborough.

The owner of the Greenvale potato business, Produce Investments, acquired The Jersey Royal Company (JRC), of the Channel Islands[6].

United Oilseeds bought the midlands based specialist seed supplier Hubbards in November 2013[7].

York Potash completed exploration work that had included the drilling of 4,200 metres of geological cores at sites I North Yorkshire[8]. Their ongoing crop studies included trials in the use of polyhalite as a fertiliser. Polyhalite is a naturally occurring evaporite mineral comprising hydrated sulphates of potassium, calcium and magnesium, with the chemical formula K2SO4.MgSO4.2CaSO4.2H2O.

The agricultural machinery supply industry had seen a surge in demand that followed the commodity price boom from 2007. This was not sustained and there was a reduction in demand for machinery in

[1] Farmers Weekly Interactive, www.fwi.co.uk , 7 August 2012
[2] Farmers Weekly, 12 October 2012
[3] Farmers Weekly Interactive, www.fwi.co.uk , 29 October 2012
[4] Farmers Weekly Interactive, www.fwi.co.uk , 3 March 2014
[5] Farmers Weekly Interactive, www.fwi.co.uk , 28 January 2014
[6] Farmers Weekly Interactive, www.fwi.co.uk , 16 May 2014
[7] Farmers Weekly Interactive, www.fwi.co.uk , 29 November 2013
[8] York Potash Update, December 2013

2013. Deere and Co predicted a wordwide reduction in agricultural sales of three per cent in 2013 to $389 billion[1]. However, the business was largely able to mitigate this reduction through increased sales of construction equipment.

Reflecting this same changing market for agricultural machinery, Grantham based trailer manufacturer Marston Agricultural Services went into administration in November 2013[2].

East of England machinery dealer Ben Burgess took over the John Deere dealership Anker of Coates[3].
In October 2013, Monsanto purchased the Climate Corporation for $930 million[4]. The business offers offers climate and crop management data to farmers as a subscription service, currently in the United States.

In previous years, farm cooperatives made considerable investment in central grain storage facilities. There were fewer developments in 2013/2014, but Future Grain of Beccles, Suffolk, raised funds for an initial 10,000 tonne storage facility in February 2014[5].

The Government appointed Grocery Code Adjudicator observed that suppliers to the multiples were reticent in discussing cases of mistreatment with the implied fear of retribution from their customers[6]. Farmers Weekly reported unreasonable demands that included incorrectly applied retrospective volume rebates (over-riders), unexpected requests for listing fees and contributions for promotions, unannounced deductions from payments for shortfalls in meeting service obligations, lengthening supplier payment terms, over-ordered short run promotional goods to sell the excess at full price and short notice order reductions[7].

5.4 Renewable Energy

Bioethanol and Road Fuel

In the year to 14 April 2014, 1,744 million litres of renewable fuel were supplied under the Road Transport Fuel Obligation, 3.46 per cent of road fuel and no-road machinery fuel[8]. The target was 4.75 per cent of fuel by volume. Of the total, 21 per cent was sourced from the UK. UK sourced wheat sugar beet and wheat contributed about four and three per cent respectively of the total.

The UK was the third largest producer of renewable ethanol in the EU, after France and Germany[9].

The Ensus bioethanol plant, that first opened in 2010, was shut down in April 2013, due to rising energy costs and the poor harvest[10]. In July, The Carlyle Group sold the Ensus business to Crop Energies AG, which operates plants in Germany, Belgium and France[11]. The company intended to invest £50 million in improving the efficiency of the plant and reopened in September[12]. In the year to

[1] Financial Times. www.ft.com , 20 November 2013
[2] Farmers Weekly Interactive, www.fwi.co.uk , 1 November 2013
[3] Farming Monthly, September 2013
[4] Financial Times, www.ft.com , 2 October 2013
[5] Farmers Weekly Interactive, www.fwi.co.uk , 4 February 2014
[6] Farmers Weekly, 30 May 2014
[7] Farmers Weekly Interactive, www.fwi.co.uk , 6 August 2014
[8] Renewable Transport Fuel Obligation statistics: obligation period 6, 2013/14, report 4, www.gov.uk , 7 August 2014
[9] Renewable Ethanol: driving jobs, growth and innovation throughout Europe, ePURE
[10] Farmers Weekly Interactive, www.fwi.co.uk , 4 April 2013
[11] Farmers Weekly Interactive, www.fwi.co.uk , 22 July 2013
[12] BBC News, www.bbc.co.uk , 1 October 2013

February 2014, production amounted to 884,000 cubic metres, the highest performance achieved since the plant was commissioned[1].

Following prolonged testing, Vivergo officially opened the UK's second bioethanol plant in July 2013[2].

Citing concerns about the regulatory environment, Vireol Bioenergy opened a bioethanol plant in Hopewell, Virginia whilst holding its plans to develop its Grimsby site[3].

Anaerobic Digestion (AD) Plant

The Tenant Farmers Association (TFA) expressed concern about the competition for land in several areas of the country as a result of AD policy[4]. Farmers were forced to seek land further afield or at significantly higher cost.

By April 2014, there were 65 farm fed AD plants in the UK utilising 750,000 tonnes of energy crops per year and a further 200,000 tonnes of crop waste per year[5]. Although not all of the plants use crops in their feedstock, The National Non Food Crops Centre estimate that they use 17,000 hectares of land at an assumed yield of 45 fresh tonnes per hectare.

WRAP is a not for profit company that is primarily funded by UK governments, the EU and other public sector organisations[6]. In October 2013, the organisation launched the On-Farm Anaerobic Digestion Fund was launched to allow farmers to apply for loans of up to £400,000 for AD plants of up to 250kW in England.

Willow, *Miscanthus* and Straw

In August 2013, Eco2 announced plans for their second straw powered power station to be located in Brigg, Lincolnshire[7]. The 4 mega watt plant was expected to be commissioned in early 2016.

Terravesta introduced ten year buy-back schemes for *Miscanthus* in which growers could purchase pellets for heating at a discounted price[8]. They paid £70.04 per tonne at 16 per cent moisture in 2013.

Solar

Feed in Tariffs were frozen at 14.9 pence per kWh for solar installations of up to 4kW and 11.1 pence per kilowatt hour for installations of 50 to 150 kW from October to December 2013[9]. However,

[1] The Northern Echo, www.thenorthernecho.co.uk , 14 May 2014
[2] Farmers Weekly, 12 July 2013
[3] Grimsby Telegraph, www.telegraph.co.uk , April 2014
[4] Farmers Weekly Interactive, www.fwi.co.uk , 17 July 2013
[5] Farmers Weekly, 18 April 2014
[6] WRAP, www.org.uk
[7] Eco2, www.eco2ik.com , 14 August 2013
[8] Farmers Weekly, 16 August 2013
[9] Farmers Weekly, 16 August 2013

attainment of generation capacity thresholds triggered reductions in support that would be effective from April 2014[1].

Renewable Heat Incentive

At April 2014, there were 942 biomass heat installations, accredited to receive Renewable Heat Incentive (RHI) on farms[2]. They accounted for 209.9MW of heat generation capacity.

5.5 Policy

Common Agricultural Policy (CAP) Reform

In April 2013, Defra provided information on implementation of the CAP from 2015. The Single Payment scheme would conclude in 2014 to be replaced by the Basis Payment scheme and its associate Greening measures comprising of crop diversification, maintenance of permanent grassland and the need to establish Ecological Focus Areas on five per cent of arable land[3]. The new new Rural Development Programme would provide funding for the New Environmental Land Management Scheme (NELMS), and improve productivity through RDPE network schemes whilst furthering growth through LEPs and LEADER Local Action Groups.

Agri Environment Schemes

Defra advised that it had effectively closed the Entry Level Stewardship scheme to new entrants from September 2013[4]. Some 11,000 ELS agreements were due to expire during 2015. The organisation also advised that the NELMS would not commence until January 2016.

The Catchment Sensitive Farming capital grant scheme opened for a further round of applications in February and March 2014[5]. It offered grants of up to £10,000 per farm.

Local Enterprise Partnerships

In November 2013, New Anglia local Enterprise Partnership secured £94 million for investment in Norfolk and Suffolk from European Structural Investment funds, including the European Agricultural Fund for Rural Development[6].

[1] Farmers Weekly, 8 November 2013
[2] DECC, www.gov.uk , 23 October 2014
[3] Defra, www.gov.uk
[4] Farmers Weekly Interactive, www.fwi.co.uk , 20 September 2013
[5] Farmers Weekly
[6] New Anglia LEP, www.newanglia.co.uk , 22 November 2013

Rural Development Programme for England (RDPE)

Round 3 of the Farming and Forestry Improvement Scheme was launched in February 2014[1]. The scheme provides capital funding for prescribed purposes at up to 40 per cent of the full cost and to a maximum of £35,000 per farm.

Agri Tech

The Department for Business, Innovation and Skills, with Defra, launched the UK Strategy for Agricultural Technologies in July 2013[2]. A sum of £70 million was made available to commercial organisations to improve the translation of research into practice. A further £90 million of capital funding was available to fund Centres of Agricultural Innovation.

Water Act 2014

The reformed Water Act allows farmers to sell excess water into the public supply, provides measures to restore the sustainable abstraction of water and reduce the sustainability of governance of Internal Drainage Boards[3]. The CLA and NFU broadly welcomed the new legislation[4].

[1] Defra, http//rdpenetwork.defra.gov.uk
[2] UK Strategy for Agricultural Technologies in July, www.gov.uk , 22 July 2013
[3] Reform of the Water Market – the Water Act 2014, www.gov.uk , 2 July 2014
[4] Farmers Weekly Interactive, www.fwi.co.uk , 5 December 2013

6 Net Margin and Cost of Production Estimation for Wheat, Barley and Oilseed Rape

6.1 Introduction

Gross margins are the default means of studying arable crop enterprise performance because they can be calculated from farm records without excessive investment in time. However, because crops vary in their demand for labour and machinery, the gross margin does not indicate whether an enterprise is profitable.

By attributing farm level fixed costs to enterprises, it is possible to estimate a net margin for that enterprise. The practice of estimating net margin is less straightforward than the concept, especially if the farm has a wide range of enterprises.

Although the concept of calculation of crop production costs is not new, previous methods have relied heavily on estimation. The development of new FBS methodology brings an improved approach to our understanding of crop production costs

In this chapter, we consider the practical benefits of the net margin calculation and explain the FBS methodology for estimation of net margins.

Definitions

Net Margin

The **net margin** of an enterprise equals gross margin less **adjusted fixed costs** allocated to the Enterprise[1]. 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.

6.2 Use of Net Margins

In a new and important development for the FBS, Rural Business Research has developed a means of estimating net margins with a reasonable level of accuracy.

The calculation of net margins provides some valuable information for the industry, although not always at the individual farm level. Specifically they provide information[2]:

- on the general trends in enterprise profitability
- (including physical data for planning)
- to monitor technological changes over time

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

[2] Farm Planning and Control, Second Edition, C.S Barnard & J.S.Nix, Cambridge University Press, 1979

- for price fixing (although this is less relevant to commodity crops)

From this list, enterprise profitability over time, and the changing relative cost components, are likely to be of most value to users of FBS data. Of course, given the rotational benefits of different crops, it is not essential that every crop is profitable in every year as there may be benefits that we do not currently account for, such as weed control or nitrogen fixation, that are beneficial to other crops in the rotation.

Alongside the financial record, net margins provide the possibility of using physical data (or proxy's) allowing us to consider aspects of crop production such as energy use on an individual crop basis.

Technology changes, such as the move to minimum tillage will change the relative requirements of labour and machinery between crops and we will be able to monitor these changes through the use of net margins.

6.3 Method of Estimation of Net Margins and Cost of Production in the FBS

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[1]. "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

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

[1] https://www.gov.uk/government/uploads/system/uploads/attachment_data/fil

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. HGCA 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.

6.4 Results for 2013

The 2013 harvest year was characterised by near to average yields, crop prices were high in relation to historic averages, but low in relation to the previous year whilst crop inputs, including fertiliser, crop protection, energy and rents were high in relation to historic averages. A legacy of the poor 2012 harvest was high seed prices.

In this context, the following Table shows the calculation of crop enterprise costs for winter wheat, spring barley and winter oilseed rape (excluding organic crops) using the methodology described above. These were the three most commonly grown arable crops in England in 2013.

6 Net Margin and Cost of Production Estimation for Wheat, Barley and Oilseed Rape

Calculation of Net Margin and Cost of Production for Selected Crops, 2013

	winter wheat 613 farms	spring barley 475 farms	winter oilseed rape 324 farms
Output measures			
Yield (t per ha)	8.0	5.8	3.1
Price (£ per t)	162	143	324
Total Output (£ per ha)	1354	926	1008
Inputs (£ per ha)			
Variable costs	520	364	498
All labour	204	143	116
Contract	89	90	81
Machinery	348	301	269
General costs	90	89	86
Land and property	218	203	214
Total costs (£ per ha)	1469	1190	1266
Net margin (£ per ha)	-115	-265	-257
Cost of production (£ per t)	184	205	408

All three crops gave a negative net margin calculated by deducting all of these costs from the output. The average net margin was -£115 per hectare for winter wheat, -£265 per hectare for spring barley and -£257 per hectare for oilseed rape.

The table correspondingly shows that the average cost of production of all four crops exceeded the price received for the crop.

Crop Yield

Crop yields are inherently variable and it could be argued that the farmer must manage production costs based on long term average historic yields rather than an unknown future crop yield. In the following Table, the 2013 production costs have been divided by the five year average crop yield to show what the cost of production might have been if the five year average yield was obtained.

Cost of Production Based on 2013 Production Costs and Five Year Average Yields

	winter wheat	spring barley	winter oilseed rape
2013 actual			
Yield (t per ha)	8.0	5.8	3.1
Cost of production (£ per t)	184	205	408
Five year average			
Yield (t per ha)	8.2	5.5	3.6
Cost of production (£ per t)	179	217	354

6 Net Margin and Cost of Production Estimation for Wheat, Barley and Oilseed Rape

In the case of the winter crops, wheat and oilseed rape, the five year average yield exceeded the average 2013 yield and, on this basis, the cost of production of the two crops is lower at £179 and £354 per tonne respectively. However these costs still exceed the 2013 price. For spring barley, the calculation is even less favourable because the crop exceeded its five year average yield in 2013. On the basis of five year average yield, the cost of production was £217 per tonne.

The fixed costs incurred by a crop reflect the mix of farms that grow that crop. For example, winter wheat and oilseed rape are grown by a wide range of arable and mixed farms so the costs reflect their cost structures. Spring barley is grown by both specialist arable producers but is also a popular crop among primarily livestock farms and the costs reflect this specific mix of farms in the sample.

Sensitivity Analysis

It is apparent that the cost of production calculation is very sensitive to crop yield. In the following Table, we explore the impact of a 20 per cent reduction and increase in crop yield, relative to the five year average yield. These variations are within the bounds typically observed on farms in England.

Cost of Production: Sensitivity Analysis Based on 2013 Production Costs and Five Year Average Yields

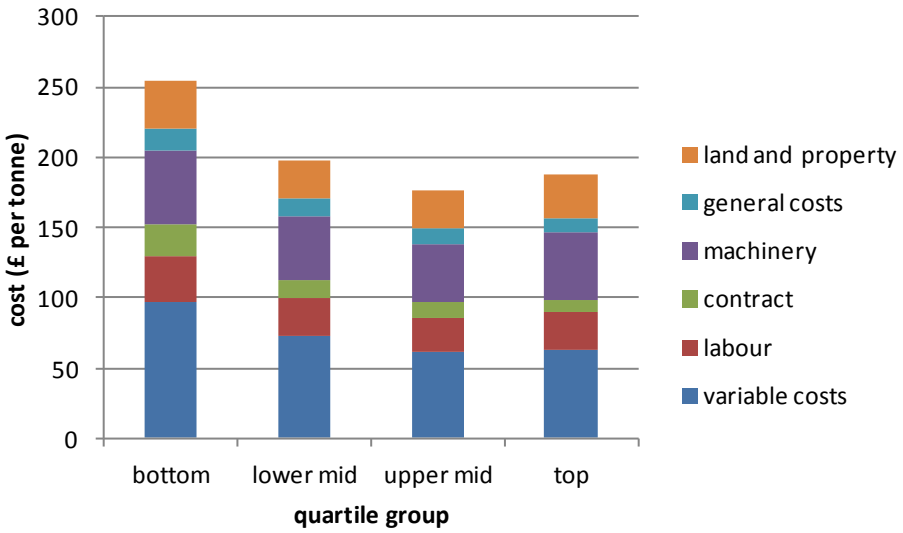
	winter wheat	spring barley	winter oilseed rape
Five year average			
Yield (t per ha)	8.2	5.5	3.6
Cost of production (£ per t)	179	217	354
Yield reduction 20%*			
Yield (t per ha)	6.6	4.4	2.7
Cost of production (£ per t)	223	271	442
Yield increase 20%*			
Yield (t per ha)	9.9	6.6	4.3
Cost of production (£ per t)	149	181	295

*based on five year average yield

Wheat Production Performance

To further explain the variation between farm businesses, we also consider the variation in farm yields and input costs for the winter wheat crop in 2013. The results are shown in the Figure below.

Winter Wheat Cost of production by Gross Margin Quartile Group, 2013



Based on gross margin quartile groups, the bottom quartile group of farms not only incurred the highest variable costs, but also incurred the highest fixed cost overall and in each individual category of labour, contract etc. On average, farms in the remaining three quartile groups incurred similar levels of fixed cost expenditure. However, the top quartile group of farms differed from the other groups because these farms tended to spend less on contract, but more on machinery.

6.5 Discussion

The 2013 Results

The components of the Cost of Production calculation are:

- The variable and fixed costs
- Crop areas
- Crop yields

The cost of production calculations in 2013 reflect relatively high long term crop and commodity input prices. As a result of the reduced crop area in 2013, these costs were spread over a reduced area of land and a reduced area of (relatively high value) winter crops. Therefore, the costs of production in 2013 were above the long term average. As demonstrated above, the results of the cost of production calculation are influenced by the crop yield.

The cost apportionment coefficients were derived using a national sample of farms, so care is needed when interpreting results from a disaggregated sample. For example, if farmers in one region are more likely to establish oilseed rape by a high cost ploughing regime, but farmers in another are more likely to use a low cost subsoiler mounted seed applicator, the coefficient will be an average for the share of costs to the oilseed rape crop.

The results for farms split into quartile groups by gross margin performance show that there is considerable variation in gross margin and net margin performance between businesses. However, it should be remembered that the coefficients may have been different if derived for different businesses. For example, the most efficient businesses may have a low cost

approach to the cultivation and harvesting of wheat but might still face high costs when carrying out an arduous task such as combining peas.

This approach differs from the widely used practice in North America where extension services prepare estimated cost of production budgets using expert opinion to allocate costs[1]. Where custom (contract) operations are widely practised, stubble to stubble costs can be readily estimated.

[1] Economic Research Service, United States Department of Agriculture, www.ers.usda.gov

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Dairying Farming in England 2013/14
Hill Farming in England 2013/14
Horticulture Production in England 2013/14 (Horticultural Business Data)
Lowland Grazing Livestock Production 2013/14
Organic Farming in England 2013/2014
Pig Production in England 2013/14
Poultry Production in England 2013/14

Crop Production in England 2012/13
Dairying Farming in England 2012/13
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Organic Farming in England 2012/2013
Pig Production in England 2012/13
Poultry Production in England 2012/13

Crop Production in England 2011/12
Dairying Farming in England 2011/12
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Pig Production in England 2011/12
Poultry Production in England 2011/12

Crop Production in England 2010/11
Dairying Farming in England 2010/11
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Details available at www.ruralbusinessresearch.co.uk

Other Farm Business Survey publications of interest to arable farmers:

Farm Accounts in England, Defra
http://statistics.defra.gov.uk/esg/publications/fab/default.asp

Farm Business Survey Region Reports, University of Cambridge
http://www.farmbusinesssurvey.co.uk/regional/

FBS farm business benchmarking
http://www.farmbusinesssurvey.co.uk/benchmarking/
For arable performance for the East of England up to 2004/2005 see the annual publication: Report on Farming in the Eastern Counties of England, Rural Business, Unit, Department of Land Economy, 19 Silver Street, Cambridge, CB3 9EP.

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