Farm performance and productivity

Analysis of Farm Business Survey

Department for Environment Food & Rural Affairs

Government Statistical Service

Farm Business Survey

The Farm Business Survey (FBS) provides information on the financial, physical and environmental performance of farm businesses in England to inform and evaluate policy decisions. The FBS is intended to serve the needs of farmers, farming and land management interest groups, government, government partners and researchers. Survey results typically give comparisons between groups of businesses, for example between regions or between types of farm.

Unless otherwise specified, the figures reported in this slide pack are based on a 3 year matched dataset 2016/17 to 2018/19.

Farm Performance

Summary – Farm Performance

1.1
England, how is the economic output distributed across the number of farms?

In England in 2017, a small number of economically large farms (8%) produced over half (57%) the agricultural output using just 33% of the total farmed land area.

1.2
How does the economic size of a farm affect its performance in England?

Over the three year period 2016/17 to 2018/19 in England, the highest performing 25% farms have a similar level of performance regardless of farm size. However, the gap between the top and bottom 25% is greater for smaller farms.

1.3
Why does agricultural performance vary so widely and how can lower performing farms improve performance?

Differences achieved in input and outputs values is one reason for differences in farm performance. As a result of differences in input and output values achieved, for every £100 spent by Lowland Grazing Livestock farms, those in the top 20% made on average £161 compared to £87 for farms in the bottom 20%.

1.4
How can farms maximise their outputs?

Farms can maximise their outputs by responding to the market, such as by ensuring their outputs conform to processor safety requirements and quality specifications, therefore reducing wastage and increase prices achieved.

1.5
What are the routes to improving farm performance?

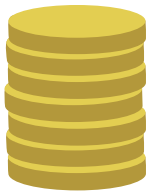
Routes to improving farm performance include reducing inputs, such as by feed efficiency or nutrient management, maximising the value of outputs by improving animal and plant health or the marketability of outputs, or alternative routes like diversification.

1.6
How can diversification help to increase farm profitability?

Over the three year period 2016/17 to 2018/19, two thirds of farms (62%) in the bottom 10% by profitability undertook a diversified activity, compared with three quarters (75%) in the top 10%. Of those farms that had a diversified activity, the bottom 10% made, on average, £43/ha, compared with £223/ha for farms in the top 10%.

In England how is the economic output distributed across the number of farms?

In England in 2017, a small number of economically large farms (8%) produced over half (57%) the agricultural output using just 33% of the total farmed land area.

Economic Size Classification	**Very Small**	**Small**	**Medium**	**Large**	**Very Large**
Standard Output	Under €25K	€25K to €125K	€125K to €250K	€250K to €500K	At least €500K
					
% total Farm Businesses	**41%**	**30%**	**12%**	**9%**	**8%**
Number of farm businesses	38,700	28,200	10,800	8,600	7,100
					
% of total Output	**2%**	**11%**	**12%**	**18%**	**57%**
					
% total Farmed Area (thousand Hectares)	**7%**	**21%**	**18%**	**21%**	**33%**

Total: 93,400 Farm Businesses

Total: €16,400 million estimated output

Total: 9.1 Million hectares

Standard Output measures the total value of output of any one enterprise - per head for livestock and per hectare for crops. For crops this will be the main product (e.g. wheat, barley, peas) plus any by-product that is sold, for example straw. For livestock it will be the value of the main product (milk, eggs, lamb, pork) plus the value of any secondary product (calf, wool) minus the cost of replacement.

Note - the chart excludes businesses classified as 'specialist horse'

How does the economic size of a farm affect its performance in England?

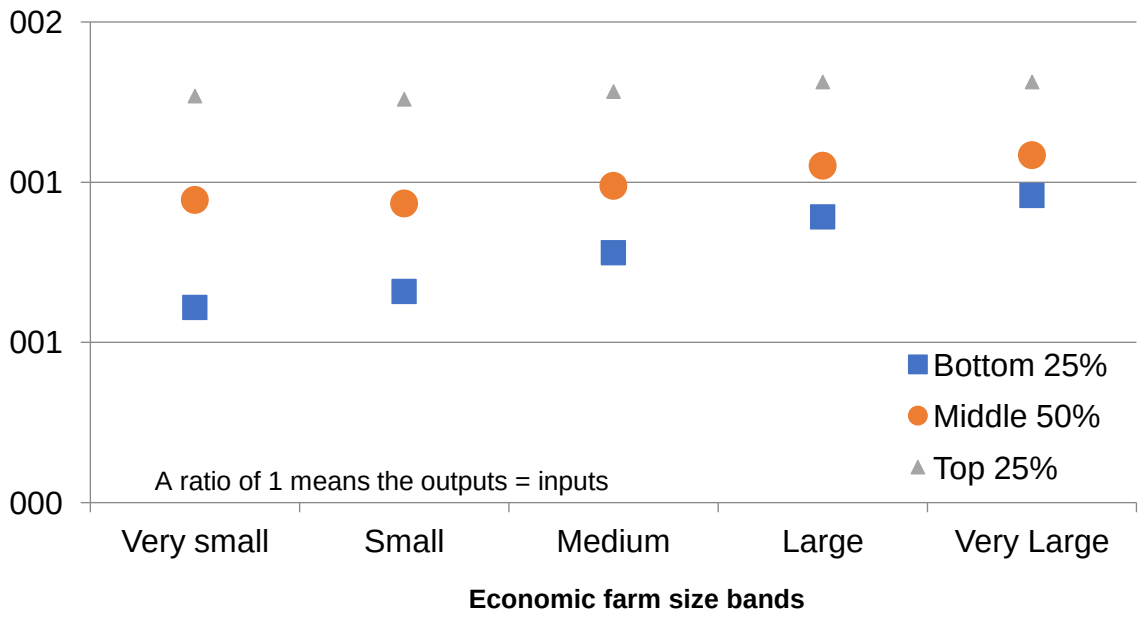
Over the three year period 2016/17 to 2018/19 in England, the highest performing 25% farms have a similar level of performance regardless of farm size. However, the gap between the top and bottom 25% is greater for smaller farms.

Very small farm businesses show the largest difference in performance between top 25% and bottom 25%, but the average performance of the top 25% is similar to larger farms.

Farm sizes are based on the estimated Standard Labour Requirements (SLR) for the business, not its land area.

SLR is defined as the theoretical number of workers required each year to run a business, based on its cropping and livestock activities. For more information on how SLR is defined (see slide 3.4).

Ratio of the average output costs and average input costs for whole farm business for the top 25% of farms, middle 50% (25%-75%) and bottom 25% of farms by economic size



	Very small	Small	Medium	Large	Very Large
Ratio of economic performance, top 25% vs bottom 25%:	2.1	1.9	1.7	1.5	1.4

Farm Business Income (FBI) is calculated as the **difference** between Farm Business Outputs and Farm Business Inputs. It does not deduct the cost of unpaid labour. When calculating **farm economic performance**, unpaid labour is included as a cost. This allows a fairer comparison between farms with employees and those that use unpaid (often family) labour.

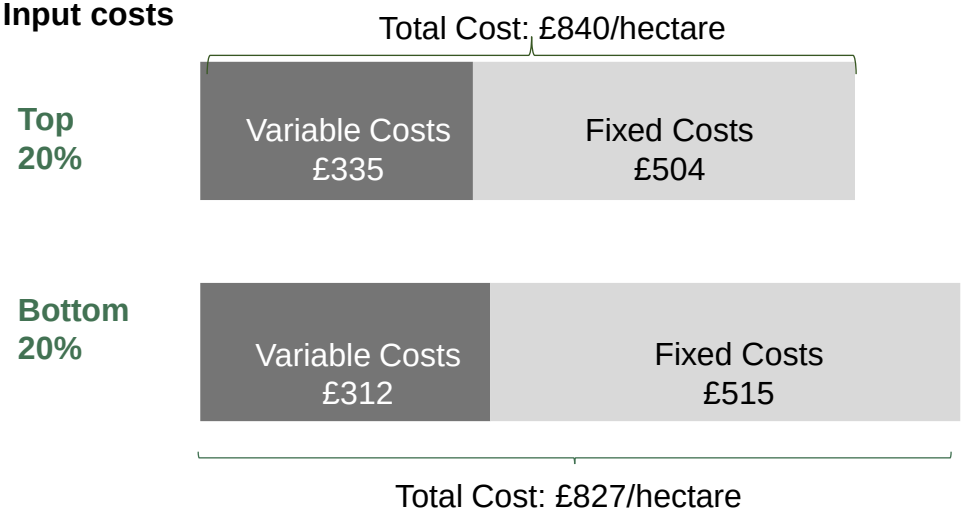
Why does agricultural performance vary so widely and how can lower performing farms improve performance?

Differences achieved in input and outputs values is one reason for differences in farm performance. As a result of differences in input and output values achieved, for every £100 spent by Lowland Grazing Livestock farms, those in the top 20% made on average £161 compared to £87 for farms in the bottom 20%.

Differences in inputs costs can be due to inefficient use of inputs, differences in farming system and management, and the resource efficiency of crops and livestock on the farm. Our research shows that where beef animals of the same breed were reared in different sized groups the feed intake required to obtain the same growth rate varied considerably, by up to 23%.

Differences in outputs achieved may be due to system design, impacts of pests and diseases, and the yield potential of crops and livestock grown on the farm. For example, diseases such as Bovine Viral Diarrhoea can reduce milk outputs by 10% to 20%.

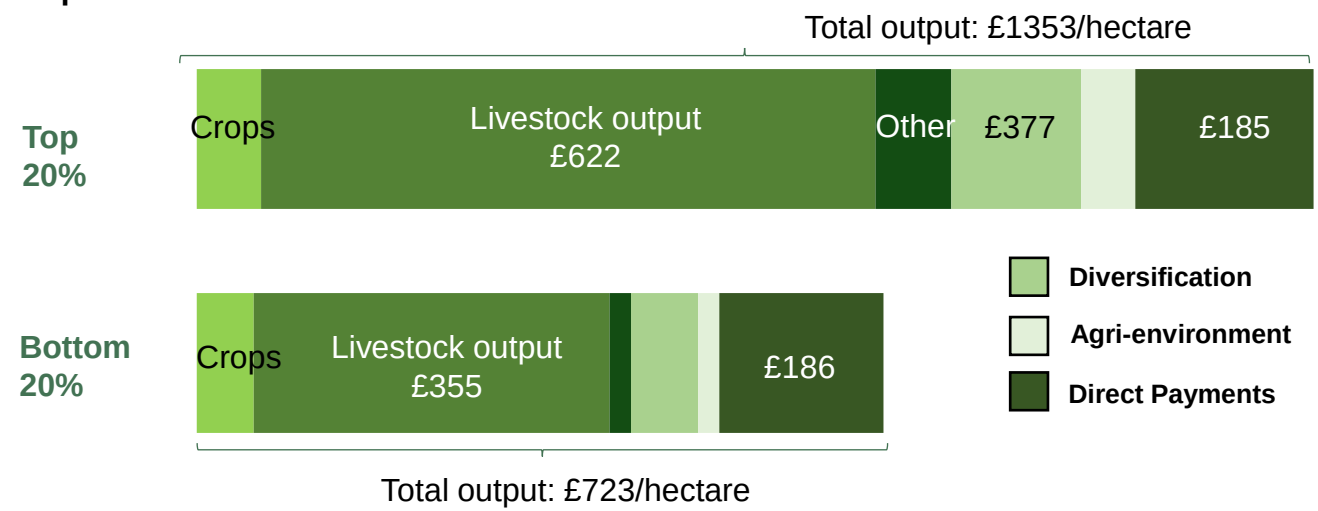
Input costs



Fixed and variable costs are broadly similar between the bottom and top 20%.

The top 20% achieved a greater revenue per hectare for their crops and livestock, and made more from diversification and agri-environment schemes.

Output value



How can farms maximise their outputs?

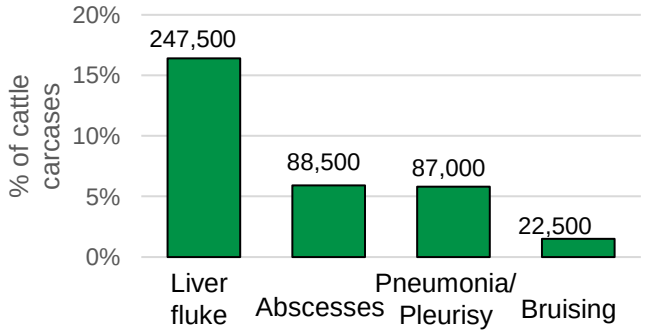
Farms can maximise their outputs by responding to the market, such as by ensuring their outputs conform to processor safety requirements and quality specifications, therefore reducing wastage and increase prices achieved.

Safety requirements

Farm businesses can maximise their returns by minimising the loss of saleable products.

Livestock sold for slaughter must be fit for human consumption. Anything that doesn't meet safety requirements will be rejected, resulting in reduced returns and possible non-payments to farmers. Many losses are avoidable through disease management and welfare practices. For example, liver fluke (parasitic worms) can be avoided through vaccination programmes and bruising avoided through taking greater care of animals during transit.

Main causes for rejection and number of rejections in English red meat slaughterhouses in 2017



Losses can also be avoided in other sectors.
For example, knowing the hygiene requirements of a dairy contract can avoid hygiene deductions, and following protocols to ensure mycotoxin levels are low enough in cereals can ensure standards are met.

Understanding the market

Meeting quality specifications can maximise the price of the product.

Abattoirs require animals that satisfy certain fat and weight specifications to meet consumer demands. However, **49% of prime beef fails to meet target market specifications**. Knowing the market means that cattle of the appropriate breed, weight and specification can be reared to maximise returns.

Securing more favourable contracts may help maximise prices paid or highlight problematic clauses, to ensure the farmer gets the best deal. Dairy contracts, for example, can have different standards for fat and protein levels, affecting the price by up to 0.75p/litre.

Crop loss at harvest, out-graded material and spoilage in storage accounts for 2-25% of yield. Losses can be avoided by investing in machinery to minimise potato damage, or ventilation systems to improve grain drying.

Greater transparency in the food chain increases information flow, enabling farms to better respond to market signals and increase efficiency. This could be through **vertical integration,** where a farm business becomes involved in the processing, retailing or catering of their produce. Alternatively, seeking feedback from processors can help farms monitor and improve.

What are the routes to improving farm performance?

Routes to improving farm performance include reducing inputs, such as by feed efficiency or nutrient management, maximising the value of outputs by improving animal and plant health or the marketability of outputs, or alternative routes such as diversification.

Reducing Inputs

Monitoring Input Use
Crop and livestock inputs represent 84% of variable costs to farms, which may be reduced by improving feed efficiency, selective breeding of animals and/or following a detailed crop nutrient management plan.

Controlling Livestock and plant disease can help farmers to reduce input costs, such as veterinary medicines or plant protection products.

Efficiency Improvements/Reducing Input Costs

There are often large variations in input costs for farms (see slide 2.3). Some aspects of this may be outside of a farmers control, such as transport costs (delivery and collection) being higher for farms in more remote areas .

In some circumstances, farm businesses can work together to create a purchasing cooperative for greater buying power. Cash flow will impact on the ability to do this as some farm businesses may not have the capital to buy in advance.

Increasing Outputs

Improving Animal & Plant Health
Poor animal and plant health can decrease productivity and increase emissions, such as greenhouse gases, associated with production.

Improving Marketability of Outputs
Farms can maximise their outputs by responding to the market, such as by ensuring their outputs conform to processor safety requirements and quality specifications, therefore reducing wastage and increase prices achieved (see slide 2.4).

Business Management Practices

Whilst reducing inputs and maximising outputs could help offset the reduction of subsidies, business management practices could also be used to make improvements (see slide 4.5).

Alternative Options

Diversification
Over the three year period 2016/17 to 2018/19, for the 70% of farms that had diversified, the average additional income from diversification was £19,800. (see slide 2.6).

Environmental Land Management System (ELM)
Farms may be able to use some of their agricultural land, in particular the less productive land, to deliver environmental benefits through a new ELM system.

The ability to diversify will depend on the characteristics and location of the farm. If more farms diversify, this would increase the supply and thus in turn may lower the return to the farmer.

How can diversification help to increase farm profitability?

Over the three year period 2016/17 to 2018/19, two thirds of farms (62%) in the bottom 10% by profitability undertook a diversified activity, compared with three quarters (75%) in the top 10%. Of those farms that had a diversified activity, the bottom 10% made, on average, £43/ha, compared with £223/ha for farms in the top 10%.

30%
of farms did not undertake some form of diversified activity in 2018/19

£19,800
average income from diversification for farms that diversified in 2018/19

Farms that have not yet diversified may be able to improve their income by undertaking diversified activities. However, the ability to diversify will depend on the characteristics and location of the farm.

For those farms that had diversified, the average additional income from those activities was £19,800 in 2018/19.

For around a quarter (22%) of these businesses, the income from diversification was higher than the income from the rest of the farm business

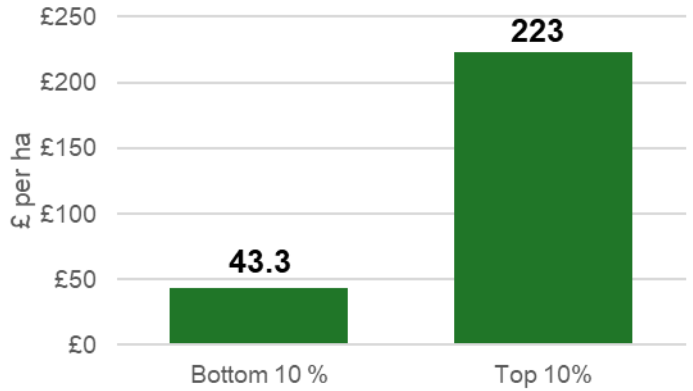
Supply and demand may also affect the profitability of the activity. For example, if more farms diversified into tourism this would increase the supply and may in turn lower the return to the farmer.

Differences in diversified activities by farm profitability

A greater proportion of farms in the top 10% by profitability (75%) undertook a diversified activity compared to the bottom 10% (62%) over the three year period 2016/17 to 2018/19. There was little difference in the type of diversified activity undertaken by farms in these two groups. However, those in the bottom 10% made on average £43/ha, compared with £223/ha for farms in the top 10%.

There may be scope for the bottom 10% to improve profitability by undertaking more diversified activity.

Profit from diversified enterprises by farm business profitability group



What are diversified activities?

Diversified activities are non-agricultural work of an entrepreneurial nature on or off farm, but which utilise farm resources. This includes letting buildings for non-farm use, the processing or retailing of farm produce, sport and recreation, tourist accommodation and generating renewable energy (see slide 3.9 for a more detailed breakdown of this).

Farm Accounts

Summary – Farm Accounts

2.1
What factors are contributing to some farmers in England continuing to farm while making a loss?

Income from agriculture can be volatile, as farm businesses are price-takers and the determinants of the prices they receive can be out of their control. Income from Direct Payments, agri-environment schemes and diversification tends to be more stable.

2.2
What factors are contributing to some farmers in England continuing to farm while making a loss?

Many farmers put the farming lifestyle as being more important to them than maximising profits. Many farms are also asset rich, with owner occupied farms averaging a net worth of £1.84m.

2.3
How does Farm Business Income vary by region?

Farm Business Income (FBI) varies across the different regions of England, and on average over the three year period 2016/17 to 2018/19 the East of England had the highest FBI (£61,800) and the South West the least (£38,800).

2.4
How does profit vary according to different farm size in England?

Farm Business Income varies by farm size, and over the three year period 2016/17 to 2018/19 part time and small farms were more reliant on Direct Payments and very large farms the least.

Summary – Farm Accounts

2.5 How does Farm Business Income vary by tenure type?

Over the three year period 2016/17 to 2018/19 mixed – mainly tenanted farms had the highest farm business income (£68,300) and owner occupied farms the lowest (£33,700).

2.6 How does agriculture contribute to the incomes (or profit) of farmers in England?

Over the three year period 2016/17 to 2018/19, only the top 50% of farms made a profit from agriculture. The bottom 25% of farms made a loss of £27,000 from agriculture, and overall made a loss of £7,300.

2.7 How does profit vary between the Uplands and Lowlands?

On average, over the three year period 2016/17 to 2018/19, grazing livestock farms in Severely Disadvantaged Areas made a greater loss from farming activities, but Farm Business Income for these was higher than grazing livestock farms generally due to greater income from Direct Payments and agri-environment schemes.

2.8 How important is agriculture in the rural economy?

Agriculture is important for rural areas, especially in the rural uplands, accounting for around 15% of registered businesses and 8% of employment across all rural areas, which rises to 30% and 14% respectively in rural uplands areas.

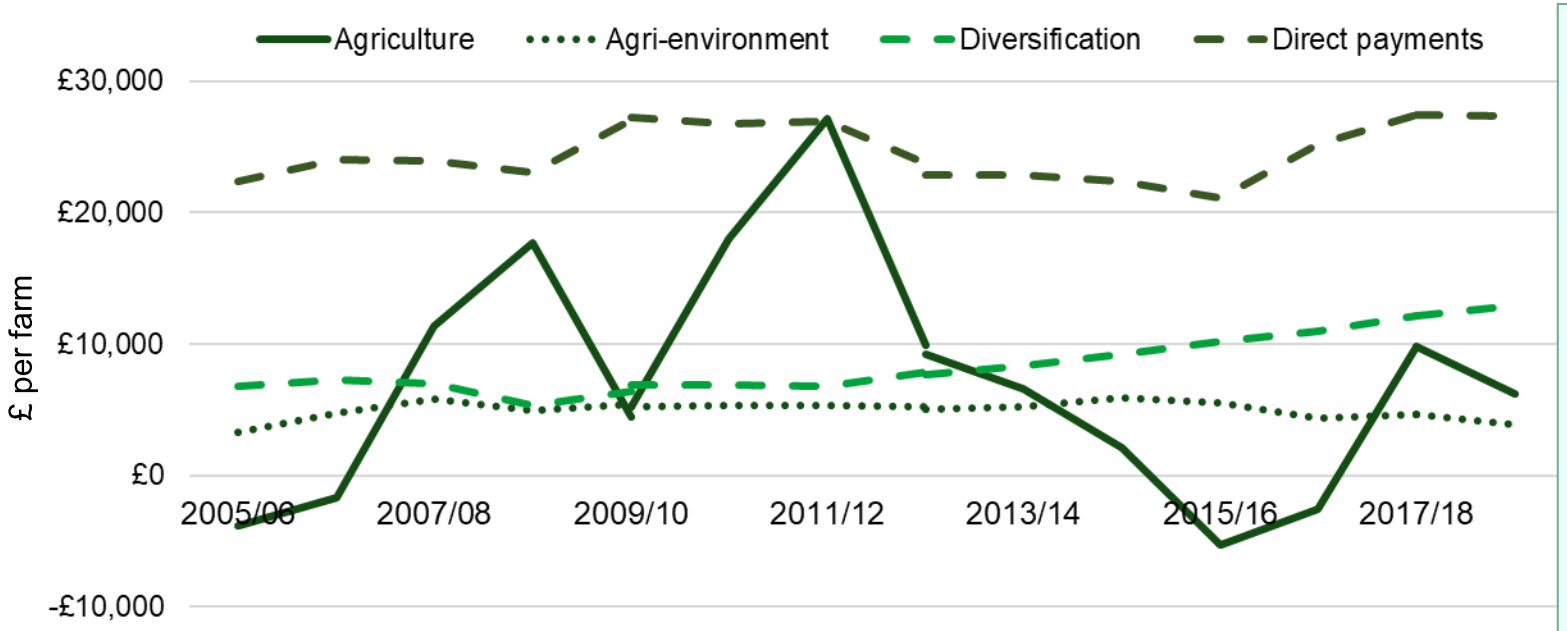
2.9 How much income do farmers generate from providing non-agricultural products using their farm resources?

Over the three year time period 2016/17 to 2018/19, 2/3rds of farms used farm resources to deliver non-agricultural activities, generating around £623 million additional profit (£15,600 average per farm).

What factors are contributing to some farmers in England continuing to farm while making a loss?

Income from agriculture can be volatile, as farm businesses are price-takers and the determinants of the prices they receive can be out of their control. Income from Direct Payments, agri-environment schemes and diversification tends to be more stable.

Average income (£) from agriculture, diversification, Agri-environment and Direct Payments for all farms from 2005/06 to 2017/18



Note there are slight discontinuities in the data in 2009/10, 2012/13 and 2017/18

Compared to income from Direct Payments, Agri-environment schemes and Diversification, **income from agriculture** is volatile from year to year. This volatility in agricultural income is found across all farm types.

Fluctuations in **Direct Payments** are due to changes in the exchange rate. The sterling rates are set based on the exchange rate in September each year.

Farmers are price-takers

Many of the determinants of the prices farmers receive are out of their control. Farmers plant crops and raise animals, but by the time their produce is available for market the actual price they receive may have fallen. Many agricultural products are perishable and cannot be stored on farm, so have to be moved into the supply chain quickly, meaning farmers cannot wait for better prices. Weather patterns can also impact both domestic and global supply.

These factors mean that in some years farmers make profits and in others losses.

What factors are contributing to some farmers in England continuing to farm while making a loss?

Many farmers put the farming lifestyle as being more important to them than maximising profits. Many farms are also asset rich, with owner occupied farms averaging a net worth of £1.84m.

Many farmers are asset rich
52% of farm holdings in England are owner occupied and the average net worth of this group was around £1.84 million pounds in 2018/19. The average for this group has also increased by 22%, or £329,000, since 2013/14.

A further 21% of farm holdings are mixed tenure but mainly owner occupied and the net worth of these farms was almost £2.6 million in 2018/19, up 24% since 2013/14.

However, tenanted farms (14% of farm holdings) have fewer assets (e.g. machinery and livestock). Their average net worth was £313,000 in 2018/19, up 10% since 2013/14.

Tenancy Type	Average net worth (£million)	Average total area (hectares)	Average owner occupied area (hectares)	% owned
Owner occupied	1.84	60	60	100%
Mixed - mainly owner occupied	2.60	135	105	78%
Mixed - mainly tenanted	1.42	145	35	24%
Tenanted	0.31	97	0	0%
All farms	1.82			

Please note: the data on net worth is taken from the Farm Business Survey which only samples from farms in England with a standard output of over 25,000 Euros and therefore will exclude smaller farms.

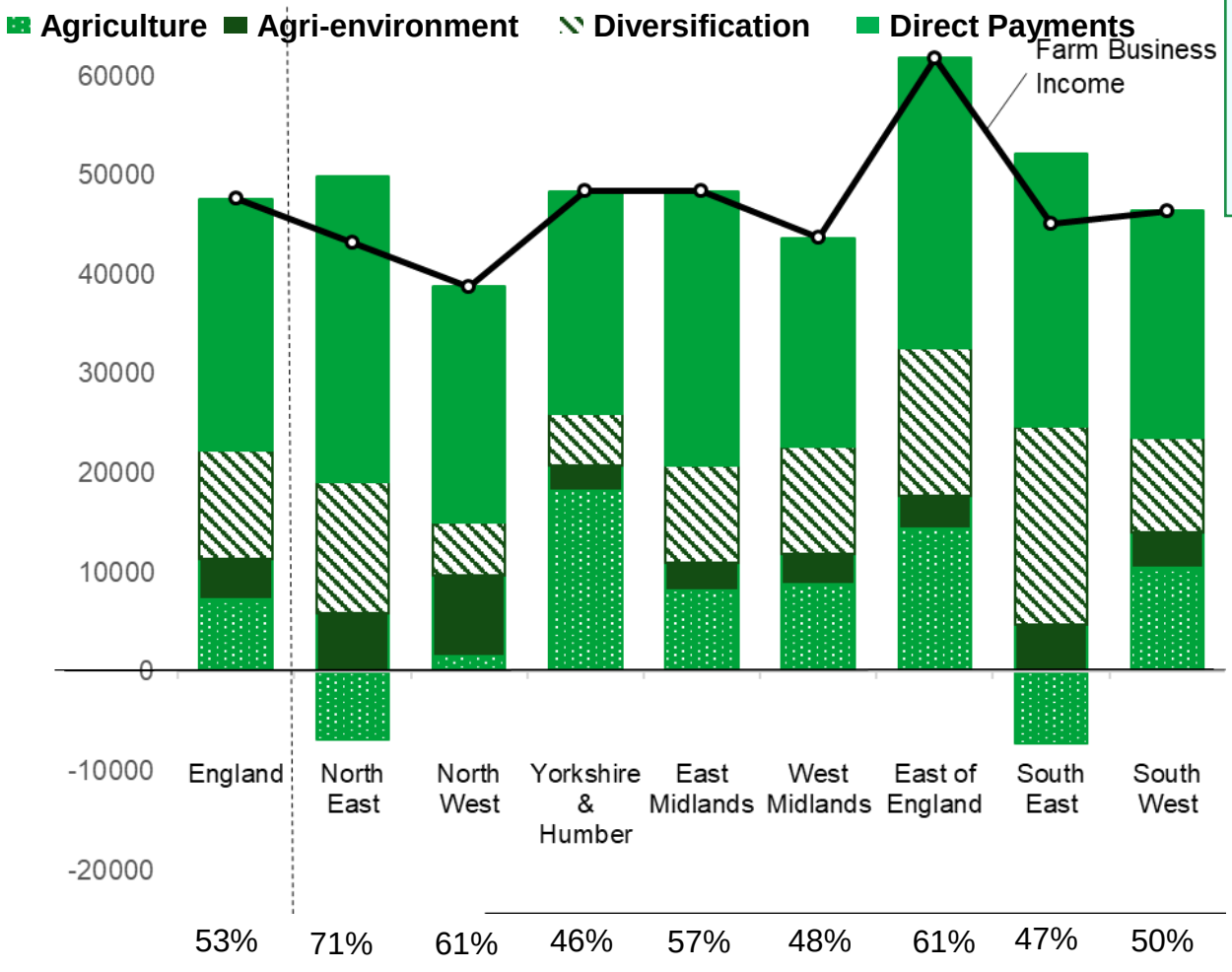
For many farmers profits are not their main motivation and many farm households are supported by off-farm income
Approaches to farming vary – some focus on the business, others on the lifestyle (individual and family heritage). In a survey conducted for Defra (in 2008) to understand different attitudes to farming, 93% agreed that the farming lifestyle is what they really enjoy and 91% agreed that maintaining environmental assets is a priority. This compares to 79% saying farming is about maximising profit.

Many farms are supported by income generated off farm, either from other family members or a second job, and for 40% of principal farmer households, the income received from non-farming sources exceeded the income received from the farm business.

How does Farm Business Income vary by region?

Farm Business Income (FBI) varies across the different regions of England, and on average over the three year period 2016/17 to 2018/19 the East of England had the highest FBI (£61,800) and the South West the least (£38,800).

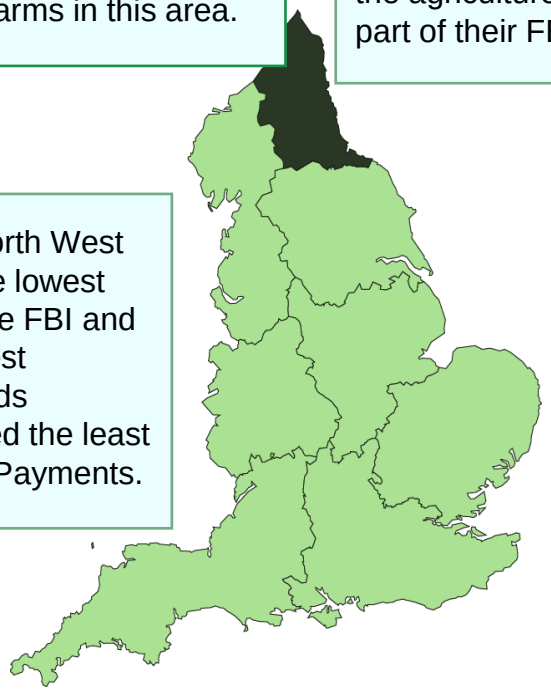
Farm Business Income (FBI) and the proportion that comes from:



The North East had the highest proportion of income from Direct Payments due to a prevalence of Grazing livestock farms in this area.

Farm businesses in the South East and North East made losses on the agriculture part of their FBI.

The North West had the lowest average FBI and the West Midlands received the least Direct Payments.



The East of England had the highest average FBI of £61,800.

How does profit vary according to different farm size in England?

Farm Business Income varies by farm size, and over the 3-year three year period 2016/17 to 2018/19 part time and small farms were more reliant on Direct Payments and very large farms the least.

The standard labour requirement (SLR) of a farm represents the normal labour requirement, in Full Time Equivalents, for all enterprises on a farm under typical conditions. The SLR for a farm is calculated from standard coefficients applied to each enterprise of the farm. The standard coefficients represent the input of labour required per head of livestock or per hectare of crops for enterprises of average size and performance.

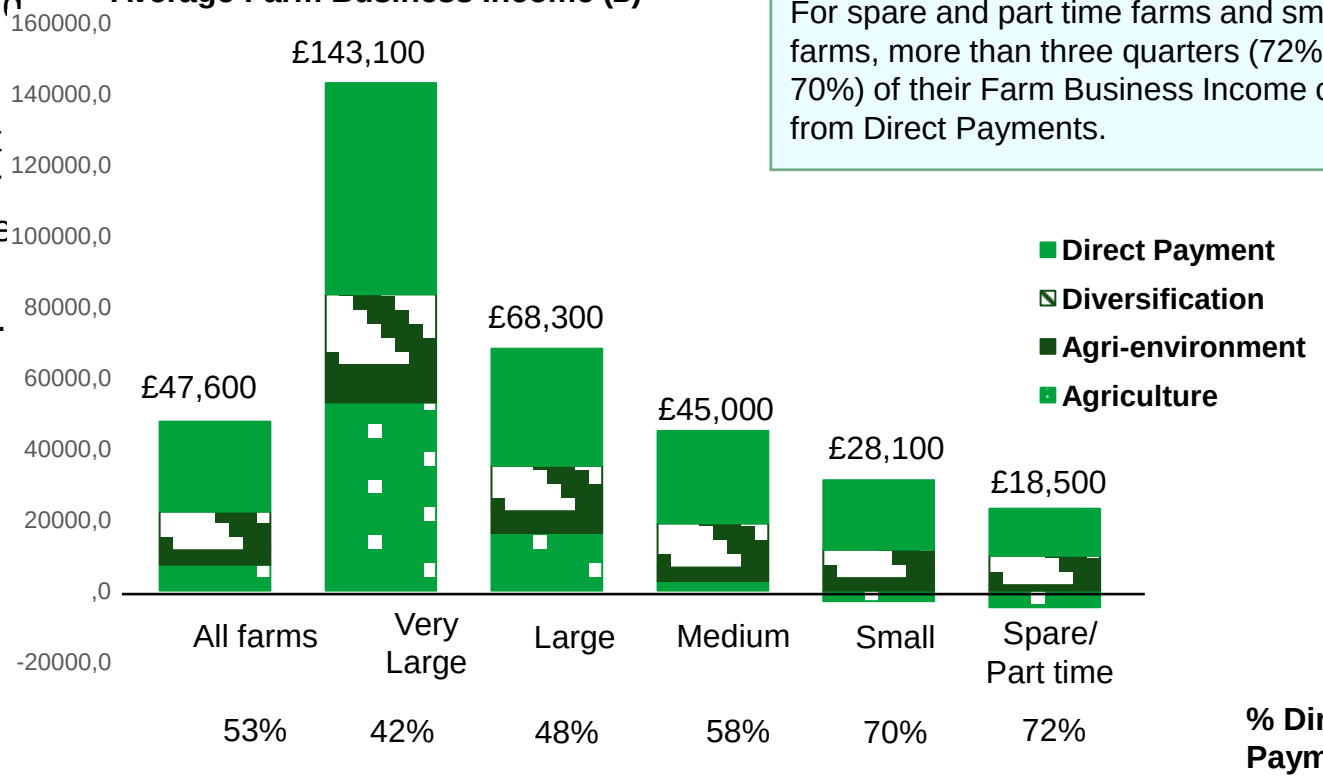
Farm size	Definition
Spare & Part time	Less than 1 SLR
Small	1 to less than 2 SLR
Medium	2 to less than 3 SLR
Large	3 to less than 5 SLR
Very Large	5 or more SLR

For very large farms just under half (42%) of their income came from Direct Payments.

For Medium and Large farms, the amount of their income (58% and 48%) that came from Direct Payments was just above the average for all farms (58%).

For spare and part time farms and small farms, more than three quarters (72% and 70%) of their Farm Business Income came from Direct Payments.

Average Farm Business Income (£)



How does Farm Business Income vary by tenure type?

Over the three year period 2016/17 to 2018/19 Mixed – mainly tenanted farms had the highest farm business income (£68,300) and owner occupied farms the lowest (£33,700).

In England in 2017…

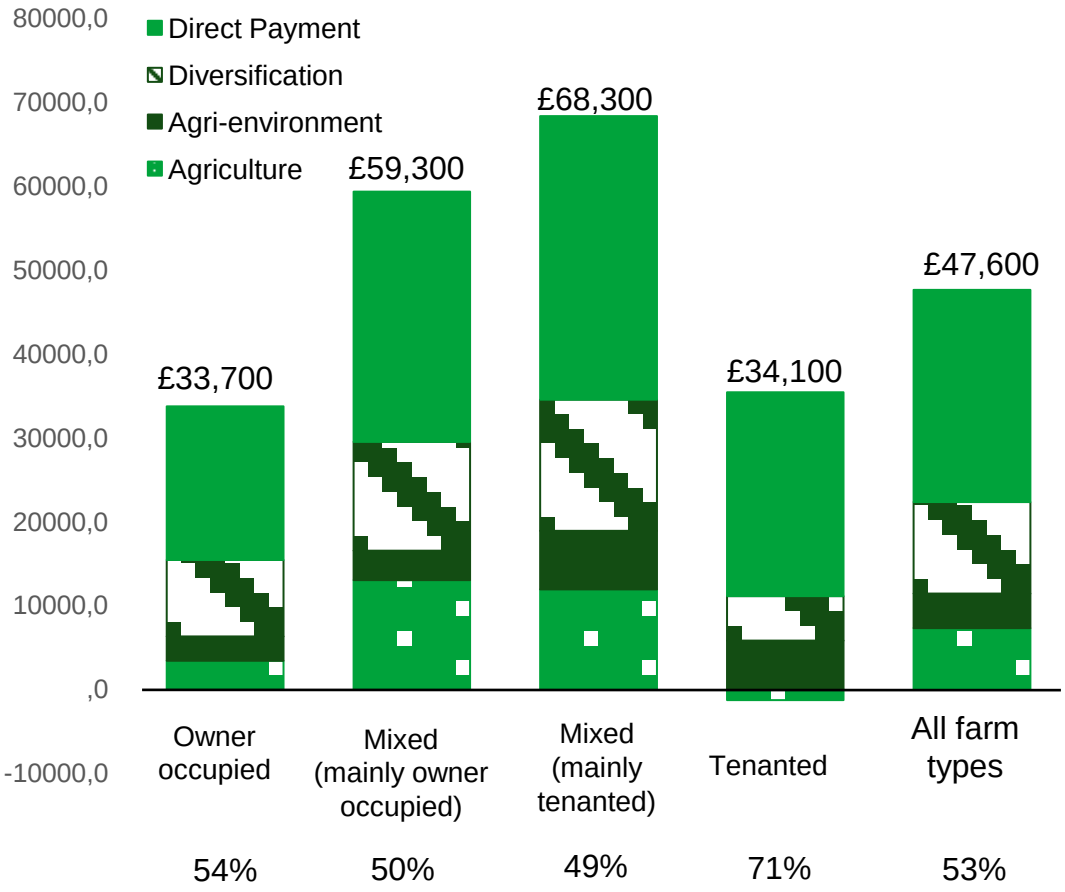
14%
of farm holdings were wholly tenanted (15,000 farms), accounting for 16% of farmed area (1.4million ha).

34%
of farms were mixed tenure (36,000 farms). These accounted for 50% of farmed area (4.6million ha).

Of the land that was rented, the majority (85%) was rented for at least a year, while the remaining 15% was rented seasonally.

52%
Over the three year period 2016/17 to 2018/19 Mixed – mainly tenanted farms had the highest farm business income (£68,300) and owner occupied farms the lowest (£33,700)).

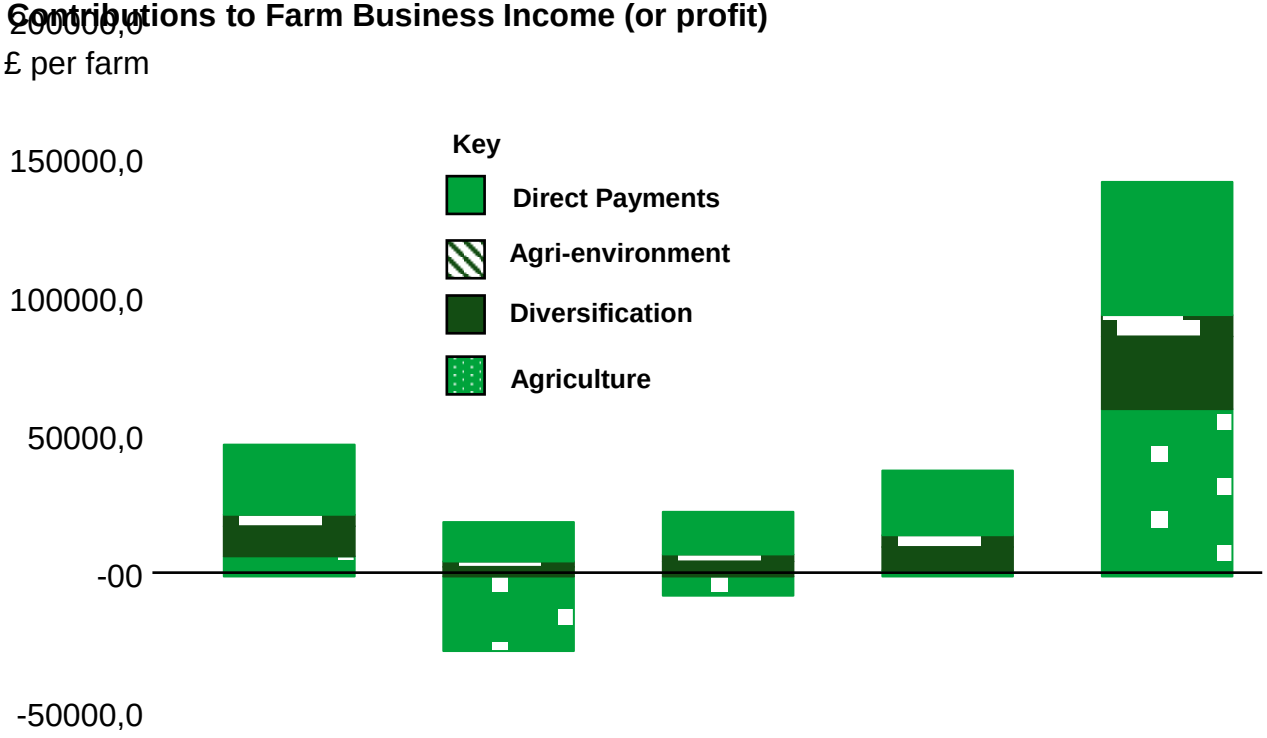
Average Farm Business Income (FBI) by tenancy type, based on 3 year matched dataset 2016/17 to 2018/19



How does agriculture contribute to the incomes (or profit) of farmers in England?

Over the three year period 2016/17 to 2018/19, only the top 50% of farms made a profit from agriculture. The bottom 25% of farms made a loss of £27,000 from agriculture, and overall made a loss of £7,300.

Contributions to Farm Business Income (or profit)



	All farms	Bottom 25% of farms	25%-50%	50%-75%	Top 25% of farms
Income from agriculture	£7,300	-£27,000	-£7,000	£2,200	£60,500
Farm Business Income	£47,600	-£7,300	£16,300	£38,300	£142,600

Farms are ranked from the lowest to highest Farm Business Income

Ranking farms from lowest to highest by their Farm Business Income and splitting into 4 equal groups:

Agriculture
Only the top 25% on average made a profit from the agricultural part of the business (£60,500). The bottom 25% made an average loss of £32,000 from agriculture.

Agri-environment
These schemes contributed an average £4,100 to farm incomes.

Diversification
On average, diversification provided profit to farms in each group, but contributed most (£26,300) to the top 25% of farms. The bottom 25% made only £3,500 from diversification.

Direct Payments
On average, Direct Payments contributed £25,300 to farm business income. For the top 25% of farms, the average income from Direct Payments was £48,100, these farms receive more because this is an area based payment and they tend to be larger.

How does profit vary between the Uplands and Lowlands?

On average, over the 3-year three year period 2016/17 to 2018/19, grazing livestock farms in Severely Disadvantaged Areas made a greater loss from farming activities, but Farm Business Income for these was higher than grazing livestock farms due to greater income from Direct Payments and agri-environment schemes.

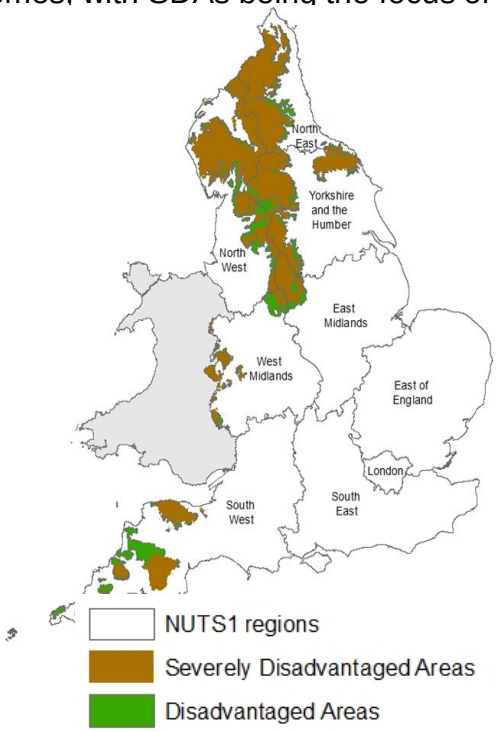
Less Favoured Areas (LFA) in England are subdivided into two areas.

The more environmentally challenging areas within the LFA, which tend to be more upland in character, are classed as 'Severely Disadvantaged Areas' (SDA). The remainder is classified as 'Disadvantaged Areas' (DA).

This distinction is important as it determines eligibility for support payments and environmental schemes, with SDAs being the focus of Government support in the LFA.

Three quarters of farm holdings in the SDA are grazing livestock, accounting for 87% of the farmed area.

In 2016 there were 9,500 holdings forming 9,200 farm businesses classed as having the majority of their land in the SDA in England, covering 1.1million hectares (excluding common land).

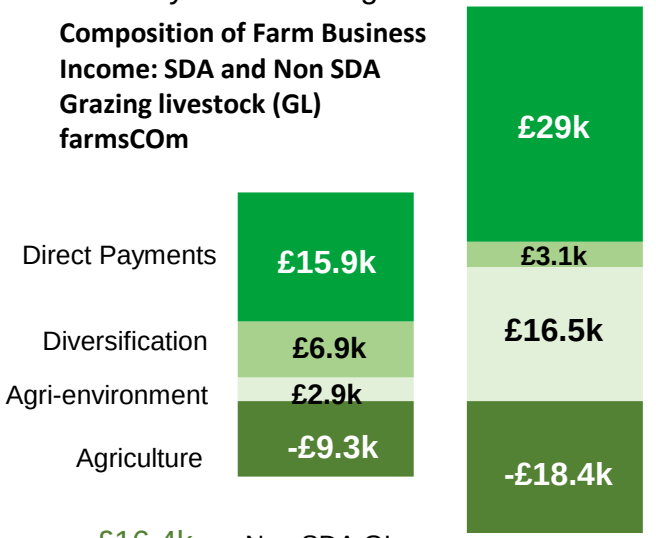


Average Farm Business Income (FBI) for all farms in the SDA is lower than the average of all farms outside the SDA due to the prevalence of Grazing Livestock (GL) farms, which tend to have lower incomes than other farm types.

SDA GL farms made greater loss from agriculture, but overall FBI was higher due to greater income from Direct Payments and agri-environment schemes.

On average, SDA GL farms are larger than non-SDA GL farms (132ha compared with 45ha), and hence the per farm income from Direct Payments and agri-environment schemes is larger.

Composition of Farm Business Income: SDA and Non SDA Grazing livestock (GL) farmsCOm



Farm Business Income £30.3k

Without Direct Payments, grazing livestock farms in SDA have an average FBI of £1,300 compared to non-SDA GL FBI of £500 due to larger agri-environment payments.

How important is agriculture in the rural economy?

Agriculture is important for rural areas, especially in the rural uplands, accounting for around 15% of registered businesses and 8% of employment across all rural areas, which rises to 30% and 14% respectively in rural uplands areas.

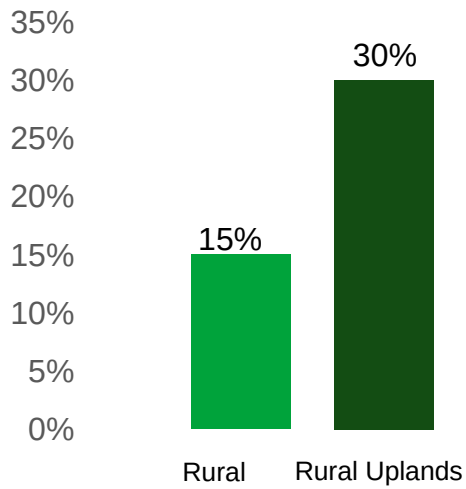
Agriculture contributes around 2% to the rural economy (in England). It is 0.6% of England's economy overall.

Rural uplands are home to almost 240,000 people, of which 31% (72,000) live within areas that are sparsely populated.

The proportion of **rural employment** in agriculture is greater in smaller settlements and in sparsely populated areas, especially in upland areas.

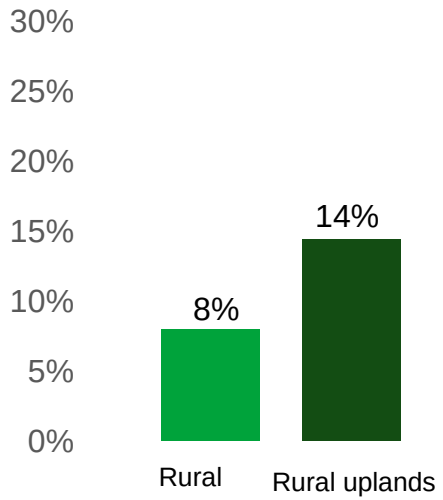
Agriculture accounts for 15% of registered businesses across all rural areas, however this proportion is twice as much in rural uplands areas (30%), making it one of the most important sectors in rural uplands.

Proportion of businesses in agriculture, forestry and fishing



Agriculture accounts for 8% of employment in registered businesses across all rural areas, however in rural uplands the proportion of people employed in agriculture is almost twice as high at 14%. Accommodation and food service activities are also important employment sectors in rural uplands.

Proportion of employment in agriculture, forestry and fishing



Note: * agriculture includes agriculture, forestry and fishing sectors

How much income do farmers generate from providing non-agricultural products using their farm resources?

Over the three year time period 2016/17 to 2018/19, 2/3rds of farms used farm resources to deliver non-agricultural activities, generating around £623 million additional profit (£15,600 average per farm).

Diversified enterprises = non-agricultural work of an entrepreneurial nature on or off farm, but which utilises farm resources.

Over the three year time period 2016/17 to 2018/19, 70% of farms participated in some form of diversified activity, up from 51% in 2009/10.

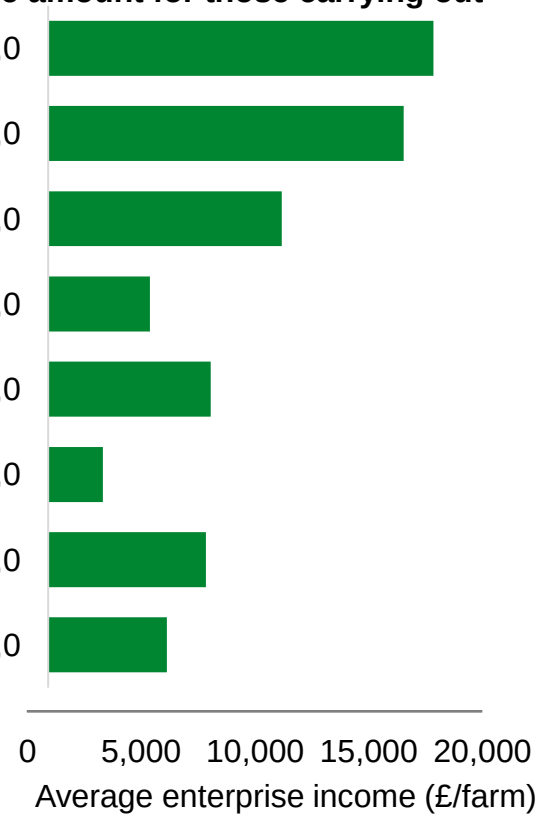
For those farms with a diversified activity, their income from that activity accounted for 28% of their profit in 2016/17 to 2018/19.

Just under a quarter (23%) of these businesses had a greater income from diversification than from the rest of the farm business.

Letting out buildings for non-agricultural use was the most common diversified activity, on average generating around £14,400 for those carrying out this activity in 2016/17 to 2018/19.

Processing and retailing of farm produce had the second highest average income stream among the diversified activities but only 12% of farms carried this out in 2016/17 to 2018/19.

	% of farms carrying out	Average amount for those carrying out
Diversified enterprises (all kinds)	70%	£15600,0
Letting buildings for non-farming use	48%	£14400,0
Processing/retailing of farm produce	12%	£9400,0
Sport and recreation	15%	£4100,0
Tourist accommodation and catering	7%	£6600,0
Solar energy	21%	£2200,0
Other sources of renewable energy	10%	£6400,0
Other diversified activities	15%	£4800,0



Productivity

Summary – Productivity

3.1
How does UK agricultural competitiveness on cost compare internationally by sector?

Although aggregate comparisons suggest lagging UK agricultural productivity growth, other data shows that certain UK sectors have costs of production that are competitive on a global scale, such as for wheat and milk production.

3.2
What drives productivity growth in the agriculture sector?

People, innovation, competitive pressures and capital are the four key drivers of productivity growth in UK agriculture, underpinned by the wider business environment including the trade regime, infrastructure and regulatory frameworks. Productivity growth must also be balanced with environmental outcomes.

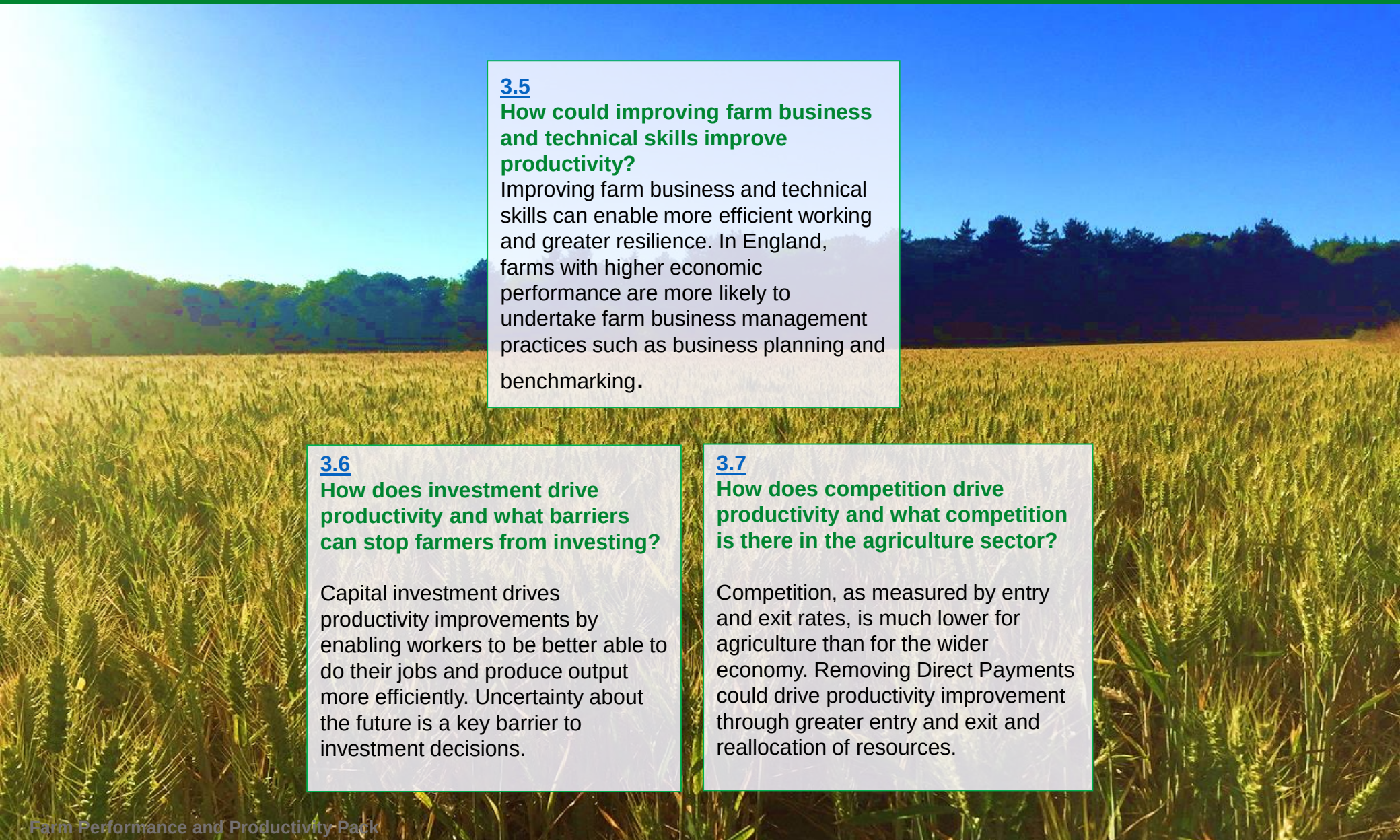
3.3
What is innovation, how is the UK performing?

Innovation is central to productivity growth and evidence suggests there should be high returns from public support for Research and Development (R&D) for agriculture

3.4
How many farmers innovate and what are their motivations?

The strong agricultural research base needs to be mirrored by uptake of innovative practices by farmers. In autumn 2018, 54% of farms had introduced a significant change to their business in the previous year. Increased productivity, lowering costs and making things easier for self and staff were the most commonly cited motivations.

Summary – Productivity



3.5
How could improving farm business and technical skills improve productivity?

Improving farm business and technical skills can enable more efficient working and greater resilience. In England, farms with higher economic performance are more likely to undertake farm business management practices such as business planning and benchmarking.

3.6
How does investment drive productivity and what barriers can stop farmers from investing?

Capital investment drives productivity improvements by enabling workers to be better able to do their jobs and produce output more efficiently. Uncertainty about the future is a key barrier to investment decisions.

3.7
How does competition drive productivity and what competition is there in the agriculture sector?

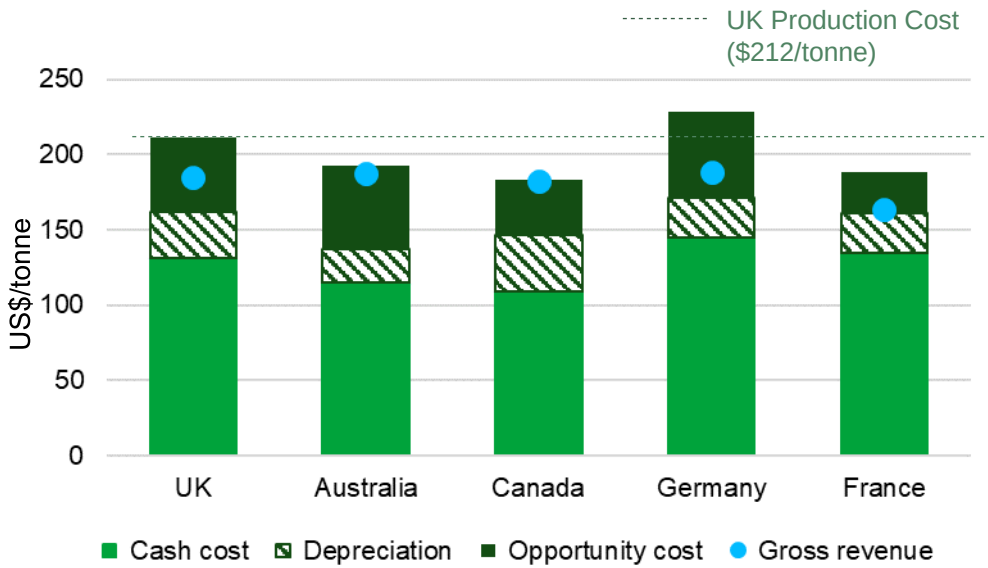
Competition, as measured by entry and exit rates, is much lower for agriculture than for the wider economy. Removing Direct Payments could drive productivity improvement through greater entry and exit and reallocation of resources.

How does UK agricultural competitiveness on cost compare internationally by sector?

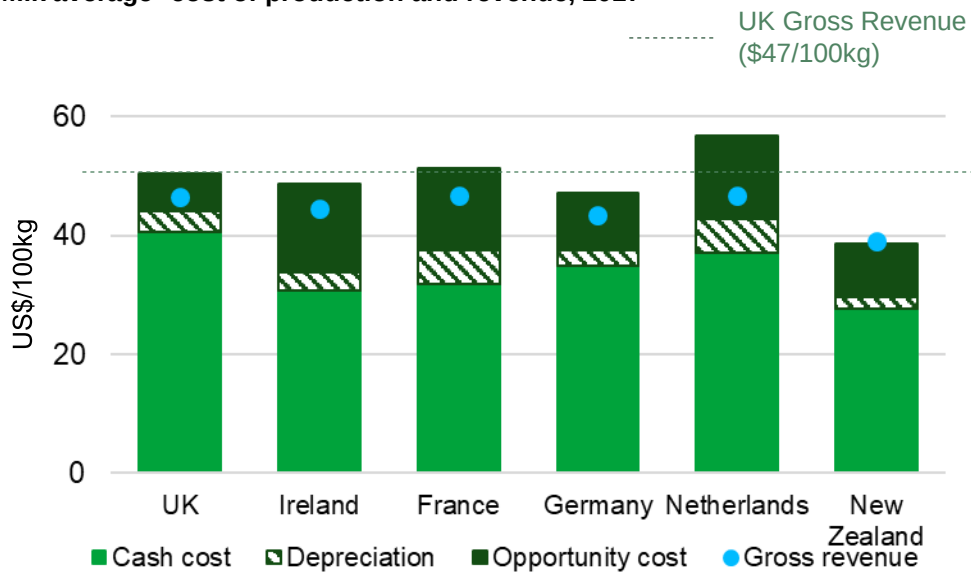
Although aggregate comparisons suggest lagging UK agricultural productivity growth, other data shows that certain UK sectors have costs of production that are competitive on a global scale, such as for wheat and milk production.

Costs of production are influenced by productivity, as well as other factors such as production standards and exchange rates. Comparisons are shown for selected, comparable countries.

Wheat average* cost of production and revenue, 2017



Milk average* cost of production and revenue, 2017



For wheat, the average revenue for representative farms in the UK was similar to other EU and non-EU countries. Average production costs are competitive with some countries, with costs of $212/tonne lower than Germany ($229), although higher than others such as Canada ($183).

For milk, average revenues are competitive with other countries at around $47/100kg. Costs are largely competitive with most countries, with the exception of New Zealand.

*These charts show data from a small number of representative or typical farms in a given country rather than the national average. Opportunity cost is calculated as a combination of unpaid family labour and imputed rent; these are based on local/regional values.

What drives productivity growth in the agriculture sector?

People, innovation, competitive pressures and capital are the four key drivers of productivity growth in UK agriculture, underpinned by the wider business environment including the trade regime, infrastructure and regulatory frameworks. Productivity growth must also be balanced with environmental outcomes.

Wider business environment including Government, market frameworks, infrastructure, local and rural economic policy and macroeconomic climate

Ideas and Innovation	People and Information	Competition	Investment
Investment in research and innovation which generate new products, processes and business models.	Investment in people with the right skills to implement new ideas and technology to generate commercially viable outputs	Competitive pressures in domestic and international markets which encourage firms to innovate.	Investment in capital such as machinery and equipment, branding, land and natural capital.
Short term outcomes			
Greater use of innovation and technology	Better able to recognise and implement new ideas and practices as well as better risk management	Farmers adapt businesses. Land use changes to better reflect market and public values.	More finance goes to productive investments that embody innovation.

Final outcomes

Improved productivity and resilience to volatility.

Productivity and the Environment

Increasing productivity must be considered alongside environmental outcomes.

The Agricultural Productivity Evidence Group (APEG), which comprises Defra officials and external analysts, is developing a set of productivity and environment metrics that will enable a more holistic assessment of the UK agriculture sector's productivity performance.

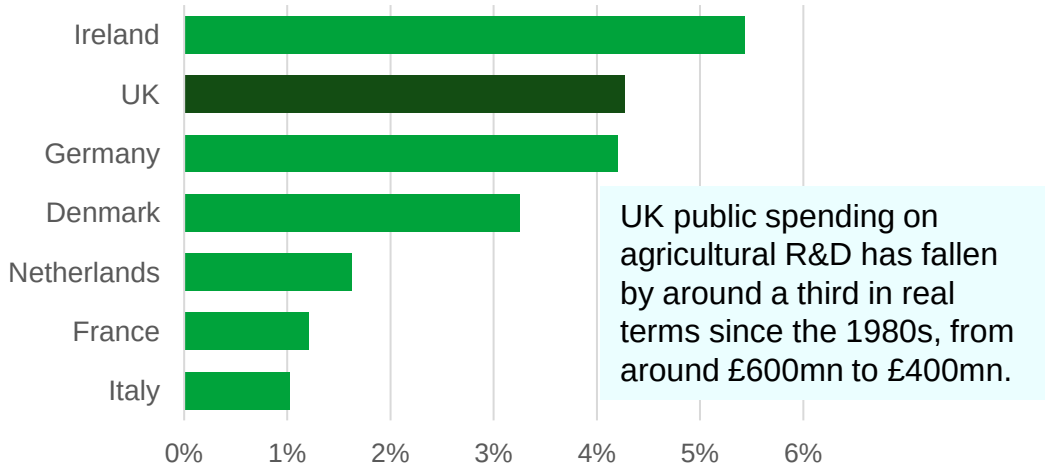
What is innovation, how is the UK performing?

Innovation is central to productivity growth and evidence suggests there should be high returns from public support for Research and Development (R&D) for agriculture.

Innovation is the successful exploitation of new ideas. New ideas can take the form of new technologies, often embodied in capital equipment, new products or new ways of working.

Public sector spending is strong and higher or comparable with other European Countries, supporting a strong research base….

Public Agricultural R&D as a percentage of agricultural GVA (average 2008-2017)



UK public spending on agricultural R&D has fallen by around a third in real terms since the 1980s, from around £600mn to £400mn.

Public sector R&D should be complemented by private sector investment, although this has remained stagnant at approximately 1.1% of GDP since 1995, compared to an OECD average of 1.6%.

…however, this appears not to have translated into higher productivity growth in the UK.

UK agricultural productivity has not grown as fast as some of our competitors including those with lower public investment in innovation.

Evidence suggests this may be due to fragmentation and coordination failures in the current UK innovation system, which have resulted in poor translation of public spending on innovation into productivity improvements on the farm level.

The Standing Committee on Agricultural Research found that there are a number of gaps between practitioners and the research community that need to be bridged:

- **Success is judged in different ways.**
- **Researchers and farmers have different styles of communication**
- **Researchers must be aware of the realities for farmers regarding which innovations they use**

Survey responses to Health and Harmony and discussions with farmers undertaken by Defra highlighted the following as key factors to increase innovation and to promote wider adoption of new approaches of technology: enabling farmers to be involved in research – both individually and in collaborative efforts - tailoring research to farmers' needs, and effective knowledge exchange.

How many farmers innovate and what are their motivations?

The strong agricultural research base needs to be mirrored by uptake of innovative practices by farmers. In autumn 2018, 54% of farms had introduced a significant change to their business in the previous year. Increased productivity, lowering costs and making things easier for self and staff were the most commonly cited motivations.

When asked in autumn 2018:

54%
Had introduced a significant change to their business in last year

33%
Planned to introduce a significant change to their business in the next year

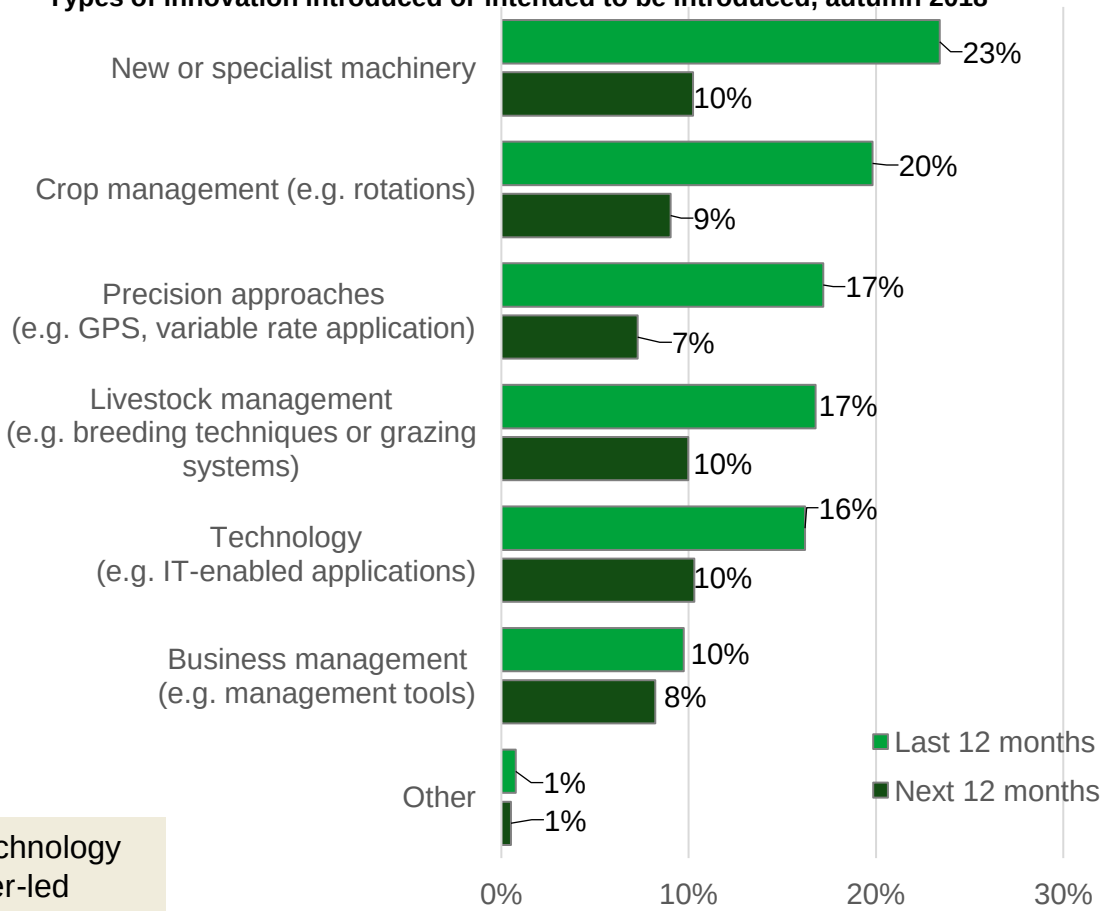
Large farms were more likely to have introduced a significant change than small farms. Cereal farms were more likely to have introduced a significant change than other farm types.

The most commonly selected motivations for innovating were to “increase productivity” (67% of farms), “lower costs” (65%) and “make things easier for me and my staff” (64%).

Farm advisors (51% of farms), other farmers (44%), the farming press (36%) and family (36%) were the most commonly selected as sources of encouragement to innovate

Whilst there were a number of businesses very focused on technology (i.e. for horticulture), most of the farmers participating in farmer-led Future Farming discussions regarded innovation as being easily adopted measures, rather than just technology, that boost productivity.

Types of innovation introduced or intended to be introduced, autumn 2018



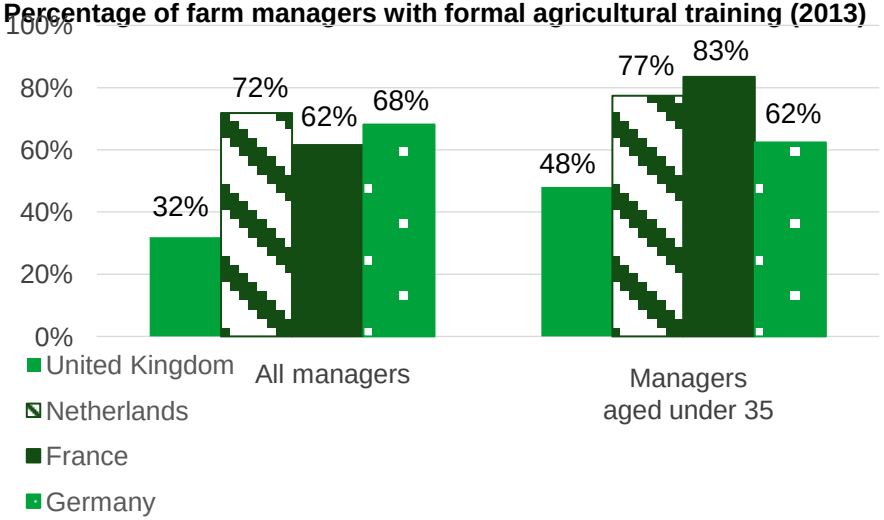
How could improving farm business and technical skills improve productivity?

Improving farm business and technical skills can enable more efficient working and greater resilience. In England, farms with higher economic performance are more likely to undertake farm business management practices such as business planning and benchmarking.

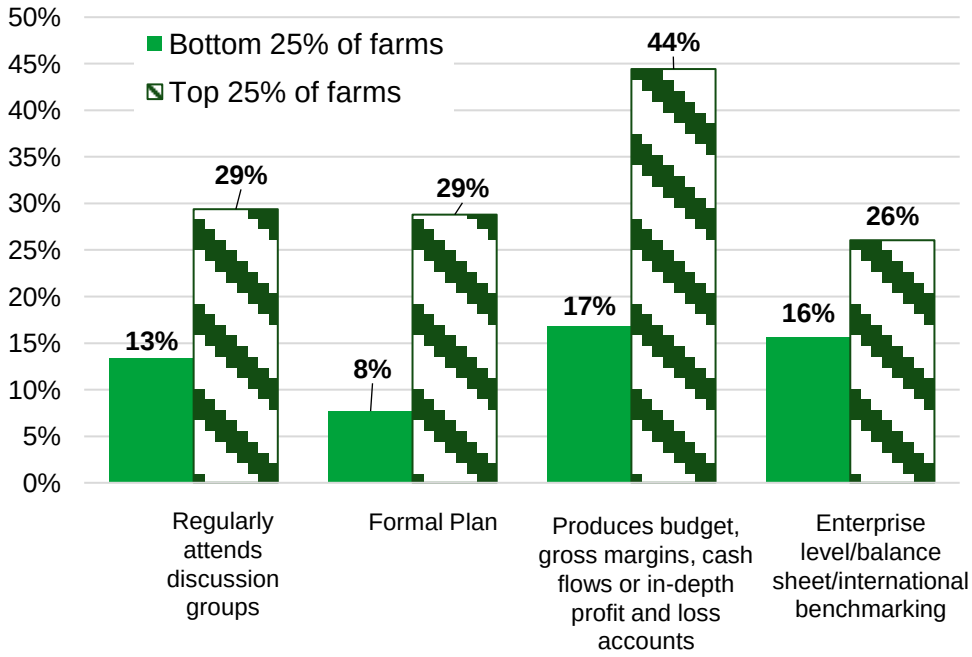
Business management skills are important for ensuring that managers employ best practices to optimise performance and to underpin an efficient knowledge exchange system. Good managers are better able to recognise new ideas and undertake complementary investments to turn these ideas into new products and processes.

Only a third of farm managers in the UK had some form of formal training in 2013, compared to our main competitors, of which at least 60% of farm managers had a form of formal training. The UK compares better when considering younger farmers, with approximately 48% of farm managers aged under 35 in the UK having a form of formal training.

Percentage of farm managers with formal agricultural training (2013)



Proportion of farm businesses in top 25% and bottom 25% engaging in business management practices (2016/17).



While farms with higher economic performance are more likely to engage in farm business management practices, even the majority of these higher performers do not engage in these practices.

Grazing Livestock farms were the least likely to produce budgets and in depth profit and loss accounts. These farms also tended to have the lowest Farm Business Income.

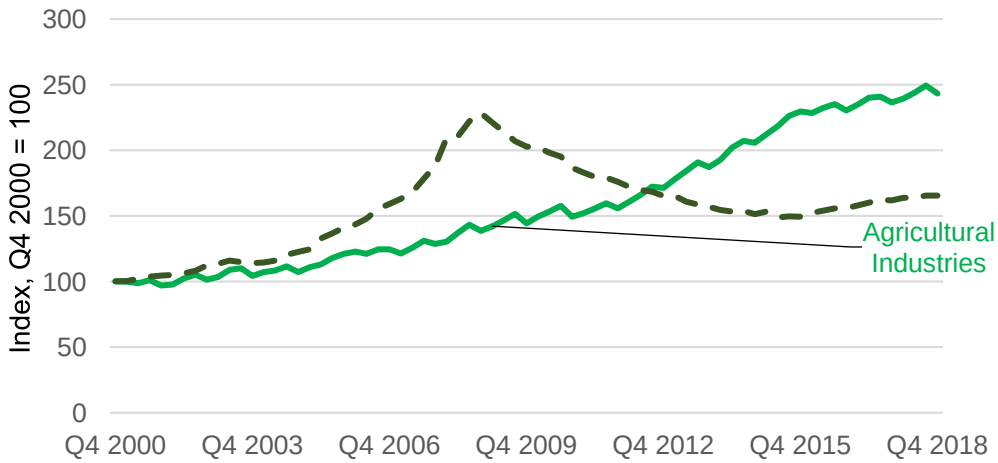
How does investment drive productivity and what barriers can stop farmers from investing?

Capital investment drives productivity improvements by enabling workers to be better able to do their jobs and produce output more efficiently. Uncertainty about the future is a key barrier to investment decisions.

Lending to the agricultural sector is strong….

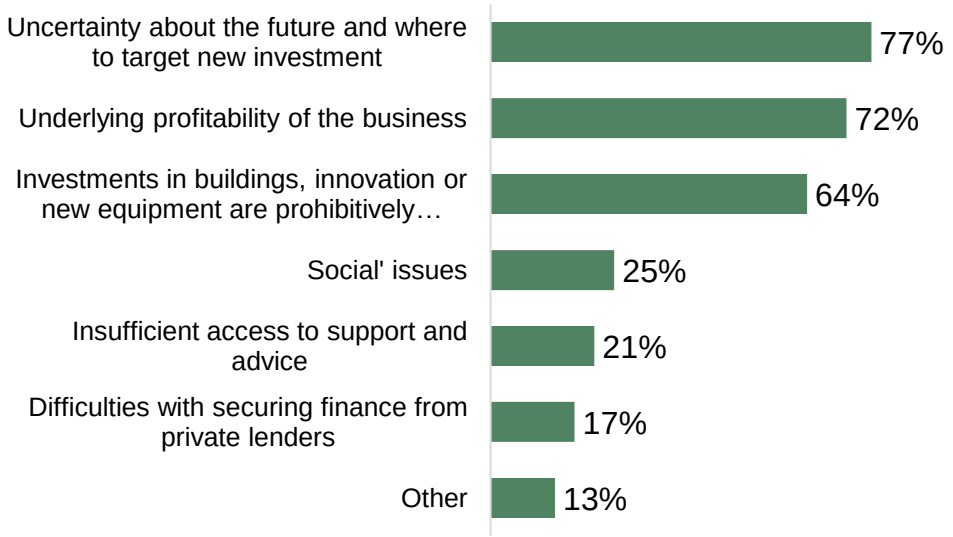
Agriculture has seen a consistent upward trend in lending since 2000, compared to non-financial corporations. Although not all lending will be for investment purposes, access to finance for farm businesses appears to be strong.

Outstanding lending from monetary financial institutions(£m)



…however, there are some barriers to investment.

Proportion of online respondents that selected each option as a barrier to new capital investment that could boost profitability and improve animal and plant health on-farm



Whilst only 17% of on-line respondents to Defra's Health and Harmony consultation cited difficulties with securing finance as a barrier to capital investment, for 77% the barrier was considered to be uncertainty about the future and where to target new investment.

Listening to farmers as part of our discussion groups, we heard that profitability is a key factor in driving investment decisions. Some farmers highlighted future uncertainty over markets and standards (including trade and tariffs) as a barrier to investment, as well as labour and financial support becoming increasingly important, including for securing loans based on less certain business plans.

How does competition drive productivity and what competition is there in the agriculture sector?

Competition, as measured by entry and exit rates, is much lower for agriculture than for the wider economy. Removing Direct Payments could drive productivity improvement through greater entry and exit and reallocation of resources.

Competitive markets encourage new entrants and act as a spur to incumbents to innovate or exit.

The Direct Payments system has acted to maintain high prices of agricultural land, impacting entry and exit rates as higher land prices have: made it difficult for new entrants wanting to start a new farm businesses to obtain land; increased the cost of expansion for productive businesses; and constrained incentives to exit for less productive farm businesses. If there is limited exit from the sector, this directly limits entry due to the need for land on which to farm.

The median age of farm holders is **60 years** and just 2% are aged under 35 years highlighting the limited structural change in the sector.

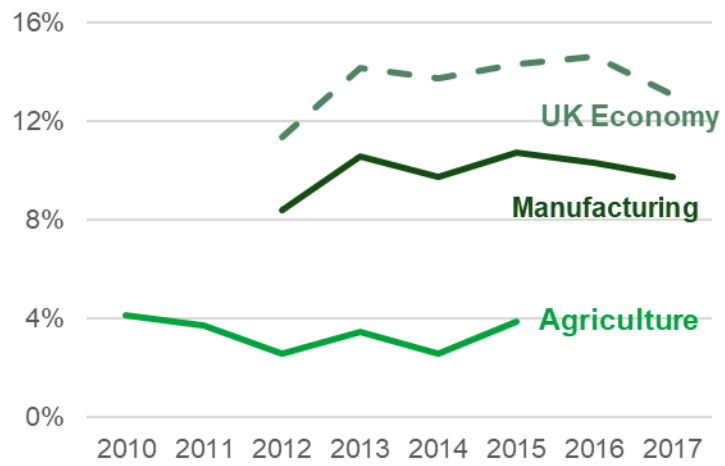
60 years
Median age of farm holders in England

2%
farm holders aged under 35 in England

A common view from farmers participating in Future Farming discussion meetings was that encouraging new entrants was important for the long-term success of the industry.

There was also a view that some structural change could be encouraged by older or less productive farmers leaving the industry.

UK business birth rates



Business birth and death rates for agriculture remain consistently below those for the UK economy as a whole and the manufacturing sector. As a result, the "churn" of businesses in the agriculture sector is limited.

UK business death rates