Agriculture in the UK Evidence Pack

September 2022 update

Department for Environment Food & Rural Affairs

Government Statistical Service

Contents

Introduction: About this publication

This publication presents a range of key statistics on farming and its environmental impacts. It is structured in the same way as the publication Agriculture in the UK 2021 and complements the information published in that report.

The evidence and narrative presented here is based on the latest available data at the time that Agriculture in the UK was published. The majority of data is for the 2021 calendar year but in some cases data are for earlier years where more recent data is unavailable.

This publication will next be updated in the summer of 2023, with data for the 2022 calendar year.

Introduction: Why is agriculture important?

In 2021, agriculture contributed around 0.5% to the United Kingdom’s economy. Agriculture provides half of the food we eat, employs almost half a million people and is a key part of the food and drink sector.

In 2021, farmers and land managers managed 71% of the UK's land, and through them we can safeguard our natural environment and ensure the highest standards of animal and plant health.

This Agriculture in the UK evidence pack brings together existing statistics on agriculture to summarise the current state of the agricultural industry.

Structure of Industry

How is the UK agriculture industry structured and how is agricultural land used?

In 2021, the UK agriculture industry was made up of 216,000 farm holdings. The utilised agricultural area was 17.2 million hectares of land, 71% of the UK land total.

The Utilised Agricultural Area (UAA) includes arable and horticultural crops, uncropped arable land, land for outdoor pigs, temporary and permanent grassland and common rough grazing.

Total utilised agricultural area has remained between 17 and 18 million hectares since 2000.

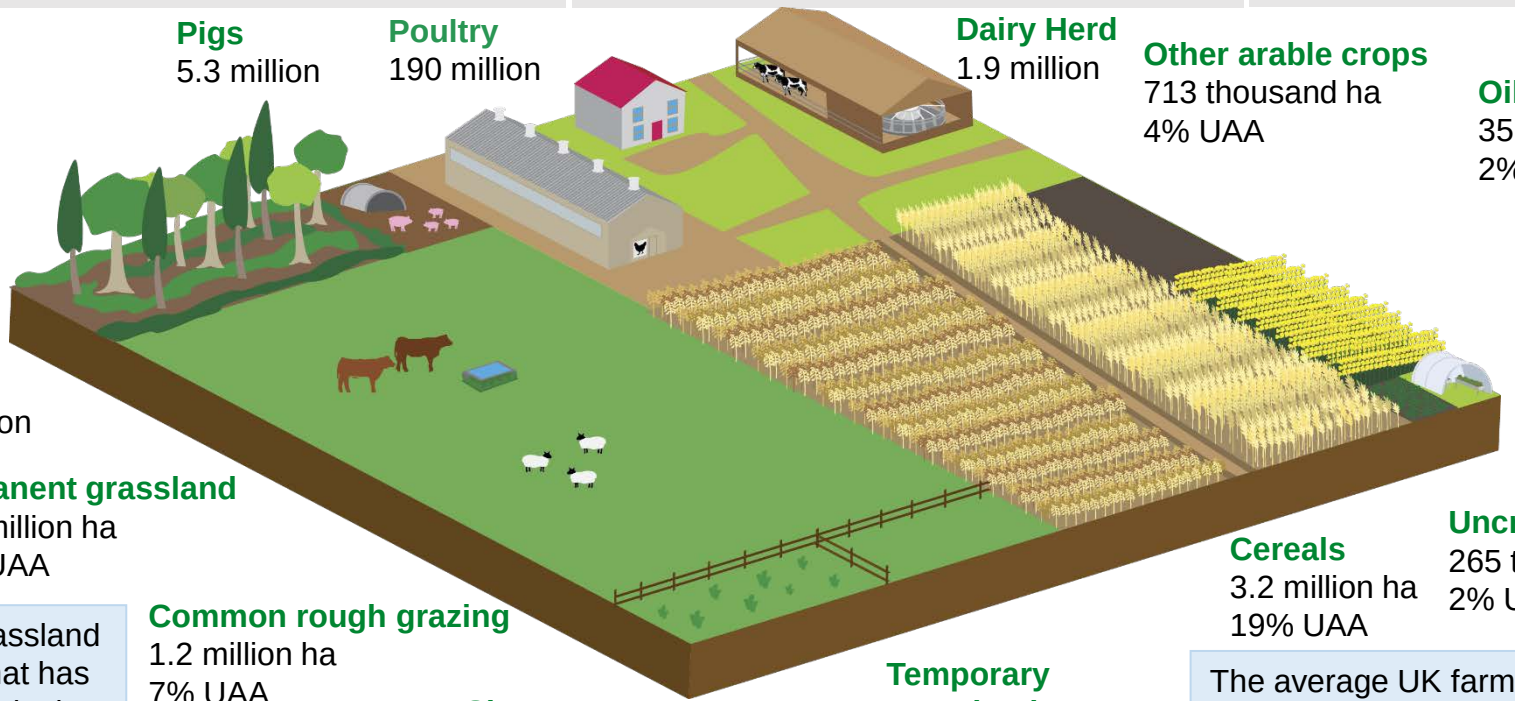
Total croppable area consists of cereals, oilseed, potatoes, other arable crops, horticultural crops, uncropped arable land and temporary grass.

In 2021, the total croppable area was 6.1 million ha, just over 1/3 of the UAA.

In 2020, 121,000 hectares of agricultural land were used to grow crops for bioenergy. This represents just under 2.1% of UK arable land.

Around 30% of this land was used for biofuel (biodiesel and bioethanol).

In 2021:



Pigs
5.3 million

Poultry
190 million

Dairy Herd
1.9 million

Other arable crops
713 thousand ha
4% UAA

Oilseeds
352 thousand ha
2% UAA

Woodlands
1.1 million hectares on farmland
6% UAA

Horticulture
161 thousand ha
1% UAA

Cattle
9.6 million

Potatoes
137 thousand ha
1% UAA

Permanent grassland
10.0 million ha
58% UAA

Uncropped arable land
265 thousand ha
2% UAA

Cereals
3.2 million ha
19% UAA

Common rough grazing
1.2 million ha
7% UAA

Sheep
33 million

Temporary grassland
1.2 million ha
7% UAA

Permanent grassland is grassland that has not been sown in the last 5 years.

The average UK farm size in 2021 was 81 hectares. However, almost half of all farms were less than 20 hectares in size.

How are farm types classified in England?

Across England, many farms undertake more than one type of farming, and so farms are classified according to their main output within one of nine main farm types.

- **General Cropping**
- **Cereals**
- **Mixed**
- **Horticulture**
- **Poultry**
- **Pigs**
- **Dairy**
- **Grazing livestock - lowland**
- **Grazing livestock - less favoured area**

The varied topography and climate of England means that some sectors are more concentrated in some regions than others.

The hillier upland regions are typically colder and wetter than the lowlands

Sheep are commonly farmed in hillier areas, particularly where cool summers and high rainfall are unsuitable for growing crops. 20% of England's sheep herd is in the South West and 20% in the North West.

Moist air brings wet weather to the west of the England

The warm, wet climate and gentler hills of the west of England make it suitable for **dairy farming**. 39% of England's dairy herd is farmed in the South West.

Poultry can be reared indoors and require less land compared to other types of farming. Therefore, poultry farming is less dependent on environmental factors such as climate, altitude or soil type.

Hot air brings dry summers to the East of England

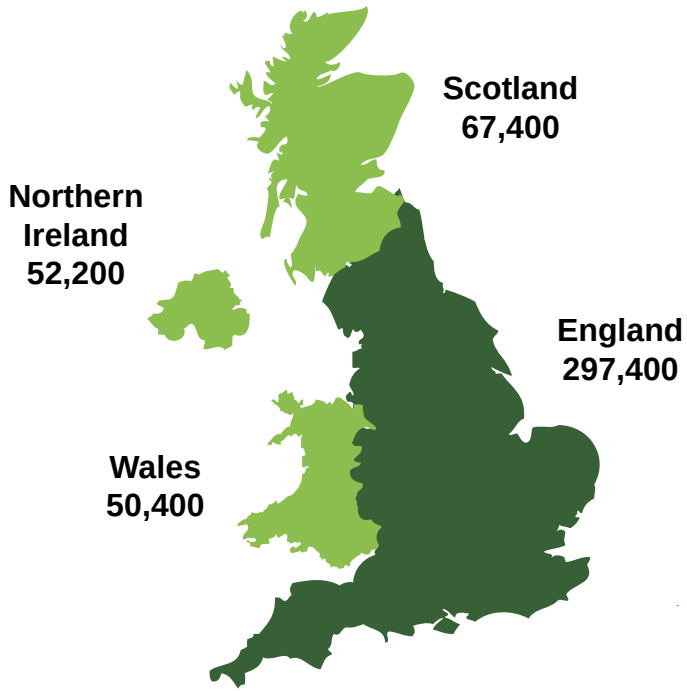
Pig farming is concentrated close to where the feed is produced. 38% of England's pigs are reared in Yorkshire and The Humber.

Warm summers and flat land makes the East suitable for **cropping**. 64% of England's sugar beet and 26% of total cereals are grown here.

How many people are employed within agriculture in the UK?

In the UK in 2021, agriculture employed almost half a million people, who were mainly involved in business ownership or management.

467,400 people were employed in the agricultural sector in the UK in 2021.



The size of the UK agricultural labour force has remained largely stable over the past decade ranging between 464,000 and 481,000

In 2021, 64% of those employed in the agricultural sector in the UK were either as farmers, business partners, directors or the spouse.

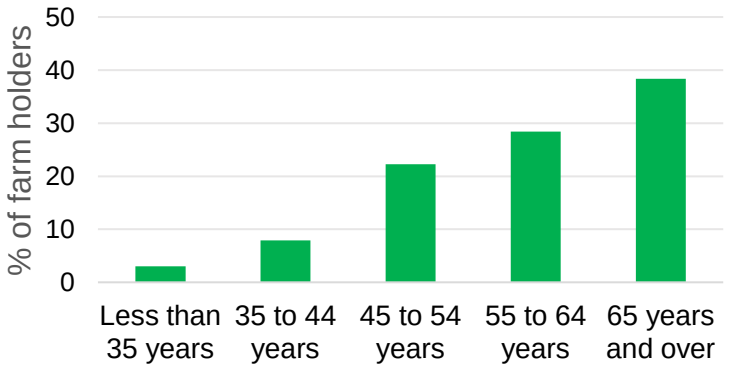
All agriculture workers **(467,400)**

Farmers, business partners, directors, spouses **(300,600)**

Regular employees, salaried managers, casual workers **(166,800)**

In 2016:

Agriculture typically has an ageing workforce. In 2016, over a third of all farm holders in the UK were over the age of 65 years. Just 3% of holders were aged less than 35 years.



85% of farm holders in the UK in 2016 were male

15% of farm holders in the UK in 2016 were female

We capture information on the age and gender of farm holders less frequently. The most up to date data available is for 2016.

What are the characteristics of farmers and employees in England?

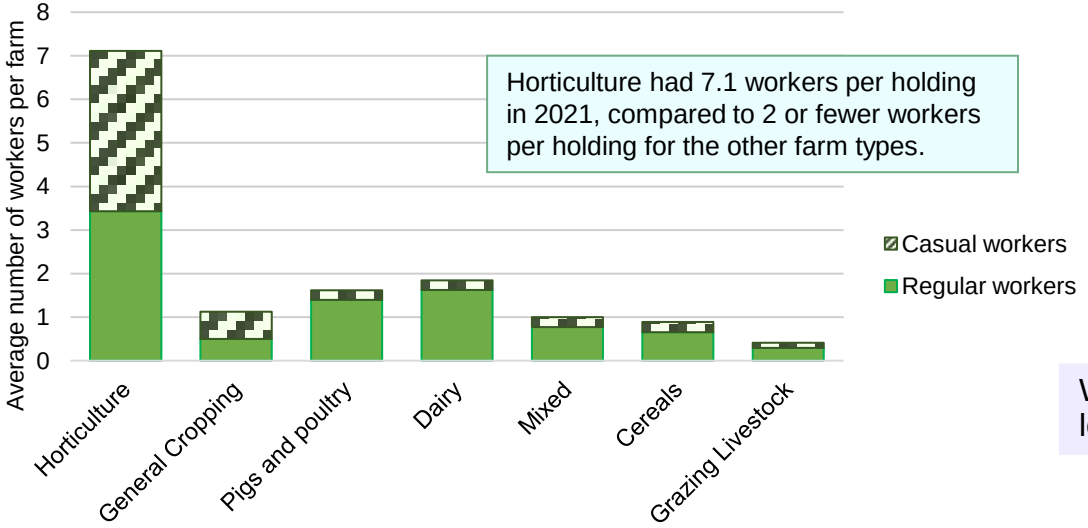
In England, horticulture was the most labour-intensive farm type in 2021, with 7.1 workers per holding compared to 2 or fewer workers per holding for all other farm types. The majority of farm holders in England in 2016 were male (84%) and over a third were aged 65 or more.

In 2021

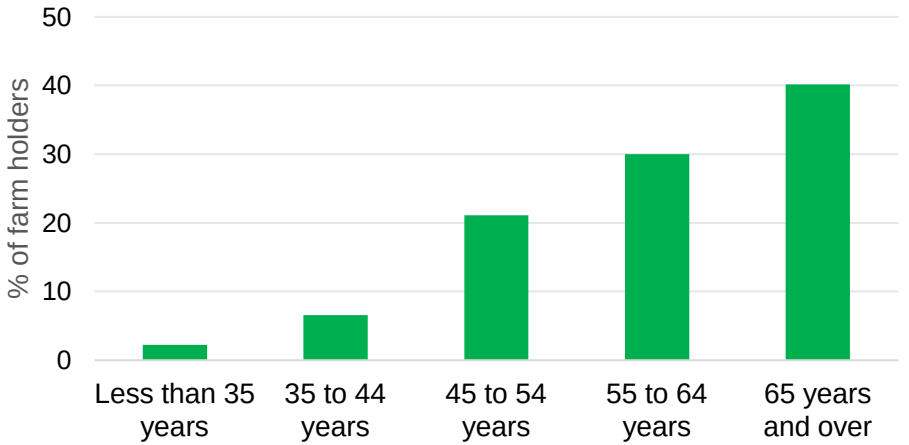
All agriculture workers **(297,400)**

- Farmers, business partners, directors, spouses **60% (179,000)**
- Farmers managers **4% (11,800)**
- Farm workers **36% (106,600)**
  - Regular workers **64% (67,700)**
  - Seasonal, casual, gang workers **36% (38,900)**

Average number of workers per farm



Agriculture typically has an ageing workforce.
In 2016, over a third of all farm holders in England were over the age of 65 years. Just 2% of holders were aged less than 35 years.



84%
of farm holders in England in 2016 were male

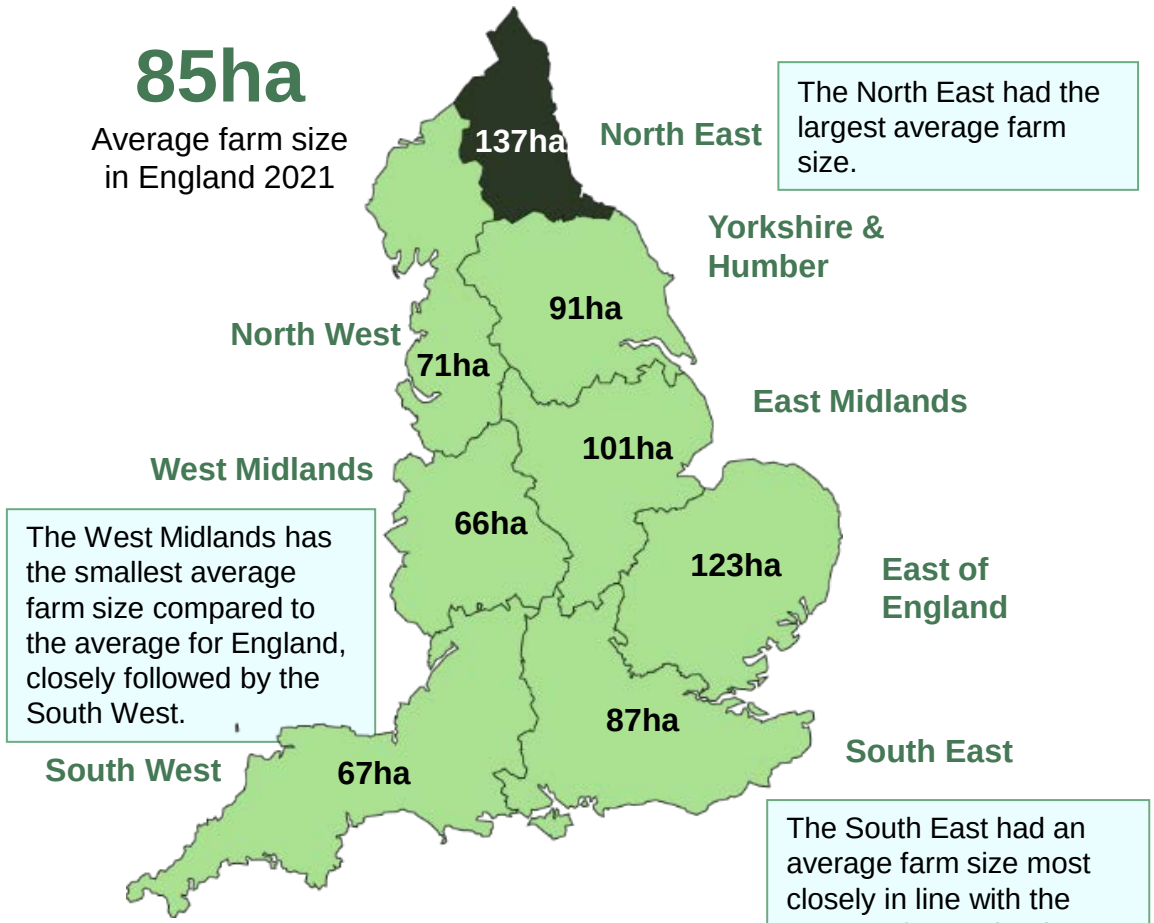
16%
of farm holders in England in 2016 were female

We capture information on the age and gender of farm holders less frequently. The most up to date data available is for 2016.

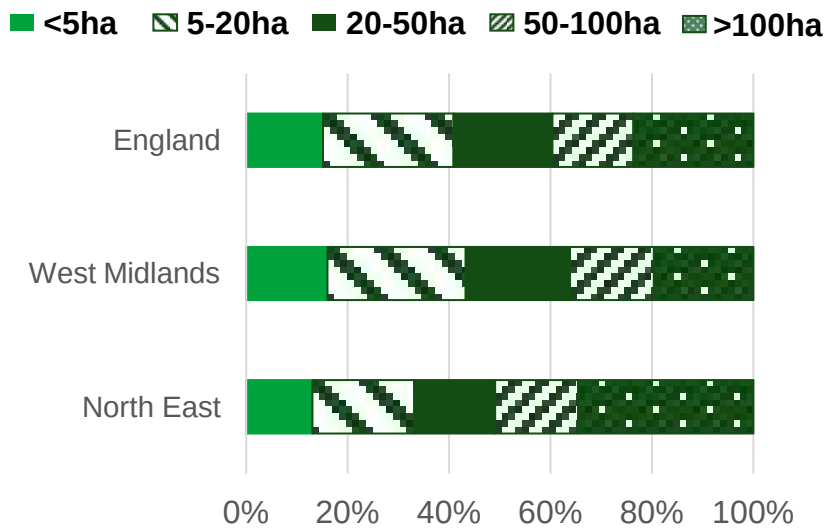
How does average farm size vary across the English Regions?

In 2021, the average farm size in England was 85ha, however farms in the North East had the largest average farm size of 137ha and farms in the West Midlands were, on average, the smallest at 66ha.

Average farm size in England and each Region 2019 in hectares (ha)



Distribution of farms by size in England (number of holdings)



The proportion of farm size >100ha is greater in the North East than any other region, which may be due to the number of large estates in the North East.

Farm type is also a factor, as there is a high proportion of LFA farms in the North East, which tend to be larger because of the grazing area required. There are fewer dairy farms, which tend to be smaller in area.

In England, how many farms are owner occupied and how many are tenanted?

In England in 2021, the majority of farms (54%) are owner occupied, followed by 31% mixed tenure and 14% wholly tenanted. For the remaining 1%, tenancy was undeclared.

Of all the farms in England…

54%
owner occupied

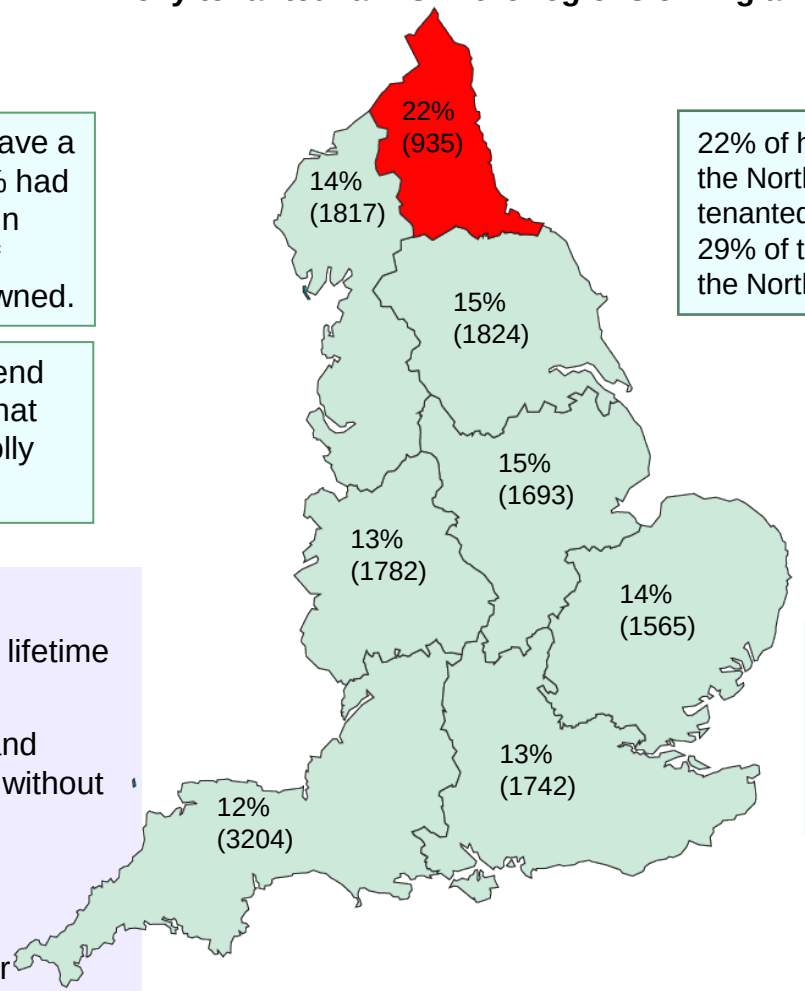
14%
wholly tenanted

31%
mixed tenure
(owning and renting the land that they farm)

Wholly tenanted farms have a younger age profile: 18% had a farmer aged under 45 in 2016 compared to 6% of farms that were solely owned.

Farms of mixed tenure tend to be larger than farms that are wholly owned or wholly tenanted.

Wholly tenanted farms in the regions of England



22% of holdings (935) in the North East were wholly tenanted, accounting for 29% of the farmed area in the North East.

In each of the other regions, 15% or less of holdings were wholly tenanted, accounting for less than 20% of land.

Types of Tenancies in England

Full Agricultural Tenancies (FAT), which generally have lifetime security of tenure.

Farm Business Tenancies (FBT), which can be formal and informal (i.e. based on the same principles as an FAT but without the accompanying legal documentation).

FATs and **FBTs** can be with and without Direct Payment entitlements and can include buildings/other assets.

Seasonal agreements include licences for grazing and/or mowing - these can also include SPS/BPS entitlements.

Farming Income

How is farm business profit calculated and what was the average for all farms in England in 2017/18 and 2019/20?

Farm Business Income (FBI) is a measure of net profit, calculated as Farm Business Outputs (revenue) minus Farm Business Inputs (costs). Between 2018/19 and 2020/21 the average profit for all farms was £50,900, with Direct Payments equivalent to the largest share of this (54%).

Average inputs and outputs for all farms from 2018/19 – 2020/21

Agriculture (£257,000)
Main measure of the value of crop and livestock outputs.

On average, across all farm types the agricultural part of the business **made a small profit** of £5,600 between 2019/19 and 2020/21.

Diversification (£24,200) Non-agricultural work of an entrepreneurial nature, on or off farm, but utilising farm resources, such as running a farmhouse bed and breakfast.

Agri-environment (£6,000) Payments to deliver environmental outcomes, compensating for income foregone in providing them.

Direct Payments (£30,300)
Direct Payments are farm subsidy payments from the EU under the Common Agricultural policy. They are paid to farm businesses based on the amount of agricultural land they maintain.

Costs (£267,100)
Around half of costs to farmers are variable, changing depending on the level of production, and the other half are fixed, of which machinery is their largest.

Farm Business Income (£50,900)
The amount that a farm business has left after costs to invest, pay taxes and pay salaries.

Output values include the total value of crops produced, livestock enterprise output, by-products, forage and cultivations, and miscellaneous output.

Inputs are resources used in the production process, such as feed, materials, labour and machinery, measured in physical or financial terms.

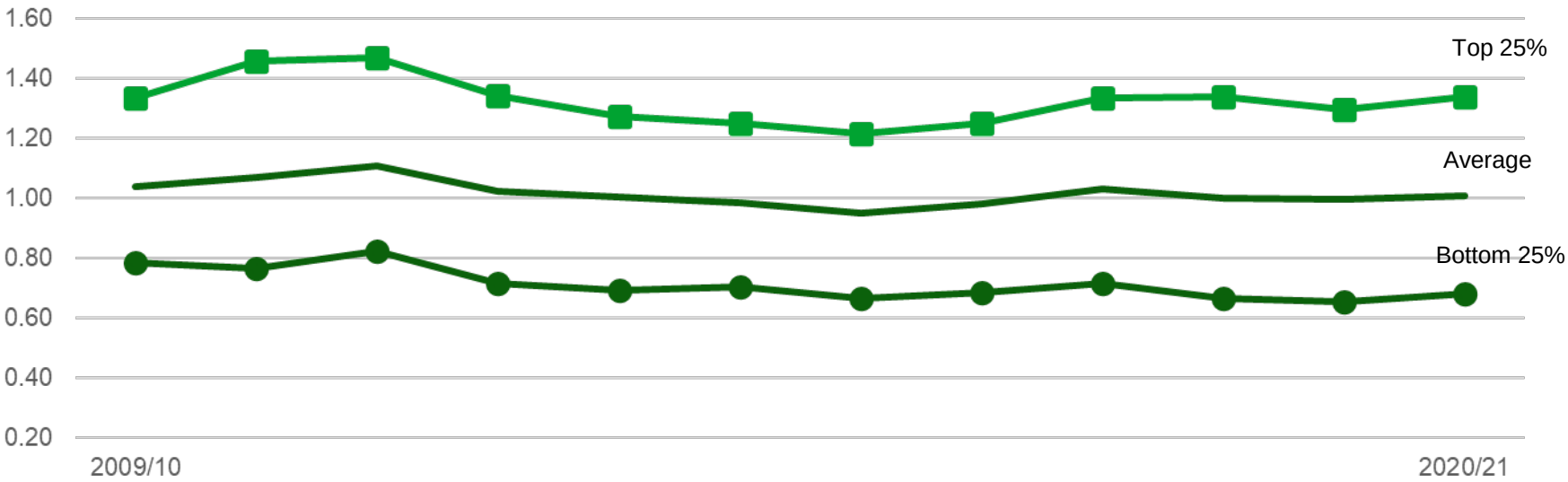
Direct Payments contribute, on average, £30,300 to the revenue of the farm, but also have costs (£2,900) associated with them, such as the application process and cross compliance. This means that the average net income from Direct Payments was around £27,400.

How has economic performance of all farm businesses changed between 2009/10 and 2019/20?

Average performance has changed little since 2009/10 for the business as a whole. The difference between the top 25% and bottom 25% has grown very slightly.

Farm business performance

If performance ratio = 1, then value of outputs = value of inputs Over 1 indicates a profit and under 1 indicates a loss



Ratio of economic performance, top 25% vs bottom 25%, 2009/10 to 2020/21:

2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
1.7	1.9	1.8	1.9	1.8	1.8	1.8	1.8	1.9	2.0	2.0	2.0

Farm Business Income (FBI) is calculated as the difference between Farm Business Outputs and Farm Business Inputs. It does not include an imputed cost for 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.

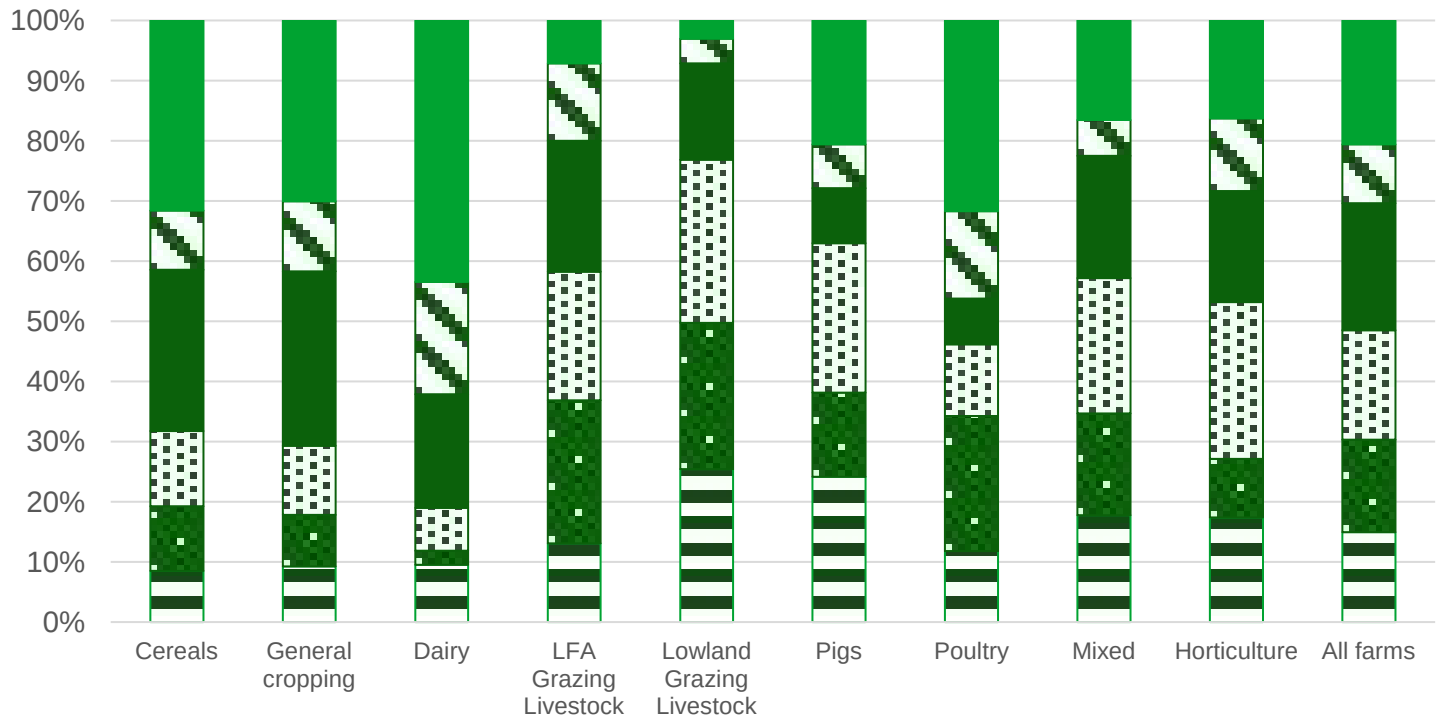
What are the most profitable farm business types?

Between 2018/19 and 2020/21, 21% of all farms made a profit of more than £75k, with dairy, poultry and cereal farms having the greatest proportion of farms in this group. Grazing livestock and pig farms were most likely to make a loss.

Key (Average in brackets)

- More than £75k
- £50k to less than £75k
- £25k to less than £50k
- £10k to less than £25k
- £0k to less than £10k
- Less than £0 (make a loss)

% of farms within different Farm Business Income bands, 2017/18 and 2019/20



While Farm Business Income averages are useful to get a sense of how profitable the sector or a particularly farm type is overall, averages can mask the variation in profitability.

Thus, while there are some farms in every farm type who are not making a profit currently, there are also a large proportion of farms who are, demonstrating the potential for farms to be more profitable overall.

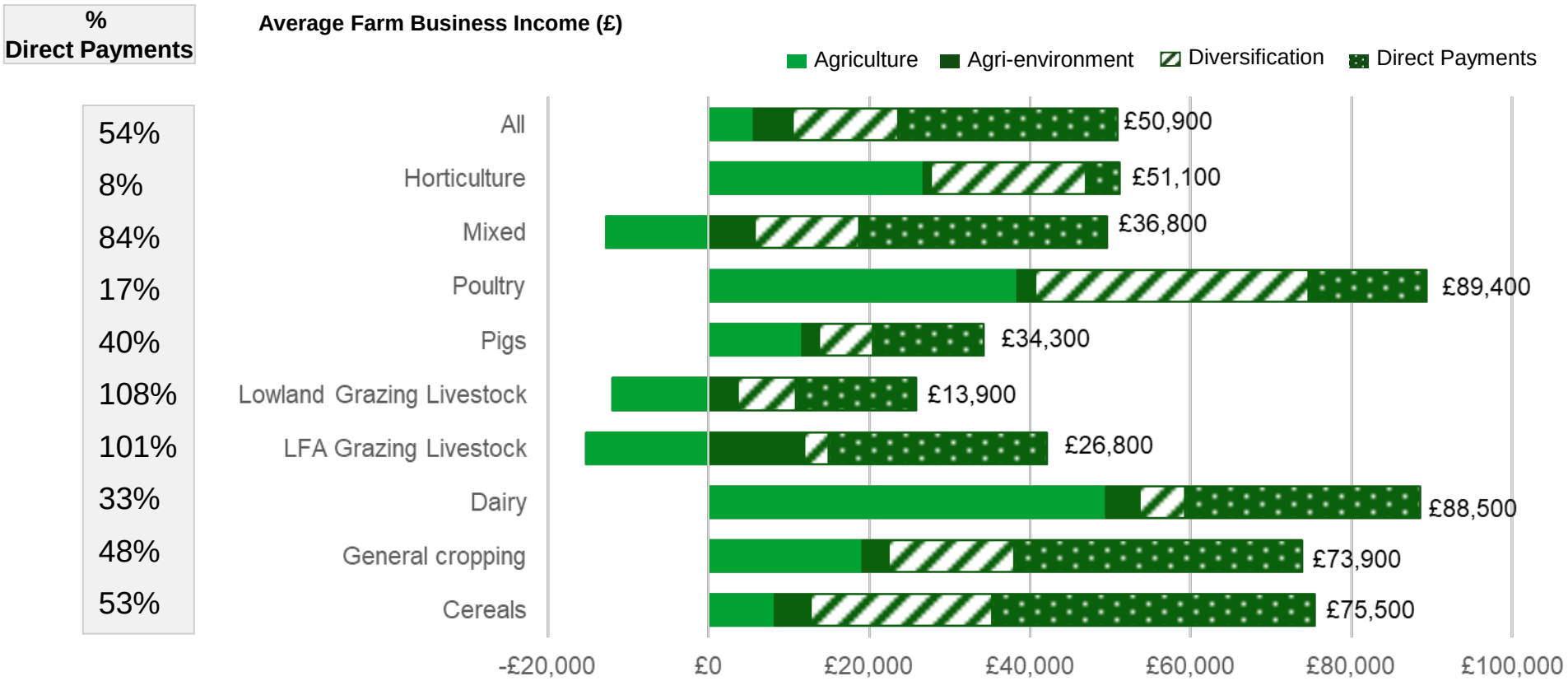
Over two fifths of Dairy farms made a profit of more than 75k (41%), however even with these farms 10% made a loss.

58% of Grazing Livestock farms in the Less Favoured Areas and 77% of Lowland Grazing Livestock farms had a profit of less than £25k per year.

32% of poultry farms made a profit of over £75k, but 34% made less than £10k

How does profit (Farm Business Income) vary across the different farm types in England?

Profit (Farm Business Income) varies across the different farm types, and over the period 2018/19 to 2020/21 poultry farms were most profitable and grazing livestock farms the least.



Mixed and grazing livestock farms made a loss from the agriculture side of the business as their costs of production outweighed the value of their output.

For dairy and horticulture farms, over half of their farm business income came from the agricultural side of the business.

Over 80% of Farm Business Income came from Direct Payments for grazing livestock and mixed farms.

How does economic performance vary between the highest and lowest performing farms in England?

Between the years 2018/19 and 2020/21, across all farm types in England, the average performance of the top 25% of farms was 1.6 times better than the bottom 25%. The largest gap was among grazing livestock farms and smallest within dairy and poultry.

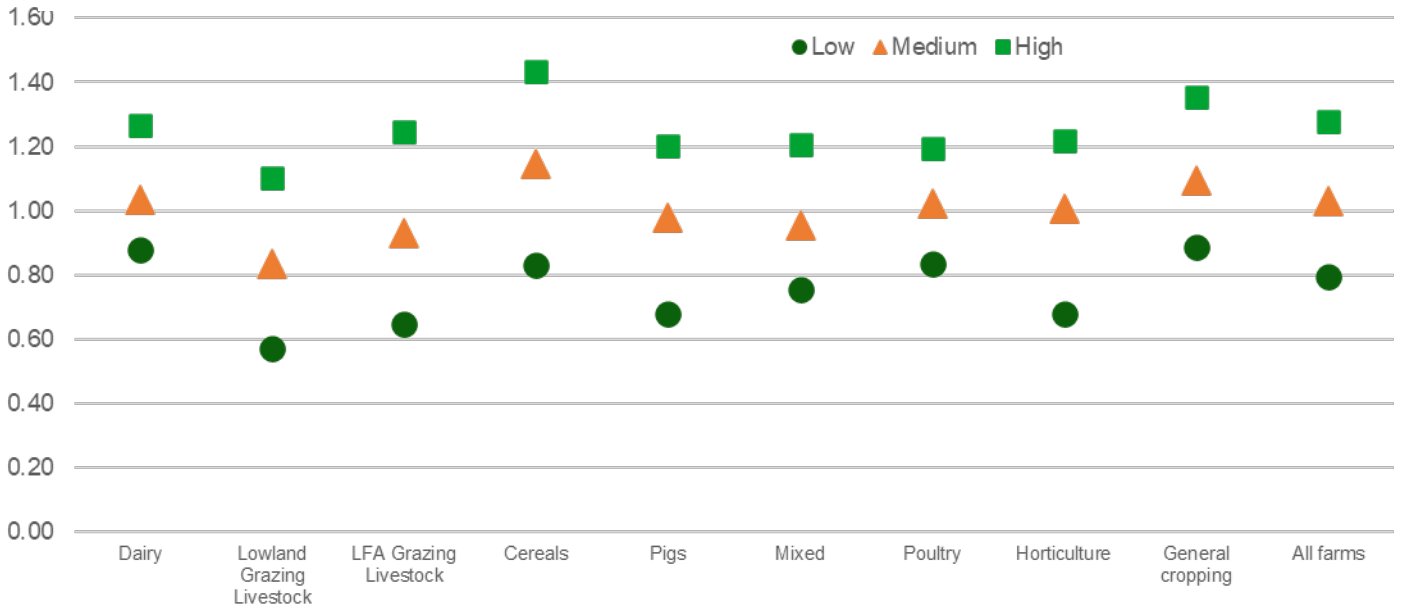
For the top 25% of farms across each sector, cereal farms had the best average performance with outputs 43% higher than their inputs.

Comparing average economic performance of the top 25% of farms to the bottom 25% of farms shows the largest performance gap was among horticulture and grazing livestock farms and pigs.

If the bottom 25% of farms improved to become more in line with the average then productivity for the whole sector would increase.

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, 2017/18 - 2018/19

A ratio of 1 means the outputs = inputs



Ratio of economic performance, top 25% vs bottom 25%:	1.4	1.9	1.9	1.7	1.8	1.6	1.4	1.8	1.5	1.6

Farm Business Income (FBI) is calculated as the difference between Farm Business Outputs and Farm Business Inputs. It does not include an imputed cost for 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.

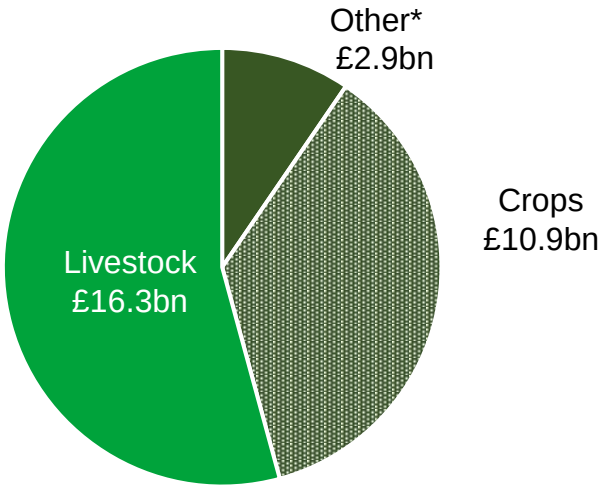
Accounts

What overall value of goods and services did agriculture produce and consume in 2021?

In 2021, agriculture generated £30.0bn worth of produce while consuming £18.9 worth of goods and services, giving a net contribution to the UK economy of £11.2bn.

£30.0 bn

Total economic activity in the **production** of new agricultural goods and services

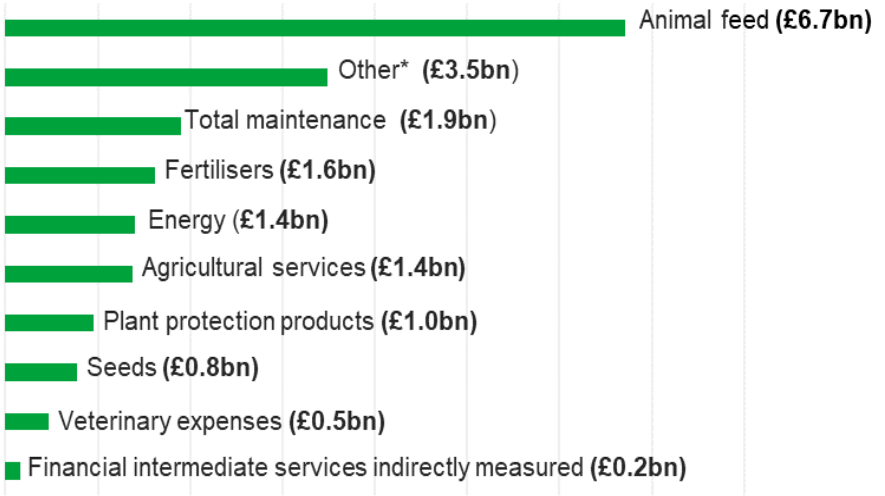


*Other includes inseparable non-agricultural activities

56% of livestock output is in the form of meat, 29% through milk, 9% through acquiring farming stock and 5% through eggs.

£18.9 bn

Intermediate **consumption** of goods and services to produce agricultural output

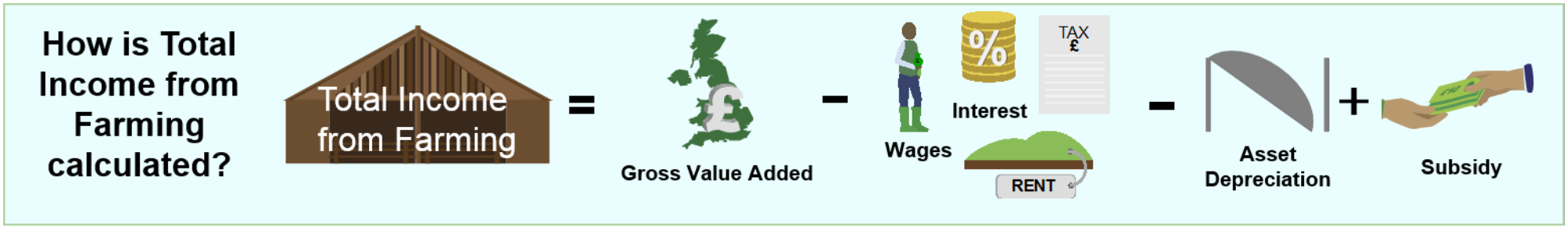


Producing agricultural products generates a demand for goods and services from other industries in the wider economy.

Gross Output (£30.0bn) less Intermediate Consumption (£18.9bn) = Gross Value Added (£11.2bn)

What is the total income (profit) from farming in the UK?

In the UK in 2021, the total profit of all farm businesses (Total Income from Farming) was £6.0bn. This is the gross value added (£11.2bn) minus depreciation of farm assets (£4.6bn), payment of wages, rent, interest and taxes (£3.9bn) and addition of farm subsidies (£3.2bn).



In 2021 these values were:

Wages, rent, interest & taxation
Total value: £3.9bn

Breakdown by type:

	£bn
Wages (inc. pensions)	£2.81
Rent	£0.55
Interest	£0.39
Taxes on production	-£0.10

Asset depreciation
Total value: £4.6bn

Breakdown by type:

	£bn
Equipment	£2.13
Livestock (a)	£1.37
Buildings	£1.12

Subsidies on production (b)
Total value: £3.2bn

Breakdown by type:

Scheme	£bn
Basic Payment Scheme	£2.83
Agri-environment payments	£0.36
Less favoured areas support scheme	£0.03
Animal disease compensation	£0.03

(a) includes those held for draft, breeding or dairy purposes
(b) Subsidies on production" comes from the breakdown of UK agricultural accounts, and does not reflect the nature of payments, but is used here for consistency with other publications relating to Total Income from Farming; for example, agri-environmental schemes are not a subsidy and are based on income forgone.

How does the total income (profit) from farming vary from year to year?

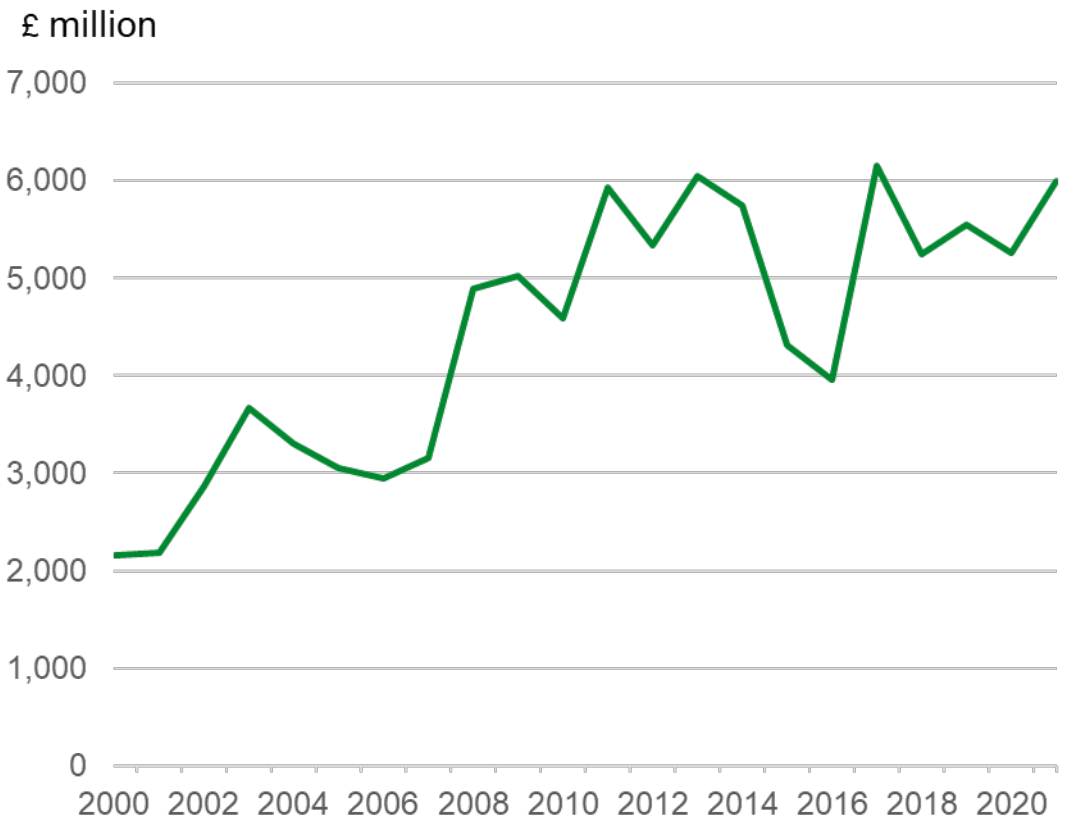
Profit as measured by Total Income from Farming (TIFF) varies from year to year and therefore it is important to consider more than just one year when interpreting the performance of agriculture.

Exchange Rates
Farm income is exposed to variations in exchange rates. A weak pound is generally good for farming as UK agricultural goods become more competitive on the world market and imports become more expensive and less attractive.

Direct Payments
£/€ exchange rate affects income from Direct Payments, which is calculated in Euros. A weakening of the pound against the Euro increases the value of subsidy payment paid in pounds sterling.

Volatility
Income can be quite volatile with year-on-year rises and falls of over 40% over the last 20 years.

Total income from farming in the UK in real terms from 2000 - 2021



External shocks
Many products are traded globally, and droughts or disease in other countries cause shortages in production that can influence world commodity prices, impacting on the domestic market.

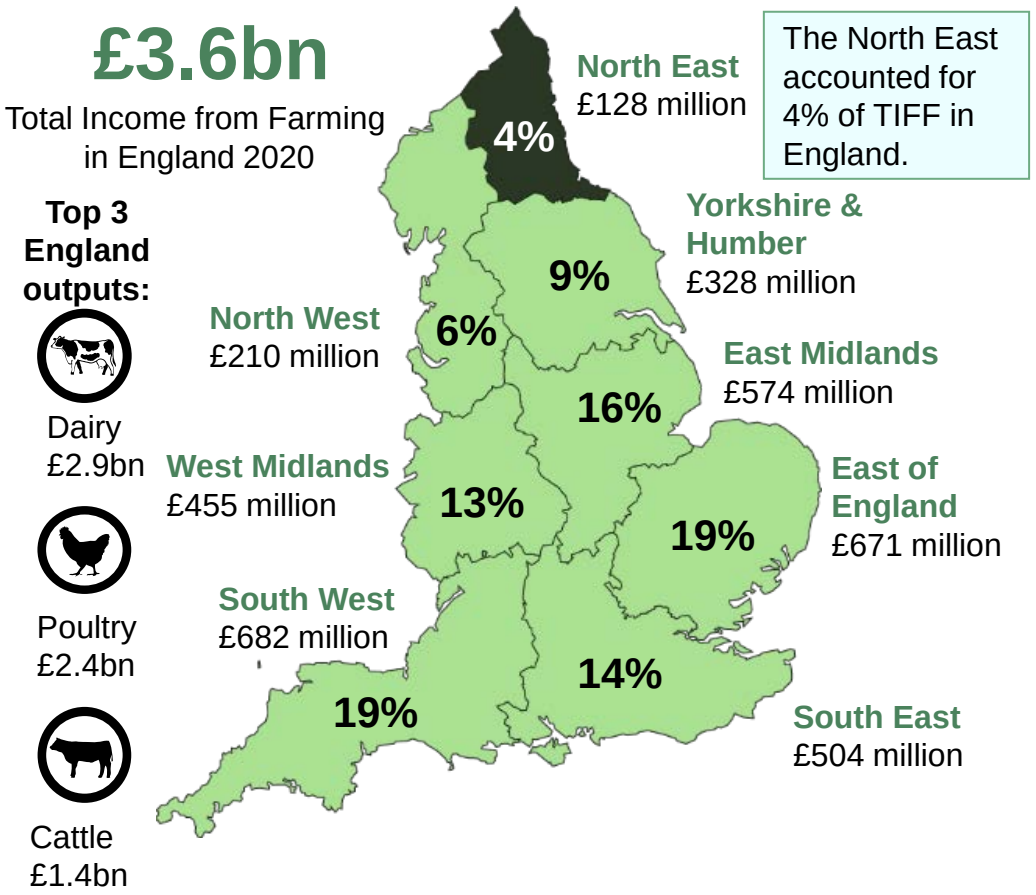
Production
Year on year, volumes of outputs remain relatively unchanged, whereas the prices farmers receive for what they produce can vary considerably. As a result incomes can rise and fall annually by up to 50%.

Weak Sterling
Reduces the pressure on farms to find efficiency gains which impact on growth.

What was England's Total Income from Farming and how did the contribution by Region vary in 2020?

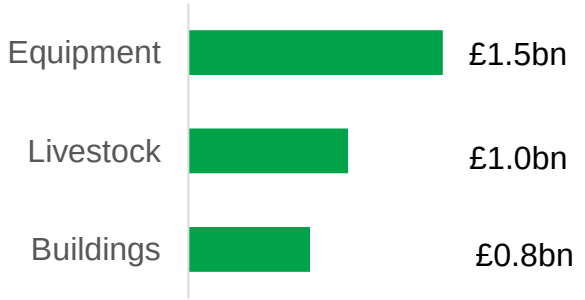
In 2020, after deductions for wages, rent, interest and asset depreciation and taking subsidy contributions into account, the total income from farming in England was £3.6bn, with the South West contributing the most (19%) and the North East the least (4%).

Total Income from Farming (TIFF) in England and the proportion from each Region 2020

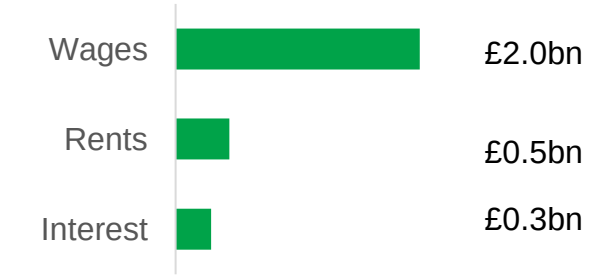


England's net contribution to the UK economy from agriculture was £7.6bn. To calculate TIFF, the following are deducted or added to this:

Minus Asset Depreciation values



Minus wages, rents and interest values



Plus subsidy value £2.1bn

Productivity

What is productivity and how has UK agricultural productivity changed over time?

Productivity is a measure of the efficiency with which businesses turn inputs into outputs, indicating the economic competitiveness of a sector. Total factor productivity (TFP) in agriculture has increased by 58% since 1973, due to a 36% increase in outputs and a 14% decrease in inputs.

Productivity improves if the same use of inputs produces a larger volume of output, or if the same volume of output is achieved from a smaller volume of inputs. The two main ways of measuring this are:

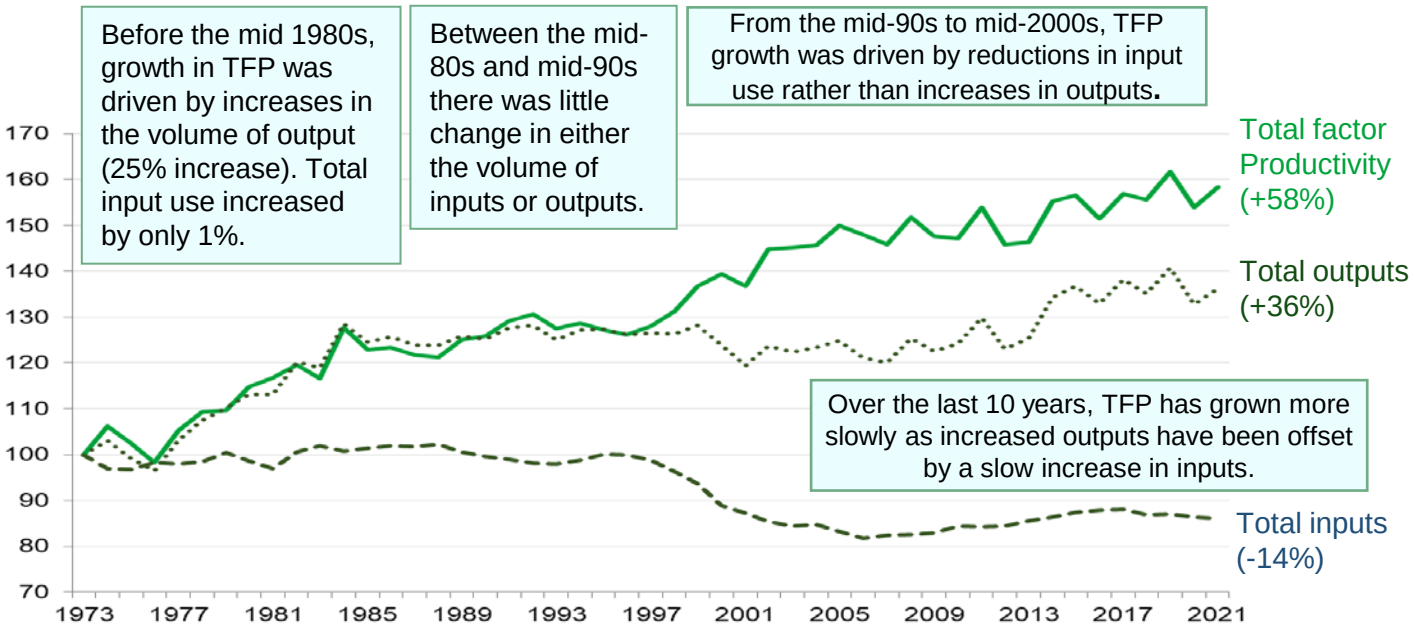
Total Factor Productivity (TFP) is a measure of how well agriculture turns inputs into outputs and is calculated as:

$$\frac{\text{total volume of outputs}}{\text{total volume of inputs}}$$

Labour Productivity (LP) is a measure of average output per unit of labour and is calculated as:

$$\frac{\text{total output (by volume or value)}}{\text{total volume of labour inputs}}$$

Index (1973=100) of agricultural inputs, outputs and total factor productivity since 1973



How do farmers view productivity?

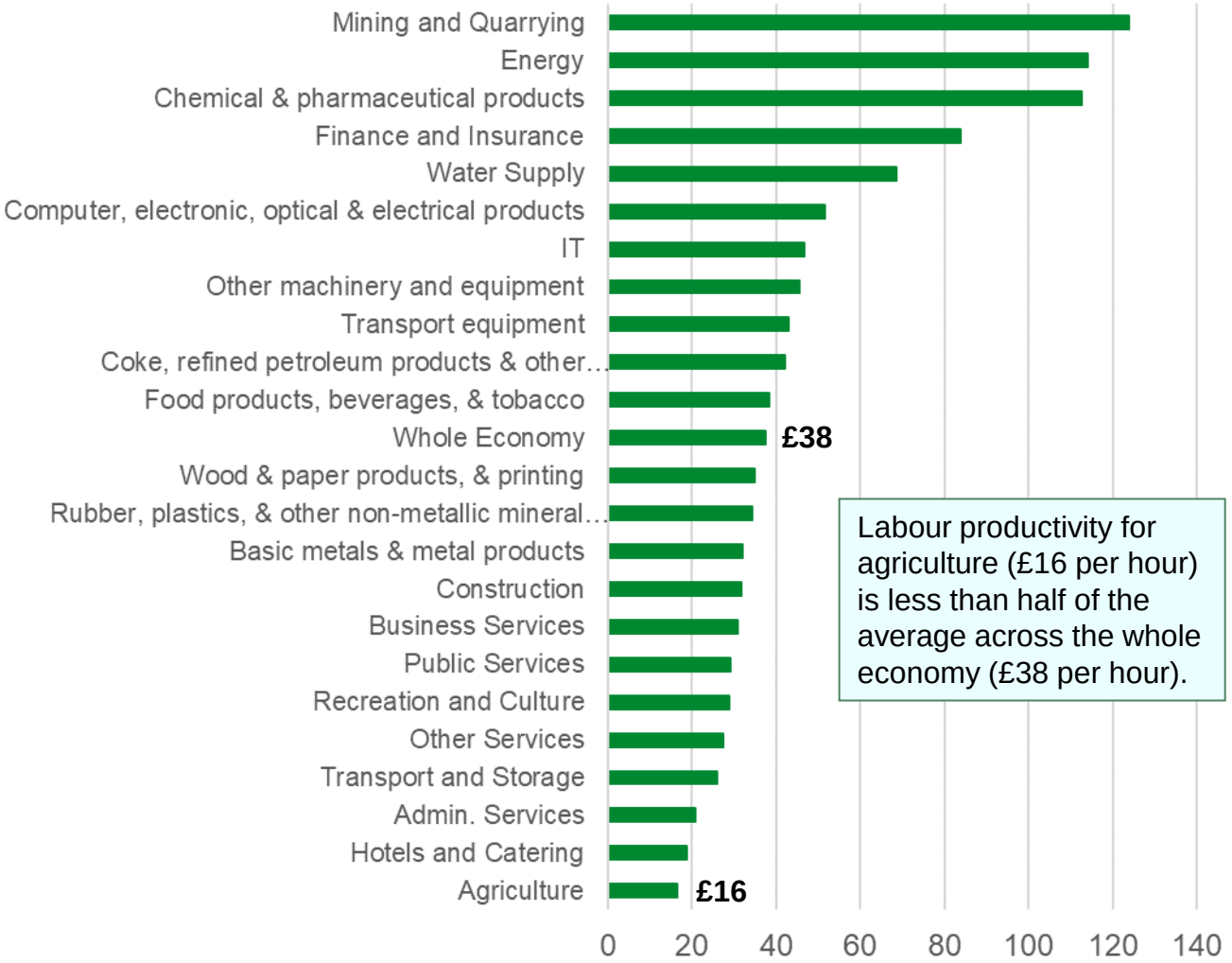
From an economic perspective, improving productivity in the agricultural sector increases the productive capacity of the economy, leading to economic growth and improved international competitiveness.

Farmers taking part in discussion groups understood 'productivity' to relate to profitability rather than its economic definition, and view productivity as part of their objectives for business growth and sustainability. The importance assigned to productivity depends on whether farmers' motivations are closer to profit and business growth, or lifestyle and environmental stewardship.

Productivity and the environment - Reducing input use by using more efficient production systems improves productivity, in addition to providing beneficial environmental outcomes from reduced use of natural resources and other inputs.

How does agricultural productivity compare to other sectors in the UK economy?

Over the first three quarters of 2021, the agriculture sector had an average labour productivity of £16 output per hour, the lowest figure of all sectors and £22 less per hour than the average for the whole economy (£38).



Labour productivity for agriculture (£16 per hour) is less than half of the average across the whole economy (£38 per hour).

Labour Productivity (LP) is a measure of average output per unit of labour and is calculated as:

$$\frac{\text{total output (by volume or value)}}{\text{total volume of labour inputs}}$$

Labour productivity is lower for agriculture than for many other sectors of the UK economy.

This could be due to an extent to the relatively low market value of agricultural products and relatively lower bargaining power compared to other primary industries such as mining and quarrying that extract high-value resources such as diamonds

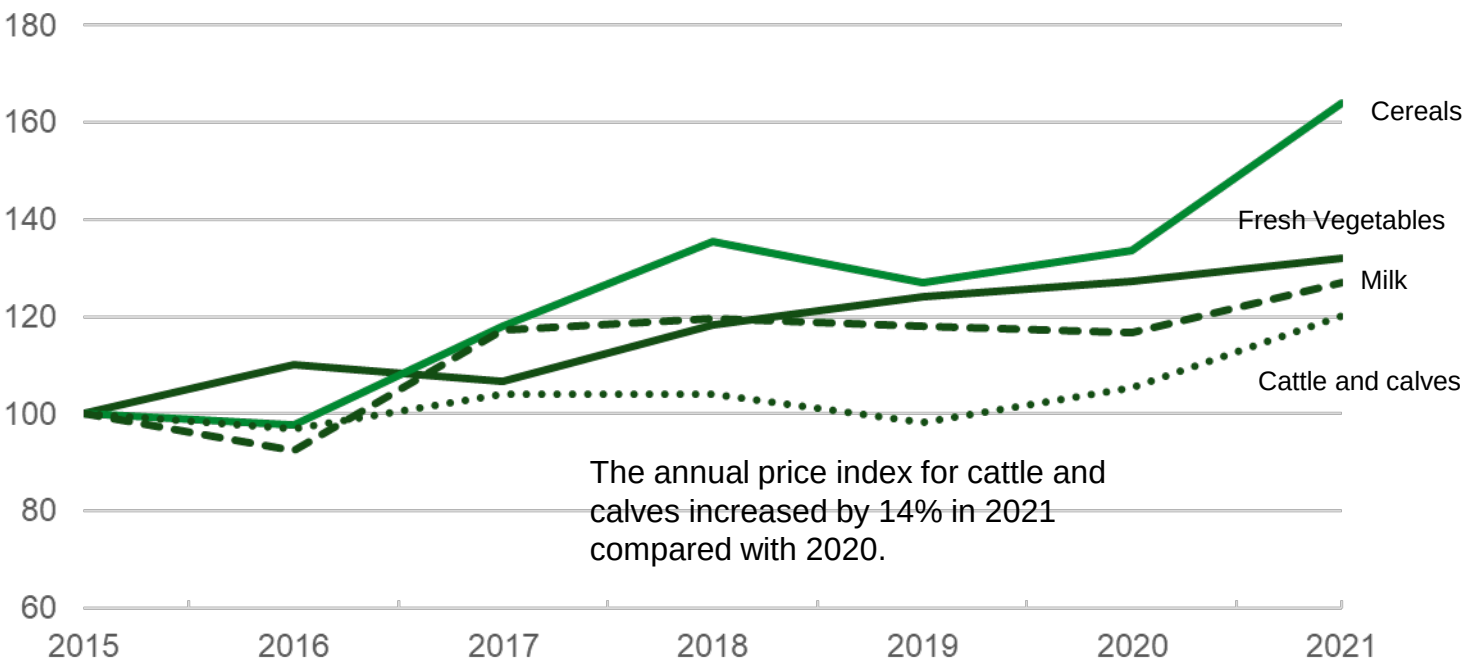
Agriculture's relatively low labour productivity may also be due in part to the relatively high hours worked in the sector, with workers on average working for 43 hours per week compared to the economy-wide average of 31.

Prices

How have the prices received by farmers for the main UK agricultural outputs changed over time?

The prices farmers have received for their produce have fluctuated over time, and the factors behind this are often outside of their control.

Price indices for selected agricultural commodities 2015 to 2021 (2015 = 100)



The annual price index for cereals increased by 23% in 2021 compared to 2020. This increase was driven by a tight global supply-demand balance for much of the year and export curbs on cereals from various markets.

The price of fresh vegetables has risen steadily since 1988

The annual price index for milk increased by 9% in 2021 compared with 2020, driven by reduced production as a result of increasing input costs.

These indices have a base year of 2015=100. Price indices measure relative price changes compared to a reference point or base year which is given a value of 100. The base year and the basket of goods used to calculate the index needs to be updated over time to reflect changing market trends, and for the Agricultural Price Index is updated every five years in accordance with the standardised methodology agreed across the EU.

Many determinants of output prices are outside the control of farmers. Increased global supply, changing consumer tastes and weather patterns are key external price determinants, particularly in heavily traded sectors like cereals.

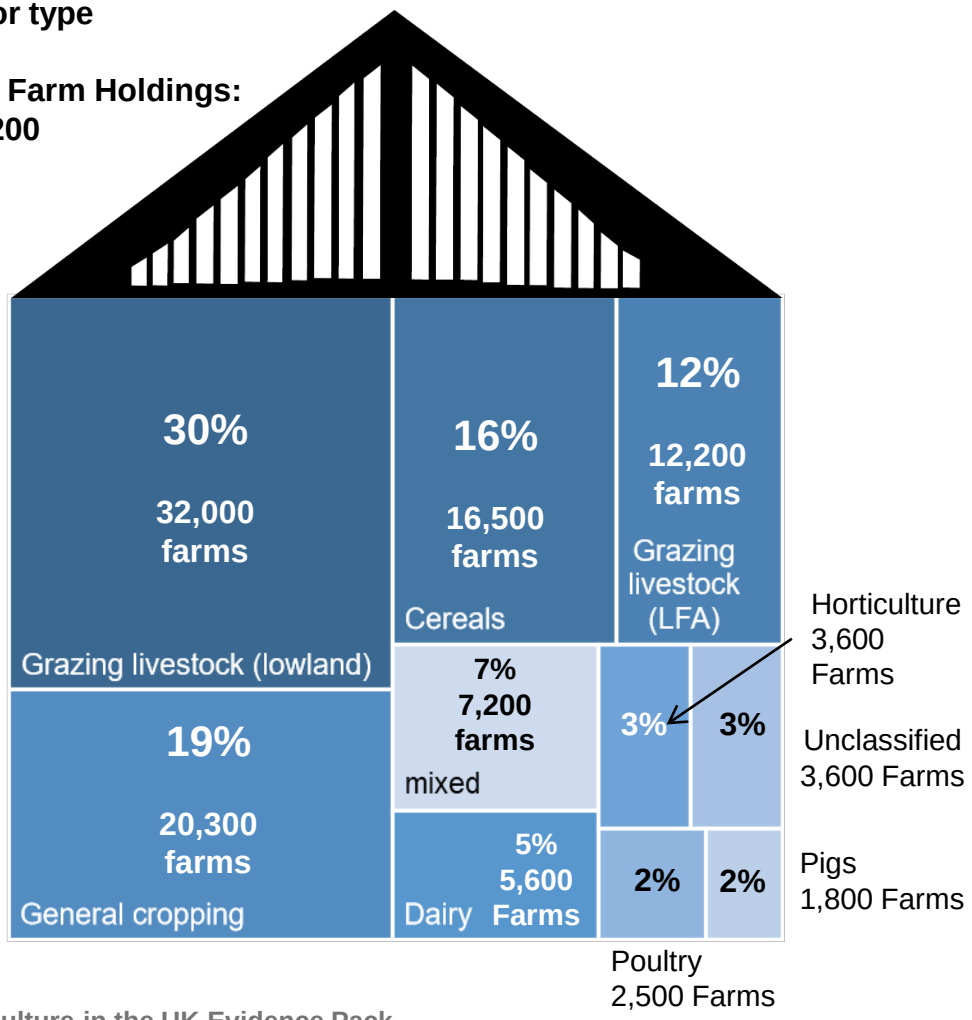
Crops and Livestock

How many of each farm type are there in England and how much land do they use?

In England in 2021, the most numerous farm type was grazing livestock in lowland areas (30% of total), and cereals farms accounted for the largest farmed area (32% of total).

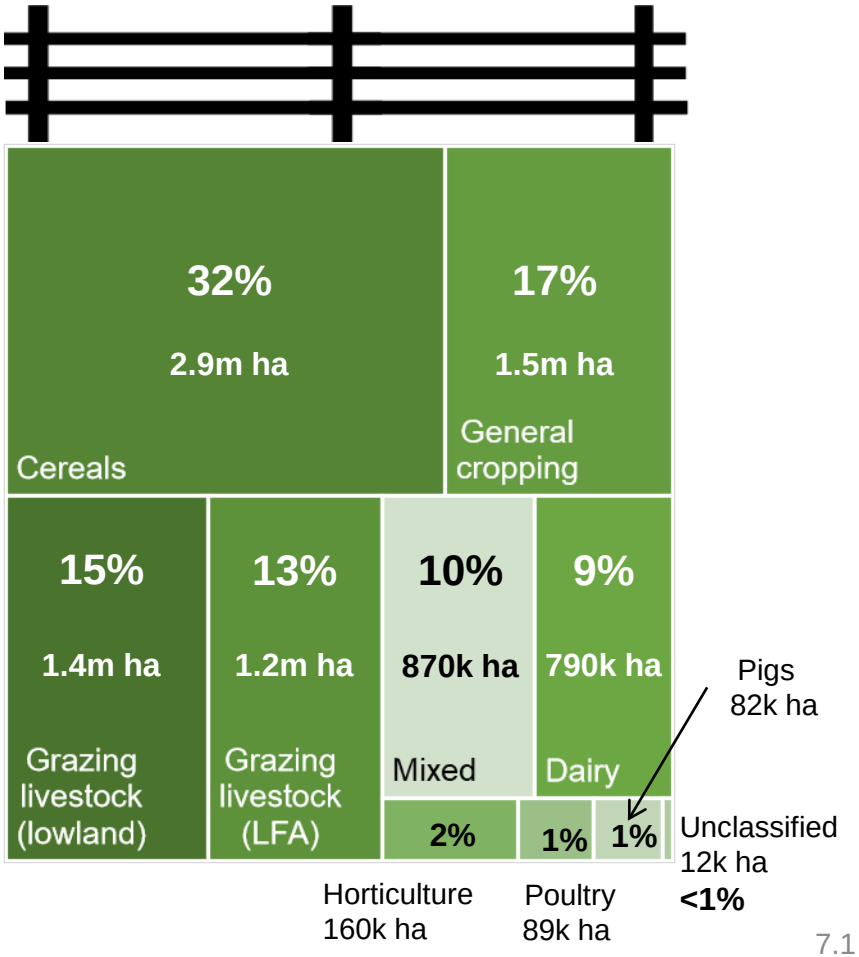
Number of farms by sector type

Total Farm Holdings: 105,200



Area of land used by sector type

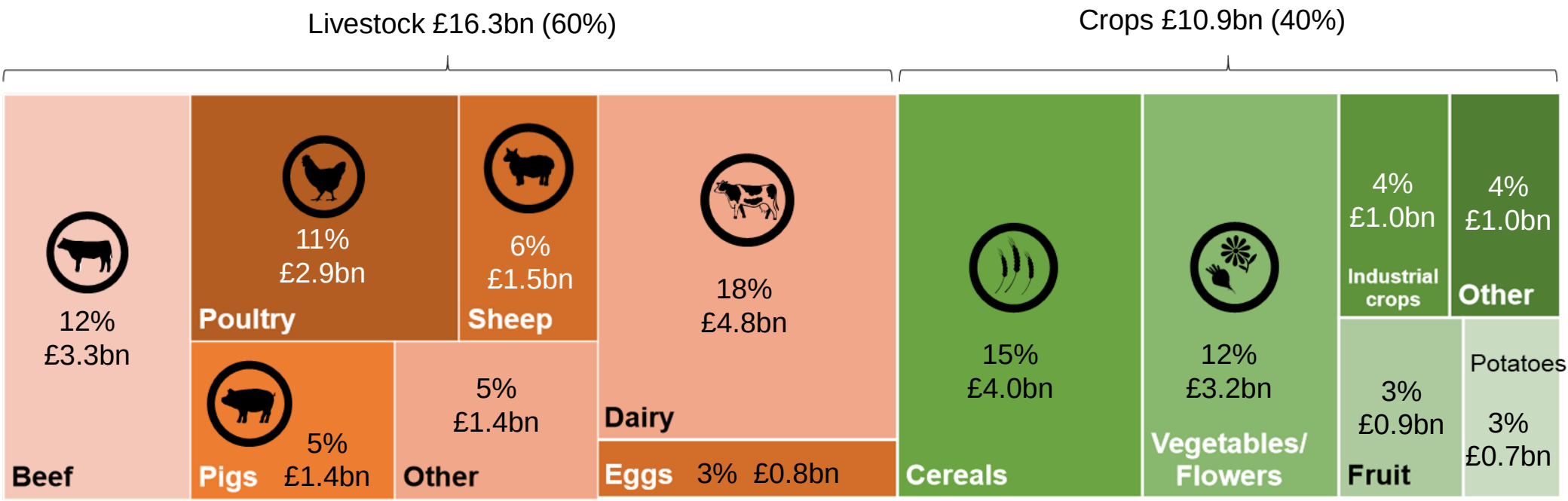
Total Farmed Area: 9.0 million hectares (ha)



Which products contribute most to the value of UK agricultural output?

In 2021 60% of the total value of the UK's agricultural production comes from livestock, of which dairy and beef are the largest sectors.

Value of UK crop and livestock products*



For livestock 'Other' is the value of animals going into the breeding herd/flock.

Dairy had the highest value of output of all agricultural sectors in the UK in 2020, at £4.8bn.

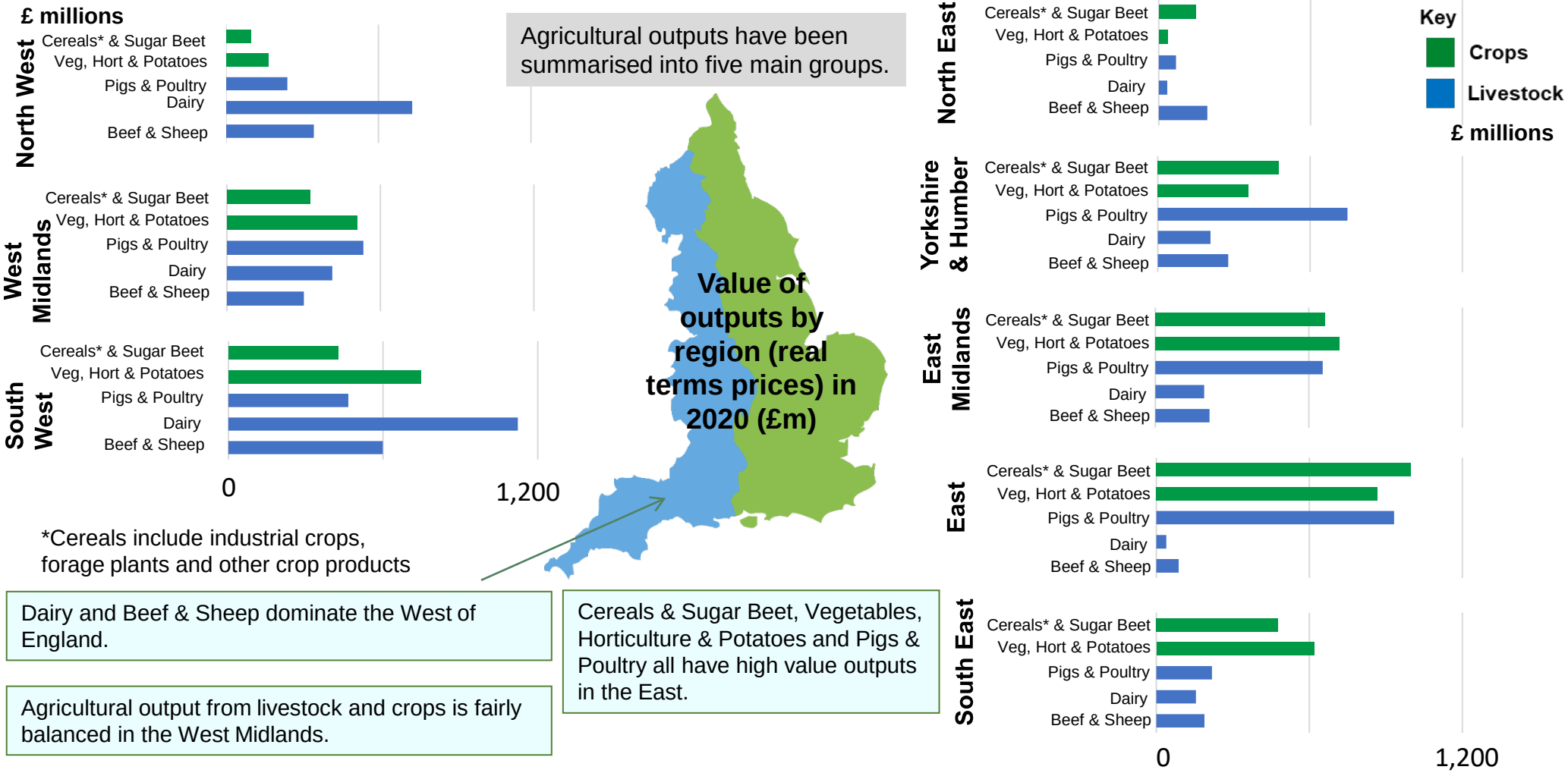
Cereals and Vegetables/Flowers are the two largest crop outputs.

For crops 'Other' includes forage plants and other crop products, including seeds.

*This table shows only the main contributors to crops and livestock product value.

How does the output from agricultural production vary across England?

Livestock is the principal output in the West of England, with dairy having the highest value. Crops are generally more prevalent in the East, however pigs and poultry also have high output values.



*Cereals include industrial crops, forage plants and other crop products

Dairy and Beef & Sheep dominate the West of England.

Agricultural output from livestock and crops is fairly balanced in the West Midlands.

Cereals & Sugar Beet, Vegetables, Horticulture & Potatoes and Pigs & Poultry all have high value outputs in the East.

Inputs

What are the costs of production for farmers?

Around half of costs to farmers are variable, changing depending on the level of production, and the other half are fixed, of which machinery is their largest.

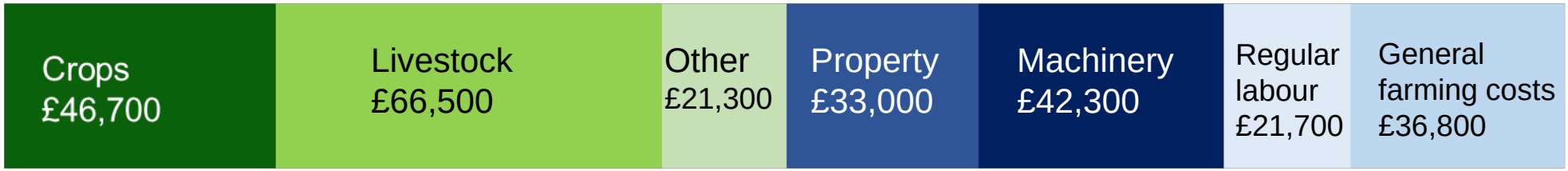
Variable costs change as the level of output varies. For example if a farmer plants more crops they need to purchase more seed or would need more casual labour for harvesting.

Fixed costs are constant in the short term meaning they are the same regardless of how much the farmer produces.

In the longer term these can vary, for example, through negotiation of lower rent or purchasing of cheaper machinery.

Total variable costs
(£134,500)

Total fixed costs
(£132,600)



Other variable costs
This contains mainly contractor costs and casual labour which increase or decrease depending on the amount produced by the farm.

Rents
Rents on average for all farm types, contributed 39% (or £12,900) to total property costs, or 5% of all input costs between 2018/19 and 2020/21.

Many farms have no rental costs as they are owner occupied. For wholly tenanted farms, rental costs made up 12% (£29,956) of their total costs.

General costs
This group includes items such as bank charges, professional fees, water, electricity, net interest payments, bad debt write off.

Water and electricity comprise around a half of these costs.

How can better input management help to reduce variable costs?

Costs from crops and livestock inputs can be reduced by practices such as improving feed efficiency, selective breeding of animals and/or following a detailed crop nutrient management plan developed with a qualified advisor.

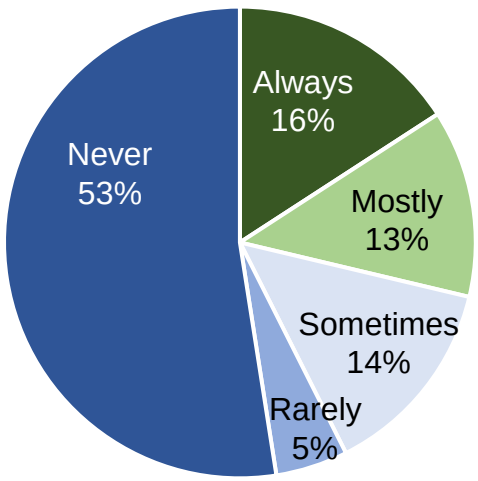
Reducing livestock costs

Feed Efficiency

Animal feed is expensive for farmers, and inefficient conversion to a product for human consumption (meat, eggs and dairy) is costly. The feed conversion ratio (FCR) is the amount of feed required to produce 1kg of live weight. Since 2010, FCR has improved for poultry and pigs, indicating greater feed efficiency and increased productivity in these sectors.

Choosing the most appropriate feeds and ensuring the right balance of protein and nutrients can help farmers reduce costs and optimise production.

% holdings using bulls with high EBVs when breeding beef cattle in 2021



(Total may not add to 100 due to rounding)

Breeding

Selecting traits in livestock can improve productivity and efficiency. Estimates from the Beef Feed Efficiency Programme suggest profits could increase by 40% if feed efficiency was incorporated into breeding programmes.

The estimated breeding value (EBV) measures the genetic worth of an animal for traits like meat production. However, in 2021, over half of holdings rarely or never used bulls with high EBV when breeding beef cattle.

How can better input management help to reduce variable costs?

Costs from crops and livestock inputs can be reduced by practices such as improving feed efficiency, selective breeding of animals and/or following a detailed crop nutrient management plan developed with a qualified advisor.

Reducing crop costs

Nutrient Management

Farmers need to make advance decisions on input use, without having information on the conditions, future yield or the price that the product will be sold at. Because of this, farmers may use standardised quantities (e.g. as recommended within RB209 fertiliser manual), or apply excessive amounts to try and secure a better yield. Excessive use of inputs reduces profits as the cost of using more than is optimal may exceed the revenue gained. Nutrient excess also contributes to poor water and air quality, as well as GHG emissions. Farmers can optimise inputs so every unit of input increases profit.

Nutrient management practices like taking soil type, climate and crop demands into account could reduce the amount of fertiliser needed, reducing costs. However, nearly

1/2

of holdings do not have a nutrient management plan

The majority of holdings spread manure, slurry or fertilisers, and limiting the use of nitrogen rich fertilisers to economically efficient levels can save money. However, just under

1/3

of relevant holdings
do not have a manure management plan.

Measuring soil fertility allows farmers to determine the type and amount of fertiliser that needs to be applied, minimising unnecessary fertiliser application. However, nearly

1/3

of relevant farms do not test the nutrient content of their soil.

Public Payments

How profitable are farms without Direct Payments?

On average, with Direct Payments excluded from their accounts, over the period 2018/19 to 2020/21, for every £100 spent, farm businesses made £109, meaning a profit of £9 per £100 inputs.

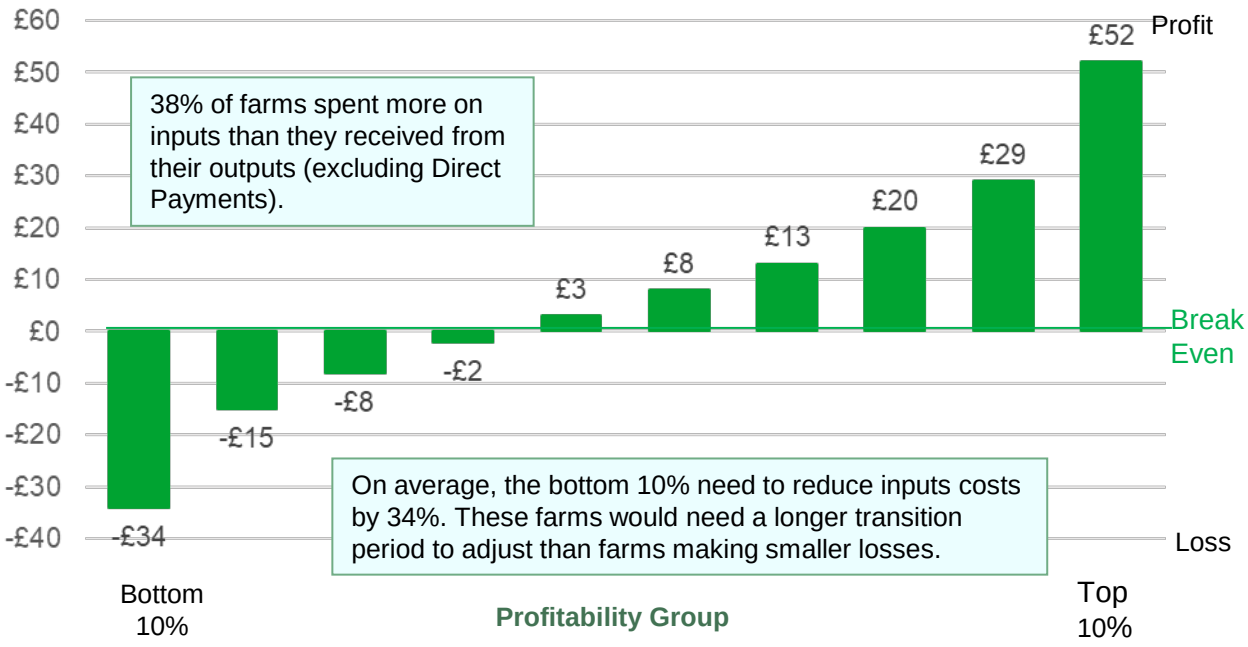
Farm Profitability (profit for every £100 inputs)

Profitability groups are defined by ordering farms by profitability from 1-100 (1st being least profitable and 100th being most profitable) and dividing these into 10 groups, so that 10% of all farms fall within each group.

More profitable farms produce more output for every £100 of input. Unlike farm performance, this measure does not include unpaid labour as a cost. Overall, farms received £109 in outputs for every £100 spent, an average profit of £9 per farm.

Most farms have the potential to be profitable. However, when looking at farm profitability by farm characteristic (such as farm type, economic size, land ownership status and farmer age), some characteristics are more prevalent in the bottom 10% than the top 10%. For example, 74% of farms in the bottom 10% are Grazing Livestock or Mixed farms compared to 20% in the top 10%.

Average profit for every £100 spent by profitability group (2018/19 to 2020/21) excluding Direct Payments.



Farm characteristics of the top 10% and bottom 10%

Top 10%	20%	38%	5%	31%
Bottom 10%	74%	57%	15%	37%
	are Grazing Livestock or Mixed farms	very small economic farm size	are wholly tenanted	are aged at least 65 (farmer)

Environment

What is the environmental challenge of agriculture in relation to water quality?

Water quality can be adversely affected by farming through run-off of fertilisers, pesticides and slurry and through erosion of soil, which is washed off farmland.

Soil and Sediment

Soil and sediment enter water when rain and wind erode soil, leading to nutrient enrichment and siltation, which impact fish and invertebrates and cause ecological damage.

Nutrients from Fertilisers

Nitrogen and phosphorus enter the water cycle via groundwater and run-off, causing harmful blooms of plant life that deoxygenate rivers and lakes.

Pesticides & Ammonia

Pesticides and ammonia can be toxic to many aquatic plants & animals, killing fish and invertebrates.

Nitrogen and Phosphorous from manure, slurry and fertiliser application can make its way into surface waters and aquifers. Improvements in nutrient management practices and slurry and manure storage can help to reduce water pollution.

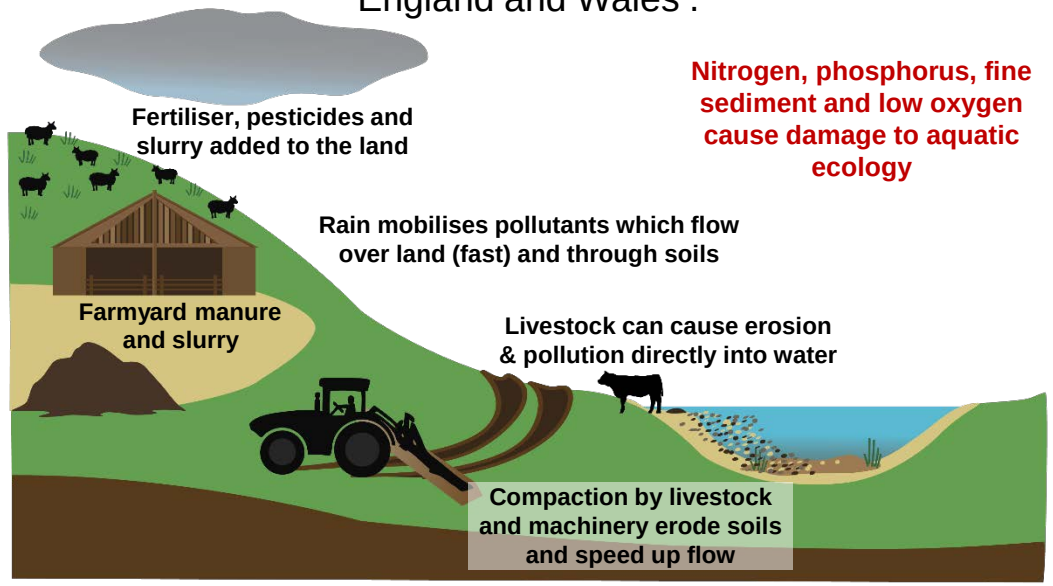
36%

of all surface water bodies assesses under water framework directive (WFD) in the UK were in “high” or “good” status in 2020.

28%

of failures to meet the WFD standards in England have been directly attributed to diffuse water pollution from agriculture and rural land use.

It is estimated that agriculture accounts for around 61% of the total nitrogen and 28% of phosphorus load in river water in England and Wales .



Pollutants can enter groundwater, affecting drinking water supplies and taking decades to wash away. Some of the pollution affecting UK waters is a **legacy of previous agricultural practices,** which heavily focussed on increasing production.

Overall application rates of nitrogen were 87kg/ha in 2021, up 5% on 2020.

Overall application rates of phosphate and potash fell to 14 kg/ha (-7%) and 18 kg/ha (-5%) respectively.

What is the environmental challenge of agriculture in relation to soil health?

Soil is an essential natural resource, with poor management causing erosion, compaction, and depletion of nutrients, organic matter and biodiversity.

Why are soils important?

One quarter
of the planet's biodiversity is found in its soils. Soil and its organisms play vital roles in supporting food production, plant and tree health, nutrient cycling, carbon storage and sequestration, water storage and quality, and flood prevention.

Poor soil management can lead to:

- Compaction from livestock and machinery, leading to increased flood risks for downstream areas and reduced crop yields.
- Increased greenhouse gas emissions and loss of the carbon stored in soils.
- Erosion by wind and water, leading to less fertile soils and pollution in surface and coastal waters.
- Poor soil structure and nutrient balances, reducing fertility and provision of public goods.
- Loss of soil biodiversity.

What is the current state?

In England and Wales:

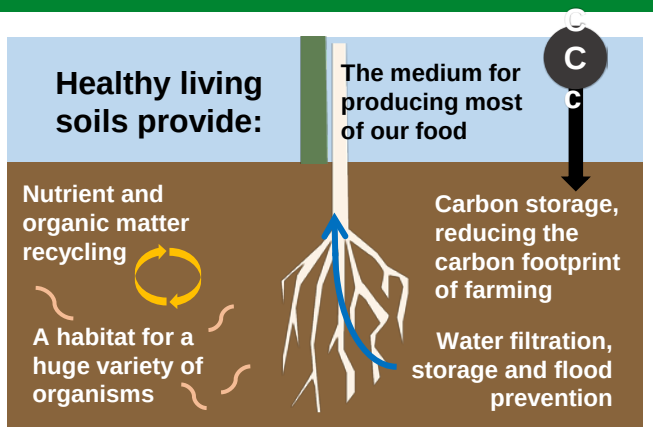
2 million
hectares of soil are at risk of erosion in England and Wales

4 million
hectares of soil are at risk of compaction

40 to 60%
of organic carbon lost from arable soils cased by intensive agriculture.

£0.9bn to £1.4bn
estimates of cost of soil degradation per year.

95% of UK land carbon stock is held in our soils.



How can agriculture help soils?

Careful management is needed to make the use of soil resources by agriculture sustainable.

Zero tillage systems may increase organic matter in the root zone, helping nutrient and water retention, and also reduce fossil fuel use.

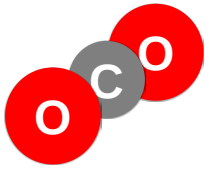
Planting cover crops and careful management of hillside fields can reduce erosion rates.

Reducing compaction leads to increases in soil fertility and farm productivity, and helps to retain water in upland catchments.

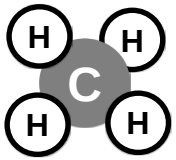
Organic farming and other agroecological approaches can protect and enhance the health of agricultural soils, for example, through the use of legumes, crop rotations and organic manures.

What is the environmental challenge of agriculture in relation to greenhouse gas emissions?

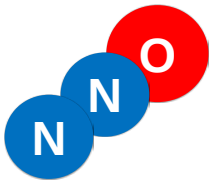
Agriculture is responsible for around 10% of the UK's greenhouse gas emissions, mainly through emissions of methane and nitrous oxide from grazing livestock and fertilisers.



Carbon dioxide (CO_2) is a major greenhouse gas, but agriculture is only responsible for around 2% of UK CO_2 emissions. These are mainly though use of energy and fuel, which can be reduced by improving efficiency, and by generating energy from renewable sources on-farm.



Methane (CH_4) is a more potent greenhouse gas than CO_2, particularly over short timescales. Agriculture is responsible for almost half of the UK's total emissions.



Nitrous oxide (N_2O) is the most potent greenhouse gas that agriculture emits, having a warming effect that is around 300 times stronger than CO_2. Agriculture emits 69% of the UK total.

Carbon sequestration:

Land managers can and do help mitigate climate change by increasing carbon storage through the creation of more forests and woodland, and to a lesser extent, through good management to restore the organic carbon content of soils to its natural maximum. These practices can also improve the nutrient and water holding capacity of soils, which provides agronomic benefits. There is also potential to reduce the contribution of degraded peatlands to GHG emissions through restoration activities

In 2020:

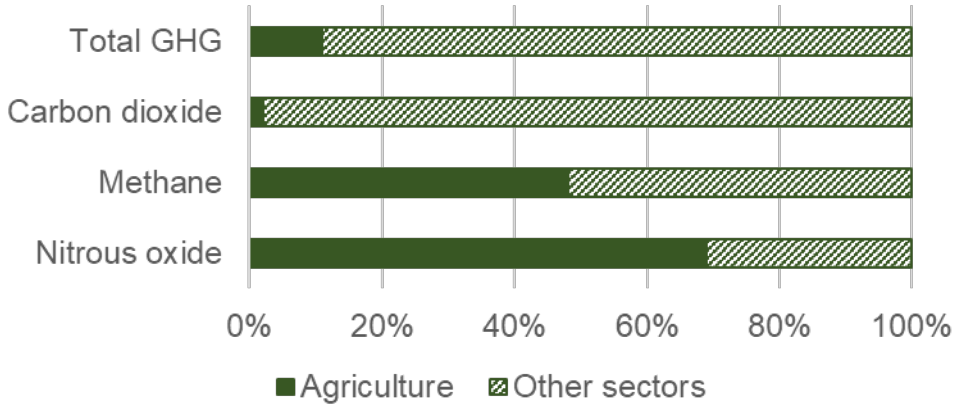
20%
estimated fall in nitrous oxide emissions from agriculture since 1990

15%
estimated fall in methane Emissions from agriculture since 1990

The majority of nitrous oxide emissions are a result of nitrogen fertiliser application and leaching/run off.

The majority of methane emissions from agriculture are due to grazing livestock.

UK Greenhouse Gas Emissions (2020) in CO_2 Equivalents



What is the environmental challenge of agriculture in relation to ammonia emissions?

Agriculture was responsible for 87% of UK emissions of ammonia in 2020, mainly from livestock farming and fertiliser use.

22%
overall fall in agricultural emissions of ammonia between 1990 and 2020, due partly to declining cattle numbers, better manure and slurry management, and reduced fertiliser use, although this trend has reversed in recent years.

Ammonia emissions affect human health, reduce air quality, can cause soil acidification, harm vegetation and contribute to air pollution.

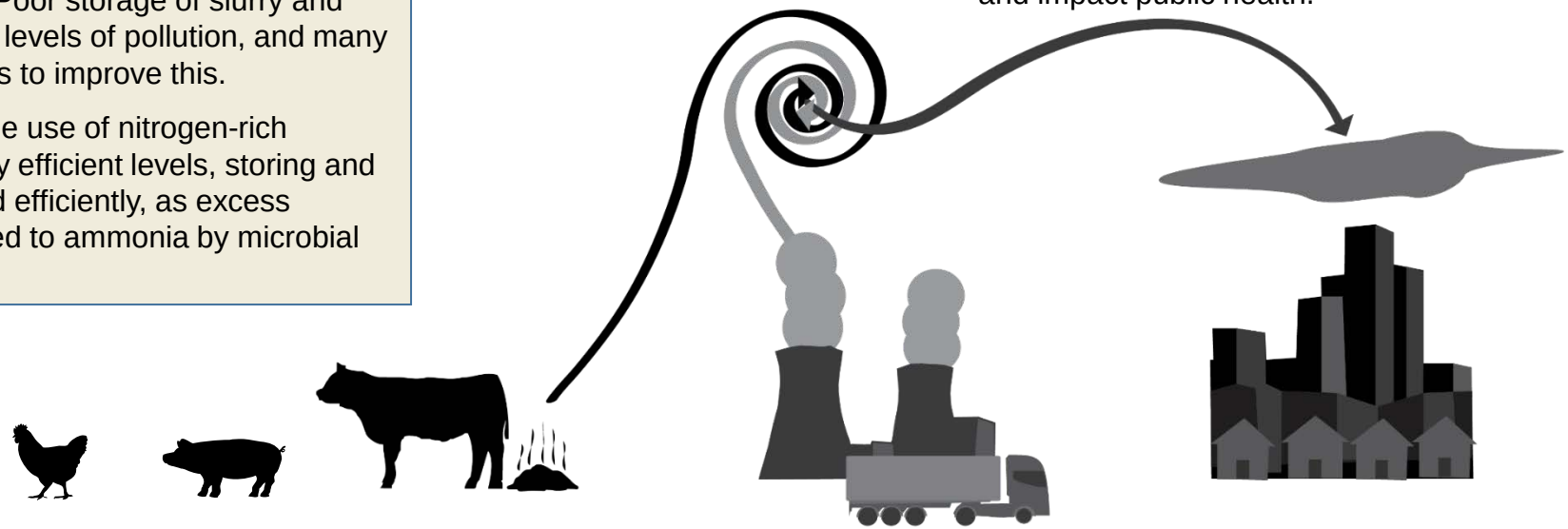
87% of UK ammonia emissions came from agriculture in 2020, mainly from livestock farming and mineral fertiliser use.

£1.79bn
costs to human health and the environment from UK agriculturally-produced ammonia in 2020 (in 2017 prices)

Cattle are the largest source of ammonia, but it is also associated with chicken and pig farms, and with slurry and fertiliser use. Poor storage of slurry and manure can lead to high levels of pollution, and many farmers have taken steps to improve this.

Farmers can also limit the use of nitrogen-rich fertilisers to economically efficient levels, storing and applying them safely and efficiently, as excess nitrogen can be converted to ammonia by microbial processes.

Ammonia emissions can combine with industrial and transport emissions, forming harmful fine particulates which cause smog in urban areas and impact public health.



What is the environmental challenge of agriculture in relation to biodiversity?

Farming practices can have many impacts that can lead to a reduction in wildlife biodiversity (including loss of habitats and food sources). The UK farmland bird index, an indicator of the state of wildlife generally, has fallen to less than half its 1970 value.

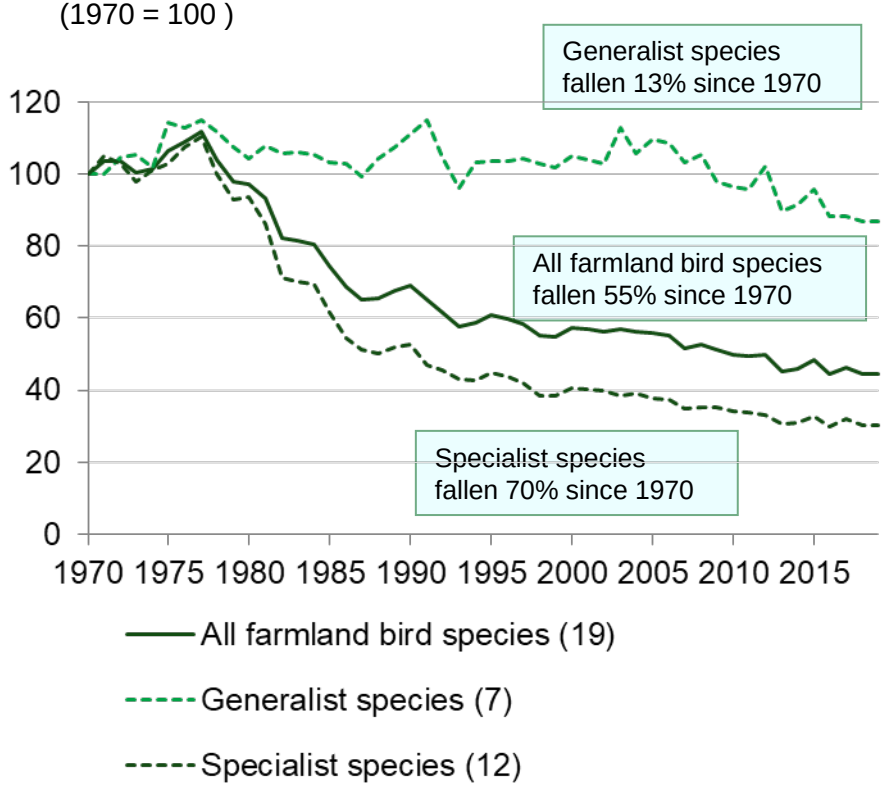
Bird populations are often used as indicators of the state of wider wildlife biodiversity, as they occupy a wide range of habitats, respond to environmental stresses that affect other groups of wildlife and are often high up their respective food chains.

Some farming practices have negative impacts on bird populations, and on wildlife more generally. The vast majority of England's wildlife depends on the remaining areas of semi-natural habitat that are less intensively farmed within the countryside.

However, many farmers and land owners are actively playing their part to conserve and enhance the countryside's wide network of trees, hedgerows, ponds, ditches and other watercourses. Many options to do so are included within agri-environment agreements.

The index measures the average rate of change in relative abundance for 19 species of wild birds which live in agricultural landscapes, against a 1970 baseline.

Farmland bird index 1970 – 2019
(1970 = 100)



Agriculture and Biodiversity

There have been historic trade-offs between farming and biodiversity, with the conversion of natural habitats into intensively managed farmland.

Land sharing integrates delivering environmental benefits and producing food on the same land, for example through current agri-environment schemes.

Land sparing protects natural habitats by separating them from intensive agriculture, for example through nature reserves. Sparing of land is then balanced by sustainable intensification of farming on agricultural land.

These two models benefit biodiversity on different scales, and a combination of different approaches will be needed in different landscapes and habitats.

Organic Farming

What are the main farming systems?

In the UK 97% of farmed area is classified as conventional and 3% is classified as organic in 2021.

Conventional
97% Total Farmed Area

The majority of land in the UK is farmed conventionally. There are two types of conventional agriculture:

Intensive Farming

increases productivity through increasing inputs. Inputs, such as capital, labour, and chemicals are high relative to land area. Output per hectare tends to be high.

For example intensively farmed livestock may be housed indoors and fed on arable by-products.

Extensive Farming

increases productivity through farming more land. Inputs are relatively low, as is output per hectare. More land is therefore needed to produce the same amount of food as intensive farming.

For example extensively reared livestock may be kept on pasture and grass fed for most of the year.

Organic
3% Total Farmed Area

507,000 ha are farmed organically, using natural methods to control pests and disease to minimise damage to the environment and wildlife. Herbicides, synthetic pesticides and antibiotics are banned. All foods sold as organic must go through a certification process.

81%
of organically farmed land in the UK is pasture (permanent and temporary)

9%
of organically farmed land in the UK is for cereals. (43k ha)

61%
of the total UK organic area is in England

How many animals are reared organically, and what proportion of total UK livestock do they represent?

Overseas Trade

Of the food we can produce in the UK, how much do we produce and what do we produce the most of?

The UK's food production to supply ratio, an indicator of the ability of UK agriculture to meet domestic consumer demands, stood at 74% for indigenous foods in 2021.

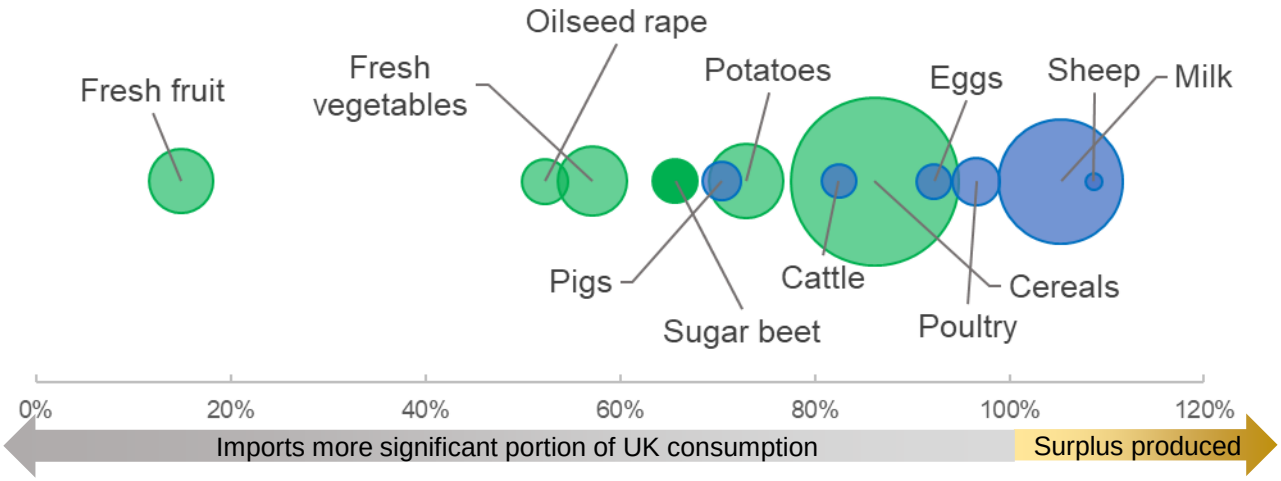
74% the Food Production to Supply Ratio of indigenous food in 2021

The Food Production to Supply Ratio provides a broad indicator of the ability of UK agriculture to meet domestic consumer demands and is calculated using the following formula:

$$\frac{\textit{Total production (including for export)}}{\textit{The total produced, plus imports, minus exports}}$$

Indigenous food excludes those foods not commercially grown in the UK, such as bananas, which could not reasonably be grown in our climate.

Historically, the UK has been a large net importer of food. To have a resilient food chain, it is advantageous to have a diverse range of food sources, including imports from a wide range of stable economies. The chart below shows some of our most important products, where circle size indicates sector size (£).



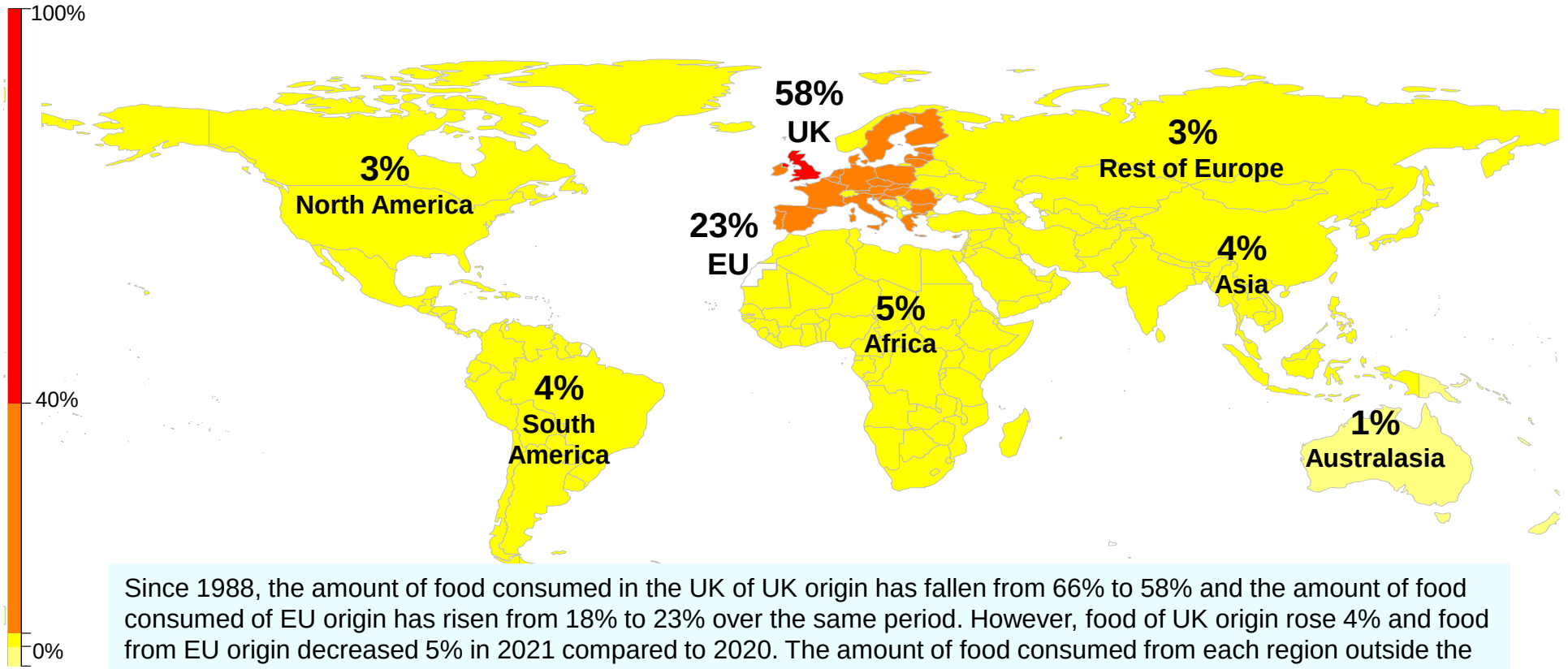
For fresh fruit, the food production to supply ratio was just 15% in 2021, highlighting the need for imports to meet domestic demand.

The food production to supply ratios of sheep and milk were 109% and 105% respectively in 2020 showing that domestic production more than met domestic consumer demand.

What are the origins of food consumed in the UK?

In 2021, over half of all food (58%) consumed in the UK was of UK origin, with the majority of the rest of food consumed (23%) of EU origin.

Origins of food consumed in the United Kingdom, based on the farm-gate value of raw food.



Since 1988, the amount of food consumed in the UK of UK origin has fallen from 66% to 58% and the amount of food consumed of EU origin has risen from 18% to 23% over the same period. However, food of UK origin rose 4% and food from EU origin decreased 5% in 2021 compared to 2020. The amount of food consumed from each region outside the UK and EU has remained stable over time.

Please note: The origins of food consumed in the UK looks purely at the breakdown of food that the UK actually consumes, and should not be confused with the Food Production to Supply Ratio chart. Totals may not add to 100 due to rounding.

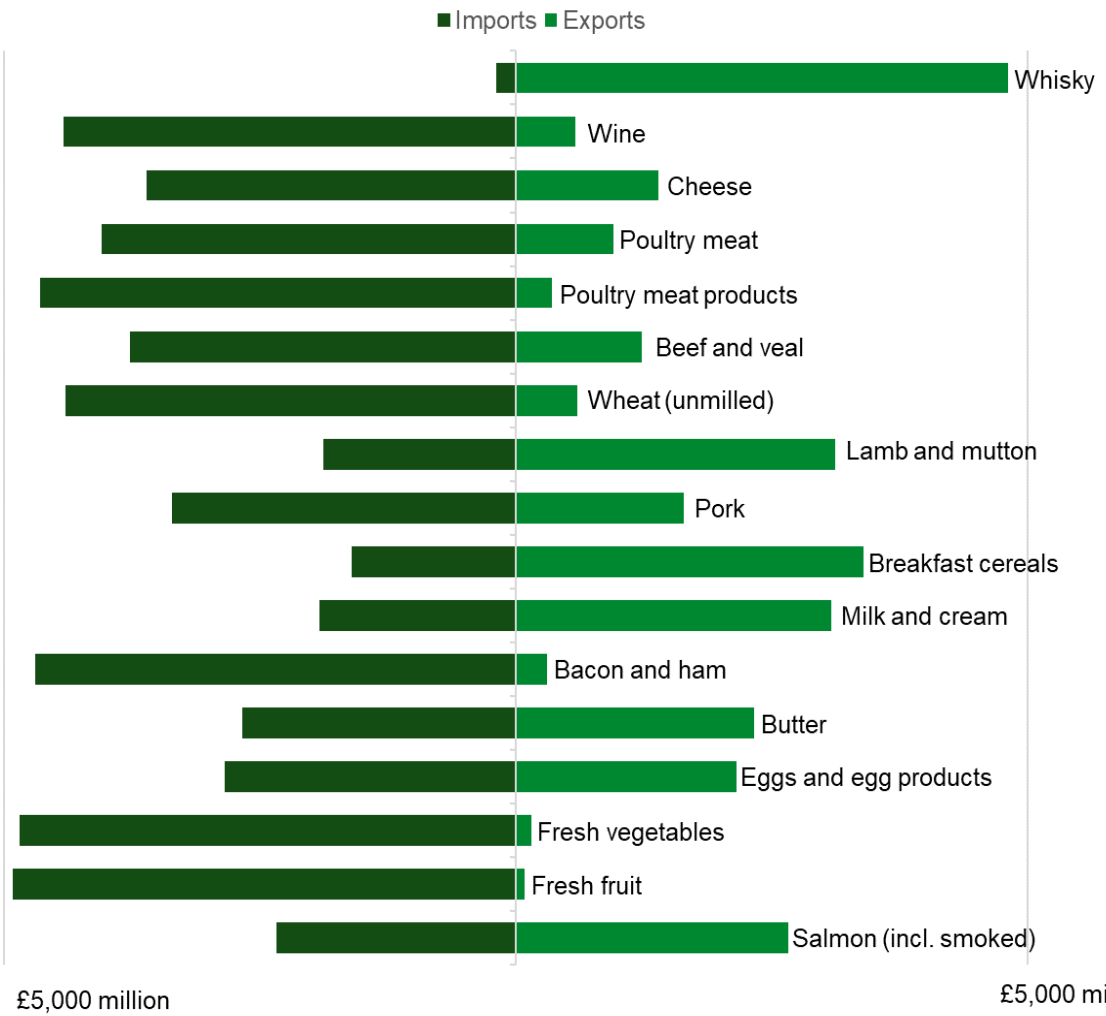
What agricultural food products do we import and export most of?

Whiskey continues to have the highest export value, whilst together fruit and vegetables remains the highest value category for imports.

Fresh fruit and vegetables together remained the highest value category for imports, totalling £6.1bn.

Imports of unmilled wheat increased by 13% in real terms to £471m in reaction to reduced domestic supplies.

Import volumes have been increasing more rapidly over recent years, and the volume of imports of 39.9 billion tonnes in 2021 was 12% higher than 2012.



Whisky continues to have the highest export value, totalling £4.6 bn

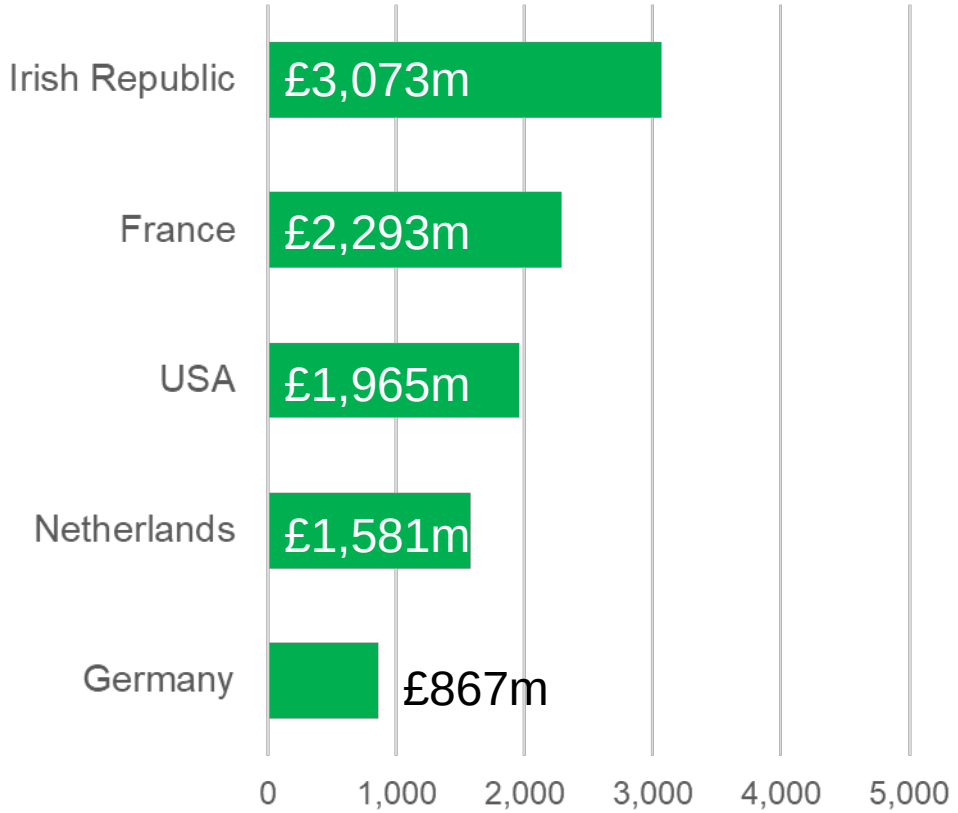
.

The overall volume of exports of food, feed and drink in 2021 decreased by 19% to 10.9 billion tonnes. The long term trend for the volume of exports has been slightly upwards year-on-year, however, the recent economic slowdown followed by the effects of the Coronavirus pandemic has resulted in a slowdown of exports.

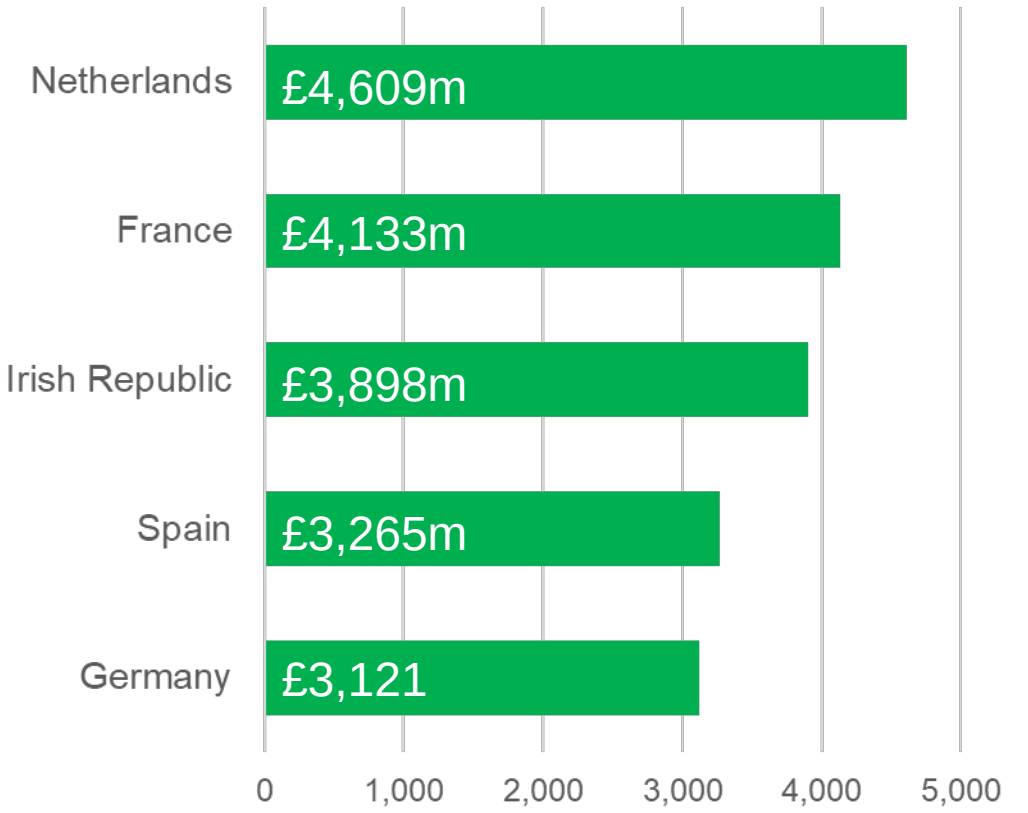
Which countries do we trade the most (agricultural and lightly processed foods) with?

In 2021, the UK exported the most food, feed and drink to Ireland, with a value of £3.1bn. The UK imported the most from the Netherlands, with a value of £4.6bn.

The top 5 countries of exports of food, feed and drink from the UK in 2021
(£ million)



The top 5 countries of imports of food, feed and drink to the UK in 2021
(£ million)

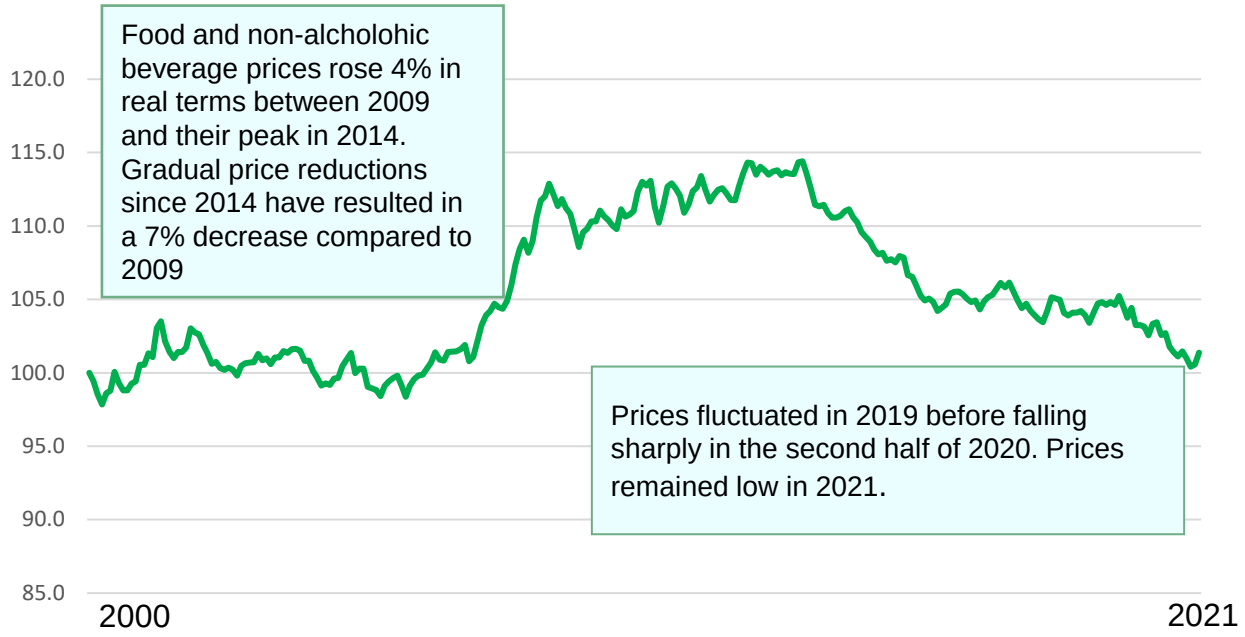


Food Chain

How have food prices and the amount British households spend on food changed over time?

Food is exerting greater pressure on household budgets since 2007 when food prices started to rise in real terms. Averaged over all households 11% of spend went on food in 2019/20, however this proportion is higher for lower income households (15%) who are disproportionately affected by food price rises.

UK trend in food and non-alcoholic beverage prices in real terms, January 2000 to December 2021



Successive spikes in the price of agricultural commodities since 2007 have led to higher retail food prices. They have not returned to the low price levels of pre-2007. Oil prices also rose over this period, and inflation was higher than historically, but food prices have risen above inflation.

Households can react in many ways to food price increases - they may simply spend more, or buy less of a type of product. They may also 'trade down' by switching to purchases of cheaper products within a food grouping.

A rise in food prices is more difficult for low income households to cope with because those on low incomes spend a greater proportion of their income on food - a rise in food prices has a disproportionately large impact on money available to spend elsewhere.

£29

average weekly UK household expenditure per person on food and non-alcoholic drinks in 2019/20 (not including eating out)

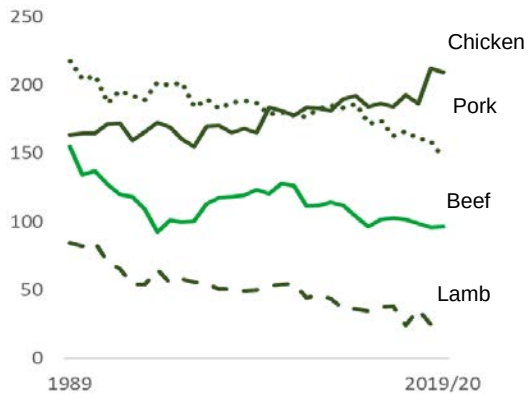
As consumers' incomes rise they tend to spend a smaller proportion of their family budget on food and drink.

In 2019/20, households in the lowest 20% of household income spent a greater proportion of their household expenditure on food and drink (15%) compared with other households (11%).

How have consumer purchasing habits of some of the key agricultural products changed over time?

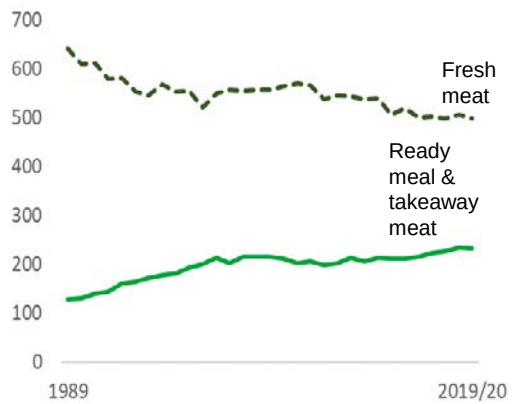
Purchases of fresh meat, milk and vegetables has decreased over the last 30 years, but we are buying more fruit and more meat in ready meals; this might be driven by trends in convenience and health and fluctuations in food prices.

Fresh Meats*
Chicken, Beef, Pork, Lamb



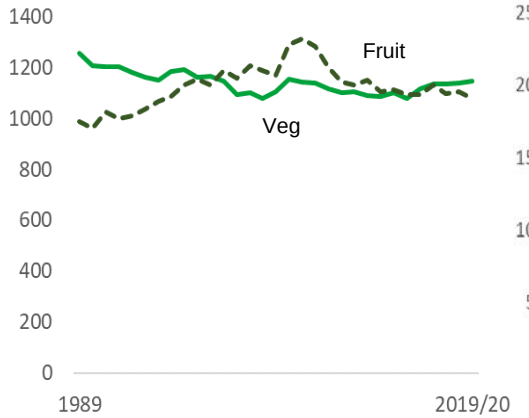
All fresh meats have declined over the past 30 years, apart from chicken. Purchases of lamb and pork have both more than halved over the last 30 years.

Fresh & Ready Meats*
Fresh meat, Ready meals & takeaway



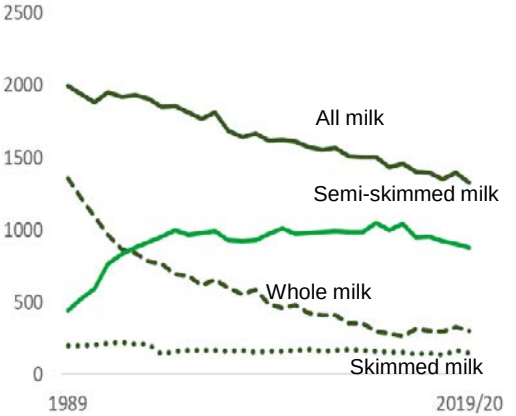
The overall decline in fresh meat is partly offset by meats in ready and takeaway meals, which has increased from 129g in 1989 to 232g in 2019/20.

Vegetables & Fruit*
Vegetables, Fruit



Purchases fruit jumped in the early 2000s before dropping off again. Both now stand at just over 1kg per week.

Milk*
All milk, Whole, Semi-skimmed, Skimmed



Milk purchases overall have gradually decreased to around 1300ml in 2019/20.

***Household food only. Average quantity per person per week (g/ml). The data contain changes in recording periods, so not every year is exactly equivalent.**

Do British consumers want to buy British food?

In 2018, when asked, the British public say they try to buy British food and believe it is important to support British farmers, but that isn't wholly reflected in consumer behaviour.

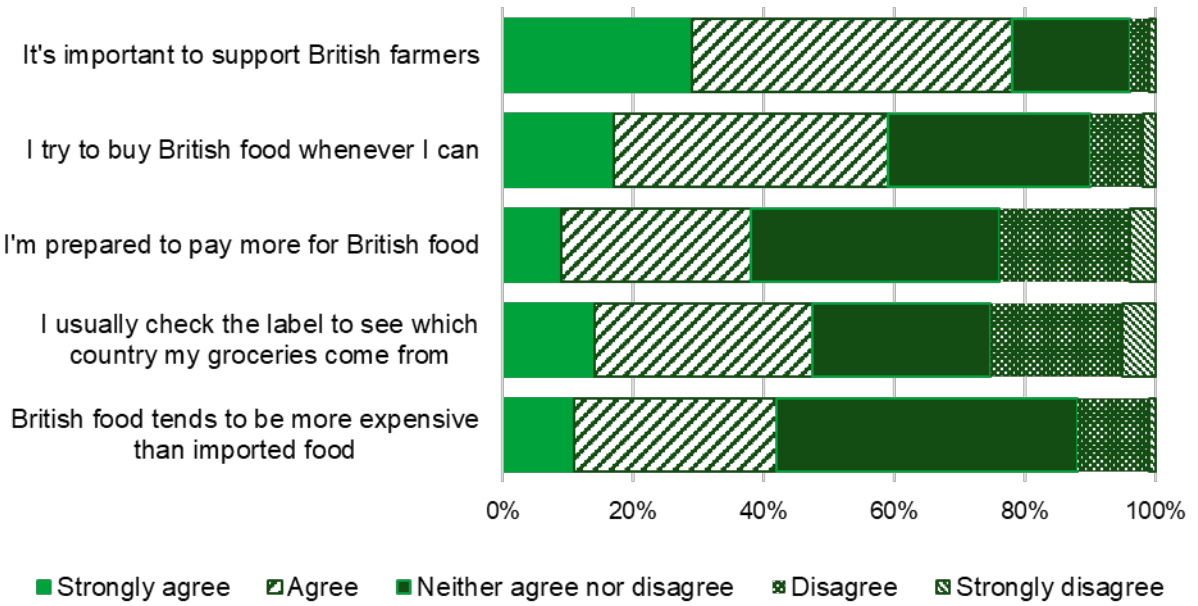
78% of British surveyed consumers believe it is important to support British farmers.

59% say they try to buy British food whenever they can.

However, less than half said they are willing to pay more for British food, or said that they check where their food comes from before buying.

Consistently, price is the key factor determining purchasing for consumers. There is strong evidence from official statistics, Defra funded independent research and retailer research that price is the most important factor influencing consumer choice.

Consumer Attitudes (2018)



How do consumer preferences affect UK food imports and exports?

Although we can produce a wide range of foods in the UK, importing food from different climates means that consumers have the choice of seasonal food all year round.

International trade in meat allows producers, manufacturers and retailers to address deficits in certain cuts of meat:

- imports supplement the supply of those cuts most popular with British consumers such as bacon, leg of lamb, and chicken breast,
- the least popular cuts are exported to countries where there is a stronger demand (for example exporting pigs feet to China).

References

Slide	Data source
2.1	Agriculture in the United Kingdom, 2021 [NS] Structure of the agricultural industry, [NS] Area of crops grown for bioenergy in England and the UK: 2008 - 2020
2.2	Structure of the agricultural industry [NS]
2.3	Farm structure survey – 2016, Structure of the agricultural industry [NS]
2.4	Structure of the agricultural industry[NS] ; Farm structure survey – 2016 and Agriculture in the United Kingdom, 2021 [NS]
2.5	Structure of the agricultural industry [NS]
2.6	Structure of the agricultural industry[NS]
3.1	Defra analysis of Farm Business Survey [NS and OS]
3.2	Defra analysis of Farm Business Survey [NS and OS]
3.3	Defra analysis of Farm Business Survey [NS and OS]
3.4	Defra analysis of Farm Business Survey [NS and OS]
3.5	Defra analysis of Farm Business Survey [NS and OS]
4.1	Agriculture in the United Kingdom, 2021 [NS]
4.2	Agriculture in the United Kingdom, 2021 [NS]

Slide	Data source
4.3	Agriculture in the United Kingdom, 2021 [NS]
4.4	Agriculture in the United Kingdom, 2021 [NS] Total income from farming in England [NS], Total income from farming for the regions of England
5.1	Agriculture in the United Kingdom, 2021 [NS]
5.2	Defra analysis of ONS Labour productivity data ONS Average hours worked by industry [NS]
6.1	Agriculture in the United Kingdom, 2021 [NS]
7.1	Structure of the agricultural industry [NS]
7.2	Structure of the agricultural industry [NS]
7.3	Total income from farming for the regions of England
8.1	Defra analysis of Farm Business Survey [NS and OS]
8.2	Beef Feed Efficiency Programme AHDB; Greenhouse Gas Mitigation Practices – England Farm Practices Survey 2021 [NS]
8.3	Greenhouse Gas Mitigation Practices – England Farm Practices Survey 2021[NS]

References

Slide	Data source
9.1	Defra analysis of Farm Business Survey [NS and OS]
10.1	Agriculture in the United Kingdom, 2021 [NS], Countryside Survey Report for Soils, 2007; UK Land Use and Soil Carbon Sequestration (Ostle, Levy, Evans & Smith, 2009, Land Use Policy vol. 26) and Natural England British survey of fertiliser practice 2021 [NS]
10.2	Agriculture in the United Kingdom, 2021 [NS] The state of the environment soil report
10.3	Agriculture in the United Kingdom, 2021 [NS]
10.4	Agriculture in the United Kingdom, 2021 [NS] [NS] ENV01 – Emissions of air pollutants [NS] Air quality damage cost update 2020
10.5	Agriculture in the United Kingdom, 2021 [NS]
11.1	Agriculture in the United Kingdom, 2021 [NS]
12.1	Agriculture in the United Kingdom, 2021 [NS]
12.2	Agriculture in the United Kingdom, 2021 [NS]
12.3	Agriculture in the United Kingdom, 2021 [NS]
12.4	Agriculture in the United Kingdom, 2021 [NS]
13.1	Family food statistics [NS]

Slide	Data source
13.2	Family food statistics [NS], AHDB
13.3	Food statistics pocketbook [NS]