



28 November 2019

Total factor productivity of the UK agriculture industry

Second estimate for 2018

This release presents the second estimate of Total Factor Productivity (TFP) of the UK agriculture industry for 2018. It also presents volume indices for inputs and outputs. These figures are a scheduled update to those published in May 2019 using additional data that became available in the second half of the year.

Total factor productivity is a measure of how well inputs are converted into outputs giving an indication of the efficiency and competitiveness of the agriculture industry. While external factors such as weather conditions or disease outbreaks may have short term impact on productivity, it is developments in productivity over a longer period that constitute one of the main drivers of agricultural income.

TFP estimates are derived from the aggregate farm accounts data used to calculate UK Total Income from Farming (TIFF). TIFF second estimates for 2018 are published in parallel with these and can be found [here](#).

Key points

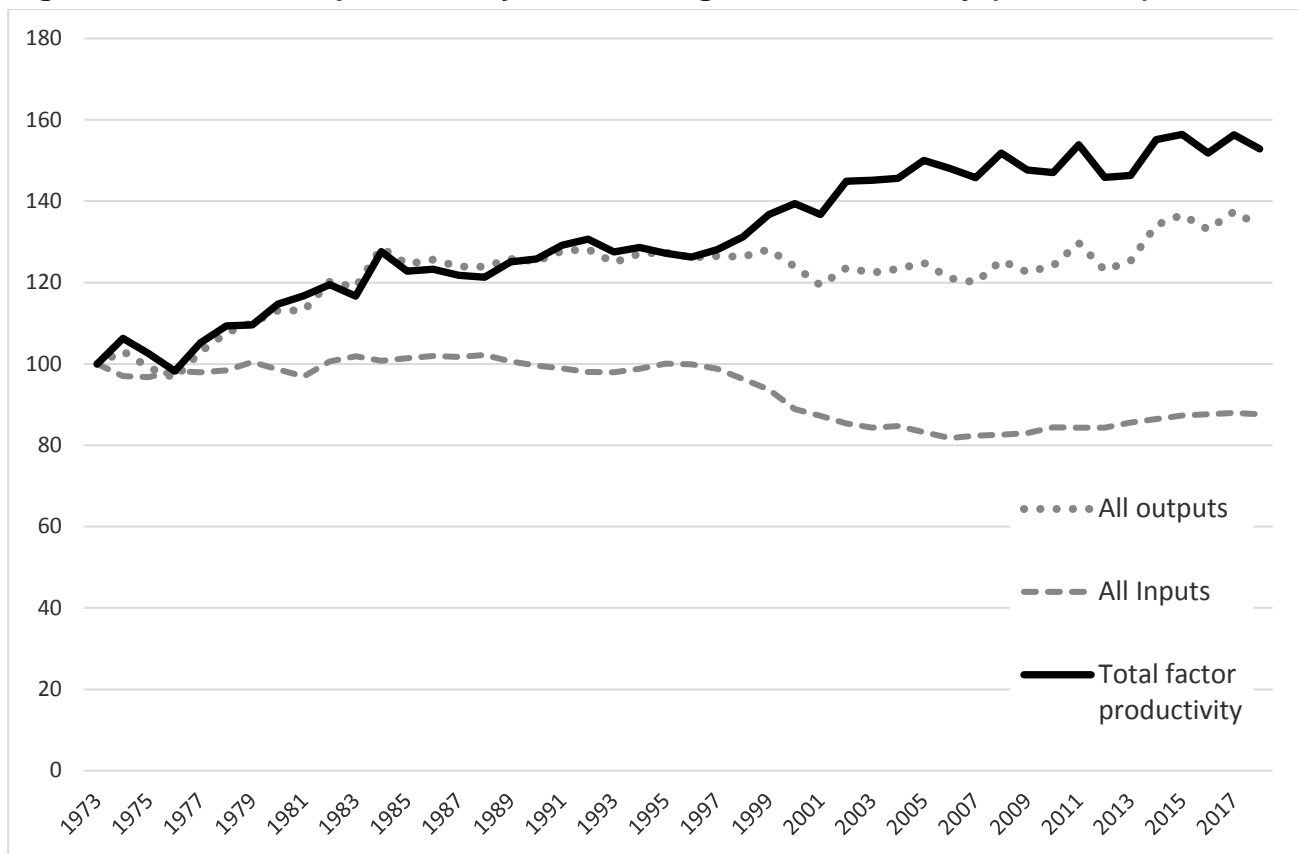
- Total factor productivity is estimated to have decreased by 2.2% between 2017 and 2018. This is driven by a decrease in overall levels of production combined with a small decrease in volumes of inputs.
- The volume of all outputs decreased by 2.6% from the high levels seen in 2017. This was driven by the following volume changes:
 - a 8.8% decrease for all crop outputs
 - a 0.7% increase for livestock meat outputs
 - a 1.3% increase for livestock product outputs
- The volume of all inputs decreased by 0.4%, to partly offset the fall in output.

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Total factor productivity

Figure 1: Total factor productivity of the UK agriculture industry (1973=100)



Total factor productivity of the agriculture industry in the United Kingdom is estimated to have decreased by 2.2% between 2017 and 2018. This continues the pattern of fluctuations seen from around the year 2000 onwards. In spite of these fluctuations the long-term trend is still one of slow but steady overall improvement.

The annual decrease is driven by a fall of 2.6% for outputs, partly offset by a small decrease of 0.4% in the volume of inputs.

Table 1a Volume indices for outputs (2010=100)

	2016	2017	2018	% Change from 2017
1 Output of cereals	106.9	108.4	97.3	-10.2%
wheat	97.2	96.7	86.6	-10.4%
rye	90.9	77.3	90.9	17.6%
barley	142.3	152.8	134.5	-12.0%
oats and summer cereal mixtures	122.3	120.2	130.8	8.8%
other cereals	77.8	95.0	126.0	32.7%
2 Output of industrial crops	84.7	105.9	91.4	-13.6%
oil seeds	78.9	95.9	89.0	-7.1%
oilseed rape	79.6	97.2	90.2	-7.1%
other oil seeds	66.4	64.2	59.9	-6.7%
protein crops	113.2	124.5	71.9	-42.3%
sugar beet	87.1	136.6	116.4	-14.8%
other industrial crops	101.1	104.9	102.7	-2.1%
3 Output of forage plants	121.3	121.3	121.3	0.0%
4 Output of vegetables & horticultural products	100.4	101.7	95.3	-6.2%
fresh vegetables	101.9	102.8	92.9	-9.6%
plants and flowers	98.9	100.4	97.9	-2.5%
5 Output of potatoes	131.2	151.3	121.6	-19.6%
6 Output of fruit	101.7	107.8	109.4	1.5%
7 Output of other crop products	116.0	106.3	130.1	22.5%
Total crop output (sum 1 - 7)	104.4	110.5	100.8	-8.8%
8 Output of livestock (meat)	108.5	109.4	110.1	0.7%
cattle	104.2	102.9	100.7	-2.1%
pigs	124.6	122.4	124.2	1.5%
sheep	106.5	108.8	105.2	-3.3%
poultry	109.0	113.4	119.9	5.7%
other animals	99.4	99.4	99.4	0.1%
9 Output of livestock products	107.5	112.3	113.7	1.3%
milk	107.5	111.9	112.3	0.3%
eggs	107.9	112.4	118.1	5.1%
raw wool	102.3	101.0	94.8	-6.2%
other animal products	86.6	113.1	143.3	26.7%
Total livestock output (8 + 9)	108.4	110.7	111.7	0.9%
10 Inseparable non-agricultural activities	115.3	114.5	117.4	2.5%
11 All outputs	107.2	110.7	107.9	-2.6%

Table 1b Volume indices for inputs (2010=100)

	2016	2017	2018	% Change from 2017
12 Seeds	107.4	109.1	108.3	-0.8%
13 Energy	98.0	95.2	95.5	0.3%
electricity and fuels for heating	80.0	84.0	84.4	0.5%
motor and machinery fuels	105.9	99.1	99.3	0.2%
14 Fertilisers	113.3	99.7	90.0	-9.8%
15 Plant protection products	130.6	125.0	112.2	-10.3%
16 Veterinary expenses	103.5	106.1	99.6	-6.1%
17 Animal feed	103.7	105.9	109.1	3.0%
compounds	114.3	119.0	123.9	4.1%
straights	86.3	84.4	84.7	0.3%
18 Total maintenance	108.4	107.3	110.8	3.3%
materials	101.2	104.2	107.0	2.7%
buildings	120.1	112.1	116.8	4.2%
19 FISIM	100.0	100.0	100.0	0.0%
20 Other goods and services	97.3	101.0	97.8	-3.2%
21 Intermediate consumption (excl Agricultural services)	105.0	104.7	103.4	-1.2%
22 Consumption fixed capital (excluding livestock)	109.5	111.4	112.6	1.1%
equipment	118.5	122.1	124.7	2.2%
buildings	96.1	95.3	94.6	-0.8%
23 All Labour	100.4	101.2	101.9	0.6%
Compensation of employees	99.9	101.1	100.9	-0.2%
Entrepreneurial workers (farm and specialist contractor)	100.6	101.3	102.4	1.1%
24 Land	100.7	101.4	100.7	-0.7%
25 All Inputs and Entrepreneurial Labour	103.8	104.1	103.8	-0.4%

Table 1c Summary volumes indices and Total Factor Productivity (2010=100)

	2016	2017	2018	% change from 2017
All outputs	107.2	110.7	107.9	-2.6%
All inputs	103.8	104.1	103.8	-0.4%
Total factor productivity	103.3	106.3	103.9	-2.2%

Annual change in volumes of outputs and inputs between 2017 and 2018

Outputs

Total outputs decreased by 2.6%, driven by a decrease of 8.8% in the volume of all crops partly offset by an increase of 0.9% in the volume of livestock outputs.

Cereal fell by 10% driven by the fall for both wheat and barley.

Oilseed rape decreased by 7.1%.

Sugar beet saw a large decrease of 15%.

Livestock outputs showed an overall increase of 0.9%.

Milk showed a modest increase of 0.3%.

Total volume of **meat** production increased slightly, by 0.7%. This was driven by increases for pigs (+1.5%) and poultry (+5.7%) whilst cattle (-2.1%) and sheep both fell (-3.3%).

Inputs

Overall there was a slight decrease of -0.4% in the volume of **all inputs including labour**.

Animal feed is the largest input by value and showed an increase of 3.0% overall. This was driven by an increase of 4.1% for compounds, plus a 0.3% increase for straights.

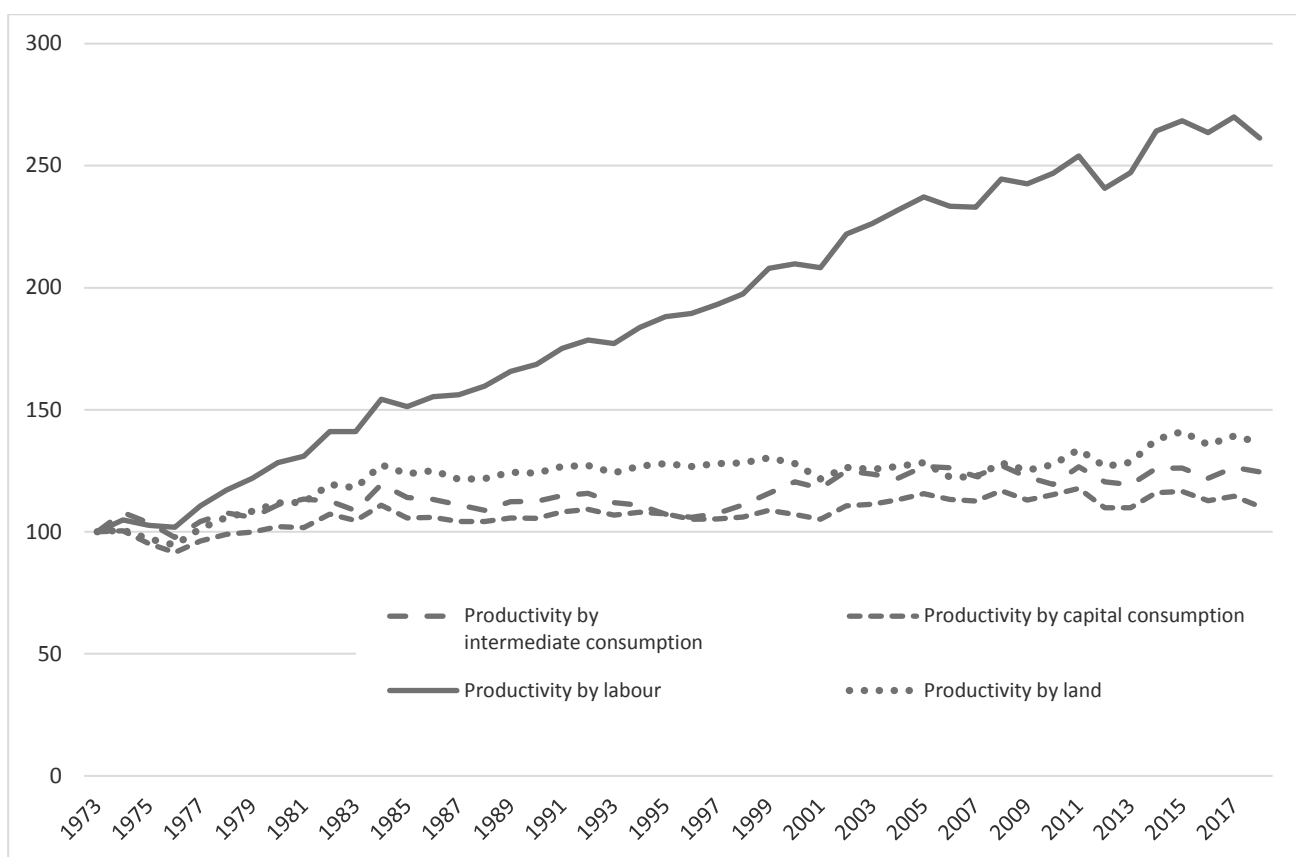
Partial productivity

Partial productivity shows the impact key inputs have on productivity. It measures total outputs against a part of the inputs. The figures below clearly show that labour is the key input in driving productivity gains. Productivity by labour shows a steady increase over the whole period. Labour volumes are now approximately half of what they were in 1973. However more recent growth in labour productivity is due to increased output rather than a reduction in labour volume.

Table 2 Partial factor productivity (2010=100)

	2016	2017	2018	% Change from 2017
Total factor productivity	103.3	106.3	103.9	-2.2%
Partial factor productivity indicators				
Productivity by intermediate consumption	102.1	105.8	104.3	-1.4%
Productivity by capital consumption	97.8	99.4	95.8	-3.7%
Productivity by labour	106.8	109.4	105.9	-3.2%
Productivity by land	106.4	109.2	107.1	-1.9%

Figure 2 Partial productivity indicators (1973=100)



Background to total factor productivity

Total factor productivity is a key measure of the economic performance of agriculture and an important driver of farm incomes. It represents how efficiently the agriculture industry uses the resources that are available to turn inputs into outputs. These are measured in volumes rather than values to remove any price effects. It is expressed here as a relative measure rather than an absolute measure, enabling us to see if improvements are made by comparing one year to another. Data are compared to a base year with a value set to 100, so for example a figure of 150 would represent a 50% increase compared to the base year.

External factors such as weather and animal disease can have short term effects on total factor productivity. When we look at the results we should consider the overall, long-term trend. In the long-term, developments in productivity constitute one of the major factors that impact on income.

These results are produced as part of the preparation of aggregate agricultural accounts required by EU legislation and by UK policy making. The accounts are also used to produce other measures of the performance of the agriculture industry, including Total Income from Farming.

Definitions and explanations

All outputs	The change in volume (expressed as an index) of all outputs sold off the farm. This excludes transactions within the industry.
All inputs	The change in volume (expressed as an index) of goods and services purchased and consumed. This excludes transactions within the industry.
Total factor productivity	How efficiently all inputs are turned into outputs. Derived by dividing all outputs by all inputs.
Partial productivity	How efficiently intermediate consumption, capital, labour or land is transformed into outputs. Derived by dividing all outputs by each factor.

Quality Assurance

Defra has in place quality assurance processes to check the accuracy and reliability of the aggregate agricultural accounts that includes:

- Ongoing review of methods employed in the calculation of the accounts.
- Assessment of the quality of the estimates of components of the accounts with internal and external experts.
- Quality assessments made by Eurostat, the statistical office of the European Union.

A summary quality report for this statistical release can be found on the GOV.UK website at <https://www.gov.uk/government/collections/productivity-of-the-agricultural-industry>

This is an overview note which is not release-specific but will be reviewed and updated at regular intervals. It pulls together key qualitative information on the various dimensions of quality as well as providing a summary of methods used to compile the output. It provides users with information on usability and fitness for purpose of these estimates.

NATIONAL STATISTICS STATUS

National Statistics status means that our statistics meet the highest standards of trustworthiness, quality and public value, and it is our responsibility to maintain compliance with these standards.

The continued designation of these statistics as National Statistics was confirmed in December 2017 following a compliance check by the Office for Statistics Regulation [Total factor productivity of the UK agriculture industry](#)

The statistics last underwent a full assessment [[Assessment Report 271 Statistics on Agriculture](#)] against the [Code of Practice for Statistics](#) in 2014.

Since the latest review by the Office for Statistics Regulation, we have continued to comply with the Code of Practice for Statistics, and have enhanced data quality by reviewing methodologies and data sources.

Main users and uses of total factor productivity

Total factor productivity is used in conjunction with other economic information to:

- Inform policy decisions and to help monitor and evaluate current policies relating to agriculture in the UK by Government and in the European Union by the European Commission.
- Inform stakeholders of the performance of the agriculture industry.
- Inform research into the economic performance of the agriculture industry.
- As an impact indicator of Government policy.

User engagement

As part of our ongoing commitment to compliance with the Code of Practice for Official Statistics <http://www.statisticsauthority.gov.uk/assessment/code-of-practice/index.html>, we wish to strengthen our engagement with users of these statistics and better understand the use made of them and the types of decisions that they inform. Consequently, we invite users to make themselves known, to advise us of the use they do, or might, make of these statistics, and what their wishes are in terms of engagement. Feedback on this notice and enquiries about these statistics are also welcome.