Department for Environment Food & Rural Affairs

7 May 2020

Total factor productivity of the UK agriculture industry

First estimate for 2019

This release presents the first estimate of Total Factor Productivity (TFP) of the UK agriculture industry for 2019. It also presents volume indices for inputs and outputs. These figures will be revised as more data becomes available in the coming months, and a second estimate published in November 2020.

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. Although external factors such as weather conditions or disease outbreaks may have a short term impact on productivity, it is developments that improve 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 first estimates for 2019 are published in parallel with these and can be found on Gov.uk.

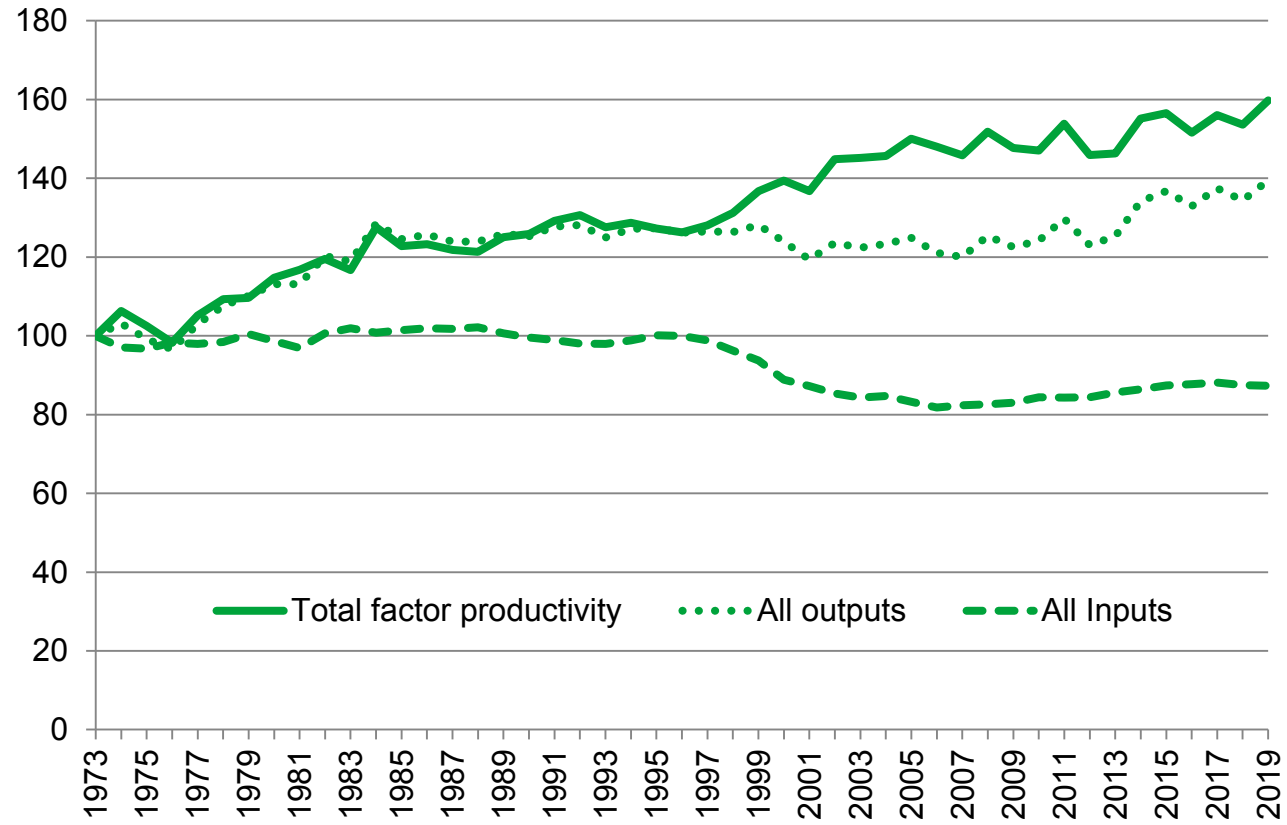
Key points

- Total factor productivity is estimated to have increased by 4.0% between 2018 and 2019 to the highest recorded level (102.1). This is driven by an increase in overall levels of production combined with a small decrease in volumes of inputs.
- The volume of all outputs increased by 3.8%. This was driven by the following volume changes:
    - a 7.8% volume increase for all crop outputs
    - an 1.6% volume increase for livestock meat outputs
    - an 1.8% volume increase for livestock product outputs
- The volume of all inputs decreased by 0.2%.

Enquiries on this publication to: Helen Mason, Department for Environment, Food and Rural Affairs, Room 201, Foss House, Kings Pool, 1-2 Peasholme Green, York, YO1 7PX. Email: FarmAccounts@defra.gov.uk **Media enquiries to**: Tel: 0345 051 8486

Total factor productivity

Figure 1: Total Factor Productivity (TFP) of the UK agriculture industry (as an index where 1973=100)



Total factor productivity of the agriculture industry in the United Kingdom shows an increase of 4.0% between 2018 and 2019. This extends 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 (whole series from 1973-2019 averaging 1% per annum; from 2000-2019 averaging 0.7% per year).

The annual increase from 2018 to 2019 is driven by a rise of 3.8% for outputs combined with a small decrease of 0.2% in the volume of inputs.

Table 1.1 Volume indices for outputs (2015=100)

	2017	2018	2019	% Change from 2018
1 Output of cereals	**90.3**	**80.5**	**100.0**	**24.1%**
wheat	88.9	79.3	97.5	22.9%
rye	85.0	100.0	100.0	0.0%
barley	92.3	81.1	103.8	27.9%
oats and summer cereal mixtures	109.9	106.4	130.8	22.9%
other cereals	106.4	136.6	155.9	14.2%
2 Output of industrial crops	**96.7**	**83.6**	**78.9**	**-5.6%**
oil seeds	86.1	80.0	69.0	-13.7%
oilseed rape	85.2	79.1	68.8	-13.0%
other oil seeds	161.6	150.7	87.2	-42.1%
protein crops	100.3	58.4	78.8	34.9%
sugar beet	143.4	122.2	119.8	-2.0%
other industrial crops	103.8	101.6	104.6	2.9%
3 Output of forage plants	**100.0**	**100.0**	**100.0**	**0.0%**
4 Output of vegetables and horticultural products	**100.8**	**96.9**	**97.8**	**0.9%**
fresh vegetables	99.6	92.1	91.5	-0.7%
plants and flowers	102.0	102.2	104.9	2.6%
5 Output of potatoes	**110.2**	**89.2**	**92.9**	**4.2%**
6 Output of fruit	**97.5**	**103.3**	**102.7**	**-0.6%**
7 Output of other crop products	**84.8**	**103.5**	**110.8**	**7.1%**
Total crop output (sum 1 - 7)	**97.3**	**89.7**	**96.6**	**7.8%**
8 Output of livestock (meat)	**103.4**	**104.1**	**105.8**	**1.6%**
cattle	102.7	100.5	100.7	0.2%
pigs	102.1	103.6	108.3	4.5%
sheep	98.8	95.6	102.5	7.3%
poultry	107.9	114.1	113.4	-0.7%
other animals	100.0	100.1	100.1	0.1%
9 Output of livestock products	**101.5**	**102.8**	**104.6**	**1.8%**
milk	99.6	99.9	101.5	1.5%
eggs	108.6	114.2	118.6	3.8%
raw wool	99.9	93.7	93.8	0.1%
other animal products	140.5	177.9	180.0	1.2%
Total livestock output (8 + 9)	**102.7**	**103.7**	**105.4**	**1.7%**
10 Inseparable non-agricultural activities	**99.9**	**102.4**	**102.6**	**0.2%**
11 All outputs	**100.6**	**98.3**	**102.0**	**3.8%**

Table 1.2 Volume indices for inputs (2015=100)

	2017	2018	2019	% Change from 2018
12 Seeds	**103.2**	**102.3**	**97.4**	**-4.8%**
13 Energy	**96.9**	**96.9**	**95.5**	**-1.4%**
electricity and fuels for heating	101.6	102.0	102.0	0.1%
motor and machinery fuels	94.7	94.6	92.6	-2.1%
14 Fertilisers	**99.0**	**89.5**	**87.8**	**-1.9%**
15 Plant protection products	**95.0**	**85.7**	**77.2**	**-10.0%**
16 Veterinary expenses	**100.1**	**94.3**	**93.8**	**-0.6%**
17 Animal feed	**102.2**	**105.3**	**104.1**	**-1.2%**
compounds	106.8	111.2	107.9	-3.0%
straights	92.7	93.0	96.1	3.3%
18 Total maintenance	**100.0**	**103.4**	**102.6**	**-0.7%**
materials	102.5	105.2	104.1	-1.0%
buildings	96.5	100.8	100.4	-0.4%
19 FISIM	**100.0**	**100.0**	**100.0**	**0.0%**
20 Other goods and services	**103.1**	**96.2**	**101.0**	**5.0%**
21 Intermediate consumption (excluding Agricultural services)	**100.9**	**99.0**	**98.2**	**-0.7%**
22 Consumption fixed capital (excluding livestock)	**102.3**	**103.5**	**104.3**	**0.8%**
equipment	104.6	106.8	108.5	1.6%
buildings	98.3	97.6	96.9	-0.8%
23 All Labour	**100.0**	**100.7**	**100.8**	**0.0%**
Compensation of employees	99.1	99.1	98.0	-1.1%
Entrepreneurial workers (farm and specialist contractors)	100.5	101.6	102.2	0.6%
24 Land	**101.9**	**101.2**	**102.2**	**1.0%**
25 All Inputs and Entrepreneurial Labour	**100.9**	**100.2**	**99.9**	**-0.2%**
Total factor productivity (11 divided by 25)	**99.7**	**98.2**	**102.1**	**4.0%**

Table 1.3 Summary volumes indices and Total Factor Productivity (2015=100)

	2017	2018	2019	% change from 2018
All outputs	100.6	98.3	102.0	3.8%
All inputs	100.9	100.2	99.9	-0.2%
Total factor productivity	**99.7**	**98.2**	**102.1**	**4.0%**

Annual change in volumes of outputs and inputs between 2018 and 2019

Outputs

Total outputs decreased by 3.8%, driven by an increase of 7.8% in the volume of all crops and an increase of 1.7% in the volume of all livestock outputs.

Cereals increased by 24% to almost the highest level ever recorded for the UK (at 120.7 just 0.1 less than in 2015), helped by higher yields and favourable growing conditions.

Oilseed rape decreased by 13%. Production was at its lowest level since 2006 with yields and area both down.

Livestock outputs showed an overall increase of 1.7%,

Milk increased by 1.5% and **eggs** by 3.8%

Total volume of **meat** production increased by 1.6%, with all sectors seeing productivity gains apart from poultry which showed a modest decrease (-0.7%).

Inputs

Overall there was a slight decrease of -0.2% in the volume of **all inputs including labour**.

Virtually all inputs showed decreases. **Animal feed** is the largest input by value and showed a fall of 1.2% overall. Plant protection products showed the largest fall at 10%, with lower usage due to the dry weather conditions in spring and the wet autumn.

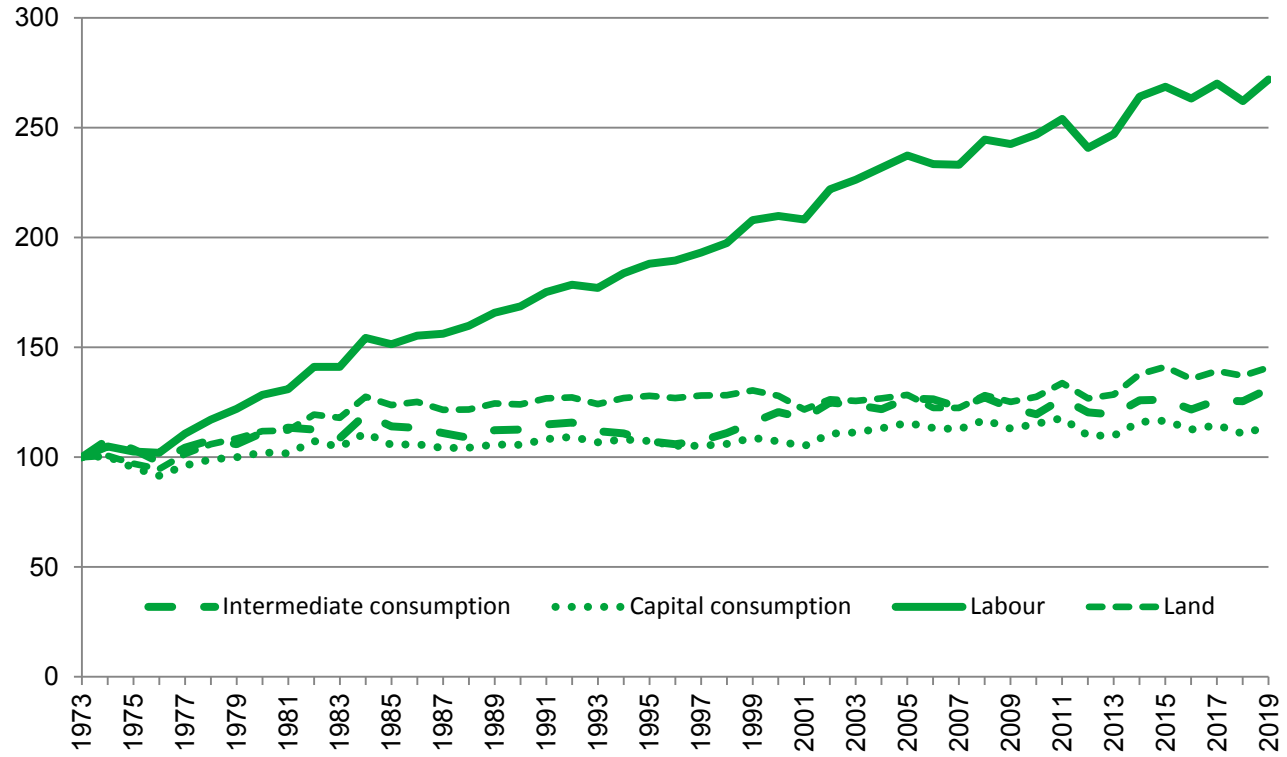
Partial productivity

Partial productivity shows the impact key inputs have on productivity. It measures total outputs against a part of the inputs. Figure 2.1 below clearly shows that labour is the key input driving productivity gains. Productivity of labour shows a steady increase over the whole period from 1973. Labour volumes are now approximately half of those in 1973. However, more recent growth in labour productivity is due to increased output rather than a reduction in labour volume.

Table 2.1 Partial factor productivity (2015=100)

	2017	2018	2019	% Change from 2018
Total factor productivity	**99.7**	**98.2**	**102.1**	**4.0 %**
Partial factor productivity indicators				
Productivity by intermediate consumption	99.7	99.3	103.9	4.5%
Productivity by capital consumption	98.3	95.0	97.8	3.0%
Productivity by labour	100.6	97.6	101.3	3.7%
Productivity by land	98.7	97.1	99.8	2.8%

Figure 2.1 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 available resources to convert inputs into outputs. Here these are measured in volumes rather than values in order to remove any effects of price. Total Factor Productivity is expressed as a relative, rather than absolute, measure enabling us to make inter-annual comparisons. Data are compared with a base year (set to 100), so, for example, a figure of 150 would represent a 50% increase compared with 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. The accounts are also used to produce other measures of the performance of the agriculture industry, including Total Income from Farming (TIFF).

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.