



3 May 2018

## Total factor productivity of the UK agriculture industry

### First estimate for 2017

This release presents the first estimate of Total Factor Productivity (TFP) of the UK agriculture industry for 2017. It also presents volume indices for inputs and outputs. These figures will be revised using data that becomes available in the coming months and a second estimate published towards the end of 2018.

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.

#### Key points

- Total factor productivity is estimated to have increased by +2.9% between 2016 and 2017 to the highest level recorded. This is driven by an increase in overall levels of production partly offset by a smaller rise in volumes of inputs.
- The volume of all outputs increased by +3.6% from the low levels seen in 2016. This was driven by the following volume changes:
  - a +7.3% increase for all crops
  - a +0.5% increase for livestock meat outputs
  - a +4.0% increase for livestock product outputs
- The volume of all inputs increased by only +0.7%, this being lower than the increase in output volumes.

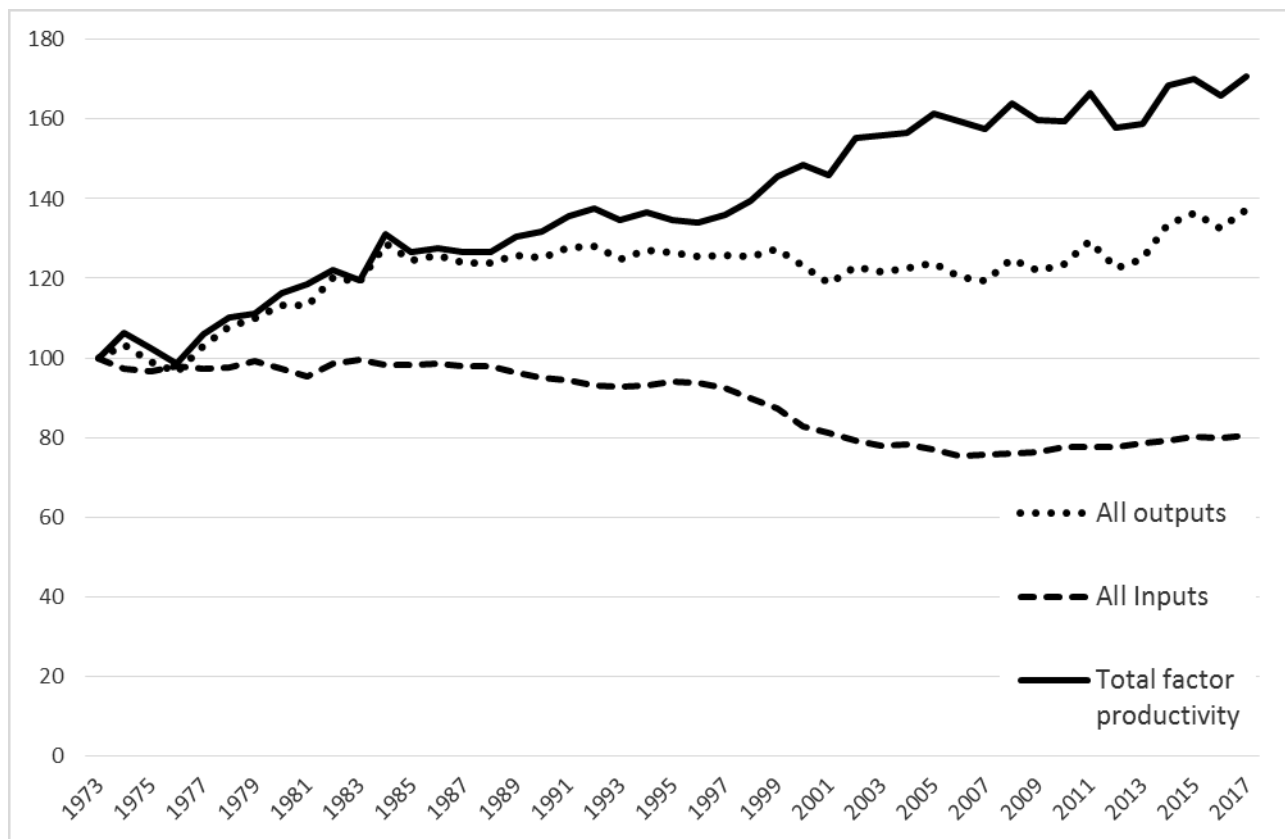
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## Total factor productivity

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 increased by +2.9% between 2016 and 2017 to the highest level recorded. This represents a recovery, after a dip in 2016, to a level slightly higher than that seen in 2015. Although there are annual fluctuations the long-term trend is still one of slow but steady overall improvement.

The annual increase is driven by an increase in almost all outputs, partially offset by a smaller increase in the volume of inputs. Compared to 2016 the volume of all outputs rose by +3.6%, whilst the volume of all inputs rose by +0.7%.

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

	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>Change 16-17</b>
<b>1 Cereals</b>	120.4	107.0	111.9	+4.6%
Wheat	109.1	97.3	99.3	+2.0%
Rye	90.9	90.9	90.9	0.0%
Barley	164.5	141.8	160.5	+13.2%
Oats and summer cereal mixtures	119.4	122.3	120.3	-1.7%
Other cereals	89.7	78.4	95.6	+22.1%
<b>2 Industrial crops</b>	109.5	84.7	106.6	+25.9%
Oil seeds	111.3	78.9	96.5	+22.3%
Oilseed rape	114.0	79.6	97.9	+23.0%
Other oil seeds	39.7	66.4	64.2	-3.3%
Protein crops	124.5	113.2	125.1	+10.5%
Sugar beet	95.3	87.1	137.9	+58.3%
Other industrial crops	101.1	101.1	101.1	0.0%
<b>3 Forage plants</b>	121.3	121.3	121.3	0.0%
<b>4 Vegetables &amp; horticultural products</b>	100.3	100.2	102.1	+1.9%
Fresh vegetables	103.0	101.4	103.8	+2.3%
Plants and flowers	97.4	98.9	100.3	+1.5%
<b>5 Potatoes</b>	137.3	131.1	151.6	+15.6%
<b>6 Fruit</b>	110.4	101.7	106.7	+4.9%
<b>7 Other crop products</b>	123.2	126.1	129.2	+2.5%
<b>Total crop output (sum 1 - 7)</b>	113.4	104.4	112.0	+7.3%
<b>8 Livestock (meat)</b>	105.7	108.2	108.7	+0.5%
Cattle	100.2	103.8	102.5	-1.2%
Pigs	119.9	124.6	122.6	-1.6%
Sheep	110.1	106.3	108.4	+2.0%
Poultry	105.1	108.4	111.7	+3.1%
Other animals	99.4	99.4	99.4	0.0%
<b>9 Livestock products</b>	110.8	107.5	111.8	+4.0%
Milk	112.4	107.5	111.8	+4.0%
Eggs	103.4	107.9	112.4	+4.2%
Raw wool	101.2	102.3	100.5	-1.8%
Other animal products	89.3	87.8	92.0	+4.7%
<b>Total livestock output (8 + 9)</b>	107.8	108.2	110.1	+1.8%
<b>10 Inseparable non-agricultural activities</b>	120.7	120.8	120.7	-0.1%
<b>11 All outputs</b>	110.4	107.3	111.2	+3.6%

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

	2015	2016	2017	Change 16-17
<b>12 Seeds</b>	105.8	106.0	108.2	+2.1%
<b>13 Energy</b>	98.1	97.5	98.4	+0.9%
Electricity and fuels for heating	82.7	79.6	80.8	+1.5%
Motor and machinery fuels	104.5	105.4	106.1	+0.6%
<b>14 Fertilisers</b>	100.7	113.6	110.9	-2.4%
<b>15 Plant protection products</b>	134.0	132.6	135.6	+2.3%
<b>16 Veterinary expenses</b>	106.0	103.5	104.5	+1.0%
<b>17 Animal feed</b>	105.4	104.9	108.1	+3.0%
Compounds	114.5	116.3	122.6	+5.4%
Straights	90.8	86.2	84.1	-2.5%
<b>18 Total maintenance</b>	102.3	102.6	102.5	-0.2%
Materials	101.7	101.3	102.9	+1.6%
Buildings	103.5	105.0	101.9	-3.0%
<b>19 FISIM</b>	100.0	100.0	100.0	+0.0%
<b>20 Other goods and services</b>	100.0	96.0	95.9	-0.1%
<b>21 Intermediate consumption</b>	104.4	104.4	105.5	+1.1%
<b>22 Consumption fixed capital</b>	108.8	109.5	110.1	+0.6%
Equipment	116.7	118.5	120.1	+1.4%
Buildings	96.9	96.0	95.1	-0.9%
<b>23 All Labour</b>	101.2	100.4	100.6	+0.2%
Compensation of employees	102.2	100.3	100.4	+0.1%
Entrepreneurial workers	100.7	100.4	100.7	+0.3%
<b>24 Land</b>	99.5	100.7	101.4	+0.7%
<b>25 All Inputs and Entrepreneurial Labour</b>	103.4	103.2	103.9	+0.7%

**Table 1c Summary volumes indices and Total Factor Productivity**

	2015	2016	2017	% change 16/17
<b>All outputs</b>	110.4	107.3	111.2	+3.6%
<b>All inputs</b>	103.4	103.2	103.9	+0.7%
<b>Total factor productivity</b>	<b>106.7</b>	<b>104.0</b>	<b>107.0</b>	+2.9%

## Annual change in volumes of outputs and inputs between 2016 and 2017

### OUTPUTS

**Total outputs** increased by +3.6%, driven by an increase of +7.3% in the volume of all crops and a smaller increase of +1.8% in the volume of livestock outputs.

**Cereal** volumes rose by +4.6% with oats being the only cereal crop to see a fall (-1.7%).

**Oilseed rape** saw a large increase in the volume of outputs, up +23%.

**Sugar beet** saw a large increase in volume, up by +58%.

**Livestock** outputs showed an overall increase of +1.8%.

**Milk** volume increased by +4.0% following the drop in 2016.

Total volume of **meat** production increased slightly, by +0.5%. This was driven by increases for sheep (+2.0%) and poultry (+3.1%) and partly offset by falls for cattle (-1.2%) and pigs (-1.6%).

### INPUTS

Overall there was a slight increase of +0.7% in the volume of **all inputs including labour**.

**Animal feed** is the largest input and showed an increase of +3.0% overall. This was driven by an increase of +5.4% for compounds, partly offset by a -2.5% fall for straights.

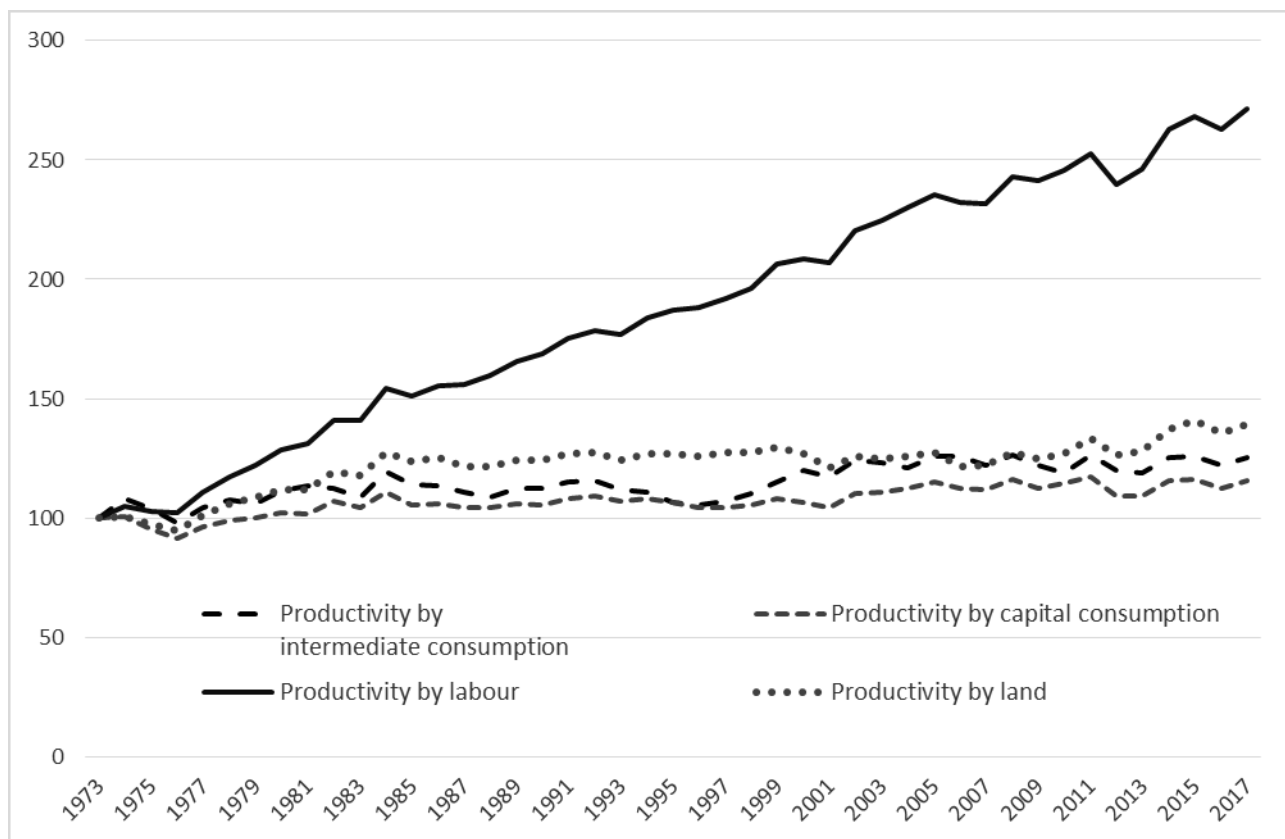
## Partial productivity

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 over the last few years growth in labour productivity is due to increased output rather than a reduction in labour number.

**Table 2 Partial factor productivity (2010=100)**

	2012	2013	2014	2015	2016	2017
<b>Total factor productivity</b>	<b>99.0</b>	<b>99.5</b>	<b>105.6</b>	<b>106.7</b>	<b>104.0</b>	<b>107.0</b>
<b>Partial factor productivity indicators</b>						
Productivity by intermediate consumption	100.8	99.9	105.4	105.8	102.8	105.4
Productivity by capital consumption	95.3	95.3	100.7	101.4	98.0	101.0
Productivity by labour	97.5	100.1	107.0	109.0	106.9	110.6
Productivity by land	99.3	100.8	108.0	110.9	106.5	109.7

**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. 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.

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

<b>All outputs</b>	The volume of all outputs sold off the farm. This excludes transactions within the industry.
<b>All inputs</b>	The volume of goods and services purchased and consumed. This excludes transactions within the industry.
<b>Total factor productivity</b>	How efficiently all inputs are turned into outputs. Derived by dividing all outputs by all inputs.
<b>Partial productivity</b>	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.

## **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.