Department for Environment Food & Rural Affairs

30 November 2017

Total factor productivity of the UK agriculture industry

Second estimate for 2016

This release presents the second estimate of Total Factor Productivity (TFP) of the UK agriculture industry for 2016. It also presents volume indices for inputs and outputs. These figures have been revised using data that has become available since the first estimate published in April 2017.

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.

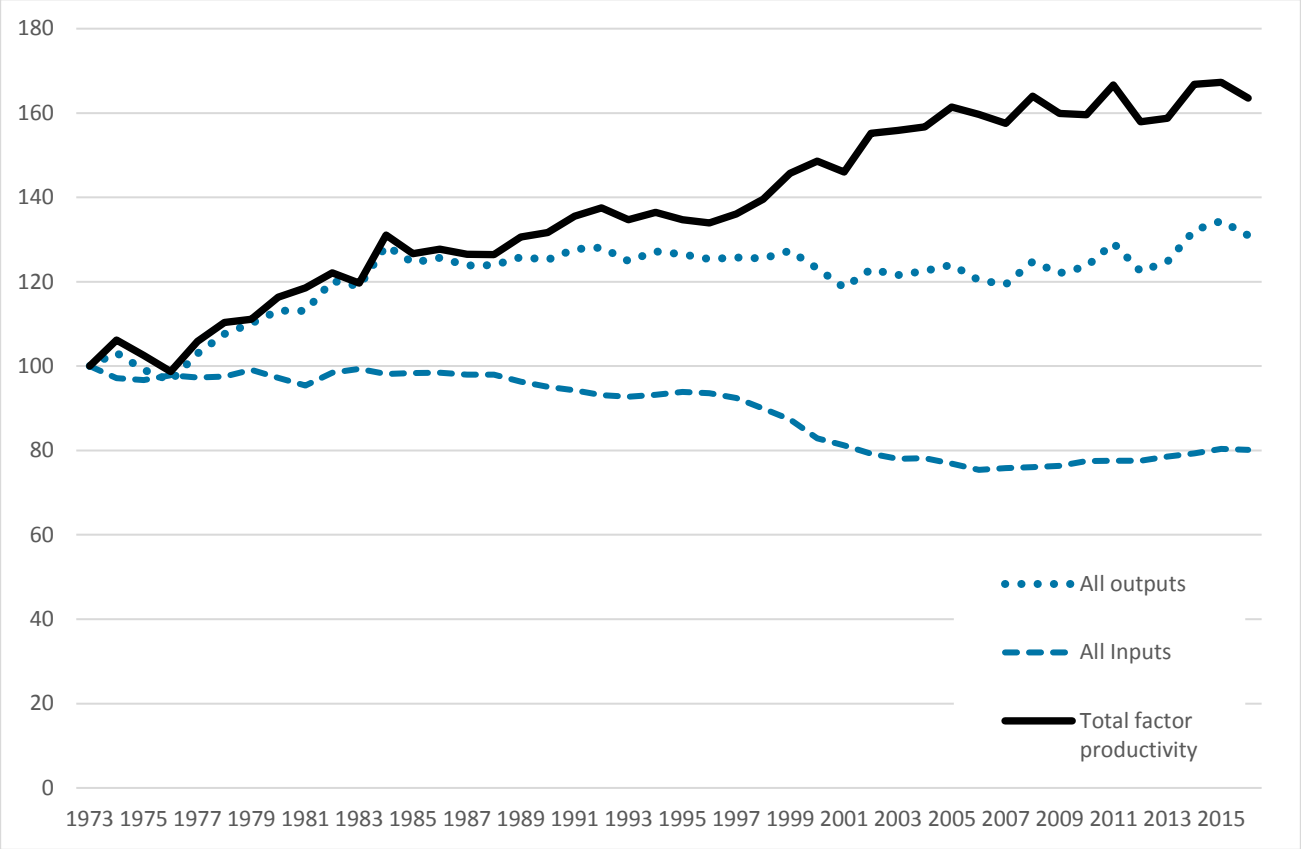
Key points

- Total factor productivity is estimated to have fallen by 2.2% between 2015 and 2016. This is driven by a fall in overall levels of production combined with static volumes of inputs.
- The volume of all outputs fell 2.5% from the high levels seen in 2015. This was driven by the following volume changes:
    - a 7.9% fall for all crops
    - a 2.4% increase for livestock meat outputs
    - a 2.2% fall for livestock product outputs
- The volume of all inputs fell slightly (0.3%) but by less than the decrease in outputs.

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.gsi.gov.uk **Media enquiries to**: Tel: 020 7238 5054 / 6001 / 5610 / 6092 / 6007 / 5599

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 fallen by 2.2% between 2015 and 2016. Although there are annual fluctuations the long-term trend is still one of slow but steady overall improvement. The slight annual fall is driven by a reduction in outputs, partially offset by a slight reduction in the volume of inputs.

The volume of all outputs fell by 2.5%, from the record levels recorded for the UK in 2015. The volume of all inputs fell slightly (0.3%) but by less than the decrease in outputs.

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

	2011	2012	2013	2014	2015	2016
1 Cereals	105.0	92.6	92.6	118.8	120.4	106.9
Wheat	104.2	88.2	75.9	109.7	109.1	97.2
Rye	100.0	68.2	90.9	90.9	90.9	90.9
Barley	110.7	111.3	154.3	153.5	164.4	142.0
Oats and summer cereal mixtures	92.1	93.3	150.6	114.1	120.3	122.9
Other cereals	99.5	93.3	106.0	105.4	89.7	78.5
2 Industrial crops	118.3	105.8	98.6	111.6	109.5	84.7
Oil seeds	122.9	112.9	95.2	108.3	111.3	78.9
Oilseed rape	123.7	114.6	95.4	110.3	114.0	79.6
Other oil seeds	98.9	58.0	86.4	54.6	39.7	66.4
Protein crops	76.0	55.5	68.9	81.8	124.5	113.2
Sugar beet	130.3	111.7	129.2	142.6	95.3	87.1
Other industrial crops	101.1	101.1	101.1	101.1	101.1	101.1
3 Forage plants	107.1	109.0	121.3	121.3	121.3	121.3
4 Vegetables & horticultural products	97.4	94.7	97.6	100.0	100.3	99.8
Fresh vegetables	97.7	92.8	97.4	102.5	103.0	100.6
Plants and flowers	97.2	96.7	97.7	97.3	97.4	99.0
5 Potatoes	116.4	90.7	112.8	109.7	94.1	95.7
6 Fruit	101.3	93.1	100.2	106.9	110.4	98.7
7 Other crop products	114.4	126.9	119.1	133.9	123.2	126.1
Total crop output (sum 1 - 7)	105.5	95.6	97.9	110.4	109.6	100.9
8 Livestock (meat)	106.0	102.8	102.9	102.7	105.6	108.0
Cattle	111.9	102.0	98.0	96.3	100.2	103.8
Pigs	106.4	108.6	111.9	115.8	119.9	124.6
Sheep	105.9	101.2	103.3	108.3	110.2	106.5
Poultry	99.5	102.2	105.5	102.5	104.4	107.8
Other animals	100.0	100.0	100.0	100.0	100.0	100.0
9 Livestock products	101.3	98.9	100.2	107.3	109.9	107.6
Milk	101.5	99.8	100.5	108.5	111.3	107.6
Eggs	99.6	96.5	99.5	100.0	103.5	107.9
Raw wool	105.3	110.4	97.4	99.8	101.2	102.3
Other animal products	98.7	57.5	84.2	107.1	89.3	87.8
Total livestock output (8 + 9)	104.1	101.2	101.8	104.6	107.4	108.1
10 Inseparable non-agricultural activities	101.5	103.1	115.4	113.2	120.7	120.7
11 All outputs	104.5	99.1	100.9	107.0	108.7	106.0

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

	2011	2012	2013	2014	2015	2016
12 Seeds	97.6	101.6	107.0	107.0	105.8	105.7
13 Energy	96.3	96.3	97.0	95.9	98.1	98.5
Electricity and fuels for heating	94.5	93.8	87.4	80.7	82.7	80.0
Motor and machinery fuels	96.9	97.2	100.9	102.1	104.4	106.7
14 Fertilisers	103.2	97.9	99.2	100.5	100.8	112.7
15 Plant protection products	108.1	117.9	124.9	130.6	134.0	132.5
16 Veterinary expenses	97.2	100.3	104.1	105.6	106.2	104.8
17 Animal feed	93.0	94.8	98.9	101.3	105.4	104.9
Compounds	97.7	103.0	109.3	109.9	114.5	116.3
Straights	85.3	81.6	82.1	87.4	90.8	86.2
18 Total maintenance	99.8	99.3	100.5	106.8	107.2	106.9
Materials	101.4	100.2	102.2	103.0	101.6	101.1
Buildings	97.2	97.8	97.6	112.9	116.3	116.5
19 FISIM	100.0	100.0	100.0	100.0	100.0	100.0
20 Other goods and services	102.7	97.6	98.5	96.8	100.0	96.1
21 Intermediate consumption	98.5	98.3	101.0	102.5	104.9	104.9
22 Consumption fixed capital	102.2	104.0	105.9	107.3	108.9	109.6
Equipment	103.9	107.2	110.8	113.7	116.9	118.7
Buildings	99.6	99.1	98.4	97.7	96.9	96.0
23 All Labour	101.6	101.6	100.8	100.9	101.2	100.1
Compensation of employees	102.4	102.4	101.7	101.8	102.2	100.0
Entrepreneurial workers	101.2	101.2	100.3	100.5	100.7	100.2
24 Land	99.6	99.7	100.1	100.0	99.5	100.7
25 All Inputs and Entrepreneurial Labour	**100.1**	**100.1**	**101.4**	**102.3**	**103.7**	**103.4**

Table 1c Summary volumes indices and Total Factor Productivity

	2011	2012	2013	2014	2015	2016	% change 15/16
All outputs	107.0	107.0	107.0	107.0	108.7	106.1	-2.5%
All inputs	102.3	102.3	102.3	102.3	103.6	103.4	-0.3%
Total factor productivity	104.5	104.5	104.5	104.5	105.0	102.6	-2.2%

Annual change in volumes of outputs and inputs between 2015 and 2016

OUTPUTS

Total outputs fell by 2.5%, driven by a fall of 7.9% in the volume of all crops, offset by a slight (0.7%) increase in the volume of livestock outputs.

Cereal volumes fell by 11% with oats being the only cereal crop to see an increase (2.2%).

Oilseed rape saw a large fall in the volume of outputs, down 30%.

Livestock outputs showed little change overall, with an increase of 0.7%.

Milk volume fell by 3.3% from the high levels seen in 2015.

Total volume of **meat** production increased 2.4%. This was driven by increases of 3.6% for cattle, 4.0% for pigs, 3.2% for poultry and a fall of 3.4% for sheep. Volume of output for other animals remained level.

INPUTS

Overall there was a slight fall of 0.3% in the volume of **all inputs including labour**.

Animal feed is the largest input and showed a slight fall of 0.5% overall. This was driven by a 5.1% fall for straights, partly offset by a small increase in compounds (1.6%).

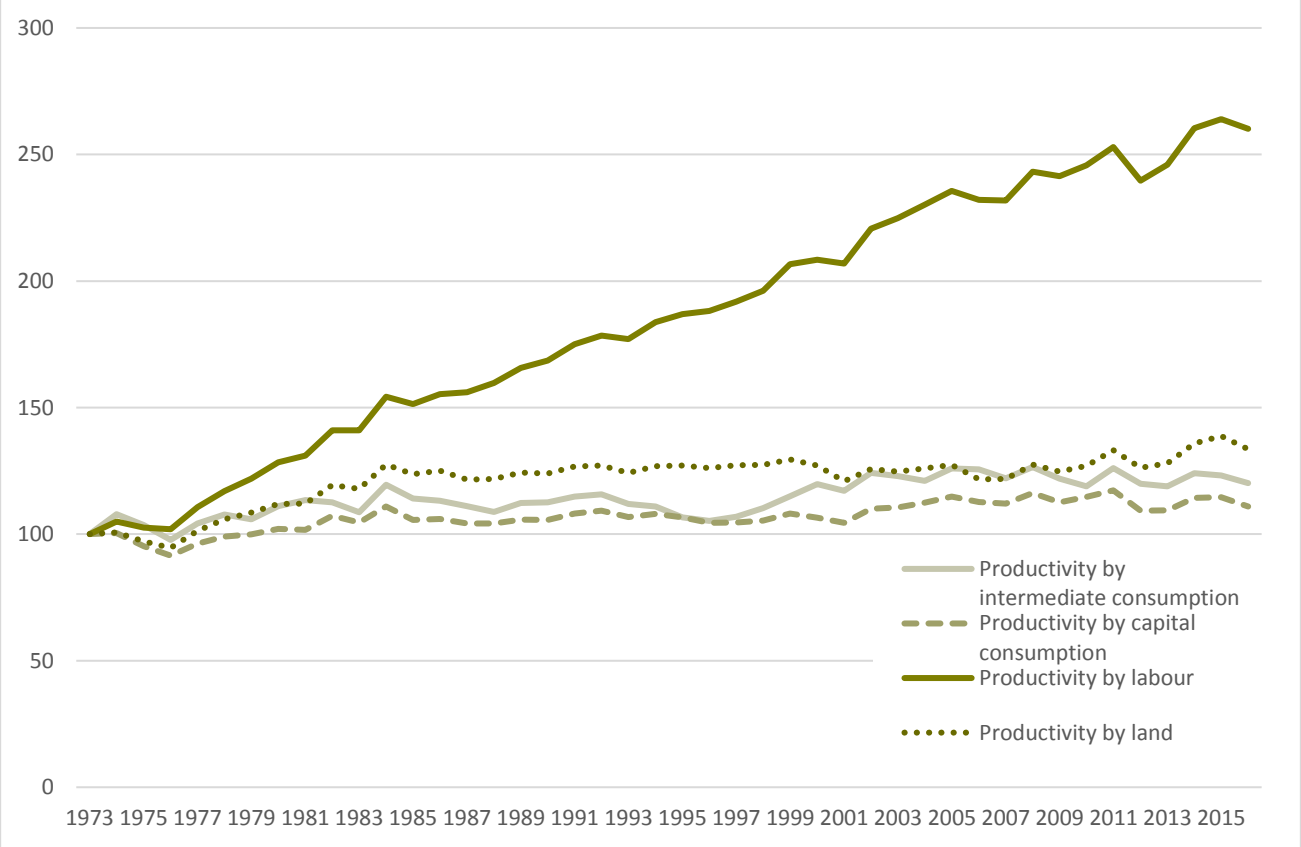
Partial productivity

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)

	2011	2012	2013	2014	2015	2016
Total factor productivity	**104.4**	**99.0**	**99.5**	**104.5**	**104.8**	**102.5**
Partial factor productivity indicators						
Productivity by intermediate consumption	106.1	100.8	99.9	104.4	103.6	101.0
Productivity by capital consumption	102.2	95.3	95.3	99.7	99.8	96.6
Productivity by labour	102.9	97.5	100.1	106.0	107.4	105.8
Productivity by land	104.9	99.3	100.8	106.9	109.3	105.2

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

All outputs	The volume of all outputs sold off the farm. This excludes transactions within the industry.
All inputs	The volume 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.

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.