



30 April 2015

Total factor productivity of the UK agricultural industry 2014 – 1st estimate

This release presents the first estimate of total factor productivity of the UK agricultural industry and volume indices for 2014. Total factor productivity of the agricultural industry in the United Kingdom is an indicator of how well inputs are converted into outputs giving an indication of the efficiency and competitiveness of the industry. Year to year variations in total factor productivity may be due to factors outside the farmer's control, such as, weather conditions or disease outbreaks.

For the first time land is included in the productivity calculation which brings it in line with other countries who produce the productivity indicators. The introduction of land has slightly reduced the overall increase in productivity. There have also been other changes to the indicator this year which are highlighted in the revision section of the document on page 9.

Key points:

- Total factor productivity of the agricultural industry in the United Kingdom is estimated to have risen by 6.0% between 2013 and 2014. This follows two years of poor productivity when bad weather conditions affected production. Compared to 2011 productivity is up by 1.7%.
- The volume of all outputs rose by 6.5% driven by a 13% increase in the volume of all crops following a year of high cereal yields. There was a 0.4% increase in volume of all inputs
- Since 1973 total factor productivity has increased by 52% driven by a 34% increase in the volume of outputs and a 12% decrease in the volume of inputs.

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Productivity

While weather conditions or other factors such as disease outbreaks may have short term impact on agricultural productivity, it is developments in productivity over a longer period that constitute one of the main drivers of agricultural income. Productivity growth means that more value is added in production and more income is available to be distributed.

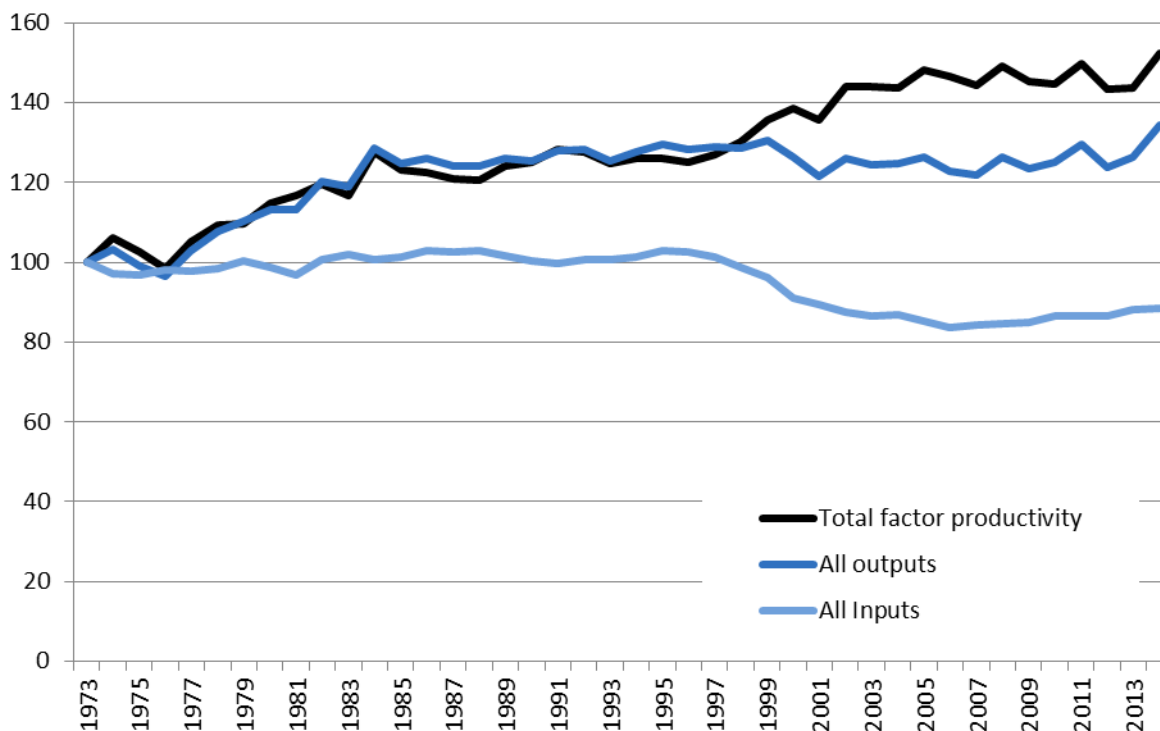
Latest figures

Total factor productivity of the agricultural industry in the United Kingdom is estimated to have risen by 6.0% between 2013 and 2014.

Following two years where productivity was negatively affected by the weather 2014 was a marked change. Despite above average rainfall at the start of the year, with floods in south west England the remainder of the year was conducive to good crop growth. As a result in 2014 we saw record cereal yields which led to a 13% increase in the volume of crops produced in 2014. Weather does not have such a large influence on animal production but there was still a 2.9% increase in the volume of livestock output. This increase was largely down to an 8.2% increase in milk production, which was the highest level of production since 1987. Overall the volume of all outputs is estimated to have increased by 6.5%.

In 2014 there was only a small change in the volume in inputs: 0.4% increase. This was due to a small increase in the use of animal feed, partly to achieve the higher milk yields, as well as an increase in the consumption of fixed capital.

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



2014 compared to 2011

As productivity in 2012 and 2013 were negatively affected by the bad weather it is interesting to compare 2014 against 2011. Again we see increase in total factor productivity but now a more moderate 1.7% increase. There was a 3.8% increase in the volume of all outputs offset by a 2.1% increase in all inputs.

The volume of crop output rose by 4.7% between 2011 and 2014, compared to 13% between 2013 and 2014. The key driver for this change was the increase in cereals where there was a 14% increase between 2011 and 2014, reflecting the record yields seen in 2014.

For livestock there was a 2.6% increase between 2011 and 2014. This increase was driven by the high milk production in 2014 where there was a 7.1% increase in milk output.

Compared to 2011 there was a 2.1% increase in the volume of all inputs used. There was a 3.0% increase in the volume of intermediate consumption used driven by a 21% increase in plant protection products due to increased disease pressures in 2014.

Details

Outputs: crops

2014 was a good year for crop growth and when compared against 2013 there was a 13% increase in productivity. The key driver behind this growth is cereals where there was a 29% increase compared to 2013.

In 2014 the volume of wheat output increased by 46% when compared against 2013. This was due to a 20% increase in the planted area and a 16% increase in yield. The average wheat yield in 2014 was 8.6 tonnes/hectare, the highest recorded average for the United Kingdom.

2014 also saw the highest recorded yield for barley at 6.4 tonnes/hectare (average for spring and winter barley). Despite this increase in yield there was an 11% reduction in the planted area as farmers reverted back to wheat. This led to an overall 3% fall in the volume of barley when compared to 2013.

Oilseed rape also saw an increase in the volume of outputs. Good yields were offset by a reduction in the crop area to give a 16% increase in the volume of outputs. This was the second year in a row that the planted area of oilseed rape has fallen following the peak plantings in 2012.

Outputs: livestock

Livestock output is not so directly affected by the weather as crops. Compared to 2013 there was a 2.9% increase in the volume of all livestock outputs.

The key contributor to the increase in livestock outputs was milk where there was an 8.2% increase in the volume compared to 2013. In 2014 milk production was 14.5 billion litres, the largest since 1987. This was achieved by a 2.6% increase in the size of the dairy herd as well as increased production per cow. High milk prices at the start of the year are thought to have encouraged the additional production seen in 2014.

There is a mixed picture for meat production with increases seen in pigs and sheep which were offset by decreases in cattle and poultry. Overall there was no change in the volume of meat production.

Inputs

In 2014 there was a 0.4% increase in the volume of all inputs.

Animal feed is the largest input and there was a 1.6% increase in the volume used in 2014. Overall, the volume of compounds used in 2014 was down by 0.2%. There was an increase in compounds used for poultry and pigs but a reduction for cattle and sheep. However, it is worth noting that there was an increase in the volume of compounds used by dairy herds to accommodate the increased milk production. The total volume of straights used in 2014 increased by 5.6%. This was driven by the lower cost of straights and an increase in oilseed based products possibly to boost the lower protein content seen in cereals this year.

The volume of plant protection products used in 2014 increased by 5.0%. This was due to a greater use of fungicides to match the increased area of winter wheat and winter oilseed rape. There was also higher disease pressure in 2014 compared to 2013.

There was an 8.3% fall in the volume of seeds used in 2014 when compared to 2013. However this is back to a more normal level of seed use after higher than normal seed use in 2013 due to increased spring plantings seen that year.

There was a 1.9% fall in the use of energy in 2014. This was largely driven by the reduction in fuels for machinery as there was less land work in the spring, notably spring plantings of cereals.

Partial factor productivity

Partial factor 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.

In 2014 all the partial factor productivity indicators were driven by the 6.5% increase in the volume of outputs. Land productivity saw the largest increase of 6.9% in 2014 as the area of utilised agricultural land fell by 0.4%.

Figures 2 Partial productivity indicators compared against total factor productivity (1973=100)

Figure 2a Intermediate consumption

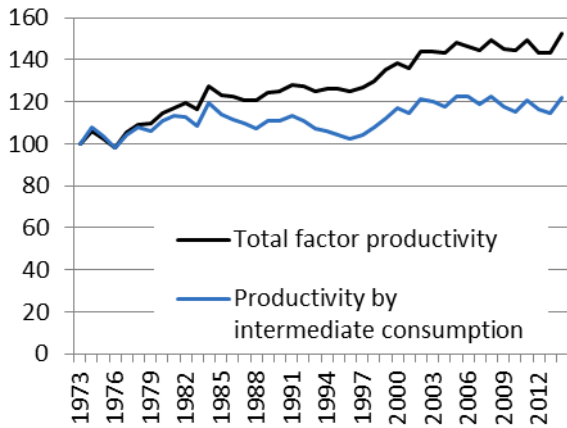


Figure 2b Capital consumption

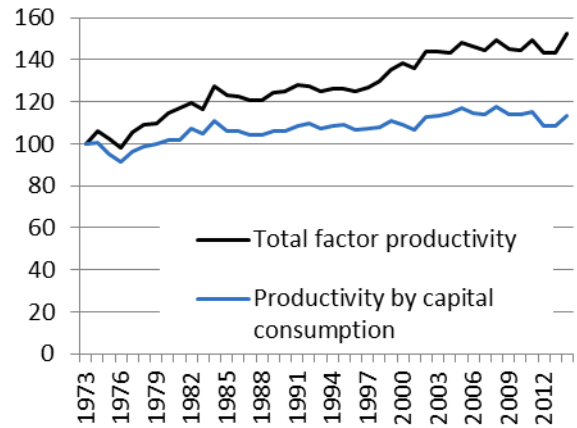


Figure 2c Labour

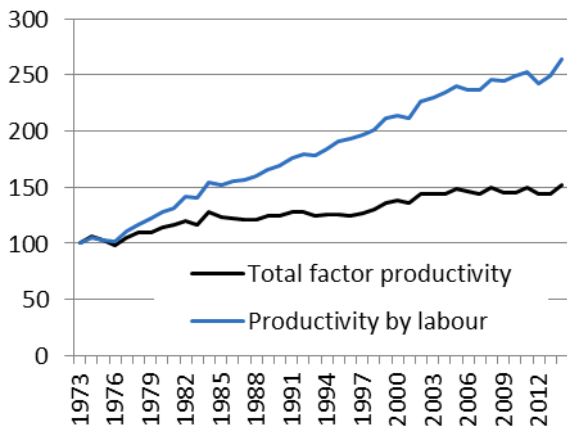


Figure 2d Land

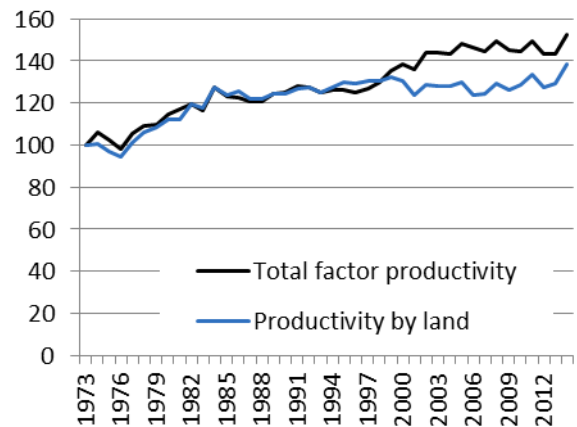


Table 1 Volume indices for outputs and inputs

	2010=100					
	2009	2010	2011	2012	2013	2014
1 Output of cereals	102.4	100.0	105.0	92.6	92.9	119.9
wheat	93.6	100.0	104.2	88.2	76.4	111.8
rye	86.4	100.0	100.0	68.2	90.9	113.6
barley	141.2	100.0	110.7	111.3	154.2	149.6
oats and summer cereal mixtures	109.7	100.0	92.1	93.2	150.4	112.2
other cereals	120.2	100.0	99.5	93.3	106.0	105.3
2 Output of industrial crops	99.5	100.0	118.3	104.4	97.3	109.7
oil seeds	87.0	100.0	122.9	112.9	95.2	108.3
oilseed rape	87.5	100.0	123.7	114.6	95.4	110.3
other oil seeds	75.4	100.0	98.9	58.0	86.4	54.7
protein crops	117.2	100.0	76.0	55.5	68.9	79.1
sugar beet	129.6	100.0	130.3	111.7	129.2	142.6
other industrial crops	98.1	100.0	101.1	57.1	57.1	57.1
3 Output of forage plants	105.3	100.0	107.1	109.0	121.3	121.3
4 Output of vegetables and horticultural products	96.4	100.0	97.7	95.0	97.8	99.9
fresh vegetables	96.4	100.0	98.1	93.4	97.9	102.2
plants and flowers	96.4	100.0	97.2	96.7	97.7	97.3
5 Output of potatoes	125.8	100.0	116.4	90.3	111.1	110.9
6 Output of fruit	99.7	100.0	101.3	93.0	100.1	106.7
7 Output of other crop products	103.5	100.0	114.4	126.9	119.1	132.6
Total crop output (sum 1 - 7)	101.7	100.0	105.5	95.4	97.7	110.5
8 Output of livestock (meat)	96.7	100.0	102.8	102.6	103.0	103.0
cattle	95.4	100.0	102.8	101.7	98.0	97.1
pigs	95.3	100.0	106.4	107.8	111.1	115.6
sheep	108.1	100.0	105.9	101.1	104.2	108.3
poultry	92.7	100.0	99.5	102.2	105.2	102.2
other animals	100.0	100.0	100.0	100.0	100.0	100.0
9 Output of livestock products	96.2	100.0	101.3	98.9	100.2	107.5
milk	97.5	100.0	101.5	99.9	100.5	108.8
eggs	89.2	100.0	99.6	96.5	99.5	100.0
raw wool	99.0	100.0	105.2	110.7	97.5	103.6
other animal products	92.9	100.0	98.7	57.5	84.2	106.8
Total livestock output (8 + 9)	96.5	100.0	102.2	101.2	101.9	104.9
10 Inseparable non-agricultural activities	100.5	100.0	101.5	103.1	115.4	117.7
11 All outputs	98.6	100.0	103.4	99.0	100.9	107.4

continued

Table 1 Volume indices for outputs and inputs (continued)

	2010=100					
	2009	2010	2011	2012	2013	2014
12 Seeds	92.6	100.0	97.6	101.3	106.4	97.6
13 Energy	102.5	100.0	96.3	96.3	97.0	95.2
electricity and fuels for heating	100.5	100.0	94.5	93.8	87.4	87.4
motor and machinery fuels	103.4	100.0	96.9	97.2	100.9	98.2
14 Fertilisers	88.4	100.0	103.2	97.9	99.2	99.0
15 Plant protection products	92.3	100.0	108.1	117.9	124.9	131.2
16 Veterinary expenses	102.4	100.0	97.2	100.3	104.1	106.5
17 Animal feed	92.6	100.0	93.0	94.7	99.1	100.7
compounds	93.7	100.0	97.7	103.0	109.3	109.1
straights	90.9	100.0	85.3	81.3	82.5	87.2
18 Total maintenance	98.7	100.0	99.8	99.3	100.4	100.4
materials	97.4	100.0	101.4	100.2	102.2	102.2
buildings	100.8	100.0	97.2	97.8	97.6	97.6
19 FISIM	100.0	100.0	100.0	100.0	100.0	100.0
20 Other goods and services	103.7	100.0	103.4	96.0	99.6	100.6
21 Intermediate consumption (excl Agricultural services)	96.4	100.0	98.6	98.0	101.3	101.7
22 Consumption fixed capital (excluding livestock)	98.8	100.0	102.3	104.0	106.0	108.0
equipment	97.7	100.0	104.0	107.2	110.9	114.5
buildings	100.4	100.0	99.6	99.0	98.3	97.6
23 All Labour	100.4	100.0	101.6	101.7	100.9	101.1
Compensation of employees	100.7	100.0	102.3	102.4	101.7	102.0
Entrepreneurial workers (farm and specialist contractor)	100.3	100.0	101.3	101.3	100.5	100.6
24 Land	100.5	100.0	99.6	99.7	100.1	99.7
25 All Inputs and Entrepreneurial Labour	98.1	100.0	99.9	99.8	101.6	102.0
Total factor productivity (11 divided by 25)	100.5	100.0	103.5	99.2	99.3	105.3
Partial factor productivity indicators						
Productivity by intermediate consumption (11 divided by 21)	102.4	100.0	104.9	101.1	99.6	105.7
Productivity by capital consumption (11 divided by 22)	99.8	100.0	101.1	95.1	95.1	99.5
Productivity by labour (11 divided by 23)	98.2	100.0	101.8	97.3	100.0	106.3
Productivity by land (11 divided by 24)	98.1	100.0	103.8	99.2	100.7	107.7

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 any transactions for goods or service within the industry.
Total factor productivity:	A measure of the efficiency of turning all inputs into outputs. Derived by dividing all outputs by all inputs.
Productivity by intermediate consumption	A measure of how efficiently intermediate consumption is transformed into outputs. Derived by dividing all outputs by intermediate consumption.
Productivity by capital consumption	A measure of how efficiently capital is consumed in the production of outputs. Derived by dividing all outputs by capital consumption.
Productivity by all labour	A measure of how efficiently labour is used in the production of all outputs. Derived by dividing all outputs by all labour.

Description of 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 agricultural industry uses the resources that are available to turn inputs into outputs. The volumes of outputs and inputs are weighted by price.

Total factor productivity is not an absolute measure of the efficiency of transforming inputs into outputs but a relative measure, which enables us to see if improvements are made by comparing one year to another.

When we look at the results we need to consider the trend as changes from year to year are often shaped by factors outside the farmer's control. Factors such as weather, animal disease, policy interventions and general economic conditions can have short term effects on total factor productivity. However, over a longer period, 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 also produce other measures of the performance of the agricultural industry, including Total Income from Farming.

Revisions

Revisions have been made owing to further information becoming available and methodology reviews.

The key change in this statistical notice is the introduction of land in the productivity indicator. The volume of land is based on the utilised agricultural area. The value associated for land is an annual rent figure. Owned land is given a notional rent value which is added to the rent paid by farmers to give a total annual rent value. Due to the value associated to land it has become a key component of the productivity indicator. The overall impact of land on the indicator is a slight reduction in productivity gains. Productivity growth from 1973 to 2014 is 52% when land is included compared to 53% when land is excluded.

Methodological changes have been made to the calculation of consumption to fixed capital. These changes have extended the period that the capital is consumed and changed the profile of consumption. Changes to the data were made back to 1973.

There were changes to plant protection products data back to 2008. This corrects errors in the interpretation of the data.

There were data changes made to seeds all the way back to 1973 to rectify an error in the data. Changes to cereals and potatoes data were made back to 2010.

Table 2 shows the impact these changes have had on the 2013 figures for total factor productivity.

Table 2 Revisions made to the 2013 estimate of total factor productivity between November 2014 and April 2015

2010=100	Nov-14 2013	Apr-15 2013	% change to 2013
All outputs	100.5	100.9	0.4%
All inputs	101.6	101.6	0.0%
Total Factor Productivity	98.9	99.3	0.4%

Summary quality report

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 relates to estimates of Total Income from Farming and aim to provide users with information on usability and fitness for purpose of these estimates.

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 experts.
- Discussion of components of the accounts with external experts.
- Quality assessments made by Eurostat, the statistical office of the European Union.

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 agricultural industry.
- Inform research into the economic performance of the agricultural 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.