Department for Environment Food & Rural Affairs

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Total factor productivity of the UK agricultural industry 2013 – 1st estimate

This release presents the first estimate of total factor productivity of the UK agricultural industry and volume indices for 2013. 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. A second estimate, incorporating data that becomes available later, is to be released on 27 November 2014.

Key points:

- Total factor productivity of the agricultural industry in the United Kingdom is estimated to have marginally fallen (0.1%) between 2012 and 2013.
- The volume of final output at market prices rose by 0.5%; however this increase was more than offset by a 0.7% rise in the volume of all inputs and entrepreneurial labour used in the production process.
- Over the longer period, the volume of final output has remained largely unchanged between 1988 and 2013 while the volume of all inputs and entrepreneurial labour fell by 18%, leading to total factor productivity increasing by 20%. Total factor productivity stayed relatively unchanged during the mid-80s to mid-90s, increased by 18% between 1997 and 2005 and has since remained mostly level with year to year variations.

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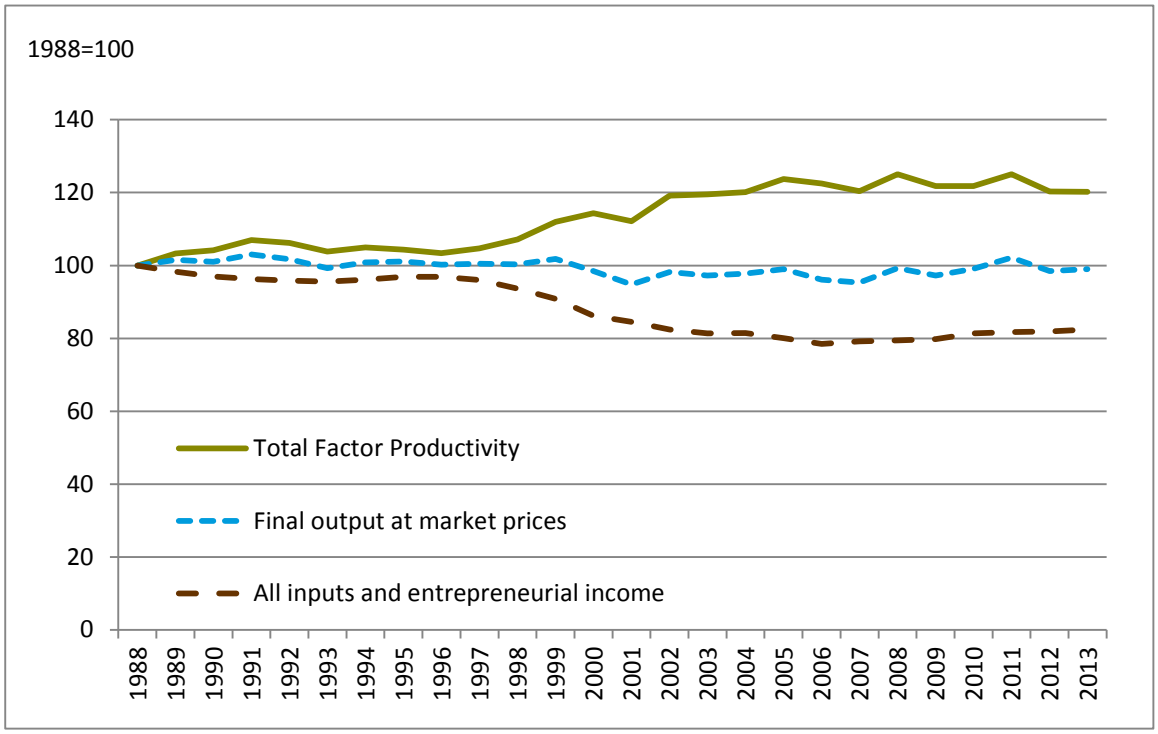
Long term trends

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.

Figure 1 show the trends in total factor productivity, final output at market prices and all inputs and entrepreneurial labour between 1988 and 2013.

Figure 1: Total factor productivity of the UK agricultural industry



Over the longer period, the volume of final output has remained largely unchanged between 1988 and 2013 while the volume of all inputs and entrepreneurial labour fell by 18%, leading to total factor productivity increasing by 20%. Total factor productivity stayed relatively unchanged during the mid-80s to mid-90s, increased by 18% between 1997 and 2005 and has since remained mostly level with year to year variations.

During 1997 to 2005 the increase in total factor productivity was due to a sharp reduction in the volume of inputs. There was a 30% reduction in both fertiliser and energy use as well as a 26% reduction in labour whilst the volume of final outputs fell by just 1.5%.

In this period an additional 350,000 hectares of less productive arable land was taken out of production as part of the set-aside scheme. In 2001 foot and mouth disease hit the UK. Following the outbreak not all the farmers restocked and some stopped farming. For those that remained in livestock farming there was a notable improvement in productivity. Despite a 20% fall in the dairy herd there was only a 2% fall in total milk production. Similar improvements were seen in the sheep industry with 18% fall in the breeding flock and only a 1% fall in the production of meat. Similar improvements were not seen in the

pig industry where there was 40% reduction in both the pig herd and pig meat production. During this period there were also financial pressures on farmers as total income from farming fell by 24% in real terms during this period.

Looking back just 5 years to 2008 total factor productivity fell by 3.9 %, as all inputs and entrepreneurial labour rose by 3.7% while final output at market price changed little. A 4.8% fall in the volume of crop outputs was offset by a 5.2% increase in the volume of livestock outputs. Total intermediate consumption is estimated to be 8.1% higher than in 2008. This was driven by large increases in plant protection products, agricultural services and energy expenses, in particular motor and machinery fuels. All of this reduction in productivity is related to the fall seen in the last two years on the back of the bad weather during 2012.

Latest figures

Total factor productivity of the agricultural industry in the United Kingdom is estimated to have fallen by 0.1% between 2012 and 2013. Compared to 2012 there was an increase of 0.5% in the volume of outputs but a larger increase of 0.7% in the volume inputs.

This is the second year in a row that total factor productivity has fallen. The effects of the poor weather in 2012 also impacted on the 2013 figures. Autumn planting for wheat and oilseed rape were down and the lack of forage crops produced in 2012 led to increased volumes of animal feed used in 2013.

Table 1 shows output and input volume indices derived from the aggregate agricultural accounts. Values are expressed with a reference year of 2010 = 100.

Outputs

Crop output recovered slightly in 2013 following the poor harvest in 2012 a result of the difficult weather conditions. Cereals were a mixed picture, the volume of barley output rose by around a third compared to 2012 as spring plantings increased following problems in sowing autumn crops due to the wet weather conditions. In comparison the volume of output of wheat fell by 10%, with a reduction in the area harvested offsetting any improvements in yield and quality.

The volume of oilseed rape output fell by 17% between 2012 and 2013. Due to the poor planting conditions in the autumn of 2012 the harvested area was down by 12% and the yields were at their lowest since 2004.

The volume of output of potatoes rose by 7%, with the 2013 potato harvest back to normal levels and stocks replenished following the difficulties seen in 2012.

Output volumes of forage crops rose by 45% in 2013 as they bounced back strongly after the drop seen in 2012.

The output volume of fruit also recovered after the fall in 2012 and rose by 6.5% in 2013; however the volumes are not back to the levels seen in 2011.

Overall there was a 0.9% increase in livestock output with increases seen in most sectors. The exception being cattle with production lower as feed availability and higher costs affected weights.

Inputs

Additional feed was required in 2013 due to limited forage stocks caused by the poor forage harvest in 2012, as well as poor early season grass/fodder growth, increased pig and poultry numbers and the need for extra rations to maintain milk production following milk price rises. This led to a 7.8% increase in the volume of animal feed in 2013.

Increased spring plantings and drilling resulted in an increase in seed inputs in 2013 compared to 2012 when autumn plantings were affected by the poor weather.

In contrast use of plant protection products fell by 10% due to the improved weather conditions and a reduced area of wheat and oilseed rape crops.

Table 1 Output and input volume indices

2010=100

	2008	2009	2010	2011	2012	2013
1 Output of cereals	113.3	102.5	100.0	100.8	91.5	93.6
of which: wheat	115.2	95.5	100.0	101.9	89.2	79.9
barley	109.5	122.5	100.0	98.9	97.7	124.6
2 Output of industrial crops	93.9	98.4	100.0	118.3	105.7	98.4
of which: oilseed rape	88.5	85.7	100.0	123.7	114.6	95.4
sugar beet	117.1	129.6	100.0	130.3	111.7	129.1
3 Output of forage plants	83.5	106.7	100.0	96.0	77.2	112.3
4 Output of vegetables and horticultural products	98.4	96.3	100.0	97.6	97.4	97.8
of which: fresh vegetables	92.1	96.2	100.0	98.1	93.9	96.8
plants and flowers	107.2	96.4	100.0	97.1	101.6	99.0
5 Output of potatoes (including seeds)	116.5	118.3	100.0	112.1	97.9	104.5
6 Output of fruit	94.6	99.9	100.0	101.3	93.0	99.1
7 Output of other crop products including seeds	101.9	104.7	100.0	99.3	140.6	128.0
Total crop output	**103.9**	**101.4**	**100.0**	**103.1**	**97.9**	**98.9**
8 Output of livestock	97.6	96.1	100.0	102.3	103.0	103.7
primarily for meat	99.7	96.7	100.0	102.9	102.8	103.2
of which: cattle	98.1	95.4	100.0	102.8	101.7	98.2
pigs	99.0	95.6	100.0	107.1	108.9	112.1
sheep	111.7	108.1	100.0	105.9	101.1	104.1
poultry	95.7	92.7	100.0	99.5	102.2	105.3
gross fixed capital formation	87.2	92.8	100.0	99.1	103.9	106.2
of which: cattle	90.3	90.7	100.0	88.5	106.4	101.6
pigs	101.8	90.1	100.0	108.8	124.5	113.7
sheep	77.1	96.1	100.0	119.5	100.7	130.9
poultry	84.6	96.6	100.0	104.1	97.8	90.9
9 Output of livestock products	97.0	96.2	100.0	101.3	98.9	100.2
of which: milk	98.6	97.5	100.0	101.5	99.9	100.5
eggs	88.3	89.2	100.0	99.6	96.5	99.5
Total livestock output	**97.4**	**96.1**	**100.0**	**101.9**	**101.6**	**102.5**
10 Other agricultural activities	88.6	95.5	100.0	109.8	107.7	107.2
11 Inseparable non-agricultural activities	86.1	96.8	100.0	98.2	100.5	102.9
12 Output (at market prices)	**98.8**	**98.0**	**100.0**	**102.5**	**100.4**	**101.4**
13 Total subsidies (less taxes) on product	. .	. .	. .	. .	. .	. .
14 Gross output (at basic prices)	**98.8**	**98.0**	**100.0**	**102.5**	**100.4**	**101.3**

Table 1 Output and input volume indices *continued*

2010=100

	2008	2009	2010	2011	2012	2013
Intermediate consumption						
15 Seeds	107.0	104.4	100.0	104.5	109.3	117.6
16 Energy	89.9	102.6	100.0	95.6	95.7	99.2
of which: electricity and fuels for heating	94.0	100.5	100.0	94.5	93.9	93.7
motor and machinery fuels	88.2	103.5	100.0	96.1	96.3	101.3
17 Fertilisers	97.6	88.4	100.0	103.2	97.9	99.3
18 Plant protection products	89.8	91.5	100.0	106.4	126.2	113.7
19 Veterinary expenses	95.5	102.4	100.0	99.4	101.7	102.7
20 Animal feed	92.6	94.5	100.0	92.1	93.8	101.1
of which: compounds	94.9	93.6	100.0	97.3	102.9	109.3
straights	88.0	90.9	100.0	85.6	81.4	84.3
feed produced and used on farm or purchased from other farms	94.6	109.1	100.0	85.6	86.4	109.8
21 Total maintenance	95.2	98.7	100.0	99.7	99.5	99.7
of which: materials	94.7	97.4	100.0	101.4	100.2	100.2
buildings	96.0	101.0	100.0	97.1	98.2	98.8
22 Agricultural services	88.6	95.5	100.0	109.8	107.8	107.2
23 FISIM	95.9	94.4	100.0	95.7	96.4	96.4
24 Other goods and services	99.3	102.5	100.0	102.5	102.1	101.1
25 Total intermediate consumption	**94.9**	**97.2**	**100.0**	**99.0**	**100.1**	**102.6**
26 Gross value added at market prices	**106.4**	**99.5**	**100.0**	**109.4**	**101.2**	**99.4**
27 Gross value added at basic prices	**106.4**	**99.5**	**100.0**	**109.3**	**101.1**	**99.3**
28 Total Consumption of Fixed Capital	103.1	98.0	100.0	106.2	107.0	105.0
of which: equipment	94.3	97.0	100.0	106.6	110.6	108.8
buildings	102.3	100.8	100.0	100.7	99.8	96.7
livestock	115.4	97.0	100.0	109.4	107.7	106.3
cattle	121.3	93.2	100.0	112.2	111.3	108.0
pigs	107.3	93.8	100.0	114.1	125.9	120.0
sheep	116.2	109.8	100.0	104.0	96.0	106.5
poultry	86.7	93.3	100.0	107.9	113.8	103.0
29 Net value added at market prices	**109.8**	**101.2**	**100.0**	**112.2**	**96.7**	**95.0**
30 Net value added at basic prices	**109.6**	**101.1**	**100.0**	**112.1**	**96.6**	**94.9**
Compensation of employees	102.0	100.7	100.0	102.3	102.4	100.9
Entrepreneurial workers (farm and specialist contractors)	101.9	100.3	100.0	101.3	101.3	100.0
Final output at market price	100.2	98.1	100.0	103.0	99.4	99.9
All inputs and entrepreneurial labour	97.6	98.1	100.0	100.3	100.6	101.2
Total factor productivity	102.7	100.0	100.0	102.7	98.8	98.7

Note: . . means no data available or not applicable

Definitions and explanations

Final output at market prices: Output excluding subsidies linked to products and transactions within the industry.

All inputs and entrepreneurial labour: Goods and services consumed in the productive process and the labour of those with an entrepreneurial interest in the farm business, e.g. farmers, partners.

Total factor productivity: Final output at market prices divided by all inputs and entrepreneurial 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. Outputs and inputs are adjusted for quality by weighting the volumes by price.

Results are measured in terms of the trend in volume of output leaving the industry per unit of all inputs including labour. Changes from year to year are often shaped by factors outside the control of farmers, such as weather, animal disease, policy interventions, general economic conditions, and other factors, and are rarely the main driving factor behind short-term changes in farm income. 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.

Basic quality information

These estimates for 2013 are based on incomplete data. The amounts of data available vary depending on the item. Outputs are estimated to be around 90% complete with more crop data expected by November. Intermediate consumption and other costs are less complete and are estimated using industry intelligence. Further 2013 data will become available in November when these estimates will be revised and forecasts replaced.

Revisions

Revisions have been made owing to further information becoming available and methodology reviews, in particular:

Potato data for 2012 have been revised upwards due to data quality checks identifying certain limitations in the methodology and source data used to estimate the volumes of potatoes. It is likely further revisions will be required as a result of more detailed review into the data and methodology.

Revisions have been made to the cattle GFCF values back to 2005. Revisions were made following identification of an error in the “number of entries into the breeding herd” figure which is a fundamental part of the overall calculations.

Fertiliser data has changed back to 2002 due to errors found when this data was reviewed.

Table 3, over the page, presents a revision analysis of estimates for 2012 made between May 2013 and May 2014.

Table 3: Revisions made to the 2012 estimate of total factor productivity between May 2013 and May 2014

2010 = 100	May-13	Dec-13	May-14	Revision May-13/ Dec-13	Revision Dec-13/ May 14
Final output at market prices	98.7	99.1	99.4	0.5%	0.2%
All input and entrepreneurial labour	100.2	100.4	100.6	0.2%	0.1%
Total Factor Productivity	98.4	98.7	98.8	0.3%	0.1%

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 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.