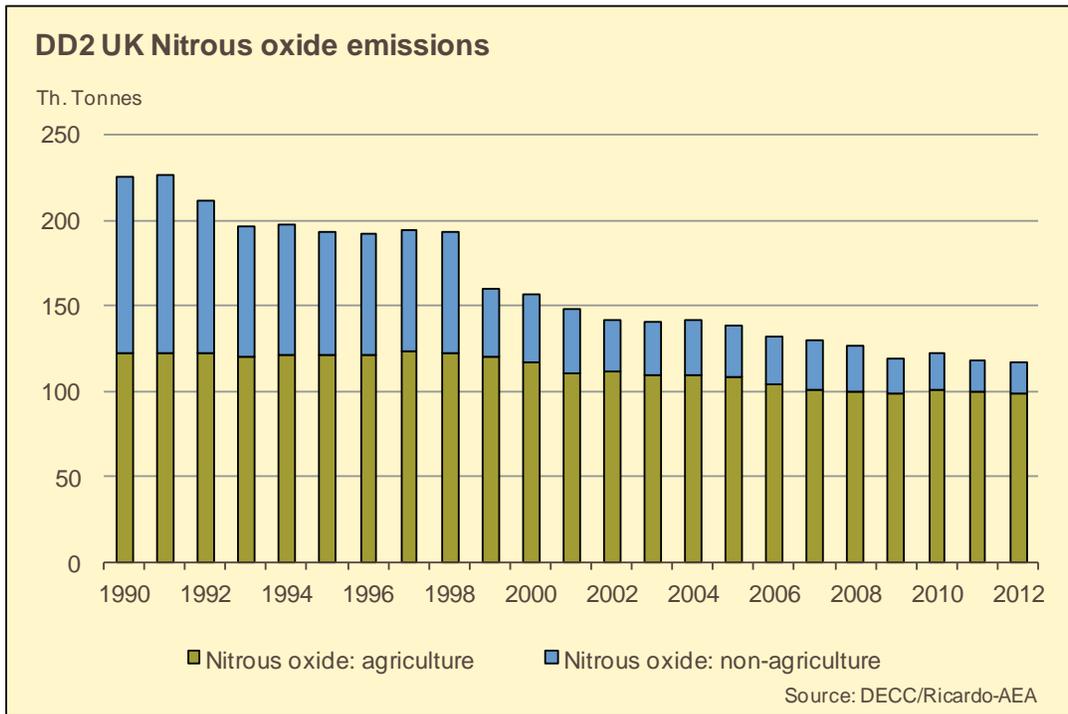


Observatory monitoring framework – indicator data sheet

Environmental impact: Climate change

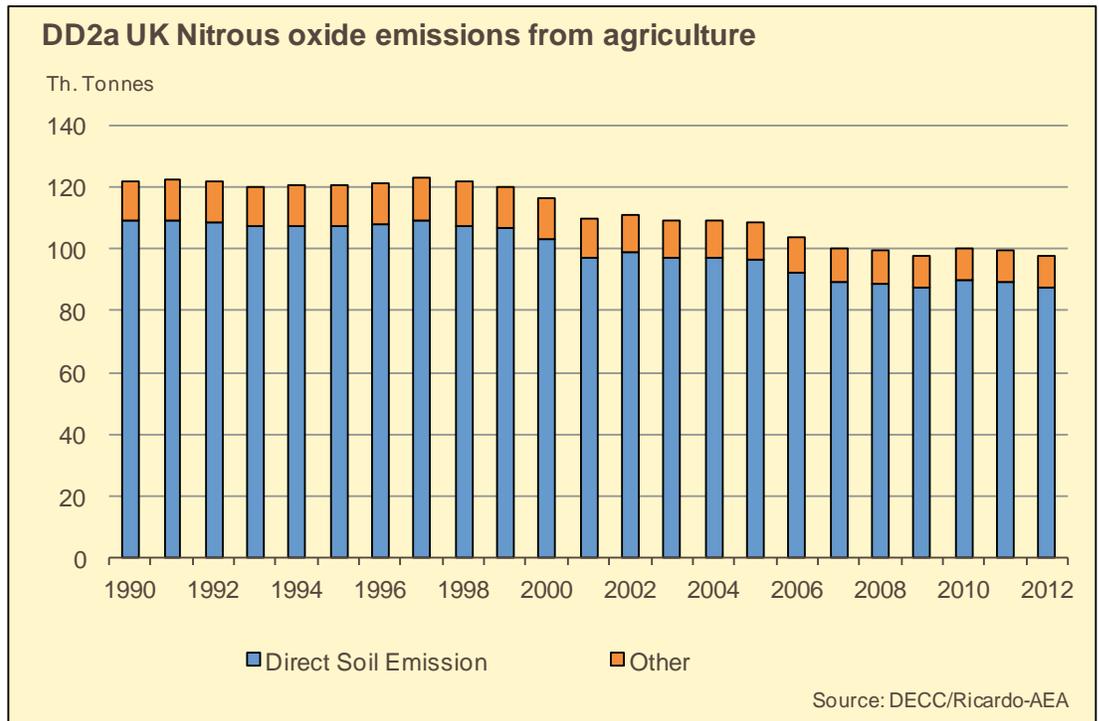
Indicator DD2: Nitrous oxide emissions

This indicator shows agriculture’s contribution to total UK nitrous oxide emissions. Agriculture is the main source of nitrous oxide emissions, accounting for 84% in 2012.



Total nitrous oxide emissions have fallen by 48% between 1990 and 2012. The largest reductions were in emissions from adipic acid production (a key raw material of polyurethanes) between 1998 and 1999. Reductions in industrial process emissions have continued to decline primarily due to decreases in the production of adipic and nitric acid.

Around 90% of agricultural N₂O emissions come from soils, particularly as a result of fertiliser application and leaching.



- Since 1990 emissions of all three greenhouse gases from agriculture (Methane, Nitrous Oxide, Carbon Dioxide), have shown a steady decline; by 2012, nitrous oxide emissions from agriculture had fallen by 20%.
- Between 2011 and 2012 emissions of nitrous oxide from agriculture reduced by 2%.

This indicator was updated in February 2014. It will next be updated in February 2015

Further information and contact

Background information can be found in the accompanying fact sheet.

For further queries or information on this indicator contact Defra's Observatory team on +44 (0) 1904 455823 or email Observatory@defra.gsi.gov.uk

Observatory monitoring framework – indicator fact sheet

Environmental impact: Climate change

Indicator DD2: Nitrous oxide emissions

<i>Indicator</i>	Nitrous oxide emissions from agriculture.
<i>Data</i>	Emissions of nitrous oxide from agriculture.
<i>Geographic coverage</i>	UK
<i>Years</i>	1990 – 2012
<i>Source</i>	Department of Energy and Climate Change (DECC)
<i>Origin of data</i>	UK greenhouse gas inventory, Ricardo-AEA
<i>Updates</i>	This data will be updated annually. The next update is due in February 2015.
<i>Background</i>	<p>Nitrous oxide (N₂O) is a greenhouse gas which contributes to global warming and climate change. Nitrous oxide emissions accounted for about 6 per cent of the UK's greenhouse gas emissions in 2012. It is one of the basket of six greenhouse gases for which emission reduction targets were agreed internationally under the Kyoto Protocol.</p> <p>Agriculture is the largest source of nitrous oxide emissions in the UK. Around 84% of N₂O emissions are produced by agriculture, and around 90% of this is from soils, particularly as a result of fertiliser application and leaching. The UK target under the Kyoto Protocol was to reduce greenhouse gas emissions to 12.5% less than 1990 baseline levels by 2008 to 2012 (averaged over 5 years).</p> <p>The Climate Change Act 2008 sets a legally binding commitment of at least an 80% cut in Greenhouse Gas (GHG) emissions by 2050 measured against a 1990 baseline. To support progress towards achieving this ambition, a carbon budgeting system which caps GHG emissions over five year periods, has been established with the first three carbon budgets running from 2008 – 2012, 2013 – 2017 and 2018 – 2022. Carbon budgets cap GHG emissions from the overall 'carbon' economy but do not set targets for sectors as action to reduce GHG emissions is focused on areas where cost effective savings may be achieved. The level of savings between sectors of the carbon economy will therefore vary to reflect the unique challenges and circumstances each face.</p> <p>In England, the approach for reducing GHG emissions from agriculture includes a range of actions led by industry and government. The Greenhouse Gas Action Plan (GHGAP) is an industry led voluntary initiative being taken forward by an Industry Partnership consisting of 14 organisations. It outlines how GHG emission reductions could be delivered between now and the third carbon budget (2018 – 2022) through wider uptake of more resource efficient practices. Its ambition is to:</p> <ul style="list-style-type: none">• Reduce annual GHG emissions from English agricultural production by 3 MtCO₂e by the third carbon budget period (2018 – 2022), compared to a 2007 baseline.
<i>Statistical & methodological information</i>	The UK greenhouse gas inventory is compiled for the UK governments by Ricardo-AEA.

Estimates of N₂O emissions are calculated for livestock wastes and agricultural soils. For agricultural soils, contributions are estimated separately from:

- (i) The use of inorganic fertilizer
- (ii) Biological fixation of nitrogen by crops
- (iii) Ploughing in crop residues
- (iv) Cultivation of histosols (organic soils)
- (v) Spreading animal wastes on land
- (vi) Manures dropped by animals grazing in the field

In addition to these, the following indirect emission sources are estimated:

- (vii) Emission of N₂O from atmospheric deposition of agricultural NO_x and NH₃.
- (viii) Emission of N₂O from leaching of agricultural nitrate and runoff.

The analysis of the uncertainties in nitrous oxide emissions is particularly difficult because emissions sources are diverse, and few data are available to form an assessment of the uncertainties in each source. However, an analysis of uncertainty in emission estimates for the 2003 NAEI suggested that the level of uncertainty for nitrous oxide emissions was between -76% and +267% of the total emissions. Although for any given year considerable uncertainties can surround the emission estimates for a given pollutant, trends over time are likely to be more reliable. UK national emission estimates are updated annually and any developments in methodology are applied retrospectively to earlier years. Adjustments in the methodology are made to accommodate new technical information and to improve international comparability.

Further information

Data and information on greenhouse gas emissions can be found at:

<https://www.gov.uk/government/collections/uk-greenhouse-gas-emissions>

Further information about the Kyoto protocol can be found at:

http://unfccc.int/files/national_reports/initial_reports_under_the_kyoto_protocol/application/pdf/report_final.pdf

Further information on the 2008 Climate Change Act can be at:

<https://www.gov.uk/government/policies/reducing-the-uk-s-greenhouse-gas-emissions-by-80-by-2050>

The 2012 review of progress in reducing greenhouse gas emissions from agriculture can be found at:

<https://www.gov.uk/government/publications/2012-review-of-progress-in-reducing-greenhouse-gas-emissions-from-english-agriculture>

The National Atmospheric Emissions Inventory web site can be found at:

<http://www.naei.org.uk/>

The Agricultural statistics and climate change publication can be found at:

<https://www.gov.uk/government/publications/agricultural-statistics-and-climate-change>