Department for Environment Food & Rural Affairs

May 28th, 2021

Soil Nutrient Balances Regional Estimates for England, 2019 (Provisional)

Soil nutrient balances provide a method for estimating the annual nutrient loadings of nitrogen and phosphorus to agricultural soils. They give an indication of the potential risk associated with losses of nutrients to the environment; losses which can impact on air and water quality and on climate change. The nutrient balances are used as a high-level indicator of farming's pressure on the environment and of how that pressure is changing over time.

These regional breakdowns are derived from a combination of the England soil nutrient balances and the Total Income from Farming for the Regions of England. More details are in the Methodology part of Section 3.

Key Messages

Table 1 - Summary of provisional estimates for the nitrogen and phosphorus balances for 2019

Kg of nutrient per hectare	Nitrogen	Phosphorus
North East	+43.8	-0.7
North West	+111.4	+10.2
Yorkshire & The Humber	+71.2	+2.8
East Midlands	+65.7	+0.7
West Midlands	+107.2	+8.2
East of England	+34.9	-4.8
South East & London	+48.8	-1.2
South West	+110.3	+9.0
ENGLAND	**+75.9**	**+3.2**

The nutrient balances vary considerably by region for both nitrogen and phosphorus. They show a clear regional trend with below-average balances in the North East, East Midlands, East and South East in contrast to above-average balances in North West, West Midlands and South West.

Contents

Soil Nutrient Balances Regional Estimates for England, 2019 (Provisional) 1
Key Messages 1
Contents 2
What you need to know about this release 3
Contact details 3
National and Official Statistics 3
Section 1 – Regional Nitrogen Balance 4
Figure 1 – Nitrogen balance for England regions, 2019 4
Table 2 – Nitrogen balance for England regions, 2019 4
Section 2 –Regional Phosphorus Balance 5
Figure 2 – Phosphorus balance for England regions, 2019 5
Table 2 – Phosphorus balance for England regions, 2019 5
Section 3 – About these statistics 6
Background 6
Methodology 6
UK approach 6
Regional breakdowns 7
Future publications 7
Section 4 - Glossary 7

What you need to know about this release

This section ensures any important information is clearly explained so users do not misunderstand the data.

Contact details

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National and Official Statistics

Publications with National Statistics status meet the highest standards of trustworthiness, quality and public value, and it is our responsibility to maintain compliance with these standards.

The soil nutrient balance estimates are based on a methodology developed by the OECD and adopted by Eurostat (see the Methodology section at the end for more detail). Whilst this methodology is sound and allows meaningful comparisons between countries and over time, the specific data sources used within different countries will vary depending on the data available. The majority of the data sources used to calculate these nutrient balance estimates are designated as National Statistics. However, some of the data are from sources that do not have this designation and may have greater levels of uncertainty. As a result these estimates have been designated as Official Statistics.

For general enquiries about National and Official Statistics, contact the National Statistics Public Enquiry Service:

Tel: 0845 601 3034

Email: info@statistics.gov.uk.

You can find National Statistics on the internet on the Gov.uk website.

Section 1 – Regional Nitrogen Balance

Figure 1 – Nitrogen balance for England regions, 2019

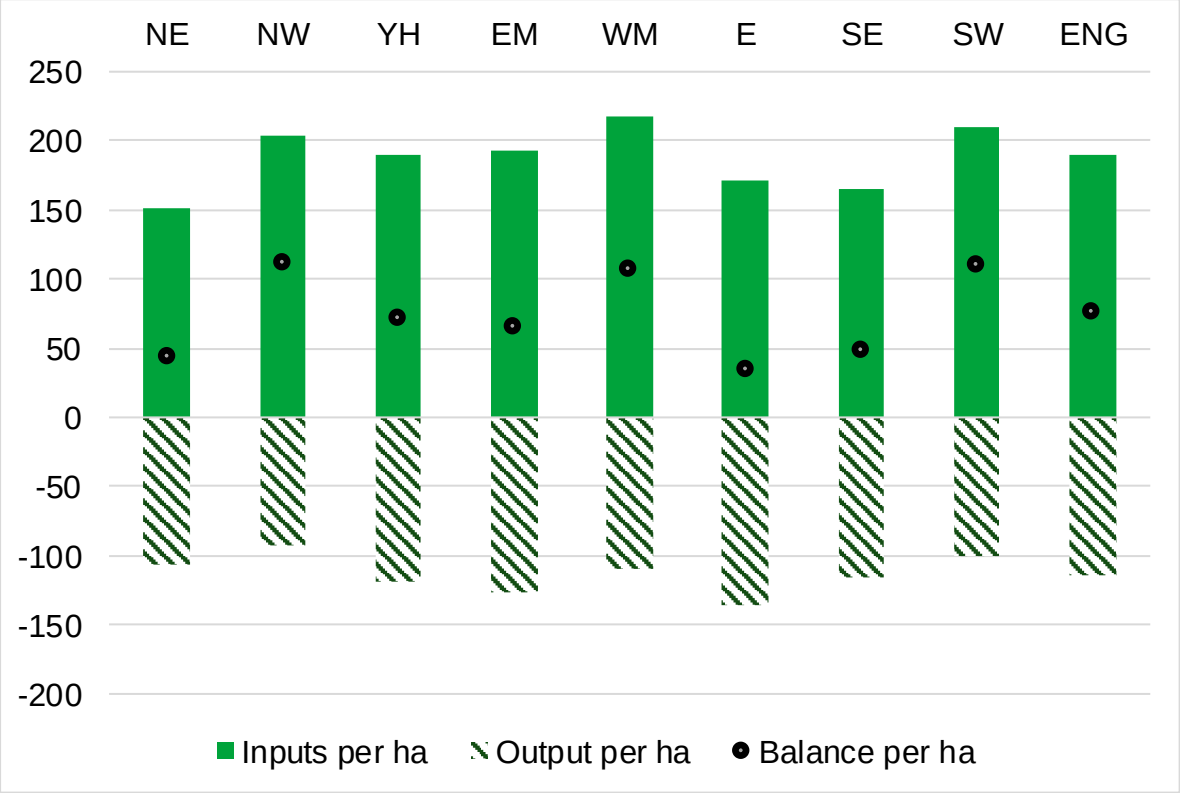

Table 2 – Nitrogen balance for England regions, 2019

	Kg/ha	Inputs	Outputs	Balance
NE	North East	150.7	106.9	+43.8
NW	North West	204.4	93.0	+111.4
YH	Yorkshire & The Humber	189.6	118.4	+71.2
EM	East Midlands	192.6	126.9	+65.7
WM	West Midlands	217.5	110.3	+107.2
E	East of England	170.6	135.7	+34.9
SE	South East & London	164.9	116.1	+48.8
SW	South West	210.3	100.0	+110.3
ENG	**ENGLAND**	**189.9**	**114.0**	**+75.9**

Key points are:

- The N balance varies considerably between regions and ranges from a surplus of 111.4 kg/ha (North West) to 34.9 kg/ha (East of England)
- The regions in the west of England where livestock farming is predominant show considerably higher N surpluses than do the regions in the east where cropping is predominant.

Section 2 –Regional Phosphorus Balance

Figure 2 – Phosphorus balance for England regions, 2019

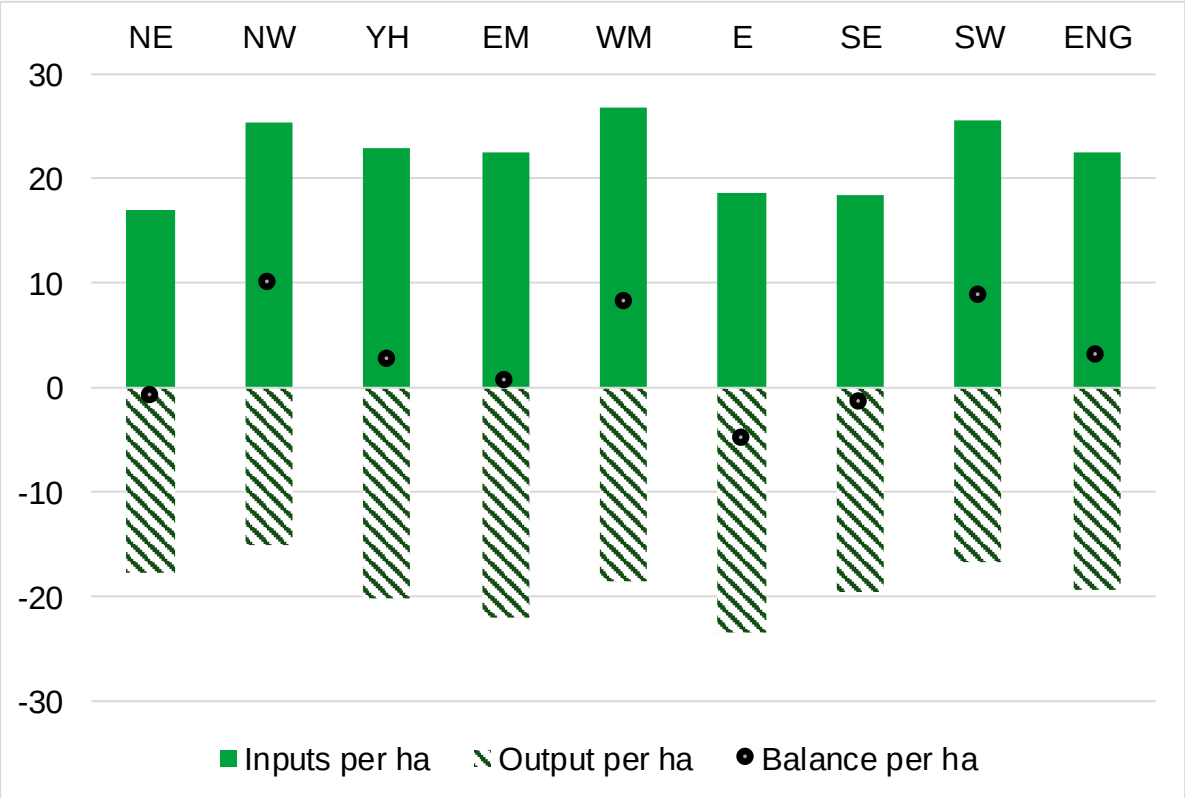

Table 3 – Phosphorus balance for England regions, 2019

	Kg/ha	Inputs	Outputs	Balance
NE	North East	17.1	17.8	-0.7
NW	North West	25.4	15.1	+10.2
YH	Yorkshire & The Humber	22.9	20.1	+2.8
EM	East Midlands	22.6	21.9	+0.7
WM	West Midlands	26.8	18.6	+8.2
E	East of England	18.6	23.4	-4.8
SE	South East & London	18.4	19.6	-1.2
SW	South West	25.6	16.6	+9.0
ENG	**ENGLAND**	**22.4**	**19.3**	**+3.2**

Key points are:

- The P balance varies considerably between regions and ranges from a surplus of 10.2 kg/ha for the North West to a deficit of (-)4.8 kg/ha for the East of England
- The regions in the west of England where livestock farming is predominant show considerably higher P surpluses than do the regions in the east where cropping is predominant.

Section 3 – About these statistics

Background

Soil nutrient balances provide a method for estimating the nutrient loadings of nitrogen and phosphorus to managed agricultural soils. Whilst a shortage of nutrients can limit the productivity of agricultural soils, a surplus of these nutrients poses a serious environmental risk. Losses of nutrients to the environment can impact on air quality (ammonia emissions), water quality (nitrate and phosphate levels in rivers) and climate change (nitrous oxide emissions). A soil nutrient balance estimate, expressed as a loading of nitrogen or phosphorus per hectare of managed agricultural land can be used as an indicator of the environmental risks. It provides a high level measure which can be used to monitor long term trends and to make meaningful comparisons between countries.

Methodology

A methodology for calculating soil nutrient balances has been developed by OECD (Organisation for Economic Cooperation and Development) and adopted by Eurostat (Statistical body of the European Commission). Although based on an internationally recognised methodology, the nutrient balance estimates are subject to a level of uncertainty or error margins.

The approach estimates the full range of nutrient inputs and removals to soils from all sources. The input sources are: manures, mineral fertilisers, atmospheric deposition and biological fixation. The removals sources are: crop production and fodder production for livestock, including grazing. The nutrient input or removal from each source is either estimated directly (atmospheric deposition) or calculated by applying a coefficient (e.g. for the amount of nitrogen that a dairy cow produces each year) to the corresponding physical data characteristic (e.g. number of dairy cows). The relevant coefficients are derived from research and the physical data is taken from a wide range of data sources many of which are already published as official statistics.

UK approach

The estimates within this release are based on a programme of work to develop and improve the methodology and data sources. This work includes two funded projects and follow-up work carried out within Defra. Details of the two projects can be found here.

Follow-up work is presented in a separate paper that gives an overview of the methods utilised to compile the data series within this release. The paper also gives details of where they differ to the proposals within the ADAS project and provides a commentary on the resultant balances and components. The project report can be found here.

The estimates presented in this Statistics Notice use the June Survey data for England for commercial holdings for 2009 onwards and for all farms for preceding years. A consistent time series can be found in the accompanying excel worksheets.

Managed agricultural land has been defined as the utilised agricultural area (UAA) excluding common land and sole right rough grazing. The balance per hectare is based on the area of managed agricultural land. This is based on the approximation that this is the only land to which significant levels of fertilisers and manures are applied.

Regional breakdowns

These regional breakdowns are derived from a combination of the England soil nutrient balances and the Total Income from Farming for the Regions of England.

The results for England are apportioned across the 8 regions based on regional data published for the aggregate farm accounts. Each individual element of the nutrient balance is shared out across the regions in proportion to the relevant item from the farm accounts. For example the volume of nitrogen input from cattle for each region is based on that region's share of the total cattle population. Similarly, the total volume of nitrogen offtake from cereals for each region is based on that region's share of the cereals area. The individual components are then aggregated into an overall balance sheet to calculate the overall net balance, either a surplus (greater than zero) or a deficit (less than zero).

Future publications

The next publication is due in July 2021

Section 4 - Glossary

Term	Definition
Nutrients	The key macro-nutrients required for crop growth which are nitrogen and phosphorus
Inputs	The total amount of inputs of each nutrient to the soil. This can be through application of mineral fertilisers or organic manures, atmospheric deposition or biological fixation
Offtake	The total amount of nutrients removed from the soil by the growth of crops, which are either harvested or grazed by livestock.
Nutrient balance	The difference between the inputs and the offtake for each nutrient
Loading	Another term for the balance, conveying that this is the total net amount being loaded onto the soil over a year
Surplus	If the annual inputs exceed the offtake the net balance represents a surplus of the nutrient. This surplus represents an environmental risk as it can be lost from the soil to the air or water courses.
Deficit	If the annual inputs are less than the offtake the net balance represents a deficit of the nutrient and hence the crop growth requirements will not have been met.