

# Soil health, improvement and striking a balance

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# Soil Health

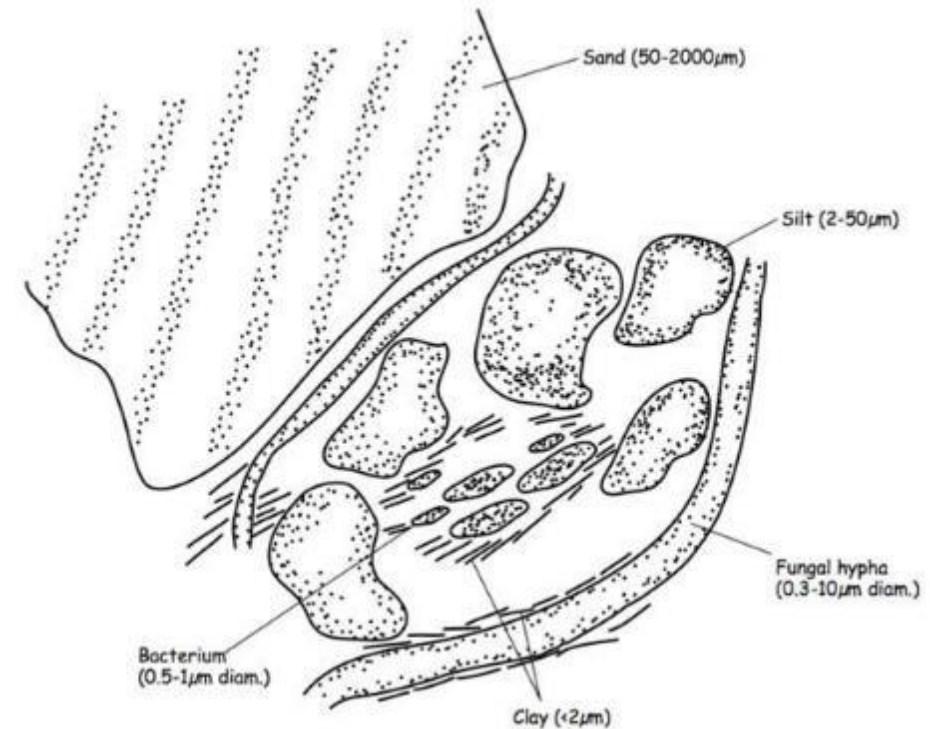
When we question the health of the soil we are asking -  
How well is it functioning?

Function is about soil:

- Chemistry
- Biology
- Physical structure

Measuring soil health needs to look at all of these characteristics together

Improving soil health may involve a variety of measures, and will be field or farm specific



Source: Dr Martin Wood, Earthcare Technical

# Assessment methods

Method	Difficulty /interpretation level
Dig a hole with a spade to 30 cm	*
Plant health observation	*
Standard soils test P, K, Mg & pH	*
Measure soil organic matter (SOM) levels	*
Measure micronutrients, CEC	**
Visual evaluation of soil	**
Laboratory soil health test	***
Earthworm counts	**
Carbon check plus – assesses SOM readily available to Soil Microbes.	**
Dig a soil profile pit 30-150 cm	***
Soil life test suites e.g. food web tests	****

# Soil health scorecard

Source: AHDB Testing the soil health score card

Table 1. Example scorecards sampled in November 2018 for fields on light soils of the same soil series in the mid-rainfall region (North East England, Midlands, Southern England)

Attribute*	Field A; Farm 1	Field B; Farm 2	Field C; Farm 3
SOM (%)	3.4	2	2.2
pH	6.7	6.9	7.0
Ext. P (mg/l)	40.6	59.6	37.2
Ext. K (mg/l)	158	106	148
Ext. Mg (mg/l)	82	89	144
VESS score	2	2	2
Earthworms (Number/pit)	13	8	1

■ Investigate    ■ Monitor    ■ No action needed

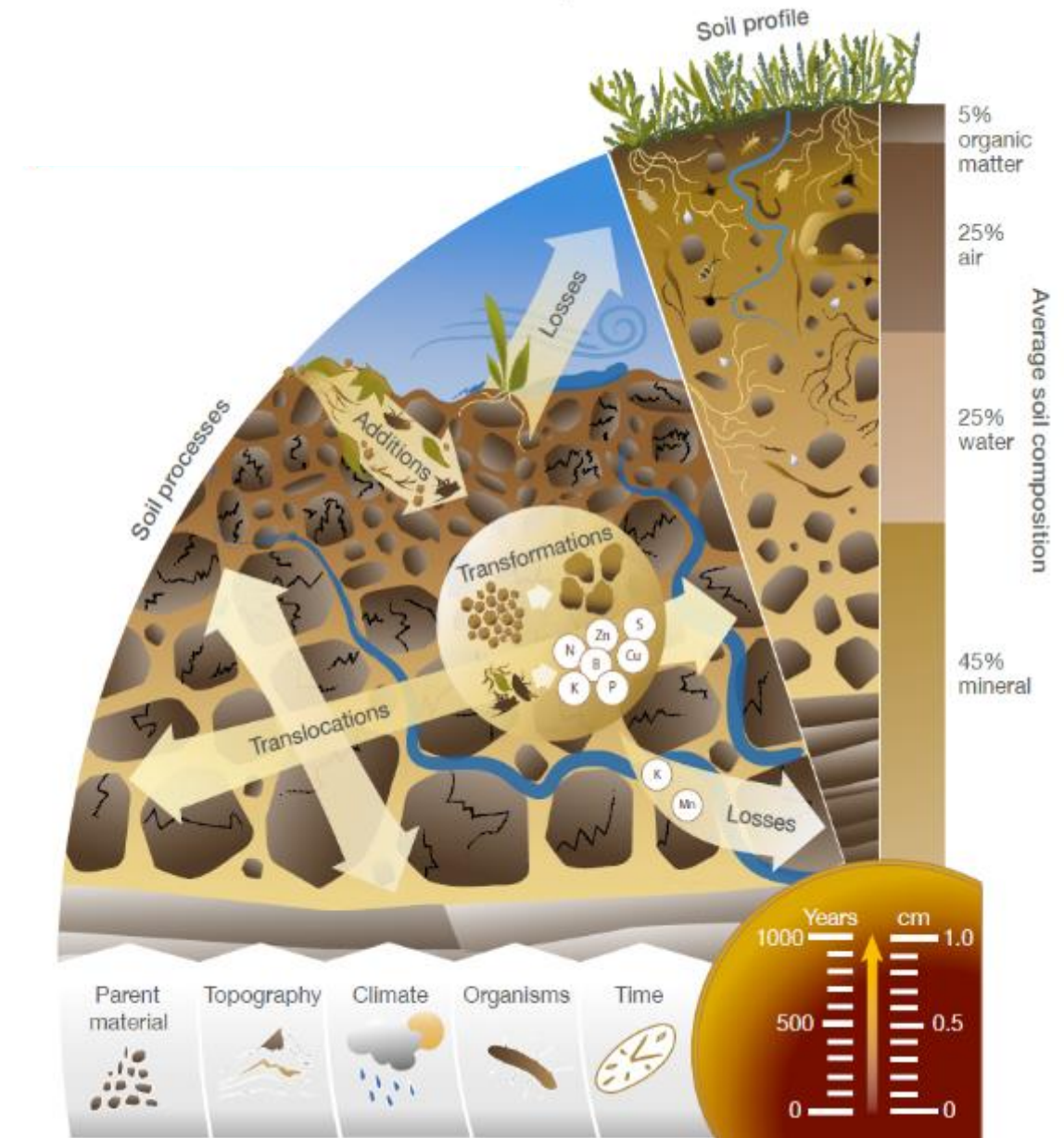
Field A - long-term inputs of farmyard manure and composts; now includes cover crops to try to maintain the SOM levels.

Field B – silage field 3 x cuts taken.

Field C - had grown potatoes in 2017

# Improving soils

- Cover crops
- Adding organic manures
- Crop residues
- Choosing appropriate cultivations
- Optimise livestock access - housing
- Monitor nutrient levels
- pH and liming
- Plan nutrients needs carefully



Source: AHDB Principles of soil management



# Managing losses

Help us inform Farming Rules for Water review



Defra has launched a review of the Farming Rules for Water and has invited stakeholders to feed in by responding to a range of questions on the regulations.



## Revealed: no penalties issued under 'useless' English farm pollution laws

Exclusive: Environment Agency has failed to prosecute or fine any of 243 documented violations since 2018



### Testing reveals ammonia pollutant hotspots at UK farms

Agricultural ammonia emissions are not monitored, but investigation exposes gas at three out of eight farms across south of England

- Revealed: UK government failing to tackle ammonia pollution
- Analysis: dealing with ammonia is an urgent health problem

▲ Pollution collects in a flooded picnic area by the River Thames in Dorset. (McLean/REX/Shutterstock)

Campaigners have called legislation designed to be caused by agriculture in England "useless" as data shows no prosecutions or fines issued despite regular checks.

The Environment Agency has documented 243 breaches of the "rules for water" since they came into effect in April 2018, the Guardian has obtained using freedom of information requests.

The region with the most breaches recorded was the East of England with 75, followed by Wessex with 52.



▲ Government grants to improve the storage and use of organic fertilisers are scarce. (Photograph: Carolyn Jenkins/Alamy Stock Photos)

Testing carried out by the Bureau of Investigative Journalism around eight dairy units in the UK has revealed ammonia hotspots at three of them.

The government does not monitor ammonia pollution from most UK farms, despite the fact that it is a major contributor to the air pollution crisis.

AIR QUALITY EXPERT GROUP

## Air Pollution from Agriculture



### Farmers could face fertiliser ban in a bid to reduce ammonia pollution

Chris Hill, [chris@brianlowe.co.uk](mailto:chris@brianlowe.co.uk) @ChrisHillEUS  
PUBLISHED: 11:47 AM November 2020 | UPDATED: 12:01 PM November 2020



A government consultation has been launched on how to reduce ammonia emissions from solid urea fertilisers used on farms. (Picture: Matthew Usher)

When an solid urea fertiliser is one of the options being considered in a

# Farming rules for water – leaching/runoff losses

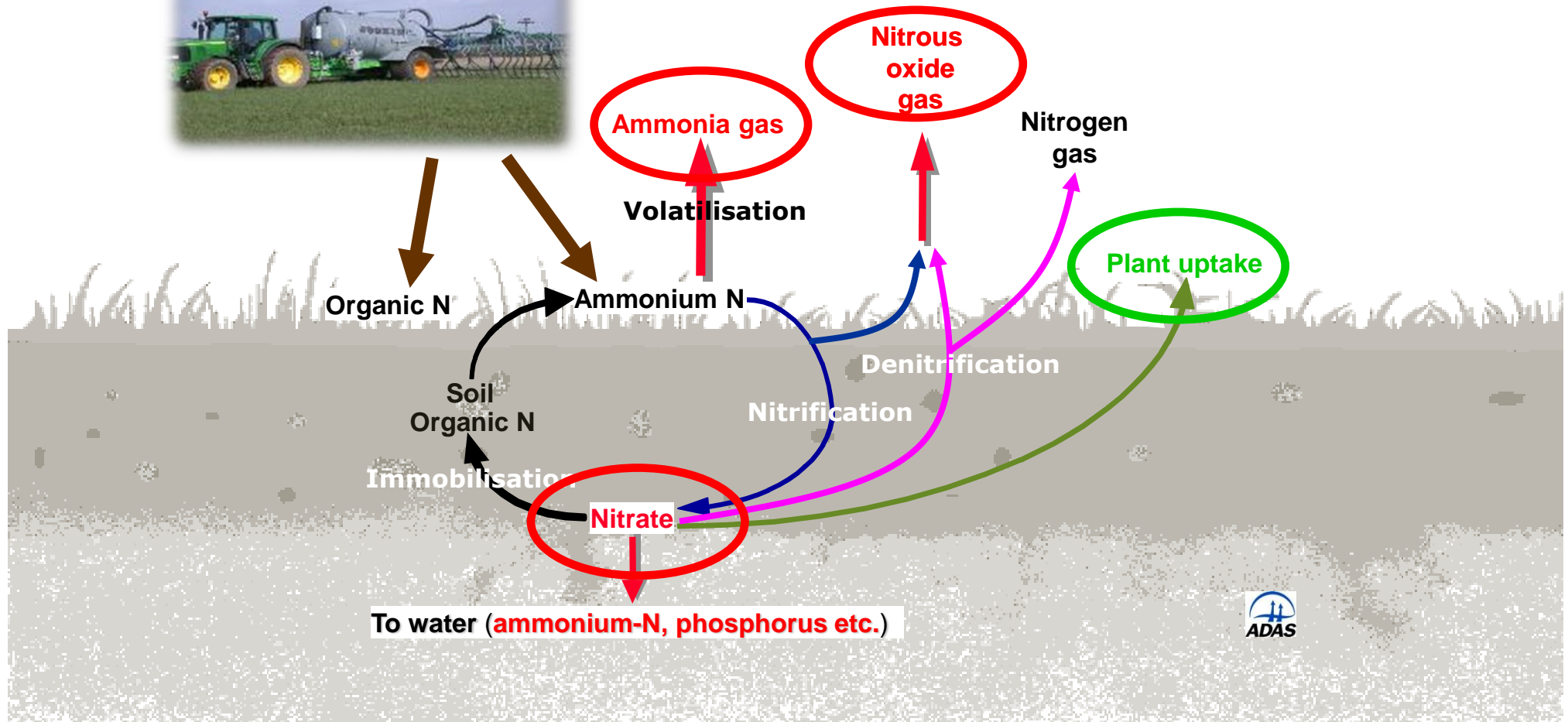
Reduction and Prevention of Agricultural Diffuse Pollution (England) Regulations 2018, Farming Rules for Water (FRFW) – Nutrient planning under Rule 1 (Regulation 4)

The requirements for this Rule are that for each application of organic manure or manufactured fertiliser the application is planned so that they,

- 4 a (i) Do not exceed the needs of the soil and crop on that land; or
- 4 a (ii) Do not give rise to a significant risk of agricultural diffuse pollution, and;
- 4 b Take into account the weather conditions and forecasts for that land at the time of the application.

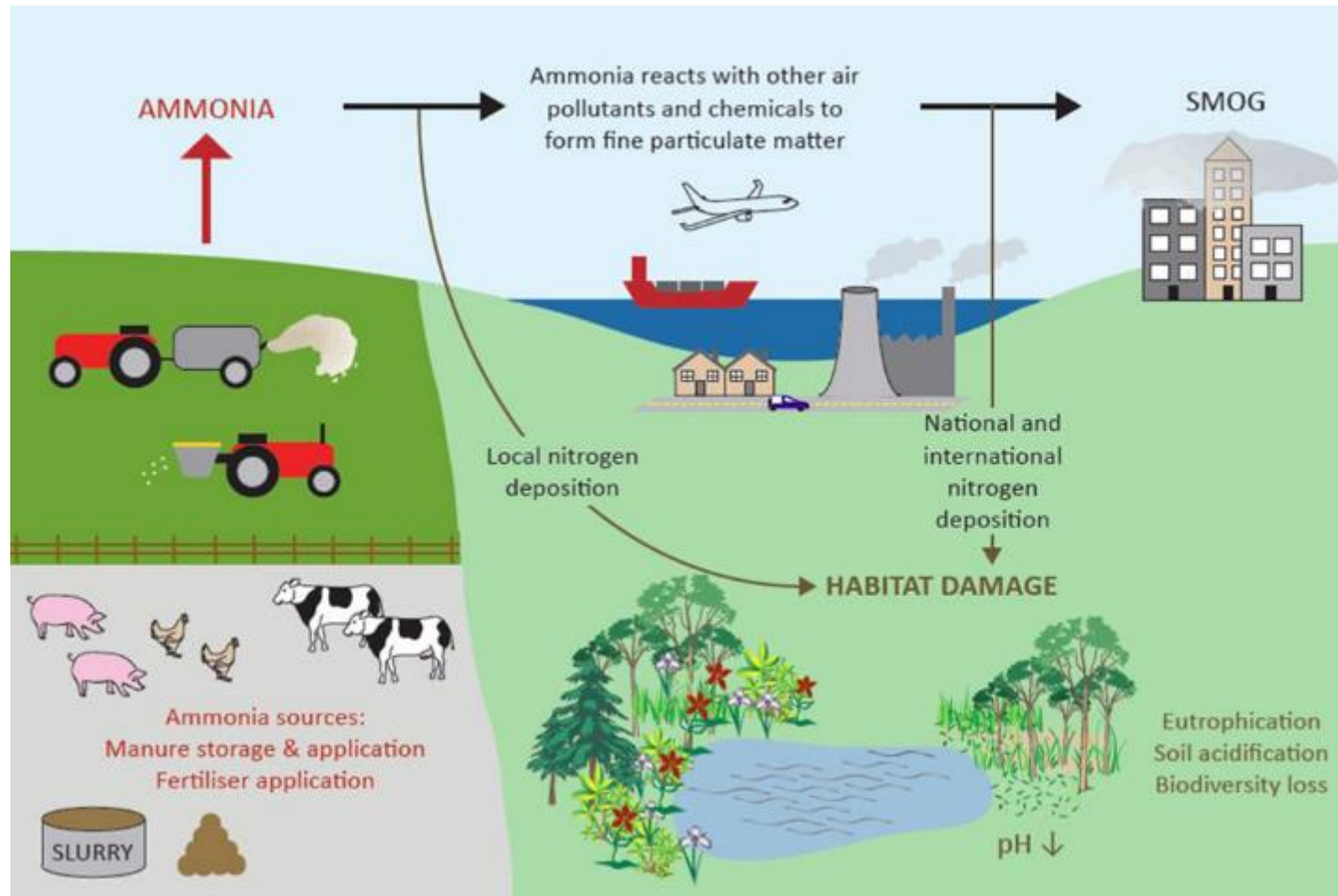
Original focus was to reduce phosphorus losses, but EA are focussing on nitrate losses

# Overall nitrogen supply and losses

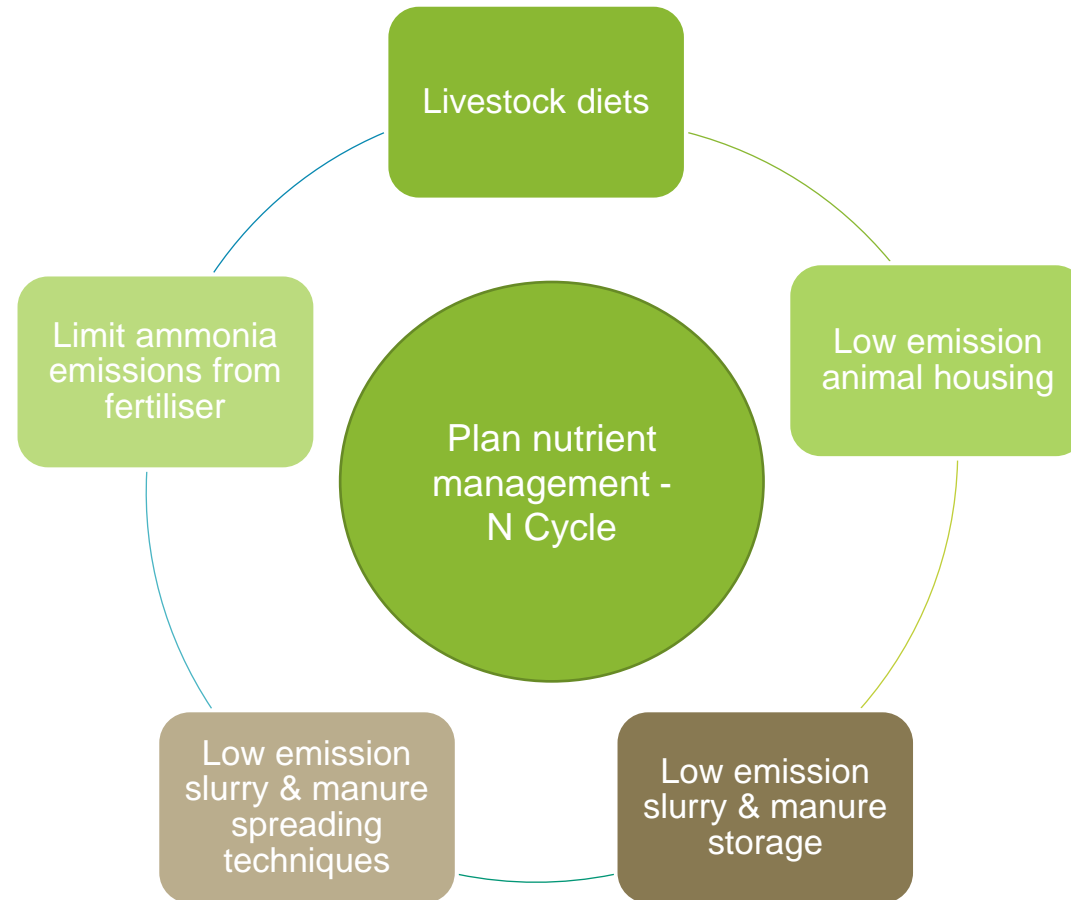




# Focus on ammonia losses: Code of Good Agricultural Practice for reducing ammonia emissions



# Managing ammonia emissions



# Improving soil health and manage potential losses

- Cover crops – choice, timing, destruction and following crop drill date
- Adding organic manures – careful management, focus on timing
- Crop residues – straw removed or incorporated
- Choosing appropriate cultivations – reduce potential for any soil erosion
- Optimise livestock access – housing carefully place to reduce potential impact of emissions
- Monitor nutrient levels – every farmed field minimum of 5 year test interval
- pH and liming – Test more regularly
- Nutrients – right time, right amount, applied the right way

# Explore soil resources

The Great Soils Project: <https://ahdb.org.uk/greatsoils>



## Key soil publications



### Earthworm recording sheet

Simple recording sheet to use on site when counting earthworm numbers. To accompany the 'How to Count Earthworms' workbook.

### Biological Tests for Soil Health

Biological soil health testing is a useful method of quantifying the impact of different soil management practices such as the

### Testing Soil Health

Soil health is the ability of a soil to sustain, in the long term, its most important functions. A healthy soil will be able to sustain crop and

### Soil Assessment Methods

Many farmers and growers are concerned about the health of their soils. They understand the importance of soil health for the

Good Soil Guide <https://soilguide.co.uk/>



Soil Association Technical guide: soil management for organic farmers <https://www.soilassociation.org/sa-tech-guide-soil.pdf>



British Society of Soil Science <https://soils.org.uk/>

