

Water quality – Fertiliser and manure application

Purpose:

To promote the importance of water quality and best practice when applying fertilisers or organic manures, to reduce water pollution and raise awareness of why it's important for the environment.

Why:

To ensure that farm staff are aware of the impact on farm businesses and the environment in the application of fertilisers and farmyard manures.

TIAH Capability Framework area:

This aligns with the knowledge and skills in the Environment area.

<https://tiah.org/tiah-capability-framework>

Talk leader instructions:

- Prepare to do the talk in a suitable/quiet location with no distractions
- Consider using some of the resources as part of the talk, e.g. showing a video
- Engage with participants, ask questions and give everyday examples
- Conclude with a brief review
- Get everyone to sign the form. Make sure to write the name of the farm and the date. Keep a copy for your records (e.g., staff training, land/ environmental management)
- Ensure all participants have access to a copy of this document to refer to once the session has finished. This could be electronic and emailed or printed

Notes:

Background

As farmers, we play a vital role in the UK's economy, providing jobs and producing food for our tables. We also have a vital role in protecting the environment and tackling climate change, especially since almost 70% of land in England is used for agriculture.

Unfortunately, some farming operations, if not done correctly, can cause pollution, especially in rivers and other water sources. Therefore, by understanding the risks, knowing how we can reduce them, and always following best practice in our farming operations, we can help to make a real difference.

In this Toolbox Talk, we'll explore the impact and best practices associated with the application of organic manure and manufactured fertilisers.

Main learning points 10 minutes

Environmental impact

The release of diffuse pollutants from a range of activities including nutrients from organic manures and fertilisers, is a threat to our water/ drinking water and environment. It occurs when rainfall, surface water or groundwater wash nutrients from organic manures or fertilisers, soil, chemicals, microplastics, or pesticides into ditches, streams, lakes, rivers and ultimately the sea.

This can have catastrophic effects on the environment and biodiversity, resulting in the depletion and death of wildlife, plants and aquatic systems.

Organic manures include other materials such as compost, anaerobic digestate and sewage sludge. Indicator bacteria are types of bacteria used to detect and estimate the level of faecal contamination in water. These bacteria can come from many sources including sewage, agricultural livestock, wildlife, birds and road drainage. When more of these bacteria are present in a bathing water, they can indicate greater risks to human health.

Eutrophication: Occurs when excess nutrients, often from fertilisers, wash into waterways, leading to algal blooms that harm aquatic ecosystems and reduce water quality, impacting fishing and farming sustainability and the wider global environment.

Q: What can cause pollution incidents on farms if not managed properly?

Responses might include:

- Compacted soils stops water from soaking into the land, causing topsoil containing nutrients and pesticides to be washed into streams and rivers. This is known as runoff
- Poor storage of manure/slurry, fertilisers, silage, chemicals and oil
- Inadequate planning and testing of soils for phosphorus, potassium, magnesium, pH and nitrogen levels
- Incorrect or over application of organic manures, fertilisers or pesticides
- Spreading too close to watercourses
- Spreading when soil is frozen, covered in snow or water-logged
- Poorly maintained machinery used for the application of organic manures, fertilisers or pesticides
- Soil erosion including poaching caused by livestock

Soil type, geology and topography of the land and weather can also significantly impact how pollutants enter our water.

Notes:

The rules

Every farmer and land manager must comply with **the eight Farming Rules for Water**. These specific rules only apply in England. Our farm/site is working to minimise the risk of pollution to meet these rules, and it's important we collaborate with organisations such as the Environment Agency and independent agronomists, consultants, or FACTS advisers to improve or adjust our farming practices as necessary.

Q: What are the eight Farming Rules for Water?

Responses might include:

- 1. Planning use of manures and fertilisers.** You must: a) Plan in advance each application to meet but not exceed soil and crop nutrient needs; b) take into account soil testing for pH, nitrogen (N), phosphorus (P), potassium (K) and magnesium (mg). Nitrogen levels can be determined by assessing the soil nitrogen supply instead of soil testing.
- 2. Organic manure must not be stored on land:** a) within **10 metres** of inland freshwaters or coastal waters; b) where there is significant risk of pollution entering inland freshwaters or coastal waters; c) within **50 metres** of a spring, well or borehole.
- 3. Organic manures and manufactured fertilisers must not be applied:** a) if the soil is waterlogged, flooded, or snow-covered; b) if the soil has been frozen; c) if there's significant risk of causing pollution.
- 4. Organic manures must not be applied:** a) within **10 metres** of any inland freshwaters or coastal waters; b) within **50 metres** of a spring, well or borehole. This is reduced to 6 metres where precision equipment is used.
- 5. Manufactured fertiliser application must not be applied:** within **2 metres** of any inland freshwaters or coastal waters.
- 6. You must take all reasonable precautions to prevent significant soil erosion runoff from:** a) the application of organic manure and manufactured fertiliser; b) cultivation practices and harvesting; c) poaching by livestock
- 7. Protecting against soil erosion by livestock.** Any land within **5 metres** of inland freshwaters and coastal waters must be protected from significant soil erosion by preventing poaching by livestock.
- 8. Livestock feeders must not be positioned:** a) within **10 metres** of any inland freshwaters or coastal waters; b) within **50 metres** of a spring, well or borehole; c) where there is significant risk of pollution.

Precision application

Some farm businesses are incorporating precision technology for the application of fertilisers, manures, and other inputs into their farming practices to improve efficiencies and water and air quality.

However, there are many factors to consider with precision application, such as:

- Level of investment of machinery – whether existing machinery can be altered to improve accuracy
- Soil and crop type
- Size and shape of land may have an impact on the time it takes
- Level of precision needed
- Whether solid or liquid materials are used
- Watercourses or neighbouring properties close by



It can, however, be beneficial in high-risk areas. For example, in terms of slurry spreading, it's considered best practice to apply under cool and damp conditions and use Low Emission Slurry Spreading (LESS) techniques which minimise the contact of slurry with the air, such as a dribble bar, a trailing hose, trailing shoe (as shown in the image above) or injection methods.

Q. What do high-risk areas include?

Responses might include:

- A drinking water protected area
- Where farmland is connected to watercourses like streams and ditches
- Steep slopes or shallow soil
- Next to sensitive habitats: Sites of Special Scientific Interest (SSSI), groundwater source protection zones (SPZ), special areas of conservation (SAC), special protection areas (SPA), Ramsar wetlands and marine conservation zones (MCZ)
- Nearby neighbouring properties if you're applying materials with a strong smell

Suggestions/ ideas:

Notes:

Suggestions/ ideas:

Discussion points



9 minutes

Choose two of the following discussion points to discuss with your team and complete the remaining one at another time.

Q: What should be considered before applying any fertiliser or manure?

Assessing the risk of pollution when using manures or fertilisers is an important first step when planning an application.

Responses might include:

- The slope of the land, especially if it is greater than 12 degrees
- Any green cover
- Whether application has been planned to not exceed soil and crop need or give rise to significant risk of diffuse pollution
- Proximity to inland fresh waters, wetlands and coastal waters. You can use Magic Maps to assess this: <https://magic.defra.gov.uk/magicmap.aspx>
- Weather conditions and forecasts
- Soil type and condition
- Presence and condition of agricultural land drains
- Spreading equipment – check for leaks and calibration
- Organic matter levels and moisture content of soils
- Organic manure should be incorporated within 12 hours or as soon as possible after application

You can check these details with your supervisor if you're unsure.

Q: When and where should you NOT apply fertilisers or manures?

Responses might include:

- If the soil is waterlogged, flooded or covered in snow
- If the soil has been frozen for more than 12 hours within the last 24 hours
- Organic manures must not be applied within 10 metres of any inland freshwaters or coastal waters. If precision equipment is used, the minimum distance is 6 metres
- Organic manures must not be applied within 50 metres of a spring, well or borehole
- Manufactured fertiliser must not be applied within 2 metres of inland freshwaters or coastal waters

Q. What are the benefits of precision application?

Responses might include:

- Save money by reducing the need for artificial fertiliser
- More consistent crop growth/quality = better yields

Better placement of slurry or digestates onto or just below the ground surface will:

- Reduce crop contamination
- Reduce the risk of crop scorch
- Improve odour control
- Enable use on growing cereal crops
- Allow livestock to return to grazing sooner, with less grass rejected

Precision application of inputs will benefit the environment. It can help reduce:

- Nutrient (nitrate and phosphate) loss from organic and artificial fertilisers
- Runoff of faecal bacteria from biosolids, livestock manures and slurries
- Soil compaction, by using fewer but more accurate machinery routes
- Air pollution from ammonia and tiny airborne particles
- Greenhouse gas emissions
- Drinking and bathing waters

Fewer nutrients and faecal bacteria in water bodies, wetlands, coastal waters and groundwater help to protect:

- Aquatic habitats and species

Print out the following page which shows poor examples of the application of manure and fertiliser and how this impacts watercourses and show it to your team.



Spreading slurry on waterlogged soil



Spreading slurry on snow covered soil



Slurry spread too close to a river (minimum is 10 metres) or 6 metres if using precision equipment



Splash plate spreaders are not considered best practice and may be phased out as part of the government's Clean Air Strategy.



Excessive nutrients in watercourses (especially nitrates and phosphorus), leads to an excessive growth (or bloom) of algae. It often results in the deterioration of water quality and the depletion of dissolved oxygen. Eutrophic waters can eventually become 'dead zones' that are incapable of supporting aquatic life.

Summary/Wrap-up

 1 minute

It’s essential that anyone operating machinery used for the application of manure/slurry and fertiliser is fully trained and competent. They should be aware of the risks to both safety and the environment and how to reduce them so that they can operate machinery safely and without compromise to the environment and business productivity.

Resources

NFU: Farming Rules for Water – what you need to know: <https://www.nfuonline.com/updates-and-information/farming-rules-for-water-what-you-need-to-know/#Rule3>

Environment Agency: Working to reduce pollution from farming: <https://environmentagency.blog.gov.uk/2023/03/10/working-to-reduce-pollution-from-farming/>

Defra: Protecting our Water, Soil and Air: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/268691/pb13558-cogap-131223.pdf

GOV.UK: Use precision application of fertiliser, manure and other inputs: <https://defrafarming.blog.gov.uk/sustainable-farming-incentive-pilot-guidance-use-precision-application-of-fertiliser-manure-and-other-inputs/>

NFGWS: Good Slurry Spreading Practices to Protect Water Quality — Roscommon Training Day: <https://www.youtube.com/watch?v=SbvyAOG01UI>

Farmers Weekly: Guide to slurry assessment and application: <https://www.fwi.co.uk/livestock/guide-to-slurry-assessment-and-application>

NFU: Improving water quality – 6 things to do on farm: <https://www.nfuonline.com/updates-and-information/improving-water-quality-6-things-to-do-on-farm/>

NFU: Addressing water quality and challenges in agriculture: <https://www.nfuonline.com/updates-and-information/addressing-water-quality-challenges-in-agriculture/>

Catchment Sensitive Farming: A clear solution for farmers: <https://www.youtube.com/watch?v=yTv5sseAOHs>

Toolbox Talk participants

Toolbox Talk: **Water quality – Fertiliser and manure application**

Name of farmDate

Talk leader name.....

Name	Signature	Date