

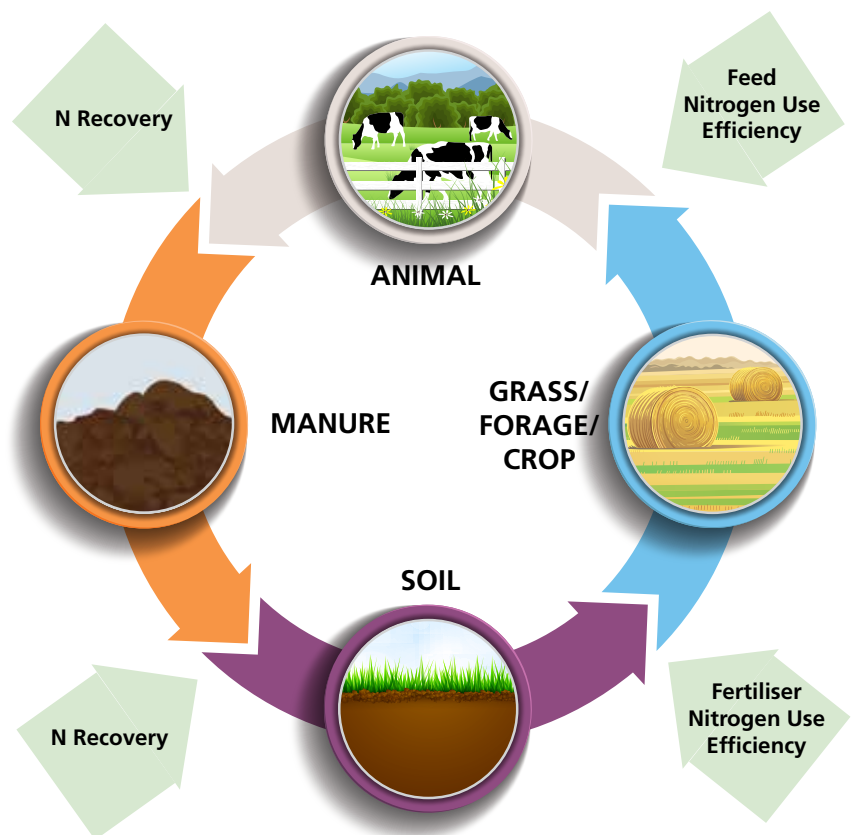
Reducing ammonia emissions on livestock and arable farms



Why do ammonia emissions from agriculture matter?

Ammonia, a volatile nitrogen compound, is released when slurries, manures and nitrogen fertilisers come into contact with air. When mixed with other air pollutants, eg from transport or industry, ammonia forms tiny toxic particles called 'particulate matter', leading to poor air quality and health problems. Ammonia deposition can also lead to soil acidification and excessive nitrogen in sensitive habitats, reducing biodiversity.

Agriculture accounts for 88% of UK ammonia emissions. Despite some reduction during the 1990s, ammonia emissions have not declined at the rate of other air pollutants.



NUE is a unit of efficiency used in crop or livestock production. NUE is increased by increasing farm output per unit of N input.

What are the government's plans?

UK Government is bound by legal emission reduction targets for ammonia:

- 8% reduction by 2020
- 16% reduction by 2030

From 2005 baseline levels, the 2030 target especially is ambitious and will require action by the agricultural industry. The more that can be achieved by voluntary means, the better, so that the need for regulation is minimised.

Large, intensive poultry and pig units – significant point sources of ammonia emissions – are already regulated by 'permit conditions' requiring Best Available Techniques to be used to control emissions to air, land and water. The ruminant sector as well as smaller, less-intensive pig and poultry farms now need to look to reduce ammonia.

And, non-livestock farms have a part to play.

Closing the nutrient loop

Ammonia, and therefore fertiliser value, can be lost whenever slurry or manures are exposed to air. Reducing exposure time in housing, storage and during crop application cuts losses but it is a continuous process. The nitrogen recovered in housing and storage can be lost at the point of field application so risk has to be managed at every point in manures handling.

Reduce ammonia – by managing nutrients better

Careful nutrient management can save money as well as reducing impacts on air and water quality as well as greenhouse gas emissions. Good practice in managing soil, manure, fertiliser and feed will also help reduce ammonia losses. Recovering as much nitrogen as possible for grass and crops will maximise returns from farm inputs. Look to capture nutrients at every step in the process and adopt an integrated, whole-farm approach to get the best performance from soils, grass, livestock and crops.

Improving overall farm Nitrogen Use Efficiencies will protect the farm's assets and reduce ammonia emissions.



ACTIONS TO REDUCE AMMONIA LOSSES FROM AGRICULTURE

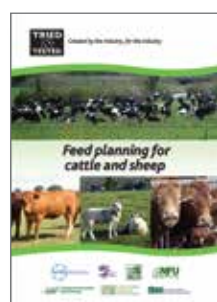
Source of ammonia	Measures to reduce ammonia losses	Potential outcome
Animal feeding	<ul style="list-style-type: none"> Analyse soil and forage to optimise soil condition and fertility and improve forage nutritional value 	Optimum grass and crop quality from efficient use of N from fertiliser and manure. Production costs and emissions reduced, margins improved
	<ul style="list-style-type: none"> Seek advice from qualified crop and/or animal nutritionist (FACTS/FAR qualified) to achieve efficiencies as well as improve animal health and welfare 	
	<ul style="list-style-type: none"> Optimise feed dietary protein content to reduce nitrogen excretion 	Improved feed utilisation efficiency. Reduced nitrogen in excreta at risk of loss as ammonia
	<ul style="list-style-type: none"> Match feed to species and growth/production stage 	
Housing	<ul style="list-style-type: none"> Wash housing and collection points regularly 	Reduced likelihood of ammonia loss from slurries and increasing recovery of fertiliser N
	<ul style="list-style-type: none"> Regularly remove and transfer slurry to a suitable store, ideally purpose built to reduce surface area exposed to air 	
	<ul style="list-style-type: none"> Install effective scraper units (in new buildings) 	
	<ul style="list-style-type: none"> Plant tree shelter belts around livestock housing to capture ammonia before it leaves the farm 	Loss of ammonia from the farm is reduced
Storage	<ul style="list-style-type: none"> Ensure slurry storage capacity is adequate to enable application when crops require nutrient 	Well designed and covered stores reduce ammonia losses and exclude rainwater. All leading to more efficient N use and leading to increased nitrogen recovery from manures, and fertiliser value
	<ul style="list-style-type: none"> Fix rigid lids or flexible covers to slurry tanks to retain N and exclude rainwater 	
	<ul style="list-style-type: none"> Install floating covers on lagoons and slurry tanks 	
	<ul style="list-style-type: none"> Consider using slurry storage bags 	
	<ul style="list-style-type: none"> Cover solid heaps with sheeting 	
Spreading	<ul style="list-style-type: none"> Use shallow injection (for slurry and urea fertilisers) 	Reduced contact with air keeps ammonia emissions low and ensures N is available for crops increases potential recovery of nitrogen by grass and crops
	<ul style="list-style-type: none"> Use band spreading with a trailing hose or trailing shoe (on grassland where shallow injection cannot be used) 	
	<ul style="list-style-type: none"> Incorporate manures spread onto bare soil as soon as possible after application (ideally within 4 – 6 hours, 12 hours at most) 	
	<ul style="list-style-type: none"> Spread slurry under cool, windless and humid conditions 	
Grass, forage, crops	<ul style="list-style-type: none"> Adopt a Nutrient Management Plan to balance grass and crop nutrient requirements with manure and fertiliser applications 	Efficient use of manures and additional nitrogen fertiliser improves overall Nitrogen Use Efficiency, reduces farm costs and lessens the risk of loss of ammonia and other forms of nitrogen
	<ul style="list-style-type: none"> Improve Nitrogen Use Efficiency of urea fertiliser using low-emission application techniques, inc. urease-inhibited fertilisers or switch nitrogen source to ammonium nitrate fertiliser 	
	<ul style="list-style-type: none"> Refer to RB209 or seek advice from a FACTS Qualified Adviser for guidance on urea fertilisers, and ammonium sulphate and ammonium phosphate use on calcareous soils. Avoid dry, warm, windy conditions, when risk of ammonia loss is increased 	

Reducing ammonia emissions from livestock and arable farms

CFE helps farmers and land managers choose the right environmental measures, put them in the right place and manage them in the right way – to protect soil, water and air quality and benefit wildlife.

CFE is a partnership approach supported by many organisations engaged in agriculture and the environment.

Tried & Tested offers a hub of practical tools to help grassland and livestock farmers manage their nutrient sources, created by industry for the industry. For more visit www.nutrientmanagement.org



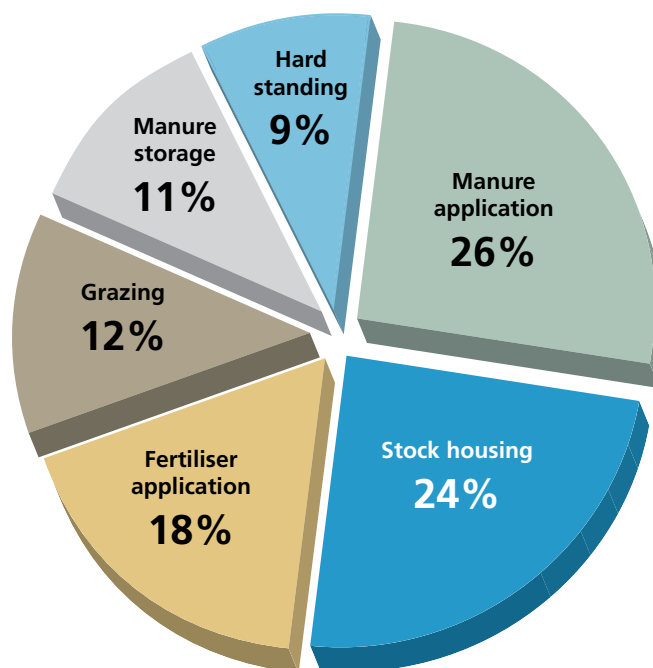
- Feed Plan



- Think Manures



- Crop Nutrient Management Plan



Sources of ammonia losses from agriculture

Where to find further information

- CFE – www.cfeonline.org.uk
- Download the [Nutrient Management Guide](#)
- Tried & Tested – www.nutrientmanagement.org
- [Defra's Code of Good Agricultural Practice for Reducing Ammonia Emissions](#)
- [UNECE Framework Code of Good Agriculture Practice for Reducing Ammonia Emissions](#)
- [Countryside Productivity Grants](#)
- [AHDB Resources RB209](#)