Department of Agriculture, Environment and Rural Affairs
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FAS news

Farm Advisory System newsletter

Summer 2019 Issue 14

Foreword

Eric Long,
Head of Knowledge Advisory Service, CAFRE.

I am pleased to introduce the 14th edition of the "Farm Advisory System" (FAS) newsletter. This issue focuses on key advisory messages to update you on Northern Ireland's ammonia challenge and the new Northern Ireland Nutrients Action Programme 2019-2022.

What is FAS?

The EU requires all member states to have a Farm Advisory System (FAS) to inform farmers on the following five areas:

1. Cross-Compliance;
2. Greening and Land Eligibility;
3. Rural Development Programme;
4. Water Framework Directive;
5. Sustainable Use of Pesticides Directive.

This issue contains articles on a range of FAS topics which focus on compliance and improving agriculture's efficiency and impact on our environment, including:

- The environmental importance of Low Emission Slurry Spreading Equipment (LESSE).
- Soil Analysis is required before applying Chemical Phosphate.
- Antimicrobial Resistance.
- Responsible Pesticide Use.
- The Environmental Farming Scheme.

Forthcoming Events

CAFRE Short Courses

There are over 40 different industry short courses on offer from CAFRE. You can enrol on upcoming courses or register your interest for future events. Courses particularly relevant to topics in this FAS edition are listed under Agri-Environment and include:

- Nutrient Management Planning,
- Ammonia – why it is a problem and what can farmers do?

The full list can be accessed on the CAFRE website under Find a course - Industry Training or using the link www.cafre.ac.uk/industry-support/industry-training.

Sheep Conference 2019 Future Proofing your Sheep Enterprise

- Conference cost is £15 per person and includes a light supper. Booking for either event is via the UFU website www.ufuni.org/events or contact Angela Scott at UFU HQ on 028 9037 0222.

Northern Ireland Nutrients Action Programme 2019-2022

Aveen McMullan, Sustainable Land Management Branch, CAFRE.

The Nitrates Action Programme was introduced across Northern Ireland in 2007 and is reviewed and revised every 4 years. Following the recent review, there have been a number of changes to the previous Nitrates Action Programme & Phosphorus Regulations which are now incorporated in the Nutrients Action Programme (NAP) 2019-2022. The NAP has been agreed and a future NI Derogation has been secured for 2019-2022, after approval by the EU Nitrates Committee on the 27 March 2019.

The aim of the NAP is to improve the use of nutrients on farms and, as a result, improve water quality throughout Northern Ireland. In particular it promotes better management of animal manures, chemical fertilisers and other nutrient containing materials spread onto land. The changes are summarised as follows.

Water Protection

Starting this autumn, from 1st to 15th October 2019 and during the month of February the buffer zone for slurry application is increased from 10m to 15m of any waterways and 20m to 30m for lakes. Also, the maximum slurry application limit during these months is reduced from 50m^3 to 30m^3 per ha (2,700 gal per ac).

Where there could be a significant risk of pollution occurring from their use, supplementary feeding sites must be a minimum of 20m from water courses and livestock drinking points must be a minimum of 10m from any waterway.

Phosphorus Reduction & Efficiency

Chemical phosphorus (P) fertiliser regulations will be included in Cross-Compliance requirements from 1st January 2020. Similar to the existing requirements for derogated farms, a fertilisation plan will be required for all grassland farms using chemical P fertiliser, P rich manure and anaerobic digestate. If organic manures are used the phosphorus available from these manures should be accounted for and a soil analysis will be required to show the need for chemical P fertiliser to meet crop P requirements. Maximum phosphate fertiliser application limits (kg P_20_5 per ha), have been revised for extensively managed grassland; that is grassland receiving under 60kg chemical N/ha/year or where the farm is under 120kg N/ha/year nitrogen loading. If you intend to use chemical P fertiliser, P rich manures or anaerobic digestate you need to plan ahead and make sure you have a valid soil analysis in advance.

Nitrogen Efficiency

There will be a phased introduction of the mandatory use of low emission slurry spreading equipment (LESSE) for larger farms, slurry spreading contractors and the spreading of digestate from AD plants. LESSE includes trailing shoe, trailing hose, dribble bar and soil injection. Taking effect from 1 February 2021, all slurry spreading contractors, (contractor is defined as any person who in the course of a business, spreads slurry on an agricultural area and who is not claiming direct agricultural payments on that agricultural area) will be required to use LESSE. Similarly from 1 February 2022 larger farms i.e. cattle farms with 200 livestock units or more and pig farms with a total annual livestock manure nitrogen production of 20,000kg or more will also have to use LESSE. If using LESSE on fields sloping towards a waterway and there is a risk of water pollution, slurry must be spread taking into account risk factors such as application rate, proximity to the waterway and weather conditions. Revised N excretion rates for cattle and poultry will apply from 1 January 2020.

Slurry and Manure Storage

All new above ground slurry stores constructed after 1st January 2020 must be covered. Any new above ground slurry stores must be sited at least 50m from any water way. There will be no requirement to cover existing slurry stores.

Controls on Anaerobic Digestate

From 1 February 2020 anaerobic digestate and anaerobic digestate separated liquid must be spread using LESSE. Where farms are applying digestate as fertilisation, records of nutrient content analysis must be retained. Farms importing digestate will need to prove there is a crop need through a soil analysis and have a fertilisation plan in place.

Prior to field storage of anaerobic digestate fibre, NIEA must be notified. It must be covered, unless it is ploughed in within 24 hours and if stored in open middens must be covered within 24 hours of storage.

An updated guidance booklet for the NAP 2019-2022, will be made available online. CAFRE will be delivering a series of workshops to promote the revised NAP and explain the revisions. This is to assist farmers in complying with the new Regulations.

Northern Ireland's Ammonia Challenge

Patrick Savage, Agri Ammonia Policy Branch, DAERA.

Ammonia emissions are an issue of increasing importance for the local agriculture industry, particularly for those farmers who have been required to assess emissions as part of their applications for farm development. There is a huge opportunity for agriculture to contribute to cleaner air and improved biodiversity by reducing ammonia levels and increasing the sustainability of the farming sector.

What is Ammonia and why is it important?
Ammonia (NH_3) is a colourless gas produced by many common farming activities such as the housing of livestock, the storage and spreading of manure and slurries and the application of fertiliser. Nitrogen is critical to our agricultural systems and food production is dependent on the availability and cycling of nitrogen. However the more nitrogen which cycles in our agricultural systems, the greater the risk that some of this will be lost to the atmosphere as ammonia.

Too much ammonia can be harmful to the environment, and particularly to sensitive habitats such as heathlands, peat bogs and dune systems. When ammonia is emitted into the air, it will fall back onto land through a process known as **nitrogen deposition**. This often occurs close to the source of farming activities however nitrogen can also be carried for long distances and through rainfall, can be deposited on land many miles from where the initial ammonia emissions took place. Where sensitive habitats are receiving too much nitrogen and ammonia, they can be damaged as the delicate plant life is out-competed by other species. Natura 2000 sites are the most precious habitats and we have a shared obligation to protect them. In Northern Ireland, the vast majority of these sites are receiving more nitrogen and ammonia than they are able to cope with. In fact well over half of these sites are receiving at least twice as much nitrogen as they should be.

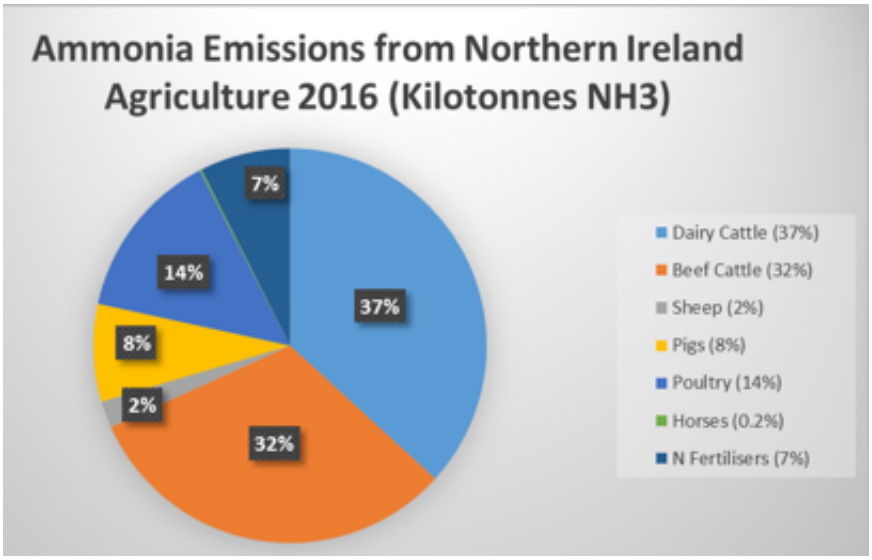
Ammonia emissions can also impact on human health. Ammonia is one of a number of contributory factors in the formation of harmful Particulate Matter (PM) in the atmosphere. PM consists of tiny particles that can get into our lungs and blood and be transported around the body, lodging in the heart, brain and other organs. PM can have short term health impacts over a single day when concentrations are elevated and cause long term impacts from lower level exposure.

The moss on the left has been damaged by N deposition on a 'Natura 2000' site (image courtesy of NIEA)

Ammonia: The Statistics

At the UK level, Northern Ireland produces 11% of all UK ammonia, despite having only 3% of the UK population and 6% of the land area. Our agriculture sector produces 94% of the ammonia emissions while 88% of our land receives ammonia concentrations above the critical levels set to

protect the most sensitive plants. This compares to 85% of land in England, 56% of Wales and 18% of Scotland. These figures show that Northern Ireland needs to reduce its ammonia emissions urgently. However they also reflect the importance of the agriculture sector to our economy and the nature of Northern Ireland as a food-exporting region in which agriculture is dominated by livestock.



The majority of Northern Ireland's ammonia emissions come from the cattle sector with the dairy sector being the largest source of ammonia. Beef cattle produce almost a third of our emissions with poultry and pigs the next largest contributors.

Since 84% of ammonia emissions are caused by the management and application of livestock manures and slurries, best practice in this area is key. All sectors are part of the solution and have a role to play in positively addressing Northern Ireland's ammonia challenge.

Achieving Ammonia Reductions

Farmers have huge potential to contribute to improving the environment and human health outcomes by including ammonia reduction techniques within their farming systems. Case study modelling at farm level, completed through a DAERA funded research programme led by AFBI, has shown that significant emission reductions can be achieved on individual farms. In both the dairy and beef sectors, farms have the potential to reduce their ammonia emissions by over 40% if they undertake a series of measures.

In the case study scenarios modelled at farm level, it was assumed that for dairy farms ammonia reduction measures include; reduced crude protein levels in animal diets, increased scraping frequency in housing, storage of slurry in outdoor covered tanks, spreading of slurry by trailing shoe, substitution of straight urea fertiliser for a stabilised urea product and an increase in grazing days by two weeks. Case study modelling for beef farm ammonia reduction measures included; an increased duration of cattle grazing, slat mats retrofitted in cattle housing, slurry spread by trailing shoe and stabilised urea used instead of straight urea.

While not all of these measures will be appropriate on every farm, the key message is that by applying the right measures on individual farms, large reductions in emissions can be achieved. There are also significant benefits to farmers from many of these systems, for example, spreading slurry by trailing shoe will increase grass growth by 21% (with an 19% increase in grass growth where a trailing hose is used), while slat mats will increase animal comfort. Increasing the duration of cattle grazing grass where possible has been shown to increase farm profit margins.

All of the reduction measures modelled feature in the Code of Good Agricultural Practice for the reduction of Ammonia emissions which was produced in collaboration with the farming industry and launched at the 2019 Balmoral Show. This Code provides helpful advice to farmers on how they can reduce ammonia in a way most suitable to their own farm and is available at: www.daera-ni.gov.uk/publications/code-good-agricultural-practice-reduction-ammonia-emissions

Using low emission techniques to spread slurry reduces ammonia emissions and increases grass growth.

What next?

DAERA has been working with stakeholders on the ammonia issue during 2018 and 2019. An economic analysis of ammonia reduction measures is ongoing whilst farm case study modelling is taking place for both the pig and poultry sectors. This work will inform the comprehensive consultation on ammonia that is planned. The consultation will give farmers and the wider public an opportunity to state their views on how Northern Ireland can achieve tangible and sustained reductions in ammonia in a way that supports a thriving and prosperous agri-food sector.

Ammonia and the Natural Environment

Áine O'Reilly, Natural Environment Division, NIEA.

Ammonia, a form of atmospheric nitrogen is building up in our atmosphere with knock-on effects to our natural environment. Deposited to land from the air or by rain, our natural habitats are acting as sinks for nitrogen within our landscape.

Almost all of our designated sites and other priority habitats are exceeding the critical thresholds for ammonia concentrations and associated nitrogen deposition, but what does this mean?

All plants need nitrogen to grow however, most plant species in sensitive habitats are specially adapted to low nutrient conditions. Nutrient-poor habitats such as peatlands, woodlands, sand

dunes and grasslands support plants with a low tolerance to nitrogen and studies show that these plants and habitats are increasingly under threat as a result of nutrient enrichment from nitrogen deposition. The effects of nitrogen deposition are not always immediately visible, unlike the impact of a fire or a major pollution event, but over time these gradual changes can have a devastating impact on the plants and animals that characterise these habitats. The composition of the habitat moves from a healthy, diverse environment to a more uniform sward with a narrower range of plants and animals that are then able to live and thrive.

The most damaging effects occur when ammonia is present in high concentrations. The impacts are observed through direct toxicity, bleaching and algal growth, which can smother sensitive plants. These chronic effects are often observed at close proximity to sources. When the balance of plant and species in these habitats is adversely affected, it can be a difficult and costly recovery process that takes a long time.

While the natural environment is resilient, it is currently facing a strong challenge from ammonia pollution and the duty is on each of us to protect it for future generations. Our habitats are a precious resource that provide us with clean air, clean water, help alleviate flooding, and tackle climate change through capture and storage of carbon. In addition, these habitats provide a home to our birds, mammals and pollinators, all of which have a place in our landscape.

There is also a legal requirement to protect sites such as Natura 2000 sites, Areas of Special Scientific Interest (ASSIs) and priority habitats. Our protected areas represent the very best of our natural landscapes and biodiversity, forming the cornerstone of nature conservation by supporting plants, animals and habitats that are rare or unique and worthy of protection.

The UK is obliged under the UNECE Gothenburg Protocol and the EU National Emissions Ceilings Directive to reduce ammonia emissions by 8% by 2020 and 16% by 2030, compared to 2005 levels. Ammonia emissions from Northern Ireland have increased by around 4% each year in the last three years and it is clear that meeting these targets to protect our precious and sensitive habitats will be a very significant challenge and one which Northern Ireland will be expected to play its part.

An image of Cladonia lichen from a lowland raised bog in Northern Ireland. Lichens consist of fungal and algal parts. Lichen are nature's own indicators of polluted or pure air as they absorb minerals from the air. Cladonia is usually pale greyish-green in colour, the 'pinking' of this species is a response from the plant to toxicity from ammonia emissions [Image source: Áine O'Reilly]

The Environmental Importance of using Low Emission Slurry Spreading Equipment

Robert Edwards, Sustainable Land Management Branch, CAFRE.

Slurry application using a trailing shoe attachment.

In Northern Ireland 94% of all ammonia emissions are from agriculture. There is a need to reduce ammonia emissions to prevent damage to sensitive sites, protect human health, help meet UK targets and improve the efficiency of nutrient use. It is important to learn from other countries. The experience of the Netherlands has shown the importance of low emission slurry spreading equipment (LESSE) techniques in helping to reduce their ammonia emissions.

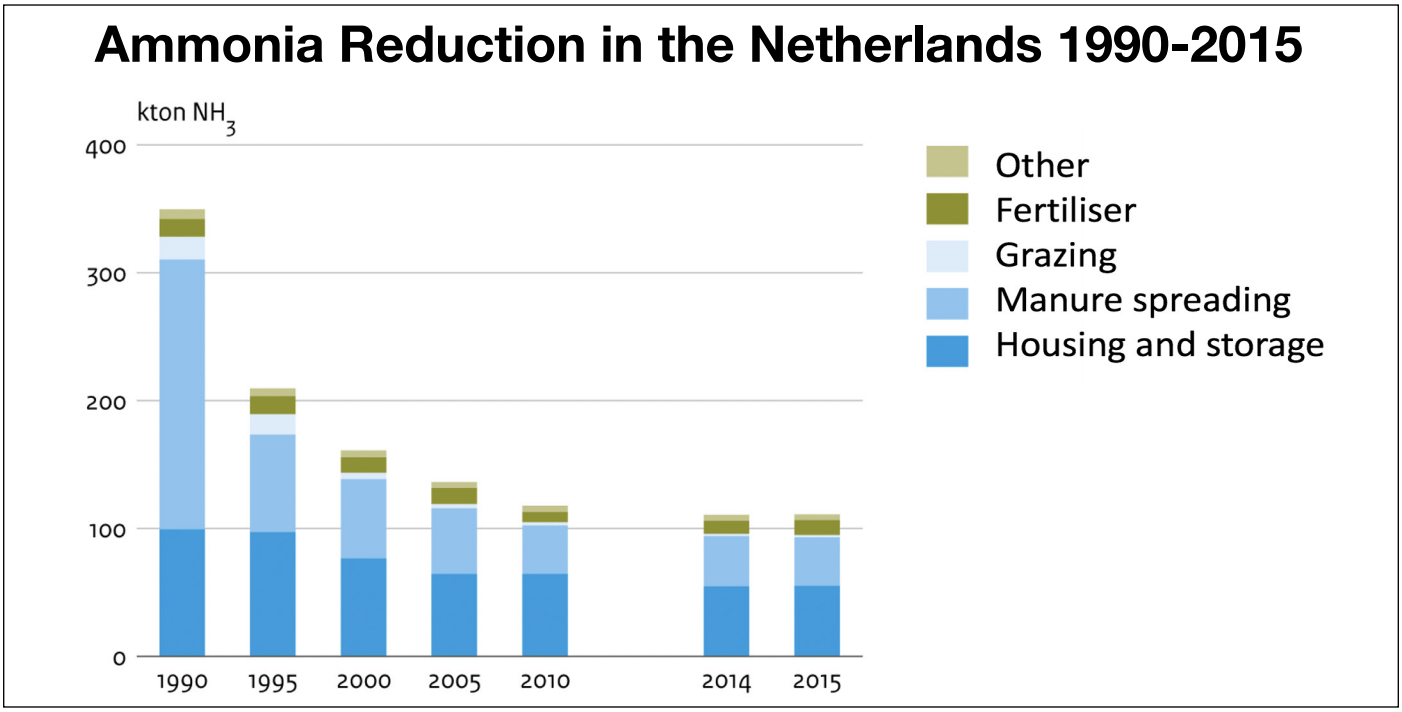


Figure 1. Graph outlining progress with ammonia reduction in the Netherlands 1990-2015.

Source: https://www.clo.nl/indicatoren/nl010114-ammoniakemissie-door-de-land--en-tuinbouw

Figure 1 illustrates the very high levels of ammonia that were emitted in the Netherlands in 1990. The majority of ammonia emissions came from the spreading of manure and slurry which was mainly applied using the splash plate system. Legislation was to reduce ammonia emissions which resulted in a change from the use of splash plates to shallow injection. Consequently between 1990 and 2015 the greatest reduction in ammonia emissions came from changing the method of slurry spreading.

In Northern Ireland, the inverted splash plate is still the main method of slurry application. However splash plate systems are not recommended for spreading liquid organic manures because they can cause high levels of ammonia emissions. They can also increase the risk of surface run-off into water. Splash plate systems operate by forcing liquid at high pressure onto an inclined plate and spraying the liquid into the air. Ammonia loss is significantly increased when there is a high surface area and a lot of air movement. The act of spraying the manure onto the soil or crop surface, means that much of the nitrogen in the slurry is lost to the air as ammonia and less nitrogen is available to fertilise the crops.

Low Emissions Slurry Spreading Equipment (LESSE) systems such as trailing hose, trailing shoe and shallow injection are very effective ways to reduce ammonia emissions. LESSE places the slurry or digestate onto or into the ground, thereby reducing nitrogen losses to the air as ammonia. Many farmers that already use LESSE are finding that they get more fertiliser value from slurry leading to increased crop yields or the opportunity to reduce fertiliser rates. Research trials completed by AFBI found a 21% increase in silage yields using the trailing shoe system to spread slurry compared to splash plate application. LESSE systems are more precise, reduce overlapping during spreading and so result in a more even distribution of slurry or digestate with considerably reduced odours.

	Inverted splash plate	Trailing hose (low emission)	Trailing shoe (low emission)	Shallow injector (low emission)
Typical range of dry matter	Up to 12%	Up to 9%	Up to 6%	Up to 6%
Requires separation or chopping	No	Yes (if over 6% DM)	Yes	Yes
Relative work rate	→→→→	→→→	→→→	→→
Uniformity across spread width	✓	✓✓✓	✓✓✓	✓✓✓
Ease of bout matching	✓	✓✓✓	✓✓✓	✓✓✓
Crop damage	Moderate	Low	Low	Moderate
Relative odour	High	Moderate	Low	Low
Relative ammonia reduction	0%	30-35%	30-60%	70-80%
Capital cost	£	££	£££	£££

Table 1. A comparison of slurry application systems.
Source: DAERA Code of Good Agricultural Practice for the Reduction of Ammonia Emissions. www.daera.gov.uk

Table 1 shows that the inverted splash plate method of application is the least effective method in reducing ammonia emissions. The trailing shoe and shallow injection methods are much more effective in reducing ammonia emissions and therefore securing maximum nutrition from the slurry.

DAERA's recently revised Nutrients Action Programme (NAP) regulations now include requirements for using low emission slurry spreading equipment (LESSE).

These are summarised in Table 2.

Low Emission Slurry Spreading Equipment (LESSE)		
	LESSE includes: bandspreading, dribble bar, trailing hose, trailing shoe, soil incorporation or soil injection methods.	If spreading slurry using LESSE in fields sloping towards a waterway, you must not be spread within 10m of the waterway.
Implementation Date	**Who will this affect?**	**What Must I Do?**
1 February 2020	Anaerobic Digestate.	Apply digestate using LESSE.
1 February 2021	Contractors.	Apply slurry using LESSE.
1 February 2022	Large cattle farms with 200 or more livestock units and pig farms with a total annual livestock manure nitrogen production of 20,000kg or more.	If your cattle or pig farm falls into either of these categories you must not spread slurry using an inverted splash plate.

Table 2. Summary of the requirements for using low emission slurry spreading equipment in the revised Nutrients Action Programme (NAP) Regulations.

Further information will be included in the NAP Guidance which is expected to be available later this year.

Conclusion

Low emission slurry spreading systems have played a significant part in reducing ammonia emissions in the Netherlands and they will also have an important part to play in reducing ammonia emissions from farms in Northern Ireland.

Changes to the Nitrogen Excretion Rates for Cattle and Poultry. Check your Nitrogen Loading

Alastair Cameron, Sustainable Land Management Branch, CAFRE.

Some standard figures for nitrogen (N) excretion rates used to calculate the livestock manure N loading of farms have been updated in the Nutrient Action Programme (NAP) 2019-2022.

The livestock manure N loading limit is the amount of total N in livestock manures applied to the eligible land under your control, including that excreted by the animals themselves. This figure must not exceed 170kgN/ha per year as required under the previous Nutrients Action Programmes.

In Northern Ireland approximately 90% of farms are working under this limit. Only intensive dairy, beef, pig and poultry farms tend to exceed this limit. However, it is strongly advisable that all farm businesses calculate their N loading to ensure they comply with the limit. To calculate the livestock manure N loading, you should work out the total N excretions for the livestock on your farm and divide by the eligible agricultural area controlled.

The new figures shown in Table 1, should be used for calculations for the 2020 year onwards. You can easily calculate the N loading for your farm using the revised figures by logging on to the CAFRE Nutrient Calculators at www.daera-ni.gov.uk/onlineservices.

Table 1. Nitrogen Excretion Rates for Cattle

Livestock type and age	N produced per head per year (kg N)	
	Previous value	Revised value
Dairy cows	91	100
Dairy heifer (over 2 years)	54	45
Dairy heifer (1-2 years)	47	39
Beef suckler cow (over 2 years)	54	52
Breeding bull	54	52
Cattle (over 2 years)	54	45
Cattle (1-2 years)	47	39
Bull beef (0-13 months)	30	30
Bull beef (6-13 months)	23	23
Calf (0-1 year)	19	19
Calf (0-6 months)	7	7
Calf (6-12 months)	12	12

Table 2. An example of the effect of the change in values, for a 67 hectare farm with a 100 cow dairy herd.

Stock type	N excretion per animal per year (kg)		Total N excretion (kg) per animal per year	
	Previous value	Revised value	Previous value	Revised value
100 dairy cows	91	100	9100	10 000
5 cattle over 2 years	54	45	270	225
30 cattle 1-2 years	47	39	1410	1170
30 calves under 1 year	19	19	570	570
Total N			11350 kg N / 67ha	11965 kg N / 67ha
N Loading/ha			= 169.4 kg N/ha (Compliant with 170 kg N/ha limit)	= 178.6 kg N/ha (NOT Compliant with 170 kg N/ha limit)

If your livestock manure N loading for 2020 will be above the 170kgN/ha limit, you need to plan ahead and take action next year. Your options include exporting manure or preparing to apply for a derogation. It is important to plan ahead now.

Table 3. Approximate eligible land area requirements per animal to meet 170 kg N/ha

Livestock type	Eligible land requirement to meet 170 kg N per ha	
	Revised values	
	Hectares	Acres
1 Dairy cow place (assuming a 30% replacement rate*)	0.69	1.7
1 Suckler cow place and calf place up to 1 year (assuming a 20% replacement rate*)	0.37	0.91
1 Cattle place 1–2 years	0.23	0.56
1 Cattle place over 2 years	0.26	0.65

** Land requirement will vary according to replacement rate.*

Similarly the standard figures for N excretion rates have been revised for poultry with some additional production systems included. Research carried out by AFBI and assisted by industry, has identified a substantial reduction in N produced in litter per week or per crop of birds when compared to the previous values, as shown in Table 4. The new figures shown in Table 4, should be used for calculations for poultry businesses from 1 January 2019 onwards.

Table 4. N Excretion Rates for Poultry.

Livestock type and age	N produced per 1000 birds per week (kg N)	
	Previous value	Revised value
Broiler Breeders (0-18 weeks)	5.9	2.9
Broiler Breeders (18-60 weeks)	21	7.2
Broiler Breeders (0-60 weeks)	19	5.9
Pullets	5.7	4.7
Layers	12	12
Free Range Laying Hens	12	5.4
Livestock type and age	**N produced per 1000 birds per crop (kg N)**	
	Previous value	**Revised value**
Conventional Broilers	40	40
Broilers with Hot Water Heating System (6 week crop)	Previously undefined	33.8
Free Range Broilers (8 week crop)		44.9
***Turkeys (0-6 weeks)**	Males 611	229
***Turkeys (6 weeks to kill)**	Females 363	305
***Turkeys (0-6 kill)**		534

Further information on the new Nutrients Action Programme will be available in the Nutrients Action Programme 2019-22 Guidance Booklet.

Soil analysis is required before applying Phosphate Fertiliser

David Trimble, Sustainable Land Management Branch, CAFRE.

From 1 January 2020 a farm fertilisation plan will be required prior to applying phosphate fertiliser, high phosphate manures and or anaerobic digestate. Soil sampling is the first step to efficient nutrient management and the basis of a fertilisation plan. Soil analysis determines the fertility of your soils, allowing you to plan applications of lime, manure and fertiliser to maximise yield. This minimises wastage and nutrient loss, efficiently uses slurry and manure and can reduce your expenditure on chemical fertilisers.

Soil sampling is the first step to efficient nutrient management.

Autumn through winter (October to February) is the ideal period for soil sampling provided lime, organic manure or bagged fertiliser has not been applied in the previous three months. A single soil sample is adequate for 4 hectares (10 acres) in one or more fields provided they have been under similar management. Soil testing costs approximately £9 including VAT for a standard analysis. It represents excellent value for money as it enables you to improve your soil fertility, by balancing Phosphorus (P) and Potassium (K) supply and potentially reduce purchased fertiliser.

Procedures for soil sampling

- Collect a soil auger and sample bags from your DAERA Direct office.
- For areas similar in use and soil type, up to 4 ha in total area, take 20-25 cores across the field with the auger. Walk in a W pattern avoiding feeding and drinking troughs, gates, headlands, manure patches and areas where stock shelter.
- Mix the cores well in a bucket and place a representative sample of approximately 500g in a bag. Label it clearly with your name, the farm survey number and field number(s).
- Return the auger and samples to the office with the payment. Samples will be sent to the laboratory for analysis and the results will be sent directly to you, usually within one week.

The soil analysis report gives the pH and the amount of P and K in milligrams per litre (mg/l) of soil that is available for the plant to take up. This is also expressed as an index. The higher the soil index the lower the need for additional nutrients from slurry, manure and or chemical fertilisers.

Under the new Nutrients Action Programme 2019-2022 you will only be allowed to apply Phosphate fertiliser or Phosphate rich manures (such as layer litter and pig farmyard manure) and anaerobic digestate if you can demonstrate there is a crop requirement for P.

Always aim for the optimum index to suit your production system. Whilst in general the optimum index for P is '2+', new recommendations for extensive grazing specify that a P index of '2-'('two minus') is adequate. The optimum index for K is '2-'.

The report will specify a recommendation for lime, Phosphate (P_2O_5) and Potash (K_2O) in kg/ha and units/acre if they are required. These are maximum amounts and where possible should be supplied from slurry or farmyard manure and only topped up with the right chemical fertiliser at the right rate to make up the balance.

The CAFRE Crop Nutrient Calculator available at www.daera-ni.go.uk/onlineservices can quickly and easily help you determine crop requirement, the value of manures and it calculates the correct application rate for you. Agri-environment scheme participants should check their agreements for possible restrictions.

Take the opportunity to sample your farm's soil from October to February so that you are prepared for the new requirements of the Nutrients Action Programme and can obtain the full benefit from your soil analysis report. Without a report you won't be able to apply Phosphate fertiliser or Phosphate rich manures next year.

Further information on managing nutrients and understanding your soil analysis report is available at www.daera-ni.gov.uk/5-steps-to-managing-nutrients

Changes to the use of Anaerobic Digestate on Farms

David Trimble, Sustainable Land Management Branch, CAFRE.

A number of new measures will be introduced for the use of anaerobic digestate as a fertiliser from 1 January 2020. These arise under the Nutrients Action Programme (NAP) 2019-2022.

1. Digestate must be spread by low emission slurry spreading equipment (LESSE) and not by splash plate from 1 February 2020. LESSE includes trailing shoe, trailing hose, dribble bar and soil injection.

2. Digestate must be applied to meet crop requirements. This is based on soil analysis and a fertilisation plan.

3. For a farm importing anaerobic digestate to use as a fertiliser from 1 January 2020 you must:

    - Have a valid soil analysis for your farm.

    - Only accept digestate which has the required analysis (below) normally provided by the AD plant operator.

- Prepare a fertilisation plan and apply to meet crop requirements.
- Keep the analysis records for 5 years and make them available to the NIEA if you have an on farm Cross-Compliance inspection.
- Cover any anaerobic digestate fibre stored in field heaps or middens within 24 hours of storage. Any field heaps of anaerobic digestate fibre should be notified to NIEA.

Where anaerobic digestate is used on a farm as a fertiliser it must have a nutrient content analysis. This analysis must give the percentage of:

- Dry matter
- Total N (nitrogen)
- Total P_2O_5 (phosphate)
- Total K_2O (potash) and
- Ammonia N or Ammonium (NH_4^+)

Antimicrobial Resistance

Carl Kennedy, Veterinary Service Animal Health, DAERA.

Antimicrobial Resistance (AMR) has become a major threat affecting not just human health and healthcare but also farming, the environment, the food chain and ultimately the food we eat.

The emergence and spread of drug resistant microbes is driven by over and inappropriate use of antimicrobials (particularly antibiotics) in both humans and animals. Highly resistant bacteria and antibiotic residues are found in bathing water, streams and slurry. Taking action to reduce the need for or misuse of antibiotics will lead to improvement in the overall health status of animals, which in turn will increase productivity and protect the trade of animals and animal products.

Significant progress has been made in a number of the farming sectors to date but a collaborative and sustained effort is necessary to help keep our antibiotics working.

Farmers in conjunction with their veterinarians have a vital role to play in tackling AMR in their animals and there are a number of measures that they can take in order to help achieve this.

These include:

- Good management of housing, hygiene, nutrition and biosecurity to ensure the health and welfare of livestock.

- Speak to your veterinarian about the development of a herd health plan, including vaccination and implementation of disease prevention and control methods to minimise the use of antibiotics.

- Not expecting antibiotics to be prescribed for every type of infection, as not all conditions need to be treated with antibiotics.

- When antibiotics are necessary, use them according to your veterinarian's instructions regarding the correct dose and withdrawal periods, thereby reducing the risk of AMR development and its consequent serious risks to the health of humans and animals.

- Keep accurate records in order to determine whether a withdrawal period has expired.

Further information on Antimicrobial Resistance can be found on the DAERA website at: www.daera-ni.gov.uk/articles/antimicrobial-resistance-amr

Training in Responsible Use of Antimicrobials for red meat and dairy producers will be available from autumn 2019. Register for training at www.cafre.ac.uk/farm-family-key-skills/animal-health/. These workshops will create an awareness of what AMR is, how it is caused and the practical steps producers can take to minimise the risk of developing AMR. The workshops will be delivered as part of the Farm Family Key Skills (FFKS) programme.

Responsible pesticide use means getting the basics right ALL the time

Leanne Harris, Environmental Farming Branch, DAERA.

If we all use pesticides responsibly we can help to ensure that products remain available without further national or local restrictions. Farmers need to carefully plan their use of pesticides so as to minimise the risk of pollution to water.

Image Courtesy of AFBI.

In Northern Ireland there is a particular problem with MCPA getting into our water. MCPA is designed to kill weeds without harming crops. It does not bind to soil particles so it is prone to leaching directly into watercourses or via land drains. One single drop can pollute river water for up to 30km. It is very expensive for NI Water to treat water to remove MCPA and if not treated it can take 3-4 weeks to break down. Therefore, anyone using MCPA needs to act responsibly and ensure it does not pollute waterways.

DAERA is part of the Water Catchment Partnership (WCP), along with NI Water, Ulster Farmers Union, DAERA's College of Agriculture, Food and Rural Enterprise, the Northern Ireland Environment Agency and The Voluntary Initiative. The aim of the partnership is deliver one message incorporating the ethos from all organisations. We have been attending agricultural shows across the province promoting 'best practice when using pesticides'. This includes ensuring you get the basics right every time.

What are the Basics?

- Protect all watercourses with 6m grass buffer strips or 5m no spray/spread buffer zones.
- Ensure all pesticides applications (sprays and pellets) are applied by trained and qualified staff.
- Ensure sprayers are calibrated and regularly checked for leaks or drips.
- Ensure filling and container cleaning occurs well away from drains and watercourses.
- Do not apply pesticides to dry, cracked or saturated soils.
- Do not apply pesticides if heavy rain is expected within 48 hours of application.
- Apply pesticides with care. Do not overspray watercourses.
- Clean application equipment over a lined biobed or in the field away from watercourses and drains.
- Manage soils to avoid erosion and run-off.
- If in doubt, check it out. Consult a BASIS registered agronomist.

The Voluntary Initiative
Promoting responsible pesticide use

Failure to voluntarily reduce the levels of pesticides in water may result in restrictions on their use.

The following DAERA website links can offer more advice and information:

www.daera-ni.gov.uk/topics/plant-and-tree-health/pesticides-use-and-regulations
www.voluntaryinitiative.org.uk/media/1013/h2ok-advice-sheets-may-2016-v11.pdf
www.basis-reg.co.uk/Schemes/FACTS/FACTS-Qualified-Adviser

Chemical Phosphate Fertiliser Limits for Grass Production

Aveen McMullan, Sustainable Land Management Branch, CAFRE

Chemical Phosphate Applications for Grassland.

Only 37% of waterbodies in Northern Ireland are at "Good" status or better under the Water Framework Directive classification. A major cause of poor water quality in our rivers and lakes is excess phosphorus (P) from agricultural sources. Although use of phosphate fertilisers has declined since 2000, in the last 5 years it has increased again and there is now evidence that water quality is deteriorating. Therefore continued overuse of phosphate (P_2O_5) fertilisers is likely to lead to further deterioration in water quality.

Chemical fertilisers and manures need to be applied to grow swards for cutting or grazing. Unfortunately, very few grassland farmers test their soils and therefore most do not know the nutrient status of their soils.

A recent AFBI soil survey of more than 500 grassland farms across Northern Ireland indicated that more than 40% of fields, across all classes of farmland, are over-supplied with a phosphorus (P) index of 3 or above. In some situations this has occurred because expensive NPK compound fertilisers have been applied routinely to cut or grazed swards, even though more than enough P has been present in soil and/or slurry to meet crop requirements. Provided the P in slurry is being recycled back to cutting land, there ought to be more than enough in both soil and manure to meet crop requirements without the need for additional chemical phosphate fertiliser.
To protect the farming industry and the environment, farmers must manage nutrient inputs wisely and responsibly and only use phosphate fertilisers when there is a crop requirement for P that cannot be met by using organic manures alone.

Chemical phosphate fertiliser regulations are now in the Nutrients Action Programme Regulations and will be a Cross-Compliance requirement from 1st January 2020. All farms applying chemical phosphate fertiliser require a prior soil analysis to demonstrate crop need. They will also be required to maintain a fertilisation plan for their farm.

Don't apply phosphate (P_2O_5) fertiliser where you don't need it!

New Maximum Phosphate Application Rates for Extensively Managed Grassland.

Grassland (i.e. grazing, silage, hay and reseeds) that is extensively managed has lower nitrogen and phosphate requirements. Extensively managed grassland is defined as grassland that receives less than 60 kg N/ha/year as chemical N or where the farm has a manure N Loading of less than 120 kg N/ha/year.

Lower nutrient inputs for extensively managed grassland.

It has a lower soil P target level than grassland managed 'intensively' which has higher N inputs, and high levels of grass production and P removal.

On farm research by AFBI has provided evidence that production on extensively managed grassland is under 6 t DM/ha/year and is limited by N deficiency rather than inadequate P availability. Accordingly, there is no justification for applying rates of P needed to produce 9-12 t DM/ha/year and maintain soil P at Index 2+. Such levels of production cannot be achieved with the N inputs typical of extensively managed grassland systems. Furthermore, there is clear evidence that overuse of P fertiliser on many extensive cattle and sheep farms, even within Less Favoured Areas is raising soil P to unacceptably high levels (Index 3 - 5) and exacerbating water quality problems. Therefore, for grassland managed extensively and receiving less than 60 kg N/ha/year as chemical N or with manure N loadings less than 120 kg N/ha/year (supporting grazing and one cut of silage or hay per season), the new target soil P Index is 2- (16-20 mg P/l) and the following phosphate fertiliser application limits apply.

Table 1. Maximum phosphate fertiliser application limits (kg P_2O_5 per ha) for extensively managed grassland (receiving less than 60 kg chemical N/ha/year (less than 48 units chemical N/ac/year) or the N Loading is under 120 kg manure N/ha/year).

	Soil P Index					
	0	1	2-	2+	3	4
Grass establishment	80	65	50	30	0	0
Grazed grass (whole season)	50	35	20	0	0	0
First cut silage	70	55	40	0	0	0
Hay	55	43	30	0	0	0

In situations where grassland is managed extensively, i.e. with on average less than 60 kg chemical N/ha/year applied to the entire grassland area, but where more than 80 kg chemical fertiliser N/ha/year is applied to certain fields for first cut silage or hay, higher rates of phosphate fertiliser are permissible on these fields, as shown in Table 1a below.

Table 1a: If extensively managed grassland; silage or hay crops receive over 80 kg chemical fertiliser N/ha/year, the following maximum phosphate fertiliser application limits apply.

Soil phosphorus index	0	1	2-	2+	3	4
First cut silage	100	70	55	40	0	0
Hay	80	55	43	30	0	0

Typically a suckler and sheep farm with an N Loading of 100 kg N/ha/year and where 50 ha of grassland is managed extensively i.e. receiving an average of less than 60 kg N/ha (chemical N) across the entire extensively managed grassland area in the calendar year (equivalent to 48 units chemical N/ac/year or 1.8 bags/ac of 27%N fertiliser) the new phosphate fertiliser application limits in Table 1 should be used to avoid over application of nutrients and excessive cost.

However, if more than 80kg chemical N/ha is applied to a portion of this grassland for silage

or hay (equivalent to 64 units chemical N/ac/year or 2.4 bags/ac of 27%N fertiliser) the new phosphate fertiliser application limits in Table 1a should be used for those fields.

Example:
A farm with 50 ha of extensively managed grassland is receiving an average of 59 kg chemical N/ha/year and has an N loading of 100 kg N/ha/year. The grassland on this farm is extensively managed and meets both criteria:

Less than 60 Kg of chemical N is applied per ha per year and;
it also has an N loading under 120 Kg N per ha per year.

30 ha of grazing receives 45kg chemical N/ha/year (equivalent to 1.3 bags/ac 27%N fertiliser) and fields within the grazing area with a P index of 2- should receive a maximum of 20kg P_2O_5/ha/year (Table 1).

The remaining 20 ha is made up of 15 ha of silage and 5 ha of hay and receives a minimum of 80kgN/ha (equivalent to 2.4 bags/ac 27%N fertiliser). Silage fields with a P index of 2- should receive a maximum of 55 kg P_2O_5/ha for first cut (Table 1a).

Applying excessive amounts of expensive compound fertilisers containing phosphate is a waste of money and damages water quality.

Act responsibly, protect the environment and save money

The Environmental Farming Scheme – what's in it for you?

Rosemary Quinn, Countryside Management Delivery Branch, DAERA.

The Environmental Farming Scheme (EFS) Wider level tranche 3 application window closes on the 20th September 2019, with the next agreements starting on 1 January 2020. The scheme has become increasingly popular with farmers and has already achieved its targets for the uptake of some options, but there are many options remaining.

Unlike previous agri-environment schemes the EFS is designed so that much of the works are completed and claimed in the first year. To date, the scheme has already seen the 'Tree Enhanced Boundaries' option has met its target uptake, therefore it will not be offered in tranche 3. However, there are still many other options in the scheme to plant trees. For example, in the 'Planting Native Tree Corridors' option at least three rows of native trees are planted either downwind of an agricultural building or as a shelter belt, in return for a payment of £2,146.90 per hectare (ha) in the first year and £465 per year thereafter.

You could also create either a 2 metre or 10 metre wide 'Riparian Buffer' planted with trees, or leave it ungrazed. These Riparian buffers which involve erecting a protective fence, gate(s) and gate posts, are primarily aimed at improving water quality by reducing the potential for pollution from fertilisers and pesticides. Additionally, when planted with trees they increase the biodiversity value of your farm and reduce your carbon footprint. The Riparian Buffer options attract a first year payment of between £6.07 and £8.13 per metre.

There are also a range of other EFS options to help support biodiversity on farm such as 'Creation of Traditional Orchard' or the 'Establishment of Native Woodland less than 5 ha' the latter involves planting 1600 trees and shrubs per hectare. Another option, the 'Natural Regeneration of Native Woodland' allows the natural colonisation of extensively managed land by trees and shrubs. Alternatively, if you prefer to plant a traditional hedge rather than trees then the 'Planting new hedgerows including two protective fences' option, with a year one payment of £15.83 per metre, would be the best option for you.

EFS Option 'Planting new hedgerows including two protective fences.

There are also a range of options for arable land which to date have been undersubscribed. Please contact DAERA for more information specific to your local area if you farm arable land. The online application will show each of your eligible fields and the options available. You simply choose which options are suitable to your farm business. You will need to have control of the land for the five year period of the scheme.

Prepare Now!

Read up on the range of options available on the DAERA website or contact your local office for more information. Also, please note, the application can only be made on-line and there are a few steps to take now to prepare so you are ready when the application window opens.

You will need access to **DAERA Online Services** and you must also have a current email address that you can access. If you already have a Government Gateway ID and password that you use for APHIS or the Single Application and Maps Service, then you can use the same log in details to access the EFS online application. Find out more about accessing **DAERA Online services** or call **028 9442 6699**.

If you do not already have access, you will have to apply to register for the new Northern Ireland Identity Assurance (NIDA) via nidirect www.nidirect.gov.uk/. Do not wait until the application window opens as the registration process involves providing photographic identification documents at your local DAERA Direct Office.

Find out more about accessing **DAERA Online services** or call **028 9442 6699**.

Common Issues in Cross-Compliance - 2018 Scheme Year

Denise Phillips, Area Based Schemes Operational Policy Branch, DAERA.

Cross-Compliance rules apply across all areas of your holding and to all agricultural activities for the whole of the calendar year. As a claimant for any EU Area-based Scheme payment, you are responsible for ensuring that Cross-Compliance rules are met.

Cross-Compliance breaches can attract penalties from 1% to 100% of all your Area-based Schemes Payments (including BPS and EFS). The level of penalty to be applied depends on the extent, severity, reoccurrence and permanence of the non-compliance.

During the 2018 scheme year, a significant number of businesses inspected had their support payments reduced because they did not meet the Cross-Compliance requirements.

Animal welfare remains an area of concern.

Other areas of concern include:

1. Protection of water against nitrates pollution

There has been an increase in the number of non-compliances found at inspection in relation to this Statutory Management Requirement.

2. Food and Feed Law

Whilst there has been a decrease in the number of non-compliances being reported, especially in relation to testing frequency required for Tuberculosis/ Brucellosis, instances of non-compliance remain an issue.

3. Animal Identification and registration

There are separate standards for cattle, pigs and sheep and goats under the Cross-Compliance statutory minimum requirements in relation to, for example, births, deaths and record keeping. The numbers of breaches being reported against these standards remain high with an increase from the instances reported in 2017.

You must not plough, cultivate or intensify (including the extraction of peat, sand or gravel) semi-natural habitats unless you comply with the DAERA Environmental Impact Assessment (Agriculture) Regulations (Northern Ireland) 2007.

4. Retention of Landscape Features

The aims of this requirement are to retain landscape features, ensure a minimum level of maintenance for their protection and prevent encroachment by invasive species. Whilst there has been a reduction in number of breaches being reported when compared against 2017, the number of instances of non-compliance in this area remains high.

Hedge, tree or scrub cutting (including trimming and laying) is not permitted between 1 March and 31 August, except when a derogation has been granted by DAERA.

2019 Cross-Compliance verifiable standards can be found at www.daera-ni.gov.uk/articles/cross-compliance. You can get a copy of this document in other formats such as:

- *Large Print*
- *Braille*
- *Audio CD*
- *Computer Disk*
- *Other languages*

To get a copy of this document in another format contact:
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