Department of Agriculture, Environment and Rural Affairs
www.daera-ni.gov.uk

FAS news

Farm Advisory System newsletter

Winter 2018 Issue 12

Foreword

Eric Long,
Head of Development Service, CAFRE.

I am pleased to introduce the 12th edition of the "Farm Advisory System" (FAS) newsletter. This issue focuses on key advisory messages to help you realise the benefits of area-based schemes and EU support while minimising the risk of penalties.

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 improving agriculture's efficiency and impact on our environment.

- Complying with NAP farm inspections.
- Improving nutrient efficiency through soil testing and management.
- Promoting the Farm Family Key Skills training.
- Understanding and reducing Ammonia emissions from NI agriculture.
- Pesticide use and certification.

A list of training courses on offer from CAFRE is provided at www.cafre.ac.uk/industry-support/industry-training.

Forthcoming Events

CAFRE UAS UFU Annual Arable Conference

Tuesday 15th January 2019 09.30 at Greenmount Campus

The theme of this years conference is:
What's around the corner?

Guy Smith NFU Deputy President will open the conference and speakers from UK and Ireland will address Natural Capital and future support models, the future of fungicides, robotics for arable and the profitable integration of environmental measures.

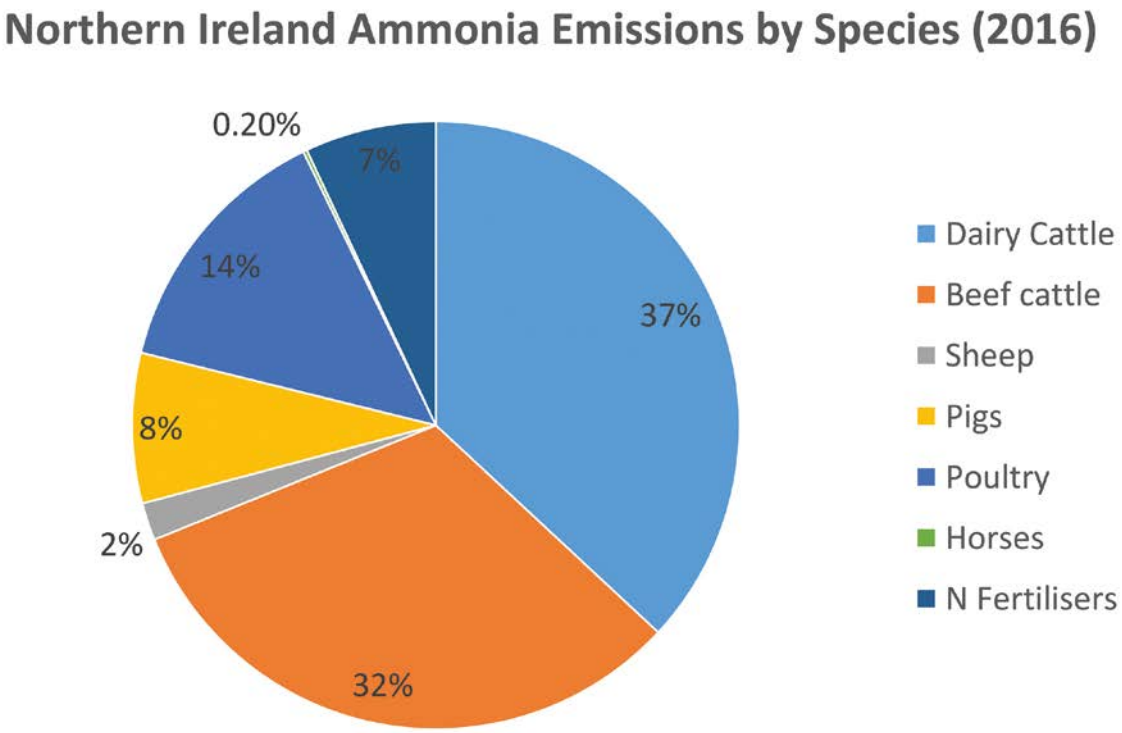
Booking is via the UFU web-site.
For more information;
e-mail kt.admin@daera-ni.gov.uk
or call 028 9442 6790

Ammonia: How reducing emissions can benefit a farm business

Paddy Savage, Ammonia Project Co-ordinator, DAERA.

Sustainability is an often used “buzz word” but is there sufficient understanding of what sustainable farming actually means?

There are three pillars to sustainability; economic, social and environmental. Each of these elements are equally important and to be truly sustainable, our farming systems must be able to deliver on all three.



Source; Rothamstead Research

The Challenge of Ammonia

Ammonia emissions are a key environmental challenge for farming. Although significant reductions were achieved from a peak in the late 1990s, since 2010 ammonia emissions have been steadily increasing. In 2016 they were 13% higher than in 2010. Ammonia emissions lead to the deposition of nitrogen on land, both close to the source and also further away as carried in rainfall. The vast majority of environmentally designated sites and priority habitats in Northern Ireland are receiving nitrogen deposition above the thresholds at which damage to vegetation is caused. If Northern Ireland agriculture is to be considered sustainable, significant reductions in ammonia emissions are required.

A key question to consider is how actions taken to reduce ammonia and thus support the environmental element of sustainability will impact on the economic and social elements.

Fortunately there are measures available which can provide multiple benefits; improving the environment and supporting farm profitability.

Low Emissions Slurry Spreading (LESS)

A key ammonia reduction technique is to spread slurry using low emission technologies. These methods are extremely effective with the trailing hose slurry application system reducing emissions from spreading by around 30%. The trailing shoe system provides around double the benefit, achieving an approximate 60% ammonia reduction. Shallow and deep injection techniques reduce emissions by 70-90% but these are less suitable for most of Northern Ireland's soil types and landscapes. Indeed, recent analysis has suggested that a move to low emission spreading techniques across the farming industry would achieve a 10% reduction in total ammonia emissions in Northern Ireland. Importantly, there are also benefits for the farm business. AFBI research has demonstrated that low emission slurry application increases grass growth by 18% and 26% for trailing hose and trailing shoe respectively. Inorganic nitrogen fertiliser application rates for grass silage crops can be reduced by up to 38 kg per hectare when typical rates of slurry are applied by trailing shoe. Providing extra forage or saving money on fertiliser – good news on any farm! This improved manure efficiency and reduced need for chemical fertiliser also helps to improve water quality by reducing the risk of nutrient loss.

Longer Grazing Season

Ammonia is emitted when urine and dung mix and this will clearly take place in greater volumes when livestock are housed. In other words, the longer livestock are kept outdoors, the less ammonia will be emitted. There will also be economic benefits to increasing the length of the grazing season as grass is the cheapest feed for ruminant livestock. AFBI analysis as outlined in the Expert Working Group's Sustainable Agricultural Land Management Strategy has shown that utilising 1 extra tonne of better quality grass dry matter per hectare can increase profit on cattle farms by between £137 and £334 per hectare per year. Grazing for longer can be a challenge and is significantly influenced by weather. However, actions farmers can take to help extend grazing include improving soil structure, using a rotational grazing system, incorporating legumes in swards and establishing widely spaced trees in grazing fields which all help to improve soil's resilience against poaching.

Conclusion

These are two examples of how measures taken to reduce ammonia can also benefit the farmer financially and therefore contribute to more sustainable farm businesses. As the Department works with stakeholders to develop an Action Plan on Ammonia, the need to address all elements of sustainability will continue to be taken into account.

The impact of Nitrogen deposition on Sphagnum moss on a designated site. (Courtesy of Aine O'Reilly NIEA)

Soil Sampling- the time is now!

Hannah McNelis, Sustainable Land Management Branch, CAFRE.

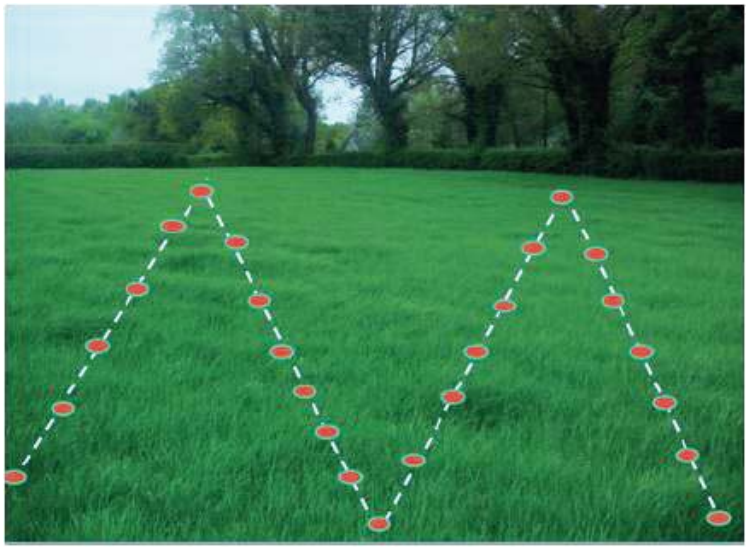
Why?

Soil sampling is the place to start when managing nutrients and soil fertility. Only 18% of soils analysed in Northern Ireland are at optimum fertility for pH, Phosphorus (P) and Potassium (K). Soil analysis determines the fertility of your soils, allowing you to plan manure and fertiliser applications to maximise yield, minimise wastage and nutrient loss and make full use of slurry and manure. Applying lime can give you a return of up to 5-7 times the cost of this vital input.

When?

The period from October to February is the optimum time for taking samples as soils should not be tested within three months of the last application of lime, slurry or chemical fertiliser in order to achieve accurate results.

It is good practice to sample a quarter of the farm routinely every years. Under the Nitrates Action Programme 2015-2018 and Phosphorus Regulations you are only allowed to apply Phosphate (P) fertiliser or P rich manures (layer litter, pig farmyard manure) if you can demonstrate there is a crop requirement.



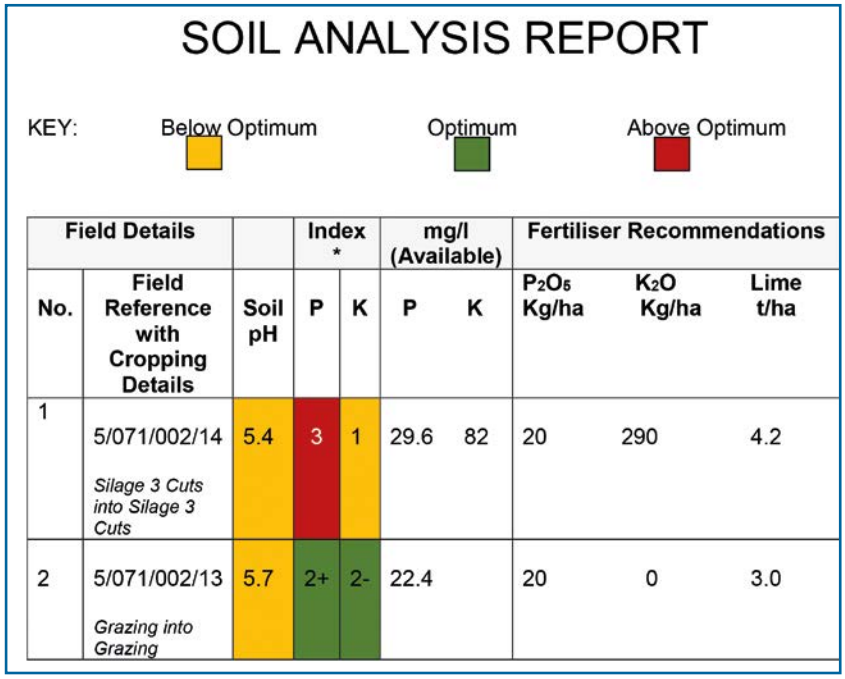
How?

Soil augers and sample bags are available from your local DAERA Direct office.

- For areas similar in use and soil type, up to 4ha in size take 20-25 cores across the field. Avoid troughs, gates,headlands, manure patches and where stock shelter.
- Mix the cores well in a bucket and place a representative sample of approximately 500g in a bag and label properly with name, farm survey number and field number.
- Return the auger and samples to the office with the payment (£9 including vat/ standard analysis).

Samples will be sent to the laboratory for analysis and the results will be received within one week.

Using your soil analysis report



SOIL ANALYSIS REPORT

KEY: Below Optimum Optimum Above Optimum

Field Details			Index *		mg/l (Available)		Fertiliser Recommendations		
No.	Field Reference with Cropping Details	Soil pH	P	K	P	K	P_2O_5 Kg/ha	K_2O Kg/ha	Lime t/ha
1	5/071/002/14 *Silage 3 Cuts into Silage 3 Cuts*	5.4	3	1	29.6	82	20	290	4.2
2	5/071/002/13 *Grazing into Grazing*	5.7	2+	2-	22.4		20	0	3.0

Using the colour code, you can quickly determine if your soil is below optimum, optimum or above optimum for pH, Phosphorus (P) and Potassium (K).

1. **Check the pH and if lime is needed.**
   pH is the basis from which all soil fertility is built. It is a measure of soil acidity and has a major impact on plant growth. pH is a logarithmic scale so a pH of 5 is 10 times more acidic than a pH of 6. Always aim for the optimum pH.

Optimum pH	Mineral Soils	Peaty Soils
Grassland	6.0	5.3
Arable	6.5	5.8

A low pH will result in much lower availability of nutrients in the soil and a poorer response to applied nutrients and so will result in a significant reduction in yield.

Lime neutralises the acidity in the soil and improves the availability of nutrients to the crop.

If pH is low, the report will specify a recommendation for lime (t/ha) to bring the soil up to the optimum pH and is based on one application of ground limestone in the first of the four years that the analysis is valid for.

The maximum lime application in a calendar year is 7.5t/ha or 3t/acre. If requirements exceed this, applications should be split over 2 years.

Ground limestone is generally the most cost effective source of lime and is beneficial to the soil as it works over a 4 year period to increase and maintain the pH. Granular lime is an option where field conditions do not allow for the spreading of ground limestone, however it is less cost effective and must be applied every year at a lower rate to maintain pH.

When purchasing lime, regardless of type, it is important to consider the Neutralising Value (NV) of the product. The recommendation is based on an NV of 57%.

2. Check the Phosphorus (P) and Potassium (K) Index

P is vital for root development and is also important for the production and use of energy by plants to grow and develop. K, often referred to as 'potash' is an important nutrient for crops and grass, especially silage. It is critical to the uptake of nitrogen and also helps the plant maintain its water balance.

The report gives the amount of P & K in milligrams per litre of soil (mg/l) 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 chemical fertilisers.

Always aim for the optimum Index. The optimum Index for K is 2-. Whilst in general the optimum index for P is 2, **for extensive grazing a P index of 1 is adequate**.

Index 0-1	Below optimum*	Insufficient P & K available in the soil to grow the crop. Apply recommended rates for growth and to build up fertility
Index 2-, 2+	Optimum for intensive grazing, silage & arable crops	Sufficient P & K is available in the soil to grow the crop. Apply recommended rates to maintain fertility
Index 3	Above optimum (high)	High levels of P & K. Only slurry is required to maintain fertility. Consider redistributing slurry to lower index fields. Use a zero P fertiliser. Arable: Apply recommended rates P_2O_5 & K_2O

*For extensive grazing, a P Index of 1 is adequate.

3. Plan Phosphate (P_2O_5) & Potash (K_20) applications based on the recommendations

The report will specify a recommendation for kg P_2O_5/ha and kg K_2O/ha if 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 to determine crop requirement, the value of manures and complete the application rate calculations for you. Agri-environment scheme participants should check their agreements for possible restrictions.

Take Action now!

Now is the time to get out and take soil samples and make use of your soil analysis report. Remember this will help you grow productive crops, save money on chemical fertiliser, improve and maintain soil fertility and help improve water quality.

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

Farm Family Key Skills providing lifesaving skills for Farm Families

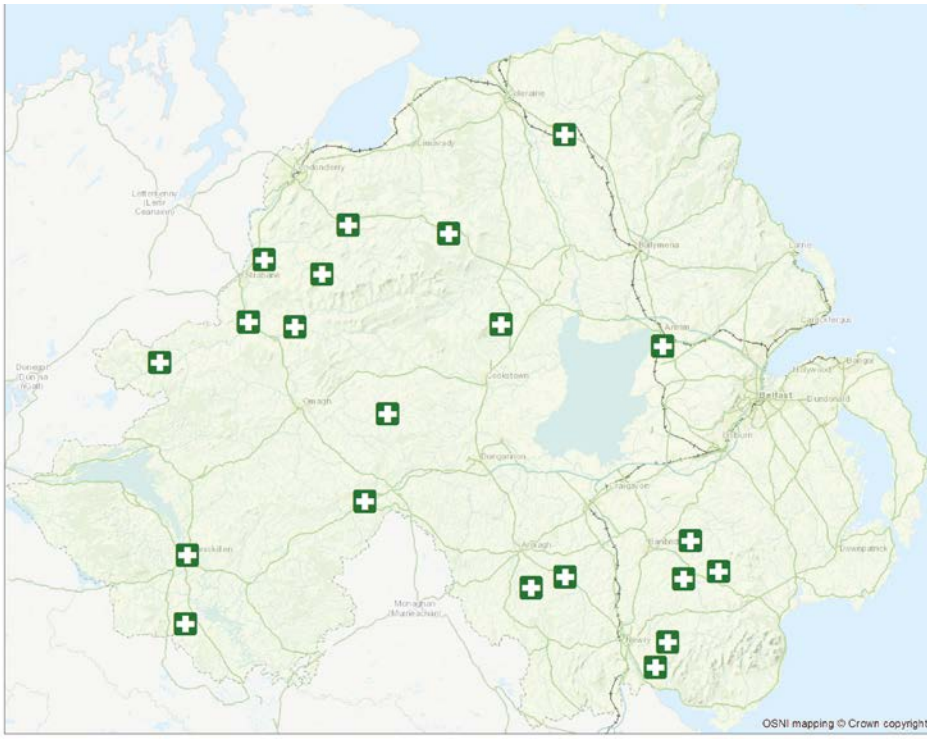
Siobhán Sheppard, Agri Business Development Branch, CAFRE.

Since March 2018 over 500 farm family members and farm employees throughout Northern Ireland have attended First Aid Awareness training. This training course could help save a life as up to 100 accidents occur each month on Northern Ireland farms which need medical attention. The First Aid Awareness is free and covers lifesaving skills which can help all family members and employees deal with an accident on farm. The course covers:

- Dealing with a medical emergency on farm;
- Basic First Aid procedures for common farm based injuries;
- How to use the contents of a First Aid kit; and
- Technologies to aid lone farm workers in an emergency.

During 2019 we aim to train another 1000 farm family members and employees throughout Northern Ireland in First Aid …but we need your help.

Has a First Aid Workshop been in your area?



The map above shows the location of the First Aid workshops that have already taken place.

Have we been to your area?

Why not organise a workshop in your area or alternatively attend one of the courses already set up. There is no cost to hosting the training in your area or to attend a pre-arranged course. Every trainee will receive a free First Aid Kit. A maximum of 20 people can attend. The workshops are very popular – so remember to book your place and don't miss out.

Where & When are the next First Aid Workshops?

Workshops are advertised on CAFRE's webpage www.cafre.ac.uk/industry-support/farm-family-key-skills/. You could also email (*see below for email address*) to us an expression of interest in attending or hosting a workshop in your area.

This training is provided as part of the Farm Family Key Skills [FFKS] scheme under the Farm Business Improvement Scheme (FBIS) part of the Rural Development Programme 2014 – 2020 which receives co-financing from the European Agricultural Fund for Rural Development (EAFRD). Since 2016 over 3500 farm family members and employees have attended FFKS training across Northern Ireland on Farm Health & Safety, First Aid, Farm Business Taxation and Succession Planning, Pig Health, Biosecurity and Interpretation of Soil Analysis.

For more information on any FFKS Training above or to arrange a course in your area contact:
CAFRE kt.admin@daera-ni.gov.uk on 028 9442 6790

Do you use pesticides? – Reminder of your legal requirement for training

Leanne Harris, Environmental Farming Branch, DAERA.

Certificate of Competence

Now is a good time to refresh your knowledge and check to ensure you have the required certificate for spraying next year. Under the Plant Protection Products (Sustainable Use) Regulations 2012 any person who uses professional pesticides has a legal requirement to undertake an assessment and obtain an approved certificate of competence. If you are not applying the pesticides yourself, you are responsible for ensuring the person applying them on your land has the necessary certificate of competence.

A full list of the specified certificates which meet the legal requirements under the Sustainable Use Directive is available on the DAERA website at:
www.daera-ni.gov.uk/topics/plant-and-tree-health/pesticides-use-and-regulations

These certificates can only be issued by City and Guilds or Lantra.

Pesticide training, assessment and certification for various pesticide applications methods are available from a range of providers. CAFRE provides training, assessment and certification by City & Guilds at both Greenmount and Loughry Campuses.

Training, assessment and certification can be arranged at CAFRE by enrolling online at:
www.cafre.ac.uk/?s=pesticides

If you have any queries about booking a place on a course, you can contact Industry Training Administration by emailing:
Industry.TrainingAdmin@daera-ni.gov.uk or calling 028 9442 6880.

Sprayer Equipment Certification

In addition, all pesticide sprayer application equipment, excluding handheld and knapsack equipment, must have a certificate showing that it has passed independent inspection before being used. For more information please see:
www.nsts.org.uk/ or www.pcs.agriculture.gov.ie/sud/

The regulations have been put in place to protect health and the environment. All these steps work together to ensure safe and efficient use of pesticide products, which in the long run should save you money. They also help protect your health and safety.

Information on pesticide regulations can be found on the DAERA website at:
www.daera-ni.gov.uk/daera-pesticide-legislation

Avoiding & Alleviating Soil Compaction

Bryan Irvine, Sustainable Land Management Branch, CAFRE.

The more pore space in soils that can be accessed by roots the more resources become available to allow potential yields to be achieved. Compaction reduces the size and quantity of pore space and has an adverse effect on drainage, soil life, root growth and ultimately crop yield. In the past cultivating land, incorporating manure and sowing out to a long term ley was the solution for compaction to allow soil structure to rebuild. However, the increased size of machinery, increased stocking rate and the requirement to travel on soils at their weakest time when they are wet in spring and autumn can often result in compaction in grassland. Trials results are indicating yield losses of 14 - 25% from compaction.

Avoiding damage to soil structure

Avoiding compaction completely is not possible but it can be reduced by being aware and using a range of strategies to reduce pressure on the soil when it is at its weakest.

- Where possible stay off weaker fields especially in the 48 hours after heavy rain. Dense swards do help to spread the weight over a greater area compared to open swards.

- Use alternatives to heavy machinery – lighter vehicles, use of umbilical slurry systems and/or ferrying slurry to a smaller dedicated spreading tanker.

- Check tyre pressures, targeting less than 0.8 bar in cultivated or moist conditions, and 1.0 – 1.5 bar in good conditions. Specify tyres that can operate at a lower pressure when purchasing the tractor or when replacing tyres.

- Axle loads should be less than 6 tonnes. A weight of 4 tonnes per tyre can cause pressure 1m below the surface. Using the weighbridge at Greenmount showed that a 115hp tractor and 1300 gallon tanker weighs 1.6 ton, 4.5, 7.5 tonnes on the front, rear and tanker axles respectively. A 140hp tractor and 2000 gallon tanker and trailing shoe application kit weighs 3.2, 6.8, and 11.8 tonnes again on the front, rear and tanker axles respectively.

Methods to improve soil structure

Cultivation methods

Several cultivation solutions exist to break up soil pans and compacted layers but research evidence points to a varying success rate due to the damage caused to grass swards and the very weak structure created, which is then even more prone to re-compaction. Digging soil pits to identify the extent and depth of the problem is essential. If sward-lifters or subsoilers are to be used it is critical to ensure the working depth is 2-4cm below the compacted layer, and the tines should be spaced at one and a half times the depth. To assist drainage the lines should be run across any existing collector drains. Dry ground conditions, ideally in August or September are key to achieving cracking and fissuring of clays and loams. On gley soils with a clay subsoil using a mole plough will both alleviate compaction and create drainage channels as long as existing collector drains are present every 30m. Where a reseed is due, ploughing can be used to disrupt any shallow compaction layer.

Due to sward and root damage delay using lifters and subsoilers to a dry autumn.

For further information please see the booklet "improving Soil and Sward Performance" via the search function on the DAERA website.

Any physical method of breaking soil up including the welcome shrinking and cracking effects on clay from this summer's drought creates soil blocks with straight edges which when wet are easily pushed together again. Allowing the soil biology of roots, microbes and earthworms time to use these pores, shape them and coat them with organic compounds will create stronger soil structure for the long term. Liming improves soil structure by assisting physical granulation and increasing soil life. In addition a healthy soil will not only allow greater use and achieve higher yields but will act as a more effective filter to protect our ground water resource.

2017 Nitrates Action Programme farm inspections highlight need for better farmyard management.

Siobhan Bowers, Environmental Farming Branch, DAERA.


Effluent tank not being managed

The measures in the Nitrates Action Programme (NAP) promote efficient farming by encouraging best practice in managing manures and chemical fertilisers. The NAP aims to improve water quality by protecting our rivers, lakes and groundwater from nutrient pollution coming from agriculture sources. The NAP is therefore the main agricultural measure for implementation of the Water Framework Directive which aims to achieve at least "good status" for all water bodies.

Results of 2017 on-farm Inspections

Each year a number of farm businesses are inspected by the Northern Ireland Environment Agency (NIEA) to assess compliance with the NAP legislation. The results from 2017 NAP farm inspections show an increase in the number of farms breached from 2016. The main cause of non-compliance has been exceeding the manure Nitrogen loading limit.

170kg/ha Nitrogen loading limit

A key measure of the NAP is the 170kg Nitrogen loading per hectare per year limit on the application of livestock manure. The purpose of this limit is to prevent the over application of manure to land which can lead to water pollution. The nitrogen loading of a farm is calculated from data on livestock numbers, land area and any manure imports/exports.

A significant number of more intensively stocked farms in NI are close to or above this limit. Unless a farm is operating under an approved derogation, exceeding the 170kg/ha Nitrogen loading per hectare per year limit is a breach of the NAP and Cross Compliance. Inspections will have an increasing focus on this issue, so make sure your farm is compliant.

You can calculate your farm nitrogen loading using the CAFRE online calculator at:
www.daera-ni.gov.uk/onlineservices

Alternatively, you can use the NAP Workbook, which contains figures and tables to guide you through the calculation.

However, the 2017 inspection figures also showed that defective slurry storage and effluent facilities remained a common non-compliance. This was closely followed by pollution to waterways caused mainly by poor farmyard management of slurry and silage effluent. Issues arising from manure and fertiliser spreading were the next most frequent causes of breaches. Therefore, it is worth focussing attention on these issues to ensure your farm is not causing pollution and you are not at risk of a cross compliance breach and financial penalty.

Improving farmyard management

In many cases these are areas where much improvement can be achieved by a simple change in practice or by carrying out timely repairs. Regularly check the storm water outfalls leaving your yard, drains and other watercourses on the farm. Ensure that they remain totally free from pollution. Also, it is important to continue doing these checks during the winter months as a contaminated drain or waterway may go unnoticed when there is no other reason to be in the fields.

Make sure you check slurry and effluent transfer and storage facilities for leaks and defects regularly and especially in the run up to and during the closed spreading period. However, when doing this, never ever enter a slurry tank as there is always the risk of gas. Only people who have the proper training and equipment should enter a tank. In an emergency, contact the Northern Ireland Fire and Rescue Service who have the right training and equipment to deal with the situation.

Phosphorus Regulations

The Phosphorus Regulations require you to have a soil analysis demonstrating a crop requirement for phosphorus before you can apply any chemical fertiliser containing phosphorus.

Many soils in Northern Ireland are now above Phosphorus Index 2, which is sufficient to maintain optimal production from grassland. For example, recent soil analysis from intensive grassland farms showed that approximately 60% of silage fields were above Index 2. Provided phosphate in slurry is being recycled back to silage fields, there should be more than enough in both soil and manure to meet crop requirements without the need for additional phosphate fertiliser.

On many farms, expensive NPK compound fertilisers are being applied routinely to grassland regardless of whether or not phosphate is needed.

Phosphorus levels in rivers are showing an increase over the past 3 years and over use of phosphate containing fertilisers is one of the main causes. Therefore, act responsibly, and only use phosphate containing fertiliser when there is a definite crop requirement evidenced by a soil analysis, that cannot be met using organic manure.

Ensure you comply with the Phosphorus Regulations and are not causing water pollution.

NAP and Cross-Compliance

All farmers claiming under area-based schemes, including the Basic Payment Scheme, must meet the NI Cross-Compliance conditions. NAP forms part of these requirements, therefore where farmers do not comply with NAP, their area-based payments may be reduced.
The NAP 2015 – 2018 guidance book workbook and the summary document is available on the DAERA website www.daera-ni.gov.uk/publications/2015-2018-nitrates-action-programme-and-phosphorus-regulations-and-associated-documents.

Remember farmers exporting organic manure from their farm must submit their records to NIEA annually by the 31 January for the previous calendar year. You can submit **your export** record using the on-line facility at www.daera-ni.gov.uk/onlineservices. Farms operating under a derogation have until 1 March to submit their manure records to NIEA.

Carbon Sequestration Research – Can you help?

AFBI have been investigating carbon sequestration in grassland and hedgerows, and the effects on carbon, nitrogen and phosphorous cycling within fertilised and manured grassland. Further study is required, as recent evidence is indicating that grassland soils recover quite quickly after cultivation and continue to be carbon sinks. The impact of liming which promotes the soil micro-biome may also allow the pasture to continue to sequester carbon beyond time frames previously thought.

One of the strands of further research is to sample grassland where there is an oral history available of how it has been farmed in the last 50 years. Because this study is one strand of many, detailed written records whilst helpful are not required. If you or between yourself and another family member can remember the approximate timing of reseeding and liming, and an approximate slurry and fertiliser regime for a particular block of at least 8 hectares of land please contact me. Your participation would be greatly appreciated and would simply involve allowing AFBI staff to take some soil samples and ask you questions using a short questionnaire based on the management over the years.

For further details and to register your interest please contact Bryan Irvine at CAFRE on 028 9442 6825 or email bryan.irvine@daera-ni.gov.uk

Nitrates Derogation Reminder

In 2018 NIEA moved to the on-line submission of fertilisation accounts. If you have been operating under an approved Nitrates Derogation for the calendar year 2018, you will need to submit your Fertilisation Account, which will include exported organic manures, online at www.appsd.daera-ni.gov.uk/fertilisationaccount by midnight 1 March 2019.

Applications for 2019 Nitrates Derogation year, must be submitted online at www.daera-ni.gov.uk/derogationapplication by midnight 1 March 2019.

If throughout 2019 your farming practice changes and you no longer require a Nitrates Derogation, you will need to formally withdraw your application in writing and provide evidence of compliance with the 170kg N/Ha/year livestock manure nitrogen loading limit. This should be sent to NIEA, Water Management Unit, 17 Antrim Road, Lisburn BT28 3AL by 31st December 2018.

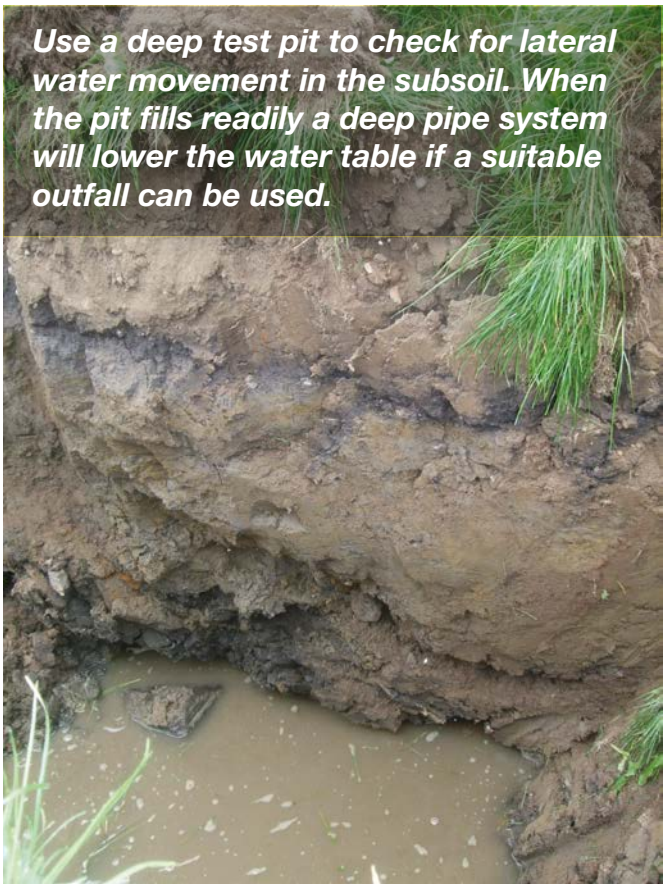
Maintaining drainage systems for a changing climate

Bryan Irvine, Sustainable Land Management Branch, CAFRE.

Sheughs provide major storage capacity but must be maintained and linked to effective outfalls to allow field drains to flow.

While local climate reports show a longer growing season with an average 0.5 degree Celsius increase in temperature, the real climate change challenge has been a 5% increase in rainfall and a higher probability of extreme events. Wet summers, droughts, intense storms and very cold periods have always been part of our weather, but higher CO_2 levels have doubled their probability so that we have encountered all the extremes in the last decade. In addition an increasingly wide oscillation between the north and south range for the jet stream will result in more extreme and often rapid weather events.

With the increased probability of more extreme weather and in particular wet summers, the priority for managing land is to lower the water table through effective drainage. This allows opportunity for deeper rooting which has plant survival and yield benefits in both wet and dry seasons, and allows for a larger storage tank in the soil to cope with spikes of excess rainfall.



Use a deep test pit to check for lateral water movement in the subsoil. When the pit fills readily a deep pipe system will lower the water table if a suitable outfall can be used.

Draining excess water away more rapidly assists in maintaining soil structure, and utilises soils role as an effective filter to protect groundwater from surface run-off of nutrients and fine particle sediment.

With 1mm of rain equating to 10,000 litres of water over a hectare and a rainfall event of 30mm in one day being common there is a vast quantity of water to both store and move. Good soil structure with 50% mineral and organic matter, 25% air space and 25% capillary water, can hold and move additional water, however if there is already a high water table the space available in the soil storage tank is reduced and is filled quickly and field conditions then rapidly worsen. With annual rainfall ranging from 1100 – 1600mm and evapo-transpiration from soil and plants using 500-600mm, there remains a huge 5 to 10 million litres per hectare to drain from land each year.

Tight soil structure can reduce water infiltration down from 0.5m/day to 0.02m/day for a clay loam.

The priority in drainage systems is always the main drains. Whilst many landowners still pursue piping those who have kept open drains have a potentially more effective system. In the 1970's many of the pipes installed were 6 inch diameter with a maximum volume of 0.015m^3 per metre. An open sheugh carrying 0.5m depth of water can carry over 15 times the volume. With open drains often 1.5 to 2m deep they have the potential to rapidly store and shift vast quantities of water which is particularly important where several fields or land blocks drain towards the one outfall.

Maintenance

Sediment or sludge will collect at the bottom of any drain, piped or open, as clay particles are less than 0.002mm in size and travel in the soil water. Open drains should be regularly cleaned out, outfalls cleared, and drains deepened where possible. Ensure that drain cleanings are spread over the whole field or in hollows away from the drain to avoid creating a dish beside the open drain. Keeping drains open allows easier opportunity for maintenance and for new secondary drains to be installed. Pipes installed for reasons of access, safety and collapse unfortunately become clogged with clay, rust deposits and roots and the outflow should be checked for flow rate to see if maintenance by jetting or rodding is required.

Sheughs are valuable habitats so clean in the winter removing vegetation from one side only.

Whilst getting the water down to the deeper drains through impervious layers and into the main drain is the next problem it should not be considered until the main drains are clear, and the water table has the potential to drop.

INVESTORS IN PEOPLE

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