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The
Code
of

Good Agricultural Practice

for the Prevention
of Pollution of
Water,
Air and Soil



Department of
**Agriculture and
Rural Development**

www.dardni.gov.uk

AN ROINN
**Talmhaíochta agus
Forbartha Tuaithe**

MÁNNYSTRIE O
**Fairms an
Kintra Fordèrin**

DMS 07.08.045/08.09.092



Department of
**Agriculture and
Rural Development**

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Foreword



Water. Freshwater is one of our most important natural resources. In addition to supplying over 50% of drinking water, the network of rivers and lakes throughout the countryside supports diverse commercial and leisure activities. Waterways and associated wetlands are an integral part of our landscape and make a significant contribution to biodiversity.

Farmland is criss-crossed by a network of water channels fed by small streams and sheughs. These together with our groundwater are vulnerable to pollution.

Air. Agricultural activities impact on air quality, and are one of the main sources of greenhouse gas emissions. Cattle production releases considerable quantities of methane, and ammonia is released during the storage and application of manures.

In addition to the impact on climate change, there is increasing concern about the odour nuisance from farming.

Soil. Soil covers most of the earth's land surface, varying in depth from just a few centimetres to several metres. In Northern Ireland we have a remarkable variety of soils. These are essential for food production and perform a multitude of key environmental, economic, social and cultural functions which are important for life.

This natural resource provides an essential link between the components that make up our environment.

The challenge is simple - the sustainable use of natural resources, through reducing any negative impact of agricultural activities on our water, air and soil.

This Code gives practical advice on management practices that can be implemented on farms.

A handwritten signature in black ink that reads "H. Gracey". The signature is written in a cursive style with a long horizontal flourish at the end.

Dr Harry Gracey O.B.E.
Head of Countryside Management Branch

Introduction

Who is this code for?

The code is for farmers, growers, contractors and others involved in agricultural activities.

What is this code about?

This code is about how you can help to avoid polluting water, air and soil. It sets out good management practices you can use on farms.

Why does this code matter to you?

When claiming Single Farm Payment (SFP) and other direct payments you must meet what are called Cross-Compliance conditions. These consist of Statutory Management Requirements (SMRs) and Good Agricultural and Environmental Conditions (GAECs). We set these out in annex 11, page 151.

Following this code will help you meet these conditions.

We must protect the quality of our water, air and soil. Our well-being and that of our countryside depends on them.

Contact

If you have any questions about this code please contact your local Countryside Management Branch staff. Details are in annex 17, page 161.

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Abbreviations

ASSI	Area of Special Scientific Interest
BOD	Biochemical Oxygen Demand
BS	British Standard
CAFRE	College of Agriculture, Food and Rural Enterprise
DARD	Department of Agriculture and Rural Development
DEFRA	Department for Environment, Food and Rural Affairs
DOE	Department of the Environment
EC	European Commission
EU	European Union
FYM	Farmyard Manure
GAEC	Cross-Compliance Good Agricultural and Environmental Condition
ha	Hectare
HSENI	Health and Safety Executive for Northern Ireland
kg	Kilogram
LFA	Less Favoured Area
LFACA	Less Favoured Area Compensatory Allowance
LMC	Livestock and Meat Commission
m	metre
mm	millimetre
N	Nitrogen
NI	Northern Ireland
NIEA	Northern Ireland Environment Agency
NVZ	Nitrate Vulnerable Zone
OFTEC	Oil Firing Technical Association for the Petroleum Industry
RB209	DEFRA Fertiliser Recommendations for Agricultural and Horticultural Crops (RB209) 2000
SAC	Special Area of Conservation
SMR	Cross-Compliance Statutory Management Requirement
SPA	Special Protection Area
SSAFO	The Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) Regulations (Northern Ireland) 2003



The
Code
of

Good
Agricultural
Practice
for the Prevention
of Pollution of
Water

Section 1

Introduction

1.1 What is a Waterway and what is Groundwater?

The Water (Northern Ireland) Order 1999 defines a waterway as any river, stream, watercourse, inland water (whether natural or artificial) or tidal waters and any channel or passage of any kind (whether natural or artificial) through which water flows. It also includes the channel or bed of a waterway, which for the time being is dry.

Groundwater is water in underground strata which means any water below the surface of the ground. Groundwater is often unseen but is encountered in springs, wells, boreholes and swallow holes. Groundwater also feeds water into waterways and this is particularly important during dry periods.

1.2 Pollution sources

Agricultural pollution can be described as either **point source** or **diffuse**.

1.2.1 Point source pollution

Point source pollution is pollution of a waterway from a single point of discharge such as a pipe, tank or building. Point source pollution can be caused, for example, by:

- slurry;
- manures;
- silage effluent;
- uncollected dirty water;
- fuel oil;
- pesticides; or
- sheep dip;

directly entering the waterway, causing damage to aquatic life or making groundwater unfit for use.



Photo 1: Point source pollution

1.2.2 Diffuse pollution

Where there is no distinct single point of discharge, and pollution enters the water by a number of pathways, this is known as diffuse pollution. In NI, agricultural activities can cause significant diffuse pollution problems. The main water quality problems which may be associated with diffuse pollution from agriculture arise from the loss of nutrients such as phosphorus and nitrogen, pesticides and other agrochemicals and faecal micro-organisms.



Photo 2: **Diffuse pollution**

1.3 Types of water pollution

There are five types of pollution:

1. organic pollution;
2. eutrophication;
3. pesticides;
4. faecal micro-organisms; and
5. oils.

More information about the types of water pollution can be found in annex 1, page 108.

1.4 Indicators of water pollution

Chemical and microbiological monitoring is carried out in waterways and groundwaters around NI every year. This monitoring provides information on the levels of organic pollution (Biochemical Oxygen Demand), nutrients, pesticides, faecal micro-organisms and oils. Chemical monitoring is only targeted at specific substances. It may also miss intermittent or periodic pollution events. However, monitoring the plants and animals that live in waterways can reveal the effects of pollution not detected by chemical monitoring.

Waterways can support a wide range of aquatic life including plants, fish and other less visible organisms (aquatic invertebrates). Rivers in NI contain over 1,500 species of aquatic invertebrates. Some of these such as mayflies and stoneflies are very sensitive to pollution and will only survive in sizeable numbers in the cleanest waters. Others, including water beetles and freshwater shrimps,

are slightly more pollution tolerant, but they too will suffer a reduction in numbers, or disappear, if water becomes polluted. Pollution also increases the opportunities for invasive species, such as Zebra mussels in Lough Erne and Lough Neagh, to increase uncontrollably.

Invertebrates are a useful indicator of water quality. A clean waterway should contain a diverse range of aquatic invertebrates with no single species becoming excessively abundant. The presence in a waterway of a small number of species, even when in abundance, indicates that the water may not be clean. It is possible for a very polluted water to support a large population of aquatic invertebrates such as midge larvae and worms. Mayfly, however, would be absent.

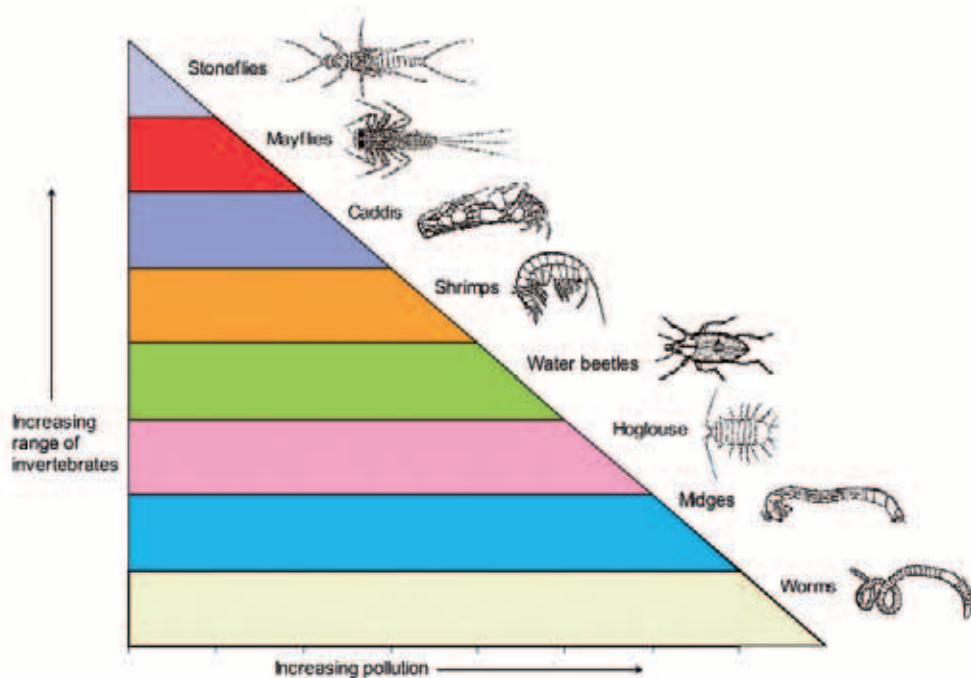


Figure 1: Relationship between water quality and invertebrate diversity

Likewise the plant life (including algae) in surface water can be a useful indicator of whether a water body is eutrophic (annex 1.2, page 108) or not. Some plant species will grow more abundantly in nutrient rich freshwater and some species will dominate others in these conditions resulting in a loss of biodiversity. Changes to bankside and aquatic vegetation can also impact water quality.

1.5

Sources of water pollution

Each year, agriculture is responsible for about 25-30% of all recorded water pollution incidents. Most agricultural pollution incidents are due to silage effluent, slurry and dirty yard water entering waterways.

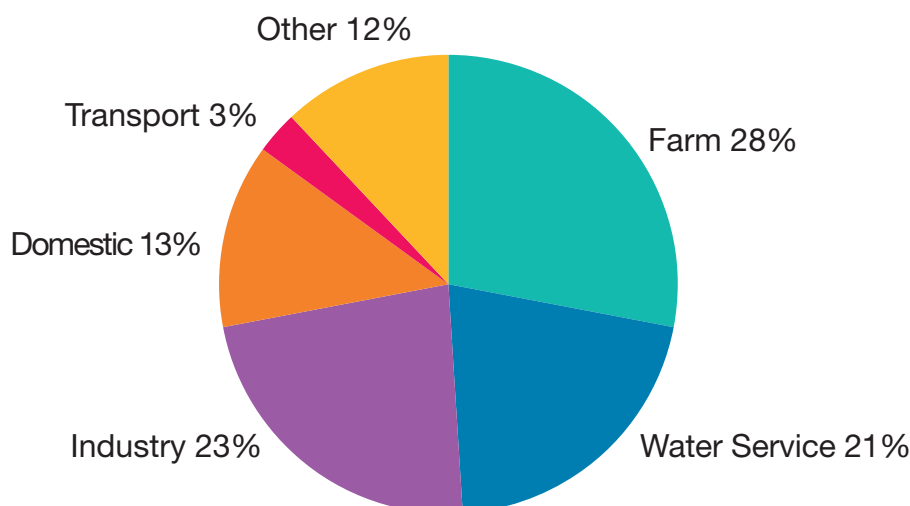


Figure 2: **Source of pollution incidents in NI (2000-2005 average)**

1.6

Statutory requirements

Developed by the European Commission, the Water Framework Directive (2000/60/EC) is an important part of water quality legislation that has set a target of 'good' status for all waters by 2015. Measures to be applied under this Directive encompass certain pieces of existing water quality legislation, including the EC Nitrates Directive (91/676/EEC). The action programme under the Nitrates Directive has a key role in delivering an improvement in water quality and this Directive requires Member states to produce and promote a Code of Practice.

The key statutory requirements aimed at preventing water pollution from agricultural enterprises are the:

- Nitrates Directive;
- Phosphorus Regulations;
- Water (Northern Ireland) Order 1999;
- Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) Regulations (Northern Ireland) 2003 (SSAFO); and
- Groundwater Regulations (Northern Ireland) 1998.

More information about these key requirements can be found in annex 2, page 114.

You can find a comprehensive summary of environmental legislation in annex 10, page 135.

Section 2

Collecting and storing silage effluent, slurry, manure and dirty water

Slurry, manure, silage effluent and dirty water are rich in plant nutrients, especially nitrogen, phosphorus and potash. To make the most of these organic fertilisers, you should spread them when grass and other crops can take up nutrients. It is therefore important to have sufficient storage capacity on the farm to enable planned spreading.

- Silage effluent, slurry, dirty water and seepage from manure are all highly polluting if they enter a waterway.
- Most agriculture related pollution incidents occur because of a failure to collect, store or dispose of silage effluent, slurry and dirty water properly.
- The Nitrates Action Programme (NAP) Regulations require a minimum storage capacity to prevent land spreading during the 'closed period' and during periods of adverse land and weather conditions. Compliance with this legislation is a requirement of Cross-Compliance, under SMR 5.

2.1 Silage effluent

2.1.1 What is silage effluent?

Silage effluent is defined in the SSAFO Regulations as effluent produced from any forage crop which is being made, or has been made, into silage or a mixture consisting wholly of or containing such effluent, rain or water coming from a silo, silage effluent collection system or drain.

It is one of the most potent sources of pollution on the farm and is 200 times more polluting than untreated sewage. On entering a waterway, it causes the oxygen to be rapidly removed from the water with devastating effects on animal and plant life.

2.1.2 Reducing silage effluent

The volume of effluent produced depends mainly on the moisture content of the grass being ensiled. Grass which is cut at 18% dry matter and immediately ensiled will produce about 150 litres of effluent per tonne. Grass wilted to 25% dry matter produces around 25 litres of effluent per tonne and at higher dry matter levels effluent flow may cease altogether. Wilting grass before ensiling can reduce effluent production. The success of wilting depends on the weather conditions at the time.



Photo 3: Wilting grass silage

Rates of flow

Effluent starts to flow within a few hours of grass being ensiled, peaks within two days and can continue for several months. Directly ensiled grass can produce a peak flow of about 30 litres per tonne per day. Many factors influence effluent flow, including the use of additives, depth of silage and efficiency of drainage within the silo.

Rain falling directly onto or near an open silo often becomes mixed with silage effluent, adding to the volume to be collected and disposed of. Make every effort to reduce the quantity of clean water mixing with effluent. While roofing the silo will largely overcome this problem, you can also significantly reduce the volume of effluent to be collected by maintaining spoutings and downpipes on nearby buildings.

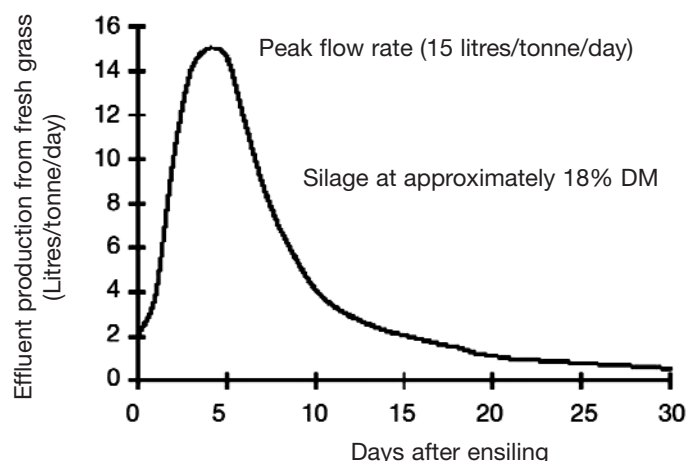


Figure 3: Flow rate of silage effluent for fresh grass ensiled at 18% dry matter

2.1.3 Designing and constructing new silos

Silage effluent can corrode concrete and steel. Poorly designed, constructed or maintained silos or effluent collection facilities can lead to pollution incidents. When constructing new silos, proper planning can greatly reduce the risk of pollution problems.

Make sure your new silo is big enough to meet your storage requirements both now and in the future. This will depend on:

- the number and type of stock;
- the length of the winter feeding period; and
- any possible future developments you may have planned.

The SSAFO Regulations set minimum standards for the construction and siting of new silos, silage bales, silage effluent tanks and any associated pipes and channels. The regulations also cover any structures, which have been substantially altered since the regulations came into force. Anyone intending to build a new structure, or substantially alter an existing structure, should tell Northern Ireland Environment Agency (NIEA) at least 28 days before using it.

You can find more information about the SSAFO regulations in annex 2, page 118.

Planning approval is required for farm buildings and stores over a certain size. New units must comply with the NI Building Regulations and should be sited well away from housing developments. Full details may be obtained from the Planning Service website www.planningni.gov.uk. Alternatively contact:

Planning Service Headquarters

Millennium House

19-25 Great Victoria Street

Belfast

BT2 7BN

Telephone: 028 9041 6700

Fax: 028 9041 6802

You should also:

- use waterstops and sealants to prevent effluent leakage at construction joints in walls and floors;
- allow adequate curing of concrete before exposure to effluent (you should complete the silo at least one month before filling);
- ensure the silo floor has a fall of approximately 1 in 60 from back to front;
- provide internal drains to reduce pressure on the walls; and

- protect wall-floor joints by providing internal drainage on top of 1,000 gauge polythene sheet as shown in the photo 4. This will reduce the possibility of a leak and greatly increase the lifespan of the silo wall-floor joint.



Photo 4: **Protecting silage pit wall-floor joints**

2.1.4 Collecting and storing silage effluent

- SSAFO Regulations set minimum standards for any new or substantially altered silage effluent tanks, effluent collection drains and channels. They should discharge to a suitably sized below ground tank, which is impermeable and able to resist corrosion by silage effluent. Tanks must be constructed according to BS5502: Parts 22 and 50 (1993) and BS8007 (1987). Reinforced concrete tanks must be allowed to cure properly before use. Alternatively, tanks may be of a one-piece construction and made of corrosion resistant materials such as glass-fibre reinforced plastic. For more information about BS go to www.bsonline.bsi-global.com.
- Ensure that tanks do not have overflow pipes, except where they lead to another tank suitable for the collection of silage effluent.
- For silos with a capacity of less than 1,500m³, allow a minimum tank capacity of 3m³ per 150m³ (or part thereof) of silo capacity.
- For example, for a silo 20m x 10m x 3m (600m³) allow a tank capacity of 12m³. During periods of peak effluent flow, a tank of this size must be emptied daily.
- Silos with a capacity of 1,500m³ or more, should have an effluent tank able to hold at least 30m³ plus an additional 1m³ for every 150m³ (or part thereof) of silo capacity in excess of 1,500m³.
- Ensure that tanks and channels are sited at least 10m away from waterways or drains.

In addition:

- Do not overfill silos as cracking of wall-floor joints may occur, because of the leverage effect, resulting in effluent escape.
- Where necessary, pump effluent from a small below-ground tank to a larger above-ground container for either storage alone or mixing with slurry. While silage remains in the silo, all effluent and contaminated rainwater from the cover and silage must be collected and disposed of properly.

- Closely monitor the effluent level in the tank and empty the tank at regular intervals. Never allow it to overflow and ensure that effluent collection channels do not become blocked.
- Silage effluent contains valuable nutrients and may replace up to 15% of the meal requirement of finishing pigs. Effluent must be stored in a suitable container before being used for animal feeding.
- Frequently check all waterways during silage making, and for at least one month afterwards, to ensure no effluent has escaped. You should carry out further checks until the silo is empty.

2.1.5 Repairing existing silos

- Cracked, porous or deteriorated silo floors, walls, collection channels or tanks allow effluent to escape easily.
- Always carry out a thorough examination of silos as soon as they become empty to identify any defects that may require attention. Early examination is essential to allow sufficient time for satisfactory repairs to be carried out and for 'curing' to be complete before the silo is used again.
- Substantial repairs to existing silos must comply with the SSAFO Regulations. You can find more information in annex 2, page 118.

2.1.6 Baled silage

Under the SSAFO Regulations it is an offence to:

- store bagged or wrapped bales within 10 metres of any waterway; and/or
- open or remove the wrapping of any bales within 10 metres of a waterway.

You may reduce these distances if the bales are placed down slope from the waterway and there is no risk of contamination.

You should also:

- wilt grass to at least 25% dry matter, where possible, to help preservation of the silage and minimise effluent production;
- collect all effluent arising from silage bales standing on hard surfaces;



Photo 5: Baled silage

- dispose of bale wrap in accordance with the Waste Management Regulations (more information about the Waste Management Regulations can be found in section 11.4, page 86); and
- ensure that residual effluent contained within the removed wrap does not escape to a drain or waterway.

2.2 Slurry

2.2.1 What is slurry?

Slurry is a valuable fertiliser but it can have devastating effects on aquatic life and drinking water if it runs off or leaches from land.

Slurry is defined in the NAP Regulations as:

‘excreta produced by livestock whilst in a yard or building;’ or

‘a mixture of such excreta with bedding, rainwater, seepage, washings or any other extraneous material from a building or yard used by livestock, or in which livestock manure is stored or any combination of these; of a consistency that allows it to be pumped or discharged by gravity at any stage in the handling process and includes dirty water that is stored with slurry or mixed with slurry.’

2.2.2 Planning slurry storage

An important step in preventing pollution by slurry is deciding when to land spread. Inadequate storage capacity may force you to spread when weather and soil conditions are unsuitable and the risk of nutrient loss and water pollution is high.

Your storage capacity requirement depends on the number and type of stock, how long slurry has to be stored and the volume of dirty water or rainwater entering the system. In many slurry systems dirty water, such as run-off from yards and washings from buildings, is directed into the slurry tank.

Do not waste storage capacity. Prevent rainwater from roofs or clean concrete areas getting into slurry tanks and stores.

The NAP requires you to have sufficient capacity to store slurry for a minimum of 26 weeks for pig and poultry enterprises and 22 weeks for all other enterprises. We strongly recommend that you aim for more than 26 weeks storage capacity for all enterprises, especially in areas of high rainfall or where land is wet. The NAP and Phosphorus Regulations guidance booklet will help you to calculate how much existing storage capacity you have on your farm and how much you need to hold six months’ slurry production.

2.2.3 Designing and constructing new slurry stores and tanks

Slurry must be stored in suitable tanks or stores, which are designed and constructed to a high standard. The SSAFO Regulations set minimum standards for the construction and siting of new or substantially altered slurry stores, reception pits and channels. More information regarding the SSAFO Regulations can be found in annex 2, page 118.

As in the case of new silos, described in section 2.1.3, page 22, planning approval is required for farm buildings and stores over a certain size.



Photo 6 Left: **Slurry tank under construction.** Right: **Slurry tank completed.**

Other points to note:

- Ensure an effective storm water system is in place and regularly check and maintain gutters and downpipes.
- When choosing a site for a new store or tank, consider the ease of access for filling, mixing and emptying, potential odour nuisance and visual appearance.
- When planning new houses with below-ground slurry tanks, make sure they are designed to permit mixing of the slurry from outside the building and have doors at both ends.
- Covering slurry stores will prevent rainwater entering and reduce emissions of ammonia and odour.
- If you are intending to build a new store or substantially alter an existing structure within an Area of Special Scientific Interest (ASSI) you must also obtain prior written consent from NIEA. The application to undertake the works must come from the registered landowner.
- Intensive pig and poultry farms that exceed 40,000 places for poultry, 2,000 places for production of pigs over 30kg or 750 places for sows, must comply with the Integrated Pollution Prevention Control (IPPC) Regulations. Any new housing (including replacement or an expanded installation) must be designed in accordance with the Standard Farming Installation Rules to minimise ammonia emissions (by using Best Available Techniques). Farmers should contact NIEA prior to commencing construction of any new buildings. More information about this legislation may be found in annex 10, page 139 and the relevant contacts may be found in annex 17, page 164.

2.2.4 Operating and maintaining slurry tanks and stores

- Slurry tanks and stores must not be overfilled or allowed to overflow.
- Aim to empty tanks and stores by 1 September.
- We strongly recommend, even in the case of SSAFO exempt structures, that you leave a minimum 'freeboard' of 300mm between the surface of the slurry and the top of a tank and 750mm for an earth banked lagoon.
- Check regularly for any signs of slurry leakage. Seek professional advice and repair faults as necessary.
- A summary of permitted organic manure storage methods can be found in annex 2, page 115.



2.2.5 Mixing slurry

After slurry has been stored for some time, it separates out into sludge and a liquid fraction, and often is topped with a crust of fibrous material. Mixing slurry with a tractor-driven slurry pump, or other type of slurry mixing system, reverses the separation process, thereby enabling the complete removal of slurry from the tank.

Health and Safety note – Precautions when mixing slurry

Agitation or re-circulation of slurry produces dangerous gases which are lethal to both humans and livestock.

You must make anyone working with slurry or in slurry tanks aware of the dangers created by slurry gases and the precautions to take. Below ground tanks contain lethal gases and should not be entered unless wearing fresh air breathing apparatus. Display a warning notice to this effect on or adjacent to the store. When mixing slurry in confined spaces such as slatted houses:

- remove all the animals before starting to mix;
- ventilate well, providing openings at both ends to induce a strong through draught at floor level – remember, air movement is limited during frosty weather;
- provide and use outside mixing points as much as possible. Stay outside the house, especially during the early stages of mixing. Allow adequate time for the gas to disperse before going into the building;

Health and Safety note – Precautions when mixing slurry (continued)

- make sure another adult is nearby to summon emergency help if needed;
- do not smoke or allow naked lights during agitation or if reaching into the tanks as the gas mixture is highly inflammable; and
- keep children and pets well away – the highest toxic gas levels are often nearest the ground but can also be dispersed upwards beside walls and buildings.

2.2.6 Biologically treating manures and slurries

Most livestock slurries are present in highly concentrated forms so their biological treatment has been directed towards:

- the reduction of odour;
- the reduction of Biochemical Oxygen Demand (BOD) to reduce environmental pollution; and
- the production of energy in the form of biogas or heat.

Biological treatment occurs either aerobically (in the presence of air/oxygen) or anaerobically (in the absence of air/oxygen).

More information about:

- anaerobic digestion;
- aerobic treatment;
- use of slurry additives and deodorants; and
- composting

can be found in annex 3, page 119.

2.3 Farmyard manure and other solid manure

2.3.1 What is farmyard manure (FYM)?

FYM is defined in the NAP as a mixture of bedding material and animal excreta in solid form arising from the housing of cattle, sheep and other livestock, excluding poultry and pigs, but including spent mushroom compost. Solid livestock manures are less likely to cause pollution than slurry. However, seepage from manure can be highly polluting if it enters a waterway.

In the case of separated slurry, the solid fraction is classified according to the slurry source. If the separated solid is derived from cattle, sheep or other livestock slurry, excluding that from pigs, it may be classified as FYM for the purposes of the NAP. The liquid fraction is classified as slurry.

2.3.2 Storing farmyard and other manure

Permanent stores

- Seepage/run-off from solid livestock manure stores can be highly polluting and must never be allowed to enter a drain or waterway. This run-off is considered to meet the definition of slurry under SSAFO.
- A purpose built store reduces the risk of pollution and allows easier handling of manure.
- The capacity of the solid manure store required depends on the number and type of stock, the storage period and the amount of bedding used.
- Manure stores should have an impermeable solid base. The base should slope so that liquids run off into a collection channel across the front and along the sides of the store. Liquid run-off is considered slurry under the SSAFO Regulations and must be collected in an appropriate tank, meeting the SSAFO Regulations if built after 1 December 2003.
- Seepage/run-off from straw bedded livestock housing is also considered slurry under the SSAFO Regulations. Always collect seepage/run-off and never allow it to enter a drain or waterway.
- Aim to provide at least six months storage for seepage/run-off.
- When choosing a site, consider the ease of access for filling and emptying, appearance and potential odour nuisance.
- A summary of permitted organic manure storage methods can be found in annex 2, page 115.

Temporary heaps for solid manure

You may store FYM in a temporary field heap provided that there is no risk of pollution to any waterway or field drain. Follow the conditions outlined in the NAP guidance book. These include the following.

- FYM may only be stored in the field where it is to be spread.
- The quantity of manure stored in a field heap cannot exceed that which is to be spread on the field during the next cropping cycle.
- Manure in a temporary field heap must not be stored any longer than 180 days.

Never site heaps:

- on the same site within a field year after year;
- over field drains;
- within 20 metres of a waterway, including lakes, open areas of water, open field drains or any, drain that has been backfilled to the surface with permeable material such as stone/aggregate;
- within 50 metres of a borehole, spring or well;

- within 250 metres of any borehole or well used for a public water supply; or
- within 50 metres of exposed cavernous or karstified limestone features such as swallow holes and collapse features.

Poultry litter contains very high levels of nutrients, in particular phosphorus, and the run-off can be highly polluting. Under the NAP Regulations poultry litter can be stored in field heaps. However, this will be reviewed by 31 December 2008. This is to give time for new technical solutions to be developed.

Additional precautions are necessary when storing poultry manure in field heaps. Cover the field heap with an impermeable membrane which should be securely anchored to the ground. Do this as soon as possible, and no longer than 24 hours after placing the heap in the field.

2.3.3 Designing and constructing new manure stores

New permanent stores for solid manure must:

- meet BS5502 Parts 22 and 50 (1993) and BS8007 (1987). For more information about BS go to www.bsonline.bsi-global.com;
- have an impermeable concrete floor with a slope and also peripheral collection channels to collect and divert effluent to an underground tank;
- be able to take the weight of tractors and spreaders - all side walls must be constructed of reinforced concrete; and
- be structurally sound and leak proof.

As in the case of new slurry stores and tanks described in section 2.1.3, page 22, planning approval is required for manure stores over a certain size.

2.4 Dirty water

2.4.1 What is dirty water?

Dirty water is a low dry matter effluent made up from water contaminated by manure, urine, effluent, milk, dairy washings or cleaning materials. It is further defined in the NAP Regulations as having a Biochemical Oxygen Demand (BOD) no greater than 2000 mg/litre, a total Nitrogen content of less than 0.3kg/m³ and a dry matter content of less than 1%. Collect all dirty water and dispose of it carefully. Never allow dirty water to enter a drain or waterway or be diverted to a soakaway. Because the contaminants around a farmyard have very high BOD values (see table 5, annex 1, page 108), only water that has been lightly contaminated by these can be regarded as dirty water.

2.4.2 Collecting dirty water

Collection tanks

You must collect all dirty water produced on the farm and dispose of it properly. It can be collected in tanks or stores dedicated solely to dirty water collection or in facilities designed primarily for slurry and effluent collection. Dirty water stored with slurry or effluent can no longer be regarded as dirty water for storage or spreading purposes.

Tanks used only for the collection of dirty water should be:

- in good condition and not leaking;
- checked regularly for fullness and never filled to the top;
- emptied at regular intervals;
- fitted with a secure cover to prevent anyone from falling in; and
- big enough not to need emptying during periods where land spreading is not permitted, for example, when weather and ground conditions are unfavourable.

Soakaways or blind ditches must never be used to dispose of dirty water.

Diverter

Your yard may produce different types of run-off at different times of the year. For example, run-off from a frequently used livestock handling yard is classified as slurry under the SSAFO Regulations. When livestock are on the yard ensure all the run-off is collected in a slurry tank. However, when the same yard is empty and after it has been cleaned, the run-off may be collected in a dirty water tank.



Photo 8: Dirty water or slurry?

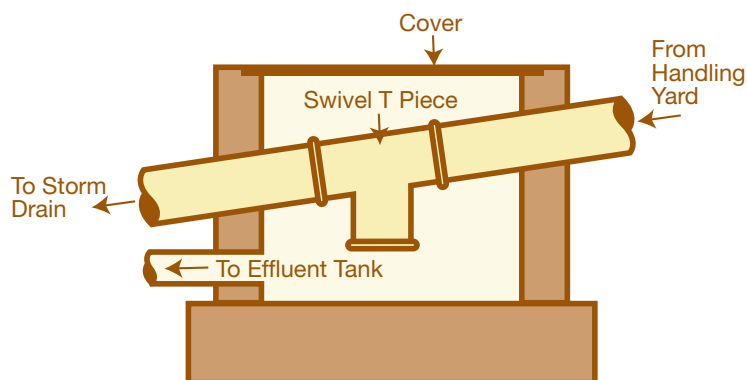


Figure 4: Typical use of a diverter

Using diverters (Figure 4) can introduce flexibility to the management of farmyard run-off. They enable the operator to divert run-off to a slurry tank or a dirty water tank, whichever is appropriate for the run-off at the time. Take care never to divert slurry to a dirty water tank, or dirty water to a slurry tank, by mistake.

Never connect a diverter to a waterway when the diverter is also connected to a silo, midden or yard which is frequently used by livestock and constructed, substantially reconstructed or enlarged since 1 December 2003.

Carefully manage all diverter systems to ensure pollution of a waterway or groundwater never occurs. This would be an offence under the Water (Northern Ireland) Order 1999.

2.4.3 Minimising the dirty water problem

The most cost effective method of increasing the available slurry storage capacity on the farm is to reduce the volume of dirty water produced.

Approximately 1,000 litres of rain falls per square metre of yard or roof in NI annually. But, the volume of dirty water produced on your farm is largely affected by rainfall, yard layout, pattern of farmyard usage and general management.

Separating clean water from dirty water

Clean water (from roofs, nearby fields or clean concrete), running onto dirty concrete will increase the amount of dirty water which you need to store and spread. Separating this clean water requires careful planning and regular maintenance of gutters and downpipes.

Direct all clean water into a drain, waterway or soakaway through an impermeable system with sealed joints. Make sure the system has a manhole at the point where it leaves the yard so you can monitor the drainage water for contamination. All manholes in the system should have a facility for closing off the outlet if required and a sump to allow the insertion of a submersible pump for cleaning the system if farm effluent enters it.

Minimising the dirty yard area

A reduction in the volume of contaminated water produced may be achieved by reorganising the farmyard to reduce the area of yard which livestock have access to. Keeping the yard free from contamination will significantly reduce the volume of dirty water or slurry to be collected in a tank.

2.4.4 Managing run-off from livestock walkways

You should never allow run-off from regularly used walkways to enter a waterway. This would be regarded as pollution under the Water (Northern Ireland) Order 1999.

In situations where the collection of run-off is impractical, for example, from lanes throughout the farm, take alternative action to prevent such a discharge to a waterway. This should include scraping the slurry off the walkway or lane immediately after use, ensuring that all run-off drains to vegetated ground at least 10 metres away from any drains, ditches or other waterways. This approach can also be taken when dealing with run-off from areas of the farmyard which are used by livestock infrequently.

2.4.5 Dirty water disposal systems

You can dispose of dirty water using the following systems.

- Low rate irrigation.
- High rate irrigation.
- Inverted splash plate spreaders.
- Band spreaders with trailing hose or trailing shoe.
- Soil injection.

You can find more information in annex 4, page 121.

2.5 Recent developments

In recent years some farmers have shown interest in:

- woodchip corrals and stand-off pads;
- swales; and
- constructed wetlands.

You can find more information about these developments in annex 5, page 122.

It is essential that you enter discussion with NIEA well in advance of embarking on any project to treat dirty water or other farmyard run-off in a constructed wetland. Contact details can be found in annex 17, page 163.

Section 3

Spreading slurry, manures and farm effluents

Spreading during the growing season makes maximum use of the valuable nutrients in slurry, manures and farm effluents and reduces the potential for pollution.

Silage effluent, slurry, manure and dirty water have the potential to cause serious water pollution if not collected, stored and disposed of properly. Failure to do this results in a high number of pollution incidents every year.

Slurry and manures should not be applied when there is a risk of run-off to a waterway.

Prepare and follow an application plan for slurry, manure and farm effluents so you and/or your contractor can easily identify land suitable for spreading slurry, manures and other farm effluents, and minimise the pollution risk from land application.

Adhering to the guidelines in this section will help reduce the risk of water pollution when land spreading slurry, manures and other farm effluents.

You must comply with the statutory requirements of the NAP Regulations regarding the use of slurry and manures. Compliance with this legislation is a requirement of Cross-Compliance under SMR 5.

3.1

Application plan for slurry, manure and farm effluents

An application plan for slurry, manure and farm effluents is a copy of your farm map colour-coded to show areas of your farm that are suitable and unsuitable for spreading agricultural wastes.

Following an application plan for slurry, manure and farm effluents has many benefits.

- It can help reduce the pollution risk from spreading slurry, manures and other farm effluents.
- It will provide you and your contractor with a simple way of identifying the pollution risks on your farm.
- A plan provides evidence that you are taking measures to ensure that effective procedures for spreading slurry, manures and other farm effluents are in place.

3.1.1 Preparing an application plan for slurry, manure and farm effluents

You will need a copy of your farm map. Follow the stages below to colour code your map so that it shows the suitability of each area for spreading slurry, manures and other farm effluents.

Stage 1:

Colour *BLUE* all waterways including natural or other open areas of water, boreholes, springs or wells. Don't forget to include any along the farm boundary.

The definition of a waterway can be found on page 16.

Stage 2:

Colour *RED* all areas that can never be used for spreading slurry, manure and farm effluents. These include:

- areas within 20 metres of any lake;
- areas within 10 metres of a waterway other than lakes (this distance may be reduced to 3 metres where slope is less than 10% towards the waterway and where organic manures are spread by bandspreaders, trailing shoe, trailing hose or soil injection or where adjoining area is less than 1 hectare in size or not more than 50 metres in width);
- areas within 15 metres of exposed cavernous or karstified limestone features such as swallow holes and collapse features;
- areas within 50 metres around a borehole, spring or well (in some cases, a bigger distance may be required, particularly upslope of a spring or shallow well);
- land which is steeply sloping (an average incline of 20% or more) and where, taking into account factors such as proximity to bodies of surface water, soil condition, ground cover and rainfall, there is a significant risk of causing water pollution;
- areas which have been pipe or mole drained within the last 12 months (the colour coding of these areas will change to orange 12 months after the drainage work is completed); and
- wetland areas (areas of land that are waterlogged due to high rainfall and/or poor drainage, including fens, reedbeds, raised bogs and blanket bog).

Also, you may not be allowed to spread slurry, manure and farm effluents on other areas of your farm such as:

- designated areas (for example, ASSIs) unless prior written consent has been received from NIEA (the application to undertake the works must come from the registered landowner); and
- certain lands subject to management agreements under our agri-environment schemes. If in doubt, check your management agreement or contact your local DARD Countryside Management staff. Contact details can be found in annex 17, page 161.

Stage 3:

Colour ORANGE all areas from which there is a high risk of pollution occurring (may be part or whole fields). Slurry, manures and other farm effluents may be applied to these areas at certain times of the year but before spreading always ensure that there is no risk of pollution occurring. Such areas include:

- areas with a moderate slope that slopes towards a red area (steep slopes should be coloured red);
- areas next to red areas, which may become severely compacted, waterlogged or flooded at some time throughout the year;
- areas with active pipe or mole drains, which have been in place for at least 12 months (do not apply when the drains are running); and
- areas where the soil may crack down to drains or backfill.

Stage 4:

Mark with an 'X' areas not normally used for spreading slurry, manures and other farm effluents. These include non-farmed areas, buildings and roads, woodland, areas too far from the yard, areas with rocky or uneven surfaces and some wildlife habitats.

Stage 5:

Colour GREEN all remaining areas. These can be used for spreading when land and weather conditions are suitable.

(NOTE: These areas do not have effective pipe or mole drains).

Your plan is now complete. Figure 5 shows an example. Use your plan every time you or your contractor spreads.

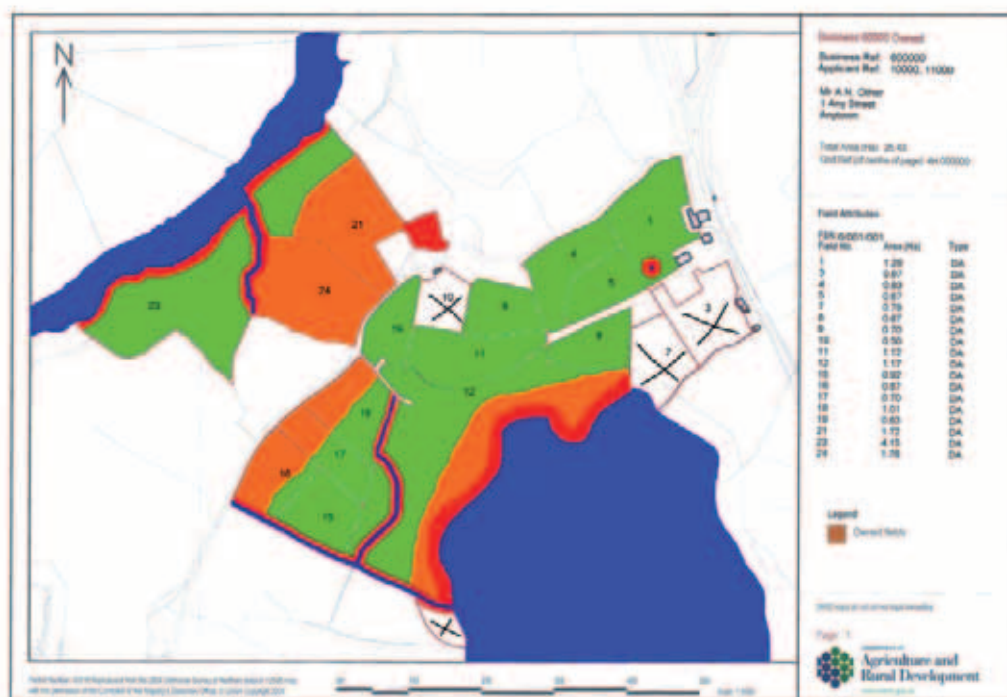


Figure 5: Application plan for slurry, manure and farm effluents

Summary:

- Only spread slurry, manures and other farm effluents on ORANGE and GREEN areas of the map.
- Take extra care with ORANGE areas. There will be times when GREEN areas are suitable for spreading but ORANGE areas are not.
- Spreading should always be carried out according to the guidelines in section 3.2. Remember that run-off can occur from very dry soils in summer as well as from wet soils in winter.

3.2

Spreading livestock and organic manures

As part of Cross-Compliance, the Good Agricultural and Environmental Condition (GAEC) soil measure requires you to protect soils from erosion and maintain soil structure. This includes not spreading slurry and other organic manure in unsuitable field and weather conditions. Annex 11 page 151, contains a summary of the Cross-Compliance GAEC measures.

3.2.1 Getting to the field

- Take care when transporting slurry, manures and other farm effluents to prevent spillages and contamination of road surfaces. It is the responsibility of the farmer to remove all spillages and mud from the road as soon as the spillage occurs.
- You should wash down and disinfect all machinery and equipment before moving from farm to farm.

3.2.2 Spreading slurry, manure and farm effluents

Table 1: Advice for applying slurry, manures and farm effluents

Always	Never
<ul style="list-style-type: none"> ✓ Ensure there is no risk of run-off. ✓ Leave at least a 20 metre wide untreated strip beside any lake. ✓ Leave at least a 10 metre wide untreated strip beside all other waterways. This includes sheughs, open areas of water, open field drains and any drain which has been backfilled to the surface with stone/aggregate. To achieve this, your tractor should stay at least 13-14 metres away from waterways when spreading, to allow for the tanker spreading width. Don't forget waterways on the boundary of your farm. On slopes with an average incline less than 10% towards the waterway, this may be reduced to three metres where organic manures are spread by band spreaders, trailing shoe spreaders or soil injection or where the adjoining area is less than one hectare in size or not more than 50 metres in width. ✓ Leave at least a 15 metre wide untreated strip beside any exposed cavernous or karstified limestone features such as swallow holes and collapse features. 	<ul style="list-style-type: none"> ✗ Apply when run-off to a waterway is likely to occur. ✗ Allow silage effluent, slurry, manure or dirty water to enter a waterway. ✗ Apply more than 170kgN/ha of total nitrogen from livestock manures to the total area farmed within any 12 month period, unless a derogation has been received as described on page 116. Additional inorganic nitrogen can be added to meet crop requirements but never apply more nutrients than are needed. ✗ Apply slurry when heavy rain is forecast within 48 hours. Rainwater that runs off fields that have recently been spread with slurry may also cause pollution. ✗ Apply to land that is flooded or likely to become flooded. ✗ Apply to waterlogged ground. This is where water appears on the surface of the land when pressure is added. ✗ Apply to compacted ground. ✗ Apply to fields that have been pipe drained or mole drained within the last 12 months.

Table 1: Advice for applying slurry, manures and farm effluents

Always

- ✓ Dilute silage effluent 1:1 with water when spreading on grass to avoid scorching and, if possible, spread on the land from which the silage was cut.
- ✓ Keep at least 50 metres away from all springs, wells and boreholes to reduce the risk of polluting groundwater.
 - Increase this distance to 250 metres if the borehole or well is used for public water supply.
 - Always take account of any springs, wells or boreholes on your neighbours' land.
 - In some cases, a greater distance may be required, particularly upslope of a spring or shallow well.
- ✓ Prepare and follow an application plan for slurry, manure and farm effluents (section 3.1, page 34) and a Nutrient Management Plan (section 5.2, page 52).
- ✓ Check waterways frequently, during and after spreading.
- ✓ Leave at least three weeks between applications to avoid surface sealing and to allow the soil time to absorb the nutrients.
- ✓ Observe due diligence in the use of slurry and FYM particularly in the growing and harvesting of ready to eat crops to protect public health. Contact the Food Standards Agency for more information. Contact details can be found in annex 17, page 163.

Never

- ✗ Apply when field drains are running.
- ✗ Apply to fields that are cracked down to drains or backfill.
- ✗ Apply to ground that has been frozen for more than 12 hours or is snow covered. Days when soil was frozen overnight but completely thaws out during the day do not count.
- ✗ Apply when fields are flooded or likely to flood.
- ✗ Spread on land which is steeply sloping (an average incline of 20% or more) and where, taking into account factors such as proximity to bodies of surface water, soil condition, ground cover and rainfall there is a significant risk of causing water pollution.
- ✗ Spread within one metre of the base of a hedge.
- ✗ Apply more than 50m³ (50t) per hectare in any one application.
- ✗ Apply to designated sites (for example, ASSIs) unless prior written consent has been received from NIEA (the application to undertake the works must come from the registered landowner); and/or
- ✗ Apply to certain lands subject to management agreements under our agri-environment schemes. If in doubt, ask your local DARD Countryside Management staff.

Always take the phosphorus content of the soil into account. Where high phosphorus levels have accumulated in soils, the amount of manure which should be applied may be less than that required to provide 170kg/ha/yr of nitrogen from livestock manures, unless a derogation has been received as described on page 116. Adjust application rates as necessary. See annex 2, page 111, and the Nitrates Action Programme (NAP) and Phosphorus guidance book for more details.

3.2.3 Extra care when spreading poultry litter

Broiler litter is a risk factor for many outbreaks of botulism in cattle. It is essential to carefully dispose of all animal or bird carcasses and poultry litter to minimise the risk of botulism to cattle. You should promptly remove poultry carcasses from the chicken house and dispose of them by incineration or rendering as required by EU Regulation No. 1774/2002.

After removing the broiler crop, you should:

- keep all poultry house doors closed until the litter is removed;
- keep the litter in the house until it can be loaded directly onto spreading equipment, covered vehicles or immediately stacked and covered;
- prevent access for dogs, foxes, crows or other scavengers that may carry carcasses onto nearby pasture or into cattle housing; and
- collect washings from poultry houses and yards in tanks rather than allow it to flow onto neighbouring land.



Photo 9: Poultry unit

You should not spread poultry litter on agricultural land that is to be grazed, or from which silage or hay is to be harvested in the same year. This is because fragments of carcasses, containing botulinum toxins, may persist on pasture for a considerable time.

If litter must be spread, it should be deep ploughed into arable ground. Where the only option is to spread litter on pasture, you should not allow cattle to access the treated fields for at least several months. However, there is no guarantee that the treated fields would then be safe for cattle. Spreading litter on a windy day may also pose a risk of contaminating adjacent fields.

Even small fragments of carcasses may be dangerous to cattle. Remember scavenger animals and birds may carry carcasses or fragments of carcasses to neighbouring fields. If you see any animal or bird carcasses, or portions of carcasses, on pasture or in cattle houses, promptly remove the material. You should dispose of it by incineration or rendering, as required by current legislation.

3.3

Slurry spreading methods

The NAP Regulations require all slurry to be spread close to the ground using inverted splash plate spreaders, band spreaders with trailing hose or trailing shoe, soil injection or soil incorporation techniques. All equipment must be maintained to ensure that application is uniform and accurate. This requirement also applies to dirty water. However, it can also be spread by irrigation. For more information please refer to section 2.4, page 30. The specified application methods, especially band spreading, injection and soil incorporation, reduce the loss of ammonia, air pollution and the risk of spreading disease.

You can find more information on the following slurry spreading methods in annex 6, page 126.

- Inverted splash plate spreading.
- Band spreading.
- Trailing shoe spreading.
- Injection systems.
- Umbical systems.
- Rain guns and travelling irrigators.

3.4 Getting the application rate right

Achieving the correct application rate is vital. Applying silage effluent, slurry and dirty water at excessive rates, creates a pollution risk. It will also take longer for the grass to recover and may cause problems with grass ensilability.

Always follow a nutrient management plan and consider the nutrient content of the dirty water and the soil to which it is being applied. Adjust the application rate to meet the nutrient requirement of the crop. The application rate must not exceed 50m³/ha (50,000 l/ha). Always leave at least two weeks between applications. Remember that many NI soils are overloaded with phosphorus and no longer need additional phosphorus to be productive.

Do not apply more than 170kg/ha of total nitrogen from livestock manures and other farm effluents in any 12 months, unless you have received a derogation as described on page 116. Annex 2, page 111, and the NAP Regulations guidance booklet contains more details.

Dilute silage effluent with the same amount of water (1:1) before applying to the land. Never apply more than 50,000 l/ha of slurry, diluted silage effluent, dirty water or 50 t/ha of solid manure at one time. Regular applications of slurry or manure spread at lower rates are preferable to infrequent applications spread at higher rates.

3.5 Timing applications to get the best crop response

Slurry, manures, other organic manures and other farm effluents contain valuable plant nutrients. Time the application to make the most of nutrients. For grass growth this means spreading during the growing season.

Under the NAP Regulations, organic manures, excluding FYM and dirty water, must not be applied between 15 October and 31 January. Up to 90% of available nitrogen in slurries can be lost following autumn and winter applications.

To make best use of nitrogen in solid manure and to minimise nitrate leaching losses, apply where possible to arable ground in spring. Rapid soil incorporation will minimise nitrogen losses.

Leave at least three weeks between applications of silage effluent, slurry or organic manures to avoid surface sealing and to allow the soil time to absorb the nutrients.

Forage crops, particularly forage maize prior to drilling, provide an opportunity to apply solid manure in late spring. Never apply more than 50 tonnes of solid manure per hectare in one application. Where possible, incorporate the manure quickly into the soil to minimise nitrogen losses to the atmosphere and reduce odour emissions.

Where slurry and solid manure applications are made to grazed grassland, it should not be grazed for at least six weeks following application, or until all visible signs of slurry solids have disappeared. More information on nutrient management and fertiliser use can be found in section 5 'Using nutrients efficiently on the farm' (page 50) and from 'Fertiliser Recommendations for Agricultural and Horticultural Crops (RB209)' available from the Department for Environment, Food and Rural Affairs (DEFRA).

Section 4

Storing, spreading and using other organic wastes

Organic wastes, such as dairy waste, septic and sewage sludge, treated blood and rumen contents are sometimes disposed of by spreading on agricultural land. All of these activities must be carried out in accordance with the NAP Regulations. Compliance with this legislation is a requirement of Cross-Compliance, under SMR 5.

All of these wastes are potentially very highly polluting. Take extreme care to ensure the pollution of waterways, groundwater or soil does not arise following land spreading of these wastes.

Keep to the following guidelines, in addition to those given in section 3, page 34, to reduce the risk of pollution when land spreading organic wastes.

4.1 Milk and dairy waste

Sometimes it is necessary to dispose of waste milk as well as dairy washings.

4.1.1 Dairy washings

Dairy washings can be land spread or mixed with slurry. In both cases they will be subject to the requirements of the NAP Regulations. Always follow the guidelines for spreading slurry, manures and other farm effluents given in section 3 (page 34).

4.1.2 Feeding waste milk to livestock

Waste milk can be fed to livestock, but a veterinary surgeon should always be consulted to check animal health aspects.

4.1.3 Spreading waste milk

- It is necessary for you to be properly authorised to dispose of milk on land, even on the farm of origin. Register for an exemption under the Waste Management Regulations (Northern Ireland) 2006. You can register for agricultural waste exemptions when completing your IACS/Single Application Form. If you do not fill this form, apply directly to NIEA. Contact details may be found in annex 17, page 163.
- Dilute milk 1:1 with water before spreading. Never apply more than 50,000 l/ha of this diluted milk in a single application.

- Remember that milk and dairy wastes have the potential to be extremely polluting (300 times more polluting than domestic raw sewage). They should never be allowed to enter a waterway or groundwater.
- Follow the guidelines for land spreading slurry, manures and other farm effluents (section 3, page 34) to reduce the risk of pollution of waterways.
- Milk is subject to the conditions of the NAP Regulations, including the closed land spreading period.
- Waste milk, when used or disposed of other than on the farm of origin, is regarded as an animal by-product and is controlled by the EU Animal By-Products Regulation 1774/2002. Under the Regulation, milk can be disposed of on non-pasture land providing DARD consider that there is no serious disease risk. Milk must only be applied to land that will not be grazed after spreading for two months in the case of pigs, or three weeks in the case of other farmed animals.

4.1.4 Milk from diseased animals

Under the Food Hygiene Regulations (Northern Ireland) 2006, milk from animals which are reactors to the tuberculin (TB)¹ and brucellosis tests must not be sold for human consumption and should be withheld from the bulk tank.

Under domestic legislation in NI, it is illegal to feed reactor cows' milk to calves unless in the case of TB it has first been sterilised, or in the case of brucellosis, it has been treated as required under notice.

Milk which we consider to present a risk of spreading a serious transmissible disease, such as brucellosis or TB, must not be spread on pasture land. In addition to the recommendations for landspreading milk in the previous section, where land spreading is necessary to dispose of brucellosis reactor milk, no cattle (except steers) should be allowed to graze that land for at least six months. In the case of milk from TB reactors, a gap of at least six weeks should be left between spreading and livestock access, to reduce the risk of spreading disease. It is important that where this method of disposal is proposed it is only carried out **after** consultation with the local DARD Divisional Veterinary Office.

4.1.5 Mixing waste milk

Extreme care is needed when mixing milk with slurry, as lethal or explosive gases can be given off. Only small quantities of waste milk should be disposed of to the slurry system. Precautions when adding milk to slurry and when mixing slurry may be found on pages 27 and 46.

¹ Includes severe interpretation and third time inconclusive reactors.

Health and Safety note – precautions when adding milk to slurry stores

The disturbance of slurry tank contents by mixing or the addition of other liquids such as waste milk will cause poisonous gases to be produced. Anyone adding milk to stored slurry should take the following precautions:

- remove all animals before adding milk;
- ventilate well, providing openings at both ends of the house to induce a strong through draught at floor level – remember air movement is limited during frosty weather;
- stay outside the house when adding milk to stored slurry;
- do not smoke or allow naked lights; and
- keep children and pets well away – the highest toxic gas levels are nearest the ground.

For more information on the dangers of adding milk to stored slurry contact the HSENI. Tel: 0800 0320121.

4.2 Septic tank and sewage sludges

Septic tank and sewage sludges contain significant levels of nitrogen, phosphorus, trace elements and organic matter. It has a fertiliser value similar to that of animal manure and slurries. Be careful when using these sludges as a fertiliser, as they can contain pathogens and heavy metals that could be potentially harmful to human, animal and plant health. It is therefore necessary to monitor their use in agriculture in order to minimise health risks and preserve crop yields.

It is important that you match the application rate to crop and soil needs. Septic tank and sewage sludges fall within the definition of organic manure under the NAP Regulations and therefore must not be applied to land between 15 October in any year and 31 January of the following year.

4.2.1 Food and forage crops

The spreading of sewage sludge and septic tank sludge on agricultural land is controlled by the Sludge (Use in Agriculture) Regulations (Northern Ireland) 1990 and is enforced by NIEA. This legislation applies only to the application of sewage sludge and septic tank sludge to commercial food crops, including those for stock rearing purposes.

Compliance with this legislation is a Cross-Compliance Statutory Management Requirement (SMR 4). To avoid losing all or some of your Single Farm Payment, you must satisfy these requirements when applying septic tank or sewage sludge to land.

Note that the spreading of human sewage sludge is not permitted on grassland or forage crops under the Livestock and Meat Commission (LMC) Farm Quality Assurance Scheme for beef and lamb.

Septic tank sludge

To meet the requirements of the Regulations and Cross-Compliance SMR 4 you must:

- incorporate the sludge into the soil as soon as practicable if not injected into the soil;
- exclude grazing animals from the application area for a period of at least three weeks from the date of application;
- not harvest forage crops from the application area for a period of at least three weeks from the date of application; and
- ensure that no fruit or vegetable crops, which are normally eaten raw, are grown in direct contact with the soil for a period of at least 10 months from the date of application.

Sewage sludge

Sewage sludge is defined in the Sludge (Use in Agriculture) Regulations (Northern Ireland) 1990 as residual sludge from sewage treatment plants treating domestic or urban waste waters and from other sewage plants treating waste waters of a composition similar to domestic and urban waters.

The following conditions apply when applying sewage sludge to agricultural land.

- If the sewage sludge is untreated, the requirements for septic tank sludge must be followed.
- Sewage sludge must not be applied to land if the soil pH is below 5.
- Sewage sludge must only take place in a manner that takes account of the nutrient requirements of the plants and ensures that the quality of the soil, surface waters and groundwater is not impaired.
- The average annual rate of addition to land by means of sewage sludge application of any of the elements listed in the sludge table of the Regulations must not exceed the specified limit.
- The concentration in the soil of any of the elements listed in the soil table of the Regulations must not exceed the limit specified in the table either at the time of using sewage sludge or as a result of applying it.

For more information about sludge and soil tables, contact NIEA. Contact details can be found in annex 17, page 163.

- Where sewage sludge is applied to agricultural land by another party not employed by the sludge producer, the occupier of that land must provide the sludge producer with details of the land area, its location and when and how much sludge was applied. The name and address of the sludge supplier is required where this is different from the sludge producer.

To prevent water pollution, guidelines for spreading slurry, manures and other farm effluents in section 3, page 34 should also be followed when applying septic tank or sewage sludge to land. More information on the Sludge (Use in Agriculture) Regulations can be obtained from NIEA Water Management Unit. Contact details can be found in annex 17, page 163.

Sewage sludge producers

In accordance with the Regulations, sewage sludge producers are required to analyse the sludge before it is applied to agricultural land and thereafter at least every six months. The sewage sludge producer is also required to analyse the soil within the application area at least once every five years to determine its pH, metal and nutrient concentrations prior to application. The sludge producer must maintain a register containing the results of the soil and sludge analyses.

4.2.2 Non-food crops

The application of sewage sludge to agricultural land for use with non-food crops, for example willows for short rotation coppice, is controlled through the Waste Management Licensing Regulations (Northern Ireland) 2003. If you wish to undertake this activity you must obtain an exemption from NIEA. When applying for the exemption each year you will have to submit a list of plans and documents to support the application. NIEA should be contacted to obtain further information on how to apply for an exemption and the information that must be included with the application. Contact details can be found in annex 17, page 163.

4.3 Blood and rumen contents

The treatment or disposal of blood and rumen contents is controlled by the EU Animal By-Products Regulation No 1774/2002. The Regulation prohibits the spreading of untreated blood on land. Blood may only be spread if it has been treated in accordance with the Regulation, that is, in an approved rendering, biogas or composting plant.

The Regulation also states that organic fertilisers and soil improvers (including biogas digestate, compost and rumen/digestive tract contents) may only be spread on non-pasture land. This is land which will not be grazed after spreading, for two months in the case of pigs, or for three weeks in the case of

other farmed animals. Manure and slurry, which we do not consider to present a risk of spreading a serious transmissible disease, can be spread on pasture land. For further information contact your local Divisional Veterinary Office. Contact details can be found in annex 17, page 162.

Before applying treated blood or rumen contents to agricultural land you will need permission from NIEA. Permission will take the form of an annual exemption from Waste Management Licensing Regulations for the practice to be undertaken. When applying for the exemption each year the applicant is required to submit a list of plans and documents to support the application. NIEA should be contacted to obtain further information on how to apply for an exemption and the information that must be included with the application.

The spreading of treated blood is not permitted on grassland or forage crops under the Livestock and Meat Commission Farm Quality Assurance Scheme for beef and lamb.

4.4

Other industrial sludges

Contact NIEA if you wish to apply other industrial sludges, for example, creamery or food processing waste to agricultural land. Permission from NIEA is also required under the Waste Management Licensing Regulations. Similarly to blood and rumen contents, an exemption is required and NIEA should be contacted for guidance.

Section 5

Using nutrients efficiently on the farm

Plants take up phosphorus in soluble forms, usually as phosphates. More information on the phosphorus balance for NI can be found in annex 7, page 129.

Surplus phosphorus in soil leaches into water where it can cause water quality problems such as eutrophication. Phosphorus pollution, even in drains and small tributaries, will have a knock on effect further downstream and in the catchment as a whole.

5.1 Balancing the phosphorus budget

The key to managing soil fertility in the long term and preventing water pollution is to balance the amount of phosphorus entering the farm, (in fertilisers and feedstuffs) with that leaving the farm gate, (as crops, livestock, eggs or milk), plus soil maintenance requirements. (For examples, refer to Table 2, page 51).

Balancing the phosphorus budget reduces the risk of phosphorus contamination of our waterways. This will result in lower water treatment costs and higher quality waterways for angling and tourism. With careful use of slurry, manures and other farm effluents, the purchase of phosphorus fertiliser may be reduced or may not be required at all.

Soil test regularly

Under the Phosphorus Regulations, chemical fertilisers containing phosphorus shall not be applied unless it can be demonstrated that there is a crop requirement. Soil fertility status and the supply of phosphorus available from the application of organic manures on the farm should be taken into

consideration. It is therefore a requirement to soil test every four years to determine the levels of phosphorus within the soil if you intend to apply chemical fertiliser containing phosphorus.

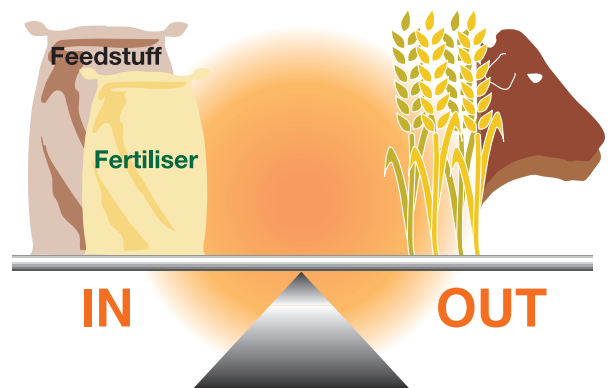


Figure 6: The phosphorus balance



Photo 10: Soil Sampling

Annex 12, page 154 provides guidelines for soil sampling, some of which are mandatory requirements for a soil test under the Phosphorus Regulations. Annex 13, page 155 provides details of soil phosphorus indices. Remember the optimum phosphorus index for intensive grassland is two. For low intensity grass based systems, a P index of less than two may be adequate. Applying phosphorus to soils where the index is above two is a waste of valuable plant nutrients and money and contributes to an overall phosphorus imbalance on the farm.

Use slurry effectively

Slurry and other organic fertilisers can provide a valuable supply of plant nutrients. When calculating the fertiliser requirements for grass and crop growth, you should take the nutrients applied in organic fertilisers into account. This is vital if the over application of phosphorus is to be avoided.

A summary of the quantities of phosphorus entering and leaving a typical intensive dairy farm is summarised in Table 2.

Table 2: Summary of the quantities of phosphorus entering and leaving a typical NI dairy farm

	Phosphorus entering farm	Phosphorus leaving farm
Fertilisers	262kg	
Feedstuffs	1,305kg	
Milk, cull cows, calves		959kg
Total	1,567kg	959kg

A total of 1,567kg of phosphorus is entering this farm while only 959kg is leaving in milk and livestock. This represents an annual excess of 608kg of phosphorus for the whole farm.

The soil analysis results for this farm are shown in Table 3.

Table 3: Soil analysis results for a typical NI dairy farm

Soil Phosphorus Index	Cutting fields	Grazing fields
0 Deficient		
1 Optimum for extensive grassland systems	Fields 11,12 and 23	
2 Optimum for intensive grassland and silage.	Fields 21	Fields 1,4,5 and 19
3 High	Fields 17 and 18	Field 9
4 Excessive	Fields 16,15 and 24	Field 8

Soil testing showed that no fields on the farm were deficient in phosphorus, while seven fields contained high or excessive levels of phosphorus. This information is summarised in Figure 7.

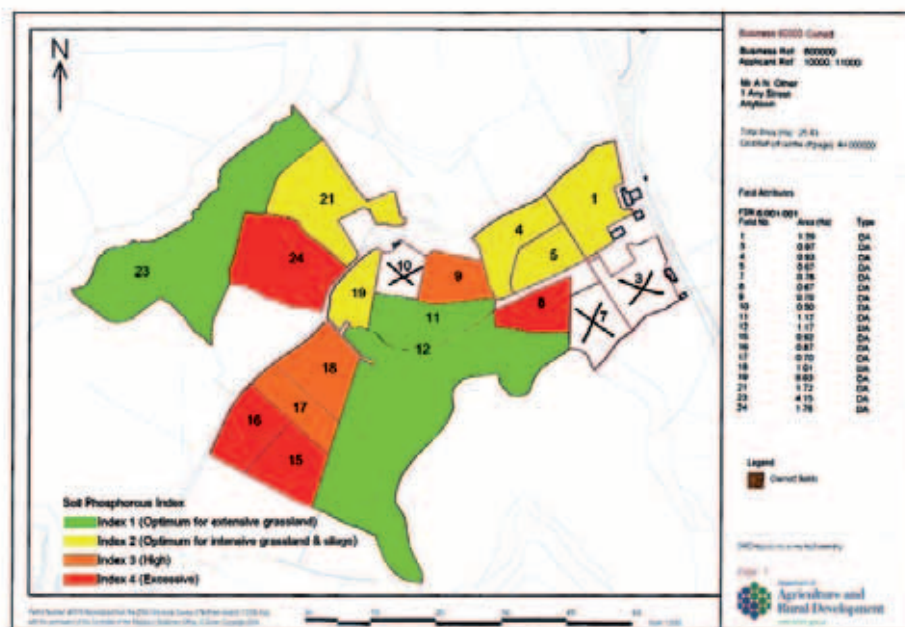


Figure 7: Soil phosphorus map

With careful redistribution of slurry nutrients there may be no need for chemical fertiliser phosphorus on this farm. This is the case on many grassland farms throughout NI.

Adopting a simple nutrient management plan, including better targeting of slurry applications and use of zero phosphorus fertiliser will help you to:

- reduce the phosphorus indices of fields that are high or very high in phosphorus;
- make better use of slurry nutrients;
- save money on the purchase of inorganic fertilisers;
- balance the phosphorus budget for the farm; and
- reduce the risk of water pollution.

5.2 Nutrient management plans

A nutrient management plan provides recommendations, based on soil analysis, about how much slurry, manure and inorganic fertilisers should be applied to each field. The main purpose of the plan is to bring the nutrient balance on the farm, for phosphorus in particular, in line with grass and/or crop requirements. Nitrogen levels in soils are generally not determined using soil analysis. However, the plan uses calculations based on management practices to show that organic nitrogen limits are being observed.

It is recommended that you summarise your lime and potash requirements in your plan. A plan can be implemented for four years, after which soils should be retested and a new nutrient management plan drawn up.

The benefits of using a nutrient management plan include:

- making better use of nutrients in slurry and manures;
- saving money on the purchase of inorganic fertilisers;
- balancing the nutrient budget for the farm;
- reducing the risk of mineral disorders;
- reducing the phosphorus indices of fields that are high in phosphorus; and
- reducing the risk of water pollution.

In addition to the requirements of the NAP Regulations, never spread fertilisers on:

- designated sites (for example ASSIs) unless prior written consent has been received from NIEA, (the application to undertake the works must come from the registered land owner);
- certain lands subject to management agreements under our agri-environment schemes. If in doubt contact your local DARD Countryside Management staff.

Detailed information on nutrient management, including other mineral and trace elements, and fertiliser use can be found in 'Fertiliser Recommendations for Agricultural and Horticultural Crops (RB209)' available from the Department for Environment, Food and Rural Affairs (DEFRA) or through CAFRE Challenge Programmes. For details of this comprehensive, user friendly learning package consult your local CAFRE Development Adviser.

5.3

Storing and handling inorganic fertiliser

- Site the fertiliser store where there is no risk of flooding and at least 10 metres away from any waterway or drain.
- Handle bags carefully to avoid damage.
- Clean up any spilt fertiliser to prevent it entering or being washed into a drain or waterway.
- When washing spreaders after use, do not allow the water to enter a drain or waterway.



Photo 11: **Storing inorganic fertiliser**

Section 6

Pesticides

The term 'pesticides' includes herbicides, fungicides, insecticides and other products, such as growth regulators, rat poisons and wood preservatives.

All pesticides used on NI farms must be on the UK list of approved products, which you can find on-line at www.bcpc.org. Before approval is granted, each product is thoroughly tested for safety, including possible harmful effects on wildlife. In addition, the mobility of the pesticide in the soil and its potential to contaminate groundwater are also examined.

Careless storage, application or disposal of pesticides and their containers can have devastating effects on river life and water supplies.

Pesticides applied directly to farm animals, such as sheep dips, are classified as veterinary medicines. For further information about sheep dip, see section 7, page 63.

6.1 Pesticide legislation

Increasing public concern for human health and the protection of the environment has led to the introduction of legislation to control the use of pesticides.

Information about key legislative requirements can be found in annex 8, page 130.

In addition to any action taken by NIEA against a farmer in breach of the Groundwater Regulations, a reduction in Single Farm Payment (SFP) may also result. The Cross-Compliance Statutory Management Requirement (SMR) 3 requires those in receipt of SFP to protect groundwater against pollution.

It is a requirement of Cross-Compliance (SMR 10) that only approved pesticides are used on crops for which they have been approved, at the correct dosage levels. Sufficient buffer zones must be left so that the spray does not enter a waterway.

You can find a comprehensive summary of environmental legislation in annex 10, page 135.

6.2 The Voluntary Initiative for pesticides

The Voluntary Initiative is a programme of self regulation measures proposed by the agricultural and agrochemical industries to minimise the environmental impact of pesticides and has been agreed by government. Farmers are asked to participate in the areas related to the application of sprays, crop protection management plans and appropriate training.

Key requirements:

- Join the National Register of Sprayer Operators.
- Maintain safety and accuracy of spraying equipment.
- Complete a Crop Protection Management Plan.

For more information on The Voluntary Initiative see:
www.voluntaryinitiative.org.uk

6.3

Storing pesticides

BASIS (Registration) Ltd is a voluntary system of self-regulation to establish and assess standards in the pesticide industry relating to storage, transport and competence of staff involved in the agricultural and agrochemical industries. It is recommended that all those with large volume pesticide stores register with BASIS.

Siting the pesticide store

- Provide easy access for the emergency services.
- Site well away from drains, waterways and drinking water supplies. Make sure that there is no risk from flooding.
- Locate the store at least four metres away from fertilisers and other flammable materials.
- Do not site the store near to a workshop, office, canteen or area used to store or process animal feed.

Storage requirements

All pesticide stores should be:

- constructed with an impermeable bunded floor which is capable of retaining at least 110% of the maximum volume of pesticide stored;
- made from easily cleaned materials;
- kept locked when not in use;
- dry, with no drain pipes or water supply inside the store;
- insulated and/or heated to provide frost protection;
- ventilated; and
- marked with a warning sign complying with BS5378 (a yellow triangle with a black exclamation mark).



Photo 12: A pesticide store

Small amounts of pesticides may be stored in marked metal pesticide cabinets, chests or bins, provided they are constructed and sited to meet the above requirements. These containers should be impact and fire resistant and have a built-in sump large enough to contain the amount of pesticide stored in case the packages leak.

Extra precautions will be necessary where the consequences of any escape of pesticides would be particularly serious. In such circumstances the guidance of the Northern Ireland Fire and Rescue Service and NIEA should be sought and followed.

More information on store requirements is provided in Agricultural Information Sheet No. 16 - 'Guidance on Storing Pesticides for Farmers and Other Professional Users' which is available free of charge from the HSENI, Tel: 0800 0320121.

Managing the pesticide store

- Have absorbent, non-combustible materials convenient, such as sand or dry soil to clean up or prevent the spread of, any spillage.
- Stack pesticides safely and within easy reach. Store liquids below powder formulations in case of accidental spillage.
- Use pesticides in order of expiry date to avoid container deterioration and labels becoming illegible with exposure to light.
- Keep flammable pesticides in a separate, clearly marked section of the store.
- Never smoke in the store. If large quantities of flammables are stored, a separate fireproof cabinet within the store is advisable.
- Keep any pesticides requiring special storage in a separate secure container within the building.
- Triple rinse empty containers and store in a secure area and out of reach of children.

Triple rinsing involves filling the emptied container 10-20% full with water, replacing the cap securely, shaking the container vigorously and finally emptying the washings into the sprayer. The process should be repeated twice.

- Regularly examine stocks to make sure that products remain on the UK list of approved products and are not out of date or revoked. Dispose of pesticides that are no longer approved in an appropriate manner. This is a requirement of Cross-Compliance (SMR10).
- If a container is not out of date but is showing early signs of deterioration, use the contents as soon as possible for the approved purpose. Only store pesticide in its original container.

Washing facilities

- Provide washing facilities for those using pesticides. A washroom should be separate from the store and equipped with a clean wash hand basin, clean hot and cold water, soap and towels.
- Provide somewhere convenient to the store where protective clothing and other equipment can be washed without risk of pollution.

Records

- Record all pesticides, including quantities, kept in the store.
- Keep the records close to, but not in, the store and readily available in case of fire, theft or accident.

6.4

Using pesticides

Before spraying

- Use pesticides only when necessary. Seek advice from a BASIS-qualified agronomist on weeds, pests and disease thresholds. Unnecessary use is uneconomic and increases the risk to people and the environment.
- Choose pesticides with care. Pests, weeds, diseases and other problems should be correctly identified. If in doubt advice should be sought from a BASIS-qualified agronomist.
- Only buy pesticides listed in the UK Pesticide Guide. It is an offence to use or store those which are not approved.
- Do not buy more pesticide than you need for the foreseeable future.
- Wear protective clothing as specified on the pesticide label.
- Thoroughly check equipment and replace any faulty parts before use. Look for damaged nozzles, hoses, tanks and pumps.
- Calibrate the sprayer regularly to ensure that the correct amount will be applied in the field.

Mixing the spray

- Take great care when mixing and filling.
- Before you start work, read the label and follow the instructions, and any other recommendations made by a BASIS-qualified agronomist.
- Calculate the exact quantity of spray required and mix slightly less than this to allow you to spray out tank rinsings once the job is complete.
- Pour pesticides carefully with minimal splashing.
- To prevent back-siphoning, never make a direct connection between a spray tank and a domestic water supply.

- Never fill spray tanks directly from waterways.
- Never handle open pesticide containers on an unsteady platform or near water.
- Never leave pesticide containers, even when empty, unattended at filling points or work sites.
- Triple rinse empty containers before storage, (for more information, see page 56).
- Store empty bottles upright in their boxes.
- Carefully dispose of seals, caps and lids.

The mixing of pesticides and filling of spray containers should take place well away from waterways or drains and always be carried out in such a way that there is no risk of polluting water by spillage, or indirectly by soil movement.

If your only option is to fill the sprayer close to a drain, protect the drain, for example, by impermeable bunding or kerbing.

Travelling to the spray site

Before moving off with equipment containing pesticides, always:

- secure all hatches and containers; and
- make sure all valves isolating the spray tank are firmly closed.

Drive at a steady pace. Take extra care when crossing streams and ditches. Use bridges or tunnels rather than fords.

Spillages

All mixing, filling and washing operations should be carried out in a way which ensures spillages cannot escape from the area and contaminate soil, surface water or groundwater. Make sure spillages do not get into yard drains. Ensure water from washings and tank mixing flows to a leakproof sump or unit.

Spraying pesticides

- Never allow pesticide spray to drift onto open drains or waterways.
- Minimise drift by using the correct nozzles, pressure and boom height. Remember that there is greater potential for drift when crops are small.
- The boom should be kept as close to the optimum height as possible.
- The safest conditions for spraying are when there is a steady light breeze (3.2-6.5km per hour) at boom height blowing away from any open water. Leaving an unsprayed strip of crop at the field margin adjacent to any water will further decrease the risk of pollution. Six metres is a suitable width. For some pesticides, a minimum width for the no-spray zone is specified on the label.

- If the product label calls for a buffer zone, either apply it in full or do a LERAP (Local Environmental Risk Assessment for Pesticides) if you want to reduce it. For more information contact your CAFRE Crops Development Adviser. Contact details can be found in annex 17, page 162. Leaving a sufficient buffer zone so that spray does not enter waterways is also a requirement of Cross-Compliance (SMR 10).



Photo 13: **Spraying on the farm**

- The statutory buffer zones may not be adequate in all cases for the protection of particularly sensitive habitats such as freshwater. Consult NIEA if intending to spray close to an ASSI to ensure it is adequately protected.
- Watch for changes in wind speed and direction. If necessary, adapt your work plan.
- You must consult the NIEA where a herbicide will be used to control aquatic weeds, or if you propose to apply a pesticide in or near water.
- Avoid contamination of field margins and boundaries, either by direct application or from drift. Contamination may kill a wide range of beneficial or harmless insects and other wildlife.
- Avoid forming pools when spraying on land.
- Do not spread on shallow soils overlying limestone or gravel.
- When soils are wet, spray headlands last to reduce contaminated mud on sprayer wheels. Clean mud from wheels before leaving the treated field.

Pesticides should not be sprayed on the following areas

- Designated sites (for example, ASSIs) unless prior written consent has been received from NIEA, (the application to undertake the works must come from the registered landowner).
- Certain lands subject to management agreements under our agri-environment schemes. If in doubt contact your local DARD Countryside Management staff.

After spraying

- Clean and rinse all equipment and protective clothing.
- Wash equipment in an area chosen and built for that purpose so that spillages cannot escape. The washing facilities should be designed to ensure that pesticides cannot back-siphon into the water supply.
- Return partly used containers to the pesticide store.
- Following application of the pesticide, record the details and retain for reference.
- Store the sprayer under cover.

6.5

Disposing of dilute pesticides and washings

- Careless or incorrect disposal of even very small amounts of pesticides is a potential source of pollution. Carefully calibrate all equipment to avoid having any spray left over. Mix slightly less than required to allow you to spray out tank rinsings once the job is complete.
- Spray the contaminated water back over this target area. This does not require an authorisation under the Groundwater Regulations.
- Under the Groundwater Regulations (Northern Ireland) 1998, if waste pesticide is to be disposed of by spreading over land other than the target area, prior authorisation is required from NIEA.
- It is an offence to cause pollution of waterways and groundwater with pesticides.

More information can be obtained, free of charge, from the 'NIEA Guidance Note: Disposal of Waste Agricultural Pesticides to land: Guidance on Compliance for Farmers and Growers'.

If no suitable land is available, store the waste pesticides in a suitable container in an appropriately bunded area for collection by a specialist waste disposal contractor.

Remember

- Waste pesticides should be disposed of as soon as is practicable after spraying. Do not store them in the sprayer.
- Never discharge waste pesticides into a waterway, drain or sewer.
- Soakaways should NEVER be used to dispose of pesticide waste or rinsings. They pose a considerable threat to groundwater.

When land spreading waste pesticides, follow the guidelines for spraying pesticides and the conditions within the Groundwater Authorisation. These include the following points.

- Do not apply more than 5,000 litres of prepared pesticide per hectare.
- Keep the land on which waste pesticides have been sprayed clear of all farm livestock for at least four weeks.
- Keep at least 10 metres away from a waterway and do not spread on fields which slope steeply towards a waterway.
- Keep at least 50 metres away from springs, wells or boreholes.
- Keep at least 500 metres away from groundwater drinking supplies for human consumption.

In addition to taking the above precautions, suitable sites should be:

- under grass or stubble;
- flat or gently sloping (a slope of less than 1:20);
- on moderate or free draining soil at least 0.6 metres deep; and
- on loamy, clay or peaty soil with a pH of 5.0-7.5.

Biobeds

These are usually lined pits, typically 1-1.3 metres deep, filled with a mixture of straw, soil and peat-free compost which is then turfed over. When used correctly, biobeds are effective at locking in and breaking down pesticide residues. These may result from drips and splashes when handling, and/or mixing larger volumes from the washdown of sprayers.

Biobeds can be either a drive-over system where liquids fall directly on to the biobed or an offset system, where liquids are collected and directed to the biobed. In either case, the regulatory system is evolving and the applicable regulations depend on whether the biobed is lined (usual and recommended) or unlined (not recommended) and the use and destination of the liquid waste. For more information, contact the NIEA Land Resource Management Unit. Contact details are in annex 17, page 163.

You need a Waste Management Regulation exemption for this practice. An exemption can be registered when completing the IACS/Single Application Form. If you do not fill this form, apply directly to NIEA. Contact details may be found in annex 17, page 163.

Disposing of containers

Containers, except those liable to produce hazardous gases, should always be cleaned before disposal. The container should be triple rinsed and the rinsing liquid used to dilute the concentrate when making up batches of pesticide solution.

Triple rinsing involves filling the emptied container 10-20% full with water, replacing the cap securely, shaking the container vigorously and finally emptying the washings into the sprayer. The process should be repeated twice.

Pesticide containers and their lids that have been triple rinsed can be treated as non-hazardous waste and may be disposed of in the same way as other farm plastics. Triple rinsing is described in section 3, page 56.

Warning

Containers of Aluminium, Magnesium or Zinc Phosphides should not be rinsed or cleaned, as they give off dangerous gases if they get damp. Always follow the manufacturer's advice with regard to disposal.

Disposing of foil caps

Foil caps will have residues of active ingredient on them and must not be allowed to blow away, drop on the ground or contaminate water. Rinsed foil caps can be collected in a container and sent once a year for disposal using a waste contractor. Make sure you discuss with your waste contractor how they prefer you to collect and store the waste.

Disposing of waste concentrate

You will need to dispose of any pesticides which are surplus to requirement, out of date, unapproved or in unsuitable containers.

It is false economy to store pesticides you cannot use. It is illegal to store products if the approval has been withdrawn. In some cases, it may be possible to return unwanted, unused pesticides to the supplier. Otherwise, you will need to use a licensed waste disposal operator.

Section 7

Sheep dip

Sheep dipping can play an important role in good animal welfare.

Sheep dips are powerful insecticides.

They are, by necessity, toxic and potent products used to control external parasites of sheep, including sheep scab mites, blow flies and ticks.

Sheep dips are potentially powerful pollutants.

All sheep dips are toxic to fish and other river life. Contamination of surface water or groundwater with sheep dip can cause the poisoning of people and animals. It can also mean the loss of drinking water supply, possibly forever.

Never dilute and dispose of waste concentrate by land spreading. Land spreading of sheep dip is illegal without prior authorisation from the NIEA.

Current sheep dips are based on either organophosphorus or synthetic pyrethroid chemicals. Newer sheep dips containing synthetic pyrethroids are 100 times more toxic to aquatic life than organophosphorus formulations.

Only use those sheep dips listed in the Veterinary Medicines Directorate 'List of Products Authorised in the UK for use Against Ectoparasites in Sheep (Ectobook)' booklet. It is available from the Veterinary Medicines Directorate website (www.vmd.gov.uk) or your local Divisional Veterinary Office. Contact details can be found in annex 17, page 162).

7.1

To dip or not to dip

Seek veterinary or professional advice on the alternatives to plunge dipping and flock management techniques that might reduce the need to treat for ectoparasites. Injectables or pour-ons may provide the control required to ensure that animal health and welfare is protected. These forms of treatment do not produce waste and therefore do not require an authorisation for disposal. Whatever method is used, follow the label instructions carefully to ensure that the treatment is effective.

Remember that Sheep Scab is a notifiable disease in NI. If your sheep are affected or suspected of being affected with sheep scab, you must notify your local Divisional Veterinary Office immediately.

7.2

Cross-Compliance and sheep dip

If you are in receipt of Single Farm Payment you must farm in accordance with Cross-Compliance. The Cross-Compliance Statutory Management Requirement (SMR 3) requires you to obtain authorisation from NIEA before disposing of various substances including spent sheep dip to land.

SMR 3 requires you to:

- meet the conditions of a Groundwater Authorisation;
- produce, on request, satisfactory written records that indicate that no breach of the legislation has occurred;
- ensure the proper siting, operation and maintenance of a sheep dipper;
- ensure that there is no evidence of the pollution of Groundwater and/or surface water by pesticides, sheep or oil; and
- comply with any Notice served by NIEA under the Groundwater Regulations (Northern Ireland) 1998.

7.3

Sheep dipping facilities

Siting the sheep dip

Sheep dipping facilities, mobile or fixed, must be carefully sited. Never site within 10 metres of any waterway (including rivers, streams and ditches, drains and wetlands) or within 50 metres of a spring, well or borehole and preferably as far away from one as possible. Baths and drain pens must not be sited on, or at the top of, slopes where there is a risk that spillage might drain directly to a waterway or to roads or tracks.

Designing and constructing

- Design and construct sheep dipping facilities to a high standard which meets the specifications in BS5502, Part 41, 1990. Further information may be found on-line at www.bsonline.bsi-global.com.
- Ensure that dipping facilities are leakproof.
- Never fit a dip bath with a drain hole. Dip baths of one-piece prefabricated construction are recommended.
- Provide draining pens where sheep can stand after dipping.

These pens should have an impervious floor and be laid on a slope of at least 1:60 so that surplus dip drains back into the dip bath.



Photo 14: A sheep dipping unit

Existing dip baths

- Existing dip baths may be repaired but, if the bath is one of the older types with a drain hole, this must be permanently sealed unless it can be demonstrated that the drain leads to an impermeable tank.
- When replacing an existing dip bath, re-siting should be considered.

Dipping operations

- Ensure that the dip bath is in good condition and watertight prior to dipping.
- Fit simple physical controls such as splashboards, to help protect the operator and avoid pollution.
- Use only UK authorised dip concentrates.
- Carefully follow the instructions given on the product label for safe use and disposal of dip. The waste dip should not contain any List I or List II chemicals other than those included in the list of Veterinary Medicinal Products authorised for use in the UK against Ectoparasites in sheep.
- Always wear the recommended personal protective equipment and keep it in good condition so that dip liquid does not get onto your skin.
- Ensure that the concentration of dip is always at the strength recommended by the manufacturer.
- Do not overfill the dip bath and never allow dip baths to overflow during dipping operations. The dip concentrate should be placed in the dipper after filling with water to avoid overflow risk.
- Consider the welfare of sheep during the dipping operation. Ensure that the sheep are properly immersed according to the instructions on the product label.
- Check any settlement traps regularly and clear as necessary.

After dipping

Hold the sheep in drip pens for at least 10 minutes and make sure that all surplus dip and splashes flow back to the dip bath.

Do not let freshly dipped sheep come in contact with rivers, streams, ponds, ditches or drains on their return route to grazing. Waterlogged ground should also be avoided.

Keep freshly dipped sheep in a field where they have no access to rivers, streams, ponds or ditches. It may be necessary to fence off these waterways and provide alternative drinking troughs where no such field is available. This precaution is necessary as dipped sheep continue to pose a risk to water quality for some time after dipping, even if their fleeces are dry. While the risk of contamination is significantly reduced after two days, it is good practice to avoid contact with waterways for at least two weeks.

Mobile dippers, showers and jettors

The use of mobile equipment has become popular in recent years. It is usually carried out by contractors. It is an option if your existing dipping facilities are inadequate or showing signs of deterioration or are inappropriately sited.

Choose the site carefully. If used on hard standing or impermeable areas, ensure that all run off is collected in the same way as is required for static dip baths. If the dipper is located in a field, it should be more than 10 metres from a watercourse and 50 metres from springs, boreholes or wells. This distance should be increased to 500 metres from groundwater drinking supplies. The field should be flat or gently sloping with well established grass cover and underlain by at least 150 millimetres of topsoil. Never use mobile dippers on land which is frozen, compacted or liable to flooding.

Agree responsibility for disposal of spent sheep dip with the contractor prior to the commencement of dipping. If the contractor proposes to dispose of the spent sheep dip, establish where it is to be disposed of and confirm that the contractor has the appropriate authorisation.

7.4

Disposing of sheep dip

Used sheep dip continues to contain a proportion of active insecticide, so poor or inappropriate disposal of even small quantities can have devastating effects on fish and other aquatic life.

It is an offence to pollute water (including groundwater) with sheep dip. Under the Groundwater Regulations, which implement the Groundwater Directive, used sheep dip can only be spread on land authorised by NIEA. Do not dispose of sheep dip before receiving Groundwater Authorisation from NIEA. Land spreading of waste sheep dip without prior authorisation is illegal and a breach of Cross-Compliance.

More information is available from the 'NIEA Guidance Note: Disposal of Waste Agricultural Pesticides to land: Guidance on Compliance for Farmers and Growers'. This is available free of charge.

If no suitable land is available for spreading, store used dip in a holding tank to await collection by a specialist waste disposal contractor. It may be necessary to have a tank for retaining used dip at locations where many sheep are being dipped.

Remember:

- Dispose of used sheep dip as soon as is practicable after dipping.
- Do not store used dip in the dip tank.
- Do not remove the label from empty dip containers.
- Never discharge used dip into a waterway, drain or sewer.
- Soakaways should never be used to dispose of used sheep dip as they pose a considerable pollution threat to groundwater.
- Do not use any existing soakaways and never construct a new one.
- Do not pour used dip onto land adjacent to the dipper.

Land spreading used sheep dip

It is a condition of the Groundwater Regulations that records must be kept of the types of substances to be disposed of and their volumes, dates and locations of disposal. Disposal should only be permitted on one occasion per disposal site per year.

If approval is given by NIEA to dispose of used sheep dip on land, you must observe the conditions of the Groundwater Authorisation. These may include the following points.

- Do not spread within 10 metres of a waterway or on fields which slope steeply towards waterways.
- Keep at least 50 metres away from springs, wells or boreholes.
- Keep at least 500 metres from groundwater drinking supplies.
- Dilute the used dip by at least one part dip to three parts water to achieve the correct dilution. Slurry may also be used to dilute waste dip, but remember, if mixed with slurry, then that slurry may only be spread on fields authorised under the Groundwater Regulations.
- The maximum daily application rate of spent sheep dip before dilution shall not exceed 5,000 litres (1,100 gallons) per hectare or 20,000 litres per hectare after dilution (3:1) to assist safe spreading. The presence of vegetation will assist breakdown of dip chemicals;
- Avoid forming pools of dip when spreading on land;
- Keep land on which used dip has been spread clear of farm livestock for at least four weeks;
- Do not spread on shallow soils overlaying limestone or gravel.

Sheep dip should not be spread on:

- designated areas (for example, ASSIs) without prior permission from NIEA;
- certain lands subject to management agreements under our agri-environment schemes. If in doubt contact local DARD Countryside Management staff.

Disposing of containers

- Never reuse empty dip containers for any purpose.
- After cleaning by triple rinsing (as described in section 3, page 56), puncture or crush containers to make them unusable. Dispose of them in accordance with the Waste Management Regulations, as described in section 11.4, page 86.
- Containers which hold unidentified substances, or which cannot be thoroughly cleaned, must be disposed of by a specialist waste disposal contractor.

Disposing of surplus concentrate

- Return surplus concentrate to the supplier or dispose of it by employing a specialist waste disposal contractor.
- Always store concentrate dip in a locked pesticide store on the farm.

It is false economy to store sheep dip you cannot use. It is illegal to store products if the approval has been withdrawn. In some cases, it may be possible to return unwanted, unused sheep dip to the supplier. Otherwise, you will need to use a licensed waste disposal operator.

Certificate of competence

Anybody who wishes to buy any form of sheep dip must have a Certificate of Competence, or must satisfy the merchant selling the dip that they are the employer of, or acting on behalf of, someone who has a Certificate. The Certificate of Competence in the safe use of sheep dips course demonstrates how to handle and dispose of sheep dip safely and effectively. For more information contact CAFRE. Contact details can be found in annex 17, page 161. More information can be found in annex 8, page 130.

Section 8

Fallen animals

Farm burial of animal carcasses or parts of carcasses is prohibited under the Animal By-Products Regulations (Northern Ireland) 2003. Under this Regulation, animal carcasses must only be disposed of by approved methods. Failure to comply with this Regulation is an offence.

Under the Dogs (Northern Ireland) Order 1983, animal carcasses awaiting collection or disposal must not be accessible to dogs.

The Animal By-Products Regulations allow the burial of pet species, such as dogs and cats. The burial of individual pet horses and ponies is also permitted provided they were not kept for commercial purposes.

Improper disposal of fallen animals can lead to:

- public criticism, resulting in damage to the image of the NI agricultural industry and countryside;
- detrimental effects on the environment, particularly water quality;
- spread of disease to stock on neighbouring farms; and
- potential risks to public health.

8.1

Disposing of fallen animals

Since 3 December 2003, routine on-farm burial of animal carcasses or carcass parts has been prohibited under the Animal By-Products Regulations (Northern Ireland) 2003.

Animals which die on the farm (including stillbirths) should be disposed of by one of the following options.

- **The National Fallen Stock Scheme**

The National Fallen Stock Scheme was set up on 22 November 2004 to help farmers cope with the change in legislation. The scheme is run by the National Fallen Stock Company on a not-for-profit basis. There is an annual registration fee (reviewed annually) to cover administration costs with additional payments according to usage. For more information about this service and the collection operators in your area call the Scheme helpline on 0845 0548888 or access the website: www.nationalfallenstock.co.uk.

- **An independent rendering plant**

It is permissible for farmers to dispose of fallen stock in an approved rendering plant outside the National Fallen Stock Scheme.

- **Bovine animals over 24 months**

In the case of bovine animal carcasses, aged over 24 months, there is currently a free collection service operated by Glenfarm Holdings Ltd on behalf of DARD (Tel: 028 9445 1919) to facilitate BSE testing of such animals in line with EU requirements.

- **Collection Centres**

Farmers have the option of disposing of animal carcasses at approved Collection Centres. Such premises supply treated material for feeding to dogs at recognised kennels, to zoo or circus animals, or to maggots for fishing bait. However, they are limited in the number of fallen animals they can handle. Contact your local Divisional Veterinary Office for details.

- **Incineration**

Farmers may install and use on-farm incinerators for the disposal of fallen animals. All incinerators must be approved under the Animal By-Product Regulations (Northern Ireland) 2003 and may be subject to Planning Permission. Please note that you need to register for an agricultural waste exemption. You can do this when completing the IACS/Single Application Form, or for if you do not fill a IACS/Single Application Form, apply directly to NIEA. Contact details may be found in annex 17, page 163.

8.2

Other requirements

Record all deaths in the herd/flock register and notify cattle deaths to your local Divisional Veterinary Office within seven days using form MC1.

If you suspect that a notifiable disease has caused the death, for example, Brucellosis or Anthrax, you must report details immediately to your local Divisional Veterinary Office. They will advise whether or not the carcass should be made available for a postmortem examination.

For more information and advice on the disposal of fallen animals contact your local Divisional Veterinary Office. Contact details may be found in annex 17, page 162.

Section 9

Fuel oil storage

Most farms have tanks to store fuel oil used to power agricultural machinery. In addition, waste lubrication and hydraulic oils are produced in significant quantities from the servicing of machinery.

As well as being a fire risk, oil is poisonous and a potential pollutant. Spillages into waterways and onto land can have serious implications for plant and animal life. Oil spills cause a number of pollution incidents each year.

It is vital to store and use fuel oil safely to prevent pollution of our environment.

9.1

Legislation affecting agricultural fuel oil stores

Under the SSAFO Regulations, any new or substantially altered agricultural fuel store with a capacity of more than 1,250 litres must be constructed and bunded to the appropriate specification and notified to NIEA at least 28 days in advance of the structure being brought into use.

Oil tanks, which were in use before the Regulations came into force, can continue to be used. However, the Regulations give NIEA powers to inspect tanks on farms. If they consider an existing structure to present a potential pollution problem, NIEA may serve a notice, which requires work to be carried out or precautions taken to minimise any risk of pollution to waterways or groundwater. Use of the tank may be prohibited until all necessary works are completed.

9.2

Design and construction of fuel oil stores

Relate the size of the tank or store to the expected consumption of fuel on the farm.

SSAFO Regulations state that above ground fuel tanks or areas for storing oil drums must meet certain specifications.

- They must be surrounded by a bund (a base and walls which are impermeable to fuel oil). The required size of the bund varies according to whether the fuel is stored in a single tank or in several tanks. For example, with a single tank, the bund should be capable of holding 110% of the tank's contents. Every part of the tank should be within the bund. The bund and the base of the storage area must be impermeable and constructed so that, with proper maintenance, they are likely to last at least 20 years. The tank and bund surrounding it must be at least 10 metres away from any waterway.
- They must be arranged so that any permanently fixed valves or taps empty vertically downwards into the bund and shall be shut and locked in that position when not in use.

- They must be fitted with an automatically closing valve or tap at the end of any flexible pipe used for filling vehicles.
- They must be sited so as to minimise the risk of fire.
- New steel tanks for fuel oil should meet BS799; Part 5; 1987, or OFS T200, which details the thickness of steel plates, supports, filling pipes and vents. Plastic tanks should hold an OFCERT Licence OFS T100 issued by The Oil Firing Technical Association (OFTEC - Tel: 0845 65 85 080). For more information about BS specifications go to www.bsonline.bsi-global.com
- The tank should be adequately supported on a permanent base.
- The tank should be protected from damage by vehicles.
- A sight glass or contents gauge should be visible to prevent over filling.
- The bund must have no outlet but should slope internally towards a small sump at one end.
- A shut-off valve should be fitted next to the tank if it supplies a grain dryer or other fixed equipment.
- An anti-siphon device should be fitted if the tank filling inlet is lower than the highest level of fuel in the tank.
- Outlet valves should be marked to show whether they are open or closed.
- Integrally banded fuel tanks are now available. These aim to reduce the risk of pollution from oil spillage without the need to construct a bund.

SSAFO Regulations do not apply to underground fuel tanks, temporary mobile fuel tanks or domestic fuel oil that is stored separately from agricultural fuel oil.

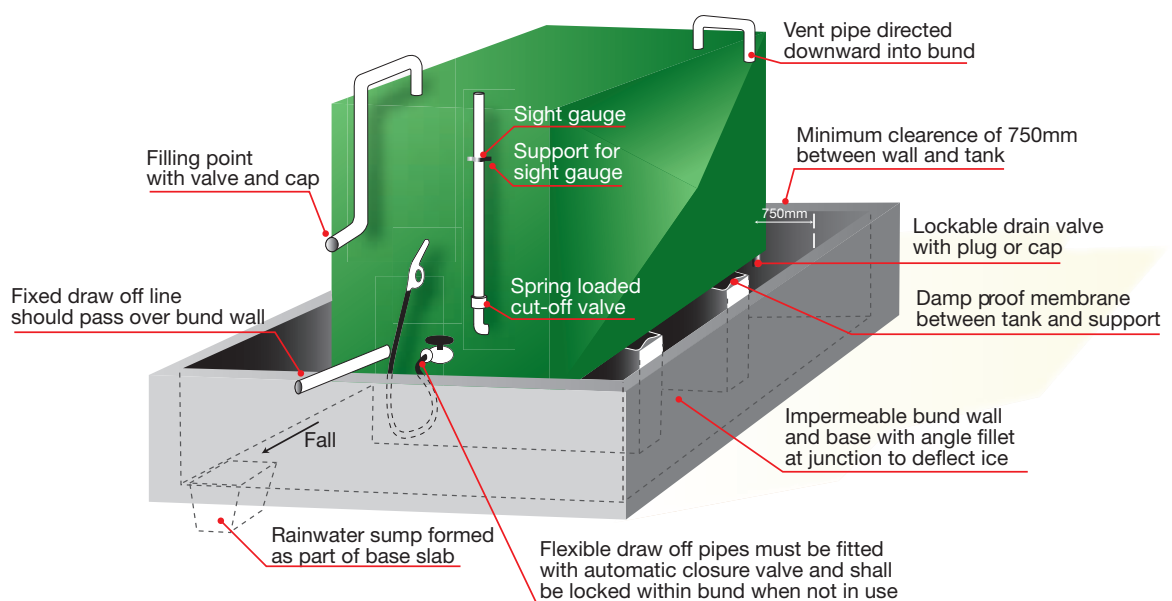


Figure 8: Bunded oil tank (showing arrangement for both fixed and flexible draw off points)

9.3

Tank filling and operating procedures

Fuel oil is flammable, as well as being highly polluting, so take extra care when handling it.

- Clean up spillages with sand or other absorbent material. Have these convenient to the storage area. Never use detergents to clean up an oil spill as this will increase the pollution risk.
- Arrange to be present when fuel is delivered.
- Keep valves closed and locked when not in use.
- Flexible hoses and hose outlets should be contained and locked within the bund when not in use.
- Check tank, bund and valves regularly for leaks and repair as soon as possible.
- Paint steel tanks regularly to prevent corrosion.
- Avoid over filling vehicle fuel tanks.
- Have a contingency plan to deal with any leakages.

Emptying the bund

- If the tank is integrally bunded or the bund has a roof to keep out rainwater, emptying will not be necessary.
- Clean water in the bund can be disposed of. A hand pump can be used to empty the sump of clean rainwater. Small amounts of oil on the surface can be removed using a special oil absorbing textile but care must be taken to prevent the discharge of any oil.
- If large amounts of oil are present, then an appropriate clean-up contractor must be used.
- Water and oil which collect in the bund or sump must be disposed of safely.
- Care must be taken when emptying the bund to ensure that no oil is released.

Disposing of waste oils

- Never dispose of waste oils or oily wastes to a soakaway, waterway, drain or sewer as it can cause serious water pollution.
- Never deposit waste oils on land. This poses a risk to groundwater and soil quality. Mineral oils and hydrocarbons such as diesel, petrol and oil are classified as List I substances under the Groundwater Regulations (Northern Ireland) 1998. It is a requirement of Cross-Compliance (SMR3) that there is no evidence of Groundwater pollution by such substances.
- Where waste oil cannot be reused on the farm, for example, to fuel a heater, it should be taken to a suitable licensed waste disposal facility. Your local council should have one.



The
Code
of

Good
Agricultural
Practice
for the Prevention
of Pollution of
Air

Section 10

Introduction

Everyone wants and expects to breathe clean air. 'Clean fresh air' is often a quality highlighted when promoting NI as a pleasant place to live, visit, invest in or purchase food from. It is an essential component of our 'Clean, green image'.

10.1 What is air pollution?

Air pollution occurs when a substance, or substances, modifies the natural characteristics of the atmosphere. Pollutants include smoke particles, gases and noxious odours.

10.2 Why are we concerned about air pollution?

There are four main concerns.

1. Health and quality of life.
2. 'Good country smell' or air pollution?
3. Habitat quality.
4. Climate change.

You can find more information in annex 9, page 131.

10.3 Legislation

Legislation dealing with the pollution of air in NI is summarised in annex 10, page 145.

Section 11

Preventing air pollution

11.1 Reducing odour and ammonia losses

11.1.1 Farm buildings

The following points will help you to minimise the risk of smell and reduce ammonia losses.

New buildings

- Design buildings and slurry systems to reduce the exposed surface area of slurry. Losses of ammonia and the creation of odours are related to the surface area of the exposed slurry or manure. Shallow tanks with a large surface area tend to have higher ammonia emissions than deeper tanks with a similar capacity and a smaller surface area. Above ground slurry stores have the least potential for ammonia emissions. This can be further reduced by fitting specially engineered covers.
- New slurry stores must comply with SSAFO. Annex 2, page 118 gives more details.
- Slurry produces more offensive odours than FYM. This is because slurry is often stored for long periods in warm conditions and it often has other organic materials such as silage effluent added to it which increase the production of smells.
- Livestock manure stores must meet the requirements of BS5502 (Part 22). More information is available on-line at www.bsonline.bsi-global.com.
- Planning approval is required for farm buildings and stores over a certain size. New units should be sited well away from housing developments and must comply with the NI Building Regulations. Full details may be obtained from the Planning Service website www.planningni.gov.uk. Alternatively contact:

Planning Service Headquarters

Millennium House

19-25 Great Victoria Street

Belfast

BT2 7BN

Telephone: 028 9041 6700

Fax: 028 9041 6802

- Intensive pig and poultry farms that exceed 40,000 places for poultry, 2,000 places for production of pigs over 30kg or 750 places for sows must comply with the Integrated Pollution Prevention Control (IPPC) Regulations. Any new housing (including replacement or an expanded installation) must be designed in accordance with the Standard Farming Installation Rules to minimise ammonia emissions (by using Best Available Techniques). Farmers should contact NIEA prior to commencing construction of any new buildings. More information about this legislation can be found in annex 10, page 139. The relevant contacts are listed in annex 17, page 164.

Existing buildings

- Existing units should be well managed, including maintaining a high standard of hygiene and cleanliness.
 - Remove slurry and manure daily from buildings. Scrape and wash floors in cattle and pig units regularly.
 - Do not allow manure to accumulate around buildings that have been cleared of stock. Regularly clean and thoroughly disinfect housing after each batch of stock has been removed.
 - Collect run-off from dirty concrete areas separately from clean water and spread as recommended in annex 4, page 121 and section 3, page 34.
 - Use dry bedding which is free from dust and moulds.
 - Regularly maintain drinking water systems to avoid overflows which could wet any bedding or poultry litter and cause odours.
- Increased storage capacity will enable you to choose when to spread. This will reduce the risk of odour nuisance.
- Covering slurry stores will further reduce odours. In certain circumstances it is possible to build a floating or fixed cover for existing slurry tanks.
- Slurry that is frequently agitated will produce odours and therefore agitation should be kept to a minimum. An agitation system that can break up any crust or remove any sediment should be installed and used before the tank is to be emptied. Health and Safety precautions when mixing slurry can be found on pages 27 and 46.

- Solid manures compost naturally without producing much odour if they are well aerated. A long, low, narrow store is preferable, no more than 10-15 metres wide and no taller than three metres high. This will allow as much of the manure surface to be exposed to the air as possible. Poultry manure can develop a strong odour if it gets wet. This may be minimised by covering with an impermeable cover.
- If there is insufficient storage, store the livestock manure outside in narrow 'A' shaped heaps well away from any residential area. Refer to section 2.3, page 29 for further guidance on storing livestock manure in temporary field heaps.
- Manure from laying hens has a dry matter content of 20-24%. Air-drying under cover in the poultry house or in a separate storage area will dry it further and reduce the amount of odour produced. Air-dry poultry litter rapidly and keep it dry at all times to reduce ammonia losses. This will retain the fertiliser value of the manure.
- Broiler litter can have a dry matter content of up to 65%. If stored prior to spreading, store it under a cover on an area of hard standing for at least one month to keep it dry and prevent odour problems. Any run-off would be considered slurry under the SSAFO Regulations and must be collected. Refer to section 2.3.2, page 30 for further guidance on storing poultry litter.
- Avoid adding water to poultry manure as this increases the smell problem.
- Where possible, store waste milk products, waste food and silage effluent separately from slurry.
- Do not overstock. See our 'Recommendations for the Welfare of Livestock' booklets for guidance. These are available from your local DARD Divisional Veterinary Office. Contact details can be found in annex 17, page 62.

Ventilation

The following points will help you to minimise the risk of smell and reduce ammonia losses.

- Use proper ventilation to control the temperature, humidity, dust levels and amounts of poisonous gases. It is essential to follow Health and Safety guidelines when mixing slurry. Please refer to page 27 and 46 for more information.
- Clean ventilators between batches of livestock so that the correct airflow is maintained.
- Position ventilation outlets as high as possible to maximise the dilution of smells by air currents. Ventilators along the sides of buildings, over slurry collection channels and below slatted floors can increase smell problems.

Contact CAFRE Development Advisors for more information about the positioning of ventilator outlets. Contact details are in annex 17, page 162.

Feed storage and feed areas

The following points will help you to minimise the risk of smell and reduce ammonia losses.

- Ensure that animals are not fed more protein than they require for the target level of production. 60-80% of the nitrogen fed to livestock is excreted and much of it is rapidly converted to ammonia.
- Avoid long feed drops into meal bins and onto floors, as odours can be absorbed by dust particles and carried in the air. Liquid feeding systems greatly reduce dust and odours.
- Store strongly smelling feeds, such as whey, molasses and yeast in properly constructed containers that are easy to fill and empty to avoid spillage.
- Provide a concrete delivery and feed preparation area that can be easily cleaned. Washings should be directed into the dirty water collection system.

Fallen animals

To minimise the risk of smell, dispose of fallen animals as described in section 8, page 69.

Other options to reduce odour

- Consider treating the slurry with anaerobic or aerobic digestion techniques. This involves a high capital investment. More information can be found in annex 3, page 119.
- Bioscrubbers and biofilters for reducing ammonia emissions and odours are a developing technology. They are too expensive to be widely used at present.

11.1.2 Spreading slurry, livestock manure and organic wastes

Over 50% of total ammonia loss occurs within one day of spreading. Losses are negligible after five days.

The following points will help you to minimise the risk of smell and reduce ammonia losses when spreading.

- Use a weather forecast to choose suitable conditions for spreading, which must also comply with the NAP Regulations.
- Avoid spreading during windy conditions or when the wind is blowing towards neighbouring houses or populated areas.
- Avoid spreading in conditions of high humidity or clear still nights which prevent odour from dispersing.
- Avoid spreading at weekends, public holidays or in the evenings.
- Where possible, slurry or manure spreading should not be carried out within one kilometre up-wind of a residential development or areas to which the public has access.

- Follow the guidelines for slurry and manure application outlined in section 3, page 34.
- Match the application rate to crop requirements, but do not apply more than 50,000 litres/hectare of slurry or 50 tonnes/hectare of solid manure in one application. Three weeks must be left between applications. Incorporate the slurry, manure or organic wastes into the soil as soon as possible after spreading. Remember that the total nitrogen spread applied from livestock manures on the area farmed can not exceed 170kgN/ha/yr, unless a derogation has been received as described on page 116.
- Avoid overfilling tankers or spreaders to reduce the risk of spillages on roads and lanes. You should clean up any spillages on roads immediately.
- Clean the outside of spreading machinery regularly and direct all washings into the dirty water collection system.

A number of techniques to reduce ammonia emissions associated with slurry application can be used.

- Band spreading/trailing shoe.
- Soil incorporation of slurry on bare arable land can reduce emissions by up to 90%. This should be carried out by ploughing or rotavating in as soon as possible after spreading.
- Shallow soil injection.
- Deep soil injection (150mm) can reduce ammonia emission by 97% of that of conventional tanker spreading.

You can find out more information about these techniques in annex 6, page 126.

Other organic wastes such as treated blood or sewage or septic tank sludge must be injected or incorporated into the soil immediately after application in order to reduce the smell nuisance. For more advice on the prevention of pollution by these wastes, see section 4, page 44.

11.2 Smoke

The unregulated burning of agricultural wastes is no longer permitted under the Waste Management Regulations (NI) 2006. However, small quantities of plant matter (up to 10 tonnes of waste plant tissue in any 24 hour period) may be burned provided an exemption is obtained from NIEA.

Full details of the Waste Management Regulations can be found in section 11.4, page 86.

11.2.1 Burning straw and stubble

The burning of straw and stubble is strongly discouraged as it poses risks to:

- farm buildings, crops and machinery;
- the countryside - hedgerows and trees can be damaged, and wildlife disturbed or killed; and
- the public - the smoke can cause nuisance to nearby houses and businesses as well as being a hazard to road traffic. The emission of dark smoke is an offence under the Clean Air (Northern Ireland) Order 1981. Also, local councils can take action if burning gives rise to smoke that constitutes a nuisance under Section 107 of the Public Health (Ireland) Act 1878, to have the nuisance abated and to prevent its recurrence.

Before burning

- Register for a waste exemption. You can do this when completing the IACS/Single Application Form, or for if you do not fill a IACS/Single Application Form, apply directly to NIEA. Contact details may be found in annex 17, page 163.
- If planning to burn within one mile of a forest, contact the Forest Service or the owner to get permission first.
- Inform the local Northern Ireland Fire and Rescue Service of your intention to burn.
- Inform neighbours to prevent unnecessary alarm or inconvenience.
- Consult your local Environmental Health Department if burning near a residential area.
- Check that wildlife will not be disturbed or destroyed.
- Inform air traffic control at any airstrip with a perimeter fence within half a mile of the burn.
- Use an up to date weather forecast to assess whether to burn or not. Avoid burning during still conditions, during periods of variable, strong or gusting winds or when the wind exceeds Force 3 (8-12mph). Wind speed can be estimated by observing the effect on the environment. For further information see annex 14, page 157. Assess wind direction and likelihood of wind direction change.
- Have sufficient fire beating implements nearby as well as competent staff to use them.
- Make a fire break at least 10 metres wide by removing straw (bale or cart off). Then cultivate or plough to thoroughly incorporate the residues into the soil.
- It is useful to have at least 1,000 litres of water available at each burn, along with a pump capable of discharging 100 litres per minute.
- Have a quick means of calling help.

During and after burning

- Make sure sufficient people and equipment are on hand at all times to control the burning. An experienced person with overall responsibility must be present.
- Limit burning to controllable blocks, with at least 150 metres between blocks being burned at one time.
- Start early in the day. All fires must be out by nightfall.
- Burn against the wind.
- If the fire gets out of control, call the Northern Ireland Fire and Rescue Service. Stop burning if conditions become unsuitable.
- The fire must be completely out before you leave the field. Check for smouldering and return later to check again.
- Vehicles used in connection with the burning operation must be equipped with a suitable fire extinguisher.
- People not connected with the burning operation must be kept away from the field (especially children).
- Incorporate the ash into the soil as soon as possible.

Do not burn:

- within 15 metres of a hedgerow, tree, march fence or any public utility (for example, telegraph poles);
- within 50 metres of residential, livestock or industrial buildings, glasshouses, historic monuments, ripening standing crops, hay or straw stacks, woodland, nature reserves, or any accumulation of combustible material;
- within 150 metres of any road or mainline railway;
- within 150 metres of a block of straw or stubble already burning;
- after dusk;
- on weekends or public holidays;
- when you may cause discomfort to the public or put the public in danger;
- when smoke could restrict visibility on any road; and
- on peaty soils which may catch fire.

11.2.2 Burning moorland vegetation

Occasional small scale burning can be beneficial on moorland vegetation as rapidly regenerated plants provide nutrition to sheep and cattle. However, large scale uncontrolled, frequent burning damages the vegetation structure and can cause erosion. Burning on areas of deep peat can destroy sensitive plants. To avoid damage to wildlife and property, burning must be well controlled.

Time of burning

The best time to burn heather is in autumn. It is an offence to burn between 15 April and 31 August, any gorse, furze, whin, heath, ling or fern growing on any mountain, moor, heath, bog or other uncultivated land under the Game Law Amendment Act (Northern Ireland) 1951. This is also a requirement of Cross-Compliance GAEC 6.

The heather burning code

- Burn in blocks of less than two hectares.
- Limit burning to one tenth of the total area in any one year.
- Fires must always be supervised and sufficient people and equipment on hand to control burning.
- Burning during still conditions, during periods of variable, strong or gusting winds or when the wind exceeds Force 3 (8-12mph) should be avoided. Wind speed can be estimated by observing the effect on the environment. For more information see annex 14, page 157. Assess wind direction and likelihood of wind direction change.
- Light fires with the flames blowing downhill and away from areas of woodland, forest, scrub, bog and steep slopes.
- Get permission from the local Forest Service or owner before burning within one mile of a forest.

11.2.3 Incinerating animal carcasses

Farmers can install and use on-farm incinerators for the disposal of fallen animals provided that the incinerator is approved under the Animal Product Regulations (Northern Ireland) 2003. Planning permission and an operating licence for an incinerator may be required from the Department of the Environment.

You need an agricultural waste exemption for this practice. You can register for agricultural waste exemptions when completing your IACS/Single Application Form. If you do not fill an IACS/Single Application Form, apply directly to NIEA. Contact details may be found in annex 17, page 163.

Details of the safe disposal of fallen animals can be found in section 8, page 69.

If you think that a notifiable disease, for example anthrax, has caused ill health or death you must report it to your Divisional Veterinary Officer, who will advise on whether the carcass should be made available for a postmortem examination.

11.3 Reducing greenhouse gas emissions from agriculture

Land management activities both absorb and release greenhouse gases. It is impossible to prevent all greenhouse gas emissions from agriculture, but it is possible to reduce the amounts emitted.

11.3.1 Reducing methane emissions

The likely reduction in animal numbers as a result of CAP reform and ongoing developments in productivity and fertility in the livestock industry, suggest that overall emissions of methane are likely to decrease. Actions to directly reduce methane emissions from livestock include:

- changes to livestock feed regimes;
- improving the milk production of dairy cows, so reducing the total number of animals needed to produce the same quantity of milk; and
- installing anaerobic slurry digestion systems. These make use of methane produced from slurry, are a useful power source and reduce methane losses to the environment. Such systems require high capital investments and must be economically viable. More information about anaerobic treatment can be found in annex 3, page 119.

11.3.2 Reducing nitrous oxide emissions

A number of practical actions and technologies can be taken up by farmers to efficiently use chemical nitrogen fertilisers, reduce chemical nitrogen use and maximise the benefit of organic nitrogen, so reducing nitrous oxide emissions. These include:

- accurate application of chemical nitrogen;
- nutrient management planning;
- the use of organic manure and reduction of chemical nitrogen use in fertiliser regimes; and
- better slurry handling practices.

11.3.3 Reducing carbon dioxide emissions

The most effective way of reducing carbon dioxide emissions is to use energy more efficiently. Alternative energy sources derived from non-fossil fuels (for example, rape oil) may become more important in the future. Improvements in energy efficiency can also reduce farm running costs.

You can help reduce carbon dioxide emissions by the following actions.

- Protect intact peatlands to retain their function as a carbon store. It is estimated that deep lowland raised bogs in NI store carbon levels in excess of 5,000 tonnes per hectare.
- Properly maintain engines by following the manufacturer's recommendations.
- Choose the lowest powered tractor capable of doing the required job.
- Do not make unnecessary journeys and machinery passes.
- Maintain fixed equipment such as grain driers, refrigerated stores and bulk milk tanks in good condition and operate them efficiently.
- Reduce heat loss from heated buildings by installing effective insulation and ventilation.
- Save on fuel in heated glasshouses and mushroom houses by exercising precise control over temperature using thermal screens and correct maintenance of boilers and burners.
- Consider using non-fossil fuel energy sources where economically viable, such as solar heating, heat pumps, straw burning boilers, biogas from manure digestion, wind and water power.
- Make sure fertiliser spreaders are properly maintained and fertiliser is applied at the correct rate. Remember, large amounts of fossil fuel are needed to make nitrogen fertiliser.



Photo 15: **Moorland**

11.4 Waste management

The Waste Management Regulations (NI) 2006 extend waste management controls to agriculture in accordance with the European Waste Framework and Landfill Directives. NIEA is the regulatory body with the responsibility for implementing these Regulations. Contacts within NIEA may be found in annex 17, page 163.

This legislation requires many of you to change the way that you dispose of waste from your farms. You should:

- be aware of what the Regulations will mean for your business;
- examine your own operation, to find out if more inputs could be sourced in bulk, to minimise the packaging problem;
- examine how you can reduce, reuse and recycle material;
- discuss options with suppliers to find out if they can reduce packaging or operate a take-back scheme; and
- examine existing services which you could utilise for the management of your waste.

11.4.1 What are agricultural wastes?

Agricultural wastes are all substances or objects produced at agricultural premises which are to be discarded. These include all non-organic and some organic waste materials.

Agricultural premises are farms used for an activity defined as agriculture in the Agriculture Act (Northern Ireland) 1949 including: ‘...horticulture, fruit growing, seed growing, dairy farming and livestock breeding and keeping, the use of land as grazing land, meadow land, osier land, market gardens and nursery grounds, and the use of land for woodlands where that use is ancillary to the farming of land for other agricultural purposes, and ‘agriculture’ shall be construed accordingly.’

Examples of agricultural waste are shown in Figure 9, page 88.

Figure 9: Types of agricultural waste

Agricultural Waste		
<p>Vehicle and machinery waste</p> <p>Antifreeze, batteries, brake pads, oil, filters, tyres, redundant vehicles and machinery, hydraulic oils, engine/gear/lubricating oil, waste fuels.</p>	<p>Plastic packaging</p> <p>Feed bags, animal health packaging, fertiliser bags, agrochemical containers, seed bags, feed bags, general plastic packaging.</p>	<p>Animal health products</p> <p>Animal health treatments, swabs and dressings (used and unused), sheep dip, syringes (used and unused), medicines.</p>
<p>Non-packaging plastic</p> <p>Bale twine, net wrap, tree guards, cores for silage sheets, greenhouse and tunnel film, mulch film, crop cover, fleeces, horticultural plastic, silage plastic.</p>	<p>Natural farm wastes</p> <p>Ditch and waterway dredgings, feathers, wool, silage, plant tissue, manure and slurry, parlour washings, yard washings, poultry, litter, milk, straw, hay, unused (treated) seed.</p>	<p>Hazardous waste</p> <p>Agrochemical concentrates, antifreeze, asbestos (all forms), batteries, brake fluids, oils, medicines, fluorescent light tubes.</p>
<p>Miscellaneous</p> <p>Ash, textiles, vegetable washings.</p>	<p>Metal, wood, glass, rubber</p> <p>Hedge trimmings, tree prunings, oil drums, scrap wood (e.g. fence posts), paint tins, sawdust, wood shavings, pallets, aerosols.</p>	<p>Cardboard and paper</p> <p>Packaging, feed bags, cores for silage sheets, seed bags.</p>

11.4.2 Disposing of agricultural waste

Table 4: Permitted options for disposing of agricultural waste

1	Register a licence exemption	<p>There are 25 exemptions, 21 simple and 4 complex exemptions. Exemptions include: burning plant tissue; depositing water course dredgings onto farmland. A full list of exemptions can be found in annex 15, page 158.</p> <p>You can register for agricultural waste exemptions when completing your IACS/Single Application Form. If you do not fill this form, apply directly to NIEA. Contact details may be found in annex 17, page 163.</p>
2	Store the waste for up to 12 months	<p>Agricultural waste can be stored for 12 months where it is being produced, pending collection. However, this storage must not pose a risk to the environment or human health. Once this timescale has elapsed the waste must be recovered or disposed of at an appropriately licensed site.</p>
3	Dispose of the waste in an appropriately licensed waste management site off-farm, transported by farm producer	<p>Non-hazardous agricultural waste The producer of the waste can undertake the transport of the material, except agricultural construction and demolition waste, without the need for a waste carrier’s licence.</p> <p>Agricultural construction and demolition waste The producer of the waste can undertake the transport of the material, but a waste carrier’s license is required.</p> <p>Hazardous agricultural waste A consignment note from the NIEA is required if the agricultural waste is hazardous.</p>
4	Dispose of the waste to an appropriately licensed waste management site off-farm, transported by anyone other than the farm producer	<p>A waste carrier’s licence is required.</p> <p>If the carrier is only transporting agricultural waste, applying for the licence will be a one off procedure and it is free of charge.</p> <p>If a carrier is transporting all forms of waste the existing registration of carriers system applies. The current cost is £120 for the initial application and £60 for subsequent three year renewals.</p>

(continued)

Table 4: Permitted options for disposing of agricultural waste

5	Transfer the waste to a registered waste carrier for recovery or disposal off farm at an appropriately licensed site
6	Apply to NIEA for a waste management licence or a landfill permit to recover or dispose of the waste on farm

Duty of Care Obligations

Duty of Care applies to all waste produced on a farm. The Duty of Care principle places a legal responsibility on anyone who produces, stores, transports, treats or disposes of waste to take the necessary steps to keep it safe and prevent it from causing harm, especially to the environment or to human health. There are some simple rules to follow including keeping the waste secure so it does not leak or blow away. If you give your waste to someone else, for example a waste contractor, it is your duty to make sure that:

- the person can take it - check they are authorised;
- the waste goes to a proper legal site – one that is licensed or exempt;
- you give the person a transfer note – this needs to include a description of the waste; and
- the waste does not escape from their control (for example by ensuring that your waste is safely contained).

More information is available from NIEA. Contact details can be found in annex 17, page 163.

11.4.3 Prohibited disposal options

- **Waste must not be disposed of in a 'farm dump'**
 You are no longer able to use a farm dump as a method of disposal unless you have applied for, and received, a Waste Disposal Licence for the site. The dumps are liable to be treated as landfill sites where they do not have a Waste Disposal License. As a result they would require a site conditioning plan and all of the remedial measures associated with the closure of a landfill site. These implications are costly.

- **Waste must not be burned**

The unregulated burning of all wastes is no longer permitted. The only exception to this rule is for small quantities of plant matter, including hedge trimmings, where an exemption may be obtained to burn up to 10 tonnes in any 24 hour period. The operation must comply with the Public Health (Ireland) Act 1878. More information about this legislation can be found in annex 10, page 145. You need an agricultural waste exemption for this practice. You can register for agricultural waste exemptions when completing your IACS/Single Application Form. If you do not fill an IACS/Single Application Form, apply directly to NIEA. Contact details may be found in annex 17, page 163.

- **Agricultural waste must not be disposed of in household bins**

This disposal method is not permitted as agricultural waste is an industrial waste and not a household waste.

11.4.4 Disposing of tyres

If you no longer have a use for tyres, you are required to dispose of them correctly.

- Tyres, which are to be discarded, cannot be stored for a period longer than 12 months.
- Tyres must be disposed of through an appropriately licensed tyre recovery or disposal company.
- Tyres must never be burnt or buried on the farm. Burning produces large amounts of dark smoke which is an offence. It can also give off poisonous gases.
- Farmers can take the tyres themselves to the recovery or disposal company without the need for a waste carrier's licence. However, if someone else transports the waste tyres for the farmer they would require a waste carrier's licence to undertake the operation.

Tyre suppliers may take old tyres after fitting new ones to agricultural machinery.

Reusing waste tyres on the farm

The beneficial reuse of waste, when it requires no further treatment and where the activity does not involve disposal of the waste, will qualify for an exemption from the NIEA. The exemption costs £730 and must be renewed every three years.

Tyres from your farm vehicles and machinery can be reused on your farm, for example on top of a silo. You need an agricultural waste exemption for this practice. You can register for agricultural waste exemptions when completing your IACS/Single Application Form. If you do not fill this form, apply directly to NIEA. Contact details may be found in annex 17, page 163.



Photo 16: Tyres on a silo

Illegal disposal of tyres

The illegal disposal of waste tyres may result in prosecution under the Waste and Contaminated land (NI) Order 1997.

The Department of Environment may issue a Notice under Article 27(2) of the 1997 Order which will require controlled waste to be removed. District Councils may also serve notice under Article 28(1) of the Order. Failure to adhere to such notices may result in further charges.

Any of these offences may attract a fine of up to £5,000 in the Magistrate's Court. Additional offences relating to Duty of Care legislation may also be relevant.

11.4.5 Disposing of used farm plastic

The use of plastic on farms is unavoidable and increasing. It is an extremely versatile material used for covering silos, wrapping bales, covering crops and as a packaging material for almost everything that arrives in the farmyard. Approximately 2,500 tonnes of used silage plastic is disposed of in NI every year.

Plastic litter is unsightly and can be blown some distance, ending up in trees and hedges. On getting into a waterway it can cause blockages or end up hanging on riverbank vegetation or fences. If you participate in our agri-environment schemes you must keep your farm free from litter and eyesores. Plastic waste or litter can also be potentially lethal to livestock.

Until recently, the most common method of waste plastic disposal was burning. Other methods included burial or disposal along with household waste in the dustbin. All of these practices are prohibited under the Waste Management Regulations (NI) 2006.

All waste, including plastic waste, must now be:

- taken or sent for recycling (recycling is encouraged and should always be the preferred management option as it helps to reduce resource use and the requirement for space at landfill sites); or
- taken to a licensed landfill site for disposal.

Storing plastic waste prior to collection

- It is permissible under the Waste Management Regulations (NI) 2006 to store waste on the farm of origin for up to 12 months.
- Keep plastic as clean as possible. Dirty plastic costs the recycling industry more. It also costs you much more to dispose of, as a contaminated silage cover weighs roughly twice as much as it does when clean.
- It can be good practice to separate wastes by type to facilitate recycling, for example, different types of plastic.
- To stop stored plastic from blowing around the farmyard and to prevent it from becoming further contaminated, a storage system such as a cage, a silage trailer or other trailer with high sides or a recycling bin is recommended.
- When you open fertiliser and plastic feed bags, fold the used clean bags into one single clean bag for storage in a clean condition for later recycling.



Photo 17: Storing plastic for recycling

11.4.6 Implications for the management of manure and slurry

Manure and slurry will not be considered controlled wastes where they are applied to land to take advantage of their fertiliser value in line with good agricultural practice and the NAP Regulations. However, they may be controlled wastes where:

- the amount applied to land is excessive (that is, beyond good agricultural practice and the NAP Regulations) whether on or off the farm upon which it was produced; and/or
- it is mixed with other controlled wastes before spreading.

If manure or slurry is applied to land beyond good agricultural practice, a farmer could be found guilty of disposing of waste in a manner likely to cause pollution.

11.4.7 Managing hazardous agricultural waste

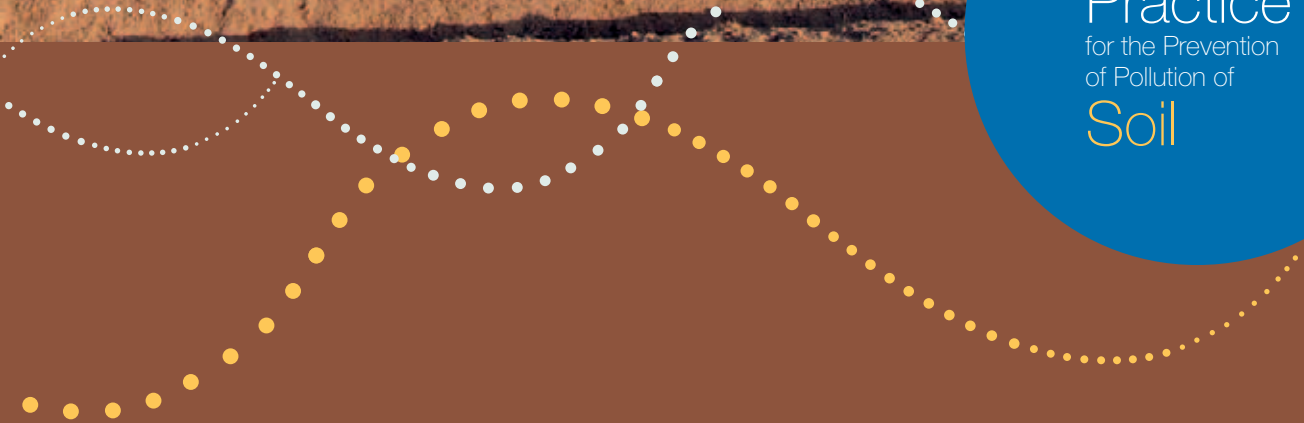
The Hazardous Waste Regulations (NI) 2005 applies to hazardous agricultural waste. Most farms have hazardous wastes to dispose of. Examples include agrochemical concentrates, antifreeze, asbestos, batteries, surplus medicines, sharps and fluorescent light tubes.

The Regulations apply to all agricultural waste products. NIEA administer a consignment note system. This system requires a unique code for each particular movement of hazardous waste. This acts as a system of control for dangerous and difficult to handle wastes. Therefore, from 1 September 2006, hazardous agricultural waste must not be transported without a consignment note, which can be obtained from NIEA. The current fees, which are periodically reviewed, vary depending on the type of movement involved, either £24, £10, or in certain cases, the codes will be issued free of charge. Contact details for NIEA may be found in annex 17, page 163.



The
Code
of

**Good
Agricultural
Practice**
for the Prevention
of Pollution of
Soil



Section 12

Introduction

Soil is a complex mix of mineral particles, air, water, organic matter and living organisms and is undoubtedly one of our most valuable natural resources. In addition to its role as a growing medium for grass and other crops, soil also has the ability to act as a filter by intercepting nutrients and other potential pollutants.

12.1 Is soil under threat?

On a global scale, 20 million hectares of agricultural land is either lost to urban sprawl or becomes too degraded for crop production each year. In the EU more than 16% of land is affected by soil degradation. Many factors can be involved in soil degradation, but change in land use is often implicated. Such changes include the loss of organic content, compaction and erosion. It takes thousands of years for soil to form and therefore it is crucial to minimise any deterioration or loss of this essential 'non renewable' resource.

Soil erosion, loss of organic matter and soil structure are of much less concern in NI than in other regions of the EU. This is due to the soil type, topology and farming practices, including the fact that less than 4% of farmland is cropped arable land. Careful soil management is necessary if agriculture is to be sustainable in the long term.

12.2 Why is soil management important?

Careful soil management is an important factor in achieving optimum levels of grass and crop production. Poor soil management may lead to environmental damage. Soil structure and quality affect both natural and agriculturally intensified vegetation. Because of this, damage to soils of all types should be minimised. Soils are also important in preserving and revealing our past.

CAP reform with the introduction of the Single Farm Payment has provided farmers with the opportunity to respond to consumer demand, thereby operating their businesses on a more sustainable basis. This flexibility will inevitably lead to some change in land use.

You are required to protect soil under Cross-Compliance Good Agricultural and Environmental Conditions (GAEC). Requirements include:

- protect soils from erosion and maintain soil structure by preventing land from being severely trampled or poached (GAEC 1);
- ensure that cultivated land has either crop, stubble or grass cover, or is left ploughed or disced over the following winter (GAEC 1);
- not carry out cultivations if water is standing on the surface or if the soil is waterlogged (GAEC 1); and
- manage supplementary feeding sites to prevent excessive trampling, poaching or vehicle rutting to minimise soil erosion and to avoid run-off to waterways. Sacrifice areas/paddocks are not permitted (GAEC 2).

More information about Cross-Compliance is available in annex 11, page 151.

Section 13

Preventing soil pollution

13.1 Preventing physical soil degradation

Soils can be physically damaged, perhaps irreversibly, by compaction, topsoil removal and erosion.

13.1.1 Soil compaction

Soil compaction can result from field operations being carried out when the soil is too wet.

Signs of soil compaction include:

- waterlogging occurring in areas which were not susceptible to this previously;
- poor seed germination;
- poor response to fertiliser; and
- an increased tendency of grass and other crops to be affected by minor drought conditions.

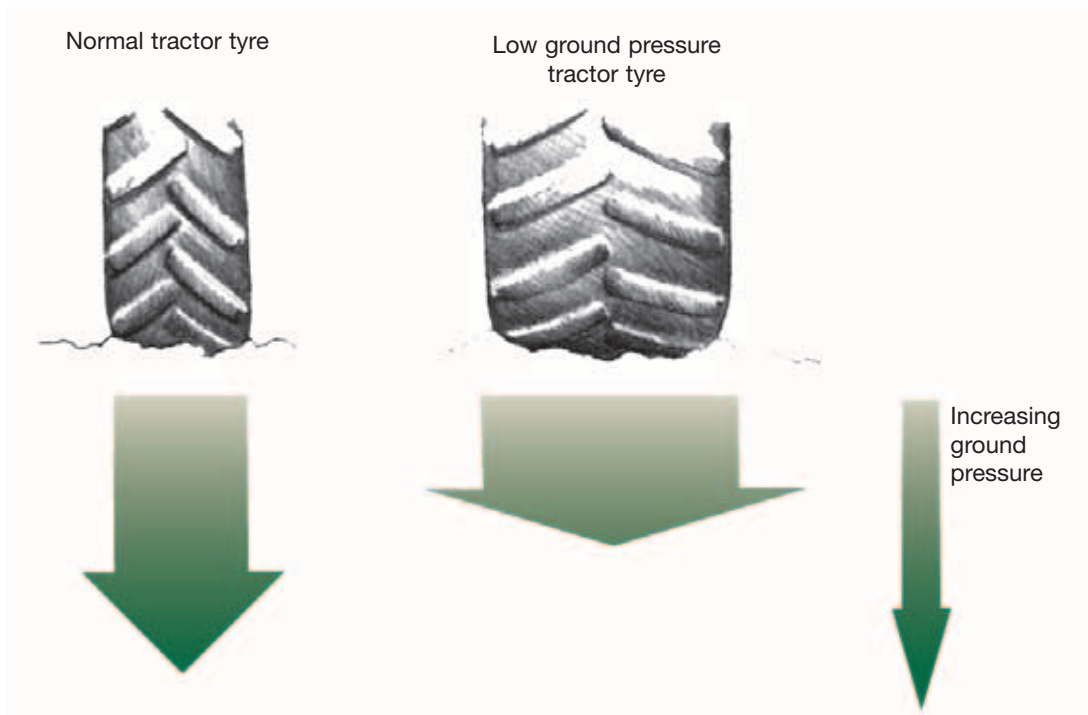


Figure 10: **The use of low ground pressure tyres to reduce soil compaction**

Undisturbed soil structure allows air and water to reach plant roots. Using heavy machinery when the soil is too wet can interfere with this structure through compaction and can restrict root and crop growth.

Compaction is not a widespread problem on soils in NI. You can minimise the possibility of causing soil compaction by:

- taking soil conditions into account when planning field work (Using low ground pressure tyres, wide tracks and faster work rates can help reduce damage); and
- preventing heavy trampling of fields by livestock. Where grazing occurs in very wet fields, poaching occurs which may lead to compaction and provides suitable sites for weeds to establish.

It is a requirement of Cross-Compliance (GAEC 1) that soil structure is maintained. This involves preventing land from being severely trampled or poached.

Repairing compacted soils

- You can normally repair damage by ploughing or subsoiling.
- If compaction is severe, especially in soils with low organic matter, deep cultivation followed by several years in grass can be required to improve the soil structure.
- Uncultivated or semi-natural land must not be brought into intensive agricultural use through ploughing or cultivation without obtaining prior permission from us, under the Environmental Impact Assessment (Agriculture) Regulations (N.I.) 2007. Compliance with these regulations is a requirement of Cross-Compliance GAEC 6. More information can be obtained from Agri-Environmental Scheme Management Branch. Contact details are in annex 17, page 161.

13.1.2 Topsoil removal

- Humus rich topsoil takes thousands of years to form. Removing topsoil can have a negative effect on the land's ability to support crop growth, impacting severely on soil structure, nutrient balance and herbage species that can be supported.
- Using grass turf from agricultural land for amenity purposes removes the surface layer of the soil along with its accumulated organic matter and plant nutrients. Modern turf removal techniques only remove a shallow layer of soil. Repeated cutting will reduce the productivity of the land and should be avoided.

- In some cases the removal of top soil can lead to the spread of serious pests and diseases. Most important of these are Potato Cyst Nematode, commonly known as eelworm, and Potato Wart Disease. Before planning soil movements it is advisable to check with your local DARD potato inspector that the land is not subject to a notice under the Plant Health Order banning soil movements from the land.
- Top soil removal requires Planning Permission and must comply with Duty of Care legislation. You can find more information about Duty of Care legislation in section 11.4, page 90.

13.1.3 Infilling

You should note that anyone wishing to infill land with soil, hardcore or other waste material must apply to the Department of Environment, Planning Service, Special Studies Unit. The telephone number is (028) 9041 6892. Their advice will enable you to comply with elements of the Cross-Compliance measure regarding the protection of habitats (wildlife areas), archaeological sites and permanent pasture (GAEC 6). Infilling must comply with Duty of Care legislation. For more information about Duty of Care legislation can be found in section 11.4, page 90.

13.1.4 Soil erosion

Soil erosion by wind and water has not been a major problem in NI. However, soil erosion can:

- cause damage to crops;
- block waterways with silt and contaminate them with soil nutrients;
- cause damage to aquatic life and reduce habitat quality;
- cause public nuisance through soil deposition on roads; and
- lead to a gradual loss of topsoil.

Soil erosion by water

Soil erosion by water occurs on all sloping arable land and recently re-seeded grassland, especially on lighter soils. Hedgerows, open drains and small fields in NI help reduce erosion by intercepting water and suspended soil before there is a build up of water volume and flow speed. Only when losses from land are regularly in excess of three tonnes per hectare does irreversible loss of fertility occur.

Surface run-off and possible erosion occurs when rainfall exceeds infiltration or where soil capping occurs due to the impact of the rain. Soil particles, carried overland, flow to waterways giving rise to the cloudiness of water.

Careful management can substantially reduce the risk of soil erosion by water. Measures include:

- good maintenance of field drains and drain outlets to minimise surface water and run-off;
- channelling surface water away from areas prone to erosion by using interceptor drains;
- using animal manures to increase soil organic matter and improving soil structure;
- avoiding over-cultivation and working the land when it is too wet; and
- avoiding soil compaction by using low ground pressure tyres and/or dual wheels on tractors and equipment.

If the area is a semi-natural habitat, marshy or prone to flooding, obtain prior permission from us, under the Environmental Impact Assessment (Agriculture) Regulations (N.I.) 2007. Compliance with these regulations is a requirement of Cross-Compliance GAEC 6. More information can be obtained from Agri-Environmental Scheme Management Branch. Contact details are in annex 17, page 161.

Only attempt cultivation and drilling across the slope when the contours can be followed accurately and where it is safe. NI fields often have complex slopes. Because of this, contour working can lead to a concentration of run-off and more severe erosion. It may be possible to use strips of uncultivated ground next to watercourses as buffers to reduce the risk of soil loss where water erosion is a frequent problem.

Soil erosion by livestock

Livestock trampling at supplementary feeding sites, riverbanks and at the edge of other waterbodies, such as lakes, can introduce polluting sediment into waterways. This may cause silting up which can alter or reduce the range of aquatic life that a waterway can support. An example of this is where sediment becomes trapped in the gravel spawning beds of salmonid fish (salmon and trout), making them unproductive.

Increasing the sediment load of a waterway may also necessitate costly additional maintenance. Rivers, drains and sheughs will need to be cleaned out on a regular basis.

Measures to reduce the risk involve protecting the riparian zone by providing livestock fencing at vulnerable banksides. Cattle access for drinking in waterways should be managed to minimise disturbance to the banks and bed of a waterway by fencing off. Consideration should be given to the provision of separate drinking supplies away from waterways. An added advantage of

fencing off waterways is the reduced risk of contamination by faecal micro organisms as referred to in annex 1, page 110. Cross-Compliance (GAEC 2) requires that supplementary feeding sites should not be placed within 10 metres from a waterway, 50 metres from a borehole or well or 250 metres from any borehole used for public water supply.

The erosion of peat in upland areas can be caused by overgrazing and excessive burning. Peat erosion coupled with high rainfall can lead to excessive surface run-off which can transport high levels of sediment into receiving waters such as reservoirs and streams. Please note that overgrazing is not permitted under Cross-Compliance GAEC 3.



Photo 18: A riparian zone

Soil erosion by wind

Wind erosion is confined mostly to the light, sandy soils of Magilligan and Comber. Even in these areas, the presence of hedgerows helps to reduce the severity of any erosion.

13.1.5 Using crop cover to protect soil

Plant cover plays an important role in reducing soil erosion and the loss of topsoil rich in nutrients and organic matter. Crops should be established as soon as possible after ploughing to provide ground cover and minimise the loss of nitrogen.

There are soil management requirements for fields following cropping under the NAP Regulations.

- After harvesting a crop of cereals (other than maize), oil seeds, grain legumes (for example, peas or beans), ensure that from harvest until 1 March in the following year one of the following conditions is met on that land at any time:
 - the stubble of the harvested crop remains in the land; or
 - 'green manuring' where the land is sown with a crop that will take up nitrogen; or
 - the land is left with a rough surface (ploughed or disced) to encourage the infiltration of rain.

- In the case of late harvested crops such as maize and potatoes, the field should be left undisturbed until just before sowing the following spring.
- Where grass leys are grown in rotation with arable crops, the first crop should be sown as soon as possible after the grass has been ploughed to minimise the loss of nitrogen.

13.2 Soil quality and fertility

The biological activity, pH status (acidification), nutrient status and organic matter determine the quality of soil and its fertility.

13.2.1 Biological activity

- Earthworms are the most obvious beneficial soil organisms, but can be killed by certain chemicals that are added to the soil. Pesticides should be carefully selected for the purpose required and used according to the manufacturer's recommendations.
- High nitrogen manures and slurries, especially those containing a lot of ammonia and ammonium sulphate, can temporarily lower earthworm populations. However, in the long term, slurry may increase earthworm populations as it is also a food source. Do not apply slurry to wet or poorly drained soils.

13.2.2 Acidification

- Acidification is a natural process in all soils. The susceptibility of a soil to this process depends on the soil type, cropping and other management practices, and the acidity of any rain or snow.
- The result of acidification is a lowering of the soil pH unless the soil is naturally lime-rich or a dressing of lime has been applied. A low pH soil will support a limited range of crops.
- Do not over-lime since this can reduce the availability of plant nutrients to any crop.
- Some soils may have a high pH because of the presence of chalk or limestone. In theory, the pH can be lowered to allow the growth of a wider range of crops by adding sulphur. However, in practice, this is expensive and the decrease in pH is unpredictable.
- A soil pH test is a valuable tool to ensure that the soil pH is correct for the crop to be grown.

- Uncultivated or semi-natural land must not be brought into intensive agricultural use through ploughing or cultivation without obtaining prior permission from us, under the Environmental Impact Assessment (Agriculture) Regulations (N.I.) 2007. Compliance with these regulations is a requirement of Cross-Compliance GAEC 6. More information can be obtained from Agri-Environmental Scheme Management Branch. Contact details are in annex 17, page 161.

13.2.3 Soil nutrient status

- Most plants require adequate supplies of nitrogen, phosphorus and potassium, as well as magnesium, calcium, sulphur, manganese, iron, copper, boron, zinc, molybdenum and chlorine, to grow satisfactorily. These are generally supplied from soil reserves supplemented mostly by nitrogen, phosphorus, potassium and sulphur in inorganic fertiliser, FYM and slurries.
- If soil pH and organic matter are maintained at appropriate levels, most plant nutrient requirements can be met by annual inputs. The soil can supply some nutrients for many years without addition.
- Avoid applying excessive amounts of plant nutrients, especially nitrogen and phosphorus, since the excess can be leached out of the soil and lead to pollution of waterways.
- Match applications of inorganic fertilisers, livestock manures and slurries to crop requirements and where necessary build up soil reserves of phosphorus and potassium. Follow the guidelines in section 3 (page 34), section 4 (page 44) and section 5 (page 50). All of this must be in accordance with the NAP Regulations.
- A soil test carried out every four years to assess nutrient levels, as part of a nutrient management plan, will avoid over or under application of fertilisers.

13.2.4 Organic matter levels

- The level of organic matter in the topsoil influences its physical, chemical and biological properties, particularly its ease of cultivation, water retention capacity and nutrient availability to plants. If the organic matter level falls, it can restrict the soil's ability to support plant growth.
- Cultivation increases the rate of decomposition of soil organic matter. Organic matter levels are most likely to fall under continuous arable cropping where there is little return of plant residues or animal manures.
- In the mostly grass-based agricultural systems of NI, the soil organic matter levels are not a cause for concern.
- Adding animal manures over several years, incorporating crop residues or sowing out in grass will increase organic matter levels in low organic matter soils.

- Uncultivated or semi-natural land must not be brought into intensive agricultural use through ploughing or cultivation without obtaining prior permission from us, under the Environmental Impact Assessment (Agriculture) Regulations (N.I.) 2007. Compliance with these regulations is a requirement of Cross-Compliance GAEC 6. More information can be obtained from Agri-Environmental Scheme Management Branch. Contact details are in annex 17, page 161.

13.3 Preventing chemical contamination

Soil contamination can affect the fertility of the soil as well as affecting livestock and the human food chain. Human activities can contaminate soil, either directly through applying materials such as industrial wastes, slurry, sewage sludge, pesticides or fertilisers, or indirectly by atmospheric deposition such as lead from car exhausts. Soil may also become contaminated by natural processes such as flooding by freshwater or seawater.

Soil contaminants include the following.

- Inorganic materials such as heavy metals, sodium and chlorine.
Some of these trace elements are essential for plant and animal growth, but excessive concentrations under certain soil pH conditions can adversely affect the health of plants, animals and humans. The most likely source of heavy metals is from the application of sewage sludge. More information about applying sewage sludge can be found in section 4.2, page 46. Copper and zinc may also be added to soils by pig slurry.
- Organic materials including chemicals such as oil, solvents and pesticides.
Some of these compounds are broken down harmlessly by soil micro-organisms, but in some cases, toxic and persistent residues may be formed which cause just as much contamination.

Soil contamination may affect:

- soil processes, leading to soil structure damage and death of soil microbes;
- plant growth by reducing nutrient availability and restricting root development;
- human or animal health by uptake into plants or by direct ingestion of soil; and
- waterways and groundwater by run-off from contaminated land.

Where you are uncertain about the current level of soil contamination, or where a new potentially contaminating waste such as sewage sludge is to be applied to farmland, it is important to seek professional advice and have a soil analysis carried out.

Pesticides

The Food and Environment Protection Act (FEPA) 1985 controls the sale, supply, storage, use and advertisement of pesticides. Under this legislation it is an offence to pollute the environment and/or use a pesticide in such a way that would be likely to cause harm to humans and animals. It is very important to follow the manufacturer's instructions on the use of any approved pesticide. You can find more information in section 6, page 54.

Slurry and manure

Manure may contain high concentrations of copper and zinc where it has been added to feedstuffs. Where fields are receiving regular applications of this manure, the content of these metals in the soil should be measured.

Oil spillages

Occasionally oil spillages may occur in fields. Most spillages are minor, but in some cases, action needs to be taken to prevent damage to the soil and contamination of groundwater and waterways.

When an oil spillage occurs:

- minimise the fire hazard;
- contain the oil and prevent run-off to drains and waterways;
- remove as much of the oil as possible and dispose of it safely (contaminated soil should be removed to a licensed disposal site, preferably after any oil, especially heavy oil, has been allowed to dry first. You can find more information in section 9, page 71);
- where possible, dig a sump to collect light oils, such as diesel or gas oil, then pump it out making sure that the sump does not penetrate any impermeable layer which is containing the oil;
- do not burn oil on the soil surface;
- do not attempt to wash the oil into the soil by using water and/or detergents;
- avoid cultivating the soil as this will increase the rate of oil breakdown and release; and
- if necessary, add inorganic nitrogen and phosphorus fertiliser before cultivation of heavily contaminated soils to give an adequate nutrient supply for soil micro-organisms. Do not add organic manures such as slurry or FYM.

The time for complete soil recovery after contamination is one to five years for light oil and over five years for heavy/crude oil. Commercial contractors offer services for cleaning up soil contaminated with oil.

If there is any likelihood of pollution of neighbouring waterways contact the Pollution Hotline on free phone 0800 80 70 60.



The
Code
of

Good
Agricultural
Practice
for the Prevention
of Pollution of
Water,
Air and Soil

Annexes

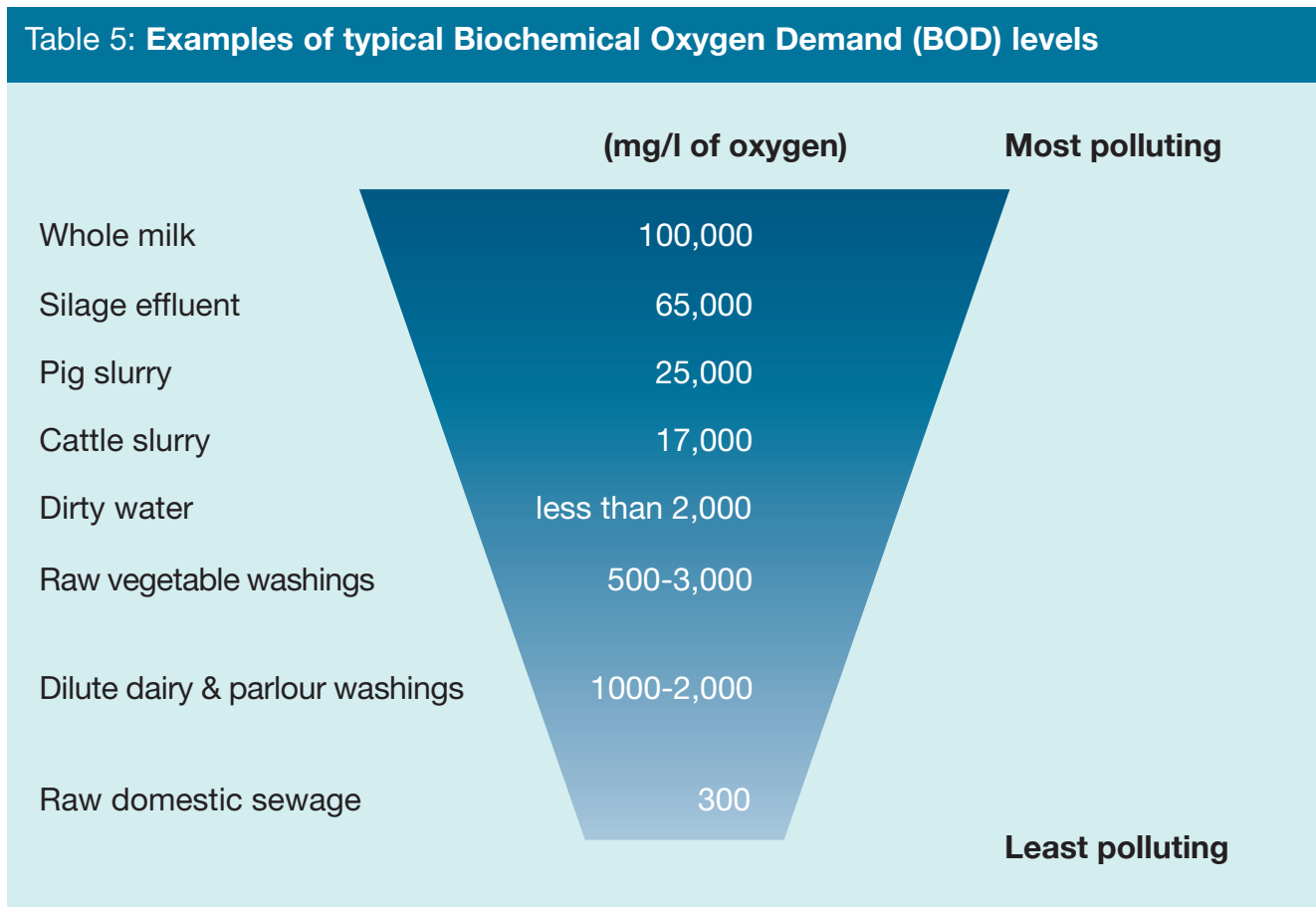
Annex 1

Types of water pollution

1.1

Organic pollution

Animal or plant wastes are potential sources of organic pollution. The breakdown of most pollutants uses oxygen needed by aquatic life (including plants, fish and invertebrates) to survive. Biochemical Oxygen Demand (BOD) is a measure of the amount of oxygen needed by micro-organisms to break down organic material. BOD is therefore a measure of the polluting strength of organic wastes. Farm effluents generally have a high BOD. Table 5 shows examples of BOD levels for some common pollutants. The higher the BOD, the more polluting the material.



1.2

Eutrophication

Eutrophication is considered to be the most widespread threat to water quality in NI. It refers to the enrichment of waterways (both freshwater and marine) with nutrients, especially compounds of phosphorus and/or nitrogen. This leads to an accelerated growth of algae and higher forms of plant life. As a result, the balance of organisms changes and the quality of the water deteriorates.

Some of the undesirable effects caused by high nutrient levels may be:

- algal blooms, some of which may be toxic and thereby pose a health risk to both humans and livestock;
- excessive plant growth, in severe cases, leading to the removal of oxygen from the water, resulting in fish kills;
- excessive weed growth, which can obstruct drainage and interfere with livestock watering;
- poor water clarity;
- loss of biodiversity;
- reduced amenity value, for example, for angling and tourism; and
- increased costs of removing algae, odours and toxins at water treatment facilities.

Freshwater eutrophication, caused primarily by high phosphorus inputs, is widespread. Both Lough Neagh and Lough Erne are highly eutrophic, as are many of the small lowland lakes. Increased phosphorus inputs through diffuse pollution are still being identified.

In addition, high nitrogen concentrations can lead to similar eutrophication problems in the marine environment. There is some evidence of marine eutrophication problems, for example in the northern end of Strangford Lough and inner Belfast Lough.



Photo 19: Algae bloom

Slurry, manures and other farm effluents can contain very high concentrations of nutrients. Even small quantities can have severe consequences if allowed to enter a waterway. Phosphorus and nitrogen from agriculture can reach surface waters in a number of ways, including:

- surface run-off, particularly after the application of slurry, manure, other farm effluents or fertilisers. To prevent this occurring follow the advice given in section 3;
- water flowing from land drains, particularly from soils which contain high levels of phosphorus. Recommendations for the efficient use of nutrients are given in section 5 of this code; and

- erosion of soil particles, especially in arable areas. Recommendations on how to minimise soil erosion can be found in section 13 of this code.

Phosphorus and nitrogen can also be leached from soils into groundwater, threatening the quality of these waters for drinking.

1.3

Pesticides

The term pesticide covers a wide range of agrochemicals used on farms, including:

- herbicides;
- fungicides;
- insecticides (for example, sheep dip);
- growth regulators;
- rat poisons; and
- wood preservatives.

These compounds are highly toxic to aquatic ecosystems and can, if they enter a waterway, have a devastating effect on the plant and animal life. They are also highly toxic to humans and can make both surface waters and groundwaters unfit to drink.

1.4

Faecal micro-organisms

Faecal micro-organisms are the bacteria and viruses associated with sewage, manures and other farm effluents. These micro-organisms can cause diseases in both humans and animals. If present in large numbers they can make waters unsafe for bathing or recreation and unfit to drink.

1.5

Oils

When oil, such as heating, fuel or lubricating oil, enters a waterway, a film is formed on the surface which can drastically reduce the oxygen content of the water, making it difficult for fish and other aquatic life to breathe. It can also coat plants, birds and animals that come in contact with it. Oil contamination can make water unfit for drinking or irrigation. Diesel fuels, in particular, are extremely toxic to the invertebrate life of waterways. Oil can have a long term impact on aquatic communities persisting long after any spill. Oil also causes taints in fish, making farmed fish unsalable and wild fish inedible.

Annex 2

Preventing water pollution – key statutory requirements

2.1 Nitrates Directive

The requirement to apply a Nitrates Action Programme (NAP) across NI (total territory) was established in October 2004 following a public consultation. Further consultations took place with the European Commission and stakeholders in 2005 and 2006 on the measure to be contained in the Nitrogen and Phosphorus Regulations. It is therefore mandatory that all farmers comply with a set of measures laid down in the Nitrates Action Programme to prevent water pollution from agricultural sources. Compliance with the Nitrates Directive is a requirement of Cross-Compliance, under SMR 5. Failure to comply with Cross-Compliance may result in a breach of Cross-Compliance with a possible loss or reduction of Single Farm Payment.

Required storage capacity must be in place by 31 December 2008 at the latest. The organic manure closed spreading period applies from the date at which required storage capacity is in place. All other measures became effective from 1 January 2007.

Table 6: Summary of Nitrates Action Programme

Verifiable Standards	Key Measures
Closed Spreading Periods	<ul style="list-style-type: none"> ● Chemical Nitrogen fertiliser must not be applied between 15 September and 31 January. ● Organic manures, excluding farmyard manure and dirty water, must not be applied between 15 October and 31 January.
Land Application Restrictions	<ul style="list-style-type: none"> ● All fertilisers, chemical and organic, must not be applied on: <ul style="list-style-type: none"> ■ waterlogged soils, flooded land or land liable to flood; ■ frozen ground or snow covered ground; ■ if heavy rain is forecast; ■ steep slopes where other significant risks of water pollution exist. ● Prevent entry of fertilisers to waters and ensure application is accurate, uniform and not in a location or manner likely to cause entry to waters. ● Chemical fertilisers must not be applied within 1.5m of any waterway.

Table 6: Summary of Nitrates Action Programme

Verifiable Standards	Key Measures																
<p>Land Application Restrictions</p>	<ul style="list-style-type: none"> ● Organic manures including dirty water must not be applied within: <ul style="list-style-type: none"> ■ 20m of lakes; ■ 10m of a waterway other than lakes; this distance may be reduced to 3m where slope is less than 10% towards the waterway and where organic manures are spread by bandspreaders, trailing shoe, trailing hose or soil injection or where adjoining area is less than 1 hectare in size or not more than 50m in width; ■ 50m of a borehole, spring or well; ■ 250m of a borehole used for a public water supply; ■ 15m of exposed cavernous or karstified limestone features. ● Application rates: <ul style="list-style-type: none"> ■ No more than 50m³/ha (4500 gal/ac) or 50 tonnes/ha (20 t/ac) of organic manures to be applied at one time with a minimum of three weeks between applications; ■ No more than 50m³/ha (4500 gal/ac) of dirty water to be applied at one time with a minimum of two weeks between applications. ● Slurry can only be spread by inverted splashplate, bandspreaders, trailing shoe, trailing hose or soil injection. ● Dirty water to be spread by same methods as slurry and by irrigation. ● Sludgigators must not be used. 																
<p>Chemical Nitrogen (N) Fertiliser Crop Requirement</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="4" style="text-align: center;">Maximum kg N/ha on grassland</th> </tr> <tr> <th style="text-align: left;">Year</th> <th style="text-align: center;">2007</th> <th style="text-align: center;">2008</th> <th style="text-align: center;">2009</th> </tr> </thead> <tbody> <tr> <td style="text-align: left;">Dairy farms*</td> <td style="text-align: center;">289 (8¾ bags/ac)**</td> <td style="text-align: center;">281 (8½ bags/ac)</td> <td style="text-align: center;">272 (8¼ bags /ac)</td> </tr> <tr> <td style="text-align: left;">Other farms</td> <td style="text-align: center;">239 (7¼ bags /ac)</td> <td style="text-align: center;">231 (7 bags/ac)</td> <td style="text-align: center;">222 (6¾ bags/ac)</td> </tr> </tbody> </table> <p>(N from organic manures other than livestock must be subtracted.)</p> <p>* More than 50% of N in livestock manure comes from dairy cattle</p> <p>** Approximate number of 50kg bags of a 27% N type fertiliser</p> <p>For non-grassland crops, the crop requirement as determined by RB209, must not be exceeded.</p>	Maximum kg N/ha on grassland				Year	2007	2008	2009	Dairy farms*	289 (8¾ bags/ac)**	281 (8½ bags/ac)	272 (8¼ bags /ac)	Other farms	239 (7¼ bags /ac)	231 (7 bags/ac)	222 (6¾ bags/ac)
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Other farms	239 (7¼ bags /ac)	231 (7 bags/ac)	222 (6¾ bags/ac)														

Table 6: Summary of Nitrates Action Programme

Verifiable Standards	Key Measures			
Nitrogen Livestock Manure Limits	<ul style="list-style-type: none"> • 170kgN/ha/year farm limit. More information about a derogation for a higher limit can be found on page 116 			
Livestock Manure Storage Requirements	Minimum livestock manure storage capacity.			
	Livestock		22 weeks	26 weeks
	Pig enterprises*	Fewer than 10 breeding sow places	✓	
		More than 10 breeding sow places		✓
	Poultry enterprises*	Fewer than 500 poultry places	✓	
		More than 500 poultry places		✓
	Cattle and sheep*		✓	
	<p>* In calculating a holding’s livestock manure storage capacity, provided certain criteria are met, there are allowances for out-wintering, animals in bedded accommodation, separated cattle slurry, renting additional tanks and exporting slurry to approved outlets. For more information see the NAP Guidance Booklet.</p> <ul style="list-style-type: none"> • Storage must be maintained to prevent seepage or run-off (See table 7, page 115 for permitted storage methods). • New or substantially enlarged or reconstructed stores must comply with Silage, Slurry and Agricultural Fuel Oil (SSAFO) (Northern Ireland) Regulations, 2003. More information can be found on page 118. 			

Table 6: Summary of Nitrates Action Programme

Verifiable Standards	Key Measures
	<ul style="list-style-type: none"> ● Farmyard manure and poultry litter can be stored in fields where the next application is to take place but for no longer than 180 days. It must not be stored in the same location of the field year after year. Poultry litter must be covered with an impermeable membrane within 24 hours of placement in the field. The storage of poultry litter to be reviewed 31 December 2008. Heaps must not be stored within: <ul style="list-style-type: none"> ■ 50m of lakes; ■ 20m of a waterway; ■ 50m of a borehole, spring or well; ■ 250m of a borehole used for a public water supply; ■ 50m of exposed cavernous or karstified limestone features. ● Provide storage for dirty water during periods when conditions for land application are unsuitable.
Land Management	<ul style="list-style-type: none"> ● Crop and soil management to minimise soil erosion and nutrient run off.
Record Keeping	<ul style="list-style-type: none"> ● Agricultural area, field size and location. ● Cropping regimes and areas, Soil Nitrogen Supply (SNS) index for crops other than grassland. ● Livestock numbers, type, species and time kept. ● Organic and chemical fertiliser details including imports and exports. ● Storage capacity and where applicable associated evidence to support allowances to reduce capacity. ● Evidence of right to graze common land. <p>Note that many of the records already exist on farms, for example, IACS, herd and flock records and fertiliser receipts.</p>

A comprehensive publication on the Nitrates Action Programme is available from your local Countryside Management Branch and at www.dardni.gov.uk and www.nieani.gov.uk.

Table 7: Permitted organic manure storage methods

Storage method		Tank		Midden ¹	Field store ²	
		Leak proof constructed pre 1/12/03	Constructed post 1/12/03			
			Non-SSAFO spec			SSAFO spec
Slurry		✓	X	✓		
FYM				✓	✓	
Pig Slurry		✓	X	✓		
Poultry litter				✓	✓ ³	
Poultry slurry		✓	X	✓	X	
Silage effluent		✓	X	✓	X	
Separated slurry	Solids			✓	✓	
	Liquid	✓	X	✓		
Dirty water		✓	✓	✓		

1 Middens must have adequate run-off collection facilities which are SSAFO compliant.

2 Field storage: FYM may be stored in fields where land application will take place until the time of next application, but for no longer than 180 days. It must not be stored in the same location of the field year after year. The FYM must be stored in a compact heap. FYM heaps must not be placed within:

- 50 metres of lakes;
- 20 metres of any other waterway, including open areas of water, open field drains or any drain which has been backfilled to the surface with permeable material such as stone/aggregate;
- 50 metres of a borehole, spring or well; or 250 metres of a borehole used for a public water supply;
- 50 metres of exposed cavernous or karstified limestone features (such as swallow holes and collapse features).

3 Poultry litter stored in the field must be covered with an impermeable membrane within 24 hours of placement in the field. Field storage of poultry litter is permitted until 31 December 2008 when this position will be reviewed.

More information about Silage, Slurry and Agricultural Fuel Oil (SSAFO) (Northern Ireland) Regulations, 2003 may be found on page 118.

Nitrates Action Programme Derogation

Under the terms of the Nitrates Directive, Member States which introduce a compliant action programme may apply for a derogation from the statutory 170 kg N/ha/year livestock manure limit specified by the Directive. The terms of the derogation are set by the European Commission and must be compatible with achieving the objectives of the Nitrates Directive and other environmental Directives. Approval by the EU Nitrates Committee, established to assist the Commission with the implementation of the Directive and comprised of representatives of each Member State, is required. NI has been granted a derogation to permit the land application of up to 250kg grazing livestock manure nitrogen per hectare per year provided certain criteria are adhered to. The derogation is particularly important for the intensive grassland farms in NI with higher than average stocking rates.

The main criteria of the NI derogation are that farms must:

- have at least 80% grassland;
- have a farm phosphorus balance of no more than 10kg phosphorus per hectare per year (for an explanation of phosphorus balance see section 5.1, page 50);
- carry out soil sampling to establish soil fertility status;
- only apply nitrogen to crop requirements;
- make an annual application to NIEA;
- produce and maintain annual fertilisation plans; and
- produce and submit annual fertilisation accounts.

The EC Decision must now be made into NI legislation and further guidance will be produced when this process is complete. Arrangements have been put in place to allow farms to make applications for the 2008 calendar year. The derogation has been granted by the EC to NI until 31 December 2010. During this period further monitoring of practice on farms and water quality will be required in order to support any future derogation application.

NIEA is responsible for the enforcement of this legislation. More information about the NAP Regulations including making an application for a derogation is available from the NIEA, Water Management Unit. Contact details can be found in annex 17, page 163.

2.2 Phosphorus Regulations

The Phosphorus Regulations were introduced on 1 January 2007. Under this legislation chemical fertilisers containing phosphorus must not be applied unless it can be demonstrated that there is a crop requirement, taking into consideration soil fertility status and the supply of phosphorus available from the application of organic manures on the farm. Soil tests must be carried out, as

described in the Regulations. These will determine the phosphorus index of the land in which a crop is to be grown. For more information about soil sampling see annex 12, page 154. The application of chemical fertilisers containing phosphorus must not exceed the recommendations in RB209 and any supplementary guidance.

If chemical phosphorus (P) fertiliser is applied to agricultural land, the following records must be retained for each field:

- controller of the land for the calendar year in question;
- size and location of each field to which chemical P fertiliser was applied;
- soil test results;
- a statement of future phosphorus requirements, including P index;
- details of P fertiliser applied – both chemical and manure other than livestock manure; and
- the type and date of any crop sown.

These records must be retained for five calendar years.

NIEA is responsible for the enforcement of this legislation.

Phosphorus Measures

The objective of the measures governing phosphorus is to arrive at the situation where all holdings are in sustainable balance by 2015. During the period of consultation on the NAP and P Regulations, a commitment was made by the NI authorities to review, by December 2008, the need to give statutory effect to phosphorus balances on individual holdings to be introduced on a phased basis.

2.3

The Water (Northern Ireland) Order 1999

This legislation, which replaced the Water Act (Northern Ireland) 1972, aims to prevent pollution of all waterways and groundwater.

- It is an offence under the Water Order to knowingly, or otherwise, make a polluting discharge into a waterway or underground strata.
- Under the Order a notice may be served to prevent pollution from occurring.
 - The notice may specify that a certain activity can only be undertaken in a certain way or may prohibit something altogether.
 - A time period may also be specified in which to stop something that is or has the potential to cause pollution.

When pollution has occurred a notice can be issued which requires:

- the removal of the polluting matter from the watercourse;
- that any damage caused to the river is rectified.

The costs for the investigation of a pollution incident and any subsequent clean up may be recovered from the polluter.

Prosecution for an offence under the Order can result in:

- conviction on indictment leading to imprisonment for a term not exceeding two years, or to a fine, or to both;
- summary conviction leading to imprisonment for a term not exceeding three months, or to a fine not exceeding £20,000, or to both.

In addition, polluters may, if found guilty, also find themselves liable for considerable costs such as those associated with restocking rivers.

Enforcement of the legislation is by NIEA.

2.4

The Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) Regulations (Northern Ireland) 2003 (SSAFO)

The Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) (Northern Ireland) Regulations 2003, commonly referred to as the SSAFO Regulations, aim to minimise the risk of water pollution from the storage of silage, slurry or agricultural fuel oil.

The Regulations require that all new stores (and those substantially reconstructed or enlarged after the Regulations came into force on 1 December 2003) are:

- sited at least 10 metres from any waterway;
- designed to last at least 20 years (with maintenance);
- designed and built to meet specific standards and requirements;
- notified to NIEA at least 28 days before they are brought into use. Depending on the work carried out, a qualified, chartered, structural or civil engineer may be required to sign the notification form.

Structures, which were in use before the Regulations come into force, can continue to be used. However, the Regulations give NIEA powers to inspect structures on farm. If NIEA considers an existing structure to present a potential pollution problem, to either waterways or groundwater, they may serve a notice, which requires work to be carried out or precautions taken to minimise any risk of pollution. Use of the structure may be prohibited until all necessary works are completed. If the terms of the notice are not met the structure can lose its exemption and must therefore be brought up to SSAFO standards.

2.5

The Groundwater Regulations (Northern Ireland) 1998

This legislation aims to prevent the pollution of groundwater. It requires, amongst other things that before certain listed substances such as sheep dip and pesticides are disposed of by land spreading, authorisation must be obtained from NIEA. Contact details can be found in annex 17, page 163.

Annex 3

Biological treatment of manures and slurries

Biological treatment of slurry and FYM by anaerobic or aerobic (aeration and composting) techniques has proved successful in significantly reducing the amount of odour from waste products. The cost of providing and operating treatment systems can be high. Expert advice should therefore be sought to ensure the treatment is appropriate and cost effective. Please note that the treatment of waste slurries may require additional waste management and planning permission. Contact NIEA Land and Resource Management for guidance. Contact details can be found in annex 17, page 163.

3.1

Anaerobic digestion

Controlled anaerobic digestion takes place in an insulated gas-tight tank. Slurry is fed in on a regular, usually daily, basis. The contents of the tank are mixed regularly and heated to 35 or 55°C. The treatment period is usually 12 to 15 days for pig slurry and 20 days for cattle and poultry slurries. The main benefits of anaerobic digestion are:

- a very substantial reduction of slurry offensive odour;
- reduction of dry matter and BOD, thus minimising the risk of creating anaerobic soil conditions and minimising pollution of drainage water after field application of digested slurry. However, neither the digested slurry nor the liquid decanted from the digested slurry may be discharged to a watercourse;
- some destruction of harmful organisms (for example, pathogens) and weed seeds;
- improved fertilising quality of digested slurry; and
- energy generation in a form of biogas.

3.2

Aerobic treatment

Whole or separated slurry can be aerated either in specially built tanks, slurry storage tanks or lagoons using compressed air or mechanical aerators. Correctly designed aeration systems can treat slurry in a relatively short period of time, between 3 to 10 days, to achieve the following objectives:

- offensive odour removal; and
- reduction of BOD.

3.3 Use of slurry additives and deodorants

Additives to reduce odour emissions can be used as a short-term treatment for a batch of slurry or a store which is causing a nuisance. Masking agents may be used to control site smells where it is not possible to deal effectively with the source. As most additives and deodorants have not proved very effective, seek professional advice before making a purchase.

3.4 Composting

Composting is an aerobic process, which stabilises organic matter such as solid livestock and vegetable wastes, straw, grass and hedge cuttings, leaves and other biological wastes. It prevents a further degradation of wastes which, normally stored under anaerobic conditions, generate leachates, gases and obnoxious smells. High temperature, which occurs during composting, substantially decreases the viability of weed seeds and significantly reduces harmful organisms (pathogens). Compost, made by this process, can be used as a fertiliser or soil conditioner, depending on its manurial value. Compost is a potentially marketable product but the farmer should seek professional guidance on technical feasibility and economic viability of composting before commencing such an enterprise. Please note, this practice requires an agricultural waste exemption. You can register for agricultural waste exemptions when completing your IACS/Single Application Form. If you do not fill this form, apply directly to NIEA. Contact details may be found in annex 17, page 163.

Annex 4

Dirty water disposal systems

4.1 Low rate irrigation

This is a reasonably safe method of disposal but it cannot be used on land sloping towards open drains or waterways or on wet or waterlogged soils. Not all farms have sufficient 'suitable' land to allow its use all year round. Provided there is a suitable electricity supply, dirty water can be pumped over long distances to the spreading area.

This system requires:

- a properly built tank to allow for settlement - the tank must be below ground for year round disposal;
- an electric pump and small bore pipework protected from frost; and
- a sprinkler or travelling irrigator (Sprinklers must apply no more than 5mm of liquid per hour and should be easily moved. A travelling irrigator should apply less than 50,000 litres per hectare (that is 5mm or less on each run) and leave a minimum of two weeks between applications, in accordance with the NAP Regulations).

4.2 High rate irrigation

This system uses large bore pipelines, high flow rates and high application rates. It is not normally used in winter because of the risk of run-off and therefore a suitable store is needed for dirty water.

Irrigation systems can cause pollution if the application rate is too high, if the irrigators or sprinklers are not moved often enough or if they are used on unsuitable land.

4.3 Inverted splash plate spreaders, band spreaders with trailing hose or trailing shoe and soil injection

An inverted splash plate spreader, band spreaders with trailing hose or trailing shoe or soil injection can be used for spreading all types of dirty water. Extra tank storage capacity may be required to avoid land spreading during wet weather, or when the ground conditions are unsuitable. The use of sludgigator type attachments is no longer permitted.

Annex 5

Recent developments

5.1 Woodchip corrals and stand-off pads

Woodchip corrals and stand-off pads are outdoor uncovered enclosures used to out winter cattle. They are typically bedded with large woodchips. It is claimed that cattle out wintered on woodchip corrals tend to have fewer respiratory problems than those housed during the winter months.

Woodchip corrals and stand-off pads are both sometimes referred to as ‘corrals’. However, they are, in fact, two distinct systems.

- **Woodchip corrals** are unsealed systems that are designed to drain freely to the soil. Although it is claimed that the Biochemical Oxygen Demand (BOD) and pathogens in the effluent are degraded in the woodchip and that the nutrients are retained, the risk of groundwater pollution is a concern. Unlined woodchip corrals are not acceptable under the SSAFO Regulations and the Groundwater Regulations.
- **Stand-off pads** have a similar construction to woodchip corrals but are built to contain the effluent. This is achieved by either compacting the surrounding clay subsoil to decrease its permeability or where the soil is unsuitable for this treatment, by installing a plastic liner.

Although similar in appearance, the function of the two systems is very different. A woodchip corral relies on infiltration to remove the potential pollutants, whereas a stand-off pad is a sealed system, collecting and storing all of the effluent to be spread on land at a later date.

Woodchip disposal

Waste woodchip should be disposed of to protect the environment. This may involve landspreading, composting or landfilling. All of these activities require a Waste Exemption or permit from NIEA, depending on the nature and scale of the operation.

Legislation

The SSAFO Regulations and the Groundwater Regulations are the principle pieces of legislation used to regulate the use of woodchip corrals and stand-off pads. Proposals for installing new woodchip corrals or stand-off pads will not be accepted by NIEA unless they are for contained, lined systems, with an effluent collection system that complies with the SSAFO Regulations. Unlined woodchip corrals would not be acceptable.

Existing corrals or stand-off pads that are having any impact on groundwater or waterways will be required to have a liner installed so that all effluent can be collected in a SSAFO compliant containment system. NIEA will also consider enforcement action under the SSAFO Regulations, Groundwater Regulations (NI) 1998, and the Water Order (NI) 1999, whichever they regard the most appropriate.

Cross-Compliance

In addition to any action taken by NIEA against a farmer in breach of the Groundwater Regulations, a reduction in Single Farm Payment (SFP) may also result. The Cross-Compliance Statutory Management Requirement (SMR 3) requires those in receipt of SFP to protect groundwater against pollution.

Contact NIEA without delay if you are not sure whether an existing woodchip corral or stand-off pad is compliant with current legislation or not.

5.2

Swales

A swale is a system designed to improve the quality of lightly contaminated run-off, for example, roof water and lightly contaminated farmyard run-off. Lightly contaminated in this context does not include 'dirty water' as defined in the NAP Regulations and excludes run-off from buildings and yards to which animals have direct access.

Constructing a swale involves creating a linear depression in a field which is then grassed over. The lightly contaminated yard run-off is diverted slowly along the swale where solids and nutrients are deposited on the bottom. The size of the swale needed is determined by the throughput of water. Construction guidelines are available from NIEA or may be accessed at www.nieani.gov.uk/pubs/publications/swaleguid.pdf.

Swales do not require a discharge consent. However, if one is found to be causing a problem it would be subject to control under the Water Order (Northern Ireland) 1999. More information is available from the NIEA. Contact details can be found in annex 17, page 163.

5.3 Constructed wetlands

In recent years some farmers have shown interest in constructed wetlands to 'treat' farm effluents, as an alternative to recycling nutrients on their land.

Constructed wetlands are artificial ponds planted with aquatic plants such as common reed (*Phragmites australis*). Farm effluent is channelled through the ponds where the plants act as a vegetative filter, resulting in reduced suspended solids, nutrients and BOD value in the water at the point of discharge.

A review of relevant literature was carried out by the Global Research Unit at ARINI Hillsborough (September 2004) on 'Constructed wetlands and their use to provide bioremediation of farm effluents in NI'. This review highlighted some areas of concern including:

- Contaminant removal from agricultural wastewaters is not conclusive. Improvement in effluent quality may not always meet the standard likely to be specified by the NI environmental and water authorities.
- Constructed wetlands are designed to treat dilute farm waste with no evidence that they are capable of dealing with raw slurry or silage effluent.
- Consistency of performance is not clearly demonstrated.
- Reliability is questionable and heavy rainfall can cause nutrient levels to rise in the out-flowing water.
- Uncertainty about how to deal with the constructed wetland at the end of its working life.

Constructed wetlands are unlikely to be a low cost solution because of the land requirement. Unavailability of a suitable site near the farmyard may be an obstacle for many farmers considering the system, especially on dairy farms where land near the farmyard is needed for grazing. It is also difficult to create an isolated area of wetland without impacting on the drainage function of neighbouring land.

The use of constructed wetlands to treat agricultural dirty water requires discharge consent from NIEA under the Water Order. As long as only dirty water is being treated in this manner, these discharges are likely to be considered under a site drainage discharge consent for industry. However where a constructed wetland is being used to treat slurry, silage effluent, or any other form of effluent, the activity will be consented in the same way as any other trade or commercial discharge.

NIEA is currently developing a design manual targeted primarily at advisers and engineers to offer guidance on best practice in the design of a practical, affordable and cost effective constructed farm wetland. More guidance on the suitability of constructed farm wetland proposals and the charging scheme for the associated discharge consent will be available from NIEA in conjunction with the manual.

Natural wetlands must never be used to treat run-off from farms.

It is essential that you enter discussion with NIEA well in advance of embarking on any project to treat dirty water or other farmyard run-off in a constructed wetland. Contact details can be found in annex 17, page 163.

Annex 6

Slurry spreading methods

6.1 Inverted splash plate spreading

Most slurry in NI is spread by the inverted splash plate (photo 22) method. In the past, splash plates on many spreaders were designed to distribute the slurry or effluent with a high trajectory from the tanker. Aerosol drift from these machines and sludgigator type machines led to many complaints from neighbours about odour and concerns about the possibility of spread of disease. Their use has been prohibited as a consequence of the NAP Regulations.

Inverted splash plates can be purchased by farmers who wish to modify their existing non-inverted splash plate spreaders. This equipment complies with the NAP Regulations regarding slurry spreading.

When using a splash plate spreader, always remember to switch the pump off as soon as the spreader is empty.



Photo 20: Inverted splashplate slurry spreading

6.2 Band spreading

Band spreaders (photo 23) distribute slurry in strips on the surface of the field via a boom with a number of hoses connected to it. The surface area of slurry exposed to air is less than if it had been applied by a splash plate spreader. This results in reduced ammonia loss to the air, providing an improved nitrogen efficiency and better crop response. Band spreading can reduce odour production by 55-60% when compared to the splash plate method. Other advantages include a more even distribution of slurry on the field and less contamination of the pasture or crop. Disadvantages of band spreading include a higher purchase cost of the machine and reduced work rate.



Photo 21: Band spreader

6.3

Trailing shoe spreading

A trailing shoe spreader (photo 24) operates under the same principle as a band spreader, except that it has a shoe attached to the end of each pipe. The shoes trail along the surface of the soil under a canopy of the growing crop resulting in even less contamination of the crop or pasture than conventional band spreading.

Disadvantages of this method, when compared to splashplate spreading, include high purchase cost of machinery and reduced work rates. However, these disadvantages may be offset by the additional flexibility of allowing slurry to be spread when the pasture or crop is at a more advanced stage of growth.



Photo 22: Trailing shoe spreader

6.4

Injection systems

Injection systems (photo 25) can be divided into two categories, deep injection and shallow injection. Deep injection involves injecting the slurry to a depth of 120-300mm in the soil. Shallow injection injects the slurry in a series of shallow 50-80mm slots.

When compared to splash plate spreading, injection systems reduce ammonia loss and can reduce odour emission by over 80%. Greatest reduction in emissions may be obtained by using deep injection. However, shallow injection is more appropriate for much of NI, because of the need for relatively stone free soil to operate a deep injection system.



Photo 23: Slurry injection

6.5

Umbilical systems

Umbilical systems and equipment with low ground pressure tyres may be used to avoid damage to soil structure, often associated with the use of heavy machinery. Do not be tempted to use this type of equipment in unsuitable conditions, such as those referred to in section 3.2, page 37, as the risk of pollution from its misuse is very high.

6.6

Rain guns and travelling irrigators

These systems can be used to spread dirty water. Choose sprinklers, irrigators or rain guns with low trajectories and large droplet size to reduce the risk of vapour and odour drift. Move them regularly.

Annex 7

The phosphorus balance in NI

Until the late 1960's, phosphorus fertiliser was needed to correct widespread soil deficiencies. From the 1970's, phosphorus applied to agricultural land in excess of crop requirements has increasingly built up soil reserves. As a result many NI soils are now overloaded with phosphorus and no longer need additional phosphorus to be productive. In fact, since the 1940's the amount of phosphorus (P) entering NI agriculture in fertilisers and feedstuffs has exceeded the amount being removed through crop and animal products by almost 10,000 tonnes per year. This is equivalent to 23,000 tonnes of phosphate (P₂O₅) per year.

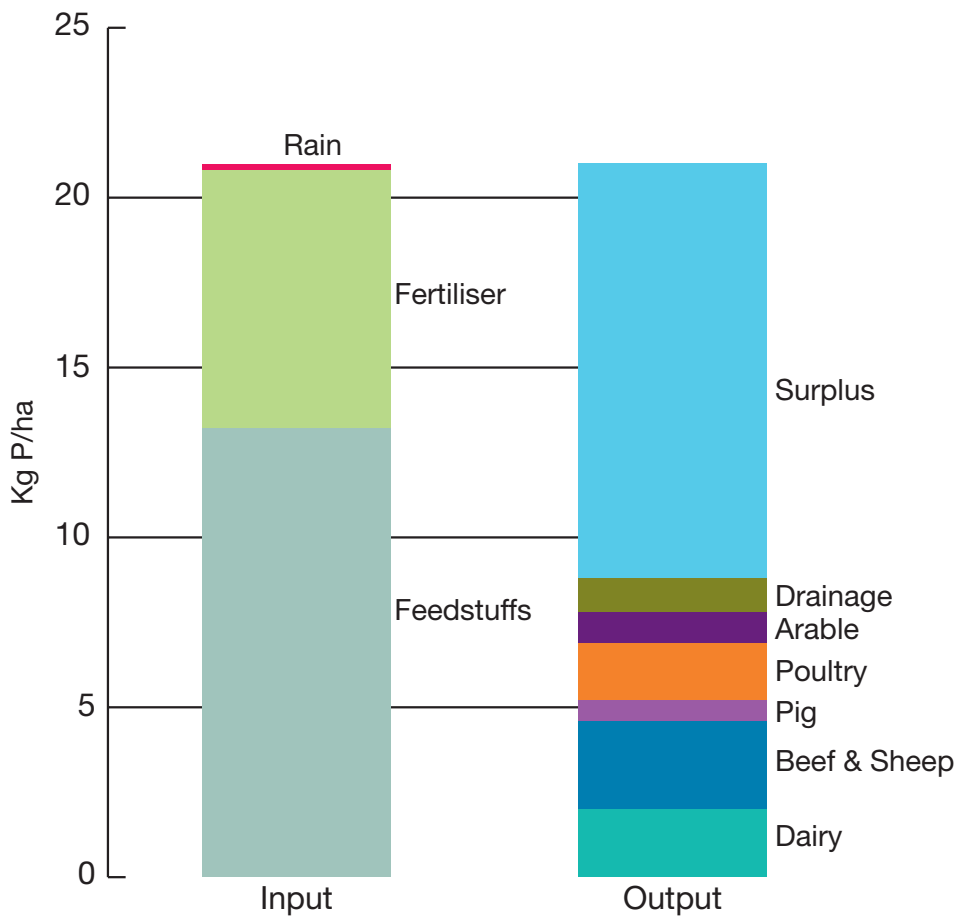


Figure 11: Phosphorus balance for NI agriculture in 2005

The NI authorities, working with the agricultural industry will, by December 2008, examine commercial / technical proposals that have the potential to bring about a reduction in the phosphorus surplus. They will also review the need to give statutory effect to phosphorus balances on individual holdings to be introduced on a phased basis.

Annex 8

Pesticide legislation

The Food and Environment Protection Act (FEPA) under which the Control Of Pesticides Regulations (Northern Ireland) 1987(COPR (NI)) (as amended) was made to control the sale, supply, storage, use and advertisement of pesticides in NI.

All pesticide suppliers and users should be familiar with the requirements of this legislation which relates specifically to pesticides, and the Control of Substances Hazardous to Health (COSHH) Regulations (Northern Ireland) 2000 which is concerned with all hazardous substances used at work.

Under FEPA, anyone selling, supplying or using agricultural pesticides must take reasonable precautions to protect the health of humans, animals and plants and to safeguard the environment - taking particular care to avoid water pollution. You can find more information about such precautions in the Code of Practice for using Plant Protection Products, available on-line at: www.pesticide.gov.uk

FEPA requires that anyone using pesticides must have received adequate instruction and guidance in their safe, efficient and humane use. All contractors and sprayer operators born after 31 December 1964 must hold a recognised Certificate of Competence for the method of application being used. The College of Agriculture, Food and Rural Enterprise (CAFRE) provide training in the application of pesticides and can arrange competence testing. Contact details can be found in annex 17, page 161.

The Groundwater Regulations (Northern Ireland) 1998, which implement the Groundwater Directive (80/68/EEC) require that authorisation is obtained prior to the land spreading of waste pesticides including washings. Note that the reuse of washings applied to the target area is not considered to be disposal and thus does not require authorisation. Applications must be made to NIEA. Contact details for the NIEA can be found in annex 17, page 163.

In addition to any action taken by NIEA against a farmer in breach of the Groundwater Regulations, a reduction in Single Farm Payment (SFP) may also result. The Cross-Compliance Statutory Management Requirement (SMR 3) requires those in receipt of SFP to protect groundwater against pollution.

Annex 9

Why are we concerned about air pollution?

9.1 Health and quality of life

Air pollution can have a serious effect on people's health, particularly those with asthma, heart or lung disease. It can lead to a reduction in life expectancy. Whilst not life threatening, odour nuisance has the potential to significantly reduce the quality of life of those living or working near its source.

9.2 'Good country smell' or air pollution?

In the past, air pollution was largely seen as a problem experienced in industrialised countries. It was associated with cities enveloped in smog. However, the impact of agricultural activities on air quality is increasingly being recognised.

Farming activities have the potential to cause air pollution and the odour sometimes arising from modern intensive livestock operations is far removed from the traditional 'Good country smell'.

- Agriculture is the main source of ammonia emissions in the UK, mainly arising from the storage and application of livestock manures and slurries.
- Approximately 38% of ammonia emissions from agriculture in the UK are from livestock buildings. Another 30% is from land spreading of slurry and manure.
- Slurry contains up to 50% of its nitrogen content in the form of ammonium which is readily lost as ammonia. The amount of nitrogen contained in the slurry and available for swards to utilise will depend on the type of livestock and diet. The proportion of the nitrogen in slurry that is utilised by swards depends on many factors such as slurry dry matter, method of application and weather parameters.
- Poultry manure produces significantly more ammonia than cattle or pig slurry or manure.
- Reducing ammonia emissions benefits the environment. It also increases profit margins by improving nitrogen efficiency.
- Losses from grazed pasture are much lower than those from buildings or from land spreading.
- There are international obligations under the Gothenburg Protocol and National Emission Ceilings Directive. These obligations include targets to reduce ammonia emissions and limits for the concentration of particles in the air which are increased by the presence of ammonia.

- Slurry, livestock manures and organic wastes provide crops and grass with valuable plant nutrients, but they can produce unpleasant odours that are detectable over considerable distances during spreading.
- Pig slurry, poultry slurry and silage effluent can be particularly offensive. Cattle slurry is least odorous but its smell is persistent after spreading. Fresh material has the least smell.
- Every year in NI, complaints are received about odour nuisance from farms. Under the Public Health (Ireland) Act 1878, local councils have the responsibility to inspect their areas for odour nuisances and to investigate complaints. In certain circumstances, local councils may take action under this legislation.
- NIEA frequently receives complaints regarding odours from land spreading activities, such as those described in section 4, page 44, which are exempt under the Waste Management Licensing Regulations. Where the problem persists NIEA may consider revoking the waste exemption.

9.3

Habitat quality

Air pollutants (for example ammonia emissions) can, if carried in the air and deposited elsewhere, result in nutrient enrichment of many habitats such as arable land, heaths, bogs, woods and hedgerows. This can lead to the loss of biodiversity in sensitive ecosystems, including bogland and heathland.

Many species supported by these habitats, for example sundew in bogs, rely on low nutrient inputs and clean unpolluted air. This is an important aspect to consider in relation to the siting of intensive livestock enterprises and carrying out of measures to minimise ammonia emissions.

Ammonia contributes to acid rain formation which can cause long-term damage to upland soils in particular. It can also damage to vegetation, especially trees and semi-natural habitats.



Photo 24: A sundew

9.4

Climate change

Why should we be concerned about climate change?

Four out of five of the warmest years ever recorded were in the 1990's, including 1999 which was the warmest year on record in the UK. There is increasing recognition that global warming is occurring as the result of human activity and that the release of 'Greenhouse gases' into the atmosphere is responsible. These gases include carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O). Agriculture is a significant source of methane and nitrous oxide, contributing approximately 23% of NI total greenhouse gas emissions, as illustrated in figure 12. The challenge is to adapt to new threats and opportunities, whilst maintaining a sustainable industry.

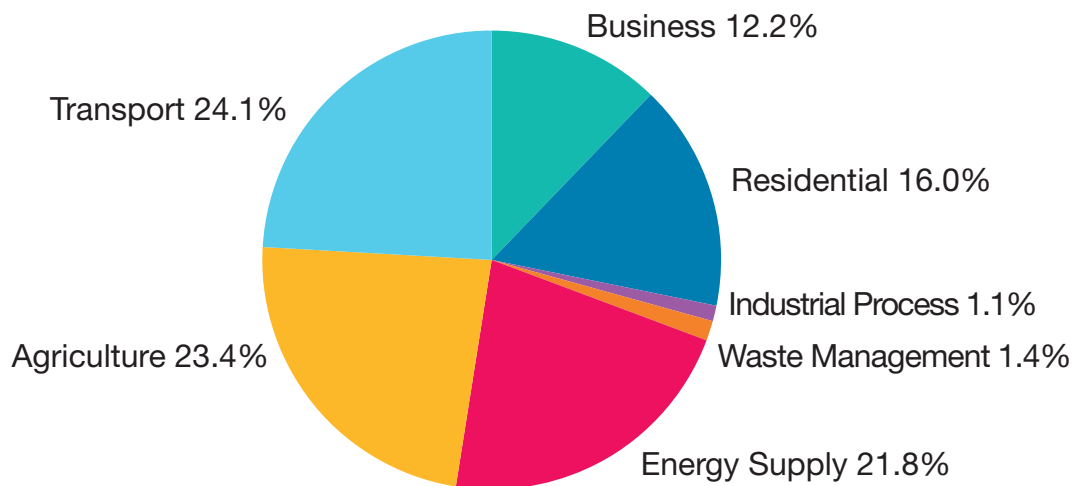


Figure 12: NI greenhouse gas emissions in 2004

International Framework for Action

Climate change is a global problem, with global causes and effects. In Kyoto, Japan, in December 1997, a number of developed countries agreed to reduce their total emissions of greenhouse gases by the year 2012. Under the Kyoto Protocol, the UK agreed to ensure that emissions of greenhouse gases were at least 121/2% lower than the 1990 base year levels.

Greenhouse gas emissions from agriculture

- Carbon dioxide: primarily from the use of fossil fuels and electricity.
- Methane: from animal manures and the digestive processes of animals.
- Nitrous oxide: from inorganic nitrogen fertiliser and from the storage of organic manures.

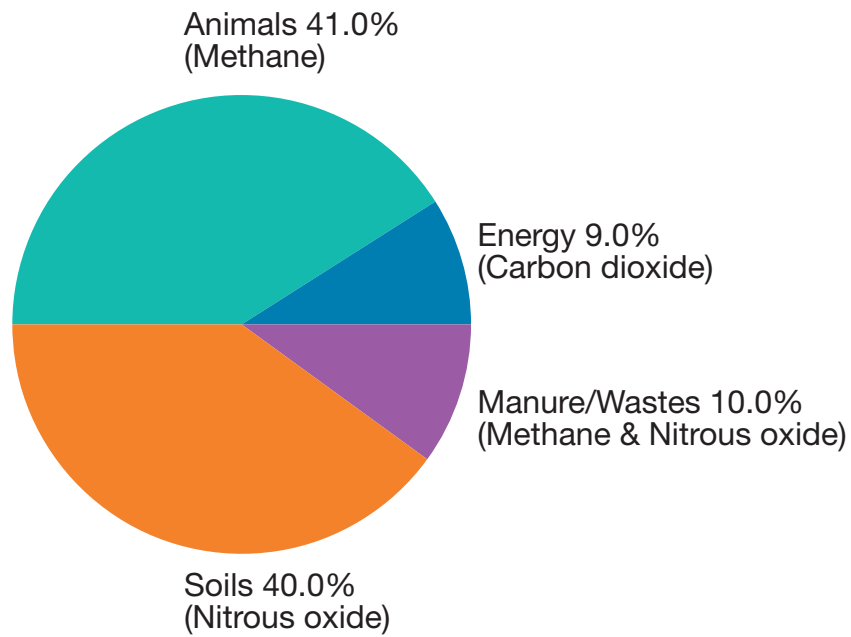


Figure 13: Greenhouse gases emitted from agricultural sources in NI in 2004

Annex 10

Summary of legislation

WATER

The Water (Northern Ireland) Order 1999

This legislation which replaces the Water Act (Northern Ireland) 1972, aims to prevent pollution of all waterways and groundwater. It is an offence under the Water Order to knowingly, or otherwise, make a polluting discharge into a waterway or underground strata. Under the Order a notice may be served to prevent pollution from occurring. The notice may specify that a certain activity can only be undertaken in a certain way or may prohibit something altogether. A time period may also be specified in which to stop something that is or has the potential to cause pollution.

When pollution has occurred, then a notice can be issued which requires the removal of the polluting matter from the watercourse and specify that any damage caused to the river is put right. The costs for the investigation of a pollution incident and any subsequent clean up may be recovered from the polluter.

Under the Order, notices on the owner of land may be served:

- prohibiting the use of wastes.
- prohibiting the deposition or discharge of a specified material onto land or into a waterway or groundwater.
- permitting the use of wastes subject to conditions.
- requiring use of wastes to be stopped within a period.
- requiring a clean up for which the landlord must permit entry.

Prosecution for an offence under the Order can result in:

- conviction on indictment leading to imprisonment for a term not exceeding two years or to a fine or to both;
- summary conviction leading to imprisonment for a term not exceeding three months, or to a fine not exceeding £20,000 or to both.

in addition, polluters may, if found guilty, also find themselves liable for considerable costs such as restocking rivers.

NIEA is responsible for the enforcement of this legislation.

The Groundwater Regulations (Northern Ireland) 1998

These Regulations implement the E.C. Groundwater Directive (80/68/EEC) to prevent the pollution of groundwater. Under this legislation farmers must not dispose of List I or List II substances, such as spent sheep dip or waste pesticides, to land without written authorisation from NIEA. The terms of the authorisation, including record keeping requirements, must be followed. Farmers must not discharge List I substances or cause pollution by indirect discharge of List II substances from activities in or on the ground, such as discharge from a poorly maintained sheep dipper. This is a Statutory Management Requirement under Cross-Compliance and further guidance can be found in the DARD booklet 'Cross-Compliance Verifiable Standards 2005/2006'. NIEA is responsible for the enforcement of these Regulations.

The Sludge (Use in Agriculture) Regulations (Northern Ireland) 1990

These Regulations implement Council Directive 86/278/EEC on the protection of the environment, and in particular soil, when septic tank or sewage sludge is used in agriculture. This legislation applies only to the application of sewage sludge and septic tank sludge to commercial food crops, including those for stock rearing purposes. These Regulations prohibit the use of sludge in agriculture as described above unless specified requirements are fulfilled. These include spreading controls, crop nutrient requirements, harvesting timetables, controls on the addition of certain metals and requirements to supply information. Both the sludge and the soil must be tested regularly to avoid a build up of nutrients and heavy metals. This is a Statutory Management Requirement under Cross-Compliance and further guidance can be found in the DARD booklet 'Cross-Compliance Verifiable Standards 2005/2006'. NIEA is responsible for the enforcement of these Regulations.

The Nitrates Action Programme Regulations (Northern Ireland) 2006 and the Phosphorus (Use in Agriculture) Regulations (Northern Ireland) 2006

The EC Nitrates Directive (91/676/EEC) requires Member States to identify:

- All surface freshwaters and groundwaters that contain 'elevated' levels of nitrate (that is, nitrate concentrations in excess of 50 mg NO₃/L); and
- All surface waters (fresh and marine) that are, or may become, eutrophic.

In both these instances, Member States must designate the catchment areas draining to the polluted waters as Nitrate Vulnerable Zones (NVZs) and establish Action Programmes to regulate farming activities within NVZs. Alternatively, Member States may establish and apply Action Programmes throughout their national territory.

Until 1 October 2004, NI had designated seven NVZs on the basis of elevated nitrate levels in groundwaters. These NVZs were very small and covered less than 1% of the NI land area. Following extensive consultation, the total territory of NI was designated under the Protection of Water Against Agricultural Nitrate Pollution Regulations (Northern Ireland) 2004 with effect from 29 October 2004.

The Nitrates Action Programme Regulations (Northern Ireland) 2006 (NAP Regulations) and the Phosphorus (Use in Agriculture) Regulations (Northern Ireland) 2006 (Phosphorus Regulations) were introduced to improve the use of nutrients on farms and as a result improve water quality throughout NI.

A series of water quality problems affect the groundwaters, rivers and lakes in NI and extends into the surrounding marine waters. The largest and most widespread of these is nutrient enrichment arising from too much nitrogen and phosphorus entering the water environment. This causes an undesirable disturbance to the water's ecology resulting in a phenomenon known as eutrophication. The urban and industrial sectors also contribute to this problem and action is being directed at these sectors, in particular the urban sector, through the implementation of other Directives.

The introduction of the NAP Regulations meets NI's legal and environmental obligations and the Phosphorus Regulations support these obligations. Both sets of Regulations applied to all farmers in NI from 1 January 2007 including those farmers operating in the seven previously designated Nitrate Vulnerable Zones (NVZs).

To help understand and comply with the rules, measures and requirements introduced by the NAP and Phosphorus Regulations the Departments issued a Guidance Booklet to all farmers throughout NI.

The Nitrates Directive is one of the Cross-Compliance Statutory Management Requirements, therefore farmers claiming Single Farm Payment and other direct payments are required to comply with the NAP Regulations. Measures relating to the Phosphorus Regulations are not Cross-Compliance Verifiable Standards however adherence to both sets of Regulations is required by law.

Under the terms of the Nitrates Directive, Member States which introduce a compliant action programme may apply for a derogation from the statutory 170 kg N/ha/year livestock manure limit specified by the Directive. The terms of the derogation are set by the European Commission and must be compatible with achieving the objectives of the Nitrates Directive and other environmental Directives. Approval by the EU Nitrates Committee, comprised of representatives of each Member State, is also required. NI has been granted a derogation to permit the land application of up to 250kg grazing livestock manure nitrogen per hectare per year provided certain criteria are adhered to. The derogation is particularly important for the intensive grassland farms in NI with higher than average stocking rates. The EC Decision must now be made into NI legislation

and further guidance will be produced when this process is complete. Interim arrangements have been put in place to allow farms to make applications for 2008. The derogation has been granted by the EC to NI until 31 December 2010. During this period further monitoring of practice on farms and water quality will be required in order to support any future derogation application.

SSAFO Regulations (Northern Ireland) 2003

SSAFO Regulations aim to minimise the risk of water pollution from the storage of silage, slurry or agricultural fuel oil. They set minimum standards for the construction and siting of new storage structures. The Regulations also cover any structures, which are substantially reconstructed or enlarged after the Regulations came into force on 1 December 2003.

Structures which were in use before the Regulations come into force can continue to be used. However, the Regulations give NIEA powers to inspect structures on farm and if NIEA considers an existing structure to present a potential pollution problem, they may serve a notice, which requires work to be carried out or precautions taken to minimise any risk of pollution. Use of the structure may be prohibited until all necessary works are completed.

Anyone intending to build a new structure or substantially alter an existing structure must notify NIEA, at least 28 days before bringing the structure into use.

Abstraction and Impoundment (Licensing) Regulations NI 2006 (& the Water Resources (Environmental Impact Assessment) Regulations (NI) 2005)

The EC Water Framework Directive (2000/60/EC) seeks to ensure a sustainable approach to water resource management for both public and environmental needs. The Water Abstraction and Impoundment (Licensing) Regulations (NI) 2006 came into force on the 1st February 2007 which fulfilled our commitment to the European Commission to have an abstraction and impoundment control system in place for NI.

These regulations seek to manage the availability of both surface water and groundwater in order to protect the water environment by establishing an abstraction and impoundment management regime and ensure that adverse impacts are mitigated.

Under these Regulations, abstractions of groundwater or surface water from rivers or lakes (including coastal waters) or impoundments will either be authorised or licensed. Water abstractions of greater than 20 cubic metres per day (equivalent to 4400 gallons per day) and significant impoundments of water will require a licence.

In NI the agricultural sectors most likely to require a licence are medium to large dairy, pig or poultry enterprises who supplement their water supply with borewell, river or lake water. Spray irrigation (and some other irrigation techniques) of crops, particularly potatoes, may require a licence, as they are likely to require more than 20 cubic metres per day from these sources. (to help calculate farm water usage refer to annex F of our application form)

The Water Resources (Environmental Impact Assessment) Regulations (NI) 2005 which apply to agricultural (water management) projects abstracting more than 200 cubic metres per day (equivalent to 44,000 gallons per day) remain in force but have been amended in line with the new licensing regime.

Under the Minerals (Miscellaneous Provisions) Act 1959, a proposal to sink a borewell deeper than 50 feet (15 metres) must also be notified to the Geological Survey of NI and a record provided of the borehole/shaft constructed.

To find out more about authorisations and licences or to obtain an application form, phone 028 9263 3482 or visit www.nieani.gov.uk

The Pollution Prevention and Control Regulations (Northern Ireland) 2003

The Integrated Pollution Prevention and Control (IPPC) Directive (96/61/EC) requires that different classes of installations obtain a permit and take steps to prevent pollution, or where that is not possible to minimise it using 'Best Practice Techniques'.

The Directive also requires that:

- energy is used efficiently;
- waste is minimised and recovered where possible;
- measures are taken to prevent accidents;
- sites are restored when operations cease.

The Directive is implemented in NI by the Pollution Prevention and Control (PPC) Regulations (NI) 2003.

Certain farms are covered by IPPC – these are installations for the intensive rearing of pigs or poultry above the following thresholds:

- More than 40,000 places for poultry;
- More than 750 sows;
- More than 2000 production pigs over 30kg.

If a farm is over one of the IPPC thresholds the farmer will need to apply for a permit. An application form has been developed for IPPC farms.

To try to simplify the process of permitting IPPC farms, 'Standard Farming

Installation Rules' have been developed. If the farmer agrees to operate their farm in accordance with the Standard Farming Installation Rules, lower charges will apply. A key requirement of an application for a permit is to show that the farm will have an acceptable impact on the environment. When a permit is issued, the farmer will need to comply with the conditions in it.

IPPC farms can affect the environment through the following:

- Accidental releases of polluting material can cause damage to watercourses;
- Ammonia from animal housing, slurry/litter management and spreading can damage sensitive vegetation like trees;
- Application of slurry or litter in excess of crop requirements leads to a build up of nutrients in the soil. Nutrients (particularly phosphorus) then run off into streams and rivers leading to excessive growth of algae and plants and damage to habitat and fisheries; and
- Noise and odour which can cause a local nuisance.

If anyone wants to start up a new unit over the threshold number of livestock places, expand an existing operation so that it goes over the threshold, or wants to make a 'substantial change'* they will need to apply for, and be granted, a permit before doing so.

** A substantial change is defined as one which could have significant negative consequences for humans or the environment. That will depend on the extent of the change and the location of the installation.*

What are the other main areas where changes will be required?

- Training: You will need to demonstrate that staff received appropriate training.
- Carcase disposal: Carcasses will need to be disposed of in accordance with the Animal By Products Regulations. This effectively means by incineration or rendering. The Regulations set standards required for incinerators.
- Diet: Ensuring that diet formulation matches the animals' needs, particularly for crude protein content and phosphorus, as these can significantly reduce emissions at source. In some cases diets will require little or no change, but in other cases the change may be more significant.
- Storage of fuel oil and other raw materials: Fuel oil storage above 1,250 litres will need to be bunded. Storage of smaller quantities will need to be effectively contained.
- Housing: Housing design should aim to minimise releases of ammonia. This is particularly important for new buildings.
- Slurry storage: You will need to cover any above ground open slurry stores. (Use of floating covers is permissible where engineered covers are not practicable or too expensive).

The Water Environment (Water Framework Directive) Regulations (Northern Ireland) 2003

These Regulations implement the EC Water Framework Directive (2000/60/EC) (WFD). The WFD aims to establish an overall framework for the protection of surface waters and groundwaters. It is a comprehensive and co-ordinated piece of legislation that will ensure that all European waters are protected according to a common standard.

The Directive uses a new approach to water management, based on natural river basins. It aims to simplify and rationalise current legislation and will gradually replace several existing key pieces of legislation. The overall aim is for all waters to achieve good status by 2015. In order to achieve this River Basin Management Plans must be drawn up by 2009. These plans will characterise the river basins and identify the pressures and impacts on water bodies within the river basins. Programmes of measures must be put in place where necessary to achieve good status.

Agriculture has already been identified as a significant source of diffuse pollution impact on the water environment in NI. Compliance with the Nitrates Directive will help progress NI towards meeting WFD goals. In addition, DARD and NIEA are working closely to ensure that future agri-environment schemes deliver water quality benefits that will help with WFD compliance. The Directive requires the active involvement of all interested parties and farmers and landowners will therefore play a very important role.

Further information can be found on the NIEA website: www.nieani.gov.uk

The Quality of Bathing Waters Regulations (Northern Ireland) 1993

These Regulations implement the EC Bathing Water Directive (76/160/EEC). The purpose of this Directive is to ensure that the quality of bathing water is improved and maintained to protect human health and also for reasons of amenity. This is to be done largely by ensuring that faecal contamination from sewage or agriculture is not present or has been adequately diluted. Bathing water is defined as fresh or seawater in which bathing is explicitly authorised, or is not prohibited and is traditionally practised by a large number of bathers.

The Directive lists 19 physical, chemical and microbiological parameters against 13 of which are indicated I (Imperative) and/or G (guideline) values. The most important of these values are the total and faecal coliform counts. Faecal coliforms are indicators of sewage or agricultural pollution. To conform with the Directive, 95% of samples must meet the I values. It is now recognised that faecal streptococci are a reliable indicator of faecal contamination and as such have a G value.

The Surface Waters (Shellfish) (Classification) Regulations (Northern Ireland) 1997

These Regulations implement the EC Shellfish Waters Directive (79/923/EEC). This Directive concerns the quality of shellfish water and applies to those coastal and brackish waters designated by the Member States as needing protection or improvement in order to support shellfish life and growth and thus to contribute to the high quality of shellfish products directly edible by man. It is not intended by itself to protect the quality of shellfish for consumption as a separate Directive (The Shellfish Hygiene Directive 91/492/EEC is concerned with protecting consumers).

The Shellfish Waters Directive sets values for 12 physical, chemical and bacteriological parameters. It specifies I and/or G values and sometimes both. The values set must be at least as stringent as the I value.

The Surface Waters (Fish life) (Classification) Regulations (NI) 1997

These Regulations implement the EC Freshwater Fish Directive (78/659/EEC). This Directive sets standards of water quality for the protection of coarse and game fisheries, together with monitoring requirements. The Member States are to designate freshwaters needing protection or improvement in order to support fish life. Two categories of water are to be designated: either suitable for salmonids (salmon, trout) or for cyprinids (coarse fish). An annex sets out fourteen physical and chemical parameters against which are listed I and G values for salmonid and cyprinid waters. Member States are to set values no less stringent than the I values and 'shall endeavour to respect the values in Column G'. Member States are to establish pollution reduction programmes and are to ensure that within five years of designation the waters conform to the values set.

The Urban Waste Water Treatment Regulations (NI) 1995

These Regulations implement the EC Urban Waste Water Directive (91/271/EEC). This Directive seeks to reduce the pollution of freshwater, estuarial and coastal waters by domestic sewage, industrial waste water and rainwater run-off, collectively, 'urban waste water'. It sets minimum standards, and timetables for their achievement, for the collection, treatment and discharge of urban waste water. It introduces controls over the disposal of sewage sludge, and requires the ending of sewage sludge dumping at sea.

All towns and villages ('agglomerations') with a population equivalent (pe) greater than 2000 are required to have collecting (sewerage) systems by the end of either the year 2000 or 2005, depending on their size. Urban waste water entering these collecting systems is to be subject to treatment requirements which generally become more stringent the larger the agglomeration. Waste

water is normally to be subject to a minimum of secondary treatment, a process generally involving biological treatment with a secondary settlement. Deadlines for the installation of secondary treatment systems vary with the size of the population served.

Higher, or tertiary, standards of treatment are required for discharges to sensitive areas. They include waters subject to eutrophication (in which case significant reductions of nitrates and/or phosphates are required); surface waters with high nitrate levels intended for the abstraction of drinking water; and other waters where higher treatment standards are necessary to fulfil the requirements of other Community Directives.

The Surface Waters (Dangerous Substances) (Classification) Regulations (NI) 1998

These Regulations implement the EC Dangerous Substances Directive (76/464/EEC). This Directive sets a framework for the elimination or reduction of pollution of inland, coastal and territorial waters by particular dangerous substances. Subsequent daughter Directives set standards for particular substances. The Directive is also intended to ensure consistency in implementing various international Conventions and to reduce distortion to conditions of competition.

An annex of the Directive has a List I and a List II of families and groups of dangerous substances. List I, sometimes referred to as the 'Black List', includes substances selected on the basis of their toxicity, persistence and bioaccumulation, eg organohalogen and organophosphorus compounds, carcinogenic substances and mercury and cadmium compounds. List II, sometimes called the 'Grey List', includes possibly less dangerous substances such as zinc, copper and lead compounds, cyanide and ammonia.

Member States are to take appropriate steps to eliminate pollution by List I substances and to reduce pollution by List II substances. 'Elimination' of pollution does not necessarily mean a zero-emission, since pollution is defined not by reference to the presence of a substance but to its effects. Discharges of both List I and List II substances are to be subject to prior authorisation by a competent authority.

Control of discharges is through the setting of emission standards that are to be based on uniform emission standards or quality objectives. The latter system of quality objectives must be in accordance with any existing Directives and the approach is conditional on the Member State proving to the Commission that the quality objectives are being met in accordance with a monitoring procedure set up by the Council.

The Surface Waters (Abstraction for Drinking Water) (Classification) Regulations (NI) 1996

These Regulations implement the EC Surface Water Directive (75/440/EEC).

This Directive has two purposes: to ensure that surface water abstracted for use as drinking water reaches certain standards and is given adequate treatment before being put into public supply; and secondly to improve rivers or other surface waters used as sources of drinking water. Sources of surface water for the abstraction of drinking water (referred to as 'surface water') are to be classified by their existing quality (physical, chemical and microbiological characteristics) into three categories corresponding to the three standard methods of treatment required to transform the 'surface water' into drinking water.

The Fisheries Act (Northern Ireland) 1966 as amended

It is an offence under section 47 of this act to allow deleterious matter to enter any waters

Prosecution for an offence under the act can result in the following.

- On summary conviction, a fine not exceeding the statutory maximum;
- On conviction on indictment to a fine or to imprisonment for a term not exceeding 2 years or both
- In the case of a continuing offence on summary conviction to an additional fine not exceeding one twentieth of level 5 on the standard scale for each day on which the offence continues
- Where a person has been convicted they may also become liable for the cost of reinstatement of the fishery
- A civil case being brought by the owner of the fishing rights

Foyle and Carlingford Fisheries (Northern Ireland) Order 2007

This legislation applies to the Foyle and Carlingford regions which cover most of the areas within the district councils of Limavady, Londonderry, Strabane, Omagh and Newry. It amends the existing Foyle Fisheries Act (Northern Ireland) 1952. Within this legislation it is an offence to 'permit any deleterious matter to enter a waterway' and where fish stocks have been damaged the Loughs Agency may carry out such restocking / reinstatement to restore the fish population and recover the cost from the polluter. It is also an offence under the above legislation to 'disturb fish on spawning grounds' and under the 2007 Order it becomes an offence to remove any material from the bed of the freshwater river without permission of the Loughs Agency.

AIR

The Clean Air (Northern Ireland) Order 1981

This legislation aims to prevent air pollution and thus makes it an offence to cause or permit the emission of dark smoke from chimneys or trade premises, including farms. This legislation is enforced by District Councils.

Roads (Northern Ireland) Order 1993

Anyone who, without lawful authority or reasonable excuse, lights a fire within 15m of the centre of a road, which causes injury or interrupts or endangers a road user, is guilty of an offence under this legislation.

The Public Health (Ireland) Act 1878

Under this legislation local councils have a responsibility to monitor their areas for statutory nuisance and can investigate complaints from the public. Enforcement action may be taken. Further details are available from Council Environmental Health Departments.

The Pollution Control and Local Government (NI) Order 1978

This legislation provides for the control of noise nuisances generally and specifically the control of noise on construction sites, in streets and from plant and machinery. It is enforced by District Councils.

SOIL

Agricultural Land (Removal of Surface Soil) Act 1953

This legislation requires planning permission to be obtained for the stripping or removal of topsoil. Contact DOE Planning Service, Divisional Offices for details.

PESTICIDES

Food and Environmental Protection Act 1985, Chapter 48, Part III

This legislation provides the powers to make secondary legislation for the control of sale, supply, storage, use and advertisement of pesticides. The term 'pesticide' includes herbicides, fungicides, insecticides, rodenticides, soil-sterilants, wood preservatives and surface biocides. Under this legislation, which is enforced by the Health and Safety Executive for NI, it is an offence to:

- pollute the environment and/or use a pesticide in such a way that would be likely to cause harm to humans and animals;

- not follow the instructions in the statutory box on the pesticide label;
- spray pesticides on land without a certificate of competence if born after 31 December 1964.

Control of Pesticides (Amendment) Regulations (Northern Ireland) 1997

These Regulations apply to pesticides or any substance, preparation or organism that is used for protecting plants or wood or other plant products from harmful organisms; regulating the growth of plants; giving protection against harmful creatures; rendering such creatures harmless; controlling organisms with harmful or unwanted effects on water systems (including sewage treatment works), buildings or other structures, or on manufactured products; protecting animals against ectoparasites; as if it were a pesticide.

Devastating effects to river life and water supplies can occur if pesticides are stored carelessly or applied/disposed of in a careless manner.

Restrictions on use.

Any pesticides that are used on farms in NI must be approved by DARD. In order to be approved the product is tested for:

- safety;
- harmful effects on wildlife;
- mobility in soil;
- potential to contaminate groundwater.

Plant Protection Products Regulations (Northern Ireland) 2005

The EU legislation covering agricultural pesticides is Directive 91/414/EEC. This is currently implemented in NI by the Plant Protection Products Regulations (Northern Ireland) 2005 as amended. This legislation controls the sale and supply of plant protection products, mainly agricultural pesticides. Under this legislation it is an offence to use or distribute a non-approved pesticide. Enforcement is by the Health and Safety Executive for Northern Ireland.

WASTE

The EC Waste Framework Directive 75/442/EEC (as amended in 91/156/EEC)

This requires member states to appoint competent authorities to draw up Waste Management Plans which develop an integrated network of regional facilities. The Directive also establishes requirements for licenses and registration of carriers and the polluter pays principle. The Amendment contains a number of significant modifications intended to maintain a high level of environmental protection.

The EC Landfill Directive 1999/311EC

This aims to harmonise controls on the landfill of waste throughout the European Union. It also aims to reduce the amount of methane, a powerful greenhouse gas emitted from landfill sites, by setting three progressive targets for member states to reduce the amount of their Biodegradable Municipal Waste (BMW) sent to landfill.

The Waste and Contaminated Land (Northern Ireland) Order 1997

This legislation implements the EC Waste Framework Directive in NI. Key elements involve the introduction of duty of care, registration of carriers and comprehensive provisions for new waste management licenses.

The Waste Collection and Disposal Regulations (Northern Ireland) 1992 as amended by the Waste Collection and Disposal (Amendment) Regulations (Northern Ireland) 1997

These Regulations apply to the collection and disposal of controlled waste. They specify procedures, which must be followed when spreading certain wastes such as blood onto agricultural land. For example, where appropriately treated blood is to be applied to agricultural land, full details must be forwarded to and approval sought from the local council. This must be obtained every time blood is to be applied or every six months if blood is applied regularly. Enforcement is by district councils.

Producer Responsibility Obligations (Northern Ireland) 1999

This legislation establishes a legal base for Regulations and allows the DOE (NI) to impose obligations on people with regard to the reuse, recovery and recycling of various products and materials in accordance with the EC Packaging Directive 94/62/EC

The Controlled Waste (Registration of Carriers and Seizure of Vehicles) Regulations (NI) 1999

This legislation establishes a system for registration of carriers of controlled waste. These controls make it a criminal offence for any person who is not registered as a carrier to transport controlled waste and enable the seizure and disposal of vehicles used for illegal waste disposal.

Controlled Waste (Duty of Care) Regulations (Northern Ireland) 2002

This legislation places a legal responsibility on anyone who produces, imports, stores, transports, treats, recycles or disposes of waste to take the necessary steps to keep it safe and prevent it from causing harm, especially to the environment or to human health.

The Waste Management Licensing Regulations (Northern Ireland) 2003

This legislation provides the mechanism to control waste management activities through the use of licenses or exemptions.

The Hazardous Waste Regulations (Northern Ireland) 2005

This legislation came into operation on the 16th July 2005. They replaced the Special Waste Regulations (Northern Ireland) 1998. The controls which are implemented by the legislation require a form (consignment note) you must use before you can get rid of special waste: notify the movement in advance (pre-notification): fees for consignment notes: restrict mixing of wastes.

The Waste Management Regulations (Northern Ireland) 2005

This legislation transposes the remaining requirements of the Waste Framework Directive and the Landfill Directive, which had been excluded in NI e.g. agricultural waste.

CONSERVATION

The Environment (Northern Ireland) Order 2002

This legislation largely replaces the Nature Conservation and Amenity Lands (Northern Ireland) Order 1985. It aims to designate areas of high nature conservation by declaring them Areas of Special Scientific Interest (ASSI) and subsequently protecting them. It is an offence to knowingly cause reckless damage to an ASSI or to undertake works without the Department's written permission.

In accordance with Article 32 of the Order any owner/occupier wishing to carry out a Notifiable Operation listed in the declaration document must apply for the Department's written consent. If an owner/occupier is refused consent, does not receive a response within three months or is aggrieved by any condition attached to the consent has the right of appeal under Article 33 (2) of the Order. Any person contravening Article 32 or who intentionally or recklessly destroys or damages an ASSI is guilty of an offence under Article 46 of the Order.

The Conservation (Natural Habitats, etc) Regulations (Northern Ireland) 1995

These Regulations implement EC Directive on the Conservation of Natural Habitats and Wild Flora and Fauna (92/43/EEC) (the 'Habitats Directive') and EC Directive on the conservation of wild birds (79/409/EEC) (the 'Birds Directive'). The Birds Directive aims to provide for the long term protection and conservation of all bird species, their nests and habitats, naturally living and occurring in the wild throughout Europe. The Habitats Directive aims to contribute towards ensuring biodiversity throughout Europe through the conservation of natural habitats and of wild fauna and flora. The measures taken to achieve this are designed to restore and maintain this biodiversity to favourable conservation status, whilst taking account the economic, social and cultural requirements and regional and local characteristics.

Both the Birds and the Habitats Directives are Statutory Management Requirements under Cross-Compliance. For the Birds Directive, the killing capturing or keeping of any wild bird, without a licence in authorised circumstances is prohibited. Certain quarry species of birds may be killed outside the close season and certain pest species of birds may be killed. In addition, the unauthorised destruction, damaging, removal or keeping of birds nests or eggs, including disturbance whilst nesting, is prohibited. For the Habitats Directive the unauthorised picking, cutting, destruction, selling and transporting material from European protected plants is prohibited as is the disturbing, killing or injuring of European protected animals. In addition the unauthorised damaging of the interests of a Natura 2000 site is prohibited as is non-compliance with terms of management agreements. Further guidance can be found in the DARD booklet "Cross-Compliance Verifiable Standards 2005/2006". NIEA is responsible for the enforcement of these Regulations.

The Environmental Impact Assessment (Agriculture) Regulations (Northern Ireland) 2007

These Regulations implement the EIA Directive and the Habitats Directive in that they:

- replace the existing EIA Regulations applying to projects for the use of uncultivated land and semi-natural areas for intensive agricultural purposes; and
- introduce new rules applying to projects for the restructuring of rural land holdings.

They revoke the Environmental Impact Assessment (Uncultivated Land and Semi-Natural Areas) (Northern Ireland) Regulations 2006 (S.R. 2006 No. 90), which amended the Environmental Impact Assessment (Uncultivated Land and Semi-Natural Areas) Regulations (Northern Ireland) 2001 (S.R. 2001 No. 435).

The Regulations require an assessment of whether such projects, above certain thresholds, are likely to have significant effects on the environment. If so, an environmental impact assessment and public consultation must take place before a final consent decision is made.

In essence, the Regulations contain a two stage consent process. First, if a farmer or land manager wishes to carry out a project of a scale equal to or above the threshold, he must apply to DARD for a screening decision. DARD will decide whether the project is likely to have significant effects on the environment. If the project is not likely to have significant effects, it can go ahead.

Secondly, if a project is likely to have significant effects on the environment, the applicant must submit an environmental statement assessing the effects of the project on the environment and the application must be subject to public consultation (which, if necessary, must extend to other EEA States). Following the consultation there is a final consent decision.

More information can be obtained from Agri-Environmental Scheme Management Branch. Contact details are in annex 17, page 161.

Annex 11

Summary of Cross-Compliance requirements

Statutory Management Requirements (SMRs)		
SMR 1	Conservation of wild birds	Applicable from 1 Jan 05
SMR 2	Conservation of natural habitats and of wild flora and fauna	Applicable from 1 Jan 05
SMR 3	Protection of groundwater against pollution	Applicable from 1 Jan 05
SMR 4	Protection of the environment when sewage sludge is used in agriculture	Applicable from 1 Jan 05
SMR 5	Protection of water against nitrate pollution	Applicable from 1 Jan 05
SMR 6	Identification and registration of animals	Applicable from 1 Jan 05
SMR 7	Identification and registration of bovine animals	Applicable from 1 Jan 05
SMR 8	Identification and registration of bovine animals (labelling of beef and beef products)	Applicable from 1 Jan 05
SMR 9	Sheep and/or goat identification and registration	Applicable from 1 Jan 06
SMR 10	Placing of plant protection products in the market	Applicable from 1 Jan 06
SMR 11	Food and feed law	Applicable from 1 Jan 06
SMR 12	Prohibition on the illegal use of stock farming of certain substances having a hormonal or thyrostatic action and of beta-agonists	Applicable from 1 Jan 06
SMR 13	Prevention, control and eradication of transmissible spongiform encephalopathies	Applicable from 1 Jan 06
SMR 14	Control of Foot and Mouth Disease	Applicable from 1 Jan 06
SMR 15	Control of certain animal diseases	Applicable from 1 Jan 06
SMR 16	Specific provisions for the control and eradication of bluetongue	Applicable from 1 Jan 06
SMR 17	Minimum standards for the protection of calves	Applicable from 1 Jan 07
SMR 18	Minimum standards for the protection of pigs	Applicable from 1 Jan 07
SMR 19	Protection of animals kept for farming purposes	Applicable from 1 Jan 07

Good Agricultural and Environmental Condition Measures	
1	Soil management
2	Supplementary feeding
3	Overgrazing
4	Undergrazing
5	Field boundaries
6	Protection of habitats (wildlife areas), archaeological sites and permanent pasture

For further information regarding Cross-Compliance, Statutory Management Requirements (SMRs) and Good Agricultural and Environmental Condition measures can be accessed at www.dardni.gov.uk

GAEC is made up of the following six elements

Soil Management

There is a requirement to protect soils from erosion and maintain soil structure by preventing land from being severely trampled or poached. All cultivated land must have either crop cover, stubble cover, grass cover or be ploughed or disced over the following winter. Finely tilled bare seedbeds are not permitted over the winter period. Do not carry out any cultivations if water is standing on the surface or the soil is waterlogged.

Supplementary Feeding

Supplementary feeding sites are prohibited on semi-natural habitats, archaeological and historic monument sites or within 10m from waterways or 50 m from a borehole or well (irrespective of its current use) or 250 m from any borehole used for public water supply. Supplementary feeding sites should be rotated and managed to prevent excessive trampling, poaching or vehicle rutting to minimise soil erosion and runoff to waterways. Sacrifice areas/paddocks are not permitted.

Overgrazing

Avoid overgrazing grassland, semi-natural habitat or archaeological and historic monument sites with livestock in such numbers which would damage the growth, quality or species composition of vegetation cover on that land to any significant degree or destroy the archaeological and historic monument features.

Undergrazing

Undergrazing must be avoided by using appropriate grazing or cutting management, except where it is deemed necessary for environmental management, for example, as part of an agri-environment agreement. Avoid infestation by species such as rhododendron, gorse/whin, giant hogweed, Japanese knotweed and noxious weeds, which degrade the agricultural and environmental value of the land to such an extent where the land is not capable of returning to agricultural production by the start of the next growing season.

Field Boundaries

Removal of field boundaries (dry stone walls, ditches, hedges, earth banks, rows of trees) is not permitted except by prior approval from DARD. This includes infilling or laying drainage pipes in open drains (sheughs). Hedge cutting/coppicing or laying is not permitted between 1 March and 31 August.

Protection of Habitats, Archaeological Sites and Permanent Pasture

- Comply with the Environmental Impact Assessment (Agriculture) Regulations (NI) 2007. Farmers/landowners must not undertake new drainage works, ploughing, clearing, levelling, reseeding or cultivations on uncultivated land or semi-natural habitats without prior approval from us. Semi-natural habitats include woodland, scrub, moorland, wetlands and species-rich grassland.
- Retain all archaeological features, ponds, shelterbelts, trees protected under the Tree Preservation Order and earth science sites.
- Do not burn heather, gorse, whin or fern between 15 April and 31 August (Game Law Amendment Act (NI) 1951).
- Infilling any land with soil, spoil, hardcore or any waste material requires written consent from DOE Special Studies Unit, Planning Service before commencing any works. The telephone number is 028 90 416880.

Annex 12

Soil sampling guidelines

Soil sampling augers and sample bags are available from your local DARD office. It is recommended that you contact the local office to check auger availability and arrange a suitable time for you to collect the necessary equipment.

Area to sample:

The size of the area from which one sample can be taken varies but shall not be more than 4 hectares. Where a field is greater than 4 hectares, each sample should be labeled A, B, C etc. Generally one sample shall be collected from each field. Within one field, areas which are not uniform for crop growth and areas which have been cropped or fertilised differently shall be sampled separately.

Time of sampling:

Sampling every fourth year shall be satisfactory as a basis for phosphorus fertiliser recommendations. A field shall not be sampled for phosphorus until at least three months after the last application of any fertiliser (organic or chemical) containing this nutrient.

Depth of sampling:

Grassland shall be sampled to a depth of 75mm and arable land to a depth of 150mm.

Method of sampling:

A soil sample shall be made up by bulking at least 25 sub-samples taken from the area to be sampled. The sub-sampling points shall be selected systematically to give an even distribution over the whole sampling area. This distribution shall be achieved by following the pattern of a letter "W", and taking sub-samples at regularly spaced intervals.

Taking sub-samples from headlands, dung and urine patches, areas where stock gather or other unusual features shall be avoided. Each sub-sample shall be taken using a soil auger which takes an even core of soil throughout the sampling depth.

Before transferring the sample to the clean sample bag write your Name, Farm Survey Number and Field Number in the following order on the sample bag panels.

NAME:	
FARM SURVEY NUMBER:	
FIELD NUMBER:	

When sampling is complete, return the soil auger and samples, together with the payment by cheque, to your local DARD office. More information can be obtained from your local Countryside Management Branch staff. Contact details may be found in annex 17, page 161.

Annex 13

Recommendations for P fertilisers based on soil analysis

Under the Phosphorus (Use in Agriculture) Regulations 2006, chemical fertilisers containing phosphorus shall not be applied unless it can be demonstrated that there is a crop requirement taking into consideration soil fertility status and the supply of phosphorus available from the application of organic manures on the farm. Table 8 provides a guide to interpreting the P index stated on your soil analysis report.

Designated priority habitats should only receive applications of fertiliser, slurry or farmyard manure where permission has been requested and received from NIEA Conservation, Designations and Protection. Certain lands subject to management agreements under DARD’s agri-environment schemes can not receive inputs of fertiliser, slurry or farmyard manure. If in doubt, check your management agreement or contact your local DARD Countryside Management staff. Contact details may be found in annex 17, page 161.

Table 8: Recommendations for P fertilisers based on soil analysis

P. Index	P concentration (mg/l)		Advice
0	0-9	Deficient	Low P levels likely to limit production. Increase P applications.
1	10-15	Optimum for extensive grassland	<p>Extensive grazing: Adequate. If current level of production is satisfactory continue with your usual fertiliser and slurry policy.</p> <p>Intensive grazing and silage: Low P levels are likely to limit production. Increase P application with slurry.</p>
2	16-25	Optimum for intensive grassland and silage	<p>Extensive grazing: High P levels present. No yield response to added phosphate. Use zero P fertiliser. Avoid slurry applications. Redistribute slurry to suitable fields on the farm.</p> <p>Intensive grazing and silage: Optimum for intensive grazing and silage fields. If current production is satisfactory, continue with your usual slurry and fertiliser policy.</p>

Table 8: Recommendations for P fertilisers based on soil analysis

P. Index	P concentration (mg/l)		Advice
3	26-45	High	High P present. No yield response to added P. Use zero P fertiliser. Avoid slurry applications on grazing fields. Redistribute slurry to suitable fields on the farm, concentrating on February/March application for first cut silage and dilute slurry applied at low rate between cuts. This should take place no more than three days after cutting.
4 or above	46 and above	Excessive	Excessive levels of soil P. No yield response to added P. Use zero P fertiliser. Avoid slurry applications on grazing fields. Redistribute slurry to suitable fields of lower P status on the farm, concentrating on February/March application for first cut silage and dilute slurry applied at a low rate between cuts. This should take place no more than three days after cutting.

Annex 14

The Beaufort wind scale

Table 9: The Beaufort wind scale

FORCE	WIND SPEED			DESCRIPTION	WIND SPEED INDICATORS
	MPH	KNOTS	KPH		
0	<1	<1	<1	Calm	Smoke rises vertically
1	1-3	1-3	1-5	Light air	Smoke drift indicates wind direction; vanes do not move
2	4-7	4-6	6-11	Light breeze	Wind felt on face; leaves rustle; vanes begin to move
3	8-12	7-10	12-19	Gentle breeze	Leaves and small twigs in motion; light flags extended
4	13-18	11-16	20-29	Moderate breeze	Leaves and loose paper raised up; flags flap; small branches move
5	19-24	17-21	30-38	Fresh breeze	Small trees begin to sway; flags flap and ripple
6	25-31	22-27	39-50	Strong breeze	Large branches in motion; whistling heard in wires
7	32-38	28-33	51-61	Moderate Gale	Whole trees in motion; resistance felt in walking against the wind
8	39-46	34-40	62-74	Fresh Gale	Whole trees in motion; twigs break; resistance felt in walking against the wind
9	47-54	41-47	75-86	Strong Gale	Slight structural damage occurs; shingles blow from roofs
10	55-63	48-55	87-101	Whole Gale	Trees broken or uprooted; considerable structural damage occurs
11	64- 74	56-63	102-120	Storm	Widespread damage to trees and buildings
12	75+	64+	120+	Hurricane	Severe and extensive damage

Annex 15

Exemptions under the Waste Management Regulations (NI) 2006

Table 10: Exemptions under the Waste Management Regulations (NI) 2006

Simple exemptions	
Ref No	Description
6	Treatment and cleaning of agricultural packaging or agricultural containers so that they can be reused
7	Burning waste as fuel in appliance or appliances
12	Preparatory treatment of wastes intended for recovery or reuse
14	Manufacture from agricultural waste and treatment of agricultural waste soils
15	Manufacture of finished goods from agricultural waste
16	Beneficial use of agricultural waste
17	Storing agricultural wastes intended for recycling or recovery, in a secure place
18	Storing agricultural wastes intended for recycling or recovery, in secure containers
21	Chipping, shredding, cutting or pulverising agricultural waste plant matter
25	Spreading of agricultural dredgings and plant material cleared from Inland Waterways
27	Baling, compacting, crushing, shredding or pulverising agricultural waste at the place of production
28	Storing returned agricultural goods
29	Burning agricultural waste in an exempt incinerator
30	Burning agricultural waste plant tissue in the open
32	Burying waste from a portable toilet at an agricultural premises where produced
39	Storing agricultural medicines and medical, nursing and veterinary waste
47A	Spreading diluted milk on land for agricultural benefit

Table 10: Exemptions under the Waste Management Regulations (NI) 2006	
47B	Deposit of plant tissue at the place of production
47D	Treating agricultural land with ash from a pig or poultry carcass incinerator
47E	Treating agricultural land with dredgings from farm ditches for agricultural benefit or ecological improvement
47F	Treating agricultural land with spent mushroom compost for agricultural benefit or ecological improvement
Complex Exemptions	
9	Spreading only agricultural waste on land for agricultural benefit or ecological improvement
13	Composting biodegradable waste from agricultural premises
19	The storage and use of building wastes from agricultural premises in construction
47C	Using a lined biobed to dispose of agricultural waste consisting of non-hazardous pesticide solution or washings

You can register for agricultural waste exemptions when completing your IACS/Single Application Form. If you do not fill this form, apply directly to NIEA.

For further information, contact the NIEA. Details can be found in annex 17, page 163.

Annex 16

Conversion factors

Volumes

1 cubic metre (m³) = 1000 litres
 1 cubic metre (m³) = 220 gallons
 1 litre (l) = 0.22 gallons
 1 gallon = 0.0045m³ or 4.55 litres
 1000 gallons = 4545 kilograms (4.5 tonnes)

Length / distance

1 metre (m) = 1.094 yards
 1 yard = 0.9144 metre
 1 metre (m) = 3.281 feet
 1 foot (ft) = 0.31 metre
 1 kilometre (km) = 0.6214 mile
 1 mile = 1.6093 kilometre

Area

1 hectare (ha) = 10,000 square metres (m²)
 1 hectare (ha) = 2.4711 acres
 1 acre = 0.405 hectares

Weight

1 kilogram (kg) = 2.205 pounds
 1 pound = 0.4536 kilogram
 1 tonne = 1000kg
 1 metric tonne (t) = 0.98 imperial ton

Application rates

1m³ per hectare = 90 gallons per acre
 1 gallon per acre = 0.011m³ per hectare
 50,000 litres per hectare = 50m³ per hectare = 4,500 gallons per acre
 1 tonne per hectare = 0.4 ton per acre
 1 ton per acre = 2.5 tonnes per hectare.

Fertilisers

1 unit per acre = 1.25 kilograms per hectare (kg/ha)
 1kg/ha = 0.8 units/acre

1kg P = 2.29kg P ₂ O ₅	1kg P ₂ O ₅ = 0.44kg P
1kg K = 1.20kg K ₂ O	1kg K ₂ O = 0.83kg K
1kg S = 2.50kg SO ₃	1kg SO ₃ = 0.40kg S
1kg Mg = 1.66kg MgO	1kg MgO = 0.60kg Mg

Notes: A 'unit' is 1% of 1 hundredweight, or 1.12 lb
 Tonne = metric tonne
 Ton = imperial ton

Annex 17

Useful contacts

Department of Agriculture and Rural Development www.dardni.gov.uk		
Headquarters Dundonald House, Upper Newtownards Rd, Belfast, BT4 3SB	Tel. No. 028 9052 0100	
Countryside Management Branch Email: cmbenquires@dardni.gov.uk Headquarters: Lindesay Hall, Loughry Campus, Cookstown, BT80 9AA 2 Newry Road, Armagh, BT60 1EN Kilpatrick House, 38-54 High Street, Ballymena, BT43 6DP Inishkeen House, Killyhevin, Enniskillen, BT74 4EJ 31 Station Road, Magherafelt, BT45 5DN 2b Portaferry Road, Newtownards, BT23 8NN Sperrin House, Sedan Avenue, Omagh, BT79 7AQ	Tel. No. 028 8675 7507 028 3751 5650 028 2566 2800 028 6632 5004 028 7930 2066 028 9181 3570 028 8225 1020	Fax No. 028 8675 7511 028 3751 5611 028 2566 2838 028 6634 3000 028 7930 2067 028 9182 2106 028 8225 3500
Agri-Environment Scheme Management Branch Lindesay Hall, Loughry Campus, Cookstown, Co. Tyrone, BT80 9AA	028 8676 8310	028 8675 7511
Environmental Policy Branch Room 651, Dundonald House, Upper Newtownards Rd, Belfast, BT4 3SB	028 9052 4130	028 9052 4059
CAFRE www.cafre.ac.uk Enniskillen Campus, Levaghy, Enniskillen, BT74 4GF Greenmount Campus, 22 Greenmount Rd, Antrim, BT41 4PU Loughry Campus, Cookstown, BT80 9AA	028 6634 4800 028 9442 6666 028 8676 8101	028 6634 4888 028 9442 6603 028 8676 1043

	Tel. No.	Fax No.
CAFRE Development Advisers Greenmount Campus, 22 Greenmount Rd, Antrim, BT41 4PU	028 9442 6772	028 9442 6777
Veterinary Service Room 733, Dundonald House, Upper Newtownards Rd , Belfast, BT4 3SB	028 9052 4580	028 9052 5012
Divisional Veterinary Offices Mall West, Armagh, BT61 9BL Crown Buildings, Pound Street, Larne, BT40 1SH Kilpatrick House, 38-54 High Street, Ballymena, BT43 6DP Crown Buildings, Asylum Road, Derry/Londonderry, BT48 7EA Crown Buildings, Artillery Road, Coleraine, BT52 2AJ Glenree House, Unit 2 Springhill Road, Carnbane Industrial Estate, Newry, BT35 6ES Crown Buildings, Thomas Street, Dungannon, BT70 1BR 9 Robert Street, Newtownards, BT23 4DN Inishkeen House, Killyhevlin, Enniskillen, BT74 4EJ Sperrin House, Sedan Avenue, Omagh, BT79 7AQ	028 3752 9900 028 2826 3222 028 2566 2862 028 7131 9500 028 7034 1111 028 3025 3200 028 8775 4777 028 9182 5825 028 6632 5004 028 8225 1020	028 3752 9911 028 2826 3220 028 2566 2853 028 7137 2489 028 7034 1135 028 3025 3255 028 8775 4888 028 9181 3870 028 6634 3043 028 8225 3500
Other Useful Contacts		
Forest Service Customer Services, Room 34, Dundonald House, Upper Newtownards Rd, Belfast, BT4 3SB	028 9052 4480	028 9052 4570
Rivers Agency www.riversagencyni.gov.uk Hydebank, 4 Hospital Rd, Belfast, BT8 8JP	028 9025 3355	028 9025 3455

	Tel. No.	Fax No.
<p>Food Standards Agency Northern Ireland www.food.gov.uk 10a-c Clarendon Road, Belfast, BT1 3BG</p>	028 9041 7700	028 9041 7726
<p>Health and Safety Executive for Northern Ireland www.hseni.gov.uk 83 Ladas Drive, Belfast, BT6 9FR</p>	0800 0320121	028 9023 5383
<p>The Loughs Agency www.loughs-agency.org 22 Victoria Rd, Waterside, Derry/Londonderry, BT47 2AB</p>	028 7134 2100	028 7134 2720
<p>Department of the Environment Northern Ireland Environment Agency www.ni-environment.gov.uk Water Management Unit 17 Antrim Rd, LISBURN, BT28 3AL</p>		
General Enquiries	028 9262 3100	
General Fax Number	028 9262 3011	
Nitrates Regulations	028 9262 3184	
SSAFO Regulations	028 9262 3102	
Groundwater Authorisations	028 9263 3445	
Sewage Sludge to Land	028 9263 3445	
Discharge Consent for single domestic dwellings	028 9262 3014	
All other Discharge Consents	028 9262 3034	
Abstraction Licensing	028 9263 3462	
Water Pollution Hotline (A 24-hour confidential hotline for reporting pollution incidents.)	0800 80 70 60	
<p>Land Resource Management Unit Klondyke Buildings, Cromac Avenue, Gasworks Business Park, Lower Ormeau Road, Belfast, BT7 2JA</p>		
General Enquiries	028 9056 9353	
Waste Management Exemptions Queries	028 9056 9360	
Registration of Carrier's Queries	028 9056 9389	
Hazardous Waste Section	028 9056 9710	

	Tel. No.	
Industrial Pollution and Radiochemical Inspectorate Klondyke Buildings, Cromac Avenue, Gasworks Business Park, Lower Ormeau Road, Belfast, BT7 2JA Industrial Pollution Prevention and Control Queries (IPPC)	028 9056 9296	
Natural Heritage Klondyke Buildings, Cromac Avenue, Gasworks Business Park, Lower Ormeau Road, Belfast, BT7 2JA Conservation, Designations and Protection Conservation Science Biodiversity Queries	028 9056 9515 028 9056 9604 028 9056 9605	
Historic Buildings and Monuments Waterman House, 5-33 Hill St, Belfast, BT1 2LA Historic Buildings General Queries Historic Monument General Queries	028 9054 3095 028 9054 3037	
Further on-line information Net Regs: Environmental Regulations Online (www.netregs.gov.uk)		

Plain language guidance on NI environmental regulations, developed by the Northern Ireland Environment Agency (NIEA), in partnership with the Environment Agency and SEPA. Guidance arranged by Environmental Topic (suitable for all businesses) and by Business Type (tailored to specific industries). Current and Future Environmental Legislation section is regularly updated. There is also a facility to register for free email updates.