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The Code of Good Agricultural Practice

For the Protection of Water, Soil and Air for Wales

Welsh Assembly Government

Acknowledgements

This Code was produced by the Welsh Assembly Government, in partnership with, and with input and comments from:

Defra, Environment Agency Wales,
Countryside Council for Wales,
Welsh Assembly Government Divisions: Waste Strategy, Office of the Chief Veterinary Officer, Rural Payments, Plant Health, Climate Change and Water Policy, Forestry Commission Wales, CADW

The following stakeholders were consulted:

National Farmers' Union, Farmers' Union of Wales, Country Land and Business Association, National Trust, Royal Society for the Protection of Birds, Dwr Cymru, Kelda Water Services Wales, Farm Assured Welsh Livestock, Organic Centre Wales, Farming and Wildlife Advisory Group, Hybu Cig Cymru, Welsh College of Horticulture, CALU, Council for National Parks, Welsh Local Government Association, Young Farmers Clubs of Wales, Welsh Wildlife Trusts, Machinery Rings, ADAS.

Contents

About this Code

The Code of Good Agricultural Practice for the Protection of Water, Soil and Air for Wales provides advice and guidance for farmers and land managers to minimise the risks of causing pollution.

The Code draws together advice on good agricultural practice from many sources. In this Code good practice is defined as that which reduces the risk of pollution, while allowing profitable and productive farming to continue.

The Code also provides a reference source for the legal requirements for farmers and land managers with respect to air, soil and water. It also contains references to related legal requirements such as planning, access and biodiversity.

The content of the Code

This Code brings together and updates guidance provided previously in the separate Codes for Air, Soil and Water by the Ministry of Agriculture, Fisheries and Food and the Welsh Office Agriculture Department (last revised in 1998). It reflects latest changes in agricultural practices and environmental obligations, and applies in Wales only.

The advice in this Code recognises that certain farming activities can affect water, air and soil all at the same time. For example, following a nutrient management plan will ensure efficient use of fertilisers and organic manures and can:

- limit nitrate leaching to surface and groundwater;
- prevent the unnecessary accumulation of phosphorus in the soil and its potential transfer to the water environment;
- reduce the risk of nitrous oxide (a greenhouse gas) being lost to the atmosphere;
- improve soil structure.

The advice also recognises that you may also save money by following the good practice. Further details of cost savings can be found in the Environment Agency's Best Farming Practices Guidance and the Farming Connect Datasheets 'For Better Returns' (Refs 1 & 2).

How the Code is structured

The Code is split into three parts:

Part 1 (and section 1) of the Code provides general information on how farm activities can affect the environment.

Part 2 of the Code, which is the Statutory Code under section 97 of the Water Resources Act, see below, is comprised of sections 2 – 6 regarding aspects

of farm activity, from planning the environmental management of the holding to looking after farm buildings and field husbandry.

Part 3 of the Code (sections 7 and 8) gives further advice to protect air, soil and water regarding waste and water supply management.

Sections 2 – 8 relate to areas of farming activity, and managing waste and water resources.

Each section includes a guide to the legal and cross compliance requirements for the activity – what you have to do by law.

The text of European laws and directives can be obtained from http://eurlex.europa.eu/en/index.htm

The text of National laws and explanatory memoranda can be obtained from http://www.opsi.gov.uk and http://www.opsi.gov.uk/legislation/wales/wales_legislation

The Environment Agency's website www.netregs.gov.uk also provides further guidance.

The remainder of each section is advisory and goes over and above your legal obligations. This good practice advice is comprised of a summary of the key points, followed by more detailed advice on good practice for each activity.

The legal status of the Code

Under the Environmental Permitting (England and Wales) Regulations 2010, it is an offence to 'cause or knowingly permit a water discharge activity or groundwater activity'[1], in other words to cause pollution to surface or groundwater, unless you have an Environmental Permit.

Surface water includes all surface water: coastal waters, estuaries, canals, lakes, ponds, rivers, streams and ditches, including those which are temporarily dry, and blind ditches.

Groundwater means all water which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil.

Part 2 of this Code is produced under section 97 of the Water Resources Act 1991, which provides for a Code of Good Agricultural Practice to give practical guidance and promote desirable practices to minimise pollution of surface and

[1] 'Water discharge activities' include the discharge to surface water of any poisonous, noxious or polluting matter, or waste matter. This would include, for example, discharges of silage effluent and slurry. Groundwater activities include the discharge of a pollutant that results in the direct or indirect input of that pollutant to groundwater.

groundwaters. While you do not have to follow the advice given in Part 2, Environment Agency Wales could take whether you have or not into account when deciding on enforcement action following any water pollution incident. This does not apply to any advice given purely to minimise air and soil pollution risks.

Parts of the Code also meet the requirement of Article 4 of the EC Nitrates Directive[2]. This requires WAG to provide a Code of Good Agricultural Practice to be implemented by farmers on a voluntary basis, to provide all waters with a general level of protection from nitrate pollution. This advice is drawn together as Appendix 1 of this Code. Farmers with land outside Nitrate Vulnerable Zones are encouraged to follow this Code to help prevent nitrate levels in waters rising to the point where further regulation would become necessary. However, land managers in NVZs must follow the mandatory Regulations. Full guidance to this is provided in the NVZ in Wales Farmers Pack (Ref 3)

Following the legal requirements and good practices in this Code will help achieve the standards set by the Water Framework Directive[3]. This requires an integrated approach to managing water quality and quantity across whole river catchments, with waters achieving 'good ecological status' by 2015.

Following good practice in this Code will also contribute to meeting the targets set under the National Emission Ceilings Directive[4] and the UNECE Gothenburg Protocol[5], to meet targets for limiting ammonia emissions.

Please note that although it will help to achieve them, following this Code does not replace any obligations placed on you by Cross Compliance requirements if you claim the Single Farm Payment, or any Farm Assurance, Organic Standards or land management schemes.

[2] The Nitrates Directive 91/676/EEC
[3] The Water Framework Directive 2000/60/EC.
[4] National Emissions Ceiling Directive 2001/81/EC implemented by The National Emissions Ceilings Regulations 2002.
[5] Protocol to the 1979 Convention on long-range transboundary air pollution to abate acidification, eutrophication and ground-level ozone.

PART 1

Introduction

1 Introduction

This section describes how agricultural practice can affect our water, soil and air.

Protecting our natural resources of water, air and soil is essential for a sustainable environment and for farming and forestry. Good management of these resources will help sustain your farming business, reduce costs by avoiding pollution, and add value by demonstrating to customers that their food has been sustainably produced.

Overall it is estimated that up to 1 in 6 jobs in Wales rely to some extent at least on the environment in Wales (Ref 4).

1.1 Resource Protection

1.1.1 Water

Clean water is very important for the economy of rural Wales. Most of the drinking water in Wales is taken from rivers draining important agricultural areas, which were historically very clean. Groundwater[6] is also an important resource for drinking water - there are thousands of private wells and water supplies around Wales, especially on farms.

Clean water also supports local economies in Wales more directly, for example the quality of our bathing waters and internationally recognised "Blue Flag" beach awards depend heavily on clean water in nearby streams or rivers which drain from agricultural land. Angling in Wales' rivers and lakes brings in an estimated £100 million each year, with money spent predominantly within the local rural fishing areas (Ref 5).

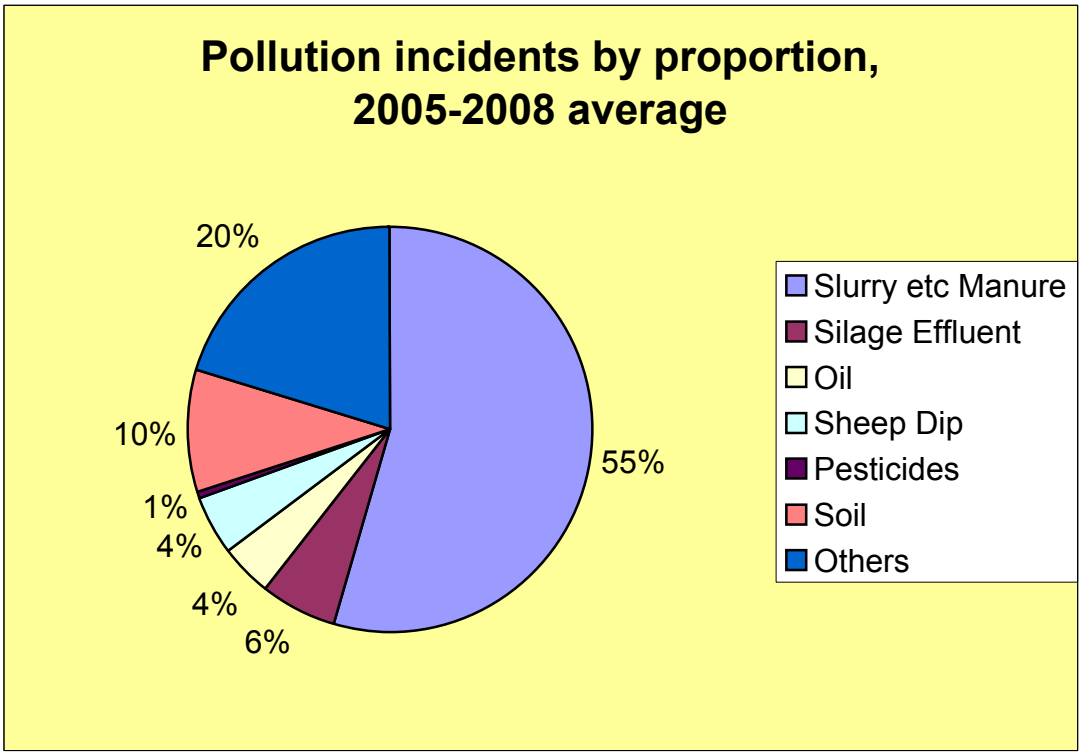
Water Pollution

There are a number of pollution risks arising from agriculture.

Pollution coming from a single identifiable source, such as a building, store or field is known as **point source pollution**. The main causes of these incidents are overflows or leaks from slurry stores, seepage of silage effluent

[6] Groundwater is the water held underground in rock formations. Where these formations support wells, boreholes, surface water, wetland habitats etc, they are called aquifers. Groundwater feeds streams and rivers as well as providing a source of drinking water. If it becomes contaminated it may take years and considerable costs to remedy.

from silage facilities from yard drainage not connected to slurry stores, spillage or leaks of agro-chemicals, oils or sheep dip chemicals.

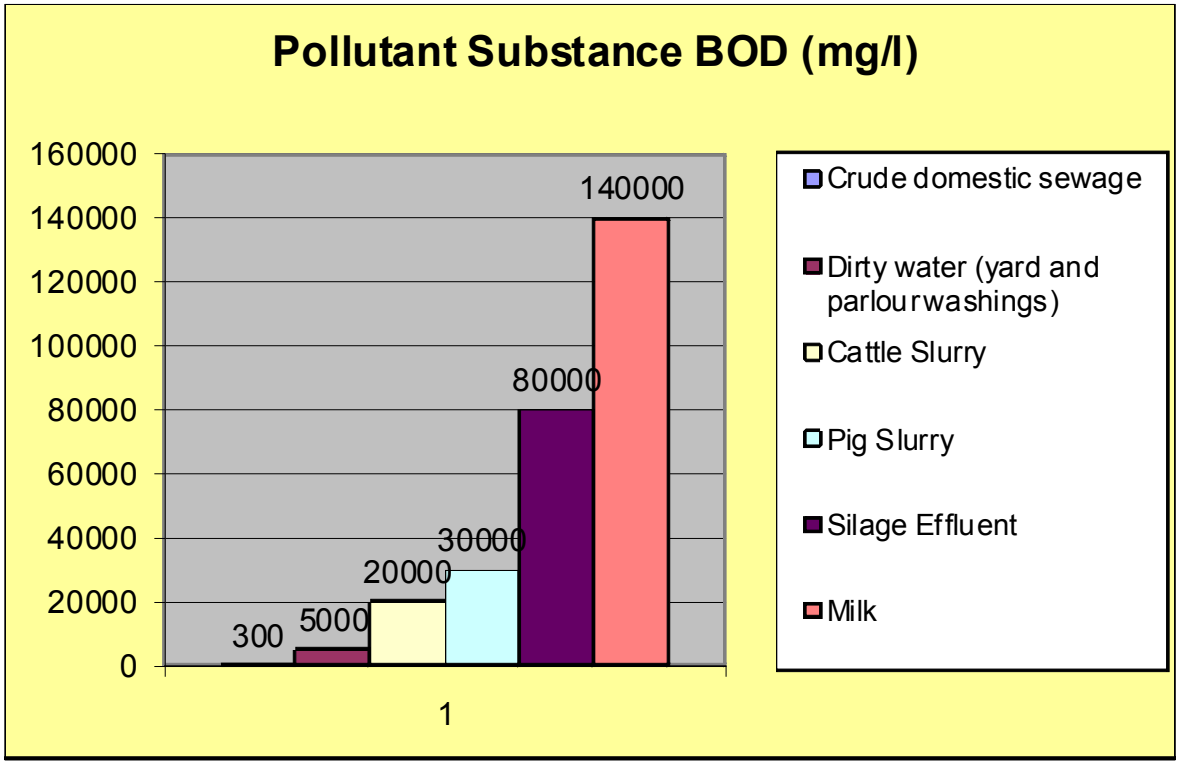


Diffuse pollution can come from many fields or sources within a catchment over time, and is not caused by a single event or action. An example of this is where excess slurry is applied to several fields in a river valley. The run-off from one field may not appear too large a problem, but the combined run-off could result in poor water quality and cause the loss of blue flags at designated bathing waters, or render a stream unsuitable for livestock watering.

Typical BOD levels of Farm Pollutants

When naturally occurring micro-organisms in water break down organic matter they use oxygen in the water, suffocating fish and wildlife. In severe cases this can kill all river life. Biochemical Oxygen Demand (BOD) is a measure (in milligrammes of oxygen/litre of water) of this. It is used to show the polluting strength of livestock manures and other materials. A Grade 1 surface water[7] normally has a BOD of less than 3mg/l, any loading in excess of this can be considered a pollutant.

[7] Surface water includes all surface water: coastal waters, estuaries, canals, lakes, ponds, rivers, streams and ditches, including those which are temporarily dry, and blind ditches.



Source: Prevention of Environmental Pollution from Agricultural Activity – A Code of Good Practice, 2005, Scottish Executive

Silage effluent, the liquid produced when any forage crop is made into silage, is one of the most potent pollutants on the farm. Very small amounts will kill fish and other water life if it gets into surface water. Grass which is cut at 18% dry matter and immediately ensiled will produce about 150 litres per tonne. Grass wilted to 25% dry matter produces around 25 litres per tone.

Livestock manures[8], dirty water[9] and organic wastes[10] are a particular hazard if they are released into water or are washed there from fields.

- They have a high BOD as shown above, and can lead to fish kills.
- The ammonia they contain can poison wildlife in the water and kill fish.
- They contain high levels of faecal pathogens, which can pose a hazard to public health if discharged into surface water used for potable water supplies (Ref 6), or to bathing waters.
- The nutrients they contain can cause eutrophication[11].

[8] In this Code, livestock manure includes slurries, solid manures and farmyard manure.

[9] Dilute washings from dairy parlours and run-off from lightly contaminated yard areas are referred to as dirty water.

[10] Organic wastes include milk waste, paper waste, sewage sludge cake, liquid digested sludge, waste derived composts and digestate from anaerobic digestion plants.

[11] Eutrophication is the enrichment of ecosystems by nitrogen or phosphorus. In water it causes algae and higher forms of plant life to grow too fast, leading to potentially toxic algal blooms. This disturbs the balance of organisms present in the water and the quality of the water concerned. On land, it can stimulate the growth of certain plants which then become dominant so that natural diversity is lost.

Nitrogen, in the form of **nitrates** from fertilisers, and manures, and in some circumstances also **phosphorus**, may be leached from the soil into groundwater and surface waters. They are also present in run-off from fields (in soluble form) as well as in soil organic matter, organic manures and attached to soil particles from where they can be released into surface water by soil erosion and contribute to eutrophication. Ammonium nitrogen from organic manures can also pollute ground and surface waters.

Phosphorous in the form of **phosphate** is usually attached to soil particles, and any measures to prevent the loss of soil particles from fields will help to reduce phosphate pollution.

Eroded soil may remain suspended in the water and can impact on the quality of drinking water. Larger particles may settle, called sedimentation, in river gravels, causing serious damage to fisheries by smothering spawning grounds and reducing food supply. Such sediment can also support large growths of aquatic vegetation, increasing the smothering effect, and which may increase the risk of flooding.

Agro-chemicals (pesticides, disinfectants, sheep dip and other veterinary medicines) are extremely toxic potential pollutants of water, and must be managed accordingly. Sheep dip chemicals in particular can have a huge impact on the ecology of a river. There is also a maximum permissible concentration of any one pesticide in drinking water of only 0.1 microgram per litre[12] (equivalent to one drop in an Olympic sized swimming pool) which can easily be exceeded unless carefully managed.

Fuel oil spills on farms can cause incidents that pollute water and damage wildlife. Oil spreads very widely over the surface of water and can easily get into groundwater. Clean up costs are very high.

Flooding

Climate change is expected to affect rainfall in winter and summer, resulting in more extreme weather events. Floods and droughts are both more likely and could have a significant impact on farm businesses. Adopting practices to help the land absorb and slow the flow of water will reduce the risk of flooding further down the catchment, and maintaining soil organic matter levels will retain water to aid crop and livestock yields.

1.1.2 Air

We all need and expect to breathe clean fresh air. It is an important factor in the quality of life in Wales, and our tourist industry. Farm odours are the source of public complaints to local authorities every year, and although it is not possible to avoid many of these, some can be minimised through good

[12] Drinking Water Directive 98/85/EC

practice. Gaseous emissions are also a major contributor to climate change – see section 1.2.

Air Pollution

The primary pieces of legislation protecting our air resource are the Clean Air Act 1993, and the Environmental Protection Act, 1990, enforced by the Environmental Health Department of local authorities. Local authorities have a duty to inspect their areas to detect any statutory nuisances and to take reasonably practicable steps to investigate complaints of statutory nuisances that are made to them. Where a statutory nuisance exists, or is likely to occur or recur, they have a duty to serve an abatement notice.

Intensive farming of pigs and poultry can also give rise to air pollution, and this is regulated through Environmental Permitting by Environment Agency Wales[13] .

The main statutory nuisances arising from agriculture are:

Ammonia and odour forming gases released from organic manures during handling and storage, and during and after application to land. Ammonia in the air can cause human health problems. When it is re-deposited, it can acidify soils, natural habitats and fresh waters. By increasing the supply of nitrogen, it can reduce biodiversity, particularly in upland surface waters and natural and semi-natural habitats. Agriculture produces more than 85 per cent of ammonia emissions in the United Kingdom (Ref 7), so it is important to consider ways of reducing this.

Dark smoke or smoke nuisance has been significantly reduced by regulations that restrict what may be burnt in the open[14]. Farm waste materials, must now be recycled or disposed of correctly, in order not to pose a risk to the environment (see section 7).

Poultry and pig housing can also generate significant amounts of **dust particles**, which may adversely affect the health of people living nearby.

For information on **Greenhouse Gases**, see section 1.2.1

1.1.3 Soil

Healthy soils are the foundation of any successful farm business. Soil provides a stable medium for crop development, supports feed for livestock and enables good field access if properly managed. Soils are a finite and non-renewable resource and so it is essential that they be managed correctly.

[13] Environmental Permitting (England and Wales) Regulations 2010
[14] As above

Well structured soils also act as a natural buffering system, filtering pollutants, and reduce harm to the environment. They also support ecological habitats and biodiversity, and preserve archaeological sites.

Impacts on Soils

Soils can become polluted and contaminated, and can be damaged by field operations and livestock. Small quantities of soil run-off (sometimes called soil wash) and erosion, can seem insignificant, but can cause pollution and nuisance and lead to a loss of nutrients, soil organic matter and carbon.

In some cases, soil degradation can contribute to environmental damage of surface water and habitats, and a loss of greenhouses gases. It can also be an expensive loss, particularly where nutrients are lost and the soil workability and crop (including grass) health is affected.

The loss of soil organic matter can damage soil structure resulting in lower crop yields, and poor water infiltration exacerbating soil erosion and flood risks. There is also a loss of associated soil carbon. Some examples of practices that reduce soil organic matter in Wales are:

- overgrazing, whereby excessive removal of vegetation results in less organic matter being incorporated into the soil;
- conversion of permanent pasture to new leys and / or arable systems;
- uncontrolled or poorly managed heather burns where the actual organic matter of the soil is burnt (Ref 8).

Soil erosion results in a loss of an essential resource from your fields, and can cause pollution and sedimentation problems in watercourses and on roads. This can also contribute to localised flooding. Some examples of practices leading to soil erosion are:

- growing arable crops on steep slopes;
- leaving bare soils over winter;
- supplementary feeding leading to poaching and soil run-off to nearby surface water.

Soil compaction is caused by downward pressure on the soil by livestock and machinery, particularly in wet conditions. This damages soil structure, impeding root growth, movement of nutrients through the soil and drainage, and can also contribute to localised flooding.

Soil contamination by heavy metals or persistent organic chemicals may be, or may become, a problem, particularly from organic wastes applied to the land, or by atmospheric deposition. You should consider the possibility of this and manage the land to protect its long-term fertility.

Such problems can be overcome through careful planning of farm activities, carrying out cultivation operations when conditions are right, and using the good practice given in this Code. This will also contribute to protecting our water resource and the wider environment. For example, in many cases,

managing land in ways to prevent soil loss is also the best way to prevent damage to archaeological remains.

1.2 Climate Change

1.2.1 Greenhouse gases

Greenhouse gases (GHGs) are responsible for human induced climate change. Agriculture accounts for 10.4% of total greenhouse gases in Wales, and is the most significant source sector for methane and nitrous oxide, accounting for 55% and 85% of total Welsh emissions of these two gases, respectively (Ref 9).

Carbon dioxide is produced by burning fossil fuels such as coal and oil, in the production of energy. The manufacturing process of inorganic nitrogen fertilisers is one of the largest sources of carbon dioxide from agriculture, during which a significant amount is released into the atmosphere.
Soils are an important component of the carbon cycle, and on a global scale, they hold the second largest stock of carbon, after the oceans, see 1.2.3 below.

Nitrous oxide is produced by micro-organisms after the application of fertilisers and organic manures, especially if the soil is poorly aerated and an excessive amount of nitrogen has been applied. Agriculture is responsible for 85% of nitrous oxide emissions in Wales, of which soil processes account for 94%. **Nitrous oxide is over 300 times more powerful as a greenhouse gas than carbon dioxide.**

Methane is produced directly by cattle and sheep, by enteric fermentation[15] and a smaller amount is also released from all organic manures. Agriculture is responsible for 55% of all emissions of methane in Wales, 90% of which is produced by enteric fermentation. **Methane is over 20 times more powerful as a greenhouse gas than carbon dioxide.**

Chloroflourocarbons (CFCs) and **halons** are greenhouse gases, and also damage the ozone layer. In agriculture, CFCs are used in refrigeration equipment and halons are often used in fire extinguishers for use on electrical fires.

The efficient use of fertilisers and organic manures as detailed in this Code will help to reduce losses of nitrous oxide and provide a financial benefit to farmers. It is possible to reduce methane emissions by optimising livestock diets. The amount of methane emitted from livestock manures depends on the handling, storage and field spreading system, but avoiding anaerobic conditions will reduce such emissions. However, it is also possible to collect and use methane from livestock manures in a controlled process called anaerobic digestion, to produce energy.

[15] Enteric fermentation is the process of digestion of an animal's food in the rumen by micro-organisms, producing methane as a by-product.

1.2.2 Energy Efficiency

- Using energy efficiently on the farm will reduce CO_2 emissions - for further guidance see references 2.4, 10 and 11. An assessment of the carbon balance of your farm can help identify cost savings and contribute to combating global warming. The CALM Carbon Calculator, or similar tools, can help you prepare such a balance (Ref 12). You may be able to claim back the taxable element of any hardware and installation using the Government Enhanced Capital Allowance Scheme (ECA) (see Useful Contacts).

1.2.3 Soil carbon

In Wales soils contain approximately 9 times the amount of carbon than is stored in vegetation (Ref 13), and over 80% of this carbon is associated with our upland and grassland soils, particularly peat and organic soils. The total Welsh stock of carbon in soil and vegetation has been estimated to be in the order of 450-500 million tonnes of carbon.

Carbon dioxide is released largely by microbial decay of plant litter and soil organic matter but agricultural operations affecting soil conditions and processes can lead to an increase in carbon dioxide emissions. For example, drainage of waterlogged organic soils leads to aeration, increased microbial decay and emission of carbon dioxide. Conversely, managing soils to increase their organic content 'locks up' carbon. This is known as sequestration. It is important to prevent degradation of these stocks of soil and associated carbon.

1.3 Protecting the wider environment

The Environment Strategy for Wales (Ref 14) lists further challenges for the Welsh environment than those mentioned above, including loss of biodiversity and loss of landscape and heritage quality and distinctiveness. Land owners and managers have an important part to play in reducing and halting these losses, and much of the good practice in this Code to minimise the risks of pollution, is also good practice for the wider environment.

1.3.1 Farmland Habitats and Species

Habitats on farms of high nature conservation value include hedgerows, watercourses, streamside corridors, field margins, unimproved and semi-improved grasslands, heathlands, wetland, and scrub. How all these habitats are managed has a great effect on their value for wildlife and the wider environment. Keeping soil, manures, fertilisers and pesticides out of these habitats and away from in-field trees during field operations, and leaving

buffer strips or part of the headland untreated, will provide additional benefits for ground nesting birds and natural predators of crop pests.

Native and mixed woodlands, are key habitats on farms. They are not only of benefit to biodiversity as a habitat but can provide valuable environmental services such as soil stability and help to reduce diffuse pollution from other land use pressures. They can also reduce fragmentation of woodland habitats within the immediate environment.

Careful management of permanent pasture, including possibly reducing stocking density and overall nutrient input, can reduce run-off and erosion, decrease nitrogen and phosphorus losses, and in time diversify the botanical composition of the sward with further benefits for insects and birds.

Fencing watercourses prevents livestock fouling the water, damaging the banks, and causing soil to enter the water. Planting native trees or allowing a natural habitat to develop, will in turn provide additional protection of the watercourses from run-off and soil erosion. Planting hedges along contour lines can also reduce run-off and erosion.

Over many years, due to changes in farming systems and different land use pressures, wildlife habitats have become increasingly isolated and fragmented, making species populations less viable. This also makes it harder for species to move around within the countryside. Climate change will make these effects worse, as many species will need to adapt by colonising or moving to areas with more suitable climates. Improving the general condition of habitats for wildlife and developing corridors between fragmented and isolated areas (improving connectivity) will increase the resilience of species to climate change.

1.3.2 Habitat Species and Protection

There may be designated areas such as Sites of Special Scientific Interest[12] (SSSIs), and Natura 2000[13] sites (Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar Sites) on, or adjacent to, your land. SSSIs will have 'operations likely to damage the special interest' (OLDSI) that are listed as part of their notification, and which can not be carried out without prior permission. These include activities such as cultivating soils, drainage, tree planting or felling, changes in grazing and applying fertilisers, pesticides and agro-chemicals.

Many of the birds, animals and plants found on farmland and the wider countryside are protected by UK[16] and European legislation[17]. Works such as

[16] The Wildlife and Countryside Act 1981, as amended 1991
[17] Habitats Directive 92/43/EEC

fencing, drainage and woodland management can affect protected species such as Bats, Badgers, Dormice, Water Voles, Crested Newts and Otters. Some protected species such as bats may also be present in buildings due for renovation. All wild birds, their eggs and nests are also protected.

For further information regarding habitats and species contact the Countryside Council for Wales (CCW) (see Useful Contacts).

1.3.3 The Historic Environment

The most important historic features have statutory protection as Scheduled Ancient Monuments, but there are many others which rely upon sympathetic management for their survival. Archaeological remains below the ground surface and other visible historic features should be protected from damage. Activities such as subsoiling, deep ploughing, new cultivation, uprooting trees, overgrazing, inappropriate feeding and watering as well as stocking with certain types of livestock, (for example free range pigs) can all cause or exacerbate soil erosion. This, in turn, can result in the loss of archaeological remains and the destabilisation of upstanding features. Conversely good practice to prevent soil erosion, loss of organic matter, or to slow the flow of water from land will benefit historic features and archaeological remains in the soil. Further guidance on looking after historic features farms is available (Ref 15).

If you are unsure about the status of any site or if you would like advice on management contact your local Archaeological Trust – details of these can be found in the Useful Contacts section. Cadw can provide detailed advice on the legislation and management of Scheduled Ancient Monuments.

1.3.4 Landscape

The sustainable use of land and the landscape is a very important aspect of the general public's appreciation of farming and management of the countryside. Wherever possible select and apply measures that improve or maintain the landscape in which you farm. Some of the good practice advised in this Code, such as planting new hedges to break slopes and prevent soil erosion would also have a visual effect which should be considered.

PART 2

Minimising the risks of pollution

Part 2 of the Code is the Statutory Code under section 97 of the Water Resources Act. While you do not have to follow the advice given in Part 2, Environment Agency Wales could take whether you have or not into account when deciding on enforcement action following any water pollution incident. This does not apply to any advice given purely to minimise air and soil pollution risks.

2 Environmental Management Planning

Planning the overall environmental management of your holding will help to identify any pollution risks, routes that pollution might take (e.g. slurry running down a track to a surface water) and potential problem areas. It will help you be better prepared for, or prevent, any environmental issues that may arise. Environmental incidents on farms include fires, silage effluent run-off, or slurry lagoons leaking or bursting. They could also include damage to protected areas, such as a fire on a SSSI.

Following good practice in this section will help you:
Plan the use of resources, reducing the risk of pollution from inappropriate resource use; and prepare for any potential incidents.
It may also save you money by:
Reducing any clean up costs; providing a source of funding to carry out environmental measures.

2.1 Legal Requirements

There are no legal obligations relating to the way you plan the environmental management of your farm, unless you are a large Pig or Poultry holding for which you require a permit from Environment Agency Wales[18], or are in a Nitrate Vulnerable Zone. Record keeping, however, is a requirement for many laws, e.g. Food and Pesticide law, and planning will help you organise this.

2.1.1 Large Pig and Poultry Units

Larger pig and poultry farms are required to have Accident and Emergency Plans to comply with the Integrated Pollution Prevention and Control Directive[19], as part of their permit, as above.

2.1.2 Nitrate Vulnerable Zones

If you are in a Nitrate Vulnerable Zone (NVZ)[20], you will be required to produce a risk map, showing potential risks of nitrates reaching surface water. You will also need to apply nitrogen with regard to crop requirements, assessed through nutrient management planning process, and keep records of calculations, use of nitrogen, and storage of manures. Further details can be found in the NVZ guidance (Ref 3).

[18] Regulated by Environmental Permitting (England and Wales) Regulations 2010. 'Large' units are more than 40,000 poultry places, 2000 production pig places and 750 breeding sow places.
[19] EU Council Directive 2008/1/EC concerning Integrated Pollution Prevention and Control
[20] As defined by the Nitrate Pollution Prevention (Wales) Regulations 2008

2.1.3 Cross-compliance

If you are in the Single Payment Scheme you must comply with the Statutory Management Requirements (SMRs) and follow the requirements to keep your land in Good Agricultural and Environmental Condition (GAEC).

The SMRs that relate to the environmental management of the farm, in terms of record keeping, are:

- Protection of water in Nitrate Vulnerable Zones
- Restrictions on the Use of Plant Protection Products
- General principles and requirements of food law
- Welfare standards for the protection of all animals kept for farming purposes
- Protection of groundwater against pollution
- Protection of the environment, and in particular soils, when sewage sludge is used in agriculture

The relevant standards consistent with keeping land in Good Agricultural and Environmental Condition (GAEC) are:

- A1 giving the requirements for soil. A Soil Assessment Record (Ref 16) must be kept.

See The Farmer's Guide to Cross Compliance (Ref 17) for further guidance.

2.2 Good Practice

The following advice and guidance on good agricultural practice goes over and above your legal obligations.

Summary of Key Actions

- Consider your general farm management practice, and using the advice given in this Code, identify areas where you could make simple management changes to protect the environment, and potentially save you money. The Environment Agency's publication, Best Farming Practices (Ref 1), and the Farming Connect Datasheets (Ref 2), can also help this process**.** The Linking Environment and Farming (LEAF) audit, and Integrated Farm Management can also help manage resources in an environmentally sound way, see Reference 18 for further details.

- Management plans provide a process to match your use of resources such as soil and manure, to your land and crop requirements. By matching your usage to your needs as closely as possible you can save resources, time and money and prevent pollution of the environment by overuse of, for example, fertilisers and agro-chemicals.

- A **soil management plan** will help you to provide optimum conditions for the growth of crops and grass, whilst minimising the risk of run-off and erosion.
- A **manure management plan** will help you to make the most of your manures in the most economic and environmentally friendly way, to reduce your fertiliser bill and reduce the risk of water pollution by nutrients, organic matter and pathogens.
- A **nutrient management plan** will help you to make the most efficient use of fertilisers and maximise the use of nutrients contained in any organic manures that you apply. It will also minimise the risk of pollution resulting from the over-application of nutrients.
- A **crop protection management plan** will help you to maximise the efficiency of any pesticides you use and to minimise the risk of affecting human health, harming biodiversity or polluting water.

- Joining a land management scheme will provide some financial support and technical guidance on the changes you can make, see section 2.2.2.

- Use your farm map and the headings in this Code to consider any potential pollution risks. Mark risk areas on the map, and consider what you would do in the event of any incident. See section 2.2.3 for preparing an Environmental Accident and Emergency Plan.

- Make sure everybody who works on the holding is aware of any potential environmental risks, and the procedures they should follow in the event of an incident, see section 2.2.4.

- You should check all surface water frequently to make sure that they are not polluted. Check at times of high risk such as when slurry, silage effluent or dirty water is being applied or shortly after heavy rain. Look for signs of soil erosion and soil wash, including damage to the banks by livestock, poaching of ground by livestock, ponded water in fields, gullying and run-off along 'tram lines'. Use the advice in this Code to help you take appropriate action.

- **If any surface water, lake, pond or groundwater is at risk of becoming polluted or becomes polluted, tell Environment Agency Wales at once and take immediate steps to stop any further pollution.**

The EA 24 hour incident helpline is FREEPHONE 0800 80 70 60

2.2.1 Management plans

Management plans provide a source of information for everybody who has an input on the farm, including farm staff, contractors and consultants.

You may find it most effective to prepare all the relevant plans for your farm at the same time because some information will be needed in more than one plan. It can be helpful to combine the plans into one document to provide a better overview of your system.

The essential components of any management plan are:

- an assessment of the current resource e.g. soils, cropping, amount of livestock manures produced;
- anticipation of further requirements and potential problems e.g crop nutrient requirements, areas of soil that need management;
- matching resources to requirements and planning further actions e.g. deciding how much of the crop nutrient requirement can be supplied by manures and how much fertiliser will be bought in; or planning where high risk crops such as maize can be grown and what steps will be needed to mitigate any related soil erosion;
- recording actions taken, and reviewing the plans regularly to ensure they are working and are updated when circumstances change.

Soil Management Plan

The Cross Compliance Soil Assessment Record is a simple form of Soil Management Plan (Ref 16). If you have already produced a soil management plan for a land management agreement, such as Tir Cynnal, you may wish to extend it to include a risk map for run-off and erosion, and a field-by-field assessment of the condition of the soil and how you will manage it. If you do not yet have a plan, you should consider preparing one using a similar format.

- Read relevant publications on controlling run-off and erosion and good practices for managing soils (Refs 19, 20 and 21).
- Using guidance such as the Tir Cynnal or Tir Gofal Resource Management Plan (Ref 22) or advice from a consultant, prepare an assessment of the risks of run-off and erosion for your whole farm. Look at soil during and after rain to identify areas of poor drainage and where run-off or erosion may be occurring including gateways, roads and tracks. You can also include the slope and soil type of each field, after which you can prepare a map showing the risk class for each field or part field. See Appendix 2 for an example.
- Use the map to plan where best to plant high risk crops, such as maize and potatoes, and to deal with any identified risks.
- Dig a soil pit to look at soil structure in each field, or part field, to decide what you will need to do to maintain or improve its condition. Consider whether you need to take any additional actions to improve the organic matter content of the soil.
- Recording on a field-by-field basis the steps you will take during the coming year to minimise run-off and erosion and to ensure good structure and maintain the infiltration of rainfall, such as soil slitting and subsoiling.
- Keep in mind the wider environment when preparing your soil management plan – e.g. do not increase drainage around important wetland areas.

- During the year record any problems such as ponding, patches of poor growth, or run-off or erosion events.
- Take action to rectify soil problems such as poaching and erosion.
- Review the plan each year, and include another assessment of soil structure, paying particular attention to any areas where you noticed problems. Consider changing your management in these areas.

Manure Management Plan

If you have already produced a manure management plan for a land management agreement or farm assurance scheme you may wish to check it includes the following steps. If you do not yet have a plan, prepare one using a similar format. It should include a field-by-field risk map and an assessment of the need for any extra slurry or dirty water storage. You can draw up your own using published guidance (Refs 23 and 24) or obtain professional advice from a consultant. Your plan should be clearly set out and include the following steps:

- By considering slope, soil type and the position of surface water and water supplies, you should identify fields or parts of fields where livestock manures should never be spread. These non-spreading areas should be marked on a farm map (in red).
- Identify where livestock manures should not be spread under certain conditions or where application rates should be restricted. These very high risk areas (orange) and high-risk areas (yellow) should be marked on the farm map. The remaining areas should be marked as lower risk (green). See Appendix 3 for an example of the risk map.
- Calculate the minimum area of land needed for spreading livestock manures by using a maximum field application rate of 250 kg total nitrogen per hectare per year. This will reduce nitrate leaching losses. You can use standard tables (Ref 25) or an analysis of your manures for this. There are simple on farm kits, which can measure the nitrogen in slurries that is readily available to crops (Ref 26) or you can send a sample off for analysis.
- In Nitrate Vulnerable Zones, on certified organic holdings, and with other management agreements lower spreading rates may apply.
- Assess whether you have sufficient land available to spread your livestock manures within the relevant restrictions. If you do not, you should consider reducing stocking levels or make arrangements to transfer manure elsewhere, e.g. sending poultry litter to a power station, subject to environmental permitting conditions. Moving manure to another holding would be subject to biosecurity considerations, and requirements of any schemes, such as Farm Assurance or Organic standards.

Biosecurity
Consider carefully whether to export manure produced by your livestock - movement of manure/slurry between premises carries a risk of spreading disease, unless both premises are of exactly the same disease status - and this is unlikely to be the case.
There are many diseases, some with significant impact and long term effects that may be spread by this route (even if applied to grassland for forage conservation). You should always take basic steps to minimise the risk of spreading animal disease while transporting manure to other farms:

- Provide secure containment for the manure
- Clean the exterior of the vehicle used for transport before leaving your farm
- Ensure the manure is spread to tillage land or to grassland used for forage conservation

- If you wish to spread sewage sludge, green waste compost or other organic wastes you should identify how much land is available after you have spread manures produced on your farm. You should not accept such materials on to your land if it will make it difficult to spread manures safely or to meet any restrictions.
- Assess whether extra storage is needed for slurry or dirty water. Use the coloured risk map, and your experience of spreading over the winter period, to help you decide how much, if any, you can safely apply at this time.
- If you farm in a Nitrate Vulnerable Zone, you must comply with the minimum storage requirements (Ref 3).
- See section 3.1.2 for standards of construction for slurry and manure storage.
- Update the risk map if you take on extra land.
- Update the manure management plan if livestock numbers increase, the dirty yard area gets bigger, or other changes affect the volume of slurry or dirty water produced.

Nutrient Management Plan

If you have already produced a nutrient management plan for a land management scheme you may wish to check it is clearly set out and includes the following required steps. Standard formats are available (Refs 27 and 28).

- Analyse soils every three to five years to assess their nutrient status. Soils should be analysed for pH, P, K, and Mg and the results used to adjust inputs of lime (Ref 29) and phosphate, potash and magnesium nutrients.
- Assess the nutrient requirement of the crop using a recognised fertiliser recommendation system such as Defra's RB209 (Refs 30 and 31). If you receive professional advice on your plan, ensure that you use a FACTS (Fertiliser Advisers Certification and Training Scheme) qualified person (Ref 32).
- Assess the nutrient supply from organic manure. Refer to your manure management plan or consider whether a laboratory or on-farm analysis is necessary (Ref 24, 25).

- Calculate the need for fertiliser nutrients by deducting the contribution from organic manures from the crop nutrient requirement.
- Phosphorous in manures should be the limiting factor - when you use nitrogen and other nutrients in manures, and the soil phosphorus index is already 3 or above, you should not apply more phosphorus than will be removed by the crops in the rotation. This will avoid raising soil reserves above those necessary for crop production.
- The amount of phosphorus lost by erosion, leaching or drain flow will depend on the quantity of phosphorus in the soil. To reduce losses, you should not apply fertiliser or organic manures that contain more than the recommended amounts of phosphorus.
- You should carefully work out the amount of nitrogen needed for each crop in each field. You should not exceed the crop requirement, as this increases the amount of nitrate lost by leaching as well as being a waste of money. You should take into account the amount of nitrogen supplied by the soil, which will depend on the type of soil, previous cropping, rainfall and any organic manure you have applied. Where the nitrogen supply is high, soil analysis for mineral nitrogen can provide a more precise guide to fertiliser requirement.
- When you reduce ammonia loss, more nitrogen is potentially available for grass or crop uptake. Your nutrient management plan should identify these savings.
- Keep clear and accurate field records of your cropping and of all applications of fertilisers and organic manures. This will help future decisions on nutrient management and demonstrate the practical outcome of the plan.
- Review the success of the plan annually. Use crop or grass analysis to confirm trace element deficiencies, and to help identify any that may be affecting your crops or livestock. You should seek veterinary advice for livestock problems as it is usually more effective to treat the stock than apply anything to the soil.
- Update the plan at the start of each cropping year.

Crop Protection Management Plan

A crop protection management plan will provide a checklist of what you should consider when planning the use of pesticides. You should read the Code of Practice for using Plant Protection Products (Ref 33) before producing a plan. See also Sections 3 and 4 of this Code for the measures you should take when storing and applying pesticides.

The Voluntary Initiative gives guidance on the preparation of a crop protection management plan. If you have prepared a plan as part of The Voluntary Initiative (Ref 34), it should already meet the advice given below.

- If you are using an agronomist, ensure they are BASIS qualified (Ref 35).

- Consider farm location, soil type, previous cropping, rotations and pesticide resistance issues. This can help you anticipate and predict potential problems.
- Adopt non-chemical options wherever economic and practical. Include the use of rotations, cultivations and resistant varieties and encourage natural predators by incorporating beetle banks and field margins.
- Inspect crops regularly to identify weeds, pests and diseases accurately. Evaluate the need for a pesticide by use of thresholds and diagnostic kits. You should consider the environmental impact of alternative control options such as the fuel used in flame weeding or possible damage to ground nesting birds when mechanical weeding is undertaken.
- Select an effective pesticide that is economic and will minimise impacts on crop pest predators, non-target organisms, neighbouring crops, wildlife habitats, and the quality of surface water and groundwater.
- If you want to reduce the statutory no-spray buffer zone – specified by the product label - adjacent to surface water you must undertake a Local Environment Risk Assessment for Pesticides (LERAPS) (Ref 36).
- Keep accurate records. Record keeping is a requirement under EC law when you grow food or feed crops and is a requirement of cross compliance (Ref 17). Records are a key management tool to help identify where improvements can be made, and should include the justification for a particular course of action.
- Complete an annual review so as to incorporate any new priorities.

2.2.2 Sustainable Land Management Schemes

Protection of air, soil and water is one of the objectives of land management schemes, which provide a financial payment for farming in an environmentally sensitive manner. Schemes have a whole farm element - the way the whole farm is managed to achieve good environmental protection. Details of land management schemes currently active, including Glastir, can be obtained from WAG Divisional Offices.

Better Woodlands for Wales is the Forestry Commission Wales (FCW) grant scheme. The scheme places greater emphasis on good quality woodland management and offers grants specially designed for Welsh woodlands. Grant aid is based upon an approved long term management plan. This plan must meet the minimum standards under the UK Woodland Assurance Scheme.

See the Useful Contacts section for details of Divisional Offices and FCW.

2.2.3 Environmental Accident and Emergency plan

Many farms already have an emergency plan, and it is good practice to produce one for your farm to help you deal with incidents if they happen.

Make sure everyone knows where the plan and emergency equipment is located, what they have to do, and how to do it.

Your plan should include:

a) A contact list

Include the telephone numbers (including out-of-hours) for the emergency services, regulators (e.g. Environment Agency and local Authority), water supplier, sewer provider, Health and Safety Executive, downstream water abstractors and landowners, and specialist clean-up contractors.
Also include any key holders or staff to be contacted in an emergency.

b) A site plan showing:

- the layout, access and drainage arrangements for:-
  - all relevant buildings and structures;
  - all drains, inspection manholes and gulleys – both for clean and foul drainage systems;
- location of streams, ditches, soakaways; springs, wells and boreholes near the site; and
- location of holding facilities that can be used during an emergency.

c) Location of equipment and points where pollution can be intercepted.

- the location of any equipment and materials that can be used to plug drains, block ditches or contain spillages.
- Points where these drains or ditches can most easily be blocked temporarily

d) A regular test

Consider carrying out an emergency response exercise regularly, especially on larger sites, to see how the plan works in a real emergency. Review your plan after an incident, when systems involving potential pollutants are altered, or relocated and at least every 3 years.

e) Any follow up action once emergency is passed such as informing CCW of SSSI damage.

A template for a simple farm system is given at Appendix 4 and which can be added to in more complex situations.

2.2.4 Responsibilities of land managers, farmers, farm staff and contractors

All farm staff and any contractors you employ should be familiar with the causes and effects of pollution. They should:

- receive appropriate training for what they have to do;
- know how to operate and maintain the equipment they use;

- know what to do in an emergency;
- be able to follow any emergency plan for the farm;
- comply with any risk assessments prepared, for example, in manure, nutrient, soil or crop protection management plans;
- be aware of the presence of areas which they might damage in the course of their work, such as Sites of Special Scientific Interest, other protected areas, and land under management agreements;
- be particularly aware of high risk times such as silage making and sheep dipping

Consideration should be given to preparing a written agreement with contractors, to clarify responsibility for the task in hand. If this is not clear, you could both be held liable for any problems or pollution incidents that happen.

3 Farm Buildings and Structures

This section deals with some of the buildings and structures on farms that could be the source of pollution of water, air or soil. It also contains advice on the handling and management of both solids and liquids in and around the farmyard to avoid pollution.

Following good practice in this section will help you:
reduce the risk of water pollution from leaks from buildings and structures; reduce air pollution from gases and dust; protect soil resources.
It may also save you money by:
Reducing any clean-up costs; reducing energy use.

3.1 Legal Requirements

This is what you must do by law regarding your farm buildings and structures:

3.1.1 Planning Requirements

New buildings and structures, or significant changes, will require planning notification and may also require planning permission. Further guidance is given in The Farmer's Guide to the Planning System (Ref 37). You should always seek advice from your local planning authority who will also tell you if an environmental impact assessment is needed for new or extended livestock buildings, or if consideration needs to be given to protected species (such as bats and nesting birds). Licences may be required if you will be disturbing species such as badgers and bats (Ref 38).

3.1.2 Protection of Water Resources

It is an offence to cause or knowingly permit a discharge of poisonous, noxious or polluting matter or solid waste matter into groundwater or surface waters, without proper authority from Environment Agency Wales[21]. This would apply to pollution incidents arising from escapes of slurry, silage effluent or fuel oil, pesticides or biocides from farm yards and buildings.

3.1.3 Control of Pollution from Silage, Slurry and Fuel Oil

The Water Resources (Control of Pollution) (Silage, Slurry and Agricultural Fuel Oil) (Wales) Regulations 2010 are often known as the SSAFO Regulations. They replace in full the regulations first made in 1991 and amended in 1997. Since September 1991, any new, substantially enlarged or reconstructed stores or storage areas for storing silage, collecting or storing slurry or storing agricultural fuel oil (that is, oil used as fuel for the farm

[21] Environmental Permitting (England and Wales) Regulations 2010

enterprise and not fuel used simply to heat the farmhouse) must comply with basic legal standards. These include:

- Minimum standards of construction that apply wherever the system is used.
- Environment Agency Wales must be notified in writing at least 14 days before the system is used for the first time .
- Systems must have a design life of 20 years with maintenance, except that below ground silage effluent tanks must have a design life of 20 years **without** maintenance reflecting the health and safely restrictions in maintaining below ground silage effluent systems.
- All systems must be sited at least 10m away from ditches or surface water, which the material could enter if it escaped, and field silage sites at least 50m from a water supply source.
  Note: this is a wide-ranging definition that includes ditches that may be dry for some of the year, pressure-release drains around slurry stores, or land drains. In the case of some slurry installations however, Environment Agency Wales can allow some relaxation, usually to allow pressure release drains around slurry stores, provided it is consulted before construction.

Environment Agency Wales can serve a Notice to require relevant systems to be brought up to the standards laid down in the Regulations if there is a significant ***risk*** of pollution – so the degree of possible pollution does not have to be large.

Consult Environment Agency Wales before making any changes to your:

- Silage making or storage systems
- Slurry storage
- Agricultural Fuel Oil storage systems

See the Useful Contacts section for details.

The SSAFO Regulations and Guidance for farmers (Ref 39), give more specific guidelines for individual systems, including:

Silage[22] storage:

- Floors must be impermeable and resistant to silage effluent. Asphalt can now be used, providing it is manufactured for that purpose.
- Unwalled silos may be used but require perimeter channels and silage effluent storage.
- Store, or open, baled silage that is wrapped or sealed in impermeable bags at least 10m away from any water, including field drains and ditches into which silage effluent could enter if it were to escape.

[22] Silage is defined as <u>any</u> crop ensiled or baled, and wrapped in impermeable material.

Slurry storage:

- Storage systems must be impermeable, corrosion resistant, and have structural integrity.
- Reception pits must be of appropriate size (capable of holding at least 2 days slurry production, taking account of rainfall and run-off to be collected.)
- There must be 2 valves in-line on any outlet pipes between above ground stores and reception pits, at least 1 metre apart and be locked shut when not in use.
- You must provide at least 4 months' slurry storage, unless you can demonstrate to Environment Agency Wales that you have a safe year-round slurry management and field application system that includes reducing impact on land to acceptable levels .
- You must also comply with the minimum storage requirement if your farm is in a Nitrate Vulnerable Zone, which is likely to be greater than SSAFO regulations requirements (Ref 3).
- All new or substantially altered earth-banked lagoons must keep a 750 mm freeboard at all times and other slurry and dirty water stores must be sized to include a 300 mm freeboard.

Fuel Oil Storage (Where the total quantity of agricultural fuel oil stored on a farm exceeds 1500 litres):

- The fuel tank or storage area must be surrounded by a leak-proof bund, in the case of storage in tanks, having a capacity at least 10% bigger than the capacity of the tank.
- The bund must not have an outlet or drain, be impermeable to oil and be constructed to last 20 years with maintenance.
- All valves or outlets from the tank must be inside the bund and locked shut when not in use.
- Where there is a flexible pipe outlet, this must have a tap or valve which automatically shuts off and is kept within the bund when not in use.

The regulations do ***not*** apply to underground storage tanks, or tankers etc used to transport fuel oil around a farm, or oil that is used exclusively for dwelling houses. Note that Environment Agency Wales can, however, serve Notices to prevent pollution of surface or groundwater from any oil storage activity.

3.1.4 Dipping Sheep

- Sheep dip compounds must be handled by, or their use supervised by, a person who holds a Certificate of Competence in the Safe Use of Sheep Dip[23]. Further guidance is available (Ref 40).

- You must comply with the Groundwater Regulations[24] if you are jetting, spraying, showering or carrying out conventional dipping of sheep. The Groundwater Protection Code (Ref 41) on the use and disposal of sheep dip compounds will help you comply with these regulations and you are

[23] The Veterinary Medicines Regulations, Statutory Instrument 2407, 2006.
[24] Groundwater (England and Wales) Regulations, 2009

strongly advised to read and follow it before, during and after treating sheep – see section 3.2.4 for a summary of the guidance.

- Disposal of sheep dip onto land, even in small quantities, for example after jetting or showering, requires prior written authorisation, now known as an Environmental Permit, from Environment Agency Wales[25]. Allow plenty of time for your application to be processed.
- If off-site disposal is the only viable disposal option, it is your responsibility to check that you use a licensed waste carrier, or that your contractor has an appropriate authorisation to dispose of the used dip.
- The Health and Safety Executive also provides advice on complying with the Control of Substances Hazardous to Health Regulations (COSHH) with regard to sheep dipping (Ref 42).

3.1.5 Protection of Groundwater

- Under the Groundwater Regulations[26] you must not allow yard contaminants, even minor spillages of substances such as oils or chemicals to soak away. Manage materials such as silage effluent, slurry and yard washings so that they do not soak away to groundwater. This is also part of the Statutory Management Requirements of cross compliance.

<u>Woodchip corrals/Stand off pads</u>

- These have become increasingly popular for out-wintering cattle. Good design, construction and management are crucial to avoid polluting groundwater and surface water (Ref 43). A liner and effluent collection facilities must be provided and you should seek advice from Environment Agency Wales about suitable sites.

3.1.6 Pesticide storage and treatment

- A number of regulations deal with the use of pesticides[27] therefore it is important that you fully understand your responsibilities. The Code of Practice for using Plant Protection Products gives detailed guidance on how to comply with the law when storing pesticides (Ref 33).
- You must store approved pesticides in the original container with the approved product label.
- You must have an environmental permit from Environment Agency Wales before pesticide waste can be applied to land in a way that is not as approved for the product.

[25] All groundwater permits, ie authorisations under the Groundwater Regulations, are now known as environmental permits in accordance with the Environmental Permitting Regulations (EPR) 2010

[26] Groundwater (England and Wales) Regulations, 2009

[27] Part III, Food and Environment Protection Act (FEPA) 1985, The Control of Pesticides Regulation 1986 (as amended), and Control of Substances Hazardous to Health Regulations 1994. EU Council Directive 91/414/EEC on the marketing of plant protection products, the Plant Protection Products Regulations (PPPR) 2005 to implement it into British Law, and the Plant Protection Products (Basic Conditions) Regulations 1997 which applies FEPA to PPPR approved products.

- If you intend to install a waste treatment facility for dilute pesticide washings, such as a biobed, you should consult Environment Agency Wales first to discuss the necessary permits that are needed. For further information on biobeds, see section 3.2.6.

3.1.7 Fertiliser Storage

A number of regulations deal with storage and handling of dangerous substances such as ammonium nitrate based fertilisers[28] . Useful guidance has been produced by the agriculture industry and HSE, giving further advice on the legal regulations (Refs 44 and 45). See also Useful Contacts.

3.1.8 Soil Handling

Work involving moving soil for minerals extraction, waste disposal and pipelines may require consent from a regulator[29]. If in doubt contact:

- For minerals proposals – your Mineral Planning Authority, which will be your Unitary Authority.
- For landfilling, waste recovery or waste disposal - Environment Agency Wales.
- For a pipeline proposal – Unitary Authority plus other regulator depending on the material being transferred[30].

See Useful Contacts section for details of your local Unitary Authority.

3.1.9 Animal welfare

- The space allowances and other provisions for cattle, pigs and poultry must meet legal requirements[31]. You should follow advice in the Welfare Codes (Ref 46).

- Larger pig and poultry units must comply with permit conditions set by Environment Agency Wales[32]. These conditions are based on the Best Available Techniques (BAT) for avoiding or minimising all types of gaseous emissions. Guidance is available on BAT from Environment Agency Wales (Ref 47).

3.1.10 Asbestos

[28] The Fertilisers Regulations, 1991; The Fertilisers (Amendment) Regulations,1995; The Planning (Hazardous Substances), 1992.
[29] Town and Country Planning Act 1990, Planning and Compensation Act, 1991, Town and Country Planning (General Permitted Development)Order 1995.
[30] A series of Acts give the requirements for respective pipeline work: Pipeline Act 1962, Gas Act 1986, Water Industry Act 1991, Water Resources Act 1991.
[31] Welfare of Farmed Animals (Wales) Regulations 2007
[32] Environmental Permitting Regulations (England and Wales) 2010

- Employers have a duty to protect employees and others who may be affected at work from harm from asbestos[33].

3.1.11 Cross-compliance

If you are in the Single Payment Scheme you must comply with the Statutory Management Requirements (SMRs) and follow the requirements to keep your land in Good Agricultural and Environmental Condition (GAEC).

The SMRs which relate to the built farm environment, are:

- Protection of Groundwater against pollution relating to use of sheep dip, storage of pesticides, silage effluent, slurry, dairy washings, oil spillages.
- Protection of water in Nitrate Vulnerable Zones, regarding the need for sufficient slurry storage within these zones.
- Restrictions on the Use of Plant Protection Products.
- General principles and requirements of food law, which include guidelines for design of dairy buildings.
- Welfare standards for the protection of all animals kept for farming purposes, relating to buildings standards, and particularly, for the housing of calves and pigs.

See The Farmer's Guide to Cross Compliance (Ref 17) for further guidance.

3.2 Good Practice

This section provides advice and guidance on good agricultural practice, which goes over and above your legal obligations.

[33] Control of Asbestos in the Air Regulations 1990

Summary of Key Actions

- Keeping buildings and structures in good repair is key to good practice. Regular checks on all structures containing the following potentially polluting liquids will alert you to problems, and can prevent serious pollution incidents:
  - Silage effluent
  - Slurry and manure
  - Fuel oil
  - Pesticides and sheep dip
  - Fertilisers and agro-chemicals

- Make regular checks:
  - of all buildings, roofs, gutters, downpipes, clean water drains, foul drains, yard areas, and any clean water outfalls to ditches, surface water and soakaways;
  - of liquid levels in all storage facilities;
  - for signs of corrosion, damage and leaks in containers, pipework and stores.

- Ensure you have adequate manure storage facilities, to prevent having to spread slurry and manure in poor ground and weather conditions, (see section 5.3.4 for further details. This will allow better timing and use of manure nutrients, and enable you to reduce the amount of fertiliser you buy.

- Reduce the amount of dirty water produced, through roofing, or reducing the size of livestock yards. Divert clean water and roof water into surface water, or recycle it for on-farm use.

- Monitor energy use and identify ways to save costs by making energy reductions. (Refs 1, 2.4 and 11). Reduce heat loss from buildings by using effective insulation and ventilation. Insulation will also reduce heat gains and the need for subsequent ventilation. Consider opportunities for using alternative energy sources to fossil fuels.

- Reduce carbon dioxide emissions by maintaining fixed equipment such as grain driers, refrigerated stores and bulk milk tanks, in good condition and by operating them efficiently (Ref 48 for a Case Study).

- Good management and a high standard of hygiene and cleanliness will reduce emissions of odour and ammonia from livestock buildings and from fouled open concrete yards.

- Take care when moving soil for construction purposes - the long-term function of soils should be protected when they are disturbed for mineral extraction, pipeline laying, landfilling, land reclamation and structural work on the farm.

3.2.1 Cleansing and disinfecting

- Give careful consideration to both the choice of biocide (chemicals) and its disposal when using these as part of your biosecurity programme to protect livestock or crops. It may be necessary in some sensitive environments to capture any biocide for correct disposal off-farm.

3.2.2 Silage Stores and Effluent

- The base and walls of a silo should be professionally designed to suit the conditions of the site. There are a number of British Standards or other equivalent standards involved.

- Building work should be supervised to make sure the silo is structurally sound and effluent cannot escape. Further guidance is available (Ref 49).

- Where hot-rolled asphalt (HRA) surfacing is used as a floor base this should be carried out by a specialist (Ref 50).

- During silage making check around the silo for leaks and blockages daily, check effluent tank levels and empty as necessary, and also check ditches, surface water and surface water drains for signs of pollution. If any are found put your emergency action plan into effect.

- Apply effluent from silos to land in accordance with your manure management plan. Uncontaminated effluent can be fed to livestock.

- For baled silage when crop dry matter is below 25%, using a 750mm wide bale wrap (rather than 500mm) will result in a better seal, and reduce the quantity of effluent released during storage.

- Silage additives are extremely polluting. They should be stored safely and handled at least 10 metres from a field drain or surface water. Do not leave undiluted product out on site or allow additives or used containers to get into a surface water.

    - For appropriate options for disposal of silage plastics, additive containers and tyres, see Section 7.

Safety Note

Effluent tanks can contain lethal gases. Do **NOT** go into them at any time. Lock tank covers. Display a clear warning notice.

3.2.3 Livestock Buildings

All livestock buildings

- You should collect and transfer slurry from buildings and concreted areas to a suitable store every day.

- For bedded systems use sufficient clean, dry bedding to keep animals clean. Dirty livestock increase emissions of odour and ammonia.

- Clean and disinfect buildings regularly, for example, after each batch of stock is removed or as pens become empty. Remove thick deposits of dust from surfaces inside the building, especially from ledges, ventilation shafts and cowls. Clean out grit and sediment from slurry channels and collection systems. Do not allow any of these washings or deposits to get into clean water drains, surface water or soakaways.

- You should ensure that there is adequate ventilation, for example, by carrying out a simple smoke test. Where provided, maintain ventilation fans, and check they are running at the correct airflow for the number and weight of animals or birds present. Poor ventilation can result in humid conditions that give rise to unpleasant odours, high level of ammonia and poor animal health and welfare.

- Take measures to reduce energy use in buildings that are mechanically ventilated or heated. For example, good building design can help retain heat generated by livestock in the winter.

Cattle and dairy buildings

- Scrape cubicle passages and other heavily soiled areas regularly, typically twice daily, to reduce ammonia emissions.

- Dairy and parlour buildings should be washed and cleaned frequently. Recycle dairy washing water where possible (Ref 48).

Pig buildings

- Emissions are minimised if pens are kept clean. Pen design and construction, the correct floor surface, and good siting of feeding and watering facilities can all help to keep pens clean. Clean non-bedded, concreted dunging areas every day, if possible.

- Consider using Best Available Technique (BAT) when refurbishing or constructing new buildings for all pig units (Ref 47).

Poultry buildings

- Consider using the Best Available Techniques (BAT) when refurbishing or constructing new buildings for all poultry units, as above.

  Caged laying birds

  - Remove manure frequently from caged laying hens with manure belt systems. Consider rapid air-drying of manure on the belts. For deep pit systems – rapid air-drying of manure below the cages will reduce emissions.
  - Prevent leaking drinkers spilling water onto manure belts or into manure stores.

  Deep litter systems

  - Buildings with deep litter systems should be adequately ventilated and also insulated with suitable materials which have a vapour barrier to prevent deterioration of the insulation.
  - Drinkers should be designed to minimise spillage. If suitable for the type of stock – nipple and drip cups (or similar system) are preferable to hanging bowl drinkers. Maintain drinkers at the correct height by frequently adjusting them to bird eye level to avoid spillage and wet litter.

Odours from feeding and food stores

- Odours can be absorbed by dust particles and then carried in the air. Finely ground feeds and long feed drops (into bins or onto floors) increase the amount of dust. Using liquid feeds or pelleted feeds can reduce dust and may help to reduce odours.

- Keep foods such as milk by-products (whey, skimmed milk), yeasts and molasses, which can produce strong odours, in properly constructed, covered tanks or silos.

- Ensure that any effluent from any food storage is not allowed to flow across open concrete, but is collected in a channel or drain, and stored in a suitable store. The delivery area should be concreted and any spillage directed into the foul drainage system.

3.2.4 Manure and dirty water collection, storage and treatment

- Make regular checks of liquid levels in all slurry and dirty water facilities.

- Minimise the amount of slurry and dirty water by keeping rainwater out of storage facilities, unless it is specifically required for dilution. This will

reduce storage and field application costs. Diverting roof water away from the slurry store can save spreading costs substantially (Ref 1).

- All solid manure, slurry and dirty water should be properly contained and directed into a well designed and constructed store which is professionally designed, and complies with British Standards or other equivalent.

  Store size should be based on the number of animals or birds kept, the housing period, the area of open soiled concrete yards and any additional collection areas. The amount of wash water used, the amount of rainfall falling on unroofed stores and any other water run-off from areas such as fields, roads and roofs should also be taken into account. The Farmer's Pack for Nitrate Vulnerable Zones (Ref 3) contains guidance to calculate suitable store size.

- For operational reasons and to avoid pollution you may require at least 5 or 6 months storage, particularly on farms in very wet areas and with unsuitable land for winter spreading.

- Floating covers or roofs on slurry stores are recommended to reduce odour and ammonia emissions, as well as keeping direct rainfall out.

Safety Note

- Mixing or re-circulating slurry can give off dangerous gases that are lethal to both humans and livestock.
- Never put silage effluent into under-floor slurry stores, as similar problems can occur.
- Cover or fence-off below ground tanks and reception pits; fence off earth-banked stores. Display warning signs clearly.

Slurry Storage

When constructing new systems any building work and earth works should be supervised to make sure the store is structurally sound and slurry cannot escape. Further guidance is available for a range of different storage options (Refs 51 - 57).

Below ground tanks and reception pits

This type of store is suitable for slurry and dirty water, and is usually constructed with mass reinforced concrete. Many are designed to be roofed and slatted floors incorporated above the tank as floors for cubicle housing and feeding livestock buildings.

- You should ensure that there are adequate slurry mixing points, and also adequate access arrangements for emptying the tank.

- Livestock buildings with below ground stores should be well ventilated, and stock removed from the building during slurry mixing.
- The base and walls of channels or pits should be impermeable.
- Ensure the pit is big enough to hold all the slurry that might be emptied from channels.

Above-ground circular stores

These are suitable for storing slurry that is easy to pump. They are not suitable for slurries with a lot of long straw bedding, sand bedding or waste feed.

- Mix the slurry thoroughly in the reception pit, when transferring to the above ground store.
- Mix the store contents to break up any crust and stir up sediment before you empty the store.
- To avoid the risk of overflow, do not leave the pump running unattended with the valves open between the store and reception pit.
- Allowing a crust to form on the slurry or providing a cover over the store will reduce odour and ammonia emissions.

Weeping-wall stores

These are particularly suitable for cattle slurry with a large amount of straw bedding, and are usually constructed of concrete panels with vertical slots between each panel. A channel is required around the outside of the store to collect the liquid draining through the slots and divert this liquid to a suitably sized store.

- You should prevent excess liquid from entering a weeping-wall store, as this may cause “spurting” through the slots, which is difficult to contain. Any excess liquids should be directed into the associated storage tank or other containment, depending on the design of the system. In the region of 10% of liquid going into the store will weep out through the wall, and this must be collected by drainage to a suitable sized tank.
- The weeping wall store needs to be large enough to contain the solid fraction of the manure generated through the winter months, and until the store is emptied during the summer months, when it will have dried out enough to ensure the safe opening of the store.

Earth-banked stores

These can be used for all types of slurry or dirty water. Depending on the consistency of its contents, they can operate as a liquid store which is emptied by pump or vacuum tanker, or by taking some liquids away first and removing the remaining solids with a loader and spreader.

- New or substantially altered stores must be impermeable – you can import clay or use a liner to make sure you contain the liquid material. Pre-fabricated liners are not suitable for mechanical unloading and therefore should only be used for liquid storage.
- The designer should check that the soil and the site are suitable for building. They should also check the embankments, their consolidation, and allowance should be made for settlement.
- Cover exposed surfaces embankments with a layer of topsoil sown to grass to prevent erosion but you should keep vegetation short to allow for inspection. Do not let trees grow on or next to them. If cracks appear or the banks settle, they should be repaired straight away. Examine embankments after heavy rain.
- A strainer box placed at the deepest part of the store will allow gradual removal of some liquid slurry by pump.
- Allowing a crust to form will reduce odour and ammonia emissions but you will need to be able to break up such crusts to avoid subsequent handling problems.

Storage and Systems for dirty water

- You may decide to direct small amounts of dirty water into slurry stores, but for larger amounts you could consider a separate system for storage and subsequent application to land, such as a 'low rate' irrigation system.
- These systems use suitable tanks or earth-banked stores to collect liquids and let them settle. They use an electric pump, small bore piping and a small travelling irrigator. They will require a filter system, usually a mesh arrangement or compartment buffers, to allow separation of material that could block the system.
- Take particular care if using 'high rate' irrigation systems. These systems use large bore pipes to provide high flow and application rates, and are not normally used in winter because of the high risk of run-off. They are normally associated with long-term storage facilities.
- Applications of dirty water to land in excess of 50 m^3/ha are only acceptable on field sites when soil and slope conditions are suitable and with no risk of causing pollution when spreading.
- Move sprinklers and irrigators regularly, and check land you are irrigating for any signs of run-off or ponding on the surface, or worms being killed.
- Warning devices are needed in case of system failure.
- Travelling irrigators should have an automatic shut down at the end of a run.

Solid manure stores

- Permanent stores for solid manures should have impermeable bases. The base should slope so that liquids run-off into collection channels, normally outside the store, which drain to an appropriate sized or designed tank.
- Using narrow densely packed A shaped heaps for manure will shed rainwater more easily and prevent manure from becoming very wet, and also reduce odour and ammonia emissions.

- Providing a roof or cover to keep rainfall off the manure will reduce dirty water run-off. You can reduce odour and ammonia emissions from poultry manure by keeping it as dry as possible. For pig buildings with scraped dunging passages, where it is intended to produce stackable solid manure there should be sufficient concrete yard area to retain the solid fraction for at least 1 month to allow drainage of liquids into a suitable slurry store.

Field heaps

- Only put solid manures into temporary field heaps if there is a minimal risk of run-off polluting groundwater or surface water. Sites should not be in a field liable to flooding or becoming waterlogged.
- You should not put heaps within 10 metres of a surface water or within 50 metres of a spring, well or borehole or in positions that would cause odour problems for nearby residents.
- Temporary field heaps should not be located in any single position for more than 12 successive months.
- There should be a 2-year gap before returning to the same field site.
- Field heaps should not be placed within 10 metres of field drains. If it is unavoidable that manure is stored over field drains, ensure it is for a maximum of a few days only and that it does not cause pollution.
- Field heaps should be located well away from any ruts or tracks that could provide a pathway for effluent to reach surface water or habitats.

Other manure management issues

Contamination by parasites and pathogens

- On farms where *Cryptosporidium parva* (a parasite that can make humans ill) has been diagnosed, store slurry for as long as is practically possible. Storing solid manures (farmyard manure) for at least 2 months before spreading to land, will reduce the risk of contaminating surface water with viable oocysts (eggs).

- If you plan to apply manures before planting “ready-to-eat” crops, you should follow advice on how to reduce risks of food contamination by pathogens (Ref 58).

The following techniques go beyond current good agricultural practice, but may be appropriate in some situations:

Composting

- Composting solid manures reduces the quantity to be spread to land, and the odour that is released during and after spreading. Composting itself can give rise to site odours, and increase the loss of ammonia. The best results are obtained by using ingredients that are chopped and well mixed – usually manure and straw in the right proportions –

and by controlling temperature and moisture content, and by regular turning.

Mechanical separation

- Mechanical separation of slurry removes some solids and provides a liquid that can be pumped. The solid portion, typically 10 to 20% of the original slurry volume can be stacked and stored in a similar way to farmyard manure, although you must make provision to collect run-off from the separator area and the heaps. Simple wedge-wire run-down screens or vibrating screens for pig slurry, produce separated solids which will not stack but tend to slump. For pig and cattle slurries, separators which press and squeeze the slurry against a fabric belt or steel screen will produce separated solids of 18 to 30% dry matter that can be more easily stacked and composted.

Anaerobic Digestion

- In some circumstances anaerobic digestion of slurry together with other organic materials, including food waste, can produce sufficient biogas to be used for local heating schemes or for generating electricity. Key factors for success include securing a regular and consistent supply of organic material (and associated 'gate fees') and matching the nutrients in the digested material (digestate) with crop and land availability nearby. Reference 59 gives a selection of further information on anaerobic digestion.

Constructed Wetlands

- These are a series of small sealed ponds with shallow water and reeds that trap sediment and breakdown nutrients before water is discharged to the surface or ground water systems. There has been some positive research carried out on the operation of these wetlands, although their use is seen as most beneficial for low level contamination from farmyards and roofs (Ref 60). The discharges require prior written consent from Environment Agency Wales so it is strongly advisable to discuss any proposals with the EA before starting construction.

3.2.5 Sheep Dipping

- Plan your sheep dipping, to cover personal health and safety (Ref 42), animal welfare and environmental impacts (Ref 61 and 62). Refer to the Groundwater Protection Code (Ref 41) for further details.

<u>Siting of facilities</u>

- Facilities, including mobile systems and draining pens, should be sited at least 10 metres from ditches and surface water, and 50 metres from springs, wells or boreholes.

- Mobile systems can pose greater pollution risks than static dips if improperly sited. Hard standings should only be used if they have sealed drainage and collection systems.
- Field sites are acceptable for mobile systems, provided they
    - are flat, or only gently sloping
    - have well established grassland or rough grazing
    - have at least a spade's depth of topsoil and preferably a further 50 cms depth to rock, and no groundwater within 1m of the surface
    - are free from flooding and surface ponding, and not water logged, frozen or compacted.

Preparing to dip

- Design, construct and maintain dip baths to be free of leaks, without drain holes and with screens and lips to reduce splashes and prevent escape of dip. New baths should preferably be of one-piece construction, and be designed to a recommended specification (e.g. Ref 63). Keep dip baths covered when not in use.
- Store and transport dip concentrate safely.
- There should be "draining-off" pens of sufficient size to hold sheep for at least 10 minutes after dipping, so that used dip drains back to the dip bath.
- Put procedures in place to deal with emergencies such as spillages of dip concentrate or used dip, or wet sheep getting into wetlands or surface water. These should be included in your accident and emergency plan for the farm (see Section 2.2.3).
    - Inspect the area around the treatment site and look for pollution routes. Check the bath for leaks, fill it with water and leave overnight. If the water level falls, locate leaks and permanently seal.

When you dip

- Do not dip sheep if rain is likely within 24 hours.
- Only use dip concentrate authorised for use. Mix and keep the concentrate within the dipping area. Follow mixing instructions and be careful when washing out containers, and washing protective clothes so as not to cause pollution of surface water.
- Do not overfill the dip bath.
- Organise sheep handling to minimise splashing, and take care not to spill chemicals onto equipment or clothing.
- Keep sheep in the drain pen until there are no signs of dip solution dripping from them. This may take at least 10 minutes. Do not let used dip run into drains, ditches, surface water or soak into land.

After you dip

Dip can be washed out of fleeces if sheep access surface water, or if there is heavy rain.

- Do not allow wet sheep to enter wetlands or watercourses.
- If possible keep sheep out of surface water for at least 2 weeks. Until the fleece is dry, do not hold sheep in areas that contain wells, springs surface water or wetlands.
- Empty the dip bath as soon as possible. Wash equipment, including the drain pen, and contain all washings for disposal.
- Do not dispose of dip to groundwater or surface water or a soakaway under any circumstances. Dispose of used dip in accordance with an environmental permit from Environment Agency Wales[34].
- Do not mix dip with slurry in slurry stores.

Containers and unwanted dip concentrate

- Do not reuse empty containers for any purpose. Rinse empty dip containers three times with clean water, and empty contents into the dip bath. Store the rinsed containers under cover prior to disposing of them. Store any surplus concentrate safely or, if unwanted, dispose of it (see Section 7 for disposal options).

Safety Note
Some sheep dip chemicals are poisonous to birds, including domestic geese and hens. Do not let birds and other livestock drink the dip. Do not let livestock graze on land for at least 1 month on land where used dip has been spread.

3.2.6 Pesticide Storage and Handling

For good practice regarding the application of pesticides see section 4.2.5.

Storage

- Only store as much pesticide as you need to use in the near future. New pesticide stores should meet good standards of design and construction (Refs 64 and 65), and should not be built where there is a risk of polluting surface water or groundwater. Get advice from Environment Agency Wales, local planning and fire authorities, the crime prevention officer, and the Health and Safety Executive before you build or substantially alter a pesticide store.
- Stores should be regularly checked and improvements or repairs carried out when necessary
- Small amounts of pesticide can be stored in a suitable chest, bin, vault or cabinet. This container should be resistant to impact and fire and capable of retaining any pesticide leakage, and kept locked.

[34] All groundwater permits, ie authorisations under the Groundwater Regulations are now known as environmental permits in accordance with the Environmental Permitting Regulations (EPR) 2010

- Stores should have an impermeable floor and be able to hold spillage from all the store contents plus at least an extra 10% (an extra 85% if you are near an environmentally sensitive site).

Mixing pesticides, filling spray tanks and washing equipment

- Mixing, filling and washing operations should be carried out in a designated area where spillages and washings cannot escape to contaminate soil, groundwater or surface water. All liquids and spillages should be directed to a suitable collection tank or system. These facilities should be well away from yard drains, ditches, field drains and other surface water.
- You must avoid back-siphoning when filling a sprayer by ensuring there are no direct connections between a sprayer and water supply.
- Bio-beds are straw, soil and compost filled pits, turfed over, to collect pesticide drips and spills. Micro-organisms within the pit degrade chemicals to a safe level (Ref 66). For further information on construction of a bio-bed, please contact Environment Agency Wales and the Voluntary Initiative.
- For further information regarding disposal of waste pesticide see section 7.1.6 and 7.2.4.

Spillage

- If spillage occurs outside of the area designated for sprayer cleaning, you should follow your accident emergency plan. Small spills should be soaked up immediately with absorbent material e.g. sand or cat litter. For major spills, contact Environment Agency Wales emergency hotline on 0800 807060. **Do not** hose down, as this will increase the risk of causing water pollution.

Transport

- You should transport pesticides safely. If you collect pesticides from a supplier, or move pesticides around or off the farm, you should check your legal obligations for the safe transport of dangerous goods. Consult the Code of Practice for using Plant Protection Products (Ref 33) for more detail.

3.2.7 Fertiliser Storage and handling

For good practice regarding application of fertilisers, see section 4.2.5.

The risks of causing water pollution from storing and handling solid fertiliser are low, but you need to be especially careful with liquid fertilisers. If pollution incidents occur, they are likely to be very serious. Make sure that you include how to deal with spillages in your accident and emergency plan.

Solid fertilisers

- Follow the Code of Practice for prevention of water pollution from the storage and handling of solid fertilisers (Ref 67).
- Do not store bags of fertiliser within 10 metres of a field drain, ditch or surface water, and 50 metres from a spring, well or surface water.
- Return unused bags from temporary field sites to a permanent store as soon as possible.
- Avoid damaging the bags and gather up any spilt material.
- Provide secure storage on farm and carry out regular stock checks. If possible keep fertiliser in a locked building. Further guidance is available on good practice for fertiliser storage can be found in References 44, 45 and 68.
- Bags need to be disposed of or recycled. Do not burn plastics in the open (see Section 7).

Liquid fertilisers

- Follow the Code of Practice for the prevention of water pollution from the storage and handling of fluid fertilisers (Ref 69).
- Storage tanks, pipes, valves, connections etc should be resistant to corrosion from fertiliser and inspected regularly.
- Storage tank bases should be designed to take the weight of the full store.
- Large delivery vehicles must have suitable access to the store.
- Protect tanks against collision damage, and do not use unprotected or unsupported flexible containers for either temporary or permanent stores.
- Do not overfill tanks. Leave space for the contents to expand. Lock shut any valves that might allow fertiliser to escape.
- All tanks should have secondary containment, such as a bund, to contain any leaks.
- The hatches, lids and valves of tankers and bowsers holding fluid fertilisers should be securely closed during transport. All valves should be locked when unattended.

3.2.8 Fuel Oil Storage

- You could use a “double-skinned tank” to provide secondary containment, but ensure it also satisfies the legal requirements, see section 3.1.3.
- Use a top off-take tank, such as those used by fuel stations, where fuel is drawn from the top of the tank by a pump, via a non return valve. This makes them inherently safer. This must also satisfy the legal requirements, see section 3.1.3.
- Make sure tanks are securely supported.
- Check for leaks and repair or replace the tank immediately. Oil can be removed from water using a blanket, specially made to absorb oil. Oily wastes are classified as hazardous (see Section 7), but roofing over tanks or storage areas can ease build up of this material.
- Place tank(s) away from **any** drains.

- Plan procedures for delivery to and from the tank, to minimise the chances of having a spill, or the tank being hit by vehicles. If possible, supervise delivery of fuel and check that available storage exceeds the fuel delivery. Ensure the delivery driver can easily see the filling gauge and any vent pipe, to prevent overfilling.
- Have valves which clearly show when they are open and are kept locked in a closed position when not in use.
- Take care with mobile tanks, especially when transporting and using to fill equipment.
- Have drip trays and oil adsorbent sheets available to deal with minor leaks and spills.

Further guidance on good practice for fuel oil storage is available (Refs 70 - 71).

3.2.9 Soil Handling during construction works

- Ensure that any operation on your land that involves moving soil includes detailed proposals that will protect its long-term use and function. Where necessary seek specialist advice to ensure these are appropriate for the work that will be carried out. As well as best practice (Ref 73), you should be aware of anything that you are legally obliged to do, and of contractual issues outside of any planning condition or licence.
- Good planning is essential and should include any implications for the surrounding land and the locality. You should consider the risk of run-off and erosion causing flooding and pollution in surrounding areas.
- You may need to provide storage facilities, as well as access or haulage roads to allow for the movement and re-use of soils, and possibly also the recovery or removal of surplus materials. These may require separate consents. Contact Environment Agency Wales for details of any environmental permit requirements or exemptions that may be required for the work.
- You should be aware of the roles and responsibilities of everybody involved in the project. Where permits and planning are involved this will include legally binding conditions, monitoring and ongoing commitments. If a site operator fails to meet their commitments, enforcement action may be pursued against the landowner.
- Contractors often have detailed practical instructions for site working which have been developed from the formal planning or permit process. The success or quality of work will depend upon following this best practice. If you believe that they are not being followed, notify your agent or the relevant enforcement authority.
- Different soils occurring on the site should be handled and stored separately, in particular, topsoils and subsoils. Take care to minimise contamination of soils with chemicals such as oil, or other materials such as stone, brick and wood.
- The long term potential of the land will depend on how the site is worked and managed. Avoid working or trafficking on wet soils. Although soils will recover in the long term, careful planning and good practice will reduce the

need for expensive engineering operations. Restored soils are fragile, and are easily damaged by inappropriate use. Treat the soil with great care, no matter what the immediate after-use might be.

- Further guidance on site restoration can be found in the Minerals Technical Advice Note (Ref 74).

4 Field Husbandry

Carrying out field work in accordance with this Code will help to minimise the risks of causing water pollution by run-off and erosion, of increasing gaseous emissions to the air, or harming habitats and historical features. It will also help to maintain good soil conditions, optimising plant growth, assisting drainage and uptake of nutrients.

Following good practice in this section will help to reduce:
Soil erosion, compaction and other damage to soil structure, water pollution from soil and nutrient run-off or from pesticides, air pollution from smoke, greenhouse gas emissions, damage to habitats, archaeological or landscape features.
It may also save you money by:
Reducing use of fuel, reducing any remedial work, reducing applications of fertiliser

4.1 Legal Requirements

Please note, nutrient management, including the application of manure, slurry and sludge is covered in Chapter 5.

This is what you must do by law regarding your field husbandry:

4.1.1 Protection of Water Resources

It is an offence to cause or knowingly permit a discharge of poisonous, noxious or polluting matter or solid waste matter into controlled waters, including groundwater and surface waters, without proper authority from Environment Agency Wales[35]. This would apply to pollution incidents arising from run-off from slurry and manure applied to fields, or from soil erosion.

4.1.2 Soil Run-off

You may be liable to prosecution if soil eroding from your land is deposited on a highway[36]. You may face a civil claim if it damages a neighbour's property.

4.1.3 Protecting designated sites and species.

You should be aware of any designated sites on your land. Sites of Special Scientific Interest (SSSI), Special Protection Areas (SPA) and Special Areas of Conservation (SAC) are protected by the Wildlife and Countryside Act 1981. You must not carry out any 'operations likely to damage the special interest' (OLDSI) of these areas, which may include cultivation or drainage of soils.

[35] Environmental Permitting (England and Wales) Regulations 2010.
[36] Highways Act, 1980 (as amended)

Many areas of unimproved peat soils are protected as Sites of Special Scientific Interest.

Many of the birds, animals and plants found on farmland and the wider countryside are protected by UK[37] and European legislation[38]. Works such as fencing, drainage and woodland management can affect protected species such as Bats, Badgers, Dormice, Water Voles, Crested Newts and Otters. Some protected species such as bats may also be present in buildings due for renovation. All wild birds, their eggs and nests are also protected.

It is an offence to disturb protected species, to kill, injure or take them and to damage, destroy or obstruct access to places that they use for shelter, protection or breeding. It is also an offence to pick, uproot or destroy many species of plants.

You may need a licence regarding, for example, badgers or newts, if you are likely to disturb them during a field operation. Information on wildlife management including moles (Refs 38, 75) and badgers can be obtained from the Welsh Assembly Government – see Useful Contacts section.

Scheduled Ancient Monuments are protected under the Ancient Monuments and Archaeological Areas Act 1979. It is a criminal offence to carry out any works resulting in damage or destruction to a scheduled monument, or any works to remove or repair it, or to flood or tip on land under which there is a scheduled monument. You must first obtain the formal consent of the Welsh Assembly Government (through Cadw). Land managers are therefore advised to consult Cadw before undertaking any activity, which might affect a scheduled ancient monument.

4.1.4 Changing management on uncultivated land and semi-natural areas.

All farmers must comply with the Environmental Impact Assessment (EIA) (Agriculture)(Wales) Regulations 2007. If you intend to change the way semi-natural and uncultivated land is managed, so that it is used more intensively, you must apply for a screening decision. For example, ploughing permanent grass may breach EIA Regulations, and the associated requirements of cross compliance. Guidance Notes are available which define semi-natural and uncultivated land types, and the kind of agricultural work that would need a screening decision (Ref 76).

4.1.5 Pesticide Application

To use pesticides you must either:
1) have the relevant certificate of competence, or

[37] The Wildlife and Countryside Act 1981
[38] Habitats Directive 92/43/EEC

2) work under the supervision of someone with the correct certificates (Ref 33), or
3) have 'grandfather' rights, if born before 31/12/1964.

However, changes in legislation mean that from 2013 all users of pesticides will have to have a certificate of competence in order to purchase and use pesticides.

- You must always comply with the conditions of use. These are either on the label or are part of a Specific Off Label Approval (SOLA) (Ref 77). This will specify the application method and the size of buffer zone needed around surface water, wildlife sites and hedgerows. If you want to reduce the statutory no-spray buffer zone adjacent to surface water you must undertake a Local Environment Risk Assessment for Pesticides (LERAPS) (Ref 36).

You have a legal obligation to keep all pesticides on the site of their application i.e. preventing spray drift and run-off. Before you use any product in or near water, e.g. on the bank, you should first contact Environment Agency Wales.

You must keep records of pesticide use when you grow food or feed crops[39].

For further guidance regarding the use of Pesticides, see section 4.2.5 and the Code of Practice for the use of Plant Protection Products (Ref 33).

4.1.6 Heather and Grass Burning

Heather and grass burning is subject to the Heather and Grass etc. Burning (Wales) Regulations 2008 which define when and how burns can take place. They also require that a Burning Management Plan is produced for all proposed burns (Ref 78).

4.1.7 Turf production

Turf cutting may require consents before work commences, under the Town and Country Planning Act 1990. Seek advice from your local Planning Authority where there is any doubt whether the proposed activity could be regarded as commercial and not reasonably necessary for agriculture. See Useful Contacts section for your local Unitary Authority.

Proposals may also require an application under the Environmental Impact Assessment (EIA)(Agriculture)(Wales) Regulations 2007 (Ref 76), and consent from CADW where the site is on, or close to, a scheduled monument[40]. You may need to consider protected species – see section 4.1.2 above.

[39] EC Regulations 852/2004 on the hygiene of foodstuffs, implemented by the Food Hygiene (Wales) Regulations, 2006, and 183/2005 on the hygiene of food for livestock.
[40] Ancient Monuments and Archaeological Areas Act 1979.

4.1.8 Cross compliance

If you are in the Single Payment Scheme you must comply with the Statutory Management Requirements (SMRs) and follow the requirements to keep your land in Good Agricultural and Environmental Condition (GAEC).

The SMRs that relate to field husbandry are:

- Protection of groundwater against pollution, regarding use of sheep dip, and pesticides.
- Conservation of fauna and flora
- Conservation of wild birds
- Restrictions on the use of Plant Protection Products, regarding where and when to use pesticides
- See also the SMRs relating to NVZs and Sewage Sludge in Chapter 5

The relevant standards consistent with keeping land in Good Agricultural and Environmental Condition (GAEC) are:

- A1 – A3 giving the requirements for soil, relating to soil erosion, soil organic matter and soil structure. A Soil Assessment Record (Ref 16) must be kept.
- A2 - You must comply with the Stubble Burning Regulations, and not burn crop residues (other than linseed residues) unless under certain restricted conditions.
- B – you must not overgraze.
- D – you must not carry out unsuitable supplementary feeding on natural or semi-natural vegetation, except where it is necessary for the protection of animal welfare during periods of extreme weather conditions, or within 10 metres of a surface water.
    - H – you must not burn heather, rough grass, bracken, gorse or bilberry in breach of the Heather and Grass Burning Code (Ref 78). These rules reinforce the Heather and Grass Burning (Wales) etc Regulations 2008 (as amended). If you are compliant with the Regulations, you will already be meeting the requirements.
- I - reinforces the Environmental Impact Assessment (EIA)(Agriculture)(Wales) Regulations 2007, which control the agricultural intensification of uncultivated land and semi-natural areas.
- K - you must not allow stock to damage important features on SSSIs, or on other designated areas.
- N - You must not cultivate land within 1 metre of a traditional boundary to agricultural land. A traditional boundary includes: a stone wall, stone faced bank, hedge, earth bank, slate fence, stone gate post, stile, tree, shrub, ditch and a watercourse.

See The Farmer's Guide to Cross Compliance (Ref 17) for further guidance.

4.2 Good Practice

This section provides advice and guidance on good agricultural practice, which goes over and above your legal obligations.

Please note, nutrient management, including the application of manure, slurry and sludge, is covered in Chapter 5.

Summary of Key Actions

- Know your soils – refer to further guidance (for example, refs 19 -21 and 79).

- Prepare a soil management plan to manage fieldwork and livestock management on a field-by-field basis, see section 2.2.1 for further details. You should
  - Consider the risks of run-off and erosion when planning what to grow or how to manage livestock on sloping land.
  - After rain, identify areas where run-off or erosion occurs from fields or other parts of the farm such as roads and tracks.
  - Consider the potential ground conditions at harvest time for arable planning.

- Consider providing buffer strips or zones[41] around surface water and wetlands, hedgerows and field access points to prevent soil wash, nutrient run-off, and spray drift. These can include:
  - Grass strips
  - Planting native woodland to stabilise and protect soils as well as reduce diffuse pollution and soil erosion. Woodlands can also help to slow the entry of water from extreme periods of rainfall into a surface water when planted in the appropriate areas and catchments.
  - Fencing off surface water will allow natural vegetation to colonise, protect the soils from excessive trampling from livestock, and prevent direct deposit of animal faeces to the surface water.

- Always carry out field operations with regard to weather and ground conditions. To avoid rutting and compaction, do not traffic on wet soil wherever possible. Be prepared to suspend work, including that of contractors, in adverse weather conditions. This will also reduce fuel costs and GHG emissions. Retain as much soil in the field as possible, including during turf cutting operations.

- Minimise soil erosion and compaction by managing livestock to prevent poaching whenever possible.

[41] A strip of land, vegetated or otherwise, that acts as a sediment trap, or allows nutrients to be removed from leachate or run-off.

- Avoid leaving soil bare for long periods, especially over winter.

- Peat and organic soils that have not been drained and improved for agriculture should be managed to minimise losses, for example by avoiding overgrazing. They hold large reserves of carbon and are rare and increasingly important habitats for biodiversity. They also have a part to play in flood control, by retaining water.

- Apply pesticides only where required and in accordance with the Code of practice for the use of plant protection products (Ref 33), to maximise their benefit and reduce the risk of harming people and livestock and polluting the environment.

- For best practice regarding nutrient management planning and application, see Section 5.

4.2.1 Drainage and tracks

- Regular inspection of your soils will indicate drainage needs including moling or sub-soiling. Good drainage will improve water infiltration, help to maintain soil structure and will increase the time available for working on the land or for grazing livestock.
- However, do not increase drainage around important wetland areas, or drain peat soils.
- Use well drained tracks for vehicles and livestock. Where necessary, provide cross-drains to prevent run-off channelling along impervious surfaces. Polluted run-off must not be allowed to get into field drains, ditches or surface water.
- Minimise machinery movements on tracks in wet weather.
- Where livestock tracks cross surface water, consider options to reduce the impact on water quality, through the provision of culverts or bridges. Culverts will generally require Flood Defence consent (formerly known as land drainage consent) from Environment Agency Wales.

4.2.2 Field Management

- On any field on your farm, avoid leaving bare soil, particularly a fine tilth, for any length of time. Cover crops such as green manures will reduce soil erosion and provide soil nutrients.
- Do not leave bare soil following bracken control operations, particularly on sloping sites with a risk of erosion. Leave cut bracken to protect the soil.
- Boundaries can act as sediment traps and nutrient filters. Hedgerows planted across slopes can slow downhill flow of water. Leaving an uncultivated and unsprayed strip around the outside of the field will protect any hedgerow and provide a buffer strip.

- Run-off is often channelled through gateways at the bottom of sloping land. In some cases it will be better to relocate the gateway, check if this needs planning permission first.
- Constructing hardcore feeding areas or laying hardcore in gateways will reduce poaching and subsequent run-off.
- Consider constructing swales, grassed depressions, where the risk of soil wash is high. Compared to a conventional ditch, a swale is shallow and relatively wide, providing temporary water storage and the possibility of infiltration under suitable conditions (Ref 80).
- Where severe erosion occurs (despite your best endeavours), earth banks, other physical barriers or ponding sites may be used as a last resort to check the flow of water to reduce off-site impacts. They should be carefully designed and installed to achieve the required effect. You may need consent from Environment Agency Wales if, for example, they are within 7 metres of a main river, or if the material used to make them is a 'waste'. (Ref 81)
- Soil should be routinely checked for compaction by a penetrometer, or a rod pushed into the ground – this will be impeded at the depth of any compaction. Or you can dig a soil pit - a compacted layer can often be seen in the top 10 cms of soil under grassland, and may occur as a plough pan in arable land.
- If you have to travel on wet soils, avoid compaction by reducing the loading with low ground pressure set-ups, or setting tyre pressures at the lowest possible for the load and tyre type.
- Remove compaction by subsoiling at the appropriate depth – 2–5cms below the pan, when soil is friable and will not smear. Consider using a grassland subsoiler where appropriate. Sub-soil across slopes to avoid creating drainage channels, if you need to retain soil moisture.
- Take positive action to maintain or increase soil organic matter, which will improve soil stability and increase workability by returning crop residues, applying bulky organic manures and introducing grass or green manures into the rotation. Remember to adjust your fertiliser use accordingly.

4.2.3 Livestock management

- Include the impact of all your livestock systems when preparing a soil management plan e.g. production and management of manures, poaching.
- Match the nitrogen and phosphorous content of livestock feed taking into account the grass based part of their diet, to the particular requirements of the stock. This minimises the amount of nutrients in manures that are returned to land, which reduces the risk of subsequent losses to the water environment.
- Reducing the intensity of grazing during the late summer and autumn months will reduce the amount of nitrate leached from grazed grassland.
- You should take account of slopes when planning and managing paddocks to avoid channelling run-off.
- Avoid poaching when extending the grazing season or out-wintering stock - this can reduce subsequent production, or cause pollution to surface

water by run-off or soil erosion and damage other sensitive habitats. Take particular care when grazing forage crops or crop residues.

- Remove stock from the land when the soil is too wet. Allow the site time to recover in the spring, cultivate and re-seed, as necessary, and when conditions allow, to re-establish green cover.
- Provide hard standing around permanent feeders, water troughs and in gateways.
- You should move supplementary feeders to avoid poaching the soil in any situations where it will lead to run-off and erosion.
- Wherever possible, keep livestock out of surface water. If it is necessary for them to drink direct from a surface water, limit the area to which they have access such as by installing a drinking bay. This will reduce both erosion of the banks and direct fouling of the river by the stock. Ideally, put in alternative watering facilities such as pasture pumps.
- Do not allow polluted run-off from livestock handling facilities to enter a surface water or wetland area.
- Woodchip corrals and standoff pads should not be used for over wintering cattle due to the high risk of pollution to surface waters or groundwater, unless they are lined and have effluent collection facilities. Seek advice from Environment Agency Wales about suitable sites, and refer to good practice guidance (Ref 43).
- You should maintain grass cover in poultry runs by using a mobile housing system or rotating the roaming areas, so they have time to recover. Take occasional cuts of grass where there is long term grazing by poultry, to reduce nitrate leaching and limit the build up of other nutrients. Provide hard standing around static sheds to reduce puddling of the soil in wet weather.
- Outdoor pigs can cause particular problems and are a high risk enterprise with regard to soil erosion. Use the principles listed above to reduce the risks of erosion and run-off. Further advice is available (Ref 82).
- Provide wallows for the pigs in hot weather, sited to avoid soil wash or run-off, but take measures to reinstate the soil in such areas after the pigs have left the site.

For further details of best practice regarding dipping sheep see section 3.2.5.

4.2.4 Crop Management and Cultivations

- Use your soil management plan to help decide where cultivations should take place. Refer to the Defra publication ‘Controlling soil erosion’ (Ref 19) for high risk activities and areas. For example, do not grow late sown winter cereals on sloping sites with lighter soils.
- Late harvested crops such as forage maize and energy crops like Miscanthus or rhizomes can cause soil erosion and run-off problems. Refer to separate guidance on best practice (Refs 83 – 84, and see ‘Growing Maize’ below) and site them in appropriate flat fields in low risk areas.
- Do not plough permanent grassland for arable cropping. Following this large quantities of nitrate can be leached over several years, organic

matter will be lost and carbon released to the atmosphere. There is also a high risk of soil erosion on slopes and in river valleys that flood.
- To reduce nitrate leaching, you should not apply fertilisers in the six months prior to cultivation of grass leys.

Cultivation

- Refer to useful publications such as those from the Soil Management Initiative (Ref 85).
- Check soil for compaction using a penetrometer or by digging a hole.
- Where the soil is compacted, undertake any soil loosening or sub-soiling that is needed when soils are dry and friable (crumbly) to a depth of 2-5cms below the compaction. Deeper cultivation may be needed on tramlines, headlands and gateways if compaction is causing erosion and run-off.
- Adjust machinery weights and tyre pressure according to soil conditions and manufacturer's guidelines.
- To increase work rates and reduce fuel consumption, select a cultivation system which uses the minimum number of passes to create soil conditions suitable for the crop to be grown. Consider direct drilling or reduced tillage systems. Use a furrow-press if ploughing to conserve moisture and aid cultivation.
- Do not cultivate more deeply than is necessary. It will slow down overall work rates, increase fuel use and therefore costs, and may damage field drainage and bring up poorly structured or low organic matter soil.
- De-stoning soils before planting can cause long-term damage to soil structure and increase the loss of organic matter. Only do it where it is essential to ensure the quality of the harvested crop e.g. for root crops.
- A coarse seedbed will reduce the risk of the soil slumping or capping which can reduce emergence and lead to run-off and erosion. Prepare as coarse a seed bed as you can that will still produce good germination and ensure the effectiveness of any pre-emergence herbicides.
- Plough or cultivate across the slope throwing the soil up slope where it is safe to do so. Soil moving down the slope by erosion or tillage operations can reduce the depth of soil and restrict crop growth especially on the crest of a hill.
- If cross-slope ploughing is not possible, divide long slopes with in-field grass strips or unplanted cultivated headlands to intercept erosion.
- In potato fields use tied ridges (small dykes in furrow bottoms) to improve water infiltration.
- Install buffer strips alongside surface water at the bottom of slopes. Do not rely on such areas at the expense of good soil management in the rest of the field. Buffers alongside surface water may be ineffective in river catchments where the water table is close to the surface. If necessary, consider permanent grass, woodland, or similar land cover.
- In autumn you should cultivate the land as close to sowing the next crop as agronomically possible. Crops sown earlier will take up more nitrate from the soil and will also reduce the risk of soil capping and subsequent

run-off and soil erosion. This can be especially beneficial after a crop such as oilseed rape, which leaves a residue containing a lot of nitrogen.

- Cultivate improved grassland in the spring rather than the autumn to avoid nitrate leaching. Consider oversowing instead of ploughing and re-seeding, but where you must re-seed, use the minimum number of passes, and establish grass cover from autumn re-seeds by early October.
- Undersow maize and spring cereal crops to reduce soil erosion after harvest.

Managing the crop

- On soils liable to capping and run-off, ensure any irrigation is applied evenly and that droplet size is not too big. See Sections 6 and 8 for further information regarding irrigation.
- Use a tined weeder or similar implement within a row crop to break up capped soils that are causing run-off.
- When using plastic covers on a field scale, take precautions to limit run-off and erosion from the site. Grass buffers could be retained around the fields, and reduced soil erosion, water loss and associated nutrient loss could be achieved by planting rye grass between covered beds.
- For pesticide and nutrient applications, see sections 4.2.5 and 5.2 respectively.
- Retain unsprayed margins and buffer strips throughout the cropping period.

Wind Erosion

To limit the effects of wind erosion on light, blowing soils, such as some of the sandy soils in north east Wales, you should:

- avoid susceptible crops, such as sugar beet and some vegetables, on the most exposed fields
- establish windbreaks
- direct drill or drill in to a 'ploughed and pressed' surface
- apply a surface mulch such as farmyard manure but remember to account for its fertiliser value in your nutrient management plan
- sow nurse crops such as barley to stabilise the soil and protect seedlings.

Harvesting and post harvest

- Avoid harvesting when soils are wet and in conditions where heavy machinery and equipment leave ruts in the field and cause deep soil compaction.
- Cultivate or sub soil maize stubbles after harvest to remove compaction and encourage water infiltration as soon as conditions are suitable.
- Wherever possible use floatation tyres on machinery to reduce damage to soils.
- Minimise the quantity of soil taken from the field on equipment or on crops.

- When a spring-sown crop is to follow a crop harvested early the previous autumn you should aim to sow a temporary cover or green manure catch crop following harvest, such as mustard, rye or vetch. Where it is not practicable to establish a cover or catch crop, you should leave the land in stubble or roughly cultivated over winter, to minimise run-off and soil erosion.

Growing Maize

Well managed maize growing offers real opportunities to farmers, however inappropriately managed crops can lead to environmental problems (Ref 86). The main environmental issue associated with maize is soil wash/runoff and soil erosion resulting from damaged soil structure associated with late harvest in wet soil conditions. This can result in soil, contaminated with agrichemicals and crop nutrients, being washed into watercourses.

To minimise these issues follow the general principles related to crop management, and give particular attention to:

- Site selection – choose the lowest risk flattest fields, but that are least likely to flood or suffer from soil structure problems post harvest.
- Variety selection – match the maize variety (maturity class) to your location and soil conditions in order to plant and harvest as early as possible. Details on determining suitable maturity class for your location can be provided by the Maize Growers Association (ref 87).
- Early drilling – the crop should be drilled as soon as possible in the spring when soil temperature reaches 8°C. Early drilling with the correct maize variety will help ensure an early harvest and reduce the risk of soil structure damage.
- Soil management - match nutrient applications to crop requirement, and manage post harvest stubbles to minimise water and nutrient run-off. Undersow maize with grass or clover, or sow a cover crop as soon as possible after harvest to minimise bare soils. Alternatively cultivate as soon as possible after harvest to allow water to drain downwards, rather than off the field.

Further information is available from the Maize Growers' Association (Ref 87).

<u>Silage Making</u>

- You can minimise the amount of effluent produced by wilting grass to at least 25% dry matter before ensiling.
- For baled silage when crop dry matter is below 25%, using a 750mm wide bale wrap (rather than 500mm) will result in a better seal, and reduce the quantity of effluent released during storage.
- Silage additives are extremely polluting. They should be stored safely and handled at least 10 metres from a field drain or surface water. Do not leave undiluted product out on site or allow additives or used containers to get into a surface water.

4.2.5 Applying Pesticides

- Everybody involved in the use of agricultural pesticides should follow the Code of practice for using plant protection products (Ref 33).
- A crop protection management plan will help you determine the best way to use pesticides on your farm, to optimise use and minimise waste and run-off (see section 2.2.1). Inspect crops regularly to identify weeds, pests and diseases accurately. Evaluate the need for a pesticide by the use of thresholds and diagnostic kits.
- Check that those who apply pesticides have appropriate training, and a certificate of competence to do so, and that advisers have qualifications like those from BASIS. Encourage those who use sprayers to join the National Register of Sprayer Operators (NROSO) (Ref 88).
- Maintain your sprayer to stop leaks and drips. This will ensure that it sprays evenly, and does not leave untreated patches, or over-treated areas. Consider having trailed, mounted or self-propelled sprayers tested annually under the National Sprayer Testing Scheme (Ref 89).
- Minimise spray drift at all times by using the appropriate equipment and sprayer controls. Use low drift and other types of nozzles where efficacy is not compromised and adopt the correct forward speed and boom height.
- Before you use any product approved for use in or near water i.e. on the bank, contact Environment Agency Wales. You may also have to let water abstractors know. Further guidance is available (Ref 90).
- Select an effective pesticide that will minimise impacts on crop pest predators, non-target organisms, neighbouring crops, wildlife habitats, and the quality of surface water and groundwater.
- Apply pesticides so that they only affect their intended target.
- Ensure you take adequate precautions to protect bees and other beneficial insects. Inform your local beekeepers before spraying insecticides.
- You should identify and protect wildlife habitats and prevent spray drift affecting them. To achieve this consider leaving unsprayed strips or having conservation headlands.
- Check local weather conditions, and take the direction and strength of the wind into account when deciding if it is safe to spray, and be prepared to stop if conditions deteriorate. Conditions are often better early in the morning or in the evening.
- Make sure conditions are suitable so that the soil is not compacted or rutted in a way that might lead to erosion and run-off.
- In each field, consider the pattern of working, so you avoid overlap, particularly when turning on headlands. Match up bout-widths carefully, taking particular care in fields without tramlines. Where no tramlines or sprayer wheelings are present, use foam markers or marker pegs to prevent overspraying.
- You may need to leave an area unsprayed in order subsequently to dispose of tank washings safely within label recommendations.
- For further information on the disposal of waste pesticides see section 7.2.4.

4.2.6 Upland and Peat Soils

- All undrained or unaltered peat or organic soils should be managed to retain their existing semi-natural vegetation cover. This may include mire, heath, marshy and acidic grassland. Do not apply lime or fertiliser.
- Protect peat soils from erosion and from degradation. Do not cultivate, or lower the water table by drainage. Prevent spray drift and nutrient and sediment rich run-off entering the site.
- On upland sites, protect peat from erosion. If you find signs of erosion, you should take measures to stabilise the surface, by temporarily fencing to prevent access and overgrazing.
- Control stocking rates. Monitor grazing and move stock as necessary to avoid serious poaching. Locate supplementary feeders on tracks or hard standing, but not on features of archaeological importance.
- Block drainage grips to reduce run-off and peat wastage. However you must seek Environment Agency Wales advice on which grips to block in order not to cause flood risk consequences downstream.
- Do not leave bare soil following bracken control operations, particularly on sites with a risk of erosion. Leave cut or treated bracken on site.
- Burning heather or grass on peat soils is strongly discouraged. If this does occur, ensure this will not leave an exposed surface vulnerable to erosion. Follow the Heather and Grass Burning Code for Wales (Ref 78).
- Wherever possible, manage public access to prevent damage to the surface of the peat by walkers and vehicles.

4.2.7 Turf production

- You must ensure that any permissions and consents have been obtained before turf cutting begins (See Section 4.1.7). For tenants, or where the land is held through an agreement or contract, you will need the consent of the landlord.
- Choose sites that do not have historic, ecological or landscape importance. Old grassland and sites that have historic remnants such as ridge and furrow should not be used. Seek advice from CADW if you are unsure about the status of an historic site, or from CCW regarding ecological status.
- You should not use sites with a high risk of soil erosion especially if operating a system that involves re-seeding where fine rolled seedbeds are necessary.
- Turf cutting is normally a specialist activity. Ensure that the extent, method of working and any remedial works are agreed prior to the work commencing.
- Only a minimum amount of soil consistent with producing a viable turf should be removed from the site. It is normally not necessary to remove more than 15 mm of soil.
- The work should be carried out when the weather and ground conditions are dry to avoid damaging the soil through compaction or loss of soil by

erosion. Ensure that access for machinery and vehicles is considered well in advance of cutting. You may need to provide short-term storage of turfs.

- You should take into account the management of the land for turf production when planning future land use. Include it in any soil management plan and in your Soil Assessment Record (Ref 16) if the Single Payment is claimed.

5 Nutrient Management

Maintaining an appropriate level of soil fertility by the careful use of fertilisers, organic manures and lime will help to maximise the profitability of your farming system. Nutrients lost from agricultural land are an important cause of air and water pollution but losses can be minimised by matching applications to crop requirements and applying them to land carefully.

Following good practice in this section will help you:
Reduce the loss of nutrients, especially nitrates and phosphates, to water, and nitrous oxide (a powerful greenhouse gas) and ammonia to air.
It may also save you money by:
Reducing applications of manufactured fertilisers, maximising the value of organic manures by correct application.

5.1 Legal Requirements

This is what you must do by law, regarding nutrient management:

5.1.1 Protection of Water Resources

It is an offence to cause or knowingly permit a discharge of poisonous, noxious or polluting matter or solid waste matter into controlled waters, including groundwater and surface waters, without proper authority from Environment Agency Wales[42]. This would apply to pollution incidents arising from run-off from slurry, manure or wastes, e.g. waste milk applied to fields.

5.1.2 Managing Nitrates

In Nitrate Vulnerable Zones (NVZs) designated under the Nitrates Directive, farmers must comply with mandatory measures contained in the NVZ Action Programme (Ref 3). These relate to closed periods for spreading manures and fertilisers, the total amount of nitrogen from any source you may apply to land, the storage capacity for manures you must have, and record keeping. See Appendix 1 for a summary of these conditions. You should have been made aware if you are in an NVZ, however, if you are not sure you should contact your local Divisional Office or Environment Agency Wales (see Useful Contacts).

5.1.3 Spreading Organic Wastes to Land

Organic wastes include sewage sludge cake, waste milk, paper waste, liquid digested sludge, composts from waste materials, digestate from anaerobic digestion plants and food waste. You will require an exemption under the Environmental Permitting Regulations (See Section 7.1.4) before they can be

[42] Environmental Permitting (England and Wales) Regulations 2010.

applied to your land. This will only be granted when a qualified person has made an application to Environment Agency Wales confirming that it will provide ecological improvement or agricultural benefit to the land, and that it will be safe to apply the proposed quantity. You should check that only the permitted quantities are actually applied.

If you are applying organic wastes to land used for growing food crops, grassland or forage for livestock, you must also comply with the Sludge Regulations[43] and the Safe Sludge Matrix (Ref 91). Following the Regulations will ensure that soil does not become contaminated.

Other wastes containing animal products, e.g. blood, are not normally allowed to be spread to land without being first treated in an Animal By-products Regulation[44] approved plant and there are further restrictions after processing.

Compost made from certain bio-degradable wastes may be used without specific permission if The Quality Compost Protocol is followed (Ref 92). The Protocol assures the quality of the compost, and requires the land to be analysed for metals before applications are made and a record to be kept of where the compost has been spread.

Other wastes and composts not produced according to the Quality Protocol may only be applied to land if Environmental Permitting Regulations are followed. These require prior notification to, or permitting by Environment Agency Wales. Digestate from anaerobic digesters is likely to be regulated in the same way (Ref 93)

Sewage Sludge

- Sewage sludges (sometimes known as biosolids) contain significant proportions of nitrogen, phosphorous, trace elements and organic matter. But they can also contain potentially harmful substances including pathogens and heavy metals. The Sludge Regulations are designed to protect the environment, human and animal health, and the soil.
- It is an offence to use, or knowingly allow sludge to be used, on land when such use does not meet the regulations. Farmers also have responsibilities to ensure the land is managed according to the Sludge Regulations after sludge is applied. In particular, depending on the type of sludge applied, stock must not be grazed or certain crops must not be harvested until a safe period of time has elapsed.
- Sewage sludge can also be spread on land used to grow crops other than food, such as for industrial cropping. This requires an exemption from environmental permitting from Environment Agency Wales.
- If you store liquid sludge, you must also register an exemption with Environment Agency Wales. This exemption will allow storage for up to 1250 tonnes of sludge for up to 12 months, subject to conditions such as

[43] The Sludge (Use in Agriculture) Regulations 1989, SI No 1263
[44] Animal By-products (Enforcement) (Wales) Regulations 2011

proximity to watercourses and that a freeboard of 300 mm is maintained for an open container (750 mm for an earth-banked lagoon).

NB Livestock manures and slurries are not classified as 'waste' when applied to the land for agricultural benefit. Their use and application is not regulated except in Nitrate Vulnerable Zones as above, or with regard to their storage or where their application or storage causes a pollution incident.

5.1.4 Protected sites and habitats

Sites of Special Scientific Interest (SSSI), Special Protection Areas (SPA) and Special Areas of Conservation (SAC) are protected by the Wildlife and Countryside Act 1981. You must not carry out any 'operations likely to damage the special interest' (OLDSI) of these areas, which may include the application of fertilisers, manure or lime to them without consent. Consult CCW (see useful contacts) for further advice.

5.1.5 Contaminated Soil

The contaminants of major concern are heavy metals such as lead, cadmium, copper and zinc, and persistent organic compounds such as dioxins and polychlorinated biphenyls. Some metals and compounds may harm soil organisms and reduce soil fertility, before they affect the quality of crops or the health of livestock.

There are maximum legal limits for the content of lead, cadmium, arsenic, mercury and some persistent organic compounds in foods offered for sale which must be complied with.. For further legal guidelines for the application of organic wastes that may contain these substances, see section 5.1.2.

With regard to metal contamination of soils, if you are mixing rations on the farm, you must not exceed the statutory limits for metal additions to feeding stuffs[45].

5.1.6 Cross-compliance

If you are in the Single Payment Scheme you must comply with the Statutory Management Requirements (SMRs) and follow the requirements to keep your land in Good Agricultural and Environmental Condition (GAEC).

The SMRs which relate to nutrient management, are:

- The protection of groundwater against pollution, regarding run-off from slurry and manure.
- The protection of water in Nitrate Vulnerable Zones, where this is applicable.
- The protection of the environment, and in particular soils, when sewage sludge is used in agriculture.

[45] The Feeding Stuffs (Wales) Regulations, 2006 (as amended).

The relevant standard consistent with keeping land in Good Agricultural and Environmental Condition (GAEC) is:

- A2 gives the requirements for soil organic matter, including the availability and use of farmyard manure.

See The Farmer's Guide to Cross Compliance (Ref 17) for further guidance.

Reducing ammonia emissions

Although there are no legal requirements for farmers and landowners, your actions can contribute to the following standards:

- Under the Freshwater Fish Directive[46], concentrations of ammonium Nitrogen in surface water have to fall within set concentrations. These are monitored as Environmental Quality Standards by Environment Agency Wales.

- Under the Gothenburg Protocol and National Emission Ceilings Directive there are targets to reduce ammonia emissions and limits for the concentration of particles in the air which are increased by the presence of ammonia[47].

5.2 Good Practice

This section provides advice and guidance on good agricultural practice, which goes over and above your legal obligations.

Summary of Key Actions

- Preparing a nutrient management plan and a manure management plan will help to target inputs and reduce any excess application. It will also identify the most appropriate sites for spreading of slurry and manure. See section 2.2.1 for further details.

- Manage soil nutrients to ensure efficient use of fertilisers (particularly nitrogen and phosphorous) and manures. Take account of nutrients in all the manures you apply and deposition of nutrients by grazing livestock.

- Maintaining soil fertility, including soil organic matter, will ensure the best conditions for nutrient uptake and crop growth.

[46] The Freshwater Fish Directive 78/659/EEC
[47] National Emissions Ceiling Directive 2001/81/EC implemented by the National Emission Ceilings Regulations 2002.

- Taking into account your soil management plan, make applications of nutrients at the right rate, at the right time and in the right conditions, to maximise their use by the crop, and prevent their loss to the environment. See sections 5.2.4, 5.2.5 and 5.2.6 for good practice for applying slurry and livestock manures, manufactured fertilisers and off farm wastes.

- Machinery should be regularly maintained and calibrated.

- Keep all plant nutrients away from surface water and sensitive habitats in the landscape.

- If you farm in a Nitrate Vulnerable Zone you must follow the Action Programme (Ref 3) including the rules on the quantity and timing of applying nitrogen fertilisers and organic manures, over and above the guidance on good practice given here. However, outside designated NVZs, voluntarily following the rules will help to prevent further nitrate reaching surface water.

- Soils may be, or may become, contaminated by heavy metals or persistent organic chemicals. Manage the land to protect its long-term fertility, to safeguard groundwater and surface water and the health of plants, livestock and consumers.

5.2.1 Nutrient Management Planning

- Preparing a manure management plan and a nutrient management plan will help achieve the following good practice, see section 2.2.1 for further details.
- All applications of lime and inorganic fertiliser should be based on your nutrient and soil management plans. Use your nutrient management plan to work out an application rate to supply the nutrients needed to meet crop requirements, taking into account other sources of fertility. Use your manure management plan to help you decide when and where to apply solid manure, slurry and dirty water.
- When you reduce ammonia loss, more nitrogen is potentially available for grass or crop uptake. Your nutrient management plan should identify these savings.
- Keep within any application rates specified in any management agreements you have made.

5.2.2 Maintaining soil fertility

<u>Soil pH and liming</u>

Soil pH is a measure of acidity or alkalinity.

- You should apply lime as necessary to maintain optimum pH. Excessive soil acidity can cause large yield losses, and reduce the effectiveness of other fertilisers. Optimum pH varies according to soil type and crop rotation (Ref 94).
- However, application of lime when not needed is costly and can increase trace element deficiencies which may take a long time to return to normal. Have soils analysed and use a lime calculator to ensure the correct application rate (Ref 29).
- You should not apply lime to un-improved land or habitats, some of which are naturally acidic and have developed their valuable biodiversity because of this.

Maintaining soil organic matter

The organic matter content of soil is an important part of its fertility and structure. It plays a key role in the physical, chemical and biological processes that govern plant growth and soil management.

- You should seek to maintain or enhance soil organic matter by reducing losses, minimising cultivations and adding organic carbon. Carbon is added to soil by roots and other crop residues and by recycling animal and other organic manures, such as composted materials, sewage sludge and other wastes.
- Include a 12 month grass ley in arable rotations once every 5 years, or incorporate 20t/ha of bulky organic manure one year in five.
- When a spring-sown crop is to follow a crop harvested early the previous autumn you could sow a green manure crop following harvest, such as mustard, rye or vetch.
- Do not plough too deep as this dilutes the topsoil with subsoil, which is lower in organic matter, or use minimum tillage or direct drilling where appropriate.
- Apply regular amounts of manure to arable and silage fields.

Maintaining fertility

- Provide crops with a balanced supply of the major nutrients: nitrogen, phosphorus, potassium, magnesium, calcium and sulphur. Sodium is also required by some crops. Also ensure adequate availability of trace elements: iron, manganese, boron, copper, zinc, molybdenum and chlorine. Trace elements will generally be supplied by the soil, but you may need to supplement with inorganic fertilisers or organic manures.

5.2.3 Applications of all nutrients

- Avoid damage to habitats, including surface waters and wet areas, either by accidentally spreading directly into them, or from run-off getting into them afterwards. You should not spread directly into ditches (even if dry), surface water, hedge bottoms, uncropped areas or other habitats where lime and other nutrients may harm the natural flora and fauna.

Conservation headlands and buffer strips may be eligible for payment under a land management agreement, and have associated restrictions.

- On some fertiliser distributors you can use headland discs, tilt the tractor linkage, or make some other adjustments to limit the throw. Otherwise, you should accept leaving an area where the application rate is lower.
- Take particular care when spreading very fine materials such as lime, not to cause a nuisance to neighbours or contaminate sensitive habitats.
- Only apply nutrients when soil conditions are suitable for travelling on the land. Compaction, and rutting will damage the soil structure and increase the risk that nutrients will not be used efficiently, and the risk of causing pollution by run-off, leaching or gaseous loss.
- Ensure all equipment, including that used by contractors, is checked, maintained and calibrated at least once a year. Different materials have different spreading properties, and machinery may need re-adjusting, and the spread pattern checked, during the season.
- You should carry out some spot checks on load weights, application rates and uniformity of spread, and adjust as necessary. Match up bout widths and spread patterns carefully to ensure an even spread, taking into account the width of any tramlines.
- If you use contractors ensure they are aware of pollution risks on your farm and that they use safe application rates (see section 2.2.4).

5.2.4 Applying Livestock Manures and Dirty Water

- Use your manure management plan to help you decide when and where to apply solid manure, slurry and dirty water. Use your nutrient management plan to work out an application rate to supply the nutrients needed to meet crop requirements, taking into account other sources of fertility (see section 2.2.1).
- The method and timing of livestock manure and dirty water applications to land can affect the length of time that micro-organisms survive on herbage or in the soil:

    - spreading manures onto grazing land can play a role in transferring disease to healthy livestock. Risks are reduced by storage, using low application rates and leaving the land for as long as possible before grazing (Ref 25, booklet 2).
    - if you plan to apply these before planting ready-to-eat crops, you should follow advice on how to reduce risks of food contamination by pathogens (Ref 95).

- Check field drain outfalls and surface water frequently during and after spreading slurry, solid manure, and dirty water to make sure there is no pollution.

Timing of applications

- You should apply livestock manures when grass and crops can make efficient use of nitrogen. Spring applications on all soil types make best use of nitrogen in the manures.
  - Cattle and pig slurries, and poultry manure contain a relatively high proportion of readily available nitrogen. To prevent leaching and run-off you should apply these at times when crops can use the nitrogen efficiently. Where practically possible you should not apply them in the autumn and early winter months. This is particularly important on sandy and shallow soils where the risk of nitrate leaching is greatest. The period between application of these manures and planting or drilling a crop should not exceed 6 weeks.
  - You can apply organic manures that do not contain much readily available nitrogen, such as farmyard manure, at any time, if field conditions are suitable to avoid causing run-off.
- To reduce the amount of nitrate released, you should not apply organic manures in the 6 months prior to cultivation of grassland.
- You should not apply livestock manures and dirty water when:

  - the soil is waterlogged; or
  - the soil is frozen hard[48]; or
  - the field is snow covered; or
  - the soil is cracked down to field drains or backfill; or
  - the field has been pipe or mole drained or subsoiled over drains in the last 12 months; or
  - heavy rain is forecast within the next 48 hours.

- If you can, avoid spreading at times when odours will cause a statutory nuisance. The best conditions, which cause odours to be diluted quickly, are where air mixes to a great height above the ground, which are typically sunny, windy days, followed by cloudy, windy nights.
- Check wind direction in relation to nearby housing before spreading.
- Odour will be reduced from solid manure that has been well composted, or slurry that is band spread, or injected, or has been treated to reduce odour.
- If you have any land in a Nitrate Vulnerable Zone, you must not spread slurry or poultry manures (materials that have a high readily available nitrogen content) during the closed periods (Ref 3).

Restrictions on certain areas

- You should not apply livestock manures and dirty water:

[48] This term is used when the soil is frozen for more than 12 hours. Days when soil is frozen overnight but thaws out during the day do not count.

- within 10 metres of any ditch, pond or surface water; or
- within 50 metres of any spring, well, borehole or reservoir that supplies water for human consumption or for farm dairies; or
- on steep slopes where run-off is a high risk throughout the year; or
- on fields likely to flood most winters; or
- on any areas where you are not allowed to because of specific management agreements.

- You should only broadcast slurry and solid manures to bare land or stubble if soil conditions are suitable for incorporation within a few hours.
- Avoid spreading solid manure, slurry or dirty water in fields close to and upwind of houses.
- If there is an outbreak of a notifiable disease, you must comply with any conditions for livestock manures set by the Welsh Assembly Government. Contact Animal Health for advice.
- Some veterinary products contain highly polluting compounds, and manures from treated livestock should only be applied to land according to advice from Environment Agency Wales. You must follow any instructions provided with the products.

Application rates

- Avoid applying more than 50 m^3 of slurry or dirty water per hectare (4,500 gallons per acre) in a single application to reduce run-off risk. Pay careful attention on all sites to make sure that spreading does not cause ponding or run-off. Leave at least 3 weeks between each application to reduce surface sealing and to let the soil recover.
- Keep within any application rates specified in any management agreements that you have made.

Application techniques

- Consider applying slurry with a band spreader or injector to reduce odour and ammonia loss, the risk of run-off and the increase the efficiency of nutrient use.

  Band spreaders

  - These machines place slurry on the ground in strips or bands by using a series of hoses, or hoses with shoes attached. The shoe attachment allows slurry to be placed under the crop canopy directly onto the soil. Band spreaders reduce grass and crop contamination and will increase the number of workdays available (especially on grassland) compared to broadcast (splash plate) techniques.
  - After cutting grass for silage, you should allow for some grass re-growth before applying slurry by band spreader as this will reduce ammonia and odour emissions.

Injectors

- These are usually open slot shallow injectors (up to 50 millimetres deep), or deep injectors (over 150 millimetres deep). The times and places where slurry can be injected successfully are limited by the soil and the crop, but will avoid grass and crop contamination. To reduce the risk of causing water pollution:

    - inject across slopes (where it is safe to do so), rather than up and down
    - do not inject into porous backfill over field drains
    - do not inject below a crop's active roots

Umbilical systems

Pumping slurry from store through an "umbilical pipe system" directly to tractor-mounted applicators in the field can be an effective way of increasing the area treated per day and reducing the risk of causing soil compaction compared to tanker operations (Ref 25, booklet 3). It is especially effective when combined with application by band spreader or injector as above. However the use of umbilical systems is a common cause of serious pollution incidents.

- Take care to match pumping rate to field application rate.
- Provide instant communication between the slurry store pump and the tractor cab.
- Provide warnings at tractor cab and pump if a hose bursts or pipework fails.
- Have immediate safety cut-offs to stop delivery if there is a leak or if the pressure builds too high.
- Avoid repeated dosing on field headlands by shutting off the supply while turning.
- Spread across slopes wherever possible.
- If you have to apply slurry up and down slopes, leave a large headland area at the bottom of slope and, after careful inspection to check that no run-off has occurred, treat this area last, but do not apply within at least 10 metres of any ditch or surface water.
- Take care when repositioning supply pipes that slurry does not escape and run-off into ditches and surface water.
- Only use properly trained personnel.

Low Rate Irrigation Systems

- Use equipment with a low trajectory (low spread pattern) and large droplets to reduce odour and ammonia emissions. Move sprinklers and irrigators regularly.

  - Check land you are irrigating for any signs of run-off, ponding on the surface, or worms being killed. Move sprinklers and re-set travelling irrigators if there are any signs of these problems.
  - On sloping land, set travelling irrigators to run across slopes. Travelling irrigators should have an automatic shut down at the end of each run. If the amount of liquid that can be stored is limited, you should start the irrigator on a new run as soon as possible.
  - Check storage tanks, pumps, filters and control gear regularly. During use check warning devices, sprinklers and the mobile irrigator several times a day.
  - Take care when repositioning supply pipes so that slurry or dirty water does not escape and run-off into ditches and surface water.

- Check all equipment is in good working order well before field activity starts. Carry out repairs as necessary. Set up spreaders according to manufacturers' instructions, and adjust to an appropriate application rate and uniformity of spread for the type of manure (Ref 25, booklet 3). Keep to an appropriate bout width. Avoid spilling slurry while you are filling and moving equipment around the farm; spillages on the road may be an offence[49], and run-off can enter surface water via highway drainage.
- You should carry out some spot checks on load weights, application rates and uniformity of spread; and adjust as necessary.
- If you use a broadcast technique (splash plate) then use a low trajectory and large droplets.
- Slurry should be incorporated to bare land or stubble as soon as possible to reduce odour, ammonia loss and the risk of run-off. Best results are achieved by incorporating slurry immediately it has been spread with the aim of completing work within 6 hours.
- Solid manure should also be incorporated to bare land or stubble as soon as possible, aiming to complete the work within 24 hours.
- Incorporating slurry and solid manure by ploughing is more effective at reducing odour and ammonia emissions than other techniques such as discs or tined equipment.

5.2.5 Application of lime and manufactured fertilisers

- All applications of lime and manufactured fertiliser should be based on your nutrient and soil management plans (see section 2.2.1). If soil conditions are unsuitable for travelling on the land, there is a high risk that nitrogen will not be used efficiently and the risk of causing pollution by run-off, leaching or gaseous loss will increase.
- You should only use fertiliser of a quality that you can spread accurately and evenly. If you use blended fertilisers, be careful that the components do not separate out or produce different spread patterns.

[49] Highways Act, 1980

Timing of applications

- It is important to apply manufactured nitrogen fertiliser only at times when the crop can use the nitrogen. As a guide outside NVZ areas, you should not apply it to grass between 15 September and 15 January and to other crops between 1 September and 15 January unless there is a specific crop requirement at this time.
- Reducing nitrogen fertiliser applications during the late summer will reduce the amount of nitrate leached from grassland.
- You should not spread manufactured fertilisers in very windy conditions when spread patterns will be disrupted, unless you use a pneumatic spreader. Uneven application may affect crop growth and increase the risk of nitrate leaching if overlap occurs, or the fertiliser may get blown into sensitive habitats.
- You should not apply lime and manufactured fertiliser when: -

    - the soil is waterlogged, flooded, frozen hard[50] or snow-covered; or
    - heavy rain is forecast to fall within the next 48 hours.

- Up to 20% of the nitrogen content of urea may be lost to air, but this could be minimised if urea is applied shortly before a light rain is expected.

Restrictions on certain areas

- You should take special care when applying lime and manufactured fertiliser to fields where there is a risk of run-off to surface water, especially on steeply sloping land.
- You should not spread directly into ditches (even if dry), surface water, hedge bottoms, uncropped areas or other habitats where lime or nutrients may harm the natural flora and fauna.
- You should not spread within 2m of surface water and wider buffers are advisable.

Application techniques

- Ensure all equipment, including that used by contractors, is checked, maintained and calibrated at least once a year. Remember different materials have different spreading properties, and machinery may need re-adjusting, and the spread pattern checked, during the season (Ref 96).
- Match up bout widths and spread patterns carefully to ensure an even spread, taking into account the width of any tramlines.

5.2.6 Applying Off-Farm and Organic Wastes

- The risks of causing pollution from applying organic wastes to land are similar to those when applying livestock manures. Check through the

[50] This term is used when the soil is frozen for more than 12 hours. Days when soil is frozen overnight but thaws out during the day do not count.

advice in section 5.2.4 on timing of applications, restrictions on certain areas, application rates and application techniques.
- Soil metal contents should also be monitored for the Quality Protocols and when other organic materials are applied regularly (see Contaminated Soil, section 5.1.5).
- Organic wastes may be spread and left on the surface of susceptible soils to reduce the risk of wind erosion. They may also be applied to a growing crop as a mulch and left on the surface of soils.
- In river catchments less sensitive to nitrate leaching, some wastes such as sewage sludge cake or composted organic waste that contain little plant available nitrogen, may be applied at rates supplying up to 500kg per hectare of 'total nitrogen' in one application every two years.
- Specific guidance is available on the application of paper sludge to agricultural land (Ref 97).

Timing of applications

- Organic wastes such as liquid digested sewage sludge contain a relatively high proportion of readily available nitrogen. To prevent leaching and run-off you should apply these at times when crops can use the nitrogen efficiently. Where practically possible you should not apply them in the autumn and early winter months. This is particularly important on sandy and shallow soils where the risk of nitrate leaching is greatest. The period between application of these materials and planting or drilling a crop should not be more than 6 weeks.
- You can apply other organic wastes that do not contain much readily available nitrogen such as sewage sludge cake and compost made from green waste, at any time, if field conditions are suitable to avoid causing run-off and compaction.

5.2.7 Contaminated Soil

Some soils contain contaminants from natural sources and old mine workings. This background contamination can be very variable. However, soil is usually contaminated by people's activities, either directly by things applied to the land or indirectly by atmospheric deposition. It is usually a slow process, taking place over many years. But accidental spillages of oil, or flooding with seawater or contaminated water (such as from old mine workings), may need urgent action.

- If you suspect soil contamination due to previous land use, or an incident or event such as a spillage or flooding you should take professional advice based on analysis of the soil and of crops or livestock, as appropriate. Consult Environment Agency Wales in the first instance, the Food Standards Agency if crops have been affected, and your Local Authority. Crops that are growing satisfactorily and apparently healthy animals may contain contaminants that exceed legal limits.
- Treating soils to remove contaminants is usually too expensive to be justified for agricultural land. You may be able to reduce the availability of contaminants by simple management actions such as liming the soil.

Consider alternative use of the land, such as growing biomass or industrial crops, planting trees, or establishing a habitat for wildlife, possibly through a land management scheme.

- The risk of poisoning livestock from contaminated soil depends almost entirely on how much soil they eat, rather than the concentration of contaminants in the grass. You should limit the amount of soil they ingest, by controlling the grazing, and making sure that you do not get soil into silage and hay during harvesting. Seek veterinary advice if you suspect contamination is affecting the health of your stock. Advice on sites contaminated by mine spoil is available (Ref 98).

Metals

- Monitor the metal content of the soil whenever sewage sludge, organic manures, composts and waste materials, or pesticides containing metal are applied regularly.
- Trigger values for copper and zinc for seeking advice when applying manures or pesticides (Ref 99):

	Trigger value for seeking advice - total concentration (mg/kg)	
	pH 5.0 to 5.5	pH above 5.5
Zinc	200	200
Copper	80	100

Sewage Sludge (for the use and application of sewage sludge, see section 5.2.6 above)

- Although the metal content of sewage sludge has decreased greatly in recent years due to controls on discharges to sewers, sludge producers are responsible for meeting the legal limits on metals in sewage sludge, and in the soil to which it is applied. You should ensure the pH of the soil is maintained at a satisfactory level during sludge application and in the years after sludge has been applied, as most metals become more available to plants in acid soils.

Livestock manures

- The main potential contaminants in livestock manures are copper and zinc. They are added to livestock feed as growth promoters, for medicinal purposes, or to increase the supply of trace elements. You should seek to minimise the amount of metal added to feed consistent with the health and welfare of your stock, after considering alternative husbandry practices.

- Some veterinary medicines contain compounds that leave potentially harmful residues in manures and slurries. You must therefore follow instructions provided on the packaging of all veterinary medicines and follow instructions from your veterinary surgeon.
- More metal will be applied to soil when you spread some kinds of livestock manure than from regular applications of sewage sludge. On fields which receive regular applications of pig and poultry manure, you should monitor the copper and zinc in the manure and in the soil. If concentrations in the soil approach those given in the table above you should seek professional advice, for example, from a FACTS qualified advisor, before you apply more manure to this land.

Composts and other wastes

- Ensure that you follow the Quality Compost Protocol (see section 5.1.4) which assures the quality of the compost meets BSI PAS 100[51] (Ref 100) and requires land to be analysed for metals before applications are made.
- The quality protocol for digestate from anaerobic digestors will assure the quality of the digestate meets BSI PAS 110 (Ref 101) and will require similar sampling and record keeping.

Pesticides

- Most pesticides are organic compounds which break down in the soil. Some pesticides contain copper and, although not widely used, repeated applications (such as in organic potato production) will increase the copper content of the soil. In such situations you should have the soil analysed, and compare the content with the trigger values above to decide if you should continue to use the pesticide.

Lead shot

- Lead shot can accumulate in soil. On land that is regularly used for clay pigeon shooting, it can do so in amounts that may pose a risk to grazing stock and crops if the land continues to be farmed.

- You should take professional advice from your Local Authority and the Food Standards Agency if affecting crops, or Animal Health if likely to affect livestock. Be prepared to remove the land from production or consider using a specialist contractor to remove spent shot from the soil. Alternatively consider using shot that is not lead based.

[51] British Standards Institution's Publicly Available Specification for composted material. This is the national compost benchmark - the minimum requirements for the process of composting, the selection of materials from which compost is made and how it is labelled.

Oil

- If there is a significant oil spillage, put your emergency plan into operation (see section 2.2.3). Do not try to absorb petrol spillages as these are highly flammable. Create a bund to hold the spillage and arrange for the excess to be tankered away. This is good practice for any spillage, as it reduces the amount of absorbent material generated. Any material contaminated with oil is classed as hazardous waste and must be disposed of accordingly. (See section 7 for further details.)
- Cultivate and fertilise the soil to encourage microbial activity, which will help to break down the oil. If you are in a Nitrate Vulnerable Zone, and you need to apply some nitrogen fertiliser to help this process, you must seek advice and prior permission from Environment Agency Wales. The lighter the oil the sooner the soil will recover. Detailed guidance is available in an Institute of Petroleum Code of Practice (Ref 102)

Sea Water

- If your land is flooded by seawater, drain it off as soon as possible to minimise salt remaining in the soil. Normal winter rainfall will remove this salt in one or two winters.
- Seek advice from Environment Agency Wales.
- Be prepared to leave the land fallow, grow tolerant crops such as barley or ryegrass, take extra care with cultivations, and if necessary apply extra calcium as gypsum to stabilise soil structure. If you use waste gypsum, you will need to register an exemption with Environment Agency Wales under Environmental Permitting Regulations (see section 7.1.4).

Floodwater

- If floodwater containing spoil from mine workings contaminates pasture in the growing season, seek veterinary advice before cutting or grazing. Investigate the degree of metal contamination before deciding on future management of the land. You may need to cultivate the soil if a contaminant has accumulated in the surface.
- Floodwater from urban or industrial areas, including from sewers, is another potential source of contamination. Seek professional advice on the actions that should be taken, including veterinary advice if livestock are involved.

6 Specialised horticulture

Specialised horticultural crops are often grown in high input systems, under cover or in contained facilities. This section offers advice to help minimise pollution risks and reduce harmful environmental effects.

You should also refer to other sections in this Code for guidance on the storage of fuel oil, pesticides, and fertilisers (Section 3), waste management (Section 7) and water supplies (Section 8). Field grown horticultural crops are also covered by advice in Section 4 on field husbandry and Section 5 on nutrient management.

Following good practice in this section will help you:
Reduce nutrient losses and the risk of causing water pollution
It may also save you money by:
Reducing energy costs, and the costs of inputs such as nutrients.

6.1 Legal Requirements

This is what you must do by law, regarding specialised horticulture:

- Both water abstraction and discharges to ground water and surface water require permits from Environment Agency Wales[52]. It is an offence to cause or knowingly permit a discharge of poisonous, noxious or polluting matter or solid waste matter into controlled waters, including groundwater and surface waters, without proper authority from Environment Agency Wales.
- Production units may also affect protected habitats such as Sites of Special Scientific Interest. If your existing or proposed production unit is sited on or adjacent to a SSSI, you should consult the Countryside Council for Wales (CCW) for advice.
- Cross compliance

If you are in the Single Payment Scheme you must comply with the Statutory Management Requirements (SMRs) and follow the requirements to keep your land in Good Agricultural and Environmental Condition (GAEC).

6.2 Good Practice

This section provides advice and guidance on good agricultural practice, which goes over and above your legal obligations.

[52] Under the Environmental Permitting (England and Wales) Regulations 2010.

Summary of Key Actions

- You should minimise energy use and carbon dioxide emissions by using energy efficiently and exploiting non-fossil fuel sources.

- Use the minimum quantity of water and nutrients consistent with optimum crop performance. Minimise the loss of nutrients, pesticides, sediments and organic material to the water environment. Control and monitor water applied to crops and container grown nursery stock to minimise run-off.

- Collect roof water for irrigation, use in washing down and as an emergency supply for the holding. (See section 8 for further details). Although this is unlikely, do not use for crop production if there is a risk of contaminated roof water damaging the crop. If roof water is not collected it should have a separate drainage system from dirty water and be directed into a ditch, watercourse or soak away.

6.2.1 Energy Use

- Where appropriate, insulate walls, roofs and heating pipes, reduce air leakage and consider fitting thermal screens to reduce heat loss.
- Ensure that temperature and climate regimes are maintained efficiently by using an integrated temperature and climate control system.
- Maintain existing boilers and burners and when replacing, consider installing a combined heat and power (CHP) unit (fossil or non-fossil fuelled).
- You may wish to compare your energy use with published standards (Ref 103).
- Anaerobic digestion of organic wastes can provide a sutainable, cost effective source of energy.

6.2.2 Protected crops

- You should match the nutrients added to water to the requirements of the crop, the stage of growth and time of year. Monitoring the electrical conductivity of the feed and of the run-off can help to ensure the correct quantity of feed is being used.
- You should not use more liquid feed than soil-grown crops need, as any excess nutrients will have to be flushed out of the soil before the following crop. This will mean extra work and may affect ground or surface water.
- Where possible, install recirculation systems for hydroponic crops. When the system has to be emptied, run it down as much as possible first to reduce the volume that has to be disposed of.
- For non-recirculating systems, including ‘table systems’ for crops such as strawberries, you should control and monitor water use to avoid excessive run-off. Design, install and maintain the system to ensure that the

variability in the amount of water delivered by each nozzle or dripper is as low as possible. For rock-wool systems, you should aim to reduce run-off to less than 30% of the water applied.
- Recycle used nutrient solutions by spraying on to growing crops on the holding – taking this into account in your nutrient management plan.
- Provided there are no risks from pests and diseases, compost waste plant material for re-use on the holding. If such actions are not possible, dispose of liquid and solid wastes according to Section 7.

6.2.3 Container Nursery stock

- You should minimise run-off from all systems by careful management. Consider sub-irrigated bed systems and water recycling to help with this. To reduce the risk of nutrient-rich run-off, use controlled release fertilisers in the growing media, and supplement with the minimum quantity of nutrients in the irrigation water. You should match the total nutrient supply to the production system. If you monitor nutrient levels in compost and run-off, you can minimise costs and run-off loss.
- You should match watering to the rainfall, species, growing medium, stage of growth, container size and time of year. In warm weather, irrigation should take place in early morning or evening to minimise loss by evaporation and therefore maximise plant take-up. This has the added benefit of reducing leaf scorch. Design the system so the irrigation system matches the cropped area and maintain nozzles to ensure even application. For further information see reference 104.
- You should restrict pesticide use to the minimum needed to produce marketable crops. Where possible incorporate pesticides in the growing media, rather than using drenches. If it is necessary to use a drench, make sure you follow the Code of Practice for using Plant Protection Products (Ref 33) to reduce possible environmental problems.

6.2.4 Mushrooms

- Producers can compost up to 10,000 cubic metres of biodegradable waste from agricultural premises for cultivating mushrooms by registering an exemption with Environment Agency Wales. Extra details will be required by Environment Agency Wales if the operation is within 250 m of a building or location occupied by people. Larger quantities will require an environment permit (see section 7.1.3).
- You should keep dirty yard areas to a minimum. When producing compost, apply water evenly to minimise run-off and collect it and recycle it wherever possible.
- When composting, avoid producing odours by encouraging as much air as possible to penetrate the material which is being processed. You may have to limit the width and height of windrows or heaps, and turn compost frequently to minimise anaerobic conditions under which odours are produced.
- If you keep spent compost and other organic debris on site, ensure that any run-off is collected. You should contain all surplus dirty water on the site for disposal. It must not be discharged to a ditch or surface water.

Soakaways should not be used if the dirty water contains residues of pesticides or disinfectants. See section 3.1.3 and 3.2.3 for advice on dealing with solid manures and dirty water, and section 5.2.3 for advice on application to land.

- When cleaning trays and equipment, you can reduce water usage by dry brushing, followed by careful choice of nozzle size and water pressure.

6.2.5 Watercress

- The quality of water entering rivers after watercress production can have serious effects upon aquatic habitats. If you are considering watercress production, contact Environment Agency Wales for further guidance and applications for consents.

PART 3

Resource Management

7 Waste Management

Wastes produced from agricultural and horticultural premises are regulated to protect the environment and public health.

There is no definitive list of agricultural waste but examples (when you need to get rid of them) are:

- vehicle and machinery waste
- non-packaging plastics
- plastic packaging
- animal health products
- building waste
- cardboard and paper, metal, wood, glass, rubber, ash
- some hazardous wastes such as agro-chemical concentrates and residues
- oils, brake fluids, antifreeze, asbestos, lead-acid batteries, and fluorescent light tubes.

Manures and slurries are not waste if they are used to fertilise soil for agricultural or ecological benefit on agricultural land – whether on the farm where they are produced, or on another farm.

Following good practice in this section will help you:
Reduce waste production, re-use resources and recycle wherever possible, reduce gaseous emissions, and the risk of water pollution.
It may also save you money by:
Reducing initial resource costs and disposal costs (Ref 2.5)

7.1 Legal Requirements

This is what you must do by law regarding your waste management:

7.1.1 Duty of Care

- A duty of care applies to everyone who handles waste - from the person producing the waste to the person who finally disposes of or recovers it.[53] This duty is a key method to combat fly-tipping. You must keep the waste secure and can only give it to an authorised person - a registered waste carrier. It is your duty to ensure that the waste goes to a properly authorised site, and to give the person a transfer note describing the waste and signed by you both. The transfer note is to be kept by you for a minimum of 2 years. Guidance is available (Ref 105).
- Duty of Care is currently being reviewed with Waste (England and Wales)s Regulations 2011 expected to be implemented at the end of March 2011.

[53] The Environmental Protection (Duty of Care) Regulations 1991, and as amended for Wales 2003.

A new guidance document will also be produced. Contact the EAW for further information.

Advice Note
For further advice on dealing with agricultural wastes, or to check whether someone is authorised, telephone Environment Agency Wales's National Customer Contact Centre on 08708 506 506. You can use the EA's waste directory www.wastedirectory.org.uk to find your nearest waste disposal or recovery facilities.

7.1.2 Handling and storing hazardous wastes

Examples of farm wastes that are classified as hazardous include waste oil, asbestos, lead acid batteries and agro-chemicals containing dangerous substances (Ref 106). You must not mix hazardous wastes or mix hazardous waste with non-hazardous waste or other substances and materials. Hazardous wastes must be collected and disposed of separately, and are subject to the requirements of the Hazardous Waste Regulations[54]. You must register with Environment Agency Wales if you produce more than 500 kg of hazardous waste in any 12-month period (Ref 107). Consignment notes must accompany all movements of waste when they are moved off your holding, to provide an audit trail (Ref 108). When you complete the consignment note, you must describe the waste and keep a copy for a minimum of 3 years. You must also keep a copy of any return from the waste management facility certifying receipt of the waste.

7.1.3 Environmental Permits

- An environmental permit (Ref 109) from Environment Agency Wales[55] is required if you want to run a farm tip or if you intend providing a professional waste management service to deposit, recover or dispose of waste (Ref 110).
- You must not dispose of any waste by burning, burying, or tipping it unless you have a permit, or have registered an appropriate exemption, see below, with Environment Agency Wales.

7.1.4 Exemptions (from environmental permitting)

- Most waste on farms can be dealt with via exemptions from the Environmental Permitting process.
- These are a light form of regulatory control that allow you to recover or dispose of certain types of wastes that present a low risk of causing pollution or damaging public health.
- If you wish to recover or dispose of certain agricultural wastes that arise on your holding by carrying out an exempt activity, you must register the exemptions with Environment Agency Wales. Changes were made to the

[54] The Hazardous Waste (England and Wales) Regulations 2005, SI No 894
[55] Under the Environmental Permitting (England and Wales) Regulations 2010.

exemption process in April 2010. Consult Environment Agency Wales for advice (Ref 111).
- You must comply with the conditions that are set down for each of the exemptions – if you unable to do this you will need an environmental permit.

7.1.5 Dilute Liquid Waste

- A Water Service Company might allow dilute liquid discharges to a public sewer, if they are able to treat the extra pollution load[56]. A trade effluent permit is required, for which a charge is made, and you will also need to provide and maintain an agreed sampling point.
- In some circumstances, you may be able to discharge a treated dilute liquid waste of very low polluting load to a surface water or to the ground. You must get a discharge consent from Environment Agency Wales for this, for which a charge is made. You will need to provide and maintain an agreed sampling point.
- The disposal of certain substances onto or into land can be allowed, but you must obtain an Environmental Permit from Environment Agency Wales. For farms, such a permit is typically for the disposal on land of used sheep dip and dilute pesticide washings. You must follow the conditions set down in the permit.

7.1.6 Disposal of Waste Pesticides and Sheep Dip

- The disposal of certain pesticides onto land can be allowed, but you must obtain an Environmental Permit from Environment Agency Wales and follow the conditions which it sets out. For farms, such a permit is typically available for the disposal on land of used sheep dip and dilute pesticide washings.
- You must dispose of other contaminated materials, e.g. soiled protective clothing, material for soaking up spillages, used rodenticide, or other pesticide baits, using a recognised disposal route for hazardous waste, as above.

7.1.7 Waste oil

- You can burn waste oils for heating providing you obtain approval for the installation from the local authority Environmental Health Department (see Useful Contacts). You should also check with Environment Agency Wales whether you need to register an exemption from environmental permitting requirements.

7.1.8 Disposal of animal carcasses

- Animals and poultry that die on the farm must be disposed of through an authorised incinerator or rendering plant or other approved outlet without

[56] Under the Water Act 1989, and the Water Resources Act 1991.

any undue delay[57]. Collection services may be available (for example Ref 112) or contact Animal Health for details.

- Pending removal from the farm, carcasses and any effluent that might arise from them must be made secure, and animals, including birds, kept away from the carcasses. Move the carcasses to a secure place or building or cover with a tarpaulin. Carcasses must not be left in watercourses or other bodies of water.

- If you suspect animal ill-health or death is caused by a notifiable disease, you must report it to Animal Health - they operate a round the clock notification system (See contact details). Any carcasses should be made available for post-mortem examination. Subsequent disposal is subject to direction by Animal Health.
- If a veterinary inquiry is to be made to investigate any suspect incident you should isolate the suspect animals and also restrict access to your farm until directed otherwise by the Animal Health veterinarian.

- Carcasses may be incinerated on-farm, but there are technical conditions and environmental controls that must be met. You must obtain approval for the incinerator from Animal Health. You should incinerate carcasses as soon as possible. Do not exceed the design loading rate.
- If you intend to use an on-farm incinerator with a loading rate in excess of 50 kg/hour, you must also get approval from your local authority (Ref 113).
- Carcasses of ruminant animals contain high risk material called Specified Risk Material (SRM). High capacity incinerators can accept ruminant carcasses and SRM. If an incinerator has been used to dispose of ruminant carcases any subsequent ash, even if from pig or poultry carcasses must be sent to a licensed landfill site.
- Small on-farm incinerators with a loading rate of less than 50 kg/hr must still comply with legislation[58] & [59]. You can get a list of “type approved” low capacity incinerators from Defra (see Useful Contacts).
- The ash from the incineration of pig and poultry carcasses may be applied to land for agricultural benefit, provided you have registered an exemption with Environment Agency Wales.
- Organic wastes that are classified as low risk animal by-products may be suitable for composting or digestion in anerobic digestors. but the plants where this is carried out must be approved under the Animal By-Products (Wales) Regulations 2006 and there are time limiting grazing/cropping restrictions on the land subsequent to compost/digestate application. (See Animal Health Contact Details)

Consult Animal Health if you wish to consider mobile or shared incineration facilities.

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[57] Animal By-Products (Enforcement)(Wales) Regulations 2011

[58] Environment Protection Act, 1990, Part 1. Clean Air Act, 1993 which prohibits dark smoke.

[59] British Standards Institution's Publicly Available Specification for composted material. This is the national compost benchmark - the minimum requirements for the process of composting, the selection of materials from which compost is made and how it is labelled.

7.1.9 Cross compliance

If you are in the Single Payment Scheme you must comply with the Statutory Management Requirements (SMRs) and follow the requirements to keep your land in Good Agricultural and Environmental Condition (GAEC).

The SMR which relates to waste management is:

- Protection of Groundwater relating to disposal or burial of materials which may risk contamination of groundwater.

7.2 Good Practice

This section provides advice and guidance on good agricultural practice, which goes over and above your legal obligations.

Summary of Key Actions

- Minimise the amount of waste you produce to reduce its potential impact on the environment, and save on handling and disposal costs (see section 7.2.1). This will also mean you use raw materials more efficiently and reduce costs.

- Deal with agricultural waste in any of the 5 basic ways (singly or in combination):
  - store waste securely on your holding for up to 12 months;
  - take the waste to a recovery or disposal site (see section 7.2.2;
  - give the waste to someone else (see section 7.2.2);
  - register licensing 'exemptions' to allow you to recover or dispose of wastes that have a low risk of causing pollution or harming human health. Comply with conditions for recovery or disposal of that waste (see section 7.2.3)
  - get an Environment Permit from Environment Agency Wales if you want to provide a professional waste management service.

- Dispose of dilute liquid wastes such as pesticides, and waste oil, and animal carcasses, by recognised and authorised disposal routes.

- Fly-tipping is a criminal activity that affects two thirds of farmers (Ref 114), and can pollute the environment, cause health problems and affect wildlife and farm animals. If it occurs on your land inform your Local Authority or Environment Agency Wales.

7.2.1 Minimising waste

- Identify whether you can avoid producing waste from the outset, and review current practices and consider alternative materials, or the use of alternative techniques.
- If you cannot avoid producing waste, consider how it might be reduced by making technical changes, by using a different management technique, and by improving staff training. Also consider its reuse or the possibility for recycling (Ref 115), including composting and anaerobic digestion. Guidance is available on waste audits, and ideas for reducing the cost of dealing with waste (Ref 116).

7.2.2 Waste storage, recovery and disposal

- You must only store waste for up to 12 months and all waste must be stored securely. It must not become windblown or cause pollution and may mean you have to use suitable containers. Keep different types of waste separate to avoid contamination.
- If you intend to take your agricultural waste off your holding to a recovery or disposal site (see Advice Note above), you should check first on matters such as type of waste that can be accepted under their licence, cost and paperwork, and the best way of delivering the waste (bales, loose etc)
- Consult the Agricultural Waste Plastics Collection and Recovery Programme (Ref 117), for guidelines on handling, segregation and storage of agricultural waste plastics. Check with your individual collector as to how they wish waste to be stored, separated and/or delivered.
- You will not have to register as a waste carrier to transport your own agricultural waste, but check section 7.1.1 for your duty of care obligations.

7.2.3 Waste exemptions

Waste exemptions allow you to recover or dispose of waste that has a low risk of causing pollution or harming human health.

From 6th April 2010 exempt waste operations have been grouped into four categories:

Use of waste. These exemptions are identified by a “U”;
Treatment of waste. These exemptions are identified by a “T”;
Disposal of waste. These exemptions are identified by a “D”;
Storage of waste. These exemptions are identified by an “S”.

In total, there are over 60 waste exemptions split between these four categories. Roughly half of these are relevant to agricultural activities including the examples set out below. Slight changes from the previous system have been made to the limits and conditions covering what you can do under some waste exemptions. There are also several new waste exemptions which could apply to farming. Waste exemptions need to be renewed every three years.

- You should consider the wide range of exemptions available and apply as appropriate. Those that may be useful for agriculture, include the following:-

  - burning waste plant tissue in the open e.g. hedge trimmings, logs, branches, untreated timber
  - spreading of dredgings and plant material cleared from inland waters and farm ditches
  - chipping, shredding, cutting or pulverising waste plant matter e.g. logs, branches, natural wood waste
  - baling, compacting, shredding, pulverising waste at the place of production e.g. using a compactor bin to crush waste, baling plastic, crushing clean pesticide containers
  - deposit of plant tissue at the place of production e.g. spoiled crops from store deposited on land to rot down
  - beneficial use of waste e.g. waste paper as animal bedding, tyres on a silage clamp
  - land treatment by spreading diluted waste milk on land for benefit to agriculture or for ecological improvement.
  - burning waste as a fuel in appliances e.g. waste oil, wood and straw
  - burning waste in an exempt incinerator
  - land treatment by spreading ash from the on-farm incineration of pig and poultry carcasses
  - treatment of dilute pesticide washings in a bio-bed
  - burning waste as a fuel in a local authority authorised process
  - burying waste from a portable toilet e.g. as used by crop pickers or from public events on your farm
  - storing returned goods e.g. bagged produce returned to you by the buyer because they are off-specification
  - composting biodegradable waste e.g. bracken, hedge trimmings, wood-chippings, spoiled straw, wood or paper based bedding.
  - the storage and use of building waste from agricultural premises for construction on your farm
  - land treatment by spreading waste for agricultural or ecological benefit e.g. spreading composted crop wastes and other plant material (hedge clippings etc) from agricultural premises, and ditch dredgings.

7.2.4 Disposal of waste pesticide

See also sections 3.2.5 and 4.2.5 for good practice for storage and application of pesticides.

- You should minimise or eliminate sprayer tank washings by careful planning, use of rinsing equipment or direct-meter sprayers. You can cut down the amount of waste washings when you clean out equipment by using an efficient flushing system, instead of filling the sprayer tank with water and pumping it through the equipment. You may be able to use washings to make a further batch of the dilute pesticide, but if not you can:
  - apply washings to the treated or untreated crop provided this is within the terms of the product approval;

  - apply washings to land under conditions set out in an environmental permit from Environment Agency Wales or
  - use another recognised disposal option, such as a bio-bed, (essentially a pit of mixed straw, compost and soil to degrade pesticides.) (Ref 66)
- Do not re-use pesticide containers except, if in good condition, to hold an identical pesticide from a container that is damaged or leaks. Triple rinse empty containers (Ref 118) or use specialist rinsing equipment. If possible, clean the containers when you are preparing working strength spray dilution and use rinsing liquid to dilute the spray. Store the cleaned containers upright and under cover before disposing of them using a licensed waste disposal contractor or waste recovery site.

Safety Note

Do not rinse or clean containers that have held hydrogen cyanide gassing powders or aluminium, magnesium or zinc phosphides. They give off dangerous gases if they get damp. These containers must be dealt with as hazardous waste. See Section 7.1.2

7.2.5 Disposal of animal carcasses

- Disposal of animal carcasses is controlled by law, and using recognised disposal routes as outlined in section 7.1.8, protects the environment from pollution.
- Carcasses sent for disposal to approved processing plants (rendering) can be used for some energy recovery.

8 Water supplies on the farm

Using water wisely makes good business sense, and helps to maintain a healthy environment.

Following good practice in this section will help you:
Conserve water supplies, reduce the risk of water pollution.
It may also save you money by:
Reducing use of mains water, and the associated costs of pumping and heating.

8.1 Legal Requirements

This is what you must do by law, regarding your water supplies:

- Installers and users of water fittings have a legal duty not to cause or allow waste, misuse, undue consumption or contamination of wholesome water[60] . You must prevent contamination of mains water from back-siphon or backflow. (Ref 119 and Appendix 5 – Measures and responsibilities to avoid contamination and waste of public water supplies).
- If you want to take more than 20 m^3 per day from a river, stream or canal, or from an underground source, you will almost certainly need a licence. If you intend to impound water on a watercourse, you will need a licence. Consult Environment Agency Wales for further information and the licence costs.
- If you have an abstraction licence, and it has a time-limit, you may need to justify to Environment Agency Wales that you are using water efficiently when you re-apply for your licence.

8.1.1 Cross compliance

If you are in the Single Payment Scheme you must comply with the Statutory Management Requirements (SMRs) and follow the requirements to keep your land in Good Agricultural and Environmental Condition (GAEC).

The relevant standard consistent with keeping land in Good Agricultural and Environmental Condition (GAEC) is:

- M - water irrigation - to manage the use of water, through controlling water abstraction for irrigation by licensed abstraction.

[60] The Water Supply (Water Fittings) Regulations 1999.

8.2 Good Practice

This section provides advice and guidance on good agricultural practice, which goes over and above your legal obligations.

Summary of Key Actions

Understanding how water flows around your farm, and identifying areas where you can be more efficient can save you money.

- Regularly check and record your meter readings whether you abstract direct from a stream or borehole, or use mains water, or a combination of the both. If usage is unusually high for a particular month you will know there is a leak or problem somewhere in the system.
- Deal with any leaks, dripping taps, hosepipes left running.
- Carry out a water audit (Ref 120) to identify areas for water reduction, such as less washing down, within legal requirements, or reducing milk collection to every other day, if possible, see section 8.2.1.
- Some farming activities use large amounts of water – adopt good practice for these enterprises, see sections 8.2.2, crop irrigation, 8.2.3, vegetable washing, and 8.2.4 water for livestock.
- Consider whether it is practical to **collect rainfall** from roofed areas for use on your farm or holding – often called 'rainwater harvesting' (Refs 120 and 121), see section 8.2.5.

8.2.1 Water Audits

- Refer to further information for a step by step guide to completing a water audit (Refs 120 and 121).
- Identify overall how much water you are using and its cost. Include metered and non-metered sources, and take meter readings at least every month. Do not forget the real costs - include the amount you are charged for your supply or abstraction licence, and your operational and maintenance costs.
- If you are a large dairy operator, using significant quantities of water, you may find it economically viable to employ a water consultant to install a data logger that can automatically record how much water your farm uses.
- Carry out an audit of water use by checking each separate activity. The frequency of the activity will determine how much water is used per year. While doing the audit compare usage with standard information (where available) to identify some improvements – for example by doing more dry

brushing or scraping, or changing hose nozzles and water pressure. Put improvements into practice and review and check water usage regularly.
- Make regular checks for leaks. This includes visual checks for dripping taps, leaky pipes, hoses and nozzles, and for unusually wet areas around the pipe network. You should monitor water flows by regular recording of meter readings, and increase frequency if a problem is suspected. Isolate and drain pipes that are not in use over winter to prevent freezing.
- Further guidance and suggestions for making optimum use of water, and minimising costs are available (Refs 116, 120 and 121).

8.2.2 Crop irrigation

- Use 'irrigation scheduling', and good practice, to make efficient use of water (Ref 122).
- Consider using boom irrigation to apply water more accurately than a gun. For some crops, such as vegetables, trickle irrigation can be used to reduce water consumption.
- Check that you are using the correct pump and pipe size to operate at the stated pressure. Make adjustments to avoid compaction from large droplets and to avoid run-off.
- Avoid uneven application by not irrigating when it is windy. Irrigating at night will reduce loss by evaporation, but be aware of potential noise nuisance when siting your pump.
- Further information is available if you need to construct an irrigation reservoir (Ref 123).

8.2.3 Vegetable washing

- Consider recycling vegetable wash water for use in wash cycles that do not need such a high quality of water, or perhaps you might clean the wash water for re-use.
- Wash water could be stored and used for irrigation. Check whether such water is of good enough quality for the specified crop.
- You should seek advice from Environment Agency Wales if vegetable washings need disposal.

8.2.4 Water for livestock

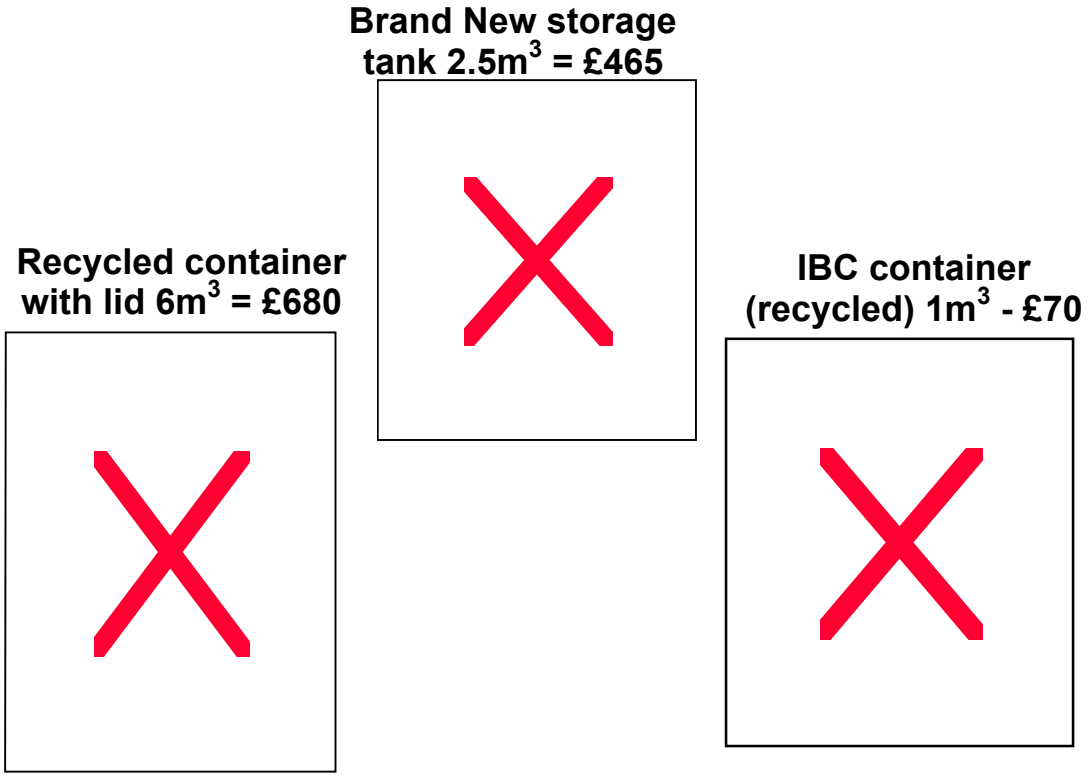
- Fit an appropriate air gap at the point of water discharge to livestock drinking troughs, and ensure they do not overflow, by setting the ball valve at a low enough level, carrying out regular maintenance, and careful siting.
- On dairy farms consider reusing plate-cooling water for drinking by livestock, or for washing and cleaning purposes. Rainwater harvesting can be especially useful, and a simple UV filter can treat the water to a suitable level for stock watering.
- You may be able to install low-lift pasture pumps or, on sites with sufficient hydraulic head, ram pumps to make use of water from a nearby surface water. If fields are left empty in the winter, remember to drain the water trough system to avoid leaks and bursts.

- Cattle operated remote water troughs cut down the need for long lengths of water trough networks, while keeping livestock out of surface water.
- On pig and poultry farms check drinkers do not cause spillage. Consider changing to better designs to reduce water losses. Wet poultry litter increases the ammonia emitted, and can cause welfare problems for the birds.

8.2.5 Rainwater harvesting

- In a farm environment, there are many options for collecting and storing rainwater. Inexpensive options include using re-cycled industrial containers.
- Types and costs of rainwater harvesting equipment vary greatly. There are many companies that will provide a free survey and give you advice on what system you could benefit from, and how long the pay-back period is.

As you can see from these examples below, you can easily set your own DIY system up, and store water for washing down your yard and vehicles. A jet-spray system can easily be plumbed into these tanks for washing your yard and machinery.



An example of how much water a dairy farm could save financially can be described in a generalised case-study: a dairy farm in Carmarthenshire with a roof area of: 5000m² could use rainwater to supply drinking water to the dairy herd and use for washing down. The Average annual rainfall for Carmarthenshire is 1500mm per annum, the amount of water available to the farm: 1,875,000 litres per annum. With a combined water charge per m³:£1.30

(representative figure), the monetary value of the useable rainwater is £1876 per annum.

See ‘Effective use of water on Dairy Farms’, DairyCo August 2007 (Ref 121) for more details.

Appendix 1 – The Nitrates Code

The Code of Good Agricultural Practice to control nitrate loss and to protect against nitrate pollution.

Article 4 of the EC Nitrates Directive (91/676/EEC) requires the WAG to provide a Code to be implemented by farmers, on a voluntary basis, to provide all waters with a general level of protection from nitrate pollution. This Nitrates Code draws together all of the advice given within the Code for Good Agricultural Practice which contributes to this purpose.

Land Managers within Nitrate Vulnerable Zones **must** comply with the mandatory rules as laid out in Wales' Action Programme (Ref 3).

Nitrogen (N) fertiliser refers to both manufactured fertiliser and organic manures.

'Organic Manures' includes all livestock manure and slurry.

Spreading periods for organic manures

- Livestock manures, such as cattle and pig slurries and poultry manure, and liquid digested sewage sludge contain a relatively high proportion of readily available nitrogen (i.e. greater than 30% of total nitrogen is present in a readily available form). You should apply these at times when crops can use the nitrogen efficiently. Where practically possible you should not apply them in the autumn and early winter months. This is particularly important on sandy and shallow soils where the risk of nitrate leaching is greatest.

- You can apply organic manures that do not contain much readily available nitrogen (i.e. less than 30% of total N is readily available) such as farmyard manure, sewage sludge cake and compost made from green waste at any time, if field conditions are suitable to avoid causing run-off.

Spreading periods for manufactured nitrogen fertiliser

- It is important to apply manufactured nitrogen fertiliser only at times when the crop can use the nitrogen. You should not apply it to grass between 15 September and 15 January and to other crops between 1 September and 15 January unless there is a specific crop requirement at this time.

Keeping nitrogen out of surface waters

- You should not apply organic manures, or manufactured fertiliser when the soil is waterlogged, flooded, frozen hard or snow-covered.

- You should be particularly careful when applying any kind of nitrogen fertiliser to fields where there is a risk of nitrogen getting into surface water via run-off. You should take into account the slope of the land, weather conditions, ground cover, proximity to surface waters, soil conditions and the presence of land drains.

- You should not apply organic manures within:

    - 10 metres of surface waters, including field ditches; or
    - 50 metres of a spring, well or borehole.

- You should be particularly careful when applying organic manures to steeply sloping land close to surface waters.

- You should spread organic manures as accurately as practically possible. You should avoid using high pressure, high trajectory techniques (e.g. rain guns, slurry guns and jetters) when spreading slurries as these cause atomisation (small droplets) and subsequent drift.

- You should spread manufactured nitrogen fertiliser accurately and at the right rate. You should not apply it within 2m of ditches or watercourses.

Storage of organic manures

- You should provide sufficient storage capacity to allow optimum timing and use of manure nutrients, which may allow you to reduce the amount of fertiliser you buy. For operational reasons and to avoid nitrate pollution you may require 5 months storage for cattle slurry (increasing to 6 months in the case of pig slurry or poultry manure).

- Slurry should be stored in a specially constructed vessel, which should be impermeable and not allow liquids to escape. Other forms of storage (e.g. in livestock housing or a temporary field heap) may be sufficient for some non-slurry manures.

- Organic manures stored in temporary field sites should be solid (i.e. stackable and not draining liquid). Solid poultry manure that does not have bedding mixed into it and is stored on a temporary field site should be covered with an impermeable material.

- Temporary field sites should not be in a field liable to flooding or becoming waterlogged. Heaps should be located at least 10 metres away from surface waters and land drains and 50 metres away from any springs, wells or boreholes. They should not be located in any single position for more than 12 months, nor located in the same place as an earlier one constructed within the last two years.

The organic manure N field limit

- To reduce nitrate leaching losses, you should not apply more than a total of 250 kg/ha of nitrogen in organic manures to any field in any 12 month period.

- The available nitrogen applied, i.e. the amount of the total nitrogen that is readily available to the crop depending on time of year and method of spreading, should not exceed the needs of the crop. This may mean applying less than the 250 kg/ha total nitrogen limit.

- There are simple on-farm kits that can estimate the nitrogen in animal slurries that is readily available to crops (Ref 26), or you can use look up tables (Ref 25).

Planning Nitrogen Use

- You should carefully work out the amount of nitrogen fertiliser needed for each crop in each field. You should not exceed the crop requirement, as this increases the amount of nitrate lost by leaching as well as being a waste of money. You should take into account the amount of nitrogen supplied by the soil. This will depend on the type of soil, previous cropping, rainfall and any organic manure you have applied. There are various recommendation systems available to help you (Refs 29 and 30). Where the soil nitrogen supply is high, soil analysis for mineral nitrogen can provide a more precise guide to fertiliser requirement.

- You should keep accurate records of the amounts and dates of applications of manufactured nitrogen fertilisers, organic manures and other nitrogen containing materials that are used as nitrogen fertilisers (e.g. digested sewage sludge) to help work out how much nitrogen fertiliser is needed for future crops.

Appendix 2 – Soil Erosion Risk Mapping

Taken from:

Controlling Soil Erosion, Defra, 2005 – Chapter 2: Field guide for an erosion risk assessment

Water erosion

This risk assessment refers to the movement of sediment within the field and possible transfer to watercourses or other places such as neighbouring properties or on to roads.

Soils	Steep slopes > 7 degrees	Moderate slopes 3 - 7°	Gentle slopes 2 - 3°	Level ground <2°
Sandy and light silty soils	Very high	High	Moderate	Lower
Medium and calcareous soils	High	Moderate	Lower	Lower
Heavy soils	Lower	Lower	Lower	Lower

Signs of erosion that may be associated with each of the risk classes are described below. Such observations should override an assessment derived solely from the table.

Very High Risk Areas – Rills are likely to form in most years and gullies may develop in very wet periods.
High Risk Areas – Rills are likely to develop in most seasons during wet periods.
Moderate Risk Areas – Sediment may be seen running to roads, ditches or watercourses and rills may develop in some seasons during very wet periods.
Lower Risk Areas – Sediment rarely seen to move but polluting runoff may enter ditches or watercourses.

Runoff or soil wash

This risk assessment refers to runoff which is usually but not always discoloured. This runoff may carry very fine soil particles, soluble pollutants such as plant nutrients and pesticides or manures to watercourses.

Signs of run-off that may be associated with each of the risk classes are described below.

High Risk Areas – slopes greater than 7° where run-off is seen in most years during wet periods.

Moderate Risk Areas – slopes between 3 and 7° where run-off is seen in some years during wet periods and in most years during very wet periods.

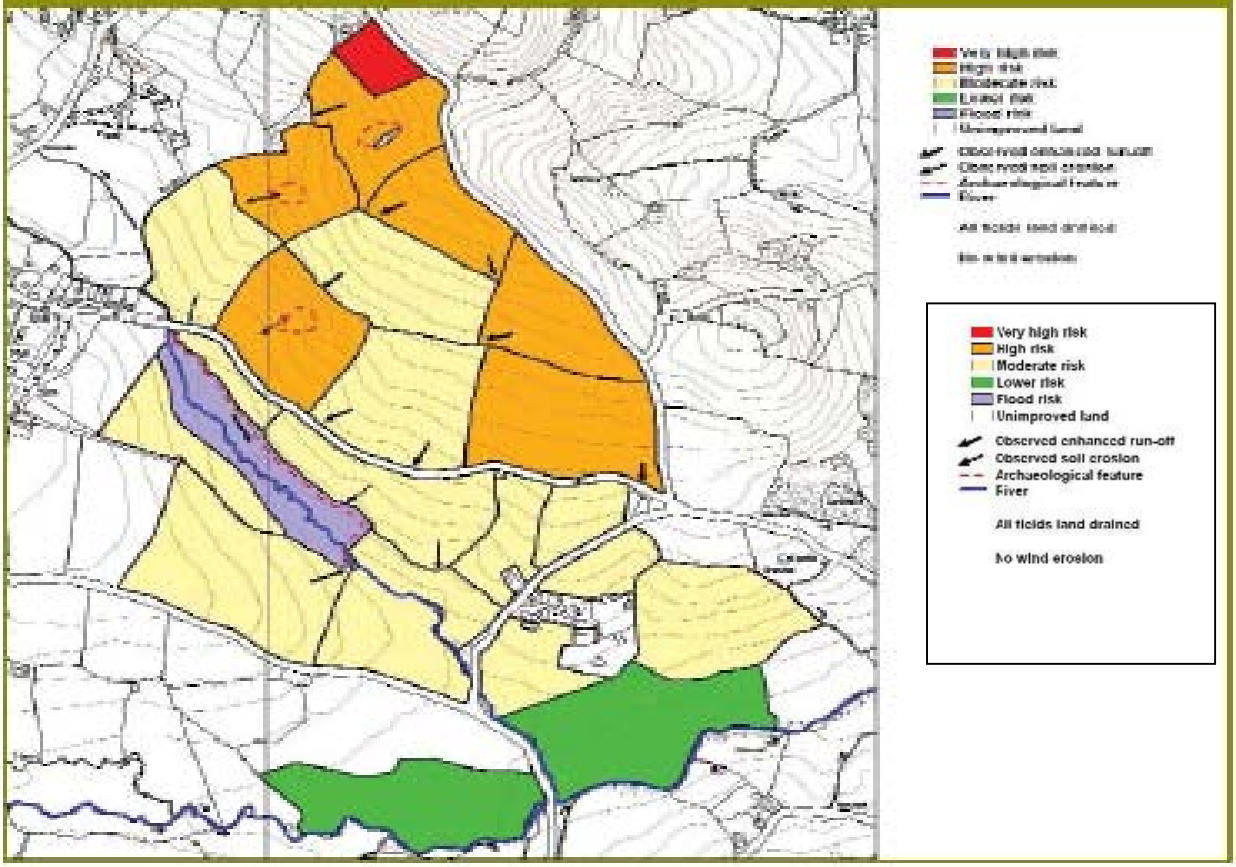
Lower Risk Areas – level ground or slopes up to 3° where run-off is seen in some years during very wet periods.

Flood risk

Land that floods is susceptible to erosion and runoff, particularly when under cultivation. Land that floods regularly (at least 1 year in 3) must be regarded as highly vulnerable and should be indicated on your map.

The map below showing the erosion risk categories outlined above should serve as a basis for planning crop rotations and management to reduce run-off risks and soil loss.

Example of farm erosion risk map:



Note: The accumulated run-off from a catchment with a large proportion of only lower risk fields can still cause serious damage to watercourses and may require action to be taken.

Farm and crop planning

The risk map shows which fields or parts of fields are most at risk when exposed to heavy or prolonged rain or flooding. At this stage, it might become clear that new hedge plantings could usefully reduce erosion risks or relocation of field entrances could reduce deposition of sediment onto roads or into watercourses.

The next step is to plan crop rotations and land use to minimise exposure of bare, vulnerable land to the erosive effects of rainfall. The susceptibility of soil to erosion is dependent upon the land cover or livestock enterprise using the land, and can be considered in three broad categories. Some examples of land management practices within each category are listed on the next page.

Highly susceptible land use

On **Very High Risk** and **High Risk** sites, avoid these land uses unless precautions are taken:

- Late sown winter cereals
- Potatoes
- Sugar beet
- Field vegetables
- Outdoor pigs
- Grass re-seeds
- Forage maize
- Outwintering stock
- Grazing forage crops in autumn or winter

Moderately susceptible land use

On **Very High Risk** and **High Risk** sites these moderately susceptible land uses can be carried out with care:

- Early sown winter cereals
- Oilseed rape – winter and spring sown
- Spring sown cereals
- Spring sown linseed
- Short rotation coppice/Miscanthus

Less susceptible land use

Consider the following land uses on **Very High Risk** and **High Risk** sites as a means of reducing the overall erosion risk:

- Long grass leys
- Permanent grass
- Woodland (excluding short term coppice)

By altering rotations and changing land use, for example, switching from late sown autumn to spring sown crops on higher risk sites, the likelihood of erosion can be reduced significantly.

Appendix 3 - Manure management plan risk map
(Figure 1 and title needs removing before reproduction)

Figure 1: Example of farm waste management plan.

Don't spread in the red areas.

Avoid orange areas in winter and in a dry summer when the soil cracks down to the drains, or when the soil is compacted.

You can use yellow areas throughout the year subject to ground conditions, but restrict application rates in the winter.

Green areas can be used throughout the year.

Bore hole.

Appendix 4 – Environment Emergency Plan Example

Contact List – suggestions - to be added to suit individual farms

Farm Name: Postcode:
Grid Reference of Yard:

Name/organisation	**Telephone No**
Environment Agency Wales EA 24hr emergency hotline EA Floodline EA General helpline Local Contact	 0800 80 70 60 0845988118 08708 506506
Local County Council Emergencies Highways Animal Welfare	
Welsh Water Water Supply Emergency and Sewer Providers	0800 0520132
Health & Safety Executive Local contact	0845 3009923
Fire Police Ambulance	
Agricultural/Slurry Contractor Licenced Waste management or clean-up contractor Local Machinery Ring Oil supplier Oil clean- up contractor	
Key holders/staff	
Downstream Water Users local contact eg - fish farm bottle water site neighbour with abstraction	
WAG Divisional office	
CCW	
NFU/FUW contact	
Vet	
Electric Gas	
Others- to suit farm operations	

MAP

On a farm map, note the main sources of pollution risk, the potential route the polluted matter would take, and any mitigation methods that could be put in place. **For example:**

Main Pollution Sources (with likely routes/positions marked)

Slurry lagoon tin tank and reception pit - could overflow to ditch
Farmyard Manure Heap – drainage could run to ditch
Silo clamp and effluent tank – overflow to ditch
Fuel Oil Store – not bunded and could drain to ditch
Cubicle Shed – all drainage to slurry tank/reception pit
Parlour – all drainage to slurry tank/reception pit
Dairy normally drainage to slurry tank, but spillages could run to ditch
Liquid fertiliser – undercover – bund too small to contain all contents and excess could overflow to ditch
Pipeline for umbilical cord system – crosses ditches

Other examples could include disinfectant store or point of use, carcass holding area, contaminated yard drainage. Some farms will also have an Environmental Permit – mark the location(s) on the map.

Then include a list of Pollution Emergency Action – referring to your map, for example:

Ditch 1 alongside main farm access: 12” pipe before going under road can block with bung or soil from adjacent bank.
Ditch 2: access at bottom of 9.67 field before road, but is 36” pipe so will need X straw bales or similar to block.
Ditch 3: if oil or chemical spill on yard – block above entry to first pond with earth or straw bale. Otherwise bung exit from each pond- each 8” pipes
Ditch 3&4: if leaks in umbilical system - can be blocked at ponds, or X & Y using soil or straw bales

Appendix 5

Measures and Responsibilities to Avoid Contamination and Waste of the Public Water Supply

Introduction

Farmers, like all other owners and occupiers of premises with a public water supply, have a duty to comply with the Water Supply (Water Fittings) Regulations 1999 (hereafter referred to as "the Regulations"). Equally importantly, by following these requirements, they will protect their water supplies from contamination, prevent waste of water (which will increase their metered water charges) and ensure they have reliable and robust plumbing systems which will give good service.

The Water Regulations Guide published by the Water Regulations Advisory Scheme (WRAS) provides total guidance on how to meet the requirements of the Regulations.

WRAS also produce a very brief Installation Guide entitled "Agricultural Premises" which summarises the key information for anyone installing, modifying or maintaining plumbing installations in Agricultural premises. This latter guide has been produced in conjunction with the NFU and the National Farmers Union of Wales.

Both guides can be obtained from WRAS (Tel: 01495 248454) and the latter document can be downloaded free of charge from the WRAS web site: www.wras.co.uk

Responsibilities

The Water Industry Act 1991 defines the responsibilities and penalties placed on the Water Suppliers and their customers.

The Water Supplier

It is the duty of the Water supplier to supply water which is wholesome. Hence the water supplier has a duty to prevent contamination of that water. One source of contamination is backflow of contaminants through supply points (taps etc) which can occur if the customers' plumbing system does not comply with the Regulations. Water Suppliers try to prevent this happening by the processes of checking Notifications before granting consent to proposed installations, and by inspecting a proportion of new and existing premises.

Notification

The Regulations require formal notification of specified information (which includes a drawing/diagram), to the water supplier, of all new installations, certain specified items of equipment, and of extensions and alterations of plumbing systems in all non domestic premises (which include all Agricultural premises). Installations must not start until consent is given or no response is made by the water supplier within 10 days of the notification being given.

Inspections

The water suppliers may inspect new and existing premises to check for compliance with the regulations. Premises where there are higher risks of contamination will have a higher priority for inspection. Agricultural premises are usually higher risk premises but there are many other types of premises that have similar high risks.

The Customer

Legislation requires that the customer (owner or occupier) must ensure that there is no risk of deterioration in the quality of the water from any cause whatsoever and must take responsibility for installing fittings to ensure that

water supplied is not liable to contamination, waste, misuse and undue consumption.

The main actions needed to prevent contamination of the water supply in agricultural premises are:-

1) Animal and poultry drinking troughs and bowls must be fitted with an appropriate air gap at the point of discharge and a float valve or some other no less effective device to control the inflow of water and prevent overflow.
2) Before hose pipes are connected to a tap, an adequate backflow prevention device (as specified by the regulations) must be fitted to the supply pipe delivering water to that tap.
3) Any pipe or fitting containing water that is not wholesome (eg used mains water, rainwater, recycled water or any water not supplied by the water supplier) must not be connected to fittings or pipes containing wholesome water, unless an adequate backflow prevention device is installed.
4) Water supplies used for farm processes (chemical mixing etc) should only be fed via a backflow prevention device appropriate to protect against the level of risk.
5) No pipe or fitting may be installed in contact with contaminated material, regardless of any protection given. It should be appreciated that plastic pipes and fittings are particularly poor at preventing diesel/petrol contaminating the water within them. Hence pipes should not be laid where diesel/petrol is stored, or is likely to be spilt.
6) Irrigation systems must be fitted with the appropriate backflow prevention device appropriate for the type of system.

The main actions needed to prevent waste of the water supply in agricultural premises are:-

1) All pipes external to a building heating envelope should be laid underground at a minimum depth of 750mm. Pipes may only be installed outside the heating envelope or at a lesser depth underground, with the written permission of the water supplier. Inadequate protection against frost may result in loss of supply and waste of water.
2) Float operated valves to BS 1212 Part 2 or 3 or those that are listed by WRAS are required for cisterns and animal drinking troughs.

Approved Fittings

Every fitting shall be of an appropriate quality and standard and suitable for the circumstances in which it is used. Examples of suitable fittings may be found in the WRAS Water Fittings and Materials Directory which can be viewed on the WRAS web site.

Pumps

If you are planning to install a booster pump which draws more than 12 litres/min., you must send a notification to your local water supplier and obtain consent, as described above, before installation.