Introduction
Environmental issues will be an increasing challenge for dairy farmers but may also provide a marketing benefit for Irish products on world markets.

1. Why is greenhouse gas policy relevant to dairy farming?
2. What are the main greenhouse gases produced by farming?
3. How can greenhouse gas emissions be reduced on dairy farms?
4. Why is water quality important for dairy farmers?
5. How can countryside management benefit dairy farmers?
Key Environment Issues for Dairy Farmers

1. Why is greenhouse gas policy relevant to dairy farming?

Key Facts
- In Ireland agricultural greenhouse gases (GHGs) account for 33% of total GHGs.
- The average for the EU 27 is 9%.
- Agricultural GHGs have fallen by almost 10% since 1990.
- Achieving Food Harvest 2020 targets is projected to lead to an increase of 7% in GHG emissions compared with 2010 levels.

The commitments
- The European Union has committed itself to a reduction of 20% below ‘1990 levels’ by 2020 with an agreement to increase this to 30% as part of a global agreement.
- The EU is committed to a 40% cut in emissions by 2030.

From the market
- There is increasing pressure from manufacturers and retailers to reduce GHG emissions in the inputs/products being purchased. This will result in pressure on farmers to quantify GHG emissions of their output and to put measures in place to reduce it.

2. What are the main greenhouse gases produced by farming?

There are three main agricultural greenhouse gases:
- Carbon dioxide – CO₂
- Methane – CH₄
- Nitrous oxide – N₂O

Methane
Methane is the most important GHG in Irish agriculture. It is 25 times more potent than CO₂ (1kg CH₄ = 25kg CO₂ equiv.). The main sources are fermentation in the ruminant animal and manure storage and handling.

Nitrous oxide
Nitrous oxide is 296 times more potent than CO₂. The main sources are the application of artificial and organic manures and animal excreta (mainly urine) deposited on grassland.

Carbon dioxide
Carbon dioxide from Irish agriculture arises mainly from the use of energy on the farm and in the transport of farm inputs and produce. While CO₂ accounts for only a small proportion of agricultural greenhouse gases, there is scope to reduce this on many farms.

Policy
Counting greenhouse gas emissions
There is considerable argument about how best to account for the greenhouse gas emissions from the agricultural sector. This issue is important because future policies on controlling GHGs will be based on a system of counting carbon.

IPCC (International Panel on Climate Change) vs LCA (Life Cycle Analysis)
Both methodologies calculate the carbon footprint for agricultural output produced in the country. The main difference between the two methodologies is that IPCC measures the carbon which was actually produced in the country while the LCA methodology calculates the carbon emissions associated with the food regardless of where it occurred. This includes the carbon footprint of imported inputs such as fertiliser and meals.
Food produced in Ireland is very efficient when considered in terms of kg of CO₂ per kg of product. In a report produced by the Joint Research Committee (JRC) of the EU, Irish dairy production was ranked first and beef production fifth in the EU 27, in terms of kg CO₂ per kg of output. On the world stage, Ireland is amongst the most carbon efficient producers of milk and beef.

**The dilemma: carbon leakage**
- Ireland has committed to challenging targets to reduce carbon emissions. Developing countries do not have the same targets.
- If Ireland reduces agricultural output to meet GHG targets, the production of food may shift to less carbon efficient countries.
- This will lead to a global increase in global GHG emissions.
- It is important to bear in mind that demand for food is growing in line with world population.

**How can greenhouse gas emissions be reduced on dairy farms?**

To improve sustainability and to meet legislative and market requirements, it is important for all dairy farmers to reduce their carbon footprint.

There are opportunities to reduce CH₄ emissions through increased efficiency and adoption of a range of management practices:

- **Increased grazing season** increases grass utilisation and reduces the volume of slurry to be stored and spread. A 10 day increase in the grazing season can reduce GHG per kg beef by approximately 2%.

- **Better production and utilisation of grass** means improved nitrogen efficiency and improved animal performance. Inclusion of clover in swards can significantly reduce GHG emissions by replacing purchased N with clover fixed N.

- **Efficiency per cow.** Your cow produces the same level of CO₂ equivalents per year as an efficient car travelling 17,000 Km per annum. Unproductive cows increase your carbon footprint. You can reduce this by improving calving rates through improved fertility management, lowering the age at first calving.

**Slurry spreading and storage.** Timing and spreading technology have a significant impact on GHG emissions. Reducing N losses to water and air are important from an environmental perspective but also lead to increased availability for plant growth.

- **Correct nitrogen usage.** Getting the timing and type of nitrogen fertiliser type right for the prevailing conditions can significantly reduce losses and improve the effectiveness of N fertiliser.

- **Improved liveweight gain** improves GHG efficiency by reducing finishing age and/or increasing carcass weight and thereby reducing the emissions per unit of output.

- **Land Use – sequestration.** Grassland and forestry take carbon dioxide out of the atmosphere and store it in wood and soil.

Fortunately, most of the mitigation options outlined above are consistent with improving the efficiency and profitability of the dairy farm. Adopting these technologies could significantly reduce the carbon footprint of Irish dairying.

**Why is water quality important for dairy farmers?**

When compared with other EU member States, Ireland has good water quality. The 2010-2012 water quality report, published by the EPA, shows evidence of improvements in water quality in Ireland. However, there is a considerable challenge to meet the target of good status for all water bodies (currently 72.9%).

The main pressures on Irish water quality arising from agriculture include: phosphorus, nitrate, sediment and pathogens. These pressures are controlled under the Nitrates Regulations.

**Importance of high quality water**

At an industry level, Ireland’s high water quality contributes to our ‘green’ image and is crucial to the future marketing of Irish dairy products.

Good quality surface and groundwater is needed for human and animal health, fisheries, tourism, and wildlife and habitat conservation.
Key Environment Issues for Dairy Farmers

Legislation
The 2003 Water Framework Directive was established to coordinate existing water legislation. The Water Framework Directive requires river basin management districts (RBDs) to be established in each member state. Eight RBDs have been established, each of which must develop and implement a management plan. The plans contain detailed standards for measurements of water such as biological and chemical status which must be reached within a specific timescale.

The Nitrates Regulations were introduced in Ireland in 2006 and updated in 2010, and 2014. The regulations are designed to control diffuse and point source pollution from agriculture.

It is vital that dairy farmers play their part in protecting water quality by ensuring that they put in place an effective nutrient management plan, ensure that there is no point source losses to the environment and comply with the provisions of the Nitrates Regulation.

Key Actions

Nutrient Management
• Carry out soil nutrient analysis on all fields on the farm
• Prepare a nutrient management plan consistent with nutrient status and level of output
• Apply lime as per recommendation
• Utilize slurry effectively
• Apply the correct level of appropriate chemical fertiliser at the right time

Point source management
• Ensure clean water is separated
• Make sure there is adequate slurry storage
• Pay particular attention to farm roadways, yards and silage pits to ensure that there is effective collection of soiled water and no potential for losses to watercourses

Water footprinting
Water footprinting relates to the total volume of fresh water that is used to produce goods by a business. It is probable that retailers will eventually include a ‘water footprint’ label on food products.

Approximately 80% of the world’s population live in areas where the fresh water supply is not secure. International research has shown that grass-based dairy systems, such as we have in Ireland, have the lowest water footprint. This places Ireland in a strong position to continue to produce milk competitively with both a low water and carbon footprint.

How can countryside management benefit dairy farmers?
Biodiversity enhances farms and the rural countryside. It contributes to the ‘green’ image of dairying. Leaving space for biodiversity maintains assets for future generations. Dairy farms can help to halt the decline in Ireland’s biodiversity and contribute to a living landscape in their own rural area. Examples of biodiversity enhancement on dairy farms are:

• planting native Irish trees in corners or rows
• erecting bird or bat boxes
• creating a pond
• growing a small area of a crop for wildlife
• planting new stock-proof hedgerows and maintaining/improving existing hedgerows.

The decline in biodiversity can be halted by a network of biodiversity areas on all farms in the country. Agri-environment schemes provide opportunities to invest in the future of your farm.

Hedgerows
Common images which market Irish farm produce inevitably feature cattle in lush green fields with scenic hedgerows in the background. Hedgerows are now landscape features which means the area beneath them is eligible for the single payment scheme. In order to avoid penalties under cross compliance, farmers must replant an equivalent length elsewhere before removal of any hedgerows. Hedgerows must not be trimmed from March to August to avoid the destruction of nesting birds.
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Archaeological and historical features
The Irish countryside is rich in ancient settlements and ritual monuments. These tell the story of generations of farming communities who have made their living from the land and are essential to our understanding of the past.

The traditions and beliefs of older generations have prevented much interference with the ‘fairy rings’ or ‘giants’ graves’ and mass rocks. They are now protected by law and any interference can lead to penalties under cross compliance.
Introduction
Complying with legislation is greatly eased by careful planning and record-keeping.

1. What is meant by cross compliance?
2. How are cross compliance inspections managed?
3. What are the key issues in relation to animal identification?
4. What are the key issues in relation to nitrates?
5. How do I secure a nitrates derogation?
6. What are the key issues in relation to pesticides?
7. What other compliance issues are relevant to dairy farmers?
What is meant by cross compliance?

All farmers in receipt of the "Single Farm Payment" are obliged to adhere to 13 statutory management requirements (SMRs) and must also maintain their lands in good agricultural and environmental condition and eligibility (GAEC). Together these are commonly known as cross compliance.

The SMRs relate to the following areas:

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<th>SMR</th>
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<tr>
<td>SMR1</td>
<td>Protection of the environment against pollution caused by Nitrates</td>
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<td>SMR2</td>
<td>Conservation of wild birds</td>
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<td>SMR3</td>
<td>Conservation of natural habitats of wild flora and fauna</td>
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<td>SMR4</td>
<td>Food and feed hygiene</td>
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<td>SMR5</td>
<td>Hormones – prohibition of Beta Antagonists</td>
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<td>SMR6,7,8</td>
<td>Identification and Registration of animals (porcine, ovine, bovine)</td>
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<td>SMR9</td>
<td>Prevention and control of transmissible spongiform encephalopathies</td>
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<td>SMR10</td>
<td>Plant protection products (pesticides)</td>
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<td>SMR11</td>
<td>Animal welfare (calves)</td>
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<td>SMR12</td>
<td>Animal welfare (pigs)</td>
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<tr>
<td>SMR13</td>
<td>Animal welfare (general)</td>
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GAEC measures refer to the following areas:

1. Establishment of buffer strips along water courses.
2. Where use of water irrigation is subject to authorisation, compliance with authorisation procedure – non applicable in Ireland.
3. Protection of ground water against pollution.
4. Minimum soil cover.
5. Minimum land management reflecting site specific conditions to limit erosion.
7. Retention of landscape features – minimum level of maintenance.

For detailed information on cross compliance including explanation of SMRs and GAEC, guides and forms for inspections and information on nitrates see DAFM website at: www.agriculture.gov.ie/farmerschemespayments/crosscompliance

How are cross compliance inspections managed?

The Department of Agriculture, Food and the Marine (DAFM) has implemented a system of farm inspections which meet EU requirements. There are two types of inspections carried out under the Single Farm Payment Scheme: land eligibility and cross compliance.

- 5% of all farmers receive land eligibility inspections, some by remote sensing (satellite).
- 1% full cross compliance (1,350 farmers).
- 3% cattle identification (5,000 farmers).
- Ovines 3% of applicants and 5% of flocks.

A full cross compliance inspection means that a farmer is inspected for all 18 SMRs (if they are applicable to the farm) and GAEC, or farmers can receive a cross compliance inspection on just one of the SMRs and/or GAEC. Inspections by the DAFM are selected on the basis of a risk assessment, but some farms are also selected at random.

DAFM may give no notification at all, or up to 14 days, depending on the regulations being inspected. Notification can only be given “where such notice does not jeopardise the objective of the inspection”. It is important that all records as required are maintained and available for inspection. SMRs that are unannounced are feed, food hygiene and welfare requirements.

- 20-25% are random and remainder are risk based.
If the inspector finds a problem he/she will issue a non-compliance notification (NF) detailing the non-compliance issues found at inspection. When the file is processed, the farmer is informed in writing of the eligibility/cross compliance inspection results if non-compliance is found and informed if penalties are to be applied.

3 What are the key issues in relation to animal identification?

Animal identification - Guidelines and tips:

- There are four different aspects involved (tagging, CMMS/AIM database, passports and bovine herd register “blue book”).
- Inspectors come prepared with current herd profile and BPS maps and will check this against the passports/ herd register.
- The herd register will be checked for movements, births, deaths and animals sold. The buyer is responsible for notifying the DAFM within seven days if an animal is bought/sold.
- There must be a passport for every animal, signed by the keeper.
- Passports for dead animals must be given to the disposal agent or returned to the Divisional Veterinary Officer.
- All calves must be tagged within 20 days of birth and registered within seven days of tagging.
- A sample of tags are read during an inspection and checked against the herd register. Animals missing one tag or both tags are recorded.
- Calves not tagged at inspection greater than 7 days old will be sanctioned under tagging, transport, AIM and Bovine Herd Register.
- All animals must have at least one ear tag.

Key facts

The top four SMR non-compliance issues for cattle in recent years were:

- CMMS/AIM breaches
- passport breaches
- register discrepancies
- tagging.

4 What are the key issues in relation to nitrates?

Nitrates guidelines and tips:

- Get the yard right and you will eliminate most of the nitrates penalties.
- The inspector starts in the yard by doing a farmyard sketch (REPS plan etc.), and will identify all animal housing and storage facilities.
- Every storage facility (slatted tanks, loose houses, FYM stores etc.) is measured (length, depth and width).
- All facilities (tanks, stores, concrete-floored sheds, silage pits) must be “fit for purpose” and the inspector will check for structural defects.
- Dirty yards which cattle have access to are measured and assessed in relation to the collection of dirty water.
- Silage facilities will be checked to ensure that effluent is collected and diverted correctly.
- Round bale storage will be checked. If stored within 20m of a watercourse, there must be storage facilities for the effluent. There should be no escape of effluent.
- All guttering on sheds will be checked to ensure it is functioning and that downpipes are in place and that no clean water is mixing with dirty water.
- Farmers must be careful not to use an earthen banked lagoon/earth lined out-wintering pad or a reed bed that does not have planning permission or is not certified by an engineer and built to specification. (20% penalty irrespective of the volume or type of material stored or 100% where it is causing significant pollution).
- Records must be submitted to the DAFM by the 31st March of the year after the inspection – the inspector will leave this with you to complete.
- Farmers must not apply more than 170kg organic N per ha without a derogation.
- Every farmer must have a fertiliser plan.
- All farmers must have completed fertiliser records on the farm by March 31st following the year end.
Cross Compliance & the Nitrates Derogation

Where a farm is at risk of exceeding 170kg of organic N per ha and has not applied for a derogation, there are a number of actions which could alleviate the problem if taken in time:

- reduce stock numbers for the remainder of the year
- export organic manures and submit relevant paperwork (Record 3) before the end of the year
- graze or house stock off-farm through DAFM-approved AIM B&B arrangements
- rental of additional land as per single farm payment regulations.

5 How do I secure a nitrates derogation?

Under the Nitrates Regulations (S.I. 31 of 2014) farmers cannot apply more than 170kgs of nitrogen from livestock sources per hectare per year. However, grassland farmers, with grazing stock, may apply annually for a derogation to apply up to a limit of 250kg per hectare in a calendar year, under certain conditions.

- An application must be made on-line by the 31 March annually to DAFM, undertaking in writing to fulfill the conditions set out therein.
- The farm holding must be at least 80% grassland and have grazing livestock.
- A fertiliser plan (or an approved REPS 4) must be on the holding by 1 March each year.
- Fertiliser accounts must be submitted on-line to DAFM by 31 March each year. (Fertiliser and meal dockets must be included).
- Soil analysis must be performed at least every 48 months and at least one analysis per five hectares of land is required. e.g. where samples were taken for 2016, they will need to be retaken for 2020.
- Livestock manure may not be spread in the autumn (from 1 August to 15 October) before grass cultivation.
- Grassland shall not be ploughed between 16th October and 30th November.

- Crop rotation should not include leguminous or other plants fixing atmospheric nitrogen. This will not apply to grassland with less than 50% clover and to cereals and peas undersown with grass.

The fertiliser plan must include:

- the number of livestock
- a description of the housing and storage system, including the volume
- a calculation of manure nitrogen (less losses in housing and storage) and phosphorus produced on the farm
- the crop rotation and area of each crop, including a sketch map indicating location of individual fields
- the foreseeable nitrogen and phosphorus crop requirements
- the amount and the type of manure exported from or imported onto the holding
- results of soil analysis related to nitrogen and phosphorus soil status if available
- nitrogen and phosphorus application from manure over each field (or parcels of the farm which are homogeneous in terms of cropping and soil type)
- application of nitrogen and phosphorus with chemical and other fertilisers over each field

Plans shall be revised no later than seven days following any significant changes in agricultural practices to ensure consistency between plans and actual agricultural practices.

IMPORTANT

- If farm stocking rate exceeds 250kg/ha, alternative arrangements, such as exporting some of the livestock manure, must be undertaken.
- All manure export forms must be submitted to DAFM by 31st December of the year concerned.
What are the key issues in relation to pesticides?

New regulations, increased inspections, and increasing instances of penalties mean that farmers need to ensure that their handling of pesticides and chemicals meets the required standards. Check out www.Teagasc.SUD

- Regulations apply to every farmer with chemicals on the farm (grassland and tillage sprays/plant protection products - PPPs).
- All chemicals are included. They must be stored in any lockable shed.
- All other products must have a dedicated store.
- Every farmer with plant protection products and disinfectants must keep up to date records of all chemicals used (purchases, where used and returns).
- Powders must be stored above liquids.
- Every container/packet should have a PCS number on it. (Protection Chemical Service)
- Pesticides must be stored away from food and feed for animals, poultry or pet food.
- Storage facilities must be secure, lockable and have concrete/bunded floors.
- The door in to the store must have a warning sign.
- All chemicals must be stored in their original containers.
- Protective clothing and equipment must be available and properly maintained.
- A bucket of sand or peat should be available to soak up spillages.
- A scales/graduated jugs for measuring products should be available.
- Sprayers must be suitable for purpose and will be inspected and sprayer serial numbers recorded.

Please refer also to appendix on the SUD at the end of the manual.

What other compliance issues are relevant to dairy farmers?

- Removal of landscape features such as hedges and open drains is not permitted except under very unusual and agreed circumstances.
- Land eligibility – land must be actively farmed (grazing, cutting, topping) to be eligible for the Single Farm Payment.
- Failure to control noxious weeds and scrub encroachment can lead to penalties.
- All animal feeds should be stored in secure self-contained vermin-proof units, with no dog food or similar materials in the same vicinity. Records of feed purchases are required.
- Fuel tanks should be well located and maintained with no evidence of discharge/leakage.
- Waste oils and batteries should be properly disposed of.
- All bedded cattle and horse sheds must have concrete floors.
- Boundaries of land declared as forage must be stockproof.
- There must be no damage to designated lands or monuments.
- Animal remedy records must be kept up to date; all animal treatments recorded and withdrawal periods should be adhered to.
- Tail docking and/or mutilation has been banned since 2003.
- Meat from animals receiving treatment or administered with Anthelmintic products must be prevented from entering the food chain. Animal remedies records must be kept for all animals.