Virtual Beef Week 2020

Wednesday 8 July

Beef farming and the environment

Martina Harrington & Sinead Waters
Teagasc Animal & Grassland Research and Innovation Programme

Farmers are the custodians of the countryside and farming over many generations has shaped the landscapes that we see today. Protecting these ecosystems and how we face the challenges of improving water quality, reducing greenhouse gas emissions and maintaining and enhancing biodiversity will heavily influence the future of the beef industry, as can be seen in emerging Irish and EU policy.

On Wednesday 8 July, Teagasc, as part of the Virtual Beef Week, will lay out the main environmental issues and focus on some of the key technologies available to reduce beef farming's impact on the environment, while on Friday 10 July a panel of experts will discuss future policies that are likely to affect day-to-day beef farming. Topics addressed will include the following:

METHANE

Agriculture is the single largest contributor (~30%) to overall greenhouse gas (GHG) emissions in Ireland. Livestock production, in particular, faces challenges in reducing GHG emissions. Methane, a GHG 28 times more potent than carbon dioxide, is released as a byproduct of rumen microbial fermentation and from stored manure and slurry on farm. Under EU legislation, Ireland has committed to reduce GHG emissions of 40% by 2030, compared to its 2005 levels.

On Wednesday we will discuss the ongoing research in Teagasc focusing on reducing methane emissions from beef production which include the development of farm-ready technologies to reduce methane emissions from animals digesting their feed including a number of feed supplements (including 3-NOP, halides, seaweeds and oils), and from stored

manure and slurry. We will also discuss the strategies being developed with ICBF to breed cattle with a lower environmental footprint, ultimately improving beef sustainability. – **Sinead Waters**

Gaseous nitrogen losses

Other gaseous losses produced in agriculture are nitrous oxide and ammonia. Both are produced as a result of the application of organic manures, synthetic fertilisers and excreta from grazing cattle. Nitrous Oxide is a GHG with a warming potential 265 times higher than carbon dioxide.

Ammonia, also a gas, is not a GHG and therefore not associated

with climate change, however it is a harmful air pollutant. In addition to the GHG emission reduction targets, we are required to reduce ammonia emissions by 1% from now until 2029. This is challenging as 99% of ammonia is produced by agriculture and we have been breaching our target since 2016. As a sector it is crucial we acknowledge the issue and adopt what technologies become available to lessen our contribution.

Teagasc research has shown measures that improve nitrogen use efficiency such as low-emission slurry spreading (LESS), protected urea, liming and clover, reduce our ammonia emissions. On Wednesday we will detail how new technologies can help reduce losses.

– **Dominika Krol**

SOIL CARBON SEQUESTRATION

Soil carbon sequestration is the process of capturing carbon dioxide (CO_2) from the atmosphere and storing it in plant material or soil. Increasing carbon sequestration can offset the emissions and reduce the carbon footprint associated with livestock production. Increasing soil organic carbon also improves soil workability, water holding capacity, and nutrient availability.

The principal ways to increase sequestration are:

- Improve soil nutrient status: Optimal pH and soil N and P status will improve grass productivity which in turn will enhance soil carbon by increasing C inputs into soil.
- Let existing hedges and trees grow wider and taller, while also planting new hedges and tress can increase sequestration and biodiversity.
- Sowing clover and deep-rooting species, such as plantain can increase soil carbon by increasing root biomass.
- Paddock-based, moderate grazing intensity (1.5 LU/ha) can increase soil carbon by increasing litter incorporation in soil and stimulating shallow root growth.
- These steps have the potential to increase output while reducing costs,

Stuart Kirwan (opposite page) and Paul Smith at Teagasc Grange are working to optimise rumen productivity to reduce the emission of harmful greenhouse gases, such as methane, from beef cattle.

eg through improved soil nutrient status, clover etc. Using the average National Farm Survey suckler beef farm (stocking rate = 1.35 LU/ha), preliminary analysis indicates that carbon sequestration could offset 46% of on-farm emissions.
– **Gary Lanigan**

BIODIVERSITY

Conservation and protection of farmland wildlife and habitats is an important dimension of environmental sustainability. It features prominently in emerging Irish and European policy. The recent Farm to Fork Strategy includes the need for effective methods for biodiversity conservation as part of the development of sustainable production systems, while the recent EU Biodiversity Strategy for 2030 has indicated that at least 10% of agricultural area should be dedicated to high-diversity landscape features. On Wednesday we will discuss management of farmland habitats, with a focus on retain, enhance and create.

It's hard to overstate the importance of retaining existing wildlife areas, as these habitats (eg hedges, buffer strips, and ponds) have the highest value for farmland wildlife. It is usually more effective to retain existing habitats than to establish new ones. Once existing habitats have been retained, we will discuss how they can be managed to maintain and enhance their quality, ensuring the delivery of multiple ecosystem services (biodiversity, carbon storage, water quality).

Finally, where there is a lack of existing habitats, we will discuss how newly created wildlife habitats play an important role. We will highlight how new measures could be targeted to less productive areas of the farm (eg wider field margins or awkward field corners), but without replacing existing habitats. – **Daire Ó hUallacháin and John Finn**

WATER QUALITY

I often get asked what the water quality is like in a river and have to ask myself, what does that person mean by "Water Quality"? Is it safe to drink? Has there been a fish kill? What are the nutrient levels? (N and/or P). Is there chemical contamination? Is there good ecology (life) in the river bed?

Recent reports from the EPA have described a falling trend in the "quality" of water bodies in Ireland and farming has been identified as a major contributing factor. This does not correspond with the longer-term reduction of polluting instances from farmyard point sources and lower number of badly polluted waterbodies.

The current trend of falling water quality is mostly attributed to nutrient enrichment of our water bodies, leading to excessive algae growth, which in turn lowers the amount of dissolved oxygen in the water. This process is called eutrophication and has a direct impact on the life in our river beds.

Nutrient enrichment can be caused by Nitrogen (impacting on our estuaries and the sea) or Phosphorous (affecting streams, rivers and lakes). Potash (K) does not cause a problem. The locations where N is problematic (free draining soils with lower rainfall) usually contrast with where P is the issue (heavy and wet soils). However, good nutrient management is applicable to all soil types and farming systems. It benefits water quality in addition to reducing fertiliser cost. Good nutrient management is not just about limiting the amount of N, P, K. Fertiliser timing, source, placement and rate are all important, for both water quality and farm profitability. This is often called the 4R's : Right fertilizer source at the Right rate, at the Right time and in the Right place.
– **Eddie Burgess.**