20th February 2024

Opening Statement for the Joint Oireachtas Committee on Agriculture, Food and the Marine on the topic of Compliance with the Nitrates Directive: Implications for Ireland

Introduction

- I'm Dr. Elaine McGoff, I'm the Head of Advocacy with An Taisce. I have a PhD in Freshwater Ecology.

- I am joined by my colleagues Professor John Sweeney, professor emeritus from Maynooth University, and member of the An Taisce Climate Committee

- And Ian Lumley, Heritage Officer with An Taisce.

Current Situation

The starting point for any discussion on nitrates and the nitrates derogation must be an acknowledgement that nitrate from dairy farming is negatively impacting on water quality, both surface and groundwater, and that we need a different approach to mitigate that impact.

In 2021, the EPA identified several catchments of concern[1] for elevated nitrogen concentrations in the South and Southeast including the Bandon, Slaney, Lee and the Tolka/Liffey catchments. Of those 10 catchments, urban wastewater was the main nitrate pressure in only one of them, the very urban Tolka/Liffey catchment (Figure 1).

While tillage can also contribute to nitrate losses, data has shown that even in some of the most tillage heavy catchments, such as the Barrow and Slaney catchments, only 28% and 27% respectively of the nitrate was attributable to arable farming. Most nitrogen in identified problem catchments for nitrate came from pasture-based agriculture.

[1] EPA (2021) Assessment of the catchments that need reductions in nitrogen concentrations to achieve water quality objectives WFD River Basin Management Plan – 3 rd Cycle

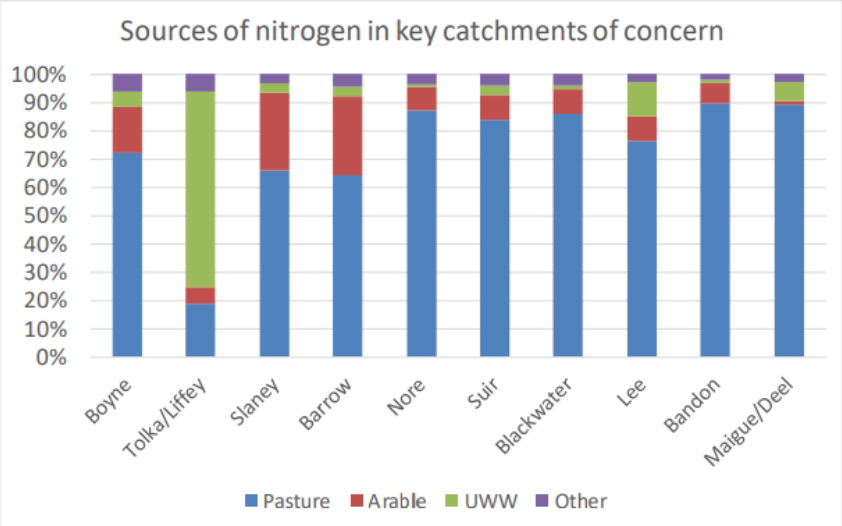


Figure 3. Sources of nitrogen in the catchments of concern. UWW means urban wastewater. Other includes forestry, septic tanks, peat, urban runoff and atmospheric deposition.

Figure 1: Sources of nitrogen in catchments of concern (source EPA 2021)

So where is the nitrogen coming from?

There is a clear and well-established link between surplus, unused nitrogen[2] and the nitrate leached to water in free draining soils. As shown in the chart below (Figure 2), the greater the surplus nitrogen, the greater the leaching shown[3].

[2] Surplus nitrogen= the nitrogen inputs that do not end up in farm production of milk, livestock or cash crops. On all farms, surplus nitrogen, is simply calculated by total farm nitrogen inputs to animals and crops minus the nitrogen exports from the farm in the milk, meat and crops produced.

[3] Nitrogen fertilizer, stocking rate and management impacts on agronomic performance and loss pathways on dairy farms (teagasc.ie)

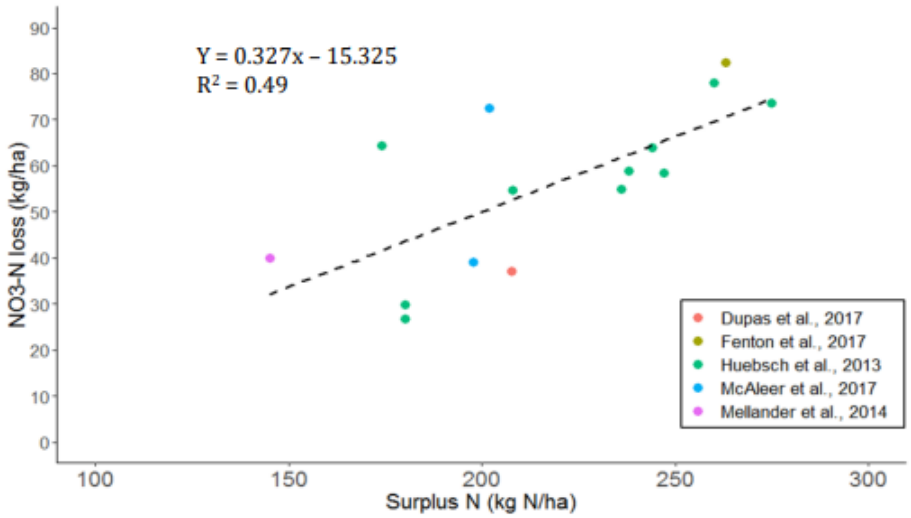


Figure 1.2. Relationship between surplus N and groundwater NO3-N loss from the reviewed literature on well-drained soils

Figure 2: Relationship between surplus N and groundwater NO3-N loss on well drained soils (source Teagasc)

Therefore, it follows logically that if we want to reduce nitrate loss to water then we need to reduce the nitrogen surplus that drives nitrate pollution.

As shown in Figure 3 below, dairy methane and nitrogen excretion rates are strongly and near-linearly related to milk yield per cow. Therefore, high milk production is liable to directly result in greater nitrates, ammonia, and methane emissions.

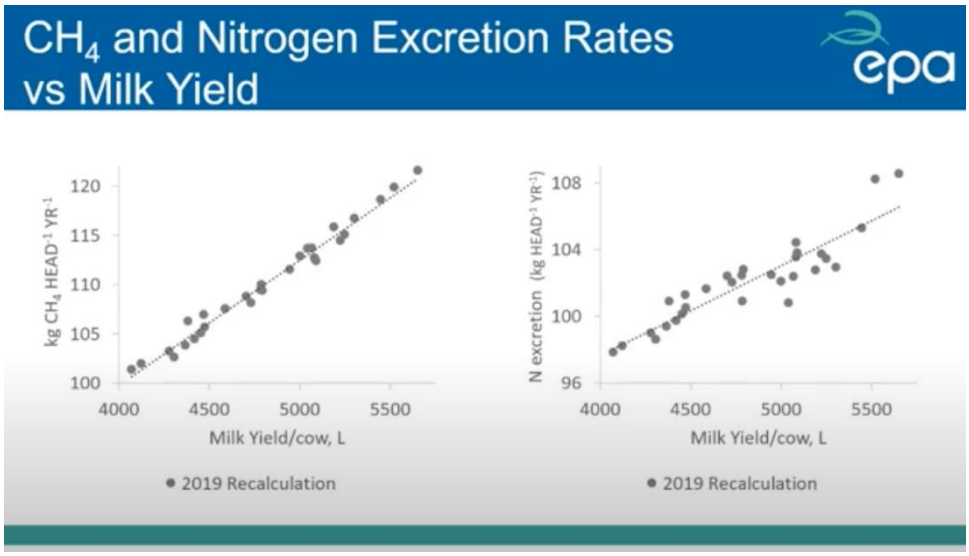


Figure 3: EPA data showing correlations with milk yield per cow versus methane (L) and nitrogen (R). Analysis presented by the EPA toward their 2019 emissions inventory reporting.

Existing measures to prevent nitrogen loss

A fundamental point which needs to be well understood by anyone working in this area is that not all water quality measures are effective for all pollutants. In an Irish context the main pollutants from agriculture to water are phosphorus, nitrogen and sediment. There can be a tendency to assume that measures designed to mitigate other pollutants, such as phosphorus, sediment or ammonia are equally effective at addressing nitrate. This is frequently not the case. For example, if a landowner in one of the catchments of concern for nitrate wished to mitigate for nitrate run off from their farm, but relied on the use of Low Emission Slurry Spreading (LESS), protected urea or extended buffer zones, these measures, while valid and useful for phosphorus, sediment and/or ammonia mitigation, are not particularly effective for nitrate mitigation. It would not be a good use of time or resources, **if** the main aim is to address nitrate losses to water. This is well illustrated in Table 1 from the Waters of Life project, which assesses the effectiveness of agricultural measures.[4]

[4] https://www.watersoflife.ie/resources/

Table 1: Agricultural Measures Effectiveness Table (source Waters of Life Project)

Setting	No.	Measure	Effectiveness rating
	The poorly draining setting has been deleted from this table.		
Freely draining	A11	Reducing N loading, e.g. less LUs/ha	H
	A2	Appropriate N & P application rates*	M
	A3	Soil testing & NMP**	M
	A7	Using low crude protein animal feeds**	M
	A12	Complying with landspreading requirements for fertilisers and soiled water, e.g. closed period*	M
	A15	Cover/catch crops (tillage)*	M
	A19	Application of sulphur	M
	A37	Denitrifying bioreactor	M
	A8	Precision nutrient applications (e.g. using GPS technology in conjunction with NMP).	L
	A13	Liming of mineral soils**	L
	A14	Low emission slurry spreading**	L
	A16	Protected urea	L
	A17	Multi-species swards	L
	A18	Best practice N applications (e.g. taking account of: i) soil temperature, ii) SMD, grass growth rate, iv) rainfall, v) N content of organic fertilisers).	L
	A20	Conservation tillage, contour ploughing & tramline management	L
	A24	Spatially targeted variable width/extended buffer	L
	A29	Wetland buffer/farm pond	L
	A38	Woodlands (outside riparian areas)	L
	A39	Agroforestry (outside riparian areas)	L

Notes:

1. Measures effectiveness ratings: High (H), Medium (M), Low (L). Measures classified as having an insignificant effect are not shown.
2. The ratings are based on consideration of measures in the catchment areas of waterbodies where the objective is restoration to the required water body status or condition.
3. The ratings are intended as guidance, and they may vary depending on local circumstances.
4. The ratings do not account for environmental co-benefits, such as GHG emission reduction, carbon sequestration, terrestrial biodiversity enhancement.
5. For optimum effectiveness, a suite of measures at an appropriate scale will generally need to be established.
6. Mandatory measures are indicated as follows:
   * Mandatory measures.
   ** Mandatory measures only when a stocking rate is exceeded (see GAP Regulations).
7. The measures are categorised based on their location in the landscape.

Source reduction & control measures | Mobilisation control measures | Pathway interception measures | In-stream measures

Source: Slightly amended Table 3-4 in Waters of Life Annex 1: Agriculture
https://www.watersoflife.ie/resources/

Of note is that the only highly ranked measure for nitrate mitigation is reducing the nitrate load, for example through a reduction in livestock units per hectare. To emphasise this point, Teagasc modelling[5] demonstrated that urine patches from cattle at pasture can be responsible

[5] Nitrogen fertilizer, stocking rate and management impacts on agronomic performance and loss pathways on dairy farms (teagasc.ie)

for as much as 62% of nitrate leached. Only 29% of the loss was attributable to artificial fertiliser and just 8% was attributable to slurry (Figure 4).

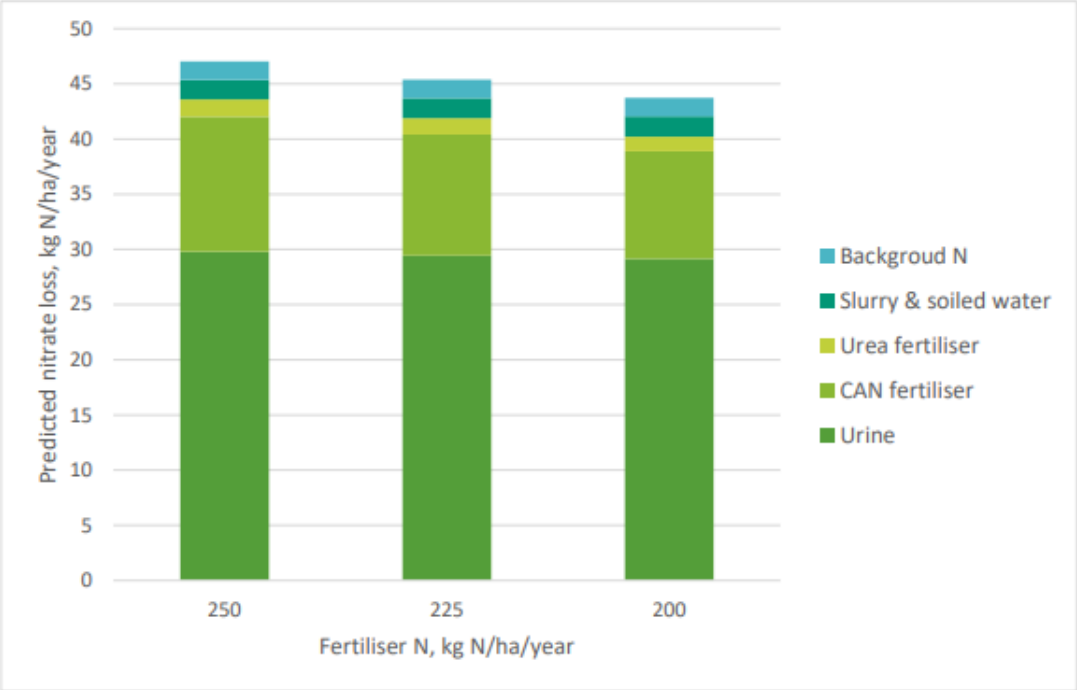


Figure 3.1. The impact of fertiliser N on predicted nitrate losses from a well-drained spring-calving grass-based dairy farm operated at a stocking rate of 250 kg organic N/ha.

Figure 4: Sources of nitrate loss on a free draining dairy farm (source Teagasc)

To put it simply, where nitrate is the pollutant of concern, compliance regarding slurry spreading and storage, while obviously desirable from a broader environmental perspective, will have relatively limited benefit in catchments where we have a serious nitrogen problem. We are all familiar with the phrase 'the right measures, in the right place' for water quality protection, but while we have made significant progress on this when it comes to measures for phosphate and sediment, we are still failing to apply the correct measure when nitrate is the pollutant of concern. There are many farmers willingly putting measures in place on their farms, but frequently they are not measures designed to adequately address nitrate leaching. In many cases what we're seeing is a nitrate problem, with phosphate solutions.

How should we address this?

So, with this science in mind, how do we specifically address nitrate pollution? We need a catchment-–based approach, with measures tailored at the catchment scale, based on the current in-stream nitrate load, or pollution load, as measured by the EPA. There will be some catchments where more drastic measures will be needed, compared with others.

As outlined earlier, nitrate leachate reductions are achieved primarily through reducing the surplus nitrate in a given catchment. Where we have catchments requiring relatively modest nitrate decreases, for example the Suir and the Blackwater, then the decrease of the derogation limit from 250 to 220 N/Ha/yr may provide a fair proportion of the necessary load reduction. However, where we have catchments with far higher levels of in stream nitrate load, for example in the Barrow and the Slaney where there is 50% too much nitrogen in the water, then we will need far greater nitrogen load reductions, well over and above what will be provided by the drop from 250 to 220 kg/n/ha.

Ultimately, we need catchment-scale measures tailored to adequately reduce the nitrate loading from the entire catchment, as required.

Conclusion

Irish farmers, in particular derogation farmers currently, are being asked to jump through a growing number of environmental hoops and at their own cost. It is imperative that they can be confident that the measures which they put in place will actually address the environmental problem at hand. I can tell you that based on the EPA and Teagasc science I have little confidence that the existing measures will work sufficiently for nitrate. The systemic failure by the State to implement a tailored catchment-–based approach, based on the best available science[6], is setting farmers up to fail, and it's setting water quality up to fail too.

Farmers, more than anyone, need honesty, it's their livelihoods on the line. The truth is, the majority of the existing measures they are putting in place will not be effective for adequately reducing nitrogen, they will not reverse the water quality trends we've been seeing in the South and South East. Farmers should be told that from the outset, not sold false promises. Ultimately, the water quality doesn't lie, and the European Commission have already indicated they will take little else into account.

[6] Updated map published by EPA: Targeting Agricultural Measures - Catchments.ie - Catchments.ie