# ZERO WASTE ALLIANCE IRELAND

*Towards Sustainable Resource Management*

---

# Submission by ZWAI to the European Commission in Response to the Commission's Public Consultation on the Evaluation of the Nitrates Directive (91 / 676 / EEC) on Protection of Waters against Pollution caused by Nitrates from Agricultural Sources

**08 March 2024**

**Zero Waste Alliance Ireland is a member of**

EEB European Environmental Bureau

and

IEN Irish Environmental Network

**An Tinteán Nua, Ballymanus, Castlepollard, County Westmeath, Ireland**
**An Tinteán Nua, Baile Mhánais, Baile na gCros, Co. an Iarmhí, Éire, N91 PP76.**
**Telephone: +353 44 966 2222 Mobile: +353 85 215 5289 Email: admin@zwai.ie**

# ZERO WASTE ALLIANCE IRELAND

*Towards Sustainable Resource Management*

## Feedback to the European Commission on a Planned Evaluation of the Nitrates Directive (91/ 676/EEC) on Protection of Waters against Pollution caused by Nitrates from Agricultural Sources

## CONTENTS



*Cont'd*

## Contents, *Contd*.

# ZERO WASTE ALLIANCE IRELAND

*Towards Sustainable Resource Management*

---

# Feedback to the European Commission on a Planned Evaluation of the Nitrates Directive (91 / 676 / EEC) on Protection of Waters against Pollution caused by Nitrates from Agricultural Sources

**08 March 2024**

## 1. INTRODUCTION

### 1.1 Background – Agriculture and the EU

Agriculture is one of the world's oldest means of production, dating back 12,000 years, when pre-historic civilisations made the transition from nomadic hunter-gathering to farming in permanent settlements. In the millennia that followed, agriculture acted as a major force of progress and helped develop many of the European cities and the agricultural landscapes with which we are familiar today.

With the arrival of Europe's Industrial Revolution, agriculture began to gradually diminish in importance and prominence as countries moved more towards extraction of raw materials, manufacturing, processing, distribution, marketing and the development of a wide range of services.

Farming became mechanised and more intensive, with increasing numbers of livestock being reared and managed on a smaller number of farms, many of them large-scale factory-type facilities; and this process was accelerated by the European Union's common agricultural policy (CAP), which has dominated Europe's farming since its introduction in 1962. The number of livestock farms in Europe declined sharply as a consequence of the CAP, and huge numbers of small farms were lost, revealing a massive intensification of agriculture.

The productivity of agriculture has increased greatly over the last decades, enabled significantly by the expanded availability and increased use of fertilisers, pesticides and a wide variety of other agricultural chemicals. This increased productivity has, however, also resulted in increased pollution of groundwaters and surface waters from nitrates, phosphorus, pesticides and residues of

pesticides, creating a major environmental pressure on water bodies throughout the European Union (EU).[1]

The European Environment Agency has pointed out that nitrogen surpluses from the over-fertilisation of grass-land and crops have remained very high in northern and central Europe. Meanwhile, the unsustainably high nitrate concentration in groundwater has not decreased for 30 years, and there has been only very limited progress in reducing pesticide use since 2011.[2]

In response, the European Commission and Parliament have been introducing reforms of the Common Agricultural Policy and farming subsidies in an attempt to halt the decline of small farms, to protect them from the intensification of agriculture promoted by decades of previous policies, and to protect the environment, by avoiding intensive farming and reducing the use of pesticides, fertilisers and chemicals as part of a zero-pollution ambition.

As reported in the Guardian on 24 May 2021, the EU Commissioner for Agriculture, Mr Janusz Wojciechowski, stated that:

> *"My intention is that this process of disappearing small farms should be stopped. The European food sector in the past was based on small farms, and it should be in the future as well. The reason we lost 4m farms in the EU was a mistake in the CAP. The support was too much* [geared] *to industrial farming and not enough to small and medium farms, … Protecting small and medium farms is a priority. It is not true that we need bigger and bigger farms for food security. Small farms can ensure food security for EU citizens. There is an understanding among legislators, Parliament and the EU Council that we need to protect better our small and medium farms – it's very important for food security, and* ***better for the environment*** [our emphasis], *climate change and biodiversity".*[3]

Another recurrent accusation levelled at the CAP is its weak enforcement of environmental standards, despite the fact that agriculture is a significant driver of pollution, accounting for more than 10% of the EU's greenhouse gas emissions which the European Environment Agency (EEA) attributes to three sources:

- $CH_4$ (methane) from enteric fermentation, the digestive process in ruminant animals such as cattle, sheep and goats;

[1] European Environment Agency, 'Water and Agriculture: Towards Sustainable Solutions' (Publications Office of the European Union 2021).

[2] European Environment Agency, 'Water and Agriculture: Towards Sustainable Solutions' (Publications Office of the European Union 2021).

[3] Fewer, bigger, more intensive: EU vows to stem drastic loss of small farms; The Guardian, 24 May 2021. https://www.theguardian.com/environment/2021/may/24/fewer-bigger-more-intensive-eu-vows-to-stem-drastic-loss-of-small-farms

- $N_2O$ (nitrous oxide) mainly from the use of nitrogen-based synthetic fertilisers; and,
- $CH_4$ (methane) from the management and disposal of manure.

Although the agriculture sector is subject to the EU's overarching goal to gradually reduce greenhouse gas emissions and reach climate neutrality by 2050, the reduction achieved so far has been extremely limited. For example, the EEA has estimated that, between 2005 and 2021, agricultural emissions increased in 13 member states, with Estonia exceeding the 30% mark. Based on current projections, the Agency predicts a modest decline of 4% by 2030 compared with 2005 levels, or even to an 8% decline if additional climate measures are put in place.[4]

This slow pace is a matter of particular concern, given that at least 25% of global warming is driven by methane, a gas 80 times more harmful than $CO_2$ in the first 20 years after being released into the atmosphere. Meanwhile, artificial fertilisers and chemical pesticides commonly used to maintain crop yields are a factor causing biodiversity loss, poor-quality water, high nitrate levels in drinking water, degraded soils and pest resistance, and have been linked to chronic illnesses in human populations.

Agriculture, together with associated food systems, has been at the core of major EU policies and programmes, such as the "*farm to fork strategy*"[5] (EC, 2020a), the EU *biodiversity strategy* for 2030[6], and the *common agricultural policy* (CAP) 2023-2027.[7] A reformed CAP is considered by the EU to be compatible with the European Green Deal's aims,[8] though we in ZWAI remain sceptical about the extent of this compatibility.

---

[4] All you need to know about the EU agriculture sector. Euronews, 13 February 2024. https://www.euronews.com/my-europe/2024/02/13/all-you-need-to-know-about-the-eu-agriculture-sector#

[5] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions — A Farm to Fork Strategy for a fair, healthy and environmentally-friendly food system. COM(2020) 381 final; Brussels, 20.5.2020.

[6] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions — EU Biodiversity Strategy for 2030: Bringing nature back into our lives. COM(2020) 380 final; Brussels, 20.5.2020.

[7] https://agriculture.ec.europa.eu/common-agricultural-policy/cap-overview/cap-2023-27_en#documents.

[8] https://agriculture.ec.europa.eu/news/cap-reforms-compatibility-green-deals-ambition-2020-05-20_en and the Strategic Dialogue on the Future of Agriculture (launched Sept 2023): https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/agriculture-and-green-deal/strategic-dialogue-future-eu-agriculture_en

## 1.2 The Nitrates Directive, the Commission's Evaluation of the Directive and this Public Consultation

For more than 30 years, the EU Nitrates Directive[9] has been the principal item of European legislation for the protection of water threatened by over-exploitation of agricultural land and the resulting nitrate contamination. The Directive was issued in 1991 to "*protect water quality across Europe by preventing nitrates from agricultural sources polluting ground and surface waters and by promoting the use of good farming practices*". Member States were asked to designate Nitrate Vulnerable Zones (NVZs), namely areas likely to contribute to surface or ground water contamination of a minimum of 50 mg L-1 of nitrate ($NO_3$-).

Within the NVZs, specific mandatory protection measures had to be adopted by farmers and a limit of 170 kg ha-1 year-1 of nitrogen (N) from organic manure was established. Within the non-vulnerable zones (nNVZs), Member States had to propose a set of measures to be implemented on a voluntary basis, mainly regarding the periods and weather conditions for fertiliser application. The Nitrates Directive is also one of the Statutory Management Requirements that European farmers are obliged to respect in order to receive the subsidies provided for the cross-compliance system of the Common Agriculture Policy, and the individual benefits are reduced proportionally to any detected noncompliance.

In its 2024 work programme, the Commission announced an evaluation of the Nitrates Directive, under which all EU member states are required to carry out several actions, including:

- Identification of waters polluted by nitrates, and waters that have become eutrophic (eutrophication is the enrichment of water with nutrients leading to excessive growth of algae, affecting the aquatic ecosystem's balance);
- Designation of areas that are particularly susceptible to nitrate pollution;
- Developing codes of good agricultural practices; and,
- Implementing measures aimed at preventing and reducing water pollution caused by nutrients.

As mentioned briefly in section 1.1 above, the Nitrates Directive also supports the implementation of the Water Framework Directive, which aims for all European surface waters to achieve "good status" by 2027. Alongside the Urban Waste Water Treatment Directive (UWWTD), the Nitrates Directive aims to improve the quality of EU water bodies, as nutrient pollution can be an obstacle to achieving "good status".

[9] Council Directive of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources (91/676/EEC).

The Nitrates Directive is also linked with the EU Biodiversity and Farm to Fork strategies, both of which set a shared objective of reducing nutrient losses by at least 50% by 2030 while maintaining soil fertility (see section 1.1 above).

The Commission's **evaluation** will assess how EU Member States have applied the Nitrates Directive since its adoption in 1991.

The assessment of **effectiveness** will investigate to what extent the objectives of the Directive are being achieved and to what extent it can continue to contribute to reducing and preventing nutrient pollution from agriculture. It will consider how the Directive has been implemented, challenges that have arisen in applying the Directive, and any factors limiting its effectiveness.

**Efficiency** will be considered by assessing whether the efforts and costs needed to implement the Directive are proportionate, and whether environmental and socio-economic benefits outweigh these costs. The potential for simplification, including on reporting and reducing the associated costs, will also be investigated.

In terms of **relevance**, the evaluation will assess the extent to which the objectives pursued by the Directive correspond to current societal needs, including the Union's environmental and climate objectives, an integrated approach to nutrients, a sustainable and resilient agriculture, and food security.

The assessment of **coherence** will focus on the internal consistency of the Directive as well as its consistency with related EU legislation and policies on water, nature, agriculture, circular economy, and others.

The evaluation of the Directive's '**EU added value**' will look at the extent to which an EU-level approach has improved what could have been achieved by the Member States acting alone at national level.

The evaluation will assess if the Nitrates Directive remains fit for purpose and contributes to a sustainable and resilient agriculture and food security. The evaluation will examine and consider whether, in changing climatic and environmental conditions, the Directive is helping farmers to adapt and increase resilience, whether it is supportive of new agricultural practices, while sufficiently promoting the recycling of nutrients from various sources, including processed manure.

A key objective will also be to investigate the potential for simplification and cost reductions with a focus on increased coherence with other legislation and developments in farm practices and technology. It will also consider the Directive's contribution to the commitments under the *Kunming-Montreal Global Biodiversity Framework* of reducing nutrient losses by 50% by 2030 globally. The

evaluation will include several consultation activities aiming to ensure that the sector's and public's interests across the EU are properly reflected.

The Nitrates Directive protects groundwaters, rivers, lakes and seas from pollution caused by nitrates. It sets limits on the use of fertilisers and promotes the adoption of good farming and environmental practices. Nitrogen is a crucial nutrient that helps plants and crops grow, but high concentrations are harmful to people and nature. Too many nitrates affect water quality and many economic activities, including agriculture and fisheries. One consequence is eutrophication, and toxic algal blooms (see section 7 below). Excess of nitrates means additional treatment costs before nutrient-contaminated water is fit to drink, loss of income for economic operators and disappearance of unique natural ecosystems.

## 2. PURPOSE OF OUR SUBMISSION AND ITS PARTICULAR RELEVANCE TO IRELAND

This submission is provided in order to inform and enhance the EU Commission's review of the Nitrates Directive, the full title of which is: "*Council Directive of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources 91/676/EEC".*

The Nitrates Directive is an important piece of legislation introduced in 1991 with the following objectives, in Article 1:

- reducing water pollution caused or induced by nitrates from agricultural sources and,
- preventing further such pollution.

As mentioned in section 1 above, it is clear that the Directive, while curbing the worst excessive of nitrate pollution in farming, has failed in its objective to reduce water pollution from agricultural nitrates, and preventing increases in it.

All available evidence points to a eutrophication crisis in the EU of epic proportions, that represents a significant threat to the ecological integrity of the environment.[10] Ammonia from waste spreading constitutes a major contributor to air pollution as well as water pollution (sections 6.1 to 6.4 below), and a major public health crisis. Ammonia also degrades to nitrous oxide, a greenhouse gas, which additionally contributes to climate change.

[10] Report from The Commission to the Council and the European Parliament on the implementation of Council Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources based on Member State reports for the period 2016–2019 {SWD(2021) 1001 final} https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2021%3A1000%3AFIN&qid=1633953687154

These effects are particularly marked in Ireland which has a high level of agricultural land use, widespread permitted derogations for higher nitrates use in agriculture,[11] a high level of illegal cross-border trade in animal waste, and very poor enforcement on either side of the border with Northern Ireland.[12,13]

The current iteration of the Directive is clearly inadequate to tackle transboundary ammonia pollution and animal waste spreading.[14]

Therefore it is very timely to revise the Directive as it is no longer fit for purpose to achieve its stated objectives. It also does not align with newer EU law obligations around public participation, access to justice and access to information.

These issues are addressed in section 8 (below) of our submission.

Finally, much greater use could be made of monitoring and information storage, capture and dissemination technologies in order to enhance compliance and effectiveness. In particular, unacceptable levels of information gaps are visible in the latest implementation report and this needs to be addressed by specific governance structures and technological solutions.[15]

[11] Some 3,000 dairy and beef farmers are understood to operate under permitted derogations for higher nitrates use on their farms: https://www.irishtimes.com/environment/climate-crisis/2023/09/19/nitrates-derogation-what-does-it-involve/

[12] Enforcement: Alison Hough, The potential of the Good Friday Agreement post-Brexit environmental governance on the island of Ireland (2019) Irish Planning and Env. Law (2) 55-65; Brennan, C., Purdy, R., and Hjerp, P. (2017). Political, economic and environmental crisis in Northern Ireland: the true cost of environmental governance failures and opportunities for reform. Northern Ireland Legal Quarterly, 68(2), 123-157.

[13] Brennan et al., EJNI Briefing 4 Ammonia (2021). https://ejni.net/wp-content/uploads/2021/01/EJNI-Briefing-4-Ammonia.pdf

[14] Niall Sargent, 06 July 2022, *Suspected false documents and illegal dumping: the murky world of poultry manure*, Noteworthy, https://www.noteworthy.ie/factory-farm-pt2-teagasc-long-read-5801687-Jul2022/ and, Niall Sargent, *Unverified exports, illegal spreading and paper acres: The murky world of manure*; The Currency 05 March 2024 https://thecurrency.news/articles/142990/unverified-exports-illegal-spreading-and-paper-acres-the-murky-world-of-livestock-manure/

[15] Grizzetti (2021) How EU policies could reduce nutrient pollution in European inland and coastal waters Global Environmental Change Vol 69, ScienceDirect https://www.sciencedirect.com/science/article/pii/S0959378021000601

# 3. ZERO WASTE ALLIANCE IRELAND (ZWAI)

At this point we consider that it is appropriate to mention briefly the background to our submission, especially the aims, activities, policies and strategy of ZWAI.

## 3.1 Origin and Early Activities of ZWAI

Zero Waste Alliance Ireland (ZWAI), established in 1999, and registered as a company limited by guarantee in 2004, is a Non-Government Environmental Organisation (eNGO) and a registered charity. ZWAI has prepared and submitted to the European Commission, the Irish Government and to Irish State Agencies many policy documents on waste management and waste elimination, and continues to lobby the Irish Government and the European Commission on using resources more sustainably, on promoting re-use, repair and recycling, and on development and implementation of the Circular Economy.

One of our basic guiding principles is that human societies must behave like natural ecosystems, living within the sustainable flow of energy from the sun and plants, producing no materials or objects which cannot be recycled back into the earth's systems, or reused or recycled into our technical systems, and should be guided by economic systems and practices which are in harmony with personal and ecological values.

Our principal objectives are:

i) sharing information, ideas and contacts,

ii) finding and recommending environmentally sustainable and practical solutions for domestic, municipal, industrial and agricultural waste management, and for more efficient and ecologically appropriate uses of natural resources such as scarce minerals, water and soil;

iii) lobbying Government and local authorities to implement environmentally sustainable waste management practices, including clean production, elimination of toxic substances from products, re-use, repairing, recycling, segregation of discarded materials at source, and other environmentally and socially beneficial practices;

iv) lobbying Government to follow the best international practice and EU recommendations by introducing fiscal and economic measures designed to penalise the manufacturers of products which cannot be re-used, recycled or composted at the end of their useful lives, and to financially support companies making products which can be re-used, repaired, recycled or are made from recycled materials;

v) raising public awareness about the long-term damaging human and animal health and economic consequences of landfilling and destruction by mass burning or incineration of potentially recyclable or re-usable materials;

vi) investigating, raising public awareness and lobbying Irish Government departments and agencies about our country's failure to take adequate care of vulnerable and essential natural resources, including clean water and air, biodiversity, and soil;

vii) advocating changes in domestic and EU legislation to provide for more ecologically appropriate, environmentally sustainable and efficient uses of natural resources; and,

viii) maintaining contact and exchanging information with similar NGOs and national networks in the European Union and in other countries, and with international zero waste organisations.

## 3.2 Our Basic Principles

Human communities must behave like natural ones, living comfortably within the natural flow of energy from the sun and plants, producing no wastes which cannot be recycled back into the earth's systems, and guided by new economic values which are in harmony with personal and ecological values.

In nature, the waste products of every living organism serve as raw materials to be transformed by other living creatures, or benefit the planet in other ways. Instead of organising systems that efficiently dispose of or recycle our waste, we need to design systems of production that have little or no waste to begin with.

There are no technical barriers to achieving a "*zero waste society"*, only our habits, our greed as a society, and the current economic structures and policies which have led to the present multiple environmental, social and economic crises.

"*Zero Waste"* is a realistic whole-system approach to addressing the problem of society's unsustainable resource flows – it encompasses waste elimination at source through product design and producer responsibility, together with waste reduction strategies further down the supply chain, such as cleaner production, product repairing, dismantling, recycling, re-use and composting.

ZWAI strongly believes that Ireland and other Member States, and the EU as a whole, should have a policy of not sending to other countries our discarded materials for further treatment or recycling, particularly to developing countries where local populations are being exposed to dioxins and other very toxic POPs. Relying on other countries' infrastructure to achieve our "recycling" targets is not acceptable from a global ecological and societal perspective.

## 3.3 What We are Doing

Our principal objective is to ensure that government agencies, local authorities and other organisations will develop and implement environmentally sustainable resources and waste management policies, especially resource efficiency, waste reduction and elimination, the promotion of re-use, repair and recycling, and the development and implementation of the Circular Economy.

As an environmental NGO, and a not-for-profit company with charitable status since 2005, ZWAI also campaigns for the implementation of the UN Sustainable Development Goals, including (but not limited to) Goal 12, Responsible Consumption and Production; Goal 6, Clean Water and Sanitation (having particular regard to the need to avoid wasting water, and to wasting nutrients contained in our wastewater); and Goal 15, to protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, to halt and reverse land degradation and to halt biodiversity loss.

In responding to many public consultations, members of ZWAI have made submissions and given presentations on:

- how Ireland and the European Union should address the problem of plastic waste (March 2019);
- addressing the problem of single-use plastic packaging by the Irish food industry (November 2019);
- transforming the construction industry so that it could become climate-neutral (instead of being a major emitter of greenhouse gases & toxicants);
- the general scheme of the Irish Government's Circular Economy Bill (October 2021);
- recovery and reuse of the phosphorus and nitrogen content of wastewater (2019 to 2022);
- proposed revision of the EU Regulation on Shipments of Waste (January 2022);
- Feedback to the European Commission on a proposed Directive on Soil Health – Protecting, Sustainably Managing and Restoring EU Soils (March 2022);[16]
- Ireland's energy security situation (October 2022);[17]

[16] https://www.zwai.ie/resources/2022/protecting-sustainably-managing-and-restoring-eu-soils/

[17] Submission to the Department of the Environment, Climate and Communications in Response to the Public Consultation on a Review of the Security of Energy Supply of Ireland's Electricity and Natural Gas Systems; https://www.zwai.ie/resources/2022/public-

- Ireland's Fourth National Biodiversity Action Plan (November 2022);[18]
- Ireland's National Bioeconomy Action Plan 2023-2025 (January 2023);[19]
- Ireland's draft Waste Management Plan for a Circular Economy (July 2023);[20]
- the problem of disposable vaping devices (July 2023);[21]
- the rapidly increasing European and global problem of waste electronic and electric equipment (WEEE, September 2023);[22]
- observations to the European Commission on a Proposed EU Directive on Soil Monitoring and Resilience (November 2023);[23]
- observations on the Irish Government's draft Green Public Procurement Strategy & Plan (November 2023);[24]
- observations and feedback to the European Commission on the proposed revision of the EU Waste Framework Directive (November 2023);[25]

consultation-on-a-review-of-the-security-of-energy-supply-of-irelands-electricity-and-natural-gas-systems/

18 https://www.zwai.ie/resources/2022/submission-to-the-department-of-housing-local-government-and-heritage-in-response-to-the-public-consultation-on-irelands-fourth-national-biodiversity-action-plan-nbap/

19 https://www.zwai.ie/resources/2023/zwai-submission-on-irelands-national-bioeconomy-action-plan-2023-2025/

20 Submission to the Regional Waste Management Planning Offices on the draft Waste Management Plan for a Circular Economy; ZWAI, 05 July 2023: https://www.zwai.ie/resources/2023/submission-on-the-draft-waste-management-plan-for-a-circular-economy/

21 Submission to the Department of the Environment, Climate and Communications in Response to the Department's Public Consultation on Disposable Vaping Devices; ZWAI, 27 July 2023: https://www.zwai.ie/resources/2023/submission-to-the-decc-on-disposable-vapes-and-why-they-should-be-banned/

22 Submission by ZWAI to the European Commission on Waste from Electrical and Electronic Equipment — Evaluating the EU Rules; ZWAI, 22 September 2023. https://www.zwai.ie/resources/2023/waste-from-electrical-and-electronic-equipment-weee-evaluating-eu-rules/

23 Observations and Feedback to the European Commission on the Proposed EU Directive on Soil Monitoring and Resilience; ZWAI, 03 November 2023.

24 https://www.zwai.ie/resources/2023/submission-to-the-decc-on-the-draft-green-public-procurement-strategy-and-action-plan/

25 https://www.zwai.ie/resources/2023/observations-and-feedback-to-the-european-commission-on-the-proposed-revision-of-the-eu-waste-framework/

- observations and feedback to the European Commission on revision of Directives 2000/53/EC & 2005/64/EC on End-of-Life Vehicles (December 2023);[26] and,

- Submission by ZWAI to the Department of the Environment, Climate and Communications in response to the Department's public consultation on proposed amendments to the Access to Information on the Environment (AIE) Regulations 2007-2018;

- Response to the Public Consultation on Ireland's Draft National Energy and Climate Plan (March 2024).

It will be clear that ZWAI is primarily concerned with the very serious issues of discarded substances, materials, water and energy, whether from domestic, commercial or industrial sources, how these become "waste", and how such "waste" may be prevented by re-design along ecological principles. ZWAI is also very concerned about the effectiveness and appropriateness of Irish and EU policies, legislation, programmes and plans which are the principal determinants of how these "wastes" are managed, controlled and monitored for environmental and societal benefits; and, while we have welcome many such initiatives, we have also considered that it was necessary to evaluate them critically and forensically in the context of what is best for the environment and society.

**ZWAI** is represented on the Irish Government's Waste Forum and Water Forum (An Fóram Uisce), is a member of the Irish Environmental Network and the Environmental Pillar, and is funded by the Department of Communications, Climate Action and the Environment through the **Irish Environmental Network**.

In 2019 ZWAI became a full member of the **European Environment Bureau** (EEB); and a member of the **Waste Working Group** of the EEB. Through the EEB, we contribute to the development of European Union policy on waste and the Circular Economy. In November 2021, the EEB established a **Task Force on the Built Environment**; ZWAI is a member of this group, and we contribute to continuing discussions on the sustainability of construction materials, buildings and on the built environment.

[26] https://www.zwai.ie/resources/2023/end-of-life-vehicles-observations-and-feedback-to-the-european-commission/

# 4. THE EFFECTIVENESS AND EFFICIENCY OF THE DIRECTIVE: HOW CAN IT BE IMPROVED?

This section analyses and assesses the success of the Nitrates Directive so far based on the European Commission's most recent report for the 2016-2019 period. We then utilise the information to identify areas where the implementation and content of the Directive are deficient or lack, and we suggest a number of points of improvement.

## 4.1 Methodologies

When it comes to the implementation of the Directive, Member States utilise different methodologies. For example, Member States are not using the same method when calculating nutrient balances, although one particular method is provided and promoted by Eurostat. The use of different methods decreases the possibility of comparing data across countries, and of accurately assessing the effectiveness of the Directive. Another example is the variation in the definition of trophic status utilised by member states, leading to no trends in trophic status of surface waters at the EU level.

It is recommended that a revision of the Nitrates Directive should include an official requirement for Member States to use a specific methodology for calculating nutrient balances and to provide a definition for trophic status within the Directive, which Member States should follow. This will allow a better comparison to be made between countries and more accurate monitoring of EU-level progress. If any other disunity in methodologies or definitions is identified that impedes the Commission's ability to assess EU-level progress, then some additional requirements should also be set.

## 4.2 Data Discrepancies

The issue of differences in methodologies applied by Member States leads to another issue with the Nitrates Directive, which is that there is a lack of data, or insufficient data, supplied to accurately assess progress on certain parts of the Directive.

For example, 13 out of the EU27+UK states did not report any information about the contribution of agriculture to nitrogen loss into the aquatic environment. That means data is lacking for nearly half (46%) of the Member States included in the Directive. This is significant because agriculture is assumed to be the leading cause of nitrate pollution (average of 77%) in aquatic systems, based on the data provided by only a little more than half of the Member States. Moreover, from those States, the average is derived from data with a large range, from agriculture being responsible for 22% to 99% of nitrate pollution. This lack of data is

problematic because it can lead to neglecting other potentially significant sources of nitrate pollution besides agriculture.

It is imperative to collect data in order to monitor the progress of each country; and, at the EU level, in reaching the Nitrates Directive's objectives. Therefore, Member States' reports should be followed up frequently when data is not provided, and infringement cases should be made against them for not complying with this requirement of the Directive.

## 4.3 Implementation

The EU's latest progress report on the Nitrates Directive states that water quality data indicates that the level of implementation and enforcement of the Directive are still insufficient in order to reach the Directive's objectives.

For example, water quality data shows that in some member states, the designation of Nitrates Vulnerable Zones (NVZ) is lacking as some polluted or at-risk areas have not been designated. Additionally, some designated NVZs do not take into account the entire water catchment area, and eutrophication is frequently not considered sufficiently when identifying polluted areas. This reduces the efficiency of action programmes and, therefore, the effectiveness of the Directive. More so, the Commission has identified a ''*significant variability*'' between action programmes when it comes to the specific actions taken and the ambitions of the programmes.

To enforce adequate implementation of the Directive, the EU Commission should push member states to utilise the Nitrate Action Programme Information system (NAPINFO) to optimise their action programmes. Additionally, infringement cases should be opened whenever a Member State is not appropriately complying with the Directive. Points under the next section on the Directive's content (section 4.4) are also relevant to improving the implementation of the Nitrates Directive.

## 4.4 Directive Content

Over the 33 years that the Nitrates Directive has existed, certain areas where it could be improved have been identified, and there have been developments which have led to the need to amend the content of the Directive to better address the current environment and Member States' needs.

It is also our submission that the effects of climate change have not been adequately considered in the Nitrates Directive, and this is not surprising, given the age of the Directive. Member states have indicated that unpredictable effects of climate change, such as the unusually dry summers in Europe between 2018 and 2019, make projections about future water quality difficult.

The Commission has stated that the action programmes currently in place by Member States may not address these effects appropriately and has urged them to apply the precautionary principle and include potential climate change effects in their updated action programmes. While we agree with this proposal by the Commission, we would strongly urge that a revised Directive should include a requirement to take climate change effects into account, and the Commission should provide Member States with a specific methodology that they should follow to account for climate change effects.

The Nitrates Directive does not have its own deadlines for reaching the water quality objectives that Member States need to reach in order to comply with the Directive, but instead relies on deadlines from the Water Framework Directive (WFD) and EU Green Deal. This may have led to the lack of implementation by some Member States addressed above. It is strongly recommended that an amended Nitrates Directive should develop and include its own specific deadlines for compliance by Member States, and these deadlines should be in line with deadlines presented within other Directives.

Although the Nitrates Directive has reduced nutrient loss and water pollution within the EU over the last 30 years, progress has slowed in the last decade. The EU Commission itself states that this could mean ‘*’the low hanging fruits have been already collected and now more far reaching measures being needed to improve the positive trend”*.[27] Therefore, it is an indication that the current Directive may have been sufficient to decrease nitrates pollution in aquatic systems at the time that the Directive was created, but that by now, further measures need to be taken in order to keep that progress going. Therefore, it is recommended that the Nitrates Directive adapts its requirements to advance and increase progress towards reaching its objectives.

## 5. IMPROVING THE CIRCULARITY OF FERTILISERS

The European Union's Nitrates Directive has played a crucial role in regulating agricultural practices to prevent water pollution from nitrates. However, in the pursuit of sustainability and resource efficiency, there is a pressing need to expand the Directive's scope to encompass measures that enhance the circularity of fertilisers. We advocate updating the EU Nitrates Directive to promote the circularity of phosphorus and encourage the use of bio-based waste as fertilizer, thereby fostering sustainable agriculture and resource management.

[27] Report from the Commission to the Council and the European Parliament on the implementation of Council Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources based on Member States’ reports for the period 2016–2019. COM(2021) 1000 final, Brussels, 11.10.2021; section 9, Conclusions.

Phosphorus is an essential nutrient for plant growth, yet its global reserves are finite, making efficient use and recycling imperative. Updating the Nitrates Directive to prioritize phosphorus circularity involves incentivizing practices such as phosphorus recovery from organic waste, sewage sludge, and agricultural by-products. By promoting the use of recycled phosphorus in fertilizers, the Directive can reduce reliance on finite mineral phosphorus sources, mitigate environmental pollution, and enhance soil fertility and productivity.

Furthermore, advocating phosphorus circularity aligns with the EU's objectives of transitioning towards a circular economy and promoting sustainable resource management. Bio-based discarded materials, including organic residues from agriculture, food processing, and municipal waste, are a valuable resource for sustainable fertilizer production; and, in an earlier submission to the European Commission on a proposed directive on soil health; protecting, sustainably managing and restoring EU Soils, we made a number of innovative proposals for sustainable agricultural practices which would significantly reduce the demand for and use of artificial fertilisers.[28]

By updating the Nitrates Directive to facilitate the safe and regulated use of bio-based waste as fertilizer, the EU can achieve multiple environmental and economic benefits. Bio-based waste utilization reduces reliance on synthetic fertilizers, mitigates greenhouse gas emissions from waste disposal, and promotes nutrient recycling and soil health. Moreover, incentivizing the use of bio-based waste as fertilizer encourages innovation, creates new economic opportunities, and contributes to the EU's goals of promoting bioeconomy and circularity.

Updating the EU Nitrates Directive to include measures that enhance the circularity of fertilizers, specifically focusing on phosphorus recycling and the utilization of bio-based waste, is essential for advancing sustainable agriculture and resource management. By prioritizing phosphorus circularity and promoting the safe and regulated use of bio-based waste as fertilizer, the Directive can contribute to environmental protection, soil fertility enhancement, and the transition towards a circular economy.

Through targeted policy interventions and stakeholder collaboration, the EU can demonstrate leadership in promoting sustainable agricultural practices and achieving resource efficiency goals.

The remainder of this section addresses two principal issues. The first part (section 5.1 below) is focused on improving the circularity of phosphorus; while

[28] Feedback by Zero Waste Alliance Ireland to the European Commission on a Proposed Directive on Soil Health – Protecting, Sustainably Managing and Restoring EU Soils; 16 March 2022. https://www.zwai.ie/resources/2022/protecting-sustainably-managing-and-restoring-eu-soils/

the second part (sections 5.2., 5.3 and 5.4) discusses how bio-waste can be incorporated into fertilizer production. Both parts aim to advocate for a closed loop system in relation to fertilizer use and production.

## 5.1 Circular Fertilizer Use: Phosphorus

The depletion of mineral deposits used for phosphorus fertilizer, while still a topic of debate, has brought phosphorus insecurity to the forefront as a global concern. This insecurity is closely linked to the prevailing "*Linear Phosphorus Economy*" (LPE) and its historical and contemporary ramifications. Several issues contribute to this problem, including geopolitical tensions over limited phosphorus deposits held by a small number of nations, escalating costs of phosphorus fertilizers, contamination of soil and food by heavy metals, challenges associated with phosphorus mining waste, and environmental degradation due to inefficiencies in phosphorus fertilizer usage.[29] We argue that transitioning to a more circular use of phosphorus is essential to address these challenges. This transition necessitates the adoption of a "*Circular Phosphorus Economy*" (CPE), which aligns with various Sustainable Development Goals and offers the potential for increased phosphorus autonomy.[30] Some methods for enabling this transition are described in sections 7.2 and 7.3 below.

Phosphorus plays a critical role in economic, agricultural, and environmental contexts, being an indispensable element essential for life on Earth. It serves as a fundamental building block for biochemicals like DNA, cell membranes, and proteins, as well as playing a crucial role in cellular energy cycles and the structural integrity of biological systems. In nature, phosphorus originates from the breakdown of parent material (rock) to form soils and sediments, with slow regeneration and losses through erosion and leaching leading to infertile soils over geological timescales.[31] Consequently, agricultural soils often require phosphorus supplementation to overcome bioavailability limitations and support crop growth. However, conventional high-production farming heavily relies on mineral phosphorus fertilizers, which exhibit low efficiency. Despite the substantial quantities of phosphorus fertilizer applied annually, approximately 70% is not utilized by crops, leading to the accumulation of inaccessible "legacy phosphorus" in soils or its loss into the hydrosphere.[32]

---

29 Walsh, Michael & Schenk, Gerhard & Schmidt, Susanne. (2023). Realising the circular phosphorus economy delivers for sustainable development goals. npj Sustainable Agriculture. 1. 10.1038/s44264-023-00002-0.

30 Ibid

31 Ibid

32 Walsh, Michael & Schenk, Gerhard & Schmidt, Susanne. (2023). Realising the circular phosphorus economy delivers for sustainable development goals. NPJ Sustainable Agriculture. 1. 10.1038/s44264-023-00002-0.

The inefficiencies associated with chemical phosphorus fertilizers entail significant costs and adverse environmental impacts, including exceeding safe planetary boundaries for phosphorus flows, accumulation of heavy metals in agricultural soils and food, and soil degradation and acidification. Despite these consequences, reforms addressing mineral deposits and phosphorus fertilizer industries have been limited, perpetuating monopolized markets, commodity exploitation, and reduced food production capacity in vulnerable nations. Moreover, adopting an LPE framework to achieve Sustainable Development Goals in developing economies exacerbates existing fragilities in the system and poses challenges to planetary boundaries. Therefore, transitioning to a circular phosphorus economy is imperative to address these issues effectively.[33]

Transitioning into a Circular Phosphorus Economy (CPE) is essential for ensuring sustainable phosphorus management in the 21st century. Implementing a CPE requires innovative measures to achieve circularity and address challenges related to foreign market dependency, environmental degradation, and public health risks.[34] This interconnected system aims to achieve food sovereignty, phosphorus autonomy, and ecosystem preservation through nutrient recovery facilities, valorisation technologies, sustainable agriculture and soil management strategies.

Conventional waste management and valorisation technologies for phosphorus-wastes encompass various methods such as enhanced biological phosphorus removal, chemical precipitation, thermal- or wet-chemical treatment, mono-incineration, and thermo-chemical treatment. The advent of the Green Revolution heralded the widespread adoption of chemical nitrogen-phosphorus-potassium (NPK) fertilizers and associated technological advancements. However, the application of these concentrated and readily available nutrients overlooked the importance of soil health and biology.[35]

Soils, which are intricate systems influenced by various biogeochemical factors such as soil type, climate, and vegetation, are profoundly impacted by agricultural management practices. Chemical fertilizers, lacking in carbon, unlike organic materials like manures and composts, can disrupt biogeochemical balances, leading to adverse soil and agronomic outcomes. Organic carbon plays a pivotal role in maintaining soil structural integrity, fertility, water retention, biological health, contaminant uptake regulation by crops, and pH neutralization in acidic soils.[36] Therefore, incorporating carbon and other essential crop nutrients into

[33] Ibid

[34] Haygarth, P. M. & Rufino, M. C (2021). Local solutions to global phosphorus imbalances. Nature Food 2, 459–460.

[35] Haygarth, P. M. & Rufino, M. C (2021). Local solutions to global phosphorus imbalances. Nature Food 2, 459–460.

[36] Ibid

solutions is imperative for enhancing phosphorus efficiency in agriculture. In light of the exceeding of planetary boundaries, it is essential to enhance phosphorus use efficiency in croplands.

## 5.2 Incorporating Bio-waste into Fertilizers

The concept of a circular economy, endorsed by the EU, advocates closing the loop in fertilizer production. This entails substituting some raw materials with residual biomass from various sources such as post-harvest residues, livestock production, and food processing waste.[37] By closing the loop, fertilizing nutrients can be reused, preventing their dispersion into the environment as pollutants.

Transitioning from a fossil-based to a bio-based economy necessitates the recovery of nutrients from waste streams. Substituting mineral fertilizers with bio-based alternatives (as we suggest in section 7 below) is a key strategy for materials and energy recovery, considering the high energy consumption and reliance on fossil fuels in current fertilizer production processes. Historically, the fertilizer industry has been reluctant to valorise renewable resources due to entrenched reliance on proven technologies utilizing non-renewable raw materials.[38] Introducing renewable raw materials, such as animal bones instead of phosphorites, poses technological challenges and requires significant investment in new production infrastructure, without clear incentives like subsidies or tax breaks.[39] Technological advancements in the fertilizer industry primarily focus on process improvements rather than product innovations, aiming to enhance efficiency, reduce raw material usage, lower energy consumption, and increase profitability.[40]

## 5.3 Methods of Biomass Valorisation

To enhance the circularity of fertilizers, several methods of biomass valorisation can be implemented. Composting stands out as a popular approach, albeit with challenges such as nitrogen loss as volatile $NH_3$.[41] Vermicomposting offers an alternative method, leveraging earthworms to transform organic matter, requiring

[37] Chojnacka, Katarzyna & Moustakas, Konstantinos & Witek-Krowiak, Anna. (2019). Bio-based fertilizers: A practical approach towards circular economy. Bioresource Technology. 295. 122223. 10.1016/j.biortech.2019.122223

[38] Ibid

[39] Ibid

[40] Walsh, Michael & Schenk, Gerhard & Schmidt, Susanne. (2023). Realising the circular phosphorus economy delivers for sustainable development goals. npj Sustainable Agriculture. 1. 10.1038/s44264-023-00002-0.

[41] Cobo, S., Dominguez-Ramos, A., Irabien, A., 2018. Minimization of resource consumption and carbon footprint of a circular organic waste valorization system. ACS Sustain. Chem. Eng. 6, 3493–3501. https://doi.org/10.1021/acssuschemeng.7b03767.

no mixing, and enhancing oxygen availability.[42] Anaerobic digestion presents a multi-stage process yielding biogas and digestate, which, when used as organic fertilizer, not only provides essential nutrients but also enhances soil quality and crop yield.[43] However, challenges such as logistics in densely populated areas exist. Thermal methods like incineration and pyrolysis generate ash and biochar, respectively, which can be utilized as fertilizers.[44] Selective collection of biomass ashes is crucial to avoid toxic elements.[45] Additionally, biochar from various sources holds potential for soil improvement and nutrient release.[46] Incorporating biomass ash with acid-solubilized residues can optimize nutrient composition.[47] Overall, integrating these valorisation methods while addressing logistical and compositional challenges can significantly improve fertilizer circularity, promoting sustainable agricultural practices.

## 5.4 Bio-Based Wastes for Fertiliser Production

Improving the circularity of fertilizers involves leveraging various bio-based waste materials for production. With significant quantities of bio-waste generated annually in Europe and globally, strategies for managing organic waste such as food waste, green waste, and sewage sludge are essential. Agricultural waste, including forest residues and animal manure, presents an abundant resource that can be utilized for fertilizer production through fermentation, thermochemical conversions, and co-granulation with other materials like sewage sludge.[48] For instance, wood ash from incineration contains valuable nutrients like phosphorus, suitable for fertilizing acidic soils.[49] Livestock manure, particularly from poultry,

[42] Ibid

[43] Ibid

[44] Karim, A.A., Kumar, M., Mohapatra, S., Singh, S.K., 2019. Nutrient rich biomass and effluent sludge wastes co-utilization for production of biochar fertilizer through different thermal treatments. J. Clean. Prod. 228, 570–579. https://doi.org/10.1016/ J.JCLEPRO.2019.04.330.

[45] Ibid

[46] Chojnacka, Katarzyna & Moustakas, Konstantinos & Witek-Krowiak, Anna. (2019). Bio-based fertilizers: A practical approach towards circular economy. Bioresource Technology. 295. 122223. 10.1016/j.biortech.2019.122223.

[47] Karim, A.A., Kumar, M., Mohapatra, S., Singh, S.K., 2019. Nutrient rich biomass and effluent sludge wastes co-utilization for production of biochar fertilizer through different thermal treatments. J. Clean. Prod. 228, 570–579. https://doi.org/10.1016/ J.JCLEPRO.2019.04.330.

[48] Chojnacka, Katarzyna & Moustakas, Konstantinos & Witek-Krowiak, Anna. (2019). Bio-based fertilizers: A practical approach towards circular economy. Bioresource Technology. 295. 122223. 10.1016/j.biortech.2019.122223

[49] Karim, A.A., Kumar, M., Mohapatra, S., Singh, S.K., 2019. Nutrient rich biomass and effluent sludge wastes co-utilization for production of biochar fertilizer through different thermal treatments. J. Clean. Prod. 228, 570–579. https://doi.org/10.1016/ J.JCLEPRO.2019.04.330.

cattle, and pigs, is rich in organic material and beneficial microorganisms, making it a valuable source of nitrogen fertilizer and soil enhancer.[50]

Food waste, a significant issue globally, offers another potential resource for fertilizer production through processes like anaerobic digestion, aerobic composting, and chemical hydrolysis. By transforming food waste into fertilizers or bio-based products, valuable compounds can be recovered, contributing to a more sustainable agricultural system.[51] Similarly, sewage sludge, a by-product of wastewater treatment, can be processed through anaerobic digestion, composting, or thermal methods to recover nutrients like phosphorus and potassium.[52] Despite challenges such as the presence of heavy metals and micro-pollutants, properly treated sewage sludge can serve as a viable fertilizer, improving soil fertility and crop yield without adverse effects.[53] Overall, the integration of various valorisation methods for bio-based waste materials, including agricultural waste, food waste, and sewage sludge, holds promise for enhancing the circularity of fertilizers. By recovering valuable nutrients and organic matter from these waste streams, the agricultural sector can reduce its reliance on chemical fertilizers, mitigate waste disposal issues, and promote a more sustainable approach to soil fertility management. However, addressing challenges related to contamination and ensuring proper treatment processes are crucial for realizing the full potential of bio-based fertilizers in circular agriculture.

# 6. INNOVATION AND EFFICIENCY: AMMONIA EMISSIONS, CIRCULAR FERTILIZER USE AND PRODUCTION

## 6.1 Ammonia in Relation to the Nitrates Directive

The European Union's Nitrates Directive, Directive 91/676/EEC, stands as a pivotal instrument in combating water pollution, primarily targeting nitrates from agricultural sources. However, it is crucial to recognize the interconnected nature of nitrogen compounds in the environment and acknowledge the significant role of ammonia emissions in contributing to water pollution. We argue that while the Nitrates Directive does not explicitly address ammonia emissions, recognizing the impact of these emissions on surface waters and groundwater is essential to

[50] Cobo, S., Dominguez-Ramos, A., Irabien, A., 2018. Minimization of resource consumption and carbon footprint of a circular organic waste valorization system. ACS Sustain. Chem. Eng. 6, 3493–3501. https://doi.org/10.1021/acssuschemeng.7b03767.

[51] Chojnacka, Katarzyna & Moustakas, Konstantinos & Witek-Krowiak, Anna. (2019). Bio-based fertilizers: A practical approach towards circular economy. Bioresource Technology. 295. 122223. 10.1016/j.biortech.2019.122223

[52] Ibid

[53] bid

achieving the Directive's overarching goals of preserving water quality and safeguarding aquatic ecosystems.

Ammonia emissions, predominantly originating from agricultural activities such as livestock farming and fertilizer application, represent a substantial threat to surface waters and potentially groundwater. Ammonia is highly soluble in water, readily forming ammonium ions, which can elevate water pH and disrupt aquatic ecosystems. Excessive ammonia concentrations can lead to eutrophication, harmful algal blooms, and oxygen depletion, ultimately degrading water quality and impairing aquatic biodiversity. Moreover, ammonia can infiltrate groundwater, posing risks to human health and compromising drinking water sources. Thus, addressing ammonia emissions is integral to preventing water pollution and preserving the integrity of aquatic ecosystems.

While the Nitrates Directive does not explicitly mention ammonia emissions, their detrimental effects on water quality align closely with the Directive's overarching aims. The Directive seeks to protect surface waters and prevent pollution caused by agricultural activities, with a primary focus on reducing nitrate contamination. However, neglecting ammonia emissions seriously undermines the directive's effectiveness in achieving its intended goals. Given the interconnected nature of nitrogen pollution, reducing ammonia emissions complements efforts to mitigate nitrate pollution and enhances overall water quality management.

Incorporating ammonia emissions into the regulatory framework of the Nitrates Directive presents an opportunity to enhance its effectiveness in addressing water pollution. By recognizing the role of ammonia in surface water and groundwater contamination, the Directive can adopt targeted measures to mitigate ammonia emissions from agricultural sources. These measures may include promoting best management practices, such as ecologically sustainably farming practices, regenerative farming, efficient nutrient management, livestock waste management (including recovery of phosphorus from cattle urine, see sections 7.2 and 7.3 below), and ammonia-reducing technologies. Additionally, integrating monitoring and reporting requirements for ammonia emissions can provide essential data for assessing compliance and guiding policy interventions.

Addressing ammonia emissions within the context of the Nitrates Directive yields significant public health and environmental benefits. By reducing ammonia pollution in surface waters and potentially groundwater, the directive mitigates risks to human health, aquatic ecosystems, and biodiversity. Moreover, improved water quality enhances recreational opportunities, supports fisheries, and sustains ecosystem services vital for societal well-being. Recognizing the importance of ammonia emissions in water pollution underscores the directive's commitment to comprehensive environmental protection and sustainable agriculture.

Incorporating ammonia emissions into the regulatory framework of the EU Nitrates Directive is essential for effectively addressing water pollution and safeguarding surface waters and groundwater. While the Directive primarily targets nitrate pollution, acknowledging the interconnected nature of nitrogen compounds necessitates attention to ammonia emissions. By recognizing the detrimental effects of ammonia on water quality and aquatic ecosystems, the directive can advance its overarching goals of preserving water resources and promoting sustainable agriculture. Through targeted measures and enhanced monitoring, the EU can demonstrate leadership in combating ammonia pollution and achieving comprehensive environmental protection. We posit that failure to appropriately address ammonia emissions greatly risks the effectiveness of the Nitrates Directive in adequately protecting ecosystems, biodiversity and human health from negative impacts. As such, to repeat, we call for an update of the Directive to include adequate ammonia reduction targets and measures.

## 6.2 Ammonia Emission Reduction

Agriculture emerges as the predominant source of ammonia emissions in most European Countries. For example, Poland attributed 94% of its ammonia emissions to this sector in 2017.[54] In Poland, livestock manure accounted for the largest share (78%), followed by nitrogen fertilization at 22%.[55] Despite this significant contribution, research findings reveal a limited adoption of pro-ecological practices aimed at reducing ammonia emissions among farmers in Europe, both in mineral fertilization and animal production. Relative to its size, agricultural ammonia emissions in Ireland are relatively high; and from 2013 to 2017 have been roughly half that of Poland during the same time, despite Ireland being roughly 4.5 times smaller than Poland.[56]

The agricultural sector encounters formidable challenges in environmental protection, necessitating technological transformations within agriculture and its ancillary industries, including agrochemical companies. The intensification of agricultural production, geared towards bolstering food supply and ensuring global food security, has engendered negative externalities impacting water, air, soil quality, biodiversity, and animal welfare. Notably, industrialized agriculture mandates grappling with the repercussions of anthropogenic activities, with a primary challenge being the reduction of ammonia emissions.

Ammonia emissions contribute significantly to eutrophication, acidification, and biodiversity loss, predominantly in rural areas. The inclusion of ammonia as an air pollutant in the Gothenburg Protocol (UNECE, 1999) underscores its adverse

[54] Piwowar, A., 2020. Farming practices for reducing ammonia emissions in Polish agriculture. Atmosphere, 11(12), p.1353.

[55] Ibid

[56] Ibid

effects, stemming not only from direct toxicity but also from reactions in water and soil environments, notably volatilization from livestock manures and mineral fertilizer application. Agricultural activities are cited as the primary contributors to anthropogenic $NH_3$ emissions, with a noteworthy 90% increase observed globally between 1970 and 2005.[57]

The detrimental impact of ammonia on human health manifests primarily through respiratory impairment and ocular disorders. Furthermore, ammonia emissions are closely associated with fine particulate matter ($PM_{2.5}$) pollution, contributing to premature mortality. While non-agricultural sources also contribute to ammonia emissions, such as wild animals, seabird colonies, and industrial activities, mitigating emissions from agriculture remains paramount for enhancing air and water quality and promoting sustainable development in rural areas.

Addressing $NH_3$ emissions poses a formidable challenge for environmental regulators worldwide, highlighting the critical need for concerted efforts to adopt and implement strategies aimed at reducing agricultural ammonia emissions to safeguard human health and environmental well-being. Areas with substantial livestock populations and high nitrogen fertilizer usage, leading to elevated ammonia ($NH_3$) emissions, garner significant attention. Excessive $NH_3$ emissions from nitrogen fertilizer applications contribute significantly to atmospheric aerosol production, resulting in reduced visibility and regional haze, particularly during peak periods in spring and autumn. In Europe, where research on $NH_3$ emissions is actively pursued, animal husbandry stands out as the primary source of anthropogenic $NH_3$.[58]

A study by Piwowar (2020) focuses on the adoption of low-emission technologies and practices in Polish agriculture to mitigate $NH_3$ emissions. They found that In 2017, $NH_3$ emissions from agricultural sources in Poland totalled 287,914 tonnes, constituting 7.9% of the EU-28 emissions. Agriculture, particularly animal production, remains a notable contributor to gaseous pollution in Poland, which ranks among the top poultry producers in Europe. Additionally, Poland exhibits one of the highest levels of mineral fertilizer consumption in Europe, with nitrogen comprising over half of the total fertilizer usage.

## 6.3 Updating the Nitrates Directive

Recent scientific research also underscores the urgent need to address ammonia emissions within the regulatory framework of the Nitrates Directive. Studies highlight the detrimental effects of ammonia on human health, biodiversity, and

[57] Piwowar, A., 2020. Farming practices for reducing ammonia emissions in Polish agriculture. Atmosphere, 11(12), p.1353.

[58] Ibid

ecosystem functioning.[59] [60] Given that ammonia emissions have largely been rising throughout Europe over the last decade, we argue that the Nitrates Directive is lacking effectiveness in controlling ammonia emissions.[61]

In order to establish an effective Nitrate Framework, the original Directive needs to be updated to better reflect current emissions. The current Nitrate Directive is largely ineffective in reducing ammonia emissions to a standard that seems appropriate. As such, we posit that an update is necessary. This update should include a focus on reducing ammonia emissions to a point that is sustainable and does not pose a negative impact to human health, biodiversity, and ecosystem functioning.

Emerging technologies and best practices offer feasible solutions for reducing ammonia emissions from agricultural activities. These advancements underscore the imperative for updating the directive to incorporate measures that target ammonia emissions effectively. Moreover, the Directive's reliance on voluntary measures and minimal enforcement mechanisms hinders its effectiveness in regulating ammonia emissions. As a result, ammonia levels continue to rise across the EU, exacerbating air pollution and environmental degradation. As such, without updated comprehensive measures to curb ammonia emissions, the directive falls short of its overarching goal of protecting water quality and ecosystems.

## 6.4 Suggestions of How to Reduce Ammonia Emissions

The study by Piwowar in 2020, found that swift adoption of natural fertilizers is identified as a key strategy for reducing overall ammonia emissions.[62] Additionally, replacing urea with ammonium nitrate shows considerable potential in this regard, along with the spray-free application of slurry, incorporating manure simultaneously. Temperature plays a crucial role in gas emissions from slurry, hence implementing manure cooling systems during storage can be beneficial. XU et al also underscore the potential for reducing ammonia emissions through changes in manure storage and management practices on

[59] Piwowar, A., 2020. Farming practices for reducing ammonia emissions in Polish agriculture. Atmosphere, 11(12), p.1353.

[60] Xu, R.; Tian, H.; Pan, S.; Prior, S.A.; Feng, Y.; Batchelor, W.D.; Chen, J.; Yang, J. Global ammonia emissions from synthetic nitrogen fertilizer applications in agricultural systems: Empirical and process-based estimates and uncertainty. Glob. Chang. Biol. 2019, 25, 314–326.

[61] Piwowar, A., 2020. Farming practices for reducing ammonia emissions in Polish agriculture. Atmosphere, 11(12), p.1353.

[62] Piwowar, A., 2020. Farming practices for reducing ammonia emissions in Polish agriculture. Atmosphere, 11(12), p.1353.

farms, with particular attention to infrastructure in utility rooms.[63] Drawing from experiences in other Baltic Sea region countries like Denmark, where slurry acidification methods have been widely adopted since 2010, offers valuable insights. Slurry acidification technology proves effective in reducing ammonia emissions both in livestock buildings and storage tanks, as well as in the field.

Implementing sustainable agricultural practices necessitates significant financial and organizational commitments from farms.. It entails large-scale adoption of low-emission techniques for fertilizer application and storage, alongside modern animal husbandry systems.[64] Enhancing instruments to support investments and fostering farmers' knowledge and skills are imperative. Regarding slurry management, simultaneous fertilization and cultivation using specialized equipment, along with slurry acidification, emerge as effective strategies to minimize $NH_3$ emissions.[65] Leveraging natural fertilizers for agricultural biogas production presents another promising avenue[66]. Proper handling of urea fertilization, including immediate mixing with soil and utilizing urease inhibitors, is crucial[67]. Technical measures need to be complemented with skilful application, especially in intensive livestock farming, where implementing low-carbon techniques is paramount. As environmental regulations tighten, precision farming elements such as continuous air emissions monitoring and precise fertilizer application gain significance.

63 Xu, R.; Tian, H.; Pan, S.; Prior, S.A.; Feng, Y.; Batchelor, W.D.; Chen, J.; Yang, J. Global ammonia emissions from synthetic nitrogen fertilizer applications in agricultural systems: Empirical and process-based estimates and uncertainty. Glob. Chang. Biol. 2019, 25, 314–326.

64 Xu, R.; Tian, H.; Pan, S.; Prior, S.A.; Feng, Y.; Batchelor, W.D.; Chen, J.; Yang, J. Global ammonia emissions from synthetic nitrogen fertilizer applications in agricultural systems: Empirical and process-based estimates and uncertainty. Glob. Chang. Biol. 2019, 25, 314–326.

65 Piwowar, A., 2020. Farming practices for reducing ammonia emissions in Polish agriculture. Atmosphere, 11(12), p.1353.

66 Guo, X.; Ye, Z.; Chen, D.; Wu, H.; Shen, Y.; Liu, J.; Cheng, S. Prediction and mitigation potential of anthropogenic ammonia emissions within the Beijing–Tianjin–Hebei region, China. Environ. Pollut. 2020, 259, 113863.

67 Ibid

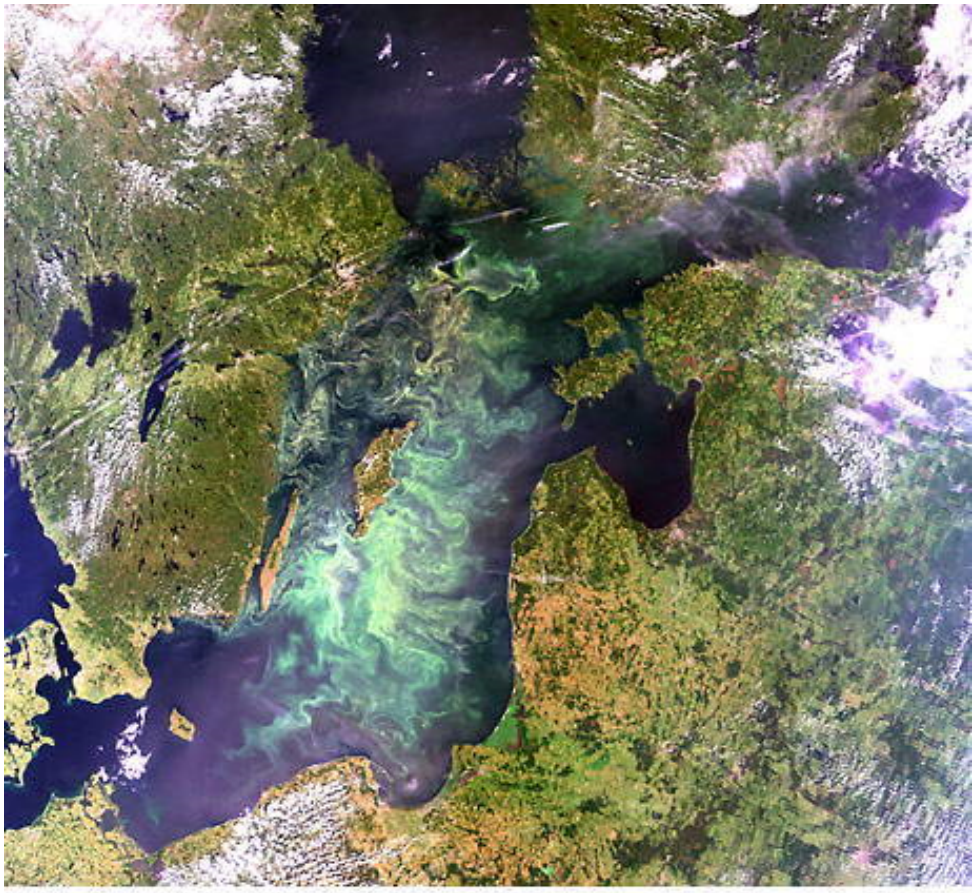
# 7. EXAMPLES AND THE SCALE OF NITROGEN / NUTRIENT WASTING AND WATER POLLUTION.

In recent decades, algal blooms have become common in Irish and international water bodies. The presence of excessive nutrients in water might not be noticed in winter but during the summer weather and the long days of sunshine, a blanket of green slime often appears on the water surface. Years ago, Lough Derg was polluted by a floating carpet of green slime, held in suspension by trapped oxygen bubbles (see photos below). In later years warning signs were erected on the hazards of this nutrient pollution.

**Fig 7.1** **Lough Derg eutrophication**


**Fig 7.2** **Cautionary notice erected by Clare County Council on the shoreline of Lough Derg**

The Gulf of Mexico near the estuary of the Mississippi River in the USA becomes a dead zone in summer. The algal blooms are so dominant that no other life form can exist in the water. The wasting of nitrates and phosphates in groundwater and surface water is now at a crisis point, mankind is breaching the safe sustainable planetary boundaries. In another part of the world the Baltic Sea turns green.



Satellite image of a Nodularia bloom in Baltic Sea
(Credit: SMHI; EOS 8211; MODIS 2005-07-11, NASA, processed by SMHI8217 oceanography unit.)

**Fig 7.3 Satellite image of plankton bloom in the Baltic Sea**

## 7.1 How Organic Based Nitrates Originate and How Synthetic Nitrogen Fertilisers are Manufactured

The manufacture of synthetic ammonia using the Haber Bosch method, to produce various forms of ammonium based fertiliser is primarily dependent on the burning of coal and natural gas. The manufacture alone accounts for 1.5% to 2% of the total global greenhouse gas emissions. Because of the Russian Ukrainian war and the need to avoid further climate change, there is now a growing global movement to burn less fossil fuels.

**Nitrates from fossil fuels**

The rising cost of synthetic and mineral fertiliser is likely to continue into the future. At some point over the coming decades, in an effort to achieve zero greenhouse gas emissions we may have to end fossil fuel burning. This trend is turning farmers to rely more on using lower cost organic fertilisers. To reduce fertiliser costs, cattle slurry is therefore being more heavily relied upon.

**How nitrogen and nitrates are entering the aquatic environment.**

Prof Owen Fenton, Teagasc, 23 March 2021: https://www.teagasc.ie/news--events/daily/environment/how-nitrate-leaching-occurs.php

> "*Nitrate leaching can occur during times of heavy or prolonged rainfall. Free draining soils are particularly susceptible to nitrate loss as it's very mobile in soil and readily leaches groundwater. The highest risk is in winter and early spring",* as Prof Owen Fenton, Teagasc Researcher explains:
>
> *"The highest risk is at the shoulders of the year in winter and early spring due to unfavourable weather and where the nitrogen is not being used by the plant due to poor crop growth.*
>
> *The pathway for leached nitrate is down through the soil into groundwater, the groundwater eventually ends up in the river (receptor) and the river carries the nitrate to the estuary.*
>
> *In free draining areas, nitrate can move from the soil to the river from months to years but as we move to moderately drained areas it can take up to decades. Remember, the landscape is rarely uniform but in reality, it is a tapestry of freely, moderately, or poorly draining areas. Therefore, the transfer of nitrate to surface waters is not uniform in our landscape."*

Any excess nitrate that remains or is not bio absorbed by growing crops will therefore move down into the soil later, especially during the winter wet weather.

The main contribution of nitrates from cow slurry, is the urine. The relative scale of phosphorus and nitrogen in cattle slurry is shown in the table below:

| Element | Cow Dung | Cow urine |
|---|---|---|
| Total Nitrogen | 1.6 | 8.9 |
| Total Phosphorus | 0.5 | 0.2 |

It is clear from the analysis above that by far most of the nitrogen in ammonia that becomes nitrates originates from the urine. It follows therefore that we should be separating any excess cow urine.

Furthermore, some reports state that dairy cows typically only utilise 30% of dietary N for milk production, with approximately 70% of ingested N being excreted. This information therefore supports the claim by the more efficient dairy farmers when they claim that they are generally self-sufficient in nutrients on their farm. In Europe we should therefore promote better methods to manage any surplus or excess nutrients.

## 7.2 Methods and Technologies to Remove and to Recover Phosphorus and Nitrogen

**PROPOSAL 1**. – That the European Commission should promote methods and technologies to separate cow urine and to treat it, to remove and recycle both phosphorus as well as nitrogen. Recent research shows that cows can be trained where to urinate in a specific area.[68]

> "*Turns out cows can be potty trained as easily as toddlers. Maybe easier. It's no bull. Scientists put the task to the test and 11 out of 16 cows learned to use the "MooLoo" when they had to go. Just like some parents, the researchers used a sweet treat to coax the cows to push through a gate and urinate in a special pen. And it took only 15 days to train the young calves. Some kids take quite a bit longer.*
>
> *"The cows are at least as good as children, age 2 to 4 years, at least as quick," said study senior author Lindsay Matthews, an animal behavioural scientist at New Zealand's University of Auckland who worked with colleagues on the tests at an indoor animal research lab in Germany.*
>
> *What started with a half-in-jest question on a New Zealand radio talk show about the very real problem of livestock waste resulted in a serious study published Monday in the journal Current Biology. And it wasn't just a "wow, this could be fun" academic question. Massive amounts of urine waste is a serious environmental issue"*, Matthews said.

Urine contains nitrogen, and when mixed with faeces becomes ammonia, which causes an environmental problem, and urine can also taint the water with nitrates and create the airborne pollutant nitrous oxide.

[68] https://www.npr.org/2021/09/15/1037387164/cows-pee-training-mooloo-nitrous-oxide-pollution#:~:text=Scientists%20put%20the%20task%20to,to%20train%20the%20young%20calves.

**PROPOSAL 2** – That the European Commission would create a market for separated urine and struvite. That urine should be collected and treated at nearby centralised facilities to remove phosphorus and nitrogen and, most importantly, to produce an economically profitable fertiliser product called Struvite and ammonium sulphate.

## 7.3 Reasons for Recycling Phosphorus and Nitrogen from Separated Cow and Human Urine

In meeting future climate change goals mankind may be forced to close down all coal and natural gas power stations. At present almost all of the global supply nitrogen fertilisers are produced by the burning of natural gas and coal using the Haber Bosch method. Half the world population would not be alive today except that we produce nitrogen fertiliser from fossil fuels.

Likewise, if we are forced to close coal and natural gas power stations over the coming 30 years, the flue gas scrubbers at these power stations will no longer produce the large quantities of sulphuric acid required to produce phosphorus fertilisers. Global shortages of sulphuric acid will seriously constrain the global production of mineral based phosphorus fertilisers.[69]

As the global mineral phosphorus supplies and synthetic nitrogen fertilisers grow ever more expensive, an ever-growing global population will require the development of recycled fertilisers from vegetable biomass, from municipal sewage wastewater and from separated urine. If this new circular economy revolution is unable to meet the global market demand for fertilisers, then millions of poor people in cities may go hungry due to unaffordable food supplies.

Scientists have developed methods for recovering phosphorus from human urine, and a research paper details the method and gives a simple diagram of the system.[70]

Adding magnesium salt to human or cow urine will produce Struvite (magnesium ammonium phosphate). Using sulphuric acid ($H_2SO_4$) in the next stage will recover the nitrogen as ammonium sulphate. If these are produced in high enough quantities, both will become the lowest cost recycled commercial fertilisers in the future emerging circular economy.

---

[69] https://rgs-ibg.onlinelibrary.wiley.com/doi/10.1111/geoj.12475

[70] *Three-stage treatment for nitrogen and phosphorus recovery from human urine: Hydrolysis, precipitation and vacuum stripping.* https://www.sciencedirect.com/science/article/abs/pii/S0301479719311533

Europe relies on its farmers to produce enough food crops for the population; and therefore any new regulations proposed by the European Commission for the purpose of reducing pollution of water by nitrates from agricultural sources should not impose further reductions in farming incomes. Instead, the opportunity to recycle a nutrient resource should developed and encouraged.

ZWAI believes that any excess nitrates in cow urine should be separated, collected, and be sold by the farmer as a third income. Cow urine and human should be regarded by the Commission as a renewable and sustainable resource for toxic free fertilisers for the European and the World fertiliser market; and therefore **it is our submission** that European farmers should in this way receive another income for avoiding nitrate pollution in ground water, and for selling nitrogen and phosphorus-rich cow urine.

Furthermore, the removal of cow urine will reduce the excess nitrates that remain in the soil, if excess slurry is excessively applied or if the nitrates still remain in the ground after a crop has been harvested.

The remaining cow dung, if mixed with straw, can be composted. Apart from the remaining nutrients remaining in straw composted cow dung, there will be more efficient enrichment of the organic content in the fields, there will better retention of the moisture and the organic matter will help to avoid top-soil loss.

**PROPOSAL 3** - That the European Commission would pay European farmers and support farm incomes, by requiring member states to collect and treat cow urine, at creameries and municipal sewage treatment works to produce a product called struvite and ammonium sulphate.

## 7.4 Removing Pharmaceuticals and Their Residues from Wastewater

It is easier and cheaper to remove pharmaceuticals from separated cow and human urine than from municipal treated wastewater. The quantities and the cost of the biochar required to reduce pharmaceuticals from urine is about 100 times smaller for urine than from mixed wastewater.[71] The costs on the pharmaceutical industry will be excessive if we remove pharmaceuticals from European municipal wastewater alone. Therefore Europe should begin to separate urine to remove pharmaceuticals.

[71] https://ec.europa.eu/environment/integration/research/newsalert/pdf/separate wastewater treatment urine lower environmental impact than centralised combined treatment 493na2 en.pdf

If mankind does not begin to prevent pharmaceuticals soon from entering ground water and rivers, then the antibiotic resistance problems in hospitals will only get worse.[72]

The UN, international agencies and experts produced a report demanding immediate, coordinated and ambitious action to avert a potentially disastrous drug-resistance crisis. If no action is taken, according to the UN Ad hoc Interagency Coordinating Group on Antimicrobial Resistance which released the report, drug-resistant diseases could cause 10 million deaths each year by 2050, and damage to the economy as catastrophic as the 2008-2009 global financial crisis. By 2030, antimicrobial resistance could force up to 24 million people into extreme poverty.

Currently, at least 700,000 people die each year due to drug-resistant diseases, including 230,000 people who die from multidrug-resistant tuberculosis. More and more common diseases, including respiratory tract infections, sexually transmitted infections and urinary tract infections, are untreatable; lifesaving medical procedures are becoming much riskier, and our food systems are increasingly precarious.

The world is already feeling the economic and health consequences as crucial medicines become ineffective. Without investment from countries in all income brackets, future generations will face the disastrous impacts of uncontrolled antimicrobial resistance. Recognizing that environmental, human, animal, food and health are closely interconnected, the UN report calls for a coordinated, multisectoral “One Health” approach.

The UN report recommends that countries should:

> prioritize national action plans to scale-up financing and capacity-building efforts;
>
> put in place stronger regulatory systems and support awareness programs for responsible and prudent use of antimicrobials by professionals in human, animal and plant health;
>
> invest in ambitious research and development for new technologies to combat antimicrobial resistance; and
>
> urgently phase out the use of critically important antimicrobials as growth promoters in agriculture.

[72] “*New report calls for urgent action to avert antimicrobial resistance crisis. International organizations unite on critical recommendations to combat drug-resistant infections and prevent staggering number of deaths each year“. 29 April 2019 from “World Health Organization”.*

"*Antimicrobial resistance is one of the greatest threats we face as a global community. This report reflects the depth and scope of the response needed to curb its rise and protect a century of progress in health,"* said Ms. Amina Mohammed, UN Deputy Secretary-General and Co-Chair of the IACG. "*It rightly emphasizes that there is no time to wait and I urge all stakeholders to act on its recommendations and work urgently to protect our people and planet and secure a sustainable future for all."*

Zero Waste Alliance Ireland is concerned about the levels of pharmaceutical pollution in Irish rivers.[73] The European Union must therefore enable measures to tackle this problem at the front to the pipe.

**PROPOSAL 4** - That the European Commission would require the Member States to permit and encourage collection and treatment systems, perhaps using biochar to remove pharmaceuticals and anti-biotics from separated animal and human urine.

# 8. Environmental Governance Provisions: Public Participation, Access to Information, Access to Justice

## 8.1 Aarhus Convention & EU Environmental Policy

The Aarhus Convention UNECE 1998 is an environmental human rights treaty with the objective of vindicating the right to a clean and healthy environment (Article 1). It seeks to vindicate this right through a framework of environmental governance that is designed to improve the quality, transparency and accountability of environmental decision making. It does this by mandating the procedural environmental human rights of access to environmental information, access to public participation in environmental decision making and access to justice where these rights are breached or environmental law is breached. It seeks to ensure those affected and environmental NGOs are informed about what is happening with the environment, and have a say in environmental decisions.

The Aarhus Convention is a "mixed agreement" ratified by both the EU and all its Member States, making it part of the EU legal framework. It has also been implemented by a number of EU laws.

The IPPC have highlighted how such rights are crucial climate adaptations, and the EU Green Deal commits to high standards of environmental justice in the EU.

[73] "Harmful levels of antibiotics found in four Irish rivers" https://www.rte.ie/news/ireland/2023/0517/1384210-waste-water-treatment/

The EU 8th Environmental Action Plan also highlighted the importance of these environmental governance measures as crucial to achieving the EU's environmental goals.

The EU Commission has indicated that due to the unwillingness of the Member States to introduce a cross-cutting Access to Justice Directive, and the ongoing issue of barriers to access to justice at Member State level, there should be specific Access to Justice clauses in all sectoral environmental laws like the Nitrates Directive.[74]

Many environmental laws also introduce access to information and public participation clauses which are tailored to the particular context of the specific law. The long experiences of EU legislation such as the EIA Directive and the Governance Regulation show how these clauses can work successfully to provide a clear basis for public participation and access to information, and synergise rather than cross over the rights in the cross-cutting Directives on Access to Information and Public Participation.

Access rights are of crucial importance to implementation of EU environmental law and policy. The EU Green Deal,[75] (pg. 23) recognised the fundamental importance of these rights for ensuring accountability and implementation of the Union environmental acquis, and it committed to enhancing access to justice in particular. Not only does accountability ensure effectiveness of EU law, it saves the Union billions. It is estimated that non-implementation of EU environmental law costs the Union collectively a conservative estimate of €55Bn per year. The EU Commission also recognised the fundamental importance of access to justice in implementing EU environmental law in its policy documents.

## 8.2 Public Participation Recommendations

The Directive does not specify any public participation provision, but we know that the Aarhus Convention is applicable to the plans and decisions made under the Directive, both via its status as a mixed agreement and the EU's ratification, and via instruments like the SEA Directive.

[74] COM(2020) 643 Final Communication From The Commission To The European Parliament, The Council, The European Economic And Social Committee And The Committee Of The Regions Improving access to justice in environmental matters in the EU and its Member States

https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX%3A52020DC0643

[75] EU Green Deal https://ec.europa.eu/info/sites/default/files/european-green-deal-communication_en.pdf

The Espoo Convention is also a mixed agreement applicable here and mandates transboundary Environmental Impact Assessment that should include public participation.

Public participation clauses should also therefore be included:

- In relation to all of the Plans required to be made under the Directive;
- in relation to the transboundary elements of the Directive particularly Article 3.3 regarding waters draining into other Member States;
- in relation to the designation decisions under Article 3.

## 8.3 Access to Information

It is vital that the Directive is updated to mandate the electronic publishing of all of the monitoring information gathered under the Directive, and that this is accessible to the public online in an understandable and plain English format.

Monitoring should include a citizen science portal where the public can report irregularities with compliance with the Directives terms.

A stronger system of penalties is needed to improve compliance.

The Directive also needs to include recommendations on use of Best Available Technology for monitoring and should provide that the Commission create an expert group to develop up to date monitoring and dissemination technologies, that use latest GIS and Blockchain technology to ensure accuracy, transparency and verification.

## 8.4 Access to Justice Recommendations

It is recommended that an “Access to Justice” clause should be introduced to allow challenge of decisions made under the Nitrates Directive at Member State level; and this should be modelled on similar clauses in use in other Directives, such as the clause in the Article 25 of the Industrial Emissions Directive (IED) Recast[76] that recently received approval.

A suggested draft text based on Article 25 of the IED with amendments highlighted in bold is set out below:

[76] Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) (Recast) (Text with EEA relevance) https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02010L0075-20110106

**Article X**

*Member States shall ensure that, in accordance with the relevant national legal system, members of the public concerned have access to a review procedure before a court of law or another independent and impartial body established by law to challenge the substantive or procedural legality of decisions, acts or omissions* ***subject to public participation obligations or to challenge breaches of the requirements of this Directive*** *when one of the following conditions is met:*

*(a) they have a sufficient interest;*

*(b) they maintain the impairment of a right, where administrative procedural law of a Member State requires this as a precondition.*

*2. Member States shall determine at what stage the decisions, acts or omissions may be challenged.*

*3. What constitutes a sufficient interest and impairment of a right shall be determined by Member States, consistently with the objective of giving the public concerned wide access to justice.*

*To this end, the interest of any non-governmental organisation promoting environmental protection and meeting any requirements under national law shall be deemed sufficient for the purpose of paragraph 1(a).*

*Such organisations shall also be deemed to have rights capable of being impaired for the purpose of paragraph 1(b).*

*4. Paragraphs 1, 2 and 3 shall not exclude the possibility of a preliminary review procedure before an administrative authority and shall not affect the requirement of exhaustion of administrative review procedures prior to recourse to judicial review procedures, where such a requirement exists under national law.*

*Any such procedure shall be fair, equitable, timely and not prohibitively expensive.*

*5. Member States shall ensure that practical information is made available to the public on access to administrative and judicial review procedures.*

# 9. CONCLUDING OBSERVATIONS

The Nitrates Directive has had a positive impact on the reduction of pollution to water bodies in Europe. However, the results are not sufficient to meet the goals set by the WFD and EU Green Deal. Therefore, it is imperative that the Nitrates Directive is revised to ensure further progress in the decreasing of nitrate pollution to aquatic systems throughout the EU27+UK.

It is recommended that the Directive takes a more active approach by providing very specific guidelines and setting increasingly ambitious requirements for Member States to meet. Additionally, the Directive should support Member States by taking into account environmental changes that have occurred within the last 30 years as a result of climate change. Further support can be provided by utilising existing tools, such as NAPINFO, which can help Member States when creating their action programmes.

The arguments presented highlight the critical need for updating the EU Nitrates Directive to address the pressing issues of ammonia emissions and fertilizer circularity. Agriculture emerges as a predominant source of ammonia emissions in Europe, with significant contributions from livestock manure and nitrogen fertilization. Despite the substantial environmental impact, there is a limited adoption of pro-ecological practices among European farmers, exacerbating ammonia emissions and their associated environmental and health risks.

Ammonia emissions contribute significantly to eutrophication, acidification, and biodiversity loss, underscoring the urgency of incorporating measures to mitigate emissions within the regulatory framework of the Nitrates Directive. Emerging technologies and best practices offer feasible solutions for reducing ammonia emissions, necessitating updates to the Directive to reflect current scientific knowledge and environmental priorities.

Furthermore, enhancing the circularity of fertilizers, particularly phosphorus recycling and the utilization of bio-based waste, is crucial for promoting sustainable agriculture and resource management. By incentivizing the use of recycled phosphorus and bio-based waste as fertilizer, the Directive can reduce reliance on finite mineral resources, mitigate environmental pollution, and foster a transition towards a circular economy.

It is also essential that public participation clauses should be included in a new or revised Nitrates Directive: (i) in connection with all plans required to be made under the Directive; (i) in relation to the transboundary elements of the Directive, particularly Article 3.3 regarding waters draining into other Member States; and (iii) in relation to the designation decisions under Article 3.

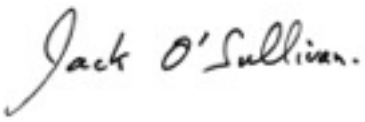
We also strongly recommend that an “access to justice” clause should be introduced to allow challenges to decisions made under the Nitrates Directive at

Member State level ; and this should be modelled on the clauses in use in other Directives.

Incorporating these updates into the EU Nitrates Directive will not only enhance environmental protection and human health but also promote sustainable agricultural practices and contribute to the EU's overarching goals of resource efficiency and circularity. Therefore, policymakers must prioritize the revision of the Directive to address the interconnected challenges of artificial fertiliser run-off, eutrophication of surface waters and groundwater, ammonia emissions, fertilizer circularity, food security, land use near water bodies, recovery of phosphorus, prevention of pollution by pharmaceutical substances and their residues, access to the relevant environmental information, and procedures to specifically permit legislative review or challenging of decisions made under the Directive.

It is our submission that these proposed or similar changes should be made in a revised or new Nitrates Directive, so that a sustainable and resilient agricultural sector can be ensured for future generations.

Jack O'Sullivan



**Zero Waste Alliance Ireland** 08 March 2024

This submission was researched and written by Ollan Herr (ZWAI founder member and director); Jack O'Sullivan (ZWAI founder member and director); Sara Borkent (ZWAI member); Craig Tobin-Dower (ZWAI member); Alison Hough (ZWAI director, legal specialist and senior lecturer in law at the Technological University of the Shannon and Head of the Access to Justice Observatory), with additional introductory text by Jack O'Sullivan; and was initially edited by Órla Coutin (ZWAI administrator and membership secretary), and final editing by Jack O'Sullivan, with the assistance of Dalia Smelstoriūtė.