EEB comments on the European Commission's initiative to develop an Integrated Nutrient Management Action Plan

The EEB welcomes the public consultation on the European Commission's initiative to develop an EU's Integrated Nutrient Management Plan and would like to submit additional comments to complement the answers in the questionnaire used for the public consultation.

As announced in the EU Biodiversity and Farm to Fork strategies and in the Zero Pollution Action plan, the Commission is developing an Integrated Nutrient Management Action Plan (INMAP) to tackle the currently unsustainable nutrient flows in the EU (mainly nitrogen (N) and phosphorus (P). The INMAP will aim to deliver on the European Green Deal target to reduce nutrient losses by at least 50% as well as reduce the use of fertilisers by at least 20% by 2030 and will complement the Zero Pollution Action Plan.

During the preparatory workshop, several researchers (e.g. from the JRC) warned that measures under the existing policies, strategies and legislation (F2F, Ff55 and UWWTD)[1] would only reduce losses by 30%. Thus the INMAP will therefore need to put forward additional measures to bridge this gap and meet the set targets as well as increase those targets to return within the planetary boundaries. In Europe, we need to drastically reduce nutrient losses to return to safe levels. Current nutrient flows surpass the **planetary boundaries** by a factor of 3.3 and 2 for nitrogen and phosphorus respectively[2] with dire consequences for the environment and human health, including eutrophication, nitrate pollution of surface and groundwater including sources of drinking water, harmful air pollution, greenhouse gas emissions, deteriorating soil quality, and biodiversity loss.

Two thirds of the excessive nitrogen and phosphorus levels in waters originate from fertilisers in agriculture and a third comes from industrial and domestic wastewaters. According to the latest Nitrates Directive report, 36% of rivers and 32% of lakes, 31% of coastal and 32% of transitional waters and 81% of marine waters were reported as eutrophic for the period 2016-2019. Atmospheric emissions of nitrogen pollutants from traffic, energy and industry (half from agriculture and half from burning fossil fuels) are estimated to be responsible for 374 000 premature deaths in the EU every year. Deposits of atmospheric emissions are causing soil acidification and eutrophication, affecting biodiversity.

Nutrient pollution has been addressed by **EU legislation** since the 1990s, including via the Urban Waste Water Treatment Directive (UWWTD) and the Nitrates Directive, and later via the Water Framework Directive (WFD), the Marine Strategy Framework Directive and the Industrial Emissions Directive. For air, the National Emission Ceilings Directive (NECD) and the Ambient Air Quality Directives (AAQD) have been cornerstone. This has been complemented with **emissions standards**

[1] See slide 35 in the presentation done during the ZPAP workshop 25 May https://environment.ec.europa.eu/news/zero-pollution-monitoring-and-outlook-workshop-2022-05-25_en

[2] EEA (2020) Is Europe living within the limits of our planet? An assessment of Europe's environmental footprints in relation to planetary boundaries

from the transport and energy sectors. The Birds and Habitats Directives are drivers to safeguard biodiversity and to lower NH_3 and NO_x emissions, as part of the precautionary approach.

Still, 30 years later, nutrient pollution in the EU remains an issue and comes at a **high cost for society and the environment**.

According to the European Nitrogen Assessment the cost–benefit analysis highlights how the overall environmental costs of all reactive N losses in Europe (estimated at €70–€320 billion per year) outweigh the direct economic benefits of reactive N in agriculture.[3] The highest societal costs are associated with loss of air quality and water quality, linked to impacts on ecosystems and especially on human health.

The comprehensive Integrated Nutrient Management Action Plan is a crucial and highly welcome opportunity to take a **holistic approach** to nutrient flows and losses, spanning agriculture, industry, transportation, and households (wastewater). It is also an opportunity to shift the burden of pollution from the environment and society to polluters in line with the zero pollution ambition. Rather than the 'end-of-pipe' pollution control solutions which are promoted by siloed approaches to nutrients pollution, this initiative must stir the search for **systemic solutions**. This is especially important in the agri-food sector, where a transition to circular and efficient nutrients management can bring huge benefits for society, farmers, and the environment. This requires a fundamental **transition** away from extractive and linear agriculture to agroecological and mixed farming that combines extensive livestock and crops for optimal nutrients cycling; as well as a move to more plant-rich, sustainable diets.

The INMAP should outline, with clear indicators, how the EU will get back to sustainable nutrient flows by 2030, following the zero pollution ambition as well as other relevant European Green Deal initiatives. When drafting the INMAP the Commission should follow the ZPAP hierarchy of actions, precaution and prevention are prioritised over elimination and substitution and set out clear timelines and measures.

In this document EEB outlines our recommendation on needed action and priorities, submitted together with our response to the European Commission's public consultation for the INMAP.

Outline

1. **Targets on reduction of inputs and losses**
    a. **Reducing the inputs**
    b. **Improve management and address losses**
2. **Legislative action**
    a. **Better implementation and enforcement of current legislation**
    b. **New legislative action**

[3] Sutton et al. (2011) European Nitrogen Assessment

3. **Guiding principles**
    a. **Shifting the burden of pollution**
    b. **Fostering self-sufficiency**

Suggested targets and measures to reduce inputs and losses

1. Reducing the inputs

Modern agriculture is the main driver behind today's unsustainable nutrient flows. Over the past century, conversion of atmospheric nitrogen into reactive nitrogen has tripled in Europe.[4] Today, synthetic and inorganic fertilisers represent the largest inputs to the EU nutrient flows. 76% of EU phosphorus imports are for the agricultural sector, mainly as fertiliser for crop production.[5] Similarly, production of synthetic nitrogen fertiliser represents the largest part of human conversion of atmospheric nitrogen into reactive nitrogen.[6]

Considerable nitrogen and phosphorus inputs are also imported in the form of livestock feed; as well as, for phosphorus, phosphate additives to animal feed ('feed phosphate'), which prop up industrial-scale livestock rearing which causes devastating air and water pollution by nutrients. Nitrogen fertiliser is produced by fossil gas, with large associated GHG emissions in both the extraction and production stage. **Extraction of fossil gas must start declining immediately** and steeply to be consistent with limiting long-term warming to 1.5°C[7], but plans by major producer countriesare worryingly going in the other direction.[8] The use of phosphate fertilisers is also associated with significant cadmium pollution, raising concerns for human health: 21% of agricultural topsoils have concentrations of cadmium above the safe limit for groundwater.

These inputs to the European nutrient cycles need to be thoroughly reassessed. End of pipe-measures to address losses are not sufficient, our overall production and consumption patterns needs to be changed or lowered.

A phase-out scenario of synthetic nitrogen fertiliser and imports of animal feed is realistic within an agro-ecologic transition according to scientists.[9] A radical reduction of nutrient inputs is also necessary

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[4] Sutton et al., (2011) European Nitrogen Assessment
[5] van Dijk et al. Sci. Total Environ. Vol. 542, Part B, (2016) 1078-1093 *https://doi.org/10.1016/j.scitotenv.2015.08.048*
[6] Sutton et al., (2011)
[7] Figueres et al. (2017) Nature comment Three years to safeguard our climate
[8] UNEP press release (20 Oct 2021) Governments' fossil fuel production plans dangerously out of sync with Paris limits
[9] See for example: IDDRI (2018) An agro-ecological Europe by 2050: a credible scenario, an avenue to explore and Billen et al. (2021) One Earth perspective Vol 4:**6**, p. 839-850 https://doi.org/10.1016/j.oneear.2021.05.008

to protect ecosystems. A study co-financed by the fertiliser industry found that N inputs[10] need to be reduced by 43% on average (with large differences within the EU territory) to sufficiently protect aquatic ecosystems.[11] Such a reduction of N inputs would also ensure sufficient protection of terrestrial ecosystems (according to the same study). An independent study points to a 65% reduction of nitrogen fixation (synthetic and biological fixation) to be necessary to return into the planetary boundaries.[12] These numbers highlight the need to set more science-based targets going beyond the current targets set in the Farm to Fork and Biodiversity Strategies and reconfirmed in the Zero Pollution Action Plan (50% reduction of nutrient losses by 2030 and resulting 20% reduction of the use of fertilisers). They should serve as a basis for increased reduction targets for N inputs to achieve the environmental objectives of the Water Framework Directive by 2027 and to get the system back within the planetary boundaries by 2030.

Key targets and measures to be introduced in the INMAP:

- **An interim commitment to reduce by 50% the use of mineral and synthetic fertiliser by 2030** – recognising that the target set in the Farm to Fork and Biodiversity Strategies is insufficient and is not matching the science .
- **A commitment to phase out by 2040 the latest**
    - **The use and production of (virgin) synthetic N fertiliser produced from fossil gas**
    - **The use and import of phosphate rock and P fertiliser from phosphate rock**
    - **Imports of livestock feed and phosphate additives to animal feed**

2. Improve management and address losses

Improve Nutrient Use Efficiency

Even though our current food system is relying on finite raw materials, we are using these resources in a wasteful way with huge nutrient losses from field to plate. Only 20% of the nitrogen and 30% of the phosphorus added to fields ends up on the plate, meaning the **Nutrient Use Efficiency** (NUE) is very low.[13] This is driven by losses at production level, inefficient utilisation of nutrients through intensive livestock farming and high consumption of animal proteins, and food waste. According to the UN, countries should strive to achieve a NUE for the crop sector of at least 70% and full-chain NUE of at least 50%.[14]

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[10] defined as fertiliser, manure, biosolids, atmospheric deposition, biological fixation and net mineralisation

[11] de Vries et al. (2017) Science of The Total Environment, Vol. 786, https://doi.org/10.1016/j.scitotenv.2021.147283

[12] RISE foundation (2018) What is the Safe Operating Space for EU livestock?

[13] EEA (2017) Report No 16/2017 Food in a green light: A systems approach to sustainable food
See also Cordell et al. (2009) Glo Env Change, Vol 19:**2**, p. 292-305 https://doi.org/10.1016/j.gloenvcha.2008.10.009 and Pikaar et al Environ. Sci. Technol. 2017, 51, 13, 7297–7303 https://doi.org/10.1021/acs.est.7b00916

[14] UNEP (2013). Our Nutrient World: The Challenge to Produce More Food and Energy with Less Pollution

Current nitrogen losses from agriculture[15] in the EU, according to the planetary boundaries concept[16] indicates that the target to reduce nutrient losses from agriculture by 50% is not enough and we would need to **cut nitrogen losses from agriculture by two thirds** to be within sustainable limits.

The largest nitrogen losses occur to water but losses also include emissions to air, with negative impact on human health and the climate. Nitrous oxide (N_2O) is a potent greenhouse gas (GHG), responsible for 6% of the EU's total GHG emissions. These emissions stem mostly from the use of nitrogen fertilisers in agriculture and have only gone down by 2.5% since 2010 despite EU climate targets covering that period. Nitrogen is also emitted as ammonia (NH_3), mainly from animal manure and slurry. Ammonia is a precursor of particulate matter (PM) 2.5, an air pollutant highly damaging to human health. 94% of NH_3 emissions in the EU originate from the agricultural sector.

Fostering soil health and fertility

The aim for the INMAP is to set out measures to reduce nutrient losses by at least 50% while ensuring no deterioration of soil fertility. Soil fertility, in our view, should be understood as healthy and resilient soils, and should not be a measure of yields alone.

Optimising fertiliser use through, for example, precision farming, is not sufficient; a fundamental rethink of **how we foster soil fertility and close the nutrients loop** is needed. This must include addressing the current soil loss in Europe that is resulting from industrial farming practices that have depleted soils of organic matter and soil biodiversity. Poorer soils results in erosion, nutrient leakage and do not absorb water as healthy soils do. Industrial farming that relies on the use of synthetic and mineral fertiliser and pesticides, while also often removing agricultural residues depletes soils of organic matter and life. The INMAP should take into account organic matter in addition to nutrients and encourage the recycling of organic residues to soils, such as in-farm recycling of residues, high quality compost and digestate that return nutrients as well as organic matter to soil.

The nitrogen surplus in a majority of agricultural soils disrupts the delicate chemical and biological balance of soil ecosystems and eventually leads to pollution of groundwaters and rivers. A similar surplus of phosphorus has resulted in a build-up of legacy phosphorus in soil[17]. N inputs exceed critical thresholds for eutrophication in 65-75% of EU agricultural soils[18].

Key targets and measures to be introduced in the INMAP:

- **Manage 50% of the EU's agricultural area through agroecological systems (including organic farming) by 2050**
- **Reduce nitrogen losses from agriculture to return within the planetary boundaries by 2030, including a reduction of ammonia emissions by 25% (compared to 2005 levels)**
- **Improve nutrients use efficiency to 50% across the full chain and 70% for crop sector by 2030**

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[15] defined as nitrogen to water and NH3 from agriculture to air

[16] EEA (2020) Report No 1/2020 Is Europe living within the limits of our planet?

[17] Baltic Sea Centre – Stockholm University (2019), Phosphorus in the catchment

[18] European Environmental Agency (2019) The European environment — state and outlook 2020

- **Develop an EU methodology for NUE and require MS to use it to assess the progression towards the NUE target**

Farming for humans, not for feed and fuel

The majority of EU agricultural land is dedicated to the production of animal feed, which is highly inefficient in terms of nutrients losses compared to farming for direct human consumption. Additionally, livestock numbers are artificially kept at unsustainable numbers due to the import of feed and feed additives as well as public subsidies. The EU currently imports around 70% of protein feed, most of it consumed by monogastrics, i.e. pigs and poultry.[19]

This supports excessive consumption of animal proteins with detrimental effects for the environment and human health. Additionally, feed imports export nutrient losses and land degradation to third countries.

Several studies show that a reduction of livestock numbers linked with a change in diets are needed to reduce emissions from the agricultural sector to sustainable numbers. This would involve reducing **animal numbers to the level that we can sustainably feed with EU land and to link back animal farming with the local** (both in terms of local feed production and nutrients load) and **carrying capacity** (both in terms of local feed production and nutrients load).

The EU should also set sustainable limits on the share of **biomass** that can be taken out of the agri-food system for other purposes than food, such as energy, fuel and bio-based materials. This way, the EU could drastically reduce its dependency on synthetic and mineral fertiliser.

Key targets and measures in the INMAP:

- **Reduce livestock to numbers that can be sustainably fed with EU land, i.e. by 50% with a specific focus to reduce the number of grain-fed pork and poultry**
- **Phase out the use of food crops used for fuel by 2030**

Cutting food waste

Globally, a third of produced food is lost or wasted, representing a quarter of fertiliser used.[20] The Commission has already committed to reduce food waste by 50% by 2030 in the Farm to Fork Stratregy[21] and should come forward with a proposal on how this can become a reality. This should include a commitment to the prompt revision of the **Waste Framework Directive** with an inclusion of this EU-level binding target as well as national binding targets.

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[19] Federal Office for Agriculture and Food (BLE), Germany (2017) Drivers of change and development in the EU livestock sector
[20] Environ. Sci. Technol. 2016, 50, 16, 8432–8443 https://pubs.acs.org/doi/10.1021/acs.est.6b01993
[21] European Commission (2020) Communication - A Farm to Fork Strategy - for a fair, healthy and environmentally-friendly food system

The Farm to Fork strategy however focused mostly on food waste created at retail and consumer levels and did not sufficiently address food waste at the primary production level and at the early stages of the supply chain. It is estimated that 30%[22] to 59%[23] of Europe's total **food waste occurs at the pre-retail stage**, and these numbers are likely to be underestimated.[24]

Key targets and measures in the INMAP:

- **A commitment from the Commission to make reality of the already existing objective from the Farm to Fork strategy to reduce food waste by 50% from, by 2030[25] and extend this objective to the whole supply chain**

Improving diets

Changing diets and lowering the fraction of animal products in diets to the recommended level decreases nutrient emissions but also have human health co-benefits. The health costs linked to the food system are huge globally due to e.g. diabetes, cancer and obesity. Excessive consumption of animal products is linked to heart disease, diabetes, and various cancers.[26] A 2010 FAO study found that 'western style diet' cost the world over $1.4 trillion in health care costs and lost productivity.[27] A comparison with national dietary recommendations showed that **Member States consume on average more than twice the recommended level of meat**, and all Member States consume more meat than recommended.[28]

Certain food additives also contain unnecessary high levels of phosphorus that can be damaging for kidney disease patients.[29]

Key targets in the INMAP:

- **A reduction of animal protein intake by 30% by 2030 and progressively by 60% by 2040**

Decreasing the load to and from waste water

Municipal wastewater is a fingerprint of our society. Excessive protein consumption increases nitrogen load to wastewater treatment plants[30], while lower intake of protein-rich food can yield significant

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[22] EU FUSIONS (2016) Estimates of European food waste levels
[23] FAO (2011) Global Food Losses and Food Waste
[24] Baker et al. (2019) Resources, Conservation and Recycling 149: 541–49. https://doi.org/10.1016/j.resconrec.2019.03.022
[25] See Open letter from EEB and other organisations on food waste in the Farm to Fork strategy
[26] IPES Food, (2017), Unravelling the food–health nexus addressing practices, political economy, and power relations to build healthier food systems
[27] http://www.fao.org/docrep/018/i3300e/i3300e00.htm
[28] RISE foundation (2018)
[29] ESPP https://www.phosphorusplatform.eu/images/ESPP_input_INMAP_v27_3_21.pdf
[30] see for example HSY website, Nitrogen loads at wastewater treatment plants grow due to excessive consumption of protein

load reductions to receiving waters.[31] Therefore, more **sustainable diets** with less reliance on meat and dairy would result in a reduced load to wastewater treatment plants and to receiving waters.

The EU Regulation on detergents (EC/648/2004) was amended in 2012 to include limits on the phosphate in laundry and dishwasher detergents, which have resulted in decreased load of phosphorus to wastewater treatment plants. However, these limits only apply to consumer detergents. A similar limit should be considered for detergents for industrial use.

In sparsely populated areas, dry (composting) toilets should be promotes as they save water and produce soil amendments that can be used locally.

Key measures:

- **Evaluate setting a limit of phosphate and other phosphorus compounds in non-consumer detergents (e.g. industrial use)**

3. Increase recycling

Current anthropogenic nutrient flows are largely linear, following an extraction to waste principle. Waste streams such as manure, wastewater, slaughterhouse waste and household organic waste contain nutrients that can be captured and re-used. Recycling of nutrients, in the form of e.g compost and agricultural residues reduces the demand for synthetic and inorganic fertiliser, including the associated GHG emissions and the dependency on imports of fossil gas and critical raw materials. **Nutrient recycling however, needs to come along with an overall better nutrient management that also reduces inputs**.

Recycled nutrients products must be free from contaminants, including microplastics. This will require much stricter **source control** and strict selection criteria for allowing chemicals on the market. The **source and the manufacturing** of recycled nutrient must also be sustainable, e.g. in terms of input of energy and resources.

Investments in nutrient recycling must be carefully controlled to **avoid creating incentives to overinvest in and lock in unsustainable practices**. For example, investments in anaerobic digestion and nutrient recycling from pig slurry creates an additional revenue for industrial pig farms when the solution lies in reduction of the livestock number. This is also a scenario that should be avoided for unsustainable fish farming, in particular those that are fed by animal products. Similarly, recycled nutrient products risk to greenwash intensive animal farming practices, e.g. by substituting virgin phosphate rock by recycled phosphorus in animal feed additives and claim this as sustainable. The

[31] Swedish Institute for the Marine Environment. 2016, 2016:3 Changes in four societal drivers and their potential to reduce Swedish nutrient inputs into the sea

Green Claims initiative is an opportunity for stricter rules for the use of "sustainable" or "sustainability" in marketing claims.

Poor separation of municipal waste streams is an obstacle for nutrient recycling from municipal solid waste. Similarly, **contamination** of municipal wastewater, by industrial wastewater, road run-off and toxic substances in household products is contaminating sewage sludge, making it less suitable for direct application (after anaerobic digestion). **Source separation** that generates concentrated flows that facilitate nutrient recycling should be encouraged in new developments.[32]

Recycling of organic residues, like compost, (digested manure) and crop residues, not only recycles nutrients back to soil, but also organic carbon. Many agricultural soils are depleted of **organic carbon** due to intensive farming with high reliance on inorganic and synthetic fertiliser. Increasing the organic content of soils improves water holding capacity, soil structure and the number and diversity of soil organisms.[33]

The **lack of coherence between EU fertilisers legislation (the Fertiliser Product Regulation, FPR) and waste legislation** represents a bottleneck, since the first one excludes many residues from the food and feed industry as input materials for composting and anaerobic digestion. For example, residues from only a few food and feed industries are allowed in the FPR. The fertilising products regulation is over-strict for biological materials, and not strict enough for mineral fertilisers.

The recovery of nutrients and organic matter from sludges should be considered in an EU Circular Economy, but the requirements of the **Sewage Sludge Directive** are outdated and there are no European wide quality criteria for treated sludge-derived materials exists.

Bio-waste, which includes any animal by-product[34], has to fulfil the requirements for the treatment in composting or anaerobic digestion plants according to the **Animal By-Products Regulation (ABPR)**, it is unlikely that any food-waste derived organic fertiliser or soil improver will be placed as CE marked organic fertiliser or organic soil improver on the European market. The requirements set in the ABPR (maximum particle size of 12 mm, 70 °C, 1 h) do not fit together with optimal composting and anaerobic digestion processes.

Key targets to be introduced in the INMAP:

- **A target for organic municipal waste recycling of 75%**
- **A cap on biowaste content in residual waste of 25 kg by 2030 reducing progressively down to 15 kg by 2040[35]**
- **Targets for nutrient recycling at EU, national and regional level by 2030**

[32] See for example the project 'Three pipes out' in Helsingborg, Sweden
[33] For more details, see EEB's report Carbon Farming for Climate, Nature, and Farmers
[34] Cat 2 (like eggs, egg products, milk) or Cat 3 (like catering waste, former foodstuff)
[35] See EEB feedback on Environmental impact of waste management – revision of the Waste Framework Directive (WFD)

What is needed: Legislative action

1. Better implementation and enforcement of current legislation

Nutrient pollution is not a new problem for Europe, and EU legislation has been in place for decades, meaning that Member States not only have legal tools but also legal obligations to address nutrient pollution in water via several pieces of legislation, including WFD, the Groundwater Directive and the Nitrates Directive. Still, the environment and human health is suffering from incomplete implementation of existing law as Member States are not on track to deliver on their environmental obligations.

Some illustrative examples of the implementation gap are: More than a third of rivers, lakes and coastal waters and more than 80% of EUs marine waters are eutrophic due to excessive nutrient concentrations.[36] 14% of EUs groundwater exceeded nitrate drinking water standards in the period 2016-2019, with no progress from the previous reporting period.[37] Non-compliance of the UWWTD represent one of the largest urban source of nutrients to water.

Full implementation of the UWWTD would reduce sewage pollution of receiving waters by 20-30 million person equivalents (p,e,) in the EU.[38] To achieve full compliance, **significant investments in the water sector are needed**. An OECD study found that all EU countries but Germany need to increase investment in water supply and sanitation by more than 25% to comply with EU legislation.[39]

The implementation of the **Water Framework Directive** needs to be stepped up considering that so far measures on agriculture and tackling nutrient pollution have been insufficient. The WFD implementation has entered the 3rd river basin management cycle but most of the plans by Member States state that mandatory and voluntary measures will be taken but do neither quantify them nor define priority application areas. They also do not perform the gap analysis if supplementary measures are needed to complement basic measures stemming from Nitrate Directive.

The EU also has long-standing legislation on air quality, which sets targets - amongst others – to reduce ammonia emissions. Yet, Member States are not on track to meet these targets. The European Commission should consider the work done by the Task Force on Reactive Nitrogen, and other Task Forces, under the Long-Range Transboundary Air Pollution Convention, including their recommendations on how to reduce **NH_3 emissions**. The actions promoted by the INMAP should contribute to at least the achievement of the existing **National Emission Ceilings Directive** (NECD)' objectives for NH3 so to reduce the total amount and concentrations of nitrogen in the environment.

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[36] European Commission (2021) Report concerning the protection of waters against pollution caused by nitrates from agricultural sources based on Member State reports for the period 2016–2019

[37] idem

[38] JRC, (2019), Water quality in Europe: Effects of the urban wastewater treatment directive : a retrospective and scenario analysis of Dir. 91/271/EEC

[39] OECD, (2020), Financing Water Supply, Sanitation and Flood Protection: Challenges in EU Member States and Policy Options

The Waste Framework Directive (Art. 22) requires Member States to **collect bio-waste separately** by end of 2023, but there is a long way to go. Currently, only 17% of municipal solid waste is processed by anaerobic digestion or composting. [40] To achieve the target, significant **investment programs** are needed.

While the implementation of EU law is a national responsibility, ultimately the responsibility of the Commission as the guardian of the treaties to ensure that Member States comply and that adequate mechanisms are in place where they do not. However, enforcement action by the Commission is currently notoriously slow. It often takes years to process a well-founded complaint, sometimes only to then close it without providing reasons, or sometimes lacking entirely.

The implementation and enforcement gap of nutrient pollution legislation is part of a wider systemic problem which requires a systemic answer towards a 'better compliance agenda'. This must entail, amongst others, real political will for enforcement, more staff, full transparency, swifter processes and regular infringement packages. More details on better enforcement can be found in our report 'Stepping up Enforcement –recommendations for a Commission 'Better Compliance' agenda to ensure the application of EU environmental law'

2. New legislative action

The INMAP will need to cover measures in different sectors and sources, but modelling by JRC shows that measures under existing legislation, even if fully implemented and enforced, will only reduce nutrient losses to water by 30%.[41] Therefore, additional **measures beyond existing legislation are needed** to achieve sustainable nutrient flows**.**

New policies and legislation are particularly needed to foster the **societal changes** which scientific research identifies as essential to achieve sustainable nutrients flows, namely reducing the consumption of animal proteins and transforming our farming system towards agroecology to close nutrients loops and achieve self-sufficiency in fertilisers and livestock feed [ref TYFA]. The forthcoming legislative framework for **Sustainable Food Systems** would seem particularly timely and appropriate to establish clear objectives and instruments for reducing and extensifying animal farming as well as for reducing the consumption of animal proteins and achieving sustainable and healthy diets.

Measures will need to consider the **balance between different nutrients** to not trigger unwanted growth of opportunistic species (e.g. cyanobacteria).

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[40] European Compost Network (2022) ECN Data Report 2022: Compost and digestate for a Circular bioeconomy: Overview of Bio-Waste Collection, Treatment & Markets Across Europe

[41] See slide 35 in the presentation done during the ZPAP workshop 25 May https://environment.ec.europa.eu/news/zero-pollution-monitoring-and-outlook-workshop-2022-05-25_en

Opportunities in ongoing revisions

The ongoing revision of the **Urban Wastewater Treatment Directive** (UWWTD) offers an opportunity to put in place policies to

- **decrease untreated wastewater discharges** (by setting a cap for overflows from the sewer network and at urban wastewater treatment plants),
- require **all large waste water treatment plants to remove nitrogen and phosphorus**
- **promote recovery of nutrients.**[42]

The ongoing revision of the EU standards for surface and groundwater pollutants is an opportunity to tighten the **threshold for nitrate in groundwater regulated in the Groundwater Directive** and improve groundwater monitoring. Stricter nutrient thresholds is supported by drinking water provides in several river basin districts in continental Europe.[43]

The revision of the **Ambient Air Quality Directives** offers the opportunity to establish air quality standards for **ammonia emission**s: this action plan should already pave the way for coherent steps being taken on this. While nitrous oxide (N2O) is already covered by the **Effort Sharing Regulation** (ESR), these emissions have not reduced since the law came into force, as the bulk of emissions reductions have come from other sectors covered by the ESR. The proposal by the European Parliament to set a sub-target for non-CO2 emissions covered by the ESR should be supported by the Commission and Council, and the INMAP should present how much N2O could contribute to such an objective in line with the wider aims of sustainable nutrients management and zero pollution.

The Commission has presented its proposal for a revised **Industrial Emission Directive.** The lower thresholds for pig and poultry farms and the inclusion of cattle are welcome. However, the Directive should also include aquaculture and other animal-based protein production of industrial scale, and the rules applying to these sectors should be strengthened rather than weakened as per the Commission's proposal. The co-legislators should significantly improve the rules applying to the livestock sector, and establish in the legislation a set of best-practice rules to deliver on pollution prevention, including[44]:

- A maximum ammonia emission to air from fattening pigs housing limit set to 2 kg NH_3/animal place, year

- Minimal safeguards for watercourses from liquid run-off of solid manure in field heaps

- A maximum nitrogen and phosphorus load limit (expressed as kg N or P per hectare and translated into maximum stocking densities) adapted to the receiving area

To support the necessary dietary changes, the EU must use the ongoing revision of its **food and agricultural products promotion policy** to set clear conditionality and eligibility rules for products

[42] For more info see EEB position paper on UWWTD
[43] European Groundwater Memorandum: to secure the quality and quantity of drinking water for future generations
[44] For more details see EEB briefing on livestock in IED (soon to be published here)

which can receive public support for their promotion, excluding all food and beverages which Europeans should eat less of in order to lead healthy lifestyles, including animal proteins.[45]

The ongoing revision of the **Waste Framework Directive** should introduce binding targets for biowaste separation at source.[46]

Further measures

The **Nitrates Directive** has as objective to reduce and prevent water pollution from agricultural sources, but is limited to nitrates only. A similar cap to nutrient application as is outlined for N in manure in the Nitrates Directive would be wanted for phosphorus as well. Denmark has a cap of 30-35 kg P/ha for manure and 30 kg/ha for mineral fertiliser in place that could serve as guidance.[47] Such a cap could be integrated in the INMAP.

It goes without saying that the **Common Agricultural Policy** (CAP) is a crucial instrument to tackle nutrients pollution from agriculture. Yet, the new policy, adopted in 2021, does not set any clear objective for reducing nutrients losses or fertiliser use, and Member States' implementation shows extremely limited environmental ambition. Assessments of draft national CAP Plans have found a dire lack of action on environmental objectives, including nutrients management. Although many draft eco-schemes (yearly subsidies for sustainable farming practices) were aimed at better fertiliser management, the vast majority were deemed to be unlikely to deliver real benefits by national experts[48] . Furthermore, relevant conditionality rules in the CAP (buffer strips, crop rotation, cover crops) are implemented so weakly by Member States, that little - if any- improvement can be expected[49].

In the short-term, the Commission must only **approve national CAP Plans which clearly deliver on the objectives of the Green Deal** and are in line with the EU acquis (e.g. the Water Framework Directive). Beyond 2022, the Commission should commit to **review and strengthen the CAP regulations** as soon as possible in order to bring the CAP in line with the Farm to Fork Strategy and the Zero Pollution Action Plan; including setting legally-binding targets for reducing nutrient losses and improving the indicators for nutrients balance reporting.

A few European countries (e.g. Germany [50]and Austria[51]) have set up **national nitrogen budgets**. This type of mapping of nitrogen flows combined with relevant indicators is essential if one want to have

[45] Have your Say platform - Feedback from: BEUC (europa.eu)
[46] See EEB's input to the EEB response to the public consultation on environmental impact of waste management (revision of the Waste Framework Directive)
[47] Danish Agricultural Agency, website Fosforregulering (Phosphorus regulation)
[48] EEB Will CAP eco-schemes be worth their name? (eeb.org)
[49] Soil and carbon farming in the new CAP: alarming lack of action and ambition (eeb.org) & Pesticides_EEB - BridLife briefing
[50] Häußermann et al. (2021) Environ. Res. Commun. 3 095004 https://iopscience.iop.org/article/10.1088/2515-7620/ac23e5/pdf
[51] See presentation by Djukic at UNCNET conference May 2022 National N-Budget – an Austrian Case Study

an integrated approach to nitrogen management. The Expert Panel on Nitrogen Budgets have already developed a guidance document[52]that could be used as a starting point to mainstream this work within the European Union. We recommend that all member states should set up their own national nitrogen and phosphorus budgets by 2025 and that they are updated every fifth year. By 2030 the national nutrient budgets should be in line with the 50% NUE target as well as respecting environmental objectives in existing environmental legislation, such as Water Framework Directive, Habitats Directive. Further, the nutrient budgets should be accompanied with a clear timeline to achieve the 2040 target to phase out the use of synthetic nitrogen and virgin mineral phosphorus fertiliser, as a well as imports of animal feed and phosphorus feed additives with interim targets for 2030 and 2035.

Fertilisers are covered by the **Carbon Border Adjustment Mechanism** (CBAM). A swifter application of CBAM, rather than an extended transition period where only information is asked, would help speed up the transition away from synthetic nitrogen fertiliser. An exploration of mirror clauses that restricts the import of fertilisers that do not respect EU standards could be explored.

Guiding principles

1. Shifting the burden of pollution

The Polluter Pays Principle is enshrined in the TFEU and the Commission should ensure that it is integrated in sectoral EU legislation. Still, it is poorly implemented and the cost of pollution is largely borne by taxpayers. The health and environmental cost of water pollution in the EU due to excess nitrogen and phosphorus is more than €22 billion per year.[53] The fitness check of the Water Framework Directive also showed that the economic instruments provided by the Directive have to a large extend been used to recover costs from households, but less so from other water users and agriculture is the sector that contributes the least. One example is raised household water fees to cover additional treatment of agricultural pollution to reach drinking water thresholds.[54]

Taxes, charges and fees should be used to **shift the burden of pollution** from taxpayers by increasing the cost of polluting activities and incentivising the move to activities with lower impact on the environment. However, putting a price on pollution should not only serve as a source of revenue but function to de-incentive pollution. Some such taxes and fees are already implemented in Member States, such as[55]:

- A tax on discharges of agricultural wastewater (in place in Wallonia since 2015)

[52] http://www.clrtap-tfrn.org/epnb
[53] European Commission (2021) Green taxation and other economic instruments
[54] ECA Special Report 12/2021: The Polluter Pays Principle: Inconsistent application across EU environmental policies and actions
[55] Examples from the European Commission toolkit on the Polluter Pays Principle

- A NOx air pollution fee (in place in the Czech Republic since 1967, in Hungary since 2003, Sweden since 1992)

Further, taxes on conventional fertiliser, (conventional) fertiliser use, phosphorus imports (covering P in feed and fertiliser), livestock and animal products (where revenues could be directed to improve animal welfare) should be considered. A tax on fertiliser use should be considered to be progressive with the idea to address in first-hand the largest users.

Mandatory **EPR schemes for fertilisers manufacturers** that integrate the price of water treatment and nutrients recovery. Such schemes could be designed for manufacturers to contribute to the installation of nutrient recovery installations in order to provide recovered nutrients products to substitute virgin fertiliser. Such EPR schemes could also be designed to require fertiliser manufacturers and agricultural industry to cover the cost for upgrading drinking water treatment in areas where excessive levels of nitrate pollution require so.

End-of-pipe measures should only be used as a complement to control pollution at source. While it is vital that more investment is directed to water and sanitation, it must be accompanied with addressing the sources of pollution. There are already examples where households have had to bear the cost of agricultural pollution of water (including nitrates) through increased water fees.

The Commission should ensure that state-aid is not granted to environmentally damaging activities, such as intensive livestock farming or sectors relying on fossil fuels, such as fertiliser production. State aid and other forms of public support to livestock farms (e.g. through the Common Agricultural Policy) should only support nature-friendly production systems or be conditional upon a transformation plan for sustainability (extensification, re-integration of livestock and crops, etc).

Nature-based solutions such as landscape features, buffer strips, wetlands and flooding zones, are proven as cost-effective solutions to tackle nutrient pollution in many different configurations, including retaining rainwater to reduce load to the sewer system during heavy rain events and prevent sewer overflows, acting as a final treatment step after conventional wastewater treatment as well as in decentralised wastewater treatment. The INMAP should promote the use of nature-based solutions.

While **reforesting** areas that were recently forested is a crucial nature-based solution which can greatly benefit biodiversity and nutrients management; **afforestation** can be more problematic as it can lead to the destruction of important ecosystems.[56] The priority for nature-based solutions should therefore be reforestation, while robust safeguards should be developed to ensure afforestation is done safely and beneficially for nature and local communities.

2. Fostering self-sufficiency

[56] See for example: Nature Today | Additional threat Danube clouded yellow: planting conifers

Russia's war in Ukraine has put spotlight on the EU's dependency on imports of fertiliser and livestock feed, and the Covid crisis before that caused disruptions due to supply chain issues. Our entire agricultural system is heavily dependent on **limited fossil resources which we import from outside the EU**: fossil gas to manufacture synthetic N fertilisers, and phosphate and potash rock for P and K fertilisers respectively. This is a critical vulnerability, which jeopardises our ability to feed ourselves in times of crises.

Phosphate rock is listed as an EU critical raw material, while fossil gas, the feedstock for ammonia fertiliser, is a limited fossil resource that needs to stay in the ground.

The geographic distribution of phosphate and potash rock is narrow, and the EU largely rely on imports as there are basically no geological reserves within the union. Morocco, including the territories it occupies in Western Sahara, has 70% of the world's reserves of phosphate rock.[57] Canada, Russia and Belarus were responsible for almost 70% of mine production of potash in 2021 (37% Russia and Belarus).[58] The EU imports fertilisers to a value of over 1 billion euros a year from Russia (of which 300 million euros is for phosphorus fertiliser).[59]

The EEB considers that the INMAP should primarily address nitrogen and phosphorus as these are the nutrients associated with the most concerning environmental impacts, including eutrophication and air pollution. However, fostering a more self-reliant agricultural system, with locally closed nutrient loops, should be considered as a wider solution since it will lead to cross-benefits of reduced reliance on imports and wider societal benefits.

The INMAP should outline how the EU can **move towards a self-sustaining agricultural system that fosters soil health for long-term productivity, while protecting our environment and our health.**

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[57] US Geological Survey, Mineral commodity summaries 2022
[58] USGS 2022
[59] Fertilizer Europe Facts and Figures EU KEY PARTNERS IN FERTILIZER TRADE (2020) (data retrieved 2022-07-11)