Petition to the European Parliament
On Establishing an EU Nutrient Flow Audit to Safeguard the Sustainability and Credibility of EU Food Policy

Executive Summary

The long-term objective of EU food policy is not a numerical target. It is the sustainability and resilience of Europe's food system within planetary boundaries.

The Farm to Fork commitment to reducing nutrient losses by 50% is an important step. But it can only be credible if it addresses not only visible leakage, but also how nutrients are structurally routed through the food system before they ever reach citizens.

Truly sustainable and circular food systems cannot be achieved while nutrients are systematically routed through unnecessary biological conversion layers that amplify resource losses and externalised environmental impacts.
This petition calls for the establishment of a formal **EU Nutrient Flow Audit**. Such an audit would examine how agricultural nutrients move through crops, feed, livestock, aquaculture and ingredient supply chains; quantify how much of their original value reaches people; and assess total nutrient throughput and biological dissipation across major pathways.

Sustainability requires structural clarity. Transparency strengthens policy legitimacy.

1. The Structural Question

All food systems are biological conversion systems in which nutrients enter the human food chain through primary producers — plants and photosynthetic microorganisms such as algae. Animal-derived nutrients are biologically transformed versions of these primary resources.

Before reaching the plate, nutrients may follow diverse biological and industrial routes.

Some routes preserve most of the original nutritional value. Others dissipate a substantial share of it through trophic conversion, metabolic processes and intermediate transformations.

EU policy measures fertiliser inputs, manure emissions and runoff, but does not systematically measure how efficiently agricultural nutrients are delivered to people across pathways.

This is a structural blind spot.

If the Union is serious about climate mitigation, biodiversity protection, zero pollution and resource efficiency, it must evaluate routing as well as leakage.

2. Nutrient Routing Architecture: Detours and Shortcuts

To clarify what is meant by "nutrient routing," the following simplified flow examples illustrate how biological detours expand or shorten the path from primary production to consumers.

A. Protein – Primary Food Route

Shortest route: Primary producers (plants) → human food → humans

Plant protein consumed directly (legumes, grains, plant-based foods) largely remains within the human food chain. This represents the shortest biological route from solar energy and soil-derived nutrients to human nourishment.

B. Protein – Feed-to-Food Detour

Elongated route: Primary producers (plants) → feed → livestock → meat/dairy/eggs → humans

In this architecture, plant nutrients are first routed through animal metabolism. A substantial share is used for maintenance, movement and heat before food reaches consumers. Depending on the system, up to 70–90% of original plant protein may be biologically dissipated prior to human consumption. This is not a failure of farmers. It is a biological property of trophic conversion.

Manure management can recycle some nutrients, but it cannot reverse thermodynamic dissipation or restore metabolised edible protein.

This detour increases total nutrient throughput and upstream land and feed demand.

This pathway underpins much of Europe's food culture and everyday diets. This petition does not seek to mandate changes in individual food choices. It addresses this routing architecture solely from a systems-level perspective of nutrient efficiency and policy coherence.

C. Industrial Ingredient Detour:

Elongated industrial route: Primary producers (plants) → feed → livestock → dairy/eggs → functional ingredients (whey, casein, egg proteins, animal fats, gelatin) → processed foods → humans

In many processed foods, animals function as an industrial processing layer. Plant nutrients are first routed through feed and animal metabolism before becoming dairy proteins, egg proteins or animal-derived fats used in food manufacturing. In these contexts, animals are often used to provide specific functional properties — such as emulsification, foaming, binding or texture — rather than because the nutrient itself requires animal origin. Biological dissipation therefore occurs before the ingredient even enters the processing stage.

D. Industrial Shortcut

Direct ingredient route: Plant inputs and/or microbial/algal fermentation → functional ingredients → processed foods → humans

Modern food technologies allow proteins and lipids to be produced directly from plant or microbial systems without feed-to-animal conversion. This shortens the route and reduces embedded upstream demand. Such technologies are already authorised and used within EU markets.

E. Omega-3 Nutrient Routing Example

Long-chain omega-3 fatty acids (EPA and DHA) originate in marine microalgae, which are primary producers. From there, they can follow multiple routes that vary significantly in length, ecological pressure and efficiency:

Longest detour:
Microalgae → small pelagic fish → fishmeal/fish oil → aquaculture or livestock → humans

This path multiplies trophic steps and embeds ecological pressure in marine extraction systems.

Intermediate route: Microalgae → wild fish → humans

This shortens the route but still depends on extractive capture.

Shortest route: Microalgae → omega-3 oil → humans

This avoids intermediate biological detours altogether.

Fish remains a legitimate food source. However, presenting it as the default or indispensable omega-3 pathway obscures the existence of shorter, already approved routes.

These examples demonstrate that nutrient pathways are not structurally equivalent.

3. Health Integrity

This petition concerns only nutrient pathways recognised as nutritionally adequate and safe by established dietary and food safety authorities. The approach avoids experimental methods and ensures human health is not compromised.

Well-planned plant-based dietary patterns are recognised as capable of meeting nutritional requirements. Algae-derived omega-3 oils and plant- or fermentation-derived proteins are authorised within the EU.

Where multiple safe routes exist, structural efficiency becomes a legitimate policy consideration.

4. Structural Preconditions for Achieving the 50% Nutrient Loss Reduction Target

Reducing nutrient losses by 50% is meaningful only if structural drivers are examined.

If large shares of agricultural nutrients are routed into high-dissipation pathways before reaching citizens, downstream technical improvements alone cannot fully deliver systemic sustainability.

Halving leakage while leaving routing architectures unexamined places limits on what can be achieved. A credible sustainability strategy must evaluate how nutrients are routed, not only how they are applied.

5. Historical Framing and Policy Neutrality

European food systems did not evolve in a neutral analytical environment. Certain nutrient pathways have historically benefited from financial support, institutional familiarity and discursive framing that presents them as normative or superior. Subsidy structures, procurement standards and research priorities have shaped production landscapes and market expectations.

Plant-based pathways have often been categorised as “alternative,” despite being primary biological entry points into the food system.

Requesting transparent evaluation of nutrient routing is not ideological. It is institutional responsibility.

A Nutrient Flow Audit would not stigmatise any sector. It would allow all nutrient pathways to be evaluated on transparent biological and systems-level criteria rather than inherited assumptions.

6. Cost and Innovation

Shorter nutrient pathways may, in some cases, appear more expensive under current market conditions. However, market prices reflect inherited infrastructure, subsidy structures and externalised ecological costs.

Emerging nutrient technologies are at earlier stages of scale and maturity. Renewable energy once faced similar cost differentials before scaling and policy support reduced costs.

Short-term price alone cannot determine the evaluation of infrastructure that underpins public health, ecological stability and strategic resilience.

A Nutrient Flow Audit would complement economic analysis by introducing structural nutrient efficiency into the assessment.

7. Strategic and Citizen Relevance

Food systems are critical infrastructure.

Elongated nutrient detours increase resource throughput, ecological pressure and exposure to external shocks. Shortening routes can enhance resilience, reduce import dependency and align food production with environmental commitments.

At the same time, many European citizens seek to align their diets with sustainability objectives. Transparent information about nutrient routing and preservation would empower informed choices without mandating specific dietary behaviour.

Transparency enables responsibility.

8. Requests to the European Parliament and European Commission

The petitioner respectfully requests that the European Parliament call upon the European Commission to conduct a comprehensive EU Nutrient Flow Audit.

Such an audit should:

- examine nutrient flows across crops, feed, livestock, aquaculture and ingredient supply chains;
- quantify how much of original agricultural nutrients reach citizens as food;
- assess total nutrient throughput and biological dissipation across major pathways;
- integrate nutrient routing efficiency indicators into Farm to Fork monitoring, CAP evaluations and future impact assessments.

Where multiple nutritionally adequate and authorised nutrient pathways exist, the findings of such an audit should inform policy analysis, public communication and impact assessments in a manner that does not structurally marginalise shorter or more efficient routes.

The purpose is not to mandate specific diets. It is to ensure that EU sustainability commitments are grounded in structural reality and applied consistently across nutrient pathways.

9. Conclusion

The European Union has committed itself to environmental integrity, resilience and intergenerational responsibility. To honour those commitments, it must evaluate not only inputs and emissions, but routing and preservation.

An EU Nutrient Flow Audit would strengthen the scientific credibility of the 50% nutrient loss reduction target and align food policy with the broader objectives of the European Green Deal.

It would not impose outcomes. It would illuminate structural facts.
And it would reinforce responsible governance.

Submitted by:
Joanna Słodownik
joannaslodownik1@gmail.com
ul. Dobra 54/95, 00-312 Warsaw, Poland
3/3/2026