IFOAM Organics Europe's recommendations regarding the Integrated Nutrient Management Action Plan (INMAP)

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Introduction

IFOAM Organics Europe welcomes the Commission's initiative to develop an EU action plan for the better management of nutrients, so-called 'the Integrated Nutrients Management Action Plan' (INMAP). This should provide the holistic approach needed **to achieve the 2030 target set in the Farm to Fork and Biodiversity strategies to reduce nutrient losses by at least 50% and fertilizers use by 20%,** while ensuring that there is no deterioration in soil fertility.

A study assessing the environmental impacts of the 25% target in 2030 highlights that '**achieving the 25% organic target could also almost deliver the 20% fertiliser reduction'**[1]**,** which is positive for water, biodiversity as well as greenhouse gas emissions due to **a reduction of nitrogen fertilizers production and distribution**. In the EU Action Plan for the development of organic farming[2], **the Commission committed to promoting the reduction of nutrient loss in all types of farming, with organic farming leading the way (Action 23).** Therefore, organic farming should stand at the core of the INMAP due to its strong reliance on local resources and recycling, which makes organic farming a driving force towards circular food systems and the reduction of nutrient losses. **The future INMAP should recognise the contribution of organic farming to sustainable nutrient management and reduction of fertilizers,** and propose measures to support the development of organic farming in this respect.

At the global level, **the Kunming-Montreal Biodiversity Agreement (2022)** stated in the target 7, **the need to 'reduce pollution risks and the negative impact of pollution from all sources, by 2030,** to levels that are not harmful to biodiversity and ecosystem functions and services, considering cumulative effects**, including: reducing excess nutrients lost to the environment by at least half including through more efficient nutrient cycling and use;** reducing the overall risk from pesticides and highly hazardous chemicals by at least half including through integrated pest management, based on science, taking into account food security and livelihoods; and also preventing, reducing, and working towards eliminating plastic pollution'.

In this paper, IFOAM Organics Europe recalls the benefits of organic farming practices to reduce nutrient losses (part I) and provides recommendations to ensure the INMAP proposes efficient ways to better integrate the nutrient management in the agricultural sector (part II).

[1] Nic Lampkin and Katrin Padel (Organic Policy Consultancy), *Environmental impacts of achieving the EU's 25% organic land by 2030 target: a preliminary assessment*. Report commissioned by IFOAM Organics Europe, 2022, URL: https://www.organicseurope.bio/content/uploads/2023/02/ifoameu_policy_FarmToFork_25EnviBenefits_202212.pdf?dd
[2] EU Organic Action Plan. URL: https://agriculture.ec.europa.eu/farming/organic-farming/organic-action-plan_en

I) Organic farming is a solution to reduce nutrient losses

Organic approach to close the nutrients' cycle

The agricultural sector contributes significantly to nutrient pollution of soil, water, and air[3], mainly through fertilisation practices, including high application rates of synthetic mineral fertilisers to achieve high yields. One European Environmental Agency and Swiss Federal Office for the Environment's report shows that several planetary boundaries are exceeded in the EU: **the European limit for nitrogen losses is exceeded by a factor of 3.3 and the one for phosphorus losses is exceeded by a factor of 2**.[4] Besides, nitrogen fertiliser production is an energy intensive process responsible for 50% of energy use in European agriculture[5].

On the contrary, **since synthetic fertilisers are prohibited in organic farming, their negative impacts on the environment are avoided**.

> **The existing 9.1% of organic land in the EU already delivers a reduction of 0.9 Mt Nitrogen use (8.5% of the total).** Increasing the share of organic land to reach 25% by 2030 could reduce nitrogen fertiliser use by nearly 1.85 Mt, or 18.6 % of total EU27 nitrogen fertiliser use in 2019. Therefore, the Farm to Fork Strategy's reduction target of 20% fertiliser use by 2030 would almost be reached only with the development of organic agriculture.[6]

Moreover, a literature review of 528 articles shows that **organic agriculture decreases the risk of water pollution** per area through excessive nutrients by 28%[7], due to the use of **inputs based on natural substances**, rather than synthetic agrochemicals, and thanks to **more catch crops and green manure** (ie. soil cover over winter). These practices contribute to reducing the effects of excess nutrient use on soil and aquatic ecosystems as well as on air quality. For instance, **nitrous oxide emissions can be reduced by 40% in organic farming** compared to conventional one due to the ban of synthetic fertilizers use in organic agricultural practises.[8]

The organic approach to plant nutrition is based on ecological processes and recycling, allowing to have circular systems and thus minimise the dependence on external inputs. Plants should preferably be fed through the soil ecosystem, so organic farmers focus on maintaining and enhancing soil fertility by closing nutrient cycles where possible. Synthetic fertilisers change soil pH and affect soil biology given microbes use up surplus nitrogen and strip out carbon from the soil. This reduces the capacity of the soil to buffer and release fertility using carbon-rich organic matter. On the contrary, **the recycling of organic manures seeks not only to help replenish nutrients but also to build soil organic matter which enhances soil fertility and health.** Moreover, a recent European Compost Network survey found that[9], **on average, every tonne of compost manufactured in Europe contained EUR 41 nutrients worth, and EUR 4 worth of carbon sequestered in agricultural soils.**

A global analysis shows on average that soil managed under organic farming have 25% more carbon stocks than soil managed under conventional agriculture.[10]
Organic farmers work with **alternative practices** to retain and circulate nutrients to maintain and enhance yields without utilizing synthetic fertilizers, such as **crop diversification, the use of organic compost, manure as well**

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[3] European Environmental Agency (EEA) / Federal Office for the Environment (FOEN), 2020, *Is Europe Living within the Limits of Our Planet? An Assessment of Europe's Environmental Footprints in Relation to Planetary Boundaries.*

[4] Same than above.

[5] Nic Lampkin and Katrin Padel (Organic Policy Consultancy), same than reference 1.

[6] Same than above.

[7] Sanders J, Hess J (eds), 2019, Performances of organic farming for the environment and the society; in German (Leistungen des ökologischen Landbaus für Umwelt und Gesellschaft). Braunschweig: Johann Heinrich von Thünen-Institut, 364 p, *Thünen Rep 65,* DOI:10.3220/REP1547040572000

[8] Skinner, C., Gattinger, A., Krauss, M. *et al,* 2019, The impact of long-term organic farming on soil-derived greenhouse gas emissions. *Sci Rep* 9**,** 1702. URL: https://doi.org/10.1038/s41598-018-38207-w

[9] European Compost Network Data Report 2020. URL: https://cutt.ly/D1ceQ2u

[10] Andreas Gattinger, Adrian Muller, Matthias Haeni, and Urs Niggli, 2012, Enhanced top soil carbon stocks under organic farming, *PNAS*, Vol. 109, No 44. Edited by William H. Schlesinger, Cary Institute of Ecosystem Studies, Millbrook, NY. URL: https://doi.org/10.1073/pnas.1209429109

as the inclusion of nitrogen-fixing plants in their crop rotations. These methods -inherent to organic agriculture- are **the way forward to stabilize yields while decreasing the input of synthetic fertilizers**[11]. It is of great importance to plan crop rotations carefully to alleviate the risks of nutrient leaching through practices such as the integration of catch crops and increasing plant availability of nutrients. Indeed, **soil erosion and soil loss are respectively 22% and 26% lower on organic farms** compared to conventional ones, given soil surface cover and soil organic matter are most important.[12]

The reliance of organic farms on efficient nutrient circulation on the farm and within the organic sector, further supplemented with recycled nutrients from recirculation and from society residues, **strengthens the economic resilience of farming enterprises through a decreased dependency on the global synthetic fertilizer market.** Yet, the organic sector is to some extent dependent on external inputs such as rock phosphate and manures from conventional farms. These dependencies are problematic in two ways: firstly rock-phosphate is a non-renewable source and secondly the risk of contaminants is high when using manures from conventional farms as well as the structural dependence on conventional farms. The need for external input of nutrients is most pronounced on stockless arable and low animal-intensive farms.[13] Decreasing this dependency would mean increasing the accessibility to organic fertilisers, such as compost and digestates of organic waste.

Strategies to increase yields within organic farming systems in Northern Europe[14]

Table 1 Strategies to increase yields in organic arable crops that are applicable to Northern Europe. Adapted from Niggli et al. (2016)

Area of intervention	Important for	Strategies to increase yields
Soil fertility	All crops, but especially on stockless farms	• Crop rotation design and management including optimal management of legume pre-crop effects and green manure crops • Increased crop diversity • Intercropping • New technologies for reduced tillage • Increased cooperation between livestock farms and stockless farms • Adding/promoting supportive microorganisms and fungi in soil
Plant nutrients	All crops (except nitrogen for legumes)	• Optimal use of legumes in rotations • Effective use of manures • Increased recycling and use of nutrients from society • Novel treatments of organic food wastes to produce high-quality composts • Technological solutions for safe sewage sludge treatments and recycling
Crop-weed competition	All crops, but especially in stockless systems without perennial leys	• Crop rotation design and management • New physical weed control strategies and techniques including cover crop management • Use of the false seedbed technique • Precision farming and robots
Control of diseases	All crops, but especially potatoes and legumes	• Use of tolerant or resistant crop varieties • Crop rotation design and management • Preventative strategies like intercropping, deep ploughing, optimal planting date etc. • New techniques and products for preventing fungal infections, physical methods and biocontrol organisms • Replace copper that is currently used • Use of certified and dressed seeds
Control of pests	All crops, several pests in oilseed rape and potatoes	• Crop rotation design • Habitat manipulation (hedgerows, wild flower strips etc.) to strengthen functional biodiversity (e.g. natural enemies) • Physical/biological methods like nets, traps and repellents • Selective pest control products with low negative side-effects

[11] MacLaren, C., Mead, A., van Balen, D., Claessens, L., Etana, A., de Haan, J., ... & Storkey, J., 2022, Long-term evidence for ecological intensification as a pathway to sustainable agriculture. *Nature Sustainability*, *5*(9), 770-779.

[12] Seitz, S., Goebes, P., Puerta, V.L. et al, 2019, Conservation tillage and organic farming reduce soil erosion. Agron. Sustain. Dev. 39, 4. URL: https://doi.org/10.1007/s13593-018-0545-z

[13] RELACS project, 2022, Replacement of Contentious Inputs in organic farming Systems. Deliverable No 7.5: European roadmap for phasing-in new nutrient sources. URL: https://relacs-project.eu/wp-content/uploads/2022/09/RELACS_D7.5_European_roadmap_Nutrients_202204_Revised.pdf

[14] Röös, Elin, et al, 2018, "Risks and opportunities of increasing yields in organic farming. A review." *Agronomy for sustainable development* 38.2.

Moreover, organic farming practices lead to a multitude of positive effects, as they decrease the risk of nutrient leakage and the dependency on external inputs, as well as benefit the environment through the provision of ecosystem services[15]. In short, nutrient management according to the organic principles strengthens a farm´s resilience on multiple levels. In the subsequent, we will highlight the best practices available within organic agriculture that are leading to decreases in nutrient leakage while maintaining high levels of yield.

Important practices to increase yields within organic farming

Conventional farming methods are leading to high levels of nutrient leaching and air, water and soil pollution due to high application rates of synthetic fertilizers.[16] **In organic farming, the risk of nutrient leaching is decreased mainly due to lower inputs of nutrients and higher nutrient efficiency of the cropping systems reaching a 40-70% decrease in nitrogen losses per area.[17]** It is crucial that the limited focus on yields is broadened to achieve sustainable farming systems. In this regard, organic farming offers an alternative path to produce food, which is less dependent on external inputs and thus strengthens the resilience of farming systems. Besides, organic farming has developed methods to achieve high-yielding cropping systems without harming the environment through energy-demanding agrochemicals such as synthetic fertilizers. The current yield gap can be linked to the low plant accessibility of nitrogen in the most frequently used fertilizers, such as green manure, manure, compost and organic waste. However, increasing fertilization rates will intensify the risks of nitrogen leaching.[18] Thus, closing the yield gap between organic and conventional agriculture is associated with high risks concerning nutrient leaching. In light of the current proposal for the INMAP it is more important to ensure that nutrients are retained and not lost within production systems to achieve higher yields. Therefore, i**t is important that the current proposal focuses on ensuring that organic farmers have access to sufficient nutrients.**

The importance of Biogas in Organic Farming

The utilization of Biogas digestate in organic farming is getting more important and the demand for digestate is high. However, the accessibility to biogas digestate is highly dependent on the local infrastructure. The utilization of crop residuals and cover crops in anaerobic digestion systems increases the total amount of mobile organic manures within farming systems. This results in higher nitrogen use efficiency and an increased scope for targeted nitrogen application in time and space in comparison to the site-bound in cooperation as green manure[19]. Thus, the increased nutrient efficiency of biogas digestate is dependent on the input to the biogas plant. The underlying mechanism is the increased availability of plant nitrogen in biogas digestate in comparison to compost. Nonetheless, **IFOAM Organics Europe stresses the importance that the substrate added to the biogas plants does not originate from 'energy crops' (crops produced with the aim of being used for producing energy) to decrease the competition of land use with food production**. In this, crop residuals such as cover crops and animal manure should be added to the substrate to ensure its contribution to nutrient recycling. Indeed, the choice of substrate to be fed into the plant is crucial to its sustainability. Agricultural waste and catch crops, both produced on the farm, represent high-potential and low-cost options. They have a positive effect on the environment and enjoy a high level of acceptance, as there is no conflict between food/feed and fuel. Meanwhile, using biogas slurry on the fields increases the quality and yields of crops. **For organic farms, combining on-farm cycle management with a biogas plant would provide recycled fertilisers and improve soil quality while bringing tangible economic advantages.[20]**

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[15] IFOAM Organics Europe, position paper on the benefits of organic farming on biodiversity and climate. URL: https://www.organicseurope.bio/content/uploads/2022/04/IFOAMEU_advocacy_organic-benefits-for-climate-and-biodiversity_2022.pdf?dd

[16] Hansen, Birgitte, et al. 2000, "Nitrogen leaching from conventional versus organic farming systems—a systems modelling approach." *European Journal of agronomy* 13.1: 65-82.

[17] See under reference 7.

[18] Röös, Elin, et al, 2018, 'Risks and opportunities of increasing yields in organic farming. A review.' *Agronomy for sustainable development* 38.2.

[19] Möller, Kurt, and Torsten Müller, 2012, 'Effects of anaerobic digestion on digestate nutrient availability and crop growth: A review.' *Engineering in life sciences* 12.3.

[20] FIBL, *Sustainable BiogasProduction, A handbook for organic farmers,* 2013. URL: https://www.fibl.org/fileadmin/documents/shop/1642-biogas-production.pdf

Example: the production of biogas in Sweden

- In Sweden, the market for digestate is growing. There are 27 biogas plants which fulfil the requirement of Avfall Sverige's certification rules for biofertilizers, SPCR120 and the EU Organic Regulation 2018/848.
- One company pelletizes the bio digest they produce, and can it spread with conventional equipment for mineral fertilizers.
- On bigger organic farms, smaller biogas plants processing only their own farm manure can also be found.

II) IFOAM Organics Europe's recommendations for the INMAP

1. Firstly, **putting organic farming at the heart of the INMAP** will help to achieve the Farm to Fork target of 25% organic farmland by 2030 and of 50% nutrient losses reduction as described in part I.

2. Secondly, the INMAP should **address implementation and enforcement gaps of the current EU legislations** related to nutrient cycles. The INMAP should also be an opportunity **to reinforce the implementation of existing EU legislations relevant to nutrient pollution,** such as the Urban Waste Water Treatment Directive (UWWTD), the Nitrates Directive, and later via the Water Framework Directive (WFD), the Marine Strategy Framework Directive and the Industrial Emissions Directive (IED). 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 from the transport and energy sectors. The Birds and Habitats Directives are also drivers to safeguard biodiversity and to lower NH3 and NOx emissions, as part of the precautionary approach.

3. Thirdly, when formulating suggestions to improve nutrient management and decrease nutrient leaching the most, the INMAP should **take into consideration the dependency on the local and regional context of farming operations when finding efficient ways to recycle nutrients.** For instance, the utilisation of biogas plants is most reasonable in regions of livestock farming in which animal manure can be used, to avoid supporting the cultivation of energy crops for biogas plants. A good example is the Danish regulation which has firstly set a maximum of 10% energy plants in the mix added in a biogas plant, and secondly aims at phasing out the use of energy crops totally within the next two years.

4. The INMAP should encourage practices ensuring **a better separation during the collection of waste** and **a certified production process** -with information on **traceability, origin, quality and GMO-free criteria-** to facilitate the adoption of recycled fertilisers, in particular for the organic sector. This requirements will enable both organic and conventional agriculture to reduce contamination of waste streams related to heavy metals and micro-plastics.

5. To ensure that nutrients are retained and not lost within production systems to achieve higher yields, the INMAP should support **the replacement of synthetic mineral fertilizers with organic recycled fertilizers,** such as compost from food waste[21] and from organic matters (weed, leaves, etc), manure from animals, human waste (urine and faeces) from wastewater sewage. These organic wastes offer an important source of plant nutrients, and would enable farmers to have more recycled fertilizers available for use.

6. The organic sector aims to decrease its reliance on external inputs, but some organic farms, in particular non-livestock ones- can still be dependent on inputs from conventional farms such as manure to fulfil their

[21] Compost from food waste is for instance already allowed in the EU Organic Regulation 2021/1165 if it is collected with a controlled collecting system decided by each Member state. URL: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32021R1165

nutrients needs for P and K[22]. **New nutrient sources are needed to support the expected growth of the organic sector under the EU target of 25% of agricultural land under organic farming by 2030**. The use of urban waste could help to decrease the reliance of the organic sector on conventional manure and close nutrient cycles between the urban and rural environment[23]. Thus, the utilization of organic waste is a fundamental aspect of developing more circular food systems.

7. The INMAP should support the development of **local infrastructures to ensure qualitative organic recycled fertilisers. In this regard, it is crucial that organic farms have a higher accessibility to organic compost**. This accessibility is highly dependent on local factors, such as the infrastructure to produce high quality compost from their local or regional area.[24]

8. The INMAP should make sure that sustainable nutrient management approaches, such as **organic farming**, receive **strong support** in the National Strategic Plans of the **Common Agricultural Policy.**

9. **The INMAP should develop on-farm nutrient tools which promote the use of organic recycled fertilizers,** given they could help farmers to better adapt their nutrient strategy to the needs of the farm. Tools such as the Farm Sustainability Tool (FaST)[25] developed by the European Commission can be a platform enabling farmers to have access to easily implementing farming practices linked to nutrient management, and should be further developed. The FaST includes for instance advice on fertilization and the product to use depending on data available on soil, target yield, farming practises and soil conditions.

10. As the Commission intends to stimulate the markets for recovered or recycled nutrients through the INMAP, it is important **to anticipate the compatibility of recycled fertilisers to be placed on the market with organic farming rules.** Recycled fertilizers should carry clear indications about whether they are suitable for organic agriculture, according to the EU Organic Regulation. Otherwise, it will be extremely time-consuming and risky for farmers to determine the suitability of these fertilizers for their organic production, as well as for organic certification bodies, particularly small not-for-profit ones with low resources, to determine the suitability of all manufactured organic fertilisers Besides, the authorisation of recycled fertilisers in organic farming may be limited depending on the source of waste or the manufacturing process.

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[25] URL : https://fastplatform.eu/