



Nutrients in the EU's Farm-to-Fork policy

This **SCOPE Newsletter** summarises the **ESPP webinars**, of 27th November 2020 with over 300 participants online.

The first webinar discussed action on nutrients across EU policies, and in particular the target on nutrients in the Green Deal [Farm-to-Fork policy](#).

The second webinar worked on a joint stakeholder input ([draft here](#)) to the European Commission in preparation of the future **EU Integrated Nutrient Management Action Plan (INMAP)**.

Further input or comments are welcome before end January 2020. The European Commission plans to start development of this Integrated Nutrient Management Action Plan (INMAP) in 2021.

This Newsletter summarises presentations and discussions at both webinars. Questions raised in the webinar 'Chats' are addressed, with input provided after the webinars from the speakers and panellists.

Slides and other webinar documents:

www.phosphorusplatform.eu/meetings

Video recording of the webinar: ESPP's YouTube channel:

<https://www.youtube.com/channel/UCMid-39AIMT-3pzjoY58qiQ>

ESPP draft input to the European Commission for preparation on INMAP (EU Integrated Nutrient Management Action Plan, (updated to take into account discussions at the webinar:

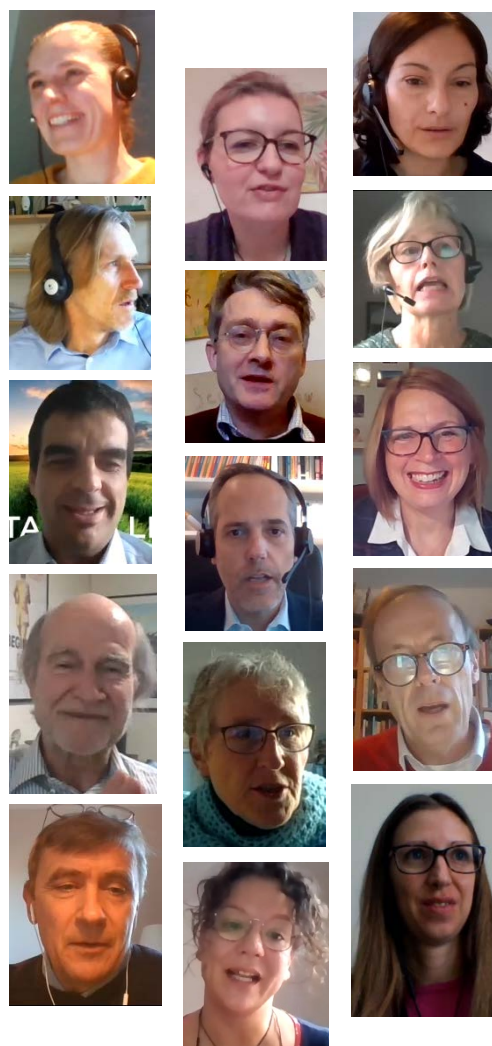
www.phosphorusplatform.eu/regulatory

With thanks to Andrea Gysin, Thames Water, for her valuable help in managing the Chat and questions.

Webinar participants additionally received copy of contributions submitted by participants and the full list of participants with emails for networking.

Contents

Contents	1
What they said	2
Editorial & Conclusions	3
Nutrients in EU policies, today and tomorrow	3
<i>Nutrients across EU policies</i>	<i>3</i>
<i>Nutrients in the Green Deal and Farm-to-Fork</i>	<i>4</i>
Webinar presentations	6
<i>Green Deal ambitions for nutrient stewardship</i>	<i>6</i>
<i>Integrated Nutrient Management Action Plan</i>	<i>7</i>
<i>Research and innovation gaps</i>	<i>7</i>
<i>Science supports the need for action</i>	<i>7</i>
<i>Fertiliser industries committed to respond</i>	<i>8</i>
<i>Farmers engaged for nutrient stewardship</i>	<i>9</i>
<i>Cradle-to-fork approach needed for nutrients</i>	<i>10</i>
Webinar discussion questions	11
<i>Developing the Circular Economy for nutrients</i>	<i>11</i>
<i>What do the -20% and -50% mean?</i>	<i>11</i>
<i>Improving nutrient management</i>	<i>12</i>
<i>Economics, markets, trade, global context</i>	<i>12</i>
<i>Which nutrients and where?</i>	<i>13</i>
<i>What to measure? How to measure it?</i>	<i>13</i>
<i>Soil Health and nutrients</i>	<i>13</i>
<i>EU Soil Strategy</i>	<i>14</i>



What they said ...

	<p>Reduction in fertiliser P use is certainly possible, but it will require decades to reduce soil P and, therefore, P losses. <i>Fien Amery, ILVO Flanders</i></p>
	<p>The 50% nitrogen loss reduction target by the green deal is on average required in the EU to protect air and water quality but it varies strongly with location. <i>Wim de Vries, Wageningen University & Research</i></p>
	<p>The waste water sector is already removing nutrients and supporting reuse of nutrients. We want to extend this in order to contribute to sustainable nutrient management and the Circular Economy, <i>Sarah Gillman, EurEau</i></p>
	<p>DG R&I is working on new, systemic approaches to combat nutrient pollution from all sources and bring nitrogen and phosphorus flows back within Planetary Boundaries, <i>Katja Klasinc, European Commission DG Research & Innovation</i></p>
	<p>It is great to see the Colombo Declaration goal embraced by the EU Farm to Fork Strategy. 'Halving Nitrogen Waste' from all sources will help meet multiple SDGs, saving billions of Euro in fresh nitrogen inputs. <i>Mark Sutton, UKCEH & INMS</i></p>
	<p>In line with the zero pollution ambition of the EU Green Deal, the Commission will propose an integrated nutrient management action plan to address nutrient pollution at source and a better management of N and P throughout their lifecycle. <i>Andrea Vettori, European Commission DG Environment</i></p>
	<p>European policies, such as the CAP, need to be clearly aligned with the targets of the Farm-to-Fork strategy. Major pollutants, particularly intensive livestock farming, have to be addressed. <i>Jessica Stubenrauch, University of Rostock</i></p>
	<p>Nature and the health of ecosystems on which all life depends are under threat. One major reason is agricultural pollution. We must take transformative action to address this crisis. <i>James Byrne, Wildlife Trusts Wales</i></p>
	<p>The workshop provided an excellent overview of the latest policy and science, and showed how the nutrient 'community' must work together to achieve extremely ambitious goals. <i>Rachel Dils, Environment Agency (England)</i></p>
	<p>We accept the F2F ambition to reduce nutrient losses by 50%. Supporting farmers with innovative solutions is a precondition. Nevertheless, 2030 seems unrealistic for this huge challenge and requires a full impact assessment. <i>Tiffanie Stephani, Fertilizers Europe</i></p>
	<p>Finnish agriculture has already decreased P use by -70% and N use -30%. MTK considers that Farm-to-Fork targets should not fix the same nutrient reduction percentages for all Member States. <i>Liisa Pietola, Finland farmers and forests organisation</i></p>
	<p>Nitrogen and phosphorus boundaries are all too often forgotten as a major environmental and food challenge of our times. Europe is at the forefront of ambitious targets to reduce nutrient losses to the environment. <i>Fabrice DeClerck, EAT</i></p>
	<p>Farm to Fork gives a framework for European Policy in the coming years. The ambitions are high. Member states will work together with the European Commission in the implementation of the strategy, looking for solutions to reduce the impact on the environment. <i>Harm Smit, Netherlands Ministry for Economic Affairs and Agriculture</i></p>
	<p>Organic based fertilizers and biostimulants are some keys for a more sustainable agriculture, by taking care of the soil and the biodiversity. <i>Benoît PLANQUES, Italtollina, founding member of EBIC and ECOFI</i></p>
	<p>To respect planetary boundaries we must radically reduce mineral fertilisers, and put the emphasis on recycling a maximum of organic matter to soils. The soil is a living ecosystem which we can learn to work with. <i>Penelope Vincent-Sweet, EEB</i></p>
	<p>Industry supports phosphorus recycling. However, for food applications, convincing communications on benefits and safety are needed and the legal framework needs to be adapted. <i>Frédéric Martens, PAPA (Phosphoric Acid and Phosphate Association, Cefic) and Prayon.</i></p>
	<p>Development and promotion of circular nutrient systems within agriculture and society will help decrease nutrient losses from farming and reduce dependency on mined and fossil fuel derived fertilizers. <i>Erik Sindhøj, RISE</i></p>



Editorial & Conclusions

The EU [Green Deal](#) recognises nutrient stewardship as a European priority for action, with an ambitious target for reducing nutrient losses (in the [Farm-to-Fork](#) and [Biodiversity Strategies](#)) and nutrient recycling in the [Circular Economy Action Plan](#). These strategies announce an **Integrated Nutrient Management Action Plan (INMAP)**.

The webinars organised by ESPP on 27th November 2020, with over 300 participants, showed that industry and stakeholders are ready to engage in implementation.

The Biodiversity and Farm-to-Fork Strategies fix the target to

- ➔ **reduce nutrient losses by at least -50%**, without deteriorating soil fertility, resulting in a **reduction in fertiliser use of at least -20%**.

The mineral and organic fertilisers industries stated that they accept the challenge of this nutrient target, with questions concerning the feasibility of the 2030 proposed timeline and subject to necessary regulatory support.

Webinar participants agreed that the nutrient target will only be possible if they are **built into CAP (Common Agricultural Policy) obligations**, with FaST (farm nutrient balance tool) included in funding conditionality.

The European Commission clarified that **the -20% fertiliser use target concerns both mineral and organic fertilisers, as well as other nutrient inputs** (such as manure application). The Commission will ask Member States to set explicit national values for the Green Deal nutrient target in their CAP Strategic Plans.

The webinar underlined the importance of **interactions between nutrients, soil carbon, soil health, crop productivity and climate change emissions**. The Green Deal nutrient target should be clearly taken into the Horizon Europe [Mission](#) “Caring for Soil is Caring for Life”.

The webinar also showed that the future EU Integrated Nutrient Management Action Plan should be holistic. INMAP should not only address the Green Deal agricultural nutrient target (as above), but also the wider **health objectives of Farm-to-Fork** (such as “a more plant-based diet with less red and processed meat” and “tax systems ... to ensure that the price of different foods reflects ... environmental externalities”), the **Nutrient Circular Economy**, waste water treatment and biosolids valorisation, and stewardship of the **Critical Raw Material** phosphate rock.

Nutrient footprinting of food products and animal and aquaculture feeds can support this.

Ludwig Herrmann, ESPP President

Nutrients in EU policies, today and tomorrow

Nutrients across EU policies

Critical Raw Materials

Phosphate rock and P4 * confirmed on 4th Critical Raw Materials list

* www.phosphorusplatform.eu/Scope136

** 2/9/2020 <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0474>)

Circular Economy

Updated Circular Economy Action Plan → “Food, water and nutrients” → Integrated Nutrient Management Action Plan*

* 11/3/2020 <https://ec.europa.eu/environment/circular-economy/>

Water policy

Water Framework Directive → considered fit for purpose (REFIT*)

Urban Waste Water Treatment Directive → evaluation planned**

Sewage Sludge Directive → public consultation underway (public consultation open to 5th March 2021 ***)

* 12/12/2019 https://ec.europa.eu/info/news/evaluation-eu-water-legislation-concludes-it-broadly-fit-purpose-implementation-needs-speed-2019-dec-12_en

** <https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12405-Revision-of-the-Urban-Wastewater-Treatment-Directive>

*** <https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12328-Evaluation-of-the-Sewage-Sludge-Directive-86-278-EEC-public-consultation>





Zero Pollution Action Plan

For air, water and soil: **public consultation open until 10 February 2021***

* <https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12588-EU-Action-Plan-Towards-a-Zero-Pollution-Ambition-for-air-water-and-soil/public-consultation>

Chemicals Strategy

Chemicals Strategy for Sustainability Towards a Toxic-Free Environment** → reduction of contaminants at source

- **ban on PFAS in consumer products****

*COM(2020)667, 14/10/2020, will ban all harmful chemicals unless use is “proven essential”

<https://ec.europa.eu/environment/pdf/chemicals/2020/10/Strategy.pdf>

** PFAS (per- and polyfluoralkyl substances) SWD(2020)249

https://ec.europa.eu/environment/pdf/chemicals/2020/10/SWD_PFA_S.pdf

Agriculture and fertilisers

Common Agricultural Policy: proposed FaST tool for Nutrients* – but Council proposes to render “advisory” only**

* FaST (Farm Sustainability Tool for Nutrients) would be obligatory monitoring of nutrient balance for all farms. Commission proposal: https://ec.europa.eu/jrc/sites/jrcsh/files/03-fast_final.pdf

** 21/10/2020 <https://data.consilium.europa.eu/doc/document/ST-12148-2020-INIT/en/pdf>

Fertilising Products Regulation 2019/1009* and STRUBIAS **

* <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32019R1009>

** recycled precipitated phosphates, ash-derived materials, biochars and pyrolysis materials, JRC proposed criteria 2019 http://publications.jrc.ec.europa.eu/repository/bitstream/JRC117856/jrc117856_electronic.pdf

Organic Farming Regulation 2018/848: art. 5(c)*

Art. 5(c) fixes as a “general principle” of Organic Farming “the recycling of wastes and by-products of plant and animal origin as input in plant and livestock production”

Health and safety

EFSA safe limit (ADI) for phosphorus in diet*

Some dossiers “stuck”: animal feed, animal by-products, diet, food products**

DG ENVI study on contaminants in fertilisers (underway)***

* European Food Safety Agency 12/6/2019

<https://www.efsa.europa.eu/en/press/news/190612>

** see ESPP letter to EU Commissioner for Health & Food Safety , 20/10/2020 www.phosphorusplatform.eu/regulatory

*** follow-up study to the criticized AMEC report on composts and digestates, which was criticised by ESPP and stakeholders, see www.phosphorusplatform.eu/regulatory

Research and Development

Support for nutrient recycling under Horizon 2020, LIFE, Interreg*

Mission “Soil Health and Food” in Horizon Europe**

Horizon Europe “Orientations” *** proposes “to develop a “comprehensive EU policy to balance nutrient cycles”

Partnership for a Circular bio-based Europe (following BBI-JU of H2020)****

* ESPP catalogue of nutrient recycling and stewardship projects and platforms <http://www.phosphorusplatform.eu/R&D>

** <https://twitter.com/hashtag/MissionSoil>

*** Summer 2019 https://ec.europa.eu/research/pdf/horizon-europe/ec_rtd_orientations-towards-the-strategic-planning.pdf

**** <https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/11903-European-Partnership-for-a-Circular-bio-based-Europe>



Nutrients in the Green Deal and Farm-to-Fork

Green Deal*

Basis for Farm-to-Fork, new Circular Economy Action Plan ...

- possible legal tools to develop recycling**

- Zero Pollution Ambition to include reducing excess nutrients***

- Methane Strategy****

* COM(2019)640 https://ec.europa.eu/info/files/communication-european-green-deal_en

** possible “legal requirements to boost the market for secondary raw materials, with mandatory recycled content”

*** public consultation open to 10th February 2021

https://ec.europa.eu/environment/strategy/zero-pollution-action-plan_en

**** COM(2020)663, 14th October 2020 <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=COM:2020:663:FIN>

Biodiversity Strategy* and Habitats Directive**

The biodiversity strategy states “The Commission will promote the goal of zero pollution from nitrogen and phosphorus flows from fertilisers” through the Key Commitment (n°10 of 14)

- “The losses of nutrients from fertilisers are reduced by 50%, resulting in the reduction of the use of fertilisers by at least 20%.”

The European Court of Justice*** judgements, concerning the Habitats Directive, impacts projects (such as housing construction, roads or airports) which would cause nutrient emissions susceptible to deteriorate protected habitats.

* COM(2020) 380 final, 20th May 2020

https://ec.europa.eu/environment/nature/biodiversity/strategy/index_en.htm

** Directive 92/43/EEC <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31992L0043>

*** <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:62017CA0293>

Nutrients in Farm-to-Fork* and Biodiversity*** Strategies

One of the four** “2030 targets” concerns nutrients:

- with the goal of zero pollution from nitrogen and phosphorus flows from fertilisers, **reduce nutrient losses by at least 50%**, while ensuring no deterioration on soil fertility, resulting in the **reduction of fertiliser use by at least 20%**.

Integrated Nutrient Management Action Plan

- address nutrient pollution at source
- livestock sector
- recycling organic waste to fertiliser
- - precise fertilisation / sustainable agriculture, → including FaST tool
- link between reducing food waste and nutrient recovery

Shift to healthy and sustainable diets

- “moving to a more plant-based diet with less red and processed meat”
- “preventing advertising meat at low prices”

Proposed actions relevant to nutrients, indicated in the Farm-to-Fork Strategy:

- “nutrient profiles” and “mandatory front-of-pack nutrition labelling” for food products, “maximum levels for certain nutrients” in processed foods (2021). However, the word ‘nutrient’ seems to here be intended to cover only fats, sugars and salt.
- “minimum mandatory criteria for sustainable food procurement” (2021)
- “sustainable food labelling framework” (2024)
- tax incentives****

* COM(2020)381, 20th May 2020 <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1590404602495&uri=CELEX%3A52020DC0381>

** https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/actions-being-taken-eu/farm-fork_en

*** COM(2020) 380 final, 20th May 2020 https://ec.europa.eu/environment/nature/biodiversity/strategy/index_en.htm

**** concerning tax incentives, see the IEEP proposals

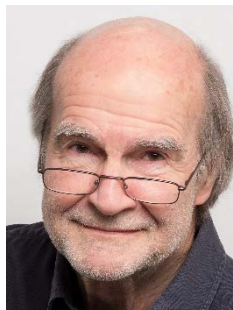
““Delivering the Green Deal: the role of a reformed European Semester within a new sustainable economy strategy” <https://ieep.eu/publications/role-of-a-reformed-european-semester-within-a-new-sustainable-economy-strategy>





Webinar presentations

Green Deal ambitions for nutrient stewardship



Ludwig Hermann, ESPP President, outlined why action on nutrients is essential, and welcomed the ambitions set in the Green Deal and the Farm-to-Fork policy.

Fertilisers are indispensable for global food security, yet **phosphorus losses to surface losses cause widespread water quality status failure**, which

will be accentuated by climate change. Planetary boundaries for both phosphorus and nitrogen are massively transgressed.

In the Green Deal nutrients are relevant not only to the Farm-to-Fork strategy and the rural economy, but also to greenhouse objectives, biodiversity policy, Zero Pollution Ambition, Circular Economy and bio-based industries.

Nutrient management is essential for UN Sustainable Development Goals and to achieve the Farm-to-Fork objectives of a **fair, healthy and environmentally-friendly food system**.

Targets fixed by the Farm-to-Fork policy include:

- Abate soil, air and water pollution by addressing the excess of nutrients (nitrogen and phosphorus)
 - by **reducing nutrient losses by 50%, leading to using 20% less fertilisers by 2030**
 - by developing an integrated nutrient management plan (COM & Member States)
- Circular, bio-based economy focusing on nutrient recovery & recycling
- New green business models (e.g. by carbon sequestering farming)
- 25% of EU agricultural land under organic farming by 2030

The actions necessary to make food production sustainable will strongly contribute to the Farm-to-Fork policy nutrient objectives:

- Reducing critical animal feed materials (e.g. soya from deforested land) and use of alternative feed nutrient sources (e.g. algae)
- Reorientation of the Common Agricultural Policy (CAP), with transfer of funding to eco-schemes and introduction of the FasT (Farm Sustainability Tool) for Nutrients
- Sustainable aquaculture, including feed, nutrient recycling
- Reducing food loss and food waste
- Healthy and sustainable diets



Andrea Vettori, European Commission, DG Environment (Land Use & Management), confirmed that the 2030 target for reducing nutrient losses by 50% and so using less fertilisers by 20% is stated in both the Farm-to-Fork and the Biodiversity strategies.

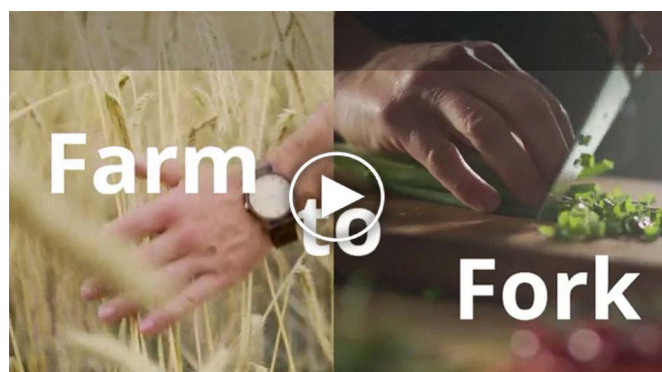
This concerns **both organic and mineral fertilising materials**.

Targets and actions will be defined at the EU level, but implementation and solutions should be defined locally. The **European Commission will ask Member States to define their own nutrient targets, in their CAP Strategic Plans**, to overall across the EU meet the Green Deal nutrient loss reduction and fertiliser input reduction targets.

Key routes to achieve these targets will be inter alia the full implementation and enforcement of EU environmental and climate legislation, e.g. the **River Basin Management Plans (under the Water Framework Directive)**, the **Nitrates Directive Action Programmes** and the **National Emission Ceilings Directive** (for ammonia emissions). Nutrient load reductions needed will be identified with Member States, for instance to achieve the Water Framework Directive 2027 target of Good Ecological Status of water. Applying systematically balanced fertilisation and sustainable nutrient management, and managing nitrogen and phosphorus better throughout their lifecycle, will be key.

Other actions which will contribute to the nutrient target include those to achieve the other Farm to Fork and Biodiversity targets, such as **25% of agriculture under organic farming**, bringing back at least **10% of agricultural area under high-diversity landscape features**, **halving per capita food waste** at retail and consumer levels, and **targeted eutrophication reduction strategies** at regional levels (in particular for the **Baltic Sea**).

The European Nitrogen Assessment ([Brink et al. 2011](#)) estimated that the **economic cost of nitrogen losses** (environmental and health impacts: 70 – 320 billion €/ year) is considerably higher than the costs of reducing losses at source.





Integrated Nutrient Management Action Plan

Development of the EU Integrated Nutrient Management Action Plan (INMAP) will **start in the second half of 2021**, and will be based on the Commission report on the implementation of the Nitrates Directive (2018 report COM(2018) 257 [here](#)) and the upcoming Zero Pollution Action Plan for air, water and soil (https://ec.europa.eu/environment/strategy/zero-pollution-action-plan_en), both expected by June 2021. It will also consider the Consultative Communication on Phosphorus (see www.phosphorusplatform.eu/Scope095) and the Circular Economy Action Plan (COM(2020)98).

INMAP will consider agriculture and all other sources of nutrient emissions. It will be developed in consultation with the Member States and stakeholders, with roadmap and **public consultation** in the second half of 2021.

Research and innovation gaps



Katja Klasinc, European Commission DG Research & Innovation, also emphasised that phosphorus and nitrogen exceed planetary boundaries, by factors of 2x for P and 3.3x for N for the EU (European Environment Agency, see www.phosphorusplatform.eu/eNews045).

To address this, and following the Green Deal targets, nutrient stewardship is clearly integrated into the **Horizon Europe** proposed programme.

Research and innovation gaps identified are:

- N and P thresholds to protect ecosystems and biodiversity
- Emissions from sources not currently reported
- Uptake of N and P recovery technologies, cost of these technologies, reliable product characteristics
- Environmental and health impacts of recycled nutrient materials, social acceptability
- Regional nutrient management solutions, including safe 'regional boundaries' for nutrients, governance

An aim is to develop **European mapping of N and P emissions from all activities, implemented at the regional level**, and linked to N and P ecological limits at the river basin level (Water Framework Directive).

Horizon Europe plans to fund nutrient stewardship projects in the pillar "Food, bioeconomy, natural resources, agriculture and the environment", as well as through agricultural R&D, in the '**Circular Bio-based Europe**' Partnership and through the **Soil Health and Food Mission**.

Science supports the need for action



Fien Amery, ILVO Flanders, indicated that there is real potential for reducing nutrient inputs to agriculture. However, reducing soil phosphorus, and so losses, will take many years.

Many regions of Western Europe have a history of high phosphorus surpluses (input to fields higher than offtake), resulting in significant P accumulation in soil. The average P surplus in the

EU has fallen, from nearly 4 kgP/ha in 2005, but the **P surplus was still over 1 kgP/ha in 2015**. Many Member States still have no soil phosphorus standards, or have standards not related to soil P measurements (pending publication: D'Haene, K., Hofman, G., 2019. A benchmark of agricultural phosphorus legislation in Europe, Research and Advisory Board on Sustainable Fertilisation, Brussels).

The Green Deal target of -20% fertiliser use is thus feasible in the short term for phosphorus, with focus on high-P soils, without jeopardising crop yield. It will however imply changes in practice for both industry and farmers, in particular a move from NPK to NK fertilisers.

Experience in Flanders shows however that **reducing average soil P to target zone levels necessary to reduce P losses takes considerable time**: from 13 years (intensive "soil P mining" = no P inputs) to 35 years or more (limited P inputs).

Not all soil P is available to crops rapidly, over one crop cycle. Reduced P inputs ("soil P-mining") will progressively reduce total soil P over a number of years (see Smolders 2020 <https://dx.doi.org/10.1111/ejss.12978>) but **may imply somewhat reduced crop yields** once soil P is below target zone numbers.

In livestock production areas, **reducing nutrient inputs will mean reducing manure application**. This poses questions for the future of livestock production. It also will result in reduced organic carbon input to soil, posing questions for soil fertility.

Focus on organic matter with high carbon over phosphorus ratio (e.g. certain composts, techniques for P removal from manure) is important for maintaining soil fertility.

Specific actions will therefore be needed to address the **delivery of phosphorus to farmland, to reduce its mobilisation in soil and to limit losses to surface waters**.



Wim de Vries, Wageningen University & Research and EAT-Lancet report, showed that the ambitious Green Deal nutrient loss reduction target is coherent with what is needed to ensure environmental protection.

However, if NUE (nitrogen use efficiency) is not increased, then the necessary reductions in nitrogen inputs will result in reductions in crop production.

Impacts of different forms of nitrogen losses (atmospheric ammonia, losses to surface water, nitrates in groundwater) must be analysed differently. Analysis suggests that (total EU) the environmental impact for nitrogen **requiring the biggest reduction to inputs and losses is losses to surface waters** with a 43 – 50 % reduction necessary.

Maps of Europe showing the necessary reductions in each of these N forms illustrate that impacts and actions must be assessed at **regional and local levels** (in De Vries and Schulte-Uebbing, 2020).

Higher reductions are needed in nutrient hotspots, which are often intensive livestock regions, and also in some areas to protect local biodiversity, whereas little or no reduction is needed in extensive agriculture. **Overall, more efficient application of fertilisers and manure is essential, but in some regions, reductions to livestock production or crop yields will be required to fully protect air and water quality.**

Fertiliser industries committed to respond



Tiffanie Stephani, Fertilizers Europe, says that industry accepts the challenge of the Green Deal target on nutrient losses, but underlines that this may not be achievable within a decade (2030).

Industry considers that the target of -50% nutrient losses is very ambitious for the timeframe (c.f. Fien Amery's presentation). If the European

Commission wants to propose such a target, then it **can only be achieved with strong measures by regulators, in particular within the Common Agricultural Policy**, including nutrient balances for farms (use of the FaST tool), eco-schemes, reinforced farm advisory networks and more.

Significant possibilities are already available with connected, **digital farming** and big data, and by rolling out existing tools, such as the **Nutrient Use Efficiency Indicator** (<http://www.eunep.com/wp-content/uploads/2017/03/Report-NUE-Indicator-Nitrogen-Expert-Panel-18-12-2015.pdf>).

The related -20% fertiliser use is only meaningful if it covers **mineral and organic fertilisers and other nutrient inputs, in particular manure** (as confirmed by the European Commission below).

Fertilisers Europe welcomes the **innovation challenges** of improving nutrient use efficiency on farms, and of integrating recycled nutrients into safe, high performance fertilisers.

Strong policy intervention is needed

Reducing nutrient losses, without deteriorating soil fertility, as targeted by the Green Deal, will necessitate **increasing nutrient use efficiency (NUE)**. This will require better data (need for an EU Farm Sustainability Data Network, with input from FaST), implementation of good agricultural practice (such as precision fertilisation) and advanced fertiliser products. Solutions must be adapted to specific crops, local contexts and farm conditions.

The Green Deal nutrient target needs a holistic approach, across policies and industries. The EU must translate the overall target into national objectives for Member States. **Partnership through the entire food chain** is necessary for food system resilience.



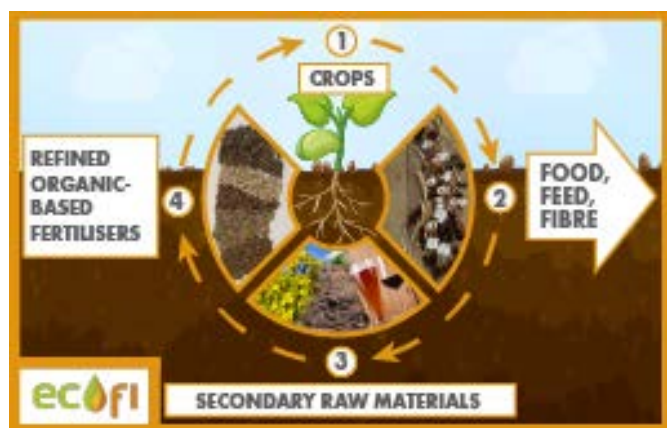
Benoît Planques, Italtollina, explained that the organic fertilisers and biostimulants industries will actively engage with the Green Deal nutrient target.

Italtollina is a global SME, since 1971, based in Italy, present in 85 countries worldwide, with 55 million €turnover in organic-based fertilisers and biostimulants.

Organic-based fertilisers contribute to nutrient stewardship by

- **improving soil health and nutrient use efficiency:** organic material improves soil retention and storage of nutrients (reducing risks of leaching), humic materials stimulate biological activity (improving soil – plant nutrient cycling);
- **recycling nutrients in organic secondary materials** which are processed into tailor-made organic fertilisers, adapted to agronomic requirements. Italtollina recycles materials including livestock manures, beverage industry by-products, cake residues (after processing of crops into animal feeds or culinary oils), food wastes ...

Organic fertilisers also contribute to **return of organic carbon to soils**, important for CO₂ storage, soil fertility and water retention.



Biostimulants, which can be used with both organic and mineral fertilisers, are substances or microbes which improve crop biology. They can improve nutrient use efficiency (NUE) both indirectly, by increasing plant vigour and resilience (e.g. water use efficiency), or directly by enhancing nutrient availability and plant uptake.

Need for coherent policy action

The organic fertilisers and biostimulants industries underline that policy coherence is necessary to support the Farm-to-Fork targets, both across EU policies and with Member States:

- **Functioning single market, allowing roll-out of innovative fertilising products and nutrient recycling routes across Europe.** Coherent interpretation of End-of-Waste and Animal By-Product regulations between Member States is needed to facilitate the development of nutrient recycling. The new EU Fertilising Products Regulation will enable significant progress, but key aspects of this regulation remain to be clarified.
- Coherent **European statistics** on fertilising products and nutrients
- Incentives and advice on **nutrient management in the CAP**
- Facilitate innovation, including with Horizon Europe support for innovation and demonstration of bio-based fertilisers, practices to improve nutrient use efficiency ...

United Nations Colombo Declaration



Mark Sutton, International Nitrogen Management System and CEH Edinburgh, underlined that the EU Green Deal nutrient target of -50% nutrient losses is in line with the **United Nations Colombo Declaration** which aims to halve nitrogen waste by 2030 (UN press release [October 2019](#) and [declaration](#)).

This Declaration calls on countries worldwide to implement comprehensive policies on sustainable nitrogen management and to **develop national roadmaps** to achieve -50% nitrogen waste by 2030, including assessing nitrogen recycling.

Mark Sutton notes that the Green Deal target goes further by addressing phosphorus as well as nitrogen. He welcomes that **the European fertilisers industry embraces the Green Deal -50% nutrient pollution target**.

Farmers engaged for nutrient stewardship



Liisa Pietola, MTK (Finland Central Union of Agricultural Producers and Forest Owners), underlined that farmers are already strongly engaged in optimising fertilisation.

Average phosphorus input in Finland has been reduced from 40 kgP/ha in the late 1980's to around 12 kgP/ha today, and **the P-balance is in many regions of Finland is now negative**. Large regional and local differences remain, however, mainly related to livestock production.

Farmers recognise the interest of organic fertilisers, in providing organic carbon and slowly-available nutrients. However, it is **difficult to manage application timing of organic fertilisers** because nutrient release is related to soil microbial activity, and so to weather.

A priority for farmers is that nutrients recycled from waste streams **must guarantee safety**.

Cradle-to-fork approach needed for nutrients



Frédéric Martens, Prayon, President of PAPA (Phosphoric Acid and Phosphates Association, the European **food phosphates sector** of Cefic, the EU chemical industry federation), indicated that the phosphates industry is looking into recycling, has appropriate chemistry and technology, but faces challenges from public and food industry perception.

The phosphate industry is aware that **phosphate rock is a non-renewable raw material** and has been looking into P-recycling since the 1990's. Around 95% of mined phosphate is used in agriculture (fertilisers and animal feed). **Around 5% is used in a very wide range of technical and industry applications, and in human food additives.** Phosphate additives' functions include preserving food products (reducing food waste), replacing sodium in baking powders (reducing dietary salt intake) ...

Industry welcomes that EU policies will bring a positive push to P-recycling: e.g. Green Deal, Farm-to-Fork, Circular Economy Action Plan, Critical Raw Material list.

The technical phosphate industry brings **processing expertise** to P-recycling (extraction and purification, production of phosphate salts with functionalities for specific applications), as well as contacts with downstream user industries.

Today, however, there are **legal obstacles** to recycling P from waste streams to fertilisers, animal food or human food additives.

Perception challenges need also to be resolved: will food companies or the public welcome phosphates derived from sewage or manure?

Recycling logistics and purification processes pose **cost challenges**, and these may be prohibitive if a separate production line is required by regulators or because of market perception (dedicated storage, handling, processing).



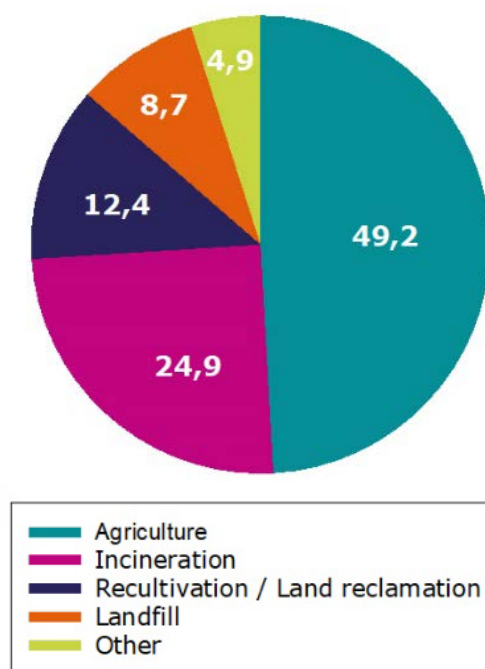
Sarah Gillman, Scottish Water and EurEau (the European Federation of Water Services), welcomes the focus on nutrient management in the Green Deal.

Already the Water Framework Directive and the Marine Strategy Directive are resulting in increasingly stringent requirements for P and N removal in sewage works.

The water industry's ambition is:

- **Protection of the environment** from losses of nutrients to water, land or air
- Reuse of nutrients from waste water, corresponding to **needs of the local economy**
- **Public confidence** in nutrient reuse routes, by ensuring safety and minimising contaminants

Today, around half of EU sewage biosolids go to agriculture, so recycling P, N, other nutrients and organic carbon. However, this is threatened by perception concerns about contaminants.



Destination of sludge produced in EurEau member countries (excluding AU, BG, HR, DK, IE, RS and CH). Source: EurEau members survey, 2017
<https://www.eureau.org/resources/publications/eureau-publications/1460-eureau-data-report-2017-1/file>

EurEau considers that the EU's Integrated Nutrient Management Action Plan should include a **coordinated and holistic approach to N and P reuse**, addressing agriculture, waste water and other streams, including:

- **legislative initiatives** where necessary
- **source control** of pollutants to improve quality of recycled nutrient materials from sewage, and so public confidence
- **new business relationships** between waste water operators and nutrient user industries
- **R&D** into performance N and P removal with lower energy and chemical consumption, compatible with nutrient recycling. This represents a major innovation gap.
- **Funding instruments** to support the nutrient circular economy.



Webinar discussion questions

Developing the Circular Economy for nutrients



Penelope Vincent-Sweet, European Environment Bureau, considers that recycled and bio-based fertilisers should be advantaged, in order to **reduce consumption of the non-renewable resource, phosphate rock, and to increase the organic matter content of the soil**, which improves its quality not only in fertilising terms but also in improving

texture, water retention capacity etc. and reducing erosion and water run-off.



Marina Ettl, Yara, suggested that **policy measures or incentives could promote the inclusion of recycled nutrients** in fertilising products.

It is reminded that **the European Commission has stated the objective to replace 30% of mineral fertilisers with recycled nutrients**: “*Circular Economy: Agreement on Commission proposal to boost the use of organic and waste-based fertilisers*”,

[IP 18 6161](#), 12th December 2018.

Participants underlined the need to remove regulatory barriers to recycling of nutrients in secondary materials, including by **widening the new EU Fertilising Products Regulation** to cover further input materials subject to safety and quality criteria e.g. to allow the input of sewage biosolids into composts, digestates and biochars (currently excluded), to accept nutrients processed e.g. from manure to produce conventional or organo-mineral fertiliser, from algae grown in wastewaters

Benoît Planques, Italtipollina, cited, for example, insect frass (spent substrate and insect excreta from insect farming, see ESPP [eNews n°40](#)) as a developing new material with potential for use in organic fertilisers.



BIOLAN

Tanja Hyttinen, Biolan, Finland, commented the need to **authorise a**

wider range of secondary organic materials in Organic Farming In order to achieve the Green Deal target of 25% Organic Farming in Europe is to be achieved, Organic Farming will need to use.

This reflects the general principles of Organic Farming as set by [Regulation 2018/848](#) (replaces 834/2007) art.5(c) “*the*

recycling of wastes and by-products of plant and animal origin as input in plant and livestock production”.

However, at present manure and other materials “*from factory farming*” are excluded from Organic farming, but it is not clear what this means, with different interpretations in different countries.

What do the -20% and -50% mean?

Participants posed various questions concerning the Green Deal 2030 target of -50% nutrient losses through -20% fertiliser use:

- Is the -20% for mineral fertilisers? For all commercial fertilisers? For all nutrient inputs, including manure and biosolids?
- Is -20% a target for total EU input of nutrients? Or per hectare? Or per tonnage of crop?
- Is the -20% for N? for P? for other nutrients?
- Does the -50% target cover all nutrients, or only N and P?

Andrea Vettori, European Commission, DG Environment, replied that this target aims to reduce nutrient pollution, and so **covers all types of fertilisers, both of mineral and organic origin as well as animal manure spreading**

He indicated that the Green Deal nutrient target is the -50% nutrient losses reduction and that it will be **measured through four indicators**:

- **water monitoring stations with more than 50 ppm of nitrates;**
- **gross nutrient balance;**
- **ammonia emissions coming from agriculture;**
- **soil carbon content.**



Harm Smit, Netherlands Government, commented that reducing nutrient losses by only 50% does not seem compatible with ‘zero’ target of the European Commission’s “[Zero Pollution Action Plan](#)” ambitions.

Several **participants** suggested that **inclusion of recovered nutrients into fertilisers** should be required by regulation (quotas) or fiscality.

Jean-Paul Beens, Yara, stated that the fertiliser industry does not have numerical recycled nutrient targets, but is actively looking for **opportunities to integrate secondary nutrients into fertiliser products**, where this is compatible with safety, quality and legislation.



Improving nutrient management

Participants underlined that reducing nutrient losses to surface waters is not only about reducing nutrient inputs and improving nutrient use efficiency, but also about reducing losses in soil erosion, runoff and infiltration. **BEMP (best environmental management practices)** are important, such as buffer zones, cover crops to reduce soil erosion ... However, such measures can only mitigate nutrient losses, and do not avoid the need to reduce nutrient inputs.

Further research is needed into the long-term effectiveness of BEMP field management measures for phosphorus.

Participants noted that to achieve the Green Deal nutrient target, **nutrient management obligations must be built into the CAP, and must be verified and enforced**, as well as being supported by agricultural advisory services.

The EU's revised (Green Deal) **Methane Strategy (COM(2020)663**, 14th October 2020) suggests that the CAP should support sustainable use of digestate nutrients, and nutrient reductions in animal feed.

Improving the nutrient use efficiency of manures, including better knowledge on nutrient contents of manures and losses in management and field application, are seen as very important by participants, because manures input more nutrients to farmland than do mineral fertilisers (for P and K, but not for N).



Wolfgang Trunk, European Commission, DG SANTE, noted that nutrient losses from livestock production can be significantly reduced by **improving animal nutrition**, e.g. optimising amino acids for N use, phytase to improve P-uptake.



Fabrice DeClerck, EAT, suggested a priority should be **reducing over-consumption of meat products**, bringing health and climate advantages, as well as reducing nutrient losses and addressing regional nutrient misbalances. A dietary shift away from meat could bring c. -20% reduction in total P losses, more significant than reductions through improved production practices.

*Springmann et al. Options for keeping the food system within environmental limits, Nature 2018, <https://doi.org/10.1038/s41586-018-0594-0>
See also Springmann 2020 in ESPP eNews n°48, showing that national government dietary guidelines are inadequate for health and the environment.*

Economics, markets, trade, global context



Jessica Stubenrauch, University of Rostock, noted that nutrient policies, be it for fertilising of crops or for livestock production, need to be defined at the EU level to avoid shifting of effects from one Member State to another.

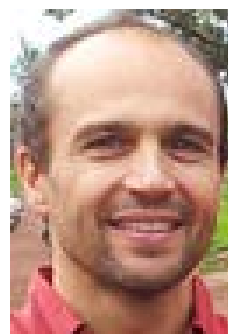
A study showing the **need to reduce livestock farming** and outlining proposals for policy instruments is here:

Land Use, Livestock, Quantity Governance, and Economic Instruments - Sustainability Beyond Big Livestock Herds and Fossil Fuels, Weishaupt et al. <https://www.mdpi.com/2071-1050/12/5/2053>

Participants also expressed concern that the Green Deal target in Europe could **disadvantage EU agriculture's competitiveness** on the world market.

Policy must also **ensure that the EU does not offshore environmental damage overseas**.

See Fuchs et al., Nature, 2020 <https://www.nature.com/articles/d41586-020-02991-1>.



Adrian Leip, European Commission, JRC, underlined the interest of targeted **Product Nutrient Footprinting**, for example for animal feeds and human food products. This can identify priority products for policy action, and can assess nutrient pollution offshoring risks.

See e.g. "Impacts of European livestock production: nitrogen, sulphur, phosphorus and greenhouse gas emissions, land-use, water eutrophication and biodiversity", Leip et al. 2015 <https://iopscience.iop.org/article/10.1088/1748-9326/10/11/115004>



Rachel Dils, Environment Agency (England), underlined the need to **'monetarise' the environmental benefits of agricultural nutrient management**, in order to be able to trade with a range of willing buyers (largely private sector).

Nutrient trading, nutrient certificates or credits should be developed as tools to monetarise nutrient loss reductions and nutrient recycling, and to optimise the cost-effectiveness of actions. Nutrient emission trading should be facilitated at the **catchment or landscape level**, see examples in SCOPE Newsletter [n°133](#).



Participants underlined that poor nutrient management results from **misfunctioning of the food price system**. Food prices to consumers must be high enough to provide a fair income to farmers and cover costs of good environmental agricultural practice.

Which nutrients and where?

Participants had varying opinions on which nutrients should be addressed by the Green Deal nutrient target.

Several **participants** underlined the importance of considering all nutrients:

- **phosphorus and nitrogen** are identified as priorities and critical for soil fertility.
- **potassium, sulphur**, micronutrients, should also be considered
- **balanced reductions** of inputs of N and P are essential (appropriate N/P ratios), reducing only one may result in increased losses of the other
- **organic carbon** is important, both for its value for soil fertility and hydrology, and its interaction with nutrients



Erik Sindhøj, RISE – Research Institutes of Sweden and Interreg SuMaNu Platform, considers that the priority should be phosphorus and nitrogen, because they are the key drivers of water quality deterioration, nutrient-related greenhouse and air quality impacts.

He notes that **a combination of measures will be needed to meet the targets for reduced nutrient loss and reduced fertilisers usage**: stricter requirements on fertilisation planning and nutrient balances, support and regulation to implement best available technologies for manure storage and spreading, nutrient reallocation from regions with surplus through manure processing and increased knowledge transfer concerning sustainable nutrient use between farmers, food industry, authorities and policy makers.

See SuMaNu policy recommendations at <https://balticsumanu.eu/about-the-project/reports/>

What to measure? How to measure it?

Discussion underlined that **better data is needed on phosphorus inputs to soils and on soil P levels**.

This is complex because different countries use **different metrics for soil P** testing and soil P status. But also, soil threshold levels for nutrients, (to limit nutrient losses), depend strongly on specific local conditions.

Key **knowledge gaps** identified are:

- how **organic carbon** in soil (and in organic fertilisers) interact with soil nutrients, with crop nutrient use efficiency and with nutrient losses
- nutrient use efficiency and management practices for **manures**
- **how nutrient balance impacts nutrient losses**, in particular how phosphorus levels impact nitrogen use efficiency
- how to correlate soil P status (given by different P-index metrics) with **risk of P losses**

Better **data on nutrient flows is also essential for policy management**, see for example work engaged by Lancaster University UK where nutrient substance flow analysis is a basis for engaging stakeholders and informing policy.

See Withers 2019 <https://doi.org/10.1007/s13280-019-01255-1>

Soil Health and nutrients

Numerous **participants** underlined the links between agricultural nutrient stewardship and soil health:

- **organic carbon**, and interactions with nutrients
- **biostimulants**, as tools to activate soil fertility and foster soil biodiversity
- **soil structure** is key to reducing soil erosion, which directly reduces nutrient losses to surface waters
- **nutrient balance**



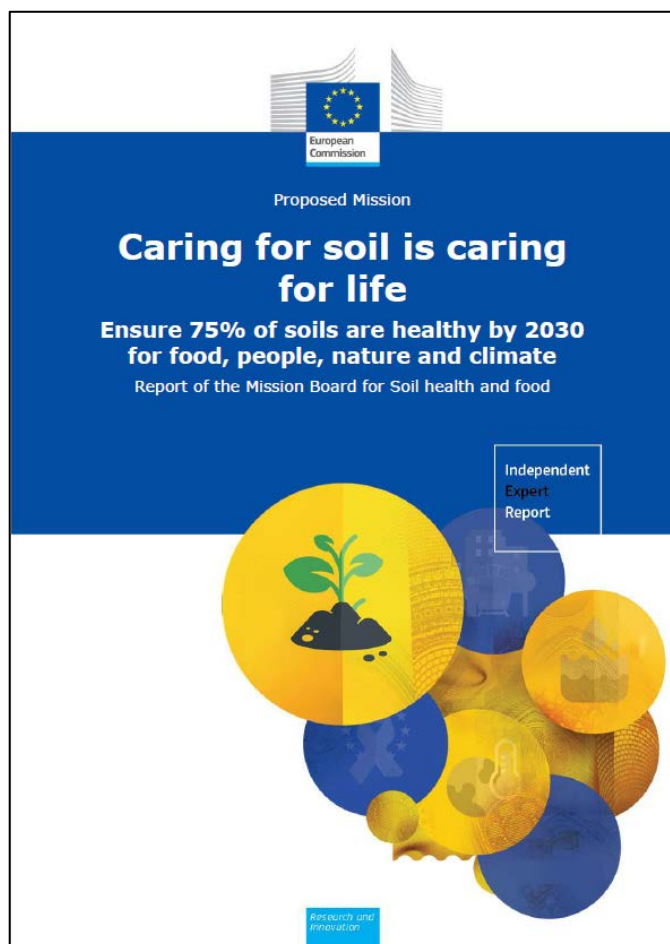
EU Soil Strategy

The European Commission is developing a **new Soil Strategy**: Roadmap here <https://bit.ly/3n5t7B7>

It is important that nutrients in fertilisation and in soil, and the link to nutritional value of food products, is integrated into the **Horizon Europe Mission on Soil Health and Food** (which has become “Caring for Soil is Caring for Life”, see [29/9/2020](https://bit.ly/3n5t7B7)):

Protecting soil health also means reducing pollutant inputs. **Participants** concurred that **high quality and safety requirements are necessary for recycled products**. This should be achieved both by strict contaminant limits on fertilising products and by **reduction at source** e.g.

- EU decision to address **PFAS** ([SWD\(2020\)249](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32020D0249), 14/10/2020)
- veterinary pharmaceuticals in livestock production
- heavy metals, in both mineral phosphate fertilisers and recycled nutrient products
- emerging contaminants in domestic wastewater



James Byrne, Wildlife Trusts Wales, notes that veterinary medicines can reduce **dung beetle activity**, so increasing nitrogen losses from manure and reducing manure nutrient recycling.

The new Veterinary Medicines Regulation ([Regulation \(EU\) 2019/6](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32019R006)) will modernise the existing rules on the authorisation and use of veterinary medicines in the EU when it becomes applicable on 28 January 2022. This process must look at the ecological (i.e. non-target organisms) and environmental (i.e. nutrient cycling) impacts of veterinary medicines – and require more benign medicines to be used, with medicines used when needed rather than prophylactically. This will combat ecological and environmental impacts but also reduce resistance.

We should apply the same standards to veterinary medicines as we do to antibiotics and the principles of Integrated Pest Management (IPM). For example, **dung beetles are important for a range of ecological services, including recycling essential nutrients back to the soil** and the sequestration of carbon. The related reduction in nitrogen loss has been valued at nearly \$60 million in the US (Losey 2006). However, avermectins used to treat internal parasites in cattle are toxic to dung beetles (Finch et al 2020). Protecting and enhancing dung beetle populations will help reduce nutrient losses, sequester carbon and restore biodiversity

Losey et al. 2006

[https://doi.org/10.1641/0006-3568\(2006\)56\[311:TEVOES\]2.0.CO;2](https://doi.org/10.1641/0006-3568(2006)56[311:TEVOES]2.0.CO;2)

Finch et al (2020)

<https://setac.onlinelibrary.wiley.com/doi/abs/10.1002/etc.4671>

See also <http://www.dungbeetlesforfarmers.co.uk/information-for-farmers>

