Results of the Focus Group on nutrient recycling

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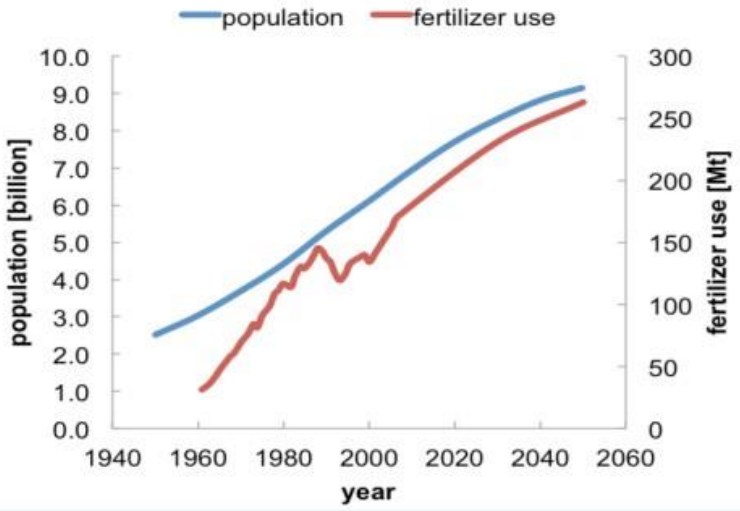
Setting the scene, the nutrient problems

1. **food demand**: population doubled in the last 60 year, more food imply more fertilizers,
2. **environmental concerns** on water, air, soil, nitrates, phosphates leaching and/or runoff, soil erosion,
3. **fossil energy depletion**: e.g. ammonium (NH4) extraction from atmospheric nitrogen gas (N2) via the H-B process require 35-40 GJ ton-1 NH4. The total energy consumption is equivalent to ± 2 % of world energy use.
4. phosphorus **reserves are limited** to 100 -250 years, the EU is 100% import dependent, from 2014 the phosphorous is on the list of critical raw materials,
5. global food trade: increasing cost of energy, **increase food prices**,



Question:How to improve the agronomic use of recycled nutrients (N and P) from livestock manure and other organic sources?

- 1) what are the most **relevant techniques** (e.g. composting, bio-digestion, etc.) to process livestock manure and other organic sources and what are the agronomic and environmental value of the derived products (e.g. nutrient availability, quality, impacts on soils, contaminants, etc.)?
- 2) what **tools and instruments** to use to help farmers to measure the nutrient content (and availability for crops) what recommendation to formulate?
- 3) which **economic and technical factors** (e.g. livestock management practices, sanitary aspects, etc.) stimulate or limit the use of these products in agriculture and indicate how to address them?
- 4) what **possible strategies** to use for the bio-based products regarding market demands (e.g. development of quality standards) and successful business cases?
- 5) what kind of **research needs**, possible gaps in technical knowledge?
- 6) what kind of **innovative solutions** exist and what can be provided for EIP-AGRI Operational Groups?

Answer : reconnecting plant cropping - animal husbandry and recovery systems

- 1. **benefits and constraints** of emerging technologies: mechanical separation, biological treatment, composting, drying, digestion, pyrolisis, (40)
- 2. **farmers acceptance** of technologies/farms specialisation (plant cropping, animal farming, mixed farming)
- 3. farmers equipment (investments),practices (GAP) e.g. sensors,
- 4. market uptake/ **consumer perception,** pushing and puling site, whole food value chain,
- 5. **contribution** to **soil organic matter** (SOM) and soil health ,
- 6. **regulatory frameworks** at national and EU level, e.g.1069/2019 EC introduce the international manure trade, contaminants e.g. AMR,

Discussion outcomes

- **Mini papers (8):**
  1). Available technologies: acidification, ammonia striping, AD, composting, manure separation, struvite production,
- 2). On farm tools : measurement, analysis, soil scanning, precision agriculture tools,
- 3). On farm practices: available fertilizers and their combinations, crop needs, farming practices,
- 4). Towards increasing the mineral fertilizers replacement value of fertilizers: modifying the nutrient availability of bio-based fertilizers,
- 5). The value of recycling organic matter to soils: EOM as fertilizers (e.g., >150 kg N or soil improver < 150 kg N),
  6). End user requirements on bio-based fertilizer products:barriers and advantages,
- 7). Regulatory environment effecting nutrient recycling: EU and national regulations,
- 8. Assessing the environmental impact of nutrient recycling products (LCA)
- 9. **Final report**,

(all available at https://ec.europa.eu/eip/agriculture/en/focus-groups/nutrient-recycling)

Knowledge gaps

- 1. need for specific **LCA and environmental risk assessment** (*in progress in the H 2020 Nutri2Cycle project 2018-2022),*
- 2. need for **standardisation** e.g. **nutrient use efficiency (NUE)**
- 3. assessing the impact of **organic contaminants, impact on soil health** and on food safety, avoiding or reducing contaminants (1069/2019 EC),
- 4. understanding **consumers perception** *(in progress in the H 2020 Nutri2Cycle project 2018-2022),*
- 5. using **remote sensing tools and practices** *(in progress in the H 2020 Nutri2Cycle project 2018-2022),*
- 6. exploring **practical tools** that can be applied **on-farm level** (farm-scale recovery, measurements, equipment),
- 7. providing to farmers **tailor-made fertilisers** with desired and well-known formulated compositions from bulk products containing variable rates and concentrations of nutrients,

Recommendation, farmers needs

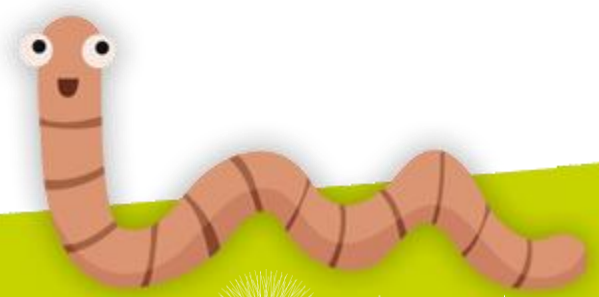
- 1. **tailor made products** the N-P-K ratio according to crop needs,
- 2. quantification of the **nutrient use efficiency** (NUE),
- 3. avoiding the spread of **organic contaminants** impact on soil health and food safety,
- 4. standardisation of the **environmental impact assessment,** LCA and modelling methodologies,
- 5. improve the **consumer and farmers acceptance** by investigating the whole food value chain,
- 6. **precision application** by remote control systems and sensors,

The focus group team on nutrient recycling

EIP-AGRI seminar
Healthy soils for Europe: sustainable management through knowledge and practice
Online – 13-14 April 2021

All information of the seminar is available on
www.eip-agri.eu

On the event webpage
https://ec.europa.eu/eip/agriculture/en/event/eip-agri-seminar-healthy-soils-europe-sustainable



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