Policy recommendations to improve the sustainability of manure and nutrient management in the Baltic Sea Region

EUSBSR PA Nutri Steering Group Meeting
30 November 2021

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SuMaNu policy recommendations

#1 Development of coherent P fertilization policies in the Baltic Sea Region

#2 Fertilization planning and nutrient balancing

#3 National standards for handling and spreading manure

#4 Regional nutrient reallocation

#5 Minimal use of harmful substances and careful manure processing ensure safe recycling of manure nutrients

#6 Knowledge transfer between farmers, advisors, researchers, authorities and policymakers

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#1 Development of coherent P fertilization policies in the Baltic Sea Region (1/2)

SuMaNu recommendation

- Set a regulatory maximum limit for P fertilization
  - **Minimum demand:** Flat-rate, if stricter P regulation do not exist (*e.g., HELCOM limit of 25 kg ha^{-1} yr^{-1} for manure P*)
  - **Optimally:** P limits based on crop need and applied for all P fertilizers

- Develop and update national guidelines for N and P application rates. They should account for:
  - Crop N and P need
  - Soil characteristics, especially soil P status
  - Cultivation history
  - Economy

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#1 Development of coherent P fertilization policies in the Baltic Sea Region (2/2)

Current status in the BSR

- Most countries in the BSR are lacking regulation for P fertilization
- HELCOM's annual flat rate limit for manure P is not adopted in many countries
- Status and basis of national fertilization guidelines vary among the BSR countries
- Manure is most often spread according to its N content leading to overfertilization of P


Photo: Sentinel Hub EO Browser/ESA Archive/Landsat 5

Regulatory fertilization limits need to be set and fertilization guidelines developed for field level fertilization planning

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#2 Fertilization planning and nutrient balancing (1/2)

SuMaNu recommendation

Fertilization planning

- All farms (esp. livestock farms) in the BSR should plan their N and P fertilization annually at the field level based on

  … national guidelines and manure nutrient content

  … regular soil nutrient content determination

Manure first!

Keep record!


Photo: Erkki Oksanen, Luke

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#2 Fertilization planning and nutrient balancing (2/2)

SuMaNu recommendation

Nutrient balancing

- Annual farm-level nutrient balance calculation
  - ➢ What is the nutrient use efficiency on the farm?
  - ➢ Are there needs to optimize nutrient use efficiency on the farm?
- National reference values should be created for various farm types


Photo: Erkki Oksanen, Luke


Photo: Erkki Oksanen, Luke

If nutrient surplus exist, part of the manure need to be reallocated to the another farm or region to substitute mineral fertilizer use.

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#3 National standards for handling and spreading manure (1/2)

SuMaNu recommendation

- **National manure standards:**
  - Develop and update national standards for determining manure quantity and nutrient content for all livestock and manure types

- **Spreading:**
  - Primarily in the spring and summer for growing crops
  - Autumn spreading only for establishing winter crops
  - According to the manure nutrient content and fertilization plan

  → Increase the minimum requirements for manure storage capacity

- **Technologies:**
  - Raise the requirements for acceptable practices and technologies for animal housing, manure storage and manure spreading
  - Establish a list of best sustainable manure management technologies and practices

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#3 National standards for handling and spreading manure (2/2)

Current status in the BSR:

- Inefficient practices and technologies are still often used, e.g.
  - Late autumn and winter spreading due to e.g.,
    - inadequate manure storage capacity
    - lack of suitable time slots for spreading in spring and summer
  - Broadcast spreading

Photo: Tapio Tuomela, Luke

Photo: Zemnieku saeima

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#4 Regional nutrient reallocation (1/2)

SuMaNu recommendation

- Reallocate P from the areas of P surplus to the areas in need of P
  - Determine the quantities and characteristics of nutrient-rich biomasses and crop nutrient need regionally
  - Develop a national strategy for nutrient recycling
    - Renewable energy possibilities
  - Base the nutrient reallocation on regional crop nutrient need
  - Support both the production and use of recycled fertilizer products to create a market for the products
  - Demonstrate and raise awareness

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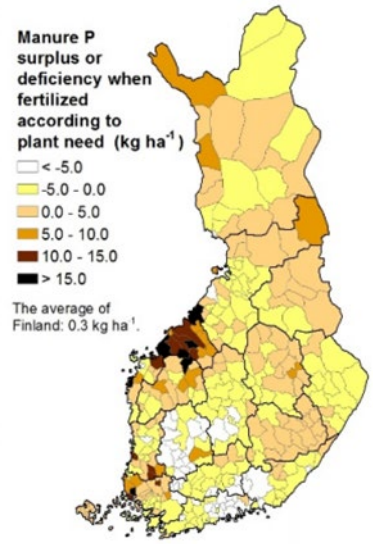
#4 Regional nutrient reallocation (2/2)

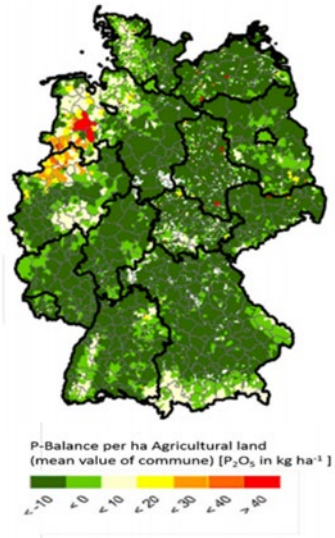
Table 1. EU nutrient recycling potential, total amounts and average amounts per year on agricultural land in the EU if spread evenly (Eurostat 2016, Leip et al. 2014, Velthof et al. 2015, van Dijk et al. 2016, Sutton et al. 2011, Buckwell & Nadau 2016). For comparison, annual mineral fertilizer use (Eurostat 2016).

	N total Mt	N average kg/ha/a	P total Mt	P average kg/ha/a
Manure	7–9	41–52	1.8	10.5
Biowaste	0.5–0.7	2.9–4.1	0.1	0.6
Slaughterhouse waste	ND	ND	0.3	1.7
Sewage	2.3–3.1	13.3–18.0	0.3	1.7
Mineral fertilizer	10.9	63	1.4	8.1

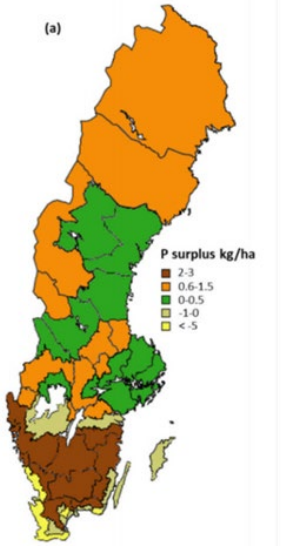
ND = no data



Finland



Germany



Sweden

Luostarinen et al. 2020. http://urn.fi/URN:ISBN:978-952-380-037-3

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#5 Minimal use of harmful substances and careful manure processing ensure safe recycling of manure nutrients (1/2)

SuMaNu recommendation

- Use antibiotics and other pharmaceuticals only when necessary
  → animal rearing conditions
- Avoid excess use of trace elements
  - use according to nutritional needs
- Secure the hygienic quality of manure and manure based fertilizer products
- Avoid co-processing with sewage sludge

Photo: Yrjö Tuunanen,/Luke

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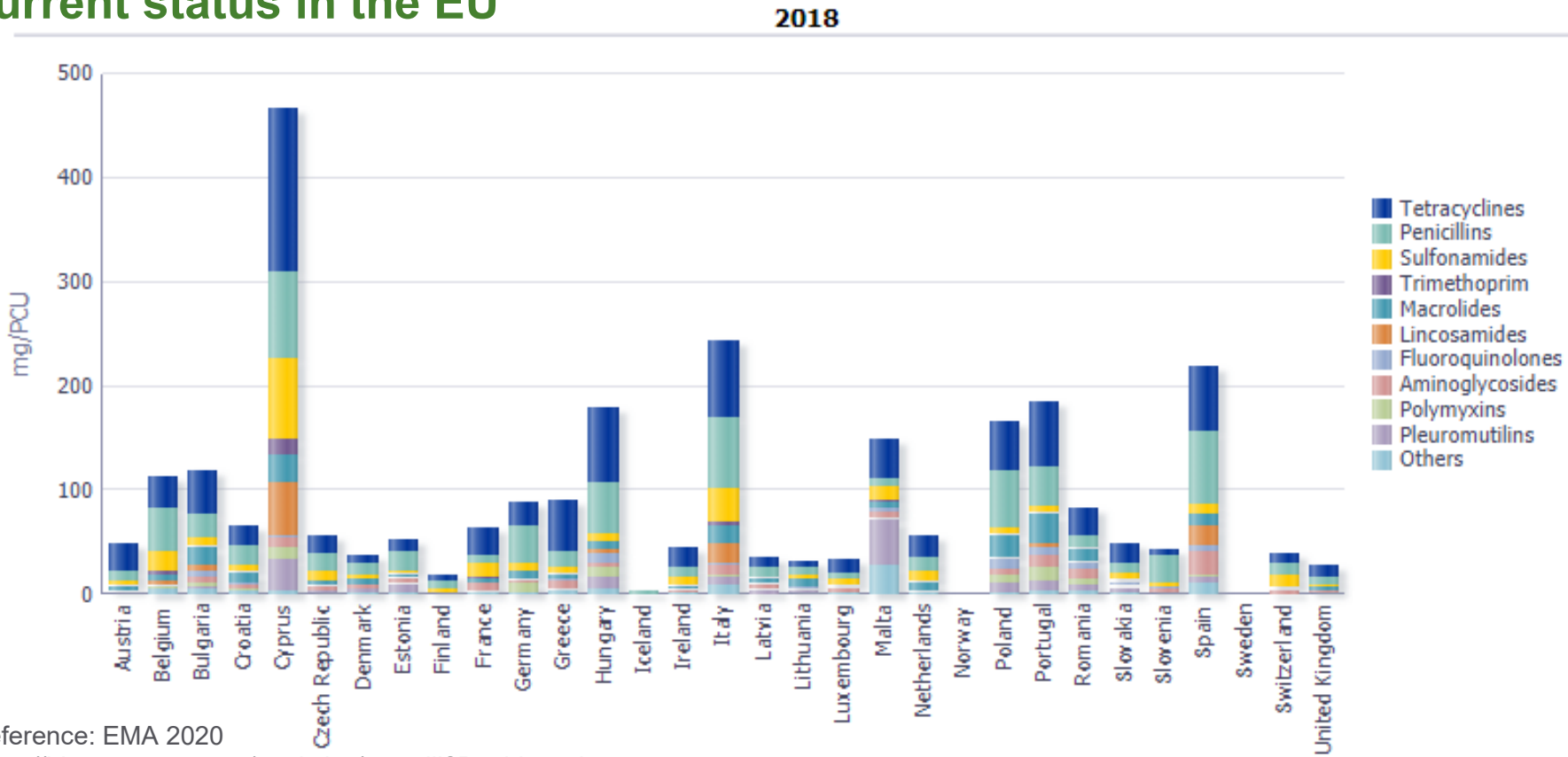
#5 Minimal use of harmful substances and careful manure processing ensure safe recycling of manure nutrients (2/2)

Current status in the EU



Reference: EMA 2020
https://bi.ema.europa.eu/analytics/saw.dll?Dashboard

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#6 Knowledge transfer between farmers, advisors, researchers, authorities and policymakers

SuMaNu recommendation

- Form national manure committees
  - To advice on manure legislation, knowledge transfer policies and research (national & international level)
- Build national manure knowledge transfer systems
  - To support implementation of recommended manure management techniques and practices
- Support cooperation between farmers, advisors, scientists, policymakers
  - Clear messages and holistic approach
  - End-user involvement in projects
  - Utilize digital solutions
- Enhance use of farming data to support nutrient management


Photo: Zemnieku saeima


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FARM LEVEL

Annual farm-gate nutrient balancing

Require stocktaking and data collection

Set official methods for determining manure quantity & nutrient content

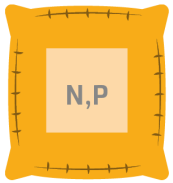
Determine manure nutrient content

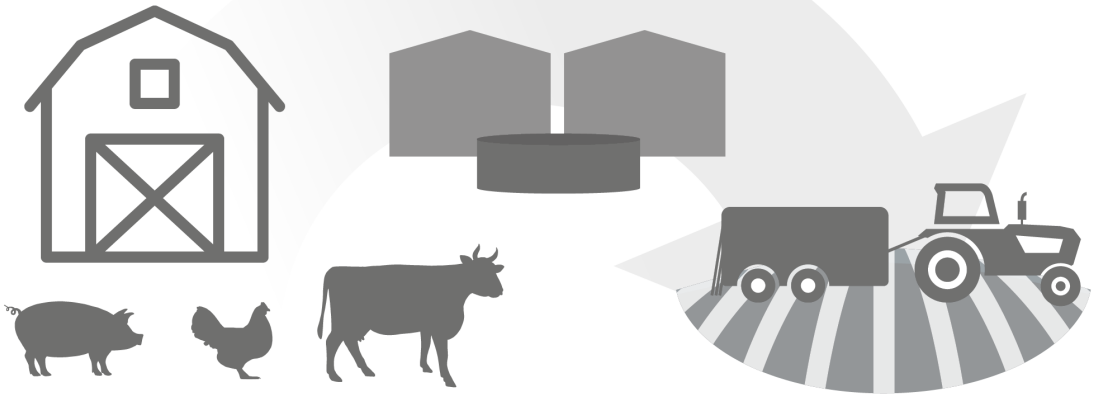
Annual field-level fertilization planning

Set regulatory limit for P fertilization

Set national guidelines for N and P fertilization and require precise nutrient use

Regular analysis of soil nutrient content





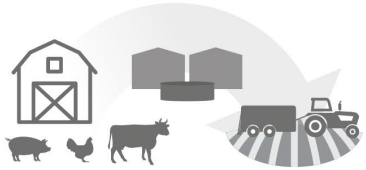
N & P

N & P

Use emission-reducing techniques

Raise the requirements for acceptable practices and technologies in all manure management

FARM LEVEL



N & P

REGIONAL LEVEL

If surplus of manure nutrients to farm need

Reallocate surplus of manure nutrients to neighboring farms

N & P

Reallocate surplus of nutrients to manure processing producing recycled fertilizing products

If regional surplus of manure nutrients

Take account of national and regional supply of manure nutrients and compare to fertilization need to set targets for nutrient recycling

Support production of recycled manure-based fertilizer products

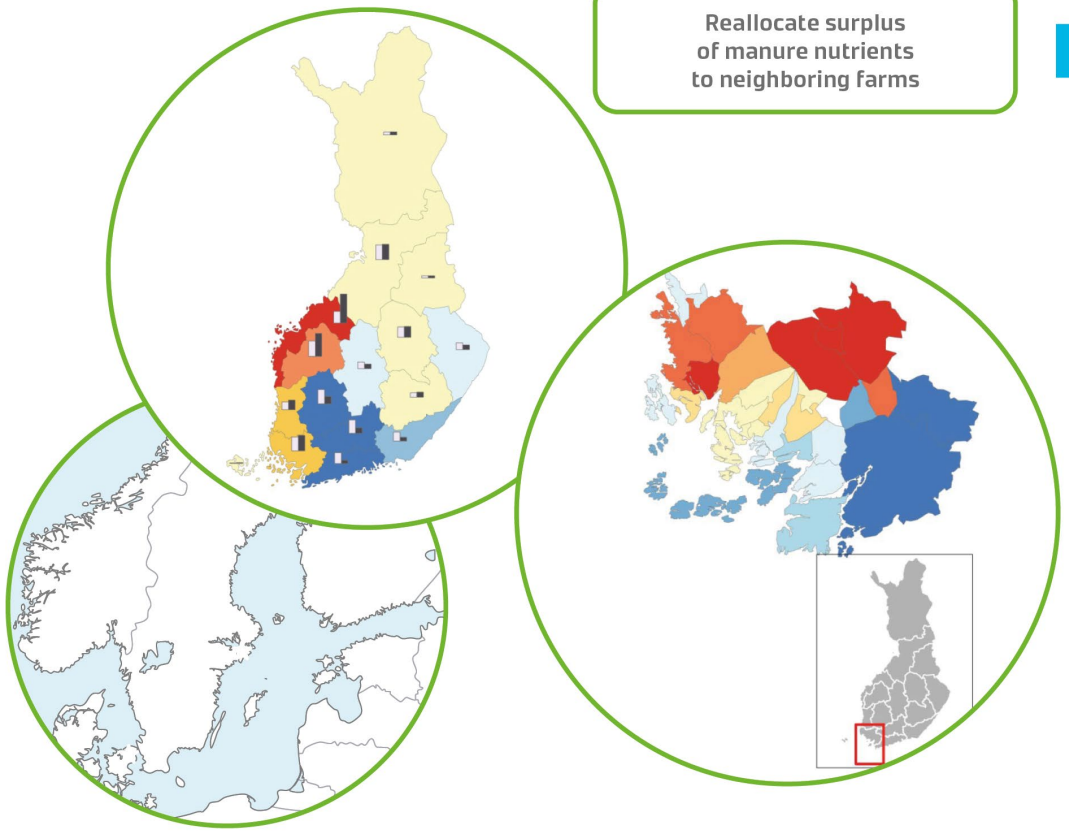
Support use of recycled manure-based fertilizer products

Ensure safety of recycled manure-based fertilizer products

Cu

Zn

As




Thank you!
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