



Water protection in agriculture – Preventing nutrient leakage by new methods

Safe Environment and Cleaner Waterways to Blue Baltic Sea –
LUGABALT 2

Безопасность окружающей среды и чистые реки в синее
Балтийское море - ЛУГАБАЛТ2

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Baltic Sea

- Small water capacity and susceptible to eutrophication due to large catchment basin
 - Four times the size of the sea area
- The increased levels of soluble phosphorus in oxygen-free deep water → more frequent algal blooms
- In Finland the fields in the southwestern area are one of the most significant sources of nutrients
- Regional concentration of farms and increase in farm size
 - Nutrients lost from manure has also become a problem
- Effective utilization of soluble nitrogen in livestock manure is one of the key factors in achieving reasonable nitrogen balance

Erosion & nutrients

- Soil type and gradient affect the intensity of erosion
 - On average about 600 kg of soil per ha is lost every year
- The proportion of perennial plants has a clear connection to nutrient leaching
 - For instance nitrogen leaching decreases to one tenth
 - Deep rooted plants prevent erosion as well add more organic matter in the soil
- Maintaining soil structure and diversifying crop rotations is even more important in the future
 - Rising rainfalls especially during the winter can cause risks

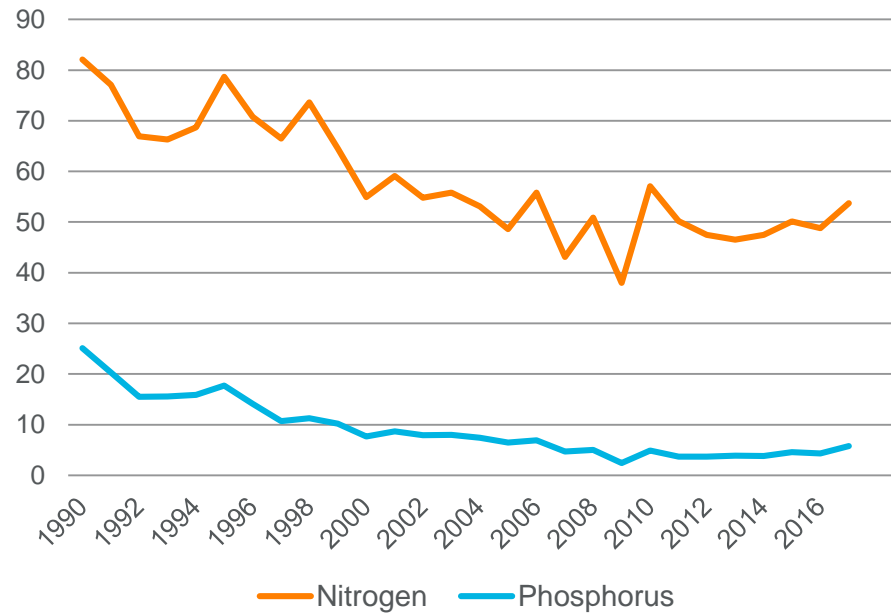


Nitrogen and phosphorus balances

Nutrient balances have been quite stable in recent years

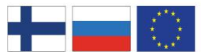
- nitrogen balance has remained at the level of 50 kg / ha
- phosphorus balance about 5 kg / ha

N and P balances in Finland
1990 - 2017



The Rural Development Programme (2014-2020)

- Policy tool for developing Finnish countryside
- Several measures to improve water protection in agriculture
 - Perennial grasslands, green manure grasses, buffer strips, cover crops etc.
- Main achievements include the expansion of the wintertime vegetation coverage of the fields
 - The risk of erosion has decreased significantly
 - The targeting of plant coverage to the areas where annual crops are common and soils are sensitive for erosion has also succeeded



The Rural Development Programme (2014-2020)



- “Balanced use of nutrients” measure is also widely implemented
- Areal targets for the measures have been achieved in
 - nutrient control
 - placement of slurry
 - nutrient and organic matter recycling
 - drainage management

Soil health

1. Back to basics: ditching and liming

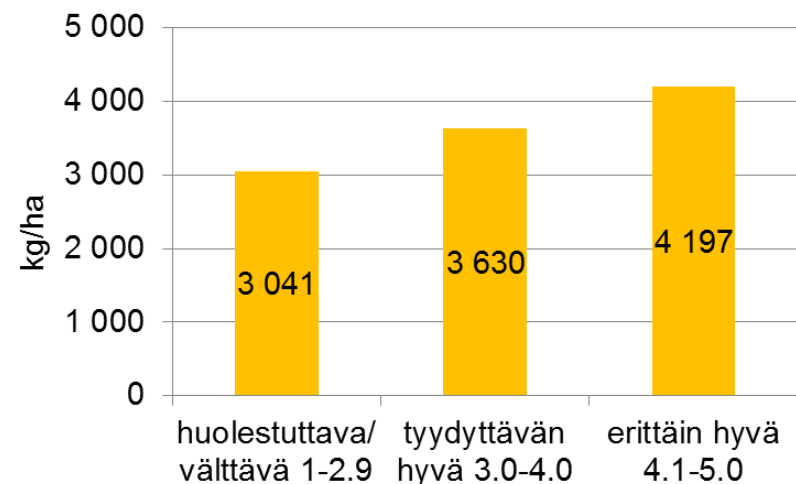
- Neglecting ditching weakens production capacity of the field
 - Nutrient leaching increases
 - Economic viability suffers

2. Preventing soil compaction, minimizing tillage

3. Crop rotation

- Diversity of features
 - A. Legume – non-legume
 - B. Annual – perennial
 - C. Spring sown – autumn sown

Barley yields 2002-2017



Project: Perusparannukset ja ravinnetase suomalaisessa peltoviljelyssä 2017 -2019

Soil organic matter

1. Improves water and nutrient retention
2. Acts as a binder in the formation of crumbs (aggregated soil particles)
3. Maintains the soil biological activity
4. Functions as a soil carbon storage

C (carbon) * 1,74 = SOM (soil organic matter)

Yield effect for organic matter

- Spring cereal yield → 230 - 390 kg/ha / 1 % soil organic matter

Project: Orgaaninen aines maaperän tuottokyvyn kulmakivenä – Oranki 2016 - 2017

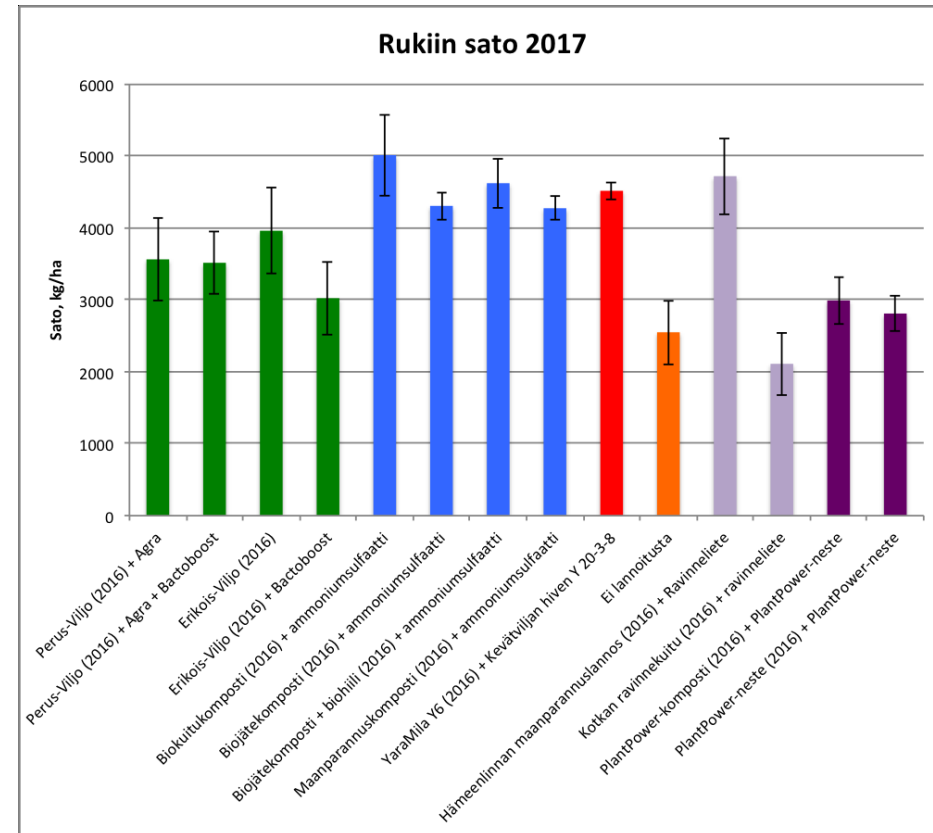
Soil amendment products:

- Livestock manure
- Compost
- Digestion residues of the biogas plant
- Biochar
- By-products from the forest industry
 - Nutrient and zero fibers

Nutrient recycling

- Field trial to compare inorganic and organic fertilizers
 - By-products from the forest industry, meat and bone meal fertilizers, composts, mineral fertilizer and no fertilization
- Effects for yield quantity and quality
 - For example rye yields in 2017

Project: *HYKERRYIS – Hyvän Sadon Kierrätyslannoitus 2016 - 2021*



Gypsym

- Simple, efficient and rapid way to protect water systems in archipelago region of Finland
 - Gypsym decreases erosion and phosphorus load
 - Possibility to reduce P load to Baltic Sea by 300 tons / year
 - Area covers about 540 000 ha
- Gypsym amendment
 - Suitable for clay soils, amount is about 4 tons / ha
 - Spreading after harvest and before tillage (plowing, minimum tillage, no tillage)
 - No negative effect for yield

Project: SAVE – Saaristomeren vedenlaadun parantaminen peltojen kipsikäsittelyllä (2016–2018)



Thank You!
Спасибо!



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