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**RavinneRenki**

**LantaLogistiikka**

# Eastern Finland – Improving Nutrient Cycles in Agriculture

Sharing best practices to improve water quality seminar

Kuopio 22.5.2019

Teija Rantala, Savonia UAS



Euroopan maaseudun  
kehittämisen maatalousrahasto:  
Eurooppa investoi maaseutualueisiin



Elinkeino-, liikenne- ja  
ympäristökeskus



MAASEUTU 2020

## Ravinnerenki project 6/2015 – 5/2019

Focus on nutrient cycles and water management in agriculture in Eastern Finland: Research, advising, events, demonstrations, some, reports...

### Partners:

Savonia UAS, Karelia UAS

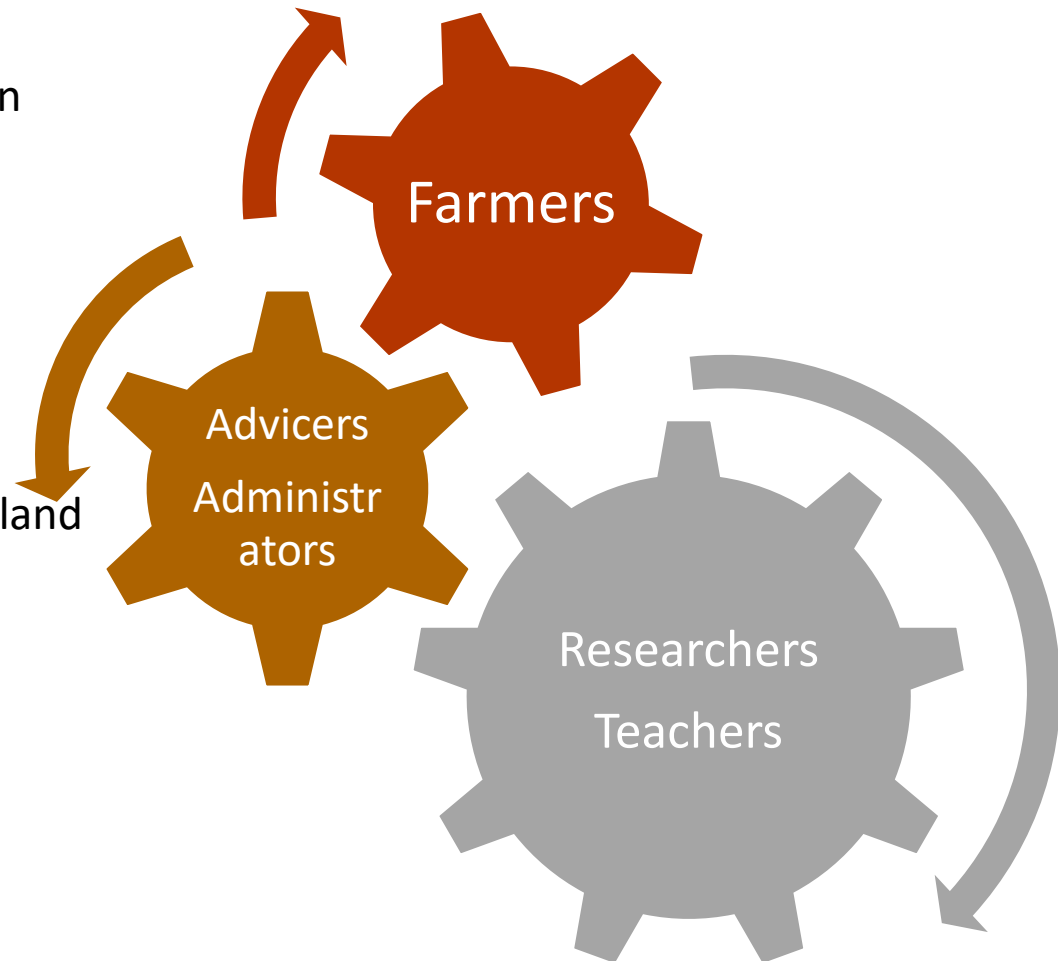
Luke, Natural Resources Institute Finland

SYKE, Finnish Environment Institute

ProAgria North Karelia (advisers)

ProAgria North Savo (advisers)

YSAO, Ylä-Savo Vocational College





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Previous  
projects,  
ideas from  
farmers

**EVENTS**  
Field observations,  
Demonstrations, Seminars

**PUBLICATIONS**  
Final report  
Articles  
Seminar presentations  
Posters

Other projects,  
international co-  
operation



**TOOLS**  
Modelling tool for  
nutrient leagages  
Tool for evalution  
of under draining  
Site on recycled  
nutrients

Steering  
committee:  
ELY, MTK etc.

Co-operation with farms:  
Observation farms, events  
on farms...





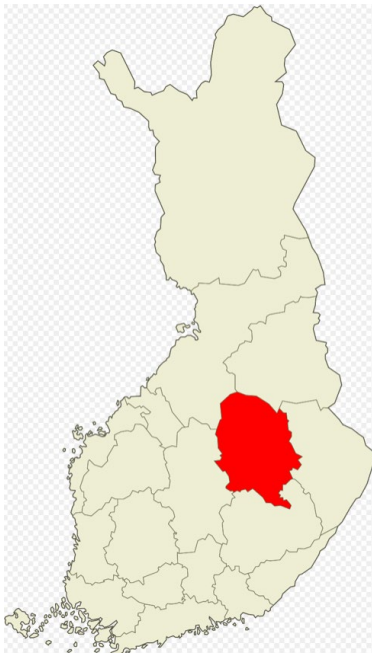
# Agriculture and water quality in Eastern Finland





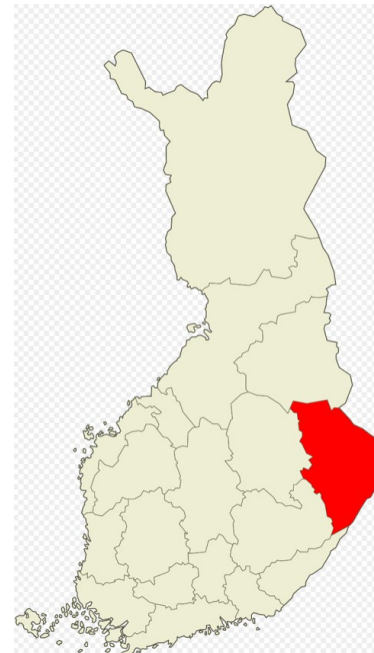
## North Savo

- Farms: 3353
- Dairy farms: 951
- Arable land: 148 800 ha
- Grassland: 85 700 ha (0-5 yr)



## North Karelia

- Farms: 1962
- Dairy farms: 435
- Arable land: 84 800 ha
- Grass land: 50 200 ha (0-5 yr)

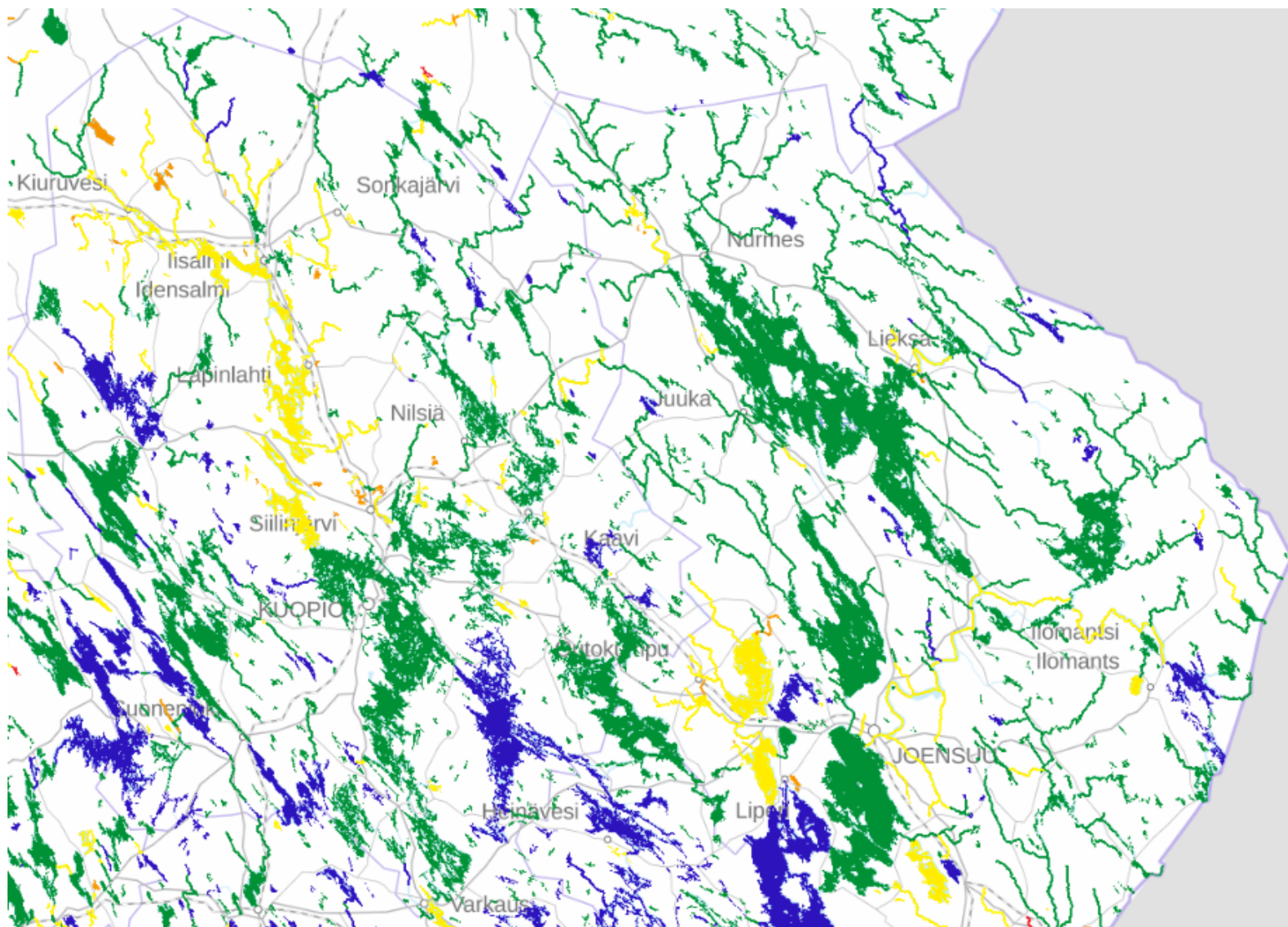




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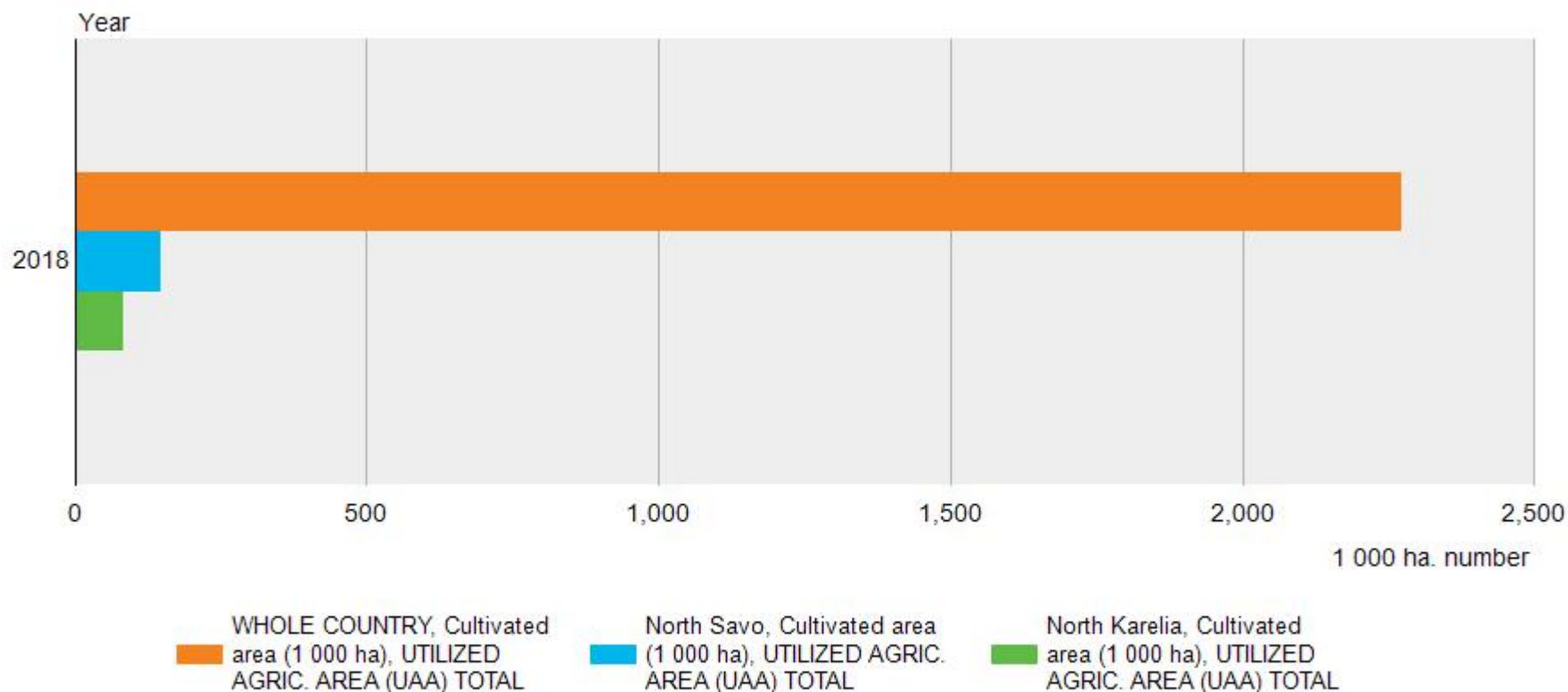
# State of surface waters in Eastern Finland

Blue: Excellent  
Green: Good  
Yellow:  
Satisfactory  
Orange: Low





## Utilized agricultural area by ELY Centre, Variable, Species and Year

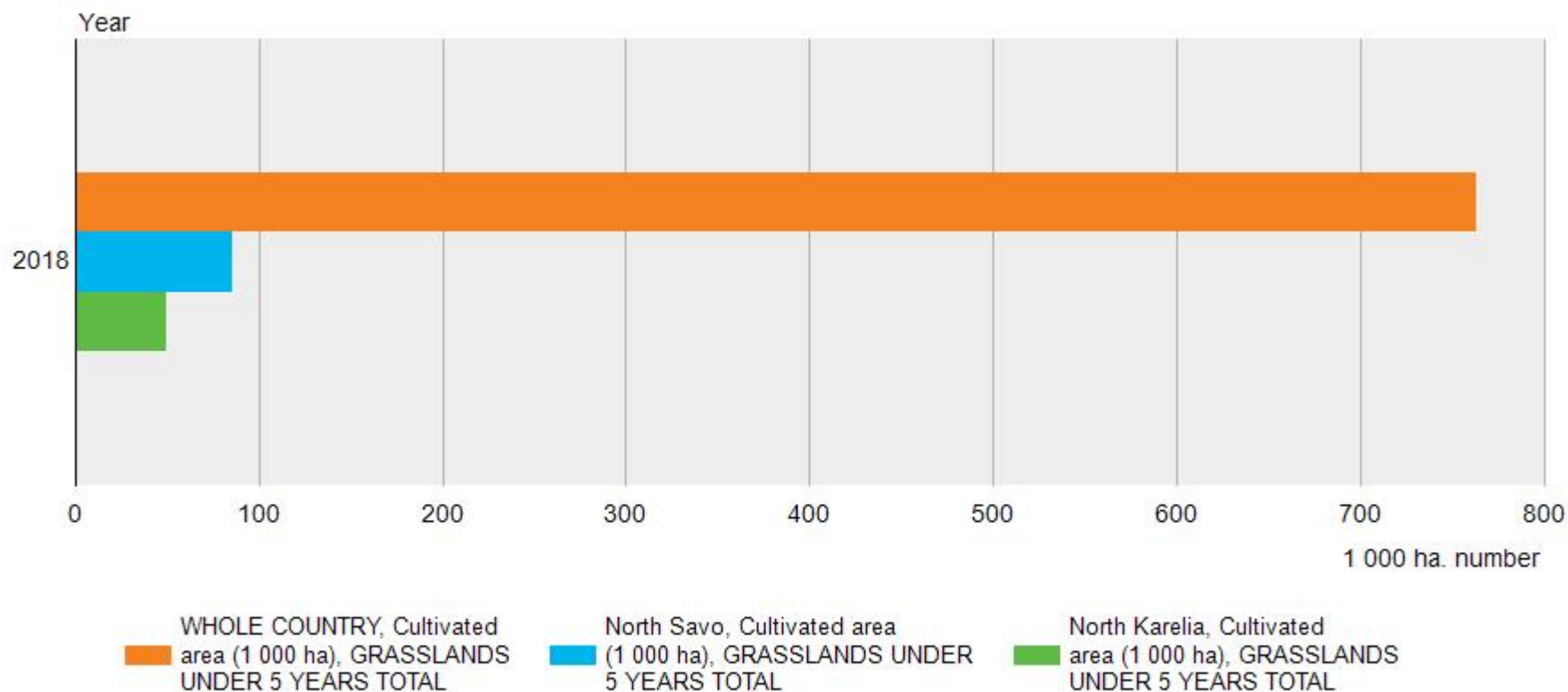


Source: OSF: Natural Resources Institute Finland, Utilized agricultural area





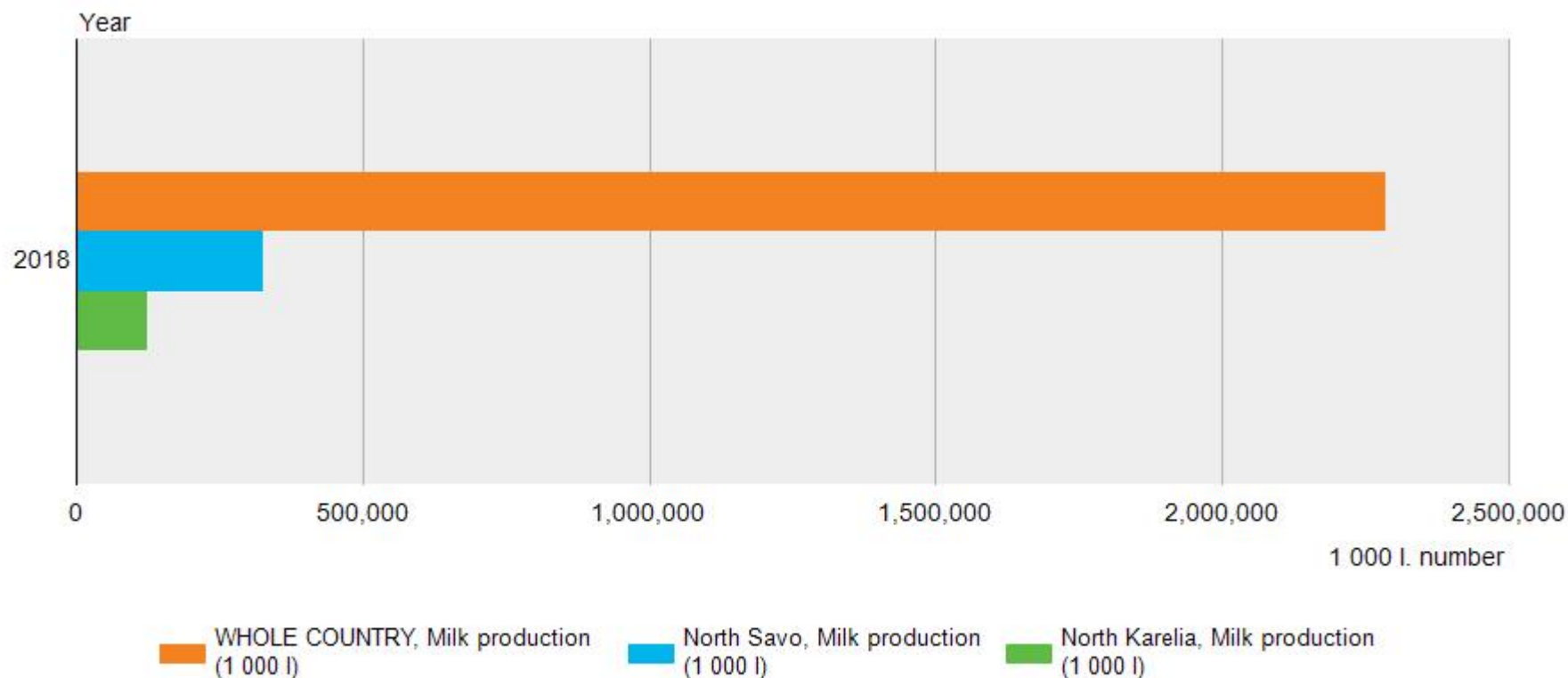
## Utilized agricultural area by ELY Centre, Variable, Species and Year



Source: OSF: Natural Resources Institute Finland, Utilized agricultural area



## Milk production by ELY Centre, Variable and Year



Source: OSF: Natural Resources Institute Finland, Milk production by area



## Nitrates directive:

- Regulates manure and organic fertilizer products storing and spreading over the country. E.g.
  - Fertilizing forbidden 5m from water system.
  - Fertilizing is allowed basicly 1.4.-31.10.
  - When using surface spreading, the fertilizer has to be earthed up in 24 hours if there is no vegetation in the field.

## Environmental commitment:

- Environmental requirements and financial support.
- Majority of farms are engaged until 2020.
- Includes e.g. plannig crop rotation for 5 years, exam on the commitment, making field soil quality test.

Projects, new techologies and separete funding: Guidelines, information, advices, and new methods for volunteer active farmers.





# Outcomes of Ravinnerenki and Latalogistiikka projects





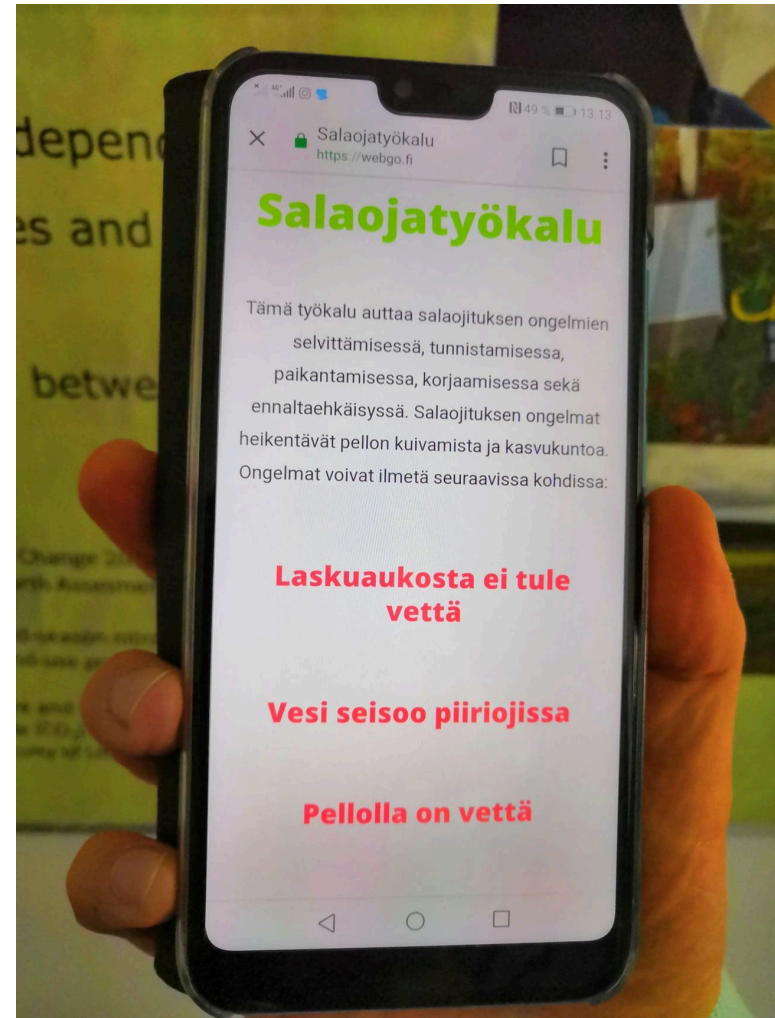
# SAVONIA Tool for evaluation of underdraining

Challenges in Finnish agriculture:

- Snow melting waters in the spring => 80 – 90 % of the nutrient leakages in the springtime.
- Short growing season => Soil compaction when driving on fields when soil is still wet.

Good draining and underdraining prevent soil compaction and nutrient leakages.

With the tool made in Ravinnerenki farmers can evaluate the state of the draining and underdraining in the field.





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# Slurry injection

Over half of the manure is injected in Finnish grasslands.

Slurry injection is good way to decrease nutrient leakages and N evaporation.

Some farmers and contractors have noticed problems in this practice. They wonder if slurry injection does harm the growth of the grass roots.

Luke Maaninka performed a research on slurry injection in Lantalogistiikka project:

- No harm from injection was noticed.
- Loss of yeild was found under the tires, no matter how the field parcel was fertilized.





# Avoiding soil compaction in slurry spreading

Soil compaction breaks soil structure and thus roots may not grow as deep and as strong compared to healthy soil. Luke Maaninka made a research on soil compaction. In that research there was not effect to the yield of the grass but compaction was made just once.

One possibility to decrease pressure to the field is using umbilical slurry system. The system has been demonstrated in Lantalogistikka and Ravinnerenki project. The system requires large field areas in 2 km distance from manure storage.

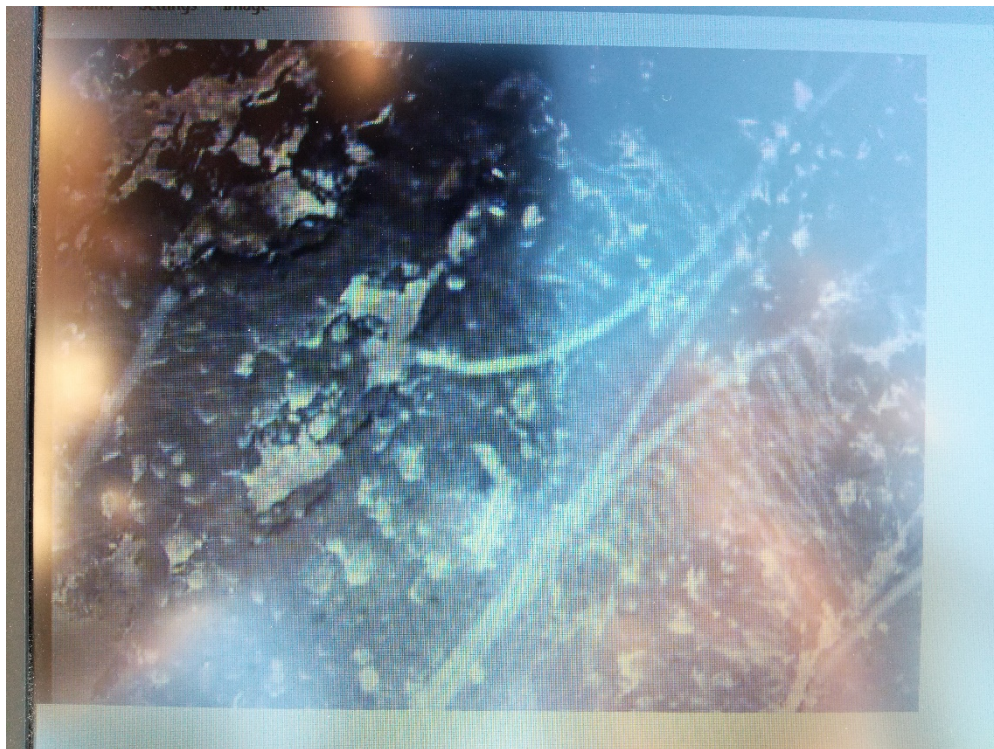


Umbilical slurry system





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# Manure separation

Manure separation:

- Dry matter: About 70-80 % of manures P
- Liquid portion: 70-80 % of manures N

Feasibility in one robot (60 cows) dairy farm:

Slurry: 2000 m<sup>3</sup> (66 ha)

Time: 38,5 h (field in 1 km distance)

Cost: 3 542 € (89€/ha).

Separated liquid portion: 1400 m<sup>3</sup> (66 ha)

Time: 27,4 h

Cost: 2 522 € (89 €/ha).

Separated dry matter: 600 m<sup>3</sup> (60 ha)

Time: 11,7 h

Cost: 910 € (78 €/ha).







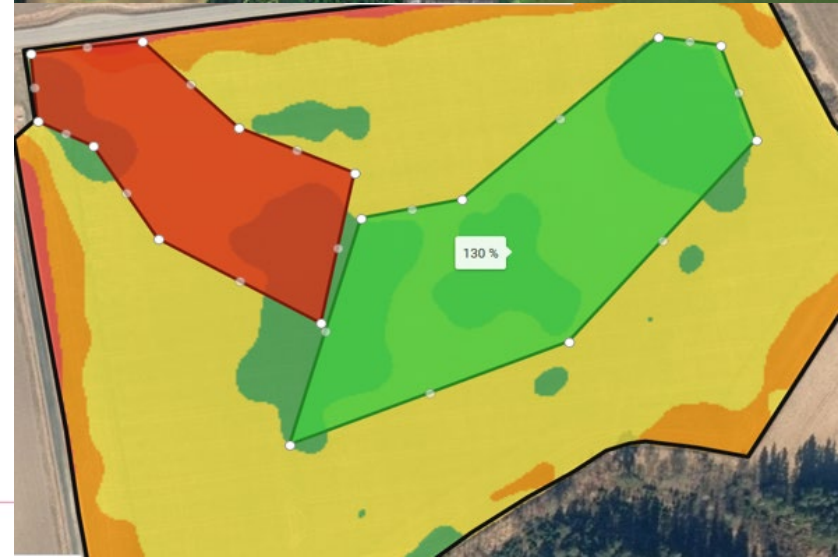
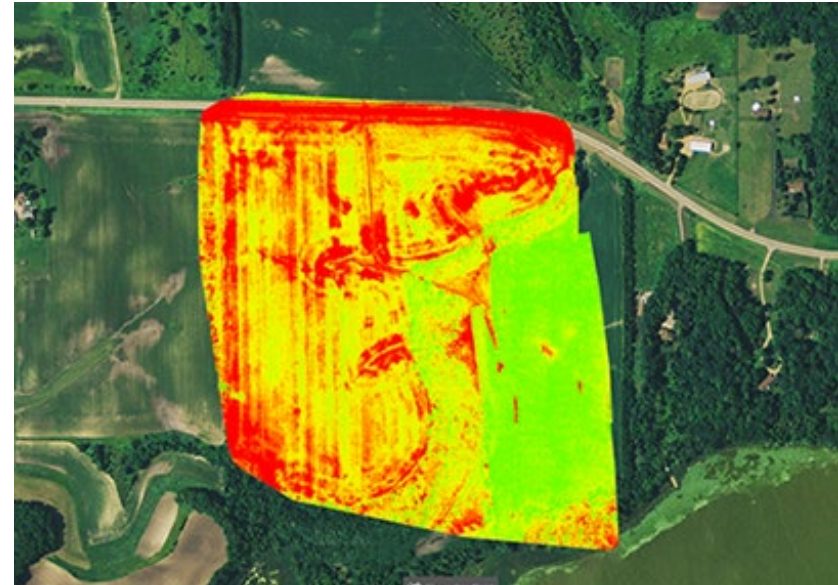
# Site specific fertilization

The idea is to spread the manure in those zones in the field, where the growth is strong and risk or nutrient leakages are lowers.

Risk of erosion is highest on the steep areas, also soil type has effect. There is data available almost from all over the country.

The erosion risk maps and crop growth indicating maps are combined to form a map for site specific fertilization.

Karelia UAS made improvovement of this system with a contractor in Ravinnerenki project.





# Simulating tool of nutrient loading

SYKE iprowed a simulation model for nutrient loading in Ravinnerenki project. The simulation tool (based on ICECREAM model), is combining data from weather, soil, crops and cultivating methods. It helps farmer to compare different cultivation methods and nutrient leakage risks.







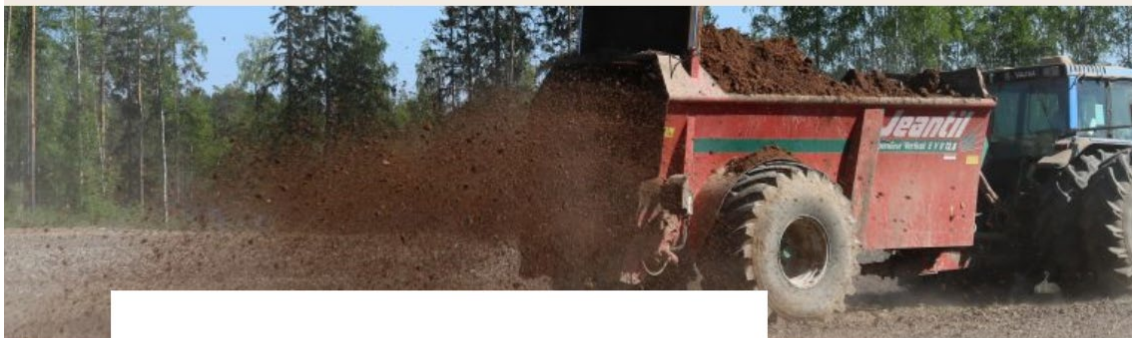
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# Circular economy in fertilization

## Kierrätyslannoitteet ja -maanparannusaineet

Etusivu / Miksi kierrätyslannoite? / Tuotevalikoima / Haitta-aineet / Säädökset / Kuvia / Lisätietoja / Käyttäjäkokenuksia



### Etusivu

Näiltä sivuilta löydät saatavilla olevat kierrätyslannoitteet ja -maanparannusaineet Pohjois-Savon ja Pohjois-Karjalan alueilla. Sivuille on kerätty tietoa tuotteista, niiden käytöstä ja kierrätyslannoitevalmisteista koskevista haasteista.

*Kierrätyslannoitteet ja kierrätysmaanparannusaineet ovat teollisuuden, sekä metsä- ja maatalouden sivuvirroista valmistettuja tuotteita. Raaka-aineena käytetään esimerkiksi elintarviketeollisuuden sivutuotteita, biojätettä, teurastamojätteitä, erilaisia tuhkia sekä jätevesilietettä.*

Sivuston tarkoitus on jakaa tietoa kierrätyslannoitevalmisteista ja mahdollistaa niiden vertailu.

Kierrätyslannoitevalmisteiden sisältö ja laatu voi vaihdella eräkohtaisesti, joten tarkista ajankohtaiset tuoteselosteet aina tuotteen toimittajalta ennen käyttöä.

Tuotteiden hintatiedot ovat suuntaa antavia, eivätkä päivity sivustolle automaattisesti. Tarkista ajankohtainen









# More information (in Finnish)


- [Ravinnerenki.savonia.fi](http://Ravinnerenki.savonia.fi)
- Youtube: [Savonia/ravinnerenki](https://www.youtube.com/channel/UCvXvXvXvXvXvXvXvXvXvXvX)
- Facebook [@ravinnerenki](https://www.facebook.com/ravinnerenki)

## RavinneRenki

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Etusivu



**Ajankohtaista**

- 25.4.2019 Separoitua tietoa lannasta ja ravinteista, Ravinnerenki- ja Lantalogistiikka-hankkeen tulosesminaari Kuopiossa, myös etäyhteys
- Muhkea maaperä -tilaisuus kiinnosti Kuopiossa. Esitykset katsottavissa!
- Vetävätkö salaojasi? Ota RavinneRengin uusi Salaojatyökalu avuksi kunnostustarpeen arviointiin!