

Decision support systems for the local level planning



Mats Söderström, Omran Alshihabi, Faruk Djodjic

Swedish University of Agricultural Sciences

Multifunctionality, healthy soil

Can we present advanced modelling data to end users, and make it accessible and usable in a decision support process in this context – quantification of effects of measures in the field/within-field scale?

Effects of measures
on nutrient loss
reduction from
(adapted) modelling

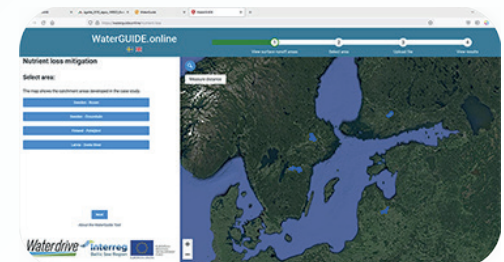
Downscale to local
level using very
detailed digital
geographical data
and automated methods

Make the data available
to the end user – advisors,
farmers, in an interactive
system



Finland x 1
Latvia x 1
Sweden x 2

WaterGUIDE.online



(Holger Johansson, Kristina Mårtensson, et al)

Catch crops, structural liming, buffer zones
Modelling of reduction effects on the regional level

(Faruk Djodjic et al)

Wetlands, erosion risk, flow accumulation
Modelling on the local level

Very detailed data on soil texture, organic soils, topography, fields

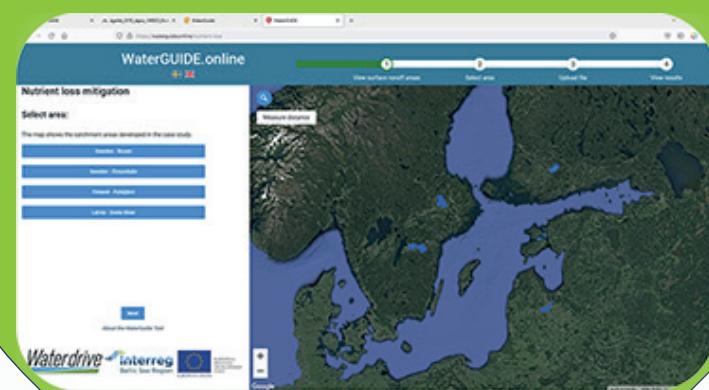
(Kristin Piikki et al)

Functions for downscaling

WP4 Economical, spatial aspects

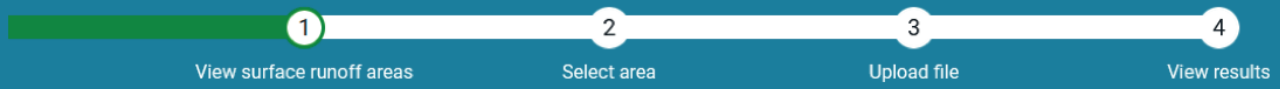
(Emma Svensson, Magnus Bång et al)

Geographic data and user interface



Source | <https://waterguide.online/nutrient-loss>

WaterGUIDE.online



Nutrient loss mitigation

Select area:

The map shows the catchment areas developed in the case study.

Sweden - Roxen

Sweden - Örsundaån

Finland - Pyhäjärvi

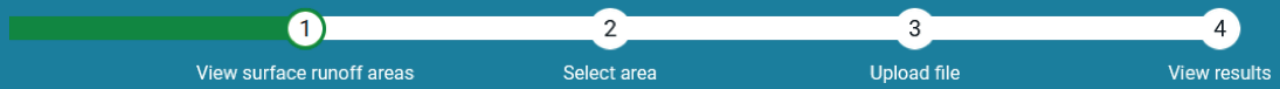
Latvia - Svete River

Next

About the WaterGuide Tool



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About the WaterGuide Tool



Measure distance



version 2021-11-05

WaterGUIDE.online – Nutrient loss mitigation Manual and training material

Read the text in the box below before you use the system

This decision support tool was developed by the Swedish University of Agricultural Sciences (SLU) within work packages 3 and 4 in the Interreg Baltic Sea Region Programme project Waterdrive in collaboration with a number of project partners.

Please note: The decision support tool is provided as is, the information presented is not guaranteed to be error free, and in most cases it was generated in a more general scale than the field level. The authors do not take any responsibility for the use of the tool; all users are solely responsible for any decisions made based on the tool. The intended users of this tool should be well acquainted with local field conditions, and the information provided. It is recommended that you go through this document before general use. The tool shall be regarded as working material, which provides information for discussion that exemplifies how various types of data related to nutrient loss from arable land can be presented to users (e.g. farmers, advisors and authorities) at the field scale, or even within-field scale. All numbers of costs and payments mentioned are only examples in the system, and should be used only for testing the system. Please read information material before using the tool. Remember that changes of the tool can be made at any time since it is a developing product within the Waterdrive project.

Read more about Waterdrive, and WP3 and WP4 here: <https://water-drive.eu/about/>
More project info here: <https://projects.interreg-baltic.eu/projects/waterdrive-194.html>

Read more about R&D on decision support systems at SLU: <http://www.slu.se/LADS>

Contacts:
Mats Söderström, SLU, mats.soderstrom@slu.se
Omrán Alshihabi, SLU, omran.alshihabi@slu.se
Faruk Djodjic, SLU, faruk.djodjic@slu.se



WaterGUIDE.online



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About the WaterGuide Tool



version 2021-11-05

Start – and find your field (Sweden, Finland, Latvia)

Open <https://waterguide.online/nutrient-loss>

WaterGUIDE.online

Nutrient loss mitigation

Select area:

The map shows the catchment areas developed in the case study.

Sweden - Roxen

Sweden - Örsundaån

Finland - Pyhäjärvi

Latvia - Svete River

Select case study area. The system has more functions in the Swedish areas Roxen and Örsundaån. In the areas in Finland (Pyhäjärvi) and Latvia (Svete River) the functionality is limited due to differences in data availability. In this document we cover one of the Swedish areas on pages 1-10. Pages 3, 4, 5, 7, 10 are relevant if you choose a field in the case study areas in Latvia or Finland. In this training example, we click on *Sweden - Roxen*.

WaterGUIDE.online

Select demarcation

Search by block number

Example of block ids
Sweden: 64784858152
Finland: 8340145781
Latvia: 44345-25013

The system only works on single agricultural fields. There are different ways of finding the block as it is denoted here) of your interest. You can search using the block-id (example of the system is shown above), to zoom directly to the field. You can also do it manually, for first using the search function to find a location, then zoom in to your field. Alternatively map) on the block of interest to select it. In this example we fill in the block number 64784858152, and then click *Search*.

2

- How to, e.g.:
- Find a field
 - Split a field
 - Upload own data



Measures against nutrient loss adapted to the characteristics of the field

Navigate the tabs to see the results.

Hide field boundaries

Soil texture, erosion risk **Wetlands** Structural liming Buffer zones Catch crops

Wetlands ⓘ

Wetland (optimal area)

- 1.00 - 5.00 ha
- 0.50 - 1.00 ha
- 0.25 - 0.50 ha
- 0.10 - 0.25 ha

Wetland area (ha)	0.1
Reduced P-losses (kg/ha/Year)	77.6
N-reduction (kg/ha/Year)	465.6
Load P (kg/Year)	194.0
Load N (kg/Year)	3481.3
Cost (SEK/kg P/Year)	307.0
Cost (SEK/kg N/Year)	51.0
Upstream (ha)	71.7

Previous New search

About the WaterGuide Tool

Results tabs:

- Soil texture / erosion risk
- Wetlands
- Structural liming
- Buffer zones
- Catch crops





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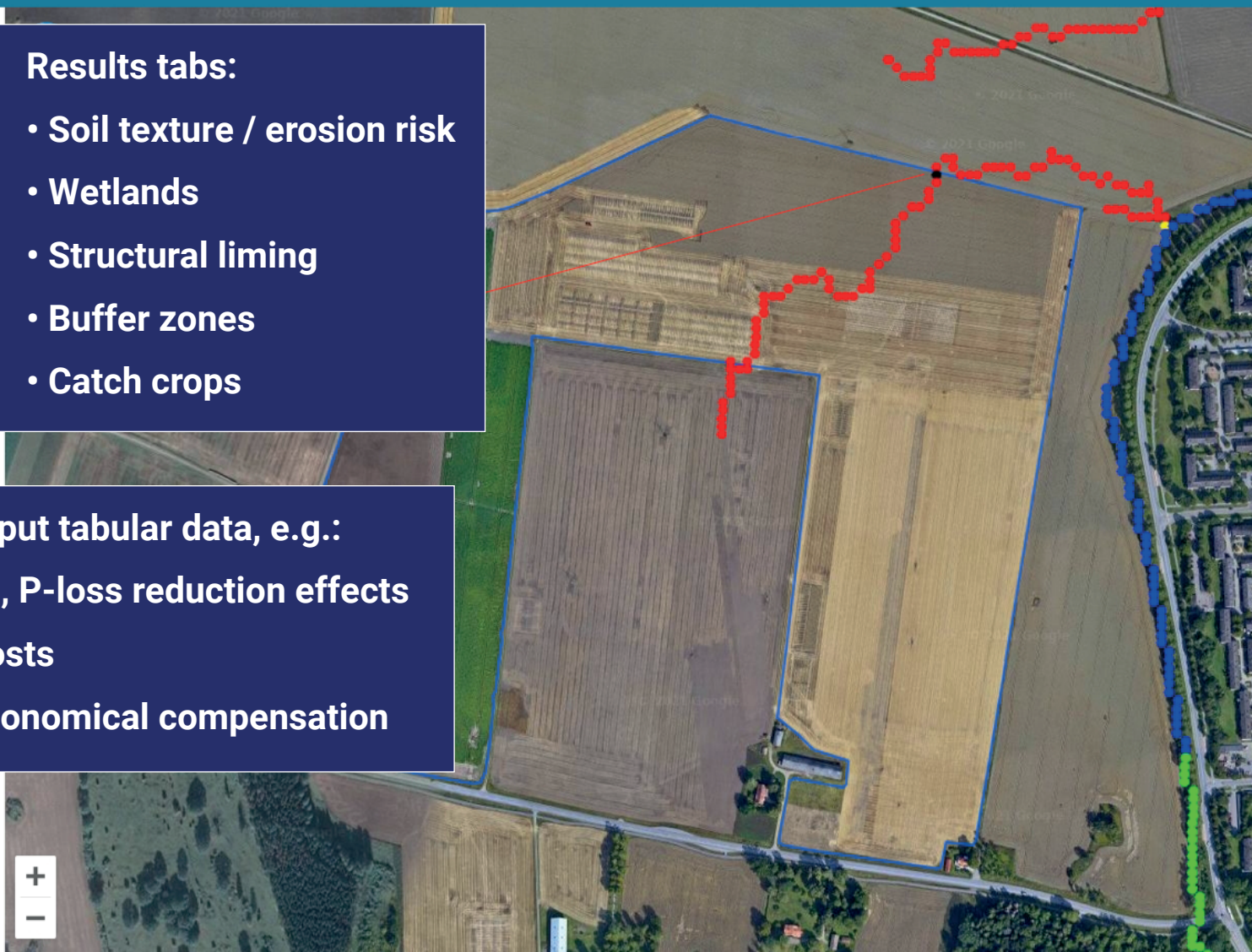
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Reduced P-losses (kg/ha/Year)	77.6
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Previous New search

About the WaterGuide Tool

- Results tabs:**
- Soil texture / erosion risk
 - Wetlands
 - Structural liming
 - Buffer zones
 - Catch crops

- Output tabular data, e.g.:**
- N-, P-loss reduction effects
 - Costs
 - Economical compensation





Measures against nutrient loss adapted to the characteristics of the field

Navigate the tabs to see the results.

Hide field boundaries

Soil texture, erosion risk | **Wetlands** | Structural liming | Buffer zones | Catch crops

Wetlands

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Previous | New search

About the WaterGuide Tool



Wetlands

This result tab contains modelled values for potential locations. Selected field are shown to provide overview. This depends on the modelled field. If you are interested in to display detailed information, click on the optimal size is shown):

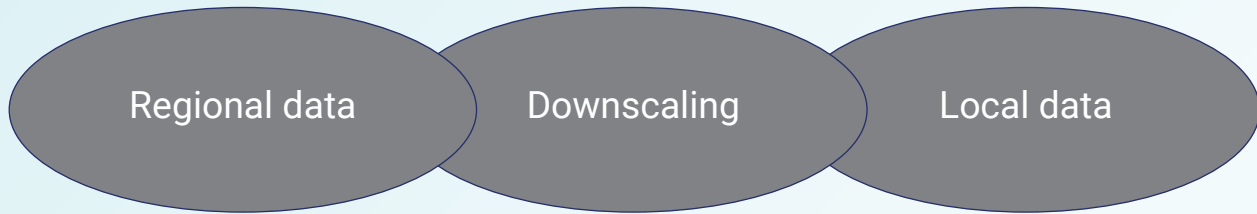
Use the documentation for explanatory text and references

- Wetland area (ha): Calculated optimal wetland size, based on a hydrological load where 100 m (100 m³ water/m² wetland and year) is assumed to optimal. For run-off modelled values per sub-catchment are used. Only wetlands within a calculated optimal size range of 0.1-5.0 ha are displayed.
- P-reduction (kg/ha/year): Potential reduction in kg P/year in kg/ha wetland. Calculated according to Weisner et al. (2016).
- N-reduktion (kg/ha/year): As above but for nitrogen (N).
- Load P (kg/year): Load in kg P/year for the potential wetlands. Calculations are based on the average runoff and HELCOM Pollution Load Compilation 7 (PLC-7) type concentrations in the subcatchment (Hansson et al., 2019).
- Load N (kg/year): As above but for N.
- Cost (SEK/kg P/year): Potential cost in SEK/kg P/year for the wetland locations. Calculations are based on the following assumptions: a construction cost of 350,000 SEK/ha wetland and 20 years (17,500 SEK/year); maintenance cost 4,000 SEK/year; tenant costs depending on region (2,334 SEK/year where Roxen is location and 1,486 SEK/year where Örsundaån is located; from Statistics Sweden (SCB) in 2018).
- Cost (SEK/kg N/year): As above but for N.
- Upstream (ha): Calculated upstream drainage area in ha to a wetland location.

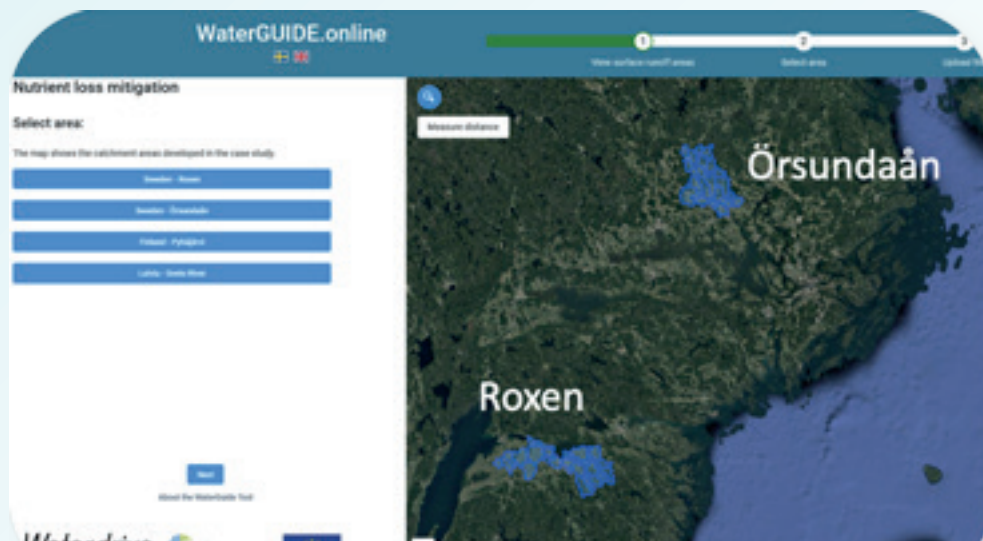
Please note: In reality, other locations for wetland may be more suitable due to local conditions not included in the modelling. The map shows the results from the modelling based on the data used and assumptions made.

More information in Djodjic et al. (2020)

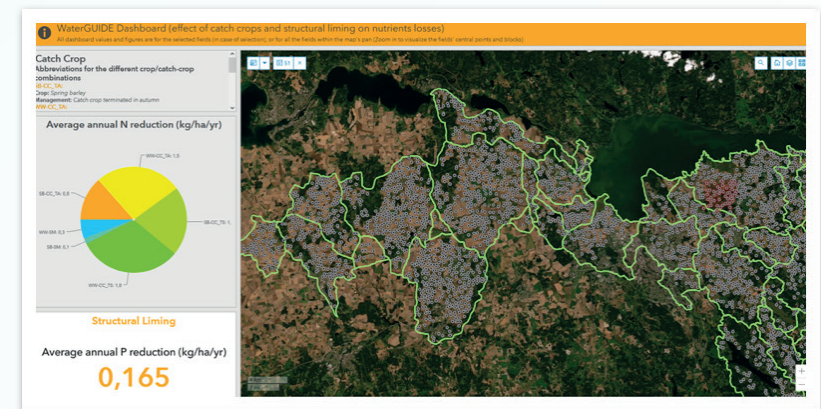
Back to regional level...



Local data for regional overview in a Dashboard



<https://waterguide.online/nutrient-loss>



https://bit.ly/waterguide_dashboard

Roxen area:
3379 fields >2 ha cropland

Örsundaån area:
2418 fields >2 ha cropland

Example: Effect of

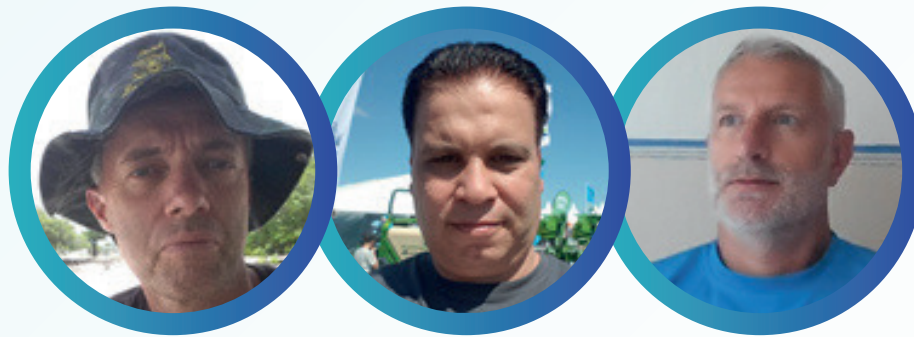
- cover crops on reduced N loss
- structural liming on reduced P loss

Concluding remarks

- See this as a prototype – not complete, first attempt
- Challenge to downscale – both for researchers and users
- Huge data demand – local data should fit the modelling, a lot of data is missing
- Easy to misinterpret – tests and training needed
- Suitable for group discussions – one part of decision support, not the only one
- New possibilities – when you start, new opportunities/needs become evident

<https://waterguide.online/nutrient-loss> | https://bit.ly/waterguide_dashboard

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