



**Calculating nitrate leaching at field scale using detailed soil data
in the catchments of Norsminde Fjord and Lake Ravn
Part of task 1.2 of the EU-LIFE project AGWAPLAN**

LIFE05 ENV/DK/000155: Integrated Protection of Surface and Groundwater in Agricultural Regions (AGWAPLAN)

English Summary

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SUMMARY

The Daisy model has been used to calculate nitrate leaching on field scale. The results are used to determine the required improvements on farm scale.

Introduction and methods

The nitrate leaching from arable land has been calculated with the Daisy model for 16 farms in the catchments of Norsminde Fjord and Lake Ravn (Ravnsø). That means altogether 1.728 ha. The calculations are based on data collected from each farm concerning agricultural practice in 2005. That means crops, rotation, fertilizers, animal manure, straw incorporation, irrigation, and crop yield. The use of detailed soil data collected with EM38 resulted in a detailed spatial calculation of the nitrate leaching.

Results

Table 1 shows an overview of the average nitrogen and water balance for the 16 project farms in the catchments of Norsminde Fjord and Lake Ravn. The average calculated nitrate leaching from arable land in the Norsminde catchment is 43 kg N/ha/yr. (58 mg nitrate/l). The average calculated nitrate leaching from arable land in the Lake Ravn catchment is 56 kg N/ha/yr. (80 mg nitrate/l). Figure 1 shows the spatial distribution of nitrate leaching in part of a catchment area.

Table 1: Nitrogen and water balance at 16 project farms in the Norsminde Fjord and Lake Ravn catchments.

	Norsminde Fjord	Lake Ravn
Area (ha)	1272	456
N-supply (kg N/ha/yr.):		
- fertilizer	158	187
- deposition	16	16
- atm. N-fixation	6	12
- seed	4	4
Total	184	219
N-removal (kg N/ha/yr.)		
- ammoniumlose	4	6
- leaching	43	56
- denitrification	21	25
- harvest	120	138
Total removal	188	224
Change in soil-N (kg N/ha/yr.)	-4	-5
Water Balance (mm/yr.)		
- precipitation	853	830
- evaporation	530	520
- percolation (matrix)	201	232
- drainage	122	78
Nitrate concentration (mg NO ₃ /l)	58	80

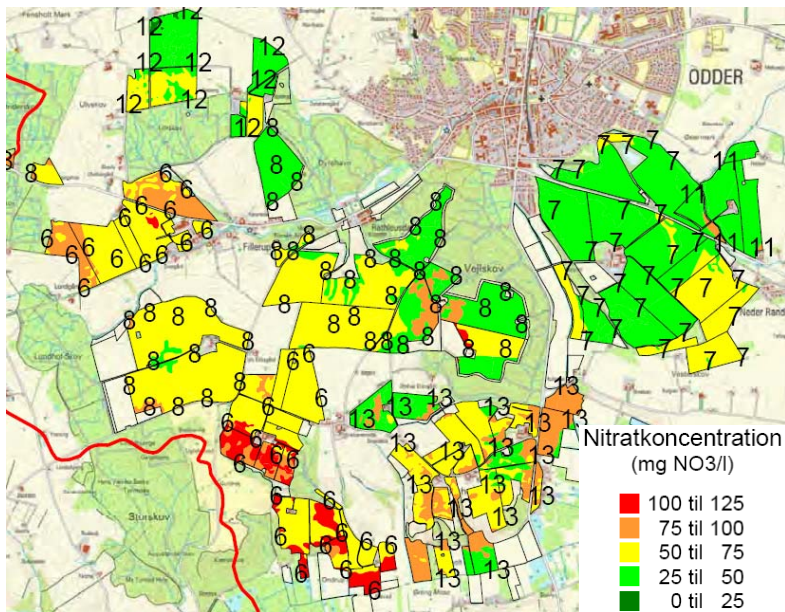


Figure 1: Example of calculated spatial distributed nitrate leaching in part of Norsminde Fjord catchment.

Conclusion

It is important to be able to point out the areas that contribute most with nitrate to the sensitive recipients. Then it is possible to find a focused and economical optimal solution. This case shows that it is possible to use detailed soil data (EM38) to model the spatial distribution of nitrate leaching. Thereby it is possible to focus the solutions to reduce nitrate leaching to a recipient.

References

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