De Økonomiske Råd

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The instrument selector

How SEGES calculates the value of nitrogen reduction efforts

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The instrument selector makes a farm-specific economic optimization of available catch crop instruments. By starting at field level, and calculating costs for each individual farm, you gain knowledge about both the level and the spread in costs between farms. This means that the model is better at showing how different farms are affected differently by similar efforts. The results can subsequently be aggregated at either ID15 level or coastal water catchment level, as needed.

Examples of results from calculations in the catchment area of Haderslev Fjord are shown below. Figure 1 shows that there is a big difference in additional costs between the 10 largest farms when increasing effort requirements. The effort requirement is the same on all farms, but the costs of solving the effort are very different.

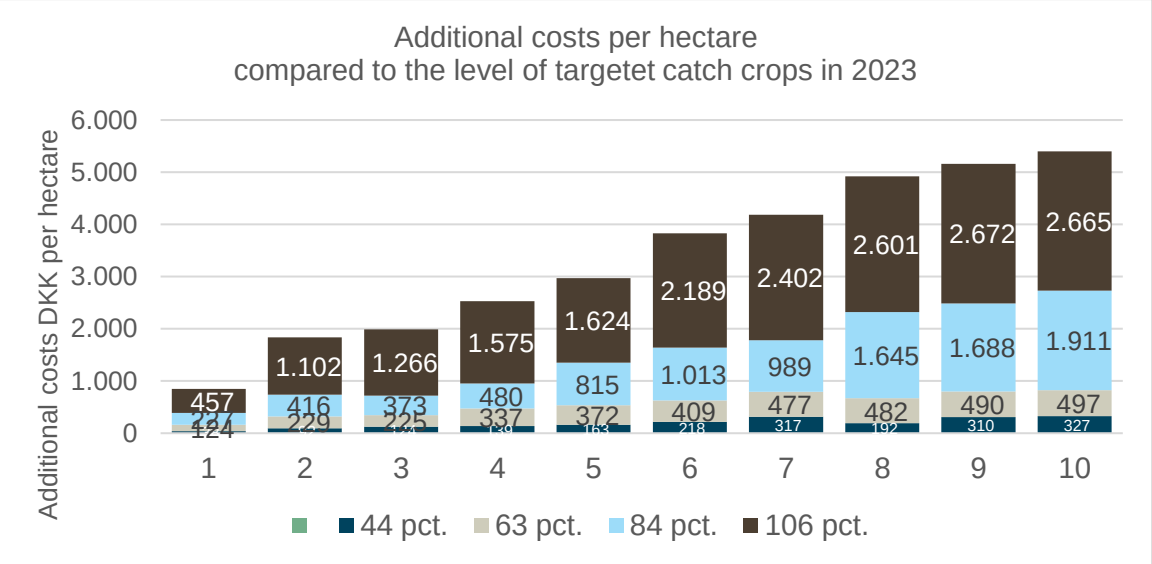

Figure 1. Additional costs per hectare compared to the targeted regulation (2023), the percentages indicate the effort requirements with targeted catch crops as a share of the catch crop land area.

It is also possible to show how the costs differ depending on the location. Figure 2 and Figure 3 each shows the additional costs within ID15 areas in the catchment area of Haderslev Fjord. The differences in costs are based solely on differences in crop choices on the farms that cultivate the land in the individual areas. The map is thus indirectly a picture of the distribution of soil type, livestock density and the proportion of winter cereals. The white areas do not have sufficient data and are therefore not shown with a value.

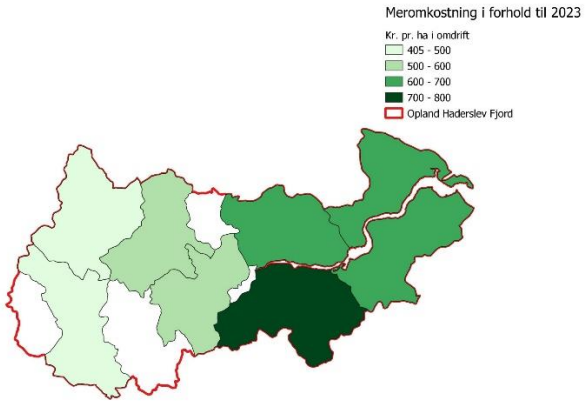

Figure 2. Additional costs for farms in each ID15 catchment area of Haderslev Fjord, if all designated mini-wetlands are established.

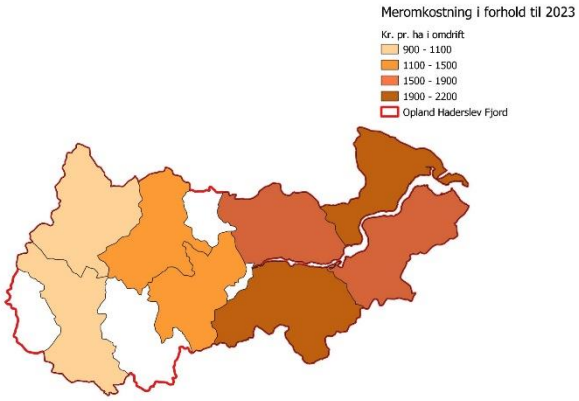

Figure 3. Additional costs for farms in each ID15 catchment area of Haderslev Fjord, if 50% of designated mini-wetlands are established.

The potential of the instruments on each farm

The economic consequences are closely linked to how each farm handles the catch crop requirement. The model is built to the best of its ability to model current rules for catch crop requirements. Thus, the model is a kind of digital twin for the nitrogen regulation on the cultivation surface.

At catchment area level, it is possible to see how the use of each individual instrument at the cultivation surface changes when the effort requirements increase. This is shown in Figure 4, where the instruments are shown in order of increasing price, with the cheapest on the left and fallow as the most expensive. N-quota reduction is shown on its own, as the cost of this depends on the extent.

The green bars in the figure show that with the effort requirement of 31 per cent targeted catch crops, there is already a large use of the instruments: “Early sowing”, “Ordinary cover crops”, “Precision farming” and “ Intermediate catch crop after cereals”. This is supplemented by an N-quota reduction, and overall, this is the cheapest calculated solution.

When the effort requirement is increased, the available instruments are used, and it is noted that there will not be significantly more ordinary catch crops. The increase in the effort requirement primarily leads to an increased use of "Fallow along lakes and streams", " Catch crops with change in crop rotation", "N-quota reduction" and when the effort requirement becomes very large, only "fallow" remains as an instrument.

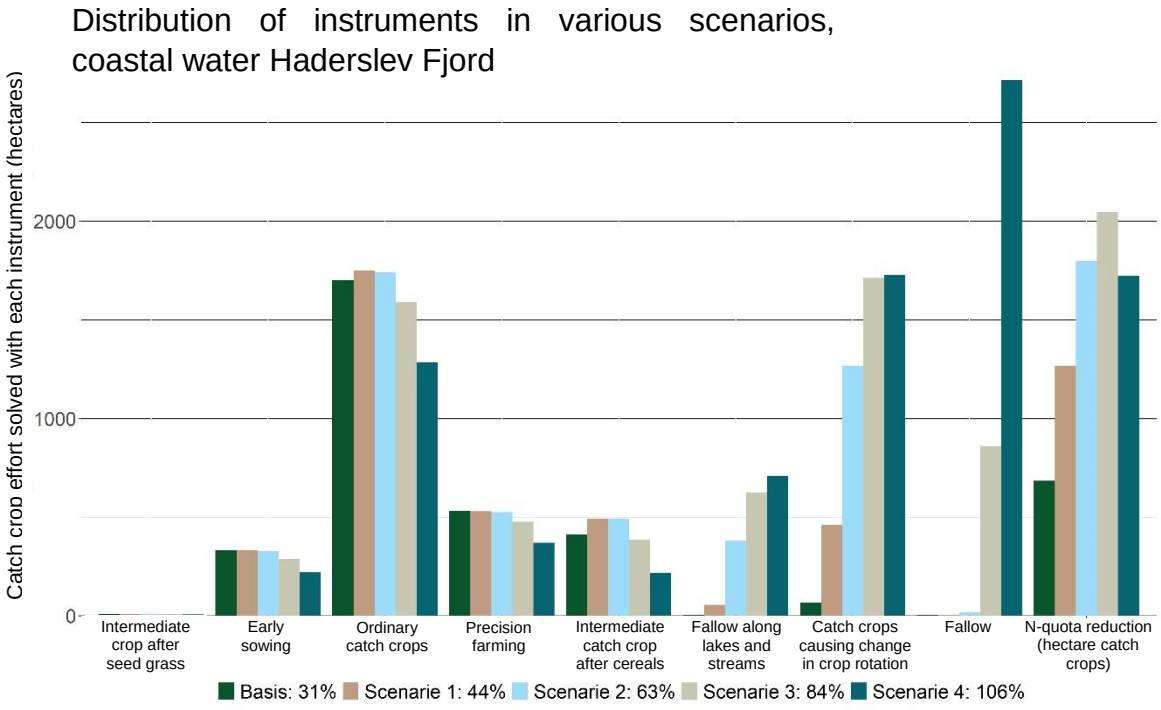

Figure 4. Distribution of policy instruments for different scenarios, the catchment area of Haderslev Fjord.

Data basis

The basis for the calculation is based on each farm's crop selection in the previous five years. The effort requirement used for calculation is either the coming year's effort requirements, or a number of scenarios with freely chosen requirements for the implementation of the project. Thus, it is always a calculation of future choice of catch crop instruments, based on an expectation that the crop choices of the past 5 years are representative of the farm's future operation.

The farm's crop selection is used to map the potential for catch crops and alternative instruments that can be used to solve catch crop requirements.

Based on the potential, an economic optimization is calculated, providing a proposal for the cheapest solution of catch crop requirements on each individual farm.

This provides a strong basis for assessing the economic consequences of a nitrogen effort on the cultivation surface. This applies both to the very specific efforts from year to year, and in particular to the value assessment of the collective effort succeeding for each individual farmer.