GROUNDWATER PROTECTION IN PRACTICE – PROJECT AGWAPLAN

Résumé:
It is feared that the implementation of the water framework directive will have a considerable impact on Danish agriculture. Traditionally environment and agriculture are seen as opposites. In the LIFE project AGWAPLAN we have worked with the possibilities of integrating environment and agricultural production. Important lessons from the project are

- that there are various structural barriers for the integration of means to reduce nitrogen leaching
- that it is possible to reduce nitrogen leaching at farm level without major negative impact on production
- that it will be necessary to find common solutions at catchment level in order to achieve the environmental objectives.

Background:
The implementation of the water framework directive employs the concept of water catchments which will force farmers to balance environmental and financial relations on the individual farms as well as in the water catchment as a whole. This is a new approach since, at present, N and P leaching from agriculture is mainly regulated on a national level that does not take regional or local circumstances into consideration.

Introduction:
The challenges in connection with the implementation of the EU water framework directive has been the inspiration for creating the project combining agriculture and water plans - the project AGWAPLAN.

The aim of the project AGWAPLAN is to facilitate the practical implementation of the EU Water Framework Directive (WFD) on farm level as well as catchment level.

A key issue for the project is “cooperation between the agricultural and the environmental sector” in order to get improved results for the environment as well as for the agricultural sector.

The project is carried out as cooperation between the Danish Agricultural Advisory Service, National Centre, three local advisory centres, 22 farmers in three pilot areas, Environmental Centre Aarhus, four municipalities, and Aarhus University, Faculty of Agricultural Sciences.

Three pilot areas participate in the project. They are all farmed intensively, and seen from an environmental point of view they have critical levels of N and P in either surface or groundwater. One of the tree pilot areas is the groundwater protection area Hinnerup.

Groundwater area Hinnerup:
The Hinnerup waterworks catchment area consists of 340 ha. The main part of the area is nitrogen sensitive. The environmental authorities have drawn up an action plan for protecting the drinking water in accordance with Danish legislation. The plan contains tolerance limits

for the area and it is estimated that it will be necessary to reduce nitrogen leaching from agriculture from the present average level of 84 mg nitrogen per litre to around 45 mg nitrogen per litre corresponding to a reduction of the surplus nitrogen of 23 kg N/ha.

The catchment of the Hinnerup waterworks is close to an urban area. The catchment is farmed intensively. There are several pig production plants in the area. Parts of the catchment are appointed afforestation areas with the possibility of acquiring subsidies for afforestation. The area is close to the motorway and within half an hour's drive from the city of Aarhus.

The participating farmers in the area are characterised by being older farmers on their way to winding up their farms. None of these farmers have children who want to take over.

Individual advising to farmers
The project has tried out a new method of advising. This method consists of finding – in cooperation with the farmer – those means for groundwater protection that can fit in with the farmer's production without harming either the farmer's production or economy. Both the farmer's adviser and an official from the local environmental authorities participated in the advisory meetings. The purpose of letting the environmental authorities participate in the meeting is to break down the barriers between agriculture and authorities.

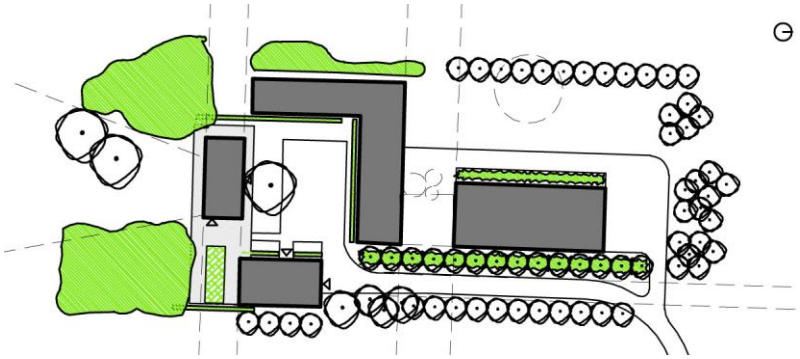
Farmer, adviser and representative of the local environment authorities together in the field. In Hinnerup we have been working with more - and different –kinds of catch crops than traditionally used in crop rotation, afforestation, and plans to make the properties and their surroundings more attractive.

Advising on catchment level
In the AGWAPLAN project we have been working simultaneously with advising on farm level and with finding solutions on catchment level. The idea is to concentrate our efforts where they have the most effect. In the catchment area of the Hinnerup waterworks it is expected that the most effective environmental efforts should be concentrated where most of the water is recovered. Joint solutions on catchment level are resource demanding, but they may well lead to better solutions for the environment as well as for agriculture. Here we have chosen to work with the possibilities for afforestation within the recovery catchment.

Other considerations
Since several of the farmers participating in the project have reached an age where they want to wind down the possibilities for selling the properties have been discussed. Will it be possible to sell the land to intensively producing farmers with the restrictions the action plan imposes?

Alternatively we have discussed the possibility of selling the properties to a less intensive and more hobby dominated use. This would lead to a more extensive use of parts of the farmed acreage in the area covered by the action plan. The proximity of the motorway and Aarhus is estimated to form the basis of attracting other buyers than traditional farmers.

Since part time farmers want properties with high amenity values such as nature, hunting, well kept buildings, and a view from the farmhouse, part of the AGWAPLAN project deals with plans for making the properties and their surroundings more attractive.



Plan for making a property more attractive. The dotted lines show the view lines into the landscape

Results and learnings from the AGWAPLAN project :

Barriers to integration of means to reduce nitrogen leaching
The list of means to reduce nitrogen leaching is long. Thus there should be many possibilities for the individual farmer. However we have learnt from the individual advising to farmers that many means must be discarded either because they don't fit in with the livestock production, because they don't match the type of soil, because they demand too large investments compared to the size of the farm, or because they presuppose an interest in technology that the farmer does not possess. Many of the farmers in the groundwater area in Hinnerup are about to wind up their farms and they do not wish to invest in new machines or new technology.

Another type of barrier is the farmers' lack of knowledge about the means to reduce nitrogen leaching, and lack of knowledge about the connection between exposure and loss of nitrogen to the surrounding environment. This type of barrier can be over won through advising.

Success
We have learnt from AGWAPLAN that by looking at environment and production as a whole you find new ways of solving problems. Rather than having farmers and environmental authorities in each their separate corners with each their own goals and agenda we have learnt that we can achieve more by working together. Often the farmer has local knowledge that can contribute to the solution, and often the farmer will have a whole new motivation for finding solutions after taking ownership of the environmental objectives.

Involvement and dialogue promote ownership and motivation and create trust between agriculture and environment.
Through dialogue a better understanding is achieved on both sides of the table, and experience from AGWAPLAN shows that it can be a short cut to a faster accept of the environmental objectives. Of course farmers are interested in having clean drinking water just like the environmental authorities are interested in finding solutions that are acceptable to the farmer. The cost would be too high otherwise.

Subject knowledge
In the AGWAPLAN project we have spent much time discussing the data and the models that have been used to calculate the environmental objectives. Experience shows the importance of sound subject knowledge behind the stipulated environmental objectives in order for the farmers to trust that these objectives are correct.

For the farmers sound subject knowledge about the pros and cons connected with the individual means to reduce nitrogen leaching is conclusive to their decision to change conduct being made on the best possible foundation.

To farmers as well as to environmental authorities it is important to gain trust and achieve agreement on the effect a certain means has on the environment since the farmer cannot be sure that his efforts are credited.

Targeted efforts
It is still too early to conclude to how high a degree it will be possible to reach the environmental objective for groundwater and surface water in Denmark without its having a serious effect on agriculture. The final objectives for many water areas are not stipulated yet. But from what we have heard up to now we expect that agriculture will be met with very high demands for reducing N and P leaching. If this is true it is our experience from AGWAPLAN that it will take a lot of hard work to reach the objectives. Thus the efforts must be targeted to achieve maximum effect. In order to target the efforts in the best possible way we have learnt from AGWAPLAN that more knowledge is needed about the transport of nutrients in the individual water catchments.

Messages
- Involving the farmers is a prerequisite for achieving understanding of the environmental objectives.
- Understanding environmental objectives and professional connections creates motivation.
- Motivation is important in order to achieve the right results.
- Results must be achieved through efforts on farm level as well as on catchment level.
- Finding solutions on catchment level is time consuming, but can be the deciding factor if there is still to be agriculture in development in a clean environment.

This project AGWAPLAN is prepared with the contribution of the LIFE financial instrument of the European Community.