BALTIC COMPASS

List of measures for the pilot region

- Schleswig-Holstein report

December 2010

Project Report

Baltic COMPASS (Comprehensive Policy Actions and Investments in Sustainable Solutions in Agriculture in the Baltic Sea Region)

Work Package 4: Investment Preparation

Prepared by the State Agency of Agriculture, Environment and Rural Areas
of the German Federal State Schleswig-Holstein (LLUR)

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BALTIC COMPASS

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1. Introduction

Eutrophication of the Baltic Sea is for a big part caused by agricultural nutrient releases. This fact requires a reduction of diffuse input caused by agriculture. Within Workpackage 4, pilot measures to face this problem have been developed. It is focussed to implement them in a certain pilot region in the eastern part of Schleswig-Holstein. In the following pages, the work until this day will be presented. At first, the pilot region in Schleswig-Holstein and its characteristics will be introduced. Afterwards the measures which were worked out will be presented. The instant report is a contribution to Task 5 in Work Package 4 in the project Baltic COMPASS.

The BalticCOMPASS project

BalticCOMPASS aims to reduce eutrophication of the Baltic Sea with a transnational approach. The Interreg-project funded under the Baltic Sea Region Programme is related to the fields of landuse, agriculture, water and environment and focuses win-win solutions for all sectors involved (for more information see: www.balticcompass.org). The specific aim of Workpackage 4 (WP4: Investment Preparation) is to accelerate investments in Best Available Technologies and solutions.

2. The pilot region

The pilot region is situated in eastern Schleswig-Holstein within the catchment area of the Baltic Sea. It covers parts of two districts called Plön and Ostholstein. Up to today, at least two farms are willing to participate in pilot measures (see Figure 1).

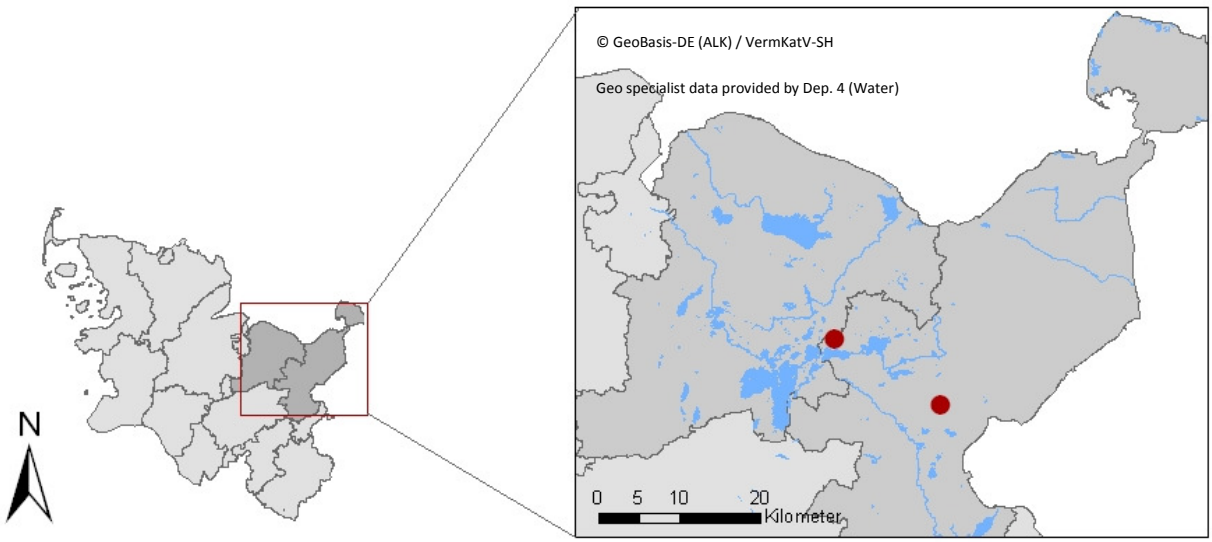


Figure 1: The pilot region in the east of Schleswig-Holstein. In the districts Plön and Ostholstein are at least two farms willing to participate in pilot-measures.

The natural area is called "Östliches Hügelland" (*Eastern Hill Country*). It is characterized by a hilly landscape which was formed by the last glacier period. In the soil region of Young moraine landscape, the basic material for soil development was mostly till which is today decalcified in the first meters of the top edge. Typical soil types in the pilot area are Cambisols and Luvisols which are partly stagnic (see Figure 2). The agricultural area in both districts amounts 68%. Because of this fact, diffuse nutrient input into waters caused by agriculture is classified as high, the water status is classified as moderate or critical.

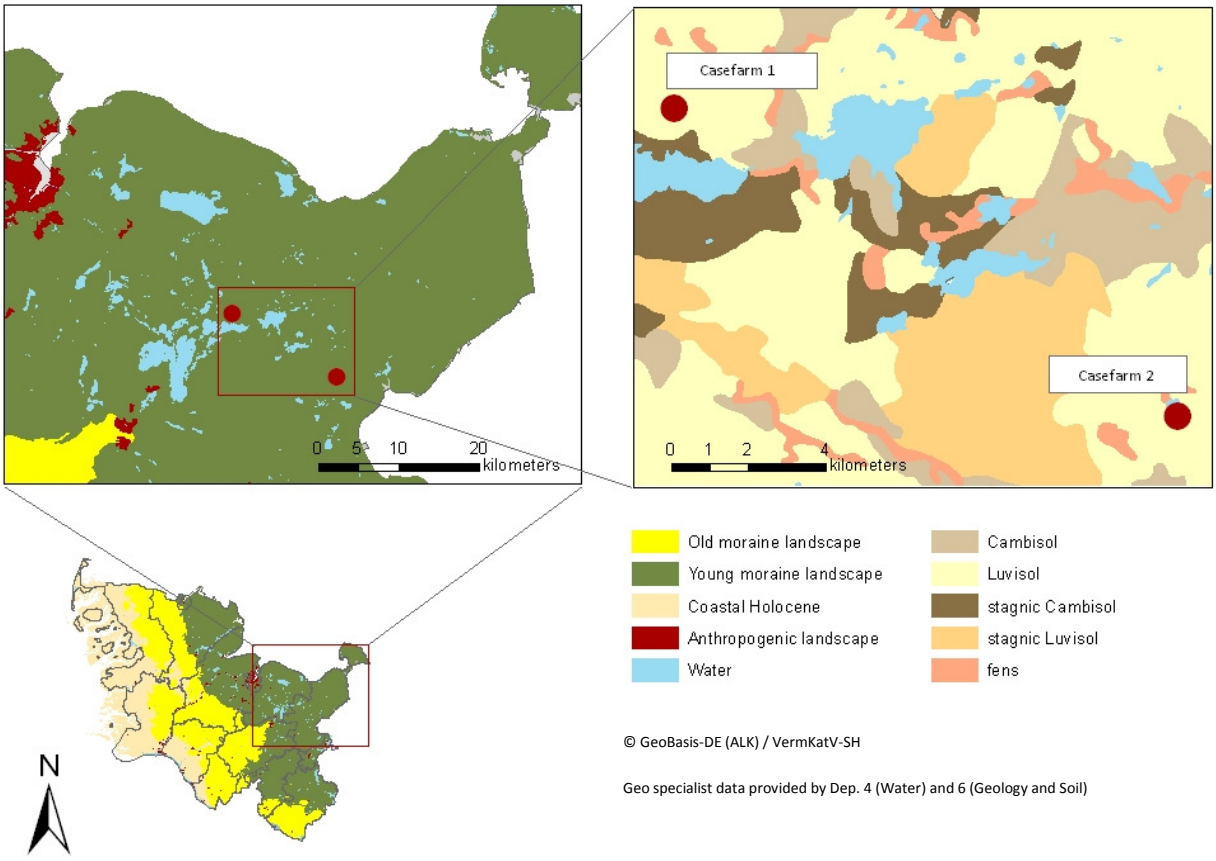
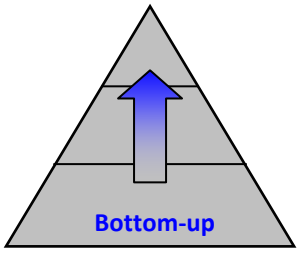


Figure 2: The three big soil areas in Schleswig-Holstein (left) and soil types in the pilot region (right).

3. Approach

To implement the project goals in the pilot region the bottom-up-approach is used. From the very first beginning the farmers had been involved - based on their knowledge and expertise, measure proposals have been developed. Direct communication and information exchange



are in the focus. Because the farmers are integrated from the beginning, the project is enjoying considerable success and interest. Further the regional Universities of Kiel and Flensburg are introduced in a new role as a regional partner and actor.

4. Possible measures for the pilot region

The following chapter is divided into two parts. At first, measures to regulate the nutrient output of agricultural areas are presented. On the one hand measures have influence on the water level directly in the field. On the other hand measures concern water treatment in the outlet of the field, after the water comes out of the drainage pipe. The second part presents measures to regulate the nutrient input into agricultural areas already while spreading fertilizer and before nutrient leaching occurs.

4.1 Measures to regulate the output of nutrients from agricultural areas

4.1.1 Drainage management

The measure drainage management means temporally closing of drainage pipes to regulate the water availability in the field. Closing the gate will keep the groundwater level higher so that the water is available for plants in dry periods. A loss of water can be avoided and the water and nutrients are kept in the field. Open the gate will lead away water from high precipitation and/or when traffic on the field is necessary.

The company GLOBUS Gummiwerke Ltd. developed a proposal for a drainage gate with a control panel for water quantity and quality as well as opening and closing gates with a full automatic system (see Figure 3, right).

Within this measure, a comparison between areas with regulated drainages and areas without will be carried out. It is possible to combine drainage management with the construction of open ponds (see 4.1.2).

Partners

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Figure 3: Drainage pipe at Casefarm No. 2 (left). Prototype of drainage gate proposed by GLOBUS-Gummiwerke Ltd. (right). [Source: own picture, GLOBUS-Gummiwerke Ltd.]

4.1.2 Cultivation of algae in open ponds

The installation of open ponds targets to collect water coming out of the drainage system to keep the nutrients in the pond. The pond will be inoculated with natural occuring algae, so that an artificial algal bloom will occur. While growing, algae consume nutrients in the water, so the amount of algae depends highly on the amount of nutrients. Harvest is possible by simply mechanical methods like sedimentation or filtration. The harvested algae can be reused as feedstock for biogas plants or as fertilizer. Depending on the amount of harvest and the proximity of a biogas plant every farmer has to calculate his most profitable recycling method. First experiences with ponds in Lolland (Denmark) have shown, that the algae clean the drainage water from fertilizer to at least 90%.

Partners

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Figure 4: Constructed open ponds (left) with algae (right) [Source: www.greencenter.dk, J. Born].

4.2 Measures to regulate the input of nutrients to agricultural areas

4.2.1 Nutrient-controlled spreading of slurry

With the goal of most efficient usage of resources, the measure nutrient-controlled spreading of slurry intervenes before spreading slurry. The fact of fluctuating nutrient content even in homogenized slurry requires a precise measuring method. This method is a continuous measuring method with a NIR-system (near infrared-system) installed beneath the liquid manure transport vehicle (see Figure 5). The NIR-system measures the nutrient content of the slurry, so that the amount of spreaded slurry is regulated referring to the nutrient content measured by the sensor.

Partners

- Prof. Dr. E. Hartung, Process Ingeneering, University of Kiel
- Chamber for Agriculture Schleswig-Holstein

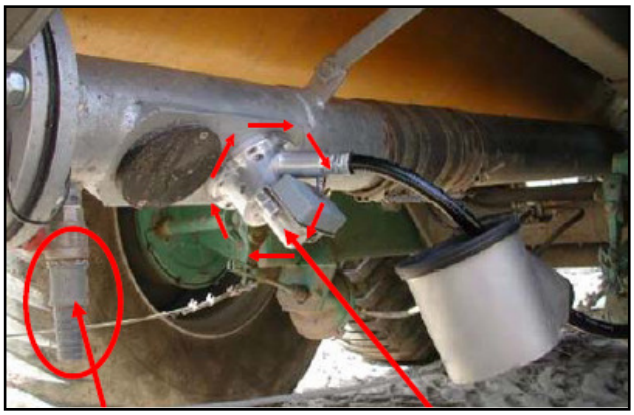

Figure 5: NIR-System installed beneath the liquid manure transport vehicle.

4.2.2 Usage of nitrification inhibitor

Nitrification inhibitors are chemical additives for slurry which inhibit nitrification of ammonium. Ammonium is adsorbed by the soil matrix and is therefore not leached as fast as nitrate. The inhibition of nitrate formation decreases the risk of nitrate leaching when slurry is applicated before nitrate-absorption of plants begins.

Partners

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4.2.3 Precision farming

Precision farming considers differences in soils and yield potential within one field to practice targeted seeding and fertilising. Now the limit for precision farming is the insufficient availability of very precise soil data. In the focus is the development and provision of required soil-related land use data on farm level.

Partners

- Nordsaat Saatgut GmbH

5. Status and further steps

First results of preliminary investigations show an increased nutrient content in the drainage water of the two pilot farms. Further samples will be taken to confirm the water status as well as a detailed concept will be worked out by the Department of Hydrology and Water Resources of Kiel University, which is also responsible for scientific monitoring of the measure drainage management.

The two measures cultivation of algae in open ponds and drainage management met with a lot of interest. Suitable farms for these two measures have been found, now the detection of suitable fields and specific areas is focused. Thereby the installation of the measures has to be realistic, shall not have (too much) impact on the cultivation method and has to be profitable or at least not cause loss of income. Scientists of the FH Flensburg have to define what kind of areas is needed for this measure, e. g. concerning size, location or runoff processes. The farmers involved will make a map to locate possible areas within their fields and another meeting for field inspection will be determined.

The installation of controlled drainages should be made until April, because dry periods are possible in spring and/or early summer.

Because of the bottom-up-approach and the integration of the farmers, they are willing to participate and very excited. Further meetings with scientists and farmers directly in the pilot region or at university will be hold to define participants for other presented measures and to bring the project forward.