

The Aquarius approach on mitigation of phosphorus losses

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The Interreg IVB-project Aquarius focus on farmers as water managers under changed climate conditions within the river Smedjeån sub catchment surrounding an area of ca 277 km² in southwest Sweden. The project which has a holistic approach on catchment level aims at delivering knowledge and tools to reach and sustain Good ecological status according to the WFD status in typical agricultural water bodies over time.

The strategy is to combine general farm subsidies, measures to limit erosive P- and N-losses from arable land and point sources, wetland constructions and improved sewage systems. An important factor in the project is to reach understanding and acceptance by land owners and the public of the values connected to the river both concerning nature interests and farmland production.

As a result of high animal density and manure production in the western area there has been an accumulation of phosphorus in the top soils and an increase of light soluble phosphorus over time. As a mean value of the pilot farms application of manure and mineral phosphorus exceed the recommendations by 11 kg P per ha and year. There is an obvious risk that surplus phosphorus application contributes to the present leakage from soils unless different measures not are taken to decrease the input.

The effects of agriculture on water quality as well as measures to mitigate has been developed and demonstrated in cooperation with a stratified sample of pilot farms in an agricultural dominated sub catchment of the River Smedjeån. The pilot farms represent the different types of agricultural production existing in the area of southwest of Sweden, e.g milk-, pig-, grain- and specialized potatoes production.

At least 86 wetlands covering an area of 27 ha have been created within the river Smedjeån sub catchment during the last 10 years. To have a significant effect on the quantity of nutrients transported to the sea, this area need to be increased substantially. It has been realized that use of wetlands for multiple ecosystem services should be developed to motivate the large-scale wetland construction that is needed for substantially decreasing nutrient transports. Ecosystem services obtained in addition to nutrient removal and increased biodiversity are e.g. water storage for irrigation, increased recreational value of the landscape, flood risk reduction and production of bioenergy. Questions that need to be answered and obstacles that need to be overcome to develop the use of multiple ecosystem services provided by created wetlands are being identified within Aquarius.

In order to identify and localize points of erosion (e.g particulate P) and areas of accumulation of sediment it has been necessary within the project to compile and analyse available data about the hydro morphology of river Smedjeån including catchment description, historical changes influencing the sediment system, description of the hydrology, sediment and geomorphologic system.