

## NuReDrain Highlights and Achievements – Update November 2017

To combat eutrophication in the North Sea Region waters, diffuse pollution of phosphorus (P) and nitrogen (N) should be tackled. Since agriculture is a main source of this diffuse pollution, the NUREDRAIN project aims to demonstrate filter technologies on agricultural waters which can trap P and N. As such, P and N will be removed from the agricultural water (e.g. run off water, tile drainage water, greenhouse discharge) before it enters the surface water. Likewise, filter technology will be used for the treatment of surface water for drinking water production. Preventing eutrophication will hence not only improve the water quality but will also reduce drinking water production costs.

At first, the Nuredrain project consortium generated a database summarizing techno-economic characteristics of 15 phosphorus adsorbing and 2 nitrate removing materials. Subsequent lab experiments on 11 P adsorbing materials were conducted to determine the adsorption kinetics at high (25 mg P/l), medium (5 mg P/l) and low (0,5 mg P/l) nutrient load. The 4 most promising materials will later on be tested for their P saturation kinetics.

Meanwhile, all project partners started with the preparatory work for the first round of field tests. In Denmark, agricultural run off water will be treated by a HydroSeparator to remove particulate P and will then flow over a filter filled with DiaPure material to adsorb soluble P. In Belgium, a filter setup has been designed to treat surface water prior to drinking water production. The construction is currently on going and will be operational from April 2018 onwards. The series of 3 filters will be filled with iron sludge granulates to adsorb P. The latter is waste generated during drinking water production. Also in Belgium, large buckets have been modified and will be installed at the outlet of tile drainage pipes. Buckets will be filled with iron oxidised coated sand to adsorb P from drainage water. Finally also in Belgium, greenhouse discharge will be treated by means a moving bed bio reactor to convert nitrate into nitrogen gas after which the water will flow over a cubitainer filled with iron sludge granulates to adsorb P. In Germany, a filter system will be installed inline of the tile drainage pipe. The filter will be filled with iron oxidised coated sand to adsorb P.

A first pot trial with P-saturated filter materials is ongoing. As such, filter materials can be valorized as fertilizer. Either directly by mingling the materials with the plant substrate, either indirectly by desorbing P from the materials so that it can be provided to chemical fertilising companies.

The results of the NUREDRAIN project must offer guidance to policy makers about implementation strategies. To support this decision making, the impact of P and N removal technologies on the surface water quality will be modeled on a catchment in Belgium and Germany. Data are currently gathered to calibrate and validate the SWAT model (Soil & Water Assessment Tool).