

DEVELOPMENT OF SEDIMENTATION PONDS IN DRAINAGE SYSTEMS



EUTROPHICATION is the main issue concerning the Baltic sea. The Baltic sea has gone from an oligotrophic (nutrient poor) to an eutrophic marine environment. Eutrophication is caused by nutrients, particularly phosphorus and nitrogen, but also organic matter, contaminating the water. Due to the increased nitrogen and phosphorus concentrations, the productivity and intensity of the biological process is significantly increased. To begin with the amount of oxygen in the water decreases, which leads to excessive growth of algae and other aquatic plants, accumulation of organic substances. This eventually leads to significant water quality deterioration.

Pollution from agricultural sources forms the majority of all nitrogen pollution which enters the Baltic Sea by surface runoff, ditches and rivers. Also, a significant proportion of the phosphorus pollution can be associated with agricultural production. The Baltic Marine Environment Protection Commission (HELCOM) data show that approximately 60% of the nitrogen and 50% of the phosphorus in rivers comes directly from farms.

Pollution from agricultural land gets into water bodies as surface and subsurface runoff. One of the ways to reduce the pollution of water bodies is to retain agricultural run-off.

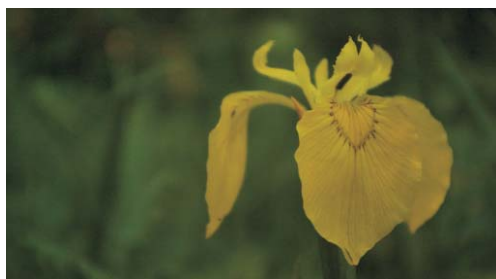
One can do this by creating a small artificial water reservoir or wetland. The easiest way to do this quickly and cost-effectively, without damaging the surrounding agricultural land, is to use the existing systems and adapt to the current situation. For example, a small dam in a drainage ditch will create a sedimentation basin. This type of construction is best to build as close as possible to the point where the ditch meets the natural water bodies – a river or a lake.



Eutrophicated water bodies get densely overgrown with a variety of aquatic plants.

WHY DO WE NEED TO INSTALL SEDIMENTATION PONDS?

- The created dam wall will form a pond that will perform as a sedimentation pond.
- The water flowing over the dam will be enriched with oxygen.
- Water will stay longer in the ditch (sedimentation ponds), the natural selfpurification process will take place and a large proportion of nitrogen and phosphorus compounds are used by aquatic plants, thereby reducing the dissolved nutrients in the water and preventing it from entering the Baltic Sea.
- The plants growing in the ditches and on the banks of ditches will absorb nutrients dissolved in water, thereby reducing pollution runoff from agricultural land into natural water bodies.
- The soil particles that get into water through soil erosion, will sediment on the bottom of the pond thereby reducing the amount of nutrient rich silt that reaches rivers and lakes.



Biodiversity increases when wetlands are created. On banks of wetlands plants like Yellow Iris start to bloom.

Other ways to prevent pollution from agriculture into natural waters:



Install the dam that will capture and accumulate the pollution before the drainage system enters the natural water bodies. It is best to choose a construction that functions as a natural system; they can be constructed wetlands with both surface and groundwater flow.



Reduce the water flow velocity in the existing drainage ditches in several segments, by creating small thresholds. It should be noted that the water level upstream will rise depending on the height of the threshold.



Create meanders in the existing drainage ditch. This will not affect flooding of agricultural land, but will increase the time water is spent in the ditch. As a result, biodiversity will increase, the suspended particles will sediment and the water self-purification process will start.



A wetland, which is placed in naturally low, wet terrain, will allow use of unsuitable agricultural land for reduction of pollution.

CONSIDERATIONS:

- Before making dams on ditches, consult the local authorities and make sure all activities are in line with existing legislation.
- Make sure your planned dam will not result in an adverse flood risk to adjacent land.

For more information visit:

Baltic COMPASS <http://www.balticcompass.org/>
Baltic Deal <http://www.balticdeal.eu/>

Contacts:

Latvian Fund for Nature
Dzirnavu 73-2, Riga
+371 67830999
ldf@ldf.lv
www.ldf.lv