

Development of sedimentation ditches in drainage system



EUTROPHICATION is the main issue for the Baltic sea. Baltic sea from oligotrophic (nutrient poor marine) has become a eutrophic marine environment. Eutrophication is caused by water contamination with nutrients, particularly phosphorus and nitrogen, and organic matter. Due to the increased nitrogen and phosphorus concentrations, significantly increases the productivity and intensity of the biological process – at the beginning decreases the amount of oxygen in the water, which leads to excessive growth of algae and other aquatic plants, accumulation of organic substances, which eventually leads to significant water quality deterioration.

Pollution from agricultural sources forms the majority of all pollution with nitrogen compounds, which comes in the Baltic Sea by river runoff. 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% nitrogen and 50% of phosphorus in rivers comes directly from the farm.

Pollution from agricultural land gets into the 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, the small dam in the drainage ditch will create a sedimentation basin. This type of construction it is best to build as close as possible to the point where the ditch meets the natural water bodies - a river or lake.



Eutrophicated water bodies densely overgrow with a variety of aquatic plants.

WHY DO WE NEED TO INSTALL SEDIMENTATION PONDS?

- The created dam will form a pond that will perform as sedimentation pond.
- The water flowing over the dam will become richer with oxygen.
- Water will stay for longer in the ditch (sedimentation ponds), the natural self-purification process will take place and a large proportion of nitrogen and phosphorus compounds are used by aquatic plants, thus 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 ground of the pond thus reduce development of nutrient rich silt in rivers and lakes.



Biodiversity increases in wetlands. On banks of wetlands plants like Yellow Iris starts to bloom.

Other ways to prevent pollution from agriculture into the natural waters:



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



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



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



Wetland, which is installed in natural lowland of wet terrain, will allow using for agricultural activity unsuitable 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 proposed dam on the ditch will not result in adverse flood risk to adjacent territories.

For more information visit:

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

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