

INSTALL SEDIMENTATION BOXES

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Description

Sedimentation boxes are tanks without a bottom and connected to tile drains aimed at reducing surface runoff.

Rationale, mechanism of action

Phosphorus is mainly transported to surface water via water flow. The pathway of the water flow can be changed in such a way that phosphorus rich components in solution will be reduced.

By constructing sedimentation boxes as inlets for runoff water transported material in runoff water will be intercepted and deposited at the bottom hole of the tank. This material can be removed regularly. The water can be transported via a tile drain to a ditch. The effectiveness will increase the more runoff water from a field can be controlled and intercepted. The general idea of the application is shown in figure 1. In particular, the P losses caused by transport of detached soil particles components in soil solution will be reduced by sedimentation boxes.

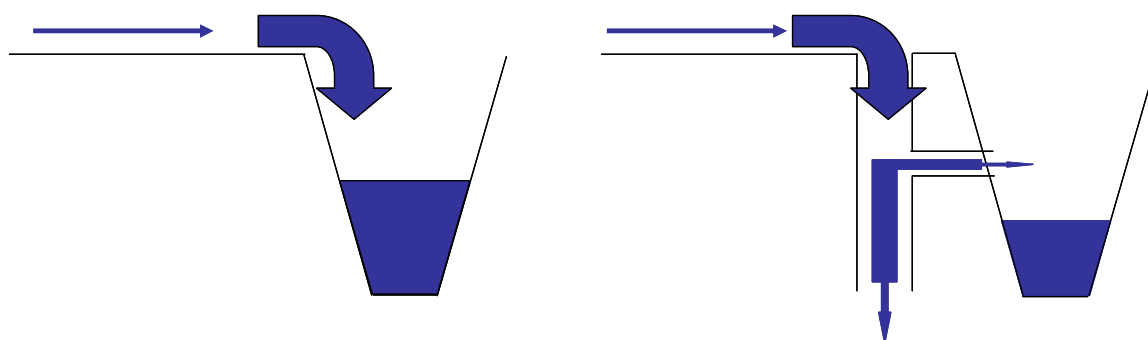


Figure 1. Schematic visualization of the impact of measure “sediment boxes” on the water flow: runoff water can infiltrate or is directed to a tile drain and particulate material can be removed via settling.

Applicability

The measure will be most effective when applied under field conditions where transport of particulate P components by overland flow causes the main P loss to surface water (erosion). This means hilly areas in combination with high rainfall intensities. The amount of erosion that is intercepted depends on the amount of runoff and the amount and size of the eroded material. Furthermore, it is important that the runoff water can either infiltrate to the soil at the bottom of the tank or is led to surface water via a tile drain.

Effectiveness, including certainty

The effectiveness of sedimentation boxes will depend on the rainfall distribution over time. At huge rainfall events the capacity of the sedimentation box and the infiltration capacity of the soil at the bottom of the box, or of the tile drain, can be too low. At this moment no field studies have been evaluated, so actual information on reduction of P loss is not (yet) available.

Time frame

The impact of the measure will turn more or less directly.

Environmental side-effects / pollution swapping

The risk of environmental side-effects and pollution swapping are minimal. A additional risk may be the fact that all P from runoff water is collected at a local point within the field and can be seen as local point source at the long term. As a result the contribution of subsurface losses and losses via tile drains will increase over time.

Relevance, potential for targeting, administrative handling, control

The option can be relevant for fields that cause diffuse P losses by overland flow at local scale. Selection of such fields based on local experiences of the farmer is very important. To maintain a good functioning of the sedimentation box it is important that this tank is emptied regularly, depending on the amount of deposited material.

Costs: investment, labor

The main costs are caused to construct the sedimentation box (investment). Labor costs are related to emptying the sedimentation box.

References

No references are known at present. Information was given by M. Bechmann, Bioforsk, Norway.