Reduction of phosphorus load from critical source areas using a ferric sulphate dozer

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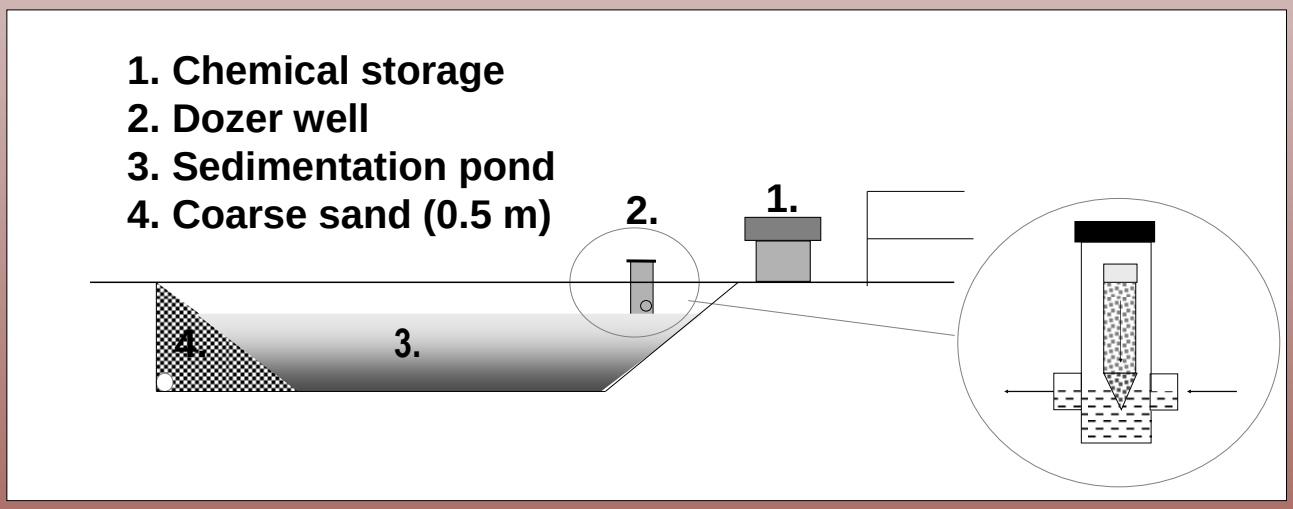
Exercise areas and milking stations have been identified as hot-spots of P losses in many animal farms. Such feces-affected soils give very high concentrations (up to tens of milligrams per litre) of dissolved P (DRP) in runoff.

One option to manage P losses from small hot-spot areas is to precipitate P in adjacent ditches. Our ferric sulphate dozer (Närvänen et al., 2008) consists of a cone-shaped polyester netting bag that is attached to the bottom of a container filled with granular ferric sulphate. The shape of the netting ensures that when water level rises, more surface of the cone is immersed in runoff and higher amount of ferric sulphate is dissolved. Dozing can be further adjusted by changing the angle of a v-notch weir.

One-year test using the ferric sulphate dozer was ran at a paddock site with a small sedimentation pond (figure below). Reduction of P concentrations was 95% for DRP and 81% for total P (Närvänen et al., 2008).



To precipitate (up to >90%) of DRP, 1 kg of ferric sulphate to 10-50 m^3 of runoff has been found to be an appropriate doze. In high P waters, the cost of this solution would be reasonably low.

Doze	DRP, mg l^{-1}	pH
0	0.084	7.1
1 kg/30 m^3	0.003	6.7
1 kg/20 m^3	0.003	5.7
1 kg/10 m^3	0.003	3.6

Närvänen, A., Jansson, H., Uusi-Kämppä, J., Jansson, H., Perälä, P. 2008. Phosphorus load from equine critical source areas and its reduction using ferric sulphate. Boreal Env. Res. 13: 265–274. (http://www.boreenv.net/BER/pdfs/ber13/ber13-265.pdf)