

Pesticide input into Swiss surface waters via hydraulic shortcuts in vineyards or orchards

Background

Pesticides from agriculture can enter surface waters through various pathways where they impair the water quality and harm aquatic organisms. Many studies have already analysed the pathways through which pesticides are transported to surface waters. However, in the past these studies focused on the processes surface runoff, direct drift into water bodies and preferential flow to tile drainage systems. Although so-called hydraulic shortcuts (e.g. inlets or manholes of road and tile drainage systems) may also play a major role for pesticide inputs into surface waters, these entry paths have been largely neglected. Within the PhD project "Shortcut" we try to close this knowledge gap.

Objectives

This Master thesis is embedded in the project "Shortcut". The goal of the project is to assess the relevance of hydraulic shortcuts for pesticide inputs to Swiss surface waters. The focus of the Master thesis lies on analysing hydraulic shortcuts for one specific type of agricultural land: Either *vineyards* or *orchards*. (One Master thesis on each of these two agricultural land types is possible.) This includes the following tasks:

1. **Assessing the spatial distribution of shortcuts:** The occurrence of hydraulic shortcuts in vineyards is assessed for multiple field sites representing typical Swiss vineyard/orchard regions. This task consists of field studies (mapping of shortcuts by feet and/or using a drone) as well as of an analysis of available data sources (e.g. plans of the road or tile drainage systems). What types of shortcuts are found? Where are they located? What are the differences between Swiss vineyard/orchard regions?
2. **Modelling areas connected to shortcuts in GIS:** The relevance of pesticide inputs into surface waters via hydraulic shortcuts compared to direct inputs is assessed in this task. This will include the modelling of areas connected to hydraulic shortcuts and areas directly connected to surface waters in GIS.

Prerequisites

- Background in environmental engineering, environmental sciences, geography or a similar field
- Interest in field work
- Experience in GIS modelling
- German and French language skills

Advisor

Dr. Christian Stamm

Contact information

Christian Stamm (christian.stamm@eawag.ch; 058 765 55 65)

Urs Schönenberger (urs.schoenenberger@eawag.ch; 058 765 53 27)

Webpage: <http://www.eawag.ch/en/departement/uchem/projekte/shortcut/>