

Soil structural quality assessment for soil protection regulation

Alice Johannes and Pascal Boivin

HES-SO-Geneva, Agronomy, Jussy, Switzerland (pascal.boivin@hesge.ch)

Soil quality assessment is rapidly developing worldwide, though mostly focused on the monitoring of arable land and soil fertility. Soil protection regulations assess soil quality differently, focusing on priority pollutants and threshold values. The soil physical properties are weakly considered, due to lack of consensus and experimental difficulties faced with characterization. Non-disputable, easy to perform and inexpensive methods should be available for environmental regulation to be applied, which is unfortunately not the case. As a consequence, quantitative soil physical protection regulation is not applied, and inexpensive soil physical quality indicators for arable soil management are not available. Overcoming these limitations was the objective of a research project funded by the Swiss federal office for environment (FOEN). The main results and the perspectives of application are given in this presentation.

A first step of the research was to characterize soils in a good structural state (reference soils) under different land use. The structural quality was assessed with field expertise and Visual Evaluation of the Soil Structure (VESS), and the physical properties were assessed with Shrinkage analysis. The relationships between the physical properties and the soil constituents were linear and highly determined. They represent the reference properties of the corresponding soils. In a second step, the properties of physically degraded soils were analysed and compared to the reference properties. This allowed defining the most discriminant parameters departing the different structure qualities and their threshold limits. Equivalent properties corresponding to these parameters but inexpensive and easy to determine were defined and tested. More than 90% of the samples were correctly classed with this method, which meets, therefore, the requirements for practical application in regulation. Moreover, result-oriented agri-environmental schemes for soil quality are now proposed to farmers based on these indicators.