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On-farm soil quality estimations

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Many aspects of the chemical quality of Finnish arable soils are already well established. However, follow-up of the physical and biological soil components, increasingly seen as important features of soil quality, is poor. The soil quality concept recognises concern for the sustainability of current arable land use practices. It is based on chemical, physical and biological soil properties and it depends on soil use. Agricultural management systems with organic fertilizers and green manure are especially dependent on biologically mediated processes and functions of the whole soil system. Decomposition of organic matter, mineralization of nutrients and symbiotic microorganisms are of fundamental importance. Soil organisms and biological processes create and stabilize soil structure and are proven important agents in suppressing pathogens. Good soil structure, including sufficient pore space and hydraulic conductivity, is a condition for soil biological activity and plant growth, which helps to reduce negative environmental impacts. Increased environmental awareness in agriculture and changes in EU agricultural subsidies policy require better knowledge of these issues. The need for broader soil fertility testing taking account of soil functionality is obvious.

On-farm assessments would help farmers to monitor and maintain the quality of their fields, and raise awareness of soil care. The study aims to develop a battery of on-farm soil quality tests for use in both organic and conventional farming. The work is largely based on available on-farm test systems, like soil physical observations ("spade diagnosis") and Soil Quality Test Kit, developed by USDA (United States Department of Agriculture) Soil Quality Institute. Potential measurements are e.g. soil respiration, infiltration, bulk density, electric conductivity (EC), soil pH, soil nitrates, aggregate stability, slake test, earthworm numbers and visual observations. Our agro-ecological environment necessitates adjustment of such tests. Comparisons between laboratory and on-farm measurements will be carried out in summer 2003, and applicability and usefulness explored with pilot projects. Such practical experience can further be used to optimise the soil quality test battery. Data sets from pilot projects will be useful in the future when estimating ranges for desired values. The poster will present an overview of the on-farm soil quality estimation system and selected measurements.