

## Testing the Visual Soil Assessment tool on Estonian farm fields

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Soil quality estimation plays important role in decision making on farm as well on policy level. Sustaining the production ability and good health of the soil the chemical, physical and biological indicators should be taken into account. The system to use soil chemical parameters is usually quite well established in most European counties, including Estonia. However, measuring soil physical properties, such bulk density, porosity, penetration resistance, structural stability ect is time consuming, needs special tools and is highly weather dependent. In that reason these parameters are excluded from controllable quality parameters in policy in Estonia. Within the project “Interactive Soil Quality Assessment in Europe and China for Agricultural Productivity and Environmental Resilience” (iSQAPER) the visual soil assessment (VSA) tool was developed for easy detection of soil quality as well the different soil friendly agricultural management practices (AMP) were detected. The aim of current study was to test the VSA tool on Estonian farm fields under different management practices and compare the results with laboratory measurements. The main focus was set on soil physical parameters. Next to the VSA, the undisturbed soil samples were collected from the depth of 5–10 cm and 25–30 cm. The study revealed that results of a visually assessed soil physical parameters, such a soil structure, soil structural stability, soil porosity, presence of tillage pan, were confirmed by laboratory measurements in most cases. Soil water stable structure measurement on field (on 1 cm<sup>2</sup> net in one 1 l box with 4–6 cm air dry clods for 5–10 min) underestimated very well structured soil on grassland and overestimated the structure aggregates stability of compacted soil. The slightly better soil quality was detected under no-tillage compared to ploughed soils. However, the ploughed soil got higher quality points compared with minimum tillage. The slurry application (organic manuring) had controversial impact – it increased the number of earthworms but decreased soil structural stability. Even the manuring with slurry increases organic matter amount in the soil, the compaction due to the use of heavy machinery during the application, especially on wet soil, reduces the positive effect of slurry.