

Spatial distribution of soil physical properties

The two projects concern spatial variation of soil physical properties and yield within fields. The first project studies the long term effects of drainage and drainage distances on soil structure and yield. The soil's water content is one of the most important factors for its compaction sensitivity. In the short term this affects the possibilities to perform a successful seedbed preparation. In the long term, unfavourable water content at tillage may lead to permanent (negative) changes of the soil structure. During the forties and fifties several field trials were started in Sweden to investigate the effect of different subsurface drainage distances. Short distances were about 15 meters and long distances about 30 meters. Four sights that showed negative effects of the longer drainage distance are used in field trials again. The effects of distance from the drainage pipes on yield, water conductivity and penetration resistance are studied and compared to the results from the previous investigation.

Soil physical parameters are seldom studied intensely over a larger area. This is a lot due to labour intensive traditional methods. Newer methods are being developed and used especially in precision agriculture. The goal in precision agriculture is to sight specifically adjust your inputs to the needs of the soil and crop. The second project concerns sight specific, fast measurements of yield limiting soil physical parameters. A horizontal, tractor pulled, penetrometer is being developed and is used to map the penetration resistance at three levels within one field. The texture, organic matter content and water content are also being mapped using NIR and soil conductivity. As a complement, cylinders are taken out and used for analysis of water conductivity, water holding capacity and bulk density. The root growth is also studied at twenty places spread across the field. The field has been yield mapped since 1996 and the soil physical parameters will be compared to the yield.