

Non-inversion tillage on sandy soils in the Netherlands



Non-inversion tillage is used on this field instead of conventional ploughing. The plough is replaced by a rigid-tine cultivator. The working depth is about similar for both conventional and non-inversion tillage (+/- 25 cm). The idea behind non-inversion tillage is that it causes less disturbance of the soil, resulting in better structure and more organic matter and soil life in the topsoil.

Soil degradation

Less disturbance and not turning over the soil can help in maintaining or even improving the soil structure and the overall soil quality. This is becoming more and more important; agricultural soils are used intensively, so soil degradation is a real threat. Non-inversion tillage has shown positive effects on the structure of clay soils but hasn't been tested intensively on sandy soils.



Field results



The picture above shows a non-inversion tilled field for carrots. Here we see signs of wind erosion which occurs in dry springs on the non-inversion fields more than on the ploughed fields. This can cause damage to the crop.



In this picture we see a small potato crop. Residues from the previous season (maize) are still visible. This is part of the strategy; to keep the organic material in the topsoil.

Location of demonstration site



Detailed description of non-inversion tillage

This technology is applied in Vredepeel (the Netherlands) on a sandy soil on arable fields. It is applicable for various crop types. In non-inversion tillage a specific machine called a rigid-tine cultivator is used. The machine can be purchased for a few thousand Euros, but in the Netherlands it is also possible to let a contractor do this tillage. The average tillage depth here is around 25 cm, dependent on the crops in the rotation.

The purpose of the non-inversion tillage is to keep the soil organic matter in the topsoil, and to disturb the soil as little as possible, which has as benefit that the organic matter levels in the topsoil can increase and soil life is maintained better. Overall, the soil structure in the topsoil will improve. This is also what the land users like about using the non-inversion tillage. Until now soil quality analyses and visual soil assessments do not show big differences between the ploughed and non-inversion tillage parcels. On clay soils these positive effects on soil quality are more distinct.

Averaged over the whole crop rotation the yields are similar for the ploughed fields and the non-inversion tilled fields. In organic cropping systems on sandy soils, non-inversion tillage is more difficult to use since, because the topsoil is not turned over, small weeds and seeds are not buried and have a higher chance of survival. In a conventional system this can be solved by applying herbicides, but in organic farming it leads to more mechanical and hand-weeding. Also when grasses are a (large) part of the crop rotation, non-inversion tillage might not be the best solution, since it is harder to destroy the grass when preparing the soil for the next crop.



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