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**Costs and benefits of reduced tillage compared to
ploughing in an organic long-term trial on Loess in
Switzerland**

MEIKE GROSSE, MAREIKE WEINER, MICHAEL THOMPSON, ALFRED BERNER,
RÖBI FREI, MONIKA MESSMER, FRÉDÉRIC PERROCHET, PAUL MÄDER and
MAIKE KRAUSS

*Research Institute of Organic Farming FiBL, Ackerstrasse 113, 5070 Frick,
Switzerland*

ABSTRACT

Reduced tillage (RT) has soil conservation benefits compared to conventional ploughing (Krauss *et al.*, 2021), but can lead to lower yields in organic farming. For the further development of reduced tillage systems in organic farming a long-term experiment was established 2010 on a Loess soil in Aesch BL, Switzerland. The factors are tillage (plough vs. reduced) and fertilization (slurry vs. mineral fertilization on two levels each (1=low; 2=high) and no fertilization). The mean yield over 13 years was reduced by 4% with RT compared to ploughing (PL). Organic carbon stocks increased significantly in the surface layer (0–10 cm) in RT compared to PL, while in the 10–20 cm layer, they were not significantly lower ($P \leq 0.01$). Life Cycle Assessment (or simply LCA) revealed an 18 to 32% lower impact of RT on climate change, mainly due to more carbon being sequestered in the soil but also less energy use. Gross margins for RT vary depending on fertilizer treatment: with unfertilised and slurry1 they were similar to PL, with slurry2 they were 9% lower than with PL. Lower gross margins for RT were due to yield reductions and thus lower revenues. However, when subsidies for RT were considered, all RT treatments had a higher gross margin than the corresponding treatments with ploughing.

References

Krauss M, Wiesmeier M, Don A, *et al.* 2022. Reduced tillage in organic farming affects soil organic carbon stocks in temperate Europe. *Soil and Tillage Research* **216**. <https://doi.org/10.1016/j.still.2021.105262>.