



## **Effects of different agricultural management on a stagnic Luvisol in Lower Saxony, Germany – Factors for sustainable soil protection**

Marco Lorenz, Joachim Brunotte, and Berthold Ortmeier

Thünen Institute of Agricultural Technology, Johann Heinrich von Thünen Institute for Rural Areas, Forestry and Fisheries, Braunschweig, Germany (Marco.Lorenz@thuenen.de)

Regarding increasing pressures by global societal and climate change, for example, the assessment of the impact of land use and land management practices on land productivity, land degradation and the related decrease in sustainable food production and the provision of ecosystem services gains increasing interest. Regarding international research on land use and soil threats, main problems in agricultural land use on global scale are erosion by water and wind, soil organic matter loss, salinization, depletion of nutrients, chemical and physical deterioration, including e.g. soil compaction. When coming to soil sciences, basically soil functions are affected negatively by intensive food production and field traffic. Management based negative changes in soil functions and a suboptimal soil structure have multiple negative effects on physical, biological and chemical soil functions, like a poor water balance, air and water permeability, disturbed soil fauna, impeded root penetration etc. and in consequence on the achievable yields. The presentation deals with the multiple effects of different agricultural machinery and technologies and different agricultural soil tillage (e.g. no-till, conservation tillage, ploughing), on various soil properties of a stagnic Luvisol in Lower Saxony, Germany. These are e.g. bulk density, air capacity, saturated water permeability, changes in pore size distribution and water retention curve as well as crop yields. Furthermore results of a long term study of bulk density and total pore size on more than 20 farms in Lower Saxony since the year 1952 will be presented. Finally, key factors and first recommendations for sustainable agricultural soil protection will be derived from the results.