



## **Effect of soil in nutrient cycle assessment at dairy farms**

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Annual farm nutrient cycle assessments give valuable insight in the nutrient cycles and nutrient losses at dairy farms. It describes nutrient use efficiencies for the entire farm and for the underlying components cattle, manure, crops and soil. In many modelling studies, soil is kept as a constant factor, while soil quality is vital for soil functioning of the ecosystem. Improving soil quality will improve the nutrient cycle, and will also have positive effect on the soil functions crop production, water cycling and greenhouse gas mitigation. Spatial variation of soil properties within a farm, however, are not included in annual nutrient cycle assessments. Therefore it is impossible to identify fields where most profit can be gained by improving farm management at field level, and it is not possible to identify and to quantify nutrient flow path ways.

The aim of this study is to develop a framework to improve the annual nutrient cycle assessment at Dutch dairy farms, by including soil properties and their spatial variation within farms. Soil type and soil quality will be described by visual soil assessment of soil quality characteristics. The visual observations will be linked to the nutrient cycle assessment, using soil-hydrological model SWAP. We will demonstrate how soil quality at field level can impact on crop production, eutrophication potential and greenhouse gas potential at farm level. Also, we will show how this framework can be used by farmers to improve their farm management. This new approach is focusing on annual nutrient cycle assessment, but could also be used in life cycle assessment. It will improve understanding of soil functioning and dairy farm management.