

C. Cordova<sup>1</sup>, S. Sohi<sup>1</sup>, M. Lark<sup>2</sup>, K. Goulding<sup>1</sup> & S. Baxter<sup>3</sup>

<sup>1</sup> Department of Soil Science, Rothamsted Research.

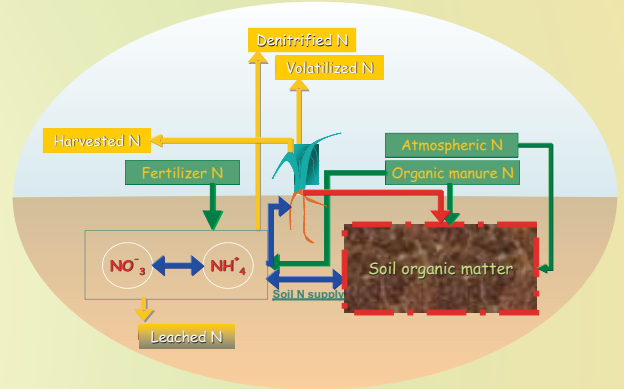
<sup>2</sup> Department of Biomathematics and Bioinformatics, Rothamsted Research.

<sup>3</sup> Department of Soil Science. University Of Reading

## Introduction:

N is a limiting nutrient for plants. Soil organic matter through N mineralisation can supply part of the N needed for crop growth (Figure 1). Large spatial variability in the N available from soil organic matter decomposition has been reported (Figure 2). Large amounts of fertiliser tend to be applied to allow for the maximum deficit in soil N supply at any point in a field. Improved spatial and as well as temporal understanding of soil N release may help protect the environment. The SOMA model describes soil organic matter turnover, and therefore N mineralisation, and its dependence on soil texture using measurable fractions (Sohi et al., 2001. Figure 3 and 4).

Figure 1. Soil- plant-atmosphere N cycle showing N mineralisation from soil organic matter.



## Objective:

To determine the scale of within-field variation for the light fractions represented in the SOMA model, and thus demonstrate how the understanding of N mineralisation can be improved using the soil organic matter turnover model SOMA.

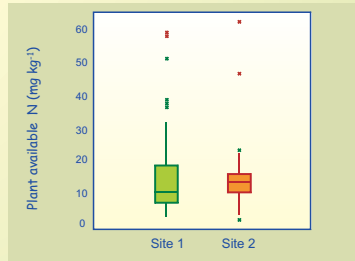


Figure 2. Potential N supply from soil organic matter at two sites at Silsoe (Bedfordshire, England; Data from Baxter, 2002). Horizontal line in the box represents the median value of the sample population; vertical lines outside of the box displays the range of the data extended 1.5 times the size of interquartile box; and crosses values represent values beyond of that range.

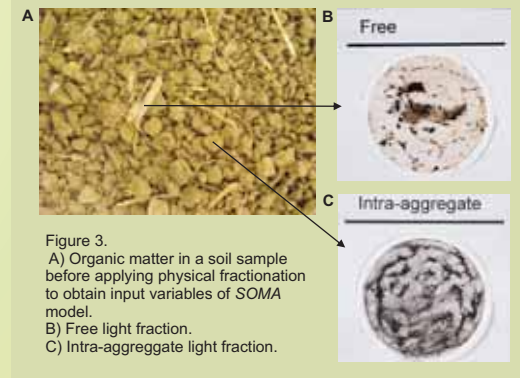


Figure 3. A) Organic matter in a soil sample before applying physical fractionation to obtain input variables of SOMA model. B) Free light fraction. C) Intra-aggregate light fraction.

## Methodology:

A regular grid (30m × 30m) was sampled within a 4-ha field under an emerging oat crop. Topsoil samples were taken at grid nodes and At nested sample points in an “unbalanced” design to allow estimation of components of variation over 10m, 1m, and 0.12m (Webster and Oliver, 1990, Lark 2005). Carbon and N in free and intra-aggregate light fractions are being obtained by physical fractionation (Sohi et al., 2001). Additionally, clay content will be determined. Hierarchical analysis of variation and variogram will be applied.

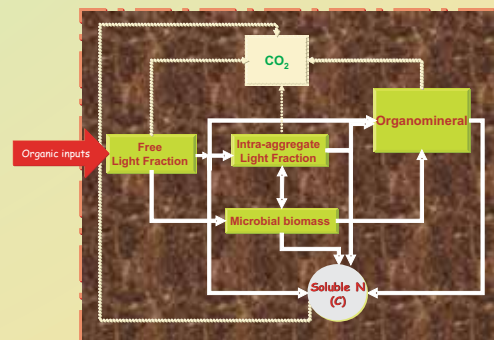


Figure 4. Soil organic matter turnover and N dynamics according to the SOMA model

## Further analyses:

Establishing the scale of variation of the modelled fractions in SOMA will enable sampling and measure in a subsequent experiment, all the input and output variables of the model and assess its simulation of N mineralisation across the field.

## References:

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