

Broom's Barn

Broom's Barn Farm, covering 77 ha, is near Bury St Edmunds in eastern England. It was bought by Rothamsted Experimental Station, now Rothamsted Research, in 1959 for research on sugar beet. The land is gently undulating and consists of unconsolidated Pleistocene and Recent sediments including Chalky Boulder Clay and cover sands which lie over Chalk of Cretaceous age. The soil is formed in the superficial sediments.

In 1960 the staff, J.A.P. Marsh and S.N. Adams, sampled and analysed the topsoil with a view to assessing and mapping the fertility of the soil on the farm. They sampled on a grid at intervals of 40 m. There were 436 nodes within the farm where the soil was accessible. Around each grid node they took some 25 cores of soil from 0–23 cm within a square of 16 m × 16 m, put the cores into a bucket, stirred the soil and took sub-samples from the bulked sample for chemical analysis. The support of the sample is thus 16 m × 16 m to 23 cm depth.

The variables measured included pH, exchangeable potassium (K) in mg litre⁻¹, available phosphorus (P), also in mg litre⁻¹, organic matter, exchangeable magnesium and exchangeable sodium. Draycott *et al.* (1977) give details of the chemical analysis. Only the first three variables are in the file. They are measures of soil fertility for arable crops in eastern England, and the people who did the survey had the idea that they would fertilize and lime to make the soil more uniform and so diminish the errors in field experiments. They drew 'contour' maps by hand and eye from the data, and fertilizers were applied differentially to even out fertility. However, when Draycott *et al.* (1977) resampled in the 1970s they found that too little fertilizer had been applied. There was still a lot of variation.

The original data have been analysed geostatistically to map the three variables, and some of the results are published in Webster & McBratney (1987) and Webster & Oliver (2007).

Reference

- Draycott, A.P., Durrant, M.J., Hull, R. & Messemer, A.B. 1977. Changes in Broom's Barn Farm soils, 1960–75. In: *Rothamsted Experimental Station Report for 1976, Part 2*, pp. 33–52. Lawes Agricultural Trust, Harpenden.
- Webster, R. & McBratney, A.B. 1987. Mapping soil fertility at Broom's Barn by simple kriging. *Journal of the Science of Food and Agriculture*, **38**, 97–115.
- Webster, R. & Oliver, M.A. 2007. *Geostatistics for Environmental Scientists*. John Wiley and Sons, Chichester.