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Introduction

The supplementary tables contain information behind Soil Organic Carbon (SOC) and Soil Bulk Density data statistics for the different land uses used in this study (Table S1), the variables tested in the UK DOC export model but not statistically significant (Table S2), SOC first-order constants for each land use transition (Table S3), and the preferential direction of land use change (Table S4).
Table S1. SOC and soil bulk density summary statistics under different land uses.

|                  | N  | Mean | Min | Max | Range | Lower Q | Median | Upper Q | SD  | CV  | Skewness | Kurtosis |
|------------------|----|------|-----|-----|-------|---------|--------|---------|-----|-----|-----------|-----------|
| **SOC (%)**      |    |      |     |     |       |         |        |         |     |     |           |           |
| Arable           | 592| 3.17 | 0.68| 30.8| 30.12 | 1.77    | 2.3    | 3.2     | 3.14| 0.99| 4.28      | 26.35     |
| Temporary grass  | 205| 2.86 | 0.8 | 20.1| 19.3  | 1.89    | 2.4    | 3.31    | 2.05| 0.72| 4.89      | 35.28     |
| Permanent grass  | 367| 4.14 | 0.68| 19.8| 19.12 | 2.63    | 3.76   | 5.12    | 2.28| 0.55| 2.78      | 17.08     |
| Woodland         | 82 | 5.84 | 1.3 | 25.6| 24.3  | 3.22    | 4.65   | 6.7     | 4.51| 0.77| 2.73      | 11.33     |
| Urban¹           | 808| 3.5  | 0.9 | 18.6| 17.7  | 2.42    | 3.3    | 4.58    | 1.6 | 0.46| -         | -         |
| **Bulk Density (g/cm³)** |    |      |     |     |       |         |        |         |     |     |           |           |
| Arable           | 242| 1.2  | 0.44| 1.47| 1.03  | 1.15    | 1.18   | 1.28    | 0.13| 0.11| -2.43     | 14.99     |
| Temporary grass  | 65 | 1.25 | 1.06| 1.37| 0.31  | 1.18    | 1.26   | 1.3     | 0.08| 0.06| -0.48     | 2.58      |
| Permanent grass  | 111| 1.04 | 0.26| 1.24| 0.98  | 0.97    | 1.07   | 1.12    | 0.15| 0.15| -2.88     | 14.89     |
| Woodland         | 65 | 0.97 | 0.58| 1.19| 0.61  | 0.93    | 1.07   | 1.07    | 0.15| 0.16| -1.18     | 3.96      |

¹Urban from Rawlins et al. [2008]
**Table S2.** Variable tested in *Worrall et al.* [2012]

| Variables tested but not statistically significant |
|--------------------------------------------------|
| Arable                                           |
| N. cattle                                        |
| N. sheep                                         |
| BFI                                              |
| Actual annual evaporation                        |
| Standard average annual rainfall                 |
Table S3. SOC first-order rate constants for land use changes from A to B (yr⁻¹)

| Land use B | Arable | Temporary grassland | Permanent grassland | Urban | Woodland |
|------------|--------|---------------------|---------------------|-------|----------|
| Arable     | 0      | 0.04                | 0.04                | 0.69  | 0.02     |
| Temporary grassland | 0.28  | 0                   | 0.03                | 0.69  | 0.02     |
| Permanent grassland  | 0.28  | 0.33                | 0                   | 0.69  | 0.02     |
| Urban      | 0.03   | 0.04                | 0.04                | 0     | 0.02     |
| Woodland   | 0.06   | 0.06                | 0.06                | 0.69  | 0        |
Table S4. Land use transition matrix showing preferential direction of land use change (after Adger et al. [1992]; Adger and Subak [1996]).

| From                  | To                     | 1                   | 2                   | 3                   | 4                   |
|-----------------------|------------------------|---------------------|---------------------|---------------------|---------------------|
| Arable                | Temporary grassland    | Urban               | Permanent grassland | Woodland            |
| Temporary grassland   | Arable                 | Urban               | Permanent grassland | Woodland            |
| Permanent grassland   | Woodland               | Temporary grassland | Arable             | Urban               |