**Supporting information**

S1 Table. Linear Mixed Effect (LME) model of the interactive effect of land-cover types, soil moisture and soil temperature on the soil respiration.

|  | **Estimate** | **Std. Error** | ***df*** | ***p*-value** |
| --- | --- | --- | --- | --- |
| Intercept | -0.061 | 0.445 | 651 | 0.891 |
| Soil Temperature (ST) | -0.062 | 0.022 | 651 | 0.006 |
| Soil Moisture (SM) | -0.038 | 0.016 | 651 | 0.014 |
| Land-cover category(L)-Pine | -1.635 | 0.848 | 8 | 0.090 |
| L-Shola | -1.790 | 1.122 | 8 | 0.150 |
| L-Wattle | -0.487 | 0.648 | 8 | 0.474 |
| ST:SM | 0.003 | 0.001 | 651 | <0.001 |
| ST:L-Pine | 0.092 | 0.055 | 651 | 0.092 |
| ST:L-Shola | 0.105 | 0.078 | 651 | 0.177 |
| ST:L-Wattle | 0.018 | 0.034 | 651 | 0.586 |
| SM: L-Pine | 0.070 | 0.037 | 651 | 0.057 |
| SM- L-Shola | 0.056 | 0.032 | 651 | 0.078 |
| SM -L-Wattle | -0.004 | 0.023 | 651 | 0.864 |
| ST:SM:L-Pine | -0.005 | 0.002 | 651 | 0.058 |
| ST:SM:L-Shola | -0.004 | 0.002 | 651 | 0.108 |
| ST:SM:L-Wattle | 0.000 | 0.001 | 651 | 0.713 |

S2 Table. Summary of Linear Mixed Effect (LME) model of soil respiration response to three-way interaction of Land-cover category, Soil moisture and soil temperature.

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable** | ***df*** | ***F* - value** | ***p* - value** |
| Intercept | 1 | 649.119 | <0.0001 |
| Soil moisture (SM) | 1 | 103.762 | <0.0001 |
| Soil temperature (ST) | 1 | 0.0239 | 0.800 |
| Land-cover category (L) | 3 | 1.7154 | 0.241 |
| SM:ST | 1 | 26.495 | <0.0001 |
| SM:L | 3 | 0.864 | 0.459 |
| ST:L | 3 | 0.396 | 0.756 |
| SM:ST:L | 3 | 2.299 | 0.076 |

**Figure S1. Map showing the distribution of shola-grassland ecosystems across the Western Ghats biodiversity hotspot, with the study area circled. (Reproduced with modification from Das et al. 2015).**