

Response to reviewers' comments

1 General comments

We are glad for the opportunity to respond to comments on this paper. We note the handling editor's observation that it is an unusual paper for SOIL. We understand that, which is why we took advice from the Editors before submission. There is a growing interest in the history of soil science, particularly in the colonial context. This was apparent at the recent Centennial Meeting of the International Union of Soil Sciences (Florence, May 2024). There were contributions at the meeting by historians as well as soil scientists, and much interest in this from researchers who want to use legacy soil information from various periods. We therefore think that the time is ripe for soil science journals to take on papers which have professional historians collaborating with soil scientists so that the work is sound from the perspective of both disciplines.

We were also pleased to note the positive comment on the paper by Professor Webster, a soil scientist from Rothamsted Research, who worked in Zambia after Trapnell's time there.

2 Reviewer 1: Doyle McKey

General comments

The reviewer summarises the key points of the paper clearly. We are glad that he notes our response to those historians who use Trapnell's work in Zambia to exemplify the 'ecological theory of development'. We acknowledge the value of those studies but (and see reviewer 2) think that Trapnell's work requires more nuanced consideration.

We understand the reviewer's point that the style of the paper is detailed, but this reflects the historical methodology of 'close reading' of sources, which we think is essential here. For example, it helps us to see both how Trapnell's work influenced the development of the East-African soil map (Section 5.2) and why Trapnell appears to have played this down (lines 306 – 312 of the revised paper). Given our general observations above on the need for transdisciplinary work along the history/soil science axis, we hope that our contribution will help with mutual understanding by being historically rigorous and pedologically informed.

Specific comments

We agree that some references to the subsequent use of Ecological Survey publications in Zambia is useful. We have not found any that refer specifically to the Upper Valley, but we refer to some general examples in the introduction to the revised paper (see lines 17 – 21 of the revised paper). We note, also, that the published field records of the survey have barely been cited at all (see lines 36 – 44 in the revised paper). This provides context to our argument that a cross-disciplinary study is required (see lines 34 – 36 of the revised paper) and we return to this in the conclusion (lines 1071 – 1075).

Technical corrections

The reviewer's careful attention here is much appreciated. We have examined all his suggestions, and in each case we have made a revision to punctuation or presentation for improved clarity. Most of these corrections do not require further comment, but we expand on some below. Note that we quote the line number from the original submission to identify each comment, and give the corresponding line in the revised paper when we indicate our response.

- **Line 26.** We have rewritten this for clarity, see line 29 of the revised paper.
- **Line 80.** Changed to 'takes place', see line 92 of the revised paper.
- **Line 428.** We shall clarify that *Cikabanga* is the language of the excerpt, see line 441 of the revised paper.
- **Line 477.** We shall ensure, here and elsewhere, that the full generic name (e.g. *Brachystegia*) is given in the first reference to any species (e.g. *Brachystegia flagristipulata*).
- **Line 481.** At line 334 – 336 of the revised paper we explain that we use the Botanical names in the original Ecological Survey reports. It seems cumbersome to refer to the modern equivalents in the text, which is why we present the synonyms in Table S10 of the supplement. Note that we have checked the table of synonymy in the published traverse records and the modern equivalent of *Afromosia angolensis* is *Pericopsis angolensis*.
- **Line 456** Here we have retained 'which' as this is not a definitive clause.
- **Line 557.** We have rewritten this for clarity. See line 571 – 573 in the revised paper.

- **Line 584.** We clarify that ‘anthills’ generally means ‘termite mounds’. See line 600 of the revised paper.
- **Line 784.** We have edited this to read ‘ ... in a state of maturity and stability ...’. See line 817 of the revised paper.
- **Lines 796** We have edited this for clarity. See line 828 – 830 of the revised paper.
- **Line 799.** We deleted ‘your’. See line 831 of the revised paper.
- **Line 800.** The verb ‘to correlate’ is used in geological and soil survey when two or more soil map legends, or working legends used by field surveyors, are compared to identify units which can be regarded as corresponding to each other. For example, Table C.4 in the first edition of the Booker Tropical Soil Manual presents the correlation of Soil Taxonomy and FAO soil groups. We have therefore not changed this, and inserted some text to explain the use of ‘correlation’ in this sense. See lines 833 – 836 of the revised paper.
- **Line 808.** This is left from a previous version of the paper. We have edited to read ‘Trapnell compares them...’, deleting ‘As noted in section..’. See line 844 of the revised paper.
- **Lines 824 – 825** Trapnell uses ‘coherent’ here to say that the soil material was cohesive. We have clarified this. See line 861 of the revised paper.
- **Line 847.** We have clarified this. See line 883 of the revised paper.
- **Line 850–851.** We have rewritten this. See line 887 of the revised paper.
- **Lines 886–887.** We have rewritten this. See line 922–923 of the revised paper.
- **Lines 897, 929.** See response to comment on line 800 of the original paper above. We have left this as it was.
- **Line 913.** We have rewritten this. See line 950 of the revised paper.
- **Line 947.** We have rewritten this. See line 983–985 of the revised paper.
- **Line 991.** We have rewritten this. See line 1029 of the revised paper.
- **Line 1008 – 1009.** This was a reference which was mistyped and so not compiled in L^AT_EX. It was to the article by Speek and to the Central-Western report, see line 1045–1046 of the revised paper.

3 Reviewer 2: Paul Smith

General comments

We are glad that the reviewer finds our work to be useful, and concurs with our final assessment of the contemporary relevance of the Ecological Survey. We are particularly pleased given his key role in making the traverse records available through his collaboration with Colin Trapnell.

Specific comments

1. *Ecological concept of development* The ‘Ecological concept of development’ is a later term from historical appraisal of colonial science, rather than one used at the time (even though the Ecological Survey was widely referred to by its title, for example in reports of the Department of Agriculture). We agree that, as presented by Speek, it does not fit well as a descriptor of Trapnell’s approach or conclusions, and we argue for a more nuanced understanding (section 4.7). In this regard we do not think we are in disagreement with the reviewer.

We have revised section 4.7, in particular see lines 705 – 709 of the revised paper, to emphasize that, while the concept of an ‘ecological’ approach to agricultural development would not have been widely understood at the time, the two reports of the Ecological Survey could reasonably be interpreted as advancing such a concept, unsuccessfully as it turned out. Nonetheless, we think that Speek’s characterisation of an ecological approach is reductive and fails to capture the sophistication of Trapnell’s understanding of the farming systems he observed and the factors which shaped their development.

2. *The Lamba* We agree with the reviewer that Trapnell’s attitude to African agricultural systems was very respectful, this is our main point in section 4.7. This distinguished him from many in the Agricultural department at the time where there was clearly considerable disagreement over many issues, not least whether European cultivation in Zambia should be encouraged at all. However, there are comments which appear in the reports of the Ecological Survey which do not reflect this nuanced understanding, and these have been picked up by authors such as Speek. For example, in the North Western report (Paragraph 90, starting on page 24), Trapnell and Clothier refer to The Lamba-Kaonde group, comprising the Bulima, the Lamba,... Generally speaking these are backward tribes, lacking in crafts and primitive in diet..’.

We are grateful to the reviewer for the references to the Traverse Records from around Solwezi which recognize specific features of Lamba practice which Trapnell regarded as well-adapted, and which show him distinguishing between practices of communities within the Lamba ethnolinguistic group. We have used these in revision as outlined below.

We have contrasted the generalized comment by Trapnell and Clothier (1937) with the more nuanced observations in the field records, observing that Trapnell noted variations in practice *within* these groups, varying from village to village (see line 697 – 704 of the revised paper). We contrast this with the generalised statement about the Lamba in the report. We think that this strengthens our critique of Speek. Note that we also refer to similar critiques by Moore and Vaughan, and by Tilley (lines 628, 696).