

Biodiversity Approach Position Paper

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Introduction

Farming systems, and the natural ecosystems in which they are embedded, differ widely across the globe, according to environmental and biogeographic conditions. For example, an oil palm plantation in Indonesia, an irrigated mango farm in Brazil and an intensive apple orchard in Germany might all be described as ‘perennial tree crop’, or ‘top fruit’ systems, but the wild species they support, and the management actions that would be appropriate to conserve those species in the context of productive farming, are unlikely to be exactly the same.

Scale

The Cool Farm Tool aims to assess biodiversity management on farms globally. We adopt a whole farm rather than crop-focused approach because many wild species live their lives at farm- or landscape scale. Management of the whole farm, including non-productive areas of habitat, matters as much or more to biodiversity than the management of specific crops.

The assessment is conducted at farm scale, rather than a wider landscape scale, because farms are the management units across which improvements can take place, and farmers, or farm managers and advisors, are the actors capable of implementing management change. Additionally, the majority of high-quality experimental evidence for the effectiveness of agricultural actions on biodiversity conservation comes from studies that test hypotheses at a farm- or field-scale. We do not provide separate versions for smallholders and large-scale farms, as we found that the questions were similar. The proposed tropical forests version will collect data on this characteristic for each farm assessment, enabling smallholders and large, commercial holdings to be benchmarked separately.

Scoring and Benchmarking

The biodiversity score is presented as four components, rather than a single overall score, because these scores provide important information about different aspects of farm management and biodiversity. However, there is nothing to stop a user of the tool setting a target based on aggregated score if this suits their objectives for biodiversity improvement. Benchmarking across farms of a similar type is important and should be part of how the tool is used. For example, users, (crops, livestock, or mixed) within a region, or monitor individual farm performance over time.

Action-Based Approach

The tool uses an action-based approach (rather than an outcome-based approach e.g., direct species counts) where points are given for efforts made, rather than requiring measurements of biodiversity response. This is for two main reasons. Firstly, it is clear from the literature that the actual biodiversity found on a farm, in terms of number of species present and the community composition, strongly depends on landscape factors operating at scales larger than most farms (Tscharntke et al. [2012]; Gámez-Virués et al. [2015]; Seibold et al. [2019]). The effectiveness of farm management actions for biodiversity has also been shown to depend on landscape context (e.g. Scheper et al. [2013]). Secondly, with the exception of areas of specific habitat types, measuring biodiversity itself (i.e. outcomes, such as numbers of species or individuals present) requires data inputs that farmers usually do not have, nor have the capacity to collect.

Biomes

Conservation strategies have differing levels of success and relevance in different places, and so tools to help support conservation efforts need to be location specific. However, the degree of location-specificity must be balanced against the practical consideration of resources available to develop multiple versions of tools. Developing tools at the level of major habitat regions strikes a good initial balance, whilst still allowing more location-specific tools to be developed in parallel, (e.g. Brandt *et al.* [2018]). We use ‘terrestrial biomes’ to define major habitat regions, as these are already spatially defined and justified in the literature.

Within the nine agriculturally important biomes, some are similar to one another in the types of agriculture they support, in that the same crops are produced across more than one biome. We thus define 5 'Cool Farm Biodiversity metric biomes':

1. temperate forest; [available on the tool]
2. Mediterranean and semi-arid; [available on the tool]
3. tropical forests; [partially developed]
4. temperate grasslands; and [not yet developed]
5. tropical grasslands. [not yet developed]

More Information

For more information, and the assumptions and limitations of the method please go to our technical description which can be found in the cool farm tool webapp, as a logged in user under help.

References

Brandt, Angela J., et al. "Effectiveness of farm management actions for enhancing NZ biodiversity: Specialist judgement assessment." *NZ Sustainability Dashboard Research Report* 18.06 (2018).

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Seibold, Sebastian, et al. "Arthropod decline in grasslands and forests is associated with landscape-level drivers." *Nature* 574.7780 (2019): 671-674.

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