

Agri-TE

Evidence-based synthesis of the impacts of agricultural transition and practices at the global scale to support integration and decision

ABSTRACT

Agriculture is the largest managed biome, with large potential for agro-ecological transition to play a crucial role in sustaining biodiversity, mitigating climate change and ensuring food security. Comprehensive evidence-based information on the multi-dimensional impacts of various agricultural practices can support decision-makers select effective transition pathways. Yet, currently no such global synthesis exists despite the abundant literature on agro-ecological systems. The fragmentation of the results in numerous articles, their focus on some particular aspects of the performance and their heterogeneous quality, prevent a global overview of their potential limits and benefices. Here, we propose to systematically synthesize quantitative evidence of the effect of main agroecological systems (e.g. agroforestry, organic agriculture, conservation agriculture) on the performance across multiple criteria such as biodiversity, agronomic, nutritional and economic outcomes. Precisely, we will synthesize agroecological system performance metrics from approx. 500 meta-analyses through a novel and state-of-the-art methodological approach. Based on these results, an evidence map will emerge to guide future research. Next, the quantification of the performance (i.e. calculation of effect-sizes) considering quality of the studies, possible redundancy of experiments, missing studies and between study variability will allow to precisely inform decision makers of the performance of such systems using the largest multi-criteria evaluation ever produced. We will analyze in detail the potential biodiversity benefits of different agro-ecological systems, considering the abundance, richness and evenness of diverse taxonomic and functional groups. We aim to produce large-scale affinity habitat indexes associated with changes from conventional to agro-ecological systems. These indexes could be used in integrative assessment approaches, such as life cycle assessment (LCA) or prospective and earth system models. All our results will be publicly available through open access publication and easy to access online web platform with regular updates.

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