



IMPACT: ACIDIFICATION

Data extracted in September 2020

Note to the reader: This fiche summarises the impact of organic systems on ACIDIFICATION. It is based on two peer-reviewed synthesis research papers¹, including 71 and 164 individual studies, respectively.

1. WEIGHT OF THE EVIDENCE

- **CONSISTENCY OF THE IMPACT:** One synthesis paper¹ reported a negative effect (increased acidification potential) of organic systems compared to conventional systems, while the second showed no effect (see **Table 1**). In these two synthesis papers, the effects were expressed per unit of product, and the negative effects reported for organic systems were partly due to the lower yields obtained in organic systems compared to conventional systems. The two synthesis papers included studies conducted in Europe.

The effect with the higher score is marked in bold and the cell coloured. All results are expressed per unit of product.

Table 1. Summary of impacts. The effect with the higher score is marked in bold and the cell coloured. The numbers between parenthesis indicate the number of synthesis papers¹ with a quality score of at least 50%. Details on quality criteria can be found in the next section.

Effects per unit of product (e.g., per ton)				
Impact	Positive	Negative	No effect	Uncertain
Decrease acidification	0	0	2	0

- **QUALITY OF THE SYNTHESIS PAPERS¹:** [The quality score summarises 16 criteria assessing the quality of three main aspects of the synthesis papers: 1) the literature search strategy and studies selection; 2) the statistical analysis; 3) the potential bias. Details on quality criteria can be found in this document [➤](#)]


As shown in the “Quality score” of the table in section 2, the quality level of the two studies is 62% and 69%, respectively. The least frequently satisfied quality criteria were “Individual studies weighted” and “Publication bias analysed” (not satisfied in any of two meta-analyses).

¹ Research synthesis papers include a formal meta-analysis or systematic reviews with some quantitative results.

² The effect with the higher score is marked in bold and the cell coloured. The numbers between parenthesis indicate the number of synthesis papers with a quality score of at least 50%; when there is no parenthesis, it means that all the papers have a quality score equal to or higher than 50%.

2. IMPACTS

The main characteristics and results of the two synthesis papers¹ are summarized in **Table 2**. The references are ordered according to their publication date.

Table 2. Main characteristics of the synthesis papers reporting impacts on acidification. All detailed results of each synthesis study are reported in the summary reports .

Nr	Reference	Population	Geographical scale	Intervention	Comparator	Conclusion	Quality score	Global effect
1	Clark, M; Tilman, D. 2017	Organic and conventional agricultural production systems.	Global	Organic systems	Conventional systems	Organic systems show similar acidification potential as conventional systems	62%	No effect (per unit of product)
2	Tuomisto HL; Hodge ID; Riordana P; Macdonald DW. 2012	Organic and conventional systems	Europe	Organic systems	Conventional systems	There is not a single organic or conventional farming system, but a range of different systems, and thus, the level of many environmental impacts depend more on farmers' management choices than on the general farming systems.	69%	No effect (per unit of product)

In Clark and Tilman (2017), the majority of LCA publications included are from agricultural systems in Europe, North America, and Australia and New Zealand (86% of systems are from these regions). Systems from China (2%), Japan (2%), the rest of Asia (5%), South America (4%), and Africa (.4%) are much less common. The results presented here are therefore indicative of highly industrialized systems and should be interpreted with this in mind.

3. KNOWLEDGE GAPS

The synthesis papers did not indicate relevant knowledge gaps.

4. SYSTEMATIC REVIEW SEARCH STRATEGY

Keywords	TOPIC: ("organic farm*" OR "organic agriculture" OR "organic system*" OR "organic product*") AND TOPIC: ("meta-analy*" OR "systematic* review*" OR "evidence map" OR "global synthesis" OR "evidence synthesis" OR "research synthesis")
Search dates	No time restrictions
Databases	Web of Science and Scopus, run on 20 July 2020
Selection criteria	Three main criteria led to the exclusion of a synthesis paper: (1) the paper does not deal with organic systems; (2) the paper does not assess the impacts of organic systems in comparison to another cropping system; (3) the paper is neither a meta-analysis nor a systematic review. Synthesis papers that passed the relevance criteria were subject to critical appraisal carried out on paper by paper basis. From an initial number of 122 synthesis papers, we finally selected 2 meta-analyses.

