SINGLE-IMPACT FICHE – ORGANIC SYSTEMS

IMPACT: NUTRIENT LOSS

Data extracted in September 2020

Note to the reader: This fiche summarises the impact of organic systems on NUTRIENT LOSS. It is based on 2 peer-reviewed synthesis research papers[1], including 72 and 102 studies, respectively.

1. WEIGHT OF THE EVIDENCE

- CONSISTENCY OF THE IMPACT: One synthesis paper[1] reported a reduction of nitrogen losses and of ammonia emissions, and no effect on phosphorus losses, when the results were expressed per unit of area. However, the same paper reported an increase of nitrogen losses and of ammonia emissions when the results were expressed by unit of product. The other synthesis paper reported an increase of nitrogen stock (potentially associated with a reduction of nitrogen losses), when the results were expressed per unit of product. See these effects in **Table 1**. All the synthesis papers[1] included results of experiments conducted in Europe.

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 papers[1] with a quality score of at least 50%. Details on quality criteria can be found in the next section.

	Effects per unit of area (e.g., per ha)					Effects per unit of product (e.g., per			
Impact	**Positive**	**Negative**	**No effect**	**Uncertain**		**Positive**	**Negative**	**No effect**	**Uncertain**
Decrease nutrient loss: N leaching	**2**	0	0	0		0	**1**	0	0
Decrease nutrient loss: Ammonia emission	0	0	**1**	0		0	0	**1**	0
Decrease nutrient loss: Phosphorous losses	0	0	**1**	0		0	0	0	0

- QUALITY OF THE SYNTHESIS PAPERS: [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 ranges from 44% to 69%. The least frequently satisfied quality criteria were "Individual studies weighted", "Dataset available",

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

"Confidence intervals reported", "Heterogeneity of the results analysed", and "Publication bias analysed" (never satisfied in the 2 synthesis papers).

2. IMPACTS

The main characteristics and results of the 2 synthesis papers are summarized in **Table 2**. The references are ordered chronologically with the most recent publication date first.

Table 2. Main characteristics of the synthesis papers reporting impacts on nutrients loss. 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	Kopittke, PM; Dalal RC; Finn D; Menzies NW 2016	Organic and conventional systems	Global*	Organic systems	Conventional systems	Organic systems increase soil nitrogen stock by 8%, compared to conventional systems.	44%	Per unit of area: Positive (for nitrogen stock).
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%	Per unit of field area: Positive (for nitrogen leaching), no effect (for ammonia emissions, phosphorous losses). Per unit of product: Negative (for nitrogen losses), no effect (for ammonia emissions).

* In Kopittke et al. (2016), conclusions may be biased towards North America and Asia.

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 or systematic reviews.