SINGLE-IMPACT FICHE – ORGANIC SYSTEMS

IMPACT: AMMONIA EMISSION

Data extracted in October 2021

Note to the reader: This fiche summarises the impact of organic systems on AMMONIA EMISSION. It is based on 1 peer-reviewed synthesis research paper[1], including 71 individual studies.

1. WEIGHT OF THE EVIDENCE

- CONSISTENCY OF THE IMPACT: organic systems, as compared to conventional systems, had no significant effect on AMMONIA EMISSION, for both unit of area and unit of product. No results are available specifically for livestock/mixed farming systems.

  The synthesis paper included studies conducted in Europe.

Table 1. Summary of effects. The effect with the higher score is marked in bold and the cell coloured. The numbers between parentheses indicate the number of synthesis papers with a quality score of at least 50%. Details on quality criteria can be found in the next section. Some synthesis papers reported effects for more than type of system.

Impact	Metric	Impacts per unit of agricultural land				Impacts per unit of product			
		Positive	Negative	No effect	Uncertain *	Positive	Negative	No effect	Uncertain *
Organic cropping systems									
Decrease Ammonia emission		0	0	**1 (1)**	0	0	0	**1 (1)**	0

* Number of synthesis papers that report relevant results but without statistical test comparison of the intervention and the control.

- 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" in **Table 2**, the quality of the synthesis paper retrieved was 69%. The least frequently satisfied quality criteria were: "Search string", "Number of studies of each step", "Individual effect sizes", "Individual studies weighted", "Heterogeneity of results analysed" and "Publication bias analysed".

2. IMPACTS

The main characteristics and results of the synthesis paper are summarized in **Table 2**.

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

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

Reference	Population	Geographical scale	Num. papers	Intervention	Comparator	Metric	Conclusion	Quality score
Tuomisto HL; Hodge ID; Riordana P; Macdonald DW 2012	Field studies, modelling studies and Life Cycle Assessment studies assessing the performance of organic systems in comparison to conventional systems in Europe.	Europe	71	Organic systems	Conventional systems	Ammonia emission	Median ammonia emissions for organic systems were 18% lower emissions per unit of area and 11% higher per unit of product. However, differences were not statistically significant.	69%

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") TOPIC: ((organic near/4 farm*) OR (organic near/4 agric*) OR (organic near/4 produc*) OR (organic near/3 livestock) OR (organic near/3 animal)) AND TOPIC: ("animal*" OR "livestock" OR "ruminant*" OR "small ruminant*" OR "cattle" OR "dairy cattle" OR "dairy" OR "beef cattle" OR "sheep" OR "ewe*" OR "lamb*" OR "swine" OR "pig*" OR "porcine*" OR "goat*" OR "rabbit*" OR "poultry" OR "chicken*" OR "broiler*" OR "turkey*" OR "hen*" OR "horse*" OR "mule*" OR "milk" OR "egg" OR "beef" OR "cheese" OR "meat" OR (animal near/2 protein*) OR "yogurt" OR "bacon" OR "pork") 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 for the first time in July 2020 and updated in September 2021 and October 2021.
Selection criteria	Four 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 report results on the effect of specific farming practices (e.g. organic fertilisation, green manure, alternative pest control techniques, etc.) which are part of organic systems, instead of the effect of the whole farming system; (4) the paper is neither a meta-analysis nor a systematic review including quantitative results. Synthesis papers that passed the relevance criteria were subject to critical appraisal carried out on paper-by-paper basis. From the 220 potentially relevant synthesis papers, 140 were excluded after reading the title and abstract, and 50 after reading the full text according to the above-mentioned criteria. Finally, 30 synthesis papers were selected for organic farming systems, from which 1 were relevant for this impact.