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Mondelaers, K; Aertsens, J; Van Huylenbroeck, G. 2009 A meta-analysis of the differences in environmental impacts between organic and conventional farming
BRITISH FOOD JOURNAL 111 10, 1098-1119 10.1108/00070700910992925

Background and objective

In recent years a lot of research has investigated whether the application of the organic farming principles indeed results in differences with respect to environmental pressure. This paper aims at comparing the environmental impacts of organic and conventional farming and linking these to differences in management practises. The studied environmental impacts are related to land use efficiency, organic matter content in the soil, nitrate and phosphate leaching to the water system, greenhouse gas emissions and biodiversity. Only impacts on organic matter content are reported here.

Search strategy and selection criteria

1) Peer reviewed; 2) studies dating from after 1992 (year of EEC regulation 2092/91); and 3) (semi) paired samples, this means that organic and conventional data are compared within the same study. Weighting of the references is based upon the possibility of deriving the standard error (s.e.) from the references. Hereby, three cases are distinguished: 1) the s.e. is reported in the study, hence the data point can enter the meta-analysis; 2) the s.e. is not reported, but multiple data points are available in the study, enabling the calculation of a standard deviation based upon the available data which can be entered in the meta-analysis data base; and 3) no s.e. is reported, only a single observation is available. The latter data point has not been retained for the meta-analysis, but is only used in the sign-test.

Data and analysis

The significance level of the overall effect size is computed. The statistical homogeneity of the effect sizes is calculated. The studies used in the meta-analysis are grouped according to various characteristics of the single studies, and the effect sizes between these groups of studies are statistically compared and analysed.

Number of papers	Population	Intervention	Comparator	Outcome	Quality score
9	Studies assessing the performance of organic systems in comparison to conventional systems.	Organic systems	Conventional systems	Metric: Organic matter content in soil (%); Effect size: Ratio of organic matter content (%) in organic systems to conventional systems.	50

Results

- As the 95%- confidence interval shows, organic matter content on organic plots is significantly higher than on conventional plots
- NULL
- NULL
- NULL
- NULL

Factors influencing effect sizes

- Plough depth : Increased plough depth drives to a decrease in organic matter content in conventional agriculture.
- Organic input : Lower organic input drives to a decrease in organic matter content in conventional agriculture.
- Crop residues incorporation : The lower input of stable organic matter by means of organic manure and soil improvers and the decrease of the practice incorporating crop residues during ploughing drive to a decrease in organic matter content in conventional agriculture.
- Land use type : The increase of conversion of grassland into arable land drives to a decrease in organic matter content in conventional agriculture.

Conclusion

Organic matter content in organic plots is significantly higher than in conventional plots.