

SINGLE-IMPACT FICHE

INTERCROPPING

IMPACT: SOIL EROSION

Data extracted in May 2021

Note to the reader: This fiche summarises the impact of intercropping on SOIL EROSION. It is based on 2 peer-reviewed synthesis research papers¹, including 121 and 180 individual studies.

1. WEIGHT OF THE EVIDENCE

- CONSISTENCY OF THE IMPACT:

Intercropping of multiple crop species (i.e., crop mixture cropping), as compared to monoculture, led to an overall positive effect on soil erosion (i.e., reduced sediment generation and soil loss, increased water infiltration). However, the two synthesis papers reported contrasting effects of intercropping on water runoff (i.e., one positive effect and one no-effect; see **Table 1**).

Among the 2 reviewed synthesis papers, 0 include data collected in Europe (see **Table 2**).

Table 1. Summary of effects. The numbers between parenthesis 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.

Impact	Intervention	All studies				Only studies including EU			
		Positive	Negative	No effect	Uncertain	Positive	Negative	No effect	Uncertain
Reduce Soil erosion	Crop mixture	2 (2)	0	1 (1)	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 the methodology section of this WIKI.*

2. IMPACTS

The main characteristics and results of the synthesis papers are summarized in **Table 2**. Summaries of the meta-analyses provide fuller information about the results reported in each synthesis paper, in particular about the modulation of effects by factors related to soil, climate and management practices.

Table 2. Main characteristics of the synthesis papers reporting impacts of intercropping on soil erosion.

Reference	Population	Geographical scale	Num. papers	Intervention	Comparator	Metric	Conclusion	Quality score
Daryanto, S; Fu, BJ; Zhao, WW; Wang, S; Jacinthe, PA;	Grain legumes and	Africa	180	Grain legume and cereal	Monoculture	Sediment generation, water runoff, water	Intercropping can	62%

¹ Research synthesis papers include a formal meta-analysis or systematic reviews with some quantitative results. Details can be found in the methodology section of the WIKI.

Reference	Population	Geographical scale	Num. papers	Intervention	Comparator	Metric	Conclusion	Quality score
Wang, LX 2020	cereals			intercropping		infiltration	reduce soil erosion.	
Xiong, M.; Sun, R.; Chen, L. 2018	Multiple crops	China	121	Strip cropping	Monoculture	Annual soil loss and runoff	Strip cropping can reduce soil loss but it doesn't influence water runoff.	69%

3. KNOWLEDGE GAPS

Authors of this synthesis	Lack of studies in Europe.
Daryanto et al., 2020	Studies that focus on indigenous African grain legumes or cereals should be encouraged because, with the exception of cowpea and teff, most past studies have focused on non-native species.
Xiong et al., 2018	Future studies should focus more on identifying the factors controlling the efficiency of each soil conservation techniques (SCTs) and provide details for key factors, such as soil type and properties, vegetation cover and rainfall intensity; the effectiveness of SCTs over longer time periods should be assessed; and the differences between the effectiveness of reducing runoff and reducing soil loss and the influencing factors should be considered.