

## IMPACT: SOIL WATER RETENTION

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**Note to the reader:** This fiche summarises the effects of Landscape features on SOIL WATER RETENTION. It is based on 2 synthesis papers<sup>1</sup>, including 84 and 300 primary studies.

### 1. WEIGHT OF THE EVIDENCE

#### CONSISTENCY OF THE IMPACT

The overall effect of landscape features, in particular terraces, on water retention is positive.

The table below shows the number of synthesis papers with statistical tests reporting i) a significant difference between the Intervention and the Comparator, that is to say, a significant statistical effect, which can be positive or negative; or ii) a non-statistically significant difference between the Intervention and the Comparator. In addition, we include, if any, the number of synthesis papers reporting relevant results but without statistical test of the effects. Details on the quality assessment of the synthesis papers can be found in the methodology section of this WIKI.

- Terraces have a significant positive effect on soil water retention (i.e. increase of soil water retention) compared to cropland without terraces, according to 1 synthesis paper. Another synthesis paper reported relevant results, but this evidence is not statistically tested.

Out of the 2 selected synthesis papers, one included studies conducted in Europe (see **Table 2**).

**Table 1:** Summary of effects. Number of synthesis papers reporting positive, negative or non-statistically significant effects on environmental and climate impacts. The number of synthesis papers reporting relevant results but without statistical test of the effects are also provided. When not all the synthesis papers reporting an effect are of high quality, the number of synthesis papers with a quality score of at least 50% is indicated in parentheses. The reference numbers of the synthesis papers reporting each of the effects are provided in **Table 3**.

Impact	Metric	Intervention	Comparator	Statistically tested			Non-statistically tested
				Significantly positive	Significantly negative	Non-significant	
Increase soil water retention	Water retention	Terraces	No terraces	1	0	0	1 (0)

#### QUALITY OF THE SYNTHESIS PAPERS

The quality of each synthesis paper was assessed based on 16 criteria regarding three main aspects: 1) the literature search strategy and primary studies selection; 2) the statistical analysis conducted; and 3) the evaluation of potential bias. We assessed whether authors addressed and reported these criteria. Then, a quality score was calculated as the percentage of these 16 criteria properly addressed and reported in each synthesis paper. Details on quality criteria can be found in the methodology section of this WIKI.

### 2. IMPACTS

The main characteristics and results of the 2 synthesis papers are reported in **Table 2** with the terminology used in those papers, while **Table 3** shows the reference numbers of the synthesis papers reporting for each of the results shown in **Table 1**. Comprehensive 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, are provided in the **summaries of the synthesis papers** available in this WIKI.

**Table 2:** Main characteristics of the synthesis papers reporting effects on soil water retention. The references are ordered chronologically with the most recent publication date first.

Reference number	Population	Scale	Num. papers	Intervention	Comparator	Metric	Conclusion	Quality score
Ref7	Croplands in China	China	84	Terraces	Slopes without terraces	Soil moisture	The results indicated that terracing has improved soil moisture content in China. The responses of soil moisture to terracing vary from different terracing land uses.	62%
Ref22	Human-made terraces world wide (including crops of rice, grain, coffee, potato, viticulture or ancient cultivation)	Global	300	Terraces	No terraces	Soil water recharge	This global synthesis suggested that diverse terracing practices played a positive role in ecosystem services provisions, particularly soil water recharge. Reviewers' note: We labelled the results as uncertain due to the lack of statistical testing.	44%

<sup>1</sup> Synthesis research papers include either meta-analysis or systematic reviews with quantitative results. Details can be found in the methodology section of the WIKI.

**Table 3:** Reference numbers of the synthesis papers reporting for each of the results shown in **Table 1**.

Impact	Metric	Intervention	Comparator	Statistically tested			Non-statistically tested
				Significantly positive	Significantly negative	Non-significant	
Increase soil water retention	Water retention	Terraces	No terraces	Ref7			Ref22

### 3. FACTORS INFLUENCING THE EFFECTS ON SOIL WATER RETENTION

**Table 4:** List of factors reported to significantly affect the size and/or direction of the effects on soil water retention, according to the synthesis papers reviewed.

Factor	Reference number
Land use	Ref7

### 4. KNOWLEDGE GAPS

**Table 5:** Knowledge gap(s) reported by the authors of the synthesis papers included in this review.

Ref Num	Gap
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### 5. SYNTHESIS PAPERS INCLUDED IN THE REVIEW

**Table 6:** List of synthesis papers included in this review. More details can be found in the summaries of the meta-analyses.

Ref Num	Author(s)	Year	Title	Journal	DOI
Ref7	Chen, D; Wei, W; Chen, L	2020	How can terracing impact on soil moisture variation in China? A meta-analysis	AGRICULTURAL WATER MANAGEMENT, 227, 105849.	10.1016/j.agwat.2019.105849
Ref22	Wei, W; Chen, D; Wang, LX; Daryanto, S; Chen, LD; Yu, Y; Lu, YL; Sun, G; Feng, TJ	2016	Global synthesis of the classifications, distributions, benefits and issues of terracing	EARTH-SCIENCE REVIEWS, 159, 388-403.	10.1016/j.earscirev.2016.06.010

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**Disclaimer:** These fiches present a large amount of scientific knowledge synthesised to assess farming practices impacts on the environment, climate and productivity. The European Commission maintains this WIKI to enhance public access to information about its initiatives. Our goal is to keep this information timely and accurate. If errors are brought to our attention, we will try to correct them. However, the Commission accepts no responsibility or liability whatsoever with regard to the information on these fiches and WIKI.

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