

SINGLE-IMPACT FICHE

LANDSCAPE FEATURES



IMPACT: WATER RETENTION

Data extracted in October 2021

Note to the reader: This fiche summarises the impact of landscape features (terraces¹) on WATER RETENTION. It is based on 2 peer-reviewed synthesis research papers², including 84 and 300 individual studies.

1. WEIGHT OF THE EVIDENCE

- CONSISTENCY OF THE IMPACT:
 - Terraces have a positive effect on water retention (i.e. increase of water retention) compared to cropland without terraces, according to 1 of the synthesis papers reviewed (see **Table 1**). Another synthesis paper reported relevant results, but without statistical test of the effects and it is labelled as uncertain. Details are provided below in Table 2 and in the summary reports.

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

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.

Impact	Intervention	Positive	Negative	No effect	Uncertain*
Increase water retention	Terraces	1 (1)	0	0	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 level was 44% and 62%. None of the studies reported any of the following criteria: "List of studies", "Number of studies at each step", "Individual studies sizes", "Dataset available", "Publication bias analysed".

2. IMPACTS

The main characteristics and results of the synthesis papers are summarised in **Table 2**. Detailed results of each synthesis study are reported in the summary reports [→](#).

¹ Described in the General Fiche.

² Research synthesis papers include a formal meta-analysis or systematic reviews with some quantitative results [→](#).

Table 2. Main characteristics of the synthesis papers reporting impacts of landscape features on water retention. The references are ordered chronologically with the most recent publication date first.

Reference	Population	Scale	Num. papers	Intervention	Comparator	Metric	Conclusion	Quality score
Chen, D; Wei, W; Chen, LD 2020	Cropland 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%
Wei, W; Chen, D; Wang, LX; Daryanto, S; Chen, LD; Yu, Y; Lu, YL; Sun, G; Feng, TJ 2016	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. <i>Reviewers' note: We labelled the results as uncertain due to the lack of statistical testing.</i>	44%

3. KNOWLEDGE GAPS

The synthesis papers did not indicate relevant knowledge gaps.

4. SYSTEMATIC REVIEW SEARCH STRATEGY

Keywords	<p>Different searches were conducted with the following search strings:</p> <p>1) TS= ("terrac*" OR "contour bund*" OR "level bench*" OR "level ditch*" OR "fish-scale pit*" OR "dry-stone wall*" OR "dry stone wall*" OR "stone wall*" OR "earth wall*" OR "dry wall*" OR "dry-wall*" OR "rubble wall*") AND TS= ("meta-analy*" OR "systematic* review*" OR "evidence map" OR "global synthesis" OR "evidence synthesis" OR "research synthesis") AND TS= (agric* OR cultiv* OR crop* OR farm*)</p> <p>or</p> <p>TITLE-ABS-KEY: ("terrac*" OR "contour bund*" OR "level bench*" OR "level ditch*" OR "fish-scale pit*" OR "dry-stone wall*" OR "dry stone wall*" OR "stone wall*" OR "earth wall*" OR "dry wall*" OR "dry-wall*" OR "rubble wall*") AND TITLE-ABS-KEY: ("meta-analy*" OR "systematic* review*" OR "evidence map" OR "global synthesis" OR "evidence synthesis" OR "research synthesis") AND TITLE-ABS-KEY: (agric* OR cultiv* OR crop* OR farm*)</p> <p>2) TS= ("ditch*" OR "earth bund*" OR "open-channel" OR "intermittent W/4 stream" OR "small W/4 stream") AND TS= ("meta-analy*" OR "systematic* review*" OR "evidence map" OR "global synthesis" OR "evidence synthesis" OR "research synthesis") AND TS= ("agric*" OR "cultiv*" OR "crop*" OR "farm*")</p>
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or

TITLE-ABS-KEY: ("ditch*" OR "earthbund*" OR "open-channel" OR "intermittent near/4 stream" OR "small near/4 stream") AND TITLE-ABS-KEY: ("meta-analy*" OR "systematic* review*" OR "evidence map" OR "global synthesis" OR "evidence synthesis" OR "research synthesis") AND TITLE-ABS-KEY: ("agric*" OR "cultiv*" OR "crop*" OR "farm*")

3) TS= ("pond*" OR "soda pan*" OR "reedbed*" OR "small W/4 lake*" OR "small W/4 wetland*") AND TS= ("meta-analy*" OR "systematic* review*" OR "evidence map" OR "global synthesis" OR "evidence synthesis" OR "research synthesis") AND TS= ("agric*" OR "cultiv*" OR "crop*" OR "farm*")

or

TITLE-ABS-KEY: ("pond*" OR "soda pan*" OR "reedbed*" OR "small near/4 lake*" OR "small near/4 wetland*") AND TITLE-ABS-KEY: ("meta-analy*" OR "systematic* review*" OR "evidence map" OR "global synthesis" OR "evidence synthesis" OR "research synthesis") AND TITLE-ABS-KEY: ("agric*" OR "cultiv*" OR "crop*" OR "farm*")

4) TS= (("strip*" OR "margin*" OR "hedge*" OR "edge*" OR "border*" OR "band*" OR "line*" OR "verge*" OR "row*") near/3 ("flower*" OR "vegetat*" OR "tree*" OR "shrub*" OR "plant*" OR "grass*" OR "filter*" OR "buffer*" OR "wooded" OR "riparian" OR "field*" OR "wildlife" OR "seminatural" OR "semi-natural" OR "semi natural")) AND TS= ("meta-analy*" OR "systematic* review*" OR "evidence map" OR "global synthesis" OR "evidence synthesis" OR "research synthesis") AND TS= ("agric*" OR "cultiv*" OR "crop*" OR "farm*")

merged with

TS= ("marginstrip*" OR "windbreak*" OR "shelterbelt*" OR "hedgerow*" OR "road verge*" OR "riparian buffer*" OR "riparian vegetation" OR "riparian woodland*" OR "buffer zone*" OR "riparian zone*" "vegetated filter strip*") AND TS= ("meta-analy*" OR "systematic* review*" OR "evidence map" OR "global synthesis" OR "evidence synthesis" OR "research synthesis") AND TS= ("agric*" OR "cultiv*" OR "crop*" OR "farm*")

or

TITLE-ABS-KEY: (("strip*" OR "margin*" OR "hedge*" OR "edge*" OR "border*" OR "band*" OR "line*" OR "verge*" OR "row*") W/3 ("flower*" OR "vegetat*" OR "tree*" OR "shrub*" OR "plant*" OR "grass*" OR "filter*" OR "buffer*" OR "wooded" OR "riparian" OR "field*" OR "wildlife" OR "seminatural" OR "semi-natural" OR "semi natural")) AND TITLE-ABS-KEY: ("meta-analy*" OR "systematic* review*" OR "evidence map" OR "global synthesis" OR "evidence synthesis" OR "research synthesis") AND TITLE-ABS-KEY: ("agric*" OR "cultiv*" OR "crop*" OR "farm*")

merged with

TITLE-ABS-KEY: ("marginstrip*" OR "windbreak*" OR "shelterbelt*" OR "hedgerow*" OR "road verge*" OR "riparian buffer*" OR "riparian vegetation" OR "riparian woodland*" OR "buffer zone*" OR "riparian zone*" "vegetated filter strip*") AND TITLE-ABS-KEY: ("meta-analy*" OR

"systematic* review*" OR "evidence map" OR "global synthesis" OR "evidence synthesis" OR "research synthesis") AND TITLE-ABS-KEY: ("agric*" OR "cultiv*" OR "crop*" OR "farm*")

5) TS=(("patch*" OR "islet*" OR "island*" OR "remnant*" OR "group*" OR "copse*" OR "coppice*") near/3 ("flower*" OR "vegetat*" OR "tree*" OR "shrub*" OR "grass*" OR "forest*" OR "wooded" OR "field*" OR "wildlife" OR "seminatural" OR "semi-natural" OR "semi natural")) AND TS=("meta-analy*" OR "systematic* review*" OR "evidence map" OR "global synthesis" OR "evidence synthesis" OR "research synthesis") AND TS= ("agric*" OR "cultiv*" OR "crop*" OR "farm*")

merged with

TS=("woodland creation*" OR "mid-field islet*" OR "environmental island*" OR "refuge*" OR "scattered tree*" OR "shading tree*") AND TS=("meta-analy*" OR "systematic* review*" OR "evidence map" OR "global synthesis" OR "evidence synthesis" OR "research synthesis") AND TS= ("agric*" OR "cultiv*" OR "crop*" OR "farm*")

or

TITLE-ABS-KEY: (("patch*" OR "islet*" OR "island*" OR "remnant*" OR "group*" OR "copse*" OR "coppice*") W/3 ("flower*" OR "vegetat*" OR "tree*" OR "shrub*" OR "grass*" OR "forest*" OR "wooded" OR "field*" OR "wildlife" OR "seminatural" OR "semi-natural" OR "semi natural")) AND TITLE-ABS-KEY: ("meta-analy*" OR "systematic* review*" OR "evidence map" OR "global synthesis" OR "evidence synthesis" OR "research synthesis") AND TITLE-ABS-KEY: ("agric*" OR "cultiv*" OR "crop*" OR "farm*")

merged with

TITLE-ABS-KEY: ("woodland creation*" OR "mid-field islet*" OR "environmental island*" OR "refuge*" OR "scattered tree*" OR "shading tree*") AND TITLE-ABS-KEY: ("meta-analy*" OR "systematic* review*" OR "evidence map" OR "global synthesis" OR "evidence synthesis" OR "research synthesis") AND TITLE-ABS-KEY: ("agric*" OR "cultiv*" OR "crop*" OR "farm*")

6) TS= ("landscape feature*" OR "landscape characteristic*" OR "green infrastructure*" OR "landscape connectivity" OR "landscape diversity" OR "landscape element*" OR "landscape fragment*" OR "landscape mosaic*" OR "landscape structure*" OR "nature-based feature*" OR "linear feature*") AND TS= ("meta-analy*" OR "systematic* review*" OR "evidence map" OR "global synthesis" OR "evidence synthesis" OR "research synthesis") AND TS= ("agric*" OR "cultiv*" OR "crop*" OR "farm*")

or

TITLE-ABS-KEY: ("landscape feature*" OR "landscape characteristic*" OR "green infrastructure*" OR "landscape connectivity" OR "landscape diversity" OR "landscape element*" OR "landscape fragment*" OR "landscape mosaic*" OR "landscape structure*" OR "nature-based feature*" OR "linear feature*") AND TITLE-ABS-KEY: ("meta-analy*" OR "systematic* review*" OR "evidence map" OR "global synthesis" OR "evidence synthesis" OR "research synthesis") AND TITLE-ABS-KEY: ("agric*" OR "cultiv*" OR "crop*" OR "farm*")

Search dates	No time restrictions
Databases	Web of Science and Scopus, run in October 2021
Selection criteria	<p>The main criteria that led to the exclusion of a synthesis paper were when the paper: 1) does not deal with any landscape feature; 2) does not synthesise pairwise comparisons on the effect of landscape features; 3) does not include results for cropland or grassland; 4) deals with agroforestry; 5) is either a non-systematic review, a non-quantitative systematic review, or a meta-regression without mean effect sizes; 6) is not written in English. Synthesis papers that passed the relevance criteria were subject to critical appraisal carried out on a paper-by-paper basis.</p> <p>The search returned 244 synthesis papers potentially relevant for the practice object of our fiche. From the 244 potentially relevant synthesis papers, 136 were excluded after reading the title and abstract, and 74 after reading the full text according to the above-mentioned criteria. Finally, 34 synthesis papers were selected for landscape features, from which 2 were relevant for this impact.</p>