The protocol:

an essentiel, yet under-recognised, element of systematic reviews

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Why is it important to develop a Protocol ?

"Accurate, unbiased and concise synthesis of available evidence following clear methodology and transparent reporting is necessary to support effective environmental policy and management decisions" (Pullin et al. 2022).

Why is it important to develop a Protocol ?

Traditional approaches to reviewing literature may be susceptible to bias and result in incorrect decisions.

Despite the increasing popularity of systematic reviews in the environmental field, evidence synthesis methods continue to be poorly applied in practice.

Scientific principles:

A protocol :

- ✓ aims at objectifying conclusions (minimizing bias)
- ✓ …to favour objectivity:
  - Replicability
  - Transparency, archiving
  - Consideration of biases (internal, external)
- ✓ provides a framework to achieve the above.
- ✓ outlines a systematic approach

Maximizing reliability = published protocol + review (both peer-reviewed).

Why is it important to develop a Protocol ?

COMMENTARY Open Access

Standards of conduct and reporting in evidence syntheses that could inform environmental policy and management decisions

Andrew S. Pullin[1,11*], Samantha H. Cheng[2], Josephine D'Urban Jackson[3], Jacqualyn Eales[4], Ida Envall[5], Salamatu J. Fada[6,7], Geoff K. Frampton[8], Meagan Harper[9], Andrew N. Kadykalo[9], Christian Kohl[10], Ko Konno[11], Barbara Livoreil[12], Dakis-Yaoba Ouédraogo[13], Bethan C. O'Leary[14,15], George Pullin[16], Nicola Randall[17], Rebecca Rees[18], Adrienne Smith[19], Romain Sordello[20], Eleanor J. Sterling[21], Will M. Twardek[22] and Paul Woodcock[23]

From: Pullin et al. 2022
https://doi.org/10.1186/s13750-022-00269-9

Table 1 Glossary of terms describing key characteristics of evidence synthesis conduct and reporting

Reliability	The extent to which an evidence synthesis can be trusted as an estimate of the truth
Replicability	The extent to which the conduct of an evidence synthesis is reported so that it could be replicated by a third party
Transparency	The extent to which the evidence synthesis methods, analyses, data, and limitations are reported openly
Potential for bias	The likelihood that the conduct of an evidence synthesis might provide misleading results or findings

Why is it important to develop a Protocol ?

- A review protocol provides a step-by-step guide for conducting Evidence reviews.
- It is important for the review team to develop an *a priori* protocol before starting the literature review so that the process is **clear** and **consistent**.
- The protocol should contain specific guidelines to identify and screen relevant articles, and outline the methods for the entire process.
- The protocol can help the review team or other researchers to replicate the work:
  - **updating** the literature review when new research becomes available.

Guidelines and Standards for Evidence Synthesis in Environmental Management

Collaboration for Environmental Evidence

Section 4

Writing and registering a Protocol

https://environmentalevidence.org/information-for-authors/4-writing-and-registering-a-protocol/

Reliability and replicability of evidence reviews

- O'Leary et al. 2016

92 environmental reviews were judged to be poorly conducted and reported (a median score of **2.5 out of a possible 39** using the Collaboration for Environmental Evidence Synthesis Appraisal Tool (CEESAT)

Contents lists available at ScienceDirect

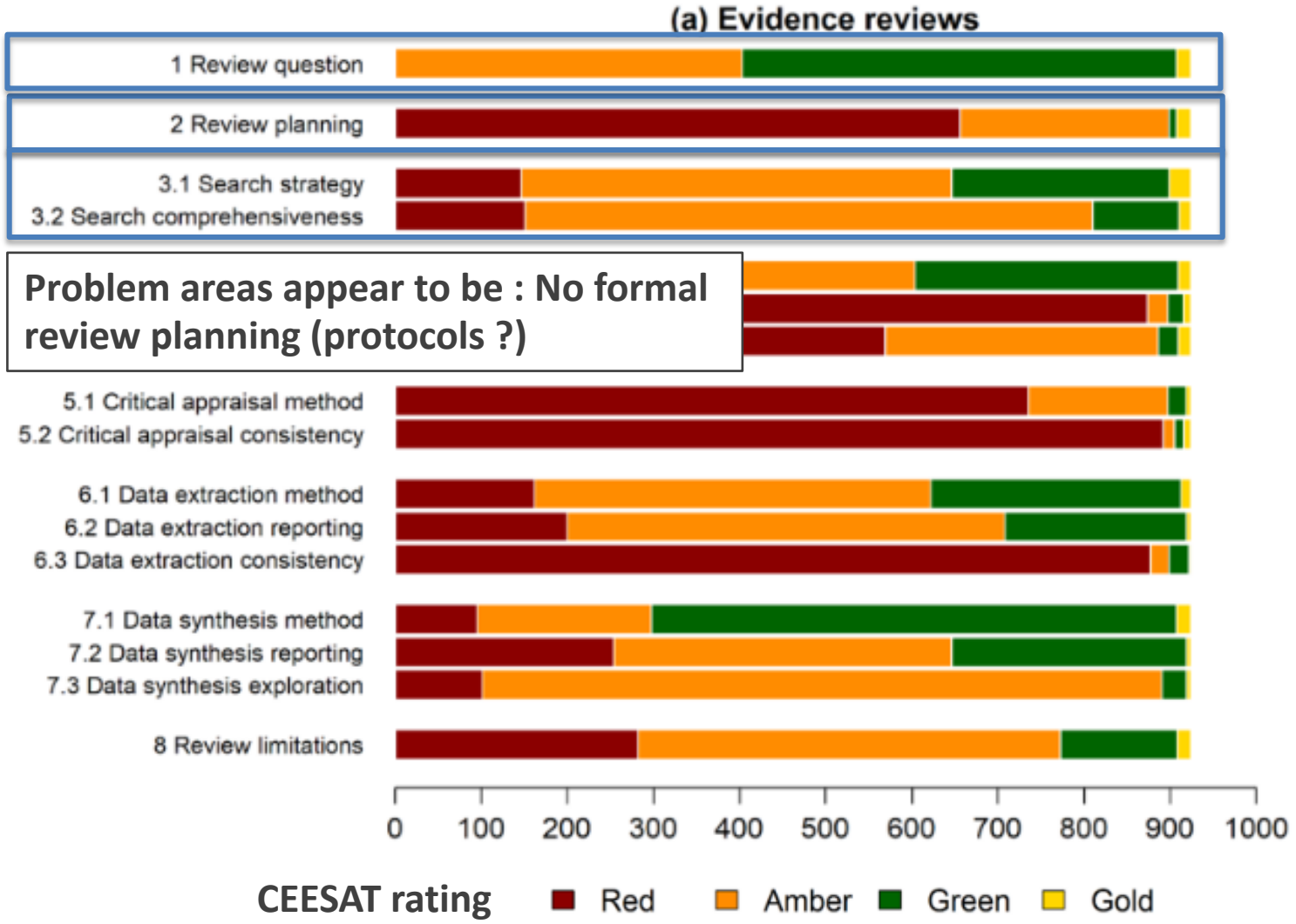
Environmental Science & Policy

journal homepage: www.elsevier.com/locate/envsci

The reliability of evidence review methodology in environmental science and conservation

Bethan C. O'Leary[a,*], Kristian Kvist[a], Helen R. Bayliss[a], Géraldine Derroire[b], John R. Healey[b], Kathryn Hughes[c], Fritz Kleinschroth[b], Marija Sciberras[c], Paul Woodcock[d], Andrew S. Pullin[a]

Reliability and replicability of evidence reviews



(Pullin et al. 2022).

Problems without a protocol

- **Mission creep :**

  Occurs when the review deviates from the initial objectives.

- *Key definitions, search strategies and inclusion or appraisal criteria may alter over time or differ between reviewers*.

- The resulting set of articles will then **not be representative** of the relevant evidence base and **important studies may have been omitted**. As a result, the review may be highly inaccurate and misleading, and will be unrepeatable.

Haddaway et al. 2020. https://doi.org/10.1038/s41559-020-01295-x

Problems without a protocol

- **Mission creep :**

  Occurs when the review deviates from the initial objectives.

Mitigation strategies:

- ✓ Outline planned methods for searching, screening, data extraction, critical appraisal and synthesis **in detail**.
- ✓ Ideally be peer-reviewed, benefit from feed-back; avoid errors.

Where to publish ?

- *Environmental Evidence*, *Ecological Solutions and Evidence* and *Conservation Biology* now accept registered reports/protocols.
- Preprint servers such as Open Science Framework Preprints (https://osf.io/preprints)

Problems without a protocol

- **Lack of transparency/replicability :**

  An ability to repeat a review's methods exactly ('replicability').

- Methods used to produce reviews should be reported transparently in sufficient detail to allow the review to replicated or verified.
- If the reader can't understand either i) *how studies were identified, selected and synthesized* ii) nor *which were excluded*, then the risk of bias cannot be assessed, and **unclear subjective decisions may affect reliability** (Haddaway et al. 2020).

- **Can unreplicable reviews be truly trusted ?**

Haddaway et al. 2020. https://doi.org/10.1038/s41559-020-01295-x

Problems without a protocol

- **Lack of transparency/replicability :**

  An ability to repeat a review's methods exactly ('replicability').

Mitigation strategies:

- ✓ Make use of high-standard evidence syntheses and guidance.
- ✓ Attempt to conform to **internationally accepted review reporting standards**.

What guidance ?

- *Preferred Reporting Items for Systematic Reviews and Meta-Analyses* (PRISMA) https://www.prisma-statement.org/
- RepOrting standards for Systematic Evidence Syntheses (ROSES) https://www.roses-reporting.com/

Help for planning

- Campbell Systematic Reviews: Policies and Guidelines (Campbell Collaboration, 2014).
- Higgins, J. P. et al. Cochrane Handbook for Systematic Reviews of Interventions (John Wiley & Sons, 2019).
- Shea, B. J. et al. AMSTAR 2: a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both. BMJ 358, j4008 (2017).
- Freeonline methods training : https://synthesistraining.github.io/

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Section 3

Planning a CEE Evidence Synthesis

https://environmentalevidence.org/information-for-authors/3-planning-a-cee-evidence-synthesis/

How to develop a review Protocol ?

1. Background/Purpose

2. Objectives/Review Question

3. Methods
   a. Selection Criteria
   b. Search Strategy
   c. Data Collection
   d. Displaying Data
   e. Analysis and Synthesis

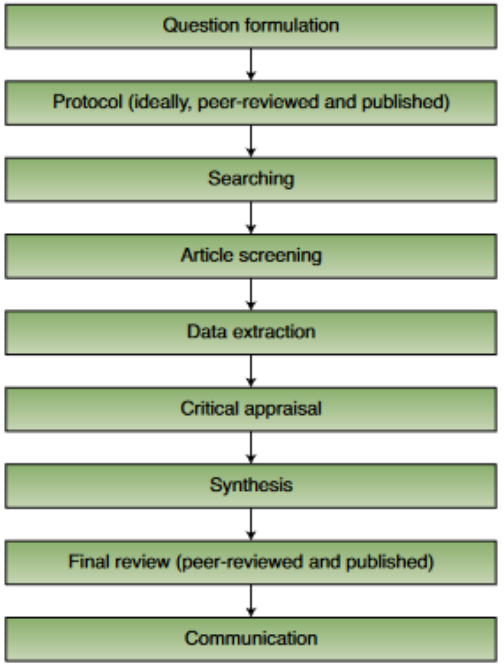

Fig. 1 | Schematic showing the main stages necessary for the conduct of a systematic review as defined by the Collaboration for Environmental Evidence. See www.environmentalevidence.org.

Preparing your Protocol manuscript - CEE

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Section 4

Writing and registering a Protocol

https://environmentalevidence.org/information-for-authors/4-writing-and-registering-a-protocol/

Title page

Abstract

Keywords

Background → background to the review

Objective of the Review → the primary question and secondary questions, the primary question components

Methods:

Searching for articles → Languages, Search strings, comprehensiveness of the search, Publication Databases to be searched

Article screening and study eligibility criteria → Screening methodology, Test(s) for consistency, Eligibility criteria

Study validity assessment → Critically appraise and assess validity

Data coding and extraction strategy → how to collect and record qualitative and/or quantitative

Potential effect modifiers/reasons for heterogeneity → a list of those effect modifiers to be coded

14 Data synthesis and presentation → Description of manipulation of the dataset (e.g. sub-group analysis)

PROCEED – « fast-track » the protocol

A global registration system for titles and protocols of environmental evidence reviews and syntheses

Collaboration for Environmental Evidence

What is PROCEED?

PROCEED is a global database of prospectively registered evidence reviews and syntheses in the environmental sector. It provides an open access resource of titles and protocols of environmental evidence reviews/syntheses. Authors can register and upload their titles and protocols using appropriate templates. The database is open-access and free to all.

Go to PROCEED

JKI Julius Kühn-Institut

https://www.proceedevidence.info/

PROCEED – « fast-track » the protocol

What is PROCEED?

- PROCEED provides an open-access resource of protocols and their titles that authors register using appropriate templates.

Why is PROCEED needed?

- A system for registration of protocols of evidence reviews or syntheses is widely regarded as important to avoid duplication of effort and to reduce risk of bias in their conduct and findings

PROCEED

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PROCEED
WWW.PROCEEDEVIDENCE.INFO

Systematic review

Systematic Review Protocol

Title
What is the influence on socio-economic well-being of UNESCO biosphere reserves in Southeast Asia? A systematic review protocol

Citation:
Phuong Thao Nguyen, Duong Minh Lam, Jacqualyn Eales. What is the influence on socio-econom well-being of UNESCO biosphere reserves in Southeast Asia? A systematic review protocol: a Systematic Review Protocol. PROCEED-22-00029 Available from:
https://www.proceedevidence.info/protocol/view-result?id=29
https://doi.org/10.57808/proceed.2022.5

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Keywords
UNESCO biosphere reserves, conservation, Southeast Asia, human well-being, socio-economics

Background
This PROCEED submission follows the open access a-priori availability of the protocol at Zenodo prior to commencing this review, on 27th October 2020. DOI: 10.5281/zenodo.4136658 The conc of Biosphere Reserves was introduced in 1975 (Jaisankar, Velmurugan, & Sivaperuman, 2018) b UNESCO in response to the need for conservation of biodiversity along with its sustainable use. Biosphere reserves comprise terrestrial, marine and coastal ecosystems for the purpose of preserving genetic diversity in representative ecosystems by protecting wild animals, the traditi

Systematic map

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PROCEED
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Systematic Map Protocol

Title
What evidence exists on the potential of Technosols constructed from mineral wastes to host biodiversity?

Citation:
Dakis-Yaoba Ouédraogo, Romain Sordello, Yorick Reyjol, Thomas Lerch. What evidence exists on the potential of Technosols constructed from mineral wastes to host biodiversity?: a Systematic Map Protocol. PROCEED-22-00018 Available from:
https://www.proceedevidence.info/protocol/view-result?id=18
https://doi.org/10.57808/proceed.2022.3

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Keywords
Anthroposol; Anthrosol; Circular economy; Constructed Technosol; Ecological engineering; Excavated materials; Urban construction wastes

Background
In 2018, an estimated 55.3 per cent of the world's population lived in urban settlements. By 2030, urban areas are projected to house 60 % of people globally and one in every three people will live in cities with at least half a million inhabitants [1]. The development of cities and transport infrastructures will produce a large volume of excavated materials. For instance, in France, the construction of the Grand Paris Express transport infrastructure will generate 45 million tonnes of these materials. The management of excavated materials, considered as wastes, has a substantial economic and environmental cost (e.g. greenhouse gas emissions), as they are most often stored in