

Knowledge Synthesis Methods

7. Systematic map¹

Summary of method

Structured, step-wise methodology following an *a priori* protocol to comprehensively collate and describe existing research evidence (traditional academic and grey literature).

Systematic reviews should be conducted according to the rigorous standards demanded by review coordinating bodies such as the Collaboration for Environmental Evidence² and the Social Care Institute for Excellence SCIE³ (see references below).

Reporting requirements include: protocol of methods, fates of all articles screened at full text, transparent documenting of all methods used.

Key references

James, K.L., Randall, N.P., Haddaway, N.R. (2016). *A methodology for systematic mapping in environmental sciences*. Environmental Evidence 5, 7.

SCIE systematic mapping guidance www.scie.org.uk/publications/researchresources/rr03.asp

Examples of application

A systematic map on the impacts of agricultural management on soil organic carbon in boreo-temperate regions (Haddaway *et al.* 2015) has been used by government agency in Sweden (Swedish Board of Agriculture, Jordbruksverket) to generate funding for extension work, including a meta-analysis of the impacts on yield.

Haddaway, N.R., Hedlund, K., Jackson, L.E., Kätterer, T., Lugato, E., Thomsen, I.K., Jørgensen, H.B. and Söderström, B., (2015). *What are the effects of agricultural management on soil organic carbon in boreo-temperate systems?* Environmental Evidence, 4(1), p.1.

¹ A guidance note from Dicks LV, Haddaway N, Hernández-Morcillo M, Mattsson B, Randall N, Failler P, Ferretti J, Livoreil B, Saarikoski H, Santamaria L, Rodela R, Velizarova E, and Wittmer H. (2017). *Knowledge synthesis for environmental decisions: an evaluation of existing methods, and guidance for their selection, use and development – a report from the EKLIPSE project.*

² www.environmentalevidence.org

³ www.scie.org.uk

Systematic map

Cost	Staff (3-24 months FTE), subscriptions (database access, article access), software (reference/specialist review management), travel and subsistence, expert (informatician, visualization/database specialist)
Time required	6 months - 4 years Affected by: quantity of literature, availability of staff, response time
Repeatability	High (if conducted and recorded, and archived properly)
Transparency	High (if conducted well, i.e. endorsing organisations)
Risk of bias	Low (if conducted well), acknowledges risk of bias transparently in evidence base and review method
Scale (or level of detail)	Independent of scale
Capacity for participation	Potential consultation throughout
Data demand	High (no reanalysis of existing data)
Types of knowledge	Scientific/technical, explicit
Types of output	Written report plus other communication materials (e.g. policy brief), searchable database of existing evidence, interactive geographical information system (GIS) possible, identification of knowledge gap/knowledge cluster
Specific expertise required	Training, systematic reviewer/informatician, topic expert, visualisation/database specialist

Strengths	Weaknesses
Any type of documented information can be included	High time/resource (staff and expertise/training/access to research papers) requirement
Very comprehensive - likelihood of missing information is low	Report typically written only in English
Protocol externally peer-reviewed and published, increasing transparency and registering intent to conduct the review	Systematic maps with large evidence bases may become out-of-date relatively quickly and require updating before full systematic reviews can be undertaken, although this is a relatively rapid task
Conduct and reporting can be supported by coordinating bodies that provide assistance and specialized peer-review	Difficult to interpret main report without additional forms of communication (e.g. factsheets), although these are usually done
Updating is relatively quick if methods have been reported well	
'Upgrading' systematic to full systematic review on sub topics with sufficient studies is relatively rapid because much of the work has already been done	
Coordinating bodies exist that can act as additional endorsement	
Fully systematic, transparent method with full documentation allowing verification and repeatability	
Low risk of bias	
Open access	
Highly resistant to criticism	
Usually peer-reviewed	
Interactive and searchable resources (database/GIS/visualizations)	
Includes stakeholder engagement	
Suitable for broad topic areas	

