

## Cost-effective mechanisms for New Zealand to make best use of global scientific evidence

A paradigm shift in how New Zealand uses evidence to inform management and policy decisions is required to facilitate a step change in sustainability outcomes. Without such a shift, evidence complacency (i.e. available evidence not sought or used to make decisions, or lack of testing for impacts of agricultural practices) will often result in poor practice and inefficiencies.<sup>a</sup> For example, a retrospective evidence evaluation of greening measures in the European Union's Common Agricultural Policy found only 20% of selected management actions are expected to deliver consistent biodiversity benefits.<sup>b</sup> Yet these actions are still being recommended by public agencies and experts.

We outline mechanisms for using evidence synthesis to address two key challenges:

- Researchers often assume that if they produce evidence, decision makers will find and apply it. However, several behavioural and practical barriers can limit use of published evidence (Box 1).
- Practitioners and policymakers who want to access scientific evidence face the challenge of deriving it from an overwhelmingly large and complex body of available literature.

### Synthesis of evidence

Distilling the available knowledge in a way that helps decision-makers to find practical solutions to their problem efficiently<sup>c</sup> is the first critical step to overcoming evidence complacency.

Evidence synthesis is the *'process of bringing together information and knowledge from*

*many sources and disciplines to inform debates and decisions'*.<sup>d</sup> Four principles can be employed to make evidence syntheses aimed at policymakers easier to commission and more powerful in delivery and implementation (Box 2).

*"An accurate, concise and unbiased synthesis of the available evidence is arguably one of the most valuable contributions a research community can offer decision-makers"*<sup>d</sup>

Systematic reviews and meta-analyses, which are labour-intensive and expensive, provide two processes for distilling evidence. By providing an evidential basis for improvements, such reviews have transformed healthcare<sup>e</sup> and decision-making in social welfare, education, crime and justice, and international development.<sup>f</sup> Unfortunately, some research areas do not naturally lend themselves readily to systematic reviews or meta-analyses, as they have relatively few studies per topic and employ different methods or measure different variables. However, we still need to make sense of the available evidence for it to be used in support of decision-making.

#### Box 1: Causes of evidence complacency<sup>a</sup>

Practitioner or policymaker believes:

- Already has sufficient knowledge.
- Too much effort for too little gain.
- Reduces professional autonomy.
- People are more accessible and useful as information sources.

In practice, practitioner or policymaker can be:

- Unaware of available resources.
- Inadequately trained to use evidence.
- Facing competing demands on time.
- Required to deliver regardless of demonstrated benefit, with limited time to make a decision.

### Box 2: Synthesising evidence principles<sup>d</sup>

Enable producers and users to more easily commission, carry out, appraise, use, and share high-quality evidence synthesis around the world with these four principles:

- **INCLUSIVE:** Involve stakeholders, ensuring usefulness and relevance to them; use many types and sources of evidence as well as skills and people.
- **RIGOROUS:** Utilise as complete a body of evidence as possible; acknowledge and minimise bias; incorporate independent review.
- **TRANSPARENT:** Document explicitly the research question, methods, evidence sources, and quality assurance processes; highlight complexities, points of contention, assumptions, limitations, gaps and uncertainties; specify any personal, political and organisational interests and manage any conflicts.
- **ACCESSIBLE:** Write in plain language and make freely available online within a suitable timeframe.

## Making best-use of sparse and patchy evidence

The Conservation Evidence project<sup>e</sup> addresses the challenges of sparse and patchy evidence in environmental management using subject-wide evidence synthesis.<sup>h</sup> The project, based at the University of Cambridge, aims to assess the impacts of conservation interventions for all species and habitats worldwide.

Conservation evidence can be synthesised in a cost-effective, industrial-scale way (Fig. 1), using protocols<sup>h</sup> designed to ensure the evidence produced is inclusive, rigorous, transparent, and accessible (Box 2). This

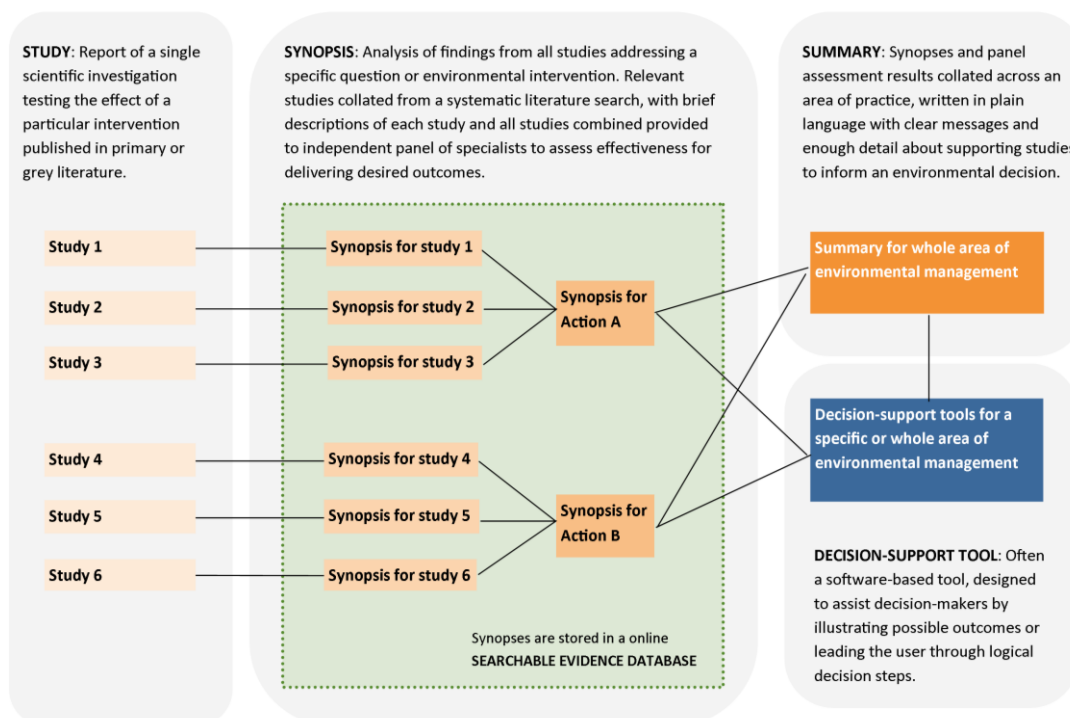
enables identification of key knowledge gaps, where number and quality of studies might both contribute to uncertainty about the effectiveness of a conservation intervention.

Manually searching for relevant studies is costly but still more cost-effective than standard systematic reviews that rely on search terms.<sup>h</sup> Over time, however, fewer resources are required as the investigator can build on the efforts of others. Annual or biennial summary updates, for example, are estimated to cost 20% of the initial research cost.<sup>i</sup>

## Raising awareness and facilitating uptake of evidence

Overcoming practical barriers to evidence use (Box 1) requires provision of distilled knowledge in ways that best empower those needing practical solutions, while recognising their different needs, skills, and time requirements. A suite of resources developed from evidence synthesis (see Fig. 1) can be used to overcome these:<sup>i</sup>

- **Evidence summaries** are a useful starting point for broad questions relevant to managing a sustainability issue to get practical advice on ‘what works’.
- **Searchable evidence databases** provide access to individual and collated synopses of evidence for intervention effectiveness, including independent panel assessments of effectiveness, allowing decision-makers to consider options and tailor for their own purposes and context.
- **Decision-support tools** can address broad or specific questions. They make it easy for the user to find out the likely outcome of their management practices, using online calculators<sup>j,k</sup> to convey this information very quickly and simply with evidence-based scores.



Ideas adapted from Dicks et al. 2014 TREE 29: 607-613.

**Figure 1:** Pathways for evidence synthesis to support sustainability management decisions.

However, delivering these resources alone does not overcome the behavioural issues of evidence complacency.<sup>h</sup> A communication strategy is also needed to:

- **Raise awareness** of the resources produced and the need to use evidence in decision-making.<sup>e,f</sup>
- **Provide training** to ensure an evidence-based approach to providing advice becomes the professional norm.
- **Build a community of practice** to support those using evidence, working in partnership to identify priorities for evidence synthesis and to influence decision-making structures and processes to make best use of the available evidence. Increasing intolerance of those who make decisions that contradict the evidence without good reason.
- **Incentivise change** using knowledge gaps, as identified by the evidence synthesis process, to guide research investments.

## Translating global evidence for New Zealand

As a first step toward revolutionising how NZ uses evidence to support sustainability decision-making, the NZ Sustainability Dashboard team, working in partnership with Conservation Evidence, delivered a proof-of-concept of evidence-based tools for sustainability assessment. This tool focused on biodiversity monitoring on NZ farms, which has always been the most problematic and expensive theme of sustainability assessment, given the skills required and how much biodiversity can vary from place to place and year to year.

Working with an independent panel of local biodiversity specialists, we tailored global synopses from the existing Conservation Evidence database to meet NZ needs. This pilot study highlighted both opportunities to and

challenges with making global scientific evidence relevant to NZ:

- NZ studies in the Conservation Evidence database covered only 7% of 164 management actions and 1% of 2449 studies relevant to the NZ biodiversity assessment tool. NZ studies may be missing from the database because the actions are not implemented in NZ, studies did not meet the design criteria required for inclusion, or NZ-based journals and grey literature have not yet been reviewed.
- For the two management actions evaluated in our pilot (reducing tillage and providing shelterbelts), evidence was only available for four of the tool's 10 target species groups. Specialist evaluation concluded that neither action was *beneficial* for those groups; in most cases, actions were categorised as *unknown effectiveness* in NZ, due to low quality and/or relevance of evidence. Where global evidence had low relevance to NZ, systematic searches for NZ evidence would be most useful, as strong evidence of overseas benefits will not provide insight to action effectiveness in NZ.

## Recommendations

- Use evidence synthesis to distil the large body of available knowledge in ways that help decision-makers efficiently find practical solutions to a problem.
- Capitalise on the existing Conservation Evidence database to give NZ a fast-start

and provide interoperable infrastructure for storing, sharing and socialising NZ-tailored resources. Thus, make global scientific evidence locally relevant, while also enhancing the international resource.

- Implement a parallel communication strategy to raise awareness of resources produced by evidence synthesis and the need to use evidence in decision-making, even when evidence is sparse and patchy or uncertain.
- Build NZ capability to carry out and use evidence synopses. Recognise the benefits good syntheses of knowledge will provide. Reward synthesis, as the academic ecosystem does not encourage such work.
- Use knowledge gaps identified by evidence syntheses to guide research investments.

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### Further Information

Biodiversity Assessment Tool for NZ farms:  
[Learn more about the tool and its design process](#)  
[Test the prototype tool](#)  
[Research resources from the co-design process](#)

[New Zealand Sustainability Dashboard](#)

<sup>a</sup> Nature Ecology & Evolution 1: 1215-1216.

<sup>b</sup> Conservation Letters 7: 119-125.

<sup>c</sup> Nature 558: 344.

<sup>d</sup> Nature 558: 361-364.

<sup>e</sup> <https://www.cochranelibrary.com/about/about-cochrane-reviews>

<sup>f</sup> <https://campbellcollaboration.org/better-evidence.html>

<sup>g</sup> <https://www.conservationevidence.com/>

<sup>h</sup> Nature 558: 364-366.

<sup>i</sup> Trends in Ecology and Evolution 29: 607-613.

<sup>j</sup> <https://coolfarmtool.org/>

<sup>k</sup> <http://www.nzdashboard.org.nz/biodiversity-assessment-tool.html>