

# **A systematic map of evidence on the links between ecosystem services and poverty alleviation in Africa: a user guide**

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## **1. INTRODUCTION**

This evidence map was produced as part of an evidence synthesis project funded by the UK Natural Environment Research Council (NERC) through the Ecosystem Services for Poverty Alleviation (ESPA) programme. More detail on the project can be accessed [here](#). This document briefly explains how the evidence map was created and acts as a guide to its use. Evidence mapping is part of the family of evidence synthesis methodologies, such as systematic reviews and rapid evidence assessments. Evidence maps present a structured, transparent, and replicable overview of all the available research evidence on a question of interest. They allow decision-makers and researchers to investigate the entire body of evidence, rigorously accessed and organised using systematic review principles.

## **2. METHODOLOGY**

This evidence map was developed by carrying out a number of steps: (i) framework development; (ii) defining what constitutes evidence; (iii) searching for evidence; (iv) accessing and screening evidence; and (v) visualising the evidence-base.

### **2.1. Framework development**

This evidence map is concerned with the impact of interventions that support human's interaction with or use of ecosystem services (ES) for multi-dimensional poverty reduction in Africa. Therefore, the evidence mapping framework reflects an intervention-to-outcome configuration populating evidence on the effects of different interventions involving ES against various dimensions of poverty. To develop the framework for this evidence map, the research team drew on academic evidence synthesis literature, key topic organisations, and content experts. These included multiple Collaboration for Environmental Evidence (CEE) systematic reviews, the Millennium Ecosystem Assessment, and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). After drafting an intervention-to-outcome framework, the research team engaged with the national focal point of the IPBES for South Africa – Kiruben Naicker – and decision-makers from the South African Department of Environmental Affairs (DEA) to ensure that the framework accurately reflected a useful understanding of the environmental intervention literature.

### **2.2. Inclusion criteria**

Clearly defined and transparent inclusion and exclusion criteria were formulated to outline what type of research evidence featured on the evidence map. In this, the Population, Intervention, Comparator, and Outcome (PICO) concept was applied. More information on the PICO criteria is provided Section 3: scope of the evidence map.

### 2.3. Searching

We designed an exhaustive search strategy to identify relevant evidence. This search strategy applied Boolean operators and wild cards adapted for different search sources. The scientific search for evidence took place in two different bodies of literature using key terms related to ecosystem services, multidimensional poverty, and Africa. The academic literature was accessed by searching seven databases<sup>1</sup>, while grey literature searches reviewed 29 organisational websites. The African studies included in ten existing evidence syntheses of environmental research were added to the search results. The total number of records screened were 15,781; of these 600 were included in the evidence map.

### 2.4. Accessing and screening

All identified citations were accessed and imported into EPPI-Reviewer 4 software to manage screening each piece of evidence for relevance. Records were screened on title and abstract. In order to be included on the map, studies needed to cover the PICO inclusion criteria, most notably related to relevant intervention, empirical data collection, and measures of poverty.

### 2.5. Visualising the evidence-base

Following the screening process, all included evidence was coded according to key characteristics<sup>2</sup> and then populated on a visual interface. This visual interface allows decision-makers and researchers to directly engage with the available evidence-base, identify patterns and gaps, and to tailor the evidence map according to their own needs using the filters provided. The interface thereby allows its users to create multiple evidence maps depending on the configurations of research required by those engaging with it.

## 3. SCOPE OF THE EVIDENCE MAP

The scope of the evidence map was kept broad, with relevant interventions and outcomes being broadly defined so as to capture as much of the relevant evidence as possible.

### 3.1. Interventions and outcomes

Relevant interventions required some kind of human action in either a specific ecosystem or ecosystem service for the benefit of humans (e.g. conservation forestry as a management process intervention or carbon trading as a market incentive intervention). See the full list of relevant interventions in Table 1 below. Studies that measured the effects of a specific ecosystem (e.g. forests) or particular ecosystem services / group of services (e.g. provisioning ecosystem services or soil nutrient cycling) were excluded as relevant interventions.

We used the Sustainable Development Goals (SDGs) as a framework to structure the outcomes included in the evidence map. The SDGs were chosen based on consultation with decision-makers at a policy level and were used for their Africa-wide acceptance and applicability. The SDGs further provided the map with a common base of outcomes that we could integrate other widely-used multi-dimensional poverty indices with (e.g. SASPRI, ESPA index). As the overall outcome for the map

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<sup>1</sup>Academic search complete; Africa-wide information; Business Source complete; Econlit; Greenfile; Humanities source; SocIndex.

<sup>2</sup> The key characteristics that each abstract was coded on were intervention type, poverty measure, country, region, whether a specific plant or animal species was mentioned in the abstract, whether the research was funded by ESPA, whether the research was primary research or an evidence synthesis, what the ecosystem involved was, and whether the abstract measured more than one dimension of poverty.

is multi-dimensional poverty alleviation, only the SDGs directly related to poverty were used as relevant outcomes on our map. To develop the specific outcomes related to each SDG, the indicators of each poverty-related SDG were reviewed and extracted.

### 3.2. Region and date

The evidence map is only concerned with research evidence focused on Africa that has been conducted between January 2000 and March 2017. Interest in research on ecosystem services and poverty reduction only grew after 2000 following the first Millennium Ecosystem Assessment established in 2000 and the first assessment being commissioned in 2001.

### 3.3. Study design

The evidence map only includes research studies that empirically evaluated the effect of ecosystem services interventions on poverty reduction. Qualitative as well as quantitative evaluation approaches were eligible for inclusion as long as empirical data and analysis on intervention effects were provided.

## 4. GENERAL GUIDELINES FOR USING THE EVIDENCE MAP

When viewing the evidence map<sup>3</sup>, the interventions will appear on the left-hand axis with the outcomes appearing on the top axis. The size of each bubble is relative to the number of studies included: the larger the bubble, the more pieces of research have been done on a specific intervention and outcome combination. Red bubbles indicate evidence syntheses while blue bubbles indicate primary research.

### 4.1. Accessing research evidence

- To view the list of studies contained within each bubble, click on the bubble. A list of titles, authors, and dates should open in a new box.
- The number of research evidence listed can be changed by selecting the dropdown menu at the top left corner of the box that lists the research articles contained within a particular box.
- Specific terms contained within the titles, abstracts, or author fields can be searched for using the search function at the top right of the research evidence box.
- To access a specific abstract, click on the title of the desired study, and another box will open which contains the abstract and other publication details.
- Do note that the search terms entered are retained when you exit a specific box and enter another one. This may cause your new box to be empty. Be sure to remove all search terms from the search function within a box when you exit.

### 4.2. Applying the filters

- The filters that can be tweaked on this evidence map are: country, region, study design, ecosystem type, whether a specific animal or plant species is involved, and whether a study investigates multiple dimensions of poverty.
- The default setting is for the evidence map to display all research evidence. To view only research with a particular feature (e.g. all research from only Tanzania), click on the dropdown menu of the relevant filter (e.g. country), deselect the *Select all* option, scroll down to the relevant feature (e.g. Tanzania), select this feature by ticking the box next to it, and click on *Apply* to retrieve research conducted in Tanzania.

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<sup>3</sup> The evidence map's functionality performs best when viewed using Google Chrome as a web browser.

- Use different combinations of features by applying different filters to retrieve a map of research evidence that fulfils your specific purpose.

**Table 1: Intervention descriptions**

Category	Intervention	Definition
(1) Interventions that provide management	Processes	Techniques or approaches to governing or managing a particular aspect of an ecosystem.
	Actors	Different entities responsible for carrying out the management of a particular ecosystem or aspect of it.
(2) Interventions that provide protection	Areas	An area that is demarcated protected and may have restrictions placed on the use of ecosystem services within that ecosystem (can be marine or terrestrial).
	Resources	A specific resource that is designated as protected and has restrictions or limitations placed on its use.
(3) Interventions that provide education	Training	Educating people about a particular management technique or equipping them in some way with new skills and knowledge.
	Capacity-building	Another approach (either explicitly mentioned or less formal than training) to equip people with new knowledge and/or skills to better manage their environment.
	Awareness-raising	Making people aware about specifically environmental issues that concern them or the importance of the environment or ecosystem services.
(4) Interventions that provide alternative livelihoods	Alternative occupation or source of income	Community members are provided with an alternative way of generating money to support themselves either through an eco-enterprise (e.g. ecotourism) or through undertaking different work (e.g. beekeeping to sell honey in a local market).
	Alternative way of using a resource (using the same resource differently)	A resource is used differently from how it is usually used (e.g. conserving leopards to attract tourists rather than killing it for cultural use).
	Alternative resource (using a new resource)	Swapping one resource with another (e.g. consuming rat meat instead of bush meat).
(5) Interventions that provide market mechanisms / incentives	Subsidies / grants / concessions	Financial or material provision to encourage the uptake of a particular technology or approach.
	Public-private partnerships	Partnering of government with private sector institutions to tackle a particular environmental issue.
	Ecosystem services trading / offsetting	Financial trade between countries on the benefits derived from the ecosystem within one country (e.g. one country selling their carbon credits to another country who needs more carbon credits).
	Payment for ecosystem services	Where remuneration is received for conserving or protecting rather than utilising the resources within a particular ecosystem.
(6) Interventions that provide regulatory frameworks / mechanisms	Assessments / monitoring / enforcements	Mechanisms in place that allow management processes to be monitored and infringements to be punished.
	International / national regulation	Regulatory mechanisms that are nationally or internationally applicable and intended to regulate the manner in which an ecosystem or environmental resource is used (e.g. REDD+ or national property rights).

	Certification	Voluntary standards that companies opt to follow in order to align their brand with the value espoused by a particular certification with the idea of the certification being more lucrative for companies who opt in.
(7) Interventions that provide ecosystem services infrastructure	Technology	Renewable technology that is rolled out on a broad scale (e.g. clean cookstoves made available across a village, the building of dams).
	Finance	Funding for environmentally-friendly projects or initiatives to take place.

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