

## Citation

Zharas Aitmambet, Joseph Dickman, Markus Frölich, Atika Pasha, Martin Prowse, Jyotsna Puri, Neha Sharma, Arne R. Weiss, Ekwaro A. Obuku, Moses Ocan, Robert Apunyo, Thomas Katairo, Kevin O. Ojiambo. Adaptation and mitigation strategies for climate change - a review of the attributes of transformational change in the energy and public health sectors: systematic review and evidence gap map protocol. PROSPERO 2020 CRD42020220671 Available from: [https://www.crd.york.ac.uk/prospero/display\\_record.php?ID=CRD42020220671](https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42020220671)

## Review question

- 1) In two sectors including (i) energy and power, in particular production and use of energy, energy efficiency, renewable energy, and transitions from GHG-emitting energy sources to clean energy, and (ii) behavioral change in public health; what are we learning about what is transformational? What are the drivers and inhibitors of transformational change as defined by the three attributes that we recognize as necessary, depth, scale and sustained change? What is rigorous causal evidence telling us about what causes these, what are contextual factors, and what are mediating factors? What does a statistical meta-analysis of these results show us?
- 2) Do scale effects differ by sector, intervention, context or other variables? How much and why? What sorts of interventions are those where scale effects are witnessed? What are the drivers of transformational change as measured by effect sizes of immediate and intermediate outcomes, distal outcomes and overall/ultimate impacts?
- 3) What is the (statistical) 'range' of transformation that we are witnessing in different sectors and sub-sectors, as measured by their effect sizes, and is there an emerging pattern? Can we define a specific threshold, or a variety of thresholds, in these two sectors that helps us understand 'large' change? What are these thresholds and what are the cut-offs in (standardized) effect sizes that can be identified to distinguish 'large' change? What are the characteristics and attributes of the causes of 'large sized' change?

## Searches

### 1. Public health sector

#### i) Databases

- (1) EconLit (via EBSCO)
- (2) Global Health (CAB- Ovid)
- (3) MEDLINE (Ovid)
- (4) Web of Science (Social Sciences Citation Index)

#### ii) Websites of agencies and research institutes

- (1) Campbell Collaboration <https://campbellcollaboration.org/>
- (2) Cochrane Database of Systematic Reviews <https://www.cochranelibrary.com/cdsr/>
- (3) Collaboration for Environmental Evidence <https://www.environmentalevidence.org/>
- (4) International Initiative for Impact Evaluation: 3ie Development Evidence Portal <https://developmentevidence.3ieimpact.org/>

### 2. Energy sector

#### i) Databases

- (1) Academic Search Complete (via EBSCO)
- (2) CAB Abstracts (via EBSCO)
- (3) EconLit (via EBSCO)
- (4) GreenFILE (via EBSCO)
- (5) Web of Science (Social Sciences Citation Index, Science Citation Index Expanded, Emerging Sources Citation Index)
- (6) World Bank eLibrary (via EBSCO)

#### ii) Websites of agencies and research institutes

- (1) African Development Bank (AfDB) <https://www.afdb.org/en>

- (2) Asian Development Bank <https://www.adb.org/>
- (3) Campbell Collaboration <https://campbellcollaboration.org/>
- (4) Collaboration for Environmental Evidence <https://www.environmentalevidence.org/>
- (5) International Initiative for Impact Evaluation: 3ie Development Evidence Portal <https://developmentevidence.3ieimpact.org/>
- (6) National Bureau of Economic Research <https://www.nber.org/>
- (7) Swedish International Development Cooperation Agency (SIDA) <https://www.sida.se/English/>

iii) Key journals

- (1) Energy Economics
- (2) Energy Journal
- (3) Energy Policy

3. Limitations of the search terms: The search was limited by time period and language. Only studies in the English language and published from 1990 onwards for energy sector and 2000 onwards for public health were searched for.

4. The searches were done in May-June 2020

### Types of study to be included

- a) Experimental designs: Cluster or individual randomized controlled trials (CRTs, RCTs);
- b) Quasi-experimental designs: These may take various nomenclatures in energy or public health realms such as case-control, controlled before and after studies; interrupted time series designs; difference-in-difference, instrumental variables and regression-discontinuity-designs; and propensity score matching;
- c) Syntheses: Systematic reviews and meta-analyses.

### Condition or domain being studied

- i) Nutrition & dietary habits
- ii) Physical activity
- iii) Substance abuse
- iv) Hygiene
- v) Healthcare utilization

### Participants/population

Exclusion: Children (below 12 years of age)

### Intervention(s), exposure(s)

Included interventions: The specific behavioral interventions are nine (9) and follow the behavioral framework defined by Michie et al (2011).

- i) Education
- ii) Persuasion
- iii) Incentivization
- iv) Coercion
- v) Training
- vi) Restriction
- vii) Social environmental restructuring
- viii) Physical environmental restructuring
- ix) Modeling

x) Enablement

Excluded:

- i) Natural interventions: These are not in the control of humans, such as sudden climate related shocks or

natural disasters or migration.

ii) Laboratory or clinical trial or field interventions: targeting a hospital, clinic or laboratory. For example quality of care, Performance Based Financing, health professional training or education.

iii) Policy changes from governmental authorities: These are liberalization of health sector. (De) regulation or decentralization or privatization or simplification of procedures. Policy changes may be governmental change/laws or regulation: legislature, bills or policies, coordination of government at different levels nationally or sub-nationally.

### Comparator(s)/control

A comparison group may be an active alternative intervention or passive or inert intervention

### Context

Studies in low- and middle-income countries as defined by the World Bank criteria for the fiscal year 2020

### Main outcome(s)

Outcomes must be related to behavior change with a causal link to the intervention of interest.

i) Action behavior: These are actions taken by individual to improve health.

- Social (e.g. HIV testing, open defecation, drunk driving, passive smoking)
- Private (e.g. ANC, PNC, institutional delivery, hand washing)

ii) Consumption/purchasing (e.g. purchasing drugs or alcohol, nutritious food)

- Social (e.g. toilet construction)
- Private (e.g. expenditure on drugs, alcohol bought, spending on tobacco/cigarettes)

### Measures of effect

relative risks, odds ratios, standardized beta, standardized mean difference

### Additional outcome(s)

None

### Measures of effect

Not applicable

### Data extraction (selection and coding)

1. Pilot stage. In the pilot phase, 200 titles and abstracts from each sector will (total 400) will be uploaded into Zotero and coded in Excel for initial title and abstract (TiAb) screening to test the utility of and refine the proposed screening codes before entering them into EPPI\_Reviewer\_4 . The same process will be followed for the full text (FT) screening to refine and finalize the codes and data to be abstracted.

2. TiAb screening stage. After the full pilot, all identified articles will be screened for eligibility by TiAb.

Duplicate screening will be done for the first 50% of the articles after which single screening will be done until saturation. Saturation will be reached when 1 in every 100-screened TiAbs are included. At this point the rest of the TiAbs will be discarded. FTs of those articles that are eligible will be retrieved and pushed to the next stage of screening.

3. FT screening. Pairs of review teams will review the FTs for eligibility applying the PICOS model. Those FTs found eligible will be pushed to the next level of FT-coding and data extraction. Differences in FT-screening will be resolved by consensus between the review team pair.

4. FT-coding and data extraction stage. Any two reviewers will extract data into EPPI\_Reviewer\_4 in duplicate and independently. The data items to be coded for the EGM are for interventions and outcomes, as pre-specified in the section for review question. In the energy sector, we will code interventions as structural or behavioral. For the systematic reviews, the following data will be extracted: intervention level, intervention size, sample size or number of beneficiaries, estimate of effect and duration of follow up. Differences in full text coding and review data extraction will be resolved by consensus between the review team pair.

### Risk of bias (quality) assessment

The methodological quality (internal validity) of the individual studies included in the systematic reviews will be independently assessed for each of the outcomes using a domain approach: selection, outcome detection or measurement, attrition biases are some of the key domains. The following domains will be considered specific for study designs, experimental and non-experimental. Differences in risk of bias assessments will be resolved by consensus between the review team pair.

### Strategy for data synthesis

The data synthesis will be done at multiple stages: EGM, systematic review and or meta-analysis. The meta-analysis will depend on having at least 10 individual studies.

Briefly, the analysis of the data will be done separately for each sector. The unit of analysis will be a study. Several articles of the same study will be amalgamated into one dataset where feasible or the article reporting with the largest sample size of the study will be considered.

Evidence Gap Maps: Our approach to Evidence Gap Maps (EGM) will be informed by Campbell Collaboration approach. Briefly, we will apply the data already identified, screened and coded from this review to develop one EGM per sector. Using the EPPI mapper add-on for EPPIR4 we will produce the EGMs in visual presentation of the evidence matrix. The intervention categories lie on the y-axis whilst outcome domains will run in the x-axis. The specific actual variables for the EGM axes will be determined after study coding.

Systematic review: This will employ descriptive statistics and if appropriate Forest plots. A funnel plot, Begg's and Egger's test will be employed to explore publication bias.

Meta-analysis: Estimates of captured in various forms will be transformed and standardized using appropriate statistical methods to facilitate meta-analysis. Biological, methodological and statistical heterogeneity will be assessed using the Cochran's Q and the I<sup>2</sup> statistics. In the absence of statistically significant heterogeneity, we will use RevMan v.5.2 and Stata v.14.2, to pool and analyze the data using the random effects model. Only the sufficiently populated cells (at least 10 individual studies) will be employed to run meta-analyses on the available evidence and estimate average effect sizes. The degree of heterogeneity will be assessed using Higgins I<sup>2</sup>. In order to explore the robustness of the results, sensitivity analyses and meta-regression will be considered.

### Analysis of subgroups or subsets

None

### Contact details for further information

Zharas Aitmambet  
z.aitmambet@gmail.com

### Organisational affiliation of the review

Center for Evaluation and Development  
<https://c4ed.org/>

### Review team members and their organisational affiliations

Mr Zharas Aitmambet. Center for Evaluation and Development  
Mr Joseph Dickman. Climate Investment Funds  
Professor Markus Frölich. Center for Evaluation and Development  
Dr Atika Pasha. Center for Evaluation and Development  
Dr Martin Prowse. Independent Evaluation Unit, Green Climate Fund  
Professor Jyotsna Puri. Independent Evaluation Unit, Green Climate Fund  
Ms Neha Sharma. Climate Investment Funds  
Dr Arne R. Weiss. Center for Evaluation and Development  
Dr Ekwaro A. Obuku. Africa Centre for Systematic Reviews and Knowledge Translation, Makerere University  
Dr Moses Ocan. Africa Centre for Systematic Reviews and Knowledge Translation, Makerere University  
Mr Robert Apunyo. Africa Centre for Systematic Reviews and Knowledge Translation, Makerere University  
Mr Thomas Katairo. Africa Centre for Systematic Reviews and Knowledge Translation, Makerere University  
Mr Kevin O. Ojiambo. Africa Centre for Systematic Review and Knowledge Translation, Makerere University

### Type and method of review

Meta-analysis, Systematic review

### Anticipated or actual start date

19 June 2020

### Anticipated completion date

31 May 2021

### Funding sources/sponsors

Independent Evaluation Unit, Green Climate Fund

Climate Investment Funds

Center for Evaluation and Development

### Conflicts of interest

#### Language

English

#### Country

Germany, South Korea, Uganda, United States of America

#### Stage of review

Review Ongoing

#### Subject index terms status

Subject indexing assigned by CRD

#### Subject index terms

Climate Change; Humans; Public Health

#### Date of registration in PROSPERO

14 December 2020

#### Date of first submission

13 November 2020

#### Stage of review at time of this submission

| <b>Stage</b>  | <b>Started</b> | <b>Completed</b> |
|---|----------------|------------------|
| Preliminary searches  | Yes            | Yes              |
| Piloting of the study selection process                         | Yes            | Yes              |
| Formal screening of search results against eligibility criteria | Yes            | Yes              |
| Data extraction   | No             | No               |
| Risk of bias (quality) assessment                               | No             | No               |
| Data analysis   | No             | No               |

*The record owner confirms that the information they have supplied for this submission is accurate and*

*complete and they understand that deliberate provision of inaccurate information or omission of data may be construed as scientific misconduct.*

*The record owner confirms that they will update the status of the review when it is completed and will add publication details in due course.*

## Versions

14 December 2020