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Effectiveness of finance for supporting climate change adaptation in agricultural sector in Low- and Middle-Income Countries: a systematic review protocol

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About this design paper

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Effectiveness of finance for supporting climate change adaptation in agricultural sector in Low- and Middle-Income Countries: a systematic review protocol

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Background

The problem

Climate change impacts and extreme weather events such as droughts, heatwaves and storms in Low- and Middle-Income Countries (LMICs) are being observed, compounding existing stresses such as poverty and inequality (Denton et al., 2014). However, if there are no proactive measures to adapt to climate change, LMICs can experience large and long-lasting negative economic, environmental and social effects (Micale, Tonkonogy, & Mazza, 2018). With the adoption of the Sustainable Development Goals (SDGs), there is broad international consensus to integrally address the challenges of climate change and sustainable development. In addition, developed countries have committed to jointly mobilize $100 billion a year in climate finance by 2025 (UNEP, 2019; UNFCCC, 2018). Climate finance is intended to help developing countries reduce emissions and respond or adapt to the consequences of climate change, and it forms a core part of the Paris Agreement. Climate finance can be disbursed in a number of ways (**Figure 1**), by supporting national budgets directly, or by investing into domestic, bilateral, or multilateral climate funds. Finance can also be channelled through bilateral or multilateral institutions, or via development cooperation agencies (Adaptation Fund, 2019; GEF, 2013). The majority of international climate finance is received by national governments and is managed at the national and sectoral levels (OECD, 2019). Nevertheless, relatively little funding is distributed to the local level where it is claimed to be needed most in low income countries (Soanes, Rai, Steele, Shakya, & MacGregor, 2017).

Investments in agriculture, forestry and other land uses are critical for achieving the Paris Agreement, both from a mitigation and an adaptation perspective (UNFCCC SCF, 2018). Within the nationally determined contributions (NDCs), agriculture has been prioritized for achieving adaptation in developing countries (Richards et al., 2016). According to the OECD's Creditor Reporting System, developed countries have committed at least USD 49.87 billion for climate adaptation as a principal objective, with 'agriculture, forestry and fishing' as a sector receiving 17.1% of the funding (Atteridge et al., 2019). However, tracking climate finance for adaptation remains a challenge and mostly due to methodological issues (Atteridge et al., 2019; UNFCCC SCF, 2018).

Beyond tracking , the understanding of the effectiveness of climate finance remains limited. Studies on the effectiveness of climate finance have identified an increasing number of potentially influencing factors, including type of financial instrument, size of funding available, and delivery mechanisms employed at country level (Arndt & Tarp, 2017; Bird & Glennie,

2011; Chen & He, 2018). Monitoring and evaluation systems have focused historically on the transactional characteristics of effectiveness, such as deployment and access to climate finance; with less coverage on actual results and impacts, though this is improving (UNFCCC SCF, 2018). Financial interventions can be evaluated in multiple ways but currently there is no consensus on how to measure their effectiveness. For example, the Paris declaration on development aid effectiveness proposes 5 criteria: 1) ownership (development countries set their own priorities for aid); 2) alignment (donor countries align behind these objectives and use local systems), 3) harmonisation (donor countries coordinate, simplify procedures and share information to avoid duplication), 4) results (developing countries and donors shift focus to development results and results get measured); and 5) mutual accountability (donors and partners are accountable for development results) (OECD-DAC, 2019). In 1991, the Organisation for Economic Co-operation and Development's (OECD) Development Assistance Committee (DAC) developed core principles for evaluation of development assistance that can be summed as relevance, effectiveness, efficiency, impact and sustainability (OECD-DAC, 1991). Other agencies such as DfID use a value-for-money (VfM) approach where the extent to which intended and unintended outcomes are achieved by outputs from a process determines effectiveness (DFID, 2011). Differences among the many frameworks employed heighten the difficulties of comparing across funding mechanisms.

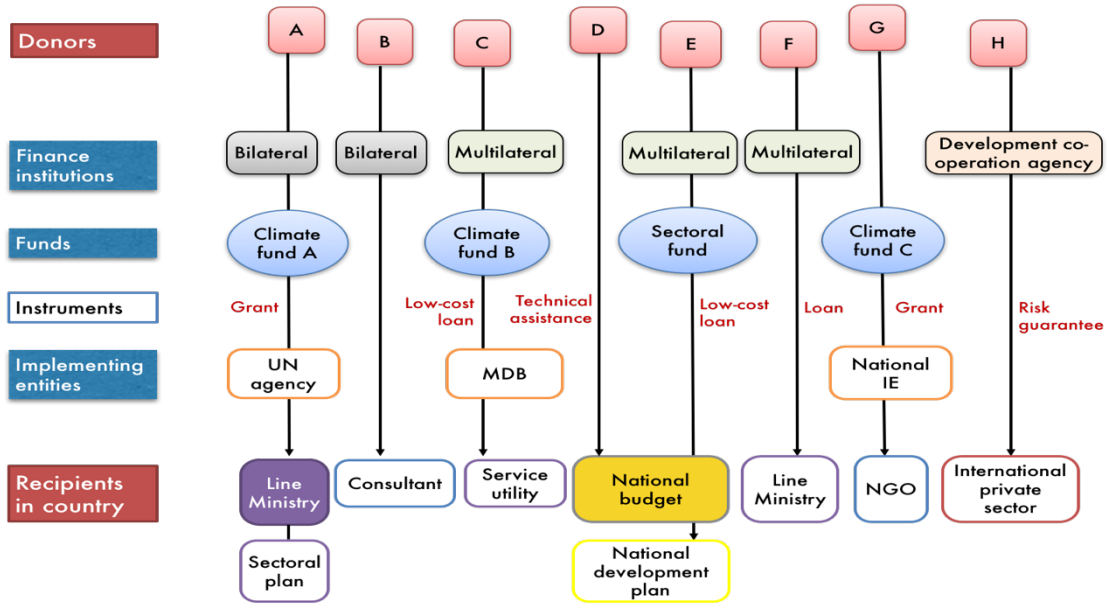

Figure 1: Complexity of climate finance (Source: Aaron Atterige, SEI)

The Intervention

In this review, interventions are all types of climate finance in agriculture for supporting national and community-level climate change adaptation actions. By adaptation we mean "the process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate harm or exploit beneficial opportunities. In natural systems, human intervention may facilitate adjustment to expected climate and its effects…") as defined by the Intergovernmental Panel on Climate Change (IPCC) (Noble et al., 2014). Specifically, these interventions can be a broad range of measures in the agricultural sector that seek to reduce climate risks and vulnerability, increase resilience, and build capacity for

adaptation actions through international climate finance. They might include, for example, measures to improve the availability and accuracy of climate forecasts and services for farmers and farming communities, promoting the uptake of new crops and land management practices, establishing new markets for agricultural products, increasing farmers' access to loans and banking to support their transformation towards sustainable farming, and provision of technologies and training in climate-smart agriculture (CSA) approaches.
The interventions can target commercial agriculture as well as small-scale farming that aim to improve food security and nutrition as expressed through the broad development targets under SDG2 when these activities also have climate-related goals. A wide set of interventions for agriculture was detailed in the Fifth Assessment Report of the Intergovernmental Panel on Climate Change section on Rural Areas (Dasgupta et al., 2014, pp. 639-640, Table 639.637). There are several dedicated climate funds. The UNFCCC established first the Least Developed Countries Fund (LDCF), and the Special Climate Change Fund (SCCF) as trust funds within the Global Environment Facility (GEF) (GEF, 2013). Later on, the UNFCCC also established the Adaptation Fund as a separate entity (Adaptation Fund, 2019), and the Green Climate Fund (GCF). There are other climate funds outside the UNFCC, including the Climate Investment Funds (CIF), managed by the multilateral investment banks; and bilateral climate funds. However, climate finance may not necessarily go through one of the dedicated climate funds, and interventions can still be considered within this review if funding aims to comply with agriculture adaptation.

How the intervention might work

In order to illustrate how the intervention is expected to work, what are causal links between different system components that lead to specific outcomes and what are the assumptions, we developed a theory of change (ToC) (**Figure 2**). The ToC will be further developed based on the inputs from various stakeholder groups (see ***Methodology*** section).

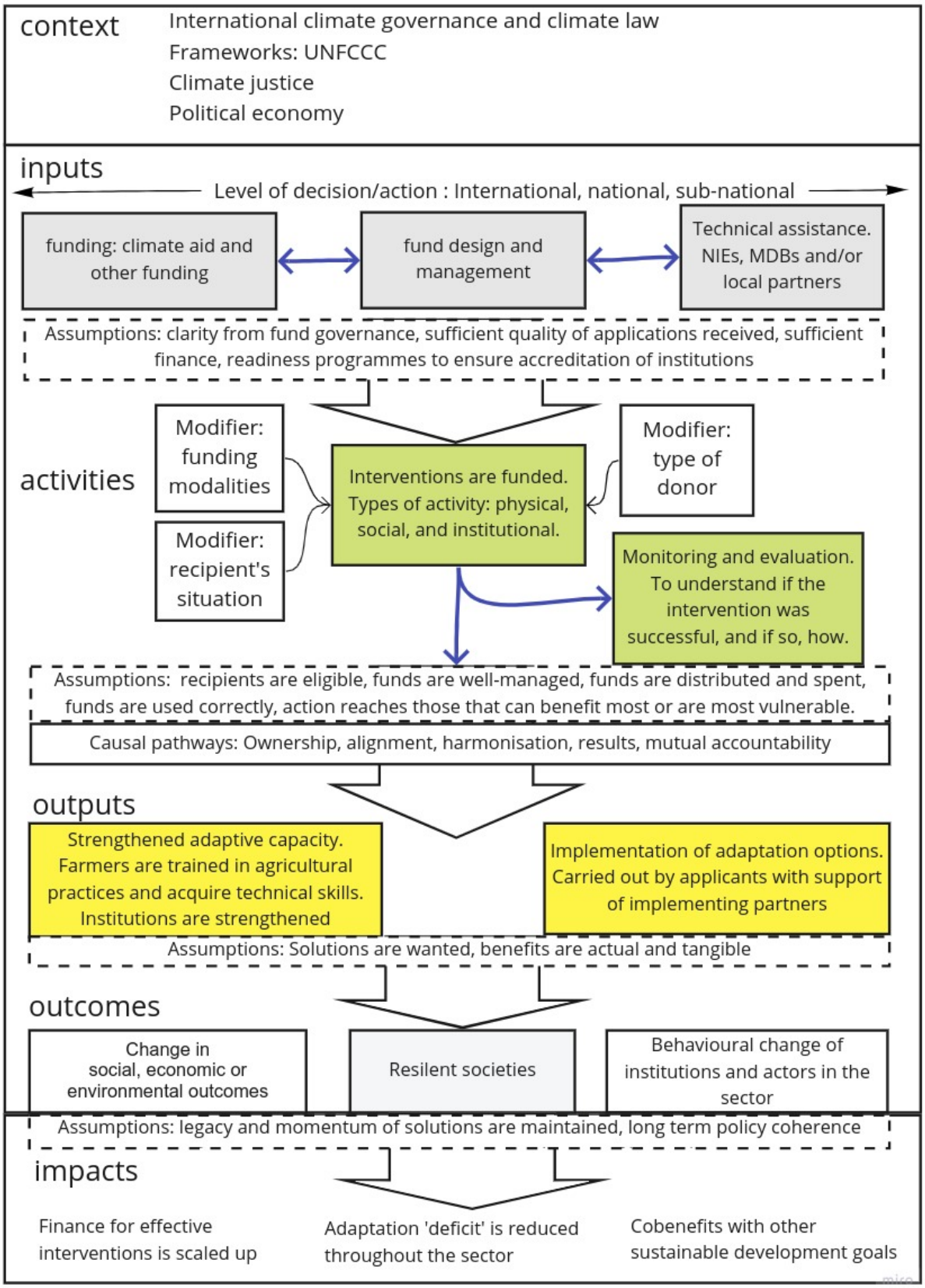

Figure 2. Theory of Change draft

Description of ToC components:

Inputs: Inputs driving expected changes are encountered at different levels of decision and action. For example, national governments frequently manage climate budgets (Figure 1), framing sectoral activities, and we assess that international development agencies are among the most influential actors regionally (based on our project's early stakeholder mapping activity). There is significant interaction, and sometimes tension between these levels, reflecting that it is challenging to align supply-side factors and recipient country needs. We consider all types of funding: international climate finance, domestic funding, private funding and combinations of these. Technical assistance is commonly provided by Multilateral Development Banks (MDBs), non-governmental organisations (NGOs) or government, for example through National Implementing Entities (NIEs), Assumptions are that there is clarity from fund governance, sufficient funding is allocated and there are accreditation programmes for transferring the management of funds to appropriate institutions.

Activities: Funding of climate change adaptation interventions is the central activity this project is concerned with, including the lifecycle of distributing and managing the funds, and how the money is spent. The IPCC (Noble et al., 2014) describes 3 broad types of adaptation options, naming physical, social and institutional as top-level categories. Lists of types of adaptation actions have been developed by IPCC synthesis reviews both for agriculture (Dasgupta et al., 2014) and for adaptation needs in Africa (Niang et al., 2014) which includes institutional, social, physical, and infrastructure needs, ecosystem services and environmental needs, and financial and capacity needs.

Different types of donor/investors, modality of funds and recipient characteristics (such as climate vulnerability, levels of development in the country etc) might affect the final output. From a recipient's perspective, funding modalities are 'direct access' through a national institution (e.g. the Ministry of environment), and 'indirect access' through an international or multilateral institution not registered in the recipient country (e.g. UNDP, DFID).

We also include monitoring activities in our ToC. Programmes and projects are responsible for collecting and reporting data and for monitoring spending in accordance to logframes. This is essential for evaluating and understanding effectiveness. Value-for-money (cost effectiveness) approach can be used in some cases where options are adequately costed. Additionally, there may be research undertaken in a small number of cases (not shown in ToC). Together, these activities are expected to give rise to outputs by means of 5 causal pathways which are based on the criteria for aid effectiveness as agreed in the Paris declaration.

Outputs: As a result of these activities, adaptation processes take place (outputs) which include (1) identifying and implementing appropriate adaptation options to reduce risks and (2) building adaptive capacity of actors and institutions. Identifying and implementing options (1) has tended to be dominated by technical adaptation measures: agroforestry projects, or diversifying crop production[1]. Financial instruments (e.g. weather insurance, cash transfers) have been employed as well as knowledge products (eg. climate services) to develop human capacity. Adaptive capacity (2) has been defined as the ability to adjust to

1 See: https://www.globalagriculture.org/report-topics/adaptation-to-climate-change/adaptation-to-climate-change.html

potential damage, to take advantage of opportunities, or to cope with consequences[2]. It focuses on the *outcome* of increased capacity taking into account current and future needs for adaptation. Adaptive capacity is often linked with education and training/skills development. In the agriculture sector one framework that has been used for adaptive capacity is the 5 capitals of the sustainable livelihoods framework (natural, human, social, physical and financial) (e.g. Brown et al., 2019). Interventions that focus on adaptive capacity are likely to make greater contributions to improving resilience to climate change – to meet broader resilience needs of societies. Adaptation strategies often combine capacity building with adaptation responses, combine multiple adaptation options (of different types), or integrate actions into other management plans, hence the inclusion of both types of activity in Fig 2.

Outcomes: Assuming that adaptation described above works as planned, positive outcomes or benefits are expected. We expect to see change in social, economic and environmental outcomes: relating to improved farming practices, more profits and savings, conservation measures and increased efficiency in the sector, allowing them to reduce their risk exposure. Behavioural changes are another outcome expected outcome (based on changes in knowledge, attitudes or practices). Finally, as mentioned earlier, interventions that focus on adaptive capacity are likely to make greater contributions to improving resilience to climate change – to meet broader resilience needs of societies.

Impacts: Longer-term legacy aspects of adaptation finance need to be considered, and an important assumption is that future policy will not derail the activities. If climate finance can achieve positive and efficient outcomes, the wider impacts could include scaling up those solutions as more finance may become available, and access to the funding may also improve. Another important longer-term goal is that adaptation deficit is reduced throughout the sector. Progress towards closing this gap is tracked by UNEP's Adaptation Gap report series. Notably 2016's report provided comprehensive assessment of adaptation needs and costs, and the difference between the costs and the finance available to meet those needs (Puig, Olhoff, Bee, Dickson, & Alverson, 2016). Finally, we expect to see co-benefits of climate with other sustainability goals as these become better integrated and better understood.

Why it is important to do this review

To our knowledge, no systematic review has been conducted on the effectiveness of any type of climate change-related financing. A recent map of evidence maps related to sustainable development in LMIC (Phillips et al., 2017) showed a clear synthesis gap related to SDG13 with only 2 reviews related to mitigation and adaptation, none of which are relevant for this review. A limited number of studies that focus exclusively on particular donor activities or funding frameworks have been commissioned recently. Examples of this include a review of UK government's ICF funding through DFID/BEIS (House of Commons, 2019), an analysis of UNFCCC funding for food systems (Conevska, Ford, Lesnikowski, & Harper, 2019), and an evaluation of the Swedish Climate Change Initiative for the period between 2009 and 2012 (Colvin et al., 2020). Other studies are currently underway, as in the evaluation of Danish

2 See: https://www.ipcc.ch/sr15/chapter/glossary/

International Development Agency (DANIDA) on climate adaptation (https://um.dk/en/about-us/procurement/contracts/long/contract-opportunities/newsdisplaypage/?newsid=8003d807-4abe-4606-9964-d8fd2b59cf28). Nevertheless, none of these are comparing a variety of financial flows from different contexts. This review will therefore generate much needed evidence on financial effectiveness of investment in agriculture across different contexts, and under the umbrella of adaptation, which will allow for more effective financial allocation decisions.

In addition, we will look at one of the most important areas for adaptation, namely agriculture, and provide an improved basis of knowledge for informing DfID policy around improving effectiveness given that the United Kingdom is among the world's leading providers of climate finance, and DfID is the UK's largest donor agency (UK Government, 2019). For the period 2016-2020 the UK committed to providing at least £5.8bn of international climate finance , aiming for a balance between supporting mitigation and adaptation (UK Government, 2019).

The review will highlight methodological deficiencies and best practices in the primary research on the subject and provide guidance for methodological improvements. This project will contribute to the methodological development of syntheses with extensive amount of grey literature and test machine learning algorithms for literature screening. Moreover, we will use theory-based evaluation with complex and extended causal pathway (please see Figure 2) where studies may address different stages along the causal pathway (see (Hayman et al., 2011; Oketch, McCowan, & Schendel, 2014; Taylor, Hayman, Crawford, Jeffery, & Smith, 2013)). Finally, stakeholder engagement will ensure that our research is highly relevant for and meets the needs of both the donor and recipient country stakeholders.

Objectives

This systematic review aims to answer following primary question:

How effective is climate finance for supporting climate change adaptation in the agricultural sector in the Global South?

Methodology

This review will follow Campbell Collaboration policies and guidelines (Collaboration, 2019). The review scope and the ToC might be changed based on the inputs from stakeholders. The inputs from funders, implementers and government representatives in recipient countries will be collected via series of webinars planned for mid/late June 2020.

Criteria for inclusion and exclusion of studies in the review

In this review, we will consider following criteria for inclusion of eligible studies:

Types of participants: All types of intervention recipients in LMICs, including national, regional and local recipients

Types of interventions: All types of =climate finance including grants , funding agreements based on recipients meeting certain policy commitments or achieving results, and loans with different conditions attached. It includes finance of all scales, supporting national adaptation actions as well as community-level interventions, supporting broad range of investments that

seek to reduce climate risks and vulnerability, increase resilience and build capacity for adaptation actions in the agricultural sector. Interventions that target commercial agriculture as well as small-scale farming that aim to improve food security and nutrition (supporting SDG2) will be considered when these activities also have climate-related goals. Investments in agriculture that do not specify source of funding and a purpose for addressing climate change adaptation will not be included. All funding labelled as climate finance or climate aid will be included, but not disaster/humanitarian aid in response to extreme climate-related events.

Types of outcome measures: Any type of social, environmental, economic outcome, including outcomes related to SDG 13 targets of LMICs.

Types of study designs: Empirical quantitative research with experimental, quasi-experimental design or observational studies. No commentary papers, theoretical or modelling studies will be included. All qualitative study designs will be considered.

Languages: English, Spanish, French

We will focus on the literature published after 2010, the year when the fourth Rio Marker on climate change adaptation started to be applied to financial flows (OECD-DAC, 2016, p. 2) and when mainstreaming and expansion of funds dedicated to adaptation finance started (Buchner, Falconer, Hervé-Mignucci, Trabacchi, & Brinkman, 2011).

Search strategy

We will make the process of study identification more efficient through the use of machine learning and other automation technologies in EPPI-Reviewer (J. Thomas, Brunton, & Graziosi, 2010). We will use a multi-pronged search strategy as follows:

Bibliographic databases

Using existing subscriptions from Stockholm University, we will search for evidence in following databases and platforms:

1. Scopus
2. Web of Science (WoS) Core Collections (consisting of the following indexes: SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, and ESCI)
3. Electronic Theses Online Service (eThOS)
4. Digital Access to Research Theses (DART)
5. Directory of Open Access Journals (DOAJ)
6. EconLit

The searches will be performed in English, using following search string:

(Mitig OR GHG OR "green house gas*" OR emission* OR emit* OR "climat* change" OR "global warming" OR "extreme weather" OR unfccc OR "national climate plan*" OR NDC OR (clima* AND (variat* OR stres* OR shock*)) OR Adapt* OR resilien* OR CCA OR "heat wave" OR drought* OR IPCC OR "sea level rise" OR flood*) AND (aid OR MAF OR "multilateral adaptation funds" OR donor* OR (cooperation* NEAR/2 development) OR assistance* OR "green climate fund" OR investment* OR "Official Development Assistance" OR ODA OR "Other Official Flows" OR OOF OR "multilateral development bank*" OR MDB OR "foreign direct investment*" OR FDI OR "South-South cooperation*" OR "Official development finance*" OR ODF OR "country programmable aid" OR Bilateral OR "Private development finance*" OR recipient* OR "development aid" OR "world bank" OR WB OR "International*

Bank for Reconstruction and Development" OR IBRD OR "International Development Association" OR IDA OR "International Finance Corporation" OR IFC OR "Multilateral Investment Guarantee Agency" OR MIGA OR "development finance" OR "climate finance*" OR DFI OR "Rio markers" OR Sida OR DANIDA OR DFID OR USAID OR Norad OR JICA OR KOICA OR AECID OR LuXDEV OR NZAID OR CIDCA OR "Creditor Reporting System" OR "least developed countries fund") AND (hunger OR *Nutrition* OR Subsistence OR Farm* OR agricult* OR (Food AND (produc* OR *security OR *sufficien*)) OR crop* OR hungry OR rural OR irrigat* OR SDG2 OR agro* OR commodit* OR poor OR poverty OR impoverish* OR destitut* OR depriv*) [shown as formatted for WoS, Topic search]*

The string is composed of 3 substrings on climate change, financing, and agriculture connected with Boolean operator 'AND' and it will be adapted to different search facilities. These searches will be restricted to articles published after 2010.

Search engines

Searches will also be performed in Google Scholar in English, Spanish and French. These searches will be done to capture grey literature and it will also make use of climate change, financing and agriculture terms. Google Scholar searches will also be restricted to articles published after 2010. The first 1000 search results will be extracted as citations using Publish or Perish software (Harzing, 2007) and introduced into the duplication removal and screening workflow alongside records from bibliographic databases.

Specialist websites

Searches will be performed across a suite of relevant specialist websites (see **Table 1**). These searches will be particularly important for capturing grey literature. Each website will also be hand-searched for relevant publications. These searches will also use terms related to climate change, financing and agriculture and be restricted to articles published after 2010. Searches will be performed in English, Spanish and French, corresponding to language skills of the review team. Literature from organisational websites will be screened separately before being combined with other records.

Table 1 A list of organisational websites

	Organisation	Website
1	African Development Bank	https://www.afdb.org/en
2	The United Nations Children's Fund (UNICEF)	https://www.unicef.org/
3	The United Nations Development Programme (UNDP)	https://www.undp.org/
4	The Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)	https://www.giz.de/en/html/index.html
5	The United States Agency for International Development	https://www.usaid.gov/

	(USAID)	
6	Overseas Development Institute (ODI)	https://www.odi.org/
7	The World Bank (WB)	https://www.worldbank.org/
8	The Department for International Development (DFID)	https://www.gov.uk/government/organisations/department-for-international-development
9	The Swedish International Development Cooperation Agency (Sida)	https://www.sida.se/English/
10	The Organisation for Economic Co-operation and Development's Development Assistance Committee (OECD DAC)	http://www.oecd.org/dac/financing-sustainable-development/development-finance-topics/climate-change.htm
11	The Food and Agriculture Organization of the United Nations (FAO)	http://www.fao.org/climate-change/our-work/what-we-do/ndcs/en/
12	Oxfam International	https://policy-practice.oxfam.org.uk/our-work/climate-change
13	International Fund for Agricultural Development (IFAD)	https://www.ifad.org/en/
14	The European Commission (EC)	https://ec.europa.eu/
15	Green Climate Fund (GCF)	https://www.greenclimate.fund/
16	NDC Partnership	https://ndcpartnership.org/
17	United Nations Framework Convention on Climate Change (UNFCCC) and Standing Committee on Finance (SCF)	https://unfccc.int
18	The Global Environment Facility (GEF)	https://www.thegef.org
19	Adaptation Fund	https://www.adaptation-fund.org/projects-programmes/
20	World Food Programme	https://www.wfp.org/
21	The Regional Universities Forum for Capacity Building in Agriculture (Ruforum)	Ruforum.org
22	CGIAR	https://www.cgiar.org/

Supplementary searches

We will search for eligible literature in the bibliographies of reviews identified during the review process.

Testing comprehensiveness of the search

A list of articles of known relevance to the review were screened against search results to examine whether the search strategy is able to locate relevant evidence. If articles were not found during the scoping exercise, search terms were examined to identify the reasons why articles were missed, and search terms were modified accordingly.

Assembling library of search results

Results of the searches in bibliographic databases and Google Scholar will be combined, and duplicates removed prior to screening. A library of search results will be assembled in a review management software (i.e. EPPI reviewer (J. Thomas et al., 2010)).

Screening

Screening will be conducted at two levels: at title and abstract level (conducted together for efficiency), and at full text level. The full texts will be retrieved, tracking those that cannot be located or accessed and reporting this in the final review report. Retrieved records will then be screened at full text.

Prior to commencing screening, consistency checking will be performed on a subset of articles (10%) at both title and abstract level and full text level screening. A subset of title and abstract records and full texts will be independently screened by three reviewers. The results of the consistency checking will then be compared between reviewers and all disagreements will be discussed in detail. Where the level of agreement is low (below c. 80% agreement), further consistency checking will be performed on an additional set of articles and then discussed. Following consistency checking (i.e. when agreement is above 80%), records will be screened by one experienced reviewer (and on a same set of records to avoid errors in screening). EPPI reviewer's machine learning component might be used to conduct the screening.

Description of methods used in primary research

We anticipate that our evidence base will include quantitative and qualitative studies, including impact assessments and other types of project evaluations.

Criteria for determination of independent findings

Eligible studies will be subject to a study validity assessment. The assessment of quantitative studies will evaluate external and internal study validity and categorise relevant studies as having a high, medium or low validity. This information will be used in a sensitivity analysis during the qualitative synthesis stage. Studies with unacceptably low validity may be excluded from the review. The assessment will also include indication of independency of study findings.

The CASP (Critical Appraisal Skills Program) checklist (CASP, 2018) will be adapted to assess qualitative studies. The detailed criteria for the study validity assessment of included studies (appraisal tool) will be developed during the review process.

Details of study coding categories

We will extract data and meta-data on study context and effect modifiers, study design, type of population, intervention, outcomes, validity assessment and study results and findings (the outcome means and measures of variation, or quotes and first order interpretations). This list may be expanded during the review process. expanded during the review process depending on the type and variety of included studies. For quantitative data, the outcome (such as means and measures of variation including standard deviation, standard error, or confidence intervals) will be extracted from tables and graphs (using image analysis software if needed). In case of unobtainable data from published materials, the review team will ask authors of relevant articles for access to unpublished raw data. The review team will calculate summary statistics if the raw data are provided. All extracted data records will be made available as additional files. Coding and extraction consistency checking will be performed among reviewers on a subset of 10% of articles.

Effect modifiers and reasons for heterogeneity

The following factors, which potentially can cause variation in measured outcomes, were considered and recorded if reported in primary studies. The list will be refined during the review process based on consultations with experts on the review team

- Study context including
    - Social, political and economic context
- Study design
- *Intervention type and implementation context including*
    - *Fund design*
    - *Type of donors (multilateral, bilateral, etc.)*
    - *Funding type (loan, grant) and funding conditions*
    - Timing and scale of investment
    - Type of implementing activates and actors
    - Type of recipients and their priorities
- Measurements and reporting of outcomes

Statistical procedures and conventions

Meta-analysis may be used to synthesise quantitative research, such as in cases where studies report similar types of outcomes. In such cases, effect sizes will be standardised and weighted appropriately. Meta-regression and subgroup analysis of different study categories may be performed where sufficient data exist. We will also analyse the potential presence of publication-bias.

Treatment of qualitative research

Qualitative research will be synthesised, such as using thematic synthesis where codes are organised in descriptive themes that are further interpreted to analytical themes (Barnett-Page & Thomas, 2009; James Thomas & Harden, 2008). Qualitative and qualitative syntheses will be conducted concurrently by overlapping teams, to support cross-fertilisation. Final integration of qualitative and quantitative findings will be led by the ToC (see draft ToC in **Figure 2**) (Kneale, Thomas, Bangpan, Waddington, & Gough, 2018) where we will discuss the complementarity, synergies and divergencies between the two lines of enquiry. As a result of this process, the ToC will be expanded and adjusted.

This review is a part of the larger project where another work package is summarising evaluations of selected DFID funded projects and that work will inform the synthesis and adjustment to the ToC. Data synthesis will also contain narrative and summary findings of each included study. A narrative data synthesis will describe the validity of the results along with the study findings in a tabular form. The synthesis will be disaggregated by gender, DFID priority countries, disability and other relevant vulnerable groups. The final report will include a refined the ToC, a description of the strength of the evidence, an assessment of possible knowledge gaps (that may constitute priority topics for primary research), and a discussion of tentative policy implications of the review findings.

References

Adaptation Fund. (2019). Projects and Programmes. Retrieved from https://www.adaptation-fund.org/projects-programmes/

Arndt, C., & Tarp, F. (2017). Aid, Environment and Climate Change. *Review of Development Economics, 21*(2), 285-303. doi:10.1111/rode.12291

Atteridge, A., Savvidou, G., Meintrup, L., Dzebo, A., Sadowski, S., & Gortana, F. (2019). Aid Atlas: About. Retrieved from https://aid-atlas.org/about

Barnett-Page, E., & Thomas, J. (2009). Methods for the synthesis of qualitative research: a critical review. *BMC Medical Research Methodology, 9*, 59. doi:10.1186/1471-2288-9-59

Bird, N., & Glennie, J. (2011). *Going beyond aid effectiveness to guide the delivery of climate finance*. Retrieved from London: https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/7106.pdf

Brown, P. R., Afroz, S., Chialue, L., Chiranjeevi, T., El, S., Grünbühel, C. M., . . . Williams, L. J. (2019). Constraints to the capacity of smallholder farming households to adapt to climate change in South and Southeast Asia. *Climate and Development, 11*(5), 383-400. doi:10.1080/17565529.2018.1442798

Buchner, B., Falconer, A., Hervé-Mignucci, M., Trabacchi, C., & Brinkman, M. (2011). *The landscape of climate finance*. Retrieved from https://climatepolicyinitiative.org/wp-content/uploads/2011/10/The-Landscape-of-Climate-Finance-120120.pdf

CASP. (2018). *CASP Checklist: 10 questionsto help you make sense of a qualitative research*. Retrieved from https://casp-uk.net/wp-content/uploads/2018/03/CASP-Qualitative-Checklist-2018_fillable_form.pdf

Chen, Z., & He, J. (2018). Lessons Learnt about Foreign Aid for Climate Change Related Capacity-Building. In Y. Huang & U. Pascual (Eds.), *Aid Effectiveness for Environmental Sustainability* (pp. 51-79). Singapore: Springer Singapore.

Collaboration, T. C. (2019). *Campbell systematic reviews: policies and guidelines*. Retrieved from https://www.campbellcollaboration.org/research-resources/writing-a-campbell-systematic-review.html

Colvin, J., Mukute, M., Habib, M., Burt, J., Kugele, M., & Wilson, J. (2020). *ODA to Tackle Climate Change: A condensed Summary of the Evaluation of the Swedish Climate Change Initiative, 2009 - 2012, Summary of EBA Report* Retrieved from Sweden: https://eba.se/wp-content/uploads/2020/04/Summary-webb-final.pdf

Conevska, A., Ford, J., Lesnikowski, A., & Harper, S. (2019). Adaptation financing for projects focused on food systems through the UNFCCC. *Climate Policy, 19*, 43-58. doi:10.1080/14693062.2018.1466682

Dasgupta, P., Morton, J., Dodman, D., Karapinar, B., Meza, F., Rivera-Ferre, M., . . . Vincent, K. (2014). Rural areas. In C. Field, V. R. Barros, D. J. Dokken, K. J. Mach, M. D. Mastrandrea, T. E. Bilir, M. Chatterjee, K. L. Ebi, Y. O. Estrada, R. C. Genova, B. Girma, E. S. Kissel, A. N. Levy, S. MacCracken, P. R. Mastrandrea, & L. L. White (Eds.), *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on*

Climate Change (pp. 613-657). Cambridge, United Kingdom and NewYork, NY, USA: Cambridge University Press.

Denton, F., Wilbanks, T. J., Abeysinghe, A. C., Burton, I., Gao, Q., Lemos, M. C., . . . Warner, K. (2014). Climate-resilient pathways: adaptation, mitigation, and sustainable development. In C. B. Field, V. R. Barros, D. J. Dokken, K. J. Mach, M. D. Mastrandrea, T. E. Bilir, M. Chatterjee, K. L. Ebi, Y. O. Estrada, R. C. Genova, B. Girma, E. S. Kissel, A. N. Levy, S. MacCracken, P. R. Mastrandrea, & L. L. White (Eds.), *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (pp. 1101-1131). Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press.

DFID. (2011). *DFID's Approach to Value for Money (VfM)*. Retrieved from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/49551/DFID-approach-value-money.pdf

GEF. (2013). The GEF and Climate Change. Retrieved from https://www.thegef.org/news/gef-and-climate-change

Harzing, A. W. (2007). Publish or Perish, available from https://harzing.com/resources/publish-or-perish. In.

Hayman, R., Taylor, E., Crawford, F., Jeffery, P., Smith, J., & Harper, I. (2011). *The impact of aid on maternal and reproductive health: A systematic review to evaluate the effect of aid on the outcomes of Millennium Development Goal 5.* Retrieved from London:

House of Commons. (2019). *UK aid for comabting climate change. Eleventh Report of Session 2017–19*. Retrieved from https://publications.parliament.uk/pa/cm201719/cmselect/cmintdev/1432/1432.pdf

Kneale, D., Thomas, J., Bangpan, M., Waddington, H., & Gough, D. (2018). *Causal chain analysis in systematic reviews of international development interventions*. Retrieved from London:

Micale, V., Tonkonogy, B., & Mazza, B. (2018). *Finance for Climate Adaptation in Developing Countries. A CPI report*. Retrieved from https://climatepolicyinitiative.org/wp-content/uploads/2018/12/Finance-for-Climate-Adaptation-in-Developing-Countries-1.pdf

Niang, I., Ruppel, O., Abdrabo, M., Essel, A., Lennard, C., Padgham, J., & Urquhart, P. (2014). Africa. In V. R. Barros, C. Field, D. J. Dokken, M. D. Mastrandrea, K. J. Mach, T. E. Bilir, M. Chatterjee, K. L. Ebi, Y. O. Estrada, R. C. Genova, B. Girma, E. S. Kissel, A. N. Levy, S. MacCracken, P. R. Mastrandrea, & L. L. White (Eds.), *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (pp. 1199-1265). Cambridge, United Kingdom and NewYork, NY, USA: Cambridge University Press.

Noble, I., Huq, S., Anokhin, Y., Carmin, J., Goudou, D., Lansigan, F., . . . Villamizar, A. (2014). Adaptation needs and options. In C. Field, V. R. Barros, D. J. Dokken, K. J. Mach, M. D. Mastrandrea, T. E. Bilir, M. Chatterjee, K. L. Ebi, Y. O. Estrada, R. C. Genova, B. Girma, E. S. Kissel, A. N. Levy, S. MacCracken, P. R. Mastrandrea, & L. L. White (Eds.), *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (pp. 833-868). Cambridge, United Kingdom and NewYork, NY, USA: Cambridge University Press.

OECD. (2019). *What is ODA?* . Retrieved from https://www.oecd.org/dac/financing-sustainable-development/development-finance-standards/What-is-ODA.pdf

OECD-DAC. (1991). *Principles for evaluation of development assistance*. Retrieved from Paris: https://www.oecd.org/dac/evaluation/50584880.pdf

OECD-DAC. (2016). *OECD DAC Rio Markers for Climate: Handbook*. Retrieved from https://www.oecd.org/dac/environment-development/Revised%20climate%20marker%20handbook_FINAL.pdf

OECD-DAC. (2019). The Paris Declaration on Aid Effectiveness. Retrieved from https://www.oecd.org/dac/effectiveness/parisdeclarationandaccraagendaforaction.htm

Oketch, M., McCowan, T., & Schendel, R. (2014). *The Impact of Tertiary Education on Development: A Rigorous Literature Review.* Retrieved from https://eppi.ioe.ac.uk/cms/Portals/0/PDF%20reviews%20and%20summaries/Tertiary%20education%202014%20Oketch%20report.pdf?ver=2014-06-24-161044-887

Phillips, D., Coffey, C., Tsoli, S., Stevenson, J., Waddington, H., Eyers, J., . . . Snilstveit, B. (2017). *A map of evidence maps relating to sustainable development in low- and middle-income countries: evidence gap map report*. Retrieved from London:

Puig, D., Olhoff, A., Bee, S., Dickson, B., & Alverson, K. (2016). *The Adaptation Finance Gap Report*. Retrieved from Nairobi: Kenya: https://unepdtu.org/publications/the-adaptation-finance-gap-report/

Richards, M., Bruun, T., Campbell, B., Gregersen, L., Huyer, S., Kuntze, V., . . . Vasileiou, I. (2016). *How countries plan to address agricultural adaptation and mitigation: An analysis of Intended Nationally Determined Contributions. CCAFS dataset version 1.2* Retrieved from: https://ccafs.cgiar.org/publications/how-countries-plan-address-agricultural-adaptation-and-mitigation-analysis-intended#.Xr54ry-w3pA

Soanes, M., Rai, N., Steele, P., Shakya, C., & MacGregor, J. (2017). *Delivering real change. Getting international climate finance to the local level. IIED Working paper.* Retrieved from London: https://pubs.iied.org/10178IIED

Taylor, E., Hayman, R., Crawford, F., Jeffery, P., & Smith, J. (2013). The Impact of Official Development Aid on Maternal and Reproductive Health Outcomes: A Systematic Review. *PLoS ONE, 8(2)*, e56271. doi:10.1371/journal.pone.0056271

Thomas, J., Brunton, J., & Graziosi, S. (2010). EPPI-Reviewer 4.0: software for research synthesis. EPPI-Centre Software. London: Social Science Research Unit, Institute of Education, University of London.

Thomas, J., & Harden, A. (2008). Methods for the thematic synthesis of qualitative research in systematic reviews. *BMC Medical Research Methodology, 8*(1), 45-45. doi:10.1186/1471-2288-8-45

UK Government. (2019). *UK International Climate Finance. Building resilience and catalysing the global low - carbon transition: A UK Government commitment*. Retrieved from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/832315/UK-International-Climate-Finance-Booklet.pdf

UNEP. (2019). *Measuring progress towards achieving the environmental dimension of the SDGs*. Retrieved from http://wedocs.unep.org/bitstream/handle/20.500.11822/27627/MeaProg2019.pdf?sequence=1&isAllowed=y

UNFCCC. (2018). *UNFCCC Standing Committee on Finance. 2018 Biennial Assessment and Overview of Climate Finance Flows Technical Report*. Retrieved from

UNFCCC SCF. (2018). *Biennial Assessment and Overview of Climate Finance Flows: Technical Report*. Retrieved from Bonn, Germany: https://unfccc.int/sites/default/files/resource/2018%20BA%20Technical%20Report%20Final%20Feb%202019.pdf

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