

The Global Adaptation Mapping Initiative (GAMI): Part 1 – Introduction and overview of methods

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Method Article

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Abstract

Context: It is now widely accepted that the climate is changing, and that societal responses will need to be rapid and comprehensive to prevent the most severe impacts. A key milestone in global climate governance is to assess progress on adaptation. To-date, however, there has been negligible robust, systematic synthesis of progress on adaptation or adaptation-relevant responses globally.

Aim: The purpose of this review protocol is to outline the methods used by the Global Adaptation Mapping Initiative (GAMI) to ***systematically review human adaptation responses to climate-related changes that have been documented globally since 2013 in the scientific literature***. The broad question underpinning this review is: *Are we adapting to climate change?* More specifically, we ask *'what is the evidence relating to human adaptation-related responses that can (or are) directly reducing risk, exposure, and/or vulnerability to climate change?'* This work responds to the recognition of the need for high-level syntheses of adaptation research to inform global and regional climate assessments.

Methods: We review scientific literature 2013-2019 to identify documents empirically reporting on observed adaptation-related responses to climate change in human systems that can directly reduce risk. We exclude non-empirical (theoretical & conceptual) literature and adaptation in natural systems that occurs without human intervention. Included documents were coded across a set of questions focused on: Who is responding? What responses are documented? What is the extent of the adaptation-related response? What is the evidence that adaptation-related responses reduce risk, exposure and/or vulnerability? Once articles are coded, we conduct a quality appraisal of the coding and develop 'evidence packages' for regions and sectors. We supplement this systematic mapping with an expert elicitation exercise, undertaken to assess bias and validity of insights from included/coded literature *vis a vis* perceptions of real-world adaptation for global regions and sectors, with associated confidence assessments.

Related protocols: This protocol represents Part 1 of a 5-part series outlining the phases of methods for this initiative. Part 1 provides an introduction to the Global Adaptation Mapping Initiative (GAMI) and an overview of methods.

Introduction

The Paris Agreement and Katowice Climate Package articulated a clear mandate to document and assess adaptation progress towards the Global Goal on Adaptation. This includes regularly scheduled stocktaking exercises to summarize and synthesis progress on adaptation. The Global Stocktake (GST) thus underpins the global mandate to track collective progress on how human and natural systems are responding to climatic changes. Despite this, there has to-date been negligible systematic assessment or synthesis of adaptation responses globally. There is, however, a proliferation of documents reporting on adaptation-related efforts and experiences across different sectors, systems, and populations. This

review seeks to systematically synthesize this growing literature to summarize diverse forms of evidence documenting global adaptation progress across sectors, systems, and populations.

Stakeholder Engagement

This review responds to the mandate of the IPCC's AR6 outline, which highlights the need to document and synthesize observed responses to climate change

(http://www.ipcc.ch/site/assets/uploads/2018/03/AR6_WGII_outlines_P46.pdf and <http://www.ipcc.ch/site/assets/uploads/2018/09/220520170356-Doc.-2-Chair-Vision-Paper-.pdf>).

The approved outline of the IPCC's AR6 Working Group II report reflects an extensive consultative process that includes climate change experts from across disciplines, users of the IPCC reports, and representatives from governments:

(https://www.ipcc.ch/site/assets/uploads/2018/03/AR6_WGII_outlines_P46.pdf) .

Throughout this protocol, we draw on the foci, categorization, and priorities outlined in the IPCC AR6 WGII outline as a reflection of stakeholder framing for this review. To maximize potential impact of outputs, the timeline for this review has additionally been aligned with the publication schedule and publication cut-offs to inform the AR6 assessment process

(https://www.ipcc.ch/site/assets/uploads/2018/12/Timeline_WGIIAR6.pdf)

Reporting standards

This protocol follows guidance for systematic review mapping (e.g. James et al. 2016) and general guidelines for evidence synthesis (Cochrane, Campbell, CEE). We follow the ROSES established reporting standards (Haddaway et al. 2018).

Funding

The Global Adaptation Mapping Initiative has no formal funding, and is supported by a network of researchers around the world who have contributed their in-kind time to this initiative.

Reagents

n/a

Equipment

n/a

Procedure

1.0 Objective of the Review

We frame the review using standards for formulating research questions and searches in systematic reviews, using a PICoST approach: population/problem (P), interest (I), context (Co), and Time (T) and Scope (S) (Table 1).

The activity of interest (I) is adaptation-related responses. Due to the lack of scientifically-robust literature assessing the potential effectiveness of responses, we use the term ‘adaptation-related responses’ rather than the more common ‘adaptations’ to avoid the implication that all responses (or adaptations) are actually adaptive (i.e. reduce vulnerability and/or risk); some responses labelled as ‘adaptations’ might in fact be maladaptive. To be included, responses must be initiated by humans. This includes human-assisted responses within natural systems, as well as responses taken by governments, the private sector, civil society, communities, households, and individuals, whether intentional/planned or unintentional/autonomous. While unintentional/autonomous responses are included, these are likely to be under-represented unless labelled as adaptation and documented as a response to climate change due to the infeasibility of capturing potential adaptive activities not identified as adaptations. We exclude responses in natural systems that are not human-assisted; these are sometimes referred to as evolutionary adaptations or autonomous natural systems adaptations. While important, autonomous adaptation in natural systems is distinct from adaptations initiated by humans; this review focuses on responses by humans to observed or projected climate change risk. We include any human responses to climate change impacts that are, or could, decrease vulnerability or exposure to climate-related hazards, as well as anticipatory measures in response to expected impacts.

This review focuses on adaptation only, and excludes mitigation (responses involving the reduction of greenhouse gas (GHG) concentrations). We consider adaptation responses across contexts (Co) globally, and focus only on adaptation activities that are directly intended to reduce risk, exposure, or vulnerability, even if later identified as maladaptation. To reflect publications since AR5 and prior to the AR6 publication cut-off, we focus on literature published in the time period (T) between 2013 and 2020.

This review focuses on the scientific literature only, and excludes grey literature and other sources of Indigenous and Local Knowledge (IKLK).

2.0 Summary of search strategy

This protocol represents Part 1 of a 5-part series outlining the phases of this initiative. Part 1 provides an introduction to the Global Adaptation Mapping Initiative (GAMI) and an overview of methods. Related protocols are outlined in Table 2.

A summary of the steps and protocols included in the GAMI work is shown in Figure 1. A flowchart of the number of GAMI articles and phases of inclusion and exclusion is provided in Figure 2.

Troubleshooting

Time Taken

The full GAMI work, including all stages, was undertaken over a period of approximately 12-18 months (2019-20).

Anticipated Results

The results of this initiative comprise a database and a set of evidence packages documenting key insights from scientific literature documenting global human adaptation to climate change. These data have been provided to author teams leading the Intergovernmental Panel on Climate Change (IPCC) 6th Assessment Report (AR6), Working Group II, to support their climate assessments. The database is also the basis for a number of secondary analyses and publications, focusing on particular regions, sectors, or aspects of adaptation. Publications are forthcoming.

Figures

Table 1: Review objectives and key components

Review objective	To systematically map and review human adaptation-related responses to climate change that have been documented in the scientific literature globally since 2013
Population (P)	Global human or natural systems of importance to humans that are impacted by climate change
Interest (I)	Observed/documentated adaptation responses to climate change within human systems (or human-assisted in natural systems) in the scientific literature
Context (Co)	Any empirically documented/observed adaptation response by humans
Time & Scope (T/S)	Published between 2013 and 2019

Figure 1

Review objectives and key components

Table 2: Related protocols linked to this protocol

Protocol	Description
Protocol 1: Introduction & overview of protocol methods	Scoping and protocol development
Protocol 2: Screening protocol	Systematic identification of potentially relevant adaptation literature using keyword searches; Systematic screening of literature, supported by machine-learning approaches, and according to inclusion/exclusion criteria.
Protocol 3: Data extraction protocol	Coding of documents passing screening criteria to collect information on adaptation-related response activities globally Quality checking and reconciliation of multiple codes.
Protocol 4: Synthesis protocol	Development of 'evidence packages' for regions and sectors.
Protocol 5: Expert elicitation protocol	Implementation of expert elicitation to assess validity of results and generate confidence statements.

Figure 2

Related protocols linked to this protocol