

Concept Note for Proposal to Wellcome Trust Climate Impacts Awards

[Link to Call text](#)

Deadline 3 April 2024

Project team:

- **CISM (lead):** Tonne, C; Cossa H
- **ISGlobal, Spain:** TBD
- **INS, Mozambique:** Marrufo, T
- **University of Birmingham, UK:** Dasandi, N
- **University of United Nations, Wider, Finland (Partners from Mozambique office):** Jones, S

Aims and research questions:

Overall aim: To provide evidence on the effects of extreme weather events (floods and tropical storms) on child health in a low-income country setting to position its national government to access funding through the UNFCCC loss and damages process.

Research questions:

1. How does evidence of health effects of climate change feed into the UNFCCC loss and damages process?
2. What are the magnitude and economic costs of floods and tropical storms on child health in Mozambique?
3. How can existing social protection schemes at the national level be modified to offset child health impacts from extreme weather events.

By the end of this project, our policy change objectives are to:

1. Empower Mozambique specifically (and other LIC generally) to access funding dedicated to compensate for non-economic loss and damages due to health effects of climate change.
2. Improve data collection at the health facility level through DHIS2 for tracking climate change impacts on child health
3. Strengthen demand for more ambitious loss and damages financing from HICs
4. Recommend how specific national policies (e.g. social protection) can be used to protect child health from climate change hazards.

Approach and methods

Our overall approach is to use an engaged research process to accelerate policy and societal change based on a clear Theory of Change (ToC) and strong understanding of policy levers

Outline of Workpackages:

WP1- Generating evidence on associations between extreme weather events, child morbidity, and health care access (lead: CISM) [M1-24]

WP1 aims to fill a well-defined evidence gap within 18 months by leveraging existing secondary data. The research will provide insights on context-specific environmentally mediated health effects of climate change on child health.

Task 1.1 Measuring exposure to floods and tropical storms (ISGlobal) [M1-12]

We will use remote sensing data, global models, household and personal temperature measurements, and questionnaires to characterize exposure to climate change hazards.(Catalogue; NOAA; Observatory; UCSB/CHG; Yamazaki)

- Flood monitoring data- digital elevation maps, flood extent
- Historical hurricane tracks.

Task 1.2 District-wide longitudinal cohort analysis (CISM) [M1-24] This task leverages the child morbidity surveillance system run by CISM in Manhiça district since 1998 to provide epidemiological evidence using rich longitudinal cohort data from a single district. We will extend an existing longitudinal child cohort constructed through data linkage of demographic, household, and hospital surveillance data (n=22K children, 76K hospital visits in current follow-up). The cohort prospectively follows all children born into the Manhiça HDSS between 2016-2020 until death, out migration from HDSS area, or end of follow-up (31 Dec 2020). Individual children are linked using a permanent ID to outpatient hospital visits and inpatient admissions. We will extend follow-up to 31 Dec 2022. We will conduct epidemiological analyses linking exposures generated in Task 2.1 at the household level to: hospital visits according to main diagnostic code (48% respiratory related, 5% due to gastro-intestinal illness, and 4% malaria). We will characterise in detail the exposure-response relationships, exploring non-linearities and thresholds, and the timing between extreme weather events and rates of hospital visits by exploring different lag structures.

Task 1.3 Nation-wide analysis based on health facility data from DHIS2 (ISGlobal) [M1-24]. Complementing the detailed individual-level analysis in Task 1.2., we will conduct a national-level analysis using health care facility data collected via the DHIS2 platform between 2018-2023 at monthly level. Using hospital facility geolocation, we will create a spatio-temporal dataset, with a monthly time series for each health facility. Exposures in Task 2.1 will be estimated based on a buffer around each health facility, approximating the spatial area of the catchment area. We will focus on outpatient hospital visits for respiratory infection, gastro-intestinal illness, and malaria among children <5y and <15y.

We will start with a comprehensive assessment of data completeness and quality of DHIS2 data for the these outcomes, which have potential to be valuable indicators to track health impacts of climate change on child health. This will feed into stakeholder engagement activities to reinforce the data quality of DHIS2 in Mozambique for purposed of tracking climate change impacts in Task 4.3.

We will use a case time series design to analyze the relationship between EWE and outpatient visits, in which each health facility is compared to itself over time.(Gasparrini 2022) This offers strong control for time-invariant confounders, flexible options to adjust for time-varying confounding, the possibility to model complex temporal relationships using distributed lag non-linear functions to characterize complex exposure-lag-response relationships. Using health facilities as the unit of analysis, also offers the opportunity to explore modification of the exposure-outcome relationship by facility or surrounding area characteristics (e.g. existing health vulnerability indicators, poverty).

WP2- Policy opportunity (lead UoB) WP2 investigates how health evidence can advance the case for loss and damages in low-income countries (LIC). [M1-24]

Task 2.1. Political economy analysis (PEA) of child health in the context of extreme weather events (UoB). We will work with local researchers to undertake a political economy analysis (PEA) of child health in Mozambique in the context of extreme weather events. PEAs have been used to provide a better understanding of the policy context and to identify drivers and barriers to change. In this project, we will conduct an adapted PEA that focuses more specifically on understanding the policy context in protecting child health from the effects of extreme weather events in Mozambique. The PEA has three key objectives:

- (1) Identify the key actors, institutions, and policies connected to the extreme weather events and child health relationship at national and local levels.
- (2) Understand the policy processes involved in responding to extreme weather events to protect child health in Mozambique, and the political and bureaucratic dynamics that underpin these policy processes.
- (3) Identify key challenges faced by different actors in protecting child health in response to extreme weather events – focusing on resources, data and evidence, and political and bureaucratic challenges, and identify opportunities for positive change.

The PEA will be undertaken in three stages. First, we will analyse existing legal, political, and policy documents to map the formal institutions and actors, and the key policies related to the extreme weather event-child health policy nexus in Mozambique. Second, we will conduct in depth interviews with relevant national policymakers (e.g., Ministry of Health, Ministry of XX), international donors (e.g., USAID, FCDO, UNDP), and key international and local civil society actors in the country (e.g., XX). These interviews will be used to identify the policy processes involved in protecting child health from extreme weather impacts, challenges for adaptation, and the financing gaps involved in addressing extreme weather event impacts on child health in the country. Third, we will focus on two local communities, and examine the local context...

Task 2.2. Progressive revision of Theory of change (UoB). [M1-24]

We will conduct two workshops including diverse stakeholders to update our preliminary ToC, to generate two further iterations of the ToC underpinning the project.

WP3 Economic valuation of health effects and offsetting through policy (UNU Wider) WP3 extends the evidence of health effects in WP1 by adding economic valuation and generates new evidence on how existing social protection policies in Mozambique can be modified to “offset” documented child health effects

Task 3.1 Economic valuation of health effects (UNU Wider)

Task 3.2 Analysis of social protection policies and how they could be modified to offset the costs of child health impacts due to EWE (UNU Wider).

WP4- Stakeholder engagement and communication to drive change (CISM) [M1-36]

Task 4.1 Capturing the lived experience of affected populations (CISM) [M1-12] We will use the Photovoice approach to engage communities and give voice to children, their families, and local research teams regarding the impacts of climate change on their daily lives. With the support of the local research team, a professional film director and producer from Cutting Edge Productions (CEP) will identify “protagonists” in Manhiça and Quelimane districts among study participants and the research team. We will equip protagonists with GoPro video cameras, provide training, and create the data infrastructure for sharing video files with CEP. This approach allows protagonists to capture in real-time the full implications of floods and tropical storms on health determinants. Photovoice techniques will be used in focus group discussions and in-depth interviews conducted by social scientists at CISM to encourage participants to annotate, discuss, and reflect on their experience with climate change. Qualitative data will be analysed for publication.

Task 4.2 Communication to catalyse societal change (CEP) [M12-36] Footage from Task 4.1 will be integrated into a short, professionally-produced, documentary film highlighting the impacts of flooding and tropical storms on child health in Mozambique and the profound justice implications of the mismatch between responsibility for and vulnerability to climate change. The documentary will combine material captured by a professional documentary crew from CEP with footage collected continuously during the first year by research participants and local research staff. The director and a small crew will film on location at specific occasions (e.g. research start, significant project events), to gather material that will serve as the backbone of the film’s narrative. Material will include interviews with local researchers, community members, and staff in Ministries involved in securing financing through earmarked funds for loss and damages. Partnerships with change agents (e.g. UK Natural History Museum) are in place for screening the documentary to catalyse demand for change among HIC audiences.

Task 4.3 Improving datastreams for tracking effects of EWE on child health through institutional stakeholder engagement_(INS) [M12-36]

Based on analysis in WP1 regarding the quality and completeness of DHIS2 data on selected indicators of child health, this task focuses on strengthening these data for purposes of tracking child health impacts of climate change, supporting indicators, evidence generation needed to quantify the child health impacts of climate change, and policy change.

Strategic relevance

The project clearly connects with local and national priorities to protect children from the health effects of floods and tropical storms, which are increasing in frequency and severity due to climate change. The project builds on priority areas (e.g. climate change and health) identified by the CISM Environmental Health Hub.

Benefit sharing/Capacity building

The project builds institutional capacity by positioning CISM as research center active in climate change and health research in Sub-Saharan Africa, a topic with increased funding availability.

A training fellow would be trained by ISGlobal in longitudinal cohort analysis and case time series analysis for spatio-temporally varying environmental exposures.

A data manager will be trained in data management and linkage for secondary analysis of large datasets.

CISM staff in budget (preliminary):

Co-Investigator time (Cossa)

Training fellow

Data manager

Project manager