METEOR: Midline Design Document

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FATHOM

GEM
GLOBAL EARTHQUAKE MODEL
working together to assess risk

Oxford Policy Management

HOT

ImageCat

NSET
Earthquake Safe Communities in Nepal

Endline Design Document

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Abbreviations

Acronym	Description
BGS	British Geological Survey: An organisation providing expert advice in all areas of geoscience to the UK government and internationally
BIPAD	Building Information Platform Against Disaster (Nepal)
CEA	Cost-Effectiveness Analysis
COP	Conference of Parties
DAC	Development Assistance Committee
DFID	UK Department for International Development
DHM	Department of Hydrology and Metrology (Nepal)
DMD	Disaster Management Department: Prime Minister's Office of Tanzania focused on disaster risk
DRM	Disaster Risk Management
DRRM	Disaster Risk Reduction and Management
EO	Earth Observation
EQ	Evaluation Question
FATHOM	Provides innovative flood modelling and analytics, based on extensive flood risk research
FCDO	UK Foreign, Commonwealth and Development Office
FGD	Focus Group Discussion
GBP	Great British Pound
GCRF	Global Challenges Research Fund
GEM	Global Earthquake Model: Non-profit organisation focused on the pursuit of earthquake resilience worldwide
GFDRR	Global Facility for Disaster Reduction and Recovery
GST	Geological Survey of Tanzania

Acronym	Description
HOT	Humanitarian OpenStreetMap Team: A global non-profit organisation the uses collaborative technology to create OSM maps for areas affected by disasters
ICIMOD	International Centre for Integrated Mountain Development
IIAG	METEOR Insurance Industry Advisory Group
ImageCat	International risk management innovation company supporting the global risk and catastrophe management needs of the insurance industry, governments and NGOs
IPP	International Partnership Programme
KII	Key Informant Interview
KP	Knowledge Product
KPI	Key Performance Indicator
LDC	Least Developed Country
M&E	Monitoring & Evaluation
MEL	Monitoring, evaluation and learning
METEOR	Modelling Exposure Through Earth Observation Routines
MoHA	Ministry of Home Affairs (Nepal)
NDRRMA	National Disaster Risk Reduction and Management Authority (Nepal)
NGO	Non-government organisation
NSET	National Society for Earthquake Technology: Non-governmental organisation working on reducing earthquake risk in Nepal and abroad
OC	Outcome indicator
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation
OP	Output indicator

Acronym	Description
OPM	Oxford Policy Management: Organisation focused on sustainable project design and implementation for reducing social and economic disadvantage in low-income countries
PEA	Political Economy Analysis
PMO	Prime Minister's Office (Tanzania)
SDGs	Sustainable Development Goals
SFDRR	Sendai Framework on Disaster Risk Reduction
TMA	Tanzania Meteorological Academy
TOC	Theory of Change
ToR	Terms of Reference
TURP	Tanzania Urban Resilience Project
UDSM	University of Dar es Salaam
UKSA	United Kingdom Space Agency
UNFCCC	United Nations Convention on Climate Change
UNICEF	United Nations Children's Fund
UNISDR	United Nations International Strategy for Disaster Reduction
VFM	Value for money
WB	World Bank
WP	Work Package

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Executive Summary

This Terms of Reference (ToR) presents the design details of the endline evaluation of the METEOR (Modelling Exposure Through Earth Observation Routines) project, which is due to end in March 2021. Due to the COVID-19 pandemic and uncertainties on whether and to what extent METEOR will be granted a time extension, the current version of the ToR assumes that the endline evaluation will run between December 2020 and February 2021. This timeframe is not ideal for the endline evaluation mainly because the key project outputs, i.e. Disaster Risk Reduction and Management (DRRM) data sets and protocols, and the capacity building activities about them will only be delivered right before or during the evaluation period. Therefore, if an extension will be granted at any time during the endline evaluation, some of the remaining evaluation activities will be postponed to allow for more time for the project outcomes to materialise.

The endline evaluation will be undertaken with the following **general objectives**:

1. Assess **evidence of the project results and evidence of longer-term impact**.
2. Assess **the degree to which the project achieved its outcomes and impacts** – and understand how project activities contributed to these.
3. **Provide insights for the consortium and stakeholders** on how to best design and implement future interventions, based on the insights gained from the experience of implementation.

The evaluation will assess the project performance and results according to the Organisation for Economic Co-operation and Development's (OECD) **Development Assistance Committee (DAC) criteria: relevance, coherence, effectiveness, efficiency, impact and sustainability** (see Section 3.3). It will entail three main components:

- **Summative evaluation**: The summative evaluation will be comprised of a Global Case Study targeting representatives of the insurance industry, the global humanitarian and development community, and governments of Official Development Assistance (ODA)-listed countries (see Section 4.2.1), and two Country Case Studies, respectively for Tanzania and Nepal (see Section 4.2.2).
- **Process evaluation:** The process evaluation will be light-touch and will be conducted by Key Informant Interviews (KIIs) with representatives of the METEOR consortium partners to understand how the consortium worked together and what lessons there are for future projects (see Section 4.3).
- **Result monitoring and logframe completion**: Compilation of the endline achievements of METEOR within the project logframe (see Section 4.4).

The findings, conclusions and recommendations of the endline evaluation will be included in the **METEOR Endline Evaluation Report** (Milestone Deliverable M2.9) (see Section 5). A summary will also be provided in PowerPoint presentation format.

Right before the end of the project, a half-day **Final Annual Learning Event** will be held to help the METEOR partners to review the endline evaluation findings and identify key lessons for future projects (see Section 5.1). The results from the Annual Learning Event will be included in dedicated minutes, which will be shared with the whole METEOR project team and the UKSA.

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1. METEOR Project Introduction

1.1. Project Summary

Project Title	Modelling Exposure Through Earth Observation Routines (METEOR): EO-based Exposure, Nepal and Tanzania
Starting Date	08/02/2018
Duration	36 months
Partners	UK Partners: The British Geological Survey (BGS) (Lead), Oxford Policy Management Limited (OPM), SSBN Limited International Partners: The Disaster Management Department, Office of the Prime Minister – Tanzania (DMD), The Global Earthquake Model (GEM) Foundation, The Humanitarian OpenStreetMap Team (HOT), ImageCat, National Society for Earthquake Technology (NSET) – Nepal
Target Countries	Nepal and Tanzania for "level 2" results and all 47 Least Developed ODA countries for "level 1" data
IPP Project	IPPC2_07_BGS_METEOR

Table 1: METEOR Project Summary

1.2. Project Overview

At present, there is a poor understanding of population exposure in some Official Development Assistance (ODA) countries, which causes major challenges when making Disaster Risk Management decisions. Modelling Exposure Through Earth Observation Routines (METEOR) takes a step-change in the application of Earth Observation exposure data by developing and delivering more accurate levels of population exposure to natural hazards. METEOR is delivering calibrated exposure data for Nepal and Tanzania, plus 'Level-1' exposure for the remaining Least developed Countries (LDCs) ODA countries. Moreover, we are: (i) developing and delivering national hazard footprints for Nepal and Tanzania; (ii) producing new vulnerability data for the impacts of hazards on exposure; and (iii) characterising how multi-hazards interact and impact upon exposure. The provision of METEOR's consistent data to governments, town planners and insurance providers will promote welfare and economic development and better enable them to respond to the hazards when they do occur.

METEOR is co-funded through the second iteration of the UK Space Agency's (UKSA) International Partnership Programme (IPP), which uses space expertise to develop and deliver innovative solutions to real world problems across the globe. The funding helps to build sustainable development while building effective partnerships that can lead to growth opportunities for British companies.

1.3. Project Objectives

METEOR aims to formulate an innovative methodology of creating exposure data through the use of EO-based imagery to identify development patterns throughout a country. Stratified sampling techniques harnessing traditional land use interpretation methods, modified to characterise building patterns, can be combined with EO and in-field building characteristics to capture the distribution of building types. The associated protocols and standards will be developed for broad application to ODA countries and will be tested and validated for both Nepal and Tanzania to assure they are fit-for-purpose.

Detailed building data collected on the ground for the cities of Kathmandu (Nepal) and Dar es Salaam (Tanzania) were used to compare and validate the EO generated exposure datasets. Objectives of the project look to: deliver exposure data for 47 of the least developed ODA countries, including Nepal and Tanzania; create hazard footprints for the specific countries; create open protocol; to develop critical exposure information from EO data; and capacity-building of local decision makers to apply data and assess hazard exposure. The eight work packages (WP) that make up the METEOR project are outlined below in section 1.4.

1.4. Work Packages

Outlined below are the eight work packages that make up the METEOR project (Table 2). These are led by various partners, with a brief description of what each of the work packages cover provided in Table 2. BGS is leading WP.6: Multiple Hazard impact, which focuses on the multiple hazard impacts on exposure and how they may be addressed in disaster risk management by a range of stakeholders.

Work Package	Title	Lead	Overview
WP1	Project Management	BGS	Project management, meetings with UKSA, quarterly reporting and the provision of feedback on project deliverables and direction across primary stakeholders.
WP2	Monitoring and Evaluation	OPM	Monitoring and evaluation of the project and its impact, using a theory of change approach to assess whether the associated activities are leading to the desired outcome.
WP3	EO Data for Exposure Development	ImageCat	EO-based data for exposure development, methods and protocols of segmenting/classifying building patterns for stratified sampling of building characteristics.
WP4	Inputs and Validation	HOT	Collect exposure data in Kathmandu and Dar es Salaam to help validate and calibrate the data derived from the classification of building patterns from EO-based imagery.
WP5	Vulnerability and	GEM	Investigate how assumptions, limitations, scale and accuracy

	Uncertainty		of exposure data, as well as decisions in data development process lead to modelled uncertainty.
WP6	Multiple Hazard Impact	BGS	Multiple hazard impacts on exposure and how they may be addressed in disaster risk management by a range of stakeholders.
WP7	Knowledge Sharing	GEM	Disseminate to the wider space and development sectors through dedicated web-portals and use of the Challenge Fund open databases.
WP8	Sustainability and Capacity-Building	ImageCat	Sustainability and capacity-building, with the launch of the databases for Nepal and Tanzania while working with in-country experts.

Table 2: Overview of METEOR Work Packages

1.5. Monitoring & Evaluation

The monitoring and evaluation work package (WP2) led by OPM includes nine deliverables (Table 3).

Deliverable	**Title**
M2.1	Annual Learning Events
M2.2	Final M&E Plan
M2.3	Baseline Design Document
M2.4	Final Baseline Evaluation Report
M2.5	Midline Design Document
M2.6	Final Midline Evaluation Report
M2.7	Cost-Effectiveness Analysis
M2.8	Endline Design Document
M2.9	Final Endline Evaluation Report

Table 3: Overview of OPM monitoring and evaluation deliverables

2. Background

METEOR seeks to contribute to a reduction in the cost, in human and financial terms, of disasters such as earthquakes, landslides and floods. A major challenge, when making DRRM decisions, is poor understanding of the distribution and character of exposure in less-developed countries. Exposure needs to be mapped, monitored, modelled and fed into sectoral policies and plans (e.g. urban, infrastructure, energy) to build resilience and foster growth. This requires that governments, companies, Non-Governmental Organisations (NGOs), the United Nations and religious organisations have strategies and practices that minimise the chance of a disaster occurring and mitigate the consequences if such an event happens. METEOR takes a step-change in the application of Earth Observation exposure data by developing and delivering more accurate levels of population exposure to natural hazards. Providing new consistent data to governments, town planners and insurance providers will promote welfare and economic development in these countries and better enable them to respond to the hazards when they do occur.

The purpose of this document is to give the Terms of Reference for the endline evaluation. This is complicated by two factors:

- The COVID 19 epidemic which is impacting the project, and the evaluation team's options and choices of tools with which to carry out the evaluation
- Recent changes in the UK's machinery of government including a merger between the Department for International Development (DFID) and the Foreign and Commonwealth Office to form the Foreign, Commonwealth and Development Office (FCDO). In parallel to this, a Spending Review is underway which, at the time of writing (November 2020) is delaying funding decisions.

To allow progress on the endline in a situation of uncertainty, the following scenarios have been developed (Table 4).

	Forecasted deadlines		
M&E Activity	**Scenario 1: No extension**	**Scenario 2: Short extension**	**Scenario 3: One-year extension**
Endline Evaluation Design Document	November 2020	January 2021	March 2021
Endline evaluation data collection phase	December 2020 – January 2021	February – March 2021	September – November 2021
Endline Evaluation Report	**February 2021**	**April 2021**	**December 2021**
Final Annual Learning Event	March 2021	June 2021	February 2022

Table 4: Scenarios for METEOR M&E activities

As we were informed that a definitive answer on whether the project will have a time extension and, if so, of which length will be given not earlier than Christmas, OPM will start to conduct the endline

evaluation activities based on Scenario 1 and if possible extend the timeline for the evaluation in accordance to the final decision by the UKSA on the extension.

3. Purpose & Scope of the Endline

3.1. Purpose of the endline evaluation

The endline evaluation will be undertaken with the following **general objectives**:

1. Assess **evidence of the project results and evidence of longer-term impact**.
2. Assess **the degree to which the project achieved its outcomes and impacts** – and understand how project activities contributed to these.
3. **Provide insights for the consortium and stakeholders** on how to best design and implement future interventions, based on the insights gained from the experience of implementation.

This TOR was drafted by OPM, steered by the guidance notes of Caribou Digital and inputs from consortium partners.

3.2. Scope of the endline evaluation

The data collection from Nepal, Tanzania, and international stakeholders will be used to update all the logframe indicators. A summary of data sources for each logframe indicator is presented in Table 5 below.

Table 5: Logframe update at endline.

##	Indicator	Data source
IM 1	Modelled reduction of deaths, missing persons and directly affected persons attributed to disasters (of similar magnitude and impact) per 100,000 population (disaggregating males and females) in Nepal and Tanzania (aligned with SDG indicators 11.5.1 and 13.1.1)	Internal model based on an hypothetical scenario whereby METEOR outputs inform the improvement of the building codes in Nepal and Tanzania. The model will cover the counterfactual as 'cost of inaction'.
IM 2	Total modelled direct avoided economic loss attributed to disasters in Nepal and Tanzania (in GBP £)	Indicator used in the Cost-Effectiveness Analysis. Internal model based on an hypothetical scenario whereby METEOR outputs inform the improvement of the building codes in Nepal and Tanzania. The model will cover the counterfactual as 'cost of inaction'.
IM 3	Qualitative indicator: progress towards mainstreaming the use of robust DRR data to systematically inform policy changes across public and private sector, and civil society	Virtual KIIs in Nepal and Tanzania, Project monitoring data

##	Indicator	Data source
OC 1.1	Qualitative indicator: progress towards use of project outputs by the governments of Nepal and Tanzania	Virtual KIIs in Nepal and Tanzania, Project monitoring data
OC 1.2	Feedback from relevant Ministry (or decision-maker) on the usefulness of the project outputs for improving their national DRRM (KPI 1)	Project monitoring data
OC 2.1	Qualitative indicator: progress towards use of project outputs by the other end-users in Nepal and Tanzania to inform their DRRM decision-making and practice	Virtual KIIs in Nepal and Tanzania, Project monitoring data
OC 3.1	Qualitative indicator: Feedback from the global community (e.g. UNICEF, UNISDR, WB, GFDRR) in respect of usefulness of project outputs (KPI 4)	Virtual KIIs with METEOR Advisory Board members
OC 3.2	Qualitative indicator: Progress towards creating insurance products informed by METEOR data and/or protocols	Virtual KIIs and FGD with METEOR Insurance Industry Advisory Group (IIAG) members
OC 3.3	Number of dissemination nodes where METEOR KPs and datasets are available to be accessed	Virtual KIIs with METEOR partners, Project monitoring data
OP 1.1	Percentage of professionals trained in Nepal and Tanzania reporting increased knowledge on the training topic (disaggregating males and females)	Project monitoring data
OP 1.2	Number of professionals trained in Nepal and Tanzania (disaggregating males and females)	Project monitoring data
OP 1.3	Number of organisations that had representatives trained in Nepal and Tanzania	Project monitoring data
OP 1.4	Percentage of targeted institutions and organisations in Nepal and Tanzania that had at least two people trained	Project monitoring data
OP 2.1a	Percentage of Nepalese and Tanzanian territory covered by Level 2 exposure data (aligned with SFDRR Global Target g and Priority Area 1) (KPI 2a.1)	Project monitoring data
OP 2.1b	Percentage of Nepalese and Tanzanian territory covered by Level 2 multi-hazard data (aligned with SFDRR Global Target g and Priority Area 1) (KPI 2a.2)	Project monitoring data
OP 3.1	Workplan on track to achieve completion within deadline	Project monitoring data
OP 3.2	Percentage of approached users reporting satisfaction with METEOR protocols (disaggregating males and females)	Project monitoring data

##	Indicator	Data source
OP 4.1	Number of Level-1 datasets for LDCs uploaded on online platforms (aligned with SFDRR Global Target g and Priority Area 1) (KPI 2b)	Project monitoring data
OP 5.1	Policy paper on the use of national-scale exposure data for insurance and other risk-transfer mechanisms published and shared	Project monitoring data
OP 5.2	Number of communication products shared	Project monitoring data
OP 5.3	Number of conferences or workshops hosted or attended by consortium members at which METEOR's findings are shared or discussed	Project monitoring data

The end of project targets are shown in Appendix A - METEOR Endline Targets.

3.3. Evaluation questions

The endline evaluation is planned to assess the progress the project has made at the end point of implementation. Taking in to account the standard criteria for evaluation[1], the focus for the endline will be on:

Relevance: In developing countries, is there a real need and/or demand for national exposure and multi-hazard and vulnerability data and protocols that validate the uncertainty process?

Coherence: To what extent was the project coherent with other DRRM interventions in Tanzania and Nepal, and possibly in other ODA recipient countries?

Effectiveness: To what extent did the design and delivery of the METEOR outputs lead to improvements in the capacity and ability of national and international stakeholders to knowledgably utilise EO-based hazard, exposure and vulnerability data in DRRM policy and practice?

Efficiency: Did the project design and deliver level-one exposure data and protocols for all ODA countries and level-two exposure, hazard and vulnerability data and protocols for Nepal and Tanzania? Was the delivery cost-efficient? What worked well and not so well?

Impact: Is there evidence to suggest that the project has improved in-country DRRM policy and planning? And, if so, is there a reasonable expectation that, in the event of a disaster, countries will experience an improved response, reducing disaster-related deaths, loss and damage?

Sustainability: Is there sustained interest by DRRM stakeholders (e.g. other LDC governments, NGOs, the insurance industry and the humanitarian community) in these data and protocols?

These topline questions are explored in more detail in Table 6.

[1] https://www.oecd.org/dac/evaluation/daccriteriaforevaluatingdevelopmentassistance.htm

Table 6: Evaluation Questions

Criteria	Evaluation Question	Indicative supporting questions
Relevance	In Tanzania and Nepal and other ODA countries, is there a real need and/or demand for national exposure and multi-hazard and vulnerability data and protocols that validate the uncertainty process?	• Is there evidence that the initial assumption of project on the lack of national exposure and multi-hazard and vulnerability data and protocols was well-founded? • Have other ODA countries expressed interest in these data? • Have there been requests for these data by other ODA countries? • Do we see broader uptake and use of the protocols?
Coherence	To what extent was the project coherent with other DRRM interventions in Tanzania and Nepal, and possibly in other ODA recipient countries?	• Is there alignment or overlap between the project goals and other projects? Is the project consistent with other actors' interventions in the same context? • How does the project fit with international norms and standards in DRRM in ODA-recipient countries?
Effectiveness	To what extent did the design and delivery of the METEOR outputs lead to improvements in the capacity and ability of national and international stakeholders to knowledgably utilise EO-based hazard, exposure and vulnerability data in DRRM policy and practice?	• Have Nepal and Tanzania used METEOR outputs in any DRRM activities? • Are users (national and international) satisfied with the tools? Are they providing the right level of information? • Have national experts improved their capacity to use and update EO data to generate information relevant for DRRM? • Are national technical experts better positioned to serve as regional experts or 'lighthouses' in the DRRM space?
Efficiency	Did the project design and deliver level-one exposure data and protocols for all ODA countries and level-two exposure, hazard and vulnerability data and protocols for Nepal and Tanzania? Was the delivery cost-efficient? What worked well and not so well?	• How has the consistency and quality of the exposure, hazard and vulnerability data in pilot countries (Nepal and Tanzania) improved overtime? • Has the project delivered open-access data? • Is the provision of protocols and level two data cost-efficient to make it feasible and practical to replicate efforts in Tanzania and Nepal across other ODA countries?

Criteria	Evaluation Question	Indicative supporting questions
		• Further VFM related questions like: Were the costs involved in METEOR reasonable? What decisions did the project take to make the best use of financial resources? • Does the Cost-Effectiveness Analysis (CEA) of the METEOR EO-based methodology show that this is more cost-effective than other non-EO-based alternatives?
Impact	Is there evidence to suggest that the project has improved in-country DRRM policy and planning? And, if so, is there a reasonable expectation that, in the event of a disaster, countries will experience an improved response, reducing disaster-related deaths, loss and damage?	• Is there evidence that the senior decision-makers of relevant Ministries (e.g. PMO in Tanzania and MoHA in Nepal) and other end-users (e.g. NSET, ICIMOD, FCDO in Nepal, and Red Cross, World Bank in Tanzania) have bought-in the METEOR outputs (i.e. they confirm the intention and have concrete plans of how to use the outputs)? • Is there evidence that key technical users in relevant governmental and other end-users (e.g. DMD, GST, TMA, UDSM, Resilience Academy in Tanzania, and NSET, ICIMOD, MoHA, DHM in Nepal) own the METEOR data and protocols (i.e. they understand them and know how to use and update them)? • How likely and in what ways will the METEOR outputs lead to improved national DRRM policy and planning? • Has the project led to improved, rapid access to relevant information on exposure? • How likely and in what ways will the METEOR outputs lead to improvements in decision-making process of NGOs, policy makers and insurers?
Sustainability	Is there sustained interest by DRRM stakeholders (e.g. other LDC governments, NGOs, the insurance industry and the humanitarian community) in these data and protocols?	• Is there evidence to suggest that humanitarian and development actors such as UNICEF, the World Bank or UK FCDO plan to use available METEOR data or protocols when evaluating disaster risk in ODA or developing countries? • Do the protocols and datasets improve and support the development of insurance products for use in developing countries? • What follow on opportunities has the consortium got in pipeline or secured?

4. Methodology of the endline evaluation

There are limitations on face-to-face interaction because of COVID-19 that impact on our methodology. For example, our plan to attend the Understanding Risk 2020 conference to meet a number of DRR representatives from ODA countries and gather some primary data on the relevance and sustainability aspects of the METEOR outputs for LDC Governments was not possible. The conference is still planned, but will be virtual which removes the possibilities of side-meetings with attendees.

Given the situation and resulting constraints, the instruments and methodology for the evaluation will have to be flexible and practical. Possible options for different data sources include:

- **Desk research**: As part of the endline case study, the team will update the information gathered in the baseline related to the DRRM processes that currently exist in the pilot countries of Nepal and Tanzania. Documents include national plans and policies related to DRRM, sector strategies/policies, literature on risk exposure representation and modelling, literature on disaster risk insurance in developing countries, and national and international statistics.
- **Focus Group Discussion** (FGD) with the IIAG members.
- **Online survey**: We will develop an online survey to receive feedback from those we can identify who have downloaded and used the data.
- **Online workshop**: Something we will explore as a possibility is to have an online participatory evaluation workshop both in Nepal and Tanzania to review with key stakeholders METEOR's progress against logframe results and indicators, to help inform the programme's contribution towards change. The workshop will be followed by a series of targeted interviews with KIIs.
- **Key Informant Interviews**: Online semi-structured KIIs will be conducted with national (in Nepal and Tanzania) and international (from the insurance industry and humanitarian community) stakeholders.
- **Cost-Effectiveness Analysis**: The findings of the CEA delivered on the side of the endline evaluation will be used to answer questions about the efficiency of the project.

Evaluation Question	OECD DAC Criteria	Methods & Tools					
		Desk Research	Cost-effectiveness analysis	Online workshop	Focus Group Discussion	KIIs	Online survey
EQ1: In developing countries, is there a real need and/or demand for national exposure and multi-hazard and vulnerability data and protocols that validate the uncertainty process?	Relevance			X		X	X
EQ2: To what extent was the project coherent with other DRRM interventions in Tanzania and Nepal, and possibly in other ODA recipient countries?	Coherence			X		X	
EQ3: Did the project design and deliver level-one exposure data and protocols for all ODA countries and level-two exposure, hazard and vulnerability data and protocols for Nepal and Tanzania? Was the delivery cost-efficient? What worked well and not so well?	Efficiency		X	X		X	
EQ4: To what extent did the design and delivery of the METEOR outputs lead to improvements in the capacity and ability of national and international stakeholders to knowledgably utilise EO-based hazard, exposure and vulnerability data in DRRM policy and practice?	Effectiveness	X		X	X	X	X
EQ5: Is there evidence to suggest that the project has improved in-country DRRM policy and planning? And, if so, is there a reasonable expectation that, in the event of a disaster, countries will experience an improved response, reducing disaster-related deaths, loss and damage?	Impact	X		X		X	
EQ6: Is there sustained interest by DRRM stakeholders (e.g. other LDC governments, NGOs, the insurance industry and the humanitarian community) in these data and protocols?	Sustainability				X	X	X

Table 7: Data collection methods map

4.1. Key Components

The overall evaluation approach for METEOR is laid out in the Monitoring, Evaluation and Learning Plan, contained in a separate document. In terms of the objectives, those of particular relevance to the endline are assessing the efficiency and effectiveness of project activities, and the relevance of project outputs, thus contributing to the likely sustainability of project results and providing operational learning. More specifically, key components of the endline evaluation include:

i. **Summative evaluation**. The project has an unusual timeline, with key outputs being completed towards the end of the project life. Moreover, there are aspects of engagement with the national project partners that require serious attention and improvement. Therefore, the focus of the endline will be on questions around relevance, effectiveness and sustainability, while the questions around impact will revert around the solidity of the causal assumptions behind the Theory of Change to understand the likelihood of longer term impact, which will be directly more visible during the legacy evaluation.
ii. **Process evaluation** in order to understand how the project has been managed, what has accelerated or impeded progress, and what has contributed to the results that have been achieved, interviews will be held.
iii. **Result monitoring and logframe completion**: Compilation of the endline achievements of METEOR within the project logframe.

Each of these are described in more details in the following sections.

4.2. Summative evaluation

Like the baseline evaluation, the summative analysis of the endline evaluation will be presented as a global case study and two country case studies. Each of these is described in further detail below.

4.2.1. Global case study

The endline Global Case Study follows up the one prepared at midline and seeks to gather **evidence on the interest in (relevance), usefulness (effectiveness, efficiency, coherence), and future prospect (impact, sustainability) of the METEOR outputs for the three main project target stakeholders outside of Tanzania and Nepal, namely**:

- **Insurance Industry**
- **Global Humanitarian and Development Community**
- **Governments of other ODA-listed countries.**

The approach will be similar to the one used for the midline evaluation, in that the data collected will come from a small number of representatives for each group. In particular, in terms of insurance industry and humanitarian and development community, we will have two separate **virtual FGDs with, respectively, members of the METEOR Advisory Board and Insurance Industry Advisory Group**. In addition, the M&E team will attend and where possible ask specific questions at other meetings with additional representatives of development partners and insurance (e.g. GFDRR, Lloyds insurance, UNICEF), organised by ImageCat as part of the METEOR sustainability strategy. These meetings will be

useful to collect additional evidence on the likelihood that the METEOR outputs will be used beyond the project implementation phase and about additional future opportunities for METEOR partners due to the project outcomes.

In terms of other ODA countries' government representatives, the M&E Team will **seek advice within the METEOR consortium for identifying a small group of relevant officials (approx. 5-7) and possibly have an FGD with them** to explore how they see the METEOR outputs to play a role in their DRRM planning. Moreover, we will also gather useful evidence from the online survey delivered to those **who will be sent or will request to see METEOR outputs**. Finally, from **KIIs with the METEOR consortium members**, we will be able to document the requests of support from other ODA governments that resulted in using the METEOR data and/or protocols outside Tanzania and Nepal.

Some possible evaluation questions for the members of the **Advisory Board and the Insurance Industry Advisory Group** include:

- *Do you think the METEOR products can strengthen the discipline around the development of exposure and risk data? Why / In what way?*
- *How likely do you think your organisation would use the open source/access METEOR products in the future? For what?*
- *How likely do you think your organisation would pay to use or expand the METEOR products in the future? For what? Have you got concrete plans to use or expand the METEOR products?*
- *[For members of the insurance industry or Disaster Risk Financing community] Do you think any METEOR product (and if so which ones) have high potential to lead to the creation of insurance products in LDC or other developing countries? Why / In what way? Have you got concrete plans to use the METEOR products to support your organisation in developing insurance products?*

Some possible evaluation questions for **LDC Government representatives** include:

- *Can you briefly describe the in-country procedures/ processes/ policies the government and other stakeholders undertake around disaster risk assessment? Is your organization involved? What other organizations are involved?*
- *In your opinion, what are the major challenges faced by your country when it comes to assessing and planning against the risks of a disaster? What about other LDC/developing countries based on your knowledge/experience?*
- *[After explaining the METEOR products that are available for their country] Do you think these products could be used to improve the disaster risk assessment effectiveness in your country? Why / In what way?*

Data gathered for the endline global case study will help us assess the endline status of the following qualitative logframe indicators: Outcome Indicators 3.1 and 3.2.

4.2.2. Country case studies

The in-country activities for the endline evaluation will be highly focused on understanding the results that have been delivered in each country:

- Was the delivery efficient and effective? What worked well and not so well? Why?
- To what extent did the design and delivery of the METEOR outputs lead to improvements in the capacity and ability of national and international stakeholders to knowledgably utilise EO-based hazard, exposure and vulnerability data in DRRM policy and practice?
- Is there evidence to suggest that the project has improved in-country DRRM policy and planning? Is there sustained interest by the national DRRM stakeholders in these data and protocols?
- Is there a reasonable expectation that, in the event of a disaster, countries will experience an improved response, reducing disaster-related deaths, loss and damage?

Data gathered for the endline global case study will help us assess the endline status of the following qualitative logframe indicators: Impact Indicator 3 and Outcome Indicators 1.1, 1.2, 2.1.

Below we explain our approach.

Tanzania

Based on the findings of the midline evaluation, the Tanzania Case Study will focus on:

- Understand whether, how and how effectively the communication and engagement issues with the Tanzanian government counterpart were resolved by the project. Example of relevant evaluation questions:
  - *Have the financial issues that did not allow to pay DMD for its participation to the project been resolved?*
  - *Has the level of engagement and contribution of DMD increased to a satisfactory level since the midline evaluation?*
  - *Are DMD and other key governmental stakeholders appropriately aware of the outputs that the project delivered?*
- Assess the level of Tanzanian government and national DRRM stakeholders' buy-in of the project and its outcomes. Example of relevant evaluation questions:
  - *Is the METEOR project and/or its outputs formally accredited by COSTECH?*
  - *Has the Tanzanian government already used the METEOR outputs? Is there evidence that the Tanzanian government intend to use the METEOR outputs in DRRM planning?*
  - *Have national non-governmental DRRM stakeholders already used the METEOR outputs? Is there evidence that they intend to use the METEOR outputs in DRRM planning?*
  - *Are the METEOR outputs hosted by a government owned platform or one that the government actively utilises?*

- Assess the level of Tanzanian key DRRM stakeholders' ownership of the project outputs. Example of relevant evaluation questions:
  - *Has the capacity of key national DRRM stakeholders been adequately built to be able to use, improve and replicate the METEOR data?*
  - *Do the METEOR outputs meet the expectations of key national DRRM stakeholders?*
  - *How satisfied are relevant national stakeholders of the level of co-development of the METEOR outputs?*
  - *Are national technical experts better positioned to serve as regional experts or 'lighthouses' in the DRRM space?*
  - *Is there alignment or overlap between the project goals and other projects? Is the project consistent with other actors' interventions in the same context?*
- Identify key lessons from the project implementation to the benefit of other projects. Example of relevant evaluation questions:
  - *What are the lessons learnt from the different key components of the METEOR projects, such as the co-development of DRRM data and protocols, integrating EO- and non-EO-based DRRM data, and working with, communicating with and building the capacity of Tanzanian DRRM stakeholders?*

The study will be conducted primarily through KIIs of DMD and other government officials involved in DRRM (e.g. Tanzania Geological Survey, Tanzania Meteorological Agency, Prime Minister's Office), development partners (e.g. World Bank, UK FCDO, Red Cross), and other national stakeholders (e.g. Ardhi University, University of Dar es Salaam). The KIIs will possibly preceded by an online evaluation workshop (see Section 4), the agenda and composition of which will be discussed with BGS, DMD, HOT, and OPM Tanzania.

In addition to the primary data collection, the Case Study will update the DRRM context assessment carried on at baseline, through a desk research.

Nepal

Based on the findings of the midline evaluation, the Nepal Case Study will focus on:

- Assess the level of Nepalese government and national DRRM stakeholders' buy-in of the project and its outcomes. Example of relevant evaluation questions:
  - *Has the METEOR Nepal Steering Committee been formed and functional?*
  - *Has the Nepalese government already used the METEOR outputs? Is there evidence that the Nepalese government intend to use the METEOR outputs in DRRM planning?*
  - *Have national non-governmental DRRM stakeholders already used the METEOR outputs? Is there evidence that they intend to use the METEOR outputs in DRRM planning?*
  - *Are the METEOR outputs hosted by a government owned platform or one that the government actively utilises?*

- Assess the level of Nepalese key DRRM stakeholders' ownership of the project outputs. Example of relevant evaluation questions:
  - *Has the capacity of key national DRRM stakeholders been adequately built to be able to use, improve and replicate the METEOR data?*
  - *Do the METEOR outputs meet the expectations of key national DRRM stakeholders?*
  - *How satisfied are relevant national stakeholders of the level of co-development of the METEOR outputs?*
  - *Are national technical experts better positioned to serve as regional experts or 'lighthouses' in the DRRM space?*
  - *Is there alignment or overlap between the project goals and other projects? Is the project consistent with other actors' interventions in the same context?*
- Identify key lessons from the project implementation to the benefit of other projects. Example of relevant evaluation questions:
  - *What are the lessons learnt from the different key components of the METEOR projects, such as the co-development of DRRM data and protocols, integrating EO- and non-EO-based DRRM data, and working with, communicating with and building the capacity of Nepalese DRRM stakeholders?*

The study will be conducted primarily through KIIs of NSET and other government officials involved in DRRM (e.g. NDRRMA, DHM), development partners (e.g. UK FCDO), and other national stakeholders (e.g. ICIMOD). The KIIs will possibly preceded by an online evaluation workshop (see Section 4), the agenda and composition of which will be discussed with BGS, NSET, and OPM Nepal.

In addition to the primary data collection, the Case Study will update the DRRM context assessment carried on at baseline, through a desk research.

4.3. Process evaluation

The aim of the light-touch process evaluation will be to understand how the consortium worked together and what lessons there are for future projects. To do so, we will have one conversation/ interview via Skype with each consortium partner of about an hour. Table 8 provides a list of the people we plan to interview.

#	Consortium Partner	Person(s)
1	**BGS**	Kay Smith, Colm Jordan, Annie Wilson
2	**GEM**	Paul Henshaw, Vitor Silva, Nicole Paul
3	**HOT**	William Evans
4	**NSET**	Sharad Wagle
5	**IMAGE CAT**	Charlie Huyck, Shubharoop Ghosh
6	**DMD**	Charles Msangi, John Kiriwai
7	**FATHOM**	Chris Sampson

Table 8: Stakeholders targeted for the process evaluation

Some possible questions include:

- *How did you feel the consortium worked together to achieve the agreed results? Any suggestions to improve collaboration on future projects?*
- *Any suggestions for how consortium partners roles could be adjusted to improve collaboration?*
- *When there were significant delays on key milestones, what do you feel were the main factors causing this? Any suggestions on minimising risks of delay on other projects in future?*
- *What steps do you feel have been taken to ensure ownership of the project process and outcomes within government counterparts? Do you feel enough was done? Any suggestions?*
- *What steps do you feel have been taken to collaborate sufficiently with other relevant development initiatives so that the results achieved are likely to be sustained beyond project-end? Do you feel enough has been done – or more needs to be done? Any suggestions?*

The answers will be analysed qualitatively, and key findings and lessons included in the Endline Evaluation Report and discussed at the final Annual Learning Event.

4.4. Result monitoring and logframe completion

Data will be compiled for all logframe indicators to show progress. A result monitoring strategy has been agreed with the METEOR consortium and it is summarised in Table 9.

Indicator	Responsibility	Collection method
OC3.3: Number of dissemination nodes where METEOR KPs and datasets are available to be accessed	Luca Petrarulo (OPM)	Forward OPM email with node owner confirming data upload
OP1.1: Percentage of professionals trained in Nepal and Tanzania reporting increased knowledge on the training topic (disaggregating males and females) (KPI 3)	Vitor Silva (GEM)	NSET and DMD to have trainees complete a baseline survey before the training at invitation, followed by end-of-training survey
OP 1.2: Number of professionals trained in Nepal and Tanzania (disaggregating males and females)	Vitor Silva (GEM)	NSET and DMD to record the data and send them to GEM after each training.
OP 1.3: Number of organisations that had representatives trained in Nepal and Tanzania	Vitor Silva (GEM)	Same as OP 1.2
OP 1.4: Percentage of targeted institutions and organisations in Nepal and Tanzania that had at least two people trained	Vitor Silva (GEM)	Same as OP 1.2
OP 3.2: Percentage of approached users reporting satisfaction with METEOR protocols (disaggregating males and females)	Vitor Silva (GEM)	Collected through post-training surveys and online survey of other users who received METOR protocols
OP 5.1: Policy paper on the use of national-scale exposure data for insurance and other risk-transfer mechanisms published and shared	Shubharoop Ghosh (ImageCat)	Shubharoop to send OPM the policy paper when final
OP 5.2: Number of communication products shared	Kay Smith (BGS)	METEOR partners to complete Google Sheet
OP 5.3: Number of conferences or workshops hosted or attended by consortium members at which METEOR's findings are shared or discussed	Kay Smith (BGS)	METEOR partners to complete Google Sheet

Key: OC = Outcome Indicator; OP = Output Indicator

Table 9: Result monitoring strategy

5. Evaluation deliverables

The report writing will be led by OPM, with comments and inputs provided by the consortium partners. The following deliverables will be produced:

- **An Endline Evaluation Report** (see outline in box below)
- **A PowerPoint presentation** summarising the findings (to be presented at the subsequent Quarterly Progress Meeting and the Final Learning Event)
- **The logframe** populated with the final project results (Excel file)
- **Minutes of the Final Annual Learning Event**.

Note that no additional knowledge products are currently planned (or budgeted).

Box 1. Outline of the endline evaluation report

1. Executive Summary
2. Introduction
3. Methodology (including limitations)
4. Logframe KPIs
5. Findings
    a. xxx
6. Conclusions
    a. Summary of key findings
    b. Sustainability and project risks
7. Recommendations
    a. For future programming (and for legacy evaluation)
8. Appendices (e.g. interview guides, workshop agenda etc.)

5.1. Final Annual Learning Event

A half-day online workshop will be held at the beginning of March 2021 with the METEOR partners to identify key lessons for future projects, regardless of who will be implementing. These will be facilitated by the OPM and will cover questions including:

- What worked well in the team to give the results achieved at the end of the project?
- Were there any delays to project deliverables, was anything brought forward and why did that happen?
- Knowing what you now know, what would you do differently if you were implementing the project again?

The results from the Annual Learning Event will be included in dedicated minutes, which will be shared with the whole METEOR project team and the UKSA. This workshop will include a presentation of the endline evaluation findings and will result in a set of aggregated lessons that may be applicable for projects to be implemented by METEOR partners or other organisations or governments working in DRRM.

5.2. Legacy Evaluation

As it currently stands, the grant agreement of METEOR does not include a Legacy Evaluation, i.e. an evaluation that happens after the project ended and looks back at the standing legacy of the project. **The M&E Team strongly recommends that additional funding is provided by the UKSA to plan and conduct a Legacy Evaluation of METEOR**.

As noted in the Midline Evaluation Report, since the milestones delivery schedule of METEOR is quite unique in the sense that it foresees the release of the final products very late in the last 3-6 months of the project timeline, the need for a Legacy Evaluation becomes quite evident. Indeed, it is not expected that Endline Evaluation can represent an "impact evaluation" as there simply will not have been enough time lapsed from the delivery of the outputs to expect to see, by the end of the project, the Impact as enunciated in the ToC. **The actual "impact evaluation" will then be the Legacy Evaluation**, which will likely focus on finding evidence of broaden and sustained uses of METEOR outputs in Tanzania, Nepal, and beyond, as reflected in the legacy indicator targets in Appendix A.

In terms of the timing of the possible Legacy Evaluation, it will be important to leave enough time to pass between the public release of the METEOR outputs and the legacy activities to be able to find evidence of "mainstreaming" of the use of METEOR outputs in the national and international DRRM decision-making. **Holding the Legacy Evaluation after 1.5 years after the publication of the final METEOR products (e.g. mid- or late- 2022) appears to be a sensible timing to suggest**. This implies the need for the team to discuss with the UKSA the possibility of funding a Legacy Evaluation of the METEOR project, well beyond the end date of the IPP Call 2 programme.

Appendix A - METEOR Endline Targets

Ref.	Indicator	Target - End of project (Cumulative Feb 2018-Mar 2021)	Target – Legacy (Cumulative Feb 2018-Mar 2023)
Impact Indicator 3	Progress towards mainstreaming the use of robust DRR data to systematically inform policy changes across public and private sector, and civil society	There is evidence of concrete plans to use METEOR outputs to inform specific DRRM activities (e.g. risk assessments, technical studies, policies or strategies) by 4 priority end-users[2] (governmental and non-) in Tanzania and Nepal (at least 1 for each country).	There is evidence 6 priority end-users (governmental and non-) in Tanzania and Nepal (at least 2 for each country) have used METEOR outputs to inform 3 DRRM activities (e.g. risk assessments, technical studies, policies or strategies).
Outcome Indicator 1.1	Progress towards use of project outputs by the governments and other end-users in Nepal and Tanzania to inform their DRRM decision-making and practice	End-users (governmental and non-) in Tanzania and Nepal have used the METEOR outputs in 1 DRRM activity per country.	N/A – Measured by Impact Indicator 3
Outcome Indicator 1.2	Feedback from relevant Ministry (or decision-maker) on the usefulness of the project outputs for improving their national DRRM	METEOR datasets are hosted on official/government-led platforms in Tanzania and Nepal.	METEOR datasets are still hosted by the official/government-led platforms currently in use

[2] Priority end-users list: Nepal: MoHA / NDRRMA, DHM, NSET, ICIMOD, FCDO Nepal, TU; Tanzania: DMD / PMO, GST, TMA, University of Dar Es Salaam, TURP / Resilience Academy, Red Cross, World Bank

Ref.	Indicator	Target - End of project (Cumulative Feb 2018-Mar 2021)	Target – Legacy (Cumulative Feb 2018-Mar 2023)
Outcome Indicator 3.1	Feedback from the global community (e.g. UNICEF, UNISDR, WB, GFDRR) in respect of usefulness of project outputs	There is evidence of concrete plans that the organisations on the METEOR Advisory Board are going to use the METEOR outputs in supporting 1 DRRM activity in developing countries	There is evidence METEOR outputs have been used by at least 3 development partners in supporting 3 DRRM activities in developing countries
Outcome Indicator 3.2	Progress towards creating insurance products informed by METEOR data and/or protocols	There is evidence of concrete plans that the organisations in the Insurance Industry Advisory Group are going to use the METEOR outputs in creating 1 new insurance product	There is evidence METEOR outputs have been used by at least 3 insurance companies
Outcome Indicator 3.3	Number of dissemination nodes where METEOR KPs and datasets are available to be accessed	6 credible nodes in total of which 1 global, 1 Tanzanian and 1 Nepalese. List of credible nodes: METEOR platform GEM OpenQuake World Bank GeoNode Humanitarian Data Exchange Nepal: Building Information Platform Against Disaster (BIPAD) Tanzania: TBC	METEOR datasets are still hosted by the credible 6 nodes and still being accessed