

TERMS OF REFERENCE
CONSULTANCY SERVICES TO CONDUCT A RISK AND VULNERABILITY
ASSESSMENT FOR THE BELIZE RIVER WATERSHED

1. BACKGROUND

1.01 The initial stages of reducing disaster and climate risk and promoting a culture of disaster resilience lies in the knowledge of the hazards and the physical, social, economic, and environmental vulnerabilities to disasters that communities face, and of the ways in which hazards and vulnerabilities are changing in both the short and long term. These inform actions to be taken to reduce these risks and enhance resilience. The National Meteorological Services of Belize is moving towards using Multi-hazard Impact-based Forecast and Early Warning System (MH-IBF-EWS) to communicate risks and impacts to the public and different sector end users. Through Impact based forecasting, a structured approach for combining hazard, exposure, and vulnerability data is utilized to identify risk and support decision-making, with the ultimate objective of encouraging early action that reduces loss of life and damage property and livelihoods from natural hazards.

1.02 This consultancy seeks to identify key hazards, assess associated risks in the project area, and update existing hazard maps. By assessing risks and potential impacts, the project will support the issuance of timely warnings, helping key stakeholders take adequate to reduce damage and loss.

2. OBJECTIVES

2.01 The main objective of this consultancy is to provide baseline information on hazard risks in the project area to facilitate the articulation and development of an MH-IBF- EWS, and to develop updated hazard maps.

3. SCOPE OF WORK

3.01 The Consultancy firm will be engaged to conduct a risk and vulnerability assessment, develop multi-hazard maps, and identify forecasting procedures for early warning systems and extreme events at varying timescales. This work will support the Pilot Project within the Belize River Watershed and will focus on key hazards to be agreed upon with the National Meteorological Services (NMS).

3.02 In carrying out the assignment, the firm is expected to adopt a participatory approach, ensuring that local knowledge is adequately considered. This will help improve accuracy and strengthen local ownership of the resulting products.

3.03 The firm will report to the Project Coordinator through the assigned team leader and will be responsible for conducting a risk and vulnerability assessment, as well as developing multi-hazard maps. The main tasks include:

Risk and Vulnerability Assessment

- (a) Collect and review existing data, information, maps and studies for the project area and conduct a gap assessment of previous risk and vulnerability assessments.
- (b) Identify and assess key natural hazards affecting the project (climate-related and geophysical hazards):
 - (i) analyse hazard characteristics (e.g. intensity, frequency and probability) of identified hazards taking historical data into consideration; and
 - (ii) evaluate climate variable and climate change (CC) scenarios:
 - (aa) determination of climate variables of interest (precipitation, drought conditions, precipitation extremes and potential flooding, temperature, winds.), and defining baseline conditions;
 - (bb) determine CC scenarios, based on the best available information.

Community Vulnerability Analysis

- (a) Conduct community vulnerability analysis for all relevant natural hazards, considering historical data sources and potential future hazard events in the vulnerability analysis.
- (b) Analyse community practices for natural resources management: identify major causes of natural resources degradation and good practices for sustainable natural resources management, and assess potential impacts on livelihoods.
- (c) Analyse factors affecting the community capacity to undertake risk and impact assessments, to plan and implement mitigation and adaptation actions.
- (d) Estimate potential human and economic losses based on the exposure and vulnerability of people (particularly youth, elderly, persons with disabilities.) buildings and infrastructure.
- (e) Map and document vulnerabilities identified in item (d) above.
- (f) Conduct a detailed assessment to collect baseline information and identify gaps relating to the impacts of different hydrometeorological hazards and the exposure of vulnerable assets and population.
- (g) Help target forecasts and warnings for exposed and vulnerable people and sectors:
 - (i) Identify relevant weather and climate parameters and establish critical threshold values required to issue a warning for hazard

- events (flooding, storm surge, heat waves and extreme temperatures, severe thunderstorms, strong winds, drought) and develop understandable, recognisable, and timely warnings for the NMS and National Emergency Management Organisation (NEMO).
- (ii) Develop probabilistic forecasts of extreme events at sub-seasonal, seasonal, inter- annual, decadal timescales (multi-hazard, multilevel and multi-sector).
 - (aa) Identify requirements for weather forecasts and warnings to be used within the MH-IBF-EWS.
 - (bb) Conduct stakeholder consultations to establish effective dissemination and communication systems whereby all actors clearly understand their functions, roles and responsibilities as well as the identification of appropriate communication media for warning dissemination.
 - (cc) Assist key stakeholders to develop warning alerts and messages that are specific to the nature of the threat and its potential impacts, and tailored to the needs of the groups/communities at risk.

Multi-Hazard Maps

- (a) Develop probabilistic hazard maps for strong wind, storm surge, drought, flood and extreme heat, and tropical cyclones in the project area.

4. QUALIFICATIONS AND EXPERIENCE

- 4.01 The successful execution of this assignment requires a consulting team that should comprise a team of professionals with the following qualifications and key personnel:
- 4.02 The successful firm will be required to possess the below listed competencies for the successful execution of this assignment.
 - (a) Proven experience of having completed at least three (3) vulnerability assessments and preparation of hazard maps in the Caribbean or Central America within the past 10 years.
 - (b) Must demonstrate strong technical capacity and expertise to undertake multi-hazard disaster risk assessments as evidenced by at least two (2) assignments successfully completed.
 - (c) Proven experience in stakeholder engagement, facilitation of consultations and presentations, and preparation of technical reports through the successful completion of at least five (5) similar assignments within the past ten (10) years.
 - (d) Familiarity with international climate frameworks such as UNFCCC, IPCC and the Sendai Framework.
 - (e) Strong experience in conducting hazard mapping and vulnerability assessments for at least 5 years.
 - (f) Evidence of project management and coordination capacities to undertake the assignment in view of other commitments.

4.03 The consulting team should comprise professionals with the following key expertise:

(a) Team Leader: Disaster Risk Management Specialist

Qualifications: A Master's or Ph.D. in Environmental Management, Climate Science or Disaster Risk Management or related fields.

- Experience: No less than ten years professional experience in managing complex, multi-disciplinary climate resilience and disaster risk assessment projects.
- Experience conducting natural hazard risk assessment in the Caribbean or similar context,
- development of participatory disaster risk reduction and climate change adaptation plans or similar initiatives,
- development or implementation of EWS.
- Working experience as facilitator of consultations with multiple stakeholders, including but not limited to representatives from public and private sector and vulnerable communities.
- The Specialist should be fluent in English. Other languages such Spanish would be an asset.

(b) Key professional 2: Hydrometeorology/Climate Change Expert

Qualifications: A minimum of a master's degree in climate science, climate change, Hydrometeorology or related fields

- Experience: No less than seven (7) years professional experience.
- Experience should include at least five (5) developing hydro-meteorological observation networks and EWS, working with data provided by Global Circulation Models and Regional Circulation Models, and
- Familiarity with the Sixth Assessment Report by the Intergovernmental Panel on CC.
- Fluency in Spanish is an asset.

(c) Key professional 3: Geophysicist/Seismologist

Qualifications: A minimum of master's degree in geophysics, seismology, or related fields

- Experience: No less than seven (7) years professional experience.
- Experience should include identifying geographic areas where seismic activity frequently occurs, setting up devices to record and measure earth movements, and collecting and analysing this data.
- Fluency in Spanish is an asset.

- (d) Key professional 4: Geographic Information System and Remote Sensing Specialist

Qualifications: A minimum of a master’s degree in Cartography and geographic information system, remote sensing, environmental science or related field.

Experience: No less than seven (7) years professional experience in spatial data analysis, GIS-based hazard mapping and remote sensing for disaster risk assessment. Expertise in using GIS tools to assess and visualize climate-related risks. Expertise in using cutting-edge tools and advanced technologies for mapping and risk assessments including the development of database using GIS. Fluency in Spanish is an asset.

5. REPORTING REQUIREMENTS AND DELIVERABLES

5.01 The consultancy firm shall submit electronically the following deliverables to NMS:

Deliverable	Timeline
1. An Inception Report To include a detailed methodology including tools to be used to gather data/information, quality assurance, mechanism of data/information collection, analyses, and roles and responsibility of team members and key milestone. The Inception Report should also detail the fieldwork plan after discussions with the NMS and NEMO to include the following: Final Workplan with Gantt Chart, considering the comments from stakeholders, detailed methodology on data collection and analysis, and expected tasks, responsibilities, and schedule of delivery of each member of the team.	2 weeks after contract signing
2. A Situational Analysis Report based on data collected and analysed.	2 months after contract signing
3. Risk Maps showing vulnerability and hazards for 30-year period (digital and hard copies).	3 months after contract signing
4. A Comprehensive and Analytical Risk and Vulnerability Report considering input and comments from stakeholders.	5 months after contract signing
5. A Comprehensive and Detailed Report identifying weather forecasts and warnings used for EWS and probabilistic forecast of extreme hazard at different timescales considering comments from NMS staff in consultation meeting.	6 months after contract signing

5.02 All deliverables are to be submitted to the Project Coordinator via email in both Word and PDF versions

6. DURATION

6.01 The level of effort required for this consultancy is estimated at 90 consultancy days spread within 6 months. The NMS will provide office accommodation, equipment and appropriate administrative support to the Consultant while in country.

7. LANGUAGE

7.01 All reports and other deliverables produced under this assignment shall be in English.

8. ADMINISTRATIVE INFORMATION

8.01 Contracting authority: The contract will be issued by the Ministry of Economic Transformation, Belize on behalf of the National Meteorological Service. As such, the consultant will liaise directly with the Project Coordinator, who is based at the NMS.