



STRENGTHENING DISASTER AND CLIMATE RESILIENCE IN THE EASTERN AND SOUTHERN CARIBBEAN (SDCR) PROJECT

REQUEST FOR EXPRESSIONS OF INTEREST

The Caribbean Institute for Meteorology and Hydrology (CIMH) has received financing from the United States Government through the United States International Development Agency (USAID) towards the **Strengthening Disaster and Climate Resilience in the Eastern and Southern Caribbean (SDCR) Project** and intends to apply a portion of the proceeds of this financing to eligible payments under a contract for which this invitation is issued. According to the Assistance Award agreement governing the SDCR Project, the authorized geographic code for procurement of goods and services under this award is US Government Code 937. As such, in addition to the United States of America and the award recipient countries,¹ a list of countries from which eligible consultant teams, companies, firms or individuals can be engaged according to US Government Code 937 is attached at ANNEX 1. The CIMH, the Implementing Agency, now wishes to procure consultancy services to enhance the use of satellite imagery to strengthen disaster resilience in the eastern Caribbean.

The primary objective of this consultancy is to build regional capacity and competence to: (i) enhance the use of satellite imagery to strengthen disaster resilience; (ii) enhance weather and climate-related impact assessments. Further details can be found in the attached Terms of Reference (ANNEX 2). The duration of the assignment is expected to be for a period of five (5) months.

The CIMH now invites interested eligible, consulting firms or individuals to submit Expressions of Interest for the provision of these consultancy services.

In the assessment of submissions, consideration will be given to technical competence, qualifications and experience, local and regional experience on similar assignments, financial capability and existing commitments. All information must be submitted in English. Further information may be obtained from sboyce@cimh.edu.bb and copied to cpascal@cimh.edu.bb below between 8:00 and 16:00 hours (Barbados Time) Monday to Friday.

Submissions in PDF format of the Expressions of Interest must be received at the email address, dfarrell@cimh.bb.edu, sboyce@cimh.edu.bb and copied to cpascal@cimh.edu.bb no later than 16:00 AST on Friday, 24 April, 2020. The email containing each submission should include the name and address of the applicant and shall be clearly marked **“Expression of Interest – Consultancy Service to Enhance the Use of Satellite Imagery to Strengthen Disaster Resilience.”**

The submissions shall be evaluated and compared, and the highest ranked candidate shall be selected. Only the selected firm shall be asked to submit a combined technical and financial proposal and, if such proposal is responsive and acceptable, be invited to negotiate a contract. The CIMH reserves the right to accept or reject late applications or to cancel the present invitation partially or in its entirety. It will not be bound to assign any reason for not selecting any applicant and will not defray any costs incurred by any applicant in the preparation and submission of Expressions of Interest

¹ Recipient Countries - Antigua & Barbuda, Barbados, Dominica, Grenada, St. Kitts and Nevis, Saint Lucia, and St. Vincent and the Grenadines

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ANNEXES

ANNEX 1 - LIST OF CODE 937 AWARD ELIGIBLE COUNTRIES

1. United States of America
2. Recipient Countries
 - a. Antigua & Barbuda,
 - b. Barbados,
 - c. Dominica,
 - d. Grenada,
 - e. St. Kitts and Nevis,
 - f. Saint Lucia, and
 - g. St. Vincent and the Grenadines
3. Other Eligible Developing Countries



List of Developing Countries

A Mandatory Reference for ADS Chapter 310

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Low income/lower middle income

Afghanistan	Gambia, The	Myanmar
Bangladesh	Guinea	Nepal
Benin	Guinea-Bissau	Niger
Burkina Faso	Haiti	Rwanda
Burundi	Kenya	Sierra Leone
Cambodia	Korea, Dem Rep.	Somalia
Central African Republic	Kyrgyz Republic	Tajikistan
Chad	Liberia	Tanzania
Comoros	Madagascar	Togo
Congo, Dem. Rep.	Malawi	Uganda
Eritrea	Mali	Zimbabwe
Ethiopia	Mozambique	
Angola	India	São Tomé and Príncipe
Armenia	Iraq	Senegal
Belize	Kiribati	Solomon Islands
Bhutan	Kosovo	Sri Lanka
Bolivia	Lao PDR	Sudan
Cameroon	Lesotho	Swaziland
Cape Verde	Marshall Islands	Syrian Arab Republic
Congo, Rep.	Mauritania	Timor-Leste
Côte d'Ivoire	Micronesia, Fed. Sts.	Tonga
Djibouti	Moldova	Turkmenistan
Egypt, Arab Rep.	Mongolia	Tuvalu
El Salvador	Morocco	Ukraine
Fiji	Nicaragua	Uzbekistan
Georgia	Nigeria	Vanuatu
Ghana	Pakistan	Vietnam
Guatemala	Papua New Guinea	West Bank and Gaza
Guyana	Paraguay	Yemen, Rep.
Honduras	Philippines	Zambia
Indonesia	Samoa	

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ANNEX 2 - TERMS OF REFERENCE

TERMS OF REFERENCE **CONSULTANCY TO ENHANCE THE USE OF SATELLITE IMAGERY TO STRENGTHEN DISASTER RESILIENCE**

1. INTRODUCTION

1.01 Changes in landforms can go undetected following severe weather events. For example, landslides occurring in mountainous remote regions may dam rivers leading to significant risk exposure for downstream communities should such dams fail. This concern is exemplified by the development of the Matthieu Earth-dam in Dominica during the period 1995-1997 due to massive landslides and its subsequent failure in 2011 which caused considerable damage and loss to downstream communities in the Layou Valley.

1.02 Changes in land use in the Caribbean are also occurring due to rapid urbanization, deforestation and/or changing agricultural practices. Much of this transformation is not readily accounted for on national maps and in Disaster Risk Reduction (DRR) planning and decision-making. Ecosystems on Small Island Developing States (SIDS) and the essential services they provide are constantly under threat and frequently undergoing change due to adverse anthropogenic activities. Mapping and monitoring these changes are critical for effective land use planning and stewardship of the environment.

1.03 Over the last decade, satellite missions have collected massive amounts of optical satellite data that support the development of workflows capable of detecting changes in land use, land cover and vegetation characteristics. In recent years, much of these data have been released to the public and academia albeit at relatively low resolutions. Examples of such publicly available datasets include (i) Sentinel-2 imagery from Copernicus, and (ii) lower resolution imagery available via Landsat 8 and MODIS assets. In the past, the Caribbean Institute for Meteorology and Hydrology (CIMH) accessed high resolution archived multi-spectral imagery through the Caribbean Satellite Disaster Pilot Project funded through the Committee on Earth Observation Satellites (CEOS).

1.04 Climate change and increasing climate variability are having adverse effects on climate sensitive socio-economic sectors on Caribbean Small Island Developing States (SIDS). The CIMH currently houses the World Meteorological Organisation (WMO) recognized Regional Climate Center (RCC) for the Caribbean. The goal of the Caribbean RCC is to support the region's socio-economic development by generating suites of user defined climate products and services to risk-inform decision-making in climate sensitive sectors at national and regional levels. This includes the collection, collation and archiving of climate-related impact data. The acquisition of multispectral satellite imagery provides an efficient and cost-effective approach to weather and climate-related impact mapping through the application of classification techniques and change-detection algorithms on archived imagery. Processed imagery also supports exposure and vulnerability mapping in addition to impact-based forecasting validation workflows and the identification of probable threats to communities and critical infrastructure.

1.05 The infamous 2009-2010 drought in the Caribbean adversely impacted the agricultural, water resources and energy sectors across the region. Agricultural production was reduced significantly in some countries. Increases in bushfires and land degradation, which contributed to erosion and enhanced landslide activity were reported. Reservoir operations and hydro-electric plants were impacted due to low water levels. Satellite image processing provides an efficient methodology for mapping large scale changes in *inter alia* the health of vegetation, vegetation cover, landforms and the extents of water bodies. The

development of time series products and comparisons with climate data further enhance the understanding of the impact of climate on the environment and provide analogues to inform future decision making.

1.06 The focus of this Terms of Reference is to enhance the use of satellite imagery to strengthen disaster resilience through the building of capacity to create time lapse imagery and the development and application of classification techniques and change detection algorithms. It is expected that the consultancy will be key to mainstreaming the use of satellite imagery in climate adaptation and disaster management. This consultancy will be funded through the generous support of the American people and implemented under the ‘Strengthening Disaster and Climate Resilience in the Eastern and Southern Caribbean (SDCR) Project’.

2. ABOUT THE CARIBBEAN INSTITUTE FOR METEOROLOGY AND HYDROLOGY

2.01 CIMH is an Institution of the Caribbean Community and the technical Organ of the Caribbean Meteorological Organisation (CMO). The mandate of the CIMH is *“to assist in improving and developing the meteorological and hydrological services as well as, providing the awareness of the benefits of meteorology and hydrology for the economic well-being of the 16 CMO Member States. This is achieved through training, research, investigations, and the provision of related specialised services and advice.”*

2.02 To achieve its mandate, the CIMH established an affiliation agreement with the UWI in 1973 where its primary responsibility is the delivery of the Bachelor of Science Programme in Meteorology in the Faculty of Science and Technology. The CIMH is also recognised by the World Meteorological Organisation (WMO) as: (i) the Regional Training Centre in the Caribbean for meteorology and hydrology and related disciplines; (ii) the Regional Instrument Centre for the Caribbean; (iii) a Centre of Excellence in Satellite Meteorology Training; (iv) the Regional Climate Centre for the Caribbean; and (v) the Pan American Sand and Dust Storm Warning Alerting and Assessment System node.

2.03 In recent years, the CIMH established the Caribbean Centre for Climate and Environmental Simulations. In addition, the CIMH is a Climate Data Centre for CMO Member States. The Institute is also an important Caribbean centre for research and development related to meteorology, hydrology, agrometeorology and climate in the Caribbean. It is active in such areas of hydrological risk impacts forecasting and agricultural risks forecasting and has had strong collaborations with other regional institutions, national organisations in CMO Member States and the international community.

2.04 Currently CIMH is implementing the Strengthening Disaster and Climate Resilience in the Eastern and Southern Caribbean (SDCR) Project, which is made possible by the generous support of the American people through the United States Agency for International Development (USAID).

2.05 The SDCR Project will contribute to building the resilience of the region through a series of small but effective initiatives that extend some areas of work started by CIMH. Equally as important, the work being proposed introduces innovative activities that are unrelated to previous activities executed by CIMH and the region. The SDCR Project will (i) strengthen hydro-meteorological observation platforms; (ii) strengthen the human capacity and institutional resilience of National Meteorological and Hydrological Services (NMHSs) in the Caribbean to enable them to maintain some level of functionality under the most arduous conditions; (iii) strengthen multi-hazard early warning systems in the Caribbean by enhancing the timely collection and integration of pre- and post-impact data into regional multi-hazard impact-forecasting and decision-support platforms that improve risk forecasting, management and reduction and (iv) further strengthen and expand the development and delivery of climate services in the Caribbean.

3. OBJECTIVES

3.01 The primary objective of this consultancy is to build regional capacity and competence to:

- (a) enhance the use of satellite imagery to strengthen regional resilience to hydro-meteorological and climate related hazards;
- (b) enhance weather and climate-related impact assessment workflows.

4. SCOPE OF WORK

4.01 Some specific duties and responsibilities of the Consultant include:

- (a) Provide the specifications for the optical imagery to be procured for image classification and change detection analysis. Acquisition dates should span major climate events for seven (7) target countries² in the Eastern Caribbean.
- (b) Advise on the procurement of the optical imagery for the seven (7) target countries in the Eastern Caribbean and provide recommendations for image processing software
- (c) Develop, apply and deliver image classification and change detection workflows that can be used to identify weather and climate-related impacts and the associated risks to communities and infrastructure.

5. QUALIFICATIONS AND EXPERIENCE

5.01 The Consultant is required to have recognised credentials in Remote Sensing or GIS with a Remote Sensing Specialisation. In addition, the Consultant must have:

- (a) more than ten (10) years of experience developing and applying image classification and change detection workflows for optical imagery;
- (b) demonstrated experience working with satellite image vendors;
- (c) demonstrated experience working with Small Island Developing States (SIDS).

6. DELIVERABLES

6.01 The Consultant will deliver the:

- (a) specifications for the optical imagery to be procured for target countries²

² Antigua & Barbuda, Barbados, Dominica, Grenada, St. Kitts & Nevis, Saint Lucia and St. Vincent and the Grenadines

- (b) recommendations on image processing software inclusive of budgetary considerations
- (c) image classification and change detection algorithms and processed imagery
- (d) time lapse imagery illustrating weather and climate related impacts and potential risk to communities and infrastructure

7. DURATION

7.01. It is expected that the scope of work will be completed in five (5) months with a start date of May 12th, 2020