

Expressions of Interest

Date: 24-07-2022

To: xxx

From: Pacific Catastrophe Risk Insurance Company

Subject: CALL FOR EXPRESSIONS OF INTEREST (EOI) ON RISK ASSESSMENT AND
MODELLING TO SUPPORT PARAMETRIC DROUGHT INSURANCE PRODUCTS
FOR PACIFIC ISLAND COUNTRIES

Closing Date for Expressions of Interest: 8 August 2022 at 4pm (Cook Islands)

Contract Type/Period: Lump-Sum to 30 November 2022

Selection Method: Consultant Qualification Selection (Firm)

Pacific Island Countries (PICs) are threatened by many types of natural hazards including, tropical cyclones, earthquakes, intense rainfall, and drought; being geographically small means that the entire country or very large parts often suffer during extreme events, negatively affecting the entire national economy.

The Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI) insurance program was designed to provide climate and disaster risk insurance to member countries in the Pacific region. The primary aim of such insurance is to provide a quick injection of financing to help participating governments deliver relief and early recovery efforts as quickly as possible after a disaster. During its pilot phase, which started in January 2013, the PCRAFI insurance program provided parametric earthquake and tropical cyclone insurance solutions that increased the financial response capacity of Pacific Island Countries and Territories (PICs), helping them to meet post-disaster funding needs without compromising their fiscal balances and development objectives.

Following a successful pilot of the PCRAFI insurance program and the endorsement by the Forum Economic Ministers Meeting in 2015, an insurance vehicle was established by legal statute in the Cook Islands on 10 June 2016, to provide a disaster risk insurance program to PICs on a long-term basis. The vehicle was established as a "group captive" insurer, the Pacific Catastrophe Risk Insurance Company (PCRIC), which is fully owned by the Pacific Catastrophe Risk Insurance Foundation (PCRIF). PCRIF is a self-standing Foundation with a Council of Members (CoM) comprising member PIC representatives, and representation of donors which provided grant capitalization.

Assignment Description

The PCRIC is now requesting the support of a suitably experienced and qualified firm (or consortium of firms), 'the Consultant', to facilitate the PCRIC offering a sovereign level parametric insurance product for drought to PICs through -

1. The implementation of an appropriate parametric index, objective trigger mechanism, and appropriate monitoring framework / system.
2. The implementation of a suitable post event loss / impact calculation methodology
3. The provision of country level risk assessment, based a stochastic simulation of drought events, impacts, and index function. [*The stochastic risk profiles should be suitable for the calculation of both inwards insurance premiums required and outwards reinsurance purchase.*]

The outcome of this project should enable PCRIC to offer a sovereign level parametric insurance during 2023.

This assignment is designed to build on both two prior projects that have explored the feasibility of both excess rainfall and drought insurance products, including potential product design (led by the World Bank Disaster Risk Finance Insurance Program between 2018 and 2020), as well a recent (third) project on the definition, demand and needs assessment of Drought Products across PICs, led by PCRIC. The outcomes of these earlier projects will be shared with the Consultant to inform this study.

In particular, the outcome of the 2022 project, ***“Definition, Demand and Needs Assessment to Support Parametric Drought Insurance Products for Pacific Island Countries”*** undertaken by WTW, includes key deliverables which should be incorporated into the consultant’s work (in discussion with the PCRIC team) throughout the project -

- A spatial and temporal definition (topology) of drought (which may vary by PICs or region, and which could form the basis of risk transfer instrument / sovereign level parametric insurance product).
- A catalogue / database of historic drought events and associated impact metrics.
- A technical report detailing the finding of extensive regional and national stakeholder engagement on the specific needs (for a sovereign level parametric insurance product for Drought) of PICs.
- A recommended parametric index design, objective trigger mechanism, and appropriate monitoring framework.

The assignment will consist of 5 distinct components as detailed below. The Consultant is expected to work jointly with the PCRIC Catastrophe Modelling Advisor, and if required Technical Specialist and Regional Coordinator, on all stages of the project.

Note (1): the following extra conditions are expected to be agreed by the Consultant -

- ***The Consultant is also expected to be willing to serve as a calculation agent for any parametric trigger, in exchange for a fee, after future disaster events.***
- ***The Consultant is also expected to be willing to engage in and support placement of any insurance product, in exchange for a fee, through discussion with the government of Pacific Island Countries, the PCRIC insurance manager, reinsurance brokers and reinsurers as required based on the results of this assignment during 2023.***

*Note (2) : In these terms of reference, Pacific Island Countries (PICs) refers to those included in the Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI): the Cook Islands, the Republic of Fiji, the Republic of Kiribati, the Republic of the Marshall Islands, the Federated States of Micronesia, the Republic of Nauru, Niue, the Republic of Palau, the Independent State of Papua New Guinea, Samoa, the Solomon Islands, Tonga, Tuvalu, and the Republic of Vanuatu. **Unless explicitly stated deliverables are anticipated to include all 14 Pacific Island Countries.***

Component 1: Review Prior Project Material & Confirm Priorities Regions

Objective

The first objective of component 1 is to review the conclusions of prior projects to ensure the Consultant's solutions and proposed work to be undertaken in subsequent components builds upon previous projects where appropriate.

Component 1 should provide:

- a) A brief review of both prior World Bank projects:
 - **Pacific Rainfall Hazard Data for Parametric Insurance**, undertaken by DHI in 2018
 - **Feasibility Study of Excess Rainfall and Drought Insurance for Pacific Island States**, undertaken by Celsius Pro in 2020
- b) A detailed review, evaluation, and any recommended modification for the conclusions of project on "**Definition, Demand and Needs Assessment to Support Parametric Drought Insurance Products for Pacific Island Countries**" undertaken by WTW in 2022.

(Available reports, data, and documentation to be provided to the Consultant).

The second objective of component 1 is to confirm, with the PCRIC, if all countries *included in the Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI) can be covered by the project, or if a subset of country priorities are necessary to ensure delivery of the sovereign level parametric insurance in 2023. **Full coverage of all PICs is preferred but a pragmatic approach is acceptable / expected to be taken.***

The output of Component 1 is intended to help inform and steer Components 2, 3 & 4. Specifically, based on the output of Component 1, the PCRIC may, in agreement with the Consultant, refine the expected output and deliverable of Components 2, 3 & 4.

Key Actions

Key actions will include, but should not be limited to:

- An expert review of reports, data, and documentation created for both prior projects.
- Detailed discussion with the PCRIC technical & leadership teams to establish any regional / country priorities required to ensure delivery of the sovereign level parametric insurance in 2023.

Expected Outputs

- 1) A short technical report or presentation highlighting the Consultant's conclusions on the prior work and recommendations for geographic/country priorities and or modifications to Components 2, 3 & 4.
- 2) Minutes documenting a technical discussion with the PCRIC Catastrophe Modelling Advisor and Technical Specialists with agreed action items and agreed modifications to Components 2, 3 & 4.

Component 2: Confirmation and Event Definitions and Development of Impact Functions.

Objective

With due consideration of the conclusions of Component 1 and the work undertaken in the prior projects, Component 2 will

- confirm the appropriate event definitions
- define an impact relationship(s) suitable to quantify the 'impacts' to Pacific Island Countries, ideally by sector, to support estimation of the government emergency response costs.

Key Actions

Key actions will include, but should not be limited to:

- For drought events impacting Pacific Island Countries.
 - confirm the appropriate event definitions (both temporal and spatial).
 - confirm the appropriate drought hazard metrics (based on the geography and spatial distribution of exposure).
 - define and recommend an impact relationship(s) considering various asset types as well as other impacts such as people affected, to be determined in consultation with PCRIC.

Appropriate geographical areas should be also considered (i.e., "risk zones", based on the underlying exposure at risk).

PCRIC will provide access to previous collated exposure information held by the SPC in the PacRIS system. The consultant will be expected to review, supplement, adjust, correct, and update this data if required based on generally available sources.

- For historic drought events (based on proposed event definitions and hazard metrics, prior project database, and the consultant's analysis of observed data, or own modelling) and recommended impact relationship(s), the consultant will calculate the resultant modelled impact metrics and validate these against reported impacts.

PCRIC will provide access to previous collated data on historic events. The Consultant will be expected to review, supplement, adjust, correct, and update this data if required based on generally available sources (insurance reports, EM-Dat, AusAID etc.).

Expected Outputs

- 1) A detailed technical report presenting and justifying the recommendations from this component.
- 2) A presentation to and minutes of a technical discussion with the PCRIC Catastrophe Modelling Advisor and Technical Specialists.
- 3) An updated catalogue / database, in a suitable commonly used data format, of historic events, based on recommended event definitions and hazard metrics supplemented with the associated 'modelled' impact metrics by PIC.

Component 3: Stochastic Modelling & Risk Assessment

Objective

The objective of this Component is to develop a stochastic representation of the drought events and impacts based on the event definitions and impact relationships from Component 2.

The consultant is expected to produce a *catastrophe risk model* simulation of at least 10,000 years of realistic drought events and impacts with consideration of seasonality and the spatial and temporal correlations across the region (& between PICs). The simulation should be calibrated to the present-day climate with explicit consideration of climate change impact (i.e., if a historic baseline is used an analysis of any trends / climate change must be considered).

This Component includes the provision of underlying model meta-data and methodology to enable the PCRIC to validate the Consultant's catastrophe risk model methodology, including the stochastic event set. It is expected that sufficient information about the model's historic baseline, and event characteristics will be provided to allow an expert to adjust the model or perform sensitivity tests with respect to climate change and / or natural variability (e.g., ENSO)

Key Actions

Key actions will include, but should not be limited to:

- *Development of a robust 'catastrophe risk model' simulation of at least 10,000 years of realistic drought events and impacts with consideration of seasonality and the spatial and temporal correlations across the region (& between PICs), based on the agreed event definition, impact relationship(s) from Components 2.*
- *Validation and Calibration of the model based on a suitable analysis against historic observations/data (including an analysis of / accounting for trends)*
- Calculation of stochastic risk profiles of 'impacts' for each of the PICs.

Expected Outputs

- 1) A detailed technical report presenting output of this Component.
- 2) A presentation to and minutes of a technical discussion with the PCRIC Catastrophe Modelling Advisor and Technical Specialists
- 3) Document on the Consultant's Stochastic Model, including validation.
- 4) 'Impact' Risk profiles by PIC in a suitable commonly used data format. *Output is expected to include, as would be expected for a market-standard catastrophe model, OEP and AEP curves, AAL maps, Year-Event Catalogues (including Hazard Metrics, Impacts).*
- 5) Event meta-data in a suitable commonly used data format. *All data necessary for a suitable experienced catastrophe risk modelling professional to perform sensitivity tests with respect to climate variability (i.e., ENSO) and/ or Climate Change will be provided. The specific data deliverables to be agreed with PCRIC team.*

Component 4: Design of Parametric Index, Trigger and Post-Event Loss Calculation Method

Objective

With due consideration of the conclusions of Components 1,2 & 3, and the work undertaken in the prior project, Component 4 will confirm the appropriate parametric index design, objective trigger mechanism, and implement a real-time calculation methodology / system.

The proposed parametric indices should be designed to relate to government emergency response costs expected to be incurred during a drought event, but the consultant is expected to consider and advise on the use of modelled impacts / 'pure' parametric or other index design.

The Post-Event Loss Calculation should be easy to explain and should be understandable by non-technical experts.

Both should also be acceptable for financial transactions in the international (re)insurance market.

Key Actions

Key actions will include, but should not be limited to:

- Design a parametric index (or indices) for Drought and events affecting PICs based on the impact metric determined in component 2.
- Produce an analytical assessment of whether the proposed index has sufficiently low basis risk compared to impacts defined in component 2, and in prior work, for insurance purposes and can act as a suitable disaster risk finance instrument for Pacific Island Countries.
- Apply the index to stochastic simulations developed in component 3 to produce 'Index' Risk profiles, by PIC.
- Define an objective trigger based on publicly available third-party information, e.g., from the regional Met Office or other official source. Proposals may include options for multiple triggers e.g. NWP output, SPI index, rainfall deficit, national emergency declarations, etc.
- Implement a real-time calculation methodology and system.

Expected Outputs

- 1) A detailed technical report presenting and justifying the recommendations from this Component.
- 2) A presentation to and minutes of a technical discussion with the PCRIC Catastrophe Modelling Advisor and Technical Specialists.
- 3) 'As-if' index calculations, by PIC, for all historic events referenced in Component 2, in a suitable commonly used data format.
- 4) 'Index' Risk profiles, by PIC, in a suitable commonly used data format.
- 5) Demonstration of the real-time Post-Event Loss Calculation methodology (and system).

Component 5: Product Placement Support Material and Future Product Development

Objective

The objectives of this Component are to

- 1) Create supporting materials which can be used to support the placement of products with PICs and the PCRIC reinsurance.
- 2) Define the Consultant's future role as a the PCRIC's Calculation Agent.
- 3) Advise on appropriate methods to maintain the relevancy of the risk analysis conducted for component 3 & 4, both with respect to changing exposure across the region and changes in the risk (e.g., due to climate change).
- 4) Advise on the potential to extend the products developed by this assignment beyond sovereign level disaster risk financing to household or local products.

Note: with regards the third objective, throughout this assignment, the Consultant is expected to use, if necessary, exposure information maintained by SPC in the PacRIS system. This information is however currently being updated by SPC and while the assignment does not specifically involve re-analysing or resetting the analysis and index calculation based on updated exposure information, such a requirement may arise in the future.

Key Actions

Key actions will include, but should not be limited to:

- Development of materials, as agreed with the PCRIC, necessary to support potential future discussions with the PICs.
- Development of materials, as agreed with the PCRIC & the PCRIC's reinsurance broker, necessary to support potential future discussions with the reinsurance partners.
- Lead Discussions with the PCRIC technical personnel and leadership around recommendations regarding the Consultant's future role as a PCRIC Calculation Agent.
- Lead Discussions with the PCRIC technical personnel and leadership on the future development of the Consultant's model, proposal(s) for resetting analysis based on updated exposure across the PICs, and proposal(s) for extending modelling solutions (for example to non-sovereign products, i.e., household, or local levels).

Expected Outputs

- 1) A brief, < 5page, report which explains the drought product in layman terms, for publication on the PCRIC website and to provide to PICs / stakeholders as necessary.
- 2) A short technical summary report (or presentation) including an overview and executive summary of Components 1-4 with explicit commentary and recommendations for:
 - a. Any future development of the Consultant's model.
 - b. Proposal(s) for resetting analysis based on updated exposure across the PICs. *--Both simple / approximate method and complex comprehensive solutions should be considered.*
 - c. Proposal(s) for extending modelling solutions to household or local levels.

Supervision & Reporting

The Consultant will report to the CEO of PCRIC who will accept the deliverables but will liaise mainly with the Catastrophe Modelling Advisor on day-to-day operations. The Consultant may also work with the Project Coordinator, Insurance Manager, Technical Specialist and Reinsurance Broker and may also interact with the World Bank team providing technical assistance to PCRIC.

Selection Criteria

- The Consultant is expected to have significant expertise in Drought and Drought Risks.
- The Consultant is expected to have significant expertise in the Pacific Region, ideally with PICs.
- The Consultant will have significant experience of catastrophe risk modeling (ideally applied to drought hazards/risks), including both the development of models, and the application of such models in insurance transactions.
- The Consultant is expected to have been directly involved in a catastrophe risk transaction previously, for example through structuring, placement, or as a Calculation Agent.
- The Consultant will have advanced analytical skills, quantitative financial expertise, a strong knowledge of parametric insurance, excellent presentation skills and be able to develop strong relationships with the clients.
- The Consultant will closely interact and report to the PCRIC team that will accept the deliverables.
- The Consultant must be willing and able to undertake trips to the Pacific region to consult stakeholders and/or present outputs to clients if required.

Timetable

The assignment must be completed prior to end of December 2022, with the delivery of outputs as follows:

Outputs	Expected Duration / Person-Working Days Assigned	Completion date
Component 1 Report Due	10	No later than 1 month post inception of project
Component 2 Reports, Database & Deliverables Due	15	No later than 1 month post inception of project
Component 3 Report, Impact Risk Profiles, Data & system Deliverables Due	45	No later than 4 months post inception of project
Component 4 Report, Index Risk Profiles, Data & system Deliverables Due	20	No later than 4 months post inception of project
Component 5 Reports & Deliverables Due	15	Before end November 2022

Additional Notes:

- *The anticipated person-working days assigned to each component are listed above as guidance only.*
- *A review meeting for each component as specified in the 'Expected Output' of each component is expected to be held within 1-week of the component deliverable specified above.*
- *Sign-off / acceptance of the deliverables for each component will follow the review meeting.*
- *Component 1 & 2, and 4 & 5 can be conducted in sequence or parallel depending on the consultant team / capacity*

Cost Estimate & Payment Schedule

This assignment will be undertaken as a lumpsum contract and will be paid on acceptance of deliverables and an invoice.

Potential for future work

There is a possibility for future work as the need arises and additional funds become available. The scope of this future work is expected to be similar to the work conducted under the current assignment but may be revised in light of the results of the program. Furthermore, the continuation of the future work with the selected firm would depend on the firm's satisfactory implementation of this assignment.

Note on items that should be included in the Expression of Interest

The procurement method for this activity follows the World Bank procurement regulations for "Consultant Qualification Selection". EOI's should provide enough information to allow the firm most qualified for the job to be identified, but full costing or details of the activity are not required at this stage. PCRIC will then invite the preferred candidate to submit a technical/financial proposal for negotiation.

EOIs may be submitted via email. While EOIs are to be brief, the following information should be included for use by PCRIC in assessing firm's ability to meet the requirements of the contract:

- Full contact details
- CV's, including qualifications, experience and references
- Basic information on costing/consulting fees
- Brief overview of current/past assignments, preferably of a similar size scope/seniority
- Declaration of any potential conflicts of interest
- Confirmation of eligibility to apply for World Bank funded contracts

Submitting an Expression of Interest

EOIs should be submitted by email only to the CEO on the emails below arriving no later than 4pm on Monday, 8 August 2022 (Cook Islands).

Contact

For further information please contact us at the address below:

Aholotu Palu, CEO, PCRIC

ceo@pcric.org or aholotupalu@yahoo.co.uk