

Expressions of Interest

Date: 26-05-2022

To: xxx

From: Pacific Catastrophe Risk Insurance Company

Subject: CALL FOR EXPRESSIONS OF INTEREST (EOI) ON EVALUATION OF PCRIC RISK MODEL DESIGN & KEY ASSUMPTIONS

Closing Date for Expressions of Interest: 1 July 2022 at 4pm (Cook Islands)

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

Selection Method: Consultant Qualification Selection (Individual/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’s current risk modelling capabilities (and insurance product offering and re-insurance strategy) rely on models developed in 2010-2011 by AIR Worldwide for Tropical Cyclones (including damages from wind, storm surge and rainfall) and Earthquakes (including earthquake-induced tsunamis). *[Note: AIR, re-branded in 2022 as Verisk Extreme Event Solutions]*

AIR’s Tropical Cyclones (TC) and Earthquakes (EQ) models were developed as part of the World Bank / PCRAFI project to perform the initial risk assessment and analysis for the region. AIR continue to act as the PCRIC’s Calculation Agent in executing the post event loss calculation process following catastrophe events impacting the PCRIC’s policy holders - an essential component of the company’s current parametric products.

While PCRIC are the principle current user of the output of AIR models, under the World Bank contract agreed with AIR for the PCRAFI project, AIR retain ownership of the model and associated intellectual property (as well as all the development files, code, and data) -- **only specific limited and derived data was provided to PCRAFI and PCRIC.**

The PCRIC is now requesting the support of a suitably experienced and qualified individual, firm (or consortium of firms), 'the Consultant', to re-evaluate key critical assumptions that were made in the development and structuring of policies currently offered by PCRIC, with regard to the general issue of Basis Risk in parametric insurance products, and specifically to

1. ensure the modelled output reflect the most up to date thinking and remain fit-for-purpose with respect to PCRIC offering a sovereign level parametric insurance product to PICs.
2. to inform if those assumptions are appropriate for other perils, such as excess rainfall and drought which also impact PICs.

The assignment will consist of 2 distinct components as detailed below.

Note (1): This assignment is being conducted by PCRIC in collaboration with the Centre for Disaster Protection (<https://www.disasterprotection.org/>) with procurement is conducted under World Bank rules. The Consultant is expected to work jointly with both PCRIC Catastrophe Modelling Advisor and our partners at the Centre for Disaster Protection on all stages of the project.

Any intellectual property ownership will be included in contract negotiations, but the output of this work is anticipated to be primarily of practical value to PCRICs product design and modelling but may also form public good to the Disaster Risk Financing community.

*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: Relationship between Loss / Damages and Emergency Costs

Objectives

In current TC and EQ models used by PCRIC, 'impacts' are measured in terms of economic losses to buildings, infrastructure, and crops, and the affected population. The losses reflect both direct losses (i.e., the cost needed to repair or replace the damaged assets), and the emergency costs that local governments may sustain in providing necessary relief and undertaking recovery efforts.

Modelled emergency costs are estimated as a percentage of direct losses based on research on historical tropical cyclones and earthquakes (Bitran, 2003).

- *Bitran, D. (2003). Participación de los daños en edificios en el total de daños directos, Report prepared for AIR.*
- *Bitran, D. (2003). Nota metodológica, Report prepared for AIR*

The specific objective of this assignment is to

1. Evaluate the current relationship between direct losses and emergency cost used by PCRIC to answer the following questions:
 - a. *Are current assumptions still appropriate / valid based on both recent catastrophe experience, and current literature / academic studies / and best practice in the insurance and Disaster Risk Financing Communities?*
 - b. *Are there any PIC specific considerations for emergency costs which could or should be considered, i.e., geographical separation of communities?*
2. Develop an improved model to estimate government emergency cost based on PCRIC models of loss and Damages which could be implemented in the PCRIC modelling framework and post-event loss calculation process.

In addition, the consultant is expected to advise and support PCRICs planning and strategy, on how a more sophisticated approach could be used in practice, including but not limited to the following questions:

- How significant is this emergency costs factor in overall basis risk to PICs?
- Can / should flexibility / ownership of emergency cost assumptions / model parameters be passed to policyholders with consideration of PCRICs current policy structure)?
- Would any refinement add 'value' based on the countries / policyholders likely understanding of the product (with consideration of PCRICs current policy structure)?

This evaluation should consider both regionally specific and global evidence from developed and developing economies as appropriate; and should consider the application to both PCRICs current (TC and EQ) and future (excess rainfall and drought) insurance products.

Key Actions

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

- Lead discussions with the PCRIC technical teams on the current approach and assumptions.
- Identification of and an expert review of any / all relevant literature, reports, data, and any other relevant documentation.
- Development of an updated emergency cost model framework which can be simply integrated with PCRIC existing models / output for any new recommended approach.

- Evaluate the impact of a new framework on PCRIC current country risk assessments, and existing Policy structures, and recent catastrophe events.
- Lead discussions with the PCRIC technical & leadership teams on conclusions.

The project should be conducted in close collaboration with PCRICs Catastrophe Modelling Advisor and PCRIC team. The project is anticipated to be primarily a desk-based literature review and modelling exercise. Primary data collection (survey / interviews with regional agencies and PIC government departments) is not anticipated but can be facilitated by PCRIC if the Consultants conclusions of question 1 supports this requirement.

Note: for this component 'recent' should be considered to mean at a minimum all catastrophe events over the last decade, as well as any benchmark events from the last 20-50 years. The scope of the work and analysis should also cover all 14 PICs included in PCRAFI.

Expected Outputs

- 1) A detailed technical report on the current state of knowledge and best practice with full references for the evidence base w.r.t question 1 above.
- 2) A detailed technical report outlining the Consultant's proposed model and recommendations for practical application and implementation in PCRIC risk modelling frameworks (for both existing and future proposed insurance products).
- 3) An archive of all datasets, literature / references, and code developed or used to throughout the project.
- 4) Presentation of results in a workshop to discuss findings

Component 2: Inclusion of Sub-Perils in Parametric Products

Objectives

The current parametric TC and EQ insurance products offered by PCRIC are ‘modelled loss products’ whereby an insurance payout is triggered based on an objective third party calculation of the modelled loss to each PIC impacted by an event (as defined by an official third-party reporting agent).

PCRIC current products use models which include losses from multiple sub-perils of each event, i.e., the Tropical Storm model includes contributions from wind, storm surge & rainfall flood; the Earthquake model includes both near field and far field Tsunami.

While the inclusion of multiple sub-perils associated with an event has clear benefits and represents a potentially better estimate of the full impacts to PICs, there are potential downsides. The modelling of each sub-peril may not be equal in sophistication, calibration or validation, and as such each has its own Basis Risk profile / concerns.

The **general objective** of the component is to support PCRIC in evaluating the benefits of a modelled loss parametric policy design versus the possibility of adopting simpler ‘pure’ parametric / parametric index-based policy design in the future.

The **specific objectives** of this component are to:

1. Support PCRIC in answering the following questions (w.r.t. to PCRIC parametric insurance policies):
 - What is the current practice of handling sub-perils in parametric insurance products?
 - Do the benefits of including multiple sub-perils out-weight the negatives (i.e., increased model basis risk), or would removing them increase ‘perceived’ basis risk?
2. Conduct an analytical and quantitative analysis of the impact of modelled & non-modelled sub-perils based on PCRIC existing TC and EQ models (model output by sub-peril can be provided) with respect to existing PIC Country Risk Profiles and PCRICs current Policy Structures (for all countries).
3. Advise PCRIC on the options to reduce basis risk from sub-perils in PCRIC product offering? i.e., recommendations regarding approaches that could include (but should not be limited to):
 - Modelling based, i.e., constrain the sub-perils in post-event loss calculation method.
 - Product / structurally based, i.e., include soft triggers.
 - Exclusion or separation of products by sub-peril

The work should consider:

- the experience of PCRIC and PIC policy holders since the inception of PCRIC (details to be provided by PCRIC technical team).
- global and regionally specific evidence.
- the materiality of other possible non-modelled sub-perils e.g., landslides.
- evidence from similar risk pools and general catastrophe insurance markets.
- the application of conclusions to both PCRICs current (TC and EQ) and future (excess rainfall and drought) insurance products.

Key Actions

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

- Lead discussions with the PCRIC technical teams on the current approach and assumptions.

- Identification of and an expert review of any / all relevant literature, reports, data, and any other relevant documentation.
- The design and execution of a quantitative analysis based on the objectives defined above.
- Lead discussions with the PCRIC technical & leadership teams on conclusions.

The project should be conducted in close collaboration with PCRICs Catastrophe Modelling Advisor and PCRIC team. The project is anticipated to be primarily a desk-based literature review and modelling exercise. Primary data collection (survey / interviews with regional agencies and PIC government departments) is not anticipated but can be facilitated by PCRIC if the Consultants work plan recommends this approach.

Expected Outputs

- 1) A detailed technical report outlining the Consultant's conclusions for items 1-3 specified above, including a recommendation for how any new approach should be implemented in PCRIC risk modelling (for both existing and future proposed insurance products).
- 2) An archive of all datasets, literature / references, and code developed or used to throughout the project.
- 3) Presentation of results in a workshop to discuss findings.

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.

Institutional Arrangements

- The Consultant role will work from his/her own office.

Selection Criteria

- The Consultant is expected to have significant expertise specific to the assignment, i.e., in the assessment and modelling of disaster loss, and government emergency costs.
- The Consultant will have advanced knowledge of catastrophe risk modeling (including the applications of and development of models).
- 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 (*but this is not expected for this specific project*)

Timetable

The output of assignment must be completed prior to end of September 2022, with an estimated schedule of outputs as follows:

Outputs	Expected Duration / Person-Working Days Assigned	Anticipated Completion date
Component 1 Reports, Database & Deliverables Due	40	No later than 3 months post inception of project
Component 2 Reports, Database & Deliverables Due	30	No later than 3 months post inception of project

Additional Notes:

- *The anticipated person-working assigned to each component are listed above with an anticipated completion date 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 and 2 can be conducted in sequence or parallel depending on the consultant team / capacity*

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 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 the 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". EOIs should provide enough information to allow the individual/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 an individual/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 Friday, 1 July 2022 (Cook Islands Time).

Contact

For further information please contact us at the address below:

Aholotu Palu, CEO, PCRIC

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