

# Risk data and modelling as an enabler for CDRF



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**PACIFIC  
CATASTROPHE  
RISK INSURANCE  
COMPANY**

# PCRIC: Key facts

- PCRIC is established as a captive insurance company in the Cook Islands, with the purpose of providing disaster risk finance and climate insurance products to Pacific Island Countries (PICs)
- PCRIC provides parametric policies which are not designed to cover ALL losses faced by the government following a disaster, but aim to:
  - Provide PICs with a quick injection of cash following a major natural disaster
  - Act as a form of direct budget support to the government to finance the immediate relief needs post disaster



# Parametric Insurance - Concepts

- Parametric insurance is not a traditional 'indemnity' insurance cover.
- Rather than insuring a policy holder for specific damages or loss of assets it pays-out based simply on the occurrence of an observed set of pre-defined parameters (a 'trigger').
- Benefits:
  - can cover intangible or hard to insure assets, i.e., the government emergency response cost following a natural disaster.
  - Can provide rapid payments, no 'claims' process.
- Limitations:
  - The 'basis-risk' needs to be understood, the pay-out received may over or underestimate relative to actual 'costs' and may not meet stakeholder expectations.

# How does PCRIC use risk analytics and exposure data?

1

Better pricing and structuring of risk financing solutions

2

Payout calculation

3

Analysis and Reduction of Basis Risk

4

Better reinsurance placement options

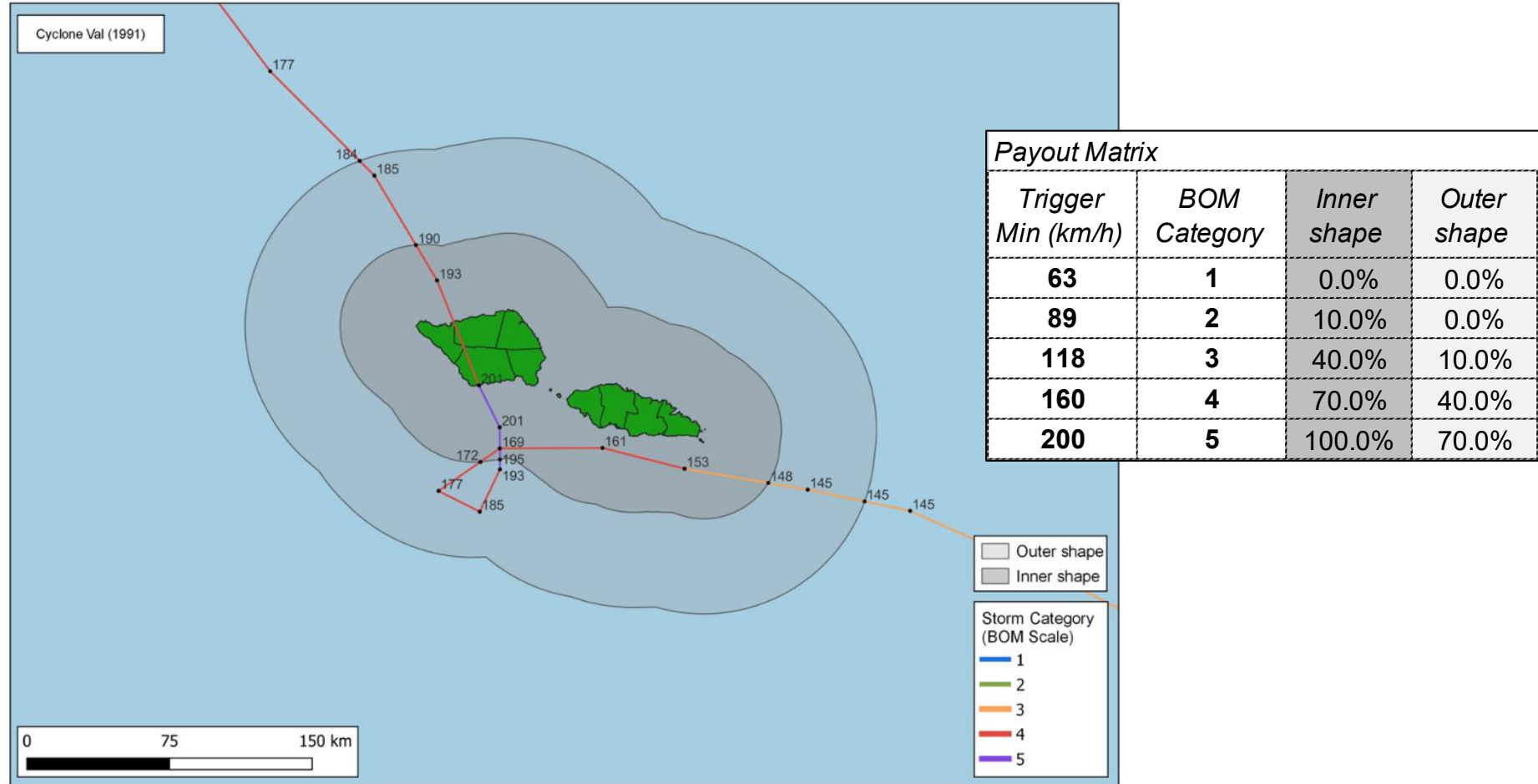
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Better culture of risk management

- Identification of risk drivers
- Reduction of uncertainties

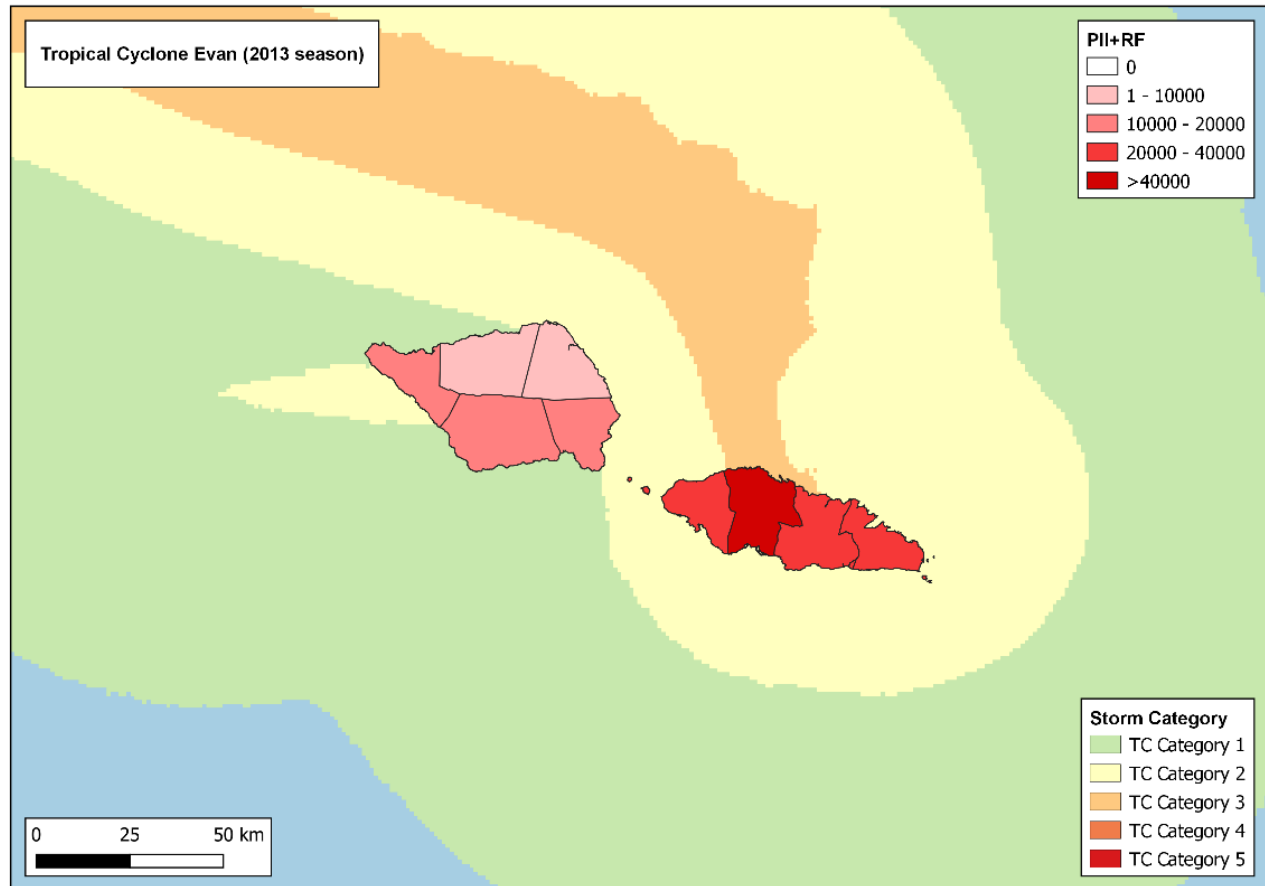
# Tropical cyclone: a dual-trigger approach

## Trigger 1: Source-in-a-Shape (SiS), also called a 'Cat-In-a-Circle'



# Tropical cyclone: a dual-trigger approach

## Trigger 2: Cyclone Impacted Population Index (CIPI)



Payouts as % of coverage limit:

Impact Index	Payout rate
0 – 0.75	0%
0.75 – 2.5	20%
2.5 – 4.0	50%
> 4.0	100%

**Impact index =**

Population affected by cyclone winds

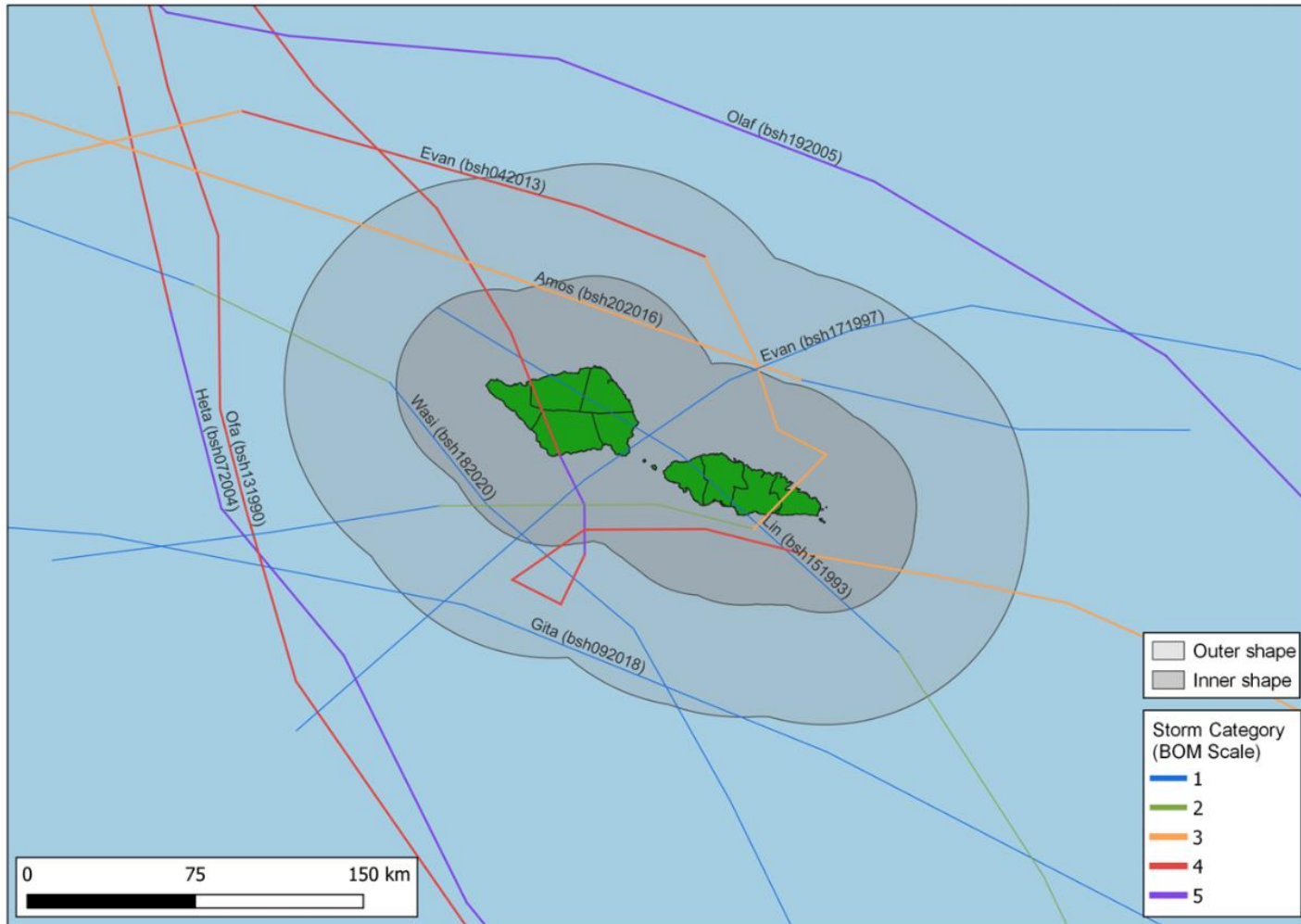
x

Uplift factor for cat 3+ winds

x

Uplift factor remote areas impacted

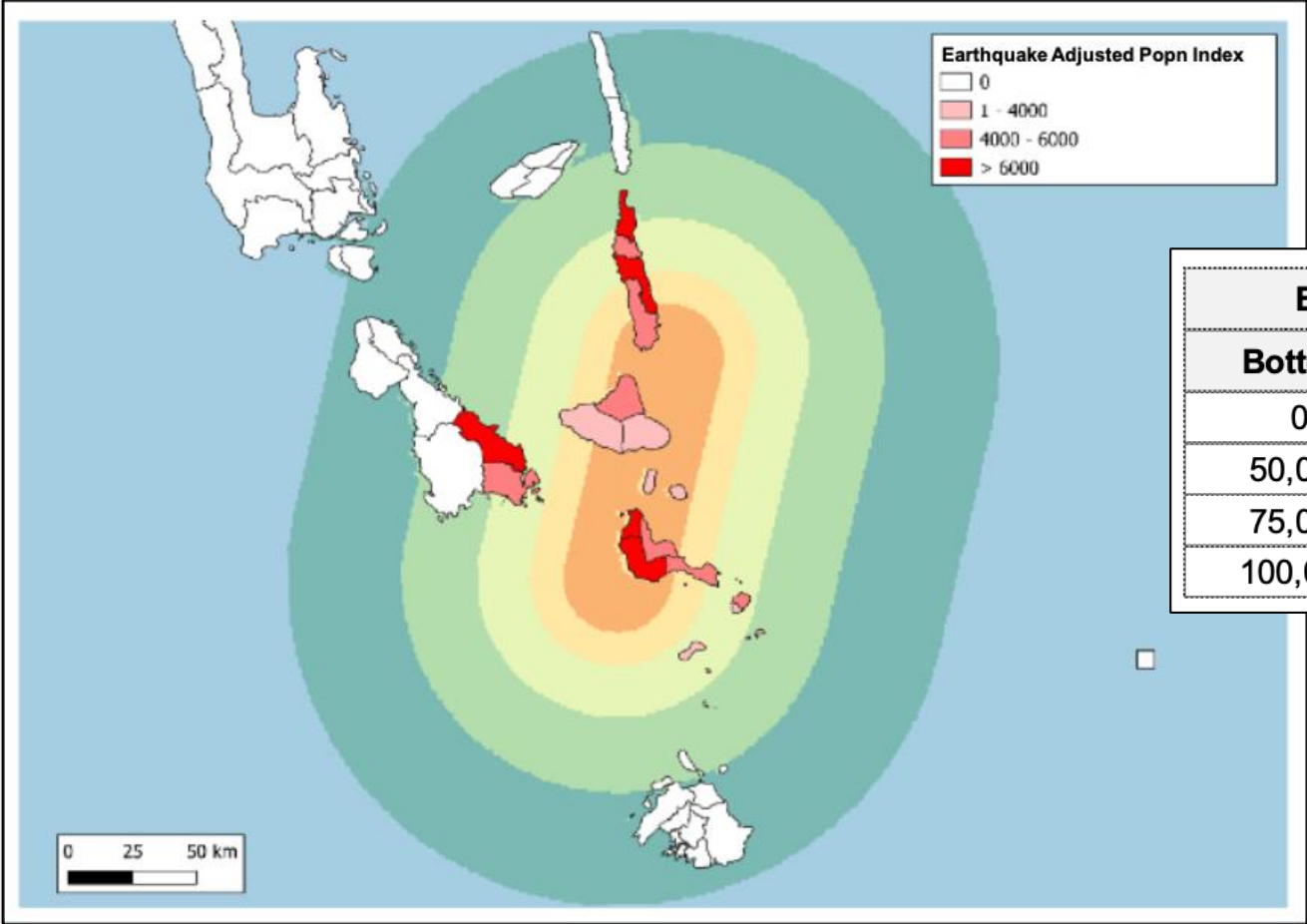
# Historical cyclones impacting Samoa



	Payout (% of coverage limit)	Trigger for payout	
		Source-in-a-shape	CIPI
Val (1992)	100%	X	
Lin (1993)	10%	X	
Evan (1997)	10%	X	
Heta (2004)	20%		X
Olaf (2005)	20%		X
Amos (2016)	10%	X	
Evan (2013)	50%		X
Gita (2018)	20%		X
Wasi (2020)	10%	X	

# Earthquake

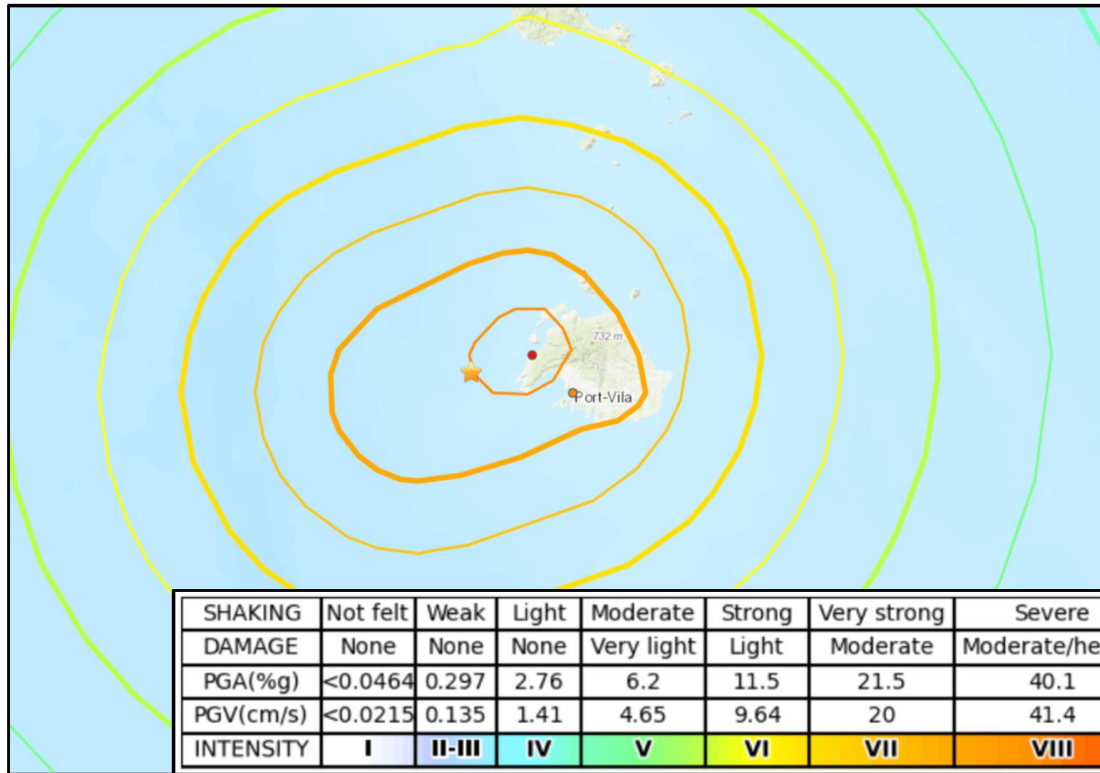
Trigger: Earthquake Affected Population Index (EAPI)



Bottom	Top	Loss Rate
0	49,999	0%
50,000	74,999	20%
75,000	99,999	50%
100,000		100%

# Payout Calculation

17 Dec 2024 Magnitude 7.3 Vanuatu earthquake



USGS ShakeMap for the earthquake of 17 Dec 2024

Source: <https://earthquake.usgs.gov/earthquakes/eventpage/us7000nzf3/map>

EAPI Parametric Loss Matrix		
Bottom	Top	Loss Rate
0	49,999	0%
50,000	74,999	20%
75,000	99,999	50%
100,000		100%

Population impacted by MMI 7+ ground-shaking = 78,935

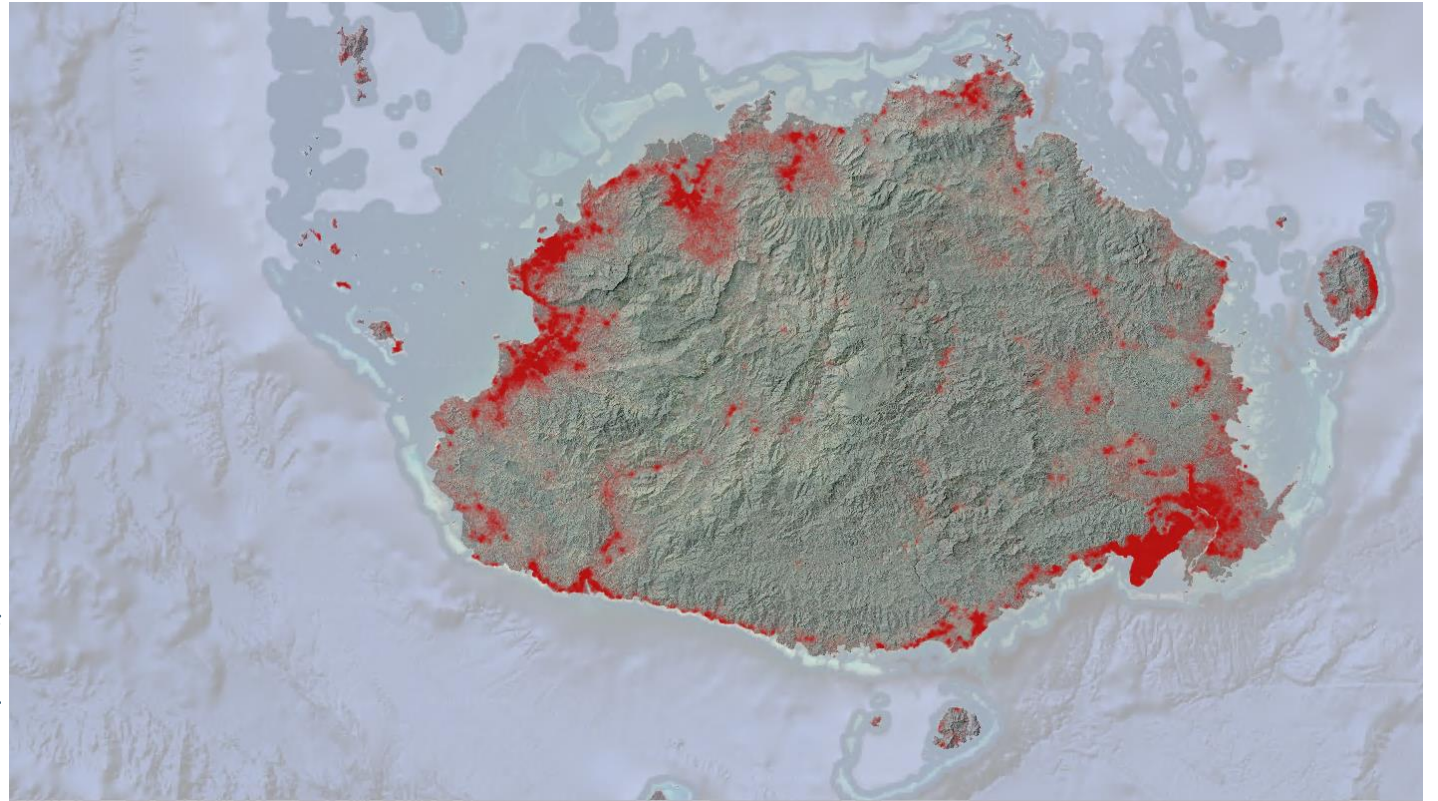
meaning that the payout amount is **50%** of the Coverage Limit. The Coverage Limit as defined in Vanuatu's policy is US\$2.4m, giving a **payout of US\$1.2m.**

# Excess rainfall

The excess rainfall policy issued to Gov. of Fiji in November 2024 is an example of a **remote-observation-based** policy.

**A payout is made based on the number of people impacted by flooding exceeds a pre-defined threshold**

- Fiji's latest population dataset is distributed across the islands according to Population Census and Meta for Good population density dataset (being based on building footprints derived from earth observation imagery)
- People represented as points at 30m resolution
- People assigned to a cell are considered impacted if the modelled flood depth in that cell exceeds a pre-agreed threshold



# Tsunami

New for 2024, PCRIC is offering a new type of tsunami policy which would trigger based off tsunami threat warnings issued by the **Pacific Tsunami Warning Centre (PTWC)**.

Wave height according to PTWC threat warning	Payout rate
0.3 – 1m	0%
1 – 3m	30%
> 3m	100%



*The tsunami that impacted Tongatapu after the Hunga Tonga-Hunga Ha'apai eruption in January 2022*

# New for 2025: Drought

PCRIC has completed a drought insurance feasibility study, with Willis Towers Watson, which is ready to be tailored to individual PICs.

The study considered two triggers:

- An early action (EA) trigger to provide a limited payout before drought impacts become most severe.
- A rapid response (RR) trigger to provide a larger payout if drought conditions intensify.



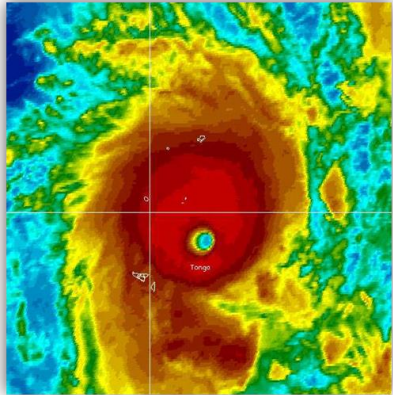
*Drought in Kiribati, June 2022*

**For each country the triggers are set based on response costs at different points in an emerging drought, so that funds are provided when they are needed most.**

# PCRIC claims paid to date

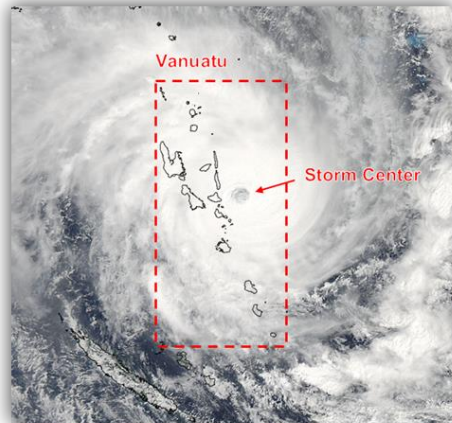
## 2014: TC Ian

- Tonga
- Payout of US\$1.27m



## 2015: TC Pam

- Vanuatu
- Payout of US\$1.9m



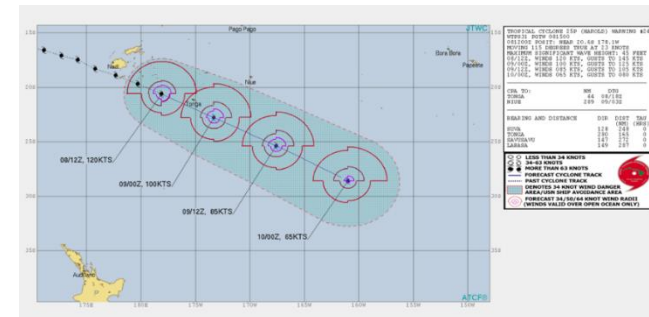
## 2018: TC Gita

- Tonga
- Payout of US\$3.5m



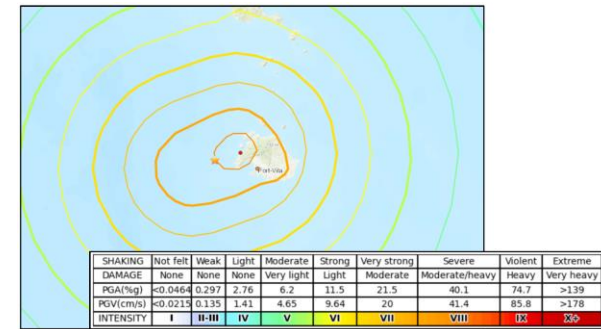
## 2020: TC Harold

- Tonga
- Payout of US\$4.5m



## 2024: M 7.3 EQ, 17 Dec 24

- Vanuatu
- Payout of US\$1.2m



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