Go with the Flow

Reflections on flood modelling for disaster risk finance

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FROM HAZARD TO IMPACT

Global Flood Maps

Design return period hazard maps for flood extent and depth

PLAN

Global Flood Models

Probabilistic modelling for evaluating the frequency and intensity of floods and impacts

ASSESS

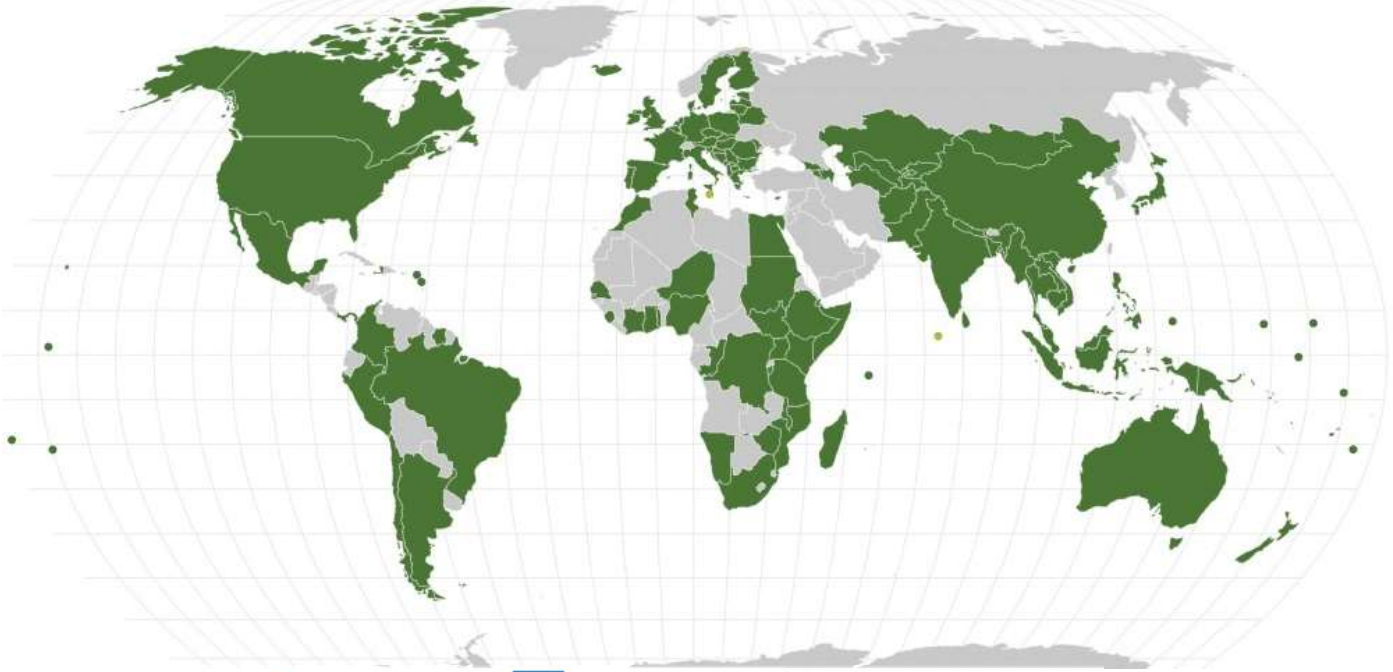
Flood Foresight

Near real-time assessment of flood events and their impacts

RESPOND

JBA Global Resilience

JBA has delivered projects in more than 125 countries and territories



giz · European Bank for Reconstruction and Development · European Investment Bank · United Nations · African Development Bank · UNDP · The World Bank · ADB · IDB Inter-American Development Bank · Save the Children · Caribbean Development Bank · Comité International Geneve · CAF Development Bank of Latin America · Oxfam International · IsDB Islamic Development Bank · African Risk Capacity · GiveDirectly

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Changing disasters and impacts

Climate change

Exposure

High income countries
Insurance, govt reserves

Low income countries
Protection gap

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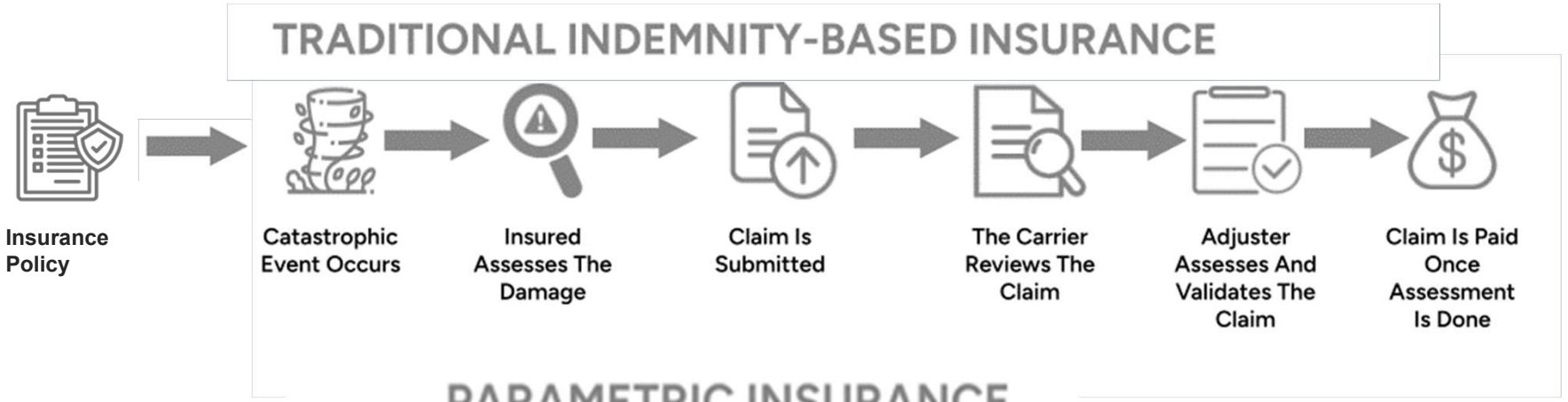
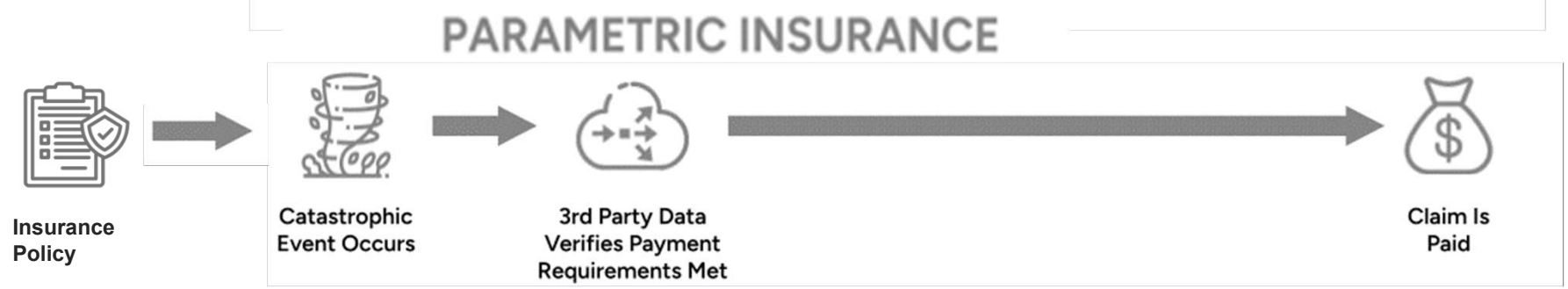
Disaster Risk Financing: an alternative financial solution

Promise to cover the actual loss incurred by an event



Coverage of the probability of a pre-defined event happening



How DRF can fall short

Catastrophe Bonds Dodge Losses After Beryl Hits Jamaica

By Gautam Naik | July 8, 2024

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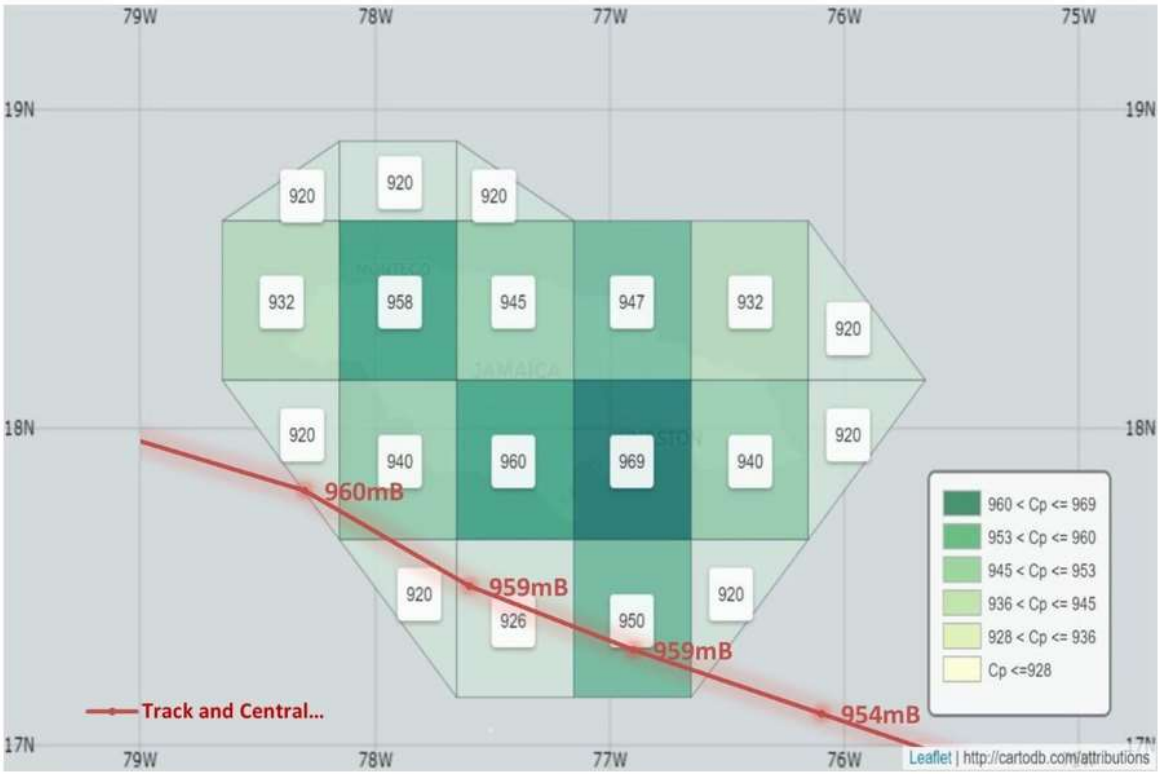
Insurance Journal
https://www.insurancejournal.com/news/international/2024/07/08/782726.htm



Artemis
https://www.artemis.bm/news/hurricane-beryl-not-expected-to-trigger-jamaica-cat-bond-loss-plenum-confirms/

An index for flood/rainfall

The index determines when payouts are made

Measureable

Reliable

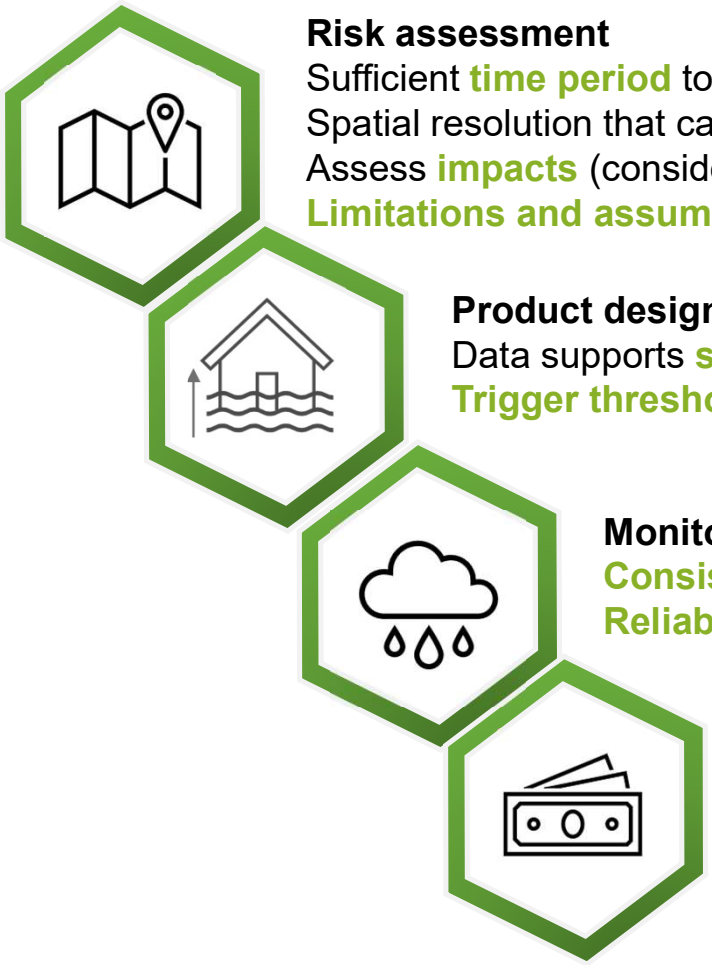
Independent

Relevant

Must enable both…

- a robust analysis of the expected range of the hazard or risk
- monitoring of the hazard/risk to assess exceedance of triggers for payouts

Data requirements for flood/rainfall



Risk assessment
Sufficient **time period** to capture extremes
Spatial resolution that captures **granularity of hazard**
Assess **impacts** (considering exposure and vulnerability)
Limitations and assumptions of method are understood and accepted

Product design
Data supports **structuring** of insurance cover
Trigger thresholds based on metrics of choice

Monitoring
Consistent with risk assessment data
Reliable, with fallback options for data failures

Actions
Rapid payouts based on monitoring
Refine product based on experience

Minimise the gap between the estimated risk and the actual event – the **Basis Risk**

Data solutions

Type	Options	Strengths	Potential limitations
EO	Visible, IR, SAR	• Spatial coverage • Resolution • Integrity	• Availability • Historical consistency • Detection algorithms • Cost
Gauges	Rain, river (flow)	• Trusted data source • Accurate point measure • Simple, relatively cheap	• Accessibility • Reliability • Localised • Can be tampered with
Hydrological modelling	Global, local	• Spatial/temporal resolution • Global coverage	• Complex • Potentially costly • Involve assumptions
Disaster reports	Global and local agencies	• Detailed	• Subjectivity • Potential for inconsistency

Experience of implementation

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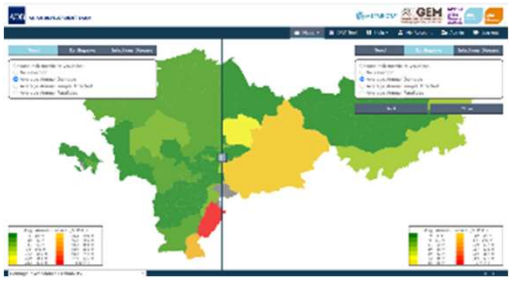
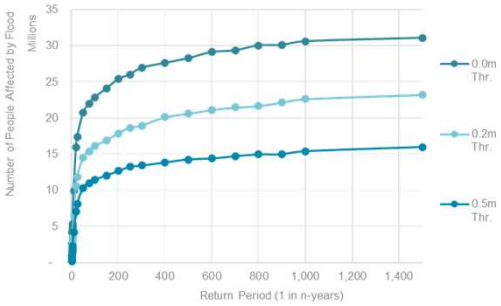
CAREC region

- Central Asia
- Flood and EQ
- People/economic impacts
- Test DRF options
- **End user knowledge gap**



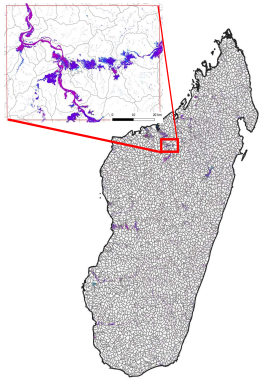
Pakistan

- Risk modelling & monitoring
- People affected
- Humanitarian DRF payouts
- **Rationale for triggering**



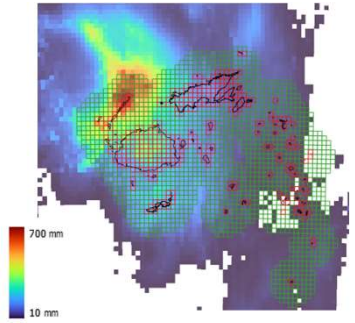
Africa

- West & southern Africa
- For flood policies
- Economic loss
- **Getting reinsurers on board**



Pacific Islands

- Rainfall-based risk modelling
- Population exposure
- Cumulative index
- **Technical challenges**



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General lessons learned

Knowledge, awareness and language

State of the science
Technical capabilities and limitations
Data availability and validation

Clarity of DRF objectives

Coverage of flood types, national or local scale
Impacts being modelled – direct or proxy?
Frequency of payments

Specific flood challenges

Event definition
Human factors – drainage, water management

What can we do?

Technical requirements

Sufficiency
Combined strength of data sources
Consistency of approach

Stakeholder engagement

Don’t assume everyone understands the concept
Deliver appropriate solutions
Bring in local capacity

Calculation Agent role

Monitoring/assessing
Reporting/validating
Independence

Closing remarks

The opportunity

Parametric flood is behind other hazards

Well supported with funds from MDBs, IDF, etc

Applications of new technology

The approach

Be open with stakeholders about what is and is not possible

Continue to educate stakeholders on the science/tech

Consider combined solutions and use of multiple triggers

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Questions

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