The Caribbean Catastrophe Risk Insurance Facility

Excess Rainfall Coverage

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Rationale for Excess Rainfall Coverage

- CCRIF has been offering hurricane and earthquake risk transfer policies to 16 CARICOM governments, covering in total over US$600M in catastrophe risk since its June 2007 launch

- CCRIF member governments and some non-member countries (for example Guyana) still have significant exposure to floods in both hurricanes and non-cyclonic storm systems

- Strong interest in coverage for excess rainfall, both within hurricanes and in non-hurricane systems. 94% of respondents from 2011 CCRIF Beneficiary Assessment felt that CCRIF should cover other hazards, including flooding

- Anticipated changes in climate, particularly in frequency and severity of hydro-meteorological events, will have an increasing impact on the Caribbean Basin

Developing an Excess Rainfall Product

The Excess Rainfall product is a new parametric insurance cover to allow governments to hedge some of their risk resulting from extreme rain events, both during tropical cyclones and from other storms

- CCRIF started to develop the product in 2008/09 but met some challenges:
  - Rainfall is perhaps the most difficult area of natural hazards risk modelling
  - There was a paucity of historical rainfall data series, particularly to be consistent with reliable real-time data sets
  - There exists no scientific consensus on a methodology to underpin excess rainfall coverage – it is very challenging to link the amount of rain falling to impacts and financial losses and very little actual quantitative loss data exists
  - Needed time to refine methodology with the reinsurance community
- The CCRIF rainfall model, built by KAC with support from CIMH, is expected to support a second iteration of the product

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CCRIF/ Swiss Re XSR Programme

- CCRIF and Swiss Re started to collaborate via an MoU in late-2011 to design and structure a "Parametric Excess Rainfall Cover" that could be used as an effective risk transfer solution

- XSR programme brought to market during 2012 and now set for full roll-out to interested countries

- Swiss Re provide technical input to CCRIF product development and refinement, ultimately producing a rainfall loss model based on NASA rainfall data and CCRIF exposure data and calibrated against any known rainfall/flood impacts in all CARICOM countries

- Swiss Re will share risk with CCRIF via reinsurance cover either on a per-country basis or across a portfolio of CCRIF country coverages

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Benefits of Partnership

- CCRIF and Swiss Re's partnership for the development and launch of the parametric flood/excess rain cover will broaden coverage options for the region
  - Methodology can be shared and replicated with the broader industry and will spur greater innovation in risk management in the region
- CCRIF and the countries do not incur any product development fees
  - Swiss Re's participation ensures the viability of risk transfer
- CCRIF and Swiss Re and are ready to implement country-specific structuring based on the XSR-model based risk profiles generated
  - Methodology is tested and customisable to the Caribbean Basin

CCRIF's members will be more adequately covered for 2013 and as climate change effects become tangible

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Technical Commentary

- XSR product is underpinned by parametric estimation of the impacts of heavy rain using the following inputs:
    - Rainfall from satellite data using uses the NASA/JAXA TRMM daily rain data
    - Exposure from the CCRIF MPRES database which also underpins CCRIF's other products
    - Vulnerability using empirical fitting of historical impact information
- Exposure mapping – 1km exposure data is mapped onto the 25km TRMM grid to provide a distribution of the total MPRES exposure value between rainfall measurement points
- Vulnerability is estimted from historical loss data; however, payout to premium relationship for each country is dictated by the raw TRMM rainfall data, so pricing is fair even if vulnerability estimation is uncertain
- Index loss calculation - for each event at each TRMM grid node, the single highest 5-day aggregate rainfall value within the event is used to calculate the loss rate via the vulnerability curve, which then translates to payout

Coverage offered on a per-event or an annual aggregate basis at the national level

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Determining National Index Losses

- Application of historical rainfall data (13 years) to the exposure database using the vulnerability function generates a historical risk profile (event-specific and annual aggregate)
- This risk profile provides the necessary information for CCRIF/Swiss Re to price coverage
- Coverage characteristics, within limits, are selected by each country separately (in the same way as existing CCRIF EQ and TC coverage selections are made)
- Premium cost is risk-based, so depends on the rainfall risk profile of the country and the coverage characteristics selected

Availability

- Models have been developed for all CARICOM countries, although some will likely be refined as additional historical data is collected from countries interested in coverage

- Includes Guyana, with Suriname model under development

- Aim is to work intensively with interested countries during March and April to get model acceptance and structure coverage

- Aim is to incept policies for those ready at the same time as EQ and TC policies (1 June)

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Comparison with other CCRIF Policies

- Rain events happen more frequently than TC or EQ events

- National level damage and loss generally less catastrophic than TC and EQ but the average annual loss (pure risk) is often not significantly different to that for TC and/or EQ risk

- Coverage for rainfall should trigger more often but also still provide substantial payouts for large impact events

- This makes rainfall coverage a relatively expensive proposition, and caution must be exercised in not aiming to cover loss levels that occur too frequently as risk reduction is more cost-beneficial for such risk

The Need for Donor Support

CCRIF is desirous of donor contributions to match CCRIF's own allocation from capital to fund the XSR underwriting pool

- Given the risk profile of rain impacts in most Caribbean countries the premium rate for XSR coverage is relatively high
- CCRIF must keep premium costs as low as possible to ensure that the product is not unaffordable to countries
- CCRIF recognises a lack of appetite for directly subsidising premiums (viewed as unsustainable)
- Matching donor contributions to an XSR underwriting pool would enable CCRIF to underwrite twice as much risk on its own book which in turn would lessen the reliance on reinsurance and thus reduce the premium cost to clients
- Donor support would follow the model that has been successfully executed by CCRIF for EQ/TC policies, delivering premium costs at less than half of what the private markets would charge for covering the same risk

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Estimated Financial Model

- Details of potential XSR coverage requirements for countries is difficult to know; however, we estimate that ~US$150M in total aggregate coverage may be required

- A CCRIF allocation of US$25M of assets to the XSR underwriting pool (which is possible without impacting the sustainability of the EQ/TC programme), if matched one for one by Donors, would mean that CCRIF could underwrite ~35% of the required capacity, leading to savings on the order of 20 to 30% on premium costs

- Without Donor support, CCRIF is only likely to be able to allocate around 15-20% of the required aggregate capacity for the XSR programme, so making it more dependent on reinsurance, and thus raising the cost to participants

Matching donor contributions would lead to a substantial and sustainable reduction in premium costs at the individual country level

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Next Steps

- Country interactions on XSR are under way as part of renewal process for EQ/TC policies (and were already in progress with Guyana and others from last year)

- Donor support prior to 1 June inception will have most value
  - Modality of contributions to be discussed
  - Pricing to countries, and available coverage amount are both dependent on CCRIF's allocated underwriting capacity to XSR

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Thank you!