CCRIF: A Natural Catastrophe Risk Insurance Mechanism for Caribbean Nations

EIGHTEENTH ORDINARY MEETING
Sustainable Tourism Development Technical Committee

Caribbean Tourism Organisation (CTO)

8 October 2010
• CCRIF overview and background
• CCRIF role in disaster risk management
• Performance to date
• Regional role of CCRIF
• CCRIF initiatives - Economics of Climate Adaptation (ECA) Project
The Caribbean context

- Caribbean countries are highly vulnerable to natural disasters, which have caused them average losses amounting to 2% of GDP since 1970

- Only 3% of potential loss is currently insured in developing countries vs 45% in developed countries

- Immediate access to liquidity is critical for governments and individuals post disaster

- Smaller nations with high debt burdens can no longer afford to self-finance disaster risk
• Pooled re/insurance solution for Caribbean governments first called for by CARICOM Working Party on Insurance after Hurricane Andrew (’92)
• Andrew resulted in US$250 million in damage in Bahamas alone
• Revived in 2004, after Hurricane Ivan inflicted almost 200% of GDP damage on Grenada and the Cayman Islands
• All parties identified the high exposure of small island economies across the region to natural hazards, and the consequential risk to sustainable development
• CARICOM Heads of Government asked the World Bank to assist in designing and implementing a cost-effective risk transfer programme for member governments
What is CCRIF?

• Began operation in 2007
• CCRIF is the world’s first multi-national risk pool to cover sovereign risk via parametric insurance
• A regional catastrophe fund for Caribbean governments designed to limit the financial impact of devastating hurricanes and earthquakes by providing liquidity very quickly after a major event
• Functions like business interruption insurance against Government revenue reductions in the aftermath of major natural catastrophes
• Capitalised by donors and participants (via a membership fee). CCRIF initially raised capital to cover claims and operating costs from donors (c. US$50 M) and from its participants (c. US$22 M). Donor capital now over US$65 M
• Claims paying capacity is greater than the modelled aggregate annual loss with a 1 in 10,000 chance of occurring
• Uses parametric index which converts wind speed (for storm) or ground acceleration (for quake) into a government loss estimate at key sampling sites, which are aggregated to national loss
Sovereign liquidity gap

Short-term emergency assistance (mainly goods and services)

Long-term infrastructure and sustainable development assistance

Catastrophe Event

Emergency Response

Recovery

Reconstruction and Sustainable Development

Liquidity Gap: little revenue to fund Government services
CCRIF performance to date

- Paid out approximately US$19 million since its inception (3 years)
- 2007 – ~US$1 M to St. Lucia and Dominica
  - 29 November earthquake in Eastern Caribbean
- 2008 – US$6.3 M to the Turks & Caicos Islands
  - Hurricane Ike
- 2010 – US$7.75 M to Haiti
  - 12 January earthquake
  - The first set of funds to be received by the Government of Haiti inclusive of all pledges, regional and international
  - Represented perhaps 50% of the TOTAL aid Government of Haiti received in first 10 weeks in the form of direct liquidity
- 2010 - US$4.2 M to Anguilla
  - Hurricane Earl (September)
- Strong proof of concept
Apart from assist in the recovery and reconstruction process through provision of liquidity, CCRIF is also engaged in the following:

- Facilitate the implementation of risk management measures that reduce risk and heighten resilience
- Promoting risk assessment and risk management tools at all levels (e.g. Real Time Forecasting System)
- Involved in the design of suitable index-based or hybrid products at sub-national level either directly or via community-based partners

Focus on one initiative

- CCRIF Economics of Climate Adaptation (ECA) Project
Key questions and objective of the Economics of Climate Adaptation approach

**Questions**
- How can we measure and predict the impact of climate change on our economies?
- How can we prepare to adapt to this impact?

**Methodology’s objective**
- Provide decision makers with facts and a common approach to assess and address any location’s ‘total climate risk’ in a cost-effective manner.
Methodology overview

Our approach for total climate risk management

1. Where and from what are we at risk?
   - Identify most relevant hazard(s)
   - Identify areas most at risk
     - Population (especially vulnerable population)
     - Economic value (assets, GDP)

2. What is the magnitude of the expected loss?

3. How could we respond?
   - Identify potential adaptation measures
   - Determine basic feasibility of potential measures
   - Determine societal costs and benefits (loss averted) of measures

4. How do we execute?
   - Identify key barriers to implementation
   - Determine actions required to implement measures

5. What are the outcomes and lessons?

SOURCE: Economics of Climate Adaptation
So far, we have examined eight countries and four hazards:

- **Wind**
- **Coastal flooding/storm surge**
- **Inland flooding**
- **Salinisation**

Additionally, we analysed the impact of climate risk on the agriculture sector in Belize and Jamaica.
### Sector analysis - driven by importance to national economy

#### Scope of analysis

<table>
<thead>
<tr>
<th>Sector</th>
<th>Housing and infrastructure</th>
<th>Tourism</th>
<th>Service industry</th>
<th>Agriculture</th>
<th>Industry</th>
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<tbody>
<tr>
<td>Anguilla</td>
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<td>Detailed analysis</td>
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<td>Preliminary analysis</td>
<td>Detailed analysis</td>
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</table>
Climate change threatens Caribbean development

- Annual expected losses amount to up to 6% of GDP
- Varies significantly across pilot countries
  - From 1% of GDP in Antigua & Barbuda to 6% of GDP in Jamaica
- Could increase by 1 to 3% of GDP by 2030 (worst case scenario)
  - i.e. the absolute expected loss may triple

- This economic damage is comparable in scale to the impact of a serious economic recession
  - but on an ongoing basis
Expected loss from climate risk today and in 2030

% of GDP

- Cayman Islands: 5, 7
- Jamaica: 6, 9
- Anguilla: 3, 4
- Antigua & Barbuda: 1, 2
- Dominica: 4, 6
- St. Lucia: 3, 5
- Barbados: 3, 4
- Bermuda: 2, 2

High change, 2030
Impacts of climate change on the risk profile

• Climate change can severely modify the risk profile of a country by impacting:
  – Local sea levels (greater risk in low-lying countries; accounts for about 45% of total damage in Cayman Islands)
  – Hurricane intensity (largest damage potential; up to 90% of overall damage)
  – Precipitation patterns
  – Temperature patterns

• In our high climate change scenario, sea levels may rise by up to 15mm/year and wind speeds may increase by around 5% as a consequence of the expected rise in sea surface temperature in the hurricane genesis region

• It is important to note that even small local changes may have large effects due to the non-linear correlations between climate and hazards

• A 200-year event in Bermuda, for instance, might become a once-in-a-lifetime (75-year) event as a result of these seemingly small changes
• Differences are driven by a diverse set of factors, including:
  – Topography/exposure to coastal hazards
  – Economic significance of particularly vulnerable sectors (e.g. residential assets)
  – Location (e.g. in “Hurricane Alley”)
Adaptation measures

- **Risk Mitigation**
  - Measures aimed at reducing the damage
  - Includes asset-based responses (e.g. dikes, retrofitting buildings) & behavioural measures (e.g. enforcing building codes)
  - *In some countries these measures can cost-effectively avert up to 90% of the expected loss in 2030 under a high climate change scenario*

- **Risk Transfer**
  - Measures aimed at limiting the financial impact for people affected by transferring part of the risk to a third party (e.g. catastrophic risk insurance or the capital market)
  - Include both traditional insurance products and alternative risk transfer instruments (e.g. cat bonds)
  - Play a key role in the case of low-frequency, high-severity weather events such as once-in-100-year catastrophes
For each of these adaptation measures, we quantified the benefits – that is, averted losses – as well as costs, and undertook a cost-benefit analysis.

There are significant differences in the share of the expected loss that can be averted cost-effectively across countries.

This is driven by:
  - Value of buildings
  - Importance of coastal flooding/storm surge
The risk from coastal flooding/storm surge can be mitigated more cost-effectively than wind hazard

- Low-lying countries such as Cayman Islands (where coastal flooding/storm surge accounts for around 45% of the damage) can therefore increase their resilience in a more economically effective manner than a mountainous country such as Dominica (where coastal flooding/storm surge accounts for only some 15% of the potential damage)

Together, the results of the study illustrate the importance of a balanced portfolio of measures in each country

- Using suitable risk mitigation initiatives to protect human lives
- Building on risk transfer solutions to protect economic assets
### Effectiveness of the risk mitigation measures analysed

**Expected loss (high climate change, 2030)**
**USD millions**

<table>
<thead>
<tr>
<th>Country</th>
<th>Cost-effective measures, cost-benefit ratio &lt; 1.5</th>
<th>Non-cost-effective measures, cost-benefit ratio &gt; 1.5</th>
<th>Residual loss</th>
<th>Average cost-benefit ratio of cost-effective measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cayman Islands</td>
<td></td>
<td></td>
<td>310</td>
<td>0.2</td>
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<tr>
<td>Anguilla</td>
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<td>30</td>
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<tr>
<td>Bermuda</td>
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<td></td>
<td>290</td>
<td>0.2</td>
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<tr>
<td>Barbados</td>
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<td></td>
<td>280</td>
<td>0.6</td>
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<tr>
<td>Jamaica</td>
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<td></td>
<td>840</td>
<td>0.5</td>
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<tr>
<td>Antigua and Barbuda</td>
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<td>50</td>
<td>0.6</td>
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<tr>
<td>St. Lucia</td>
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<td>60</td>
<td>0.6</td>
</tr>
<tr>
<td>Dominica</td>
<td></td>
<td></td>
<td>10</td>
<td>0.6</td>
</tr>
</tbody>
</table>

= 100%
Potential next steps to turn these analyses and insights into action

Potential next steps

- Understand your risk profile today and in the future
- Specify your 'risk appetite' in line with your development priorities
- (Re-)prioritise risk mitigation and risk transfer measures based on your priorities
- Calculate an adaptation business case incl. investment plan
- Develop a roadmap incl. priority initiatives
- Use roadmap and business case for funding discussions
- Speed up implementation with additional funding and further increase resilience

Output from ECA analysis

- Expected loss per hazard by scenario
- Drivers of expected loss for each scenario
- Cost-benefit curve of adaptation measures
- Measures to cover residual risk
Thank you