

Linking weather forecasts and risk financing

**A proposition for reducing losses from extreme
weather in the Eastern Caribbean**

Eastern Caribbean states are highly exposed to extreme weather. Advances in impact forecasting and disaster risk financing create opportunities for reducing the impacts of imminent disasters; but proponents of 'forecast-based early action' must be careful to avoid crowding out longer-term investments in reducing risk. A study funded by Adapt'Action^[1] proposes a rethink of risk governance and an approach to anticipating shocks and reducing impacts in a fiscally constrained environment.

I. Rising to the challenge: dealing with climate extremes in the Eastern Caribbean

Across the Eastern Caribbean, extreme weather poses an existential threat to Small Island Developing States (SIDS). They are highly exposed to tropical cyclones, excessive rainfall, droughts, dry spells and heatwaves, as well as floods and landslides. The cost of disasters in the region has increased over the past 50 years (in terms of percentage of GDP), particularly with Hurricanes Irma and Maria in 2017 (Figure 1).

These devastating impacts are set to increase, even if global average temperature rise due to climate change stays within 1.5°C. In particular, the likelihood of drought and heavy rainfall will grow.^[2] The cost of inaction would represent 10% of the annual GDP of the Caribbean by 2050 (CCCCC, 2012).

All Eastern Caribbean states have laws, policies and plans to address climate-related risks, although the details and institutional set-up varies. All have well-established national emergency management organisations (NEMOs) charged with coordinating disaster risk management activities across government and in partnership with civil society organisations. However, the capacity of these agencies to prepare for – and respond to – disasters is often overwhelmed, and a regionally coordinated response is required.

[1] Coordinated by Elodie Afonso and Christophe Buffet. For more information see: <https://www.afd.fr/en/adaptaction>.

[2] Small islands are projected to experience multiple inter-related risks at 1.5°C of global warming that will increase with warming of 2°C and higher (high confidence) ... [for] extreme weather events, the transition from moderate to high risk is now located between 1.0°C and 1.5°C of global warming.' IPCC (2018).

Authors

Emily Wilkinson ODI

Mairi Dupar ODI

Lena Weingärtner ODI

Blandine Arvis Ramboll

Janot Mendler de Suarez Red Cross
Red Crescent Climate Centre

A serious rethink of existing risk governance arrangements is needed.^[3] As the Eastern Caribbean is host to small island states and territories (with populations of between nearly 5,000 (Montserrat) and 400,000 (Guadeloupe)), with fragile ecosystems, and around 85% of the population living in coastal areas, there is an urgent need to strengthen climate resilience. Yet options for reducing risks related to extreme weather using domestic resources are limited. High public debt (above 60% in some countries) has curbed the ability of governments to sustain social spending and invest in building the resilience of their infrastructure (ECLAC, 2019). The impact of Covid-19 on tourism and foreign investment will make things worse.

A more effective approach to managing climate risks will require innovation and investment on two fronts:

- Long-term, sustained investment in increasing the resilience of communities, infrastructure and economy, using regular sectoral budgets and leveraging external resources.
- Better planned and targeted action when disasters are imminent, using forecasts of likely impacts to trigger action that channels scarce resources to those communities most likely to be affected.

In this paper, we focus on the second proposition – forecast-based early action (FbA).

Caribbean SIDS are not affected by shocks at the same time or in the same way, so there will be major efficiency benefits in pooling resources and targeting these at areas and people that will be most heavily affected. To make this work, forecasting mechanisms and financing arrangements will need to come together at the regional level.

FbA also relies on sound forward planning, as well as detailed risk information, coordination across sectors and reliable funding to pay for early action^[4] (Wilkinson et al., 2016; Levine et al., 2020). All these things are now holding back progress on disaster preparedness. What difference can FbA make?

II. Preparedness under pressure

Across the OECS region (Organisation of the Eastern Caribbean States), states and territories have Comprehensive Disaster Management (CDM) or similar plans defining in broad terms the mandates of different actors and specify general processes for reducing risk and preparing for and responding to disasters (Wilkinson et al., forthcoming). Typical seasonal preparedness activities include training and simulation exercises; reviews of plans and procedures; preparing emergency shelters and updating evacuation plans; carrying out public information and awareness campaigns; and testing emergency communication and early warning systems (EWS). These measures are all laudable and would help reduce disaster losses for a range of climate extremes. But there are some major problems:

(i) Proposed actions lack detail. One OECS national disaster plan, for instance, lists ‘clearing and maintenance of drains and drainage channels’ as a key preparedness activity, but does not specify where or when this needs to happen.

(ii) Many preparedness activities are not fully implemented. For example, not all shelters were adequately stocked when Hurricane Maria hit.

Most preparedness is based on common sense and experience, rather than data, research and evidence, and these institutional practices are difficult to shift. Governments are reluctant to allocate more resources to general preparedness activities when they do not know if any hazards will materialise, or how they will be affected. Stakeholders consulted in this study noted that perceived uncertainty and trade-offs can prevent people from dedicating resources to planning for ‘what-ifs’.

It's like people's attitude towards being on the NDMC (National Disaster Management Committee). People kind of feel like, 'Okay, well, disaster is part of my job, but I don't really know this is going to be a disaster, and I know I have these other things to do, so why am I dedicating all this time and energy to something that might not even happen?'

On the other hand, when a tropical storm or hurricane is forecasted to arrive in two days, and there is greater clarity on the areas that might be affected, people are more ready to act – but they need to know what to do. Having a set of well-planned and funded actions, with clear responsibilities for delivery, can make all the difference when a disaster is imminent – addressing some of the ‘residual risks’ that have not been reduced through longer-term investment in resilience.

What is needed now to make FbA work?

III. A revolution in extreme-weather forecasting

Determining in advance who and what will be adversely affected by an extreme weather event, and in what way, requires knowledge, not only of the multiple hazards threatening the region, but also the vulnerability of the people and assets exposed to them. The UK Met Office, the US National Oceanic and Atmospheric Administration (NOAA) and Météo France have all begun to invest in Impact-based Forecasting (IbF) as a way of anticipating not just ‘what the weather will be’, as they say, but also ‘what the weather will do’. Several regional initiatives aim to plug weighty gaps in exposure and vulnerability data:

- The Climate Risk and Early Warning Systems (CREWS) initiative promotes supporting and streamlining IbF to improve EWS, including building the capacity of National Hydrometeorological Services and regional institutions to provide multi-hazard disaster management and sectoral risk-informed action services.^[5]
- The Caribbean Institute for Meteorology and Hydrology (CIMH) DEWETRA platform (a real-time data and information management platform providing IbF warnings for communities exposed to hydro-meteorological risks) has begun to capture loss and damage data for hydro-meteorological events.
- The Caribbean Risk Information Program (CHARIM) supports countries in generating landslide and flood hazard and risk information relevant to infrastructure and planning decisions (i.e. health, education, transport and government buildings).
- Under the regional ‘Ready Together’ programme, the French Red Cross Regional Intervention Platform for the Americas and the Caribbean (PIRAC) is working with the Red Cross Red Crescent Climate Centre and the London School of Hygiene and Tropical Medicine to develop an IbF model for vector-borne diseases in the region.

[3] The upcoming Regional Assessment Report for Disaster Risk Reduction in Latin America and the Caribbean concludes that progress has been limited due to weaknesses in disaster risk governance, referred to as ‘the system of institutions, mechanisms, policy and legal frameworks and other arrangements to guide, coordinate and oversee disaster risk reduction and related areas of policy’ (United Nations, 2017).

[4] Early action includes among others: evacuating people from low lying areas, stocking shelters, distributing supplies, enhancing water collection and storage, keeping the public and businesses well informed, delivering social assistance..

[5] <https://public.wmo.int/en/media/news/caribbean-workshop-impact-based-forecasting-and-risk-scenario-planning>.

Figure 1- The OECS Members and the top five costliest cyclones affecting the region



Date	Tropical cyclone	Affected area	Overall losses (US\$m, 2016 values)*	Insured losses (US\$m, 2016 values)	Fatalities
6-14 September 2017	Hurricane Irma	Anguilla, Antigua and Barbuda, Bahamas, British Virgin Islands, Cuba, Dominican Republic, Florida (US), Haiti, Puerto Rico, Saint Martin, Sint Maarten, Saint Barthelemy, Saint Kitts and Nevis, Turks and Caicos, US Virgin Islands	67,000	32,000	128
19-22 September 2017	Hurricane Maria	Bahamas, Dominica, Dominican Republic, Guadeloupe, Haiti, Martinique, Puerto Rico, Turks and Caicos, US Virgin Islands	63,000	30,000	108
20-30 September 1998	Hurricane Georges	Antigua and Barbuda, Cuba, Dominican Republic, Haiti, Puerto Rico, Saint Kitts and Nevis, US Virgin Islands	14,700	3,800	3,661
6-14 September 2008	Hurricane Ike	Cuba, Dominican Republic, Haiti, Turks and Caicos Island	7,600	39	82
7-21 September 2004	Hurricane Ivan, storm surge	Barbados, Cayman Islands, Cuba, Dominican Republic, Grenada, Haiti, Jamaica, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago	5,900	2,300	67

* Figure for 2017 events are approximations and may overestimate losses for the Caribbean, as they are total losses (including the US) and at 2017 prices. The figures may change.

Source: Munich Re (2017), Munich Re (2018_d), EM-DAT (2018)

This sharing and integration of data at the regional level provides a promising basis for developing the kinds of forecasts needed to develop FbA in the Eastern Caribbean.

IV. Getting the finances right

The development of a regional framework for FbA in the Eastern Caribbean will build on existing solidarity and experience of sharing risks and pooling resources.^[6] The OECS already has a level of integration not found in other SIDS, with eight countries of the OECS forming a currency union (ECCU), with free movement of labour. Given their small size, OECS/ECCU members see integration as a way of building resilient economies, based on the more efficient allocation of resources (Schipke et al., 2013). By pooling resources, they can support common policies and increase the provision of supra-national public goods and services, including FbA. A regional reserve fund can add value to current arrangements by:

- spreading risk, given that not all states are expected to be equally affected by imminent hazards;
- incentivising enhanced preparedness (making updating of preparedness plans a condition of accessing funds); and ensuring resources are available, reliable and can be quickly released to support early action in at-risk communities.

Initial capitalisation of the fund will likely come from donors, but participating states will need to commit to replenishing the fund, which experience with CDEMA suggests might be difficult.

For FbA to work, funds need to be quickly released, and action taken, when a threshold or level of risk is reached. This is where forecasts and finance come together. The 'triggers' for action can be semi-automatic, whereby an alert of likely impact is issued, but governments also have to make a request for support before resources are transferred. More work is needed to define triggers for FbA and develop protocols for action, so that the actions themselves, and the timing and delivery of support, are clear and transparent. An FbA funding mechanism should also help incentivise, rather than crowd out, the longer-term and sustained investments

in risk reduction that are required to strengthen resilience of people and the economy in the region. For now, FbA in the Eastern Caribbean remains a proposition, but an urgent one.

V. Creating an enabling environment for FbA

FbA as a framework for addressing climate risk is still emergent, and as a government-led approach it has not yet been tried and tested. Moreover, despite the enormous costs of disasters in the region, there are clear challenges constraining further action in advance of these events. These include: equipment and technical capacity limitations; lack of adequate risk data and sharing; short lead times for forecasting rapid-onset events; less attention paid on slow-onset events; insufficient funds earmarked for ex-ante action; and the perceived 'political cost' of spending money early if there is a false alarm.

But FbA holds great promise in the Eastern Caribbean because of the need to focus on the most critical risks and likely impacts (particularly as these look set to increase with climate change), and to take advantage of high levels of regional integration. Current institutional arrangements are inadequate for the challenge ahead. To better support the coordination role of NEMOs, other government agencies will need to establish clear roles in planning and delivering FbA. Social welfare departments, through their management of social protection programmes, finance ministries and national meteorological services are all key actors. Regional governance arrangements will help to ensure collective efficiency in developing risk data and early action protocols, and harmonising guidelines for the disbursement of funds.

Year after year, the issue of climate-related loss and damage grows in importance in global climate change negotiations. With the right political will, impact-based forecasting, targeted resourcing and risk pooling of the kind described here, the Eastern Caribbean could become an international leader in demonstrating how to reduce climate-related losses, increasing results from small budgets.

[6] An example in the broader Caribbean region is the Caribbean Catastrophe Risk Insurance Facility (CCRIF).

References

CCCCC (2012). "Delivering Transformational Change 2011-21. Implementing the CARICOM Regional Framework for Achieving Development Resilient to Climate Change". Belmopan: Caribbean Community Climate Change Centre.

ECLAC (2019). "Planning for sustainable territorial development in Latin America and the Caribbean (LC/CRP.17/3)". Santiago: ECLAC.

IPCC (2018). "Special Report on Global Warming of 1.5°C". Geneva: IPCC.

LEVINE, S., WILKINSON, E. AND WEINGÄRTNER, L. (2020). "Anticipatory action for livelihood protection: a collective endeavour". London: ODI.

SCHIPKE, A., CEBOTARI, A. AND THACKER, N. (2013). "The Eastern Caribbean Economic and Currency Union: macroeconomics and financial systems". Washington DC: IMF.

UNITED NATIONS (2017). "UNISDR Open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction". Geneva: UNISDR.

WILKINSON, E., MENDLER DE SUAREZ, J., ARVIS, B., WEINGÄRTNER, L., JAIME, C., GRAINGER, N. AND BAZO, J. (2021). "What role for forecast-based early action in the Eastern Caribbean?". London: ODI.

Publication Director Rémy Rioux
Editor-in-Chief Thomas Melonio
Graphic creation MeMo, Juliegilles, D. Cazeils
Design and production Comme un Arbre!

Agence française de développement (AFD)
5, rue Roland Barthes | 75012 Paris | France
Legal deposit 1st quarter 2021
ISSN 2428-8926 | © AFD
Printed by AFD's reprography service.

The analyses and conclusions of this document are the responsibility of its author(s). They do not necessarily reflect the point of view of AFD or its partner institutions.