



Enhanced preparedness for extreme weather across the Caribbean

A joint work plan

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Key messages

- This paper sets out a framework and joint work plan for development partners to enhance disaster preparedness and reduce the humanitarian and economic impacts of extreme weather in the Caribbean.
- The framework can help governments and development partners to more effectively manage 'residual risks' (those not addressed by longer-term risk reduction measures) through regional cooperation.
- The framework has four components: forecasting impacts; well-planned and coordinated early actions; reliable finance; and delivery mechanisms. Each component needs strengthening through existing and new initiatives.
- Recommendations include setting up a regional reserve fund to fill gaps in preparedness and a regional shock-responsive social protection mechanism.
- For any regional mechanism, a standardised process needs to be developed to identify thresholds of likely impact that trigger pre-agreed actions and release of funds.



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About this paper

This paper sets out a framework and joint work plan for enhancing disaster preparedness in the Caribbean, in the context of scarce resources and considering the need to continue to strengthen regional solidarity post-Covid-19. It provides an overview of existing mechanisms and initiatives, and suggestions for how these could be enhanced and better coordinated so that more effective early action can be taken to reduce the impacts of weather extremes. The paper also highlights where further studies and new instruments might be needed. The forecast-based early action (FbA) framework presented below adds value to existing model policies and mechanisms by bringing together and enhancing a wide range of practice areas that are not particularly well coordinated, from extreme weather and impact forecasting, preparedness planning and capacity for implementation to reliable and well-targeted disaster risk finance and the delivery of rapid assistance through existing structures such as social protection systems.

Recommendations are discussed in each section of the paper. These are aimed at governments, donors, regional and international development banks and civil society organisations, all of whom have a role to play in reducing the humanitarian and economic impacts of extreme weather in the Caribbean. The final section of the paper highlights next steps in terms of (i) enhancing collaboration between agencies and coordination across initiatives; (ii) where further studies are needed to fill information gaps and develop new instruments; and (iii) suggestions of how resources might be more effectively pooled, and where concrete investments are needed that would help to improve disaster preparedness and response across the region.

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Acronyms

ADB	Asian Development Bank
AFD	Agence française de développement
BVI	British Virgin Islands
Caribbean RCC	Regional Climate Centre for the Caribbean
CariCOF	Caribbean Climate Outlook Forum
CARICOM	Caribbean Community
CariDRO	Caribbean Assessment of Regional Drought
CariSAM	Caribbean Society for Agricultural Meteorology
CCRIF	Caribbean Catastrophe Risk Insurance Facility
CDB	Caribbean Development Bank
CDEMA	Caribbean Disaster Emergency Management Agency
CHARIM	Caribbean Risk Information Program
CIMH	Caribbean Institute for Meteorology & Hydrology
CREWS	Climate Risk and Early Warning Systems
CRI	Climate Risk Index
DEWETRA	Web-GIS platform for risk mapping, forecasting and monitoring
DREF	International Federation of Red Cross and Red Crescent Societies (IFRC)'s Disaster Relief Fund
DRM	disaster risk management
EAF	CDEMA's Emergency Assistance Fund
ECCB	Eastern Caribbean Central Bank
ECMWF	European Centre for Medium Range Weather Forecasting
EWS	Early Warning System
FbA	forecast-based early action
FONDEN	Mexico's national natural disaster fund
GAC	Global Affairs Canada
GDP	gross domestic product
GFDRR	Global Facility for Disaster Reduction and Recovery
GRiF	Global Risk Financing Facility
IbF	impact-based forecasting
IMF	International Monetary Fund
IRI	International Research Institute for Climate and Society
MHEWS	Model National Multi-Hazard Early Warning System
NGO	non-governmental organisation
NHC	National Hurricane Center
NHMS	National Hydrology and Meteorology Services
NOAA	US National Oceanic and Atmospheric Administration
OECS	Organisation of Eastern Caribbean States
PAHO	Pan American Health Organization
PAP	Dominica's Public Assistance Programme
PIRAC	Regional Intervention Platform for the Americas and the Caribbean
RFBA	regional forecast-based early action
SDGs	Sustainable Development Goals
SIDS	small island developing states
SPHERA	System for Probabilistic Hazard Evaluation and Risk Assessment

SRSP	shock-responsive social protection
TA	technical assistance
UNICEF	United Nations International Children's Emergency Fund
WB	World Bank
WFP	World Food Programme
WMO	World Meteorological Organization

1 Introduction

The cost of disasters in the Caribbean has increased exponentially over the past 50 years and is set to keep rising as more intense hurricanes and storms become the norm. The Caribbean Islands are highly exposed to hydro-meteorological hazards, including tropical cyclones, excessive rainfall, droughts, dry spells and heatwaves, as well as secondary hazards such as floods and landslides, many of which are exacerbated by climate change and associated sea-level rise. These hazards can occur individually, but more often concurrently or in concatenation, with direct and indirect impacts cascading across sectors, and affecting the already fragile environment and narrow fiscal space. The economic and humanitarian impacts of disasters across small island developing states (SIDS) in the Caribbean are very high (in terms of percentage of gross domestic product (GDP);

see Table 1) and greater than larger mainland countries. A concerted effort is needed to increase resilience to climate-related hazards, particularly in small islands, because of these debilitating impacts. This includes increased capacity to anticipate shocks and act before the full scale of impact is known – to target vulnerable groups and take action to support them based on forecasts and models.

The Covid-19 crisis has highlighted the compounding effects of multi-hazard shocks and the importance of early action. Evidence collated by the Pan American Health Organization (PAHO) suggests that early action to acquire personal protective equipment, implement social distancing measures, limit travel and set up tracking and tracing of cases, based on the modelled spread and impact of the virus, has had a significant impact in keeping caseloads

Table 1 The Global Climate Risk Index (CRI): rankings of Caribbean countries in terms of losses and fatalities from 1999 to 2018

CRI rank	Country	No of fatalities (rank)	Fatalities per 100,000 inhabitants (rank)	Losses in \$ millions PPP (rank)	Losses as a % of GDP (rank)
47	Antigua and Barbuda	160	39	98	6
151	Barbados	171	159	157	102
10	Dominica	116	2	72	1
50	Dominican Republic	52	36	69	79
21	Grenada	128	7	91	3
3	Haiti	15	4	42	9
57	Jamaica	112	80	71	23
127	Saint Kitts and Nevis	172	172	137	14
51	Saint Lucia	142	24	132	17
52	Saint Vincent and the Grenadines	148	21	139	15
20	The Bahamas	122	18	60	10
161	Trinidad and Tobago	153	137	152	161

Note: CRI includes data from 180 countries. PPP, purchasing power parity.
Source: Germanwatch (2019)

low (PAHO, 2020). Alongside this early action, longer-term investment in community resilience and welfare reform is also needed across the Caribbean to reduce underlying vulnerabilities and avoid secondary impacts – for example, the interruption of education, including school feeding programmes, and increased food and nutritional insecurity. However, given that vulnerability and exposure to hazards will never be eliminated, anticipatory measures are needed to avoid or minimise those humanitarian impacts that can be foreseen. Forecast-based early action offers a practical, technical, enabling and coordinated approach to meeting this need.

This paper sets out a framework for making more effective use of resources based on extreme weather forecasts in the Caribbean, and the financial support and technical assistance required to strengthen the four key components of such a framework (forecasting and decision-making; timing and planning early actions; financing; and delivery). It builds on a study undertaken on behalf of the Organisation of Eastern Caribbean States (OECS) Commission, which included key stakeholder consultations, a multi-stakeholder workshop to determine interest and gaps in current mechanisms to address disaster risks, and a roundtable discussion with regional development partners. This work was conducted as part of the Adapt'Action project 'Scoping study for regional forecast-based early actions in the OECS' from 2019 to 2020.

1.1 Strengthening disaster risk management systems

Across the Caribbean, governments face severe resource constraints affecting their ability to regularly update and fully implement disaster plans. Major investment in risk reduction and adaptation is still lacking: for example, to improve the quality of housing and infrastructure, to stabilise slopes and relocate communities located in high-risk areas, and to build seawalls or reforest mangroves to protect coastal roads from storm surges. Widespread irrigation is needed to maintain crop production through dry spells, alongside nationwide education programmes, so citizens understand

the environmental risks they face, and what they can do about them. These examples point to a resilience deficit in all Caribbean islands, and highlight the significant pressure placed every year on emergency managers and their partners to prepare for, and respond to, disasters. These parties usually find themselves unable to undertake all the preparedness measures that have been identified and that would reduce risk.

Some of what are referred to as 'residual risks' can be addressed, and post-disaster response accelerated and improved, through well-planned and targeted, coordinated and resourced interventions, based on weather and climate forecasts. International experience demonstrates that FbA in the Caribbean is better suited to some hazards than others (see Table 2). While it may be easier to predict drought in some locations than to predict rapid-onset hazards, the timing, geographic extent and location of relative maximum impact are all very difficult to forecast. Meanwhile, some lower 'layers' of risk, such as the risks associated with heatwaves, frequent heavy rainfall and localised floods, and landslides, can cumulatively cause significant damage and losses, but are less often considered in the design of FbA projects.

1.2 Demand for FbA in the Caribbean

Research and discussions with OECS national and regional stakeholders at a consultative workshop in Saint Lucia (17–18 October 2019) highlighted opportunities for improving financing and delivery of support to islands and communities with high levels of risk, so they can better prepare for, and reduce the impact of, weather extremes. Despite the rapid-onset nature of tropical cyclones, and difficulties in forecasting the track and intensity of a storm to predict which islands and communities will be most affected, stakeholders agreed that emergency response and assistance is often 'too little, too late', and could be enhanced through more systematic, better-targeted preparedness and reliable financing. They were particularly keen to see the development of a regional framework for anticipating drought.

Table 2 Impacts that could be addressed through forecast-based early action in the Caribbean

Hazard	Impacts that could be reduced with FbA	Need for FbA	Feasibility of FbA
Drought	<ul style="list-style-type: none"> • Reduced water quality leading to diarrhoeal disease • Food and nutritional insecurity due to reduction in rain-fed crop production • Water rationing 	Workshop participants pointed out the lack of consideration of drought, as hurricanes draw attention and resources. They stressed the need for a common approach for managing drought. Recent development of the Caribbean Assessment of Regional Drought (CariDRO) tool offers an opportunity for enhanced drought management.	Early action can be triggered as soon as rainfall deficit is predicted, but before impacts and possible crisis set in. Caribbean Climate Outlook Forum (CariCOF) drought outlook advisories can forecast conditions 1–6 months in advance. Measures to combat the effects of drought on vulnerable households include emergency vaccination and livestock feeding, provision of seeds and tools, equipment for rainwater harvesting, rehabilitation of water points and supply of hygiene items.
Flash floods and river floods (related to tropical cyclones)	<ul style="list-style-type: none"> • Loss of life and injury • Loss and damage to property and infrastructure • Loss of livelihoods • Interruption of services • Epidemics 	Catastrophic past events, such as the 2013 Christmas Trough, have shown the need for better planning and coordination in advance of flood hazards, both to ensure that warnings are received, and that people know how to act in response.	Flood forecasting requires robust historic and real-time rainfall information to feed into hydrological models. Approaches to selecting probabilistic forecast triggers even with data scarcity have been developed in other contexts and could serve as a basis for early action (see Coughlan de Perez et al., 2016).
Tropical cyclones and storm surges	<ul style="list-style-type: none"> • Injury • Loss and damage to property and critical infrastructure • Loss of livelihoods • Interruption of services 	A single event can cause catastrophic and lasting damage to islands. However, there is only a very short window of opportunity to target actions between a hurricane forecast and impact. Early actions can improve the speed and effectiveness of post-disaster response.	Triggering finance linked to hurricane forecasts carries some basis risk because of uncertainty associated with the centre of the storm. Related hazards (wind, rainfall and storm surge) and impacts are more spatially distributed, so forecasts of these affecting sub-regions (although perhaps not specific small islands) are more accurate. Short lead times also limit the range of possible early actions. In the case of very strong storms, small maintenance measures may not significantly reduce impacts. FbA should focus on evacuation and preparations for a more effective response immediately following impact.
Heatwaves	<ul style="list-style-type: none"> • Health problems, especially for the elderly, children, pregnant women and people with existing health conditions • Losses in agriculture, fisheries • Increased energy demand for cooling • Reduced labour productivity, primarily in outdoor activities such as construction and agriculture 	FbA can help to target public awareness activities, initiate stockpiling and other actions in the health sector, and trigger actions in the tourism, agriculture and fisheries sectors to protect people and assets.	Feasibility would depend on national meteorological forecasting capacity, supported by Caribbean Institute for Meteorology & Hydrology (CIMH) training.

Two options to ensure reliable and adequate financing were proposed for further exploration:

1. A donor-funded and enhanced regional Emergency Assistance Fund (EAF), able to release funds earlier based on a risk forecast.
2. National and incentivised ‘disaster savings’ accounts, which could be placed with a dedicated regional organisation (for improved transparency and cost savings).

In discussions with the OECS Commission and other regional stakeholders, a further option, focused on *enhanced delivery*, was also recommended as a potentially powerful component of a regional FbA framework: a regional shock-responsive social protection (SRSP) mechanism.

Based on further discussions with regional stakeholders (the Caribbean Disaster Emergency Management Agency (CDEMA), the Caribbean Catastrophe Risk Insurance Facility (CCRIF) and the World Food Programme (WFP)), these three components were presented to a virtual Development Partners Roundtable on Financing Early Action in the Caribbean, convened on 31 March 2020. Participants were supportive of all three options and requested that the project team further develop these ideas, taking into account existing initiatives and the priorities of national governments and key development partners.

1.2.1 Initiatives through which FbA can be advanced

- **Global Affairs Canada (GAC)** is supporting CDEMA in developing a sustainable financing strategy, with interest in exploring a potential regional early action fund that could strengthen countries’ national risk financing strategies. The World Bank is working with governments across the Caribbean to develop disaster risk financing strategies and will explore contributions to a regional early action fund as part of

these discussions. The World Bank team also highlighted the importance of aligning the development of the RFBA framework with the support for improving preparedness planning and building institutional capacity.

- **The Global Risk Financing Facility (GRiF)** aims to scale up and strengthen existing risk financing initiatives and catalyse pilot approaches not yet explored by other programmes. The GRiF is a potential source of technical assistance in developing a regional fund for early action alongside support to subsidise premiums (if that fund were to be used to pay for risk transfer).
- **The Eastern Caribbean Central Bank (ECCB)** was also mentioned in relation to establishing a sub-regional fund for early action.
- Partners at the roundtable, in particular the **OECS Commission Social Development Unit, UNICEF, WFP and Agence française de développement (AFD)**, expressed interest in harmonising efforts towards the development of a regional SRSP mechanism.

1.2.2 Issues for further study

- If reserve funds are set aside for early action and matched by donor funding, how can transparency and accountability best be assured?
- What entity or entities will be responsible for monitoring and evaluation to ensure that triggers are specified correctly, that countries do what they can to prepare before funds are released and that FbA is improved and supported?
- Cost–benefit analysis is needed to assess whether allocating resources from national reserve funds provides the best value for money, and to highlight the lead times and magnitudes of disaster for which early action represents greater value for money. This assessment could potentially be supported by the GRiF in one pilot country before seeking co-financing and trialling the FbA approach.

2 The FbA framework

The FbA proposition is to incentivise, modify and capitalise existing regional and national funds, creating new risk financing mechanisms only where they can help increase efficiency in the use of these funds. Parallel support is needed to improve forecasting and risk assessments, so the potential impacts of extreme weather, alongside associated uncertainties, are better understood; to strengthen preparedness planning; and to prime delivery mechanisms so they can be used to channel resources quickly using forecast triggers. There have been recent improvements in understanding the accuracy and usefulness of select weather forecasts with respect to early action (Greatrex et al., 2020). Where existing forecasts have deficiencies (such as insufficient accuracy, geographic coverage and/or spatial resolution), concerted efforts have been made to characterise and improve these aspects. Efforts are ongoing at the global scale (WMO, 2015) and regional levels (Boyce et al., 2019) to improve the forecast elements of FbA, including conducting comprehensive validations of forecasts and triggers (Lopez et al., 2020), and understanding uncertainty within forecasts (MacLeod et al., 2020). Similarly, efforts are under way to look at capacity constraints in national emergency management organisations.

With so many components and areas of collaboration needed for early action to be effective, we recommend applying a framework through which current disaster preparedness (and response) systems can be enhanced. This applies to the Eastern Caribbean in the first instance, with potential for region-wide expansion.

This framework is made up of four components (Wilkinson, 2018):

1. **Forecasting and decision-making:** a range of forecasts and risk indicators can be used to decide when and where to target assistance before a disaster, from automated triggers to expert assessment and joint decision-making. Decision-making protocols need to be agreed in advance, with transparency on how information will be used and decisions taken.
2. **Timing and planning early actions:** actions can be planned and implemented across multiple timescales after a forecast, but before a disaster occurs. For cyclones and related heavy rainfall, people living in flood-prone areas can be evacuated over a 48-hour period if protocols are in place; for an acute drought, farmers can be supported 6–12 months in advance with provision of tools and equipment to protect crops and animals (see Table 2).
3. **Financing:** FbA programmes have applied a variety of financing tools, including dedicated funds, specific windows in emergency response funds, insurance and direct links to regular resource allocation processes.
4. **Delivery:** FbA mechanisms can be deployed through a range of delivery channels, including direct delivery of supplies to communities, work undertaken by contractors and cash transfers to beneficiaries.

Support is needed to strengthen and link these four components: from the development of impact-based forecasts and beneficiary databases to capitalisation of emergency funds and reforms to changes in the operating rules and public financial management systems of countries so money can be released before a disaster happens,

or very quickly afterwards.¹ Each of these components needs to be gender-responsive and participatory to ensure that the most vulnerable fully benefit from early action, and that the voices and preferences of all social groups are reflected in FbA policy. Together, support across these four areas can enhance the effectiveness and efficiency of preparedness measures when extreme weather and adverse impacts are forecast.

2.1 Enhancing preparedness in the Caribbean

This section describes progress and critical needs across the four components of the FbA framework, bringing these together to make recommendations for forecast-based early action or enhanced preparedness across Caribbean states.

2.1.1 Forecasting, using risk data and establishing triggers

With a clear understanding of the specific risks related to tropical cyclones, heavy rainfall events, heat and drought, over different timescales, it is possible to determine how much and what kind of support, where and when, can be made available before a crisis. This, combined with a good understanding of the ‘skill’ (accuracy) of the best available forecasts, provides a solid basis for developing ‘impact-based forecasts’ to inform decision-making on early action.

Data needs

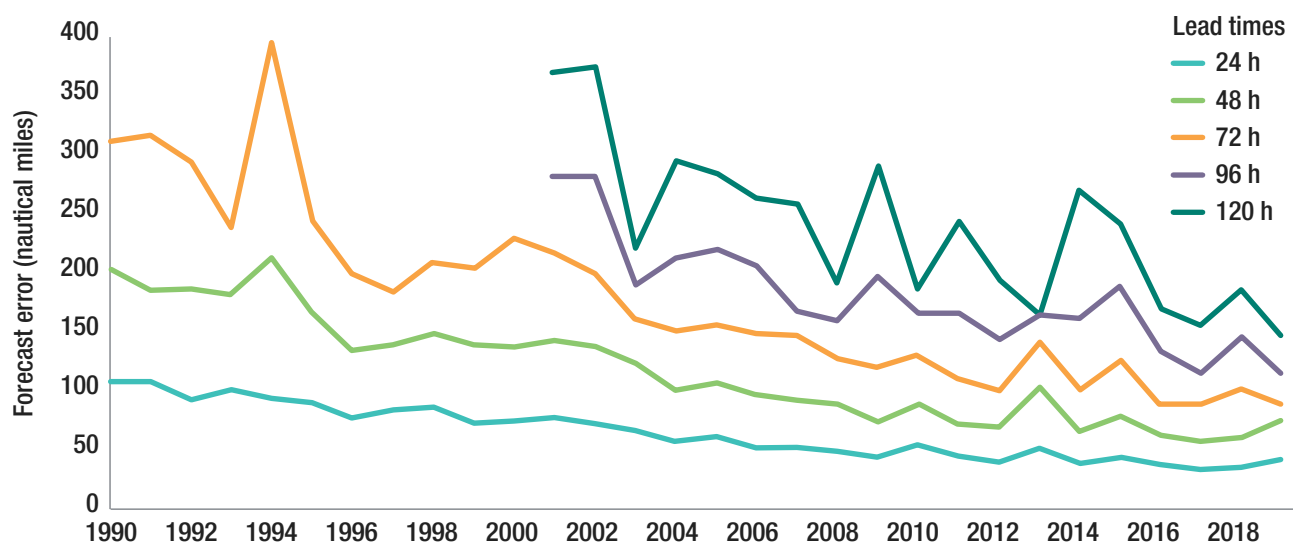
Having access to quality forecasts for a range of hazards is a critical building-block in developing a regional forecast-based early action framework. In the Caribbean, institutions such as the US National Oceanic and Atmospheric Administration (NOAA), international research institutes such as the European Centre for Medium Range Weather Forecasting (ECMWF) and Columbia University’s International Research Institute for Climate and Society (IRI), and regional institutions such as the Caribbean Institute of Meteorology and

Hydrology (CIMH), work closely with national meteorological services to produce and interpret forecasts of extreme events at different timescales, and across timescales. For tropical cyclones, NOAA, through the National Hurricane Center (NHC), provides information to countries in ‘Region 4’ of the World Meteorological Organization (WMO) classification, and is responsible for providing forecasts, assistance and coordination when tropical systems threaten the region. Regarding drought and seasonal advisories on weather and climate conditions, outlooks for the region are produced by the Caribbean Climate Outlook Forum (CariCOF), as coordinated by the WMO-designated Regional Climate Centre for the Caribbean (Caribbean RCC) at CIMH. The suite of forecasts currently includes products for rainfall, temperature and drought, with forecasts and impact maps provided for the short term (seven to 15 days) by the NOAA through a partnership between its RCC-Washington and the Caribbean RCC, and longer-term (three months or more) through CariCOF. New CIMH forecast products for extreme weather include:

- Seasonal temperature outlooks. These include minimum, maximum and mean temperatures for the coming three months, and subsequent months.
- Drought outlooks (integrated into the Caribbean Drought Bulletin, a drought early warning communication product provided by the Caribbean Drought and Precipitation Monitoring Network). These contain drought alert maps, which provide anticipated drought impact levels with a three-month lead time for short-term drought impacts, and a 1–6-month lead time for long-term drought impacts.
- Wet days and wet spells outlooks for the coming three months, including forecasts of the number of extreme wet spells, which provide risk information on the potential for flash floods.

¹ The timing of the release of funds and what counts as ‘quickly’ depends on the hazard in question and the lead times of the forecasts. For rapid-onset events, and where there is a high degree of uncertainty (including for tropical cyclones), a pre-disaster release of funds is most useful for pre-positioning supplies that will need to be deployed very quickly after the storm hits.

Figure 1 Trends in official tropical cyclone track forecast error for the Atlantic basin



Note: A lead time is the period between the forecast and when the tropical cyclone hits. The track forecast error is the difference in forecast position and observed position of the centre of the tropical cyclone.

Source: National Hurricane Centre (2020)

- Dry spells outlooks for the coming three months for 7–15-day dry spells, providing risk information for crop farmers on the potential for crop wilting.
- Heatwave outlooks in the dry season (1–6 months), providing risk information on the potential for heat stress in humans and livestock.
- The Caribbean Health Climatic Bulletin, Caribbean Tourism Climatic Bulletin and the Caribbean Agro-Climatic Bulletin of the CariSAM package climate information and advisories for the public health, tourism and agriculture and food production sectors for the coming three months.
- Hurricane Season Activity Forecasts (since 2020) provide an early look into the Atlantic Hurricane Season’s overall activity, zooming in on different portions of the hurricane season, namely the early, peak and late season. This information can help improve coordination of seasonal preparedness activities at the regional level.

The WMO established the Climate Risk and Early Warning Systems (CREWS) initiative in 2018, with a focus on strengthening ‘end-to-end’ early warning services in the wider Caribbean,

and is in the process of developing a strategic roadmap for strengthening and streamlining multi-hazard early warning systems, in order to inform risk management and resilience decision-making in the region.

It should be noted that, overall, Atlantic basin hurricane forecasts are improving in both intensity and track. Figure 1 shows that both track error and track skill (both metrics of understanding forecast accuracy) have been steadily improving over the past 30 years (NHC, 2020).

A forecast of a climate-related hazard is not necessarily enough to understand whether early action should be taken. These forecasts need to be interpreted in connection with information about people’s vulnerability and exposure. Impact-based forecasting (IbF) services are created by combining forecast and risk-related data (Lumbroso et al., 2016). Priorities for developing a regional FbA system should be centred on enhancing (risk) information management and improving availability, access, translation and use of climate and weather information. Socioeconomic data will also be required, including disaggregated data on historical impacts of disasters and on vulnerability and exposure.

On a global scale, satellite data (mostly Earth observations) and derived datasets, products and/or tools can be used to understand the potential impact of single hazards and compound hazard events (McClain et al., 2020). However, spatial and temporal resolution factors, as well as topographical issues, must be carefully parameterised given the relatively small land areas of the Caribbean islands and relatively large pixel size of useful sensors. However, given that the economic interests of small islands in the Caribbean expand beyond land area into exclusive economic zones far offshore, earth observations can be useful to inform both land and offshore anticipatory actions and awareness-raising.

Challenges to address

Determining who and what will be adversely affected by a forecasted event, and in what way, requires knowledge of the multiple hazards threatening the region and the vulnerability of the people and assets exposed to them. One obstacle to FbA is the current lack of detailed and gender-specific information on vulnerability. Post-Disaster Damage and Needs Assessments offer one possible source of vulnerability data, although this may need to be further disaggregated at appropriate scales and may not be compatible with other datasets. Another issue is that relevant data on hazards, exposure and vulnerability is often incomplete, out of date, held by different agencies and bureaucratically difficult to access; the scoping study found data-sharing practices to be often non-existent or at best ad hoc. Information management initiatives are often donor-funded and not sustained, so the capacity of national agencies to monitor changes in risk over time is limited (Wilkinson et al., 2021). The creation of National Gender Bureaus and efforts to integrate Humanitarian Open Street Map information into CDEMA's Caribbean Risk Information System both offer promise for producing and sharing data on disaster vulnerability and exposure.

Detailed risk profiles of Caribbean countries have been developed by different agencies, but this information is not always readily available

for – or easy to apply to – early action decisions. CCRIF compiles risk profiles of all participating states for tropical cyclones, earthquakes and excess rainfall, quantifying private and public assets at risk. The risk profiles are created by analysing hazards, vulnerability and exposure in each country, alongside information about the damage caused by past events. These profiles are proprietary documents that CCRIF provides to the government of each country, and are not automatically made public (they are only shared if a government agrees to make the document available).

The CCRIF approach is based on probabilistic risk assessment and modelling that allow policies to trigger in near-real time after an event has taken place. Catastrophe risk models used for parametric products rely on simplifications of weather phenomena and their impacts to provide quick payouts, which can result in inaccuracies. Such products are prone to what is known as 'basis risk', which is the possibility that modelled losses do not match losses experienced by the insured. In disaster risk financing and anticipatory action, basis risk can result from a 'combination of inherent model error, context outcome uncertainties, and miscommunication or misinterpretation of a model's capabilities' (Harris and Cardenes, 2020). To improve the accuracy of its products, CCRIF has invested in model improvements over time, most recently introducing the new System for Probabilistic Hazard Evaluation and Risk Assessment (SPHERA) for tropical cyclone and earthquake loss modelling and updating the excess rainfall model to XSR 2.5 for the 2019 2020 policy year (CCRIF SPC, 2020). It has also built historical events databases for earthquake, tropical cyclone and rainfall events and their impacts. Something similar would be required to develop and evaluate forecasts for anticipatory action. Continued research, development and learning to enhance data and models, alongside systems to assess and manage remaining basis risk, are important to disaster risk financing mechanisms such as CCRIF (Harris and Cardenes, 2020), and will also be critical to any regional anticipatory action initiative in the Caribbean.

Progress towards forecasting impacts

Impact-based forecasting (IbF) is an approach promoted by the WMO and forecasting institutions in the Caribbean for the integration of forecasts with impact analysis, using exposure and vulnerability information to better anticipate risks. The UK Met Office and NOAA, along with Météo-France in the Caribbean, have begun to build IbF capacity in Central America, as a way of forecasting not just ‘what the weather will be’, but also ‘what the weather will do’. IbF hinges on the availability of various data: (i) reliable impact data from past events (who was affected, how, to what extent, and for how long); (ii) downscaled, high-resolution climate data; and (iii) up-to-date vulnerability and exposure data. Several regional initiatives aim to plug the significant gaps in exposure and vulnerability data:

- The CREWS initiative promotes strengthening and streamlining IbF to improve Early Warning Systems (EWS), including building the capacity of National Hydrology and Meteorology Services (NHMS) and regional institutions to provide multi-hazard disaster management and sectoral risk-informed action services.
- CDEMA has developed a Model National Multi-Hazard Early Warning System (MHEWS) Policy and Adaptation Guide for Participating States as part of the project ‘Strengthen integrated and cohesive preparedness capacity at a regional, national and community level in the Caribbean’.
- The CIMH Caribbean DEWETRA platform (a real-time data and information management platform that provides IbF warnings for communities exposed to hydro-meteorological risks) has begun to capture loss and damage data for hydro-meteorological events (Collymore, 2016).
- The Caribbean Risk Information Program (CHARIM) offers capacity-building

materials and support to some countries to generate landslide and flood hazard and risk information relevant to infrastructure and planning decisions (i.e. health, education, transport and government buildings).

- Under the regional programme ‘Ready together’, the French Red Cross Regional Intervention Platform for the Americas and the Caribbean (PIRAC) has been 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 Caribbean.

Progress towards sharing and integrating data at the regional level provides a promising basis for developing the kinds of forecasts and understanding of forecasting skill needed to enhance FbA in the Caribbean.

At the global level, the WMO IbF guidelines are being updated to focus on early action in the co-production of IbF services. To complement this, the UK Met Office and the Red Cross Red Crescent Climate Centre are producing a joint IbF guide, intended to be used by NHMS around the world for the co-production of IbF services to enable early action by the humanitarian and other sectors.

2.1.2 Recommendations for trigger development

Predefined triggers can be automatic, semi-automatic or ‘soft’, to initiate the disbursement of funds, as well as triggering actions that do not require additional funding. The process of defining useful and efficient triggers is complex and requires transparency.² We recommend:

1. Development of a data management system compiling hazards, exposure and vulnerability data across the region, and a support programme for national governments to fill data gaps on

2 The greater the lead time between a forecast and an event the more uncertain the forecast; the shorter the lead time, the less room for action. Triggers thus seek a compromise between sufficient lead time and sufficient certainty in event forecasting. Furthermore, the probabilistic aspect of triggers generates basis risk, meaning risk of imbalance between actual costs/damage and funds made available/actions taken. For instance, preparations made in advance of a large hurricane could be considered a ‘waste of resources’ if the storm changes path at the last minute and leaves that island unaffected. The opposite could occur, where a forecasted low-intensity event, for which little preparation has been made, generates heavy damage and thus overwhelms post-disaster coping capacity.

disaggregated disaster losses and update vulnerability and exposure data.

2. Development of triggers for action at the regional level. CIMH drought outlook and alert levels³ and storm advisories would trigger a rapid risk assessment and dialogue followed by a release of funds. CDEMA already requests information from national emergency management organisations and convenes discussions with development partners, based on alert levels. The proposal here is to standardise that process so that, when a level of certainty and threshold of likely impact is reached (a risk threshold), a country is alerted automatically and advised to take pre-agreed actions, but needs to request a release of funds from the regional pool (see below for more details).

There is a potential precedent for the use of soft triggers in the Caribbean, with the Global Facility for Disaster Reduction and Recovery's technical assistance to the government of Saint Lucia.⁴ This includes establishing a climate resilience financing mechanism linked to a planned, risk-informed response, which could be readily expanded to encompass anticipatory actions. Catastrophe Deferred Drawdown Options⁵ are also examples of the use of soft triggers.

2.2 Early action planning

2.2.1 Challenges to address

All OECS member states and other Caribbean countries have disaster management or emergency plans in place, and are developing policies for EWS (all based on CDEMA's model policies) that define key stakeholders, outline the roles and responsibilities of different actors and specify general processes for different stages of the disaster management cycle.

Preparedness activities described in these plans include:

- training, exercises and simulations
- reviewing and updating plans and procedures
- ensuring the availability of resources, assets and supplies in case of emergency
- checking the operation of emergency shelters and evacuation planning
- carrying out public information and awareness campaigns
- disseminating emergency communication and early warnings
- reporting and documentation.

Most member states have specific plans, standard operating procedures (SOPs) or protocols for some hazards, particularly hurricanes, tsunamis and volcanic activity. However, few include actions specifically related to drought or heat. There are also sector-specific plans, for instance in health, transportation, extractive industries and tourism, though these are less common and/or not widely known.

Plans vary as to the level of detail and rarely address gender differences; many are not up to date and testing of plans is severely limited. This reflects the capacity constraints and variations between Caribbean countries. It was clear from the scoping study, for example, that many aspects of Dominica's disaster management plan had not been implemented when Hurricane Maria struck the island in 2017.

Although not a monolith, SIDS are alike in fundamental ways ... They are prone to disasters that result from natural hazards and have fewer resources to dedicate to comprehensive disaster planning and disaster risk reduction (Thompson, 2019).

3 See slide 5, https://rcc.cimh.edu.bb/files/2020/07/CARICOF_drought_outlook_end_October2020.pdf.

4 <https://projects.worldbank.org/en/projects-operations/project-detail/P127226>

5 Catastrophe Deferred Drawdown Options are a contingent line of credit provided by the World Bank to give immediate liquidity to countries in the aftermath of a disaster.

The costs of actions implemented within the time window after a forecast are not well understood. Actual preparedness expenditures are difficult to trace in official budgets because operating costs are very low, while the funds used to conduct actions may be drawn from different ministries or agencies. Some stakeholders felt that the costs of early action could easily be covered by governments – that cost was not the issue, but rather political will – while others believed the costs of fully implementing preparedness actions to be prohibitively high, particularly for an emergency management agency.

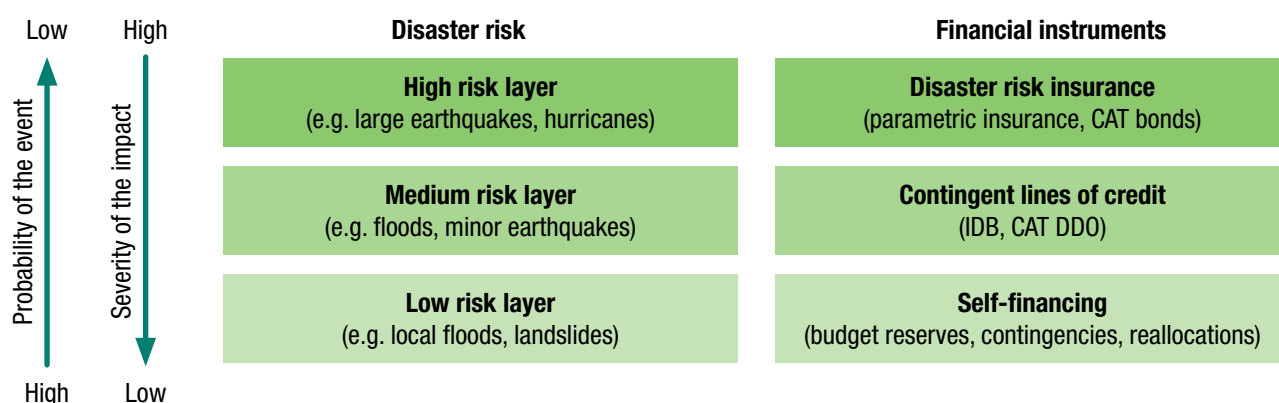
2.2.2 Recommendations for enhanced preparedness and early action protocols

1. **Support to develop and enhance preparedness planning.** The quality of preparedness planning is critical to the effectiveness of FbA. Through CDEMA, additional support should be provided so governments and communities can develop increasingly detailed, participatory multi-hazard preparedness plans. These need to be detailed on the tasks that need to be carried out (for example, before and at the start of hurricane season), the timing of these actions (i.e. which are urgent and which take longer to implement) and where any gaps may be. Protocols for early action can then be carefully designed so that, when activated, they attend to these gaps.
2. **Incentives for updating and implementing plans.** CDEMA could provide incentives to governments that regularly update and test preparedness plans and early action protocols, for instance by providing them with technical assistance, which could be paid for through CDEMA's existing Emergency Assistance Fund (EAF) (see Box 1). But this fund needs to be capitalised. The World Bank and Global Affairs Canada⁶ are both supporting CDEMA in strengthening the EAF. Using the EAF to enhance preparedness and early action planning would help reinforce CDEMA's capacity and legitimacy to manage a regional financing mechanism for early action.
3. **Develop national protocols for FbA.** The development of national FbA protocols for different hazards⁷ should be funded as part of a wider effort to enhance national and regional preparedness planning. It should engage all stakeholders at national and regional levels with a role in forecasting, financing and delivering early actions. This includes a variety of sectors, ranging from infrastructure to social protection (see Section 2.4).
4. **Enhance tracking of public and private financial flows for disaster preparedness.** Overall preparedness, as a complementary foundation for early action, needs to be properly resourced and incentivised. For this, governments need to understand how much money is already being spent on preparedness and early action, through government budget (re)allocations, regional support and international flows (e.g. through Official Development Assistance or humanitarian funds). Capturing this information more systematically by tracking flows before and after disasters can help build the case for more reliable investment in effective preparedness and for value-adding through FbA. We recommend the development of detailed guidance so governments can track their own preparedness and response expenditures, accompanied by training and promotion to support governments in undertaking more systematic accounting of disaster-related financial flows. Guidance could be supported through the Caribbean Development Bank (CDB), in cooperation with CDEMA, to enhance good practice across the region.

6 GAC is helping CDEMA develop an endowment fund to more sustainably cover operational and response costs. This project will look at the feasibility of impact bonds and other instruments that can cover ongoing costs, while also enabling CDEMA to provide greater support to participating states for preparedness and response.

7 This can build on IFRC experience with developing Early Action Protocols, a mechanism that is now being used by National Red Cross Societies to access resources for early action from the Disaster Relief Fund (DREF). Ideally, the development of Red Cross EAPs and national protocols for FbA would be one process.

Figure 2 Different financial instruments for different types of disaster risk



Note: IDB, international development bank; CAT DDO, Catastrophe Deferred Drawdown Option from the International Bank for Reconstruction and Development.

Source: Charles et al. (2018)

2.3 Financing early action

2.3.1 'Layering' disaster risk financing instruments

Reliance on external aid for disaster relief and reconstruction helps countries avoid further indebtedness and longer-term economic downturns, but also impedes their ability to plan for recovery, as they have no control over the timing, the amount of funds received or restrictions on what funds can be used for. Pre-arranged financial instruments, such as reserve funds, allow states to act early to mitigate impacts, and can also be accessed quickly in the immediate aftermath of a disaster, while still retaining control over their use. Action plans and pre-allocated finance need to be in place before a disaster happens to allow action to be taken before an impending crisis (as well as immediately afterwards).

Some financial instruments are more suitable for specific types of risk (Figure 2). Insurance – such as the parametric policies provided through CCRIF – helps countries to transfer risk, shifting some of the burden of sudden and heavy losses from a severe event, but there have been issues with the way triggers are set and some countries have objected to the price of premiums. Budgetary instruments, such as reserves or contingency funds, are more flexible but retain all of the risk, meaning the entire cost is borne by the state. Pre-arranged financing tools can be

Box 1 CDEMA's Emergency Assistance Fund

The EAF was established to receive donations and channel resources to participating states impacted by a disaster. When the fund was set up in 1991, \$250,000 was deposited in the account, but this has not been replenished since. Instead, CDEMA has built the fund slowly using grants. Funds are released post-disaster for humanitarian support, which can be in-kind or through grants of up to \$60,000, and used to purchase emergency relief supplies, conduct needs and damage assessments and facilitate early recovery and rebuilding efforts. The EAF Articles of Agreement allow funds to be spent before a disaster, and more scientific triggers could be developed for the release of funds. Currently, the EAF and all support provided by CDEMA is only available to participating states, and so does not include the French Territories, but a Memorandum of Understanding for mutual support is due to be signed that could mean these territories may access funds in the future.

more cost-effective than not having the finance in place.⁸ However, they usually only disburse funds on verification of the hazard, which means post-disaster.

Cost-effective and sustainable disaster risk financing strategies should combine risk transfer and risk retention. They should segment risks, starting with a categorisation of hazards into high, medium and low ‘layers’ of risk, to enable the selection of appropriate financing mechanisms.

2.3.2 Some options for disbursement of funds before a disaster

This section considers two linked options for developing and adapting existing risk financing that could be triggered before a disaster to ensure full and timely implementation of FbA.

1. Using budget reserves for enhanced preparedness or early action.

Although several innovative lending and insurance instruments are under development in the Caribbean, reserve funds remain one of the more flexible and rapidly deployed financial instruments for responding to disasters; there is no reason that these could not also be deployed earlier, based on a forecast trigger. As part of general disaster risk management (DRM) strengthening, OECS countries are being encouraged to build up their own reserves. The most recent International Monetary Fund Article IV discussions with members of the Eastern Caribbean Currency Union indicate that these countries’ fiscal position has weakened despite strong growth and capital inflows, due to financial sector vulnerabilities and trade imbalances. National Article IV consultations recommend that countries should set aside national reserves for prevention measures, and be able to rapidly mobilise resources post-disaster.

Few countries have reserve or contingency funds in place, however. This is partly because of the challenges involved in setting aside an initial sum sufficient to capitalise a fund, especially in light of the weak fiscal positions of these countries. Currently, only Grenada, the British Virgin Islands and Saint Vincent and the

Grenadines have functional reserve funds, while Saint Lucia’s reserve fund has been depleted in addressing non-disaster hazards. In the aftermath of the Covid-19 crisis, all countries have depleted reserves and will find it difficult to capitalise these funds again. An ongoing World Bank–Global Facility for Disaster Reduction and Recovery technical assistance programme is supporting governments to develop more robust disaster risk financing and insurance strategies responding to the region’s specific climatic and economic profile.

Another obstacle to developing risk financing strategies is the opportunity cost associated with building up stocks of emergency aid.

Thus, while reserve funds have the best potential for pre-disaster disbursement, liquidity challenges, opportunity costs and the possibility of receiving post-disaster aid all mean that there are weak incentives for national governments to make provision for such funds.

2. Building up a regional reserve fund.

This has been explored previously in the context of supporting national post-disaster response, but now needs further examination to facilitate early action. A regional reserve fund could help sidestep some of the obstacles described above. Through pooling of funds, and because of the diversity of weather patterns across islands each year, a regional reserve augments the amount of funds available for well-targeted early action when there is a forecast of elevated risk. A regional fund would rely on contributions from governments and could work well among OECS states, building on existing efforts to pool resources in support of regional agencies and programmes, as well as regional expertise in dealing with climate change.

The regional fund’s main objective would be to make money available for filling gaps in preparedness, financed and implemented at the national level. As a co-benefit, government participation in the initial set-up process could incentivise states to create and/or provision reserve funds at the national level, by applying harmonised guidelines for provisioning and adopting or adapting common disbursement rules.

8 A study of the African Risk Capacity found the benefit–cost ratio compared with emergency appeals to be around 4.4:1.

A regional fund could work in a similar way to a federal disaster fund, pooling resources (similar to how this is done by federal governments, financed through tax contributions from states – see Box 2) and covering lower levels of risk that it would be much more expensive (if not impossible) to cover through disaster risk insurance. A similar idea of a regional ‘disaster savings’ fund has been developed in the Pacific, whereby ADB allowed countries that had under-spent on their Asian Development Fund allocations to place these funds instead with the Pacific Catastrophe Risk Insurance Foundation (which were then invested via the World Bank Treasury).

2.3.3 Recommendations for financing early action in the Caribbean

Funding arrangements for FbA need to consider both incentives and sustainability. The contribution of national governments is key but will need to be complemented and further incentivised by donors. A regional mechanism could involve the following set-up:

1. **Encourage states to provision a national disaster reserve fund**, paired with appropriate guidelines for drawing down funds in advance of a disaster (implementing the recommendations developed through the World Bank’s technical assistance programme).
 - a. **Conduct a feasibility study to examine the governance of a regional reserve fund**,

capitalisation, fund management and investment options and the opportunity costs of using national budgets in this way. The aims of the fund would be to allow states to draw on and solidify or complete preparedness measures through FbA. Initial capitalisation could come from donor funds, but member contributions would be necessary to replenish the fund, requiring some form of incentivisation. A commitment from donors to match national contributions to the fund is suggested as a mutualised incentive. The regional fund would have a semi-automatic trigger (alert level being reached, with a government request for assistance), whereby resources would be transferred to member states – ideally into a national reserve fund with harmonised guidelines that enable rapid disbursement and delivery.

- b. **Governance:** an option for further exploration would be for the regional reserve fund to be held by the ECCB or CCRIF, in order to help in attracting donor funding (grants and loans); CDEMA and the OECS Commission would lead on design and management (developing triggers and criteria for accessing the fund, and monitoring the use of funds for FbA). This will require additional operational costs to be covered through Technical Assistance. The national natural disaster fund (FONDEN) in Mexico (see Box 2)

Box 2 An example of a pooled reserve fund

The national natural disaster fund (FONDEN) in Mexico was established in 1996 to finance the costs of recovery and reconstruction after disasters. FONDEN’s operational programme is financed by a trust, which receives budget allocations and is allowed to accumulate unspent budget from previous years. There is also a Revolving Fund which provides resources for emergency response. FONDEN covers emergency assistance and reconstruction costs (infrastructure, housing, natural environment) for lower layers of risk. Disbursement of funds is based on a needs and damage assessment process, to demonstrate when the scale of an event exceeds an individual state’s capacity to cope, with some mechanisms bypassing the need for a full impact assessment (OECD, 2015). Thus, FONDEN allows states and the federal government to share the burden of costs from disasters, while avoiding diverting resources from other budgetary lines.

could provide a useful example of the governance structure.

c. **Initial capitalisation and fund replenishment:** initial capitalisation of the fund should ideally come from donors, providing an incentive for all member states to participate. Replenishment of funds would come from yearly member state contributions, with equitable national contribution assessment criteria, along with a potential donor-matching scheme.

d. **Rules for enabling disbursement:** to ensure that the proposed mechanism aligns with good debt management and public fund management practices, disbursement rules must be transparent, unbiased and based on credible information. Rules would specifically address:

- hazards that the fund can respond to (in order to address lower layers of risk)
- specific types of measures covered by the funds
- triggers used to disburse funds: semi-automatic triggers based on impact-based forecasts (with conditionality linked to preparedness targets)
- caps for disbursement (to avoid fund depletion)
- rigorous method for operationalising national funds (ensuring windows are sufficiently ring-fenced for FbA).

2. **Preparedness support funding through the CDEMA EAF** (as suggested in Box 1).

3. Include emphasis on **readying systems to deliver support before a disaster** through technical assistance provided by the World Bank on disaster risk financing. Such rules can avoid second-guessing over discretionary disbursement and maintain countries' standing with the International Monetary Fund and credit rating agencies. Prior to setting up the

fund, a due diligence cost–benefit analysis should be required, to examine whether other examples of managing residual risk may offer better value for money. This should include social welfare benefits, which are a major target of FbA.

2.4 Delivering timely assistance

2.4.1 Delivering support through social protection programmes

One very effective method of delivering timely support to communities after a disaster is through existing social protection/cash transfer schemes. Recent experiences of using social protection in emergency situations (including during the 2017 hurricane season and in the 2020 Covid-19 response) indicate that scaling up programmes can be very effective in meeting the basic needs of affected populations quickly after a disaster. At the same time, experience has underscored the need to strengthen these programmes to enable surge capacity in an emergency, and even earlier when an extreme event is anticipated. Social registries need to become more agile in order to be able to anticipate vertical expansion⁹ of assistance (to cover more needs), as well as horizontal expansion¹⁰ of eligibility (to cover more people). To support this, regular assessments of vulnerability are needed so that governments and their partners know what the needs are *likely to be*, and can prepare to expand eligibility.

Social protection systems also increasingly need to develop greater and more agile surge capacity to support those displaced by disaster: people who move between islands and countries within the region require assistance, irrespective of where they are, before (in the case of evacuation) or after a disaster (if they move as a response), so any support also needs to be 'mobile' in order to reach those most in need.

9 Vertical expansion means that '[t]he benefit value or the duration of a social protection programme is temporarily increased for some or all beneficiaries' (www.opml.co.uk/files/Publications/a0408-shock-responsive-social-protection-systems/srsp-toolkit.pdf?noredirect=1).

10 Horizontal expansion describes the '[t]emporary inclusion of new beneficiaries from disaster-affected communities in a social protection programme' (www.opml.co.uk/files/Publications/a0408-shock-responsive-social-protection-systems/srsp-toolkit.pdf?noredirect=1).

Countries receiving large numbers of disaster-displaced people can be overwhelmed and would benefit from FbA where funds could be released in advance to prepare for rapid vertical and/or horizontal expansion to strengthen the delivery capacity of social protection systems.

Specific opportunities for advancing SRSP that can strengthen anticipatory action and response in the region include:

1. Using forecast-based triggers to accelerate

SRSP: There is promising experience of using social protection systems to target those affected by disasters in the region, highlighting the potential for building on existing social protection systems to provide faster disaster assistance to vulnerable and affected populations. At the same time, this experience underscores the need to strengthen the preparedness of such systems to enable surge capacity when an extreme event is anticipated, and suggests that forecasts and early warning information could be used to speed up the delivery of cash assistance before and after a disaster strikes (Beazley, 2018). However, there is no experience in the Caribbean of using social protection systems to deliver pre-disaster support based on a forecast.

2. Reaching more people with greater needs

– triggers for vertical and horizontal

expansion: In Dominica, the Public Assistance Programme (PAP) was used to provide cash support to low-income households affected by Hurricane Maria. This included vertical expansion of assistance to beneficiaries already enrolled in the PAP, and horizontal expansion to include additional households impacted by the hurricane. While the vertical expansion has been considered timely by some observers, it should be noted that the first PAP transfers were received by beneficiaries in early December, i.e. over two months after Hurricane Maria had passed through. The horizontal expansion required additional targeting and suffered substantial

delays, primarily due to the lack of ex-ante preparedness (ibid.).

3. Regional integration of social protection programmes – to bridge the displacement

gap: Caribbean governments are concerned about disaster-driven migration in the region, and how they would cope in the future if ‘climate migration’ increases. A regional mechanism is needed to reduce the strain on host countries – one that could release funding to support national social protection programmes to accommodate large numbers of displaced people. A legislative basis for a regional SRSP mechanism would need to be established. The OECS Convention on Social Security (IOM, 2019; OECS, 2016) and the Caribbean Community (CARICOM) Agreement on Social Security (CARICOM, 2010) provide a basis for this. The OECS is in the process of developing a regional Social Protection policy which will help Eastern Caribbean states to harmonise and coordinate their programmes.¹¹ In addition, the OECS has opened a path for social protection benefits to be transferred from one country to another through its contingent rights policy, and is embarking on a United Nations-supported review of adaptive social protection systems, with a view to strengthening these.

4. Regional buffer fund – for ensuring surge

capacity: It can be expected that the scale of extreme events will continue to exceed the preparedness and response capacity of OECS countries. Establishing a regional buffer financing mechanism to pool and allocate donor resources could help social protection systems in these countries cope on both an ex-ante and ex-post basis. Forecast-based triggers could be identified to release funds for scaling up preparedness of social protection programmes through vertical and horizontal expansion, including in anticipation of disaster-induced intra-regional movement, by supporting measures for social protection for people displaced to other states.

11 The OECS regional social protection policy will support data sharing and advancing the adoption of common data standards, including on meta-data. This harmonisation is key if programmes are to be linked and used to support people displaced between OECS states.

2.4.2 Direct implementation of FbA through third-party service providers

Social protection systems are only one potential channel to deliver adequate anticipatory action. Many potential disaster impacts are beyond what a social protection system can achieve, and require other types of actions to avoid, reduce or mitigate impacts. Some of the immediate damage caused by tropical cyclones and flooding, for example, is associated with practices that amplify hazard impacts, such as littering and allowing drains to become blocked. These can and should be addressed through preparedness.

Actions include removing branches from trees that could cut off roads or damage property; clearing blocked drainage systems in urban areas; dredging rivers (to some extent); and tying down roofs with hurricane straps. Where full implementation of these measures by emergency management agencies has not been possible, FbA can be delivered by private sector contractors and NGOs. CDEMA already has in place relationships with contractors for disaster response, which could be extended to cover early actions in locations most likely to be affected (and paid for through EAF, as described in the section on finance), or governments could request financial support from the regional FbA fund.

This would provide flexibility to mobilise resources across the region and represents another opportunity to build on existing mechanisms to advance early action. However, to ensure that FbA does not act as a disincentive to good preparedness, CDEMA and the

regional fund manager should include criteria for releasing funds. These could be linked to governments having provided regular updates on preparedness activities.

2.4.3 Recommendations: strengthening early action delivery systems

We propose a regional SRSP support project, building on and complementary to ongoing efforts in several countries to prepare social protection systems to scale up after a disaster.¹² The proposed regional SRSP support project entails:

1. **Undertaking a feasibility study for a regional SRSP mechanism.** This should include both regional and national components:
 - a. **Regional component:** Building on a study proposed by WFP (under the SDG fund), the feasibility study should look at the implications for SRSP of disaster-induced displacement within the region (e.g. at least within the OECS, if not CARICOM), building on existing agreements such as the OECS Convention on Social Security and the CARICOM Agreement on Social Security. Specific areas for consideration include the portability of social services and the needs of governments faced with increased influxes of displaced people pre- and post-disaster.¹³ The study would need to explore channels for delivering support from a regional mechanism to national governments, and how to fast-track the inclusion of new beneficiaries in national social protection systems.

12 A range of activities are ongoing towards strengthening (shock-responsive) social protection in the Eastern Caribbean. The first UN joint initiative to be implemented in the Eastern Caribbean by the Joint SDG Fund under the 'Leave no one behind and Social Protection' window aims to strengthen people's resilience through predictable access to adaptive and universal social protection in Saint Lucia, Barbados and the OECS. It is implemented by five UN agencies: UNICEF and WFP as co-leads, with the ILO, UNDP and UN Women. UNICEF has long engagement with social protection in the Caribbean and more recently a stronger focus on SRSP. The World Bank plays a key role in strengthening social protection in the region, including increasing the adaptiveness of social protection to prevent, mitigate and respond to shocks. WFP is also working on strengthening SRSP in the Caribbean, through a combination of regional learning events, technical assistance and research. These activities are based in part on lessons and recommendations from previous post-emergency assistance delivered through existing social protection systems, primarily in Dominica and the British Virgin Islands. Cognisant of these experiences, and responding to concerns expressed by governments in the region, one of the activities WFP is looking to undertake through the SDG Fund is a study on the implications of migration for SRSP.

13 This should initially cover the OECS (including British Overseas Territories and French Overseas Territories with associate member or observer status), but could be broadened out to CARICOM states with appropriate legislation.

b. **National component:** A dialogue process in selected pilot countries is needed to discuss how SRSP payments can be linked to forecast triggers, and how this mechanism would be coordinated. A national feasibility study should look at: existing agreements that can serve as a foundation for more anticipatory social protection; data availability and how data can be standardised to support vertical and horizontal scaling up; and impact-based forecasting capabilities (especially the quality of social vulnerability data and how it can be integrated with real time hazard-exposure data). In addition, the study will need to identify key actors responsible for the delivery of SRSP assistance, including to displaced persons.

The study would include an assessment of the required level of funding to operate a regional mechanism and support national governments in scaling up SRSP, taking into account intra-regional movement and support needs from past events and future climate projections. It should assess potential sources of funding and financial mechanisms and how to ensure continuation/replenishment post-disaster, as well as identifying entities with adequate capacity to manage funds and implement transfers at regional and national levels.

2. **Piloting an SRSP approach linked to forecasts in selected countries.** This should build on practical experience, facilitate peer learning between countries and document lessons to support scale-up and regional integration.¹⁴ This is complementary to – and would be informed by – ongoing efforts by the OECS Commission, World Bank, WFP and UNICEF in the Caribbean. This pilot would require:

- Co-development of action plans with clear definitions of timing, roles and responsibilities for SRSP and integration with DRM policies and plans at national level.
- Definition of forecast-based triggers, linking to existing national or regional funding mechanisms and delivery systems, and mechanisms to channel funds through to end-recipients.
- To support vertical and/or horizontal expansion, standard procedures for targeting and eligibility aligned with country contexts and priorities.
- Improvements in management information systems and identification of remaining gaps.

Dominica and the British Virgin Islands could be pilot countries, as they have ongoing work to make social protection programmes more shock-responsive and practical experience to build on from delivering cash support after Hurricanes Irma and Maria in 2017 (Joint Cash Platform in the British Virgin Islands, and horizontal and vertical expansion of the PAP in Dominica). A twinning approach between the two pilot countries, including peer learning exchanges, is proposed to pave the way towards regional harmonisation.

3. **Co-production of a regionally consolidated action plan and triggers** linked to the regional SRSP mechanism. This will involve the ministries and departments responsible for social protection and disaster risk management, hydro-meteorological offices, civil society actors involved in social protection, development partners and regional organisations.

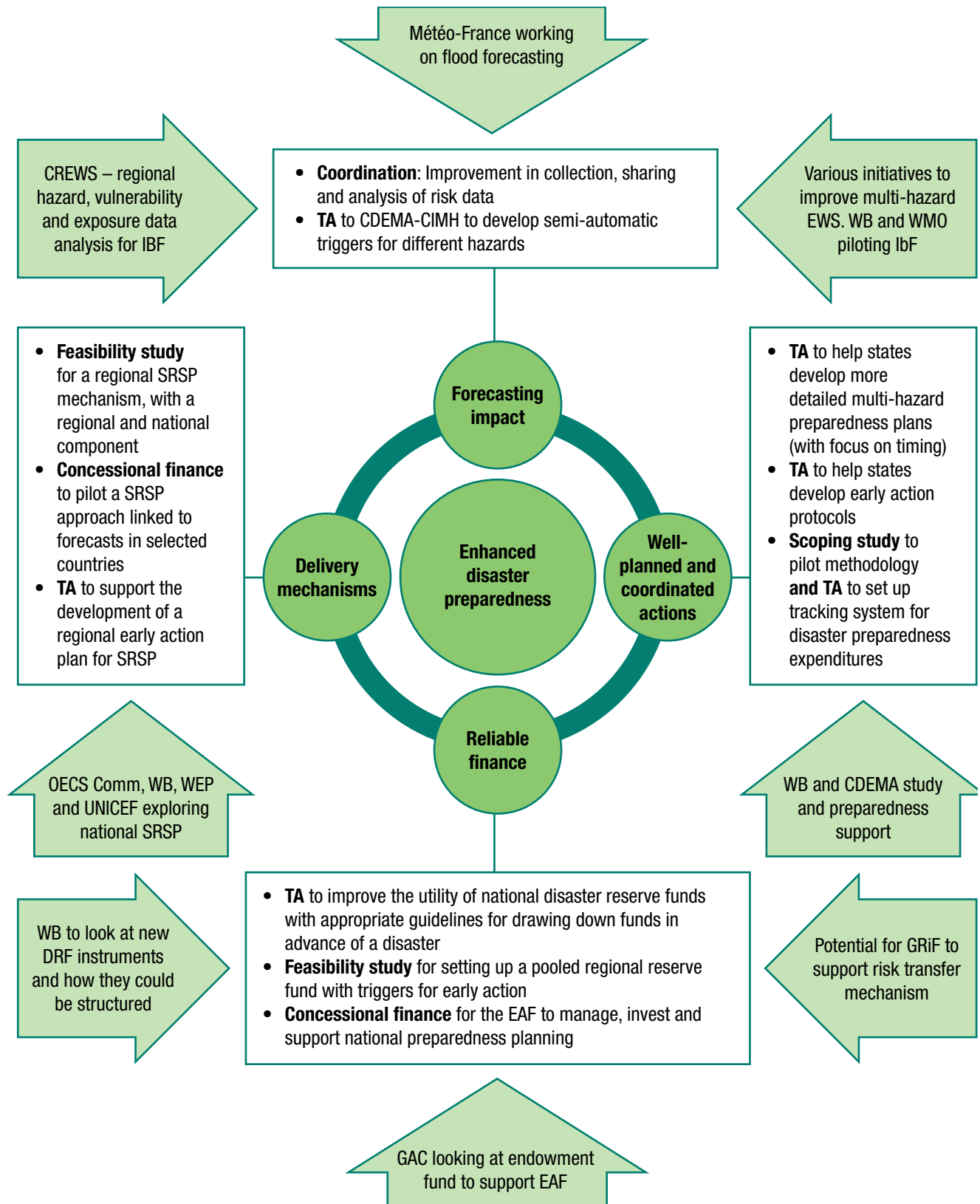
14 This resonates with recommendations from a previous process review of the joint cash response in Dominica after Hurricane Maria: ‘Protocols and contingency plans are to be developed for vertical and horizontal expansions that can be triggered and integrated with an early warning system and define pre-registration mechanisms for high risk vulnerable populations and geographic areas’ (Alviar, 2018).

3 Actions to take forward

The actions proposed in this plan encourage coordination and build on existing regional initiatives. This is important in a region with close economic and social ties between its members, as well as shared policy frameworks and regulations related to disasters, climate change and social welfare issues. The FbA framework described above draws together areas of support that need to be better coordinated, and in doing so provides an approach to overcoming some of the constraints and limitations of current preparedness for extreme weather across the Caribbean. Implementing this framework through targeted assistance and initiatives outlined in Figure 3 will help strengthen DRM institutions, enhance preparedness and reduce disaster losses.

Assistance will be required from a range of development partners according to their competencies and existing commitments to reducing climate risks in the Caribbean. Some of these commitments are highlighted in Figure 3. We suggest using this FbA Framework to strengthen cooperation and technical assistance programmes and to help adapt existing programmes to enhance preparedness. For regional organisations such as the OECS, this is a tool to encourage governments to think through how residual risks can be more effectively addressed via regional cooperation. The OECS Commission will also be looking to take forward this agenda with its development partners and through the annual Council of Ministers.

Figure 3 A framework for enhanced preparedness in the Caribbean and related actions



Note: CDEMA, Caribbean Disaster Emergency Management Agency; CIMH, Caribbean Institute for Meteorology & Hydrology; CREWS, Climate Risk and Early Warning Systems; DRF, disaster risk financing; EAF, Emergency Assistance Fund; EWS, Early Warning System; GAC, Global Affairs Canada; GRiF, Global Risk Financing Facility; IbF, impact-based forecasting; OECS, Organisation of Eastern Caribbean States; SRSP, shock-responsive social protection; TA, technical assistance; WB, World Bank; WMO, World Meteorological Organization.

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