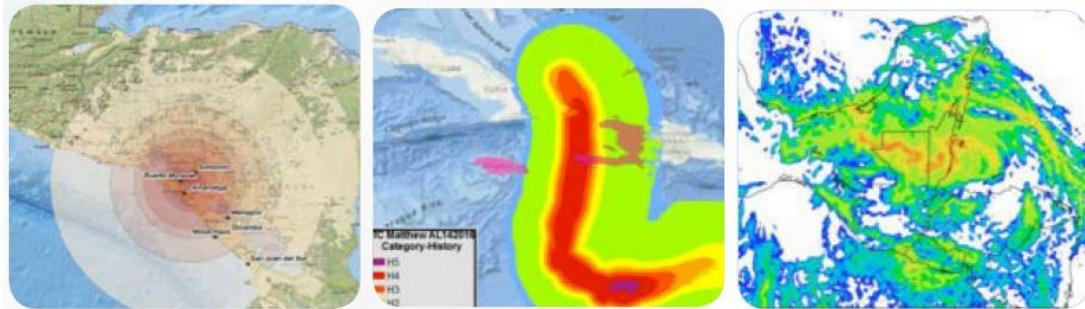# Update on CCRIF Model Development - 2019

Tropical Cyclone (TC) and Earthquake (EQ) Model

The current model for tropical cyclones and earthquakes is based on the Multi-Peril Risk Evaluation System (MPRES). The MPRES can handle multiple hazards and hazard assessment methodologies, can accommodate a variety of input/output formats and detailed exposure classifications, and produces accurate loss estimates with known statistical uncertainty. The MPRES model was used for the 2018/19 EQ and TC policies. It has been in place since 2011 and has performed adequately as particularly demonstrated by the payouts made in 2017.

A new model, known as the System for Probabilistic Hazard Evaluation and Risk Assessment (SPHERA) has been developed, peer-reviewed and thoroughly evaluated and will be used to underpin CCRIF's TC and EQ policies starting with the 2019/20 year. This new model incorporates new information and employs the most up-to-date scientific findings and methodologies which has achieved a higher precision in the evaluation of losses due to earthquake and tropical cyclone hazards. New country risk profiles are being shared and discussed with member countries.

Excess Rainfall (XSR) Model

The current model for excess rainfall is the XSR 2.1 model. For the 2019/20 policy year, an upgrade known as XSR 2.5 will be used. Improvements include the consideration of soil saturation in addition to the pure rain fall in the loss calculation, as well as a multi-trigger CARE (covered area rainfall event) based on additional WRF[1] configurations. These changes have been made in order to better represent smaller, regional severe rainfall events in the model.

---

[1] The XSR 2.1 model uses data from two WRF (Weather Research and Forecasting) weather forecast model configurations and the low-orbiter satellite-based precipitation model CMORPH (Climate Prediction Center Morphing Technique)

Excess Rainfall (XSR) Run-Off Model

An additional activity currently undertaken by CCRIF is the development of a dedicated module within the XSR model for flood events. In many cases, and in particular in countries with a bigger land mass, damage caused by rain manifests itself in the form of riverine floods, often downstream of the area where the rain was observed. For these forms of water-related damage, a new run-off module will be created. This additional feature will not be available for the 2019/2020 policy year, but will be presented in the course of the year to CCRIF's members.

Drought Model

CCRIF is in the process of finalizing a new drought model for agricultural losses due to drought. It is based on a structure of physically based triggers that account for precipitation and vegetation in order to ensure consistency with the physical phenomena that cause droughts that have impact on agricultural production. The models are calibrated against historical crop yield data provided by the United Nations Food and Agriculture Organization (FAO) and validated against historical reports of droughts. The model is designed to run on both, an annual and a monthly basis, for all the countries of the domain of study and for six types of crops (banana, coffee, maize, rice, sugar cane and a generic category that is meant to be used for any other crop).

Two types of drought events are identified by the model: the dry spell event (i.e., a short but very intense drought which causes acute crop stress) and the yield reduction event (i.e., a longer but milder drought which causes a reduction of crop yield).

The drought product will be offered to select pilot countries in 2019/20.

Fisheries and Aquaculture

Since 2015, CCRIF has been engaged in the Caribbean Oceans and Aquaculture Sustainability Facility (COAST) initiative with the United States Department of State, World Bank, and the Food and Agriculture Organization (FAO) to develop parametric insurance products to be marketed in the Caribbean to promote the resilience of the fisheries and aquaculture sectors against increasing climate change-related disaster risks.

Within the COAST initiative, CCRIF is developing a custom product for covering losses sustained by the fisheries and aquaculture sectors including business interruption from excess rainfall as well as damages caused by tropical cyclones from wind and storm surge. The parametric insurance coverage provided with this product will be underpinned by an enhanced version of the XSR model as well as an enhanced version of the SPHERA model. The adapted models will include assets and

vulnerabilities specific for the fisheries sector including an exposure database paying particular attention to landing sites, piers, warehouses, waterfront structures, boats and storage buildings. The enhanced models will be used to pilot-test the applicability of a parametric sovereign fisheries and aquaculture insurance policy in the Caribbean.

In a separate yet related effort, CCRIF is also considering the possibility of developing a microinsurance product aimed at compensating fisherfolk and fisher cooperatives for business interruption losses caused by inclement weather. This product will take advantage of lessons learned in the development of the enhanced models for COAST and will consider how wind and waves within a certain distance of the shoreline may prevent fishing activities, resulting in business interruption. The microinsurance product is envisioned to account for best practices of storing fishing material, tying boats and other activities aimed at limiting damages.

Agriculture

CCRIF and partners are in discussion about providing a product that covers the agriculture sector (for farming activities and related processes) – one which addresses and includes different perils, such as extreme rainfall, tropical cyclone-induced extreme wind and coastal flooding, and drought.

Public Utilities

CCRIF is engaged with stakeholders such as the Caribbean Electric Utility Services Corporation (CARILEC) and Caribbean Water and Wastewater Association (CWWA) about developing a product for those public assets, which are critical particularly in times of natural disasters. CCRIF is exploring options to provide coverage for utilities for energy (electricity, renewables etc.), water/wastewater and telecommunications.