



Tropical Cyclone Eta (AL292020)

Wind and Storm Surge

Preliminary Event Briefing

Nicaragua

7 November 2020

1 SUMMARY

Tropical Cyclone Eta was the twenty-ninth and most powerful tropical cyclone of the 2020 Atlantic Hurricane Season. Eta developed from a powerful tropical wave moving across the eastern Caribbean Sea, which evolved into a tropical depression on 31 October. On 1 November, it strengthened into a tropical storm while it was over the central Caribbean Sea, southwest of the island of Hispaniola. On 2 November, Tropical Storm Eta rapidly intensified, becoming a major hurricane, and on 3 November it made landfall in Nicaragua as a category 4 Hurricane. Hurricane-force winds and catastrophic storm surge were experienced near the landfall point. While moving across Nicaragua, Eta rapidly lost intensity, being downgraded to a tropical storm on 4 November and to a tropical depression on 5 November, when it left the country heading for Honduras. During this period, tropical-storm-force winds extended over a large part of Nicaragua. At the time of this writing, Nicaragua was the only CCRIF member country where wind speeds, computed with the CCRIF SPHERA model, were greater than 39 mph (62.7 km/h) due to Hurricane Eta.

The preliminary runs of the CCRIF loss model for wind and storm surge produced government losses for Nicaragua. For this country's Tropical Cyclone policy, the government losses were above the attachment point. Therefore, the preliminary analysis shows that a payment of US\$7,784,005.32 is due.

This event briefing is designed to review the modelled losses due to wind and storm surge calculated by CCRIF's models for affected CCRIF member countries, to be analyzed with respect to members' Tropical Cyclone policies. A separate report on rainfall impacts on affected CCRIF member countries will be issued if applicable.

2 INTRODUCTION

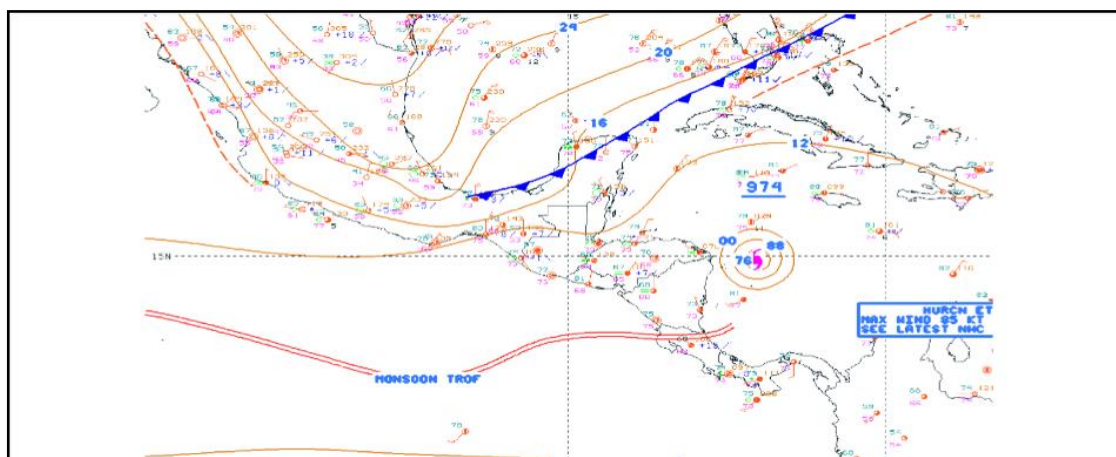
On 31 October 2020 at 2100UTC, the US National Hurricane Center (NHC) reported that a tropical depression formed over the central Caribbean Sea, approximately 214 mi (340 km) S of Haiti (15.0°N, 73.2°W). It originated from an intense tropical wave moving westward across the Caribbean Sea, which developed a low-level closed circulation. Six hours later, on 1 November at 0300UTC, the tropical depression was upgraded to a tropical storm and was named Eta. The minimum central pressure was 1005 mb and the maximum sustained winds were estimated at 40 mph (65 km/h). The system moved towards the west with an estimated forward velocity of 15 mph (24 km/h).

The weak vertical wind shear, the moisture abundance and the high oceanic heat content (due to a sea surface warmer than 29°C) supported a steady and very rapid intensification of the tropical storm. On 2 November at 0900UTC, the NHC reported that the maximum sustained winds increased to 75 mph (120 km/h) and Eta became a Category 1 hurricane (Figure 1a, Figure 3a). At this time, the centre of the hurricane was located at 14.8°N 80.9°W, about 175 mi (285 km) ENE of Puerto Cabezas, Nicaragua. The minimum central pressure was estimated at 987 mb. Eta presented an extended cloud top over its centre and several banding clouds around it, while a small eye already formed close to the surface (Figure 2a). Hurricane-force winds extended outward up to 25 miles (35 km) from the centre, while tropical-storm-force winds affected a region of 125 miles (205 km) around the centre. The system continued to move westward at a slightly reduced velocity (12 mph, 19 km/h).

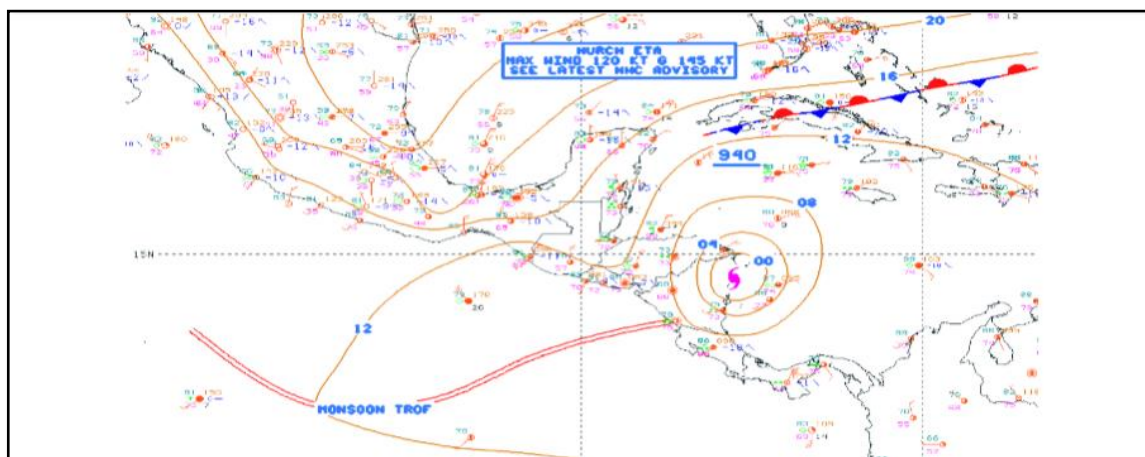
The same day at 1800UTC, Eta became a major hurricane, with maximum sustained winds of 120 mph (195 km/h) and minimum pressure of 957 mb. Tropical-storm-force winds started to affect the northeastern coast of Nicaragua (Figure 3b). At this time, the centre of Eta was sited at 14.7°N 82.0°W, at a distance of approximately 87 mi (140 km) from the nearest coast of Nicaragua. The hurricane further decreased its forward velocity to 9 mph (15 km/h) and steered towards the west-southwest, due to a mid-level ridge over the south-central United States. In the next six hours, Eta continued to intensify and on 3 November at 0000UTC it reached the category 4 strength. Figure 2b shows the well defined hurricane eye and the impressive extension of the cloud topping, as well as its symmetrical shape. The rapid evolution of Eta stopped three hours later, at 0300UTC, due to the onset of an eyewall replacement cycle (i.e. formation of two concentric eyewalls with the outer one replacing the innermost). Eta was a strong category 4 hurricane with maximum sustained winds of 150 mph (240 km/h) and a minimum central pressure of 927 mb. Its centre was located at 14.1°N 82.7°W, about 45 mi (75 km) E of Puerto Cabezas, Nicaragua. In the following 18 hours, while the hurricane was approaching the Nicaragua coast, it decelerated even further (gradually decreasing to 3 mph, 6 km/h), thus causing an increase in storm surge and affecting the Nicaragua coastal region with devastating winds for several hours (Figure 3c, 3d).

On 3 November at 2100UTC, Eta made landfall just south of Puerto Cabezas, Nicaragua, at 13.8°N 83.5°W (Figure 1b). Maximum sustained winds were near 140 mph (220 km/h) with higher gusts. Hurricane-force winds extended outward up to 25 miles (35 km) from the centre, while tropical-storm-force winds extended up to 115 miles (185 km). After landfall, Eta rapidly weakened due to the interaction with the inland areas and 12 hours later, on 4 November at

0900UTC, it was downgraded to tropical storm strength. However, due to the low forward velocity of the system, hurricane-force winds insisted for several hours in the vicinity of the landfall point. At 0900UTC, the centre of Eta was located at 13.8°N 84.7°W, about 90 mi (140 km) W from Puerto Cabezas, Nicaragua and was moving westward at 8 mph (13 km/h) across inland Nicaragua. Maximum sustained winds decreased to 70 mph (110 km/h) and continued to decrease in the following hours (Figure 3e). On 5 November at 0000UTC, Eta weakened to become a tropical depression, while its centre (at 14.1N 86.1W) left Nicaragua and moved to Honduras (Figure 3f). The depression steered towards the northwest and later towards the north, returning to the Caribbean Sea on 6 November at 0000UTC.



a) 2 November at 1200UTC

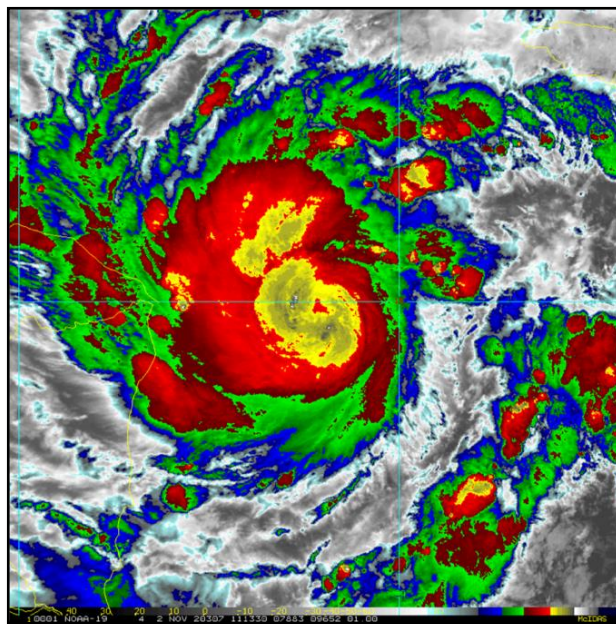


b) 3 November at 1800UTC

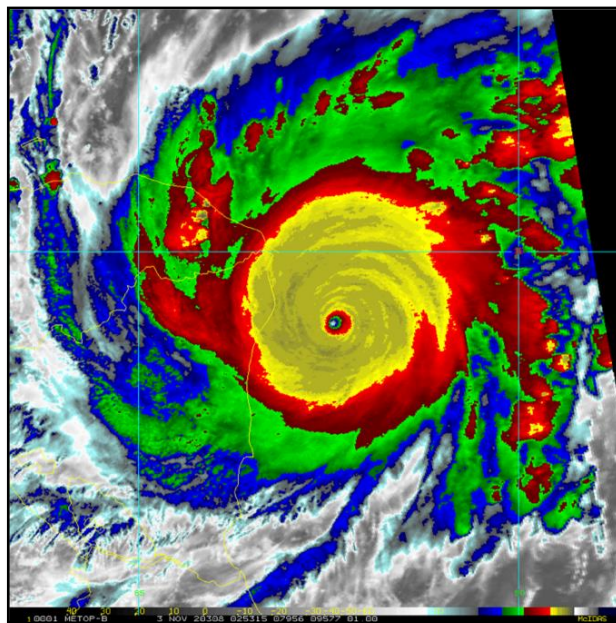
Figure 1 Surface analysis over the Caribbean area at different times as indicated in the labels.

Source: US National Hurricane Center¹

¹ National Oceanic and Atmospheric Administration - FTP, National Hurricane Center, review dates: 2-3 November 2020, available at: https://www.nhc.noaa.gov/tqfb/EPAC_18Z.gif



a) 2 November at 1113UTC



b) 3 November at 0253UTC

Figure 2 Satellite imagery at different times (as indicated in the labels) from thermal infrared channel enhanced with colour. Blue/green colours represent high altitude clouds (top cloud temperature between -50°C and -70°C), while the red/yellow colours represent very high altitude clouds (top cloud lower than -70°C). High altitude clouds indicate strong convection associated with intense precipitation. Source: NOAA, National Environmental Satellite, Data and Information Service².

² RAMSDIS Online Archive, NOAA Satellite and Information Service, available at: https://rammb-data.cira.colostate.edu/tc_realtime/storm.asp?storm_identifier=a1292020

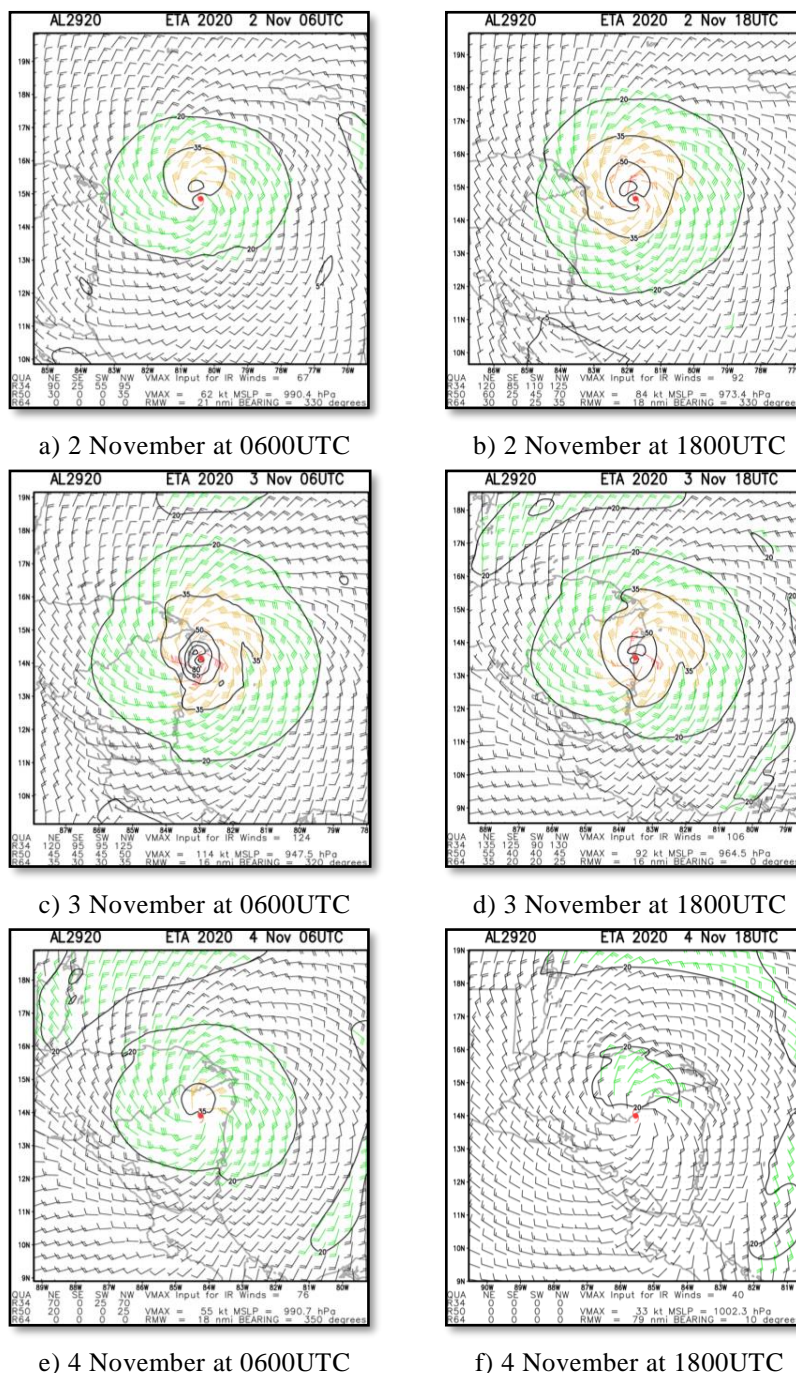


Figure 3 Multiplatform satellite based tropical cyclone surface wind analysis estimated at different times as indicated in the labels. Contouring indicates wind intensity at 20 kn (23 mph, 37 km/h), at 35 kn (40 mph, 65 km/h) and at 50 kn (56 mph, 93 km/h). Source: NOAA, National Environmental Satellite, Data and Information Service³.

³ RAMSDIS Online Archive, NOAA Satellite and Information Service, available at: https://rammb-data.cira.colostate.edu/tc_realtime/storm.asp?storm_identifier=al292020

3 CCRIF SPC MODEL OUTPUTS

Under CCRIF's loss calculation protocol, a CCRIF System for Probabilistic Hazard Evaluation and Risk Assessment (SPHERA) report is required for any tropical cyclone affecting at least one member country with winds greater than 39 mph (62.7 km/h).

Based on the SPHERA footprint for this tropical cyclone, wind speeds between 9.6 mph (15.5 km/h) and 134 mph (216 km/h) were estimated across Nicaragua. The wind footprint (Figure 4) and surge field (Figure 5) are two of the outputs from the CCRIF model, which show the regions affected by certain extents of Tropical Cyclone Eta in Nicaragua.

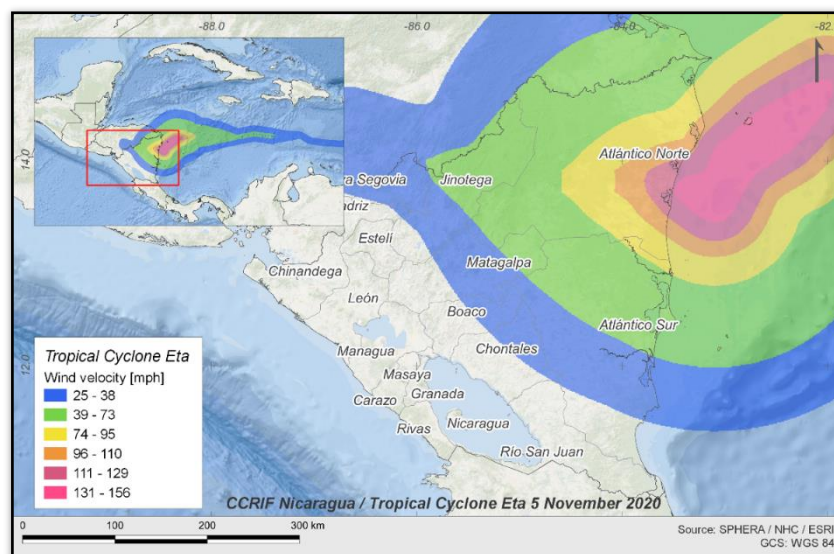


Figure 4 Map showing the wind field associated with Tropical Cyclone Eta in Nicaragua.
Source: NHC & CCRIF/SPHERA

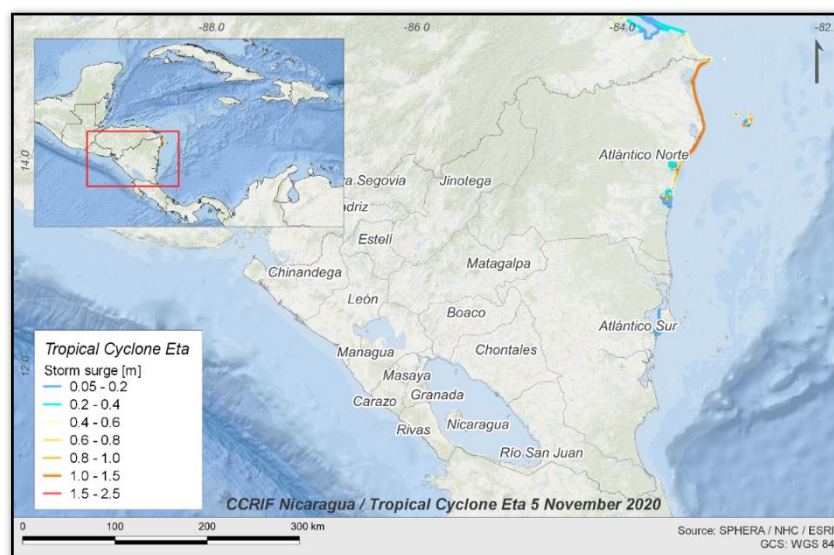


Figure 5 Map showing the storm surge field associated with Tropical Cyclone Eta in Nicaragua.
Source: NHC & CCRIF/SPHERA

4 IMPACTS

According to the preliminary assessments provided by Nicaragua's National Disaster Prevention System (SINAPRED), Hurricane Eta generated a panorama of destruction after its passage through northern Nicaragua. The area most severely affected by Hurricane Eta was the North Caribbean Coast Autonomous Region (RACCN – Figure 6). The municipalities most affected were Puerto Cabezas, Waspam, Rosita, Bonanza Prinzapolka and Siuna, where flooded rivers, fallen trees and power poles and property losses were reported.

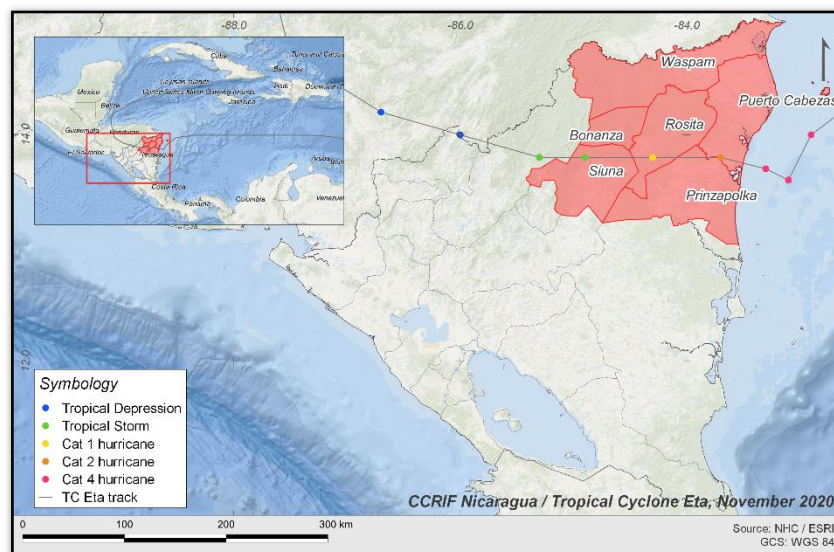


Figure 6 Area most severely impacted by Hurricane Eta in Nicaragua – November 2020

The municipalities of Waspam and Puerto Cabezas were cut off due to the overflow of the Wawa River. Facilities such as churches, schools and family homes were used as shelters. Due to heavy winds, several of these shelters suffered damage such as collapsed roofs, including the Getsemani and Moravo JAC schools. Several communities along the Prinzapolka River were affected by the rising river level⁴. Some of the indigenous communities destroyed were: Halouver, Klingna, Lamlaya, Wounta, y Wawa Bar.

At the time of this report, the impact in Nicaragua from the local and regional sources^{5 6} was reported as described below:

- 30,000 people sheltered
- 1,500 families were evacuated

⁴ La Prensa, 'Crecida del río Wawa deja incomunicados a los municipios de Bilwi y Waspam', review date: 6 November 2020, available at: <https://www.laprensa.com.ni/>

⁵ United Nations Office for the Coordination of Humanitarian Affairs (OCHA), Flash Update No. 2 (As of 5:00PM EST, 4 November 2020), review date: 6 November 2020, available at: [CENTRAL AMERICA: Tropical Storm Eta](#)

⁶ International Federation of Red Cross and Red Crescent Societies (IFRC), DREF Plan of Action (As of 4 November 2020), review date: 6 November 2020, available at: [Nicaragua: Hurricane Eta](#)

- over 1,700 homes were affected: 803 partially damaged and 77 destroyed
- interruptions of electric power occurred, affecting approximately 50,000 homes⁷

Prior to the arrival of Hurricane Eta, Nicaragua's authorities took precautionary measures such as issuing declarations of a Red Alert (maximum) in the RACCN, a Yellow (warning) Alert in the northern departments of Jinotega, Nueva Segovia and Chinandega, while maintaining Green Alert (prevention) for the rest of the country⁸; and also opening emergency shelters.

Figure 7 shows some of the wind and storm surge damage caused by Hurricane Eta in Nicaragua.



⁷ ENATREL, *Empresa Nacional de Transmisión Eléctrica*, 'Sector energético sigue trabajando para garantizar suministro eléctrico'. Review date: 6 November 2020, available at: <http://www.enatrel.gob.ni/>

⁸ SINAPRED, *Sistema Nacional para la Prevención, Mitigación y Atención de Desastres*, review date: 7 November 2020, available at: <http://www.sinapred.gob.ni/>



Figure 7 Some damage caused by hurricane Eta in Nicaragua – November 2020.

Source: *Plan International, BBC News*

Since the damages have not been completely quantified, a subsequent version of this report may be produced with updated information obtained from official reports or communications that are issued by the government of Nicaragua.

5 CCRIF LOSS MODEL

For Nicaragua, the preliminary runs of the CCRIF loss model for wind and storm surge produced government losses for Nicaragua. For this country's Tropical Cyclone policy, the government losses were above the attachment point. Therefore, the preliminary analysis shows that a payment of US\$7,784,005.32 is due.

CCRIF expresses sympathy with the Government and people of Nicaragua for the impacts on communities and infrastructure caused by this event.

For additional information, please contact CCRIF SPC at: pr@ccrif.org