Situational Awareness Overview (SAO)

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OCHA

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PHOTO ON COVER:
Mass destruction in Marsh Harbor, Abaco Island by Category 5 Hurricane Dorian Sept 2019.
Photo: UN/OCHA/Mark Garten

Executive Summary

The Situational Awareness Overview (SAO) Report is an analysis of trends in humanitarian needs, risks and vulnerabilities in the Eastern Caribbean to inform planning, strengthen collective advocacy and improve emergency response preparedness. The analysis covers the period 2000 present in the 10 countries and territories covered by the UNRCO for Barbados and the OECS[1].

The analysis was conducted by the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) Regional Office for Latin America and the Caribbean (ROLAC), OCHA Barbados Humanitarian Advisory Team, in collaboration with the United Nations Office for Disaster and Risk Reduction (UNDRR). Data collection was done using the Data Entry and Exploration Platform (DEEP) with consultative support received from United Nations Emergency Technical Team (UNETT) members, regional institutions, civil society organisations (CSOs), NGOs and academic institutions.

The SAO aims at providing a solid base for the development of preliminary impact analyses, feed into development of humanitarian funding appeals and response plans e.g. (CERF, Flash Appeals, Emergency Cash Grants) and support the update process of contingency plans.

The report consists of three main sections:

- **Situation Overview:** Explores the socioeconomic landscape, access to services, the impact of the COVID-19 pandemic, the war in Ukraine and sector-based and thematic issues with humanitarian implications.
- **Shocks and their impacts:** Includes section on climate change and variability; storms and floods; volcanoes; earthquakes and drought. Case studies of standout events (e.g. 2017 hurricane season, Saint Vincent and the Grenadines volcanic eruption, drought in Antigua and Barbuda).
- **Emergency Response Preparedness and Disaster Risk Reduction (DRR):** Highlights coordination mechanisms, logistical challenges, information gaps, DRR best practices and lessons learnt.

The report is further divided in subsections, including an analysis of the demographic and social context, economic context, social protection systems and vulnerable groups. Furthermore, the section on shocks and their impacts uses case studies of standout events (e.g. Soufriere Hills eruption in Montserrat, Hurricane Irma and Maria, La Soufrière eruption in Saint Vincent and the Grenadines) and provides information on futures trends and projections.

1 UNRCO for Barbados and the OECS: Anguilla, Antigua and Barbuda, Barbados, British Virgin Islands, Dominica Grenada, Montserrat, Saint Kitts and Nevis, Saint Lucia and Saint Vincent and the Grenadines.

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I. Situation overview

Little Abaco Island, Bahamas. Hurricane Dorian 2019.
Photo: OCHA

Geography of the Eastern Caribbean

The Eastern Caribbean stretches north to south from the British Virgin Islands – a small archipelago located some 95 km east of Puerto Rico in the north-eastern Caribbean – to the tri-island country of Grenada – located about 160 km north of the Venezuelan coast and 145 km south-west of Barbados[2].

The geographic area covered by the UN Resident Coordinator's Office (RCO) for Barbados and the Organization of Eastern Caribbean States (OECS) is composed of the independent States of Antigua and Barbuda, Barbados, Dominica, Grenada, Saint Kitts and Nevis, Saint Lucia and Saint Vincent and the Grenadines and the United Kingdom Overseas Territories of – Anguilla, the British Virgin Islands, and Montserrat. Eastern Caribbean islands are all Small Island Developing States and Territories. The average island size is just 350 Km2 – with the subregion's smallest island, Anguilla, less than 100 km2 in land area, while the largest, Dominica, is only 750 km2, nearly 12 times smaller than Puerto Rico[3].

The topography of the islands is also quite diverse, ranging from low-lying coral islands like Barbuda, with a maximum elevation of just 42 m, to volcanic islands with rugged, mountainous interiors, such as Dominica and Saint Kitts, which have significantly higher maximum elevations of 1,156 meters and 1,447 meters, respectively[4]. The topography itself of the Eastern Caribbean islands creates significant natural hazard risks, such as drought, landslides, flooding, coastal erosion, salination of fresh-water systems, volcanic eruptions, amongst others, and when these interact with socioeconomic risks, vulnerabilities and exposure related to the concentration of population in coastal areas, they can generate disasters that affect a large percentage of the population.

Figure 1 shows additional information on Caribbean countries and territories, including independent and dependent territories and their location. In the extreme right side of Fig. 1 shows information on Eastern Caribbean countries and territories, subject of study of this report. **Figure 2** shows more information on presence and coverage of the United Nations Residents Coordinators Office system in the Caribbean. Information on the Eastern Caribbean is found on the far right quadrant of each figure.

2 PAHO: https://bit.ly/3B5qF7V
3 OCHA calculations using UNDATA statistics: https://bit.ly/3PmIgNu
4 USAID: https://bit.ly/3aQeQri

Figure 1. General information on Caribbean countries and territories

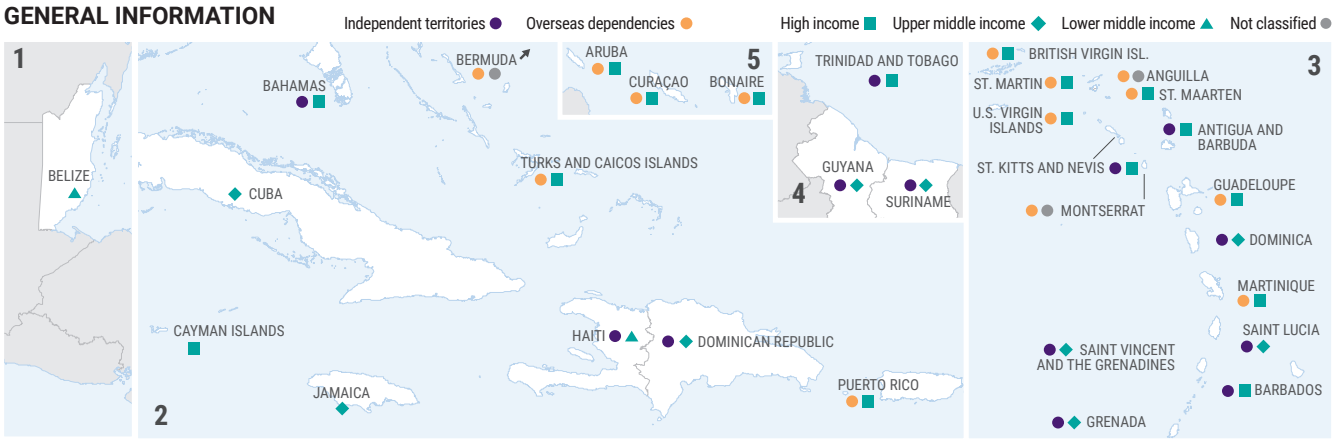


Figure 2. The United Nations System presence and coverage map in the Caribbean

Demographic & social context

Population distribution & movements

Based on 2020 population projections, the region is home to approximately 967,815 people – a nearly 12 per cent increase since 2000[5]– ranging from less than 5,000 people in Montserrat and some 15,000 in Anguilla to more than 287,370 in Barbados, the subregion's most populated country[6]. As of 2020, there are more than 129,800 migrants across Barbados and the Eastern Caribbean[7]. Most of these migrants reside in Antigua and Barbuda, Barbados, Dominica and Saint Lucia, and are mainly of Haitian origin[8].

Since the inception of the Caribbean Community (CARICOM) Single Market and Economy (CSME) in 1989, all nationals from CARICOM countries are granted free movement and a six-month stay upon arrival to any other CARICOM member states under the "Facilitation of Travel". Regarding the "facilitation of travel", figures suggest that more than 2,040,000 movements were facilitated by 2017[9],demonstrating that population movements within and to the Eastern Caribbean are constant and large-scale, not considering the persistent irregular migration flows. Guyana and Trinidad and Tobago are the biggest sending countries, while Barbados and Trinidad and Tobago receive the most CARICOM nationals[10].

The latest population data shows that there are 186,000 children under the age of 14 across the Eastern Caribbean – around 20 per cent of the subregional population[11]. At the same time, the subregion also has a rapidly ageing population, with approximately 120,000 people aged 65 or older in 2021, accounting for around 12 per cent of the subregional population[12].

For those islands with available population estimates and projections, between 2010 and 2020, the largest population increases were observed among older age groups (45 years old and above), while the proportion of young people in most countries and territories decreased, with the greatest declines in Grenada (-14.2 per cent) and Saint Lucia (-15.4 per cent)[13]. Over this period, the population growth rates aged 65 and older varied as much as 5.9 percent in Grenada to as high as 41.1 percent in Antigua and Barbuda[14]. The changing demographic structure of the subregion must be considered in emergency preparedness and response to ensure that humanitarian action is tailored to the differentiated needs of these groups and remains responsive to dynamic demographic shifts.

The average population density in the Eastern Caribbean is more than 250 people per km2[15], ranging from sparsely populated islands, such as Dominica and Montserrat, to much more densely populated countries like Grenada and Saint Lucia. Barbados is the most densely populated country across Latin America and the Caribbean, with a population density of nearly 670 people per km2[16] – more than double that of any other island in the Eastern Caribbean and over 20 times the average for Latin America and the Caribbean.

Like the rest of the islands in the subregion, most of Barbados' population lives in and around the main urban centres and capital of the country, Bridgetown, and nearly 76 per cent of its inhabitants live within 5 km of the coastline[17]. With this high concentration of populations in coastal areas along with very small, densely populated islands leaves virtually the entire population of Eastern Caribbean islands relatively more exposed to hydro-meteorological and geological hazards, and to the effects of climate change on sea level.

5 UNDESA: https://bit.ly/2DJ8Ttg
6 Worldometer: https://bit.ly/2v65eA9
7 Migration Data Portal: https://bit.ly/3eCgf6e
8 Ibid: https://bit.ly/3eCgf6e
9 IOM: https://bit.ly/3qqdRCh
10 IOM: https://bit.ly/3qqdRCh
11 UNESCO: https://bit.ly/3TWQNJa
12 OCHA calculations using UNESCO data available at: https://bit.ly/3qr6FGg
13 UNICEF: https://uni.cf/3RuC3yT
14 Ibid: https://uni.cf/3RuC3yT
15 OCHA calculations using UNdata statistics available at: https://data.un.org/en/index.html
16 UNDATA: https://data.un.org/en/index.html
17 IDB: https://bit.ly/3aU5OJW

Urbanization

The Caribbean's urban and peri-urban population is growing two to three times faster than Central and South America[18]. Rampant urbanization creates significant environmental and social problems that increase disaster risk and vulnerability, including the construction of informal settlements in hazard-prone areas, inadequate and ageing infrastructure, and limited access to essential services, among others.

While currently, less than 50 per cent of the subregion's population live in urban areas[19], the rate of urbanization in Antigua and Barbuda and Barbados is expected to triple by 2050, while in Saint Lucia, it is projected to increase six-fold[20]. Many Eastern Caribbean cities are also experiencing significant urban sprawl. Between 2001 and 2011, the population of Grenada's capital, St. George's, fell by 15 per cent, while the city's outskirts grew by 23 per cent[21]. Over the same period, Antigua and Barbuda's capital, St. John's, saw a 5 per cent population decline offset by a 43 per cent growth in its outskirt populations[22].

Although surveys on informal settlements in the subregion are outdated, they still reveal that these types of settlements are quite prevalent and are likely growing amid rapid urbanization. In Saint Lucia, one of the most rapidly urbanizing islands in the subregion, a 2007 Government survey identified 6,000 households in more than 30 informal settlements, accounting for around 10 per cent of all households island-wide.23 Even in Saint Kitts and Nevis, one of the subregion's less urbanized countries, recent estimates show that over 4,450 people – more than 8 per cent of the population – live in informal settlements[24].

Poverty & Inequality

The subregion's relatively high levels of income and human development mask the considerable disparities that exist within and between countries and territories[25].

Poverty and inequality were longstanding social issues even before the COVID-19 pandemic hit, prompting a significant spike in already high levels of poverty and exacerbating the uneven distribution of income between the highest and lowest income quintiles.

Prior to COVID-19, nearly a quarter of the subregion's population lived in poverty, ranging from 5.8 per cent in Anguilla to 37.7 per cent in Grenada[26]. It is important to point out that recent data on poverty is scarce in the Eastern Caribbean, with the latest available data for some islands dating back to poverty assessments carried out more than a decade ago.

At the outset of the pandemic, UNICEF projected that extreme poverty in the Eastern Caribbean would increase more than six-fold, climbing from less than 2.5 per cent pre-pandemic to more than 16.5 per cent afterward[27]. While no concrete data is available from post-COVID-19 poverty assessments, these projections and evidence gathered through livelihood surveys in the subregion suggest that COVID-19 likely triggered a significant spike in poverty, exacerbating food insecurity and leaving the most vulnerable less resilient in the face of future shocks.

Food Security

Even before the pandemic, high levels of poverty and income inequality limited access to food in the Eastern Caribbean[28], with the poorest households spending a relatively large per cent of their income on food compared to higher income groups. Now, the compounding impacts of the pandemic and the war in Ukraine are triggering a spike in the cost of agricultural inputs and basic food items, which, combined with the deterioration of livelihoods and purchasing power, is putting sufficient food out of reach for the most vulnerable in the subregion.

According to CARICOM and the World Food Programme's (WFP) 2022 August Food Security &

18 ECLAC: https://bit.ly/3qwj2A8
19 OCHA calculations using UNDATA: https://bit.ly/3UVZ5jI
20 IDB: https://bit.ly/3jgfhgj
21 World Bank: https://bit.ly/3cNaL80
22 Ibid: https://bit.ly/3cNaL80
23 UN-Habitat: https://bit.ly/3vmlcG2
24 Ibid: https://bit.ly/3vmlcG2
25 UNICEF: https://uni.cf/3Q27Wht
26 CDB: https://bit.ly/3vr2JYM
27 UNICEF: https://uni.cf/3zbJW4W. Note: UNICEF's projections do not include Anguilla, British Virgin Islands and Montserrat due to insufficient information to make projections. Additionally, they include Trinidad and Tobago as part of the Eastern Caribbean.
28 FAO: https://bit.ly/3S6h86I

Livelihoods (FSL) Survey, 4.1 million people – around 57 per cent of the population – across the English and Dutch-speaking Caribbean are food-insecure. This represents an additional 1.3 million food-insecure people since February 2022 and a staggering 2.3 million more compared to April 2020. For the first time since the FSL survey was rolled out in April 2020, respondents reported the inability to meet food needs as their biggest concern[29].

Rising prices are forcing a growing number of people in the Eastern Caribbean to adopt a range of negative coping mechanisms, from skipping meals and eating less preferred foods to selling productive assets or spending savings to meet their food needs[30]. The CARICOM and WFP's August 2022 FSL Survey also revealed that more than 91 per cent of participants changed their shopping behaviour, up 10 per cent from February 2022, and 37.5 per cent reduced food consumption, an increase of more than 12 per cent compared to February 2022[31]. These coping mechanisms have been employed as the conflict in Ukraine drives up local food prices, with over 97 per cent of respondents across the subregion observing increased food prices in the lead up to the survey, a nearly 11 per cent increase compared to February 2022[32].

Violence & Security

Crime and violence in the Caribbean have risen sharply in recent years. According to a survey carried out in five Caribbean countries - The Bahamas, Barbados, Jamaica, Suriname, Trinidad and Tobago and Belize - violent crime is much higher than in any other region, with nearly 7 per cent of the population affected compared to the global average of 4.5 per cent[33]. Around 40 per cent of people in the region identify crime and security-related issues as the biggest challenge facing their countries, even ranking them above poverty and inequality[34].

While the Eastern Caribbean suffers lower homicide rates compared to the most violent Caribbean islands, the average homicide rate in the seven independent states in the Eastern Caribbean is still 17.1 per 100,000 people[35], well above the global average of 6.1 homicides victims per 100,000 people[36], reaching as high as 28 per 100,000 people in Saint Lucia amid the growing presence of gangs.

Gender-based Violence

In the Caribbean, the prevalence of gender-based violence (GBV), including intimate partner and sexual violence, is widespread[37]. This is made evident by the region's rape and femicide rates which are much higher than global averages. For instance, Dominica's rape rate (34 per 100,000) is more than double the global average of 15 per 100,000, while the rate in Saint Vincent and the Grenadines is more than seven times that average[38]. In Grenada, 39 per cent of women in 2020 indicated that they had experienced intimate partner violence in their lifetime, a level significantly above the estimated global average of around 30 per cent[39] [40].

In crisis settings, multiple intersecting vulnerabilities put women and girls at increased risk of GBV. Not only does intimate partner violence tend to increase after a disaster, but most vulnerable groups are often traumatized and/or displaced and are sometimes forced to trade sex for food, money or other resources they need to survive[41]. Although these cases often remain unreported, or unaddressed if reported, they represent a serious threat to women and girls' mental and physical wellbeing.

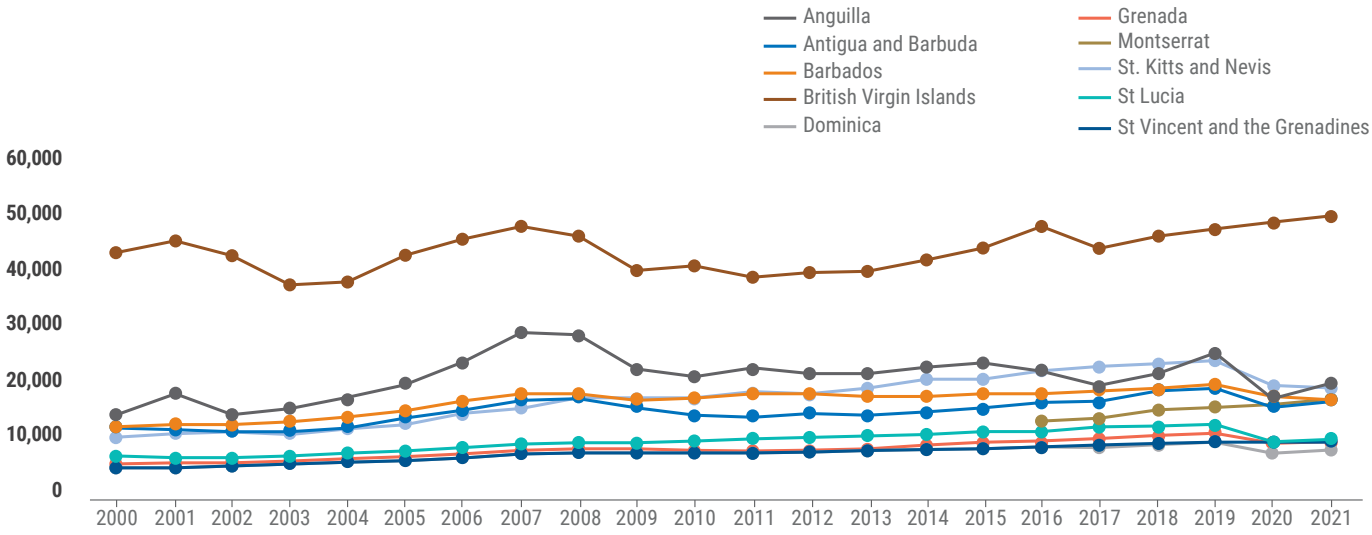
For women and girls experiencing partner and sexual violence, living under strict COVID-19 lockdowns decreased their ability to seek help and access reproductive health services. A report from the Pan

29 WFP, CARICOM (August 2022): https://bit.ly/3Spk8ue
30 Ibid: https://bit.ly/3Spk8ue
31 OCHA calculations using WFP data available at: https://bit.ly/3S4kPZX
32 Ibid: https://bit.ly/3S4kPZX
33 IMF: https://bit.ly/3Q1ErfX
34 Ibid: https://bit.ly/3Q1ErfX
35 OCHA calculations using World Bank data available at: https://bit.ly/3zffFCb
36 UNODC: https://bit.ly/2Al1a1e
37 CARICOM: https://bit.ly/3L4bUVU
38 UN Women: https://bit.ly/3SaNyg3
39 WHO: https://bit.ly/3ggUKsO
40 Caribbean Development Bank, CARICOM, UN Women: https://bit.ly/3Bp2dht
41 UNICEF: https://uni.cf/3Db7JFH

American Health Organization (PAHO) showed that Anguilla had an 88 per cent increase in partner and domestic violence during the pandemic[42].

According to a Human Rights Watch report, discriminatory laws in the subregion leave lesbian, gay, bisexual, transgender, queer and intersex (LGBTQI+) people vulnerable to discrimination, harassment, stigmatization, and even physical violence, exploitation and abuse. Hence, the LGBTQI+ community is particularly vulnerable during emergencies and, as such, require differentiated humanitarian and protection assistance[43].

Figure 3. GDP per Capita of Eastern Caribbean Countries.



Source: World Bank and UNDATA

42 PAHO: https://bit.ly/3UdR4at
43 HRW: https://bit.ly/3BtjYvQ

Economic context

Eastern Caribbean countries share many similar economic challenges, including small and open tourism-dependent markets, limited productive sectors and heavy reliance on foreign trade, as well as high energy and transportation costs[44]. The subregion's economies also face high levels of public debt, limited fiscal space, and ineligibility to access Overseas Development Assistance (ODA) or concessional financing due to their middle and high- income status[45].

Natural hazards and climate change threaten economic growth and sustainable development. The annual hurricane season exposes the subregion to potential damage and losses that can easily reverse hard-earned development gains and require costly response and recovery efforts that place additional strain on already limited national capacities.

Hurricanes in the subregion have led to damage and losses equivalent to more than a 100 or even 200 per cent of gross domestic product (GDP) in some countries, including Grenada and Dominica, with the first one suffering US$900 million in damages – 150.22 percent of GDP – following Hurricane Ivan in 2004 and the latter suffering US$1.3 billion in damage and losses – 226 per cent of GDP –, following Hurricane Maria in 2017[46].

Key Economic Sectors

Pre-pandemic data suggests that small and medium-sized businesses are the backbone of Eastern Caribbean economies, making up 70 to 85 per cent of companies, contributing some 60 to 70 per cent of GDP and accounting for about 50 per cent of employment across Antigua and Barbuda, Barbados, Belize, Guyana, Jamaica, Saint Lucia, Suriname, and Trinidad and Tobago[47]. These small businesses tend to operate in the informal sector, which leaves them and their employees extremely vulnerable to both external and internal shocks[48].

In the Eastern Caribbean, travel and tourism contribute a disproportionate share of GDP, ranging from nearly 27 per cent in Dominica to more than 83 per cent in Antigua and Barbuda[49]. Between 2014 and 2018, on average, tourism contributed more than 20 per cent of total employment across the subregion while accounting for almost half of all employment in Antigua and Barbuda and Saint Lucia[50].

Although the agricultural sector makes up a comparatively smaller share of economic activity, it is an important source of employment and food security support for low-income and rural populations. On average, the sector employs close to 11 per cent of the subregion's workforce. In Dominica (22 per cent) and Grenada (21 per cent), the sector employs more than 20 per cent of the population, while its contribution to employment is less significant in more tourism-dependent islands, like Barbados (2.7 per cent) and Antigua and Barbuda (2.4 per cent)[51].

Given its dependence on tourism, the COVID-19 pandemic rocked the Eastern Caribbean. In 2020, total visitors to Eastern Caribbean Currency Union (ECCU)[52] countries decreased drastically from 4.97 million in 2019 to 1.72 million, a decline of more than 65 per cent[53]. Following almost a decade of consecutive economic growth, this plummeted the GDP of the ECCU by nearly 16 per cent in 2020[54] and significantly set back efforts to reduce high levels of public debt[55].

44 WFP: https://bit.ly/3yn4Mh4
45 Ibid: https://bit.ly/3yn4Mh4
46 Government of the Commonwealth of Dominica: https://bit.ly/3uxyUoT
47 ECLAC: https://bit.ly/3eyKzig
48 UNICEF: https://uni.cf/3RxbOZ1; https://uni.cf/3D6Mlks
49 World Travel and Tourism Council: https://bit.ly/3IgBx46
50 IDB: https://bit.ly/3uqYZpS
51 Departments of Statistics: https://bit.ly/3Q7UY1J; https://bit.ly/3cEMwsr; https://bit.ly/3vot75u
52 ECCU Countries: Anguilla, Antigua and Barbuda, Dominica, Grenada, Montserrat, St. Kitts and Nevis, St. Lucia, and St. Vincent and the Grenadines.
53 ECLAC: https://bit.ly/3yiMJc6
54 Ibid: https://bit.ly/3yiMJc6
55 ECCB: https://bit.ly/3L0mzAM

Impacts of COVID-19 on livelihoods

The sudden stop in tourism propelled an unprecedented increase in unemployment. The Economic Commission for Latin America and the Caribbean (ECLAC) projected that unemployment would increase by more than 13 per cent in Antigua and Barbuda, Saint Lucia, and Saint Kitts and Nevis. Meanwhile, the UN Children's Fund (UNICEF) estimated that around 300,000 jobs would be lost in the Eastern Caribbean, including Trinidad and Tobago, due to the COVID-19 pandemic.

According to Round 2 (June 2020) of the CARICOM and WFP Food Security and Livelihood survey, more than 51 per cent of respondents in the Eastern Caribbean reported disrupted livelihoods, while more than 56 per cent said they experienced reductions or losses of income amid pandemic[56]. While these figures improved by the 4th round of the survey in February 2022, more than a third of respondents still projected moderate or severe future livelihood impacts due to COVID-19, highlighting the protracted effects of the pandemic on livelihoods, which the conflict in Ukraine will only exacerbate[57].

Mushrooming unemployment has disproportionately affected the poor, migrants, women and youth, among other vulnerable groups. Even before the pandemic, youth unemployment in the Eastern Caribbean stood at 26 per cent, nearly three times the adult rate of 9 per cent[58], and two times the world average[59]. Limited economic opportunities for youth will continue to drive the emigration of skilled young professionals, exacerbating the brain drain's negative effects, which are not fully compensated by increased remittance flows.

Despite reduced COVID-19 cases and deaths and a gradual return to normalcy, COVID-19 remains a serious challenge in the subregion. After three years of combatting the virus, the already stretched coping capacities and resilience of governments and affected communities have been pushed to the brink by the impacts of the war in Ukraine. The war poses additional response constraints connected to the rising price of humanitarian relief items as well as possible logistics and transportation bottlenecks.

Remittances

Remittances play a significant role in the Eastern Caribbean. Between 2009 and 2018, remittances as a share of GDP were highest in Dominica, followed by Saint Vincent and the Grenadines and Grenada. In 2020, personal remittances accounted for more than 13 per cent of GDP[60] in Dominica, while net inflows of foreign direct investment were less than 5 per cent of GDP[61], highlighting the importance of remittances to economic activity.

After disasters, remittance flows tend to increase – the average remittances-to-GDP ratio increases by 1 per cent in the year a disaster occurs in Caribbean countries[62] – making it important to ensure effective coordination between diaspora stakeholders, including the private sector and the humanitarian community, to bolster response and recovery activities. Amid the pandemic, remittances have been an important source of income support for families, which they will continue to depend on as the conflict in Ukraine propels a cost-of-living crisis across the Caribbean.

Impacts of the conflict in Ukraine

The conflict in Ukraine will likely continue to drive a surge in the prices of grains and fuel, agricultural livelihood inputs and food commodities as well as transportation and shipping, ominous trends already set in motion by the pandemic[63]. In the Eastern Caribbean, a lack of economic diversification, heavy reliance on imports and high public debt makes it difficult for economies to fight rising inflation[64], which continues to disproportionately affect the most vulnerable as real incomes and purchasing power keep shrinking[65].

56 WFP, CARICOM: https://bit.ly/3ut7ZL5
57 Ibid: https://bit.ly/3ut7ZL5
58 WFP: https://bit.ly/3uqNTBh
59 FAO: https://bit.ly/3AJDFzS
60 World Bank: https://bit.ly/3W1PyZS
61 Ibid: https://bit.ly/3FtnF5C
62 IMF: https://bit.ly/3lo7h7v
63 WFP, CARICOM: https://bit.ly/3ut7ZL5
64 IMF: https://bit.ly/3VCUFzF
65 ECCU: https://bit.ly/3MKh0XZ

While governments attempt to cushion the blow from the rising cost of living through capping or subsidizing fuel prices, bolstering social safety nets and implementing price controls on some basic food items, the high proportion of energy and food as a percentage of the subregion's expenditures makes this a challenge[66].The electricity sector is heavily dependent on imported fossil fuels in the subregion, with renewable energy sources representing only 8.9% of the electricity matrix in the small Caribbean states, contrasting with 22.8% globally[67]. Since the war broke out in Ukraine, in the ECCU food prices are up by almost 25 per cent, fertilizer prices have risen between 40 and 100 per cent in some countries, and gas prices are as high as EC$20 per gallon[68].

The impact of the conflict will setback the subregion's economic recovery from the pandemic and exacerbate existing supply chain disruptions and intra-regional transportation bottlenecks that will threaten food and energy security in the near term[69]. Some experts believe that many Caribbean governments may need to increase national budgets by at least 20 per cent in 2022 to respond to the effects of the Ukraine crisis[70], potentially leading to growing deficits, debt burdens and more costly debt servicing.

Debt & financial stability

Almost all countries and territories in the subregion, with the exception of Anguilla and Montserrat – which both receive significant financial support from the Government of the United Kingdom – already face debt-to-GDP ratios well above the 64 per cent threshold recommended for emerging economies[71], with Barbados (142 per cent)[72] and Dominica (111 per cent)[73] sitting at more than 100 per cent debt as a percentage of GDP in 2021.

Growing fiscal deficits and debt put financial stability and economic growth across the subregion at risk, leaving governments less well-positioned to respond to future disasters and potentially setting the stage for austerity and fiscal consolidation measures in the medium-term that would disproportionately affect the most vulnerable groups, including the poor, migrants, people with disabilities, women and youth, among others[74]. In the coming years, the cost of living will continue to increase in general, with governments having reduced access to financial resources for investments in infrastructure and social protection systems. Furthermore, inflation is expected to increase as fuel prices continue to drive-up the cost of energy, food and other basic services, including humanitarian interventions, creating a situation that will require additional financing and the expansion of national social protection systems.

In early September 2022, the Government of Barbados entered another International Monetary Fund (IMF) programme just as the island's current three-year

$290 million arrangement with IMF was coming to close on 30 September. The new Extended Fund Facility (EFF) will help the Government access $130 million and unlock access to a new funding facility recently established by the IMF[75]. While the IMF-backed Barbados Economic Recovery and Transformation programme helped bring the country's public debt down to 120 per cent in 2019 before the COVID-19 pandemic, austerity measures triggered public sector layoffs that drove unemployment and increased vulnerability[76].

66 ECCB: https://bit.ly/3MKh0XZ
67 WB: https://bit.ly/3HC6Cky
68 Ibid: https://bit.ly/3MKh0XZ
69 IMF: https://bit.ly/3ar9ySV
70 Forbes: https://bit.ly/3AEdPNJ
71 Grennes et al.: https://bit.ly/3nTDDOd
72 IMF: https://bit.ly/3uBUsRu
73 ECCU: https://bit.ly/3P7yJsE
74 OHCHR: https://bit.ly/3ADV0Kr
75 CARICOM: https://bit.ly/3xkzTKR
76 CDB: https://bit.ly/3xkfVQq

Social protection systems & access to services

Social protection systems in the Eastern Caribbean, composed of the classic pillars of labour market interventions, social insurance and social assistance measures, tend to focus on poverty reduction[77]. Despite the presence of integrated regional approaches, such as the Adaptive Social Protection in the Eastern Caribbean programme[78], and a strong policy commitment, there are still challenges that constrain the reach of social protection programmes, including the reduced fiscal space of governments as well as the limited capacities of local organizations.

Informal employment is pervasive across the Caribbean, especially in agriculture and tourism, the region's main economic sectors. While data is outdated and scarce, informal employment as a percentage of total employment is above 30 per cent in Barbados (est. 30-40 per cent)[79] and Saint Lucia (30.6 per cent)[80]. It is likely that high levels of informality are also prevalent in other Eastern Caribbean islands. People employed in the informal sector face considerable disadvantages due to the limited coverage of existing social security schemes, especially after disasters[81].

Past emergencies have exposed the weaknesses of social protection systems to protect people most in need in times of crisis, with the poor and vulnerable at an increased risk not only because they work in the informal sector but they are also often unaware of the mechanisms to access public safety nets[82].

Access to Services

Vulnerable groups, including people with disabilities, migrants and indigenous people, lack access to basic services. In Dominica, for instance, health providers reported limited availability of services for children and people with disabilities. Most of these services are only accessible in the capital, Roseau, including health specialists like pediatricians and the three private schools for children with disabilities. As a result, families living on other parts of the island are not able to regularly access services or end up paying more for private services or services on other islands[83]. Most recent data from 2019 reveals that the average public expenditure on health for Eastern Caribbean countries amounts to approximately 5 per cent of the GDP, which is almost half the global average of nearly

10 per cent of GDP[84]. The Global Health Security Index shows that health systems in the Caribbean substantially lag behind the global average in terms of preparedness, putting the region at a disadvantage when dealing with the health consequences of COVID-19 and other outbreaks, such as dengue[85].

In 2020 and 2021, the combination of COVID-19 and an ongoing dengue outbreak placed significant stress on health systems and exposed some of their structural shortcomings, particularly in the areas of human resources, information systems and financing[86]. In Barbados, Saint Lucia, and Saint Vincent and the Grenadines, the eruption of La Soufriere volcano complicated the situation even more, as national authorities already responding to two health emergencies found themselves responding to a third, including respiratory issues, eye and skin infections, gastrointestinal problems connected to the ingestion of contaminated food or water[87], and the exacerbation of chronic illnesses due to interruptions in access to medicines or medical services[88].

77 CDB: https://bit.ly/3TTEtJv
78 OECS: https://bit.ly/3d0Ahah
79 IDB: https://bit.ly/3vehbDC
80 ILO (2017): https://bit.ly/3OJib9K
81 ILO: https://bit.ly/3TVPOZC
82 UNRCO: https://bit.ly/3cbk1lO
83 USAID: https://bit.ly/3eJFJ2g
84 WB: https://bit.ly/3VCu8SZ
85 UN Barbados & OECS: https://bit.ly/3DbDzSB
86 PAHO: https://bit.ly/3RB6jsr
87 PAHO: https://bit.ly/3CYrAWY
88 Direct Relief: https://bit.ly/3TRAtZc

In the Eastern Caribbean, more than 97 per cent of the population uses basic drinking water services, while around 90 per cent use sanitation services[89]. Over the past few years, several Eastern Caribbean islands, including Barbados, Saint Lucia and Saint Kitts and Nevis, continue to face drought-triggered restrictions or a persistent lack of water in certain areas[90]. Amid the pandemic, a lack of adequate clean water supply created hygiene and sanitation challenges in some communities, especially in poorer neighbourhoods where schools had limited or no access at all to drinking water[91].

As governments across the subregion closed schools to help curb the spread of COVID-19, low levels of access to the internet and digital devices at home created significant barriers to students' continued learning, especially for marginalized groups such as migrants and indigenous people[92]. Despite these challenges, the Eastern Caribbean still scored among the highest globally on the Remote Learning Readiness Index – a new indicator developed by UNICEF to measure countries' readiness to deliver remote learning in response to disruptions of in- person learning[93].

In emergencies, access to services often becomes very restricted in the Eastern Caribbean. In September 2017, hurricanes Irma and Maria wrought devastation across the subregion, leading to an extensive breakdown of essential services in the weeks and months that followed. By the end of January 2018, nearly 5 months after the twin storms, between 40 and 80 per cent of the population in Antigua and Barbuda, Anguilla, British Virgin Islands and Dominica remained without electricity, while between 18 and 22 per cent of the population in the latter three islands still lacked restored access to safe water[94].

Cash Transfer Programmes in emergencies

In recent years, Eastern Caribbean countries have scaled up the use of national social protection systems in response to large-scale shocks, including the impacts of external economic shocks and natural hazards[95]. In response to COVID-19, many Eastern Caribbean countries expanded their social protection mechanisms to assist the people most affected by the pandemic.

In Barbados, the Government increased the transfer value of its cash programs (vertical expansion). At the same time, in Saint Kitts and Nevis and Saint Lucia, new beneficiaries were integrated into existing cash-based assistance programs (horizontal expansion) amid the pandemic. Meanwhile, Saint Lucia and Saint Vincent and the Grenadines established new cash programs to address growing unemployment in the tourism sector and support those who previously fell outside the reach of social protection systems[96].

Even though the ongoing COVID-19 crisis has highlighted the importance of expanding existing social protection systems, structural barriers and gaps remain, hindering government's efforts to assist the most vulnerable, including migrants[97].While those already dependent on government support received some kind of COVID-related transfers, most of those with no income reported that they had not received any assistance, regardless of gender, age group or location[98].

Examples from the subregion demonstrate that humanitarian organizations can leverage existing social protection mechanisms to provide cash assistance in response to emergencies. In the aftermath of Hurricane Maria in Dominica, WFP and UNICEF provided emergency cash assistance to some 6,600 registered beneficiaries in the social protection

89 OCHA calculations using UNICEF data available at: https://data.unicef.org/country/
90 UNDP: https://bit.ly/3QcbA8k
91 Ibid: https://bit.ly/3QcbA8k
92 ECLAC: https://bit.ly/3cloJsg
93 UNICEF (2022): https://bit.ly/3cTN7XH
94 UNICEF (2018): https://bit.ly/3KPapL1
95 WFP: https://bit.ly/3PpE3az
96 World Bank, European Union: https://bit.ly/3eGhPo0
97 WFP (2021a): https://bit.ly/3yYkBwf
98 WFP (2022): https://bit.ly/3qmYieP

system – around 9 per cent of Dominica's population – by temporarily increasing the transfer value[99].Thanks to funding from WFP and UNICEF, emergency cash transfers were made accessible to previously non-registered households affected by Hurricane Maria in 2017 through a horizontal expansion of these mechanisms[100].

Migrants and displaced people who seek social protection support regularly face several access and eligibility challenges, especially after an economic shock or disaster strikes[101]. These events can exacerbate pre-existing vulnerabilities and potentially act as catalysts for cross-border population movements, a factor which may place additional strain on already-limited national social protection systems in neighbouring countries receiving migrants[102]. In order to protect those who are the most vulnerable and traditionally excluded from social protection mechanisms from future shocks, there is a need to expand fiscal space and technical expertise to maximize their reach and effectiveness[103].

99 WFP (2019): https://bit.ly/3Braz8c
100 Ibid: https://bit.ly/3Braz8c
101 WFP (2021b): https://bit.ly/3d25Dxi
102 WFP: https://bit.ly/3W0waw7
103 UNRCO: https://bit.ly/3ywXQOJ

Vulnerable groups

The impacts of climate change and sudden-onset disasters disproportionately affect the poor and socially marginalized in the subregion. These groups face greater exposure and vulnerability to these phenomena, while limited economic resilience reduces their ability to cushion the blow and quickly recover from disasters[104].

In the Eastern Caribbean, the most vulnerable groups include children and women – especially in female-headed households, pregnant and lactating women and women living in rural areas – the elderly, people with disabilities, LGBTQI+ people, as well as internally displaced people, migrants and refugees, particularly those from Haiti and Venezuela[105].

Children & the elderly

Even before the COVID-19 pandemic, average child poverty rates in the subregion reached nearly 25 per cent[106]. The most vulnerable girls and boys in the Eastern Caribbean include children from income-poor families, especially those living in female-headed households, and children from rural areas and outlying islands within multi-island states. In 7 out of 10 Eastern Caribbean islands, children are more likely to be poor if they live in female as opposed to male- headed households, with Barbados and Grenada recording the highest level of child poverty in female-headed households[107].

Children living with disabilities, mainly girls, are especially vulnerable as they are generally excluded from normal activities within the home and the wider community, and frequently lack access to appropriate care services.108 Girls with disabilities are less likely than boys with disabilities to attend school, therefore more likely to live in poverty and are at greater risk of GBV[109], especially in emergencies.

The elderly, including people living with disabilities who are largely concentrated in this age group[110], and others who face intersecting risks and vulnerabilities such as low income, are more likely to present differentiated health, protection, and care needs in a context where there is a high prevalence of non-communicable and chronic diseases[111].

Women & girls

As elsewhere, structural gender inequalities in the subregion translate into gender-differentiated impacts of climate change, disasters and economic shocks, leaving women and girls exposed to GBV and exclusion while hindering their resilience to future shocks. The national survey on violence against women and girls' prevalence (VAWG) in Grenada for example, which was undertaken in collaboration with UN Women, the Caribbean Development Bank and the Caribbean Women Count Portal, show that 39 per cent of women have experienced at least one type of intimate partner violence.

Women commonly face more significant challenges in accessing resources for climate change adaptation (CCA) and disaster preparedness and endure more extended recovery periods after a disaster compared to men, especially in more impoverished populations. During the time of disaster, women tend to face increased levels of crime and violence, especially GBV. In the case of access to basic services, for instance, most services are male oriented without a prioritization in terms of information and the provision of basic services tailored for pregnant women, children and elderly women.

104 World Bank: https://bit.ly/3c5b2mv
105 UN System Barbados and the OECS: https://bit.ly/3KJjqoN
106 OCHA calculations using UNICEF data: https://uni.cf/3clpMs6
107 UNICEF: https://uni.cf/3S2KO4f
108 USAID: https://bit.ly/3CJYeeU
109 Ibid: https://bit.ly/3CJYeeU
110 UNDP: UNDP-RBLAC-CHDRReport.pdf
111 ECLAC: https://bit.ly/3CLbMXm

Women's access to and participation in decision-making on CCA as well as disaster preparedness and response remains limited even though they are disproportionately affected. The needs and voices of vulnerable groups, such as people with disabilities, indigenous peoples, migrant population and LGBTQI+ people are also noticeably absent from these processes.

Indigenous peoples

The Kalinago indigenous people in Dominica are perhaps the most vulnerable group across the subregion. The Kalinago territory – home to more than 2,100 indigenous people – consists of 3,700 acres of land located in the north-east of Dominica on the Windward coast of the island[112]. When compared to the size and population of other parishes, the territory has the highest population density and suffers from a high degree of land degradation due to land clearing for settlements, agriculture and infrastructure[113].

According to Dominica's latest poverty assessment (2008/2009), nearly one in two Kalinago people lives in poverty, nearly double the national rate. However, this assessment was carried out some 15 years ago, with poverty likely to have increased due to the devastating impacts of Hurricane Maria – the Kalinago territory was one of the hardest hit areas across the island – and the COVID-19 pandemic.

The risks, vulnerabilities, and capacities which characterize vulnerable groups need to be closely monitored to better understand how they can be mitigated before, during and after a disaster. However, limited technical capacity and resources for disaggregated data collection, and a lack of formal mechanisms for information sharing and policy coordination among government agencies, leave critical data and information gaps that hinder a timely, appropriate and well-targeted humanitarian action.

112 World Bank: https://bit.ly/3nUwcX0
113 Ibid: https://bit.ly/3nUwcX0

Displaced & migrant populations

Fox Town, Little Abaco Island. Hurricane Dorian 2019.
Photo: OCHA

Eastern Caribbean islands are important destination and transit points for people on the move, with population movements within the subregion and from other Caribbean countries, with Guyana and Trinidad and Tobago being quite common. Dominica has traditionally served as both a destination and transit country for undocumented migrants from Haiti en route to destinations like Guadeloupe, Saint Martin and the US Virgin Islands[114].

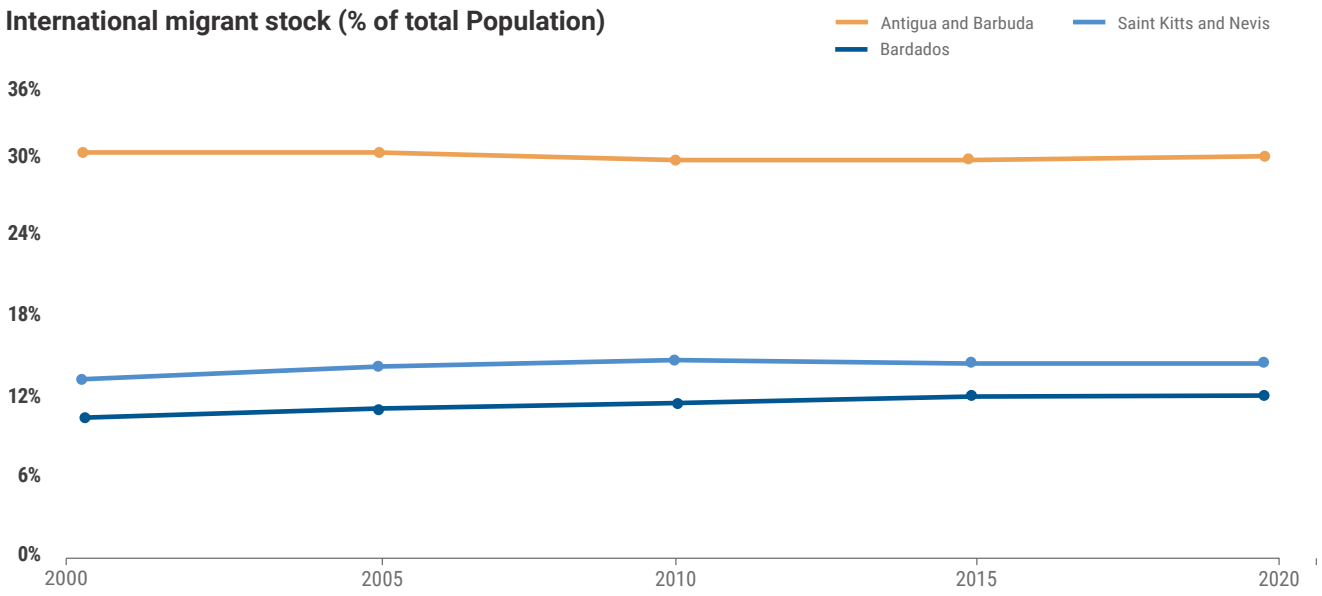
The most vulnerable migrant groups in the Eastern Caribbean are Haitians and Venezuelans. Haitians are the main migrant group in Dominica, with more than 1,000 according to the 2011 national census, a figure that is now likely much higher. Although relatively small compared to the 17 R4V Caribbean countries and territories[115], there are growing Venezuelan migrant and refugee populations in some Eastern Caribbean islands, like Barbados, Grenada, and Saint Vincent and the Grenadines.

114 Migrant Rights Group International: https://bit.ly/3D30ZJY
115 R4V Countries and territories: Colombia, Peru, Ecuador, Chile, Brazil, Panama, Mexico, Costa Rica, Argentina, Uruguay, Bolivia, Paraguay, Dominican Republic, Trinidad and Tobago, Guyana, Aruba and Curacao.

Figures 4 shows the international migrant stocks as a percentage of the population of Antigua and Barbuda, Barbados and Saint Kitts and Nevis for the period 2000-2020. The three countries have experienced a relatively steady number of migrant stocks as a percentage of the population for the period under study.

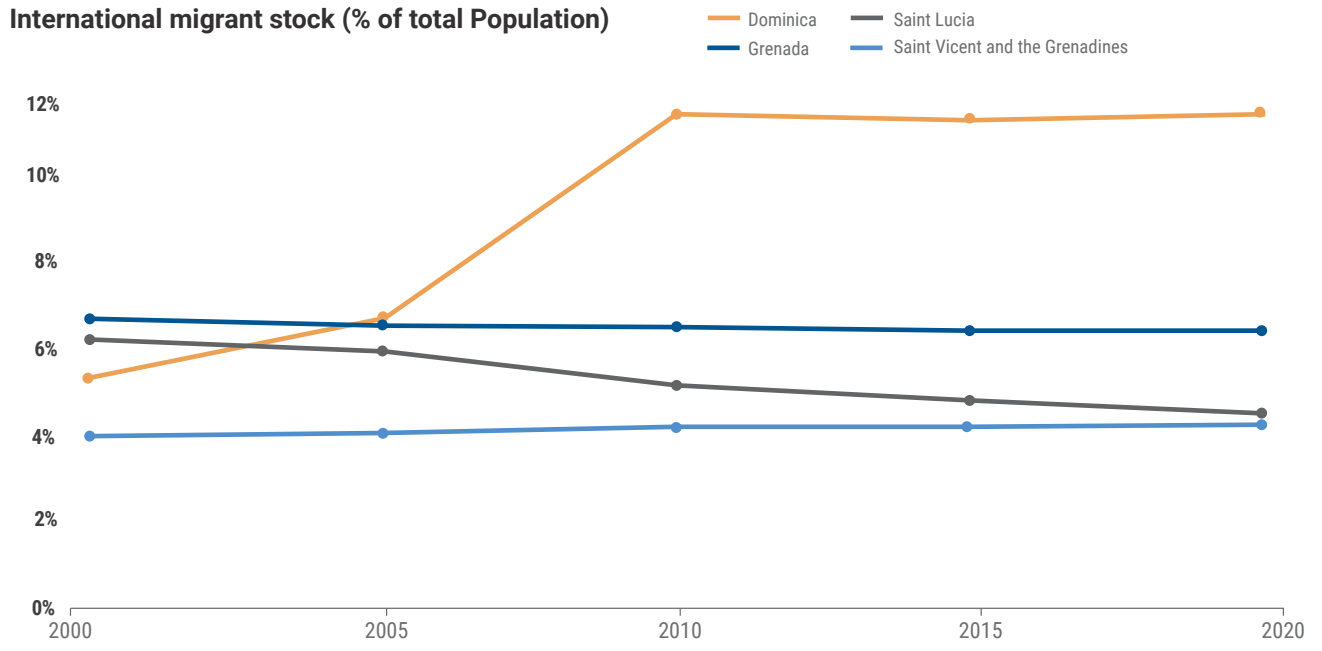
Similarly, **Figure 5** shows the international migrant stock as a percentage of the population of Dominica, Grenada, Saint Lucia and Saint Vincent and the Grenadines for the period 2000-2020. In the case of Dominica, a sharp increase of over 7 % was reported between the period 2005-2020, while Grenada and Saint Lucia have experienced a steady decrease in the migrant stock during the same period.

Figure 4. International migrant stock for the period 2000-2020 for Antigua Barbuda, Barbados and Saint Kits and Nevis. Source: IOM.



Source: UN DESA, 2020 | Data uploaded on 20 January 2021

Figure 5. International migrant stock for the period 2000-2020 for Dominica, Grenada, Saint Lucia and Saint Vincent and the Grenadines. Source: IOM.



Source: UN DESA, 2020 | Data uploaded on 20 January 2021

In emergencies, these groups will likely face barriers in accessing humanitarian assistance that leave them vulnerable to protection risks and rights violations. In situations of mass cross-border displacement, third country nationals' access to humanitarian and protection services could be constrained as they fall outside the scope of CARICOM Free Movement Regimes (FMAs).

In the aftermath of Hurricane Maria, CARICOM and OESC FMAs were activated to shelter displaced Dominicans in neighbouring Eastern Caribbean islands, prioritizing the registration and entry of Dominican nationals, often waiving travel document requirements where documents were lost and using other forms of identification, such as appearance, accent and family networks. While this admission of Dominican nationals was prioritized, CARICOM member states also tightened migration policies that could deny the entry of displaced people in future emergencies, especially in the case of displaced third-country nationals[116].

Most Eastern Caribbean countries have yet to meaningfully integrate mass displacement into their disaster risk management plans and strategies[117]. As witnessed past in emergencies, governments are likely to face considerable challenges in responding to wide-scale displacement, increasing protection risks among women, unaccompanied minors, migrants, people with disabilities and the LGBTIQ+ community, among others.

There is a need for Eastern Caribbean countries to design, develop and implement robust housing and social protection systems that keep people from needing public shelters or moving to other countries during emergencies. These systems should also include the identification and mapping of vulnerable populations.

116 Francis, A. (2019): https://bit.ly/3TR4HfO
117 WFP, OESC: https://bit.ly/3x2xaFq

II. Shocks and their impacts

Views of the mass destruction in Marsh Harbor, Abaco Island in the Bahamas due to Category 5 Hurricane Dorian Sept 2019.
Photo: UN/OCHA/Mark Garten

Climate variability and change

Economic and social life in Eastern Caribbean SIDS is intricately linked to the climate and the natural environment, making these countries more vulnerable to climate variations and change. While there is still a lack of concrete data and information on the specific impacts of climate variability, the vulnerabilities of SIDS to climate variability arise from: 1) their small size and/or complex topographies, which limit where population centres and economic zones may be located; 2) a near-exclusive reliance on climate- sensitive economic activities such as agriculture and tourism; 3) an overwhelming dependence on rainfall for water; 4) high public debt burdens; and 5) limited hazard forecasting capabilities[118].

The subregion has already experienced shifts in climate variability, which have become more noticeable over the years. While variations in the climate from the normal are expected to occur, recent regional studies (UN Climate Change, 2022; Taylor, A., 2018) warn of emerging climatic conditions that are not only unfamiliar but also unprecedented. This has been seen in such phenomena as rising sea levels, more prolonged region-wide droughts, increased heavy rainfall and flooding events, and greater numbers of very hot days and nights in a year. It is not just the magnitude of the change that has proven challenging (e.g., the intensity of the rainfall events leading to flooding or the length of droughts), but also the frequency of extreme events. For instance, when the region is hit by an extreme climate event while it is still recovering from another in the recent past[119].

Table 1 includes information on the Global Climate Risk Index (CRI), which analyses and ranks countries that have been most affected by climate-related extreme events, Dominica, Grenada and Saint Vincent and the Grenadines rank the highest in subregion out of 180 countries, based on data from 2000-2019[120].

Table 1. Global Climate Risk Index (CRI) for the period 2000-2019.

CRI RANK	COUNTRY	CRI SCORE	AVERAGE FATALITIES IN 2000-2019 (RANK)
11	Dominica	33.00	115
24	Grenada	39.67	125
48	St Vincent and the Grenadines	59.17	146
51	St Lucia	60.33	142
56	Antigua and Barbuda	64.50	161
130	St Kitts and Nevis	116.00	172
148	Barbados	135.33	171

Climate Risk Index for 2000-2019

118 Taylor et al. 2018: https://bit.ly/3TdzQca
119 CARIBANK: https://bit.ly/3gam6kk
120 Global Climate Risk Index 2021: https://bit.ly/3TjRriH
* Current CRI data does not account for the British Overseas Territories (Anguilla, British Virgin Islands and Monserrat)

CRI data only considers the direct impacts of extreme weather events and not the indirect impacts of slower-onset events, such as droughts and food scarcity, meaning the situation could be even more dire in some of these countries and territories.

According to IDB, rainfall patterns have shifted in the region, with the number of consecutive dry days expected to increase. Additionally, sea level rise has occurred at a rate of about two to four cm per decade over the past 33 years, a trend which presents risks to the region's freshwater resources and to its largely coastal economies and populations dependent on tourism and agriculture[121].

Alongside the increasing intensity of tropical storms and hurricanes, subtle changes in the amount, frequency, and intensity of precipitation directly affect the magnitude and timing of runoff and the intensity of floods and droughts. Extreme rainfall can occur as a variable of climate change resulting in landslides, which have occurred recently primarily in Saint Lucia and Saint Vincent and the Grenadines. Antigua, Barbados, Saint Lucia, Grenada, Saint Vincent and the Grenadines are the countries that have the most average rainy days.

In the coming decades, climate variability will continue to cause pressures and impacts across the subregion that will likely affect key sectors and vulnerable groups, including people living in poverty and the elderly.

An increase in temperature may result in more incidents of dengue fever and other vector-borne diseases, as conditions become more favourable for mosquito breeding. This will occur particularly because of less precipitation connected to rising temperatures as well as incorrect water storage methods[122]. Recently, Saint Lucia and Saint Vincent and the Grenadines have faced the biggest challenges related to dengue.

In the last five years, 2016-2022, around 1,866 and 1,744 dengue cases have been recorded in Saint Vincent and the Grenadines and Saint Lucia, respectively, and approximately 11 persons have died. In Saint Vincent and the Grenadines, some 1,600 dengue cases recorded in 2020 are more than double the dengue caseload in the country in the previous 10 years combined. For Barbados, dengue seems to be the sleeping giant, as the country has recorded over 4,323 cases in the last five years and approximately 1 death[123].

In the Eastern Caribbean, thousands of people are heavily dependent on agriculture as their main source of income. Thus, any potential climate variations that have impacted agriculture and resulted in intense and frequent extreme events pose not only a threat to the production and distribution of food but also to livelihoods.

A recent example of the impact of extreme weather events on agriculture and livelihoods was Hurricane Elsa in Saint Lucia in 2021. The storm caused damages equivalent of US$12.5 million, mainly through the damage and loss of crops, including banana production, and agriculture infrastructure. Furthermore, risk insurance, such as the Caribbean Catastrophe Risk Insurance Facility (CCRIF), did not allow for a significant pay out to compensate for the agricultural losses in the country.

Climate variability increases the risks of hunger in the region as it affects all four components of food security: food availability, food accessibility, food utilization and food stability. The first and main impacts on food security in Barbados and the Eastern Caribbean will be felt in the near future through reduced availability and stability for the most vulnerable[124].

One of the central challenges in supporting Caribbean countries to mitigate the effects of climate variability is the lack of sufficient and reliable data, which is either not available or not shared at present, and is fundamental for a thorough analysis of the multiple threats to the region. Areas that will be undoubtedly impacted are water resources, livelihoods, agriculture, and food security, among others.

121 IDB: https://bit.ly/3CRU5qr
122 CARIBANK: https://bit.ly/3gam6kk
123 OCHA calculations using PAHO/WHO data available at: https://bit.ly/3W8G3IK
124 FAO: https://bit.ly/3fRLOcY

Natural hazards

Aerial view of damage in Bahamas. Hurricane Dorian 2019.
Photo: CDEMA

While tropical storms and hurricanes present the biggest threat to the Eastern Caribbean, the subregion is a complex multi-hazard environment that is exposed to various hydrometeorological and geological shocks, including floods, drought, earthquakes, volcanic eruptions and tsunamis. Limited local and national response capacities are often quickly exceeded by growing humanitarian and recovery needs, prompting requests for regional and international assistance to support government-led response efforts.

In recent years, non-storm related disasters, such as the La Soufrière volcano eruption in Saint Vincent and the Grenadines, served as ominous reminders of the subregion's multi-hazard landscape, raising concerns about how well-prepared governments and local response actors are for non-hydrometeorological hazard impacts. The sole focus on hurricane preparedness could leave national authorities and local communities unprepared for such shocks, leading to greater impacts and a longer road to recovery.

Storms & floods

In the Eastern Caribbean, storms and floods warrant particular attention, given their frequency and the magnitude of damage and losses they are capable of inflicting on affected islands over a relatively short period of time[125]. These climate-related hazards account for nearly 80 per cent of all disasters in the

125 FAO: https://bit.ly/3B7cL4T

subregion since 1990, generating more than 95 per cent of cumulative disaster-related damage over the same period[126].

Tropical storms & hurricanes

Between August and September, the peak of the hurricane season, more than 15 per cent of Atlantic hurricanes make landfall in the Caribbean Antilles Islands[127]. Since 2000, more than 30 storms have affected just over 488,000 people across the Eastern Caribbean[128]. Over this period, major storm-related disasters in the subregion include Hurricane Ivan (2004), Hurricane Tomas (2010), and hurricanes Irma and Maria (2017), among others, while even less powerful storms, such as Tropical Storm Erika, have wrought havoc on some islands.

Between 2010 and 2019, the number of storm-related disasters in the subregion increased by 50 per cent compared to the previous 10 years (2000-2009). Over the same period, the number of people affected by these disasters increased by nearly 245 per cent, while total damage increased by more than 460 per cent from around $970.7 million to more than

$5.4 billion. This shows a clear trend towards more frequent and intense storms that have increasingly more devastating impacts on affected communities. In recent years, the Caribbean has witnessed increased storm activity largely fuelled by an almost unprecedented three consecutive years of La Niña's impacts on global climate patterns. The 2020 and 2021 hurricane seasons – the first and third most active on record – produced more than 50 named storms, including 11 major hurricanes, marking the first time in history that back-to-back hurricane seasons exhausted the list of 21 storm names.

In July 2021, Hurricane Elsa barrelled across the Eastern Caribbean islands of Barbados, Saint Lucia and Saint Vincent and the Grenadines, just three months after the La Soufrière volcano eruption affected all three islands. This reaffirms the need for multi-island and multi-hazard contingency planning in the Eastern Caribbean and underscores the importance of multi- hazard early warning systems.

The frequency of Category 4 and 5 hurricanes is projected to increase between 25 and 30 per cent while storms are likely to become stronger, generating more intense maximum wind speeds[129]. Combined with rising sea levels, stronger winds will produce greater impacts from storm surge and coastal inundation. While changes in precipitation are more difficult to predict, it is projected that single hurricane events will become more intense, with potential increases of up to 30 per cent of rainfall which would significantly increase the risk of flash flooding in Eastern Caribbean SIDS[130].

Another ominous climate change-driven trend in the Caribbean is the rapid intensification of tropical cyclones. While hurricane forecasting has improved, providing multi-day lead times as well as more precise track and intensity projections, forecasting rapid intensification remain challenging for current models[131]. When forecast models under-represent the intensity or rainfall associated with a tropical cyclone, communities may not mobilize as quickly to prepare for a storm's landfall, while emergency managers could be less adamant on public safety precautions against flooding and wind damage[132]. Rapidly intensifying storms could catch populations off guard and leave them with less time to evacuate or take the necessary measures to protect property and livelihoods, leading to greater impacts and longer recovery times.

Given their relatively small physical size and dense populations, a single hurricane can potentially affect the entire land area, population and economy of

126 OCHA calculations using CRED EM-DAT data available at: https://public.emdat.be/
127 Jury et al. (2019): https://www.mdpi.com/2073- 4433/10/10/590/htm
128 CRED EM-DAT: https://public.emdat.be/
129 OECS: https://bit.ly/3Sf3ZaB
130 Ibid: https://bit.ly/3Sf3ZaB
131 Jury et al. (2019): https://www.mdpi.com/2073- 4433/10/10/590/htm
132 Ibid: https://www.mdpi.com/2073-4433/10/10/590/ htm

any Eastern Caribbean SIDS, with large parts of the population and key economic and social infrastructure concentrated in low-elevation coastal areas at extreme risk from storm surge and rising sea levels[133]. As many families lack the means to effectively prepare for disasters, including hurricane- proofing homes, they are left unable to cope with the multifaceted impacts of a major hurricane (Category 3 or higher on the Saffir-Simpson scale) or even a weak tropical storm in some cases[134].

In the Eastern Caribbean, weak storms can be equally as destructive as the more powerful ones and can just as easily overwhelm national response capacities. In late October 2015, Tropical Storm Erika passed well to the north of Dominica as a relatively weak storm with maximum sustained winds of around 80 km/h[135]. Erika made up for its lack of intensity with significant rainfall, drenching the island with maximum rainfall totals of over 12 inches[136]. This triggered deadly floods and landslides that severely damaged tourism infrastructure and stunted agricultural production. Erika affected some 28,000 people[137] – around 40 per cent of the population – and nearly wiped out the island's entire GDP with damage and losses amounting to $483 million – equivalent to 90 per cent of GDP[138].

133 UN Barbados and the Eastern Caribbean: https://bit.ly/3Ba01uy
134 Ibid: https://bit.ly/3Ba01uy
135 NOAA: https://bit.ly/3b4p3R6
136 Ibid: https://bit.ly/3b4p3R6
137 CRED EM-DAT
138 Government of the Commonwealth of Dominica, UNDP: https://bit.ly/3RfTNyK

2017 Hurricane Season

Marsh Harbor, Great Abaco Islands. Hurricane Dorian 2019.
Photo: OCHA/Mark Garten

In 2017, back-to-back Category 5 hurricanes Irma and Maria devastated the islands of Anguilla, Antigua and Barbuda, Barbados, the British Virgin Islands and Dominica – half of the countries and territories covered by the UNRCO for Barbados and the Eastern Caribbean. The scale and severity of multiple simultaneous emergencies quickly overwhelmed national and regional response capacities, as both CDEMA and the UN System were also supporting response efforts in affected islands outside the Eastern Caribbean, including The Bahamas, Cuba, Haiti, Sint Maarten, and Turks and Caicos Islands.

According to CRED EM-DAT, nearly 89,000 people were affected in the Eastern Caribbean, although the figure is likely higher as available data is incomplete, with Hurricane Maria affecting almost 67,000 people[139] in Dominica alone. Based on available data from IDMC, more than 42,650 were internally displaced across six Eastern Caribbean countries and territories affected by the twin storms, accounting for nearly 90 per cent of all internal displacements in the subregion since 2010[140].

Case Study: Dominica

On 18 September 2017, Hurricane Maria hit Dominica as an extremely powerful Category 5 storm. Maria is one of the most rapidly intensifying storms on record, strengthening from Category 1 to 5 in just 15 hours,

139 Ibid.
140 OCHA calculations based on IDMC data available at: https://bit.ly/3S91fLD

despite being forecasted to make landfall in Dominica at category 2 or 3 strength[141]. Hurricane Maria lashed the island with extreme winds exceeding 274 km/h, torrential rains that triggered deadly flash floods and at least 9,960 landslides, as well an extreme storm surge about a meter above predicted tide levels that battered the country's south-west coast.

Impacts & needs

Hurricane Maria levelled a devastating blow to the country's economy and human development as the island was still recovering from Tropical Storm Erika just two years earlier. Around 90 per cent of all buildings across the island were damaged, including over half of all health centres, which, combined with disruptions to electricity, water and waste management, severely limited access to critical health services as needs and risks increased[142].

More than 60 per cent of the island's houses were heavily damaged and around 15 per cent were destroyed, forcing around 3,000 people into more than 100 collective shelters island wide. In December 2017, 35 per cent of households remained displaced, staying with friends and family or in collective or alternative shelters, while around 460 people were still in some 30 collective shelters across the island[143].

In addition to shelter, water was one of the most pressing unmet needs. Four months after Maria, 9 out of 43 water network systems remained non- operational, with some 8,800 people still receiving water from water trucking services mainly in peri- urban and rural areas[144]. Additionally, around 90 per cent of the population was still without access to electricity in January 2018, as power restoration was concentrated mainly in the capital Roseau and Portsmouth[145].

Maria displaced 35,000 people, nearly half (49 per cent) of the island's population. About a month after Maria, the Government estimated that more than 17,000 people had left the island, many of them children and teenagers between 17 and 19 years old, creating serious protection risks for people on the move, both internally and in neighbouring islands.

According to the country's Post-Disaster Needs Assessment, Maria potentially triggered a 14 per cent spike in poverty from approximately 28.8 to 42.8 per cent of the population, while the number of indigent people doubled to more than 4,730 people. Large- scale agricultural losses and disrupted supply chains led to spiralling food prices that put sufficient food out of reach for many households whose main source of income was agriculture, tourism or fishing. These families reported that their only source of food was humanitarian assistance[146]. According to WFP, around 24,000 people – roughly a third of the population – faced severe or borderline food insecurity after Maria[147].

Response gaps & challenges

In the context of a multi-island strike, the growing scale of needs quickly outpaced not only national capacities, but also regional and international ones. Access and logistics barriers significantly limited response efforts in interior and coastal communities, especially on the island's east coast, which severely hampered assessments and the delivery of humanitarian assistance. A lack of reliable baseline population data delayed the roll out of assessments and relief distributions, while limited information on population movements, including internal displacement and returns, made it increasingly difficult to provide well-targeted assistance.

Many collective shelters were in schools that did not have basic services and supplies and were ill-prepared to cope with such massive displacement. According to IOM's Displacement Tracking Matrix (DTM) analysis, people in collective shelters faced challenges accessing safe water, gender-segregated

141 Jury et al. (2019): https://www.mdpi.com/2073-4433/10/10/590/htm
142 ACAPS: https://bit.ly/2BB9cV7
143 Ibid: https://bit.ly/2BB9cV7
144 Ibid: https://bit.ly/2BB9cV7
145 Ibid: https://bit.ly/2BB9cV7
147 Ibid: https://bit.ly/3RfTNyK

sanitation facilities and basic hygiene items[148] Additionally, many reported a lack of information on early recovery operations, including the availability of bedding, clothes or household supplies, and a lack of knowledge of available assistance and the eligibility criteria to access it.

The Kalinago indigenous people were hardest hit by Maria's passage, which greatly exacerbated pre-existing vulnerabilities and exposed the chronic lack of resilience. The Kalinago, who are mostly subsistence farmers and fisherfolk, lost 80 per cent of their crops and approximately two thirds of their homes were damaged or destroyed[149]. Despite bearing the brunt of Maria's wrath, they did not receive much assistance in their recovery[150] and faced nearly a complete loss of livelihoods and a dire food security situation.

Floods

While floods can be a primary effect of hurricanes, these hydrometeorological shocks are not only caused by storms and rising coastal tides. Land- borne flooding resulting from the overwhelming of the natural and manmade drainage systems due to extreme rainfall constitutes a real threat to Eastern Caribbean islands even outside the annual Atlantic hurricane season[151]. In many countries, like Dominica, Grenada, Saint Lucia, and Saint Vincent and the Grenadines, extreme rainfall has the potential for triggering flash floods nearly every two years between April and May, and almost twice per year from July to December[152].

Despite projections that annual precipitation will decrease across the Caribbean between 2030 and 2090, the intensity of precipitation is likely to increase, resulting in episodes of extremely intense rainfall separated by periods of relative drought[153]. The subregion is particularly vulnerable to flooding due to the general weakness and poor maintenance of drainage infrastructure, especially in urban areas, and the degradation of the hillsides of drainage basins for both planned and unplanned development[154].

The macroeconomic impacts of floods on livelihoods and economic activity are not consistently measured, as is the case with tropical storms and hurricanes which usually have national implications and receive greater international attention[155]. Between 1990 and 2018, for example, only 20 per cent of flooding across the Caribbean had overall damage reported in CRED EM-DAT compared to 44 per cent for storms[156]. Nevertheless, floods often have devastating impacts on Eastern Caribbean SIDS, leading to the destruction and damage of homes, the loss of crops and livestock and displacement[157].

Case study: December 2013 floods

In late December 2013, a low-pressure trough dropped heavy rainfalls across the subregion, severely affecting Dominica, Saint Lucia and Saint Vincent and the Grenadines. At least 15 people were killed and hundreds more were displaced to emergency shelters.158 Around 220,000 people across the subregion were affected by the severe weather[159].

Saint Vincent and the Grenadines received more than 400mm of rain in 24 hours which triggered wide scale flooding and landslides that severely damaged and destroyed critical infrastructure, including homes, health facilities, roads and bridges, as well as water and sanitation services.160 Damage and losses amounted to more than $108 million – around 15 per cent of the country's GDP – while Saint Lucia experienced losses of $99 million, or 8 per cent of GDP[161].

In Saint Lucia, intense flooding collapsed the piped water supply across the country and shutdown health centres in the most affected areas (Anse La Raye

148 IOM
149 Direct Relief: https://bit.ly/3djiJ9u
150 Ibid: https://bit.ly/3djiJ9u
151 ECLAC: https://bit.ly/3BgAWhE
152 OECS: https://bit.ly/3J7ghhJ
153 ECLAC: https://bit.ly/3BgAWhE
154 Ibid: https://bit.ly/3BgAWhE
155 Ibid: https://bit.ly/3BgAWhE
156 ECLAC: https://bit.ly/3ERDQex
157 Ibid: https://bit.ly/3ERDQex
158 FloodList: https://bit.ly/3ozdtQV
159 Ibid: https://bit.ly/3ozdtQV
160 PAHO: https://bit.ly/3cDuPcO
161 World Bank: https://bit.ly/3orC0r4

and Canaries in Anse La Raye District on the island's west coast), limiting access to health services[162]. In both countries, sanitation at health facilities were left in poor condition, and disease surveillance, vector control and water quality monitoring were identified as priority response activities[163]. In Saint Vincent and the Grenadines, the Government identified access to safe water as the most critical need as the country's water trucking capacities were overwhelmed by the scale of the response required[164]. Nearly a decade later in 2021, similar water needs were identified following the eruption of La Soufrière volcano.

Drought

Drought is a slow-onset hazard whose impacts gradually accumulate over months or even years, with flows in intensity, possibly leading its effects to go unnoticed by many. The slow-onset nature of droughts, together with impacts that are usually offset by the start of the next rainy season, often makes them less of a priority for countries and territories faced with the threat of more rapid-onset hazards, like hurricanes and volcanoes[165].

Even though drought represents one of most frequently occurring climate hazards in the Caribbean, responsible for generating extensive economic losses and placing even greater stress on water and food systems, drought adaptation and preparedness measures in the subregion are relatively weak[166]. Amid the COVID-19 pandemic, the implementation of water- intensive health and hygiene protocols to curb the spread of the virus created additional water demands as many islands faced supply shortages due to drought in 2019-2020[167]. The challenges arising from drought in a subregion highly dependent on water and rain to drive tourism activity, as well as largely rain- fed agriculture and respond to disease outbreaks, will only be exacerbated by climate change and variability. According to 2019 data from the World Resources Institute, Dominica, Saint Vincent and the Grenadines, Antigua and Barbuda, Barbados, and Saint Kitts and Nevis are amongst the 37 most water-stressed countries in the world, with the latter three classified as water scarce countries, meaning they have an availability of less than 1,000 m2 of freshwater resources per capita[168]. In the years to come, the situation is only expected to become worst.

The Caribbean Drought and Precipitation Monitoring Network warns that in years to come, the subregion could suffer a 30-50 per cent decline in average annual rainfall[169]. At the same time, the region is currently experiencing a rapid depleting of freshwater aquifers due to an increase in saline and solid water and the pollution of ground water after the eruption of La Soufrière Volcano in 2021.170 The Government of Barbados was forced to implement several temporary measures to alleviate the unusually high demand for water brought about by need to clean volcanic ash as part of general cleaning and even purchased water from neighbouring Dominica[171].

In the Eastern Caribbean, drought will continue to be a key feature of the climate, though the extent of its impacts will vary across islands. In areas with low topography, physical dependency on both rainfall and evapotranspiration rates makes drought of lesser concern. However, in the case of more densely populated islands with high water consumption industries, the sensitivity of economies and the environment to this hazard is significant[172].

Periods of drought and extreme rainfall are expected to increase due to climate change[173]. During the first semester of 2010, severe and extremely dry conditions triggered water shortages and wildfires across Barbados, Grenada, Saint Lucia, Saint Vincent and the

162 PAHO: https://bit.ly/3cDuPcO
163 Ibid: https://bit.ly/3cDuPcO
164 FloodList: https://bit.ly/3ozdtQV
165 WHO: https://bit.ly/3j3zUym
166 Prevention Web: https://bit.ly/3PPa24k
167 UNDRR: https://bit.ly/3yQgr9m
168 Forbes: https://bit.ly/3SpFh7t
169 Ibid: https://bit.ly/3SpFh7t
170 Ibid: https://bit.ly/3SpFh7t
171 Nation News: https://bit.ly/3eNcjAb
172 OECS: https://bit.ly/3S1xTzC
173 OECS: https://bit.ly/3OzIzm2

Grenadines and Trinidad and Tobago, significantly affecting productive systems and commodity prices[174].

Agriculture and tourism, the drivers of economic activity in the Eastern Caribbean, will likely be hardest hit by the impacts of drought, which has the potential to unleash severe economic and social consequences. Farmers, especially small-scale farmers, are highly vulnerable to the effects of drought due to their dependence on traditional rainfall-dependent farming methods. Additionally, the lack of access to financial mechanisms for technological investment into water irrigation systems and genetically modified seeds that can thrive in low-water conditions puts them at higher risk as climate change increases the frequency, length and intensity of drought.

Given the agricultural sector's high dependency on rainfall, drought or even dry spells have the potential to generate a drastic reduction in crop yields and lower productivity of livestock and poultry[175]. In Dominica, for example, the country's banana industry was severely affected by drought in 2010, triggering a production shortfall of more than 40 per cent compared to the previous year. This led to a significant drop in banana exports to the UK and a consequent reduction in much needed foreign exchange for the country[176].

Much like agriculture, the tourism industry is highly sensitive to variations in rainfall distribution and quantities, as the dry season coincides with the boreal winter season, the peak for tourism in Eastern Caribbean islands. The high tourism season places significant demand on already-limited water resources at a time when these islands generally experience water shortages[177]. This, coupled with reduced crop yields as well as productivity in poultry and livestock production, generates further challenges to the tourism industry, as food supply for the industry becomes more expensive in the short run.

In the Eastern Caribbean, drought can also fuel devastating bushfires. Intense bushfires emerge in the dry season, especially after below-average wet seasons[178], potentially causing significant biodiversity destruction and land degradation as a result of increased erosion. In 2010, amid the worst drought in the Eastern Caribbean in decades, firefighters in Dominica responded to 160 fires in the first quarter of the year alone, surpassing the entire bush fire incidents in all of 2009; in Saint Vincent and the Grenadines, farmers reported at least two acres of scorched crops; while in Grenada there was a 150 per cent increase in bushfires that required response by the fire department, with a significant impact on the country's biodiversity and soil productivity[179].

Droughts in the Caribbean will likely become more prevalent, although this trend could begin in earnest from 2050 onward[180]. As global climate change continues to push a rise in temperature, intensification of the hot season is projected, with more frequent and intense heatwaves likely to occur. Heatwaves, although historically not regarded as a major hazard, are becoming much more common and can have potentially devastating consequences for people and the environment[181]. In the Leeward Islands, the number of extreme heat events could increase roughly 15-fold during the 2020s and become a virtually year-long occurrence by 2040[182].

Case study: Antigua & Barbuda

drought is one of the most common hazards in Antigua and Barbuda. The country faces a more than 45 per cent chance of experiencing at least one moderate or severe drought every year, a probability that reaches 95.5 per cent over five years. In the case of severe drought, Antigua and Barbuda faces a more than 15 per cent chance of experiencing one per year and at least 56 per cent of severe drought over five

174 EMDAT: https://public.emdat.be/
175 FAO: https://bit.ly/3OyBUsn
176 ISDR: https://bit.ly/3POu2nE
177 Ibid: https://bit.ly/3PVMTNw
178 FAO: https://bit.ly/3zw3VMU
179 Ibid: https://bit.ly/3zw3VMU
180 OECS: https://bit.ly/3TU5Z8Z
181 Ibid: https://bit.ly/3TU5Z8Z
182 Ibid: https://bit.ly/3TU5Z8Z

years[183]. These probabilities suggest that drought is virtually always looming on the horizon in the twin island country.

The 2014-2015 drought was severe across the Leeward Islands, prompting the Antigua Public Utilities Authority to declare an emergency as most surface water reservoirs were depleted, while the Pot Works Dam, the island's most important reservoir, was reduced to a six-week supply[184]. This led to a significant dependence on expensive desalination processes for water production. Around 70 per cent of the island's water supply comes from seawater desalination, as groundwater sources the country depends on during the dry season are progressively decreasing due to pollution of wastewater and the impacts of climate change[185].

The 2014-2015 drought led to decreases in agricultural production that spurred a decline in the country's food supply. During 2015, the onion crop declined 25 per cent in production, while 30 per cent of the tomato production was also lost as a result of the water-stress[186]. Reduced rainfall significantly reduced dam levels – the Pot Works Dam had only 10 per cent of its normal levels by the end of 2014 – leading to an increase in the consumption of desalinated water and prompting authorities to issue measures to ration the use of fresh water[187].

In addition to its direct impacts, such as food and water shortages, drought can also create the conditions for more significant compounding impacts from other hazards, like floods and storms. It is not uncommon for Antigua and Barbuda to experience flooding that overlaps with periods of severe drought[188]. For instance, Category 1 Hurricane Gonzalo in 2014 severely damaged tree crops and vegetation because many tree trunks and branches were extremely dry when the storm passed through the country[189].

Earthquakes

The Eastern Caribbean is highly susceptible to earthquakes. The region consists of an island arc system formed at a convergent plate boundary, a zone where two tectonic plates meet, and the denser plate is forced beneath, the lighter one. This is the main cause of both seismic and volcanic activity in the subregion. In recent decades, earthquake disaster risk in the Eastern Caribbean has increased considerably due to growing populations, poorly planned urban areas, unregulated construction, inadequate infrastructure and services, and environmental degradation[190].

Although the Lesser Antilles is one of the most seismically active areas of the Caribbean, very few earthquakes in the past century have been greater than magnitude 7.0[191]. In 1843, the island of Guadeloupe experienced one of the largest megathrust earthquakes to ever occur in the subregion, with an estimated magnitude greater than 8.0.

More recently, the largest intermediate-depth earthquake to hit the Lesser Antilles was in 2007, when a 7.4-magnitude quake struck Martinique north-west of Fort-De-France[192]. Three years earlier, a 6.3-magnitude quake struck in the Dominica Passage between the islands of Dominica and Guadeloupe, generating a weak tsunami and more than 30,000 aftershocks over the next two years[193]. In July 2015, a 6.4 earthquake north-east of Barbados was felt across the region[194].

In early December 2019, a burst of more than 50 small earthquakes north of Saint Kitts prompted seismologists to warn that the Eastern Caribbean must be prepared for much more powerful earthquakes, adding that these smaller quakes should serve as warnings about the lack of earthquake preparedness in the subregion[195]. Seismologists continue to assert that governments must take earthquake preparedness into

183 WHO: https://bit.ly/3sb9Nqn
184 Government of Antigua and Barbuda: https://bit.ly/3CNEqZp
185 Inter Press Service: https://bit.ly/3MiwbHO
186 ISDR: https://bit.ly/3PVMTNw
187 WHO: https://bit.ly/3OArmsR
188 Government of Antigua and Barbuda: https://bit.ly/3CNEqZp
189 Ibid: https://bit.ly/3CNEqZp
190 UWI: Eastern Caribbean Earthquakes | The UWI Seismic Research Centre.
191 USGS: https://on.doi.gov/3y9HgEh
192 Ibid: https://on.doi.gov/3y9HgEh
193 UWI: https://www.uwi.edu/ekacdm/node/109
194 CDEMA: Earthquakes felt across Eastern Caribbean this morning - CDEMA
195 Government of Saint Lucia: https://bit.ly/3L3fShd

account in public policymaking, including infrastructure construction, medical and equipment preparation, and the strict enforcement of building codes[196].

With no major damage resulting from earthquakes in the Eastern Caribbean being documented since 1843, and the possibility that powerful and destructive earthquakes may occur in the subregion, there may be an increase in disaster risk due to a lack of awareness, preparedness and adequate earthquake risk management[197]. In addition to the infrastructural damage resulting from collapsing buildings and structures, earthquakes pose a threat of rock movements, landslides, fires, floods and liquefaction, which occurs when sediments with high water concentration lose cohesive structure when subdued to continued shaking and start to "liquefy"[198].

In the Eastern Caribbean, earthquakes may also generate rare but potentially devastating tsunamis. According to UNESCO's Intergovernmental Oceanographic Commission (IOC), at least 75 tsunamis have been recorded in the Caribbean over the past 500 years, killing more than 3,500 people[199]. While tsunamis have caused far less damage and losses in the Caribbean compared to more common hazards, a large tsunami – especially one without warning – has the potential to unleash large-scale destruction across the region. The importance of low-lying coastal zones in the Eastern Caribbean, which are home to critical infrastructure, public and private property, including major tourism developments, and critical ecological systems[200], greatly increases exposure and vulnerability to tsunamis[201].

Tsunamis can be caused by earthquakes occurring within the region as well as those triggered by distant quakes, although the latter poses a much lower hazard than local earthquakes[202]. The most likely tsunamis to affect the Eastern Caribbean are those triggered by powerful, shallow earthquakes that strike at less than 50km depth and at a strength greater than magnitude 6.5[203].

Unfortunately, there is currently no Caribbean tsunami early warning system, however, various monitoring agencies across Latin America and the Caribbean are in the process of developing one as part of a project coordinated by the ICG/CARIBE EWS[204]. For the time being, Caribbean countries will continue to receive tsunami warning alerts from the Pacific Tsunami Warning Centre, but communicating these warnings to the public is something still being developed[205].

196 Ibid: https://bit.ly/3L3fShd
197 Caribbean Journal: For Large-Scale Earthquake in Eastern Caribbean, a Question of When, Not If (caribjournal.com)
198 UWI: Earthquake Effects | The UWI Seismic Research Centre
199 UNESCO-IOC cited in UNDRR (2012): https://bit.ly/3qL3kSE
200 US Climate Resilience Toolkit: https://bit.ly/3eUCWmr
201 UNESCO-IOC: https://bit.ly/3BnJRfv
202 UWI Seismic Research Centre (Eastern Caribbean earthquakes): https://bit.ly/3UggrIT
203 UWI Seismic Research Centre (Caribbean tsunamis): https://bit.ly/3Uk0CRB
204 UWI Seismic Research Centre: https://bit.ly/3TxXwIZ
205 Ibid: https://bit.ly/3TxXwIZ

Volcanic eruptions and tsunamis

Volcanic eruption in Saint Vincent and the Grenadines 2021.
Photo: UN Barbados and the OECS

Volcanoes are one of the main hazards that threaten the Eastern Caribbean. In the Lesser Antilles, at least 21 live volcanoes are likely to erupt again, spreading across 11 volcanically active islands. Over the past 200 years, more than 30,000 people have been killed by volcanic activity across the Caribbean. Today, about 1 million people are threatened by the direct impacts of volcanic eruptions, and around 2.5 million more are exposed to related effects, such as volcanic ashfalls. Most of the islands in the Lesser Antilles have at least one active volcano that could erupt in the future, including Nevis and Montserrat. Dominica is the most extreme example of a volcanic island in the subregion, with no less than nine live volcanoes[206].

In Montserrat, multiple eruptions of the Soufriere Hills volcano (1995-1998) had a significant impact on the territory's physical and human capital, setting back development by decades. The protracted eruption rendered 60 per cent of the island's land area in the south uninhabitable, including the capital, Plymouth, the island's main population centre and the heart of economic activity[207]. The eruption forced the evacuation or relocation of around 90 per cent of the population – roughly 10,000 people – and eventually pushed some two thirds of the population to leave the island, emigrating mainly to Antigua and Barbuda, the United Kingdom and the United States.

206 UWI Seismic Research Centre (Caribbean volcanoes): https://bit.ly/3yXT0ee
207 CDB: https://bit.ly/3f1zkio

Prior to the protracted eruption, the agricultural sector was the main contributor to Montserrat's GDP. However, agriculture was completely devastated by the eruption, which destroyed some 90 per cent of cultivated land and 75 per cent of land suitable for livestock, creating major barriers to agricultural production and food security, which left the territory largely dependent on imported foods. Although some arable land has been reclaimed for agricultural production, the lasting negative effects on the sector, such as the increase in soil acidity caused by volcanic ash, decreases the level of nutrients available to support crop growth[208]. Approximately 50 per cent of springs and all wells – which generated around 85 and 15 per cent, respectively, of the domestic water supply before 1995 – were destroyed in the eruption[209].

The lingering threat from Soufriere Hills has severely limited economic growth and development on the island. The economy is currently dominated by the public sector (administrative, health care and educational services), which employs 40 per cent of the total workforce. The territory remains highly dependent on UK financial assistance, which accounts for around 70 per cent of the Government's current income (capital included)[210].

In the subregion, volcanoes can also trigger potentially devastating tsunamis. Large dome-collapses at Soufriere Hills in Montserrat produced tsunami waves in 1997 and 2003. In December 1997, the volcano's collapsing dome triggered an avalanche in the White River Valley that caused a significant amount of debris to enter the sea and generate a tsunami which moved some 10km up the coast to Old Bay Road[211]. In July 2003, the climax of the dome collapse produced large pyroclastic flows that generated a tsunami with estimated wave heights of around 4 meters in Dominica and 0.5-1 meters in neighbouring Guadeloupe, around 50 km from Montserrat[212]. While these tsunamis did not produce significant impacts, the presence of active volcanoes spread across the subregion, makes volcano-induced tsunamis a real threat that islands must be prepared for.

Off the coast of Grenada, the highly active Kick em' Jenny submarine volcano also poses a worrying tsunami threat to the subregion. The submarine volcano has erupted at least a dozen times since its discovery in 1939, with at least two of those eruptions, in 1939 and 1965, generating small tsunamis off the northern coast of Grenada[213]. While the likelihood of an eruption-generated tsunami in the immediate future remains low, its potential to affect the entire Eastern Caribbean makes it a hazard that must be closely monitored, as future eruptions could increase the tsunami threat. According to CDEMA, the probability that Kick em' Jenny will generate a major tsunami within the next 50 years stands at more than 50 per cent[214].

Case Study: La Soufrière Volcano in Saint Vincent and the Grenadines

On 29 December 2020, the La Soufrière volcano alert level in Saint Vincent and the Grenadines was elevated due to increased volcanic activity. Monitoring and planning were reinforced among national structures, humanitarian partners and the international community. On 8 April 2021, due to heightened activity, the Government issued an immediate evacuation order and raised the alert level to red.

Early on 9 April, La Soufrière entered an explosive state, with the first eruption shooting ash plumes up to 20,000 feet, followed by a second eruption just six hours later. Heavy ashfall initially affected the neighbouring islands of Barbados, Grenada and Saint Lucia, although it did not cause considerable damage or force evacuations in these islands. Prior to the

208 UN Barbados and the Eastern Caribbean: https://bit.ly/3Ba01uy
209 CDB: https://bit.ly/3f1zkio
210 Ibid: https://bit.ly/3f1zkio
211 Pelinovsky et al. (2004): https://bit.ly/3LmUyDC
212 Ibid: https://bit.ly/3LmUyDC
213 CDB: https://bit.ly/3Uk0CRB
214 UNESCO-IOC cited in UNDRR (2012): https://bit.ly/3qL3kSE

eruption of La Soufrière, the country's dengue outbreak was already tailoring off but, combined with COVID-19, still amplified risks associated with increased respiratory conditions linked to exposure to ash and toxic gases.

Impacts & needs

After the eruption, some 20,000 people were evacuated from the 'red zone' around the volcano, about 4,500 of whom relocated to shelters. People living near the volcano were affected by heavy ashfall and pyroclastic flows that damaged crops and livelihood inputs, including farming equipment, and affected livestock. These impacts were expected to deepen poverty and food insecurity, which were already on the rise amidst the COVID-19 pandemic. Ashfall affected all the country's approximately 110,000 inhabitants, with most homes throughout the main island of Saint Vincent left without running water.

The most pressing needs identified by the Government and humanitarian partners were emergency food assistance, access to safe water, hygiene and sanitation, shelter and education assistance, health and protection interventions, including GBV and child protection, as well as ash clean-up. Livelihood support and recovery and rehabilitation activities were also identified as priority key areas for intervention to help prevent a further deterioration of livelihoods and food security already exacerbated by the pandemic.

The lack of safe water for drinking and basic sanitation was also a major concern, with the Government indicating that large quantities of bottled water were required as initial relief supplies. Access to adequate WASH services was critical to avoid a potential COVID-19 outbreak on the island, particularly in shelters, where physical distancing in close quarters was challenging.

Response

During the months following the emergency, the response continuously adapted based on the more precisely assessed needs of the affected population. Support gradually progressed towards the provision of cash assistance to increase household purchasing power to cover their food and other basic needs, and to medium-term interventions expected to pave the way for longer-term recovery and reconstruction. Some early recovery activities include cash for work, supported micro, small and medium enterprises, boosting local economic activity.

The multiplicity of response actors on the ground, ranging from everyday people to civil society organizations and the private sector, created response coordination challenges for traditional humanitarian actors and Government authorities. COVID-19 played a role too, adding constraints for delivery of assets, contingency stocks and relief supplies. Communication and interaction between sector representatives and national counterparts in the field was a key element to facilitate effective response, but at times it failed to bring together other important partners.

Humanitarian sectors established at the onset of the response and the Caribbean Development Partners Group for Disaster Management (CDPG-DM) played a critical role in supporting more efficient and effective coordination of the overall efforts. UN agencies working on the ground also facilitated systematic engagement with local actors through coordination mechanisms such as the CDPG-DM.

III. Emergency preparedness & response

Saint Kitts and Nevis 2023.
Photo: OCHA/Carol Sánchez

Regional response coordination

Humanitarian agencies coordinate and analyze the impacts of Category 5 Hurricane Dorian, Sept 2019.
Photo: UN/OCHA/Mark Garten

In a multi-hazard landscape, operational readiness and effective coordination are critical to the delivery of principled and efficient humanitarian action. National disaster management authorities are responsible for the coordination of emergency response efforts, receiving support from donors, UN agencies, regional institutions, local and international NGOs, civil society organizations and the private sector, among other partners.

In the Eastern Caribbean, CDEMA and the UN System, including OCHA and other UN agencies, such as WFP and UNICEF, are key players in emergency preparedness and response coordination. Both provide support to the governments of affected islands and lead humanitarian coordination forums and mechanisms to better harmonize response activities across an increasingly diverse response landscape. CDEMA's Regional Response Mechanism (RRM) is the Caribbean's operational platform for enhanced response coordination between national, regional and international actors, seeking to create synergies between actors that reduce duplication and make efficient use of increasingly scarce resources.

The CDPG-DM is one of the six thematic groups of the CDPG, a partners' forum for the RRM composed of CARICOM institutions, donors, development partners, UN agencies and other specialized organizations. The CDPG-DM's objective is to assess disaster

impacts and needs, facilitate information sharing, and coordinate support to governments and CDEMA. The CDPG-DM, co-chaired by the Executive Director of CDEMA and the UN Resident Coordinator for the affected country or subregion, is activated when an imminent threat surfaces or following a hazard impact on any CDEMA Participating State.

For the Eastern Caribbean, the UN Resident Coordinator is responsible for the strategic and operational coordination of response efforts carried out by members of the UN Emergency Technical Team (UNETT) and other relevant humanitarian actors. The UNETT is a UN inter-agency group that provides technical and operational support to the UN System to prepare for and respond to emergencies. OCHA's Humanitarian Advisory Team in Barbados and its Regional Office (ROLAC) support the UN Resident Coordinator and the UNETT in improving readiness, contingency planning and response activities, including advocacy, coordination, humanitarian financing and information management.

In emergencies, OCHA ROLAC also activates ad hoc meetings of the Regional Group on Risk, Emergencies and Disasters (REDLAC), a regional coordination platform comprised of 34 member organizations and five special guests, mainly UN agencies and humanitarian NGOs, that work together to enhance response coordination. REDLAC provides support to teams on the ground and facilitates inter-sector coordination, identifying key challenges, developing advocacy strategies and sharing information in real- time. REDLAC complements the efforts of the CDPG- DM at the subregional level through broader regional support from Panama City, home to the regional headquarters of UN Agencies, Fund and Programmes, the International Federation of the Red Cross and Red Crescent Societies (IFRC), as well as several humanitarian NGOs, including Plan International, Save the Children and World Vision, among others.

National and regional capacities - coordination

In the subregion, national disaster management agencies are often burdened by insufficient human, financial and technical resources. In major emergencies this creates governance and coordination challenges[215]. Although legislation and national plans define clear roles and responsibilities in emergency response, effective coordination among disaster management actors, including different government agencies, committees and ministries, is often hindered due to overlapping national coordination mechanisms. The consequence is that response activities are often not effectively coordinated and complementary, leading to local initiatives that are disconnected from national ones or response programing in one sector that does not link up with others, which can limit the possibility of an integrated multi-sectoral response and increases the chances of duplication.

National and regional authorities are often not familiar with the sector-based approach employed by the international humanitarian community, while the latter lacks a solid understanding of national and regional response mechanisms and tools. However, significant progress has been made in recent years, as the UN System strengthens its collaboration and interoperability with CDEMA and national authorities. The response to Hurricane Dorian in The Bahamas and to the La Soufriere Volcano eruption in St. Vincent and the Grenadines showed that the sector approach and the Emergency Support Function (ESF) system used by most CDEMA Participating States are in fact interoperable.

Coordination between national, regional and international response actors requires greater awareness raising, cross-training and simulation exercises to enhance collective understanding of coordination mechanisms and tools. In large-scale emergencies, connections between the National Emergency Operations Centre (NEOC) and the On- Site Operations Coordination Center (OSOCC), when activated, must be cultivated to bolster inter- sector coordination. To ensure effective inter-sector coordination, though, it is important that lead agencies of different sectors and ESFs (or their equivalent) at the country level understand who their respective counterparts are and how to best work together in emergencies.

215 WFP: https://bit.ly/3W5cVSK

Logistics

Freeport, Grand Bahamas. Hurricane Dorian 2019.
Photo: OCHA/Christophe Illemassene

Reliable disaster logistics is pivotal for the efficient and cost-effective delivery of relief assistance and deployment of specialized response personnel. Typically, logistics architectures are composed of warehousing, transportation, procurement and distribution, sheltering and disaster logisticians. However, persistent logistics challenges have been identified as key barriers to the full realization of the RRM's potential[216].

The unique logistics challenges faced across the Caribbean are especially pronounced in the Eastern Caribbean due to the subregion's extremely small islands, which have limited airport and port infrastructure capacities and inadequate funding that limits access to key logistics resources, including trained logisticians and transportation assets[217]. In the response to hurricanes Irma and Maria, logistics bottlenecks delayed the rapid deployment of response personnel and relief supplies. The war in Ukraine has only complicated this already-complex logistics landscape, exacerbating persistent bottlenecks and driving up transportation costs, a situation that will affect future emergency response efforts.

The lack of transportation assets to move supplies from staging to affected areas can create distribution restrictions. In Eastern Caribbean SIDS, large cargo ships face difficulties entering small seaports and must often unload supplies onto smaller vessels to

216 CDEMA: https://bit.ly/3eamYEI
217 Thompson, D. (2015): https://bit.ly/3eazMLw

move them near shore and inland[218], where they face challenges posed by inadequate land distribution networks, making the distribution of relief supplies slow and costly in many cases, especially inter-island distributions[219]. The subregion also has very small airports, with some islands, like Montserrat, unable to support large aircraft[220].

Existing distribution and logistics challenges are only exacerbated in emergencies, especially tropical storms and hurricanes, when air and seaports are often left inoperative or inaccessible due to damage from strong winds and heavy rain-induced floods. In such circumstances, national authorities often rely on transportation assets, such as foreign military air and sea assets, that do not belong to governments and, thus, cannot be fully commandeered when needed[221]. Available transportation assets and access to external support vary significantly across the subregion, with some countries, like Antigua and Barbuda and Barbados (i.e., CDEMA´s Sub Regional Focal Points-SRFPs) as well as UK dependent territories, having better developed infrastructure and capacities than some of the other islands.

In the Eastern Caribbean, logistics challenges have been attributed in part to limited and unpredictable funding for the RRM and CDEMA Participating States[222]. Even in the RRM's Eastern Caribbean SRFPs - Antigua and Barbuda and Barbados - despite having more developed infrastructure and capacities, including telecommunications systems, warehousing infrastructure and trained logisticians, they still face logistics funding gaps and capacity constraints[223]. Additionally, governments often prioritize competing needs over logistics capacity building, leaving gaps unaddressed[224].

CDEMA and WFP are working closely with national authorities to bolster regional logistics capacities. Together with the Government of Barbados, they recently broke ground on the Regional Logistics Hub and Centre for Excellence at the Grantley Adams International Airport. The hub will provide important air and sea operations, establishing a critical prepositioning and trans-shipment point for relief supplies as well as equipment and staff available to be rapidly deployed in response to emergencies[225].

From Panama City, Panama, home to the regional headquarters of most UN agencies and INGOs covering the Caribbean, humanitarian partners mobilize rapid response operations from the Regional Logistics Centre for Humanitarian Assistance (CLRAH, for its acronym in Spanish). Both the International Federation of Red Cross and Red Crescent Societies (IFRC) and the UN Humanitarian Response Depot (UNHDR) use CLRAH's facilities to pre-position and quickly mobilize critical relief items. For its part, REDLAC shares regional logistics support information, including cargo and charter flights to ensure the most efficient deployment of personnel and supplies.

218 Ibid: https://bit.ly/3eazMLw
219 Ibid: https://bit.ly/3eazMLw
220 Ibid: https://bit.ly/3eazMLw
221 Ibid: https://bit.ly/3eazMLw
222 CDEMA: https://bit.ly/3eamYEI
223 Thompson, D. (2015): https://bit.ly/3eazMLw
224 Ibid: https://bit.ly/3eazMLw
225 WFP: https://bit.ly/3SC5IHs

Information gaps & challenges

Marsh Harbor, Bahamas. Hurricane Dorian 2019.
Photo: OCHA/Mark Garten

A lack of available data and information remains a serious challenge in the Eastern Caribbean. There are significant gaps in preparedness baseline data that are needed to ensure effective operational readiness and well-targeted response activities, including data disaggregated by age, sex, disability and other vulnerability characteristics, like poverty, which are not routinely collected, calculated or updated. Across most countries and territories, the lack of vulnerability-disaggregated data has negative implications for risk and impact assessments, response design and planning, as well as evidence- based decision-making.

Most countries and territories only collect census data every 10 years, and many have not conducted comprehensive poverty assessments in 15 years or more, creating serious obstacles to the development of an accurate operational picture in emergencies as available data and information likely do not reflect the demographic and socioeconomic risks and vulnerabilities of the affected population. The COVID-19 pandemic has delayed the roll out of the 2020 census round in Dominica, Grenada, and Saint Kitts and Nevis, while Barbados was able to launch its census in 2021.

Although most countries have made considerable progress in data collection, with some even beginning the transition to digital systems, paper-based data collection remains common for censuses, post-disaster household assessments and shelter evaluations, among other processes, hindering data storage, sharing and analysis.

Overcoming these data and information challenges is limited by the lack of resources and technical capacity for data collection and management among national disaster authorities. Additionally, there is an absence of formal mechanisms to facilitate data sharing across government ministries and departments and enhance interoperability between different sources and databases. Across most of the Eastern Caribbean, data sharing between government agencies often take place in an ad hoc manner, with no formal process or management system for effective information sharing and use. In most cases, data sharing only happens during emergency responses.

Governance Frameworks Guiding DRR in the Eastern Caribbean International Governance Frameworks

The national DRR legislative and policy landscape for the countries of the Eastern Caribbean is notably guided by international and regional frameworks. At the international level, such frameworks include the Sustainable Development Goals (SDGs), the Paris Agreement on Climate Change, the Small Island Developing States Accelerated Modalities of Action (SAMOA) Pathway, and the Sendai Framework for DRR (SFDRR). The Caribbean Disaster Emergency Management Agency (CDEMA) is the key institution which supports DRR implementation across the region. Target E under the SFDRR 2015-2030 is geared towards substantially increasing the number of countries with national and local DRR strategies by 2020. To achieve this target, the UNDRR and CDEMA are providing direct technical support to Caribbean countries for the development of Country Work Programmes (CWPs), DRR plans and/or for the development of risk analyses with a systemic risk approach that seeks to enhance the alignment with climate change adaptation (CCA) and sustainable development efforts, and to integrate different hazards, including biological ones. Five (5)[226] out of the 10 countries in the Eastern Caribbean covered by the UNRCO currently have an operational CWP.

Assessing the gaps in MHEWS for the Eastern Caribbean: Lessons learnt from the COVID-19 pandemic

Common gaps in MHEWS include insufficient legal support from antiquated legislation, the unavailability of current hazard risk assessments which include data on vulnerability, a lack of sustainable financing mechanisms to fund the establishment or maintenance of detection & monitoring systems, deficiencies of warning communications to reach vulnerable groups, and a general lack of public education regarding suitable responses to warnings.

Furthermore, there is a clear bias towards geological and hydrometeorological hazards based on the frequency of occurrence and immediacy of impact within the region. This was evidenced during the initial impact of the COVID-19 pandemic on Caribbean countries, where the resources of health sectors were exhausted and there was a lack of capacity to perform testing and analysis of samples. The impact of the virus revealed that there is much needed improvement to build country capacity to manage biological pandemics. The example of St. Vincent & the Grenadines highlighted the need for early warning systems to cover all hazards and for hazard response to consider the possible cascading impacts of hazards.

Following the eruption of the La Soufriere in 2021, issues with evacuation were exacerbated by the need to enforce social distancing within shelters under COVID-19 protocols, which meant that all displaced individuals could not be accommodated in public shelters since they could not utilize maximum capacity. Prior to the eruption, the island had experienced the worst outbreak of dengue fever in recent history. This placed additional stress on the health sector, amidst the on-going response to the COVID-19 pandemic. Furthermore, the COVID-19 virus itself had recorded an increasing number of cases during the first quarter of 2021, specifically impacting law enforcement personnel who would have otherwise served during the response to the emergency. From a socio-economic standpoint, poverty levels among the population were already projected increase significantly due to the impact of the COVID-19 pandemic on livelihoods, which diminished the coping capacity and resilience of affected people.

226 Barbados, Dominica & Saint Lucia have finalized documents while the CWPs of Antigua & Barbuda and St. Vincent & the Grenadines are still in draft, requiring governmental validation.

Regional Governance Frameworks

Regional frameworks for DRR include but are not limited to the Comprehensive Disaster Management (CDM) Strategy 2014-2024, the Caribbean Resilience Framework, the St. George's Declaration of Principles for Environmental Sustainability, and the Antigua & Barbuda Declaration on School Safety which underpins the Caribbean Safe School Initiative (CSSI). Additionally, CDEMA has led the introduction of a governance mechanism for the advancement of national multi-hazard early warning systems (MHEWS). As one of the most hazard prone regions across the globe, the existing socio-economic vulnerabilities of Caribbean countries mean that the typical impact of a given hazard is one of great losses, even to the extent of exceeding many of the countries' gross domestic products (GDP) and thus, challenging overall sustainable development.

MHEWS are therefore a key tool in risk reduction, which enable individuals, communities, governments, businesses, and the society at large to take timely action and prepare for impact. The governance mechanism includes the application and validation of an Early Warning Checklist, the development of a report of the gaps in national EWSs, and a subsequent roadmap to govern priority actions. The roadmap typically outlines actions to address gaps and identifies the lead & supporting agencies for each action (see Section 1.2 A for more information).

National Governance Frameworks

At the national level, DRR is primarily governed by a Disaster Management Act which is typically complemented by an Emergency Powers Act. The Disaster Management Act establishes legislative support for several key aspects of the national DRR framework, including i) the establishment of a national disaster office, ii) the declaration of a disaster, iii) the responsibilities of key stakeholders, and iv) the need for a National Disaster Management Plan, and the annual reporting mechanism for monitoring the activities of the plan.

The National Disaster Management Plan provides the framework for managing disasters within a multi-hazard environment. In theory, the plan set forth the institutional framework for disaster management and prescribes the roles & responsibilities of key stakeholders for the coordination of emergency and disaster response activities. Additionally, the Emergency Powers Act authorizes an individual, typically the Minister of Parliament with responsibility for disaster management, to declare emergencies which aid in the management of disasters.

Beyond these core legal instruments, several policies address national level approaches to subsidiary themes which feed into the overarching context of DRR. These include climate change and resilience, environmental stewardship through instruments such as land use policies, and sustainable socio-economic development, which promote disaster risk planning in key sectors like tourism & agriculture, critical to the economic and social welfare of Eastern Caribbean states.

The ramifications of the lack of DRR planning and implementation on lives, livelihoods and economic development are well documented. The costs of inaction significantly outweigh the costs associated with an investment in DRR. The United Nations Office of Disaster Risk Reduction (2022) notes that "investments in DRR not only curb disaster losses, but they also yield economic, social, and environmental benefits that enhance the well-being and resilience of countries and communities".

Main challenges & gaps in Disaster Risk Reduction

Figure 6. A summary of the common challenges & gaps prevailing and hindering the advancement of DRR within the countries of the Eastern Caribbean.

Food and Nutrition Security (FNS)	• Absence of approved CDM legislation & policy which addresses systemic risks & the underlying drivers thoroughly • Limited financial & human resources available to national disaster offices • Limited availability of financing mechanisms for DRR including the lack of a national fund dedicated to disaster management • Inadequate coherence across sectors & national policies • Failure to mandate risk consideration into development & land use planning • Lack of incentives which promote risk reduction & disaster mitigation measure
Capacity for response, recovery & rehabilitation for resilience	• Limited capacity of EWS to trigger timely & appropriate responses • Absence of policies & strategies for the protection of critial infrastructure • Absence of recovery policies which explicitly outlines measures in alignment with building back better (BBB) principles • Limted capacity to respond & recover from the impact of biological pandemics • Infrequent & ad hoc training and exercises to inform response
Knowledge Management	• Absence of a comprehensive national risk data repository • Fragmented & inconsistent public awareness activities • Unavailability of disaggregated data at the national & community levels for vulnerability assessment & planning • No systematic methods of data collection for the update of hazard maps & models • Lack of integration & application of traditional knowlegde
Sectoral Mainstreaming	• Disaster risk considerations absent from critical sectoral policies such as the tourism & education sectors • Response-centric sectoral disaster management activities • Insufficient investment in sectors for disaster risk reduction • Inadequate business continuity planning for sectors
Community Planning	• Limited planning considerations for all vulnerable groups, including the elderly, people with disabilities, women within national disaster plans • Absence of formalised arrangements for community involvement • Limited capacity of early warning systems at the community level • Inadequate testing and exercising in response to simulated warnings across communities

Priority areas for action

1. Strengthened institutional arrangement for disaster risk reduction	1.1 Comprehensive Disaster Management (CDM) legislation and policy developed & institutionalized for the formalization of the institutional framework and clear mandates for disaster risk reduction 1.2 Increased resource investment in national disaster management offices 1.3 Increased investment in DRR, including the establishment of a dedicated fund national disaster management 1.4 The institution of risk incentives for mitigation measures 1.5 Strengthened institutional arrangements for community involvement in disaster risk reduction 1.6 Building codes and regulations enforced for disaster risk reduction 1.7 Risk transfer mechanisms expanded for the private sector and low- income households 1.8 Risk assessments mainstreaming into development to prohibit development in high-risk areas 1.9 Strengthened policy coherence in support of the joint risk reduction agenda
2. Enhanced capacity for effective response, recovery, and rehabilitation	2.1 Enhanced Multi-Hazard Early Warning Systems 2.2 Critical infrastructure assessment and resilience strategy developed and operationalised 2.3 Recovery and reconstruction policy developed and implemented 2.4 Enhanced arrangements for improved management of biological epidemics & pandemics 2.5 Improved business continuity planning for key sectors and government agencies
3. Increased and sustained knowledge for disaster risk reduction	3.1 National comprehensive risk repository established for evidence-based action, with considerations of all dimensions of risk, including social vulnerability 3.2 Strengthened capacity for data collection, analysis, and dissemination for risk assessments, particularly through the enhanced application of GIS for risk assessment 3.3 Improved collection of disaggregated data for comprehensive and granular risk understanding Public awareness and outreach strategy instituted and formalized for improved attitudes towards risk 3.4 The update of existing hazard maps & models 3.5 The integration of traditional knowledge with scientific practices for risk reduction
4. Disaster risk reduction mainstreamed into sectors	4.1 Strengthened sectoral policies with considerations for disaster risk reduction and all phases of disaster management 4.2 Increased investment in sectors for disaster risk reduction activities
5. Strengthened community resilience	5.1 Formalized arrangements for community involvement and integration in disaster risk reduction activities 5.2 Increased planning and gender considerations for vulnerable groups, including people with disabilities, children and the elderly 5.3 Strengthened training and testing regime at the community level 5.4 Enhanced interventions to address the underlying drivers that contribute to social vulnerability at the community level

Summary of DRR Best Practices in the Eastern Caribbean

Despite the challenges and gaps, the region has made significant advancements in DRR, which can be built upon or replicated. The CSSI is a prime example of how DRR can be mainstreamed at the sectoral level, with a particular focus on the education sector. The philosophy of the initiative is that children comprise approximately

30 per cent of the overall Caribbean population, spending most of their lives on the compounds of their schools. Consequently, the physical environment of the school should reflect safety.

Moreover, most schools serve as public shelters for displaced individuals following the impact of a hazardous event, thus requiring the physical infrastructure of the school compounds to be of an adequate standard. Seven schools across Saint Lucia have benefitted from infrastructural improvements under the initiative, including the construction of walkways and perimeters, the installation of drainage cover slabs, the installation of fire extinguishers and smoke detectors, and the erection of emergency signage.

The Caribbean has benefited from the launch of a regional stakeholder mechanism related to early warning systems (EWS) in 2019. The Regional Early Warning System Consortium (REWSC) is comprised of several multi-hazard organizations, with the technical expertise and mandate to support and coordinate the strategic vision for EWS. The overall goal of the consortium is to serve as a strategic and advisory body for the advancement and strengthened coordination of EWS within the Caribbean region, with an initial focus on natural hazards considering the realities of a changing climate. One of the key achievements of the consortium is the strengthening of community resilience. As part of the consortium, the Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization (UNESCO-IOC) has led the Pilot Community Performance Based Tsunami Recognition Programme, which is geared towards ensuring eligible states have a strategic, nationally approved action plan. External funding through loans and grants provides an additional lifeline for small island states with constrained national budgets with competing demands. For instance, Barbados was approved for a loan of US $120 million from the Inter-American Development Bank (IDB) in 2020, to assist the country with response to and recovery from the COVID-19 crisis and its aftermath. Part of the approval was based on Barbados having a CWP, which was endorsed by the government in 2019. community preparedness for the impact of tsunamis. To date, coastal communities within six[227] countries covered by the UNRCO have received recognition as tsunami ready. The outputs of the project included community drills and simulations, as well as the provision of communication equipment and signage for evacuation routes, assembly points and tsunami hazard zones.

At the national level, countries with valid CWPs are better able to readily access external funding to sustain DRR as donor agencies require proof that eligible states have a strategic, nationally approved action plan. External funding through loans and grants provides an additional lifeline for small island states with constrained national budgets with competing demands. For instance, Barbados was approved for a loan of US $120 million from the Inter-American Development Bank (IDB) in 2020, to assist the country with response to and recovery from the COVID-19 crisis and its aftermath. Part of the approval was based on Barbados having a CWP, which was endorsed by the government in 2019.

227 The countries include Antigua & Barbuda, Barbados, the British Virgin Islands, Saint Lucia, St. Kitts and Nevis and St. Vincent and the Grenadines.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