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FOCUS

Magazine of the Caribbean Development and Cooperation Committee (CDCC)

IRMA AND MARIA BY NUMBERS

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ABOUT ECLAC/CDCC

The Economic Commission for Latin America and the Caribbean (ECLAC) is one of five regional commissions of the United Nations Economic and Social Council (ECOSOC). It was established in 1948 to support Latin American governments in the economic and social development of that region. Subsequently, in 1966, the Commission (ECLA, at that time) established the subregional headquarters for the Caribbean in Port of Spain to serve all countries of the insular Caribbean, as well as Belize, Guyana and Suriname, making it the largest United Nations body in the subregion.

At its sixteenth session in 1975, the Commission agreed to create the Caribbean Development and Cooperation Committee (CDCC) as a permanent subsidiary body, which would function within the ECLA structure to promote development cooperation among Caribbean countries. Secretariat services to the CDCC would be provided by the subregional headquarters for the Caribbean. Nine years later, the Commission's widened role was officially acknowledged when the Economic Commission for Latin America (ECLA) modified its title to the Economic Commission for Latin America and the Caribbean (ECLAC).

Key Areas of Activity

The ECLAC subregional headquarters for the Caribbean (ECLAC/CDCC secretariat) functions as a subregional think-tank and facilitates increased contact and cooperation among its membership. Complementing the ECLAC/CDCC work programme framework, are the broader directives issued by the United Nations General Assembly when in session, which constitute the Organisation's mandate. At present, the overarching articulation of this mandate is the Millennium Declaration, which outlines the Millennium Development Goals.

Towards meeting these objectives, the Secretariat conducts research; provides technical advice to governments, upon request; organizes intergovernmental and expert group meetings; helps to formulate and articulate a regional perspective within global forums; and introduces global concerns at the regional and subregional levels.

Areas of specialization include trade, statistics, social development, science and technology, and sustainable development, while actual operational activities extend to economic and development planning, demography, economic surveys, assessment of the socio-economic impacts of natural disasters, climate change, data collection and analysis, training, and assistance with the management of national economies.

The ECLAC subregional headquarters for the Caribbean also functions as the Secretariat for coordinating the implementation of the Programme of Action for the Sustainable Development of Small Island Developing States. The scope of ECLAC/CDCC activities is documented in the wide range of publications produced by the subregional headquarters in Port of Spain.

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CONTENTS

Director's Desk: Irma and Maria by Numbers	3
Effects and Impacts of Hurricane Irma in Anguilla	4
Effects and Impacts of Hurricane Irma in The Bahamas	6
Effects and Impacts of Hurricanes Irma and Maria in British Virgin Islands	8
Effects and Impacts of Hurricane Irma in Sint Maarten	10
Effects and impacts of Hurricanes Irma and Maria in Turks and Caicos Islands	12
Regular Features	
Recent and upcoming meetings	14
List of Recent ECLAC Documents and Publications	14

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DIRECTOR'S DESK: IRMA AND MARIA BY NUMBERS

The 2017 Atlantic Hurricane season was one of the most impactful ones for the Caribbean subregion in recent years. The season's impact exceeded most of the customary physical indicators by which the strength, and social displacement of a hurricane are measured.

Storms, such as the 2017 hurricane season shows, are the most important natural hazard affecting the Caribbean countries. The decade average for Caribbean countries of the number of disasters and number of countries affected, and of the magnitude of the damage caused by storms has increased since the seventies. In terms of the aforementioned variables, the hurricane season of 2017 has been the third worst in history.

In this issue of the Focus magazine, based on preliminary findings of ECLAC's Damage and Loss Assessments, we present the economic effects and impacts in five of the countries that were affected by the two most powerful storm systems of the year – Hurricanes Irma and Maria. These assessments were conducted for Anguilla, The Bahamas, British Virgin Islands (BVI), Sint Maarten, and Turks and Caicos Islands (TCI) during the final quarter of 2017. The effects and impacts were assessed in terms of physical damage, losses of economic incomes and social services, plus additional costs.

The total estimated cost of the evaluations in these countries was approximately US \$5.4 billion. The most affected sectors were tourism and housing in that order. Given the size of these economies, this cost is

monumental. We estimate that the consequences of these events in Anguilla, British Virgin Islands and Sint Maarten will last several years. It is also important to note that the Bahamas has been hit by hurricanes the past three years in a row.

Consider, too, that the hurricane season 2017 has regional effects that have not yet been measured. For example, in the case of the tourism sector, it is likely that there was a decline in tourism across the entire region, including the unaffected countries between October and November 2017. Similarly, the substitution of tourist destinations could temporarily have taken place within the region given the destruction of tourism infrastructure in the countries directly impacted by hurricanes Irma and Maria.

The consequences of the 2017 Atlantic Hurricane season underscores the importance to the region of the key provisions of the Sendai Framework, especially investing in disaster risk reduction for resilience and enhancing disaster preparedness for effective response and the imperative of “Building Back Better” during recovery, rehabilitation and reconstruction.

Finally, with respect to the disaster caused in countries of the region, it is important to recognize the

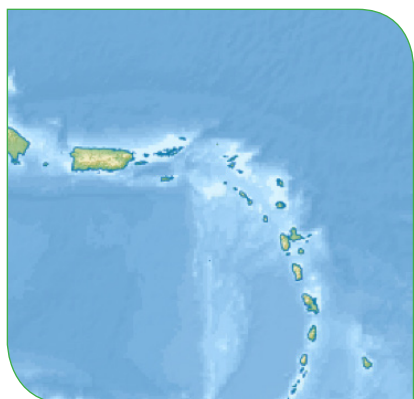
performance of a regional institution such as CDEMA and also the solidarity of unaffected Caribbean countries, whose citizens and governments made donations in kind and even gave refuge to people affected by these catastrophes.

The estimated numbers present but a cursory analysis of the consequences of disasters to our regional economies. Not fully measurable in this analysis, is the emotional and psychological impact of these disasters, the natural resource costs as well as the sunken opportunity costs to the region's development. Nevertheless, these numbers should serve to strengthen our resolve to undertake more rigorous disaster risk reduction strategies in order to better mitigate the impacts of these crises and to support a climate resilient region. As we approach another hurricane season, it is my hope that we are learning to build better and are more prepared as we seek to create a climate resilient region.

Yours in Focus

A handwritten signature in dark ink, appearing to read "Diane Quarless".

Diane Quarless



EFFECTS AND IMPACTS OF HURRICANE IRMA IN ANGUILLA¹

Omar Bello

Anguilla, a low-lying British Overseas Territory in the eastern Caribbean, was one of several islands subjected to the brutality of Hurricane Irma during the Atlantic Hurricane Season of 2017. After devastating Barbuda, the Category Five system made landfall in Anguilla and Sint Maarten on September 6th. That day by 8:00AM, the National Emergency Operating Centre reported that Hurricane Irma was located 15 miles west-southwest of Anguilla and moving west-northwest, with maximum sustained winds of 185 mph and higher gusts. At that time, the eye of Hurricane Irma was passing over Saint Martin and the northern eyewall was pounding Anguilla. A flash flood warning remained in effect in Anguilla until 12:00PM Wednesday September 6.

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Hurricane Irma caused few major injuries and one (1) fatality. With final preparations in place, an overwhelming majority of the population opted to weather the storm in private accommodations, with only 12 of the

island's 13,572 residents electing to utilize public shelters. Three of the four shelters were compromised. Fortunately, none of their occupants required hospitalization, evacuation or relocation in the immediate aftermath.

The country sustained significant damages to its environment and economy, resulting in major disruptions to Anguilla's private productive and tourism sectors. Of the total damages estimated at Eastern Caribbean Dollar (XCD) 507 million, 76.5 per cent was incurred in the private sector and 23.5 per cent in the public sector. A sectoral analysis revealed that the productive sector was hardest hit, accounting for 54.8 per cent of damages; followed by the social and infrastructure sectors which stand at 28.2 per cent and 17 per cent respectively.

Losses were valued at XCD 331.5 million. Further evaluations of these estimates indicate that the most affected sectors were the productive (85.1 per cent), infrastructure (12.5 per cent), and

social sectors (2.4 per cent). Again, the private sector was more impacted than the public, representing 88.3 per cent and 11.7 per cent of total losses.

The public sector will have to bear the majority of additional costs, assuming 58.2 per cent of the total expenditure estimated at XCD 41.9 Million. The previous trend continues, as most funds will be expended in the productive, infrastructure and social subsectors. Ports, power systems, roads, tourism and education account for a significant portion of these estimates, but debris removal and clean-up operations also represent a sizeable share of this appraisal.

Overall, the sector most affected by the hurricane was tourism. It is the driving force of the Anguillian economy; the central element of island activity and the main source of tax revenue.

The impact of Hurricane Irma on Anguilla's tourism sector will be severe. Damages are significant but even worse are the losses, which will extend several months beyond. Total damage is estimated at XCD \$275 million and is extensive, affecting buildings, equipment, furniture, and landscaping. The damages were caused mostly by intense wind, flying debris, and, in properties close to sea level, water surge. Most damage is concentrated in the large hotels and resorts (XCD \$203 million), which cater to high-end consumers. These facilities are especially costly and commonly have

Table 1. Effects of Hurricane Irma by sectors, XCD million.

Sectors	Damage	%	Losses	%	Additional costs	%	Total costs
Infrastructure	86.0	17.0%	41.3	12.5%	22.7	54.2%	150.1
Productive	277.7	54.8%	282.2	85.1%	7.7	18.4%	567.7
Social	143.2	28.2%	8.0	2.4%	11.5	27.4%	162.7
Total	507.0	100%	331.5	100%	41.9	100%	880.4

Source: Assessment Team, 2017

¹ This article is based on the report "Assessment of the Effects and Impacts Caused by Hurricane Irma" ECLAC, ECCB, Government of Anguilla.

additional equipment such as generators, water treatment plants, reverse-osmosis plants and even greenhouses. The estimated damage is XCD \$23.9 million in the Villas and XCD \$48.1 million in the medium size hotels and villas.

Losses—in accommodation, meals and drinks, shopping, and transportation—amount to XCD \$270.2 million, of which XCD \$101.2 million occurs in 2017, XCD \$168.1 million in 2018, and XCD \$898,000 in 2019. Reduced tourist arrivals will have spill over effects in the rest of the economy. The additional cost in the sector is XCD \$7.7 million.

Three sectors of infrastructure necessary for the optimal functioning of tourism such as power, telecommunications and roads, airports and ports suffered significant impacts. In the case of the power sector, wind damage to utility poles and overhead power lines was widespread and led to prolonged power outages on the island. Metal roofs failed atop power-generation and administrative buildings, causing damage to equipment inside. All photovoltaic panels on the company's 1.1-megawatt solar array were blown away or shattered by torsion and debris. A water tank used for fire suppression at the generation plant had structural damage from wind pressure.

The combined value of damage, losses and additional costs is an estimated XCD \$51.1 million. Physical damage to the power sector is estimated at about XCD \$24 million, of which about 56 per cent represents damage to transmission and distribution networks, 30 per cent is related to power generation, and 13 per cent is for buildings and equipment. Losses are estimated at XCD \$25.6 million, reflecting the value of power that was not sold because of damage to the transmission and distribution network and power that will not be sold due to reduced demand, as hotels remain closed through the high tourist season. Additional costs are estimated at XCD \$3.6 million. This figure mostly reflects

costs for crews and equipment brought in to support the recovery process.

Regarding telecommunications, Anguilla has more than 40 cellular towers, and Hurricane Irma knocked all but three offline. Many collapsed; others failed due to a loss of power, damage to equipment, or misalignment of antennas. The island's extensive overhead network of telecommunications wires, operated by FLOW and Digicel, also failed in many locations, particularly on the western portion of the island. This affected fixed-line telephone, broadband Internet, and cable television.

Damages to the telecommunications sector are estimated at XCD \$25.2 million. Digicel accounts for 57 per cent of the total damage, and FLOW, 41 per cent. The rest of the damage (2 per cent) is to the island's radio and television broadcasters. Losses are estimated at XCD 4.4 million; extended outages of broadband Internet, cable television, and landline services make up the bulk of that figure. Additional costs are estimated at XCD \$1.8 million.

The most affected social sector was housing. However, Anguilla's housing infrastructure was able to withstand Hurricane Irma better than most of the other islands in the Caribbean. Based on reports and field inspections, the assessment team determined that about 1,759 dwellings were affected. Of these, an estimated 3 per cent were destroyed, 5 per cent have significant structural damage, 13 per cent have minor damage, and 79 per cent have some damage. Most of the severely damaged houses were built with zinc roofs and tinder or plywood walls. This resulted in a total estimated damage of XCD \$83.7 million.

Losses refer to interruption of accommodation services due to severe damage or destruction of the housing stock, making it temporarily or permanently uninhabitable. The estimated losses for the 235 homes

deemed uninhabitable was XCD \$2.2 million. Additional costs are estimated at XCD \$7.9 million, including activities such as demolition of the most severely affected dwellings, debris cleaning, staff services, and equipment rental.

The overall impact on economic activity is projected to be significant in light of the crippling blow Hurricane Irma dealt to the local tourism sector. Its contraction will have a knock on effect in related subsectors such as wholesale and retail trade, transport and real estate business activities; however, this will be counteracted, to an extent, by an upsurge in construction activities as Anguilla's recovery progresses. It is still to be seen what would be the effect Irma on Anguilla's fiscal and debt sustainability, but its position will be considerably weakened. Given the sweeping effects of Hurricane Irma on the domestic economy, current revenues are projected to decline to XCD \$185.5 million compared with the pre-Irma target of XCD \$214.9 million. In light of the impacts previously discussed, an overall fiscal deficit of XCD \$45.4 million is projected compared with the pre-Irma deficit projection of XCD \$10 million.

ECLAC's disaster assessment team proffers sector-specific recommendations based on the analyses of several experts. These proposals are intended to inform a progressive national strategy that places resilience at its forefront. They form part of a comprehensive approach that aims to reduce the vulnerabilities that were identified during the DaLA mission, improve risk mitigation strategies, and promote multisectoral collaboration in the disaster risk management process. ■



EFFECTS AND IMPACTS OF HURRICANE IRMA IN THE BAHAMAS²

Francisco Ibarra-Bravo

The three-year period of 2015-2017 has been particularly eventful in The Bahamas, with the country experiencing landfall of a Category 4 hurricane in each of those years. These were Hurricane Joaquin in 2015, Hurricane Matthew in 2016, and Hurricane Irma in 2017.

Hurricane Irma was the ninth named hurricane of the 2017 Atlantic Hurricane Season. Around 01:00 UTC-5 on Friday 8 September, the center of Hurricane Irma crossed the Bahamian island, Little Inagua, then passed south of Acklins Island. On the afternoon of that same day, the center of the hurricane passed about 15 miles to the south of Ragged Island. Later, the storm affected south Andros, Bimini and Grand Bahama.

Prior to Irma reaching The Bahamas, the Government executed an emergency evacuation plan for persons on the most threatened islands to be transferred to the capital, Nassau, in New Providence. This evacuation process included residents from Acklins, Crooked Island, Inagua, Long Cay, Mayaguana and Ragged Island. According to data provided by the Bahamian Ministry of Social Services, a total of 1,479 persons were evacuated. At the national level, 3,515 persons were housed in approximately 133 shelters activated during the disaster. The emergency evacuation was the largest in the history of The Bahamas, an important sign of its success being no deaths or injuries reported.

The effects of Hurricane Irma in The Bahamas were concentrated on five islands: Acklins, Bimini, Grand Bahamas, Inagua and Ragged Island. This group of islands has about 54,906 individuals, representing 16 per cent of the country's total population.

The total estimated damage of Irma was US \$32.3 million, the losses US \$86.9

million and additional cost of US \$11.4 million. The majority of the damage was concentrated in the social and infrastructural sectors, while the losses in the productive sector were mainly in tourism. Given that the economy was already facing a number of challenges before Hurricane Irma, the fiscal challenge remains a major concern in the Bahamas. Public debt has more than doubled since the global crisis, driven in part by a stimulus programme to boost economic activity after the crisis. Before Hurricane Irma, growth of 1.4 per cent was forecast for 2017. After the disaster, however, The Bahamas economy is now projected to experience a growth of 1.0 per cent. This lower economic activity would result in loss of earnings and wages and salaries of US \$25.4 million and US \$18.7 million. It is expected that the government will undertake additional borrowing, mainly from the domestic financial sector to finance its contribution to the recovery.

The overall impact was relatively small compared to previous hurricanes. Although the areas directly affected by Irma were low population density areas,

the impact was significant, particularly in Acklins and Ragged Island. According to the report of the housing sector, a total of 387 dwellings had some type of damage directly affecting 1,120 people. A total of 60 homes were also destroyed, resulting in the displacement of 171 persons. Damage to the Housing and Public Buildings sector was estimated to be US \$14.5 million, while losses were calculated at US \$0.4 million having regards to the 135 rental homes affected. Additional costs were assessed in respect of cleaning of debris, rental equipment, labour, staff services, damage to appliances, and furniture. These tasks accounted for another US \$2.2 million.

With respect to the impact on children's education, a total of 36 educational facilities and 5,788 students were affected. The damage to school property was estimated at US \$1.5 million and the value of instruction time lost was calculated at US \$1.5 million.

There was also significant damage to roads, airports, ports and other infrastructure. This damage was caused primarily by water surge rather than wind, except for the airport terminal building in Ragged Island that was destroyed by hurricane force winds. In this case, the estimated damage was US \$10.3 million, with losses of US \$2.2 million, and additional costs of US \$4.5 million. In the telecommunications sector, Hurricane Irma caused destruction to wires and utility poles, loss of commercial power to mobile installations and cable nodes, rain and salt water-

Table 2 - Effects of Hurricane Irma by sectors, US\$ million

Sectors	Damage	%	Losses	%	Additional costs	%	Total costs
Infrastructure	16.8	52.2%	2.4	2.8%	2.4	21.1%	21.7
Productive	13.8	42.6%	3.7	4.2%	9.0	77.8%	26.5
Social	1.7	5.2%	80.9	93.0%	0.1	1.2%	82.7
Total	32.3	100%	86.9	100%	11.6	100%	130.8

Source: Assessment Team, 2017

² This article is based on the report "Assessment of the Effects and Impacts Caused by Hurricane Irma" ECLAC, IDB, PAHO, Government of The Bahamas.

related damage to electrical equipment, breakage of undersea cables by drifting boats, and damage to buildings. Ragged Island suffered by far the most damage, followed by Andros, Bimini, Inagua and Grand Bahama. Damage was estimated at US \$2.1 million. At the same time, losses for telecommunications sales as a result of service outages were estimated at US \$0.1 million, plus additional costs at US \$0.5 million.

Damage in the power sector was primarily to transmission and distribution systems, and consisted of fallen power lines and utility poles, blown transformers, compromised insulators, and salt-spray accumulated on lines and equipment. The estimated damage was US \$0.8 million while losses, representing the amount of electricity that was not sold as a result of power outages, were estimated at US \$0.4 million. Additional costs, comprising of overtime for staff and transport for repair crews and equipment, were estimated at US \$0.7 million. With the exception of Bimini (the underwater line) and Ragged Island, there was no substantial damage to the Water and Sewerage Corporation (WSC) facilities on any of the other Family Islands. Water and Sanitation damage was approximately US \$0.5 million, due to the interruption of water distribution service to dwellings, and it was estimated that losses were approximately US \$0.9 million. Additional costs were estimated at US \$3.3 million.

Tourism is the main driver of the Bahamian economy. Unlike the previous storms, Irma did not directly affect the major tourism infrastructure of The Bahamas. Nevertheless, it was a major storm that received extensive news coverage for days before making landfall, thus causing significant disruption in the flow of tourists all over the Caribbean. The total damage in the tourism sector was US \$0.6 million, nearly all occurring in the Family Islands. The losses were much greater, escalating to US \$68 million, while additional costs were US \$0.1 million.

Another important economic activity

in The Bahamas is fishing. Although Irma did not cause significant damage in this sector, it affected the most important fishing area of the Bahamas, the Great Bahama Bank. It also affected communities whose main source of income is fishing. Hence the sector suffered US \$1 million in damage and US \$12.9 million in losses. The majority of the damages and losses were concentrated in New Providence and Spanish Wells, but in relative terms, the impact of Irma was stronger in small communities like Duncan Town and Saline Point.

Hurricane Irma demonstrated once more that natural hazards can damage infrastructure in a way that is felt across multiple sectors. In The Bahamas, most infrastructure assets – including roads, ports, and tourist facilities – are located close to the shoreline, exacerbating their vulnerability to hurricanes.

To reduce the risks in the infrastructure sector, the ECLAC Damage and Loss Assessment report recommended the development, reviewing and updating of the Sustainable Master Development Plan that considers the potential risks caused by disasters. The Plan should also focus on the integration of multiple sectors and their role in the improvement of human well-being. Bahamian authorities should also seek to update and deploy construction codes, standards and guidelines, and enforce their implementation.

In the tourism sector, it is crucial to ensure that repair and rebuilding efforts are done to the existing codes and standards. The water surge severely damaged properties close to the seashore, making it imperative that any new touristic development is done with the proper adjustments for shoreline impacts, and if required, complemented with the construction of stilts or seawalls. In agriculture, it is important that new greenhouses use materials that are more suitable for the weather conditions in The Bahamas. In addition, their design should be done in a more disaster resilient manner. This includes moving

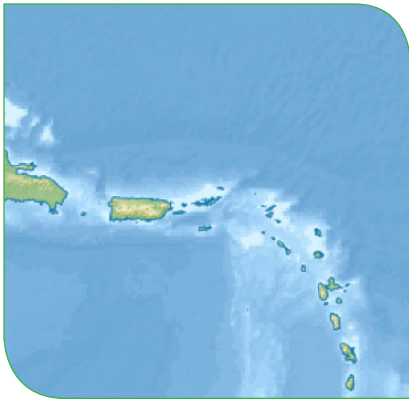
away from square crystal greenhouses that are particularly vulnerable to wind damage.

Regarding housing, enforcing the current building code is highly encouraged. To ensure such compliance, several steps could be taken. First, the creation of a popular builder's handbook is encouraged. The objective of this handbook will be to guide step by step the principles and technical methods required to comply with the building code. Secondly, the government should strengthen audit, inspection and supervision of buildings. Thirdly, the revision and update of the current building code should be undertaken. Similarly, for educational facilities, inspections of school premises should be mandatory and scheduled before the hurricane season every year.

In the telecommunications sector, the recent experiences of Hurricanes Joaquin and Matthew have already been a catalyst for the adoption of improved disaster risk management practices. For example, the Bahamas Telecommunications Company (BTC) has changed its approach to preparation prior to the hurricane season. BTC has also begun the process of retrofitting the antennas on its cellular communications towers with additional bracing. Their experience in Hurricane Irma has proven this to be an effective means of reducing the risk that antennas will be blown out of alignment by high winds.

The telecommunications company, Cable Bahamas, has made their network more resilient by adding “power to the node” systems. Loss of commercial power remains the greatest threat to the continuance of operational telecommunications services, particularly mobile services, during and after a disaster. Backup generators at cellular sites are a useful resolution.

Although Hurricane Irma represented a traumatic event for the people of The Bahamas, it should be seen as an opportunity to rebuild for resilience. ■



EFFECTS AND IMPACTS OF HURRICANES IRMA AND MARIA IN BRITISH VIRGIN ISLANDS³

Omar Bello

The first gusts of Hurricane Irma began affecting the territory of the British Virgin Islands (BVI) in the early hours of 6 September 2017. Forecasters had predicted that the eye would pass just north of Anegada. However, the system shifted to the south and the eye passed directly over Tortola.

For six hours, Irma battered the territory resulting in four deaths and approximately 125 reported injuries. With telecommunications, VHF radio networks and the National Emergency Operations Centre (NEOC) headquarters destroyed, emergency transmissions were severely impaired. The Caribbean Disaster Emergency Management Agency (CDEMA) reported that the all-clear was expected to be given at 11:00 p.m. In view of the widespread devastation and deterioration of law and order, a state of emergency was declared on 7 September and a curfew implemented on 8 September.

The northern coast of Tortola was severely affected by storm surges, particularly the communities of Cane Garden Bay and Carrot Bay, where seaside cemeteries, schools and historic edifices were displaced. In the south, residents reported tornadic activity within the valleys surrounding Road Town with extensive damage in the

House of Assembly and main government building all suffered major damage. Nine out of 19 schools in the territory were left inoperative after the storm's passage. The island's infrastructure was also devastated as road networks, telecommunication systems, airport and seaport facilities were severely damaged.

Virgin Gorda sustained heavy damage, particularly in the North Sound region, with reports of 12 to 20 feet (3.7 to 6.1 m) of storm surge in some areas. Many tourist accommodations were also destroyed, while schools, emergency shelters and health facilities suffered significant water and roof damage. Jost Van Dyke's infrastructure was also crippled as the main water storage facility and most cellular towers were flattened. Several landslides were reported in the island's western region. Anegada suffered damage to some docking facilities and tourist accommodation; most regions experienced 2 to 5 feet (0.6 to 1.5 m) of storm surge. Similar

Hurricane Maria approached BVI at 5 p.m. on Sunday 17 September, 2017. The National Hurricane Centre (NHC) in Miami, Florida, issued a Hurricane Watch for that country, advising of intense rainfall, flash floods, mudslides and possible danger from the debris left in Irma's wake. A continuous curfew was imposed the following day after consultations with the Governor and key government and private sector officials. The Category 5 system passed to the southeast of the island chain between 19 and 20 September, battering the territory with 155 mph (250 km/h) winds for over 12 hours. Though heavy rains continued, the hurricane warning was discontinued by 5 p.m. on Wednesday 20 September.

Most inhabitants were affected by the passage of Hurricanes Irma and Maria in one way or another. The assessment team estimated that approximately 17,985 persons were primarily affected as a result of some type of damage to their homes and other possessions.

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