

UNESCO/IOC CARIBE EWS
Department of Geology
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NOAA's National Weather Service

CARIBE WAVE 2021

Supplement Report

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Summary of CARIBE WAVE

The CARIBE WAVE exercise is conducted within the framework of the UNESCO Intergovernmental Coordination Group for Tsunamis and other Coastal Hazards for the Caribbean and Adjacent Regions (CARIBE-EWS) with the purpose of improving and validating tsunami readiness. The exercise took place on March 11, 2021, in commemoration of the 10th anniversary of the Tohoku earthquake and tsunami in Japan. Despite the ongoing COVID-19 pandemic, CARIBE WAVE 21 was held successfully with a participation of forty-seven Member States and Territories*. It was left up to the Member States and Territories to determine if any additional activity would be carried out and whether to use the simulated messages for one of the two scenarios: Jamaica and Northern Lesser Antilles.

According to TsunamiZone.org and the Member States, over 300,000 people across the entire Caribbean and Adjacent regions participated in the CARIBE WAVE 21 exercise. The majority of the participants were from National, State, and Local government, followed by preparedness organizations, and K-12 schools and universities. Also noted was the greater participation of Museums, Libraries, Parks, Volunteer/Service Clubs, Volunteer Radio Groups and Media Organizations. The high participation rate reflects the importance the countries are giving to tsunami preparedness despite the ongoing a pandemic.

The Pacific Tsunami Warning Center (PTWC) issued a “Dummy” message at 14h00 to all officially designated Tsunami Warning Focal Points (TWFPs) and National Tsunami Warning Centers (NTWCs). The methods of communication used to disseminate the message were: The World Meteorological Organization Warning Information System (Global Telecommunication System), the Aeronautical Information Replacement System (AISR), NOAA Weather Wire, GEONETCAST Americas, AWIPS, Fax, Email and Social Media. According to feedback, as well as social media and web posts, the dummy message was successfully sent and received, validating the communication platforms. In addition to communication tests, exercises were conducted at various levels and sophistication including seminars, tabletop, and drills. These activities were executed accordingly, taking into considerations the CARIBE EWS COVID-19 guidelines.

This report includes a summary of the responses to the online survey which was conducted among the Member States. There were 27 questions that focused on the PTWC-Member State communication, Member State CARIBE WAVE 21 actions, state of preparedness, as well as the status and interest in the implementation of the UNESCO/IOC TsunamiReady program.

Planning for CARIBE WAVE 21 took over 10 months and was coordinated by a task team led by Dr. Elizabeth Vanacore of the Puerto Rico Seismic Network (PRSN) and facilitated by the US NWS Caribbean Tsunami Warning Program (CTWP). The website of TsunamiZone.org was used for the registration of the participants.

^{1*} Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Brazil, Colombia, Costa Rica, Cuba, Curacao, Dominica, Dominican Republic, France (Martinique, Guadeloupe, St. Barthelemy, St. Martin), Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Netherlands (Bonaire, Saba and Sint Eustatius), Nicaragua, Panama, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Sint Maarten, Trinidad and Tobago, United Kingdom (Anguilla, Bermuda, British Virgin Islands, Cayman Islands, Montserrat, and Turks and Caicos), United States (Puerto Rico and the US Virgin Islands) and Venezuela (Bolivarian Republic of).

Supplement Survey Results

Caribe Wave 2021 Survey Report from TWFP/TNC

In light of the implications due to the COVID-19 emergency, the survey was reduced to reflect the decision and other priorities countries may have considering the pandemic. The survey was available through the Survey Monkey. The deadline for completion was March 26 but was extended until April 14, 2021. The following 34 Member States/Territories participated in the post-exercise evaluation:

- Aruba
- Bahamas
- Barbados
- Belize
- Brazil
- Colombia
- Costa Rica
- Cuba
- Curacao
- Dominica
- Dominican Republic
- France (Martinique, Guadeloupe, St. Barthelemy, St. Martin)^{2*}
- Grenada
- Guatemala
- Guyana
- Haiti
- Honduras
- Jamaica
- Mexico
- Netherlands (Bonaire, Saba and Sint Eustatius)^{3*}
- Nicaragua
- Panama
- Saint Kitts and Nevis
- Saint Lucia
- Saint Vincent and the Grenadines
- Sint Maarten
- Trinidad and Tobago
- United Kingdom (Anguilla, Bermuda, British Virgin Islands, Cayman Islands, Montserrat, Turks and Caicos Islands)
- United States (Puerto Rico, US Virgin Islands)
- Venezuela (Bolivarian Republic of Venezuela)

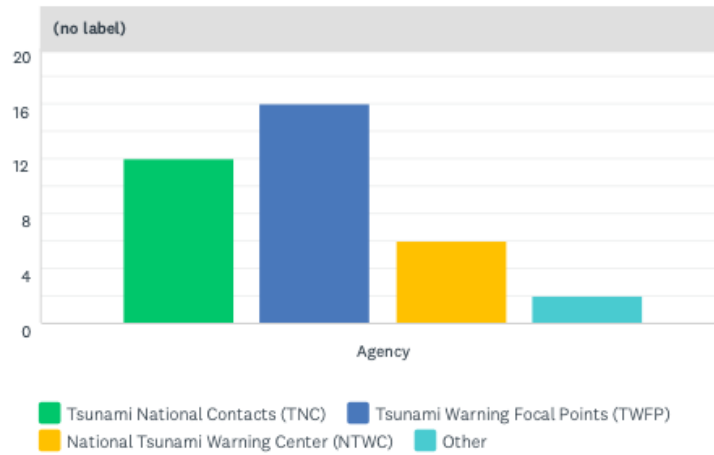
^{2*} One survey submitted by the Member State on behalf of all the territories

³ One survey was submitted by the Member State on behalf of all the territories

Contact Information – Agency

Q2 -

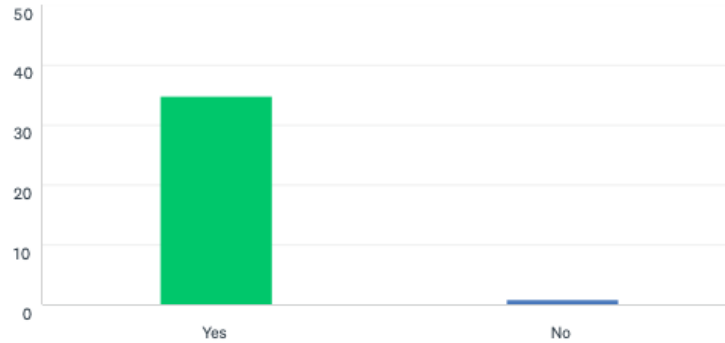
Answered: 36 Skipped: 0



(no label)					
	TSUNAMI NATIONAL CONTACTS (TNC)	TSUNAMI WARNING FOCAL POINTS (TWFP)	NATIONAL TSUNAMI WARNING CENTER (NTWC)	OTHER	TOTAL
Agency	33.33%	44.44%	16.67%	5.56%	
	12	16	6	2	36

Q4 Did your country's Tsunami Warning Focal Points/National Tsunami Warning Center receive the PTWC Caribe Wave 21 Dummy (Start of Exercise) Message?

Answered: 36 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	97.22%	35
No	2.78%	1
TOTAL		36

Comments:

Brazil: We received the started message and 13 other messages. One of them (no.5, with attachment went to the spam folder).

Colombia: 14:01 UTC.

France: Message arrived on time in exercise scenario.

NL-Curacao: We didn't receive the message via the email address "forecaster@meteo.cw".

Panama: The message was received on time.

Saint Lucia: The TWFP received the message at 14:04 UTC, however the message was not received by the NTWC.

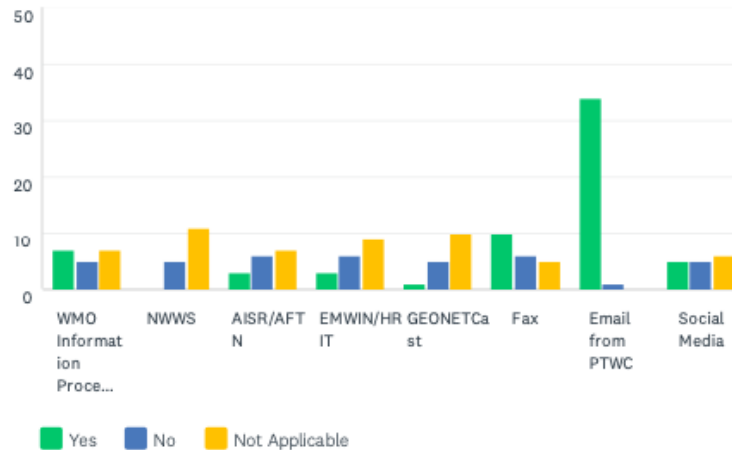
UK-British Virgin Islands: Messages came via email and fax.

USA-Puerto Rico: PREMB-10AM (EMWIN) / PRSN-10AM (EMWIN) / NWS-10AM

USA-US Virgin Islands: Where would this be sent?

Q5 The PTWC issued the CARIBE WAVE 21 Dummy Message by several methods. Please check all methods through which the message was received by the TWFP/NTWC.

Answered: 36 Skipped: 0



	YES	NO	NOT APPLICABLE	TOTAL RESPONDENTS
WMO Information Process (e.g., GTS, WIS)	36.84% 7	26.32% 5	36.84% 7	19
NWWS	0.00% 0	31.25% 5	68.75% 11	16
AISR/AFTN	18.75% 3	37.50% 6	43.75% 7	16
EMWIN/HRIT	16.67% 3	33.33% 6	50.00% 9	18
GEONETCast	6.25% 1	31.25% 5	62.50% 10	16
Fax	47.62% 10	28.57% 6	23.81% 5	21
Email from PTWC	97.14% 34	2.86% 1	0.00% 0	35
Social Media	31.25% 5	31.25% 5	37.50% 6	16

Other:

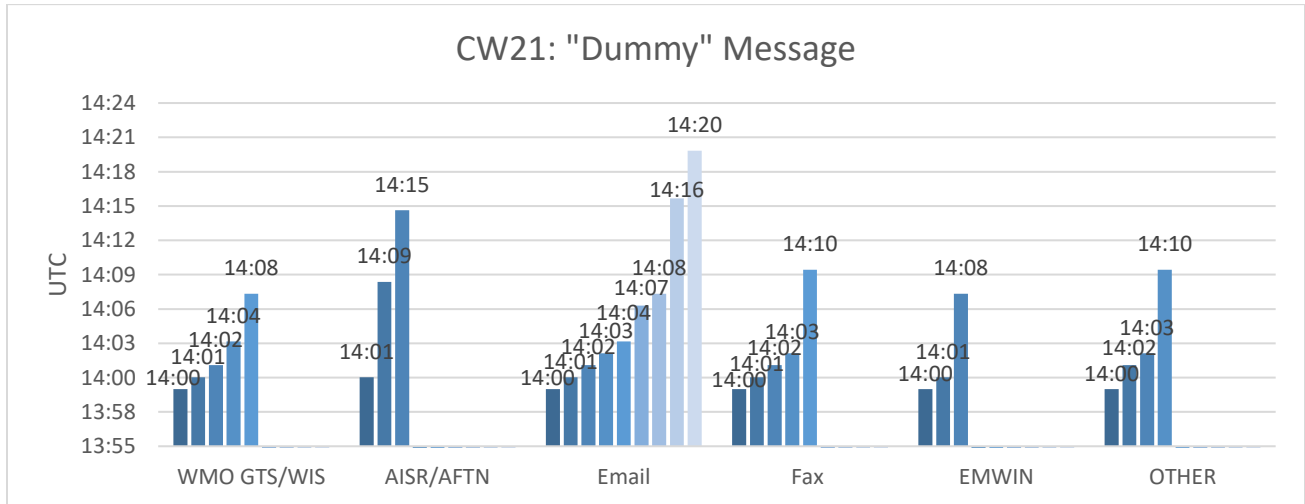
Nicaragua: CATAC issued the dummy message to the Central American countries in support of the CARIBE WAVE 21 exercise and IOC/CARIBE-EWS.

NL-Aruba: WhatsApp.

USA-Puerto Rico: PREMB and PRSN (fax, email and EMWIN) / NWS (email, phone, text).

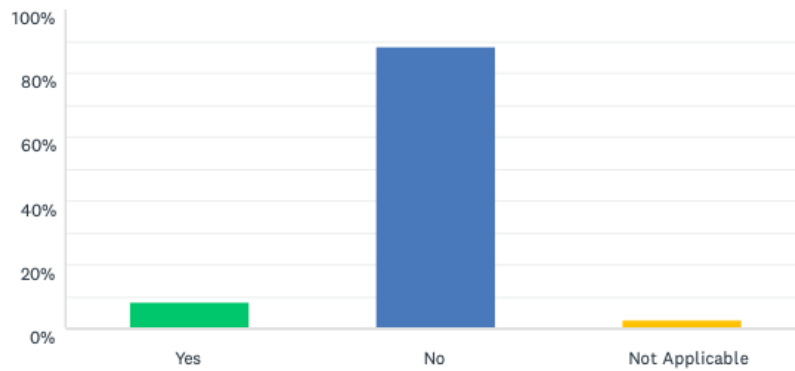
Q6 The PTWC issued the CARIBE WAVE 21 Dummy Message by several methods. Please indicate the time at which the message was received by the TWFP/NTWC in the different systems.

Answered: 31 Skipped: 5



Q7 Were there any problems with the receipt of PTWC CARIBE WAVE 21 Dummy (Start of Exercise) Message?

Answered: 35 Skipped: 1



ANSWER CHOICES	RESPONSES	
Yes	8.57%	3
No	88.57%	31
Not Applicable	2.86%	1
TOTAL		35

Comments:

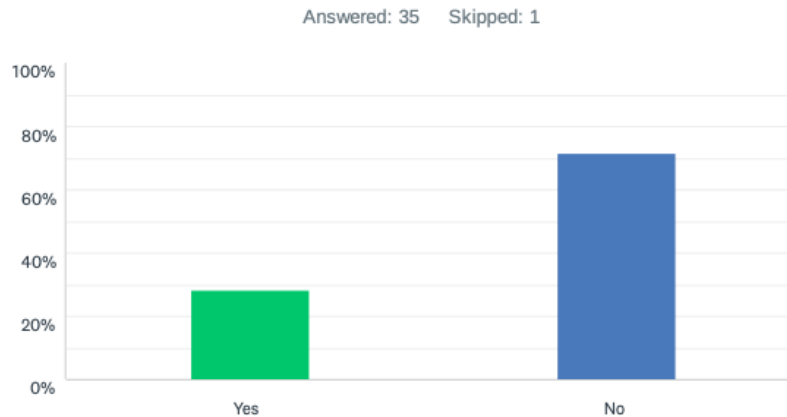
Bahamas: Just called.

NL-Curacao: We didn't receive the message via "forecaster@meteo.cw".

Saint Kitts and Nevis: Was shared late.

UK-Montserrat: We are presently making representation to hand over the Focal Point to the Royal Montserrat Police Service.

Q8 Did the Tsunami Warning Focal Point / National Tsunami Warning Center receive any message from an organization other than the PTWC (e.g. Puerto Rico Seismic Network, Caribbean Disaster Emergency Management Agency)? If yes, please use the comment box to indicate the agencies you received the message from.



ANSWER CHOICES	RESPONSES	
Yes	28.57%	10
No	71.43%	25
TOTAL		35

Comments:

Colombia: Taking into account that the bulletin #3 was not received from the PTWC, communication was established with SINAMOT so that they would forward the PTWC bulletins to the CNAT of Colombia, since it was considered that the problem was with Dimar's mail server. However, the other bulletins of the PTWC were received in the times established in the manual of the exercise CARIBE WAVE 21.

Costa Rica: We received a Dummy Message from CATAC.

Dominican Republic: Puerto Rico Seismic Network.

Guatemala: Email from CATAC.

Nicaragua: We received from CATAC.

Panama: CATAC – Centro de Asesoramiento para Tsunamis en América Central.

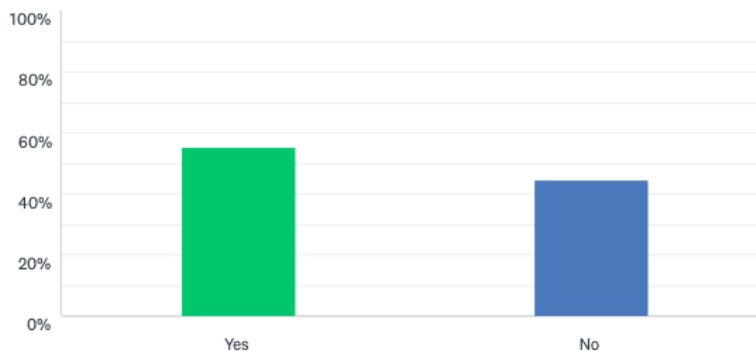
UK-British Virgin Islands: Yes, messages were received from the PRSN.

USA-Puerto Rico: PRSN (Initial Bulletins and 13 PRSN Bulletins), NWS (EAS-PR and NOAA Radio).

USA-US Virgin Islands: Puerto Rico Seismic Network and VITEMA (VI Alert).

Q9 Did the TWFP/NTWC prepare and issue messages to relevant in-country agencies for CARIBE WAVE 21? If yes, please mention the agencies.

Answered: 36 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	55.56%	20
No	44.44%	16
TOTAL		36

Comments:

Brazil: CENAD.

Colombia: National Unit for Disaster Risk Management – UNGRD (NDMO), Colombian Geological Service – SGC, Institute of Hydrology, Meteorology and Environmental Studies – IDEAM, Captaincies of the Colombian Caribbean Port, Traffic Control and Maritime Surveillance Stations – ECTVM, NAVTEX Colombia Coordination.

Costa Rica: We had to postpone the exercise due to health issues from a CNE official.

Cuba: National Civil Defense staff.

France: French west indies military, national frequency radio agencies, departmental operational centre (Martinique, Guadeloupe, Saint-Martin, Saint Barthélemy), state of sea action, directorate general of civil aviation, zonal health regional agency, Zonal Directorate of Air Police and Borders, customs, direction of the sea, Environment, Development and Housing Directorate.

Grenada: NaDMA RGPF.

Haiti: DGPC, AGERCA, and CRH.

Jamaica: No communications test.

Mexico: National Coordination of Civil Protection, State and Municipal Civil Protection Units, Secretary of the Navy, Secretary of National Defense, Firefighters, Port Captaincies, National Guard, and Local Civil Protection Committees.

Nicaragua: Civil Defense, SINAPRED, Presidency of the Republic in Nicaragua.

NL-Bonaire, Saba, Sint Eustatius: Local governments of Saba, St. Eustatius, Bonaire. DCC NL Rikjsvertegenwoordiger.

NL-Curacao: Disaster Management Organizations and all local media.

Saint Lucia: The National Disaster Office informed the Chairpersons of the Local Disaster Committees of the testing of the sirens in their communities by mobile phone.

Trinidad and Tobago: The SOP of the TWFP is to receive all messages from the PTWC and forward (unedited) immediately to NTWC. Confirmation of receipt is done at once via telephone and email.

UK-Bermuda: Ministry of National Security and Bermuda Maritime Operations Centre (also a TWFP).

UK-British Virgin Islands: They indicated having issues with communications as huge volumes of traffic prevented calls or even radio transmission from getting through.

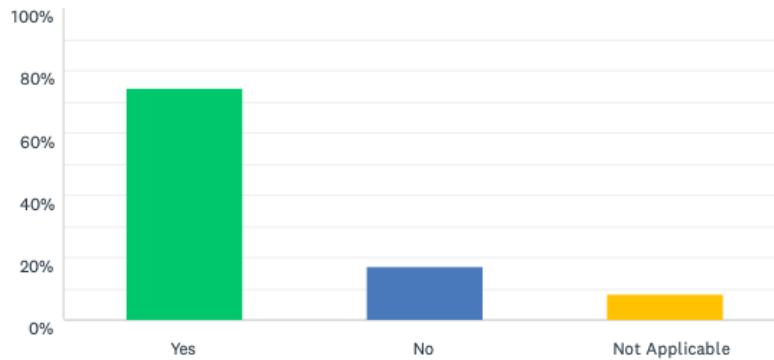
UK-Cayman Islands: Ministry of Education and Department of Education.

USA-Puerto Rico: PREMB Press Release (March 3, 2021) PREMB WEA (March 11, 2021 9:50AM AST).

Venezuela: Funvisis produced several messages along with those issued and they were sent accordingly to Civil Defense Organizations, at National, Regional and Local levels. Also, the messages were simultaneously shared with first responders and some other strategic agencies.

Q10 Did your TWFP/NTWC receive by email from PTWC the simulated exercise messages (Jamaica or Northern Lesser Antilles scenario) at the times specified in the Exercise Manual?

Answered: 35 Skipped: 1



ANSWER CHOICES	RESPONSES	
Yes	74.29%	26
No	17.14%	6
Not Applicable	8.57%	3
TOTAL		35

Comments:

Bahamas: Oops! I do not note where the Bahamas registered in order to receive a scenario. Just spoke with NEMA and they also advised that they also did not register.

Brazil: The message number 5, with attached files went to spam folder. I informed it was not spam, and further messages will not be on spam anymore.

Colombia: Bulletin #3 was not received. The other bulletins were received within the times established in the CARIBE WAVE 21 exercise manual.

Costa Rica: We did not receive the Message 3 and received Message 4 twice.

Guyana: The messages arrived within one minute of the scheduled time. Two Message 5 were received. The enhanced graphic products came in message 5 and not message 3.

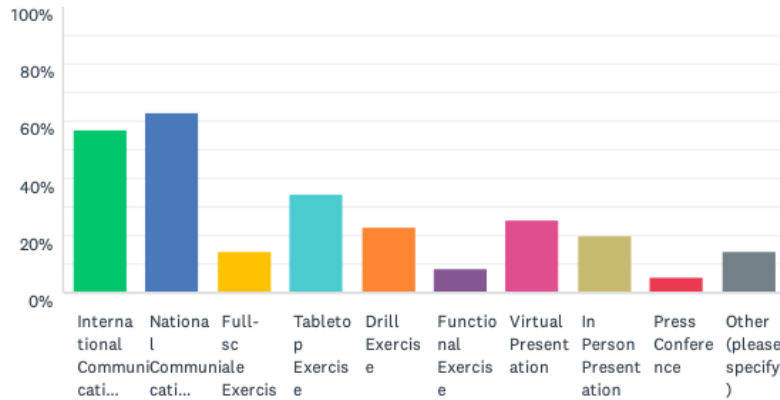
Grenada: No email was received.

Nicaragua: All according to the exercise plan.

USA-Puerto Rico: PRSN/ PREMB/ NWS.

Q11 In light of the coronavirus pandemic, in what way was your country able to participate in the CW21?

Answered: 35 Skipped: 1



ANSWER CHOICES	RESPONSES
International Communication Test Portion (PTWC-TWFP/NTWC)	57.14% 20
National Communication Test Portion	62.86% 22
Full-scale Exercise	14.29% 5
Tabletop Exercise	34.29% 12
Drill Exercise	22.86% 8
Functional Exercise	8.57% 3
Virtual Presentation	25.71% 9
In Person Presentation	20.00% 7
Press Conference	5.71% 2
Other (please specify)	14.29% 5
Total Respondents: 35	

Comments:

Bahamas: We did not participate.

Colombia: Inventory of capacities for the response to a tsunami event. Review of the national tsunami protocol. The personnel of the Captaincy of the Port of San Andres were evacuated.

Costa Rica: We had planned a drill but had to postpone.

Cuba: Seminars and workshops.

Dominica: Earthquake drill and evacuation in schools followed by discussion on tsunami protocols.

Grenada: Media interviews and social media postings.

Guyana: This exercise was held virtually.

Haiti: Tabletop exercise at DGPC.

Jamaica: Online presentation and tabletop at the National level.

NL-Bonaire, Saba, Sint Eustatius: Local authorities can give more information about the tabletop.

NL-Sint Maarten: We had 6 different tabletop exercises, using the CARIBE WAVE 21 scenario. We did not follow the timeline of the exercise.

Saint Lucia: Saint Lucia tested their emergency Early Warning sirens in three communities.

Trinidad and Tobago: The TWFP did not go beyond its SOP for this exercise. Other local agencies would have conducted their own activities for this exercise.

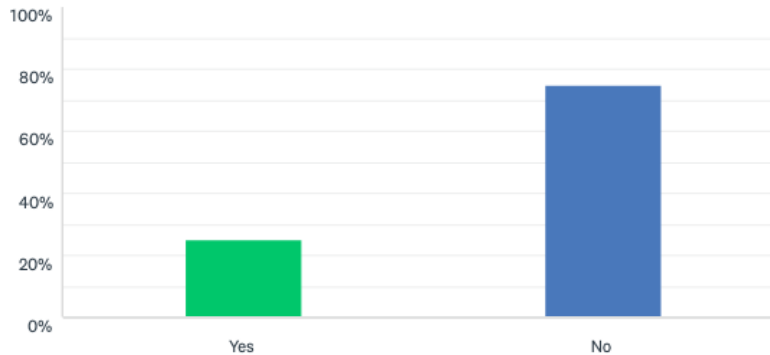
UK-Anguilla: As previously indicated, Anguilla will do the CARIBE WAVE Exercise scenario in May this year as result of us performing the CARIBE WAVE 20 replacement exercise (delayed due to COVID-19) in November 2020.

USA-Puerto Rico: Conferences, talks, media tour, webinar to Emergency managers, municipality drills, outdoor sirens activation, EAS-PR, NOAA radio, and WEA-PR.

Venezuela: Even though the schools are closed, we prepared contents to nationwide teachers and shared the content via YouTube and checked the progress with assessments carried out with Google Forms. It was a success, reaching 1,500 schools.

Q12 Were any areas evacuated as part of the CARIBE WAVE 21 Exercise?

Answered: 36 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	25.00%	9
No	75.00%	27
TOTAL		36

Comments:

Barbados: Due to the COVID-19 pandemic and a lockdown of the island this facet of the program was not able to be exercised.

Colombia: Captaincy of the San Andres Port.

Dominica: Students only evacuated from their classroom to the Muster Point on the school grounds during the earthquake drill.

Grenada: Areas in the parishes of St. John, St. Mark and Grand Mal, St. George's.

Jamaica: Canceled due to COVID-19.

Panama: Tabletop exercise.

UK-British Virgin Islands: The NEOC evacuated to its alternate location, The Governor, Premier and several government departments and private agencies also evacuated.

UK-Cayman Islands: Several schools used the opportunity to test their evacuation response procedures.

USA-Puerto Rico: Aguada, Rincon, Guaynabo, Lajas, Guanica, Guayanilla, Yauco, Santa Isabel, Manati, Barceloneta, Culebra, Mayaguez, Ceiba, and Fajardo municipalities.

Venezuela: At the Funvisis facilities, we simulated the earthquake of the exercise as a felt event, evacuating the buildings.

Q13 Overall, how timely before Estimates Time of Arrival (ETA) was the evacuation completed from 1 (after ETA) to 5 (well before ETA)?

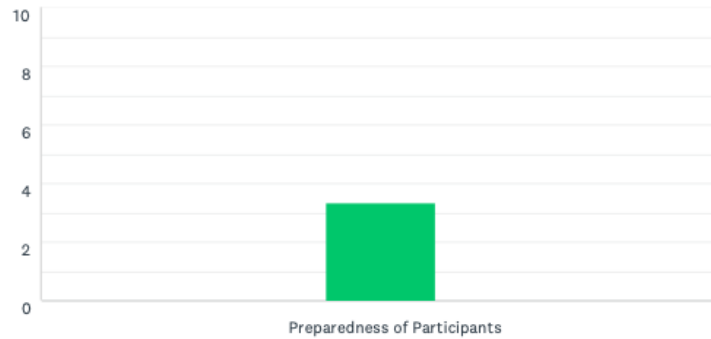
Answered: 29 Skipped: 7



	1	2	3	4	5	N/A	TOTAL	WEIGHTED AVERAGE
ETA	3.45%	3.45%	3.45%	10.34%	6.90%	72.41%		
	1	1	1	3	2	21	29	3.50

Q14 Rate the overall preparedness of participants (e.g. had emergency backpack/supplies, knowledge of evacuation route, orderly) from 1 (poor) to 5 (excellent).

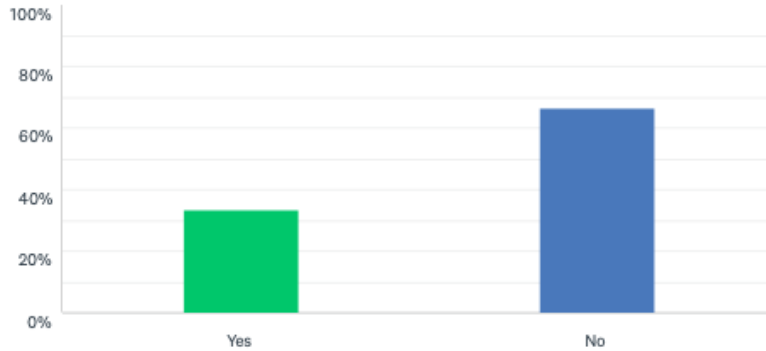
Answered: 30 Skipped: 6



	1	2	3	4	5	N/A	TOTAL	WEIGHTED AVERAGE
Preparedness of Participants	0.00%	10.00%	6.67%	23.33%	0.00%	60.00%	30	3.33
	0	3	2	7	0	18		

Q15 Did news media participate and cover the exercise? (Please provide electronic links if applicable.)

Answered: 36 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	33.33%	12
No	66.67%	24
TOTAL		36

Comments:

Barbados: <https://www.nationnews.com/2021/03/10/dont-panic-caribwave-thursday/>;
<https://barbadostoday.bb/2021/03/12/authorities-test-tsunami-warning-system/>

Colombia: <https://www.infobae.com/america/colombia/2021/03/12/junto-con-varios-paises-del-caribe-colombia-participo-en-un-simulacro-ante-un-tsunami/> ;
<https://twitter.com/Dimarcolombia/status/1370114840673521664?s=20> ;
<https://twitter.com/Dimarcolombia/status/1370045720858914819?s=20> ;
<https://twitter.com/Dimarcolombia/status/1370044593895579651?s=20> ;
<https://twitter.com/Dimarcolombia/status/1370035615279026180?s=20> ;
<https://bolivarense.com/colombia-se-prepara-ante-posibles-tsunamis/>

Dominica: Press release was issued.

Guyana: The PRO of the organization participated. This was her first exercise so it was a learning experience for her.

Jamaica: News media was not invited to participate.

UK-Anguilla: Not applicable.

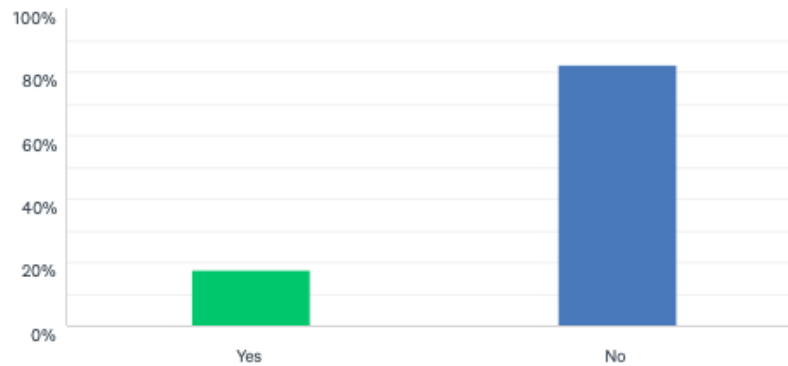
UK-Bermuda: <https://www.royalgazette.com/general/news/article/20210310/tsunami-training-exercise-to-take-place-tomorrow/>

USA-Puerto Rico: <https://www.youtube.com/watch?v=GolwzSBHJI0>
[/https://www.youtube.com/watch?v=CHREyKcrkMg](https://www.youtube.com/watch?v=CHREyKcrkMg)

Venezuela: <http://www.minci.gob.ve/sngr-venezolano-participo-en-los-ejercicios-internacionales-caribe-wave-2021/> - <https://www.vtv.gob.ve/sistema-nacional-riesgo-ejercicios-internacionales-caribe-wave-2021/> - <https://ultimasnoticias.com.ve/noticias/pulso/realizan-con-exito-ejercicio-caribe-wave-2021-en-trujillo-y-anzoategui/>

Q16 Were social scientists engaged in exercise planning/activities?

Answered: 34 Skipped: 2



ANSWER CHOICES	RESPONSES	
Yes	17.65%	6
No	82.35%	28
TOTAL		34

Comments:

Jamaica: No physical activity/exercise.

Saint Kitts and Nevis: Social services and the councilor's unit.

Saint Lucia: Due to COVID-19 and a third wave impacting Saint Lucia, there was minimum participation from other agencies.

Trinidad and Tobago: Not applicable.

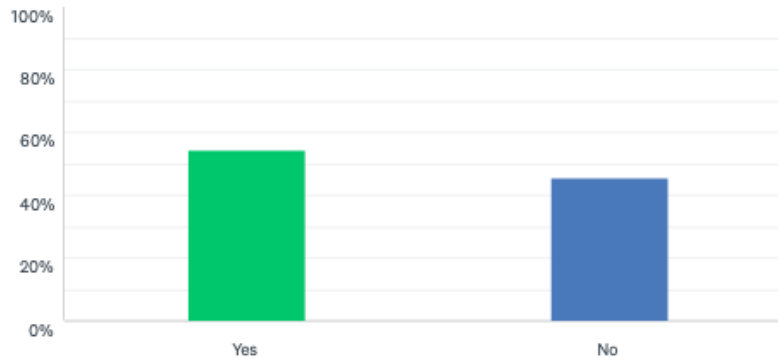
UK-Anguilla: Not applicable.

USA-Puerto Rico: Dr. Victor Rivera and Dr. Edwin Asencio with a project of communication including KP4 for communities.

Venezuela: Funvisis researchers facilitated several workshops and seminars on the CARIBE WAVE 21 contents, tasks and goals. Our department of social research prepared beforehand several Civil Defense organizations at regional and local levels.

Q17 Is your country implementing the Community Performance Based Tsunami Recognition Program (TsunamiReady® or Tsunami Ready)?

Answered: 35 Skipped: 1



ANSWER CHOICES	RESPONSES	
Yes	54.29%	19
No	45.71%	16
TOTAL		35

Comments:

Brazil: Not yet.

Costa Rica: But in the Pacific.

Dominica: Some work has begun in the community of Calibishie but much more has to be done.

Dominican Republic: We still working on that.

Jamaica: One community – Old Harbour Bay.

Nicaragua: Corn Island and Bluefields.

NL-Bonaire, Saba, Saint Eustatius: This should be done by local government, no sure what they implemented so far.

NL-Sint Maarten: But we intend to do so in the near future. Within short we should be able to do tsunami runup models for the country, based on a new Lidar survey.

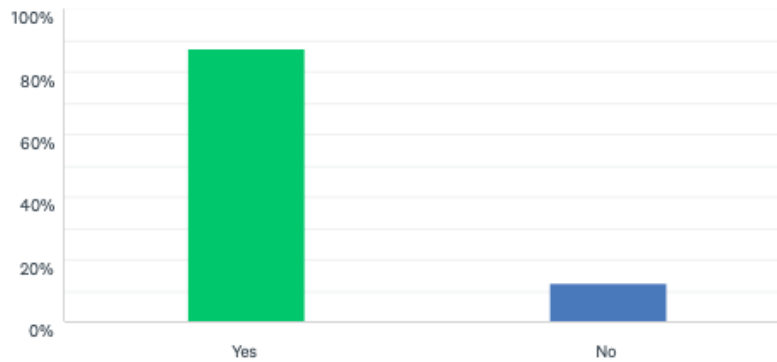
Saint Lucia: Saint Lucia has indicated its interest in implementing a Community-based tsunami recognition program (Tsunami Ready) and is awaiting confirmation of its proposal.

UK-Anguilla: Anguilla was the first English speaking international community to be certified Tsunami Ready.

UK-Montserrat: We have begun our signage program on all beaches.

Q18 Is your country interested in implementing the Community Performance Based Tsunami Recognition Program (TsunamiReady® or Tsunami Ready)?

Answered: 16 Skipped: 20



ANSWER CHOICES	RESPONSES	
Yes	87.50%	14
No	12.50%	2
TOTAL		16

Comments:

Brazil: Yes, but there will be necessary much more development.

France: Preparation work is underway in Martinique and Guadeloupe.

NL-Bonaire, Saba, Sint Eustatius: But up to local governments.

NL-Sint Maarten: See my comment at the previous question.

Saint Lucia: Saint Lucia has indicated its interest in implementing a Tsunami Ready program and is awaiting confirmation.

UK-Cayman Islands: We have unique geographical considerations that makes this program particularly challenging.

Q19 What is the target number of Tsunami Ready communities in your country/territory for TsunamiReady® or Tsunami Ready recognition?

Answered: 26 Skipped: 10

Q20 How many communities have been recognized in your country/territory for TsunamiReady® or Tsunami Ready?

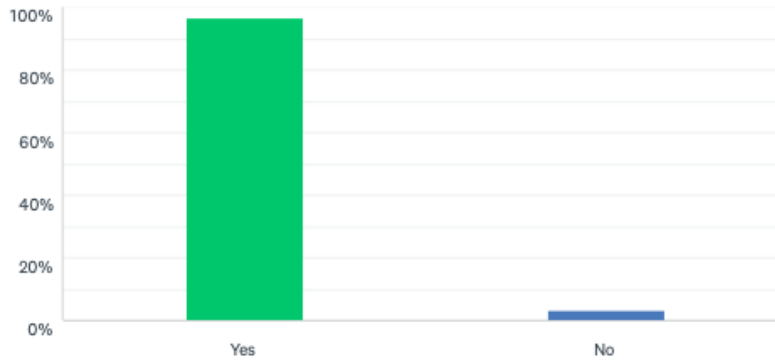
Answered: 28 Skipped: 8

Country	Already Implementing	Interested in Implementing	TsunamiReady® or Tsunami Ready Communities	Target Number
Bahamas	Yes	-	10	22
Barbados	Yes	-	8	50
Belize	Yes	-	0	1
Brazil	No	Yes	0	0
Colombia	No	Yes	0	0
Costa Rica	Yes	-	8	15
Cuba	No	Yes	0	2
Dominica	No	Yes	-	-
Dominican Republic	Yes	-	0	2
France	No	Yes	-	-
Grenada	Yes	-	4	-
Guatemala	No	Yes	2	17
Guyana	No	Yes	-	-
Haiti	No	Yes	1	20
Honduras	Yes	-	4	1
Jamaica	Yes	-	0	55
Mexico	No	Yes	0	10
NL-Aruba	Yes	-	0	-
NL-Bonaire, Saba, Sint Eustatius	No	Yes	0	3
NL-Curacao	No	Yes	0	-

NL-Sint Maarten	No	Yes	0	1
Nicaragua	Yes	-	2	3
Panama	Yes	-	6	12
Saint Kitts and Nevis	Yes	-	-	1
Saint Lucia	No	Yes	0	4
Saint Vincent and the Grenadines	Yes	-	0	8
Trinidad and Tobago	Yes	-	1	0
UK-Anguilla	Yes	-	4	-
UK-Bermuda	No	No	-	-
UK-British Virgin Islands	Yes	-	1	1
UK-Cayman Islands	No	No	-	-
UK-Montserrat	Yes	-	2	4
UK-Turks and Caicos	-	-	-	-
USA-Puerto Rico	Yes	-	46	46
USA-US Virgin Islands	Yes	-	3	4
Venezuela	No	Yes	0	60

Q21 Does the TWFP/NTWC/NDMO have standard operating procedures in place for the receipt and dissemination of tsunami alerts?

Answered: 33 Skipped: 3



ANSWER CHOICES	RESPONSES	
Yes	96.97%	32
No	3.03%	1
TOTAL		33

Comments:

France: E-mail distribution procedures are doubled by telephone calls.

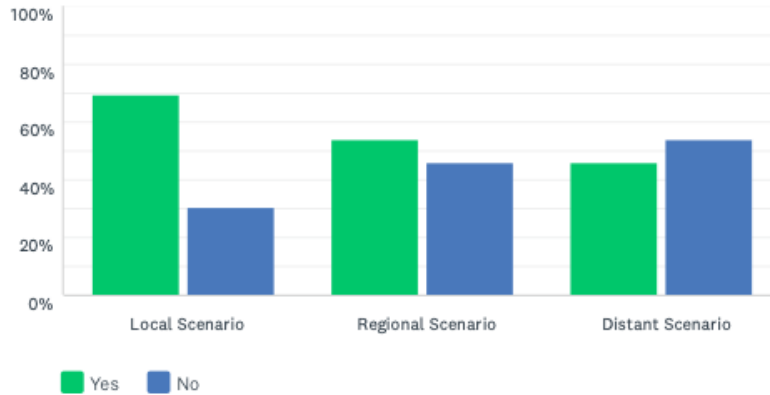
Jamaica: To be updated in 2021 – Results of CW21.

Panama: Need to be adjust.

Venezuela: Currently, the creation of a tsunami warning centre is being developed. The idea is to operate it from Funvisis facilities. The centre will work hand in hand with the Navy and the National Institute of Aquatic Spaces (INEA). However, nowadays Funvisis acts as a forwarding centre for messages associated with tsunami warnings.

**Q22 Are tsunami inundation maps available for your Country/Territory?
Select from the following list.**

Answered: 34 Skipped: 2



	YES	NO	TOTAL	WEIGHTED AVERAGE
Local Scenario	69.70% 23	30.30% 10	33	1.30
Regional Scenario	53.85% 14	46.15% 12	26	1.46
Distant Scenario	46.15% 12	53.85% 14	26	1.54

Comments:

Dominican Republic: Just for San Felipe Puerto Plata.

France: See the answers given by the island of the West Indies.

Guatemala: High resolution bathymetry/elevation data is not available or the full territory extension.

Jamaica: One community – Old Harbour Bay.

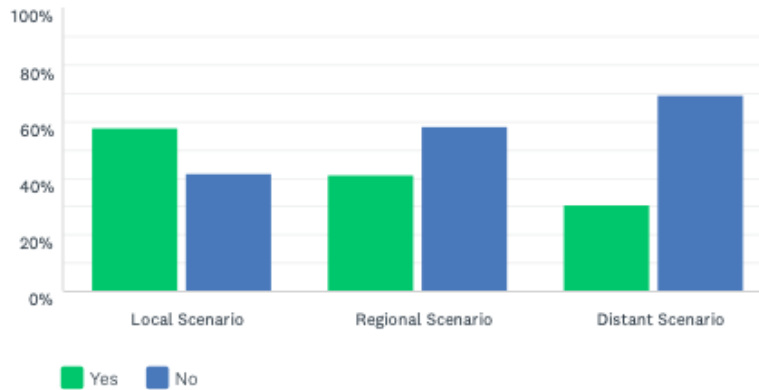
Panama: Local scenario for a few communities in the country. Regional scenario from Central America.

Saint Lucia: Saint Lucia is interested in developing tsunamis inundation maps for our selected coastal community.

UK-Anguilla: The same map is used.

**Q23 Are tsunami evacuation maps available for your Country/Territory?
Select from the following list.**

Answered: 32 Skipped: 4



	YES	NO	TOTAL	WEIGHTED AVERAGE
Local Scenario	58.06% 18	41.94% 13	31	1.42
Regional Scenario	41.67% 10	58.33% 14	24	1.58
Distant Scenario	30.43% 7	69.57% 16	23	1.70

Comments:

Dominican Republic: For San Felipe Puerto Plata.

France: See the answered given by the islands of the West Indies.

Guyana: The maps are for flooding so I think that they may be useful.

Jamaica: One community – Old Harbour Bay.

Panama: Local scenario evacuation maps for a few places.

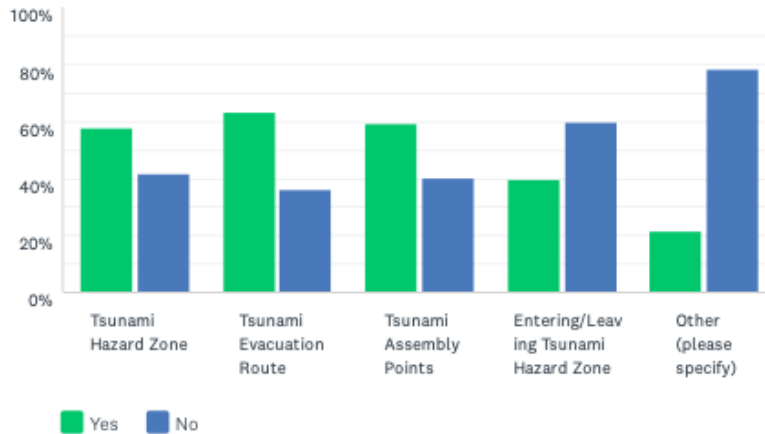
Saint Lucia: Saint Lucia is interested in developing tsunami evacuation maps for its vulnerable coastal communities.

Trinidad and Tobago: Only for the tsunami-ready community.

UK-Anguilla: The same map is used.

Q24 Are tsunami signages available for your Country/Territory? Select from the following list.

Answered: 33 Skipped: 3



	YES	NO	TOTAL	WEIGHTED AVERAGE
Tsunami Hazard Zone	58.06% 18	41.94% 13	31	1.42
Tsunami Evacuation Route	63.64% 21	36.36% 12	33	1.36
Tsunami Assembly Points	59.38% 19	40.63% 13	32	1.41
Entering/Leaving Tsunami Hazard Zone	40.00% 10	60.00% 15	25	1.60
Other (please specify)	21.43% 3	78.57% 11	14	1.79

Comments:

Barbados: Informational billboards.

Brazil: There is none.

Costa Rica: Large evacuation maps.

Dominican Republic: We have but they are not installed.

France: See the answers given by the island of West Indies.

Grenada: The signages posted are the communities that have been recognized as Tsunami Ready.

Jamaica: One community – Old Harbour Bay

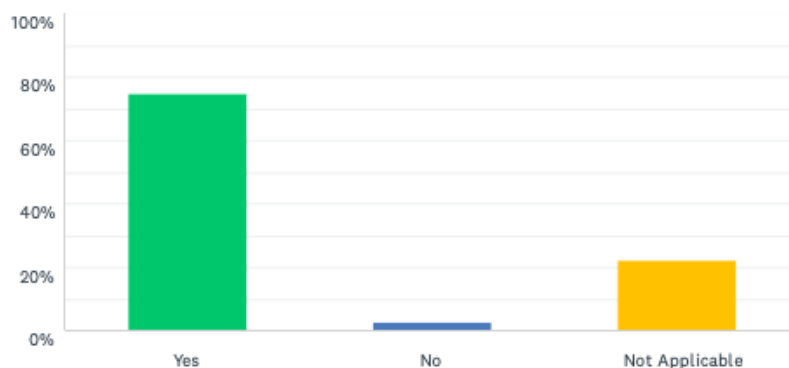
NL-Bonaire, Saba, Sint Eustatius: This has been suggested but is up to local governments.

Saint Lucia: Discussions have started with the Bureau of Standards for the specifications of such signage, but no signs are currently available. Saint Lucia would like to have these signs in place at the earliest.

Trinidad and Tobago: Particularly for the tsunami-ready community.

Q25 Did the exercise planning go well?

Answered: 36 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	75.00%	27
No	2.78%	1
Not Applicable	22.22%	8
TOTAL		36

Comments:

Colombia: Very well organized the webinars preparing for the CARIBE WAVE 21 exercise.

Grenada: Overall the exercise went well, however, there were areas identified for improvement.

Jamaica: However, COVID-19 condition led to cancellations of local activities/exercise.

NL-Curacao: Although we performed the exercise in virtual form.

Saint Lucia: There was not much opportunity to engage a local community to have an evacuation exercise due to COVID-19 restriction.

Venezuela: Despite the restrictions imposed by the pandemic, the objectives and goals proposed for this exercise were achieved.

Q26 How many people do you estimate participated in the exercise within your country/territory? In addition to national statistics, can also refer to registrations on <https://tsunamizone.org>

Answered: 32 Skipped: 4

Country		Participants according to Member States
Barbados		97
Colombia		70
Costa Rica		2
Cuba		250
Dominica		20
Dominican Republic		200
Grenada		2,568
Guyana		10
Haiti		100
Honduras		10
Jamaica		148
Mexico		560
Netherlands	Aruba	1,100
	Bonaire, Saba, Sint Eustatius	20
	Curacao	50
	Sint Maarten	100
Nicaragua		90
Panama		12
Saint Kitts and Nevis		102
Saint Lucia		228
Saint Vincent and the Grenadines		15
Trinidad and Tobago		346

United Kingdom	Bermuda	50
	British Virgin Islands	1,184
		1,500
United States	Puerto Rico	90,255
	US Virgin Island	4,000
Venezuela		29,590

**Q27 Please provide a general statement on your CARIBE WAVE 21
Tsunami Exercise experience or any additional comments related to the
exercise or Tsunami Ready**

Answered: 29 Skipped: 7

Country	Exercise Caribe Wave 21 General Statements
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<p align="center">Barbados</p>	<p>The communication aspect of the Caribe Wave exercise was a general success apart from a few misunderstandings early in the exercise which were resolved. The COVID-19 pandemic presented the opportunity for the island to solely test its telecommunications capabilities. This process was evaluated by qualified and experienced radio telecommunication specialist who concluded that the exercise was a success based on markers such as the span and rate of message transmission, the quality of the message relayed (radio etiquette, precise and clear information transmission, etc.). Caribe Wave 2021 provided a basis for evaluation and teaching strategy formulation where participants were able to be gauged on areas for improvement. The exercise also allowed for individuals who were new to the disaster management arena to be baptized with relation to the procedures, practices and the general atmosphere with regards to disaster response. The general consensus among the District Emergency Organizations who were able to test their ability to operate in a zone environment was that the experience was a great one, but they only wished the exercise lasted longer to facilitate more role play with regards to the plethora of scenarios they can encounter. The DEOs also indicated that they were intently looking forward to participation in similar exercises in the future. The Caribe Wave Exercise 2021 served not only as a practice run of procedures in case of a Tsunami but also served in promoting team building, confidence boosting of persons new to disaster management arena, promotion of cross agency collaboration and network building, encouraged recruitment and retention of members of the District Emergency Organizations but most importantly it served as a measure where through practical exercises such as these we are able to formulate programmes based on the existing apparatus in place to improve and increase training programmes, procure additional equipment and fine tune any other minor areas. In conclusion, the programme was marked a success as the generated alerts were efficiently and effectively dispersed via all available forms of telecommunication.</p>
<p align="center">Brazil</p>	<p>It was important to restart the communication between Nacional Contact and Focal Point.</p>
<p align="center">Colombia</p>	<p>Despite being in a pandemic, the exercise was successfully carried out, testing the protocols and procedures established at the national and local levels, as well as the use of different means of communication. It is necessary to continue working with the community in order to link their participation through evacuations in coastal areas in future exercises.</p>
<p align="center">Costa Rica</p>	<p>We just received the emails and one phone call from CNE saying they received the Dummy message.</p>

Cuba	All links of the National Tsunami Warning System were trained, in some cases virtually due to the measure applied for the pandemic. The experiences obtained were immediately applied to the improvement of the risk studies and the tsunami warning.
Dominica	In general, the planning and execution of the activities for Caribe Wave went well. Dominica chose to include an earthquake drill in schools in the activities for Caribe Wave which would have been followed by an evacuation for tsunami. However, given COVID-19 pandemic this was scaled back to simply discussing tsunami safety protocols and safety measures. Dominica also used the opportunity to conduct an Emergency Communication exercise to test communication capacity among national first responders and other key stakeholders. This allowed the disaster system to identify weaknesses that should be addressed particularly as we approach the 2021 hurricane season.
Dominican Republic	
France	Messaging with the communication media we use is correct but other tools will need to be explored to increase resilience.
Grenada	Participation in CARIBE WAVE 21 was another success. We had excellent stakeholder participation including some schools. There were areas identified for improvements within the tsunami protocol which will be addressed going forward.
Guatemala	The exercise will be replicated involving the national risk management office, after improvements of our internal protocols, currently under discussion, are finished.
Guyana	This year the COVID pandemic prevented us from having the usual multi-agency exercise. Additionally, the office has a few new forecasters, so a decision was made to walk them through the protocol using the different products. The reception of the initial message though the FAX, e-mail and CISM were covered. Next the Tsunami Travel Time tool was used with the initial information to determine the possible time of arrival if a wave were to be generated. As the other messages and products were made available, their uses were discussed.
Haiti	Haiti has realized this exercise. For Caribe Wave 2021, Haiti expected to make a better exercise. Unfortunately, it was impossible to do it because of the bad political and insecure situation.
Jamaica	The exercise was successful. Scenario presented a good basis for analysis of capacities (local/national), communication gaps, and usefulness of Warning Protocols. Exercise also served to re-orient/orient official on Warning Protocols as well as need for agency/organizational Tsunami Warning/Response Protocols.
Mexico	The plans and procedures were put into practice, including the measurements against COVID-19, which is why it is essential to continue carrying out this type of exercise.
Nicaragua	Although this exercise was atypical, due to the problems of the COVID 19 pandemic, the high levels of willingness and participation of the member countries through online communication allowed for significant progress,

	<p>which is highly commendable.</p>
<p>NL-Bonaire, Saba, and Sint Eustatius</p>	<p>In this case warning time between message and arrival of the wave was very short, meaning that as TWFP we expected local authorities to start procedures based on having felt the EQ. By the time we managed to reach them by phone (+20 min) it was already too late for Saba/St. Eustatius.</p> <p>It turned out mobile Saba numbers could not be reached from mainland NL, due to an issue with the provider. We are investigating what causes this problem. In the meantime, WhatsApp calls and calls to fixed numbers function properly.</p> <p>Reaching the right people is challenging because cellular reception is not good everywhere on the islands, meaning that sometimes mobiles do not work, and fixed lines need to be called.</p> <p>We will discuss improved communication with local governments. By introducing for example, a dedicated hot-line phone that they can forward to whatever phone they like.</p>
<p>NL-Curacao</p>	<p>This year we participated virtually to the CARIBE WAVE 21 Tsunami Exercise. This is an important exercise to make the population more aware of the dangers of a tsunami in the Caribbean. Curacao was in a lockdown and this impacted the way we participated to this exercise.</p>
<p>NL-Sint Maarten</p>	<p>We combined the Caribe Wave 21 exercise with an extensive ongoing training program which is ongoing with support from the Netherlands. We divided the disaster management teams in 6 groups. They were updated on their specific responsibilities within the disaster management system. Each session included a tabletop exercise using the Caribe Wave scenario. This was done during the entire week, so the timelines of the official exercise were not used.</p>
<p>Panama</p>	<p>The CARIBE WAVE 21 Tsunami Exercise provided a good experience, even it was a desktop event, because of the communication proof and results. In my personal opinion, future seismic parameters (as magnitude) should be selected considering historical tsunami data and geographical seismic zones. The magnitude of 8.0 Mw for Jamaica scenario was a bit overestimated.</p>
<p>Saint Kitts and Nevis</p>	<p>Virtual exercise provided an opportunity to capture decision makers and bring attention to the importance of their roles during a potential Tsunami impact. The testing of the cognitive skills brought a different dimension to the annual exercise that can be used to host more frequent tabletop exercises and target various communities and agency without utilizing or mobilizing a heavy resource pool.</p> <p>It also gave us the opportunity to be able to marry the cognitive and physical response. This strengthens monitoring and evaluation of the procedures and policies.</p>
<p>Saint Lucia</p>	<p>For CARIBE WAVE 21, and due to COVID-19 restrictions on mass gatherings, social distancing and other safety protocols, Saint Lucia decided to test their emergency early warning systems by triggering its sirens in three coastal communities, namely Anse La Raye, Canaries and Castries.</p> <p>Saint Lucia's exercise scenario was based on the Northern Antilles scenario. In preparation for the exercise, Saint Lucia participated in the two webinars, on January 26th and February 23rd.</p>

	<p>Saint Lucia's National Tsunami warning focal point, the St Lucia Met Service, received the dummy message from the PTWC at 14:04 UTC. However, the Tsunami Warning Center, the National Disaster Office did not receive the message.</p> <p>Additional, Saint Lucia has expressed an interest in implementing a Tsunami Ready programme to strengthen the tsunami preparedness and response in our vulnerable coastal communities. Formal confirmation has been received and the necessary infrastructure is being put into place to begin the Tsunami Ready journey.</p>
Saint Vincent and the Grenadines	<p>This year's participation was limited due to the ongoing volcanic activity at the La Soufriere volcano. We however were able to participate along with the Met service in the receipt of the PTWC messages and familiarize ourselves with the format.</p>
Trinidad and Tobago	<p>From the perspective of the TWFP, the exercise was a success for the most part, as messages were received on time and in good order. There was not much interaction with the NTWC beside communicating the PTWC messages to them and confirming receipt. Other agencies would have carried out their own exercises such as radio checks and outreach activities in a few communities.</p>
UK- Bermuda	<p>Overall, the CARIBE WAVE 21 exercise went well as a communications test. Although a review of our SOPs by BWS Management may be useful. Duty staff performed their functions well as outlined in the SOPs. In the interest of improving response times for every aspect of tsunami communication, it would be good to have more pre-canned messaging templates 'ready to go' for real events (and also for exercises). This will be considered in our review of SOPs in April. Also, it is noted that some of the messages that are not included in SOPs (especially with respect to social media) were sent out as a 'good idea' afterthought by BWS Management; social media messages should be included in the collection of templates. As a general note, we (Bermuda) need to develop more quick and pre-canned decision-making procedures for tsunamis. There remain open questions about what decisions would/could be made if a short fuse event occurs, especially in the middle of the night. Ongoing efforts to educate key decision makers about the real threats and uncertainties for natural hazards will be central to this effort.</p>
UK- British Virgin Islands	<p>This exercise was a bit different since we had to use COVID-19 protocols. This included practicing social distancing, wearing masks and using hand sanitizer. The stress of COVID-19 created a bit of fear in persons and they did not want to evacuate even though it was an exercise.</p>
UK- Cayman Islands	<p>We engaged the schools and asked them to test their response procedures. We also tested our emergency notification system, the radio interrupt and the emergency app which is about to launch.</p>
USA- Puerto Rico	<p>The communication at PREMB were excellent, we tested every communication system available to receive the alerts and disseminate them to the Municipal Emergency Management Office. The 46 TsunamiReady Communities and the TsunamiReady Supporter Agencies participated. 28 municipalities test their outdoor sirens, some of those sirens which were damaged after the hurricane Maria. Other communities painted evacuation routes on the streets (Toa Baja, Lajas, and Barceloneta) or on murals in the coastal area (Ponce). On the other hand, PRSN tested multiple</p>

	<p>communication methods with emergency management agencies in our area of responsibility (Puerto Rico and Virgin Islands Region). Starting on February 11, 2021, pre-exercise communication test was conducted to promote CARIBE WAVE Exercise in the Puerto Rico and Virgin Islands Region among emergency managers and the public. These tests were issued on February 11, March 1, March 7, and March 10, by all communication lines available in PRSN (dedicated telephones, emails, fax, text message, RSS, and social media). On March 11, 2021, we issued a total of 16 messages during CARIBE WAVE 2-21 Communication Exercise. The first one was a reminder of the exercise at 9:00 a.m. (Puerto Rico Local Time) to social media. The first PRSN bulletin was issued at 10:00 a.m. through the RSS, FAX, email service lists, SMS service list, Ring Down, Private Line Phone Call (Emergency Managers of Puerto Rico, Virgin Islands, and the Dominican Republic), Automatic Phone Call service list, PRSN web page, and social media, announcing the beginning of the exercise. In addition, 13 Official PRSN Bulletins were issued with Tsunami Warning, Advisory, and Cancellation information (in Spanish and English), as issued by the PTWC in domestic products for Puerto Rico and the Virgin Islands. All bulletins (from #01 to #13) were disseminated by NMEAD Radio Frequency, dedicated telephone lines, emails, fax, RSS, text messages, automatic calls, and social media. In general, the dissemination of the automatic products to emergency agencies in our region took place at approximate times of 0 to 5 minutes. Agency-to-Agency (a total of 8 emergency agencies) calls through the dedicated telephones lines were completed, on average, within 8 minutes. For this exercise, (only for Puerto Rico) the EAS system was activated in coordination with the Puerto Rico Emergency Management Bureau, National Weather Service (San Juan), Puerto Rico Broadcast Association, and Puerto Rico EAS Committee, through the following communication means: radio, T.V., cable, and NOAA weather radio. The real alert code tsunamis (TWS) was issued during the exercise at 10:07 a.m. on March 11, 2021, by the National Weather Service (San Juan Forecast Office) to announce the Tsunami Warning for Puerto Rico, according to the Northeastern Lesser Antilles Scenario choose for Puerto Rico and the Virgin Islands. At the PRSN we monitored the activation of EMWIN, the NOAA radios, as well as the Puerto Rico EAS (as scheduled for the exercise). At PRSN we received the PTWC Dummy Message at 10:00 a.m. (14:00 GMT) through the EMWIN System. Puerto Rico Broadcaster Association will prepare a final report about the activation of the EAS System for Puerto Rico. Puerto Rico Emergency Management Bureau emits the WEA for Puerto Rico at 9:47 a.m. (13:47 GMT) to remind the public of the CARIBE WAVE 2021 communication exercise.</p>
<p>USA-US Virgin Islands</p>	<p>Exercise participation went better than expected. Mass gatherings have individuals throughout the territory nervous. Messaging needs improvement.</p>
<p>Venezuela</p>	<p>As a scientific institution, FUNVISIS carried out assessments, before, during, and after the exercise. We provided immediate advice to risk management institutions at the national, regional and municipal levels. We disseminated through our social networks and website, proper contents, and make the entire population aware of our seismological and tsunamigenic realities. We celebrate this initiative that has indeed increased national awareness of tsunamis. Even more, we open a permanent exhibition in the Science Museum, Caracas, dedicated to explaining the tsunamis and how it has historically affected Venezuela.</p>

