

Scientific Caribbean Foundation



### Lessons from 2017 Hurricane Season in Dominica and Puerto Rico: An approach from Zero Order Responders (ZORs)

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June 5–7, 2019, XV Congreso Internacional de Investigación Científica in Santo Domingo, Dominican Republic.

# Outline

- Puerto Rico Background
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# Where is Puerto Rico?



# **Team Members**

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Dr. Ryan Vachon (CCB/INSTAAR. University of Colorado-Boulder)

Mr. Donaldson Frederick (Office of Disaster Management, Dominica)

### Alumni TIES, Trinidad and Tobago Meeting, February 2018



# **Proposal to World Learning**

Proposal Name: Lessons from 2017 Hurricane Season in Puerto Rico and Dominica. An approach from Zero Order Responders (ZORs)

Project Dates (Month/Year to Month/Year): 05/2018 to 10/2018

Project Team Leader's Name, Country, U.S. Government-Sponsored Exchange Program and Year: Juan Arratia, Puerto Rico, USA, US-India Fulbright Administrative Program, 2017

Other Alumni Team Members' Names, Countries, U.S. Government-Sponsored Exchange Program and Year:

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I certify that all statements on this form, and attachments to it, are true, complete, and correct to the best of my knowledge and belief, and are made in good faith.

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Signature:

# **Project Abstract**

- In 2018 Dr. Juan F. Arratia, then the Executive Director of the Student Research Development Center (SRDC), and now a Professor and Researcher of Scientific Caribbean Foundation in San Juan, Puerto Rico and a group of scientists from the University of Colorado, Boulder, Dr. Michael Glantz, Dr. Fernando Briones, Dr. Ryan Vachon planned a strategy to collect information about Hurricane Maria for future hydro meteorological extreme hazards. A proposal was developed and presented to the Bureau of Educational and Cultural Affairs of the US Department of State. The proposal was funded, and two field trips were implemented to collect data: one in Puerto Rico, in the months of October-November 2018 and the second in Dominica in February 2019. The areas visited in Puerto Rico were: Arecibo, Hatillo, Utuado and Jayuya, and in Dominica were: Roseau, Scotts Heads, Castle Bruce and Petite Soufriere. The data collection process in both islands dealt with interviewing local agencies, stakeholders and local leaders, and particularly the affected people, testimonies and interpretations of their actions to cope and survival strategies during the emergency and the following months. We used the Zero Order Responders (ZORs) approach to learn about the effect of 2017 Hurricane Season in Dominica and Puerto Rico. The ZORs are citizens who live at ground zero of disasters, improvising to survive. As natural hazards unfold and before official first responders arrive, affected people have to face disasters on their own. The methodology to identify the lessons from ZORs followed an anthropological approach with semi-structured interviews as the main tool. Some of the major conclusions of the project is that the ZORs actions were implemented in communities across Puerto Rico and in Dominica; those actions were family based. A full description of the data collected and specially the outcomes and best practices of interviews to ZORs in Puerto Rico and Dominica will be disseminated in June 5-7, 2019 at the XV Congreso Internacional de Investigación Científica in Santo Domingo, Dominican Republic.
- Keywords: Zero Order Responders (ZORs), Disaster Risk Reduction (DRR), Hydro Meteorological Extreme Hazards.

### Who are the Zero Oder Responders?

The Zero Order Responders or ZORs are citizens who live at ground zero of disasters, improvising to survive. As natural hazards unfold and before official first responders arrive, affected population are demanded to face disasters on their own.

# Main actors in the post disaster interventions after Hurricane Maria in Puerto Rico



### Civil radio communication systems supporting families in Utuado, Central Puerto Rico



# Best track positions for Hurricane Maria, 16-30 September 2017.



### Trajectory of Hurricane Maria over Puerto Rico. Source NOAA



#### Hurricane Maria, 20 - 21 September 2017 Annual Exceedance Probabilities (AEPs) for the Worst Case 12-hour Rainfall

**NDRR** 



Hydrometeorological Design Studies Center Office of Water Prediction, National Weather Service National Oceanic and Atmospheric Administration

http://www.nws.noaa.gov/oh/hdsc/

Created 21 Sep 2017 Rainfall frequency estimates are from NOAA Atlas 14 Rainfall values come from 6-hour Stage IV data. 1/50 - 1/10
1/100 - 1/50
1/200 - 1/100
1/200 - 1/100
1/500 - 1/200
1/1000 - 1/500
< 1/1000</p>



### The impact of 2017 Hurricane Season in Dominica and Puerto Rico

Two major hurricanes in the Caribbean Sea impacted late August and September 2017 Antigua and Barbuda, Anguilla, Bahamas, British Virgin Islands, Cuba, Dominican Republic, Haiti, Puerto Rico, St Barthelemy, St. Martin, Sint Maarten, Turks and Caicos, and the US Virgin Islands. Both Category 5 Hurricanes Irma and Maria affected over 5.5 million people in the Caribbean Islands, with wind speeds higher than 175 miles per hour.

# Hurricane Maria in Dominica

• On September 19, Hurricane Maria struck Dominica before pursuing its trajectory to Puerto Rico. The small island (pop. 74,000) in the eastern Caribbean between Guadeloupe and Martinique, was sweep out for the first time by a Category 5 hurricane since records began (Masters, 2017). The devastation in Dominica was massive, with around 90% of house roofs damaged or destroyed. Also, crops and infrastructure were destroyed, leaving communities isolated due the landslide that blocked roads. For almost a year, around 50% of the habitants lived without electricity.

### Building damage in Dominica, ReliefWeb/UNOSAT, 2017



Satellite images taken at night. Puerto Rico in July, top. Button after Hurricane Maria. NOAA National Environmental Satellite, Data, and Information Service (NESDIS)



#### POST HURRICANE MARIA - 24 SEPT. 2017

# Field Work in Puerto Rico.



### Survey after One Year of Hurricane Maria (November 2018)

- > During the last Hurricane Season, did you get support before, during and after the hurricanes?
- Which hurricane was the most divesting in your area?
- What kind of support did you needed and did not arrived?
- > Describe the main problems that you lived during and after the hurricanes
- a) Did your life was in danger?
- b) Did you lose your job?
- C) Did your house was damage?
- What were the main actions that you to cope with the impact of the hurricanes?
- a) Did you got help from your family? Friends? Community?
- b) What did you do to get income again?
- > Describe the particular actions that you did in order to return back to normal life
- Did you improvise? Did you was creative?
- b) What kind of improvised actions were helpful?
- c) What did you do to deal with lack of electricity and water?
- What do you think that should be done by the authorities during and after the hurricanes?
- a) What do you think about PR and US recovery-relief actions?
- **Did you feel fully recovery from the 2017 hurricane season?**
- a) What do you still need to be fully recovery?
- b) Are you ready to the 2018 hurricane season?
- What did you learn from 2017 hurricane season?
- a) How hurricanes Maria and Irma changed your life?
- b) What action you will not do again what action where the most useful?

### In remote villages in Central Puerto Rico, Jayuya, many houses still needs to be repaired



# Video

# References

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# Aknowledgments

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