

Improving Disaster Information and Communication Technology through Co-Design and Tabletop Exercises

Puerto Rico

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Original Research Overview



We are building a civic tech platform that integrates **mobile and web applications**, **data intelligence** and **social infrastructure** to connect residents, community groups, and disaster management & aid organizations to **direct the right responses to the right places at the right time.**



Original Research Overview

Purpose

Part 1: Cultural Probes – Explore & Understand

To collaborate with residents, community-based organizations (CBOs), and humanitarian aid agencies to co-design the process of **crowdsourcing using the method of cultural probe**, in response to **constraints from the pandemic** as well as reoccurring issues due to the **physical distances for remote or underserved communities**.



Research Site

Puerto Rico

Loíza

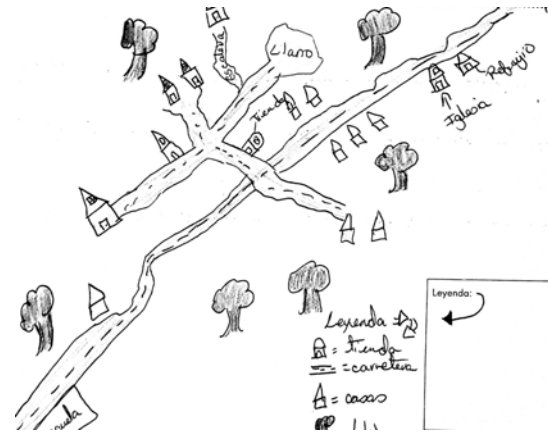
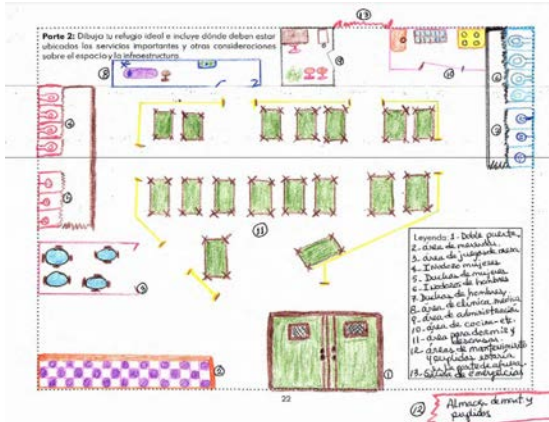
Ponce

Lajas



Timeline

February - August, 2021



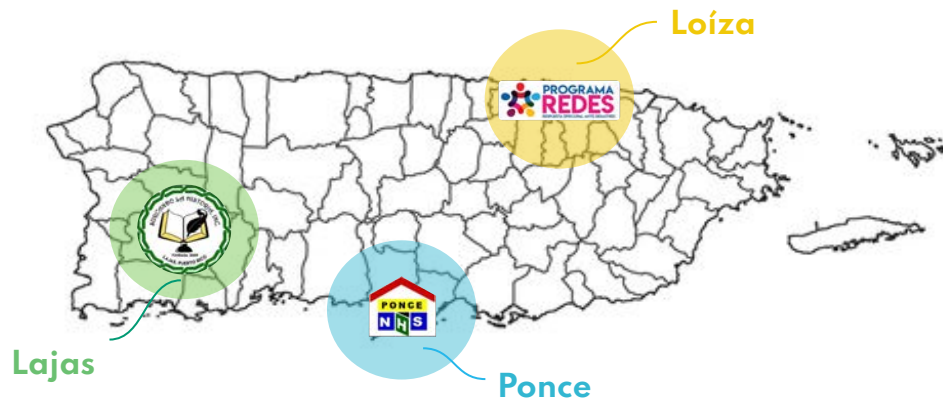
Continuation Award Project Overview



Part 2: Tabletop Exercises – Build, Test, & Iterate

- 1) Software technology:** Conduct research and user testing to improve the software technology design to ensure that re+connect is **reliable, user-friendly, and accessible**
- 2) Social infrastructure**—Increase understanding of how stakeholders interact during disaster relief resource allocation and distribution so re+connect can **foster more inclusive collaboration**; and
- 3) Data intelligence**—Explore how stakeholders use data in disaster management to make sure that re+connect **leads to equitable and effective resource allocation and distribution**.

Community Partners



Roles & Responsibilities

- 1) Participate in co-design sessions
- 2) Complete IRB/administrative requirements
- 3) Recruit tabletop exercise participants (2 community leaders, 5 residents, 2 municipal representatives)
- 4) Secure and prepare venue
- 5) Logistics support

Project Activities



1. Project Setup and Planning

February 1 - March 8: The research team collaborated with CBOs to **align research goals, agenda, and logistics**

2. Plan for Co-Design

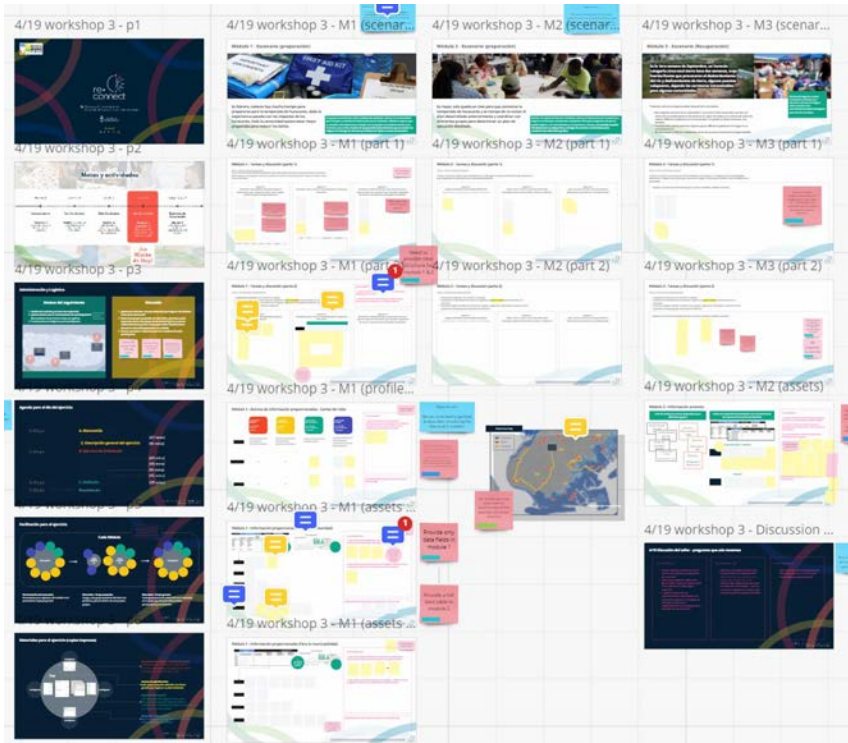
March 8 - 27: The research team **integrated Homeland Security Exercise and Evaluation Program principles and design research** to prepare for co-design sessions with CBOs

3. Co-Design and Recruitment

March 27 - April 19: The research team and CBO leaders conducted three co-design workshops to develop and **refine the different aspects of the tabletop exercises**. CBO leaders also **recruited resident and municipal representative participants** based on co-created standards.



Work Product(s)



Co-Design Materials:

- ❑ 3X presentations (discussion & activities guide)
- ❑ Exercise material iterations

Project Activities



4. Tabletop Exercises

May 3 - 5: The research team **conducted one tabletop exercise in each of the three communities**. Modifications of the workshop materials were made based on feedback and lessons learned from completed workshops

5. Synthesis and Writeups

May 5 - July 14: The research team **reviewed, annotated, and synthesized notes and transcripts** from the workshops and prepared a written report.

6. Disseminate Results

August: The research team prepared a **presentation to share findings and lessons** with peers and workshop participants.



Work Product(s)

Objetivos que esperamos puedan realizar hoy

Las agencias municipales de manejo de desastres, los grupos comunitarios y los residentes pueden usar las herramientas de re+connect para trabajar colectivamente en:

La Fase de Preparación
Hacer planes de preparación para desastres basados en colaboración y grupos de trabajo.

Suposiciones de nuestro ejercicio

Municipio **Residentes** **Lider Comunitario**

1.
Sus acciones y cómo toman decisiones deben estar alineadas con los atributos definidos en sus tarjetas de perfil.

2.
El huracán categoría cinco tocó tierra hace dos semanas, trajo fuertes lluvias que provocaron el desbordamiento del río y deslizamientos de tierra, algunos puentes colapsaron, dejando las carreteras con difícil acceso para algunas comunidades e individuos.

3.
Se compartieron nuevas actualizaciones sobre los impactos en las personas y el municipio también recibió algunos suministros para desastres. Es el momento de asignar estos recursos a las comunidades que más los necesitan.

Respuesta y Recuperación

Tu Meta
En base a la información de impactos y recursos, trabajo con el municipio/comunidad para priorizar y asignar recursos que ayuden a satisfacer las necesidades de las comunidades/individuos/hogares.

Exercise Materials:

- ❑ **Intro presentation**
- ❑ Exercise module 1, 2 (scenario + discussion guide)
- ❑ Data & prototype for exercise
- ❑ Participant Profiles
- ❑ Evaluation guide
- ❑ Participant Debrief Survey form

Work Product(s)

Parte 1 - Identificar poblaciones prioritarias por tipo de recurso

1. ¿Qué características debe considerarse para asignar generadores?

Generadores

DEMOGRÁFICO

NECESIDADES ESPECIALES

CONEXIÓN SOCIAL

INFRAESTRUCTURA

EVALUACIÓN DE IMPACTO DE DESASTRES



Parte 1 - Identificar características - comunidad

Casos que debemos considerar

- Pueden combinarse diferentes poblaciones/comunidades (cómo están interrelacionados entre sí)
- Considerar múltiples prioridades
- Agregarse otros casos que se encuentren en el territorio



Generadores

1. ¿Qué características deben priorizarse?

característica	característica	característica
Parte 2 - Comunidad: Asignar roles y tareas		
¿Qué roles/tareas debería tener su comunidad para la asignación y distribución de suministros?	¿Qué habilidades y atributos son importantes para este rol/tareas?	¿Cuáles activos asumirán los roles/tareas?
ejemplo: <input type="text" value="chofer"/>	<input type="text" value="licencia"/>	<input type="text" value="Luisa, Maria"/>
1. <input type="text"/>		
2. <input type="text"/>		
3. <input type="text"/>		
4. <input type="text"/>		
5. <input type="text"/>		

Parte 3 - Municipio: Documenten cualquier cambio nuevo que hayan hecho en la asignación de recursos para la Comunidad 001



	Cantidad para Comunidad 001	Comentarios/ Nueva solicitud recibida	Finalizada Cantidad
	<input type="text"/>	<input type="text"/>	<input type="text"/>
	<input type="text"/>	<input type="text"/>	<input type="text"/>

Explique cómo tomaron las decisiones de asignación

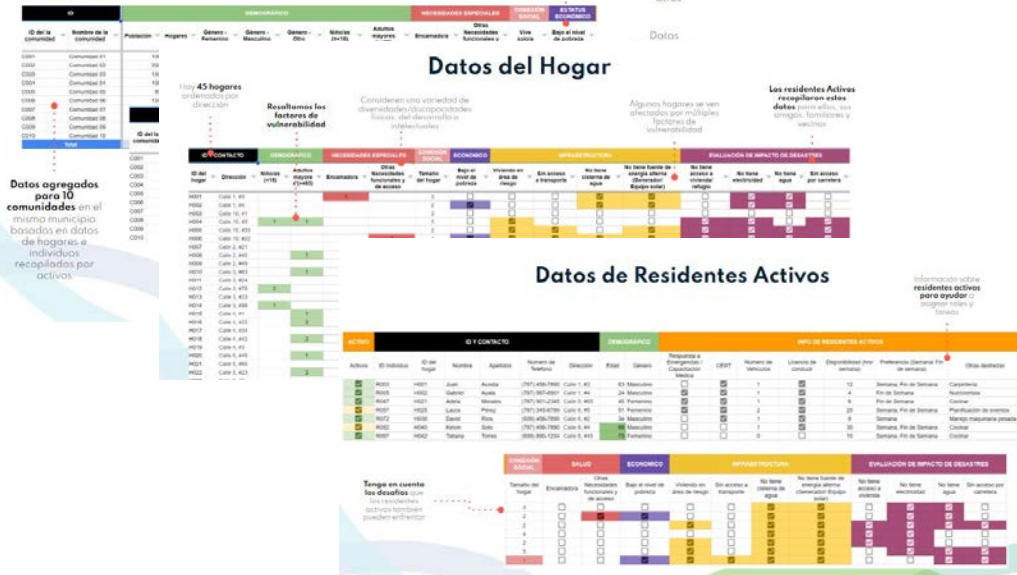
Exercise Materials:

- Intro presentation
- Exercise module 1, 2 (scenario + discussion guide)**
- Data & prototype for exercise
- Participant Profiles
- Evaluation guide
- Participant Debrief Survey form

Work Product(s)

Datos Agregados de la Comunidad

Considerando cómo los distintos factores interaccion e interactúan con otros



Exercise Materials:

- Intro presentation
- Exercise module 1, 2 (scenario + discussion guide)
- Data & prototype for exercise**
- Participant Profiles
- Evaluation guide
- Participant Debrief Survey form

Work Product(s)

Exercise Materials:

- Intro presentation
- Exercise module 1, 2 (scenario + discussion guide)
- Data & prototype for exercise
- Role profiles**
- Evaluation guide
- Participant Debrief Survey form

The image displays three screenshots of a digital form titled 'Centro de Perfil' (Profile Center) for disaster simulation exercises. Each form is for a different participant and includes various sections:

- Participant 1: Kelvin Soto**
 - Identificación:** Línea Comunal #8002, Edad 18 (Días), Dirección Calle E, #4, ID del Hogar #1052.
 - Motivación:** Reunir a las personas para un cambio positivo en la comunidad, Reconocimiento, empoderar oportunidades de crecimiento, Alargarme de que nadie se quede atrás, especialmente desastres.
 - Responsabilidad y Prioridad:** Fomentar el apoyo mutuo y la unión de las personas de la comunidad, Empoderar a la comunidad y autoayudarse, Minimizar el tiempo de recuperación de desastres.
 - Estado:** Encamabaja, Otras Necesidades Funcionales y de Acceso.
 - Infraestructura:** Viviendo en Área de Riesgo, Sin acceso a transporte, Sin Sistema de Agua, Sin Fuente de Energía Alternativa (Generador/ Equipo solar).
 - Estatus Económico:** Bajo el Nivel de Pobreza, Desempleado/a, Pensión/Asistencia del Gobierno.
 - Capacitación y Preparación:** Coposición en respuesta a emergencias, Coposición en CERT, Licencia de Conducir, Otros Destinos: Substituta.
 - Disponibilidad para ayudar como:** Ninguna, Día de semana, Fin de semana.
- Participant 2: Gabriel Ayala**
 - Identificación:** Edad 24 (Días), Número de Teléfono (797) 657-8507, Dirección Calle E, #4, ID del Hogar #1052, Otros Miembros del Hogar: Celso Ayala (Edad 26).
 - Motivación:** Mantenerme sano y seguro, Mantenerme conectado con las personas de la comunidad, Crecimiento personal y profesional, Mantener mi seguridad financiera.
 - Estado:** Encamabaja, Otras Necesidades Funcionales y de Acceso.
 - Infraestructura:** Viviendo en Área de Riesgo, Sin acceso a transporte, Sin Sistema de Agua, Sin Fuente de Energía Alternativa (Generador/ Equipo solar).
 - Estatus Económico:** Bajo el Nivel de Pobreza, Desempleado/a, Pensión/Asistencia del Gobierno.
 - Capacitación y Preparación:** Coposición en respuesta a emergencias, Coposición en CERT, Licencia de Conducir, Otros Destinos: Substituta.
 - Disponibilidad para ayudar como residente activo:** Ninguna, Día de Semana, Fin de semana.
- Participant 3: Cristina Rosario**
 - Identificación:** Edad 38 (Años), Departamento Municipal: Oficina Municipal de Manejo de Emergencias, Título y Posición: Gestora.
 - Motivación:** Generar un impacto positivo y ayudar a las personas y comunidades en necesidad, Crecer con las expectativas de las personas y los equipos de recuperación de desastres, Crecimiento profesional personal y satisfacción laboral.
 - Responsabilidad:** Desarrollar un plan de preparación para desastres, Gestionar la adquisición y el seguimiento de suministros.
 - Prioridad:** Otros programas de asistencia económica y social en cinco sectores: Planificación, Vivienda, Economía, Infraestructura y Multicultural, Vivir con justicia y equidad de oportunidades, Promoción del emprendimiento y desarrollo económico, Mejorar la salud pública y el acceso a la atención médica.

Work Product(s)

Debrief & Feedback Form

This survey should be completed and returned to the Facilitator. The information contained in this survey will help to generate next step recommendations. Thank you in advance for your input.

Name (Optional) _____

Date _____

Your role in this exercise (Circle what apply)

1-Municipal Representative 2-Community Leader

Part 1. Rate your experience

#	Assessment Factors	Strongly agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
1	The exercise was well structured and organized	5	4	3	2	1
2	The facilitator(s) was knowledgeable about the material, kept the exercise on target, and was sensitive to group dynamics	5	4	3	2	1
3	I felt supported to share and discuss my ideas openly in the small discussion group	5	4	3	2	1
4	I felt supported to share and discuss my ideas openly in the large discussion group	5	4	3	2	1
5	I felt encouraged to participate in the decision-making process	5	4	3	2	1
6	I have learned new things about disaster management from other members in my group	5	4	3	2	1
7	The ideas I proposed were incorporated into the decision-making process	5	4	3	2	1
8	The ideas I proposed were incorporated into the final response and results	5	4	3	2	1

Part 2. Rate the potentials of re+connect

This tabletop exercise with participation from user groups like you is critical for us to develop an accessible, reliable, and user-friendly platform.

Complete the assessment of this part if you were a resident in this exercise:

Based on your experience with the prototype (information tables and charts as well as the process), how likely do you think future versions of re+connect tools will be able to improve disaster resilience for the following aspects:

- Circle three of the aspects that you consider to be most important.
- Provide your ratings for the following aspects.

#	Assessment Factors	Strongly agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
1	Increase residents' awareness of community disaster management needs and measures	5	4	3	2	1
2	Increase in positive attitudes toward engaging in disaster planning and risk reduction	5	4	3	2	1
3	Increase in interactions with other community members	5	4	3	2	1
4	Increase in civic engagement activities (attending meetings, contact with decision-makers, voting)	5	4	3	2	1
5	Increase in levels of trust in neighbors and the local community	5	4	3	2	1
6	Improve trust for their communities and government/agencies	5	4	3	2	1
7	Improve access to disaster relief resources and services in an equitable and effective manner	5	4	3	2	1
8	Bridge the gap for residents with special needs	5	4	3	2	1
9	Reduce time between event onset and service/resource delivery	5	4	3	2	1
10	Improve access to and participation in decision-making process	5	4	3	2	1

Any additional feedback that you would like to share with us?

Exercise Materials:

- Intro presentation
- Exercise module 1, 2 (scenario + discussion guide)
- Data & prototype for exercise
- Participant Profiles
- Evaluation guide**
- Participant Debrief Survey form**

Results



Tabletop Session Tasks Completed:

25 participants across **3** three-hour sessions in **3** communities

- 1) set **priority populations** (and the intersections of different vulnerability factors) for different resources;
- 2) how **allocation decisions** are made at the **municipal level**;
- 3) how **communities assign roles and tasks** among resident community ambassadors;
- 4) how communities **allocate relief resources to households/individuals**.

Results



Results from the Evaluation of the Tabletop Exercises (N = 25)

Assessment Statement	Average Level of Agreement
The exercise was well-structured and organized	4.84
The facilitator(s) was knowledgeable about the material, kept the exercise on target, and was sensitive to group dynamics	4.88
I felt supported to share and discuss my ideas openly in the small discussion group	4.94
I felt supported to share and discuss my ideas openly in the large discussion group	4.96
I felt encouraged to participate in the decision-making process	4.92
I have learned new things about disaster management from other members of my group	4.88
The ideas I proposed were incorporated into the decision-making process	4.80
The ideas I proposed were incorporated into the final response and results	4.88

(Strongly agree = 5; Agree = 4; Neither Agree or Disagree = 3; Disagree = 2; Strongly Disagree = 1)

Results



Level of Agreement with re+connect's Potential for Residents

Assessment Statement	Average Level of Agreement
Increase residents' awareness of community disaster management needs and measures	4.91
Increase in positive attitudes toward engaging in disaster planning and risk reduction	4.95
Increase in interactions with other community members	4.94
Increase in civic engagement activities (attending meetings, contact with decision-makers, voting)	4.95
Increase in levels of trust in neighbors and the local community	4.89
Improve trust for their communities and government/agencies	4.90
Improve access to disaster relief resources and services in an equitable and effective manner	4.95
Bridge the gap for residents with special needs	4.82
Reduce time between event onset and service/resource delivery	4.83
Improve residents' access to and participation in the decision-making process	4.89

(Strongly agree = 5; Agree = 4; Neither Agree or Disagree = 3; Disagree = 2; Strongly Disagree = 1)

Results



Level of Agreement with re+connect's Potential for Disaster Management Agencies and Community Groups

Assessment Statement	Average Level of Agreement
Improved understanding of community needs	5.00
Easier to connect and coordinate with other organizations	4.90
Easier to connect and coordinate with residents	4.94
Increased interactions with other organizations	4.88
Greater trust with other organizations	4.82
Greater trust with residents	4.83
Improved disaster management planning and preparedness with access to community information and decision-making support	4.95
More inclusive and equitable decision-making process	5.00
Increased access to funding/resources for disaster management activities (preparation, recovery, etc.)	4.95
More equitable and effective resource allocation and distribution	4.95

(Strongly agree = 5; Agree = 4; Neither Agree or Disagree = 3; Disagree = 2; Strongly Disagree = 1)

Results



Parte 1 - Identificar características

Parte 3 - Comunidad: Asignar suministros

Generaciones

Generaciones	Roger	Caridad
1	31	
2	27	
3	13	
4	14	
5	18	
6	25	
7	21	

Activar Asignaciones

Handwritten notes:

... de la parte de los suministros y también con condiciones y normas de los suministros
 - se requiere que los suministros sean fáciles de usar y que los suministros sean fáciles de usar
 - se requiere que los suministros sean fáciles de usar y que los suministros sean fáciles de usar
 - se requiere que los suministros sean fáciles de usar y que los suministros sean fáciles de usar

workshop notes and transcripts

analysis

Observation ID	Phase	Observation	Analysis
001	Planning	The team discussed about how they will proceed in the disaster and how they will handle the disaster.	Planning is a critical phase in disaster management. It involves identifying potential hazards, assessing vulnerabilities, and developing strategies to minimize the impact of disasters.
002	Design	The team discussed about how they will proceed in the disaster and how they will handle the disaster.	Design is a critical phase in disaster management. It involves identifying potential hazards, assessing vulnerabilities, and developing strategies to minimize the impact of disasters.
003	Implementation	The team discussed about how they will proceed in the disaster and how they will handle the disaster.	Implementation is a critical phase in disaster management. It involves identifying potential hazards, assessing vulnerabilities, and developing strategies to minimize the impact of disasters.
004	Evaluation	The team discussed about how they will proceed in the disaster and how they will handle the disaster.	Evaluation is a critical phase in disaster management. It involves identifying potential hazards, assessing vulnerabilities, and developing strategies to minimize the impact of disasters.

organized observations

Insight ID	Insight
001	The team discussed about how they will proceed in the disaster and how they will handle the disaster.
002	The team discussed about how they will proceed in the disaster and how they will handle the disaster.
003	The team discussed about how they will proceed in the disaster and how they will handle the disaster.
004	The team discussed about how they will proceed in the disaster and how they will handle the disaster.

insights

Results



Insights Snapshot

- 1) Different data users need **different levels of information granularity**, especially for some particular population groups such as children, elderly, and the bedridden
- 2) Different communities and stakeholder groups **make decisions based on on a complex combination** of factors and processes
- 3) There are current **information, communication, and procedural gaps** between communities and municipalities in how they prioritize and allocate resources

Lessons Learned & Reflections



What Worked:

- 1) Close collaboration with community partners** in designing all key aspects of the exercise
- 2) Pilot testing and agile iterative development process** to improve key aspects of the exercise for future workshops
- 3) Long-term collaboration** with our community partners to make sure that we are building something that they want and to ensure mutual trust in the process

Challenges & Lessons:

- 1) First time** that some of the team members designed and conducted a tabletop exercise
- 2) Translate our digital designs into the analog** form that preserves the content and most functionalities
- 3) Adapt quickly** to logistics challenges and improve exercise materials

Acknowledgements



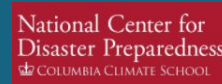
Reverenda Ana Rosa Mendez, REDES

Luis Daniel Oliveras, REDES

Israel Roman, Surcando La Historia

Jomarys Maldonado, Ponce HNS

Residents and municipal representatives from
Ponce, Loiza, and Lajas



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