Emergency Preparation Toolkit

Strategies and Tools for Community Emergency Preparation

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Project Files and Resources available at: PRPC
https://wp.wpi.edu/puertorico/projects/2023-mar-may-2/ccan/

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Introduction

This toolkit was created by a group of students from Worcester Polytechnic Institute working with the Puerto Rico Project Center (PPRC). The goal of their project was to advance the emergency preparations for natural disasters for small communities in Puerto Rico. One of their main tasks was to continue the work of a previous group working in Piñones. Their program was called the Piñones Preparation, Response, Recovery Project which involved using a technical mapping system to display the information they gathered from residents in an actionable manner. The current group decided to expand this program for their sponsor organizations and others in Puerto Rico.

The purpose of this toolkit is to help provide communities strategies for effective emergency preparation. In times of emergency, such as hurricanes, one of the most important strategies is to plan and have systems in place to allow for effective response. The two main strategies featured in this toolkit are the Critical Information System (CIS) and the Emergency Support Function (ESF) chart.

The CIS is a system that uses Google Forms, Google Sheets and Google My Maps to collect important information from people living in the surrounding area to identify individual and community assets and vulnerabilities. The CIS uses Google Forms to ask questions about an individual's current conditions and if they would be vulnerable during an emergency. This data is then placed into the Google Sheet and then into a Google My Maps map that shows the person's location and information. The map can be customized to show specific information and all data can be held confidential by the managing organization.

The ESF chart uses information from Puerto Rico's All Hazards Plan to evaluate a community center's capabilities during times of crisis. The All-Hazards Plan was created by the Puerto Rican Government to prepare the country for hurricane season. The chart takes all the major capabilities that the All-Hazards Plan says are essential and puts them into a checklist for centers to easily check for what they already have, what they have in the works and what they need to prepare for the future.

Both plans provide help and guidance to those looking to better prepare for emergencies. One gives a better understanding of the surrounding area and the other gives helpful advice for what should be in place in case an emergency happens.

Critical Information System (CIS)

Google Drive Based Emergency Data Management Tool

Acknowledgements

This document represents a collaborative effort between multiple different teams working in the Worcester Polytechnic Institute Puerto Rico Project Center. The nature of this work is to be left behind for others to build on. Students work to evolve projects and concepts across multiple teams and years. We have benefited greatly from this collaboration, and we invite others to build on our work.

The base system and this manual are built off the work done by the Piñones Preparation Response and Recovery project in 2021. The original concept was created by Jack Gomes, Cole Varney, Sarah Hildreth and Nicole Logrecco in collaboration with their sponsor organization La Corporacion Piñones Se Integra (COPI) as well as co-researchers Paola Rolon and Shawn Halliburton. Please find more about this project here: https://wp.wpi.edu/puertorico/projects/2021-fall/pinones-mapping

The information provided in their report as well as in the accompanying technical manuals has helped shape this approach to information mapping for emergencies. This report evolves the previous work by tailoring it to be more helpful for community centers. We have greatly expanded the questions asked and have done more research on Google My Maps as a whole.

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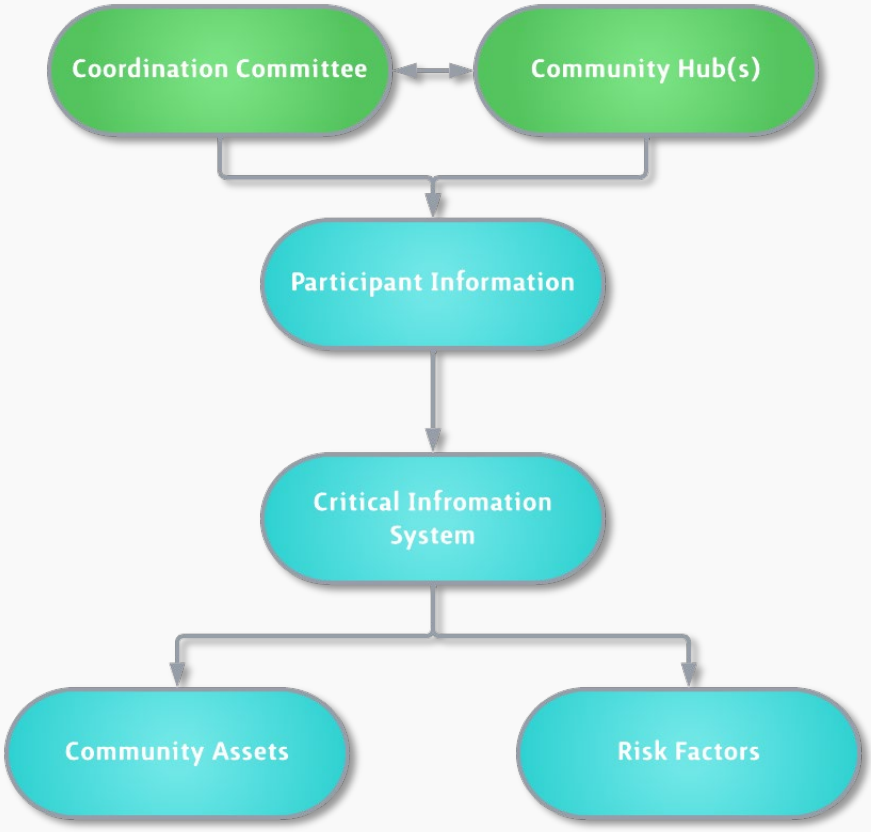
Program Overview

In emergency situations information plays a key role in an effective response. The goal of this system is for community groups to have immediate access to important information about a community to support both planning and responding to emergencies. Through voluntary surveys, community organizations will be able to understand potential assets and vulnerabilities that exist in their area. In the event of emergency, communities will have easier access to resources, such as generators or medical specialists. It would also help make sure the most vulnerable are accounted for and have the assistance that they need. This system can foster emergency preparation discussions and planning, help manage assets and assist in understanding local needs to create a stronger, more resilient community. This is designed with both climate related disasters, as well as other emergencies in mind. The proposed system is comprised of two main parts, operational and technical. This section will go into mor depth on each aspect of the system.

Outline and Organization



The figure above outlines the basic organizational structure of the system. At the top, are the coordination committee and community hubs (in green) that oversee community planning and response. These groups also manage the technical aspects of the Critical

Information System (in blue). The committee and hubs will be the organizers and decision makers in emergency situations. These groups will also be the bridge to the community, collecting the information that will be used in the CIS. Once that information is collected, it will be stored in a database and visualized through GIS mapping.

Coordination Committee

The Coordination Committee will be made up of community members and leaders, typically a group associated with a recognized community-based organization. They will oversee implementing the system, carefully and securely collecting the community's information through regular surveys. They will also manage the database and access relevant maps, making sure the information is up to date and not misused. However, the primary responsibility for the Coordination Committee will be to assess the largest needs and concerns within the community and find ways to remediate them given the resources available to the program and within the community. Lastly, they will also need to decide on the best ways to communicate information back to the community.

Community Hub

To best manage the system there will need to be a community hub acting as the epicenter of operations. The community hub will act to assist the coordination committee. There could be multiple "branch" hubs each overseeing different neighborhoods. A hub would be an established center with access to the community to best distribute surveys and information. As well as having good internal resources and organization to manage the system in their area. Hubs should be facilities that can provide aid and support. In times of emergency or disaster hubs can act as plan of action centers where community recovery and aid can operate through. A place that can distribute supplies, provide electricity, and provide refuge to those displaced. When not in an emergency, they could also hold occasional workshops or cultural initiatives. An example of a community hub would be a community center or local government organization.

Participants

Participants are those that will respond to the survey and provide information. Since many people in a community might be difficult to contact due to lack of electronic devices or an unwillingness to give out information, committee members will need to deal with Contactable and Uncontactable Participants.

Contactable:

Community members respond to the information survey so that, when something happens, the committee knows how to best proceed and can reach out if needed. An emergency response plan can be constructed based on their responses.

Uncontactable:

Community members that do not respond to the information survey or are unreachable due to lack of technology. By identifying and designating a group of people to be “Uncontactable”, this allows for the committee and other leaders to have a plan in place to better assist them even without information. A more general plan can be put in place to help those who are Uncontactable. It also allows the committee to experiment with other forms of information collection like physical surveys.

Before continuing it is important to note that when handling personal or sensitive data it is necessary that the correct privacy precautions be taken.

Technical System

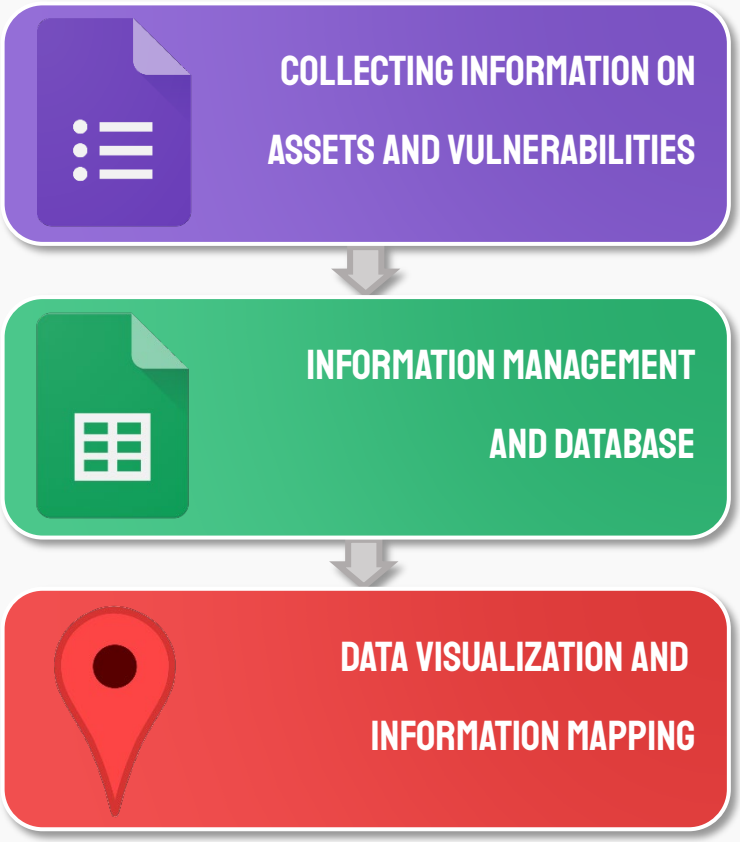
The foundation of this system is the ability to collect, manage and visualize information to allow for a more effective emergency response. A key part of the Critical Information System is the Google Drive based tools. Google based tools are being used because they are free and easily accessible. The system uses Google Forms to send our surveys and collect information. As well as using Google Sheets as a database for that information. Finally, Google My Maps is used to easily visualize the data using GIS mapping. More about each feature in the technical overview.

Community Assets and Risk Factors

Once we have all the information mapped it will assist the community to better understand its own assets and vulnerabilities. Understanding what members of the community are at the most risk in these events allows for the Community Hub to make them a bigger priority in their response. For example, if there is a person who relies on a dialysis machine or oxygen tank that needs power. The Community Hub can make sure that they can have access to electricity. A better understanding of community assets could lead to a more prompt and collaborative response. For example, if someone has a generator or solar panels, they can assist the Community Hub in providing electricity. It would be most efficient to contact these people beforehand to ask for their willingness to cooperate, a responsibility that will mostly be in the hands of the Coordination Committee. Overall, understanding these aspects can allow for a safer and more adaptive community.

Technical Overview

The technological architecture of the system will be largely hosted on the cloud through Google Drive Suite, which is free, easily accessible and used by many organizations in Puerto Rico. To use these tools, all you need is a Google account. Almost every aspect of the system can be shared between Google accounts, allowing as many users as desired to take administrative roles or otherwise be selectively granted access, making this a good choice for small community organizations. It is also simple, and all the programs work together well. Below is a diagram of the basic function of the system.



As the figure shows, the first step is data collection using Google Forms. The questions will be focused on understanding the community's assets and vulnerabilities. The data entered in the form will automatically populate a Google Spreadsheet. This spreadsheet will act as a database for any information collected. Using the information in this database, a GIS map can be created using Google My Maps. This map can be used as a visualization of information to better understand the community. This section will discuss each aspect of the system's technological side, going in depth into which technologies are used and how they link together.

Data Collection Over Google Forms

To effectively prepare for and respond to an emergency, it is important to know which community members in specific areas will need what resources. Location, needs, and other profiling information will be collected; however, it is important to remember that this information is sensitive, and privacy needs to be protected. Gathering this data and inputting it into a database will allow easy organization and access for the admins. Collecting data from the community will be achieved through the dispersal of surveys, both on paper and online. The online version of the questionnaire will be the primary point of data collection since it will ultimately be integrated with the following aspects of the system, allowing automated updates. Physical copies of the survey can be distributed and collected by the community hub.

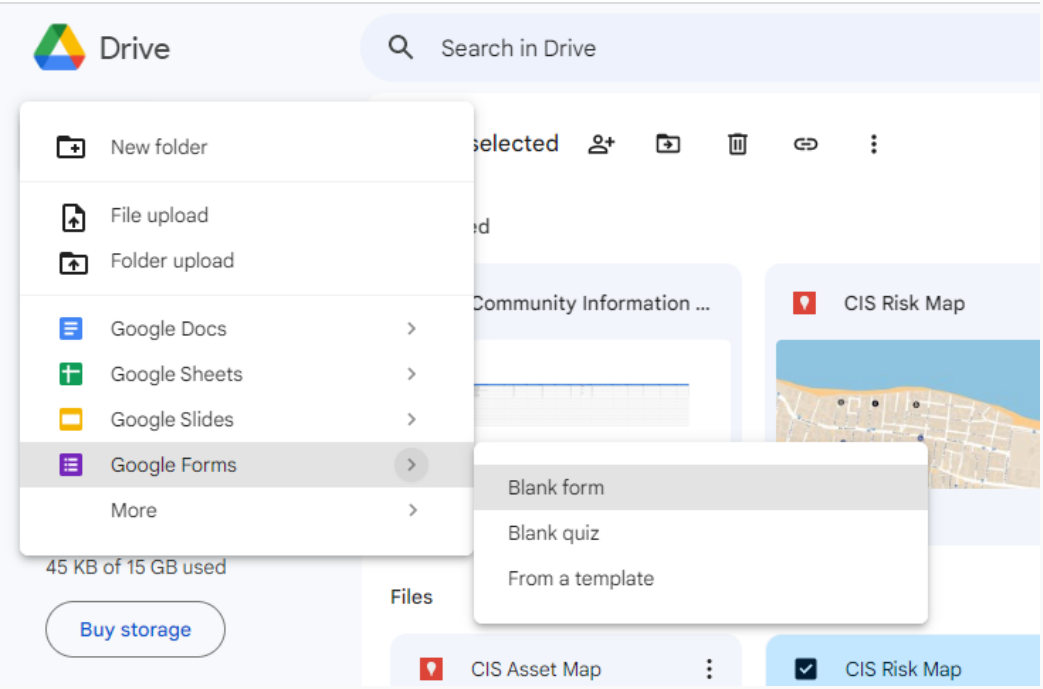
The platform used for these online questionnaires is Google Forms, as part of the Google Drive Suite. This platform was chosen for data collection due to its streamlined ability to save data to shared documents and update it in real-time. Upon a user's submission of a new response, Google automatically creates a new entry in the database for the submission.

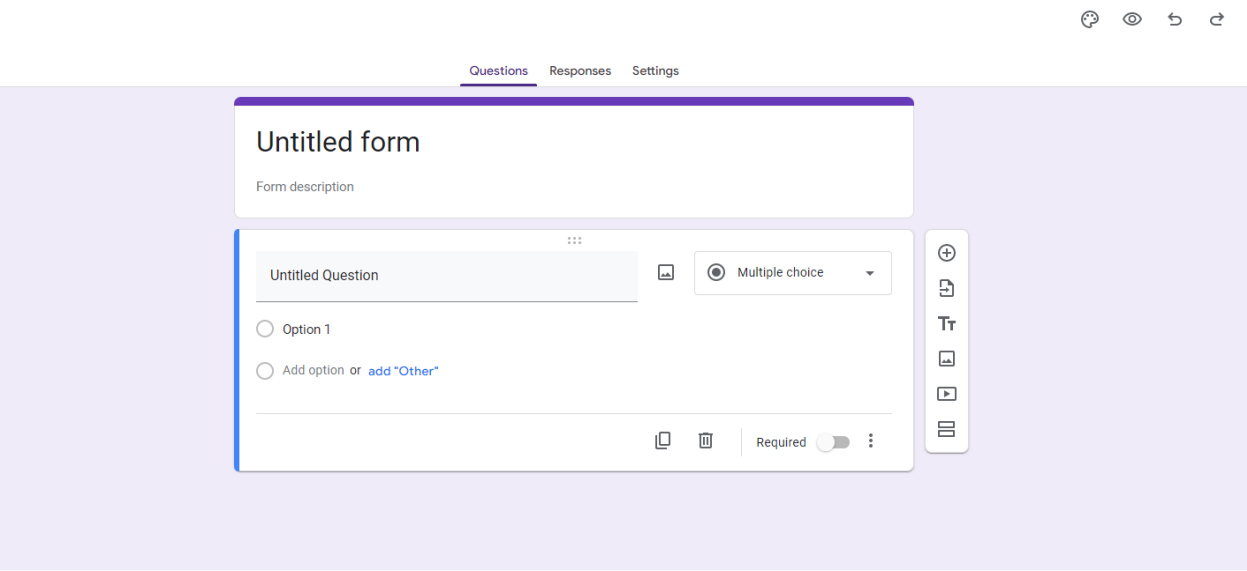
Since this is ultimately the first stop the data takes in the system, it is important that every person's submission makes it online into the database. This means that anytime a user opts to take the questionnaire via physical paper copy, somebody in an administrative role must manually enter the response into a new form entry so that the entry makes it in the database and is operable in future operations. It is also key to note that the database will need to be updated frequently, which will require new forms each time.

Creating The Survey

The first step to creating the survey is having a clear understanding of what information should be collected. This will dictate what questions you ask and how to ask them. The goal for this system is to collect as much information as possible on a community member's assets and vulnerabilities. Further, the coordination committee would need to decide what specific assets would be useful or what vulnerabilities are most important to know. Once this is decided, the survey questions can be created and formatted. This guide provides a sample list of questions in the appendix.

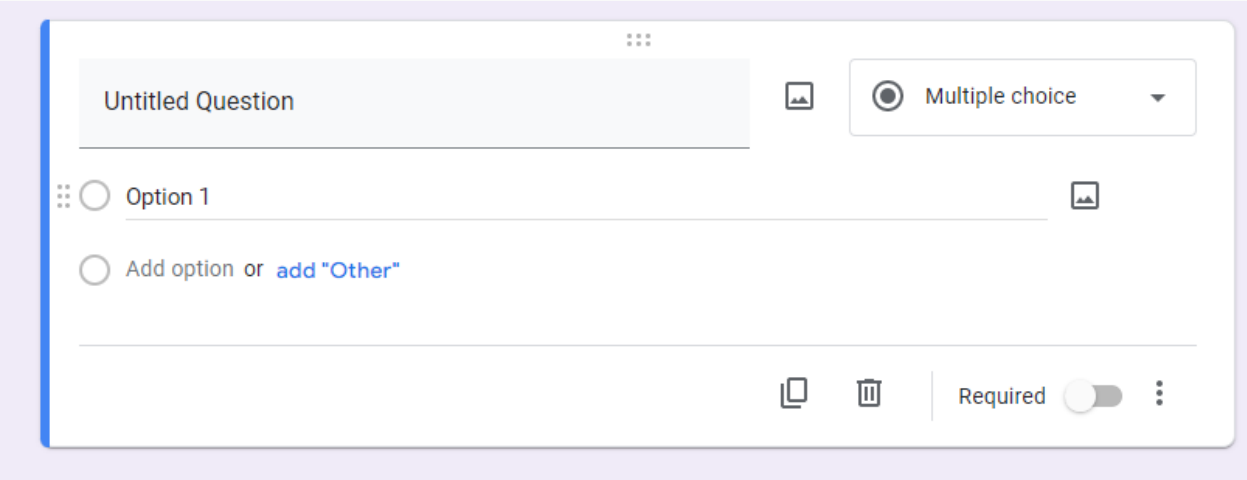
In Google, search for Google Forms or create Form directly in Google Drive. Click on new, then click the form tab to create a new blank form.

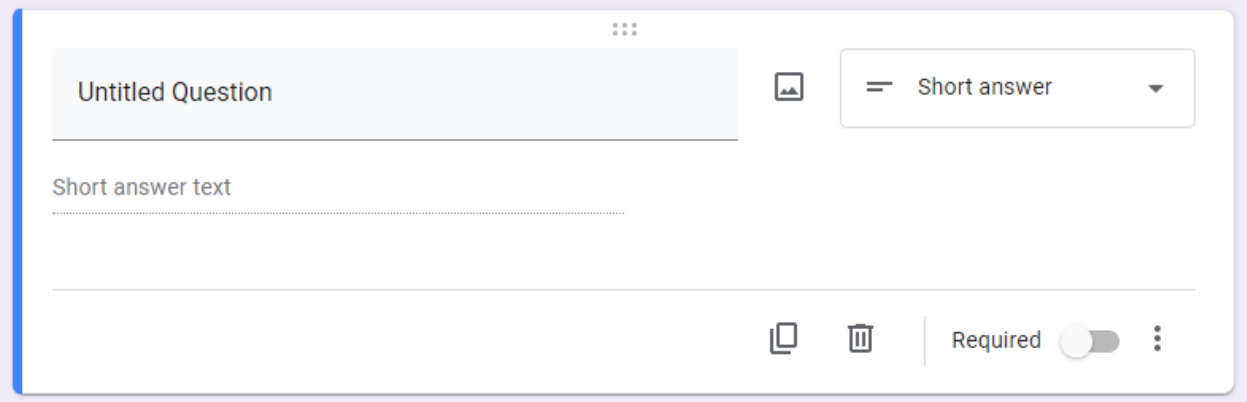

Drive
Search in Drive
New folder
File upload
Folder upload
Google Docs
Google Sheets
Google Slides
Google Forms
More
Blank form
Blank quiz
From a template
45 KB of 15 GB used
Buy storage
Files
CIS Risk Map
CIS Asset Map
CIS Risk Map

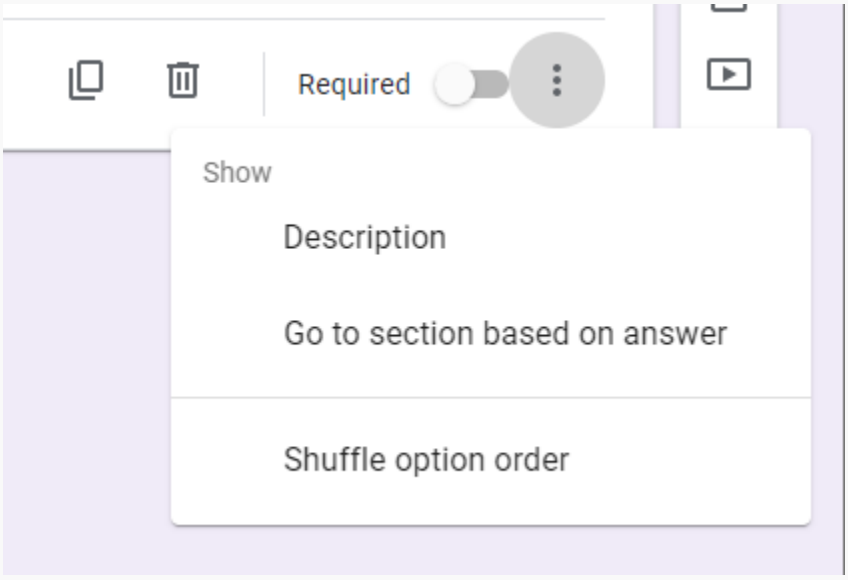

Questions
Responses
Settings
Untitled form
Form description
Untitled Question
Multiple choice
Option 1
Add option or add "Other"
Required

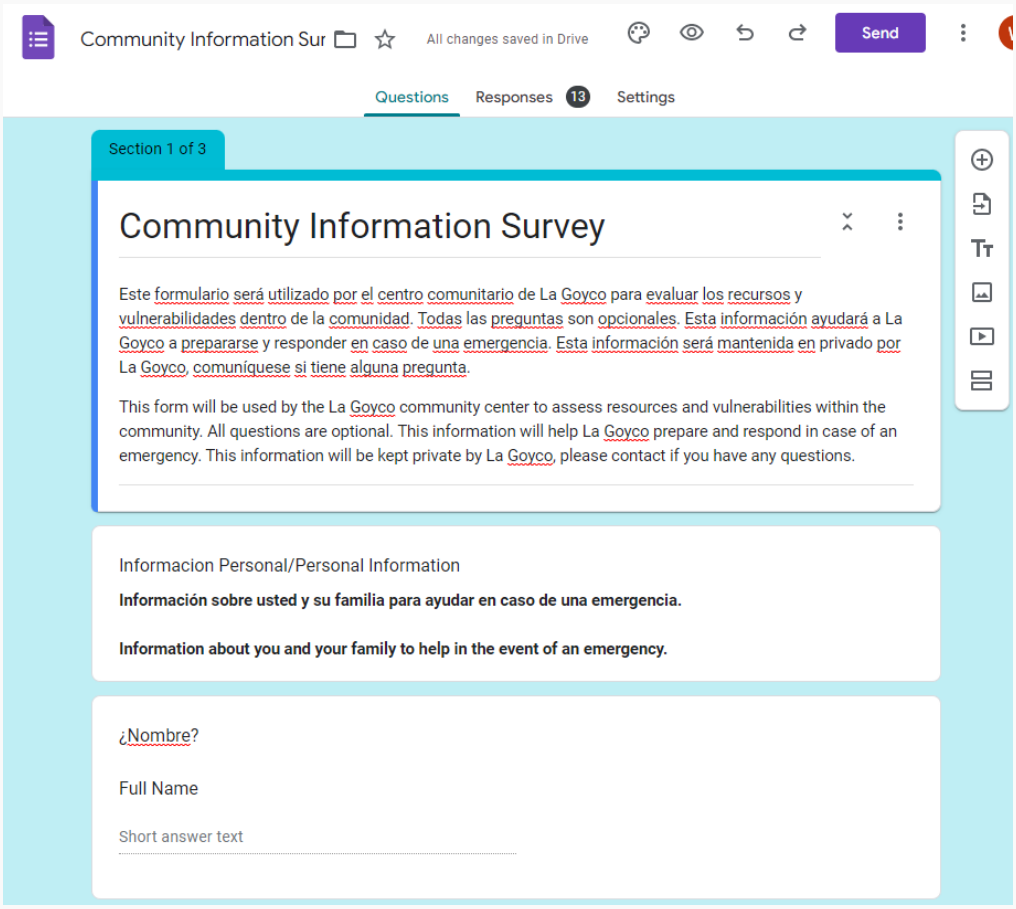
Questions

At the top of the form there is a heading block, where a title and description can be added to the form. Below is an example of a question block.

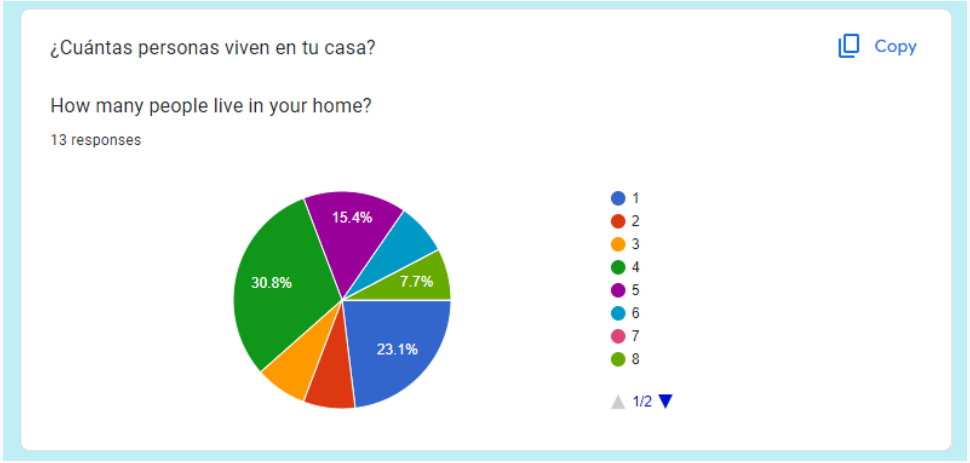





Required
Show
Description
Go to section based on answer
Shuffle option order



The responses tab is the first step in information management. First, this tab allows the user to see each response to the survey in three ways. As a summary, which will show the information graphs as well as each short answer response.



¿Nombre?

Full Name

13 responses

Béla Young-Hee

Basil Ahti

Fortuna Summer

Cosmin Dipak

Robertina Frej

Olga Glauco

Andrew Lufkin

Mariana Reyes

Carlos Santana

¿Teléfono residencial?

Residential Phone Number

555-5555

4 responses

No

1 response

511-5531

¿Nombre?

Full Name

George Johnson

¿Teléfono residencial?

Residential Phone Number

555-3424

¿Celular?

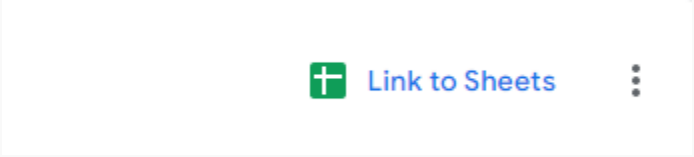
Cellular Phone

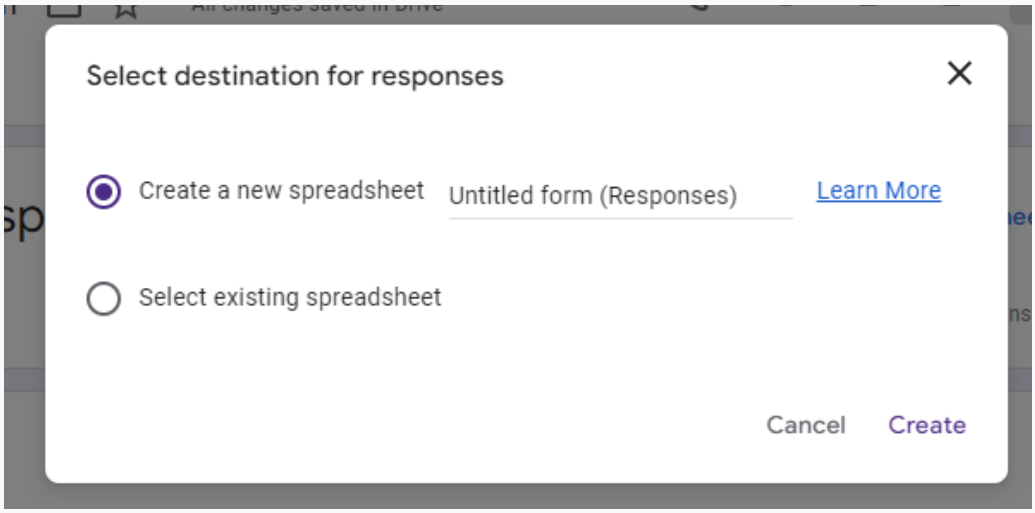
555-2234

¿Correo electrónico?

Email Address

geojohnsons@gmail.com




Select destination for responses
Create a new spreadsheet
Untitled form (Responses)
Learn More
Select existing spreadsheet
Cancel
Create

Information Database Over Google Sheets

The database is designed to organize the different assets within the community into spreadsheets that allow for the data to be sorted through and properly utilized when necessary. The database contains information about community members' skills and needs. In emergency situations, it can be easily accessed even without internet connection. It can be used to sort through community members to easily find those with assets such as generators or those with medical training. It can also be used to find those that have serious medical conditions or dependence on electronic devices.

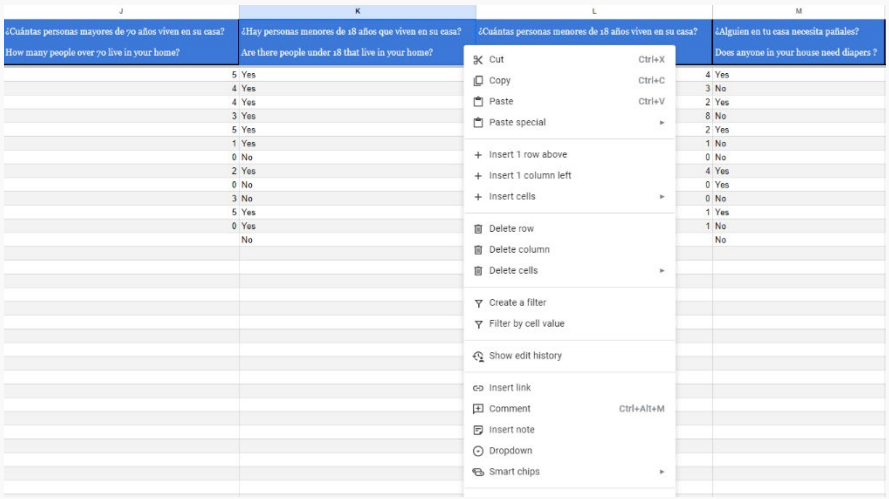
The primary platform used for data storage functionality is Google Sheets. As previously mentioned, all the data collected via Google Forms will automatically find a home in a Google Sheets file somewhere in the system folder. To send the form responses into a sheet, you must go to the responses tab at the top of the form and press a button called view in sheets.

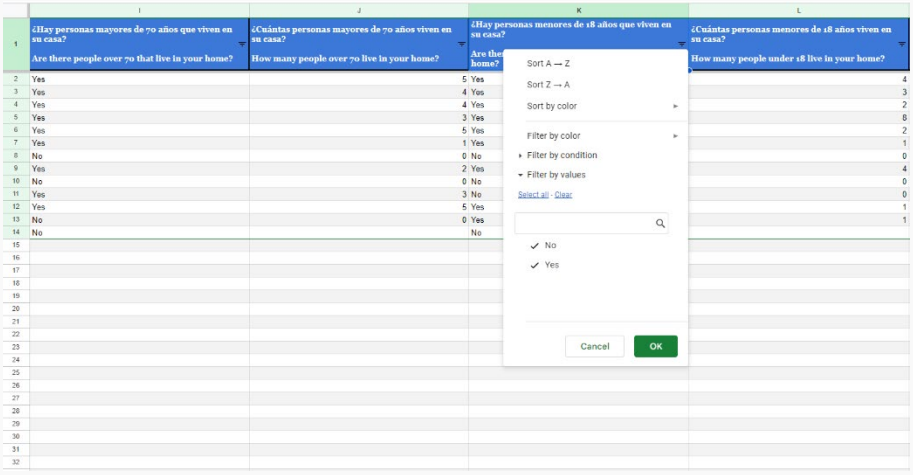
Once pressed, it will generate a new Google Sheet that will contain all the responses received. As noted above the security of this information should be taken seriously. It was decided to use Google Sheets due to its ease of access, easy maintenance, real- time updating and integration capabilities, and that it is free. These attributes make it the perfect candidate to allow efficient and easy storage of data for the use of this program.

Due to the sensitivity of some of the information in the database, only those who need access should have it. This is something that would need to be managed by the coordination committee. Also, in the event of a blackout if there is no access to the internet, the database can be downloaded and accessed offline.

Filtering Information

After the data is input into the spreadsheet from the Google Form, the data will need to be organized further to allow for efficient use of the database. One way of doing this is filtering the information. In Google Sheets there is an option to filter the data in each column. For example, to find all the people who live with a minor, you could filter that column. Isolating those that answered yes to that question. To do this, right click on a column and select "Create a filter" in the pop-up menu.


¿Cuántas personas mayores de 70 años viven en su casa?
How many people over 70 live in your home?
¿Hay personas menores de 18 años que viven en su casa?
Are there people under 18 that live in your home?
¿Cuántas personas menores de 18 años viven en su casa?
¿Alguien en tu casa necesita pañales?
Does anyone in your house need diapers ?
Cut Ctrl+X
Copy Ctrl+C
Paste Ctrl+V
Paste special
Insert 1 row above
Insert 1 column left
Insert cells
Delete row
Delete column
Delete cells
Create a filter
Filter by cell value
Show edit history
Insert link
Comment Ctrl+Alt+M
Insert note
Dropdown
Smart chips


¿Hay personas mayores de 70 años que viven en su casa?
Are there people over 70 that live in your home?
¿Cuántas personas mayores de 70 años viven en su casa?
How many people over 70 live in your home?
¿Hay personas menores de 18 años que viven en su casa?
¿Cuántas personas menores de 18 años viven en su casa?
How many people under 18 live in your home?
Sort A → Z
Sort Z → A
Sort by color
Filter by color
Filter by condition
Filter by values
Select all · Clear
No
Yes
Cancel
OK

	I	J	K	L
1	¿Hay personas mayores de 70 años que viven en su casa? Are there people over 70 that live in your home?	¿Cuántas personas mayores de 70 años viven en su casa? How many people over 70 live in your home?	¿Hay personas menores de 18 años que viven en su casa? Are there people under 18 that live in your home?	¿Cuántas personas menores de 18 años viven en su casa? How many people under 18 live in your home?
2	Yes	5	Yes	4
3	Yes	4	Yes	3
4	Yes	4	Yes	2
5	Yes	3	Yes	8
6	Yes	5	Yes	2
7	Yes	1	Yes	1
9	Yes	2	Yes	4
12	Yes	5	Yes	1
13	No	0	Yes	1
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
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35				

Information Visualization Over Google Maps

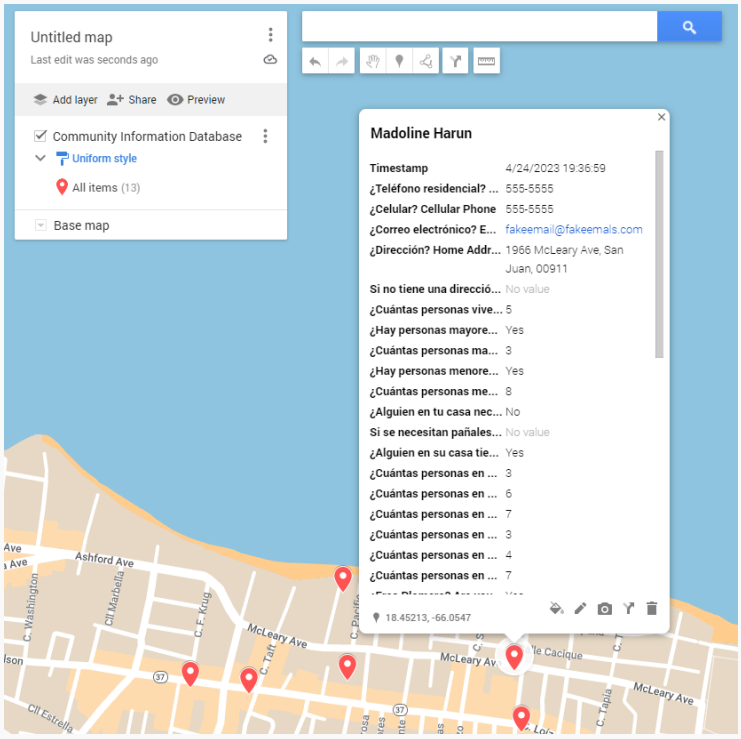
A large aspect of the program will include the creation of maps that lay out the data of the community found in our form data. The goal of the maps is to create informatics and easily digestible media to display the established community hubs as well as the information in the database. Ideally, these maps would also have instructions included on what to do in emergency situations as well as eventually emergency evacuation routes that have been deemed possibilities in times of dire need.

Google My Maps will also be a greatly beneficial mapping platform used in this program. More public-facing maps will be done in My Maps due to its ease of use, ease of continuation and maintenance, and its easy integration with Google's cloud suite platform Google Drive. Also, My Map's simplicity, familiarity, and ease of information digestion make it a great mapping medium for use in emergency situations.

Maps For Emergency Preparation

This Mapping tool can be used for multiple purposes. This report focuses more on mapping as a tool for emergency preparation. For more information on how to use Google My Maps, please refer to the My Maps Facilitators guide.

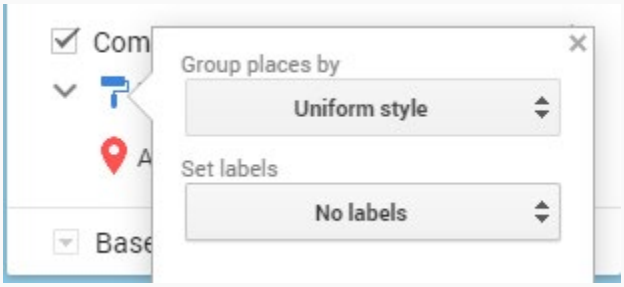
Mapping gives the community a stronger idea of its assets and risk factors. A map like this can be used by hubs before an emergency to build an effective response plan. These maps need to be designed in ways that can best assist community leaders in their emergency preparation. Clearly stating all key information concisely.

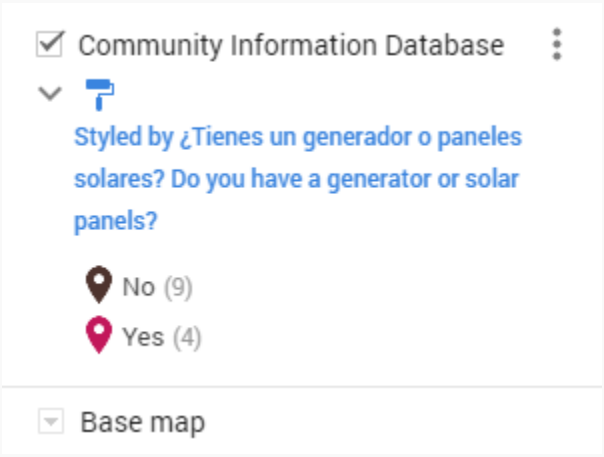


When data is imported it will look like it does above. The map will be populated with indistinct markers. If a marker is clicked on the user will be presented with all the information that they entered in the Form. A user could scroll through and see all necessary information. This can still be useful as a more visual database. However, it can be made more efficient by using conditional formatting.

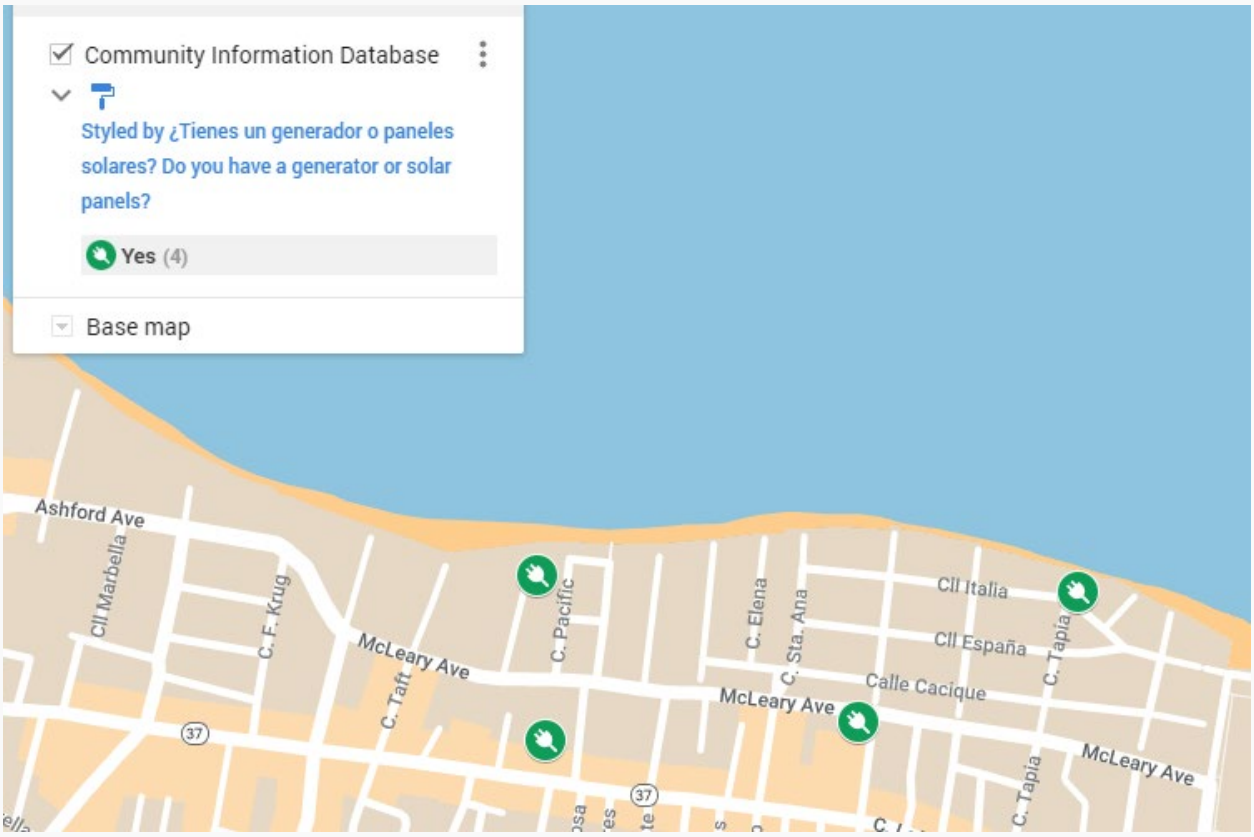
Formatting to Create Specific Maps

In many cases a hub is most interested in specific information to help their preparation. This could be community members with mobility issues or those with specific illnesses. It could also be people with solar panels or vehicles that could help after a disaster situation. An efficient use of this system would be to create maps for specific information. To do this, points on the map need to be formatted to allow for better visualization. In the map editor, click on the correct layer and there will be a blue paint roller that says, “Uniform Style”. Clicking on this will allow the user to change the style of the points. This will bring up two dropdown layers, click the one that says, “Group places by”.





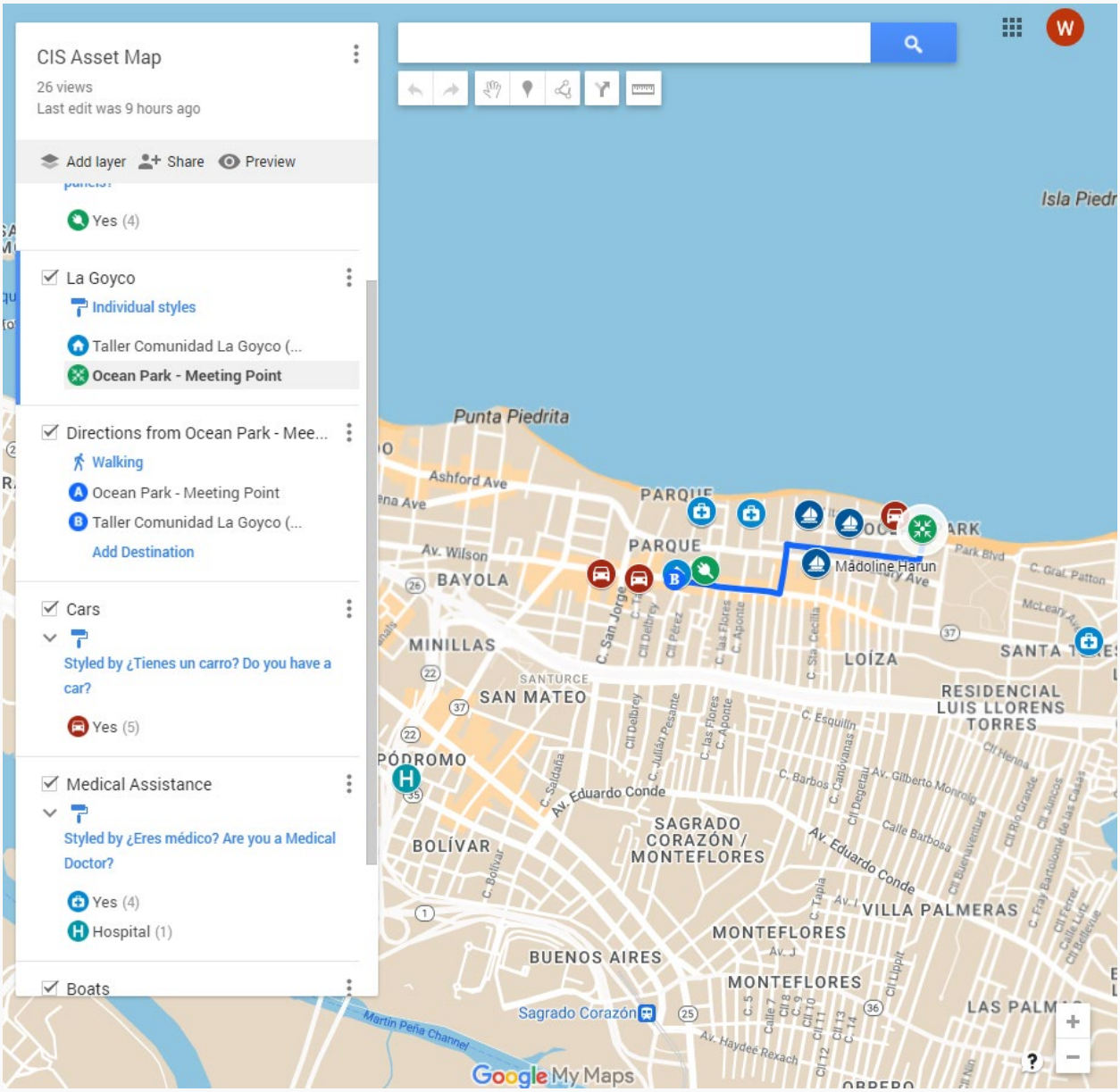
If the goal of this map is to find those with a generator, the No section can be deleted. For the Yes section, click on the paint can and style it so it is more visual. The color can be changed as well as the icon. Special icons can be imported.



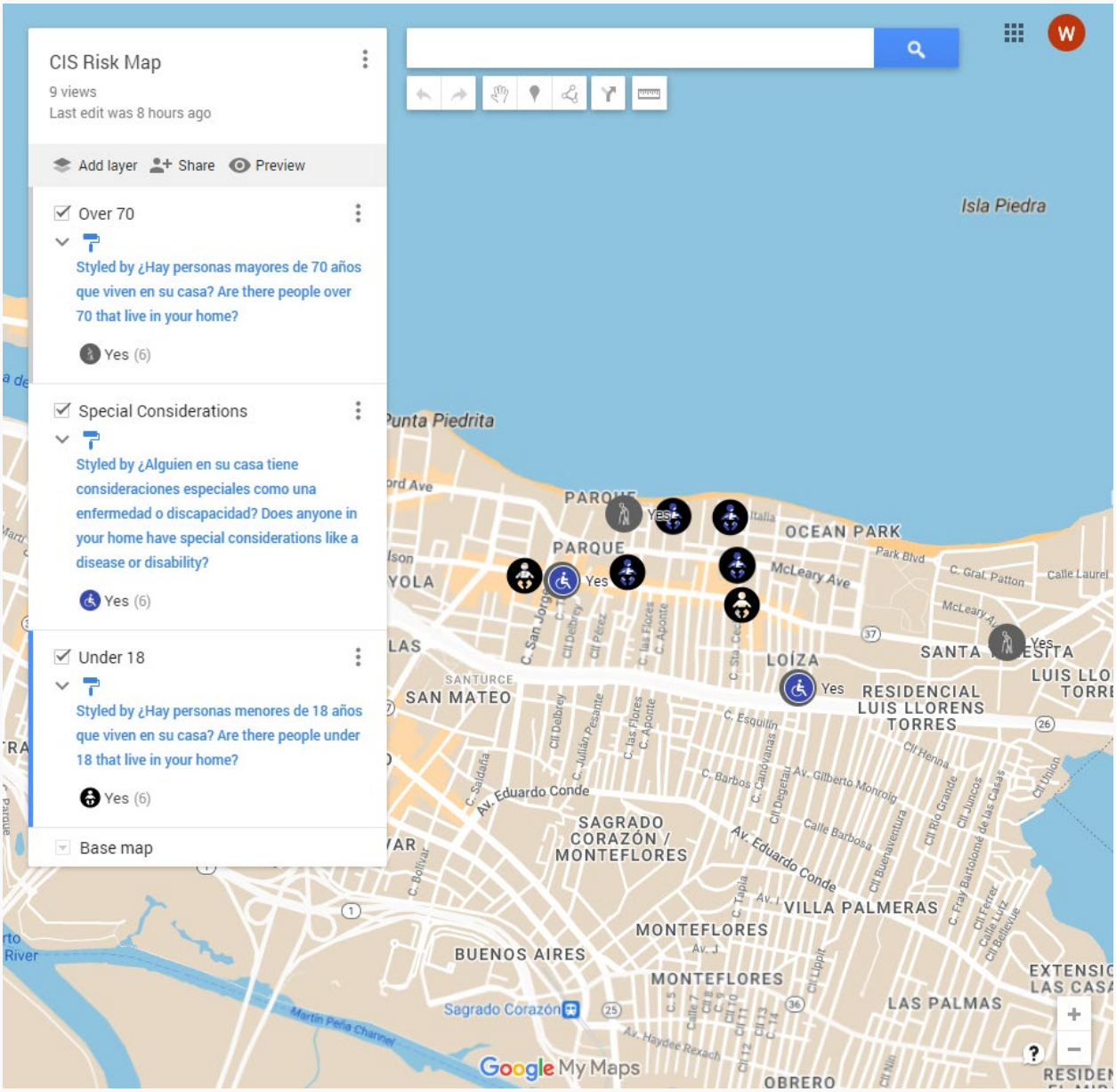
Asset and Vulnerability Maps

Potential examples of maps that can be used in emergency situations focusing on specific assets and community risks. All these following maps are using fake data.

Asset Map


CIS Asset Map
26 views
Last edit was 9 hours ago
Add layer
Share
Preview
Yes (4)
La Goyco
Individual styles
Taller Comunidad La Goyco (...
Ocean Park - Meeting Point
Directions from Ocean Park - Mee...
Walking
Ocean Park - Meeting Point
Taller Comunidad La Goyco (...
Add Destination
Cars
Styled by ¿Tienes un carro? Do you have a car?
Yes (5)
Medical Assistance
Styled by ¿Eres médico? Are you a Medical Doctor?
Yes (4)
Hospital (1)
Boats
Punta Piedrita
Ashford Ave
Av. Wilson
BAYOLA
PARQUE
Mâdoline Harun
MINILLAS
SANTURCE
SAN MATEO
LOÍZA
RESIDENCIAL LUIS LLORENS TORRES
PÓDROMO
Av. Eduardo Conde
SAGRADO CORAZÓN / MONTEFLORES
BOLÍVAR
VILLA PALMERAS
MONTEFLORES
BUENOS AIRES
Sagrado Corazón
Martin Peña Channel
Google My Maps

Risk Map



These maps can be kept separate or combined. Either way, they will both help to inform community decision making when preparing for and during an emergency. Helping to increase community resilience.

Moving Forward

We hope to use this system for other organizations and to have this tool kit act as a guide for them to understand how to use it. We feel this system has a lot of potential and that it can help a lot of people so spreading its use can only lead to more benefits. This could be something that CCAN can investigate and try to implement with not only their network but for the other locations they plan to help.

A few shortcomings the system faces are its offline capabilities. By the end of the project, the group was unable to access the maps without an internet connection. This could be a problem since during natural disasters, the internet is one of the first things to be lost. One solution would be to print these maps, but this would lose a lot of the functions the online version provides. This could be something a future group could try to improve so the system is more effective.

Emergency Support Function (ESF)

Puerto Rico All Hazards Plan

In 2020, the All-Hazards Plan was written by Puerto Rico's Department of Public Safety (DPS) and the Puerto Rico Emergency Management Bureau (PREMB) for hurricane season and other emergencies. The Governor of Puerto Rico, Pedro R. Pierluisi stated; "The purpose of this plan is to establish strategies, responsibilities, coordinate and integrate the efforts and resources of government agencies, non-governmental entities, and the private sector in the Preparedness, Mitigation, Response and Recovery in the event of an emergency or disaster." This document describes the response, recovery, and mitigation operations that are applicable to support the commonwealth of Puerto Rico. To learn more visit https://manejodeemergencias.pr.gov/ or Google Puerto Rico All-Hazards Plan.

Based on this plan, there are seven major capabilities that must be taken into consideration when preparing for a tropical storm or natural disaster. These capabilities are more directed at helping community centers and other local organizations gain a better understanding of how they can potentially mitigate the damages or response actions of an emergency. Thus, creating an Emergency Preparation Checklist for community centers, local organizations and all stakeholders. The purpose of the checklist is to build an idea of the areas that need improvement and the areas that are covered before a large storm hits the island. Using the checklist regularly will give community centers and other stakeholders the opportunity to build resilience to natural disasters and other emergencies.

Preparation checklist

Emergency Preparation Checklist: Descriptions	
1. Developed Action Plan	A plan in place that can adapt to the different incidents or emergencies that arises.
2. Situational Awareness Assessment	Gather awareness of where to locate resources or help in the region before, during, and after an incident occurs.
3. Joint information system and center	A program / or committee that can provide consistent public messaging to the region before, during, and after incidents occur.
4. Basic Communication	The ability to effectively communicate within the organization and with Municipal response agencies.
5. Coordination between stakeholders and commonwealth	Establish operational coordination within local, commonwealth, and possibly federal stakeholders and coordinate operational capabilities.
6. Adequate Response Capabilities	Deploy adequate response capabilities in impacted jurisdictions to mitigate damages until responders arrive.
7. Critical Transportation Services	Determine the most appropriate transportation services to facilitate response and act if possible.

Emergency Preparation Checklist	
Core Capabilities	**Current Status**
1. Developed Action Plan	
2. Situational Awareness Assessment	
3. Joint information system and center	
4. Basic Communication	
5. Coordination between stakeholders and commonwealth	
6. Adequate Response Capabilities	
7. Critical Transportation Services	

Key	
Yes	✓
No	✗
In Progress	+

This checklist will be a great tool during hurricane season, and future implementation with community centers, local organizations and the commonwealth will help evaluate current procedures that are in place. Establishing these core capabilities will help mitigate future damage and directly correlate to hurricane season. Use this checklist as a great way to establish structure within the community and all stakeholders.

Community Emergency Management Survey Questions

The questions sent to the community via Google Form will ultimately need to be decided upon by the Community Hub and the Coordination Committee. Questions will be based on specific community needs and how comfortable people are sharing personal information. However, listed below are a few questions to guide the process.

Community Member Form Questions:

- Name?
- Residential Phone?
- Cellular?
- Email?
- Address?
- Geographic Coordinates?
- How many people live in your home?
- How many people over 70 live in your home?
- How many people under 18 live in your home?
- How many adults and/or children have these needs?
    - o Bedridden
    - o Wheelchair
    - o Oxygen tank
    - o Position bed
    - o Diabetes
    - o Asthma
- Do you need diapers? If so, what size?
- What skills or abilities do you possess to support the community?
    - o Plummer

- o Electrician
- o Nurse
- o Paramedic
- o Carpenter
- o Automobile mechanic
- o Computer technician
- o Refrigeration technician
- o Fisherman
- o Air conditioner technician
- o Doctor
- o Social Worker

• Do you have a generator?

Do you have a solar powered generator?

• Do you have a landline?

• Vehicles available in case of an emergency?

- o Boat
- o Car
- o Van
- o Truck
- o Bus

• What certifications do you have?

- o CPR
- o First Aid
- o Lifeguard
- o Has emergency backpack

• Do you have an evacuation plan for emergencies?

• Where would you go in an evacuation?