



User Manual  
Interactive Vulnerability and Risk Tools  
Whole Community Resilience Planning Program



## Introduction

### What is a vulnerability map?

Risk and vulnerability are closely related concepts. [Risk](#) refers to the possibility of damages, losses, or dangers in any future occasion given the current characteristics or conditions in an area when facing impacts (sudden, abrupt, acute events that affect a community) and tensions (chronic and continuous events with the potential to degrade community cohesion). [Vulnerability](#) is the probability that life or property will suffer adverse consequences when facing impacts and tensions. Therefore, risk makes us vulnerable.

In this Interactive Vulnerability and Risk Maps Tool, we present a variety of thematic maps that promote knowledge on conditions or variables (also known as indicators) that affect housing, infrastructure, health, environment, education, and economic development in Puerto Rico at the most detailed level possible. In doing so, communities and the public will be able to use this data to support any local planning process.

These interactive maps were developed by the Whole Community Resilience Planning Program (WCRP), from the Puerto Rico Department of Housing in collaboration with Foundation for Puerto Rico (FPR). This Program is financed with funds from the Community Development Block Grant for Disaster Recovery (CDBG-DR) allocated by the United States Department of Housing and Urban Development and administered by the local Department of Housing as part of the Puerto Rico Recovery Plan.

## How can I use that data and information?

All information provided in this tool is provided so that communities in Puerto Rico can better understand current conditions in housing, infrastructure, health, environment, education, and economic development at a local level and carry out planning processes supported by the best data available. This data will foster knowledge and urge users to corroborate and validate its applicability in their community and environment.

A tool was created for each of the six focus areas, which include the content outlined below. Additionally, a brief explanation on general tool functionality is provided to guide the user.

The indicator maps available by focus area are the following:

- Focus Area: Housing
  - Topic 1.0: Federal aid for housing after hurricanes Irma and María
    - Indicator 1.1: Housing assistance claims approved by municipality
    - Indicator 1.2: Quantity disbursed for housing assistance per municipality
    - Indicator 1.3: Relationship between approved applications and disbursements
  - Topic 2.0: Risks to housing structures related to natural events
    - Indicator 2.1: Flood zones
    - Indicator 2.2: Landslide risk areas
  - Topic 3.0: Characteristics of housing units
    - Indicator 3.1: Vacant units
    - Indicator 3.2: Units occupied by owners
    - Indicator 3.3: Percentage of income dedicated to rent payment
    - Indicator 3.4: Units built on or before 1970

- Topic 4.0: Public housing complexes
    - Indicator 4.1: Public housing complexes per municipality
- Focus area: Infrastructure
  - Topic 1.0: Drinking water and sewer distribution
    - Indicator 1.1: Drinking water infrastructure (AAA)
    - Indicator 1.2: Sewer infrastructure (AAA)
  - Topic 2.0: Storm water management systems
    - Indicator 2.1: Stormwater management systems
  - Topic 3.0: Electrical grid
    - Indicator 3.1: Electrical grid infrastructure (AEE)
  - Topic 4.0: Transportation systems
    - Indicator 4.1: Mode of transportation used to commute to work
    - Indicator 4.2: Average travel time to work
    - Indicator 4.3: Deaths caused by traffic collisions
    - Indicator 4.4: Public transportation routes
  - Topic 5.0: Telecommunications infrastructure
    - Indicator 5.1: Hotspots of households without computers
    - Indicator 5.2: Households with access to broadband internet
- Focus area: Health
  - Topic 1.0: Mental health status after hurricane María
    - Indicator 1.1: Calls to *Línea PAS* by municipality
  - Topic 2.0: Access to medical services and facilities
    - Indicator 2.1: Population without health insurance
    - Indicator 2.2: Proximity to medical service facilities
  - Topic 3.0: General health statistics in Puerto Rico
    - Indicator 3.1: Adequate prenatal care
    - Indicator 3.2: Relationship between low and very low birthweights by municipality
    - Indicator 3.3: Infant mortality rate by municipality
    - Indicator 3.4: Deaths caused by cancer by gender and municipality
    - Indicator 3.5: Deaths attributed to diabetes by gender and municipality
- Focus area: Environment
  - Topic 1.0: Solid waste management
    - Indicator 1.1: Landfills

- Indicator 1.2: Superfund sites
    - Indicator 1.3: Recycling rates and markets
  - Topic 2.0: Water quality
    - Indicator 2.1: Impaired bodies of water
  - Topic 3.0: Air quality
    - Indicator 3.1: Air quality index
- Focus area: Education
  - Topic 1.0: Educational attainment
    - Indicator 1.1a: Population without a high school diploma
    - Indicator 1.1b: Hotspots of population without high school diplomas
  - Topic 2.0: Ability to speak English
    - Indicator 2.1a: Population with the ability to speak English
    - Indicator 2.1b: Hotspots of population with the ability to speak English
  - Topic 3.0: Educational centers
    - Indicator 3.1: Head Start centers
    - Indicator 3.2: Public schools
      - Indicator 3.2a: Rate of graduation by school district
      - Indicator 3.2b: Closed public schools by municipality
    - Indicator 3.3: Private schools
    - Indicator 3.4: Higher education institutions
      - Indicator 3.4a: Postsecondary, technical, and vocational institutions
      - Indicator 3.4b: General data on postsecondary institutions
- Focus areas: Economic development
  - Topic 1.0: Income and poverty
    - Indicator 1.1: Income per capita
    - Indicator 1.2: Population beneath the poverty line
  - Topic 2.0: Social welfare programs
    - Indicator 2.1: SNAP beneficiaries
    - Indicator 2.2: TANF beneficiaries
    - Indicator 2.3: Percent of income from government assistance
    - Indicator 2.4: Section 8 voucher program
  - Topic 3.0: Labor and economic vitality statistics
    - Indicator 3.1: Participation rate

- Indicator 3.2a: Unemployment rate by municipality
- Indicator 3.2b: Unemployment rate by census district
- Indicator 3.3: Business patterns by municipality

## Using the Interactive Vulnerability and Risk Tools

## Using the Vulnerability and Risk Tools

Throughout the tools, you will find a series of interactive maps that show several risk and vulnerability indicators in six focus areas—housing, infrastructure, health, environment education and economic development—in Puerto Rico. The structure for each of the focus areas is uniform: they begin with an introduction, followed by a disclaimer and then there are maps grouped by topic. First, you will see an introduction to the topic, followed by a list of indicators to be presented in the maps.

Mapas de Vulnerabilidad: Área de enfoque de Desarrollo Económico

A Story Map

Introducción

¿Qué es un mapa de vulnerabilidad?

El riesgo y la vulnerabilidad son conceptos estrechamente ligados. El **riesgo** apunta a la posibilidad de daños, pérdidas o peligro en alguna ocasión futura dadas las características o condiciones actuales de un lugar ante impactos (eventos repentinos, abruptos y agudos que afectan a una comunidad) y tensiones (eventos crónicos y continuos con el potencial de degradar la cohesión comunitaria). La **vulnerabilidad** es la probabilidad de que la vida o la propiedad sufran consecuencias adversas al enfrentar impactos y tensiones. Por tanto, el riesgo nos hace vulnerables.

En esta Herramienta Interactiva de Mapas de Vulnerabilidad y Riesgo presentamos una variedad de mapas temáticos que promueven el conocimiento acerca de las condiciones o variables (también conocidas como indicadores) que afectan el desarrollo económico en Puerto Rico al nivel más granular.

Nota aclaratoria

Mapas de Vulnerabilidad: Área de enfoque de Desarrollo Económico

A Story Map

Nota aclaratoria

Tema 1.0: Ingreso y pobreza

Indicador 1.1: Ingreso per cápita por distrito censal

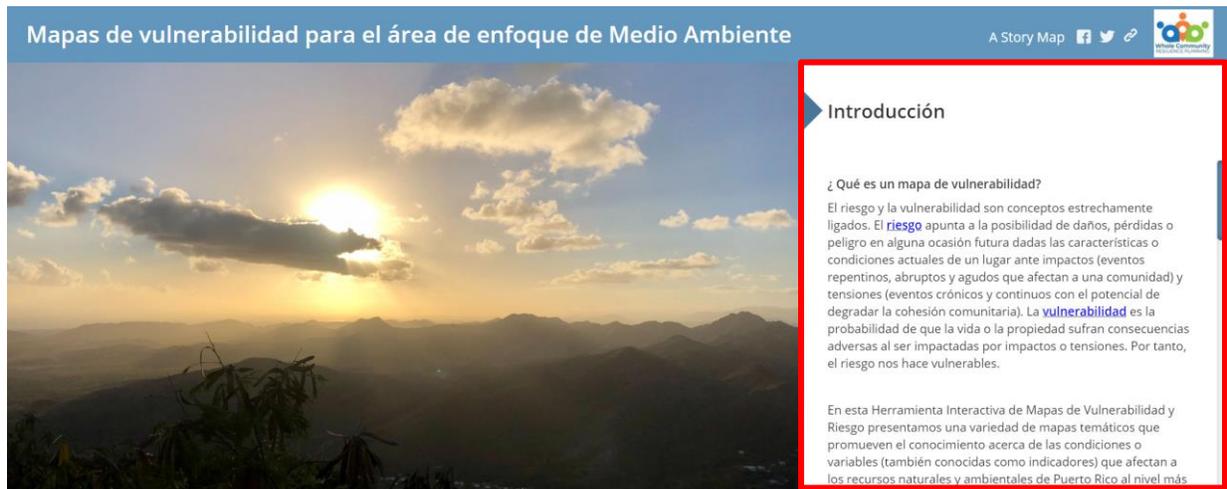
Indicador 1.2: Población por debajo de umbrales de pobreza por distrito censal

Tema 2.0: Programas de beneficencia social

**Figure 1.** Example of the format of the Tools by focus area. In each tool, no matter which focus area is chosen, the format is the same: introduction (yellow arrow), disclaimer (green arrow), general topic (orange arrow), and indicator maps (blue arrows).

## Using the Vulnerability and Risk Maps Tools

Each page has a column on the right side of the screen with explanatory content on the tool, the topics in the tool or additional information on the indicator maps presented.



**Figure 2.** Example of a screen with explanatory content on the tool. The first page of each map contains an introduction in which the concepts of risk, vulnerability and indicators are defined, details on the topics and indicators to be shown are provided, and the utility of the data and information provided is explained.



**Figure 3.** Example of a screen with details of the topics shown in the tool. The indicator maps are grouped by general topics. In the window on the right of this type of page, there is information on the indicators presented, as well as the validity, utility, and source of information for the data used.

## Using the Vulnerability and Risk Tools



**Figure 4. Example of screen with additional information on the maps presented.** Each page with an indicator map will have explanatory content on the information shown which may include clarifications on use and interaction with the map, a summary of the data or information of the limits on data used, among other information.

To see all the sections or maps available, use the scroll button on the mouse (circled in red in the image below) to go up and down on the screen. To move between options, click on the title of the desired topic or map:



## Using the Vulnerability and Risk Tools

Similarly, to scroll up and down in the content of a particular section and the options in the tool, use the scrollbars on the right side of the screen. The scrollbar that is furthest to the left (shown with the red arrow in the picture below) will move the content in that section. The scrollbar furthest to the right (shown with a blue arrow in the picture below) will allow you to move between options in the tool.

**Mapas de vulnerabilidad: Área de enfoque de Infraestructura**

A Story Map

**Introducción**

variables (también conocidas como indicadores) que afectan a la infraestructura en Puerto Rico al nivel más granular posible. De esta manera, las comunidades y el público general puedan utilizar estos datos para apoyar cualquier proceso de planificación a nivel local.

**Qué información puedo encontrar en esta herramienta?**

La infraestructura está compuesta de todos los servicios u obras públicas necesarios para el funcionamiento de una comunidad. Incluye los sistemas de energía eléctrica, agua potable, alcantarillado sanitario, redes viales, transportación pública y telecomunicaciones.

Datos e información acerca de la infraestructura del país permite que comunidades a través de Puerto Rico visualicen y comprendan cómo se distribuyen los servicios esenciales a la ciudadanía. Con este conocimiento, es posible identificar brechas entre las necesidades existentes y las necesidades localmente.

**Nota aclaratoria**

When a section with an indicator map is selected, use the (+) or (-) buttons at the top of the screen to increase or decrease the size of the map. To make the map go back to its original size, click on the home button between the (+) and (-) buttons:

## Using the Vulnerability and Risk Tools



Similarly, use the scroll button on the mouse to zoom in or out of the image on the screen.



## Using the Vulnerability and Risk Tools

Beneath the buttons that allow users to increase and decrease the size of the map, there is a circular icon. This option allows users to turn on their location to have a reference point as to where they are and where the indicators around them are. A blue dot on the map showing their location:



The tool provides a legend to identify the assets or indicators shown on the map. The legend is located under the tab that says “Leyenda” or “Legend”, depending on the language settings of your computer, to the right of the screen:

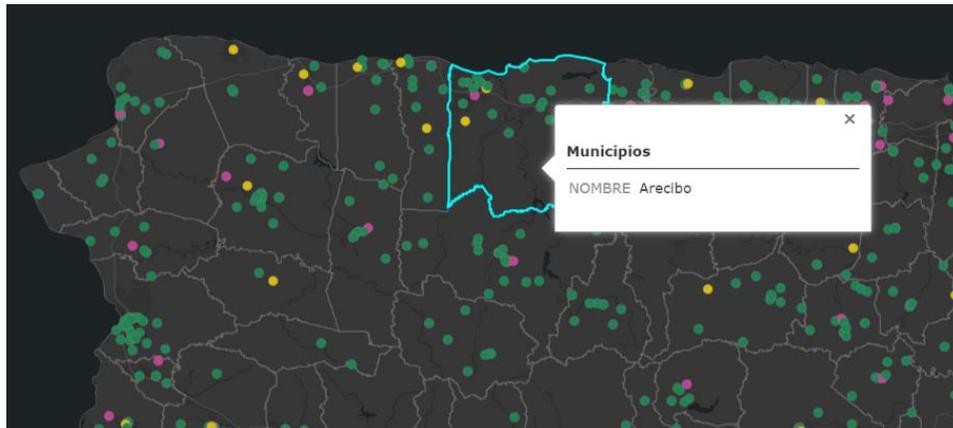
## Using the Vulnerability and Risk Tools



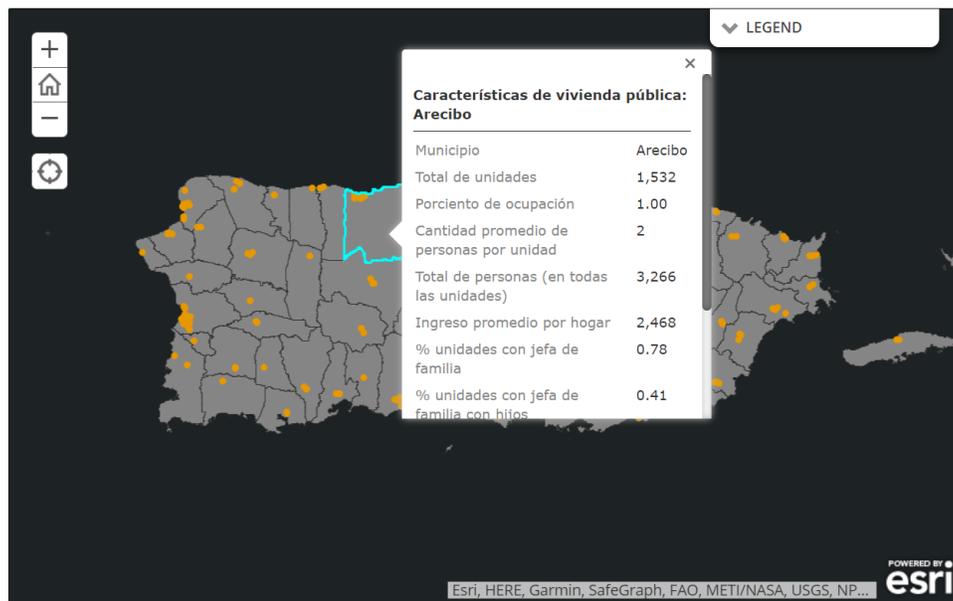
**Figure 5. Location and access to the legend in indicator maps.** When the tab pointed to by the orange arrow in the picture above is tapped, the legend will appear with an explanation of the information on the map, as shown in the lower picture.

## Using the Vulnerability and Risk Tools

To see what municipality the information displayed is from, click on any area inside the limits of the municipality without a dot, line, or any other geometric figure in it, to open a window with the name of the municipality.



When a point of interest on the map is clicked, be it a point, line, any geometric figure, or the municipality itself, a pop-up window will appear with the information available on the selected feature:



**Figure 6. Example of an informative pop-up window after clicking on a municipality.** When clicking on any municipality, a white pop-up window will appear with the name of the municipality or data related to the topic or indicator selected. Slide the gray scrollbar on the right side of the pop up to see all its content.

## Using the Vulnerability and Risk Tools



**Figure 7. Example of an informative pop up after clicking a point, line, or any other geometric figure.** When any point, line, or any other geometric figure available on the map is tapped, a white pop up will appear with information on those characteristics.

It is worth mentioning that one map may contain several different attributes, such as the map shown in Figures 6 and 7. In this case, a clarification of the use and management of the map is provided on the right side of the page. Use the legend and the informative square on the right to understand and/or learn about the meaning of the chosen characteristics.

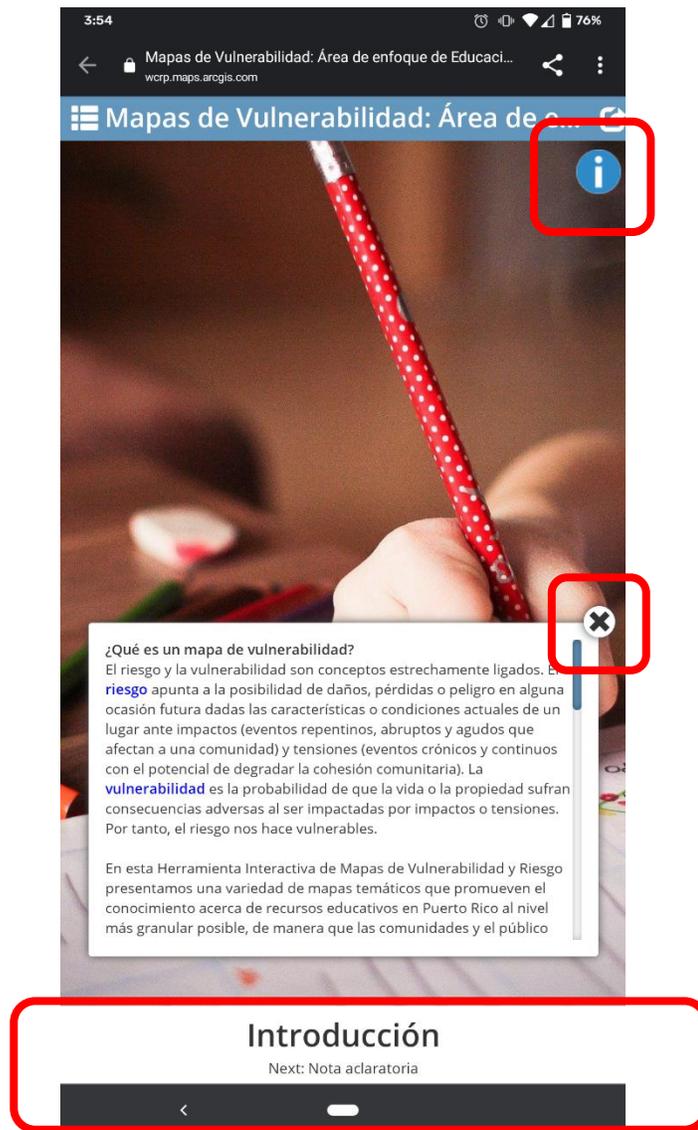
Lastly, each time text is in **blue** and underlined in the informative window on the right side of the page, this word, or phrase is a link, which, when clicked will lead to support material or the source for the information on the content. Meanwhile, when text is in **green** and dashed line, clicking on it will take you to a different section of the tool. This will allow you to compare both maps efficiently.

Use on Mobile Devices

## Use on Mobile Devices

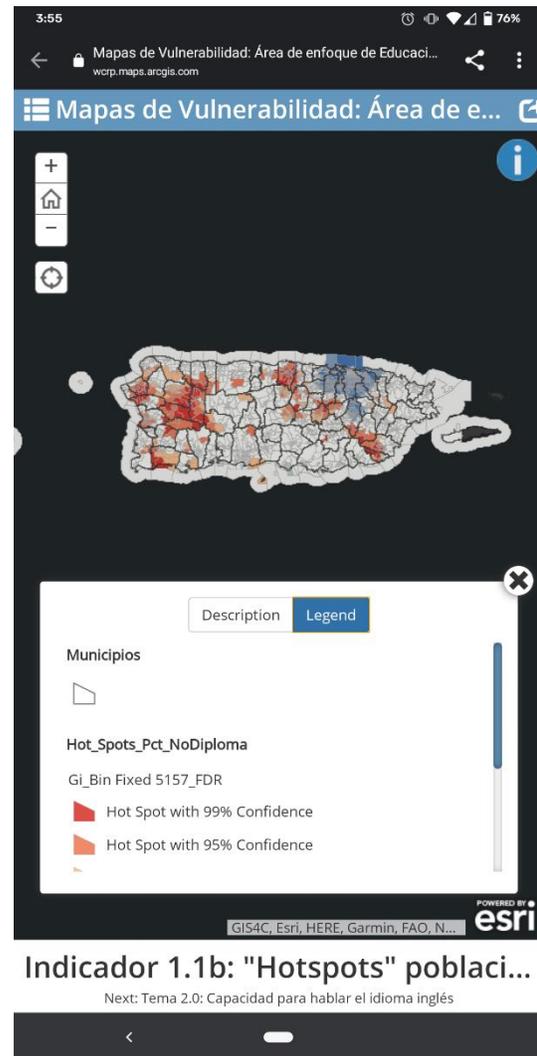
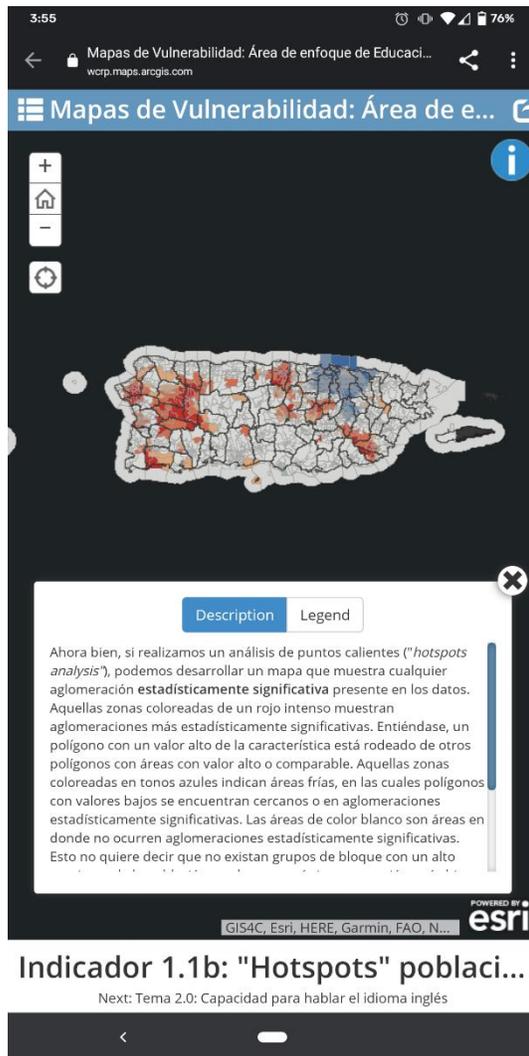
If on a mobile device, there are two ways to use the tool: vertically or horizontally. For best use of the platform with a mobile device, turn it horizontally.

To see the description for each of the pages, tap the blue information button on the upper right part of the screen. This will make the description of the page the user is on appear. To change the page, slide right or left on the gray scrollbar at the bottom of the screen. To close the description, press the X at the top of the description.



## Use on Mobile Devices

On the page with the maps, tap the gray bar to read the description of the map as well as the legend. The previously described options, to zoom in and out of the map and location identification options are available in the mobile version.

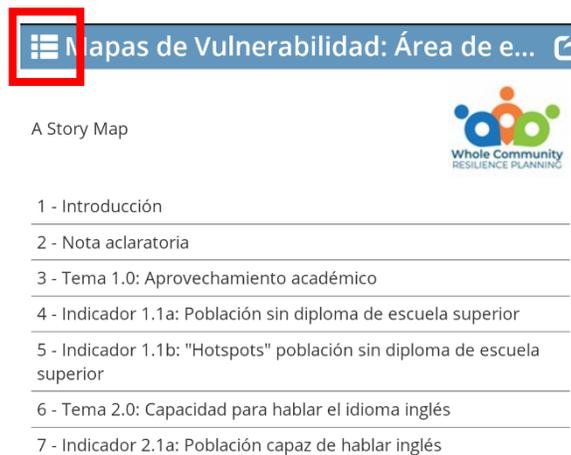


## Use on Mobile Devices

To share the tool on social media, tap the arrow symbol on the top right part of the screen. This will make the sharing options appear for sharing the platform.



Lastly, to see the entire list of the content available on the platform, tap the icon with three lines on it on the upper left part of your device. This will display a list of all the pages available on the platform appear. Select exactly which page to go to by tapping the name of the desired page.



## General Instructions

## General Instructions

For additional information or to share the tool on any preferred platform, use the bar at the top of the screen to select different options.



Tapping this icon will redirect to Foundation for Puerto Rico's **Facebook** page.



Tapping this icon will redirect to Foundation for Puerto Rico's **Twitter** page.



Tapping this icon will generate a link for sharing the maps on any preferred social media.



Pressing this logo will redirect the WCRP webpage.