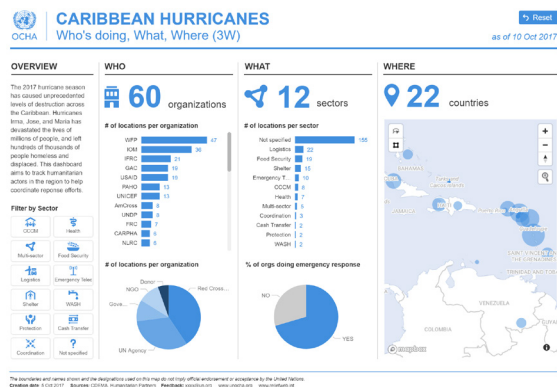


# POWERBI

The PowerBI program is used to create interactive visualizations and business intelligence reports. It could be used for product automation and exploratory data analysis.

In this tutorial, we will learn the basics of PowerBI to create an [interactive OCHA 3W product](#) from start to finish.



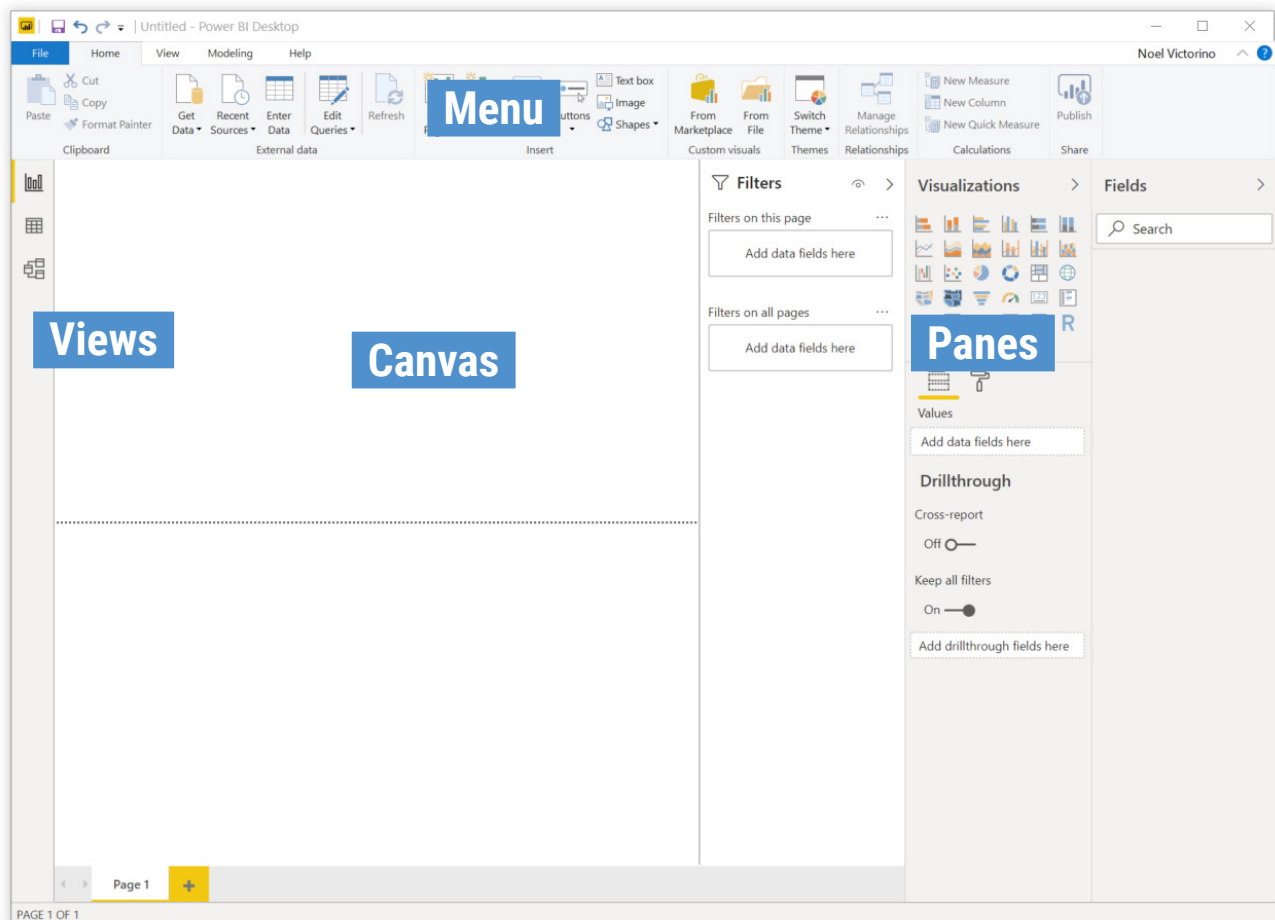
## SETTINGS AND WORKSPACE

### Workspace overview

Open the PowerBI application. By default, PowerBI will open to a screen that looks similar to the image below. If you have not signed in previously, it will ask you to use your UN email address and password.

A brief description of each section:

- **Menu** ribbons contain most of the document-wide functions that's needed.
- **Views** sections allows different ways to view and edit data.
- **Canvas** is where the report is shown.
- **Panes** are the tools that construct the report.

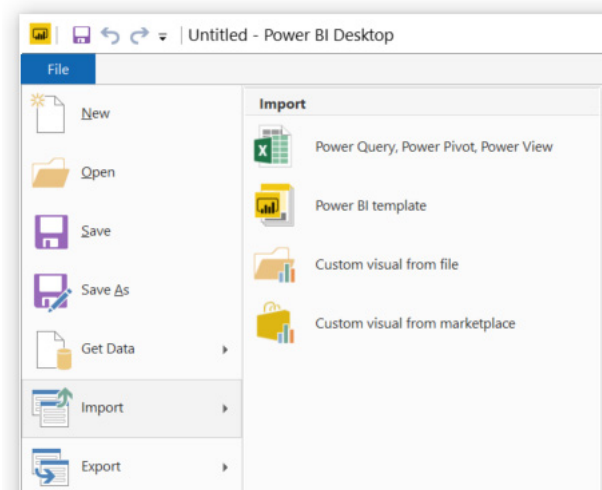


## LAYOUT

### Create a new document using an OCHA template

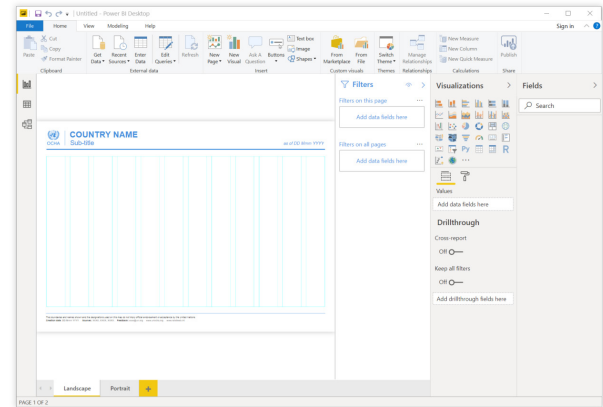
For a quick start, there is a pre-made OCHA template containing a banner, footer, grid, and colour swatches.

To create a new document using the template, click **File > Import > Power BI template**.

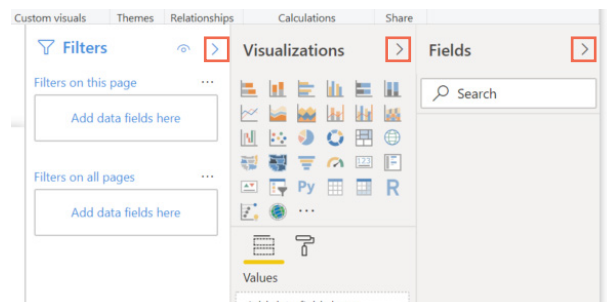


Browse to [exercise\2019\\_OCHA\\_PowerBI\\_A4-template.pbix](#) and click **Open**

The template should look like this:

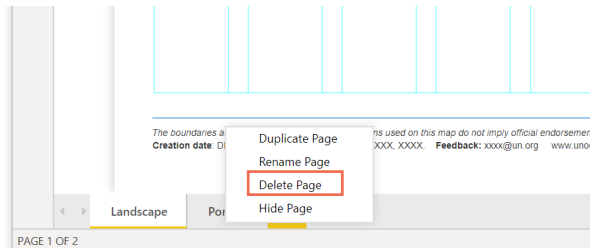


If the panels are fully expanded, close them by clicking the right arrow icons ➤



The file is still untitled. Go to **File > Save As** and give it the filename [OCHA-Caribbean-3W-2017](#) with a **.pbix** extension. Save it in the same folder.

The report will only be one page so delete the second page by **right-clicking its tab and choosing “Delete Page”**.

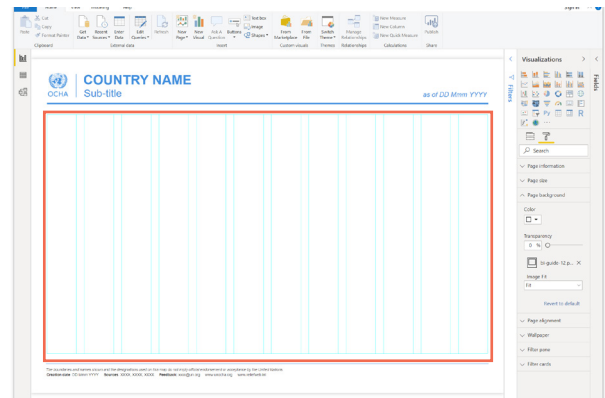


Right-click the “Landscape” tab and rename it “Overview”.

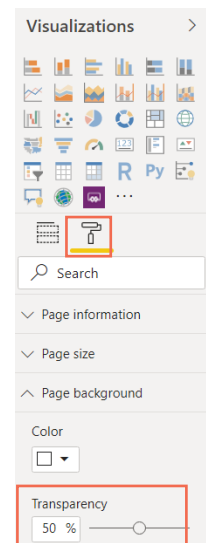


## Grid

A grid will help create a proportional structure that brings clarity, order, consistency, and harmony to your design. The OCHA template provides a 12-column grid design in Cyan.



The grid is created by adding a background image to the canvas. Darken or lighten it by adjusting its opacity. Click anywhere on the canvas and select the Format tab in the Visualizations pane. Got to the “Page Background” section and **increase opacity to 50%** to make it lighter.

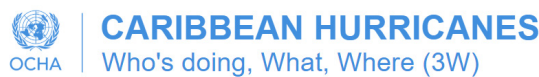


## TEXT

### Edit template text boxes

The template header has three text fields. To edit, hover the mouse over the text then click and type.

- replace **COUNTRY NAME** with **CARIBBEAN HURRICANES**
- replace **Sub-title** with **Who's doing, What, Where (3W)**
- replace **as of XX Mmm YYYY** with **as of 10 Oct 2017**

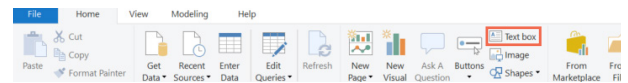


The template footer has text as well but it's just one text box.

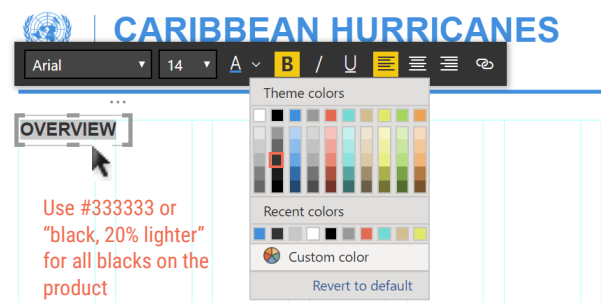
- change the **Creation date** field info with **5 Oct 2017**
- change the **Sources** field info with **CDEMA, Humanitarian Partners**

### Creating text boxes

To create text boxes click the  **Text box** button in the Home menu tab



A text box will pop-up. Use the settings in the screenshot below for the section title text.



To move the text box, make sure the tip of the mouse pointer is right on the the text box border then click and drag. Place the text box in the top left corner of the grid.

### Copy and paste

**Copy (Ctrl+C) and paste (Ctrl+V)** and edit the text to create three more titles as shown below

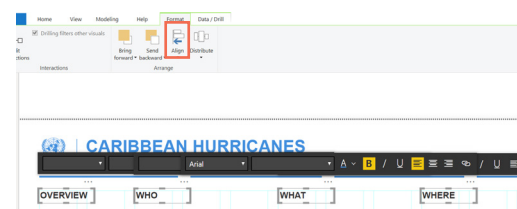


### Multiple select

To select multiple items **hold down CTRL while clicking objects.**

### Alignment

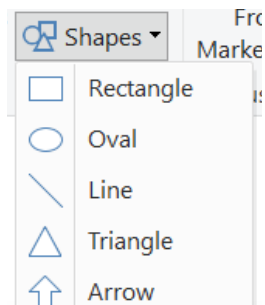
Align the text boxes to their tops by multiple selecting them and then go to the format tab and press the align button. **Choose "Align top"**



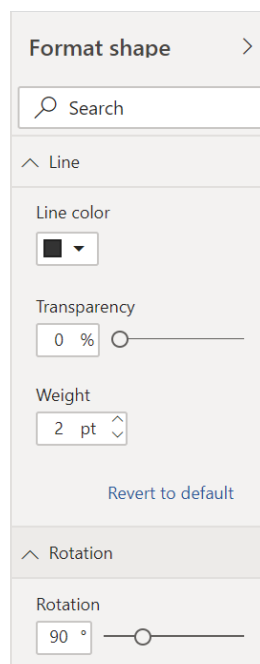
## LINES

### Add section title lines

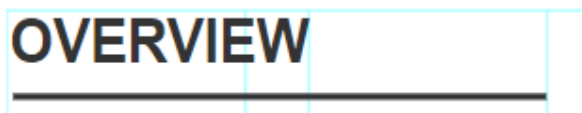
Lines under the titles should be added to better distinguish the sections. To add a line **go to the Home tab and look for the Shapes button and select Line.**



This will add a line but it will be vertical. Use these settings to create a black, horizontal, 2 pt line and place it below the section title text.



It should look like this:



Make sure there's some white space between the text and line. Use the arrow buttons on the keyboard to nudge the line into position.

Create 3 more lines for the other sections like below:

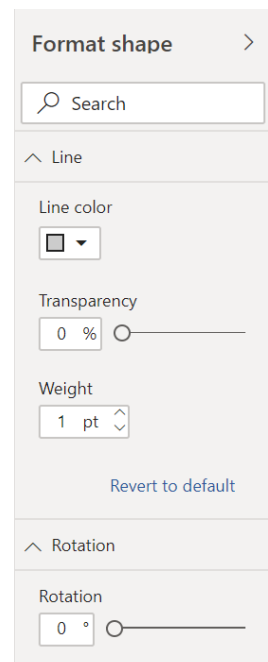


Make sure they are aligned like the text. Note the different column widths of each section:

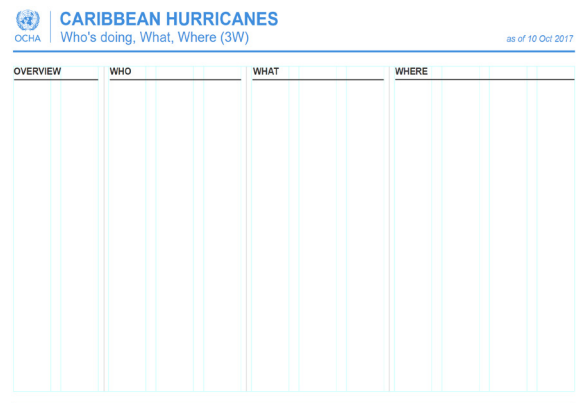
- **Overview:** 2 columns
- **Who, What:** 3 columns
- **Where:** 4 columns

### Add section divider lines

Line dividers separating each section vertically is needed. Follow these settings after creating a line.

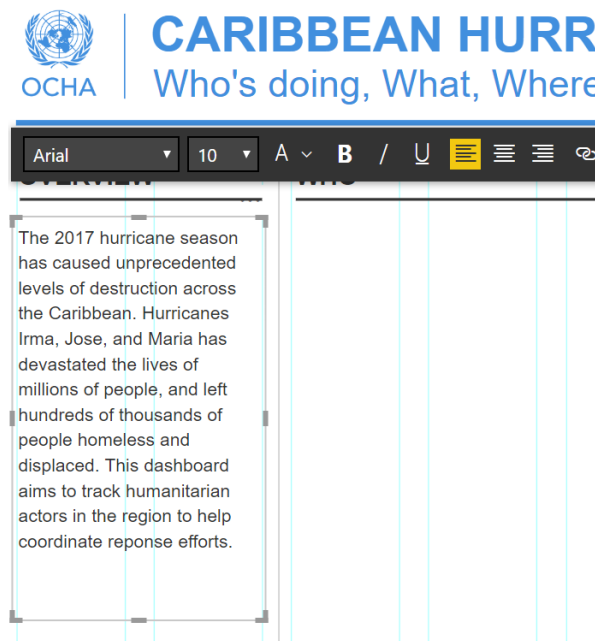


Make sure the lines extend from the top to the bottom of the grid and it is centered within the gutters. Create two more copies to divide the other sections. It should look like below:



## OVERVIEW TEXT

Create a text box to hold the overview text and follow these settings:



The screenshot shows a web editor interface. At the top left is the OCHA logo (United Nations emblem with 'OCHA' text). To its right is the title 'CARIBBEAN HURRICANES' in large blue capital letters, followed by the subtitle 'Who's doing, What, Where' in smaller blue text. Below the title is a text box with a black border and a light gray background. The text box contains the following text: 'The 2017 hurricane season has caused unprecedented levels of destruction across the Caribbean. Hurricanes Irma, Jose, and Maria has devastated the lives of millions of people, and left hundreds of thousands of people homeless and displaced. This dashboard aims to track humanitarian actors in the region to help coordinate response efforts.' Above the text box is a toolbar with various formatting options: a font dropdown set to 'Arial', a size dropdown set to '10', a bold button (B), an italic button (I), a link button (U), a list button (bulleted), a table button (grid), and a link icon (chain).

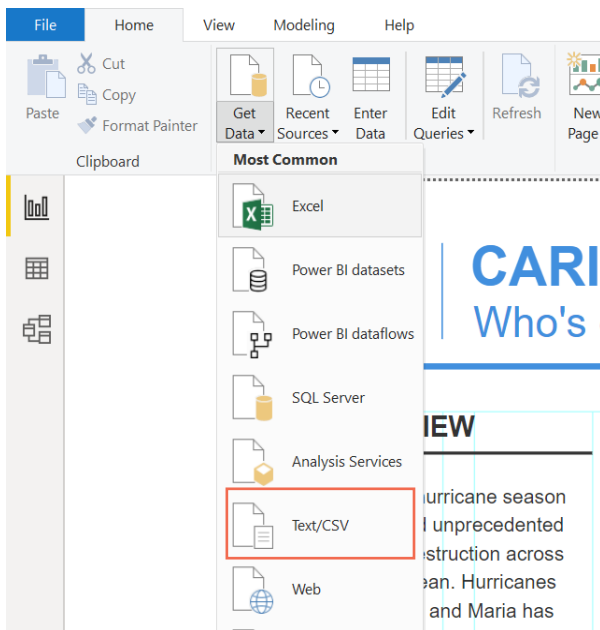
Copy and paste this text into the box:

The 2017 hurricane season has caused unprecedented levels of destruction across the Caribbean. Hurricanes Irma, Jose, and Maria has devastated the lives of millions of people, and left hundreds of thousands of people homeless and displaced. This dashboard aims to track humanitarian actors in the region to help coordinate response efforts.

## DATA

### Importing the main data set

To import data into PowerBI click the **Get Data** button in the Home tab and select your data format.



In this case, the data is in CSV format. Browse to [exercise\CDEMA-3W.csv](#) and click **Open**

What, Where (3W)

as of 10

CDEMA-3W.csv

File Origin: 1252: Western European (Windows) | Delimiter: Comma | Data Type Detection: Based on first 200 rows

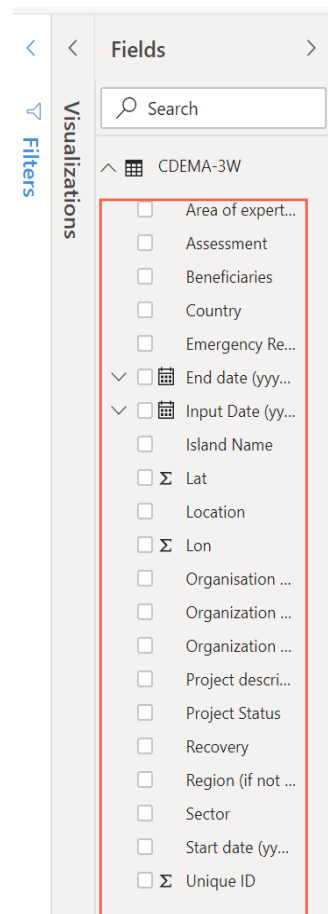
| Input Date (yyyy/mm/dd) | Organization Code | Organization name                        | Organization type                   | Area of expertise     |
|-------------------------|-------------------|--|-------------------------------------|-----------------------|
| 9/6/2017                | PAHO              | PAHO                                     | UN Agency                           | Engineer              |
| 9/6/2017                | IFRC              | Antigua and Barbuda Red Cross            | Red Cross and Red Crescent Movement | Management            |
| 9/6/2017                | PAHO              | PAHO                                     | UN Agency                           | Environmental Health  |
| 9/6/2017                | IFRC              | St Kitts and Nevis Red Cross             | Red Cross and Red Crescent Movement | Management            |
| 9/7/2017                | ICM               | International Organization for Migration | UN Agency                           | NFI                   |
| 9/8/2017                | PAHO              | PAHO                                     | UN Agency                           | Logistics             |
| 9/8/2017                | PAHO              | PAHO                                     | UN Agency                           | Architect             |
| 9/8/2017                | IFRC              | Antigua and Barbuda Red Cross            | Red Cross and Red Crescent Movement | Management            |
| 9/8/2017                | USAID             | Antigua and Barbuda Red Cross            | Red Cross and Red Crescent Movement | Disaster Response     |
| 9/8/2017                | USAID             | The Bahamas Red Cross                    | Red Cross and Red Crescent Movement | Disaster Response     |
| 9/8/2017                | IFRC              | St Kitts and Nevis Red Cross             | Red Cross and Red Crescent Movement | Logistics             |
| 9/9/2017                | UNDP              | UNDP                                     | UN Agency                           | Multi Sector          |
| 9/10/2017               | PAHO              | PAHO                                     | UN Agency                           | Health personnel      |
| 9/10/2017               | PAHO              | PAHO                                     | UN Agency                           | Engineer              |
| 9/10/2017               | PAHO              | PAHO                                     | UN Agency                           | Architect             |
| 9/10/2017               | PAHO              | PAHO                                     | UN Agency                           | Electrical Engineer   |
| 9/10/2017               | ICM               | International Organization for Migration | UN Agency                           | Protection            |
| 9/10/2017               | PAHO              | PAHO                                     | UN Agency                           | Management            |
| 9/10/2017               | ICM               | International Organization for Migration | UN Agency                           | Displacement Tracking |
| 9/10/2017               | ICM               | International Organization for Migration | UN Agency                           | Shelter Operations    |

Load Transform Data Cancel

A screen will popup showing the data being imported. **Click Load to finish the process.**


### Fields pane

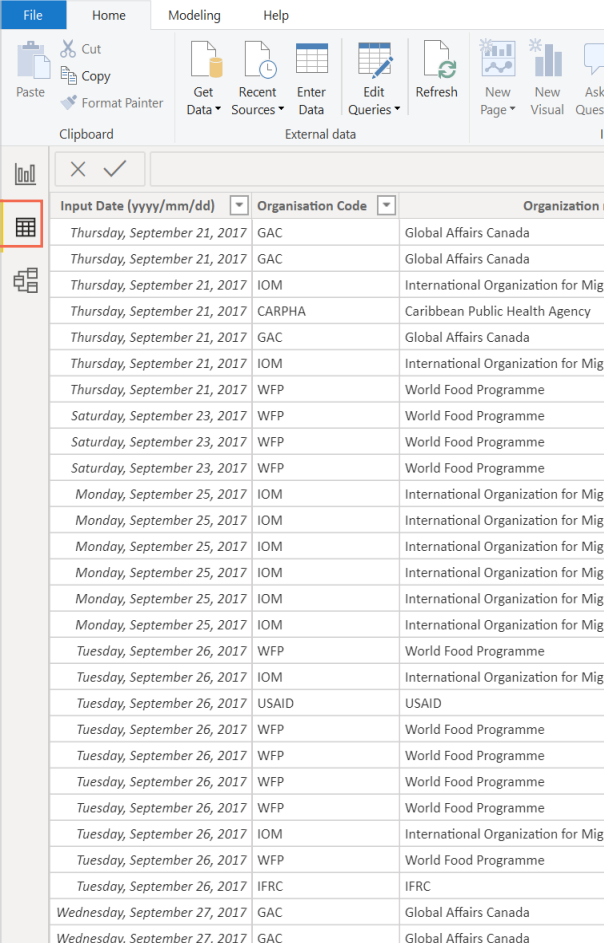
**Expand the Fields pane**, the data fields imported from the CSV should now be visible.





## Data view

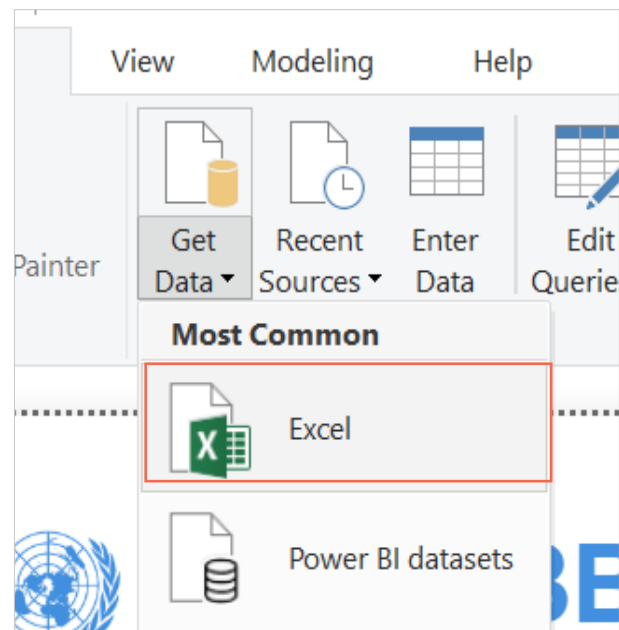
Go into data view by pressing the **Data button** on the left sidebar . This shows all the data uploaded.




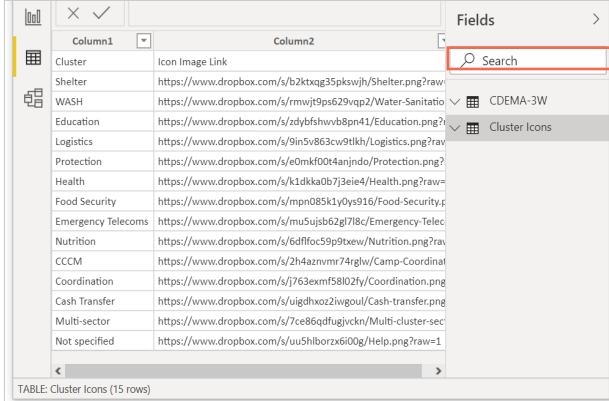
| Input Date (yyyy/mm/dd)       | Organisation Code | Organization                             |
|-------------------------------|-------------------|--|
| Thursday, September 21, 2017  | GAC               | Global Affairs Canada                    |
| Thursday, September 21, 2017  | GAC               | Global Affairs Canada                    |
| Thursday, September 21, 2017  | IOM               | International Organization for Migration |
| Thursday, September 21, 2017  | CARPHA            | Caribbean Public Health Agency           |
| Thursday, September 21, 2017  | GAC               | Global Affairs Canada                    |
| Thursday, September 21, 2017  | IOM               | International Organization for Migration |
| Thursday, September 21, 2017  | WFP               | World Food Programme                     |
| Saturday, September 23, 2017  | WFP               | World Food Programme                     |
| Saturday, September 23, 2017  | WFP               | World Food Programme                     |
| Saturday, September 23, 2017  | WFP               | World Food Programme                     |
| Monday, September 25, 2017    | IOM               | International Organization for Migration |
| Monday, September 25, 2017    | IOM               | International Organization for Migration |
| Monday, September 25, 2017    | IOM               | International Organization for Migration |
| Monday, September 25, 2017    | IOM               | International Organization for Migration |
| Monday, September 25, 2017    | IOM               | International Organization for Migration |
| Monday, September 25, 2017    | IOM               | International Organization for Migration |
| Tuesday, September 26, 2017   | WFP               | World Food Programme                     |
| Tuesday, September 26, 2017   | IOM               | International Organization for Migration |
| Tuesday, September 26, 2017   | USAID             | USAID                                    |
| Tuesday, September 26, 2017   | WFP               | World Food Programme                     |
| Tuesday, September 26, 2017   | WFP               | World Food Programme                     |
| Tuesday, September 26, 2017   | WFP               | World Food Programme                     |
| Tuesday, September 26, 2017   | WFP               | World Food Programme                     |
| Tuesday, September 26, 2017   | IOM               | International Organization for Migration |
| Tuesday, September 26, 2017   | WFP               | World Food Programme                     |
| Tuesday, September 26, 2017   | IFRC              | IFRC                                     |
| Wednesday, September 27, 2017 | GAC               | Global Affairs Canada                    |
| Wednesday, September 27, 2017 | GAC               | Global Affairs Canada                    |

## Importing another data set

Using the same steps as importing the main data set, **import the spreadsheet containing cluster icons information**. Keep in mind that this new file is in Excel format. The file is located at [exercise\cluster-icons.xlsx](#)



Go into data view  and choose your table in the Fields menu on the right. Sometimes, you'll get situations like below **where the first row is not treated as your table headers**.

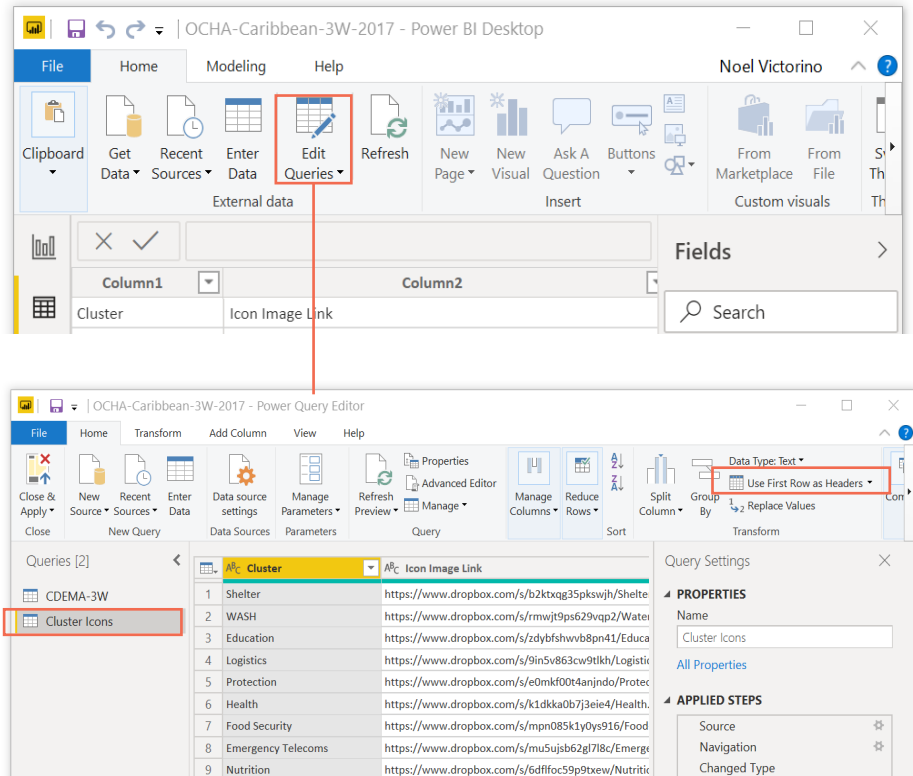


| Cluster            | Icon Image Link   |
|--------------------|---|
| Shelter            | https://www.dropbox.com/s/b2ktxag35pksvjw/Shelter.png?raw=                |
| WASH               | https://www.dropbox.com/s/rmwj19ps629vqp2/Water-Sanitation.png?raw=       |
| Education          | https://www.dropbox.com/s/zdybfshwv8pn41/Education.png?raw=               |
| Logistics          | https://www.dropbox.com/s/9in5v863cv9tlkh/Logistics.png?raw=              |
| Protection         | https://www.dropbox.com/s/e0mkf00t4anjndj/Protection.png?raw=             |
| Health             | https://www.dropbox.com/s/k1dkka0b73eie4/Health.png?raw=                  |
| Food Security      | https://www.dropbox.com/s/mpn085k1y0ys916/Food-Security.png?raw=          |
| Emergency Telecoms | https://www.dropbox.com/s/mu5ujbs62gl718c/Emergency-Telecoms.png?raw=     |
| Nutrition          | https://www.dropbox.com/s/6dflfoc59p9teww/Nutrition.png?raw=              |
| CCCM               | https://www.dropbox.com/s/2h4aznmvr74rglw/Camp-Coordination.png?raw=      |
| Coordination       | https://www.dropbox.com/s/j763exmf58i02fy/Coordination.png?raw=           |
| Cash Transfer      | https://www.dropbox.com/s/uigdhxaz2iwgoul/Cash-transfer.png?raw=          |
| Multi-sector       | https://www.dropbox.com/s/7ce86qdfugjvckn/Multi-cluster-security.png?raw= |
| Not specified      | https://www.dropbox.com/s/uushlborxz6i00g/Help.png?raw=1                  |


TABLE: Cluster Icons (15 rows)

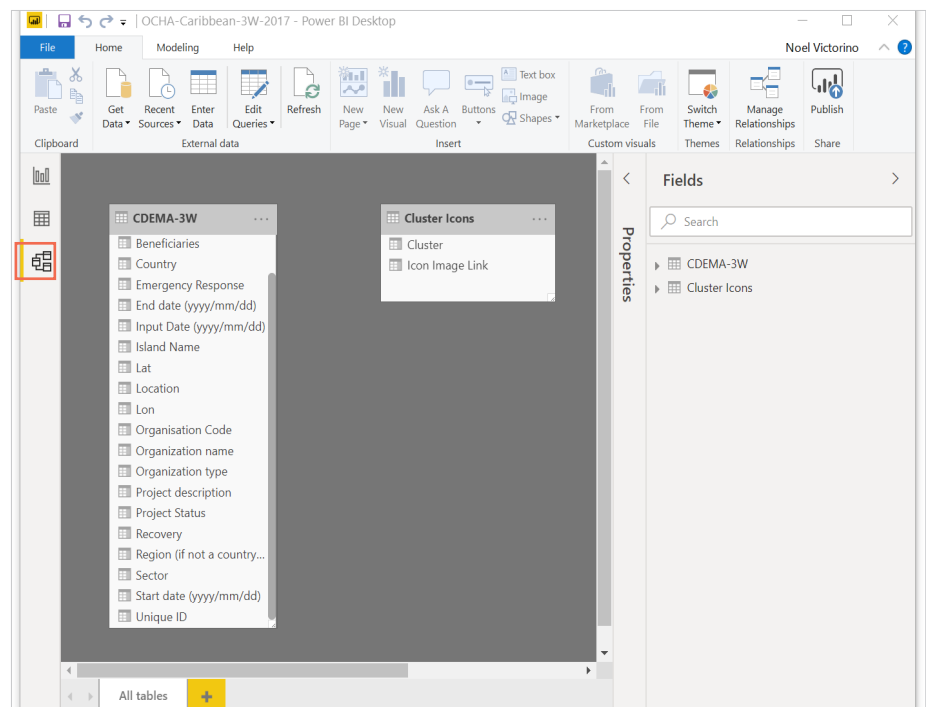
To fix:

1. Click on **Edit Queries**
2. Select **Cluster Icons**
3. Click **Use First Row as Headers**



## Model view

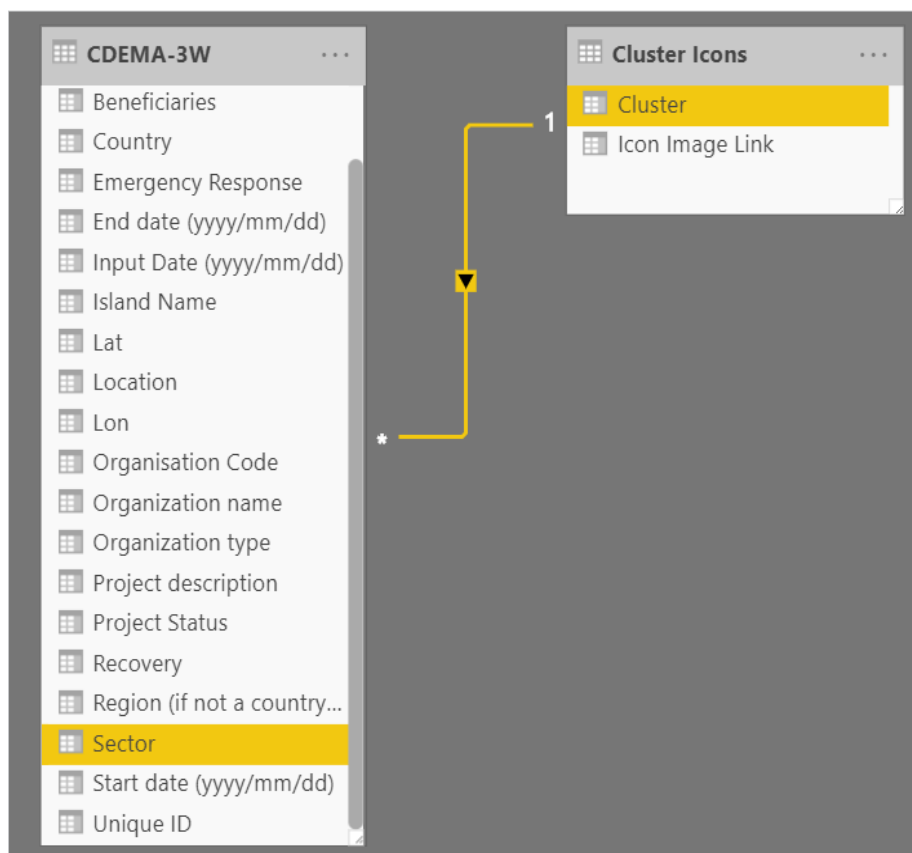
Model view enables establishing relationships between tables. To go into model view, **press the Model button** on the left sidebar .



## Defining table relationships

A relationship between tables means having a field in both, containing the same data, which allows them to be linked. In this case, the “Sector” field in CDEMA-3W and the “Cluster” field in Cluster Icons need to be linked. Both fields should have matching sector/cluster names so if a cluster icon is needed, this relationship allows its retrieval.

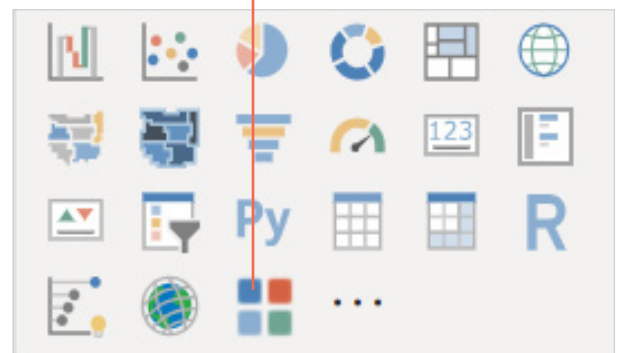
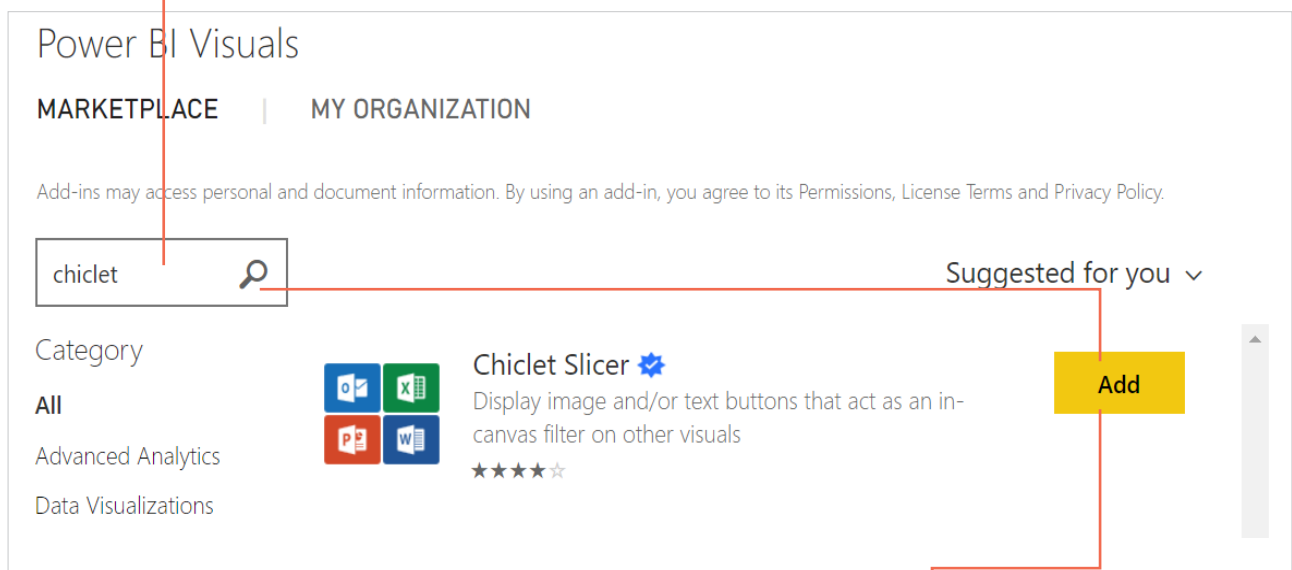
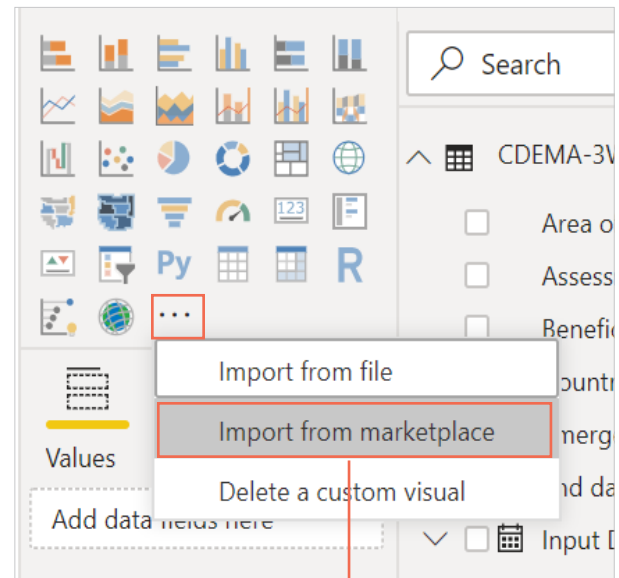
To establish the relationship, **click and drag** the **Sector** field to the **Cluster** field. A line connecting the tables should form.



## SLICERS

Slicers allows filtering by categories within the report. It is useful when trying to find categorized information quickly. In the Visualizations pane, there's a slicer visual included but we want ours to be more visual so we will install the “**Chiclet Slicer**” from the Marketplace.

Follow the red boxes and lines to learn how to import from the marketplace



## SLICER SETUP

While the newly created slicer is selected, **drag fields on the right to the sections on the left as shown below:**

The screenshot shows the slicer setup interface with two main panes: **Visualizations** and **Fields**.

**Visualizations Pane:**

- Category:** A dropdown menu with 'Sector' selected.
- Values:** A section with the text 'Add data fields here'.
- Image:** A section with the text 'Icon Image Link'.
- Drillthrough:** A section with a 'Cross-report' toggle set to 'Off' and a 'Keep all filters' toggle set to 'On'. Below these is the text 'Add drillthrough fields here'.

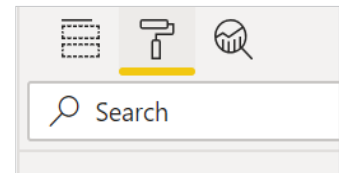
**Fields Pane:**

- CDEMA-3W:** A group of fields including 'Area of expert...', 'Assessment', 'Beneficiaries', 'Country', 'Emergency Re...', 'End date (yyy...', 'Input Date (yy...', 'Island Name', 'Lat', 'Location', 'Lon', 'Organisation ...', 'Organization ...', 'Organization ...', 'Project descri...', 'Project Status', 'Recovery', 'Region (if not ...', 'Sector' (checked), 'Start date (yy...', 'Unique ID'.
- Cluster Icons:** A group of fields including 'Cluster' and 'Icon Image Link' (checked).

Red lines indicate the following drag-and-drop actions:

- From 'Sector' in the Fields pane to the 'Category' dropdown in the Visualizations pane.
- From 'Icon Image Link' in the Fields pane to the 'Image' section in the Visualizations pane.
- From 'Icon Image Link' in the Fields pane to the 'Add drillthrough fields here' section in the Visualizations pane.

Now, switch to the formatting pane. Use the following settings:



### General

- Columns: 2

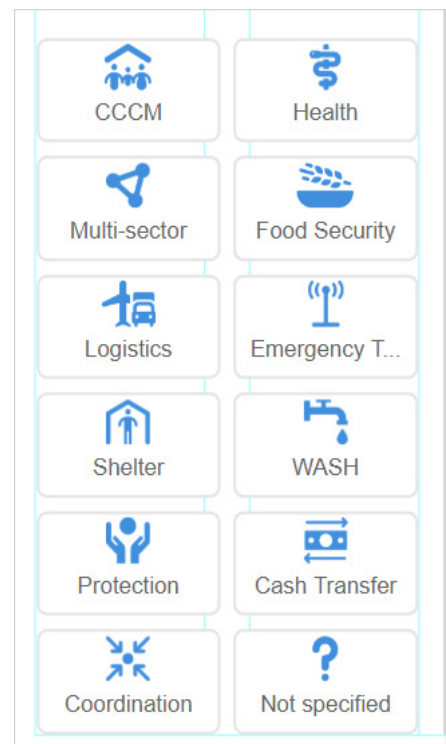
**Header:** Off

### Chiclets

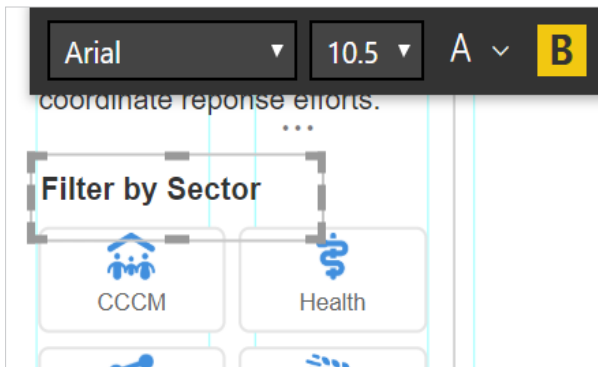
- Text size: 8
- Height: 53
- Width: 93
- Selected colour: #B3D2F2
- Hover colour: #B3D2F2
- Disabled colour: #E6E6E6
- Outline colour: #E6E6E6
- Outline weight: 1

**Position and resize the tile below the overview text** and it should look like this.

Make sure its left, right, and bottom is lined up with the gridlines.

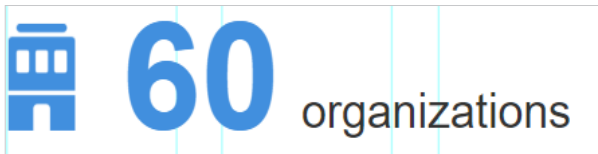



The built-in labels for the tiles won't be used for this exercise since customization is limited. Instead, create a text box above the slicer using the settings below.



## KEY FIGURES

Key Figures are staples of OCHA products. In this section, a key figure visual that looks like this will be created:

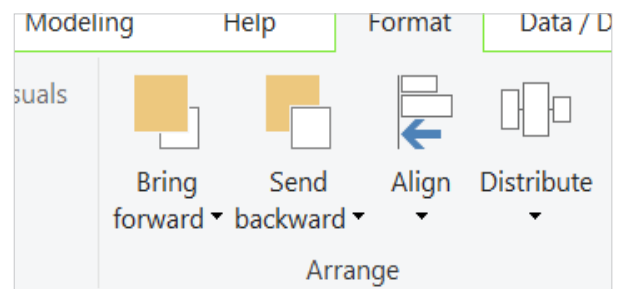


1. To add the icon, click  Image button in the menu.
2. Choose [exercise\icons\building.png](#).
3. Place it below the WHO section and try to line its top with the overview text on the left.
4. Resize so it's about the same height as three lines of overview text.




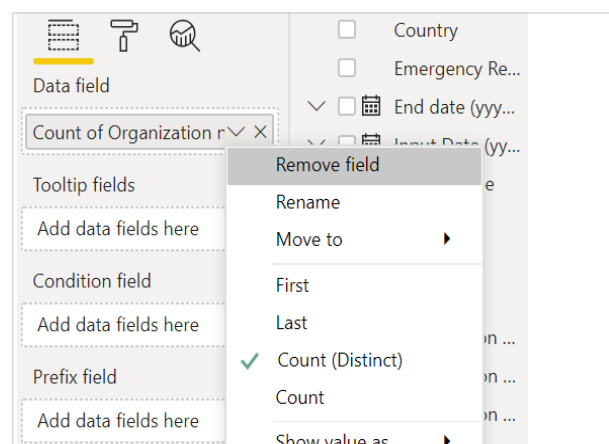
## Object layering

Using this method, eventually there will be tile overlaps and it will be hard to select certain things. If you select a tile, the Format tab will activate and the layering order can be adjusted.



Next, add the big blue figure:

1. Install the Advanced Card  custom visual from the marketplace
2. Click on it in the Visualizations pane
3. Drag 'Organization Name' to the 'Data Field'
4. In the field dropdown, choose 'Count (Distinct)'



Now switch to the formatting pane and use the following settings. (Note that colours that were used previously could be accessed in the colour picker menu under the “Recently colors” section):

#### General

- Alignment: **right-align**

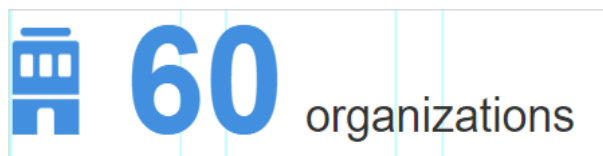
#### Data Label

- Colour: **#418FDE**
- Font-size: **50**
- Font-family: **Arial**
- Bold: **On**
- Hover colour: **#B3D2F2**
- Disabled colour: **#E6E6E6**
- Outline colour: **#E6E6E6**
- Outline weight: 1

Category: Off

Visual Header: Off

**Position and resize it next to the building icon, making sure it is the same height. Add a text label next to it** (Arial, 16pt, black). It should look like this:



Do this two more times for the ‘What’ and ‘Where’ sections but don’t start from scratch. Copy and Paste the figure and label to avoid re-doing all the steps. Follow the settings for the other sections:

#### ‘What’ section

- Data field: **Sector**
- Icon: **Multi-cluster-sector.png**
- Text label: **Sectors**

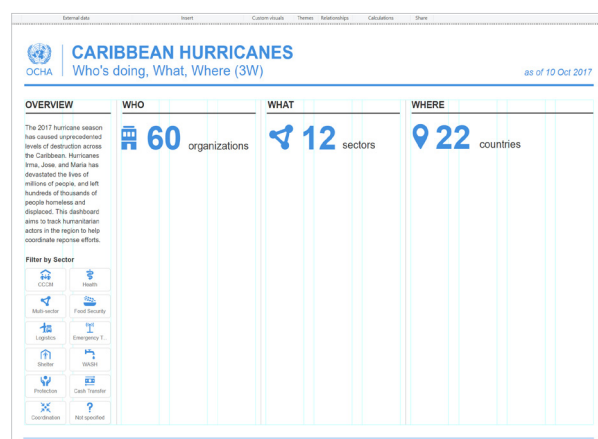
#### ‘Where’ section

- Data field: **Country**
- Icon: **Location.png**
- Text label: **Sectors**

Make sure they all line up horizontally. It should look like this:

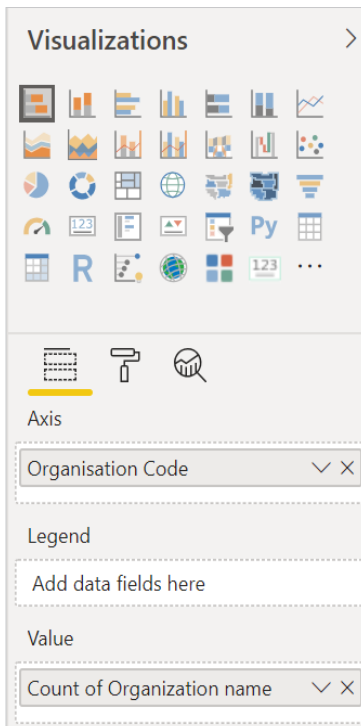


At this point, the product should look like this:

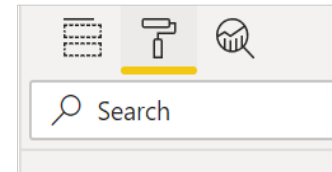


## BAR CHARTS

Create a simple bar chart by clicking on the 'Stacked Bar Chart' visual. Then, drag the fields shown below:



Switch to the formatting pane and use the following settings:



### Y-axis

- Colour: #333333
- Font-family: **Arial**
- Text size: 9
- Max size: 35
- Inner padding: 25
- Title: **off**

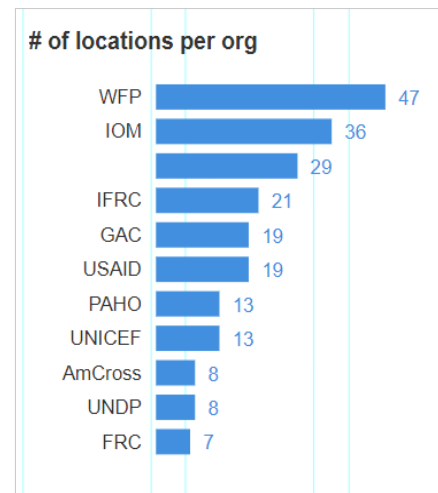
X-axis: off

### Data labels

- Colour: #418FDE
- Text size: 9
- Font-family: **Arial**

**Position and resize the tile below the 'WHO' key figure and put a label above it like we did for the chiclet slicer.**

Should look like this.

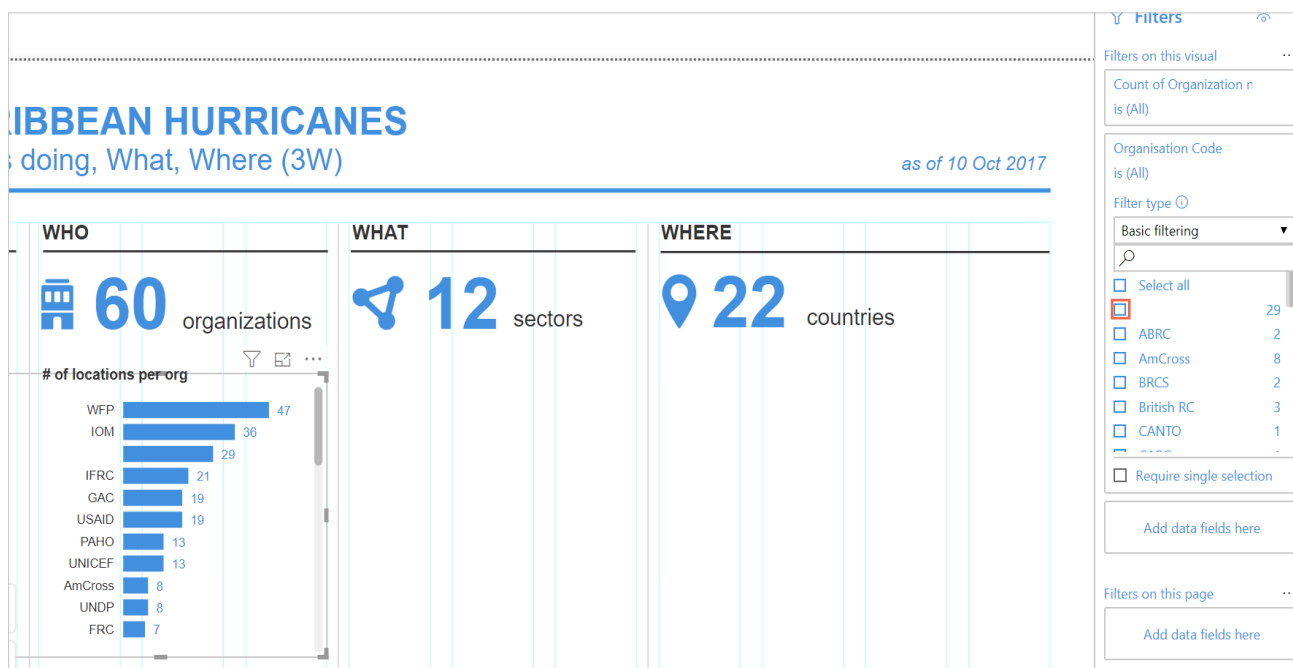




## Filtering

You'll notice that the 3rd bar chart value is missing a label. It's most likely because those cells were left blank. In some cases, hiding certain values from appearing in your chart or page is necessary. That's where filtering can help.

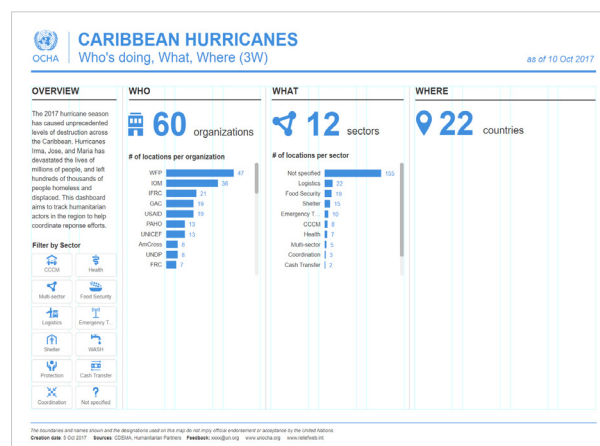
1. With the chart selected, expand the Filters pane
2. Expand 'Organisation Code'
3. Check 'Select All'
4. Uncheck the empty row



This is needed one more time for the 'What' sections. Copy and Paste the chart and the title to avoid re-doing all the steps. Follow the settings for the other section:

- Axis: **Sector**
- Value: **Count of Sector**
- Title: **# of locations per sector**

Your canvas should now look like this:



## PIE CHARTS

Create a simple pie chart by clicking on the 'Pie chart' visual. Then drag the fields shown below:

**Filters**

Filters on this visual

Count of Organisation C is (All)

**Organization type**

is not , CARICOM/Pu...

Filter type

Basic filtering

Select all

CARICOM/Public He... 2

Commercial associat... 1

Donor 7

EU 2

Government 1

Require single selection

**Visualizations**

Legend

Organization type

Details

Add data fields here

Values

Count of Organisation Code

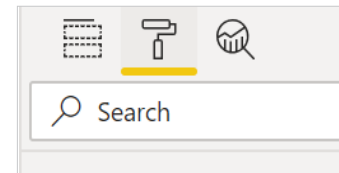
Tooltips

The data received isn't 100% clean so you should use filters for now. Select **Donor, Red Cross, Government, NGO, and UN agency**.

We'll need to do this one more times for the 'What' sections. Copy and Paste the chart and the title to avoid re-doing all the steps. Use these settings:

- Legend: **Emergency Response**
- Values: **Count of Organization Code**
- Title: **% of orgs doing emergency response**

Now we switch to the formatting pane and use the following settings:



**Data colours**

- Colour: **Pick the OCHA blues**

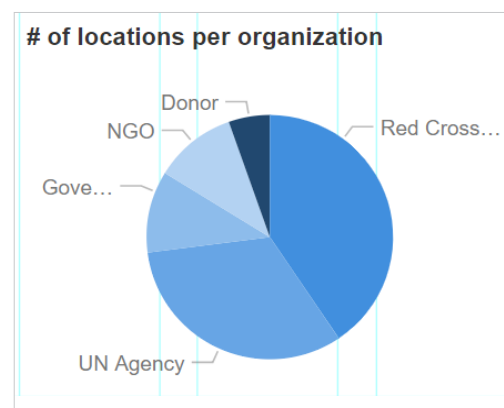
**Detail labels**

- Font-family: **Arial**

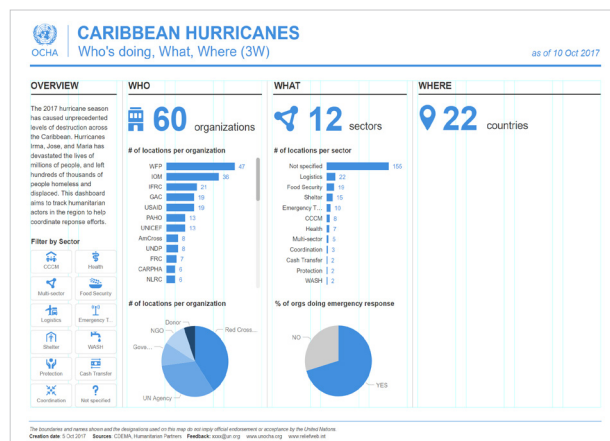
**Title:** off

**Visual header:** off

Position and resize the tile below the 'WHO' bar chart and put a label above it like we did for the bar chart. Should look like this:





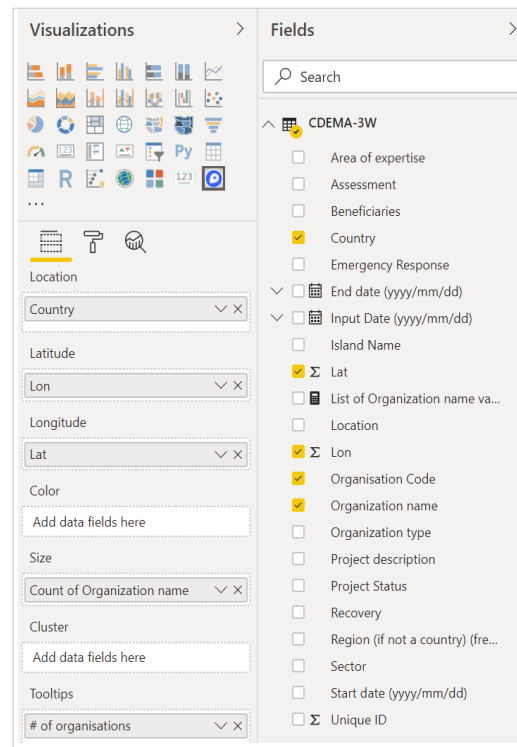
Your canvas should now look like this:



## MAPPING

For mapping purposes, use the Mapbox Visual custom visual to load a custom basemap that use standard UNGIS boundaries.

1. Install the Mapbox Visual  custom visual from the marketplace
2. Click  in the Visualizations pane
3. Follow the settings to the right. Note that the tooltip is using 'Organisation Code' but was renamed in the Tooltips section.



Now, switch to the formatting pane and use the following settings:

### Viz Settings

- Access Token: **pk.eyJ1IjoicmVsaWVmd2ViliwiYSI6IldYR2ZuV3cifQ.eSPZMZWE6UyLtO0OH\_-qrw**
- Map Style: **Custom**
- Style URL: **mapbox://styles/reliefweb/cjyh975uc16641cq12fi1rz6**

**Geocoder:** off

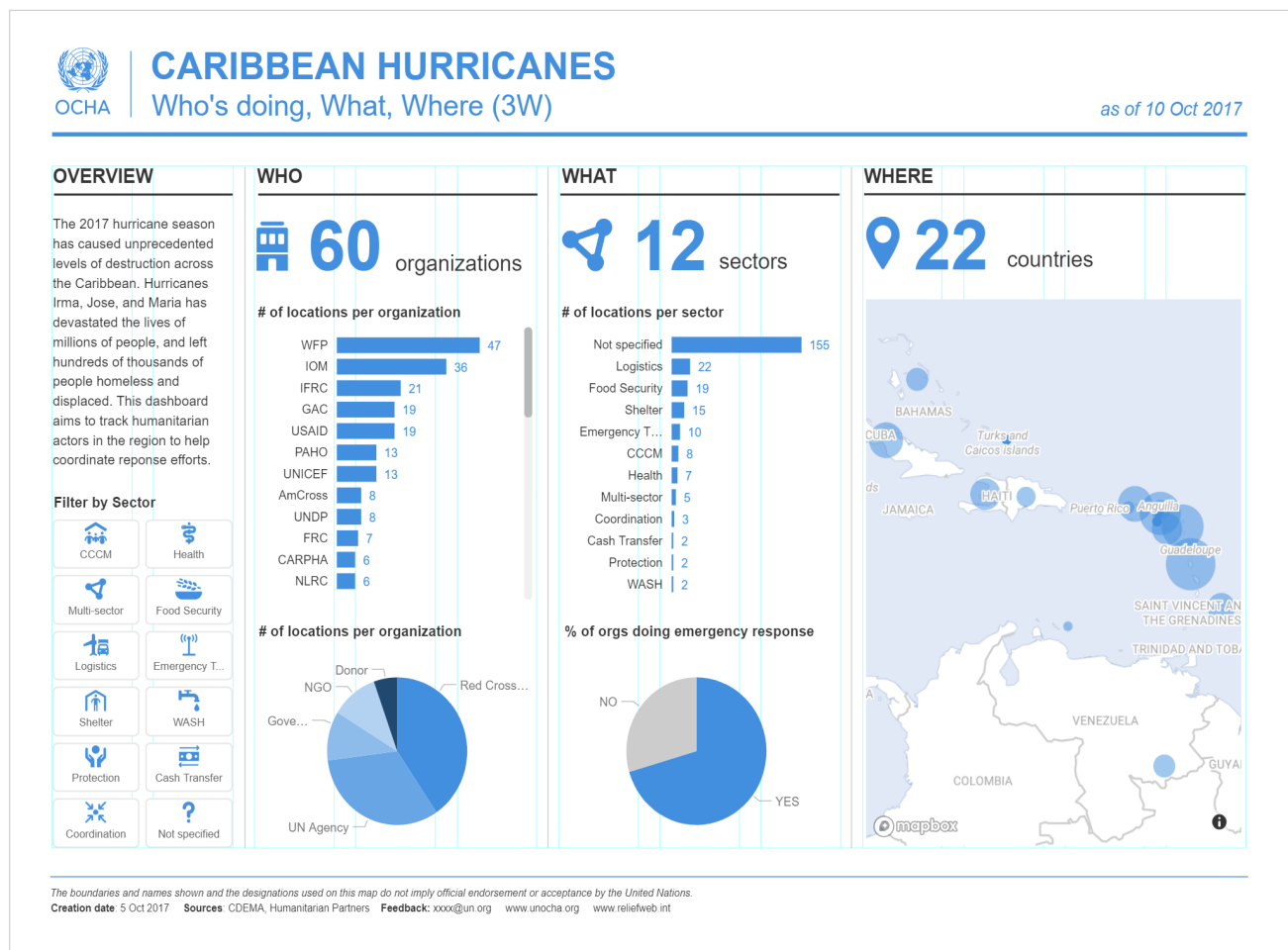
### Circle

- Radius: **5**
- Min, Max, Highlight Color: **# 418FDE**
- Opacity: **50**
- Stroke width: **0**
- Legend: **off**

**Everything else:** off

Position and resize the tile below the 'WHERE' key figure. Make sure to stay within the grid.

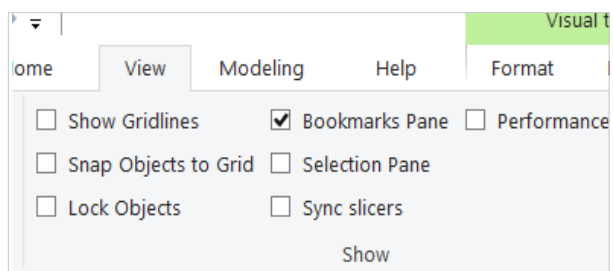
The canvas should now look like this:



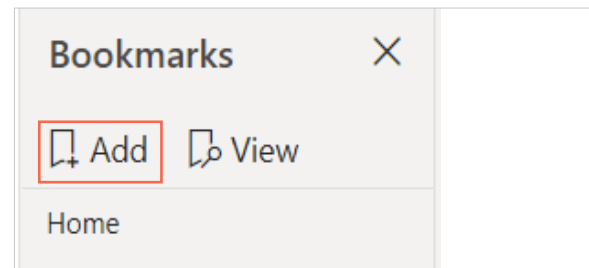
## BOOKMARKS

PowerBI let's you save a state of a report based on what filters were selected. In this case, the default unfiltered state of the report will be saved as a bookmark so it could be used to reset the interface.

**Click the View tab and check the Bookmarks Pane box.**



The Bookmarks pane should now be visible. Make sure no filters are selected and press the Add button. A “Bookmarks 1” button will be added but right-click that and rename it “Home”.

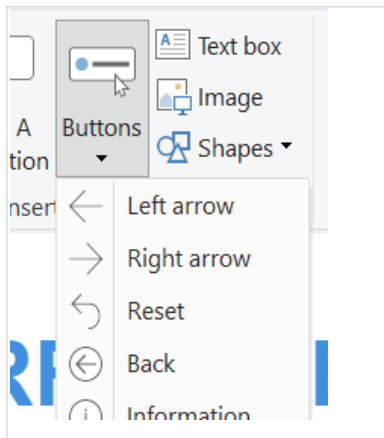


Now, anytime you want to go back to this or any view, you just select its bookmark. The bookmark just created will be used in the next section, where it will be the linked to a button as an action.

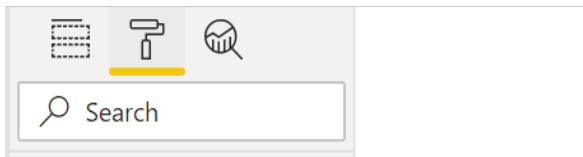
## BUTTONS

Create a 'Reset' button so the audience can always go back to the product's original state.

Click 'Buttons' in the menu and select 'Reset'



Switch to the formatting pane and use the following settings:



### Button text:

- Button text: **Reset**
- Font color: **White**
- Padding: **16**
- Text size: **12**
- Font family: **Arial**

### Icon:

- Padding: **7px**
- Line color: **White**
- Weight: **2**

### Outline:

- Outline color: **#418FDE**
- Outline weight: **3**
- Round edges: **3**

### Fill:

- Fill color: **#418FDE**

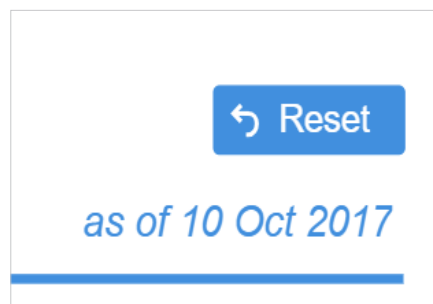
Title: off

Visual header: off

### Action:

- Type: **Bookmark**
- Bookmark: **Home**
- Tooltip: **Reset the entire page**

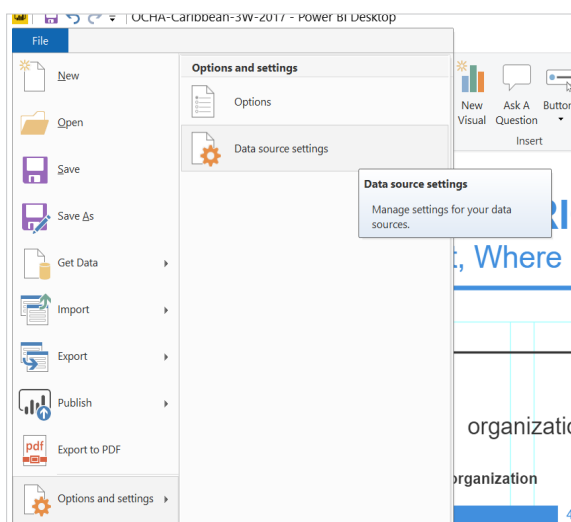
Position and resize the button at the top right corner of the header. It should look like this:



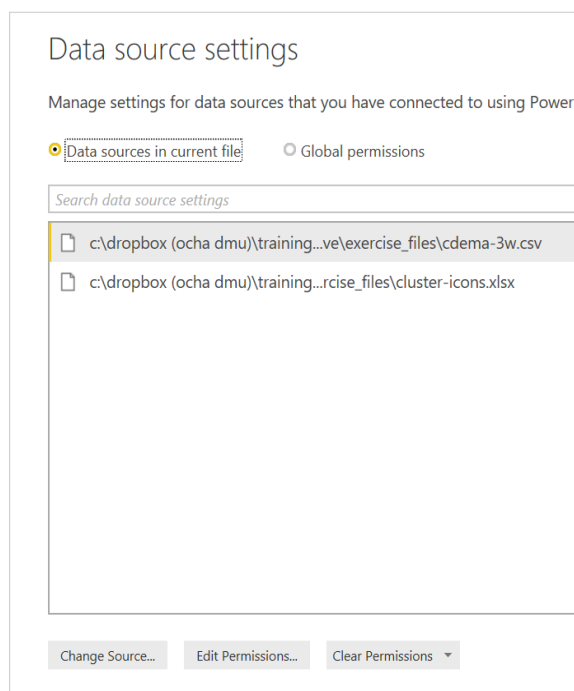
## REPLACING THE DATA

If data changes, replace it in PowerBI and the graphics will automatically update as long as the fields are the same.

Go to **File > Options and settings > Data source settings**.



Highlight one of your data sets and change its source.



## PUBLISHING

Before publishing, don't forget to save the document and hide the guides.

There are many ways to save which include the following:

- Saving as a PDF and submitting to ReliefWeb
- Embedding to a platform
- Sharing a web link

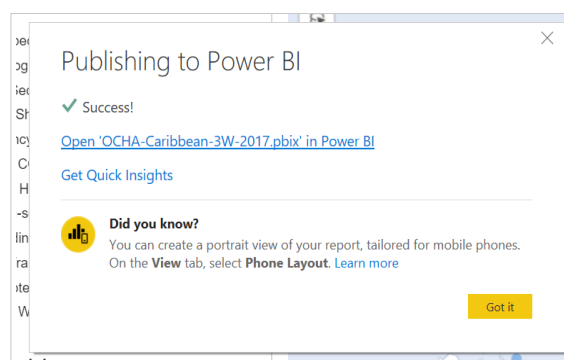
### PDF

Go to **File > Export to PDF**

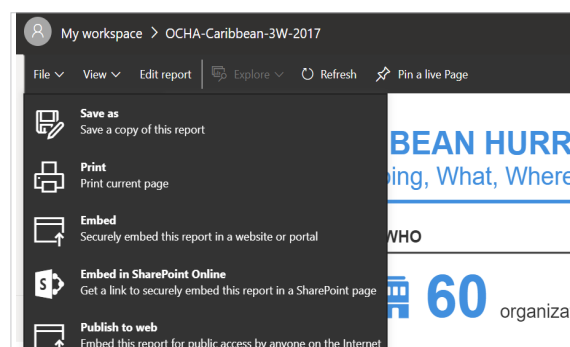
### Embedding or Web link

Click the **Publish button**  and choose a workspace.

Follow the open link:

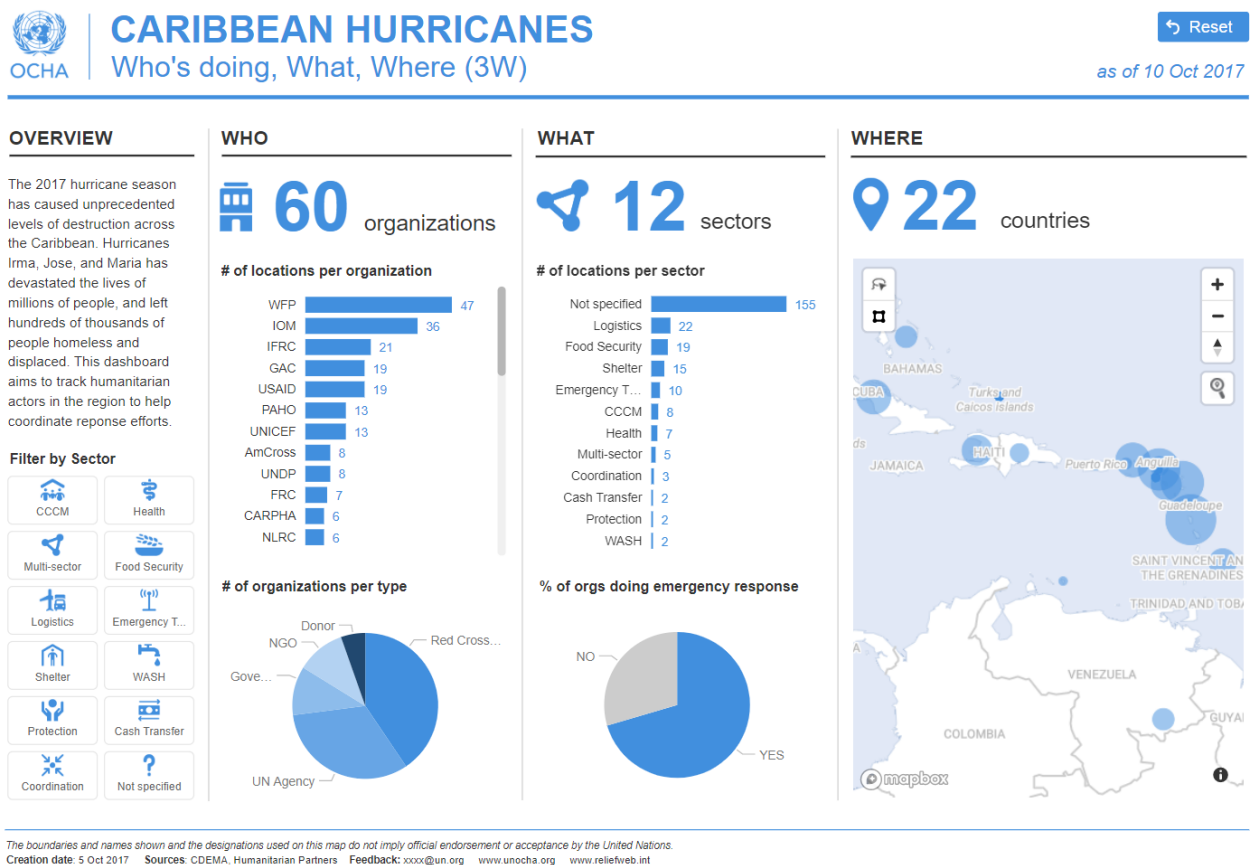


Choose from the options. You might be restricted based on account level (Pro vs Non-pro).



## CONGRATS!

You finished the tutorial! The final output should look like this:



For questions or comments, email: [victorino@un.org](mailto:victorino@un.org)