NICAR Beginner Hands-On:
US AID Data with Tableau Public

About this data: This file from Data.gov contains information on foreign aid, loans and grants from the US government from 1946-2010 on a per-year basis. This data can be used to analyze which programs and which countries the US chooses to fund and how that changes over time.

Before we start…

Let's just build something cool. In 2010 the US spent more than $50 billion in foreign assistance, both economic and military. What do you think the US spent its money on? What comes in at #2 and #3?

Do you think the US spends more now than it did in the past on foreign assistance—if you account for inflation?

Let's find out these answers, in 5 mouse clicks.

1. Drag the file **'Economic Assistance.twbx'** onto the Tableau Public icon.
2. Double-click **'Historical Amount'** on the left. *(US has spent $900 billion since 1949)*
3. Drag **'Year'** to Columns. *(See how amount has risen).*
4. Drag **'Program Name'** to Color.
5. Change the Mark type to Area
6. Drag **'Adjusted Amount'** on top of **'Historical Amount'** on Rows.

5 steps after opening our workbook, we've built a very cool visual of government data and found some answers.

Let's now learn how to build more views like this, and how to do oh so much more.

Preparing your data:

1. Get your data on one sheet in your excel file.
2. Make sure your headers are in the first row.
3. Get rid of any blank rows or columns.
4. Make sure your data is in a normalized format.

Correct: "Normalized" format:

	A	B	C	D	E
1	Country	Program Name	FY Year	Amount	Year
2	Afghanistan	Child Survival and Health	FY2002	2150000	1/1/2002
3	Afghanistan	Child Survival and Health	FY2003	47945019	1/1/2003
4	Afghanistan	Child Survival and Health	FY2004	35000000	1/1/2004
5	Afghanistan	Child Survival and Health	FY2005	35785000	1/1/2005
6	Afghanistan	Child Survival and Health	FY2006	37974000	1/1/2006
7	Afghanistan	Child Survival and Health	FY2007	69444000	1/1/2007
8	Afghanistan	Child Survival and Health	FY2008	27813000	1/1/2008
9	Afghanistan	Department of Defense Security Assistance	FY2002	2671000	1/1/2002
10	Afghanistan	Department of Defense Security Assistance	FY2003	231000	1/1/2003

Incorrect: Cross-tab format

	A	B	C	D	E	F
1	Country	Program Name	FY2002	FY2003	FY2004	FY2005
2	Afghanistan	Child Survival and Health	2150000	47945019	35000000	35785000
3	Afghanistan	Department of Defense Security Assistance	2671000	231000	113777303	354880927
4	Afghanistan	Development Assistance	3361305	7285228	46279941	157126174
5	Afghanistan	Economic Support Fund/Security Support Assist	31100000	10000000	1995000	38800

The data above is formatted as a cross-tab where each year is its own column. When this data is normalized there will be only one column for country, program name, fiscal year, amount, etc.

What should go into a column? Everything in a column should represent part of that column's whole. Countries the US has given aid to can roll up to a whole. Historical Amount and Adjusted Amount are two completely different metrics—you'd want to compare them, but they have no joined relationship to some bigger whole. They belong in different columns.

Example:

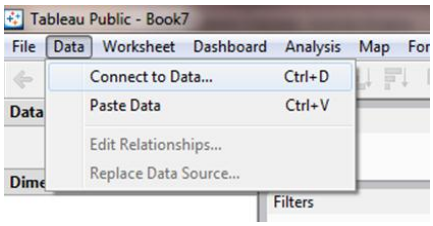
Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec = **Year**

Sales + Profit = **???**

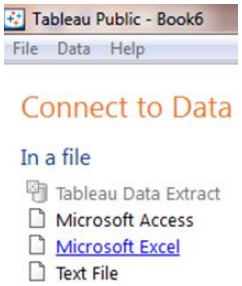
In the future, if you find yourself dealing with crosstab data, you can add the Tableau Excel Plugin to reshape your data into normalized form.

Connect to data

1. Data -> Connect to Data

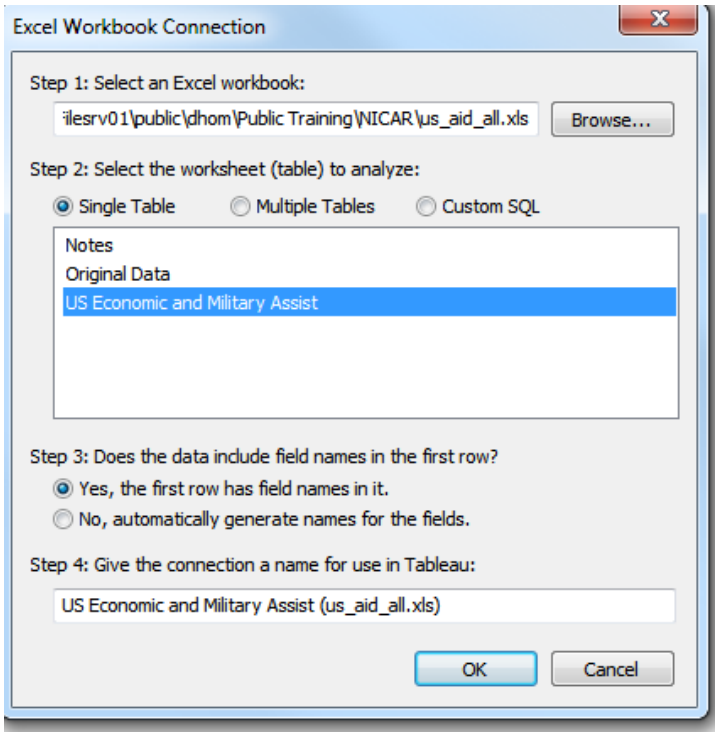


2. Select the type of data that you want to connect to (in this case an Excel file). Tableau Public connects to Microsoft Excel, Access and text files.

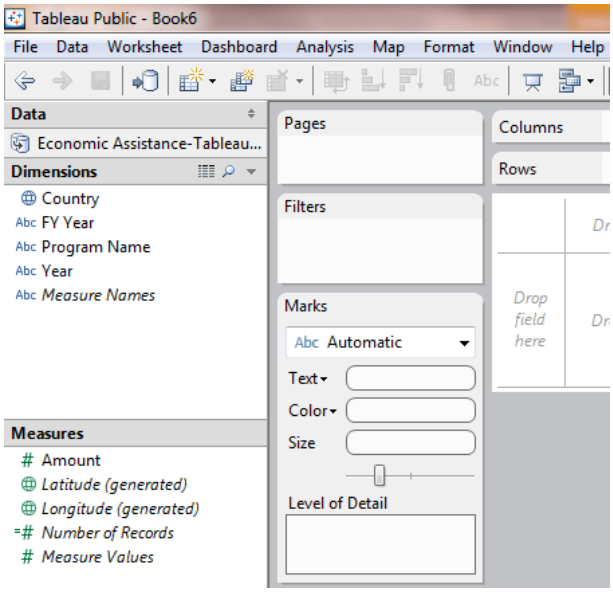


3. Open your Excel workbook.

4. Select the Sheet that has your correctly formatted data in it.



5. You'll get a layout like this, where every column from your Excel sheet appears as a **Dimension** or **Measure** in Tableau.



What are **dimensions** and **measures**? What's the difference?

Dimensions: Categories – locations, regions, colors, etc.
Measures: Values – sales, population, inventory, etc.

Dimensions and **measures** can be re-adjusted by dragging them from one group to the other.

Beginning to ask questions / create a map

1. Some of the best ways to work with Tableau is to ask questions of your data. For example, what countries has the US provided aid to?

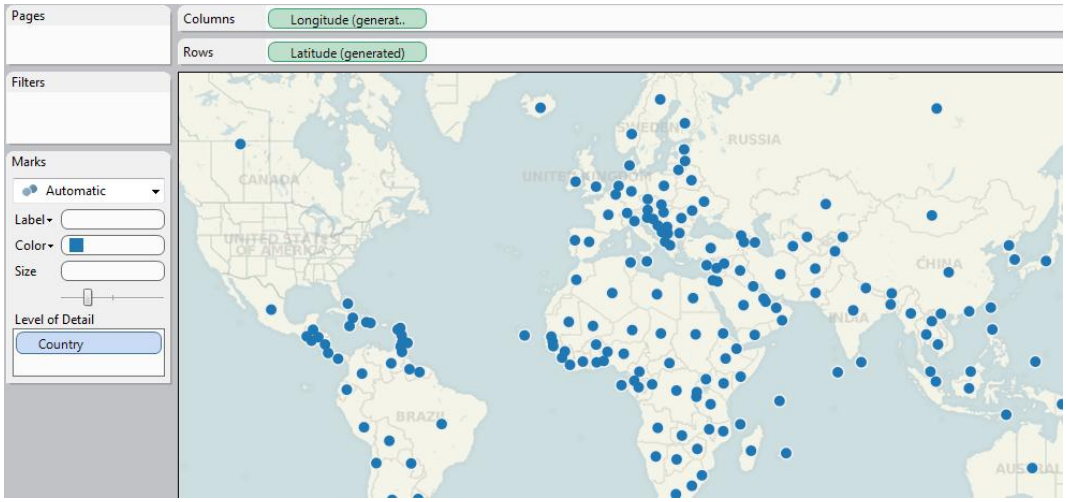
   Thankfully, we have this data. It's the **'Country Name'** field. Notice the blue globe next to it. Tableau automatically recognizes fields as having distinct properties. If Tableau recognizes a field as geographic, it will be indicated by a globe icon next to the field name as shown below.

   Country Name
   Abc Full Year
   Abc Program Name
   # Year
   Abc *Measure Names*

2. When Tableau recognizes your data as geographic, it will automatically generate **Latitude** and **Longitude** fields as **measures** *(auto generated fields are in Italics)*

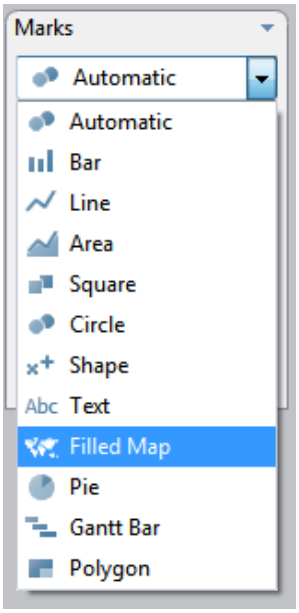
   Measures
   # Amount
   Latitude (generated)
   Longitude (generated)

3. Since Tableau has recognized your data as geographic, simply double click on the **"Country Name"** **dimension** to see all the countries that the U.S. has provided Economic assistance to over the years.

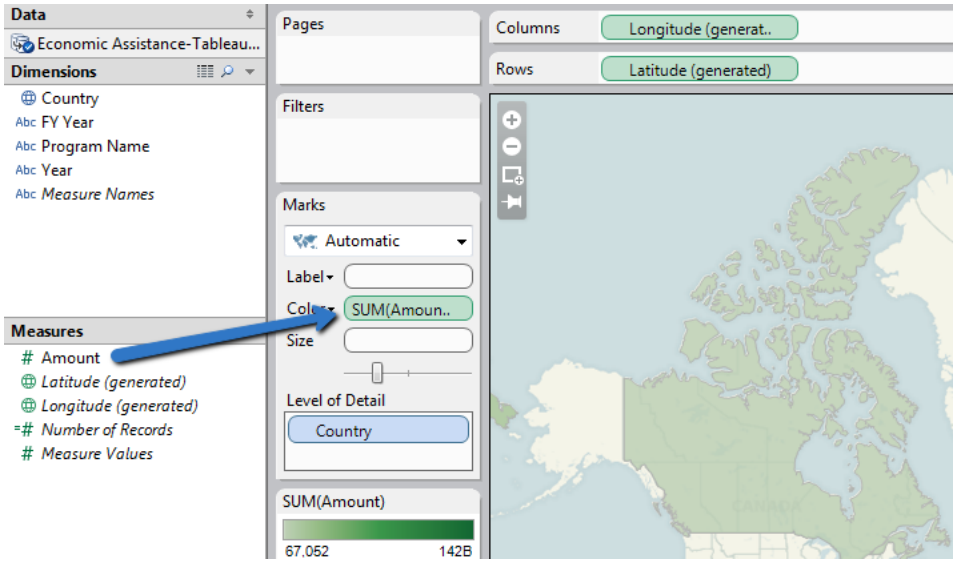


4. You'll see a '15 nulls' in the lower-right of the map. These are values Tableau doesn't immediately recognize. Let's open these up by clicking on the notice and selecting 'Edit Locations.' Tableau doesn't recognize them because they're unspecified regions. Let's 'Filter Data' to exclude these because they don't have any defined region.

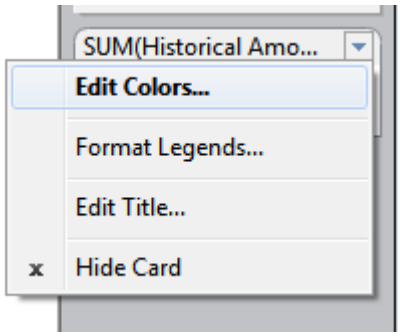
5. You'll notice a blue dot appearing in the geographic center of each country. Unsurprisingly, since this is over a 60 year period, the US has given some amount of money to nearly every country. You can change to a filled map view by clicking on the drop-down in the Marks card, and selecting 'Filled Maps'.



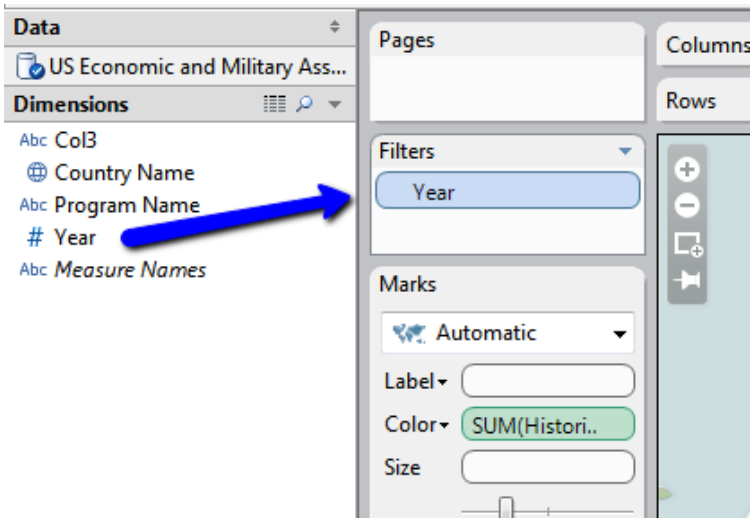
6. We can make this map more meaningful by adding in the amount of aid given to each country. Drag the **"Historical Amount"** **measure** onto the color shelf**.** To drag a **measure** onto any of the mark shelf, click and hold that **measure** and then move it to the desired shelf. *(Egypt, Iraq, Afghanistan, Israel are all top recipients. We can use map controls to zoom in.)*



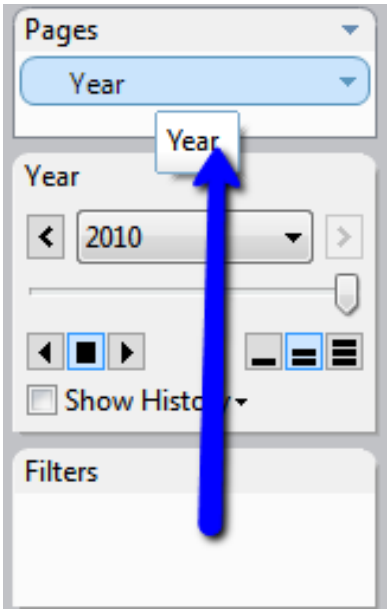
7. You can edit the color by clicking on the arrow in the upper-right corner of the color legend. Also, you can make the map gray or dark by selecting from the drop-down on the right with Map Options.



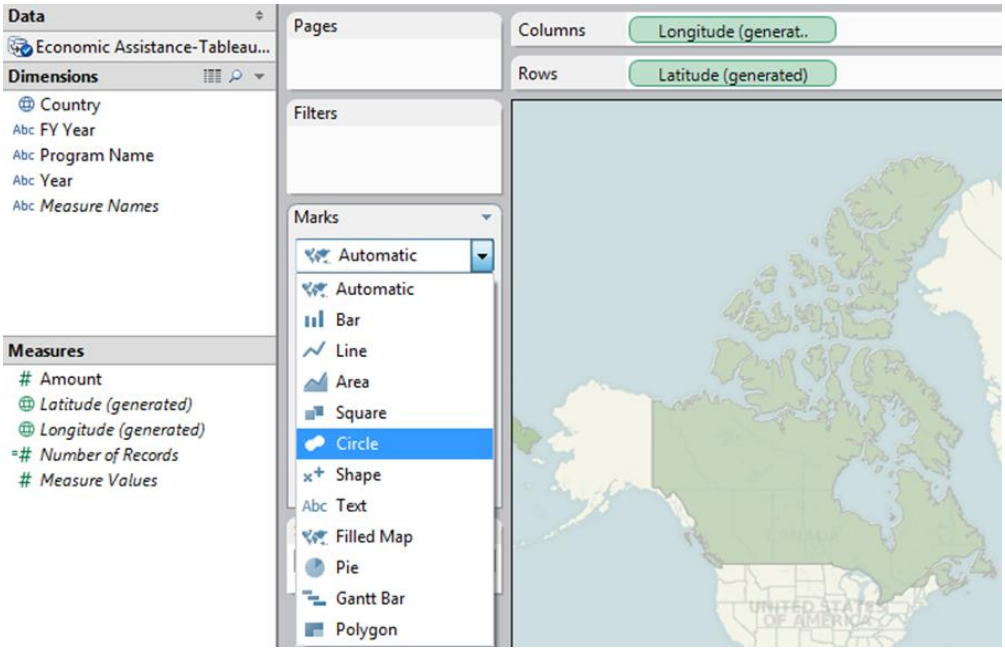
8. Not surprisingly, the US has invested a lot into the Middle East in the past decade. What if this has changed over the time? Well we can choose to see certain years. Drag **'Year'** to the '**Filters'** shelf. Select '*2010'*. Surprised by the changes?



9. Let's instead page through the different years. Move '**Year'** from '**Filters'** to the '**Pages'** shelf. Flip through the different years. You can really see how aid changes over time.

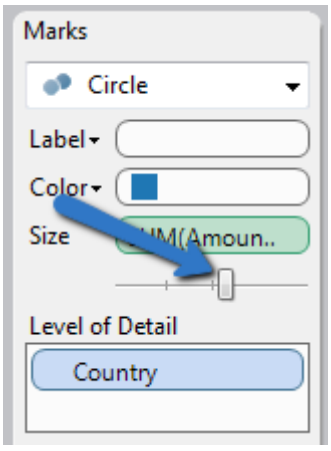


10. We can change the view again by changing the Mark type from the **Filled Map** to **Circle**.

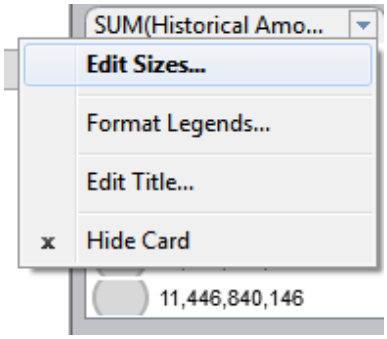


11. We can then change the size of the circles so they correspond with the amount of aid given by dragging '**Amount'** from the '**Color'** shelf to the '**Size'** shelf.

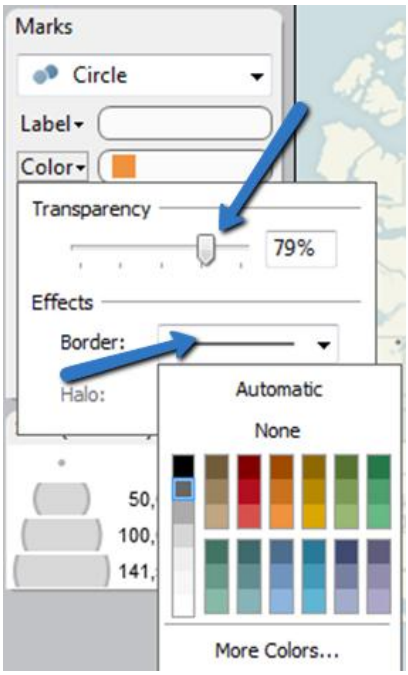
12. Use the size slider to increase the size of the circles.



13. Or change the size range by opening the size legend *(just like the color legend).*



14. Add some formatting flair by clicking on the '**Color'** mark and <u>adjusting the transparency and adding a border</u>.



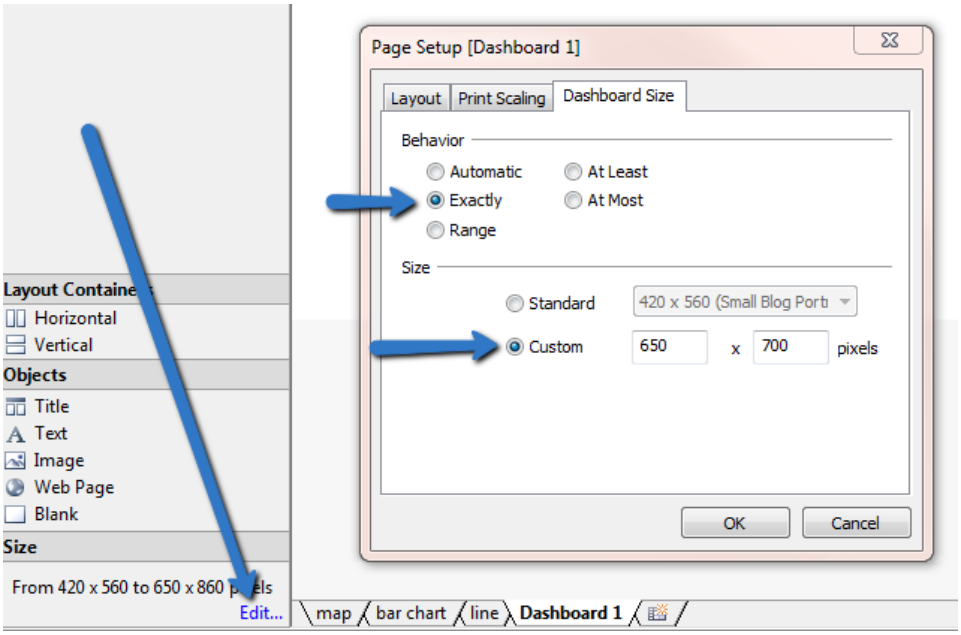
15. Let's go back to a filled map. <u>Take **'Historical Amount'** off size</u> *(because a filled map can't have relative sizes)* and <u>change the mark type back to 'Filled Map'</u>.

16. Get ready to create your next view by <u>renaming "sheet1" as "map"</u> by double clicking on its tab in the bottom left of your screen.

Building dashboards

1. First, add a new dashboard. Go to 'Dashboard' in the navigation menu and select 'New Dashboard.'

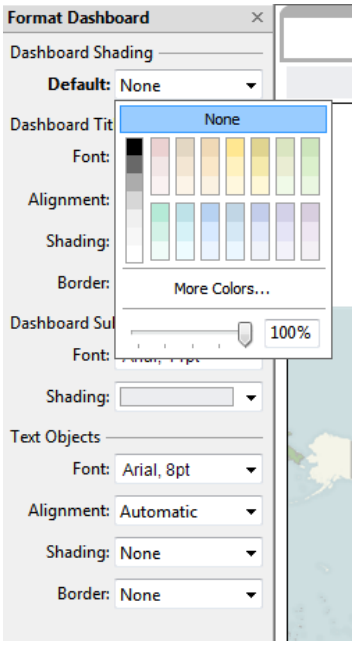
2. Let's add this worksheet to our dashboard. First, edit the size of the dashboard to match your blog or website.



3. You'll see all the sheets you created on the left-hand side. Simply drag them out and drop them. All legends and filters will be brought out too.

4. Add a title. Double-click title or drag it out. You can edit the text by right-clicking.

5. Right-click and choose 'Format.' Tableau has a wide variety of formatting options. You can also right-click and format content. For example, let's change the shading of the dashboard.



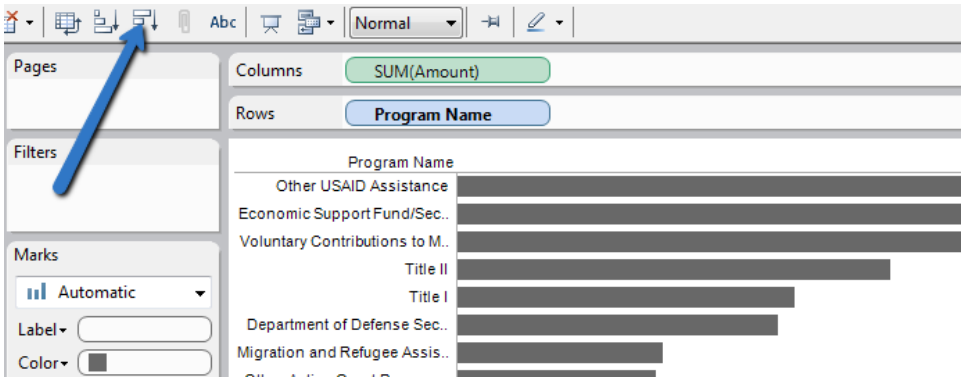
We could stop here, but we only have a single sheet and there's so much more within our data. Let's add more views to make the visualization richer. Create a new worksheet.

Audience flow, answering more questions / create a bar chart

1. What else would people want to know? Maybe which programs the US has funded the most. Let's try building that view with 'Show Me.' Open Show Me. These are not the only visualizations you can build in Tableau, but they are a great starting point where Tableau can recommend viz types based on your data.

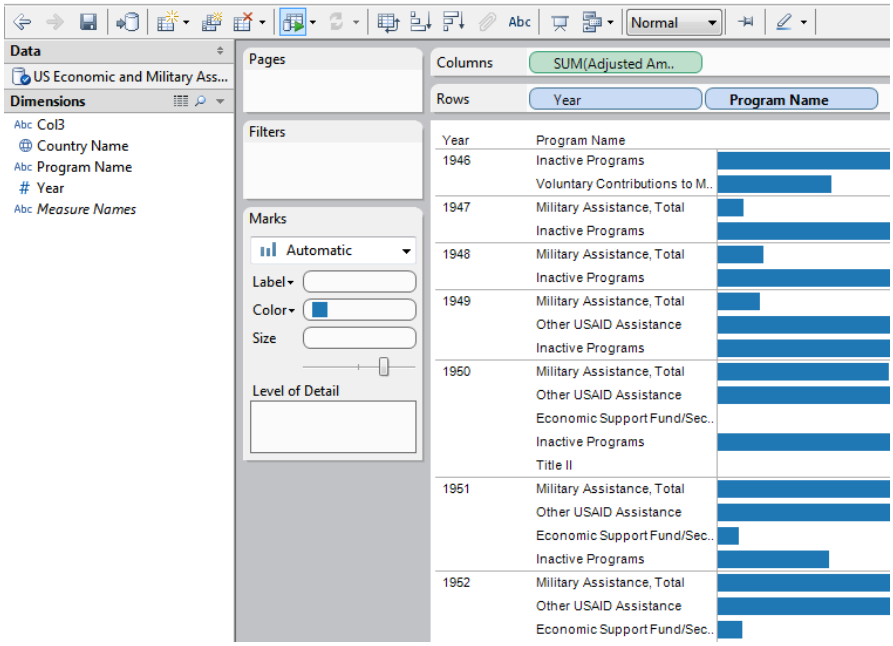
2. CTRL + click **'Program Name'** and **'Historical Amount'**. Notice that some chart types become highlighted. These are the ones Tableau can build with your data. The blue box indicates what's recommended. Let's go with the bar chart.

3. Sort the programs from largest to smallest by clicking the sort button on the ribbon.

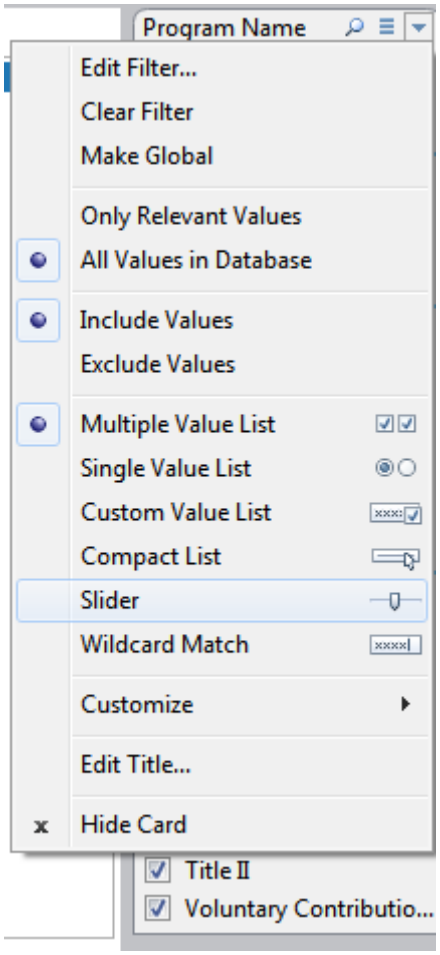


4. Click on **'Program Name'**, and select 'Show Quick Filter'. This way we can exclude *Military Assistance*, or even allow the audience to select which specific programs *they* want to include or exclude. You can change the filter type by clicking on the drop-down carat in the upper right corner of the filter.

5. Drag out **'Year'** to Rows. Notice now that Tableau breaks apart the bars for every year. Meaningful, but hard to use. Let's make it a filter instead.

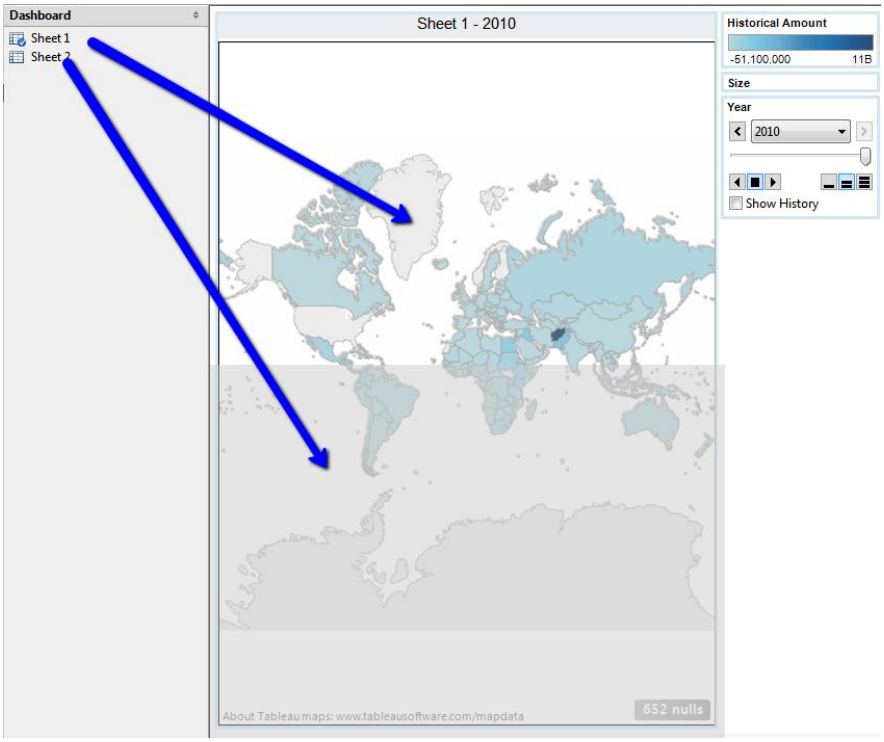


6. Drag **'Year'** from Rows to Filter. Choose **'All'**. Now, edit the filter and change it to a **Slide** filter. Now let's add this sheet to our dashboard.



Building interactivity / more on building dashboards

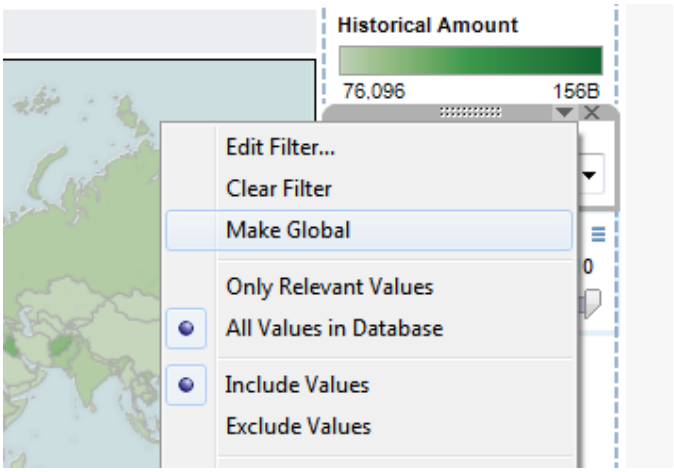
1. Let's return to our dashboard and add our created view.



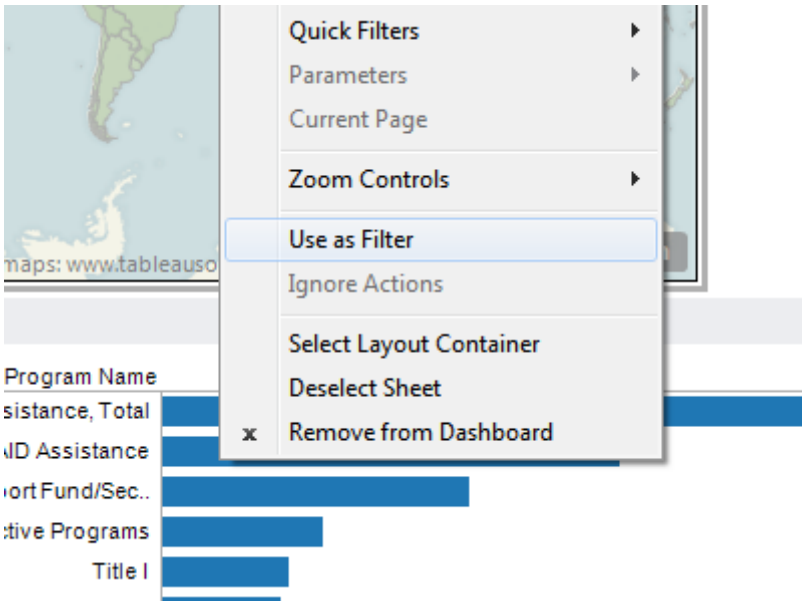
2. All your filters are added too. Let's change the filter type on '**Program Name'** to a **Wildcard** filter. This is a search box that will automatically return anything that matches your search.

3. You can re-arrange items on the dashboard by clicking and dragging.

4. Notice that the **'Program Name'** filter only affects the bar chart. Let's make it affect the map too. Click on the drop-down and choose **Make Global**. Try paging through the map now.



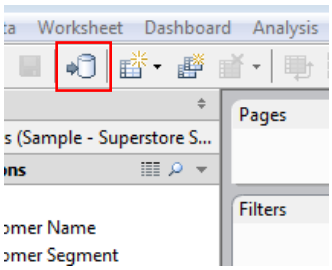
5. Let's change filter to a drop-down and go back to **'All'**. There's more interactivity we can add too. Let's say we want to use the map as a filter. Click on the map, select the drop-down carat, and click 'Use as Filter.' You can fine tune these actions further in the Dashboard > Actions menu.



6. It's also probably best to change the title of sheet here to call our users to act. Let's change the text on the map to 'Click a country for details.'

A Quick Detour / Dates

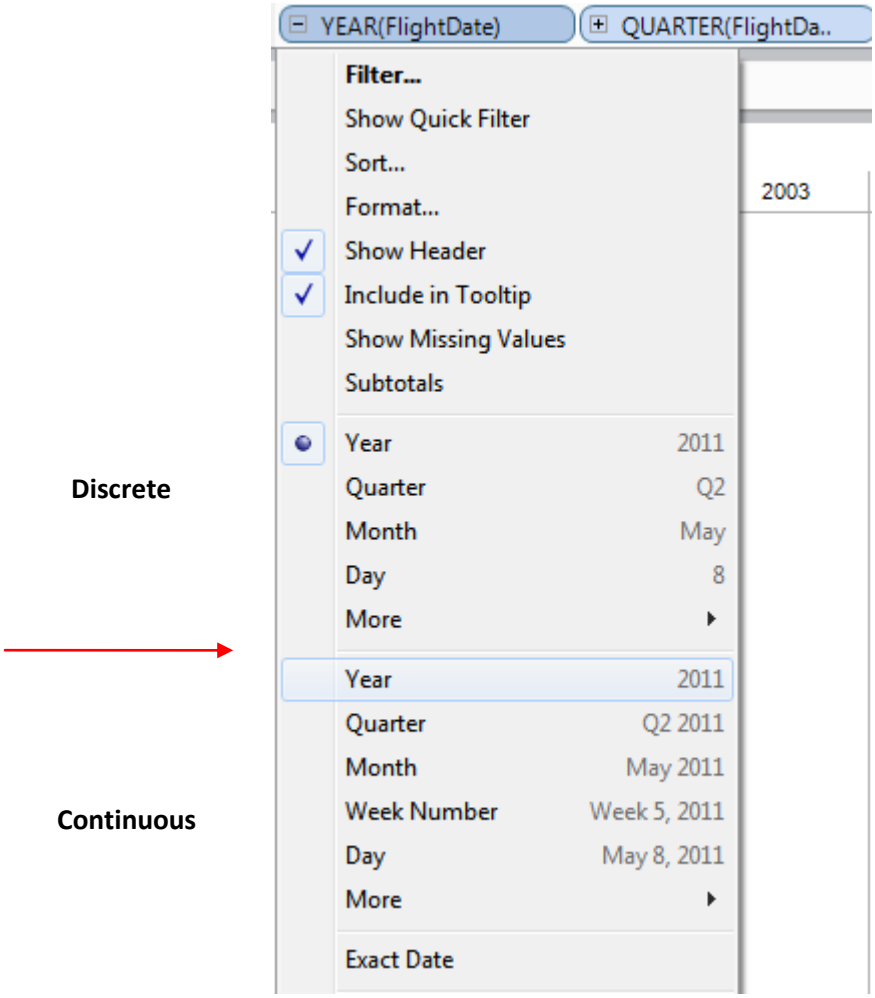
1. Let's take a quick detour to go through some more functionality on dates. Our data set just had information down to the year. What if we had a data set down to the day? Let's connect to "BirdStrikes.xlsx".



2. Notice the Calendar icon next to **'FlightDate'**. This means that Tableau knows this is a full date, and has special features just like geographic data.
3. Drag '**FlightDate**' to Columns, and '**Number of Records'** to Rows.
   Notice the upward trend: What's causing it?

4. Click the '+' sign next to '**Year(FlightDate)**'. Notice it breaks it into quarters. Clicking the '+' next to quarters will also break it into months. You can remove the details you don't want. You can even rearrange them.

5. You can also select the drop-down menu on the field. The options above the line in the middle are discrete values. They will break things *just* by Year, *just* by Quarter, or *just* by Month. The options below the line are continuous, and will plot *both* Year and Quarter, Year and Month, etc.



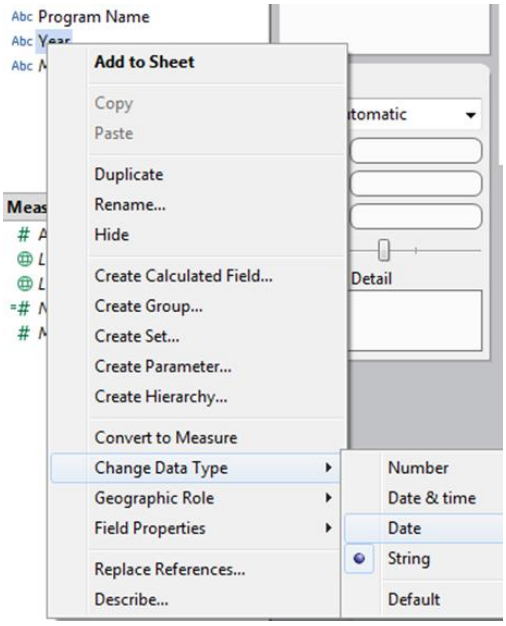
6. Select the 'Day' option towards the bottom *(May 8, 2011 is listed to the right)*. Notice the seasonality. What do you think causes that?

7. What other questions might you have? This is a great data set to play with; it also has lots of geographic and other data fields.

Create a Line Chart / answering more questions

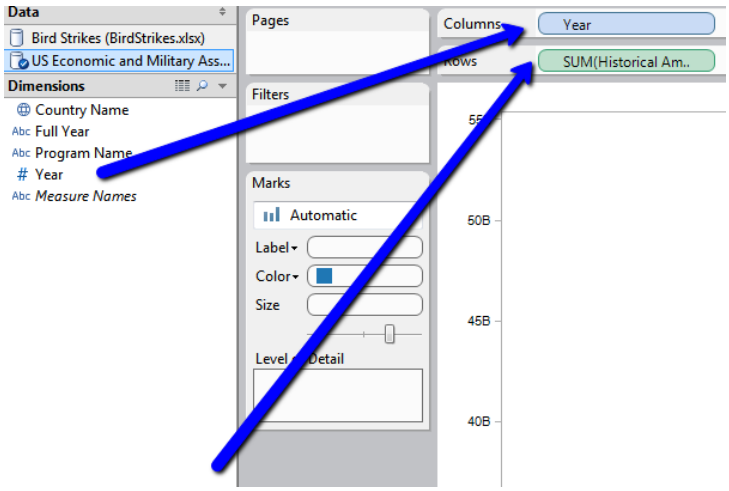
1. Now that we've worked a bit with dates, let's go back to our dashboard. A reader will probably be glad to filter things over time. But it would be more powerful to be able to show trends over time visually alongside the visuals we already have. But hey, we created a chart that does that, right in the very beginning and in just a few minutes too! Let's see if we can recreate it.

2. It looks like Tableau is recognizing the '**Year'** field as a text *string (because it's reoccurring numbers)*. In order to change this, right click on Year, highlight "Change Data Type" and select "Number"

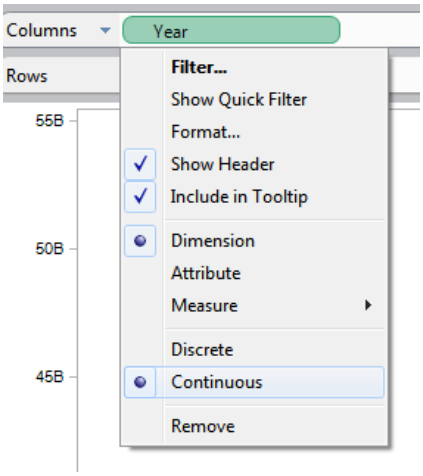


3. The **'Year'** field now has a hashtag icon in front of it. Sometimes '**Year'** may show up in 'Measures' if its many different numbers, in that case just drag it to **dimensions**.

4. Drag '**Year'** onto Columns shelf and '**Historical Amount'** onto Rows shelf to create our line chart.

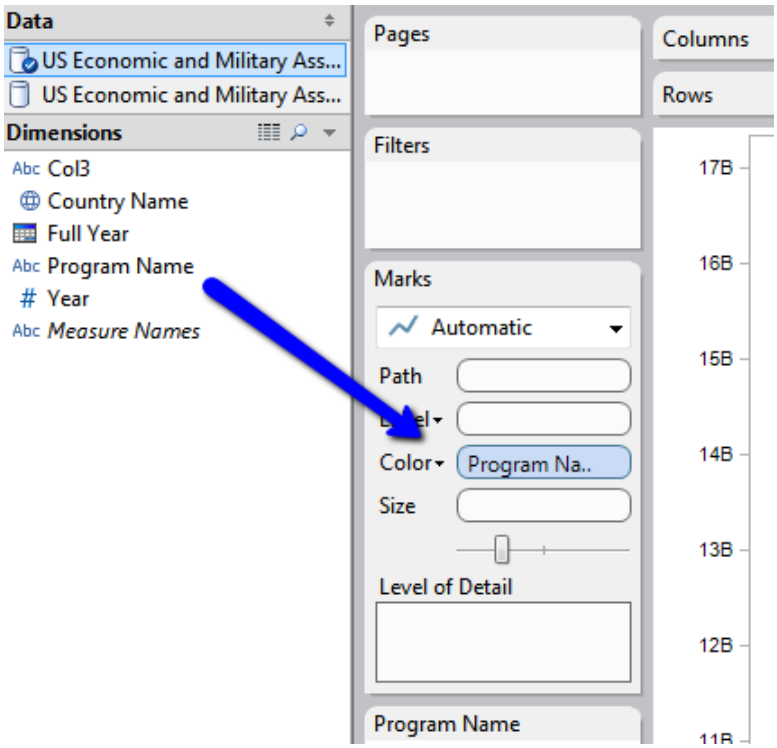


5. We can change the year to the continuous version so that we don't have to show each individual year as its own bucket.



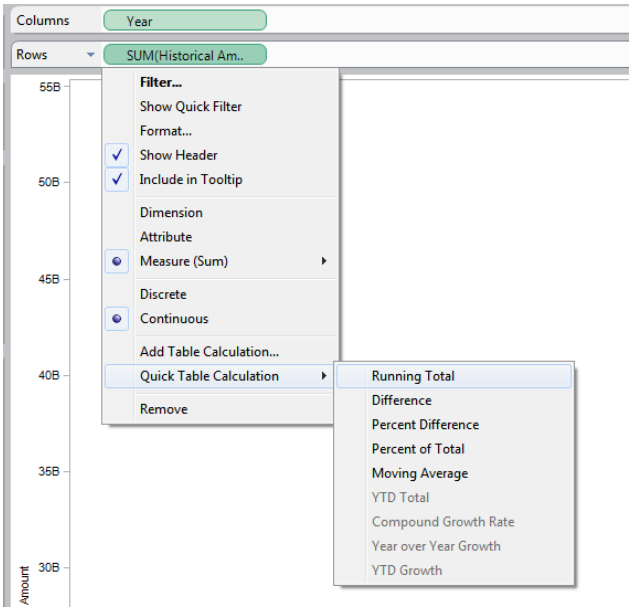
6. Let's add some interactivity by adding a filter. Click the '**Year'**, 'Show Quick Filter'.

7. Currently, everything is summed. It's nice for the overall trend, but maybe we want to take a look at individual programs. Let's drag '**Program Name'** to Color. This breaks apart every program name and assigns it a color. Essentially, putting any **dimension** onto the 'Marks' shelf disaggregates everything by that **dimension**.



8. If we want the same area chart we had before, let's change Mark type to Area.

9. If you'd like, you can have Tableau do a running total of all the dollars used for aid. Click on the green pill **'Historical Amount'** in Rows. Select 'Quick Table Calculation' and then 'Running Total'.



These are called Table Calculations in Tableau, because they must be calculated along each cell and are dependent on what came before them. There are a lot of other simple options in the Quick Table Calculation menu, but also a lot of other advanced ones which we won't cover today.

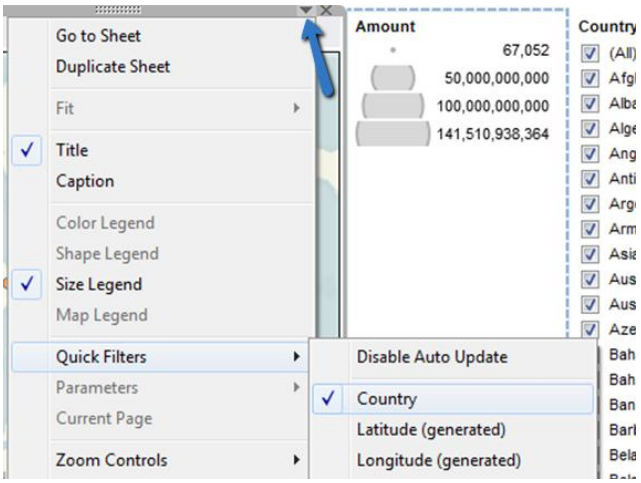
Putting it all together / finalizing a dashboard and publishing

1. Drag our last sheet to the dashboard.

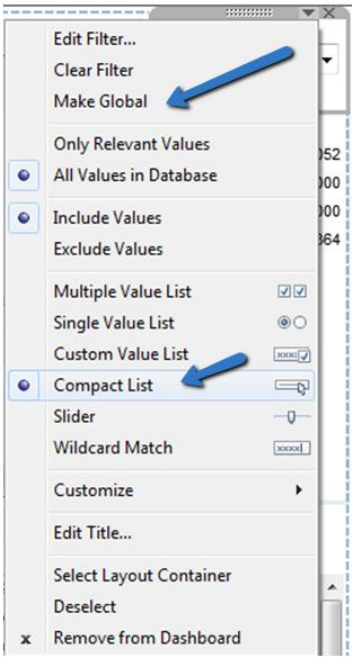
2. Let's think about how people will want to use this. Most important info on top. Probably want to filter by the map (we already did) and then maybe filter by '**Program Name'**. We've done that already, but it looks kind of funny to have a bar chart with only a single bar. Let's remove that filter, and make the bar chart a filter. Click the drop down on the bar chart and choose **'Use as Filter.'**

3. However, we do want to filter time across all sheets. Make that filter global. We should also remove the '**Year'** function on the **Pages** shelf since we now have a new way to interact by time. So let's open up the map and remove the '**Year'** on pages.

4. Maybe we do want people to select a country since some are pretty small. Let's add a drop-down filter for the map too.



5. We can then change the look of the filter by clicking on the carrot in the upper right hand corner of the filter. There are several options to choose from but in this case we'll choose Compact List.



6. Let's go ahead and publish!

Other Resources

1. Tableau Public training every Friday 9:30a PST / 12:30p EST
2. 1st Friday of every month a topical training focusing on different topics such as calculated fields, parameters, dashboard actions, data theory, storytelling, etc.
3. Tableau Public Knowledge Base, articles and walkthroughs on common topics and features
4. YouTube. We've begun putting resources onto YouTube, such as how to format your data, when to use certain chart types, etc.
5. Viz of the Day! See what other people are doing and get inspired.
6. Tableau Public team! Follow us on twitter, or email us directly. We're here to help you all succeed.

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