

## Data Literacy, Data Analysis, and Data Visualization Skills Matter a Great Deal for Today's Undergraduate and Graduate Students: Let's explore a hands-on data visualization practice!

Given that data are being created and stored on an unprecedented scale, a strong data analytical skillset would be a notable plus for career-oriented students in the “Era of Data Ubiquity” (quotes Mitchell Stevens). Up-to-date skills in data literacy, data analysis, and data visualization can help undergraduate and graduate students (who will be tomorrow's business practitioners and business leaders) make informed decisions using data. These skills can give them the ability to make “data-based decisions.”

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### What is Tableau?

Tableau is a data visualization software tool that allows users to create interactive charts, graphs, and dashboards from their data. It is meant to help people understand and analyze their data more effectively. Tableau is used by many types of organizations to make better decisions using their data. It can be connected to various data sources (e.g., Microsoft Excel, Microsoft Access, PDF files, Statistical files) and enables users to easily create visualizations by dragging and dropping elements. The insights generated by Tableau can be shared with others. Please [watch a 2:19 minute Tableau Introduction video](#) if you have little idea about the power of Tableau: [https://www.tableau.com/why-tableau/what-is-tableau?creative=2&cg\\_cmp=1695537942&cg\\_net=g&cg\\_place=hyvideo](https://www.tableau.com/why-tableau/what-is-tableau?creative=2&cg_cmp=1695537942&cg_net=g&cg_place=hyvideo)

[Watch this short Tableau video.](#)

Who can benefit from data literacy training? According to a Tableau blog, anyone can benefit from data literacy training, especially (1) business professionals, (2) organizations, (3) informed citizens, and (4) students. Feel free to check the details on a blog by Sue Kraemer (<https://tabsoft.co/3lmkLTV>).

The screenshot shows the Tableau website's navigation bar with links for Why Tableau, Products, Solutions, Resources (which is currently selected), and Partners. Below the navigation is a search bar and a 'BUY NOW' button. The main content area features a heading 'Build Your Data Skills with the Data Literacy Trail on Trailhead' and a subtext: 'Get the data skills you need to ask the right questions, make better decisions, and grow your career with this free training, available in 8 languages.' A bio for Sue Kraemer, Senior Data Skills Curriculum Strategy Manager at Tableau, is displayed, along with her photo and the date August 4, 2022. Social sharing icons for LinkedIn, Twitter, and Facebook are also present.

## Build Your Data Skills with the Data Literacy Trail on Trailhead

Get the data skills you need to ask the right questions, make better decisions, and grow your career with this free training, available in 8 languages.



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The future speaks data—do you? Despite data skills being the most in-demand skill in today's (and tomorrow's) job market, there's still a data literacy gap.

Get the training you need to ask the right questions, make better decisions, and grow your career. Start building your data skills—for free—with the [Build Your Data Literacy Trail on Trailhead](#). In support of our ongoing mission to help people everywhere see and understand data, the Trail is now available in [Japanese](#), [German](#), [French](#), [Spanish \(Mexico\)](#), [Portuguese \(Brazil\)](#), [Simplified Chinese](#), and [Korean](#).

In this hands-on data visualization practice, let's **employ Tableau to visualize a dynamic (changing) relationship between income and life expectancy across over 150 nations in the past 200+ years** (from the year 1800 up to the year 2023).

1. We will download four relevant datasets from **data.world** (<https://data.world/missdataviz-wow2021-w11>). Pls click the underlined link to find the data sets online, and then save the files on your hard drive.

If you do not have a data.world account, you need to complete a free online registration first.  
Otherwise, ask your instructor for his/her guidance.

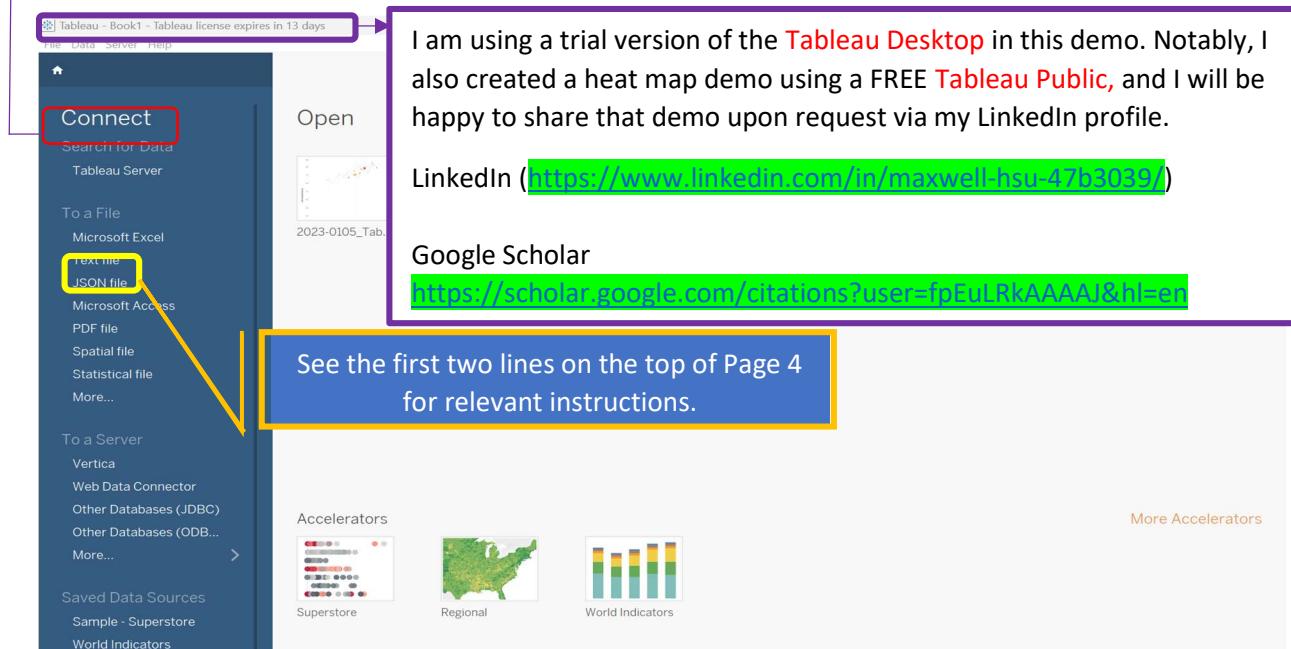
2. Please visit Tableau's official website and then download a 14-day free trial version of the **Tableau Desktop** (<https://www.tableau.com/products/desktop/download>).

Almost there!

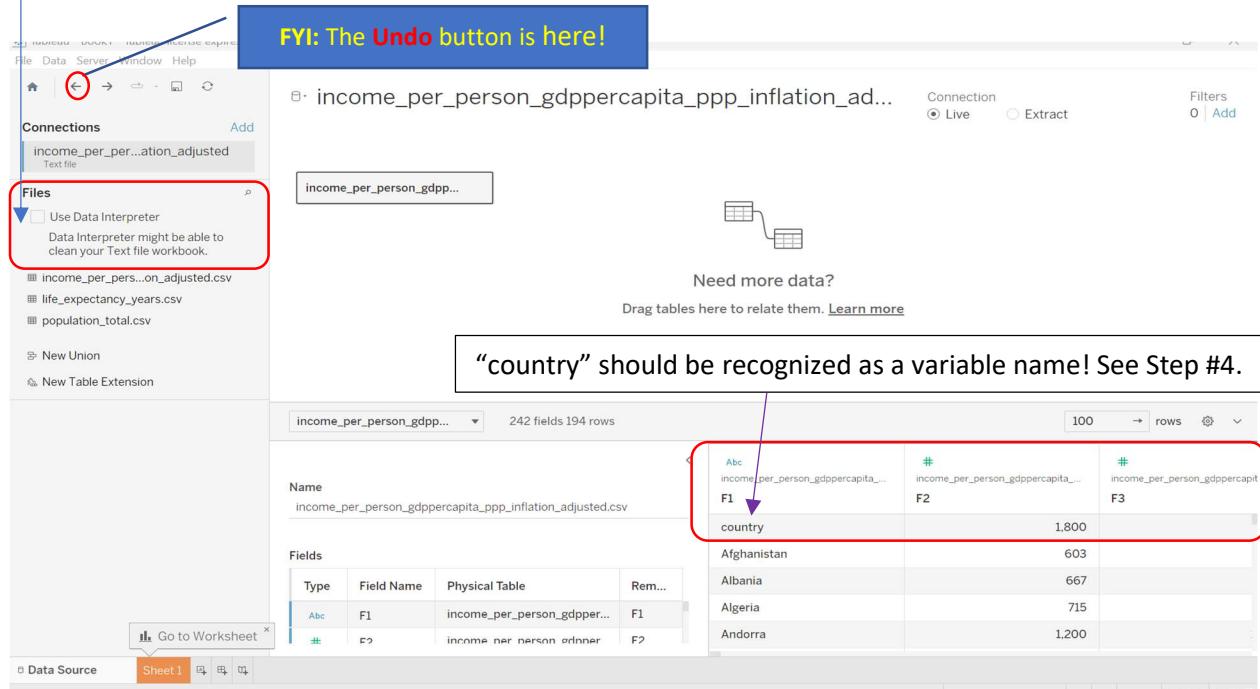
It only takes 15 seconds to fill out. If you're already registered, [sign in](#).

First Name  
Last Name  
Business E-mail  
Organization  
- Company Size -

3. We will enable **Tableau Desktop** and then “connect” the datasets to Tableau canvas. When we start Tableau Desktop, we will connect data sets via the **Connect** pane on the left side of the screen [FYI, under **Connect**, select the relevant file types (e.g., a Microsoft Excel file, a .csv text file, or a .sav SPSS data file). In the **Open** dialog box, navigate to and select a file. Select **Open...**]



Let's start with the income per person data set. As the "*income\_per\_person\_gdppercapita\_ppp\_inflation\_adjusted*" is a .csv file, we need to connect this file by clicking the "**Text file**" option (shown on P. 3). By default, the "Use Data Interpreter" option is not enabled. When we find that the 1<sup>st</sup> row data (e.g., **country, 1800**) correspond to the variable names, we will check the "Use Data Interpreter" box (see Step #4).



4. Let's check mark the "Cleaned with Data Interpreter" option (see the circled red rectangle box and the red circle). Subsequently, we will find that the first-row data (i.e., **country**, **1800**, **1801**, etc.) are recognized as variable names. FYI, **1800** represents "year 1800" while **1801** represents "year 1801."

The screenshot shows the Tableau Data Source interface. In the top-left corner, under 'Connections', there is a list of files: 'income\_per\_person\_gdpperc.csv', 'life\_expectancy\_years.csv', and 'population\_total.csv'. Below this, under 'Files', there is a section titled 'Cleaned with Data Interpreter' with a checked checkbox and a link 'Review the results'. A red box highlights this section. To the right, the main workspace displays a data preview for 'income\_per\_person\_gdpperc.csv' with 242 fields and 193 rows. A purple box highlights the first three columns: 'country', '1800', and '1801'. Below the preview, a table shows data for several countries. A red box highlights the '1800' and '1801' entries in the preview table.

5. We will re-organize the data structure using the Pivot function (i.e., we will Pivot the income data).

The screenshot shows the Tableau Data Source interface, identical to the previous one but with a callout box. A large callout box covers the bottom half of the screen, containing the following text: 'Hold both "Shift" and "Ctrl" keys to highlight all variables (all columns) but the **country** variable. In the highlighted area, click the drop-down arrow next to the column name to find this dropdown menu (see P. 5 for details.)'. A red box highlights the 'Pivot' option in the dropdown menu on the right side of the callout.

Hint: if you are not familiar with the power of the Pivot function, please check relevant information on this Tableau webpage: [https://help.tableau.com/current/prep/en-us/prep\\_pivot.htm](https://help.tableau.com/current/prep/en-us/prep_pivot.htm) or this Microsoft webpage: <https://bit.ly/3vMzVkd>

[help.tableau.com/current/pro/desktop/en-us/pivot.htm](https://help.tableau.com/current/pro/desktop/en-us/pivot.htm)

As the Tableau site reveals, once we select multiple columns (FYI, a variable would typically occupy one column), we will “click the drop-down arrow next to the column name, and then select **Pivot**. New columns called Pivot field names and Pivot field values are created and added to the data source.”

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What's New in Tableau

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› Connect to and Prepare Data

› Connect to Your Data

› Set Up Data Sources

› Plan the Data Source

› Relate Your Data

› Join Your Data

If you encounter any challenges when you attempt to select multiple columns/variables in Tableau, please consider resolving the issues with a Google search on your own or consulting your data analytics instructors.

After you have set up the data source, in the grid, select two or more columns. Click the drop-down arrow next to the column name, and then select **Pivot**. New columns called "Pivot field names" and "Pivot field values" are created and added to the data source. The new columns replace the original columns that you selected to create the pivot.

Abc	#	#	#	Data	Rename
Quarter	Samsung	Nokia	Apple		Reset Name
Q4 '11	93.8300	111.7000	35.46		Copy Values
Q1 '12	89.2800	83.1600	33.12		Hide
Q2 '12	90.4300	83.4200	28.94		Create Calculated Field...
Q3 '12	97.9600	82.3000	24.62		Pivot

6. Double click "Pivot Field Name" and change it to **Year**. Change "Pivot Field Values" to **Income**. FYI, we should also click the data type icon and change variable **Year**'s data type from ABC (string) to Number (whole) here, but I failed to do so in Step #6 → Check Step #24 to see the consequence & how to fix it.

The screenshot shows the Tableau Data Source editor. A tooltip at the bottom right of the interface says: "Change the newly created Pivot Field Names to Year and rename the newly create Pivot Field values to Income." The 'Pivot' field name is highlighted with a red box, and its data type is shown as 'Abc' (String). The 'Income' field name is also highlighted with a red box, and its data type is shown as '#'. Both fields are currently set to 'Pivot' under the 'Type' column.

7. We will connect the second data set (i.e., population total) to the Tableau canvas with the Drag and Drop trick.

Question: Why are we connecting the income table to the population table?

The screenshot shows the Tableau interface with two data sources connected:

- Connections:** income\_per\_person\_gdppercapita\_ppp\_inflation\_adjusted (Text file)
- Files:** income\_per\_person\_gdppercapita\_ppp\_inflation\_adjusted (Text file), population\_total.csv (CSV), life\_expectancy\_years.csv (CSV), and income\_per\_person\_gdppercapita\_ppp\_inflation\_adjusted (Text file).

A red arrow points from the 'population\_total.csv' box to a callout box containing the text "Drag and drop the second data set to the Tableau canvas." A red box highlights the 'population\_total.csv' file in the 'Files' section.

Country (Population Total)	1800	1801	1802
Afghanistan	3,280,000	3,280,000	3,280,000
Albania	400,000	402,000	404,000
Algeria	2,500,000	2,510,000	2,520,000
Andorra	2,650	2,650	2,650
Angola	1,570,000	1,570,000	1,570,000
Antigua and Barbuda	37,000	37,000	37,000

7a. It's likely that some might run into a different user experience. After dragging and dropping the "population\_total.csv" table, some might find a pop up window requesting an edit of relationship between the income and population tables (see below circled in blue). How to resolve this issue? Please revisit the variables in both .csv file and then associate the "country" variable in the income data set with the "Country" variable in the population data set.

The screenshot shows the 'Edit Relationship' dialog box. A blue circle highlights the dashed line connecting the 'income\_per\_person\_gdppercapita\_ppp\_inflation\_adjusted' and 'population\_total.csv' fields. The dialog box contains the following text and fields:

How do relationships differ from joins? [Learn more](#)

income\_per\_person\_gdppercapita\_ppp\_inflation\_adjusted = population\_total.csv

Select a field = Select a field

Available fields for selection:

- Abc F1
- Abc Pivot Field Names
- Abc Pivot Field Values
- Create Relationship Calculation...
- 1800
- 1801
- 1802
- 1803
- 1804
- 1805

Close

8. Please highlight all variables but the **country** variable. Likewise, we will re-organize the data structure using the Pivot table function. Change the variables names to "**Year 1**" and "**Population**" (like Step #6). Also, please change **Year 1**'s data type from ABC (a string) to Number(Whole). Revisit Step #6 again.

In the highlighted area, click the arrow to find this dropdown menu.

Hint: Do NOT highlight the **country** variable when we attempt to generate a Pivot variable... Also, please change the newly created variable name to **Year 1** (or any variable name but "**Year**" because this variable name has been used, and the **Year** variable could be found in the income per person data file).

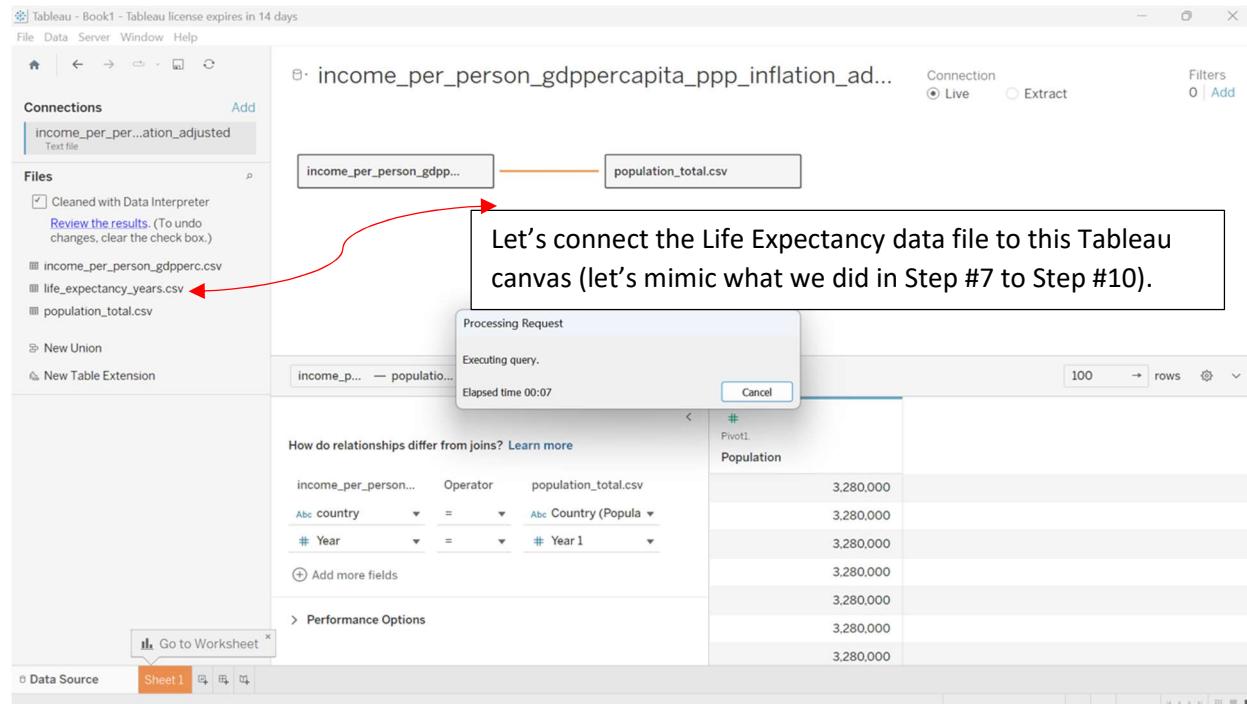
9. We will recognize the relationship between variable **Year** (in the income per person data set) and variable **Year 1** (in the population data set). Remember to edit variable **Year 1**'s data type (to Number).

10. We will hide all variables but the **Population** variable (Hint: it's okay if you skip the hiding step, as not hiding other variables won't cause any issues when we create a bubble chart).

The screenshot shows the Tableau interface with two data sources connected: 'income\_per\_person\_gdppercapita\_ppp\_inflation\_adjusted' and 'population\_total.csv'. A context menu is open over the 'Population' field in the population data set, with the 'Hide' option highlighted. A callout arrow points from the 'Year' field in the relationship editor at the bottom left to the 'Year1' field in the population data set at the top right.

Note: The **Year** variable in the income per person data set corresponds to the **Year 1** variable in the population total data set.

11. Now, we will connect the third data set (i.e., life expectancy) to this Tableau project. Notably, Tableau reads in the data, but we won't be able to save the updated data set back to the original file(s).



The screenshot shows the Tableau interface with three data sources connected: 'income\_per\_person\_gdppercapita\_ppp\_inflation\_adjusted', 'population\_total.csv', and 'life\_expectancy\_years.csv'. A red arrow points from the 'life\_expectancy\_years.csv' file in the 'Files' list to the connection line. A callout box contains the text: 'Let's connect the Life Expectancy data file to this Tableau canvas (let's mimic what we did in Step #7 to Step #10)'.

12. Similarly, we will Pivot the life expectancy data (FYI, you may want to revisit Step #8).

Note that the income data set is now connected to both the population data set and the life expectancy data set.

#	life_expectancy_years.csv	#	life_expectancy_years.csv	#	life_expectancy_years.csv
097	77.3000	2098	77.4000	2099	77.4000
Abc country	=	Abc Country (Life Ex...			
	88.0000		88.1000		
	88.9000		89.0000		
null		null			
	79.5000		79.7000		79.8000
	86.7000		86.8000		86.9000
	87.3000		87.4000		87.5000
					87.6000

Hint: Leave the **country** variable intact (i.e., the **country** variable should not be included in the Pivoting task). As a reminder, hold both the **Ctrl** and **Shift** keys when you attempt to highlight multiple columns.

13. Change/update the Pivot variable names: name them **Year 2** and **Life Expectancy**.

Country (Life Expecta...	Pivot2.	Pivot2.
Afghanistan	1800	28.2000
Afghanistan	1801	28.2000
Afghanistan	1802	28.2000
Afghanistan	1803	28.2000
Afghanistan	1804	28.2000
Afghanistan	1805	28.2000
Afghanistan	1806	28.1000

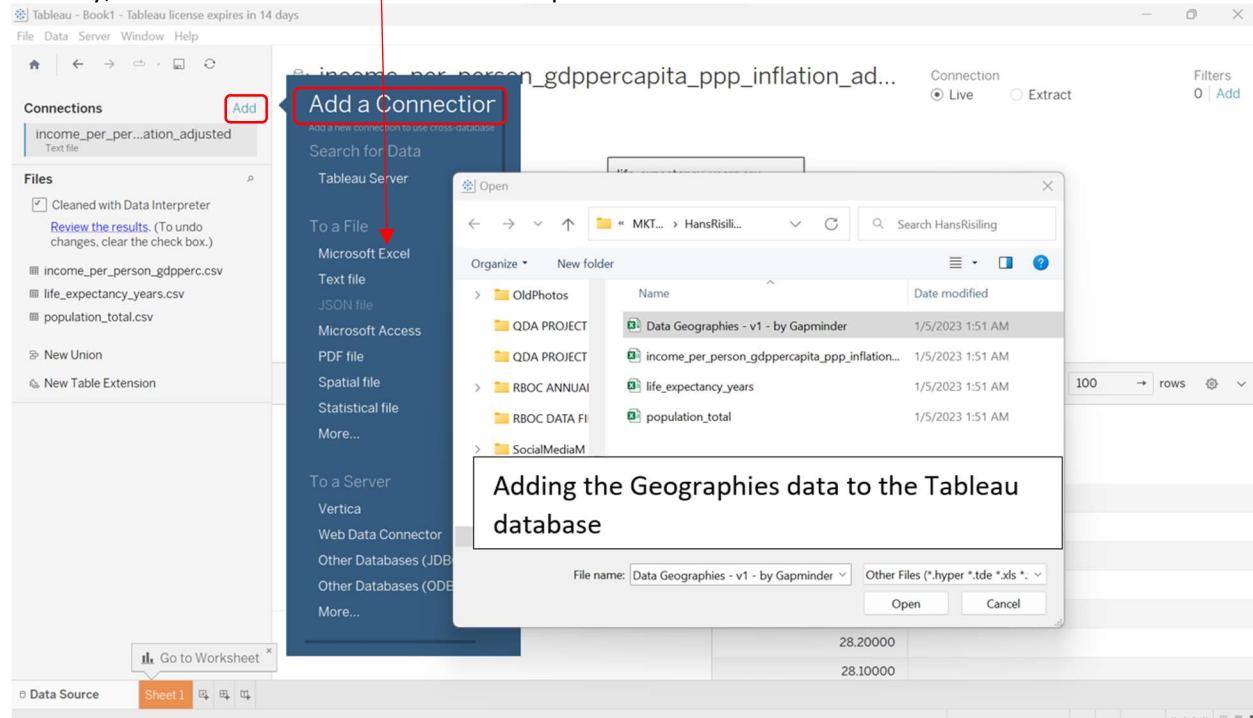
14. It's about time to instruct Tableau to recognize the additional relationships between the data sets.

The screenshot shows the Tableau Data Source interface. On the left, under 'Connections', there is a connection named 'income\_per\_person\_gdppercapita\_ppp\_inflation\_adjusted' (Text file). Under 'Files', there are three files: 'income\_per\_person\_gdppercapita\_ppp\_inflation\_adjusted', 'life\_expectancy\_years.csv', and 'population\_total.csv'. A relationship is being established between 'income\_per\_person\_gdppercapita\_ppp\_inflation\_adjusted' and 'life\_expectancy\_years.csv'. The relationship editor shows 'income\_per\_person\_gdppercapita\_ppp\_inflation\_adjusted' on the left and 'life\_expectancy\_years.csv' on the right. The relationship type is set to 'Year 2'. In the dropdown menu for 'Year 2', 'Year' is selected. A red box highlights the relationship editor area, and a purple arrow points from the 'Year' dropdown to the 'Year 2' label in the relationship editor.

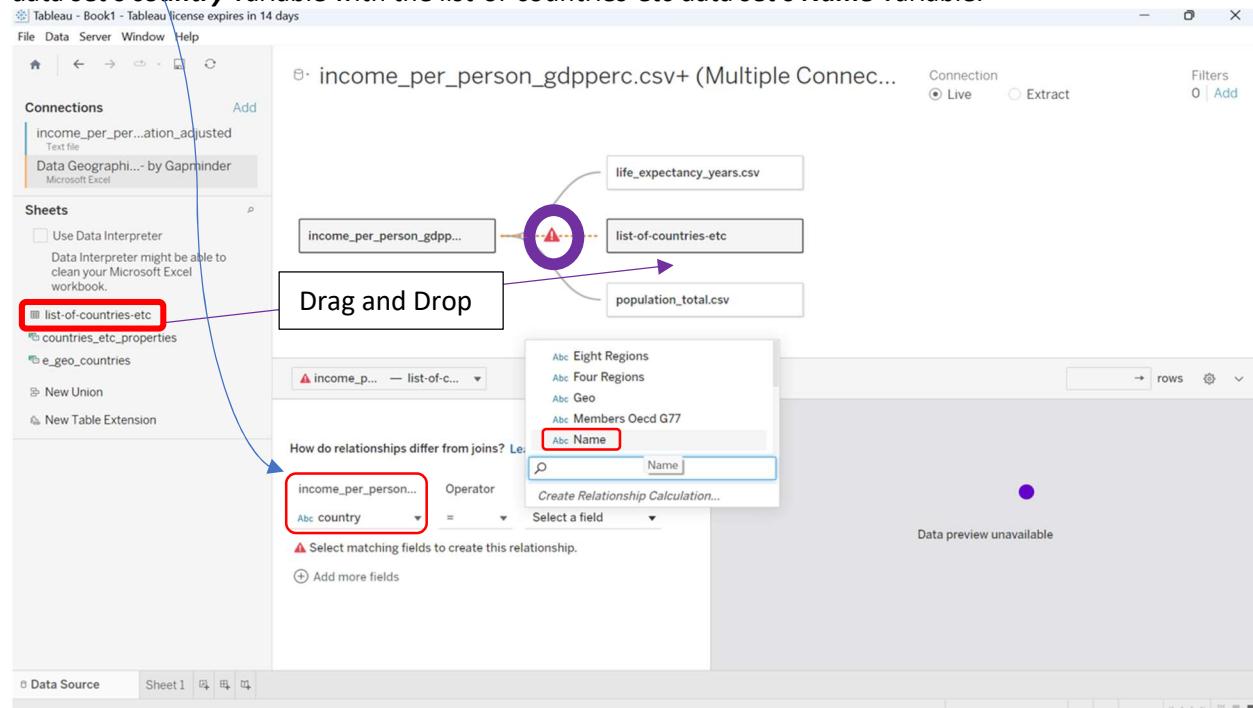
15. After we hide variables **country** and **Year 2**, the only “visible” variable in the life expectancy data set will be “Life Expectancy”. Check the red box between Step #14 and Step #15 (a relationship between **Year** in the income data set and **Year 2** in the life expectancy data set has been established).

The screenshot shows the Tableau Data Source interface. The setup is identical to the previous step, with the relationship between 'income\_per\_person\_gdppercapita\_ppp\_inflation\_adjusted' and 'life\_expectancy\_years.csv' established. A red box highlights the relationship editor area, specifically the 'Year' and 'Year 2' fields. A callout box on the right contains the text: 'We will hide two variables (see Step #10): **country** & **Year 2**'.

16. We will connect the last data set (i.e., the Geographies) to the current Tableau project. Since this data file is an Excel type, click "Microsoft Excel" and Open "Data Geographies-v1-by Gapminder." Notably, I use Microsoft Windows 11's File Explorer function to reveal all four data sets' filenames.



17. Now, let's connect the "list-of-countries-etc" sheet to the income per person data set shown on the Tableau canvas. Establish the relationship between two data sets (i.e., income & list of countries), and the exclamation mark (see the purple circle) will disappear. Note that we need to connect the Income data set's **country** variable with the list-of-countries-etc data set's **Name** variable.



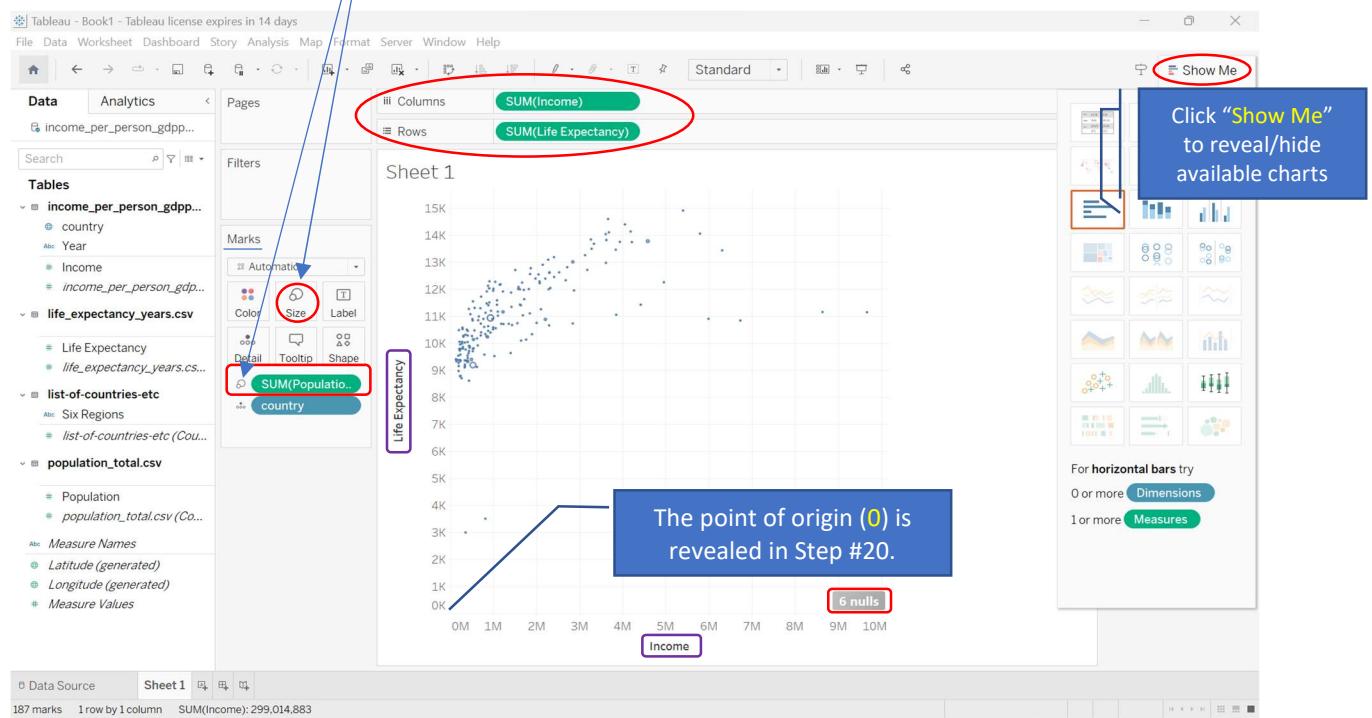
18. Again, we will hide all variables but the “**Six Regions**” variable in the list of countries data set.

The screenshot shows the Tableau Data Source interface. In the top navigation bar, it says "Tableau - Book1 - Tableau license expires in 14 days". Under "Connections", there is one connection named "income\_per\_person\_gdpperc.csv+ (Multiple Connec...)" with "Live" selected. Below the connections, the "Sheets" section shows a single sheet named "list-of-countries-etc" which has been cleaned with Data Interpreter. The "Fields" section displays a table with columns "Type", "Field Name", "Phys...", and "Rem...". One row is highlighted with a red border, showing "Type: ABC", "Field Name: Six Regions", "Phys...: list-of...", and "Rem...: six\_re...". A purple circle highlights the "Six Regions" field in the list of fields. A yellow box highlights the "Sheet1" tab at the bottom of the interface.

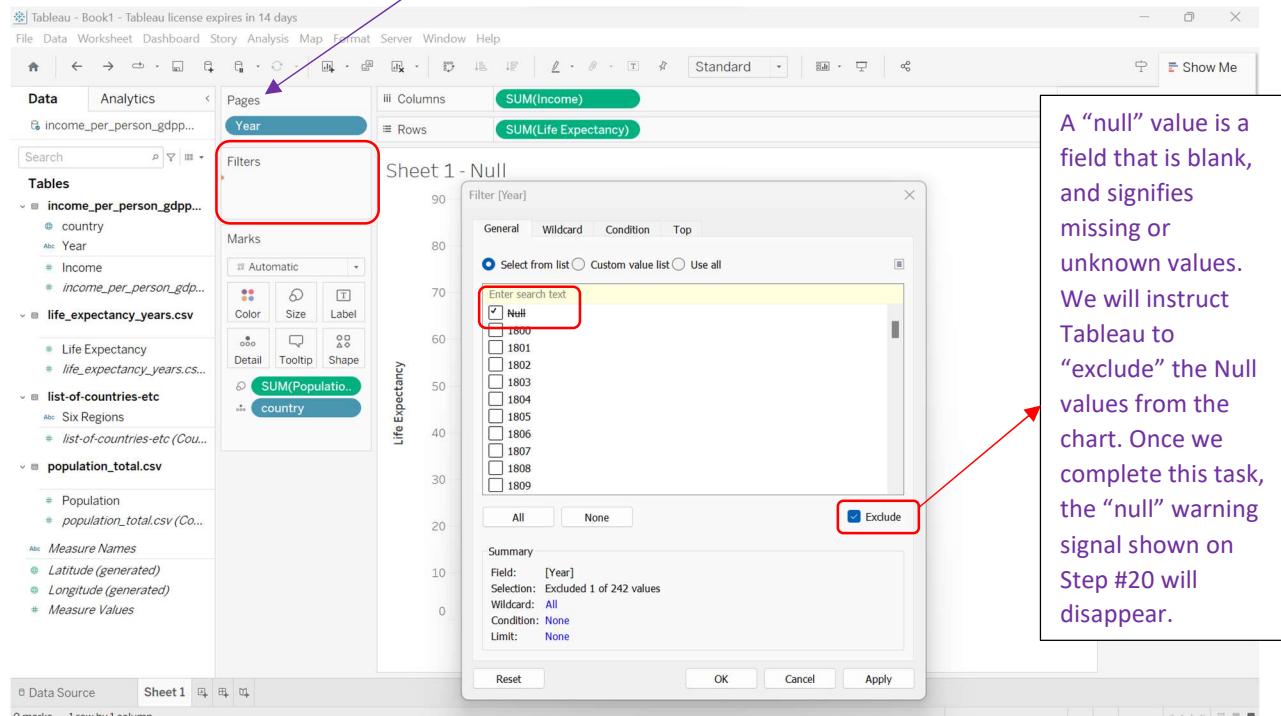
19. We are now ready to build a “static” bubble chart. Specifically, please click “Sheet1” at the bottom. After clicking “**Sheet 1**” (on the bottom of the Tableau window), we will need to drag the **country** variable to the **Marks** card (i.e., the Detail).

The screenshot shows a static bubble chart on "Sheet 1". The top navigation bar includes "File", "Data", "Worksheet", "Dashboard", "Story", "Analysis", "Map", "Format", "Server", "Window", and "Help". The "Data" tab is selected. The "Columns" and "Rows" sections in the top shelf are circled in red. The "Marks" card in the bottom shelf is also circled in red, with a red arrow pointing from the "Marks" card to the "country" field in the list of fields. The chart itself is a world map with blue bubbles representing data points for each country. A callout box on the right side of the interface provides instructions for symbol maps: "For symbol maps try 1 geo @ Dimension, 0 or more Dimensions, 0 to 2 Measures. May use spatial measure in place of geo dimension".

20. Let's remove the Longitude and Latitude information from the chart. Next, let's associate the *income* variable with the X-axis (i.e., columns) and associate the *life expectancy* variable with the Y-axis (i.e., rows). Notably, the darkness of the dot's color on the charts corresponds to each country's population.



21. We will drag the *Year* variable to the “Pages” box (as a dimension). In addition, we will drag the same *Year* variable to the “Filter” box and then exclude the missing data (i.e., Null) from the data visualization task. More details about Tableau’s filtering function can be found online (see P. 14).



Filter Data from Your Views - Tab ↗ + [help.tableau.com/current/pro/desktop/en-us/filtering.htm](https://help.tableau.com/current/pro/desktop/en-us/filtering.htm)

← → C 🔍 [help.tableau.com](#) /current/pro/desktop/en-us/filtering.htm

Filter Data from Your Views

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## Filter Data from Your Views

Applies to: Tableau Cloud, Tableau Desktop, Tableau Server

Filtering is an essential part of analyzing data. This article describes the many ways you can filter data from your view. It also describes how you can display interactive filters in the view, and format filters in the view.

**Watch a Video:** To see related concepts demonstrated in Tableau, watch these free training videos: [Ways to Filter](#) (2 minutes), [Where Tableau Filters](#) (4 minutes), [Using the Filter Shelf](#) (7 minutes), [Interactive Filters](#) (4 minutes), and [Additional filtering topics](#) (7 minutes). Use your [tableau.com](#) account to sign in.

22. We will modify the scale. The way to show the "Edit Axis [income]" is to double click **income** at the bottom of the chart. Once we are in the Edit Axis [Income] pop-up window, check mark "Logarithmic" and uncheck "Include zero."

Tableau - Book1 - Tableau license expires in 14 days

File Data Worksheet Dashboard Story Analysis Map Format Server

Data Analytics

income\_per\_person\_gdpp...  
Search  
Tables  
Year  
country  
Income  
income\_per\_person\_gdp...  
life\_expectancy\_years.csv  
Life Expectancy  
life\_expectancy\_years.cs...  
list-of-countries-etc  
Six Regions  
list-of-countries-etc/Cou...  
population\_total.csv  
Population  
population\_total.csv (Co...  
Measure Names  
Latitude (generated)  
Longitude (generated)  
Measure Values

Pages Year

Filters Year

Marks SUM(Population)  
country

Edit Axis [Income]

General Tick Marks

Range

Automatic

Include zero

Do NOT include zero in this data visualization practice.

Scale

Reversed   
Logarithmic   
Positive  Symmetric

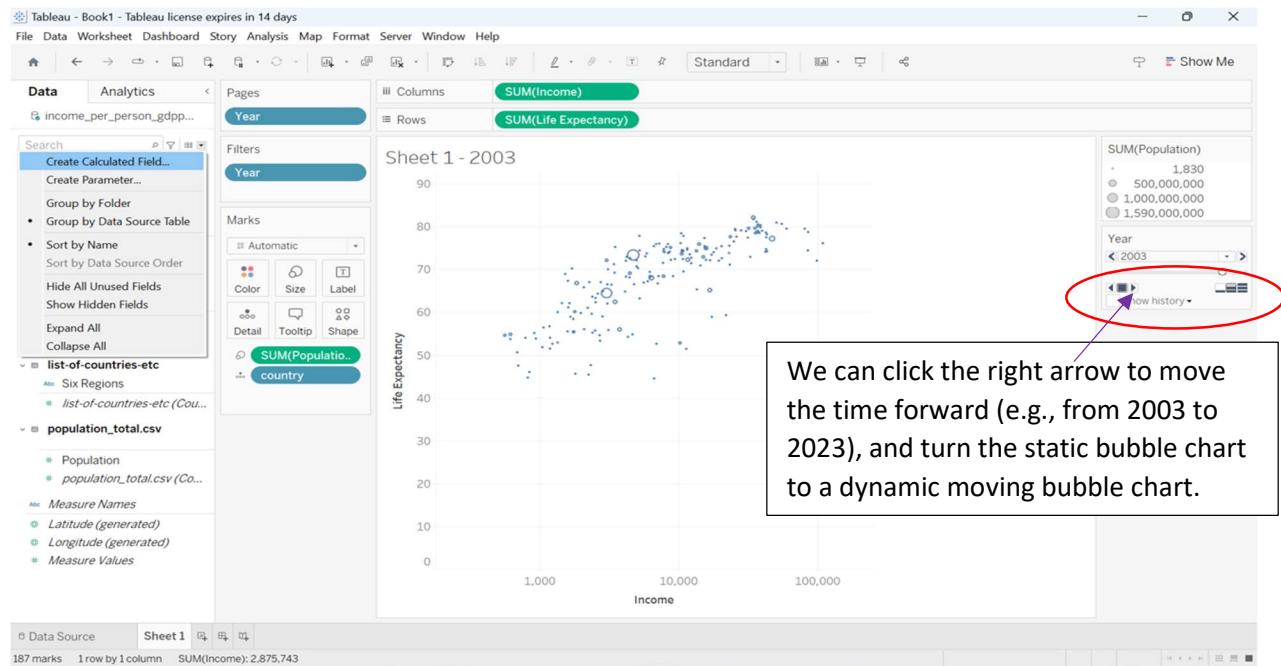
Axis Titles  
Title Income  
Subtitle Subtitle  Automatic

Reset

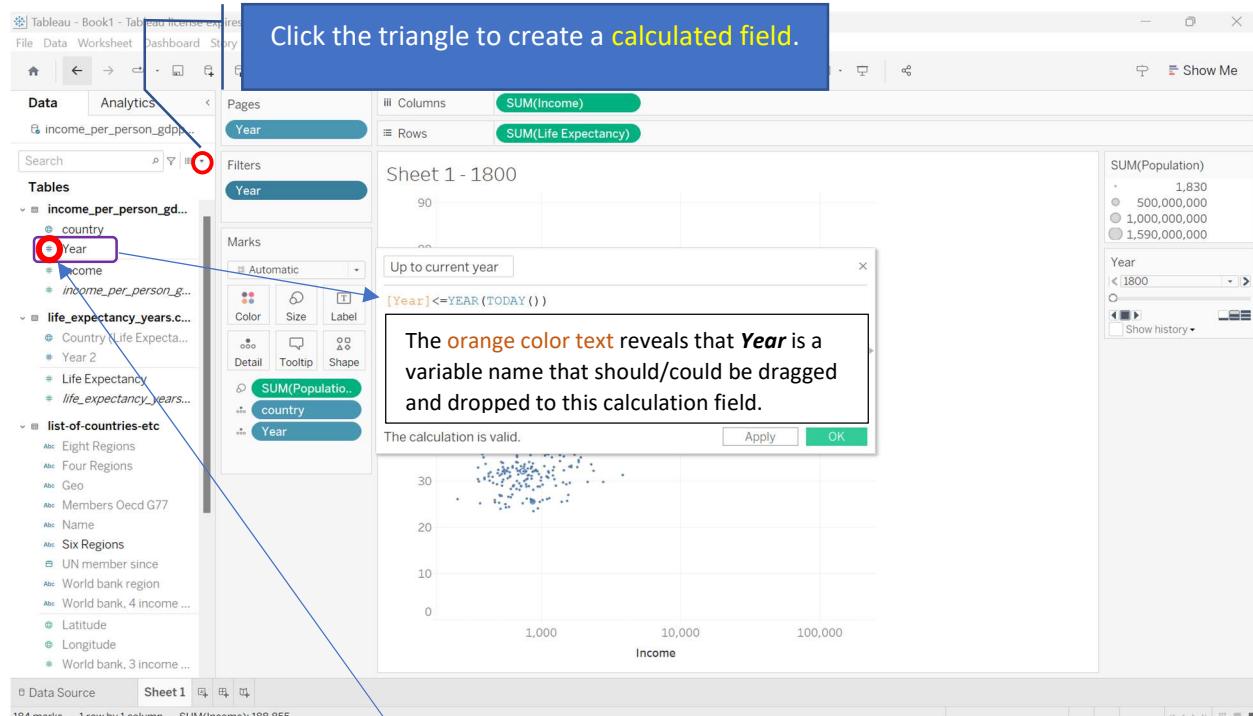
Data Source Sheet 1  
184 marks 1 row by 1 column SUM(income): 188,855

Hint: The variable "**year**" could be an issue (as it appears the data type is still a string, with an ABC icon)... and we will deal with this issue in Step #24.

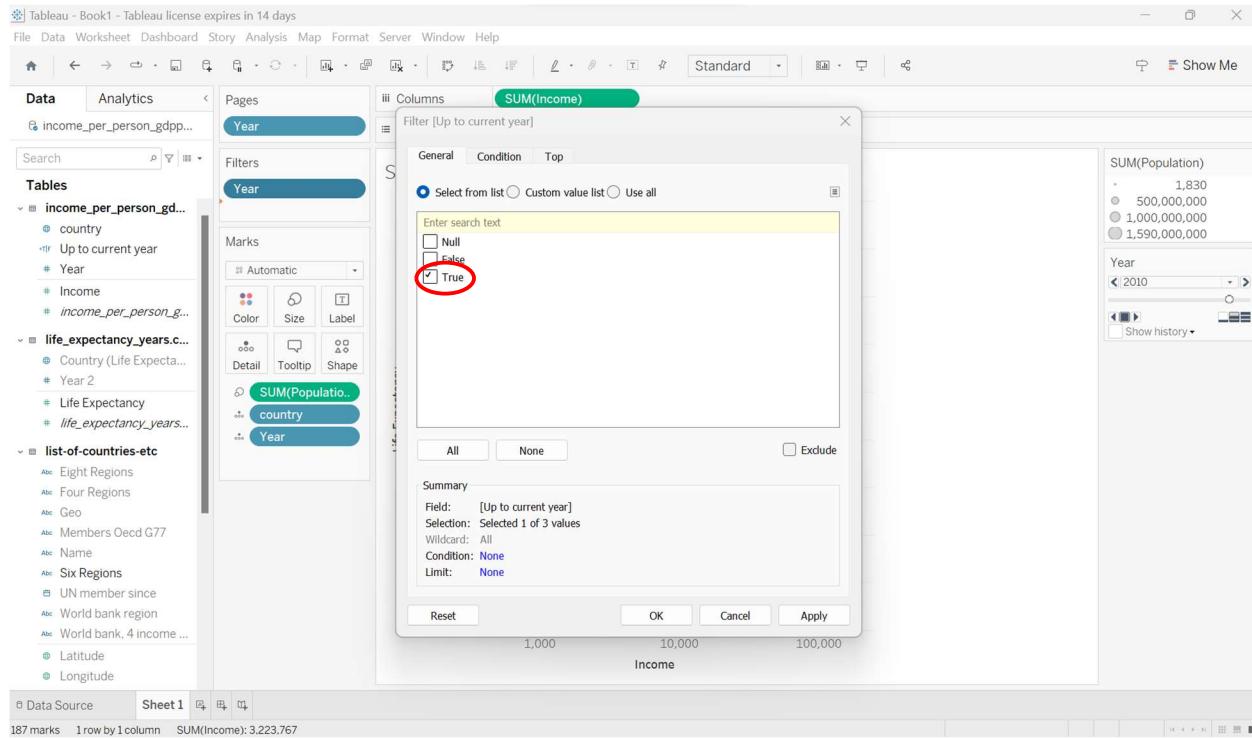
23. The data sets include income and life expectancy information all the way to year 2040.



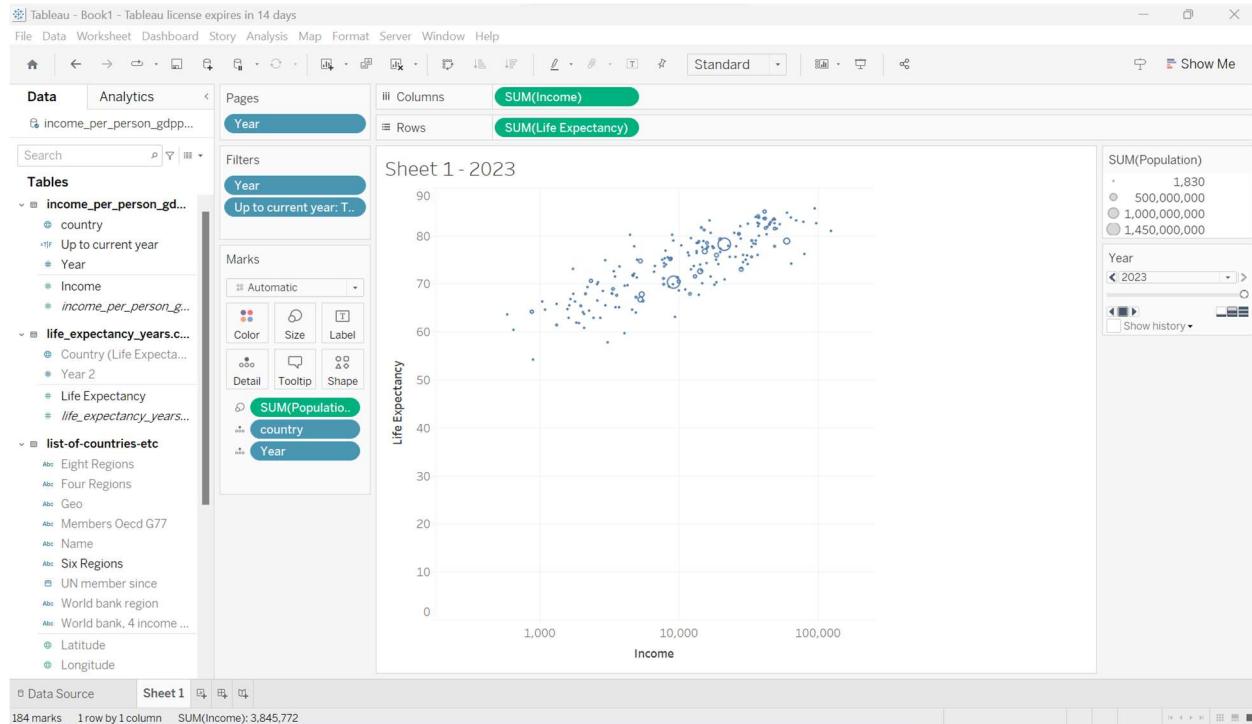
24. We will create a functional filter to reveal the moving bubble charts to the current year (i.e., 2023). Specifically, we will create a calculated field to set the time ceiling to be the current year (e.g., 2023). FYI, the to-be-typed formula in the calculated field box is [Year] <= YEAR(TODAY())



Hint: Check the variable **Year**'s data type. If we do not update variable **Year**'s data type (from ABC to Whole #), we won't be able to adequately create a "calculated field." Thus, we should double click the **Year** variable and then change its data type from ABC (string) to Number (whole).



25. The current year shown on this revised bubble chart is year 2023.

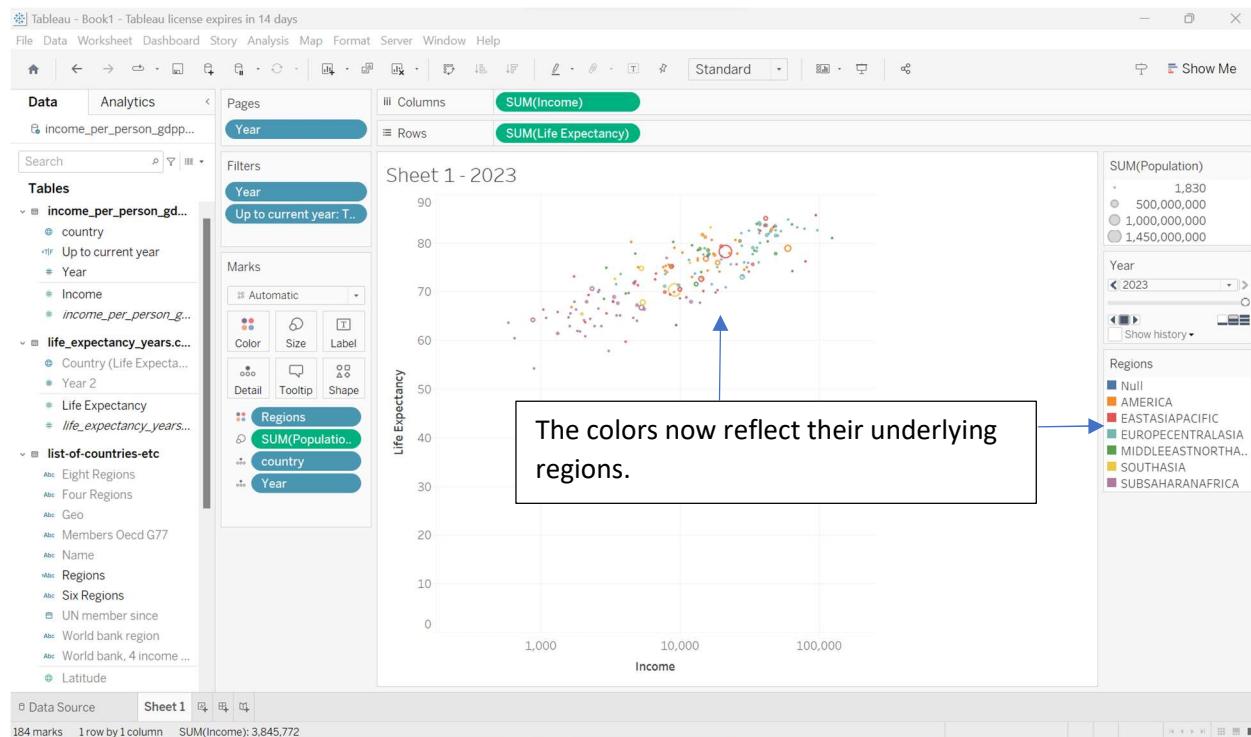


26. We will bring the “region” information to the chart. FYI, check the Appendix (p. 20) for Tableau’s Replacement function; the **to-be-typed** formula is **UPPER(REPLACE([Six Regions], ‘\_’, ‘’))** → It’s not recommended to copy and paste the formula onto the following box... or you might encounter errors.

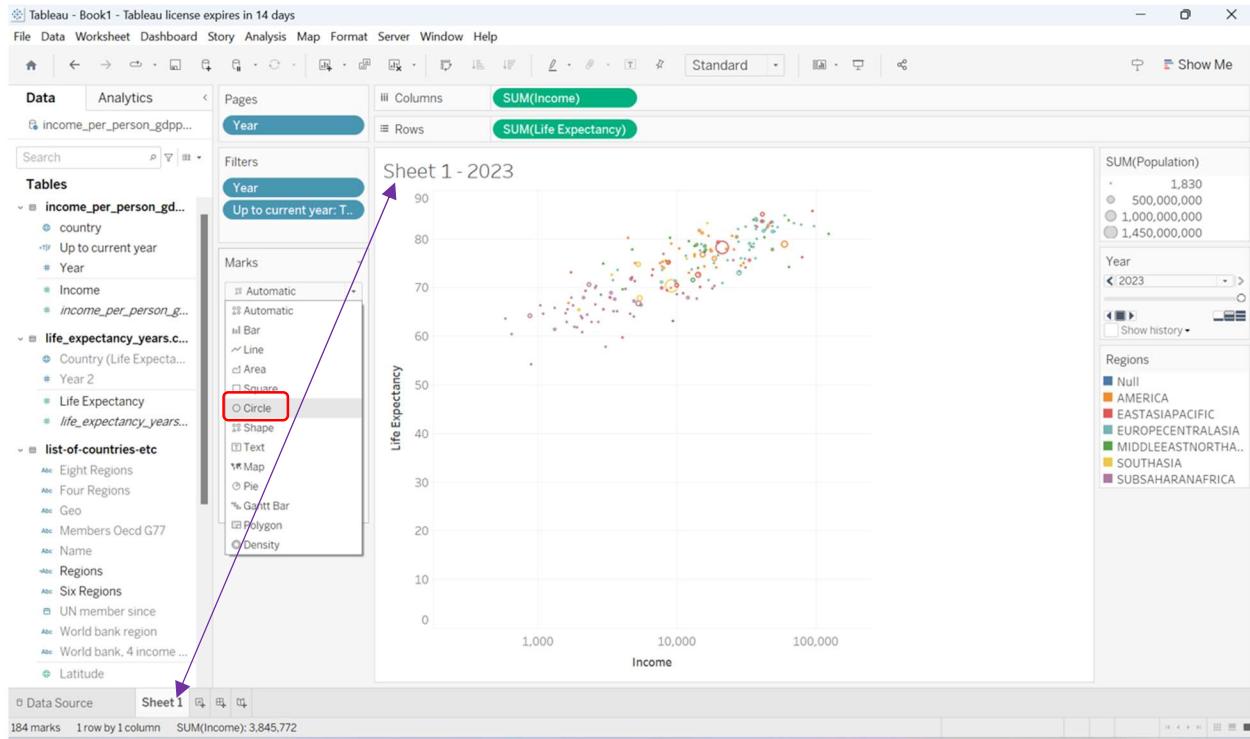
The screenshot shows the Tableau desktop interface with a calculated field dialog open. The formula is:

```
upper(Replace([Six Regions], '_', ''))
```

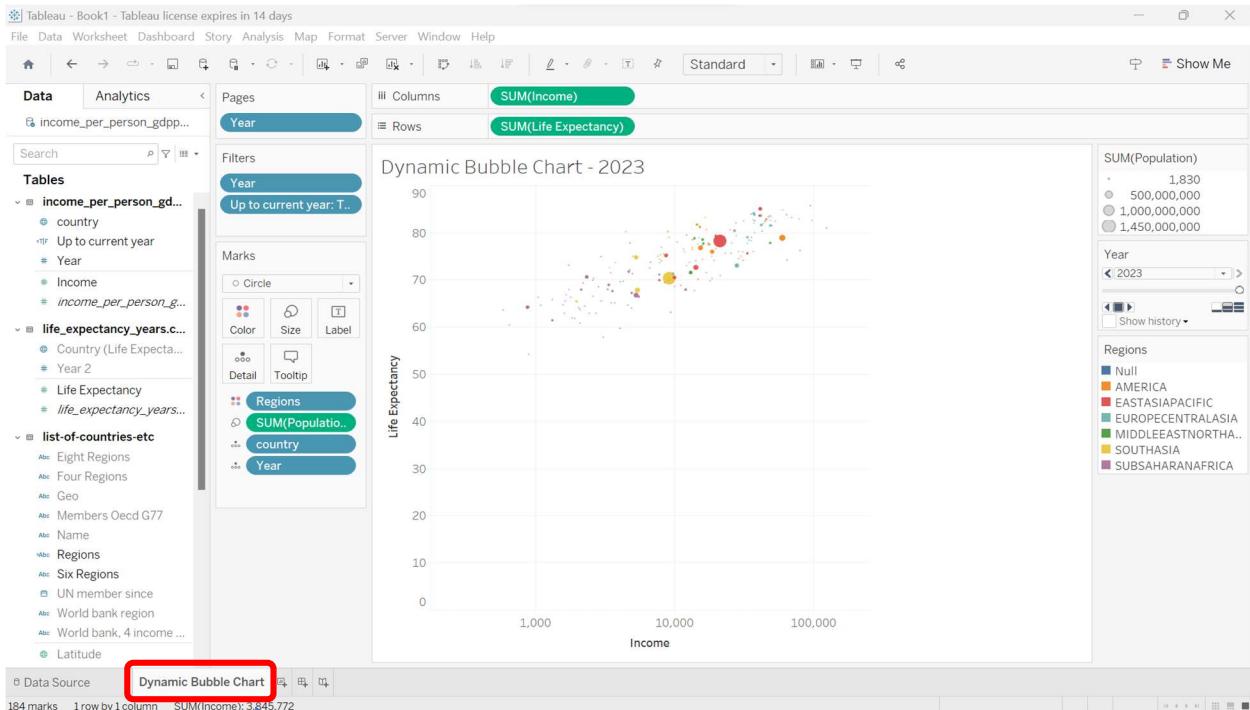
A blue callout box with the text "Click the triangle to call out a calculated field again." points to the calculate icon in the top right corner of the dialog. A red arrow points from the bottom right of the dialog to a screenshot of a Stack Overflow post titled "Trouble with basic copy/pasting on Tableau Desktop for Mac". The post discusses issues with copy/pasting calculated fields on Macs.



## 27. We can replace the dots with circles.

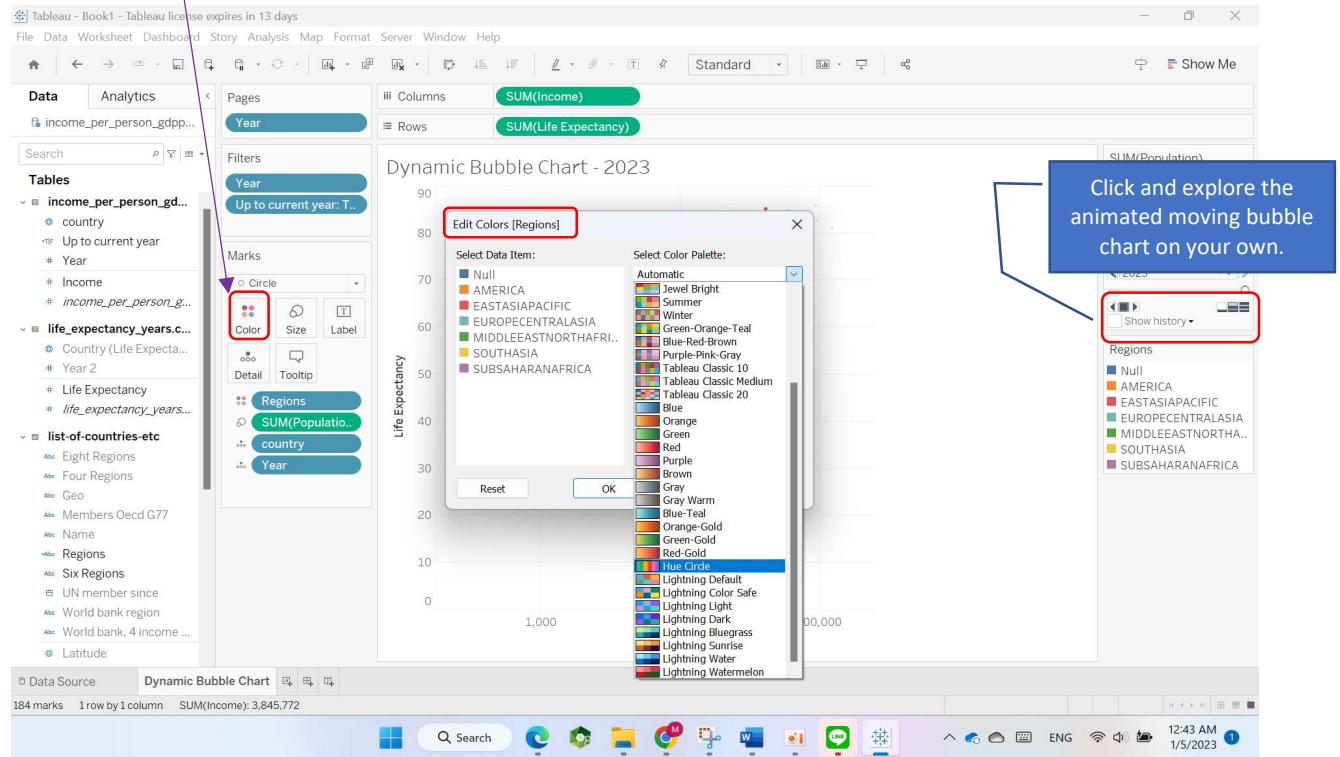


## 28. We will update the chart name (from "Sheet 1" to "Dynamic Bubble Chart").

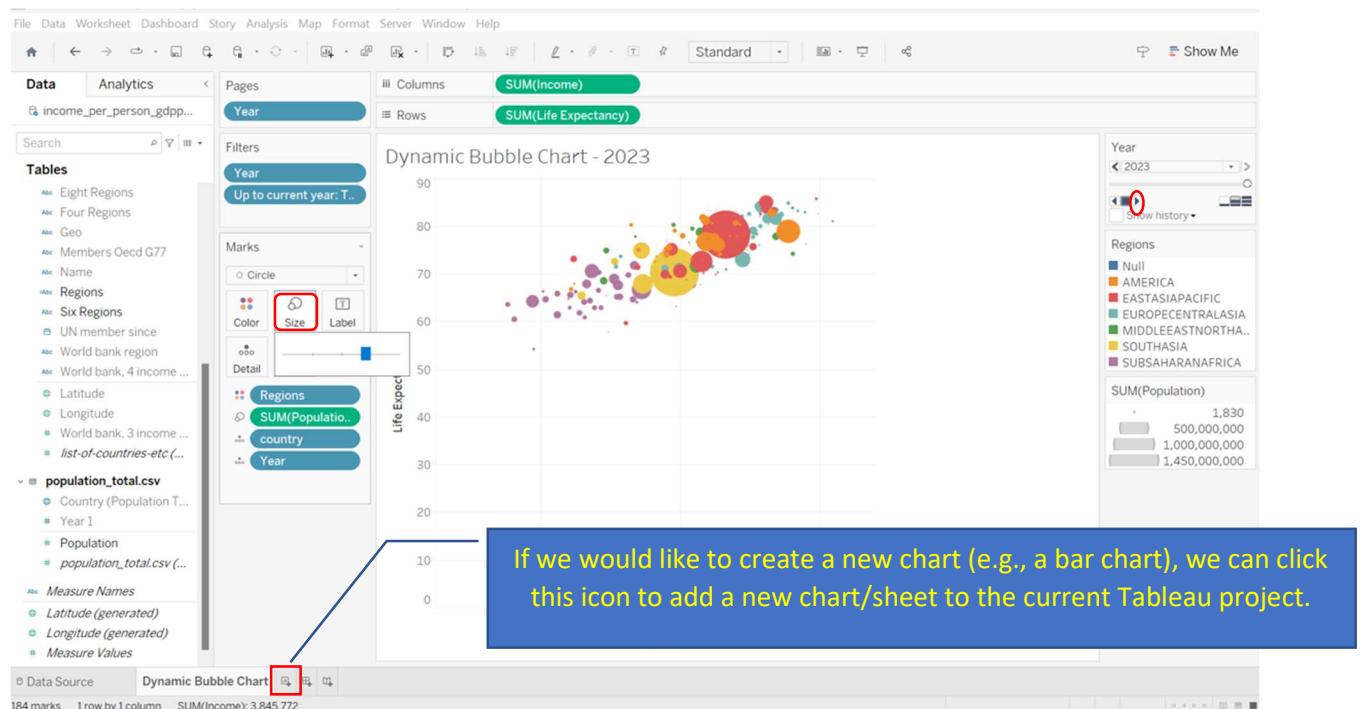


Hint: just click the name of the sheet and we can change its name.

29. We can modify the colors for the aesthetic purposes. Just click Color to Edit colors.

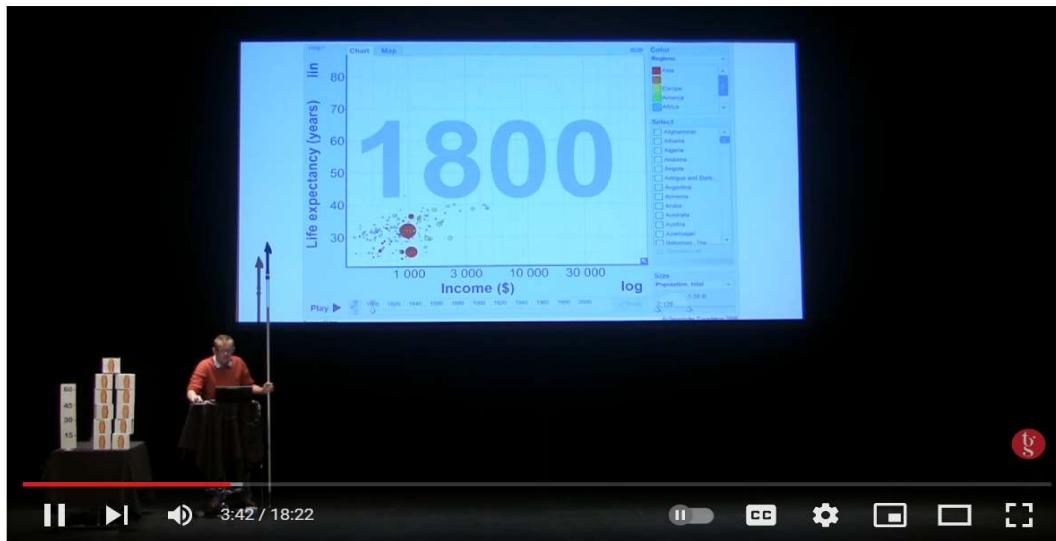


30. We can also click the Size icon to further modify the size of the circles in this bubble chart.



Finally, we are ready to demonstrate an animated moving bubble chart and tell our story by clicking a forward triangle button (see a red circle O shown on the above).

If you wonder how to give an impressive live presentation using the dynamic charts, you might find **Prof. Hans Rosling's** presentation of relevance. Please click the underlined link for a MUST SEE presentation: Please do watch the first four-minute video, and then feel free to briefly scan through the rest of this YouTube video. [https://www.ted.com/talks/hans\\_rosling\\_new\\_insights\\_on\\_poverty?referrer=playlist-the\\_best\\_hans\\_rosling\\_talks\\_yo&autoplay=true](https://www.ted.com/talks/hans_rosling_new_insights_on_poverty?referrer=playlist-the_best_hans_rosling_talks_yo&autoplay=true)



Correlating income and life expectancy throughout history | Hans Rosling | TGS.ORG

## Appendix:

1. Tableau's main functions (e.g., Replacement) could be found online:

<https://help.tableau.com/current/pro/desktop/en-us/functions.htm>

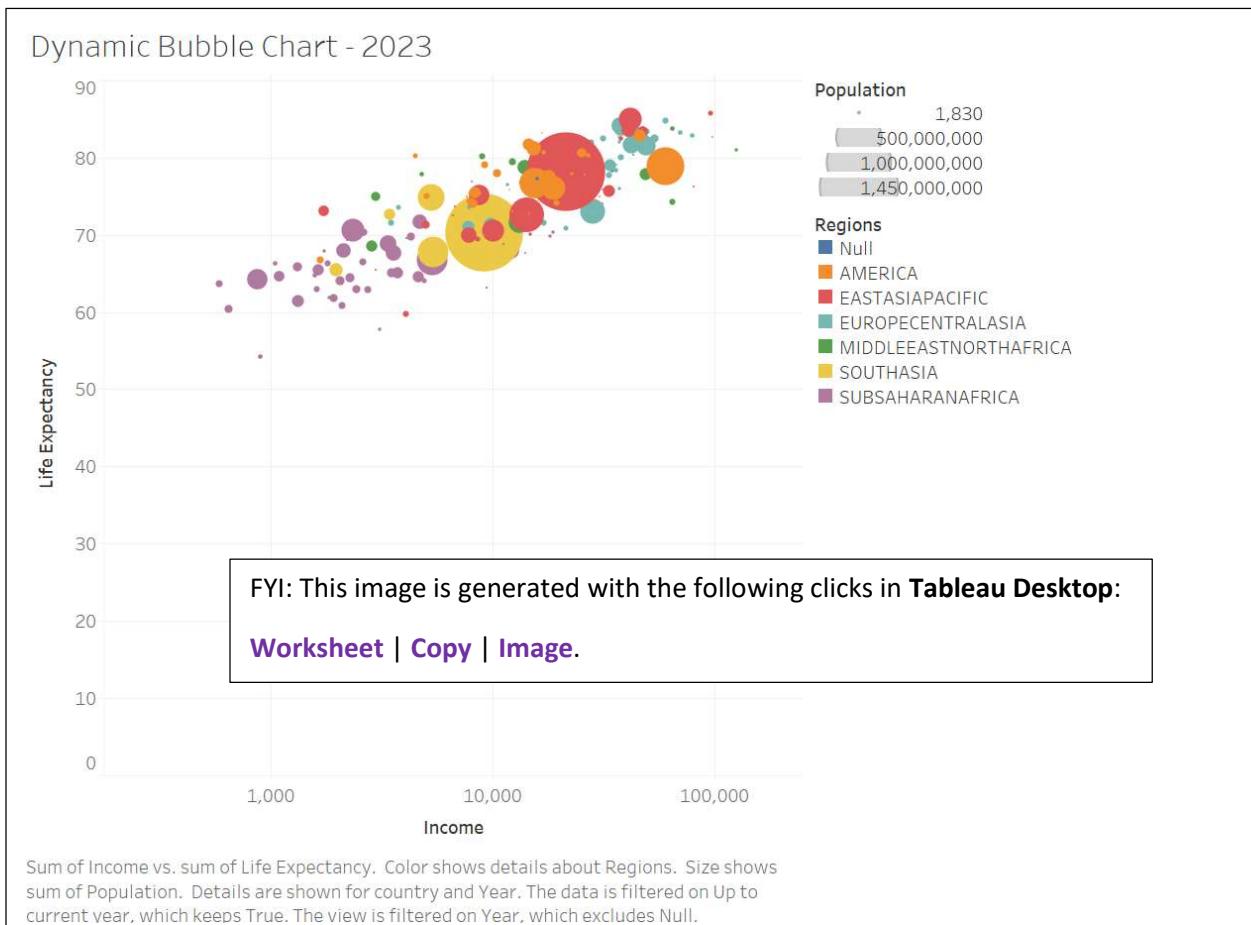
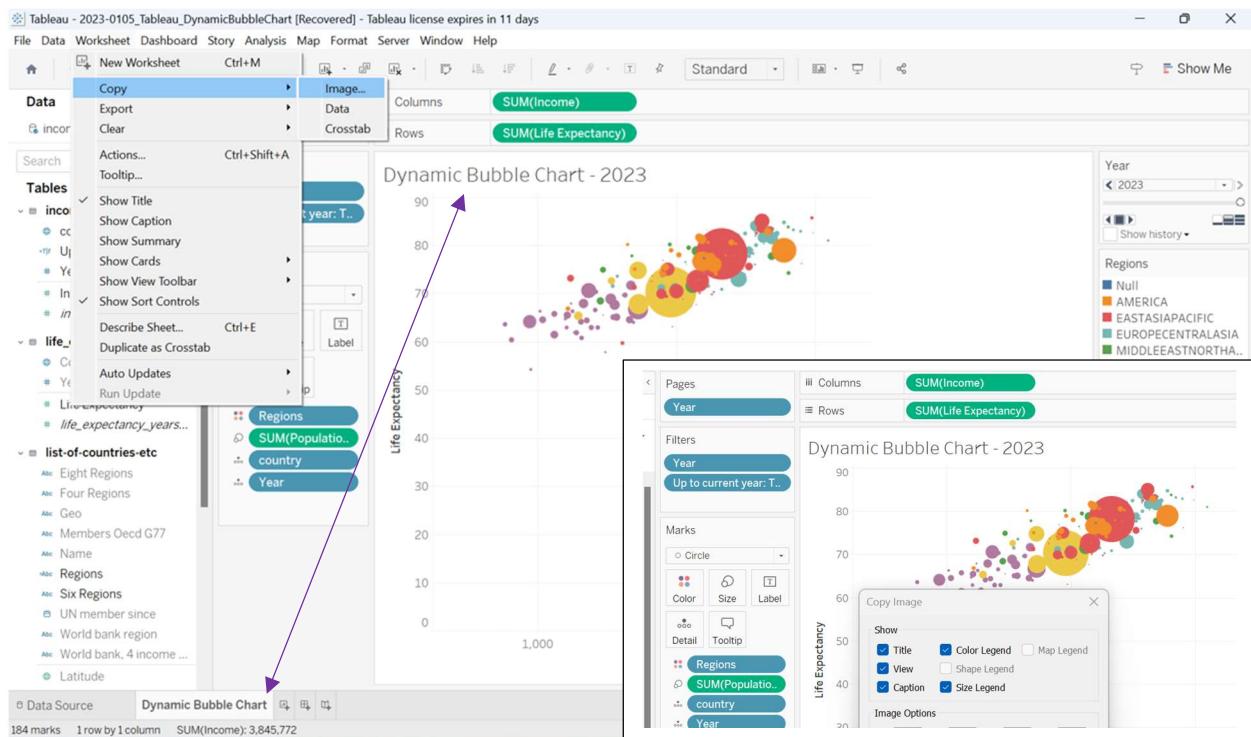
The screenshot shows a web browser displaying the Tableau Help documentation. The URL in the address bar is [https://help.tableau.com/current/pro/desktop/en-us/functions\\_string.htm](https://help.tableau.com/current/pro/desktop/en-us/functions_string.htm). The page title is "String Functions". On the left, there is a navigation sidebar titled "CONTENTS" with various links related to Tableau Desktop and Web Authoring Help. The main content area displays a table for the "REPLACE" function. The table has three columns: the function name ("REPLACE"), its syntax ("REPLACE(string, substring, replacement)"), and a detailed description explaining it searches for a substring and replaces it with a replacement. If the substring is not found, the string is not changed. Below the table, there is an "Example" section with the code: `REPLACE("Version8.5", "8.5", "9.0") = "Version9.0"`.

2. Feel free to Google search for additional Tableau tips (e.g., how to export data from Tableau View onto Excel or a relational database).

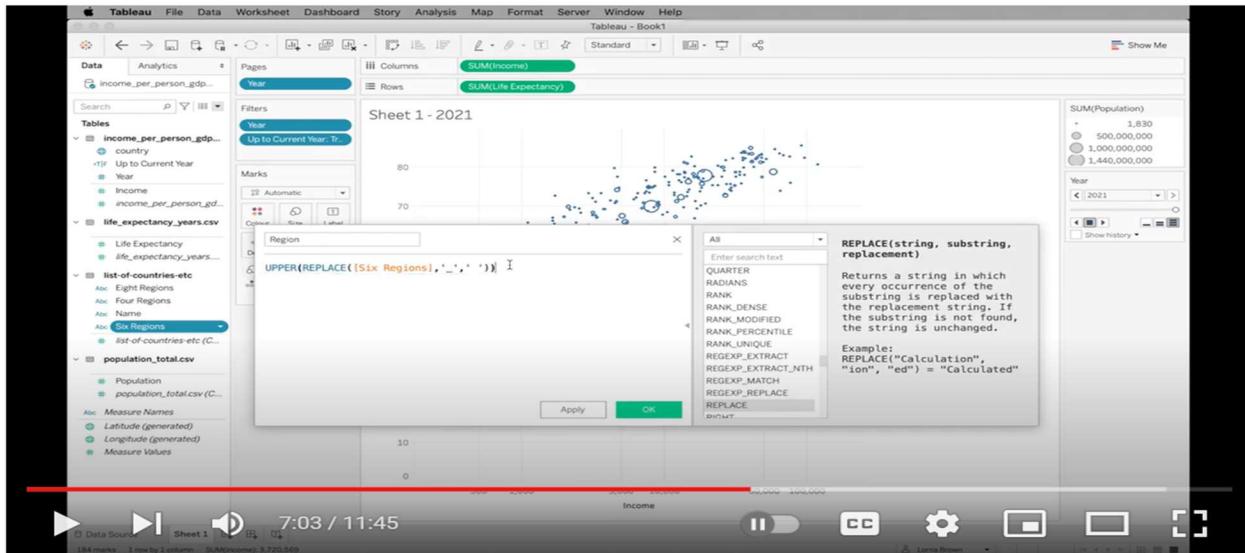
The screenshot shows a blog post titled "5 Quick Ways to Export Data from Tableau View onto Excel" by "BI Connector". The post is dated December 10th, 2021, and has a reading time of 10 Mins Read. It includes a "FYI only" note and a "Table of content" section. The main content discusses five ways to export data from Tableau views to Excel. It includes sections on exporting the underlying data and using hidden containers. A callout box at the bottom right points to "[Tableau Hacks] Saving Dashboard Space With Hidden Containers >>".

### 1. Export the visualization as a Crosstab

There are two methods to export as a crosstab:



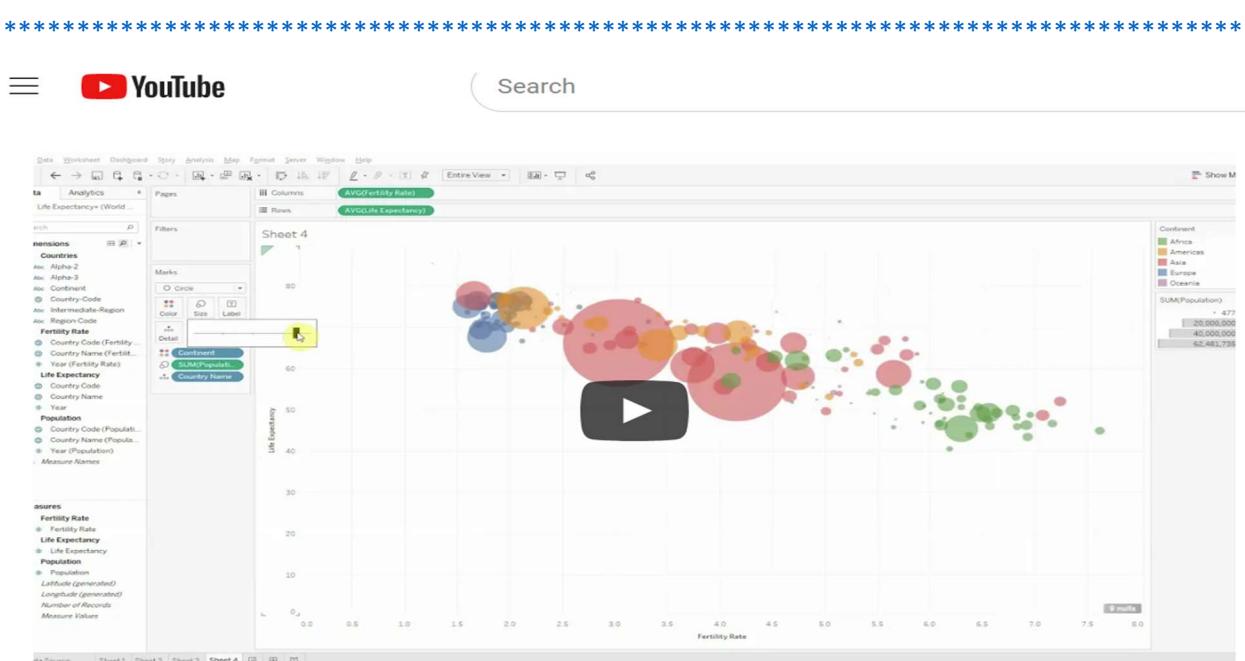
3. If you (the audience) prefer to watch a Tableau bubble chart creation video, you may find the following two YouTube videos of help.



#WOW2021 Week 11 | Tableau : Can you recreate the work of Hans Rosling?

Workout Wednesday  
1.93K subscribers

<https://www.youtube.com/watch?v=LaCprFuwHk>



How to track data evolution over time with Tableau Desktop – Animated Bubble Chart – Skill Pill

<https://www.youtube.com/watch?v=IK6AE3u6LGc>

4. Tableau also offers quite a few training videos (<https://tabsoft.co/3QuMLGp>). Happy learning!

The screenshot shows the Tableau Learning page for 2022.2. At the top, there's a navigation bar with links for Why Tableau, Products, Solutions, Resources, Partners, and Pricing. On the right, there are buttons for SIGN IN, BUY NOW, and TRY NOW. Below the navigation, a search bar is present. The main content area is titled "Free Training Videos" and "2022.2". A section titled "Creator" describes responsibilities for deep data prep and analysis. It lists three video categories: "Getting Started" (9 videos, 20 min), "Tableau Prep" (2 videos, 10 min), and "1 VIDEO". To the right, a sidebar titled "More ways to learn and connect" includes a link to "What's New in Tableau 2022.4" which features short demos of new functionalities.

The screenshot shows a specific video titled "Getting Started: Web Authoring in Tableau Online" by James Pollard, a Learning Experience Designer. The video player interface shows a play button, volume control, and a progress bar at 0.01 / 0.22. To the right of the video, a sidebar titled "CURRENT TOPIC: Getting Started" lists several related topics with their durations: "Getting Started" (1 MIN), "Tableau Cloud" (1 MIN), "Connecting to Data" (2 MIN), "The Workspace Area" (2 MIN), "Map: Profit Ratio by Geography" (2 MIN), "Area Charts: Sales by Category; Sales by Segment" (5 MIN), and "Text Table: Key Performance Indicators" (2 MIN).

5. To learn more about available Tableau programs, check out its Academic Community page:

<https://fabsoft.co/3vOkg4m>

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FEATURED CONTENT

Student Stories

This summer, we reached out to our student community and asked them to tell us about their journey with data, and to see what advice they have for students interested in learning data analytics. And as we head into

7. Explore the Tableau Community (<https://community.tableau.com/s/>). For example, click the Forums and then check the **Tableau Public!**

The screenshot shows the Tableau Community website at <https://community.tableau.com/s/>. The top navigation bar includes links for Why Tableau, Products, Solutions, Resources, and Partners. On the right, there are buttons for PRICING, TRY NOW, LOGIN, and a search icon. The main header says "Community". Below it, a navigation bar has links for Home, My Activity, **Forums** (which is highlighted with a yellow box), Ideas, Groups, Resources, Get Started, and Blogs. A "FORUMS" button is also present. The main content area features a large "Welcome to the Community!" heading. Below it, a message states: "The Tableau Community Forums is a place to get your Tableau questions answered, collaborate with others and a space to help you get the most out of Tableau. We have more than 195k questions and over 450 user groups right here! Welcome to the #DataFam!". There is a "Search for help" input field with a magnifying glass icon. Below it, a message says "Have a Question? Check out our video on how to best ask a question in the Forums" and a blue "ASK A QUESTION" button. A modal window at the bottom encourages users to "Take the Tableau Blueprint Assessment to Start your Year!" with a "TAKE THE ASSESSMENT!" button. The URL in the address bar is <https://community.tableau.com/s/explore-forums>.

The screenshot shows the "Explore Forums" page at <https://community.tableau.com/s/explore-forums>. The top navigation bar is identical to the previous screenshot. The main content area has a heading "Have a Question? Click on a Topic below" and a sub-instruction: "Choose a topic relevant to your question and select "Ask a Question" within the chosen topic." Below this, a red-bordered box contains the text: "New to the Forums? Check out our [First Time Here](#) page for help on how to search for answers and how to best ask questions." A blue box with yellow text "See a text box on page 3." points to the "Tableau Desktop" icon. Another blue box with yellow text "I recommend this one too." points to the "Tableau Prep" icon, which is circled in red. Other topics listed include Tableau Server, Tableau Cloud, Tableau Public (circled in red), Actions & Filters, Server Admin, Licensing, Calculations, Data Connectivity, Dates & Times, Developers & APIs, Installations & Upgrades, Exports & Subscriptions, Maps & Geocoding, and a "View all Topics" link. At the bottom, a blue button says "Browse All Topics →".

**Begin a free trial today at [tableau.com/trial](https://www.tableau.com/trial)**

Tableau Software helps people see and understand data, no matter how big or where it is stored. Quickly connect, combine, clean, visualize, and share your dashboards with a seamless experience from the PC to the Tablet. Create and publish dashboards with automatic data updates, and share them with colleagues, partners, or customers—no programming skills required.

#### **Additional resources**

Training & Tutorials	<a href="https://www.tableau.com/learn/training/20224">https://www.tableau.com/learn/training/20224</a>
Tableau Community	<a href="https://www.tableau.com/community/welcome">https://www.tableau.com/community/welcome</a>
Customer Stories	<a href="https://www.tableau.com/solutions/customers">https://www.tableau.com/solutions/customers</a>
Solutions	<a href="https://www.tableau.com/solutions">https://www.tableau.com/solutions</a>
Buy Tableau	



<https://www.youtube.com/watch?v=xwI2p4LSD1k>

**Acknowledgement:** Special thanks to Prof. Gary H.T. Chao for his constructive comments toward a draft version of this 30-step Tableau Bubble chart learning tutorial.